TOWNSHIP OF CHISHOLM

Asset Management Plan

September 23, 2014

WILLS
PARTNERS IN ENGINEERING

TCL

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Executive Summary

The Township of Chisholm is a rural municipality that has and is anticipated to experience minimal growth. The Asset Management Plan (AMP) was prepared with the intent to sustain and improve the existing inventory of municipal infrastructure consisting of 120 km of roads, 10 bridges, 9 major culverts, 12 vehicles, 3 major buildings and other equipment. The planning period for the AMP is 2014-2023.

The estimated book value of the infrastructure inventory is $28,070,859 (2013) of which over $26 million is for roads, bridges and culverts. The infrastructure deficit is estimated at close to $9 million while the annual requirement to maintain current assets is estimated at $1.3 million (for the period 2013-2022). The municipality has $635,965 in reserves of which approximately $244,000 is specifically targeted to infrastructure. The Township contributions to reserves on an annual basis, but not a sufficient amount to offset the funds required to maintain the capital assets.

The Asset Management Plan provides a detailed inventory of the assets, the current book value to December 2013, an evaluation of the state of infrastructure, recommended improvements and the associated costs for sustaining and improving the existing infrastructure.

The intent of the AMP commits the Township to maintaining prescribed standards for maintenance and repair and trigger mechanisms for initiating capital improvement activities. The standards are set out in Appendix 2 as the Level of Service.

The assets will be maintained through a financial strategy that will increase the capital funds available through a gradual increase in the budget allocations to be directed to capital reserves coupled with debt financing and the use of senior level of funding where available.

The AMP targets to replace vehicles, machinery, equipment and buildings at the end of their respective useful life. The strategy for roads, bridges and culverts will be to gradually improve the condition of these assets by addressing current deficiencies and to provide an enhanced program of ongoing maintenance and repair.

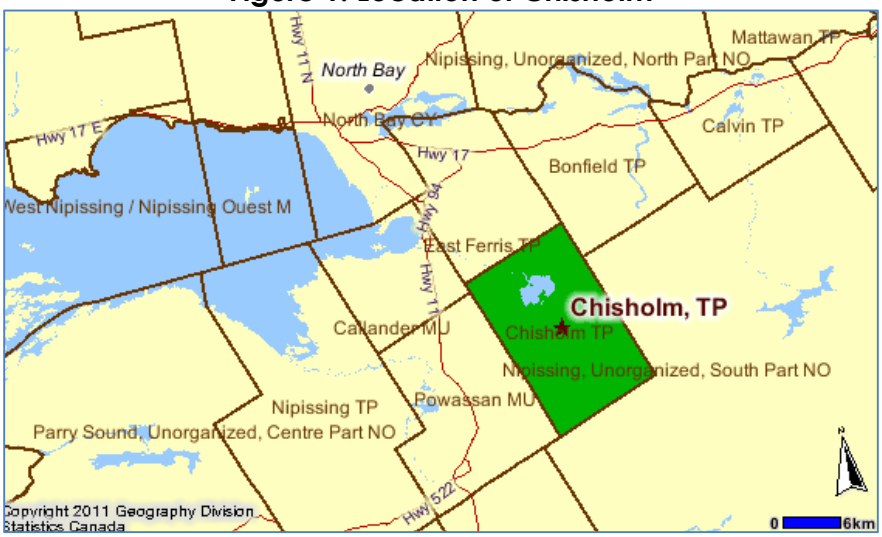
The Township of Chisholm wishes to acknowledge the support of the Ministry of Agriculture, Food and Rural Affairs (OMAFRA) in its financial support for development of the Asset Management Plan. The views expressed throughout the Asset Management Plan represent those of the Township of Chisholm and do not necessarily reflect those of OMAFRA.

Introduction

1.1 Location of Chisholm

The Township of Chisholm is located southeast of the City of North Bay in the District of Nipissing. The Township is rural and there are no urban settlement areas within the Township. A map showing the location of Chisholm is located below.[1]

Figure 1: Location of Chisholm



1.2 Population

The population of Chisholm is relatively stable with no significant growth expected over the next census period (see **Table 1.2**).

Table 1.2 : Population Change[2]

2011 Population	1,263
2006 Population	1,318
2001 Population	1,230
2006-2011 Population Change (%)	-4.2
2001-2006 Population Change (%)	7.2
2001-2011 Population Change (%)	2.68

[1] Statistics Canada, *GeoSearch 2011 Census: Statistics Canada Catalogue no. 92-142-XWE* (Ottawa: Statistics Canada, 2012). Retrieved October 11, 2013 from http://geodepot.statcan.gc.ca/GeoSearch2011-GeoRecherche2011/GeoSearch2011-GeoRecherche2011.jsp?lang=E&otherLang=F

[2] Statistics Canada, *Chisholm Ontario (Code 3548031) 2006 Community Profiles, 2006 Census – Catalogue no. 92-591-XWE* (Ottawa: Statistics Canada, March 13, 2007). Retrieved October 11, 2013 from http://www12.statcan.gc.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E

1.3 Purpose of an Asset Management Plan

The quality of life residents enjoy is directly related to the condition of municipal infrastructure. All taxpayers and residents are in fact, shareholders of the assets that make up municipal infrastructure and therefore have an interest in how they are maintained. Asset management planning allows municipalities to inventory and assess the condition of their assets and plan for their long-term maintenance and replacement. The Province has mandated the preparation of asset management plans as a prerequisite to seeking provincial capital funding. This Asset Management Plan will aid the municipality in making appropriate financial decisions and investments as part of its annual municipal budget decisions. Financial planning will require municipalities to examine a full range of financing and revenue generation tools including user fees.

This Asset Management Plan is to serve as a guidance document for the municipality's use in developing its annual budgets and long-range financing requirements as well as in the development of tax levy rates, and other related revenue generators. This plan is not intended to replace normal budgeting procedures but rather to support budgeting decisions and assist in ensuring the long-term viability and financing of the Municipality's largest and most valuable (expensive) assets.

Well-maintained infrastructure is important to the growth and development of the municipality as set out in the vision and policies of the Municipality's official plan.

The Official Plan's vision is based on a quality of life that is created in part "*by the quality of the natural environment, the people, the agricultural and rural areas, the open scenic countryside, woodland areas, lakes and rivers. Chisholm is also distinguished by its unique landforms and rich history that in part is founded upon agriculture and resource industries. Chisholm also views itself as an independent and self-sufficient community.*"[3] It is the intent of the Official Plan to encourage development that is compatible with the character, role and permitted uses of agricultural and rural areas, as well as to promote the continued functioning of natural systems. It is the intent that the rural pattern of large land holdings and rural landscapes be maintained. The Official Plan "*assumes that the high quality of life now enjoyed by the Township's residents can be maintained and enhanced if the Township's rural, natural character is maintained.*" [4] An example of a financial policy in the official plan indicates Council's intent to carefully control capital expenditures on infrastructure: D2.1 (Transportation – Objectives): "To reduce the financial burden of road maintenance upon the general taxpayer by ensuring heavy users of local roadways share in maintenance costs."

[3] Township of Chisholm, *Official Plan of the Township of Chisholm* (Chisholm: Township of Chisholm, 2013), p. 3.
[4] Ibid

Good roads and bridges facilitate the movement of goods, the provision of services, notably emergency services and the transportation of people to work, school, recreation and other facilities. Good roads are essential to attracting economic development in the transport of commodities to market or providing access to tourism and other amenities the municipality has to offer.

The state of local infrastructure also reflects on the image of the municipality to its residents and visitors. Poorly maintained infrastructure conjures a negative image and may detract from investment in the municipality as people question the value for money they receive in the poor quality services.

This Asset Management Plan appropriately focuses on those assets of the municipality that represent the greatest financial demand on the municipality and its residents. The following asset categories are included in this Asset Management Plan for the Township of Chisholm:

- Roads
- Bridges
- Buildings
- Equipment

The Asset Management Plan for the Township of Chisholm is intended to cover the period 2014-2023. The document will be used as a working tool for capital expenditure decisions on an ongoing basis, particularly in the preparation of the municipal capital budget using spreadsheets to update the pattern of capital expenditures. The Plan identifies key expenditures that are anticipated in each year of the 10-year period of the Plan.

1.4 Approach

The development of the Asset Management Plan builds on the policies and practices of the Township such as:

- PSAB 3150 Inventory
- Tangible Capital Asset Policy
- Roadway Service Standards By-law (2002-30)
- Roads Needs Study (2010)
- Pooled assets starting at $25,000 and individual asset values of $5,000
- General financial policies of the municipality
- Current practices and technologies used in management and maintenance of capital assets

The steps used in developing this Asset Management Plan are summarized in **Figure 2** on the following page. The process was intended to be broad enough to capture the essential ingredients of asset management planning to ensure that the Township benefits from the experience of others, while developing a plan that is best suited to local needs.

Development of the plan followed the framework provided by the Ministry of Infrastructure document, Building Together Guide for Municipal Asset Management Plans. Phases 1a-1d are components of the State of Infrastructure Report; Phases 2a-2b comprises the Desired Level of Services; while Phases 3a-3c are the components of the Asset Management Strategy/Financing Strategy.


Figure 2 - ASSET MANAGEMENT PROCESS
Phase 1a: Confirmed inventory of municipal assets and classify sub-types (i.e. roads, bridges, utilties, equipment, buildings etc.)
Phase 1b: Determined/confirmed curret book value of assets
Phase 1c: Determined overall asset condition and estimated remaining useful life of assets
Phase 1 d: Calculated replacement cost (valuation) considering inflation, amortization
Phase 2a: Established levels of service & performance measures and options for repair and maintenance of assets (risk analaysis)
Phase 2b: Established corporate financial management policies for capital and operational budgeting (debt, user fees, property tax levies)
Phase 3 a: Developed financial model (minimum 10 years) to project capital and operation expenditures for repair, maintenance and replacement of assets
Phase 3b: Conducted consultation sessions with municipal staff
Phase 3c: Prepared Asset Management Plan and Financing Strategy per provincial protocols

Phase 1

Phase1 of the work program involved a review of the infrastructure and assets including but not limited to:

- A start-up meeting with representatives of the Township.
- Classification of asset types (e.g. roads, bridges, municipal buildings, rolling stock, recreational facilities and equipment, etc.).
- Asset valuation based on financial accounting valuation and/or replacement cost valuation depending on the method used by the Township. Reference is made to the PSAB 3150 or comparable information. Net book values were updated with consideration for amortization rates, capital improvements and inflation using a spread sheet analysis.
- Asset age and expected useful life of the asset.
- Asset condition determined by such criteria as "good", "fair" or "poor" or as per MTO protocols for roads and bridge structures as determined from bridge reports and the Road Needs Study.
- Inventory included proposals for new acquisitions.

Phase 2

Phase 2 of the work program focused on establishing the desired Levels of Service.

Specifically:

- A review of current performance standards and practices in the Township.
- Compliance or lack thereof with regulatory requirements.
- Establishing performance standards, targets and timeframes where they do not exist.
- Establishing the useful life in the context of a planning period. The overall planning period is in the order of 20 years (minimum 10 years).
- Provisions for monitoring.
- Review of the current financial strategies for maintenance and replacement of capital assets.
- Comparisons or take advantage of best practices used by other municipalities.
- Creating a desired Level of Service for each of the asset groups based on best management practices and comparative municipal practices in Ontario

Phase 3

Phase 3 of the work program involved the design and establishment of a financial model for the Township that provided a financial strategy for Council to implement as part of the municipal budgeting process. The model indicates the cost implications for the maintenance and ongoing upgrades, improvements and/or replacement of assets over the planning period.

The output of the third phase was the preparation of an Asset Management Strategy replete with a corresponding financial strategy. The Strategy outlines the measures required to maintain, improve or add to the inventory (new assets) of infrastructure and where necessary, to examine options or trade-offs where municipal financial constraints may limit achieving the desired levels of service or performance targets. The associated financing strategy focuses on the following components:

- Yearly expenditure forecasts for capital planning that addresses maintenance, renewal or rehabilitation, replacement of assets as required, disposal, if required and the addition of new assets.
- Sources of financing.
- Alternative scenarios where appropriate and the correlation of funding (revenue) sources to capital expenditures.

To ensure the consistent evaluation of assets, the inventory assessments were completed in accordance with the most current editions of the Inventory Manual for Municipal Roads and the Ontario Structure Inspection Manual, in the case of roads and bridges. The Asset Management Plan gives the Township an understanding of the current condition of the infrastructure assets; the current 'value' for accounting purposes and the rehabilitation requirements of these assets. In addition, an understanding of the period for rehabilitation with a priorities listing is provided.

The completed infrastructure assessments enables the Township to protect and prolong the useful life of its infrastructure, identify maintenance, repair and rehabilitation needs and provide a basis for a management system for the planning and funding of the necessary maintenance and rehabilitation of each system, in accordance with Ministry of Infrastructure (MOE) requirements.

State of Local Infrastructure

The following primary assets are included in this asset management plan:

Roads
Bridges
Buildings
Equipment

A summary of the Municipality's primary assets are illustrated in **Figure 3** below.

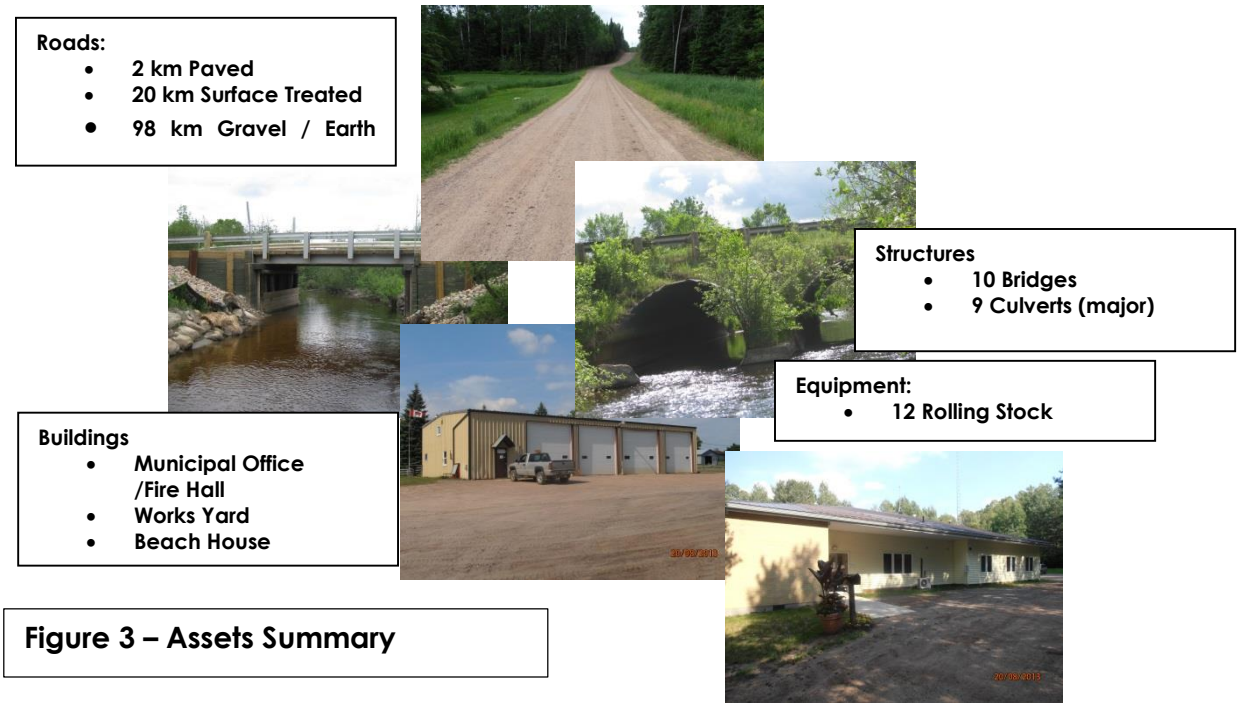


Figure 3 – Assets Summary

1.5 Roads

Given the importance of having relevant and up-to-date data to support the asset management plan, Wills undertook a Road Needs Study review to update previous documentation, from 2009, with the goal of identifying the current state of the local road infrastructure.

The Township's complete road infrastructure system spans a total of approximately 120 km primarily within a rural setting. The road network includes surfaces ranging from gravel to high class bituminous (HCB) (asphalt). The Township has approximately 98 km of earth/gravel roads, 20 km of surface treated roads (low class bituminous (LCB)), and 2 km of asphalt paved roads (HCB), as summarized in **Table 1.5** on page 10.

Table 1.5: Road System Attributes

Township of Chisholm Road System in Kilometers as of June 2013		
A.	**Surface Type**	
		Totals*
	Earth	
	Gravel (Loose Top Gravel)	98
	Low Class Bituminous (LCB)	20
	Hot Mix (HCB)	2
	Total A	**120**
B.	**Roadside Environment**	
(i)	**Rural**	
	Earth	
	Gravel	98
	LCB	20
	HCB	2
	Total Rural	**120 km**
(ii)	**Semi-Urban**	
	Gravel	0
	LCB	0
	HCB	0
	Total Semi-Urban	**0 km**
(iii)	**Urban**	
	Gravel	0
	LCB	0
	HCB	0
	Total Urban	**0 km**
	Totals B	**120 km**
*Estimated to the nearest kilometer.		

A. Current State of Road Infrastructure

An overall road system adequacy, in accordance with the MTO Inventory Manual for Municipal Roads, has been calculated based on a number of road characteristics including:

- Capacity
- Geometrics
- Surface Condition
- Shoulder and Road Widths
- Structural Adequacy
- Drainage
- Maintenance Demand

The evaluation of the roads is set out in **Table 1 - Appendix 3 – State of Local Infrastructure**

The overall system adequacy for the 2013 Road Needs Study is 37%. Stated another way, 63% of the Township's roads have at least one element identified as deficient. It is important to note however that a significant portion of the roads identified as deficient are such due to inadequate surface widths; their overall structural adequacy and surface condition generally being good. **The adjusted adequacy rating, excluding surface width deficient roads, is 76%.**

B. Capital Improvements for Roads

Prioritization and recommendations for planned capital improvements have been developed based on condition rating and traffic demands on each road. Those roads identified in **Appendix 3** as having a "NOW" or "1-5" year capital reconstruction requirement (with the exception of drainage improvements) have been included in the 5-year capital requirement.

The total length of approximately 40 km of road was identified for capital reconstruction works at an estimated cost of $ 10.3 M. If roads that are identified as deficient strictly from a surface width perspective are excluded from this list, the remaining estimated capital reconstruction cost is $ 8.6 M.

C. Resurfacing

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

A. Surface Treated Roads:

- 20 km in the existing inventory of surface treated roads (LCB)
- Degradation rate 0.625 km/year (rating drops from "10" to "5" over a 8 year period)
- Annual Resurfacing target of 2.5 km/year
- Annual Budget of $70,000 (2.5 km/yr. x $28,000/km **ST2***) for resurfacing
  ***ST2 – Double Surface Treatment**

B. Hot Mix (Paved) Roads:

- 2 km in the existing inventory of paved roads (Asphalt)
- Degradation rate 0.25 km/year (rating drops from "10" to "5" over a 20 year period)
- Annual Resurfacing target of 100 m /year
- Annual Budget $26,400 (0.1 km/yr. x $132,000/ln **RMP1*** x 2 lanes) for resurfacing
  ***RMP1- Resurfacing, Mill and Pave 1 Lift**

Gravel roads require regular maintenance. Maintenance includes regular grading and reapplication of new gravel. Application of 75mm of new gravel is recommended every 3-5 years for all gravel roads.

C. Gravel Roads:

- 98 km in the existing inventory of earth/gravel roads
- 75mm gravel every 3 -5 years
- Annual Gravelling of 20 - 33 km/year
- Granular A ($25,000/ km)
- Annual Budget $ 500,000 (20 km/yr.* x $25,000/km **G**)** for gravelling

*Based on a 5-year gravel resurfacing cycle.
** Cost based on supply and application of gravel by external forces.

The total resurfacing program, (hot mix, surface treatment and gravel) is estimated at $596,400 per year (2013$), or approximately $2,982,000 over a 5-year period. A 5-year resurfacing strategy has been developed based on this target. While the focus for road-related capital expenditures is on a five-year period, the program should be continued on for the period of the asset management plan (i.e. 10 years).

It is recommended that an assessment of the road network be undertaken during the "spring break-up" period to further assess the structural adequacy of the roads and identify those locations where the road base is suspect and causing deterioration/ distress of the overlying surface.

Further, it is recommended that regular ongoing maintenance in the form of roadside ditch cleanout and clearing be undertaken in order to extend the useful service life of the existing roads. A commitment of resources is necessary to ensure a viable annual ditching and clearing program. Both activities are considered to be two of the least expensive and most beneficial preventative maintenance activities to facilitate realizing the full pavement service life.

Similarly, a preventative maintenance program of crack sealing for hard top roads e.g. rout and seal (asphalt) or slurry seal (surface treatment), is recommended to ensure the useful service life is realized for each road. Regular grading of gravel roads is required.

1.6 Bridges

The Municipality's Bridge network was most recently inspected in 2013 as part of the Township's regular biennial OSIM inspections.

Based on the condition assessment of each structure, a five-year structures work plan was developed for the Township with the goal of maintaining their current bridge network asset. A summary of the work activities and estimated reinvestment costs are provided in **Table 1.6A** on page 13.

Table 1.6A: Bridge Inventory/Needs Summary

Township of Chisholm - Inspection Summary Report - Bridge Needs

Structure No.	Structure Type	Span (m)	2012 OSIM Inspection Comments	Recommended Works (1-5 Years)	Priority (Year)	Estimated Cost	Year Built	Deck Area m2	Culvert Size Dia.	Culvert Size Length	Estimated Service Life	Replacement Cost	Estimated Replacement Year
BRIDGES													
001 - South Shore Road Bridge	Steel I-Beam, Wood Deck	7.4	All elements in good condition				2011	36			50	$180,000	2061
002 - Depot Creek Bridge	Concrete Rigid Frame	7.6	Good condition with minor localized corrosion of the base plates Steel bean guide rail at northwest is damaged and posts are broken for length of 6m				1989	82			50	$451,000	2039
004 - River Road Bridge	Timber Frame, Timber Cribs	10.9	Medium splits and localized rotting. The steel pipe railing is under designed and bent at one location Medium splits and localized rotting. Light to medium splits and localized Transverse laminated timber deck Transverse laminated timber deck Broken planks and splits Medium splits and localized rotting.	Review for New Barrier / Guiderail System	2013	$20,000.00	1930	123			20	$430,500	1950
005 - Beach Road Bridge	Bailey Panel, Wood Deck	24.4	Minor accident damage at northwest				2003	158			50	$553,000	2053
006 - Memorial Park Road Bridge	Timber Frame, Concrete Deck	8.8	Minor surface weathering noted Road gravel on deck surface Height represents portion of pile above water surface				1985	120			20	$420,000	2005
009 - West Golf Course Road Bridg	Timber Frame	14.2	Wide to medium splits on the piles Pipe railing is under designed and Wide splits on south exterior pile.	Misc. Timber Repairs and Review for New Barrier / Guiderail System	2013	$37,500.00	1960	84			20	$294,000	1980
010 - Wasing Road Bridge	Concrete T-Beam	8.5	Severe mortar loss at east abutment Severe scaling, spall and Deck top covered in gravel	Mortar Repair on Abutments and Review for New Barrier / Guiderail System	2014	$24,000.00	1919	43			50	$215,000	1969
013 - Memorial Park Road Bridge	Steel I-Beam	14.4	All elements in good condition				2009	101			50	$505,000	2059
016 - Pioneer Road Bridge	Steel I-Beam	14.3	All elements in good condition				2008	73			50	$365,000	2058
020 - Memorial Park Road Bridge	Timber Frame, Timber Deck	4.5	Wide split on pier cap and lagging wood. Severe rotting Splits, rotting and section loss Severe rotting and section loss	Misc. Timber Reparis and review for New Barrier / Guiderail System	2013	$35,000.00	1970	32			20	$112,000	1990 0 0 0
CULVERTS													0
003 - Village Road Culvert	Steel Arch	7.8	Section loss and full perforations for 9m length of south barrel and 4.5m length of north barrel	Replace	2015	$225,000.00	1970	182	7.8	23.3	20	$145,392	1990
007 - Chiswick Line Culvert	Steel Arch	4	Light corrosion at the water line. Majority of structure submerged, could not be inspected Should consider installation of guide	Review for New Barrier / Guiderail System	2016	$10,000.00	2001	69	4	17.2	20	$55,040	2021
008 - Chiswick Line Culvert	Steel Arch	4.5	Minor corrosion at the water level. Most of culvert submerged. Limited Inspection only. Should consider installation of guide rail over structure	Review for New Barrier / Guiderail System	2016	$10,000.00	1980	77	4.5	17.2	20	$61,920	2000
011 - River Road Culvert	Steel Round	6.6	Light corrosion at the water line and minor separation at the joints Should consider installation of guide rail over structure	Review for New Barrier / Guiderail System	2016	$10,000.00	1999	139	6.6	21	20	$110,880	2019 0
012 - Grahamville Road Culvert	Steel Arch	5.6	Light corrosion at the water line				1980	116	5.6	20.7	20	$92,736	2000
014A - Wasing Road Culvert	Steel Round	1.7	Corrosion at the water line and deformation of the obvert	Replace	2016	$30,000.00	1970	21	1.7	12.5	20	$17,000	1990
014B - Maple Road Culvert	Steel Round	2.6	Minor corrosion at water line				2002	33	2.6	12.5	20	$26,000	2022
014C - Maple Road Culvert	Steel Round	2.1	Minor corrosion at water line				1980	26	2.1	12.5	20	$21,000	2000
015 - Chiswick Line Culvert	Steel Round	3.6	Should consider installation of guide rail over structure	Review for New Barrier / Guiderail System	2016	$10,000.00	1999	78	3.6	21.8	20	$62,784	2019
			Total Reinvestment Cost to Maintain Bridge Asset			**$411,500.00**						**Total Replacement Cost**	**$4,118,252.00**

Bridge replacement costs are estimated and noted in the preceding table with the expected service life and associated estimated replacement year. Bridge replacement costs are developed based on unit rates per square meter of deck for various structure types, see **Table 1.6B** below. The total replacement value of the bridge network is approximately $4.1 M.

Table 1.6B: Bridge Replacement Unit Rates

Bridge Type	Span Category	Useful Life (years)	Replacement Cost ($ / Sq. m)
Bridge – Concrete Rigid Frame	3m to 7m	50	$5,500
Bridge - Girder	7m to 15m	50	$5,000
	15m to 25m	50	$4,750
	25m to 40m	50	$4,500
Bridge - Steel Truss	10m to 30m	50	$3,500
Bridge – Timber	10m to 30m	20	$3,500
Culvert - Concrete Box (<3m fill)	3.0m to 5.0m	50	$1,050
Culvert - Concrete Box (>3m fill)	3.0m to 5.0m	50	$1,500
Culvert – Metal Pipe Arch (<3m fill)	3.0m to 4.0m	20	$800
Culvert - Metal Pipe Arch (>3m fill)	3.0m to 4.0m	20	$1,250

A total reinvestment cost to maintain the current bridge asset is estimated at $411,500 over the next 5-year period. The 5-year plan should be revisited after each mandated biennial structure inspection (OSIM) and updated every two years. In some cases, through preventative maintenance or rehabilitation activities, structures have outlived their expected useful service life i.e. the tangible capital asset amortization rates.

The reinvestment costs are intended to maintain the bridge network asset in their current state and represent near term expenditures while the replacement costs and estimated replacement year are included to facilitate long-range financing plans.

1.7 Buildings

A visual assessment of all municipal buildings was undertaken in support of development of the Asset Management Plan (AMP). The primary purpose of the assessment was to confirm the previously stated replacement values (PSAB values), based on type of building and construction material, to ensure the AMP provides sufficient funds for future replacement.

A secondary goal of the visual inspection was to confirm any immediate (within the next 5-10 years) major capital improvements necessary e.g. new roof, foundation repairs, etc. Building equipment i.e. HVAC, and interior finishes/fixtures were not considered as part of the review.

A summary of the Municipalities buildings inventory is provided in **Table 1.7** below.

Table 1.7: Buildings Inventory/Needs Summary

Asset ID	Township of Chisholm - Buildings Inventory & Condition Assessment											
	Asset	**Location**	**Year built**	**Size**	**Sq. Ft.**	**Cost / Sq. Ft.**	**Comments on Condition**	**Capital Requirement**	**Useful Life**	**Original cost (PSAB 2012)**	**2012 Replacement Cost (PSAB)**	**Updated Replacement Cost (2013)**
	Public Works Building	2373 Chiswick Line	1978	40'x80	3280	$200	Steel siding: fair, steel roof: fair, insulated steel OH doors: good, vinyl windows: good, steel doors: fair		50	$32,825.00	$130,000.00	$656,000.00
	Municipal Office / Fire Hall	2847 Chiswick Line	1989	60'x90'	4800	$105	Vinyl siding: fair, alum soffit: good, alum doors: good, vinyl windows: good, steel roof: good, metal doors (east): good. No basement.		60	$40,901.00	$70,000.00	$504,960.00
			2010*							$57,415.00		
			2011*							$25,723.00		
	Municipal Fire Hall	2847 Chiswick Line	1987	48' x 13'	624	$200	Addition		60	$45,774.00	$90,000.00	$124,800.00
			2010*							$41,650.00		
			2011*							$71,570.00		
	Public Works Storage Shed	2373 Chiswick Line	2008	44'x24'	1056	$20	Galvinized steel (walls and roof), concrete bins, all good		50	$14,500.00	$14,500.00	$21,120.00
	Public Works Tarp Shed	2373 Chiswick Line	2012	40'x18'	720	N/A	Good Condition		15	N/A		
	Beach Road Recreational Cabin		Unknown	23'x34'	782	$20	Shingle roof: poor (replace in 5 years), steel roof: fair, alum siding: poor, wood soffit: poor, steel roof: fair	Replace roof within 5 years.	60	N/A		$15,640.00

In general, the municipality's buildings are in fair to good condition with limited capital requirements envisioned over the next 10 years. Visual inspections did identify a poor roof condition rating for the Beach Road Recreational Cabin; however, the cabin currently has no reportable value under the Municipality's Tangible Capital Asset reporting.

The following generic building costs were assumed to confirm the appropriate replacement values for use in the Asset Management Plan:

Building Construction Costs (Estimated)	
Description	Cost per Square Ft.
Conventional Stud Frame (House Style)	$105
Metal Clad, Steel Frame (non-finished)	$20
Metal Clad, Steel Frame (finished, insulated)	$200

Based on the above estimated values it is noted that the Replacement Cost for the existing Municipal Office/Fire Hall Building is currently stated at $160,000 total. The original cost plus recent costs to upgrade are in fact in excess of $160,000. An updated replacement value of $504,960 (or $105.20/ft.^{2}) has been assigned to the Municipal Office complex.

1.8 Vehicles

The municipality owns a fleet of equipment generally dedicated to public works and emergency services functions. A listing of the fleet is included in **Table 1.8** below.

Table 1.8: Vehicles Inventory

	In Service Year	Estimated Life Span (Years)	Estimated Replacement Year	Estimated Replacement Cost (Jan 1 2013)
Public Works				
Volvo Truck, Model 64T	2000	10	2020	$ 166,476
Mack Truck, CV-713	2003	10	2015	$182,918
Loader Backhoe, Model BL70	2004	10	2018	$164,488
GMC Sierra SL, Long Box	2006	5	2014	$36,281
Ford Ranger	2009	5	2014	$22,363
International	2012	10	2022	$179,077
Grader	2012	15	2027	$265,673
Fire				
Ford Tanker	2003	15	2018	23,602
Dodge Ram Pick-up	2006	5	2020	$5,309
1992 Spartan Quality Fire Truck	2011	15	2027	$54,910
Total Expenditures				
Total Value of Vehicles				$1,101,097

A detailed review of each vehicle was not undertaken as part of the state of local infrastructure review. For the purpose of this Asset Management Plan, generally accepted accounting principles, with respect to depreciation of equipment, will be applied in developing the fiscal plan for replacement of the Municipalities vehicle assets. Stated another way, the municipality shall endeavor to plan for replacement of its vehicles once their respective useful service lives have been realized.

Levels of Service

The Township of Chisholm adopted standards from ONTARIO REGULATION 239/02, MINIMUM MAINTENANCE STANDARDS FOR MUNICIPAL HIGHWAYS in By-law 2002-30 to guide the program for the maintenance of roads, bridges and related facilities in the Township. **Appendix 2** sets out a modified version of the standards and extends the levels of service to buildings and equipment with the intent of addressing the entire infrastructure classes in this asset management plan.

The Level of Service provides a comprehensive approach to the maintenance of municipal infrastructure by setting out the objectives to be achieved and level of service standards for each class of infrastructure (e.g. roads, bridges, safety devices, municipal equipment and buildings).

Levels of service provide a measuring stick to ensure that municipal infrastructure is maintained to a standard that protects the municipal investment and sustains or prolongs the life of bridges, roads, buildings, equipment and other infrastructure. By establishing a level of service, the municipality will be able to identify the condition of all infrastructure on an ongoing basis and undertake measures to repair, upgrade or better all municipal assets over their lifespan. The intent of establishing levels of service is to also ensure that regulatory requirements are also met, notably, the minimum maintenance standards for municipal highways (Ontario Regulation 239/02).

The levels of service set out a written series of procedures that will guide Council in making financial decisions designed to maintain all of the municipality's capital assets to the level appropriate for the municipality given its relative priorities and minimum legislated requirements. The service level standards will ensure the delivery of a quality level of services and an appropriate measure of accountability to municipal taxpayers.

The levels of service are organized by the type of asset or infrastructure and a series of objectives to be achieved through adherence to specific standards or levels of service. In a rural township municipality, the most significant assets are roads and bridges as they are crucial to the conveyance of people and goods and services. Council has taken measures to improve the condition of the road network through better ditching, brushing, graveling and grading; however, careful capital programming will be required to sustain the road system over the coming years. Performance targets require the municipality to maintain capital assets by undertaking repairs immediately or on an as needed basis where required and by ditching, brushing and resurfacing roads on a regular cycle. Council will endeavour to provide adequate funding of road and bridge improvements to replace these facilities within their prescribed lifespan.

Some bridge structures have been replaced with culverts to reduce maintenance costs while extending the lifespan of these water crossings. The municipality will continue to have bridge and culvert structures inspected by a professional engineer once every two years, followed by the implementation of the recommended program for repairing and upgrading these structures.

The Municipality maintains an inventory of municipal buildings, rolling stock and equipment. Extending the lifespan of these assets requires a program of regular maintenance and retrofitting. For buildings, the program includes regular servicing of the HVAC system and retrofitting windows, doors and walls for energy conservation. For vehicles, regularly scheduled maintenance by staff or through contracting out is required. Council recognizes that capital reserves must be diligently set aside to replace vehicles and equipment where these assets have reached the end of their useful lifespan.

The Level of Service document is attached as Appendix 2 to this Asset Management Plan and has been prepared as a standalone supplement in a convenient booklet form that can be used by a department head.

Asset Management Strategy

The asset management strategy is a series of planned actions designed to sustain the prescribed levels of service of the municipality. The strategy takes into consideration the lifecycle costs of each asset with the intent to ensure that capital funds are set aside to replace the asset by the end of its lifespan. The strategy also provides measures to increase the lifespan of the asset and to maintain the value of the asset through its lifespan. Best management practices such as a "preservation management approach" for roads form part of the strategy.

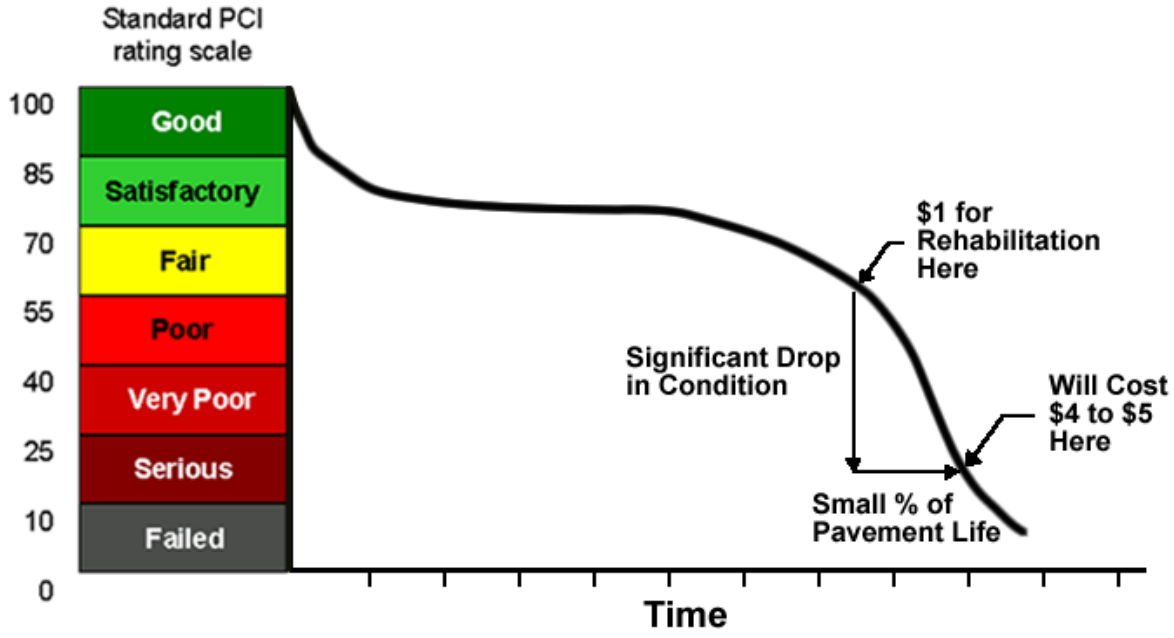
1.9 Roads Best Management Practices

The key to managing a pavement 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 4** 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. The Township of Chisholm, consequently will adopt a preservation management approach as a key component to the asset management plan for each class of road described in **Tables 1.10A – 1.10D** and to other assets.

Examples of approaches to road maintenance with their associated cost implications over the lifecycle of a road are set out in **Appendix 3** to this report and are provided as an illustration of the benefit of a "preservation management approach".

Figure 4. Typical Service Life of an Asphalt Pavement



1.10 Preservation Management Approach for Roads

A. Gravel Roads

Gravel roads are the most significant and visible asset in the Township. The proposed preservation management approach for this class of road is outlined in the **Table 1.10A** and **Table 1.10B.**

Table 1.10A – Preservation Management Approach - Gravel Surface

Action	Frequency
Regrade surfaces to maintain smooth/safe driving surface and proper cross fall.	As needed. Generally 6-10 times per year for higher volume gravel; 1-2 for lower volume.
Add calcium to tighten surface, retain aggregate and reduce dust	Each spring on all roads or 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 1.10B - Capital Activities – Gravel Roads

Action	Frequency
Add layer (75mm) of granular material to road surface	Every 5 years for all 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

B. Surface Treated Roads

Surface treated roads have a hard wearing surface that must be preserved in order to be effective. 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. The Township will employ the following preservation management strategy for surface treated roads set out in **Table 1.10C**.

Table 1.10C – Preservation Management Approach – Surface Treated Roads

Activity	Age (Years)	Condition Rating	Service Life Extension (years)
Slurry seal	3	8	4
Slurry seal	6	7	3
Double surface treatment	10	6	5
Pulverize and DST	14	<4	8

In addition to the above noted preservation approach, the following best management practices will 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 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 to improve roadbed drainage and safety.

C. Asphalt Roads

Asphalt surfaces are the smoothest and most durable hard top surface used by the Municipality however; they are also the most expensive. 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 1.10D** below summarizes the preservation management strategy to be used for asphalt roads:

Table 1.10D - Rural Asphalt Roads

Activity	Age (Years)	Condition Rating	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

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

In addition to the above noted preservation approach, the following best management practices will 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.
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.

1.11 Preservation Management Approach for Bridges and Culverts

When infrastructure is built, there becomes a need for maintenance, rehabilitation and eventually replacement. Given the significant cost to rebuilding bridges and culverts, strategic asset management and preservation becomes increasingly important to operating the asset network at a prescribed level of service over its full service life.

Similar to the roads network, it is more economical to manage the structure network rather than simply maintain it. In the case of bridges and culverts, waiting for serious signs of structural failure can lead to substantial costs for maintenance and rehabilitation, and ultimately cost the municipality and the end users more money.

The key to managing both bridges and culverts is the timing and type of maintenance and rehabilitation activities. This idea evolves from the fact that a bridge's structural integrity does not fall constantly with time. A new bridge or culvert generally provides a constant, acceptable level of service and condition for the first part of its service life and then begins to deteriorate more rapidly as time progresses. In some cases, maintenance and rehabilitation measures are ignored until early signs of structural failure become noticeable.

The Township of Chisholm will use a preservation management strategy for managing its bridge assets (including culverts larger than 3 m). The approach will be based on more frequent, less costly treatments applied over the life span of a bridge or culvert. Careful timing of maintenance will extend the service life of the structure significantly versus a more traditional approach.

Bridges and culverts are different types of structures. Generally, bridges transmit live loads directly through their structure to a foundation whereas culverts transmit loads through fill to a foundation. Because these structures are different in construction and maintenance requirements, separate strategies have been identified for each type of infrastructure.

A. Bridge Management Strategy

Bridges are complex structures made up of several elements including the foundation, the substructure (abutments or ballast walls) and the superstructure (deck). Bridges are designed with a 75-year service life; however, in order to achieve the life span, intervention at periodic times is required. **Table 1.11A** summarizes the preservation management strategy that will be applied to bridges:

Table 1.11A - Bridge Preservation Management Strategy

Activity	Age (Years)	Condition Rating	Service Life Extension (years)
Minor Repairs	10-20	80-90	2-5
Minor Rehabilitation	30	65-70	20
Major Rehabilitation	50-60	50-60	40
Replacement	75	<40	75

B. Structural Culvert Management Strategy

Structural Culverts are typically designed with a 75-year service life similar to a bridge; however, in order to achieve the life span, careful selection of culvert material considering the site chemistry and culvert exposure is required. Intervention at periodic times is also required. **Table 1.11B** summarizes the preservation management strategy that will be applied to culverts:

Table 1.11B - Culvert Preservation Management Strategy

Activity	Age (Years)	Condition Rating	Service Life Extension (years)
Culvert material/ coating Selection	at Design		
Minor Repairs (patching, re-coating - partial of full, cleanout etc.)	10-20	80-90	2-5
Minor Rehabilitation (e.g. waterproofing, coating)	25	65-70	20
Major Rehabilitation (overlay, invert paving, lining etc.)	35 - 50	50-60	40
Replacement	75	<40	75

In addition to the above noted preservation approaches, the following best management practices will be employed to extend the service life and reduce life cycle costs of bridges and culverts:

1. Implement an annual Minor Bridge Repair program into the Operations or Capital budget. Utilize specific recommendations from the OSIM Inspection report to select which repairs on which structures. Minor repairs are critical as they address the problem while it is still small and cost effective to repair. Repairs may include, hand rail repair, pothole patching, concrete patches, repair to joint armouring, tightening steel bridge hardware, regrading of approaches or embankments, erosion prevention, crack sealing etc.
2. Sweep and clean bridge decks and deck drains each spring. This will allow for inspection of the bridge surface and will promote positive drainage on the deck. This will eliminate standing water that has the potential to penetrate the wearing surface and cause premature deterioration of the deck.
3. Replace expansion joints AS SOON AS THEY ARE DAMAGED or worn. Expansion joints are flexible joints between the bridge deck and the approach slabs on a large bridge. Once they are damaged, they allow water to penetrate down to the abutments and bearing seats, which causes premature deterioration of these areas. Expansion joints are (relatively) inexpensive and their timely replacement can delay very costly rehabilitation work on the sub-structure.

4. Ensure OSIM inspections are completed on a biennial basis; not only because they are a legislative requirement but because they form the basis of the bridge inventory and contain recommendations for required improvements.
5. Complete deck condition assessments (DCA) on any larger structures as outlined in the OSIM reports. DCA's involve exploratory work to properly assess the extent of deterioration of the deck. They will help define the extent of rehabilitation required on a bridge deck.
6. Undertake localized or complete painting of steel girders, truss members or other steel members as recommended by OSIM inspections.
7. Cleanout culverts as need to prevent standing water or sediment collection in the culvert.
8. Stabilize embankments and inlet/outlet to prevent erosion and "piping" around the culvert. Ensure appropriate headwall/cutoff walls or clay seals are in place.

1.12 Building Best Management Practices

The Municipality will employ the following best management practices in maintaining their buildings with a view to ensuring the full service life (or more):

1. Program the inspection of buildings on a regular basis, preferably no less than once every two years by a qualified professional.
2. Maintain exterior sealants and flashing to ensure no water penetration.
3. Ensure grading is such that surface water (drainage) is directed away from the building or into soak away pits.
4. Repair damaged exterior elements, e.g. steel sheathing, roofing, cladding as soon as the damage occurs to prevent further deterioration.
5. Annually inspect and remove debris from roof drains, gutters, downspouts.
6. Enact or maintain service contracts for building systems such as HVAC as per manufacturer recommendations or as otherwise deemed necessary.
7. Retrofit buildings to enhance energy conservation.
8. Pump-out septic tanks on a regular basis.
9. Maintain heating and HVAC systems through annual cleaning of furnaces and replacement of filters. Provide for humidity and moisture controls to prevent mold.

1.13 Alternative Approaches to Building Management

Potential alternatives for management of the Municipality's buildings include:

- Disposal of current building assets and renting of space.
- Upgrades to reduce operating costs.

For the purposes of this Plan the Municipality has adopted the above best management practices and intends to manage its buildings assets as they have in the past, with consideration for the alternative strategies presented above, as required in the future.

1.14 Building Capital Expenditures

In general, the Municipality's buildings are in fair to good condition with limited capital requirements envisioned over the next 10 years.

The Municipality has undertaken a number of repairs to the building stock with the objective of increasing the useable life of the buildings. Replacing the metal of the municipal building, water-proofing the foundation, replacing the furnace are indicative of repairs that have been undertaken.

Where possible, the Municipality shall strive to allocate funds to a building reserve for future capital improvements or ultimate replacement of its building assets.

1.15 Vehicles Best Management Practices

The Municipality has historically benefited from a rigorous and ongoing maintenance program that has extended the useful lives of its vehicles. In the future, the Municipality shall continue to employ the following best management practices to maintaining their Vehicles:

1. Vehicles to be serviced on a regular basis, as per manufacturer recommendations or as otherwise deemed necessary by the manager of the fleet.
2. Vehicle failures shall be repaired at the earliest opportunity to prevent undue wear and tear related to faulty vehicles in disrepair.
3. Vehicles shall be used with care.
4. Vehicles will be stored indoors whenever possible.
5. Winter sanding/salting vehicles will be washed after use to remove salt/sand residue.
6. Operators shall be properly trained on the use and care of the vehicles.
7. Vehicles shall be locked and parked in a safe location, when not parked at their home facility, to prevent the potential for vandalism and theft.
8. Vehicles shall be replaced on or near the end of their respective service lives.

1.16 Alternative Approaches to Vehicle Management

Potential alternatives for management of the Municipality's vehicles include:

- Disposal of current vehicle assets and entering into operating lease agreement.
- Contract select maintenance tasks to eliminate need for specialized vehicles.
- Joint use of infrequently-used vehicles with neighboring municipalities.

Risks associated with the above alternative approaches include concern over response time for maintenance given the Municipality's location.

For the purposes of this Plan, the Municipality has adopted the above best management practices and intends to manage their vehicle assets as they have in the past, with consideration for the alternative strategies presented above, as required in the future.

1.17 Vehicle Capital Expenditures

During the period covered by this Plan, virtually all of the Municipality's vehicles will have reached, or exceeded, their expected service lives, and are scheduled to be replaced. The intent of the municipality is to debt finance the replacement of vehicles where reserve funds are inadequate to replace the vehicle.

While the expectation is that vehicles will be replaced at the end of their useful life, a high level of maintenance or the number of hours thee vehicle is used may prolong the useful life. The timing of new vehicle purchase will be based on an assessment of the residual service life of the vehicle on or before its scheduled replacement to determine whether replacement can be deferred.

1.18 Equipment Best Management Practices

The Municipality shall employ the following best management practices in maintaining their equipment, (i.e. rolling stock, with a view to ensuring the full service life (or more) from their equipment assets):

- Equipment to be serviced on a regular basis, as per manufacturer recommendations or as otherwise deemed necessary by the fleet manager.
- Equipment failures shall be repaired at the earliest opportunity to prevent undue wear and tear related to faulty of equipment in disrepair.
- Equipment shall be used with care.
- Equipment will be stored indoors whenever possible
- Winter sanding/salting equipment will be washed after use to remove salt/sand residue.
- Operators shall be properly trained on the use and care of the equipment.
- Equipment shall be locked and parked in a safe location, when not parked at its home facility, to prevent the potential for vandalism and theft.
- Equipment shall be replaced on or near the end of its respective service life.

1.19 Equipment Capital Expenditures

The Municipality does not anticipate significant expenditures for the replacement of equipment during the lifespan of the plan. The current practice of setting aside reserves for the replacement of computers will be continued

1.20 Prioritization of Projects

The need to prioritize competing projects within this Plan so that expenditures don't exceed available finances or that may result because of unforeseen or emergency events is inevitable. In general, project prioritization shall be undertaken using the following criteria:

- User safety
- Life-cycle cost and remaining service life
- Risk management
- Size of User Group (e.g. Volume of traffic for roads, number of bridge users)
- Benefits to Economic Development

1.21 Integrated Capital Planning

While it is important to manage each asset group as a system, e.g. road network, bridge network etc., it is also important to understand and implement an integrated capital planning approach to realize maximum value for money and economies of scale, and ensure the full service life is realized from each capital asset investment. As an example, it is not economical or feasible to replace a road in Year 1, only to go back and replace services beneath the road, and have to replace the road again on 5 years later. The scheduling and prioritizing of projects should be an integrated approach across related assets.

The following integrated capital planning practices shall be adopted by the municipality in developing work priorities.

A. Replacement of underground services beneath a road surface shall be coordinated with renewal of the road base and/or surface, wherever feasible, and vice versa.

B. Road rehabilitation work adjacent to structures planned for replacement shall be considered for tender with the structure replacement work or after structure work is complete.

C. Culvert replacement will be carried out in conjunction with road rehabilitation wherever possible.

D. Road and bridge priorities shall give due consideration to short and long-term development plans.

1.22 Procurement Methods

The Municipality has in place and shall adhere to its current Purchasing By-Law in retaining services to manage, maintain and improve its infrastructure assets under this Plan.

Alternative procurement methods shall be explored as the opportunities for such arise including:

- **Joint Tendering** - (e.g. calcium bulk purchase to realize potential economies of scale)

- **Retainer Services** - (e.g. engineering, consultant retainers to minimize procurement costs)
- **Shared Services** – pooled services with other municipalities.

1.23 Risks to the Asset Management Plan

As with any plan, there are inherent risks that may jeopardize the partial or full execution of the Plan or may prevent the achievement of its expected outcomes. The following is a summary of the risks that are known to exist today.
Inadequate levels of funding.

- Non-commitment by Municipal Council or Staff to the Plan.
- Emergencies, which direct funds away from the Plan.
- Change in legislative requirements, which may influence Levels of Service.
- Premature failure of an asset.
- Unforeseen development pressures.
- Risk to Public Health and Safety (relating to asset failure due to inadequate funding).
- The Plan is "Brand New" and as such will require refinement.

As is the case in many small rural municipalities, particularly in Northern Ontario, the simple reality is that there is a limited availability of funds, and a related limited ability to grow funding, in order to manage the Municipality's infrastructure. While this Plan sets out to manage the competing infrastructure priorities at the lowest combined lifecycle costs, the plan will be subject to revision and refinement as new approaches/technologies are developed, new funding strategies are found, and the expectations of the Municipality (council, staff, and ratepayers) evolve.

Financing Strategy

1.24 Overview

In 2011, the province adopted its long-term infrastructure plan for Ontario, "Building Together". One of the guiding principles of this plan is that *those who benefit directly from municipal infrastructure should pay for the service, whenever feasible*. While the province appears to be continuing to recognize its obligation to assist municipalities with their infrastructure challenges, it is clear that every municipality is expected to move towards the sustainable management of its own capital assets: to ensure that, as assets need to be repaired and replaced, each municipality will be able to finance its own requirements.

The Township of Chisholm, as with many rural and small urban municipalities, is faced with sustaining a substantial inventory of capital assets. As part of the development of this Plan, a commonly cited sustainability measure—the annual amortization of the current replacement cost of assets--was calculated for the Municipality, and contributions to reserves of an equivalent amount was considered as a proposed long-term municipal target. The resulting calculation of approximately $1.3 million vastly

exceeded any reasonable potential funding level for the Municipality to implement this approach from either increased taxation, debt financing, or all other known funding sources/strategies.

The preferred alternative is to focus capital funding based on desired Levels of Service while endeavoring to replace capital assets in combination with the objective of replacing a capital asset, notably rolling stock and machinery and equipment at the end of the useful life of the asset. The Plan identifies a program of proposed capital expenditures while acknowledging that shortfalls in funding may be expected in financing the capital program.

The Township of Chisholm has set aside reserves for a variety of projected capital projects. As of the end of 2013, reserves totaled $664,833 including a reserve of $66,594 slated for roads. The Municipality has financed road and bridge improvements and the acquisition of vehicles on a 'pay-as-you-go basis or debt financing.' Debt financing has been used for bridge construction, road construction and the purchase of vehicles such as a plow truck/sander and grader. The grader for example will be paid off in 2022. The provincially permitted (annual) debt capacity for the Municipality is $338,447 effective January 1, 2013.

Table 1F summarizes the past trends and forecasted expenditure program including the status of reserves and sources of funding. The program anticipates that an increased level of debt financing will be required to underwrite the costs of the capital program.

In the period covered by the plan, investment in capital asset refurbishment and replacement, net of reserve transfers and long-term debt repayments, is expected to vary between approximately $65,000 and $325,000 (figures rounded). These costs do not include a preservation management investment plan as the municipality cannot afford the cost implications.

1.25 Assumptions

The following summarizes the assumptions that have been incorporated into the expenditure and revenue forecast:

1. The focus of the Municipality will be on maintaining its current inventory of capital assets rather than expanding its current asset base.
2. The Levels of Service set out in Appendix '2' for sustaining the quality of assets at their current state, and the level of expenditures dictated by the resulting asset preservation strategy, will be incorporated into the plan as a reasonable level of expenditures by the final year of the Plan.
3. The Township intends to limit borrowing as a measure to ensure that there is additional debt carrying capacity in the case of an emergency.
4. The useful life as set out in **Tables 1A-1D** can be used to reasonably estimate the timing of the replacement of vehicles and equipment only. The timing for replacement of roads, bridges and buildings shall be determined based on

independent reporting (e.g., OSIM inspections, building reviews, and road needs assessments).

5. Limited growth will lead to only modest growth in the assessment base over the planning period (2014-2023). Consequently, a reasonable increase in the taxes available to fund capital additions is 1% per annum.
6. The valuation of the replacement cost for all assets will increase by a rate of inflation forecasted to be 1% annually (see Section 1.24) (see discussion on CPI and Construction Cost Indexes).
7. Borrowing will be limited to a debt repayment limit of $100,000 annually or approximately 1/3 of the provincial debt repayment capacity of the Township. The Municipality will not assume debt that would place it in a "moderate risk" category, as measured by the MMAH's "Financial Indicator Review".

1.26 Expenditures

Tables 1A – 1G in **Appendix 1** set out the cost calculations for the capital assets of the Municipality for the period 2013-2023. The **Tables** illustrate the following calculations or information:

1. The class or type of asset (i.e. roads, bridges, buildings, vehicles, machinery equipment, land improvements). The assets are derived from municipal records, notably the PSAB inventory, and were updated through field reviews conducted for, or in advance of, this study and input from municipal staff.

2. A complete inventory of all assets addressed in this Plan.

3. The historical cost of assets have been updated to estimated current values (January 1, 2013), or as set out in the field review conducted in this study.

4. The useful lifespan of the asset, in particular vehicles, machinery and equipment.

5. Capital funding will be drawn from property taxes, transfers from reserves, and through debt financing. The Municipality will utilize the MMAH financial indicators in determining a reasonable debt ceiling not to exceed approximately $100,000 annually. The Municipality has calculated that incurring annual additional debt of approximately $750,000, with a ten-year repayment period, would be the maximum amount that would allow it to remain in this minimal risk category.

For the purposes of forecasting future expenditures, an annual inflation factor of 1% has been used and has also been applied to the increase in property taxation on the basis of $100,000 starting in 2014. Highlights of the expenditures follow:

A. Road Reconstruction

The 2010 Roads Needs Study established a list of critical deficiencies which should be addressed. The estimated cost of addressing existing deficiencies is estimated at $10.3 million if resolving undersized road widths is considered or $8.6 million for road reconstruction excluding width. The proposed expenditure program will provide for a range of $30,000 to $65,000 reconstruction costs annually or approximately $400,000 over the life of the Plan. The funds would cover part of the projected annual costs of $70,000 for reconstruction of surface treated roads (@2.5 km/year) and $26,400 annually for paved roads ((as recommended in this report). While an additional $500,000 per year is recommended for reconstruction of gravel roads, the Municipality is expending close to $135,000 - $145,000 annually for gravel under its maintenance program. Expenditures on roads will be based on the priority ranking set out in **Table 1A – Appendix 1.** Council may consider additional expenditures for Golf Course Road, Village Road, and Memorial Park Drive, from Alderdale Road east to the Boundary of Powassan. However, the expenditure of $3,006,000 is not affordable on the current tax base without external funding assistance.

B. Bridges and Culverts (Table 1A – Appendix 1)

Capital expenditures for bridges and culverts for years 1-5 of the Plan are based on completing the $411,500 (2013$) recommended works in the OSIM report. Expenditures are spread out over 10 bridges and culverts.

C. Buildings (Table 1B – Appendix 1)

There are no forecasted expenditures for buildings for the 2014-2023 planning period. If financially feasible, Council should consider establishing a reserve for the eventual replacement of the municipal building stock, and making contributions to it annually in its annual budget deliberations.

D. Vehicles (Table 1C – Appendix 1)

Vehicles will be replaced at the end of their useful life if the service life is not otherwise extended through an ongoing maintenance program. Over the next 10 year period, the cost of replacing vehicles is estimated at $691,640.65 based on the 2013 replacement costs increased by a 1% annual inflation factor. The vehicles will be replaced through a combination of reserves and debt financing. Replacement of vehicles will not meet the end of lifespan in all cases, since expenditures will be incurred only when funds are available given the debt carry capacity criterion.

E. Machinery and Equipment (Table 1D – Appendix 1

Forecasted expenditures are minimal over the next 10 years; however, reserves will be used to replace computers at the end of their useful life. The municipality will also replace a photocopier ($7,308) in 2022.

In total, the total forecasted investments in capital asset refurbishment and replacement is expected to be $1,513,669 expenditures ranging from $57,000 (rounded) to $325,000. The costs do not included debt repayment s which will add an additional $467,841to the costs.

F. Expenditure Forecasts

Table 1E sets out the proposed capital expenditures for the period of the plan and provides a summary of **Tables 1A – 1D**.

Table 1E - Township of Chisholm - Expenditure Forecasts										
Item	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Roads	$ 50,000	$ 50,000	$ 50,000	$ 30,000	$ 65,000		$ 50,000	$ 50,000	$ 50,000	$ 50,000
Bridges		$ 116,500								
Culverts			$ 50,000	$ 50,000	$ -		$ 100,000	$ 95,000		
Buildings										
Vehicles		$ 22,812.50	$ 225,841	$ -		$ 199,661	$ 5,691.97	$ -		$ 195,854
Machinery and Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,308	$ -
Totals	$ 50,000	$ 189,312	$ 325,841	$ 80,000	$ 65,000	$ 199,661	$ 155,692	$ 145,000	$ 57,308	$ 245,854

1.27 Yearly Revenue and Expenditure Summary

Table 1F (and **Appendix** 1) set out the summary of proposed expenditures and revenues over the planning period 2014-2023 including funding sources (i.e., transfers from reserves and debt financing) available for financing the above-noted expenditures. Each identified source is discussed below:

A. Taxation

In the 2013 budget, an estimated **$100,000** of the general taxation levy is estimated to have been available for financing past, current and future capital asset expenditures for the combined classes of assets addressed in this report.

Working from the 2013 base, taxation available for financing net capital asset expenditures has been increased by 1% annually. This is a reasonable approximation of what would generally happen in the combined annual operating and capital budget (i.e., small increases in the tax levy annually to compensate for rising prices due to inflation).

B. Senior Government Grants

Future federal gas tax funding has been estimated at $73,000 annually for each Plan year. 2014 grant revenue also includes $ 1,246,471 related to the Municipal Infrastructure Investment Initiative. No other senior-level funding has been incorporated into the AMP, since the Municipality is not aware of any other grant entitlement at this point in time.

C. Transfers to and from Reserves

The anticipated total 2013 year-end reserve balance carried forward to Year 1 of the Plan is expected to be $635,965. Of this, $68,594 is earmarked for the purchase of fire equipment/vehicles; another $10,000 is slated for computer replacement; $29,630 is for roads equipment; $56,594 is slated for road expenditures and future road needs and $141,139 constitutes the Gas Tax Fund.

The Municipality conventionally transfers $7,500 annually for the fire department and $10,000 for roads. These amounts have been reflected in **Table 1F, Appendix 1** as they are expected to be continued to be set aside.

However, it worth noting that just because a reserve is earmarked for a specific purpose doesn't mean that it would be prudent to use the reserve for that purpose when the occasion arose. Since there is a requirement to set a balanced budget every year, any Municipality that wishes to avoid cash flow problems in its day-to-day operations needs to maintain reserves at a level sufficient to compensate for the cash that is "tied up" in such things as: tax arrears balances/other accounts receivable; inventories of gravel and other supplies, etc. Additional available cash is likely necessary to mitigate the impact of swings in the cash used for these items over the course of every year.

The municipality only has approximately $32K in non-designated capital reserves (an additional $56K is earmarked for landfill closure expenses).

The approach is to sustain the level of reserve funds using only those reserves that are required to offset expenditures not otherwise met through municipal taxation or debt. For example, in 2015, $28,000 would be transferred from reserves to help offset the cost of purchasing a replacement truck. Overall, the intent is to gradually increase the annual transfer by 1%. Over the course of the 10 year planning period, the reserve funds will fluctuate from the current level of $635K to $507K.

D. Long-term Debt Financing

Debt financing is used as a financial tool by the municipality. The annual repayment of debt is about 25% of the provincially approved maximum of $338,447 (2013). The AMP will require a commitment to additional debt in order to meet the capital expenditure requirements. The approach is conservative to the extent of not exceeding the anticipated provincial level by more than 33%. A conservative approach will enable the municipality to be able to respond to a crisis situation without exceeding its capacity (e.g. climatic event). The long-term debt levels could also be increased in response to particularly expensive capital works recognizing that the municipality does face a significant infrastructure deficit.

Debt servicing costs are currently $88,150 (2013). Additional debt will be assumed on an as needed basis with a maximum debt-retirement period of 10 years. The intent is to enable the municipality to use debt on a revolving basis.

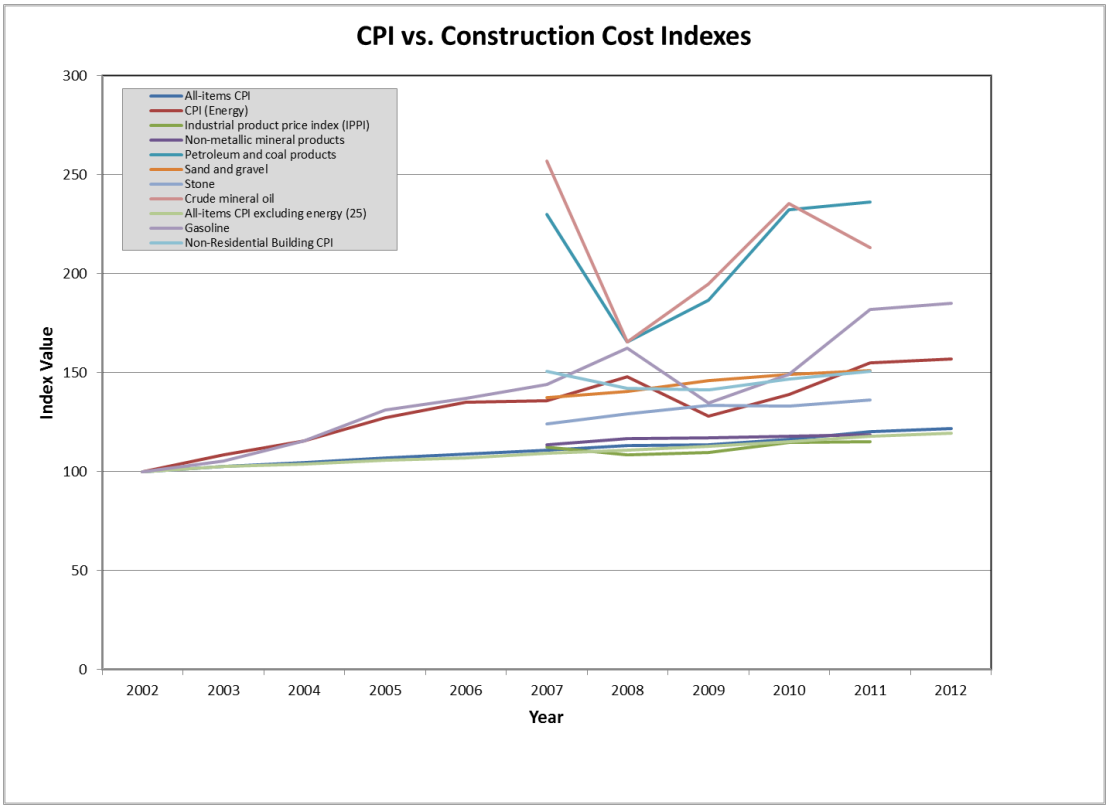
1.28 Funding Shortfall Relative to Financial Requirements

The cost calculations are intended to allow the municipality to fund capital projects without a shortfall and to this extent is a financially responsible approach given the financial constraints faced by the municipality. The AMP, however, does not fully address the capital cost requirements of the municipality nor resolves the current infrastructure deficit estimated to be $8.3 million. The AMP does address immediate and ongoing capital costs for sustaining an acceptable level of infrastructure and does permit Council to consider additional capital costs depending on the priorities of the municipality and the potential for senior level government assistance.

For comparative purposes **Table 1F** also sets out the funding shortfall that would be experienced if all assets are replaced at the end of their normal lifespan. The municipal would experience shortfalls as much as $1.5 million under this scenario.

1.29 Rate of Inflation

In assessing the future replacement costs of the various assets within the Asset Management Plan, it is important to consider the appropriate rates of inflation to ensure forecasting is as accurate as possible. The figure below illustrates the Ontario Consumer Price Index (2003-2012) against various recent (5 years) construction and material price indexes.



In general, the rates of inflation for various material and construction indexes have remained comparable to the overall rate of inflation in Ontario. While gasoline, oil and overall energy rates have fluctuated more significantly over the 10-year period (2002-2012), the overall impact in the Non-Residential Building CPI (NRBCPI) has been buffered. The Overall Rate of Inflation (Ontario) grew from 113.3 in 2007 to 121.8 in 2012, an increase of 8.5 points. The NRBCPI fell from 150.8 to 141.4 and back to 150.7 over the period 2008 -2012; remaining generally unchanged over the period. While material indexes generally grew at similar rates to the overall CPI, gas/energy rates fell substantially in 2008, potentially resulting in the generally unchanged NRBCPI.

For the purpose of this Asset Management Plan, given the potential for relative short-term instability in energy and fuel rate indexes, and resulting potential influence on NRBCPI, **an inflation rate of 1% has been adopted.**

1.30 Level of Service

The Level of Service standards set out in Appendix 2 will be used by the Township on an ongoing basis to ensure that maintenance activities are integrated into daily operations. Adherence to the LOS is intended to optimize the useful life, if not extend the lifespan of infrastructure.

1.31 Disposal of Infrastructure

Infrastructure will be amortized over the useful life. Infrastructure will be disposed of where there is a residual market value and the revenue proceeds will be used to offset the costs of the replacement item.

1.32 Replacement Items

Any replacement item will be purchased pursuant to the Township's procurement policies and procedures. The Township may replace vehicles, machinery or equipment with pre-owned or used equipment where there is a substantial residual useful life.

1.33 Expansion Activities

The addition or expansion of infrastructure is not anticipated during the planning period of the asset management plan given the limited projects for growth and development. The current inventory of municipal infrastructure is considered to have residual capacity for growth that is anticipated (i.e. roads, maintenance equipment).

1.34 Planning Period

The planning period for this asset management plan is 10 years (2014-2023). However, the costing is based on the lifecycle for each item of infrastructure, consequently any capital reserves, which are set aside, may be utilized beyond the life of this plan.

1.35 Plan Review

The plan will be used as a tool to assist with annual budgeting for capital expenditures, but will be reviewed comprehensively on a 2-year cycle.

APPENDIX 1 – Asset Management Plan Tables

Attached as excel sheets.

Appendix 2 – Level of Service

Attached as standalone document.

Appendix 3 – Supplementary Tables

Roads

Table 1A - Township of Chisholm - Roads, Bridges and Culverts

			Length (km)	Surface Type	Estimated Life Span (Years)	Estimated Replacement Year	Estimated Replacement Cost (Jan 1 2013)	Resurfacing Costs	Priority Ranking for Resurfacing 2014-2016	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
ROADS																			
GOLF COURSE RD	Memorial Park Drive	Chiswick Line	2.13	G	45		$ 395,669	$ 274,000	X	$ 399,625.69	$ 403,621.95	$ 407,658.17	$ 411,734.75	$ 415,852.10	$ 420,010.62	$ 424,210.72	$ 428,452.83	$ 432,737.36	$ 437,064.73
S SHORE RD	River Road	Twp Boundary West	2.17	G	45		$ 337,478	$ 85,000		$ 340,852.78	$ 344,261.31	$ 347,703.92	$ 351,180.96	$ 354,692.77	$ 358,239.70	$ 361,822.09	$ 365,440.32	$ 369,094.72	$ 372,785.67
VILLAGE RD	Township Boundary	River Road	2.06	LCB	15		$ 546,912	$ 918,000	X	$ 552,381.12	$ 557,904.93	$ 563,483.98	$ 569,118.82	$ 574,810.01	$ 580,558.11	$ 586,363.69	$ 592,227.33	$ 598,149.60	$ 604,131.10
GOLF COURSE RD	River Road	Booth Road	2.03	LCB	15		$ 552,472	$ 905,000	X	$ 557,996.72	$ 563,576.69	$ 569,212.45	$ 574,904.58	$ 580,653.62	$ 586,460.16	$ 592,324.76	$ 598,248.01	$ 604,230.49	$ 610,272.79
GRAVELLE RD	Chiswick Line	Pioneer Road	2.03	G	45		$ 333,245	$ 80,000		$ 336,577.45	$ 339,943.22	$ 343,342.66	$ 346,776.08	$ 350,243.84	$ 353,746.28	$ 357,283.75	$ 360,856.58	$ 364,465.15	$ 368,109.80
GOLF COURSE RD	Booth Road	Memorial Park Drive	2.04	LCB	15		$ 561,989	$ 909,000	X	$ 567,608.89	$ 573,284.98	$ 579,017.83	$ 584,808.01	$ 590,656.09	$ 596,562.65	$ 602,528.27	$ 608,553.56	$ 614,639.09	$ 620,785.48
WASING RD	Maple Road	Algonquin Road	4.13	G	45		$ 677,981	$ 163,000		$ 684,760.81	$ 691,608.42	$ 698,524.50	$ 705,509.75	$ 712,564.84	$ 719,690.49	$ 726,887.40	$ 734,156.27	$ 741,497.83	$ 748,912.81
VILLAGE RD	River Road	Grahamvale Road	2.21	G	45		$ 362,794	$ 87,000		$ 366,421.94	$ 370,086.16	$ 373,787.02	$ 377,524.89	$ 381,300.14	$ 385,113.14	$ 388,964.27	$ 392,853.92	$ 396,782.45	$ 400,750.28
MAPLE RD	Bear Mountain Road	Wasing Road	4.57	G	45		$ 710,726	$ 180,000		$ 717,833.26	$ 725,011.59	$ 732,261.71	$ 739,584.33	$ 746,980.17	$ 754,449.97	$ 761,994.47	$ 769,614.41	$ 777,310.56	$ 785,083.66
MEMORIAL PARK DR	Golf Course Road	End	4.09	G	45		$ 636,077	$ 161,000		$ 642,437.77	$ 648,862.15	$ 655,350.77	$ 661,904.28	$ 668,523.32	$ 675,208.55	$ 681,960.64	$ 688,780.24	$ 695,668.05	$ 702,624.73
GOLF COURSE RD	Chiswick Line	Pioneer Road	2.03	G	45		$ 342,014	$ 80,000		$ 345,434.14	$ 348,888.48	$ 352,377.37	$ 355,901.14	$ 359,460.15	$ 363,054.75	$ 366,685.30	$ 370,352.15	$ 374,055.67	$ 377,796.23
CHISWICK LINE	Golf Course Road	Gravelle Road	2.03	G	45		$ 324,475	$ 80,000		$ 327,719.75	$ 330,996.95	$ 334,306.92	$ 337,649.99	$ 341,026.49	$ 344,436.75	$ 347,881.12	$ 351,359.93	$ 354,873.53	$ 358,422.26
GRAHAMVALE RD	Alderdale Road	Village Road	1.47	G	45		$ 222,264	$ 58,000		$ 224,486.64	$ 226,731.51	$ 228,998.82	$ 231,288.81	$ 233,601.70	$ 235,937.71	$ 238,297.09	$ 240,680.06	$ 243,086.86	$ 245,517.73
PIONEER RD	Maple Road/Kells Road	Golf Course Road	4.09	G	45		$ 689,083	$ 161,000		$ 695,973.83	$ 702,933.57	$ 709,962.90	$ 717,062.53	$ 724,233.16	$ 731,475.49	$ 738,790.24	$ 746,178.15	$ 753,639.93	$ 761,176.33
MEMORIAL PARK DR	Memory Lane	Green Point Road	0.94	G	45		$ 158,371	$ 121,000	X	$ 159,954.71	$ 161,554.26	$ 163,169.80	$ 164,801.50	$ 166,449.51	$ 168,114.01	$ 169,795.15	$ 171,493.10	$ 173,208.03	$ 174,940.11
ALDERDALE RD	Grahamvale Road	Memorial Park Drive	1.84	LCB	15		$ 555,928	$ 820,000	X	$ 561,487.28	$ 567,102.15	$ 572,773.17	$ 578,500.91	$ 584,285.92	$ 590,128.77	$ 596,030.06	$ 601,990.36	$ 608,010.27	$ 614,090.37
MAPLE RD	Pioneer Road	Wasing Road	2.03	G	45		$ 350,784	$ 80,000		$ 354,291.84	$ 357,834.76	$ 361,413.11	$ 365,027.24	$ 368,677.51	$ 372,364.28	$ 376,087.93	$ 379,848.81	$ 383,647.29	$ 387,483.77
RIVER RD	Golf Course Road	Twp Road	2.07	G	45		$ 348,754	$ 267,000	X	$ 352,241.54	$ 355,763.96	$ 359,321.59	$ 362,914.81	$ 366,543.96	$ 370,209.40	$ 373,911.49	$ 377,650.61	$ 381,427.11	$ 385,241.38
HS SIDING RD	Private Road	Alderdale Road	1.75	G	45		$ 272,160	$ 69,000		$ 274,881.60	$ 277,630.42	$ 280,406.72	$ 283,210.79	$ 286,042.90	$ 288,903.32	$ 291,792.36	$ 294,710.28	$ 297,657.38	$ 300,633.96
HS SIDING RD	Twp Boundary	Private Drive	0.34	G	45		$ 52,877	$ 13,000		$ 53,405.77	$ 53,939.83	$ 54,479.23	$ 55,024.02	$ 55,574.26	$ 56,130.00	$ 56,691.30	$ 57,258.21	$ 57,830.80	$ 58,409.10
BELLCAIRN RD	Chiswick Line	Pioneer Road	2.08	G	45		$ 350,438	$ 82,000		$ 353,942.38	$ 357,481.80	$ 361,056.62	$ 364,667.19	$ 368,313.86	$ 371,997.00	$ 375,716.97	$ 379,474.14	$ 383,268.88	$ 387,101.57
CHISWICK LINE	Gravelle Road	End	0.87	G	45		$ 139,061	$ 34,000		$ 140,451.61	$ 141,856.13	$ 143,274.69	$ 144,707.43	$ 146,154.51	$ 147,616.05	$ 149,092.21	$ 150,583.14	$ 152,088.97	$ 153,609.86
WASING RD	Algonquin Road	Golf Course Road	0.3	G	45		$ 47,952	$ 12,000		$ 48,431.52	$ 48,915.84	$ 49,404.99	$ 49,899.04	$ 50,398.03	$ 50,902.01	$ 51,411.03	$ 51,925.14	$ 52,444.40	$ 52,968.84
PIONEER RD	Golf Course Road	Gravelle Road	2.05	G	45		$ 336,528	$ 81,000		$ 339,893.28	$ 343,292.21	$ 346,725.13	$ 350,192.39	$ 353,694.31	$ 357,231.25	$ 360,803.57	$ 364,411.60	$ 368,055.72	$ 371,736.27
GOLF COURSE RD		Wasing Road	2.21	G	45		$ 381,888	$ 87,000		$ 385,706.88	$ 389,563.95	$ 393,459.59	$ 397,394.18	$ 401,368.13	$ 405,381.81	$ 409,435.63	$ 413,529.98	$ 417,665.28	$ 421,841.93
KELLS RD		Church Road	1.01	G	45		$ 170,164	$ 40,000		$ 171,865.64	$ 173,584.30	$ 175,320.14	$ 177,073.34	$ 178,844.07	$ 180,632.51	$ 182,438.84	$ 184,263.23	$ 186,105.86	$ 187,966.92
BEACH RD		Memorial Park Drive	0.98	G	45		$ 165,110	$ 39,000		$ 166,761.10	$ 168,428.71	$ 170,113.00	$ 171,814.13	$ 173,532.27	$ 175,267.59	$ 177,020.27	$ 178,790.47	$ 180,578.38	$ 182,384.16
MEMORIAL PARK DR	Trapper Road	Alderdale Road	1.94	HCB	15		$ 617,206			$ 623,378.06	$ 629,611.84	$ 635,907.96	$ 642,267.04	$ 648,689.71	$ 655,176.61	$ 661,728.37	$ 668,345.66	$ 675,029.11	$ 681,779.40
S SHORE RD	River Road	East Twp Limit	1.46	G	45		$ 258,595	$ 188,000	X	$ 261,180.95	$ 263,792.76	$ 266,430.69	$ 269,094.99	$ 271,785.94	$ 274,503.80	$ 277,248.84	$ 280,021.33	$ 282,821.54	$ 285,649.76
PIONEER RD	Boundry Road	Bellcairn Road	1.94	G	45		$ 343,613		X	$ 347,049.13	$ 350,519.62	$ 354,024.82	$ 357,565.07	$ 361,140.72	$ 364,752.12	$ 368,399.64	$ 372,083.64	$ 375,804.48	$ 379,562.52
RIVER RD	Twp Road to Twp Road	South Shore Road	2.1	G	45		$ 367,416			$ 371,090.16	$ 374,801.06	$ 378,549.07	$ 382,334.56	$ 386,157.91	$ 390,019.49	$ 393,919.68	$ 397,858.88	$ 401,837.47	$ 405,855.84
CHISWICK LINE	Beach Road	Golf Course Road	2.03	G	45		$ 359,554	$ 261,000	X	$ 363,149.54	$ 366,781.04	$ 370,448.85	$ 374,153.33	$ 377,894.87	$ 381,673.82	$ 385,490.55	$ 389,345.46	$ 393,238.91	$ 397,171.30
KELLS RD	Chiswick Line	Pioneer Road	2.02	G	45		$ 357,782			$ 361,359.82	$ 364,973.42	$ 368,623.15	$ 372,309.38	$ 376,032.48	$ 379,792.80	$ 383,590.73	$ 387,426.64	$ 391,300.90	$ 395,213.91
CHISWICK LINE	Alderdale Road	Bellcairn Road	0.3	G	45		$ 54,432	$ 39,000	X	$ 54,976.32	$ 55,526.08	$ 56,081.34	$ 56,642.16	$ 57,208.58	$ 57,780.66	$ 58,358.47	$ 58,942.06	$ 59,531.48	$ 60,126.79
KELLS RD	Church Road	Chiswick Line	1.03	G	45		$ 177,984	$ 41,000		$ 179,763.84	$ 181,561.48	$ 183,377.09	$ 185,210.86	$ 187,062.97	$ 188,933.60	$ 190,822.94	$ 192,731.17	$ 194,658.48	$ 196,605.06
ALDERDALE RD	Memorial Park Drive W	Chiswick Line	2.04	LCB	15		$ 555,194			$ 560,745.94	$ 566,353.40	$ 572,016.93	$ 577,737.10	$ 583,514.47	$ 589,349.62	$ 595,243.11	$ 601,195.55	$ 607,207.50	$ 613,279.58
RIVER RD	Village Road	Mallard Haven Road	1.04	LCB	15		$ 293,433	$ 463,000	X	$ 296,367.33	$ 299,331.00	$ 302,324.31	$ 305,347.56	$ 308,401.03	$ 311,485.04	$ 314,599.89	$ 317,745.89	$ 320,923.35	$ 324,132.58
MEMORIAL PARK DR	Green Point Road	Beach Road	1.13	G	45		$ 205,027	$ 146,000	X	$ 207,077.27	$ 209,148.04	$ 211,239.52	$ 213,351.92	$ 215,485.44	$ 217,640.29	$ 219,816.69	$ 222,014.86	$ 224,235.01	$ 226,477.36
MEMORIAL PARK DR	Beach Road	Golf Course Road	2.04	G	45		$ 370,138			$ 373,839.38	$ 377,577.77	$ 381,353.55	$ 385,167.09	$ 389,018.76	$ 392,908.95	$ 396,838.03	$ 400,806.42	$ 404,814.48	$ 408,862.62
ALDERDALE RD	Grahamvale Road	River Road	2.04	LCB	15		$ 613,780	$ 909,000	X	$ 619,917.80	$ 626,116.98	$ 632,378.15	$ 638,701.93	$ 645,088.95	$ 651,539.84	$ 658,055.24	$ 664,635.79	$ 671,282.15	$ 677,994.97
CHISWICK LINE	Boundary Road	Point on Road	0.02	LCB	15		$ 5,110			$ 5,161.10	$ 5,212.71	$ 5,264.84	$ 5,317.49	$ 5,370.66	$ 5,424.37	$ 5,478.61	$ 5,533.40	$ 5,588.73	$ 5,644.62
RIVER RD	Laporte Road	Golf Course Road	1.15	LCB	15		$ 324,470	$ 512,000	X	$ 327,714.70	$ 330,991.85	$ 334,301.77	$ 337,644.78	$ 341,021.23	$ 344,431.44	$ 347,875.76	$ 351,354.52	$ 354,868.06	$ 358,416.74
RIVER RD	Mallard Haven Road	Laporte Road	1.94	LCB	15		$ 547,366	$ 864,000	X	$ 552,839.66	$ 558,368.06	$ 563,951.74	$ 569,591.25	$ 575,287.17	$ 581,040.04	$ 586,850.44	$ 592,718.94	$ 598,646.13	$ 604,632.59
ALDERDALE RD	Memorial Park Drive E	Memorial Park Drive W	0.19	HCB	15		$ 58,672			$ 59,258.72	$ 59,851.31	$ 60,449.82	$ 61,054.32	$ 61,664.86	$ 62,281.51	$ 62,904.33	$ 63,533.37	$ 64,168.70	$ 64,810.39
CHISWICK LINE	Bell Cairn Road	Kells Road	1.85	G	45		$ 367,632	$ 238,000	X	$ 371,308.32	$ 375,021.40	$ 378,771.62	$ 382,559.33	$ 386,384.93	$ 390,248.78	$ 394,151.26	$ 398,092.78	$ 402,073.70	$ 406,094.44
MEMORIAL PARK DR	Alderdale Road	Kells Road	2.23	LCB	15		$ 629,189			$ 635,480.89	$ 641,835.70	$ 648,254.06	$ 654,736.60	$ 661,283.96	$ 667,896.80	$ 674,575.77	$ 681,321.53	$ 688,134.74	$ 695,016.09
CHISWICK LINE	Kells Road	Beach Road	2.09	G	45		$ 406,296	$ 269,000	X	$ 410,358.96	$ 414,462.55	$ 418,607.18	$ 422,793.25	$ 427,021.18	$ 431,291.39	$ 435,604.31	$ 439,960.35	$ 444,359.95	$ 448,803.55
MEMORIAL PARK DR	Kells Road	Memory Lane	0.02	LCB	15		$ 5,643			$ 5,699.43	$ 5,756.42	$ 5,813.99	$ 5,872.13	$ 5,930.85	$ 5,990.16	$ 6,050.06	$ 6,110.56	$ 6,171.67	$ 6,233.38
CHISWICK LINE	Point On Road	Alderdale Road	1.85	G	45		$ 351,648		X	$ 355,164.48	$ 358,716.12	$ 362,303.29	$ 365,926.32	$ 369,585.58	$ 373,281.44	$ 377,014.25	$ 380,784.39	$ 384,592.24	$ 388,438.16
CHISWICK LINE	Point on Road	Point on Road	0	G	45				X	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
ALDERDALE RD	Twp Boundary	Hill Siding Road	1.72	LCB	15		$ 492,410			$ 497,334.10	$ 502,307.44	$ 507,330.52	$ 512,403.82	$ 517,527.86	$ 522,703.14	$ 527,930.17	$ 533,209.47	$ 538,541.57	$ 543,926.98
BOUNDARY RD	Chiswick Line	Pioneer Road	1.98	G	45		$ 367,805			$ 371,483.05	$ 375,197.88	$ 378,949.86	$ 382,739.36	$ 386,566.75	$ 390,432.42	$ 394,336.74	$ 398,280.11	$ 402,262.91	$ 406,285.54
PIONEER RD	Bellcairn Road	Maple Road/Kells Road	2.02	G	45		$ 375,235			$ 378,987.35	$ 382,777.22	$ 386,605.00	$ 390,471.05	$ 394,375.76	$ 398,319.51	$ 402,302.71	$ 406,325.74	$ 410,388.99	$ 414,492.88
RIVER RD	Alderdale Road	Village Road	2.02	G	45		$ 405,778	$ 260,000	X	$ 409,835.78	$ 413,934.14	$ 418,073.48	$ 422,254.21	$ 426,476.76	$ 430,741.52	$ 435,048.94	$ 439,399.43	$ 443,793.42	$ 448,231.36
ALDERDALE RD	Hill Siding Road	River Road	0.31	LCB	15		$ 90,980			$ 91,889.80	$ 92,808.70	$ 93,736.78	$ 94,674.15	$ 95,620.89	$ 96,577.10	$ 97,542.87	$ 98,518.30	$ 99,503.49	$ 100,498.52
BOUNDARY RD	Chiswick Line	End	0.55		45		$ 7,128			$ 7,199.28	$ 7,271.27	$ 7,343.99	$ 7,417.43	$ 7,491.60	$ 7,566.52	$ 7,642.18	$ 7,718.60	$ 7,795.79	$ 7,873.75
BOUNDARY RD	Conncession Rd 8	End	0.11		45		$ 1,426			$ 1,440.26	$ 1,454.66	$ 1,469.21	$ 1,483.90	$ 1,498.74	$ 1,513.73	$ 1,528.87	$ 1,544.15	$ 1,559.60	$ 1,575.19
BOUNDARY RD	Pioneer Road	Robson Lane/Con 8 Rd.	0.05	G	45		$ 7,992			$ 8,071.92	$ 8,152.64	$ 8,234.17	$ 8,316.51	$ 8,399.67	$ 8,483.67	$ 8,568.51	$ 8,654.19	$ 8,740.73	$ 8,828.14
CHURCH RD	Kells Road	End	1.05	G	45		$ 154,224			$ 155,766.24	$ 157,323.90	$ 158,897.14	$ 160,486.11	$ 162,090.97	$ 163,711.88	$ 165,349.00	$ 167,002.49	$ 168,672.52	$ 170,359.24
GRAHAMVALE RD	Village Road	End	0.53	G	45		$ 68,688			$ 69,374.88	$ 70,068.63	$ 70,769.32	$ 71,477.01	$ 72,191.78	$ 72,913.70	$ 73,642.83	$ 74,379.26	$ 75,123.05	$ 75,874.28
GREEN POINT RD	Beach Road	End	0.87		45		$ 11,275			$ 11,387.75	$ 11,501.63	$ 11,616.64	$ 11,732.81	$ 11,850.14	$ 11,968.64	$ 12,088.33	$ 12,209.21	$ 12,331.30	$ 12,454.61
PIONEER RD	Gravelle Road	End	1.33	G	45		$ 218,333			$ 220,516.33	$ 222,721.49	$ 224,948.71	$ 227,198.20	$ 229,470.18	$ 231,764.88	$ 234,082.53	$ 236,423.35	$ 238,787.59	$ 241,175.46
POPLARVALE RD	Poplarvale Rd	End	0.46		45		$ 5,962			$ 6,021.62	$ 6,081.84	$ 6,142.65	$ 6,204.08	$ 6,266.12	$ 6,328.78	$ 6,392.07	$ 6,455.99	$ 6,520.55	$ 6,585.76
TRAPPERS RD	Memorial Park Drive	End	0.09		45		$ 1,166			$ 1,177.66	$ 1,189.44	$ 1,201.33	$ 1,213.34	$ 1,225.48	$ 1,237.73	$ 1,250.11	$ 1,262.61	$ 1,275.24	$ 1,287.99
WASING RD	Maple Road	End	0.97	G	45		$ 129,902			$ 131,201.02	$ 132,513.03	$ 133,838.16	$ 135,176.54	$ 136,528.31	$ 137,893.59	$ 139,272.53	$ 140,665.25	$ 142,071.90	$ 143,492.62
GRAVELLE RD	Polarvale Road	Pioneer Road	2.12	G	45		$ 348,019			$ 351,499.19	$ 355,014.18	$ 358,564.32	$ 362,149.97	$ 365,771.47	$ 369,429.18	$ 373,123.47	$ 376,854.71	$ 380,623.25	$ 384,429.49
ISLANDVIEW LANE	End	Private Drive	0.44		45		$ 5,702			$ 5,759.02	$ 5,816.61	$ 5,874.78	$ 5,933.52	$ 5,992.86	$ 6,052.79	$ 6,113.32	$ 6,174.45	$ 6,236.19	$ 6,298.56
ISLANDVIEW LANE	Private Drive	Beach Road	0.08		45		$ 1,037			$ 1,047.37	$ 1,057.84	$ 1,068.42	$ 1,079.11	$ 1,089.90	$ 1,100.80	$ 1,111.80	$ 1,122.92	$ 1,134.15	$ 1,145.49
MALLARD HAVEN RD	Private Drive	End	0.31		45		$ 4,018			$ 4,058.18	$ 4,098.76	$ 4,139.75	$ 4,181.15	$ 4,222.96	$ 4,265.19	$ 4,307.84	$ 4,350.92	$ 4,394.43	$ 4,438.37
MALLARD HAVEN RD	River Road	Private drive	1.42		45		$ 18,403			$ 18,587.03	$ 18,772.90	$ 18,960.63	$ 19,150.24	$ 19,341.74	$ 19,535.16	$ 19,730.51	$ 19,927.81	$ 20,127.09	$ 20,328.36
BEAR MOUNTAIN RD	Maple Road	End - north	0.28	G	45		$ 41,126			$ 41,537.26	$ 41,952.63	$ 42,372.16	$ 42,795.88	$ 43,223.84	$ 43,656.08	$ 44,092.64	$ 44,533.56	$ 44,978.90	$ 45,428.69

FOSSMILL RD	Golf Course Road	Polarvale Road	2.34	G	45		$ 404,352			$ 408,395.52	$ 412,479.48	$ 416,604.27	$ 420,770.31	$ 424,978.02	$ 429,227.80	$ 433,520.07	$ 437,855.27	$ 442,233.83	$ 446,656.17
FOSSMILL RD	Polarvale Road	End	0.38	G	45		$ 50,068			$ 50,568.68	$ 51,074.37	$ 51,585.11	$ 52,100.96	$ 52,621.97	$ 53,148.19	$ 53,679.67	$ 54,216.47	$ 54,758.63	$ 55,306.22
POPLARVALE RD	Fossmill Road	Poplarvale Rd	1.14	G	45		$ 177,293			$ 179,065.93	$ 180,856.59	$ 182,665.16	$ 184,491.81	$ 186,336.72	$ 188,200.09	$ 190,082.09	$ 191,982.91	$ 193,902.74	$ 195,841.77
POPLARVALE RD	Gravelle Road	End	0.56	G	45		$ 67,738			$ 68,415.38	$ 69,099.53	$ 69,790.53	$ 70,488.43	$ 71,193.32	$ 71,905.25	$ 72,624.30	$ 73,350.55	$ 74,084.05	$ 74,824.89
POPLARVALE RD	Poplarvale Rd	Gravelle Road	0.29	G	45		$ 48,859			$ 49,347.59	$ 49,841.07	$ 50,339.48	$ 50,842.87	$ 51,351.30	$ 51,864.81	$ 52,383.46	$ 52,907.30	$ 53,436.37	$ 53,970.73
BOOTH RD	Golf Course Road	End	1.39	G	45		$ 204,163			$ 206,204.63	$ 208,266.68	$ 210,349.34	$ 212,452.84	$ 214,577.36	$ 216,723.14	$ 218,890.37	$ 221,079.27	$ 223,290.07	$ 225,522.97
CEDAR RD	River Road	End	0.27	G	45		$ 32,659			$ 32,985.59	$ 33,315.45	$ 33,648.60	$ 33,985.09	$ 34,324.94	$ 34,668.19	$ 35,014.87	$ 35,365.02	$ 35,718.67	$ 36,075.85
BEACH RD	Memorial Park Drive	Chiswick Line	2.04	G	45		$ 224,726			$ 226,973.26	$ 229,242.99	$ 231,535.42	$ 233,850.78	$ 236,189.28	$ 238,551.18	$ 240,936.69	$ 243,346.06	$ 245,779.52	$ 248,237.31
ALGONQUIN RD	Wasing Road	End	1.41	G	45		$ 225,374			$ 227,627.74	$ 229,904.02	$ 232,203.06	$ 234,525.09	$ 236,870.34	$ 239,239.04	$ 241,631.43	$ 244,047.75	$ 246,488.22	$ 248,953.11
BEAR MOUNTAIN RD	Maple Road	End - South	1.75	G	45		$ 257,040			$ 259,610.40	$ 262,206.50	$ 264,828.57	$ 267,476.85	$ 270,151.62	$ 272,853.14	$ 275,581.67	$ 278,337.49	$ 281,120.86	$ 283,932.07
MAPLE RD	Twp Boundary	Bear Mountain Road	1.92	G	45		$ 315,187			$ 318,338.87	$ 321,522.26	$ 324,737.48	$ 327,984.86	$ 331,264.70	$ 334,577.35	$ 337,923.13	$ 341,302.36	$ 344,715.38	$ 348,162.53
Total Value for Roads							$ 22,057,442	**$ 8,363,000**		$ 22,278,016.42	$ 22,500,796.58	$ 22,725,804.55	$ 22,953,062.60	$ 23,182,593.22	$ 23,414,419.15	$ 23,648,563.35	$ 23,885,048.98	$ 24,123,899.47	$ 24,365,138.46
BRIDGES									**Priority Ranking for upgrading 2014-2016**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
001 - South Shore Road Bridge					50	2061	$ 180,000			$ 181,800.00	$ 183,618.00	$ 185,454.18	$ 187,308.72	$ 189,181.81	$ 191,073.63	$ 192,984.36	$ 194,914.21	$ 196,863.35	$ 198,831.98
002 - Depot Creek Bridge					50	2039	$ 451,000			$ 455,510.00	$ 460,065.10	$ 464,665.75	$ 469,312.41	$ 474,005.53	$ 478,745.59	$ 483,533.04	$ 488,368.37	$ 493,252.06	$ 498,184.58
004 - River Road Bridge					20	1950	$ 430,500	$ 20,000	2014	$ 434,805.00	$ 439,153.05	$ 443,544.58	$ 447,980.03	$ 452,459.83	$ 456,984.42	$ 461,554.27	$ 466,169.81	$ 470,831.51	$ 475,539.82
005 - Beach Road Bridge					50	2053	$ 553,000			$ 558,530.00	$ 564,115.30	$ 569,756.45	$ 575,454.02	$ 581,208.56	$ 587,020.64	$ 592,890.85	$ 598,819.76	$ 604,807.96	$ 610,856.04
006 - Memorial Park Road Bridge					20	2005	$ 420,000			$ 424,200.00	$ 428,442.00	$ 432,726.42	$ 437,053.68	$ 441,424.22	$ 445,838.46	$ 450,296.85	$ 454,799.82	$ 459,347.81	$ 463,941.29
009 - West Golf Course Road Bridge					20	1980	$ 294,000	$ 37,500	2014	$ 296,940.00	$ 299,909.40	$ 302,908.49	$ 305,937.58	$ 308,996.95	$ 312,086.92	$ 315,207.79	$ 318,359.87	$ 321,543.47	$ 324,758.90
010 - Wasing Road Bridge					50	1969	$ 215,000	$ 24,000	2014	$ 217,150.00	$ 219,321.50	$ 221,514.72	$ 223,729.86	$ 225,967.16	$ 228,226.83	$ 230,509.10	$ 232,814.19	$ 235,142.33	$ 237,493.76
013 - Memorial Park Road Bridge					50	2059	$ 505,000			$ 510,050.00	$ 515,150.50	$ 520,302.01	$ 525,505.03	$ 530,760.08	$ 536,067.68	$ 541,428.35	$ 546,842.64	$ 552,311.06	$ 557,834.17
016 - Pioneer Road Bridge					50	2058	$ 365,000			$ 368,650.00	$ 372,336.50	$ 376,059.87	$ 379,820.46	$ 383,618.67	$ 387,454.85	$ 391,329.40	$ 395,242.70	$ 399,195.12	$ 403,187.08
020 - Memorial Park Road Bridge					20	1990	$ 112,000	$ 35,000	2014	$ 113,120.00	$ 114,251.20	$ 115,393.71	$ 116,547.65	$ 117,713.13	$ 118,890.26	$ 120,079.16	$ 121,279.95	$ 122,492.75	$ 123,717.68
Total Value for Bridges							$ 3,525,500	**$ 116,500**		$ 3,560,755.00	$ 3,596,362.55	$ 3,632,326.18	$ 3,668,649.44	$ 3,705,335.93	$ 3,742,389.29	$ 3,779,813.18	$ 3,817,611.32	$ 3,855,787.43	$ 3,894,345.30
CULVERTS									**Priority Ranking for upgrading 2014-2016**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
003 - Village Road Culvert					20	1990	$ 145,392	$ 225,000	2015	$ 146,845.92	$ 148,314.38	$ 149,797.52	$ 151,295.50	$ 152,808.45	$ 154,336.54	$ 155,879.90	$ 157,438.70	$ 159,013.09	$ 160,603.22
007 - Chiswick Line Culvert					20	2021	$ 55,040	$ 10,000	2016	$ 55,590.40	$ 56,146.30	$ 56,707.77	$ 57,274.84	$ 57,847.59	$ 58,426.07	$ 59,010.33	$ 59,600.43	$ 60,196.44	$ 60,798.40
008 - Chiswick Line Culvert					20	2000	$ 61,920	$ 10,000	2016	$ 62,539.20	$ 63,164.59	$ 63,796.24	$ 64,434.20	$ 65,078.54	$ 65,729.33	$ 66,386.62	$ 67,050.49	$ 67,720.99	$ 68,398.20
011 - River Road Culvert					20	2019	$ 110,880	$ 10,000	2016	$ 111,988.80	$ 113,108.69	$ 114,239.77	$ 115,382.17	$ 116,535.99	$ 117,701.35	$ 118,878.37	$ 120,067.15	$ 121,267.82	$ 122,480.50
012 - Grahamville Road Culvert					20	2000	$ 92,736			$ 93,663.36	$ 94,599.99	$ 95,545.99	$ 96,501.45	$ 97,466.47	$ 98,441.13	$ 99,425.54	$ 100,419.80	$ 101,424.00	$ 102,438.24
014A - Wasing Road Culvert					20	1990	$ 17,000	$ 30,000	2016	$ 17,170.00	$ 17,341.70	$ 17,515.12	$ 17,690.27	$ 17,867.17	$ 18,045.84	$ 18,226.30	$ 18,408.56	$ 18,592.65	$ 18,778.58
014B - Maple Road Culvert					20	2022	$ 26,000			$ 26,260.00	$ 26,522.60	$ 26,787.83	$ 27,055.70	$ 27,326.26	$ 27,599.52	$ 27,875.52	$ 28,154.27	$ 28,435.82	$ 28,720.18
014C - Maple Road Culvert					20	2000	$ 21,000			$ 21,210.00	$ 21,422.10	$ 21,636.32	$ 21,852.68	$ 22,071.21	$ 22,291.92	$ 22,514.84	$ 22,739.99	$ 22,967.39	$ 23,197.06
015 - Chiswick Line Culvert					20	2019	$ 62,784	$ 10,000	2016	$ 63,411.84	$ 64,045.96	$ 64,686.42	$ 65,333.28	$ 65,986.61	$ 66,646.48	$ 67,312.95	$ 67,986.08	$ 68,665.94	$ 69,352.60
Total Value for Culverts							$ 592,752	**$ 295,000**		$ 598,679.52	$ 604,666.32	$ 610,712.98	$ 616,820.11	$ 622,988.31	$ 629,218.19	$ 635,510.37	$ 641,865.48	$ 648,284.13	$ 654,766.97

Indicates priority projects for capital improvements

Appendix 1 - Table 1B - Township of Chisholm - Buildings														
	In Service Year	**Estimated Life Span (Years)**	**Estimated Replacement Year**	**Estimated Replacement Cost 2013**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Township Office	1989	60	2036	$ 504,960	$ 510,009.60	$ 515,109.70	$ 520,260.79	$ 525,463.40	$ 530,718.03	$ 536,025.22	$ 541,385.47	$ 546,799.32	$ 552,267.32	$ 557,789.99
Fire Hall	1987	60	2038	$ 24,960	$ 25,209.60	$ 25,461.70	$ 25,716.31	$ 25,973.48	$ 26,233.21	$ 26,495.54	$ 26,760.50	$ 27,028.10	$ 27,298.38	$ 27,571.37
Public Works Building	1978	50	2047	$ 131,200	$ 132,512.00	$ 133,837.12	$ 135,175.49	$ 136,527.25	$ 137,892.52	$ 139,271.44	$ 140,664.16	$ 142,070.80	$ 143,491.51	$ 144,926.42
Public Works Storage Shed	2008	50	2058	$ 21,120	$ 21,331.20	$ 21,544.51	$ 21,759.96	$ 21,977.56	$ 22,197.33	$ 22,419.31	$ 22,643.50	$ 22,869.93	$ 23,098.63	$ 23,329.62
Total Projected Expenditures by year for Replacement of Buildings														
Total Annualized Replacement Value for Buildings				$ 682,240	$ 689,062	$ 695,953	$ 702,913	$ 709,942	$ 717,041	$ 724,212	$ 731,454	$ 738,768	$ 746,156	$ 753,617

Table 1C - Township of Chisholm - Vehicles

	In Service Year	Estimated Life Span (Years)	Estimated Replacement Year	Estimated Replacement Cost 2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Public Works					$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Volvo Truck, Model 64T	2000	10	2020	$ 166,476	$ 168,140.76	$ 169,822.17	Vehicle to be retired		$ -	$ -	$ -	$ -	$ -	$ -
Mack Truck, CV-713	2015	10	2015	$ 182,918	$ 184,747.18	$ 186,594.65	$ 188,460.60	$ 190,345.20	$ 192,248.66	$ 194,171.14	$ 196,112.85	$ 198,073.98	$ 200,054.72	$ 202,055.27
Loader Backhoe, Model BL70	2004	10	2018	$ 164,488	$ 166,132.88	$ 167,794.21	$ 169,472.15	$ 171,166.87	$ 172,878.54	$ 174,607.33	$ 176,353.40	$ 178,116.93	$ 179,898.10	$ 181,697.08
GMC Sierra SL, Long Box	2006	5	2014	$ 36,281	$ 36,643.81	$ 37,010.25	$ 37,380.35	$ 37,754.15	$ 38,131.70	$ 38,513.01	$ 38,898.14	$ 39,287.12	$ 39,680.00	$ 40,076.80
Ford Ranger	2009	5	2014	$ 22,363	$ 22,586.63	$ 22,812.50	$ 23,040.62	$ 23,271.03	$ 23,503.74	$ 23,738.78	$ 23,976.16	$ 24,215.92	$ 24,458.08	$ 24,702.66
International	2012	10	2022	$ 179,077	$ 180,867.77	$ 182,676.45	$ 184,503.21	$ 186,348.24	$ 188,211.73	$ 190,093.84	$ 191,994.78	$ 193,914.73	$ 195,853.88	$ 197,812.42
Grader	2012	15	2027	$ 265,673	$ 268,329.73	$ 271,013.03	$ 273,723.16	$ 276,460.39	$ 279,224.99	$ 282,017.24	$ 284,837.42	$ 287,685.79	$ 290,562.65	$ 293,468.27
Fire					$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ford Tanker	2003	15	2018	$ 23,602	$ 23,838.02	$ 24,076.40	$ 24,317.16	$ 24,560.34	$ 24,805.94	$ 25,054.00	$ 25,304.54	$ 25,557.58	$ 25,813.16	$ 26,071.29
Dodge Ram Pick-up	2006	5	2020	$ 5,309	$ 5,362.09	$ 5,415.71	$ 5,469.87	$ 5,524.57	$ 5,579.81	$ 5,635.61	$ 5,691.97	$ 5,748.89	$ 5,806.38	$ 5,864.44
1992 Spartan Quality Fire Truck	2011	15	2027	$ 54,910	$ 55,459.10	$ 56,013.69	$ 56,573.83	$ 57,139.57	$ 57,710.96	$ 58,288.07	$ 58,870.95	$ 59,459.66	$ 60,054.26	$ 60,654.80
Total Projected Expenditures by year for Replacement of Vehicles						$ 22,812.50	$ 225,840.95			$ 199,661.33	$ 5,691.97		$ 195,853.88	
Total Annualized Replacement Value for Vehicles				$ 1,101,097	$ 1,112,108	$ 1,123,229	$ 962,941	$ 972,570	$ 982,296	$ 992,119	$ 1,002,040	$ 1,012,061	$ 1,022,181	$ 1,032,403

Indicates Year in which vehicle should be replaced

Table 1D - Township of Chisholm - Machinery and Equipment														
	In Service Year	**Estimated Life Span (Years)**	**Estimated Replacement Year**	**Estimated Replacement Cost (Jan 1 2013)**	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
General Government					$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Photocopier	2012	10	2022	$ 6,682	$ 6,748.82	$ 6,816.31	$ 6,884.47	$ 6,953.32	$ 7,022.85	$ 7,093.08	$ 7,164.01	$ 7,235.65	$ 7,308.00	$ 7,381.09
Public Works					$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Vadium Software	2009	10	2022	$ 56,545	$ 57,110.45	$ 57,681.55	$ 58,258.37	$ 58,840.95	$ 59,429.36	$ 60,023.66	$ 60,623.89	$ 61,230.13	$ 61,842.43	$ 62,460.86
Portable Garage	2012	15	2027	$ 7,389	$ 7,462.89	$ 7,537.52	$ 7,612.89	$ 7,689.02	$ 7,765.91	$ 7,843.57	$ 7,922.01	$ 8,001.23	$ 8,081.24	$ 8,162.05
Recreation					$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Playground & Equipment	2012	25	2037	$ 41,212	$ 41,624.12	$ 42,040.36	$ 42,460.76	$ 42,885.37	$ 43,314.23	$ 43,747.37	$ 44,184.84	$ 44,626.69	$ 45,072.96	$ 45,523.69
					$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Projected Expenditures by year for Replacement of Machinery & Equipment					$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,308.00	$ -
Total Annualized Replacement Value for Vehicles				$ 111,828	$ 112,946	$ 114,076	$ 115,217	$ 116,369	$ 117,532	$ 118,708	$ 119,895	$ 121,094	$ 122,305	$ 123,528

Indicates Year in which Machinery or Equipment should be replaced

Table 1F

Yearly Revenue and Expenditure Summary — Township of Chisholm

	Actual		Anticipated	Forecast									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Capital Expenditures													
Non-infrastructure solutions[1]													
Maintenance activities[2]			279,000										
Renewal/Rehabilitation activities -													
Roads			2,521	$ 1,397,767	$ 50,000	$ 50,000	$ 30,000	$ 65,000		$ 50,000	$ 50,000	$ 50,000	$ 50,000
Bridges			500	$ 16,000	$ 116,500	$ -	$ -	$ -					
Culverts			0	$ 5,000		$ 50,000	$ 50,000	$ -		$ 100,000	$ 95,000		
Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicles				$ 64,592.53		$ 225,841	0		$ 199,661	$ 5,692	$ -		$ 195,854
Equipment												$ 7,308	
Disposal Activities[3]													
Expansion Activities[4]													
Total Capital Expenditures	**0**	**0**	**282,021**	**1,483,360**	**166,500**	**325,841**	**80,000**	**65,000**	**199,661**	**155,692**	**145,000**	**57,308**	**245,854**
Reserves and Reserve Funds													
Balance, beginning of year			635,965	554,620	570,230	573,146	589,371	586,909	597,762	574,933	507,426	540,244	539,391
Transfers to reserves			130,257	30,610	30,916	31,225	31,538	31,853	32,171	32,493	32,818	33,146	33,478
Transfers from reserves			(211,602)	(15,000)	(28,000)	(15,000)	(34,000)	(21,000)	(55,000)	(100,000)	0	(34,000)	(15,000)
Net increase (decrease) in Reserves and Reserve Funds	**0**	**0**	**(81,345)**	**15,610**	**2,916**	**16,225**	**(2,462)**	**10,853**	**(22,829)**	**(67,507)**	**32,818**	**(854)**	**18,478**
Existing Debt			88,150	**87,151**	**79,895**	**78,995**	**50,948**	**48,396**	48,397	39,377	23,206	11,603	
Long-term Debt					6958	32,752	50,663	49,163	54,621	59,779	64,837	69,596	79,473
Net decrease (increase) in long-term debt			**88,150**	**87,151**	**86,853**	**111,747**	**101,611**	**97,559**	**103,018**	**99,156**	**88,043**	**81,199**	**79,473**
Total Net Capital, Reserve, and Long-term Debt Funding Requirements	**0**	**0**	**288,826**	**1,586,121**	**256,269**	**453,813**	**179,148**	**173,411**	**279,851**	**187,341**	**265,862**	**137,653**	**343,804**

	Actual		Anticipated	Forecast									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Sources of Funding													
Government Grants - I				1,397,767									
Government Grants - 2													
Gas Tax Funding (estimated)			73,000	73,000	73,000	73,000	73,000	73,000	73,000	73,000	73,000	73,000	73,000
Other Funding Sources													0
Taxation			100,000	100,000	101,000	102,010	103,030	104,060	105,101	106,152	107,214	108,286	109,369
Loans					100,000	275,000			100,000		100,000		175,000
Total Sources of Funding	**0**	**0**	**173,000**	**1,570,767**	**274,000**	**450,010**	**176,030**	**177,060**	**278,101**	**179,152**	**280,214**	**181,286**	**357,369**
Funding Shortfall Relative to Financial Requirements	**0**	**0**	**(115,826)**	**(15,354)**	**17,731**	**(3,803)**	**(3,118)**	**3,649**	**(1,750)**	**(8,189)**	**14,352**	**43,633**	**13,564**
Asset Replacement Costs				**1,389,834**	**1,666,095**	**1,324,500**	**229,500**	**452,185**	**279,500**	**482,985**	**525,354**	**424,342**	
Funding Shortfall based on replacement of all Assets				**93,526**	**(1,499,595)**	**(998,659)**	**(149,500)**	**(387,185)**	**(79,839)**	**(327,293)**	**(380,354)**	**(367,034)**	

Notes

1. For the purposes of the initial asset management plan, the Township has focussed on maintaining, renewing/rehabilitating and replacing its existing asset base. Consequently, expenditures associated with non-infrastructure solutions are not anticipated in the planning period.
2. Additional maintenance requirements resulting from the adoption of a preservation management approach have been discussed in the plan. However, since existing and additional maintenance expenditures are considered in the annual operating budgets, they are not identified in the capital expenditures above. The Municipality undertakes gravelling on an annula basis with expenditures of approximately $135 000.
3. There are no significant disposal expenditures anticipated in the planning period; however, rolling stock will be sold or traded in when vehicles are replaced.
4. Population growth over the planning period is expected to be minimal. Consequently, no significant expansion activity expenditures are anticipated.

5. Loans: $100,000 @ 4%0 over 10 years commencing mid 2015 with repayment of $13,616 annually and $6,958 in first year. Loan of $275,000 @ 4% over 10 years commencing mid 2016 with repayment of $37,445 annually and $19,135 in first year. Loan of $100,000 @ 4% over 10 years commencing mid 2019 and mid 2021 with repayment of $13,616 annually and $6,958 in first year. Loan of $175,000 @ 4% over 10 years commencing mid 2023 with repayment of $24,354 annually and $12,177 in first year.

LEVEL OF SERVICE

May 23, 2014

Levels of service are established for all types of Municipal Infrastructure

Contents

Levels of Service

Levels of service provide a measuring stick to ensure that municipal infrastructure is maintained to a standard that protects the municipal investment and sustains or prolongs the life of bridges, roads, buildings, equipment and other infrastructure. By establishing a level of service, the municipality will be able to identify the condition of all infrastructure on an ongoing basis and undertake measures to repair, upgrade or better all municipal assets over their lifespan. The intent of establishing levels of service is to also ensure that regulatory requirements are also met, notably, the minimum maintenance standards for municipal highways (Ontario Regulation 239/02).

The levels of service set out in the following pages provide a written series of procedures that will guide Council in making financial decisions designed to maintain all of the municipality's capital assets to the level appropriate for the municipality given its relative priorities and minimum legislated requirements. The service level standards will ensure the delivery of a quality level of services and an appropriate measure of accountability to municipal taxpayers.

The levels of service are organized by the type of asset or infrastructure and a series of objectives to be achieved through adherence to specific standards or levels of service. In a rural township municipality, the most significant assets are roads and bridges as they are crucial to the conveyance of people and goods and services. Council has taken measures to improve the condition of the road network through better ditching, brushing, graveling and grading; however, careful capital programming will be required to sustain the road system over the coming years. Performance targets require the municipality to maintain capital assets by undertaking repairs immediately or on an as needed basis where required and by ditching, brushing and resurfacing roads on a regular cycle. Council intends to provide adequate funding of road and bridge improvements to replace these facilities within their prescribed lifespan.

Some bridge structures have been replaced with culverts to reduce maintenance costs while extending the lifespan of these water crossings. The municipality will continue to have bridge and culvert structures inspected by a professional engineer once every two years, followed by the implementation of the recommended program for repairing and upgrading these structures.

The Municipality maintains an inventory of municipal buildings, rolling stock and equipment. Extending the lifespan of these assets requires a program of regular maintenance and retrofitting. For buildings, the program includes regular servicing of the HVAC system and retrofitting windows, doors and walls for energy conservation. For vehicles, regularly scheduled maintenance by staff or through contracting out is required. Council recognizes that capital reserves must be diligently set aside to replace vehicles and equipment where these assets have reached the end of their useful lifespan.

Section 1 - Bridges and Culverts

Asset Type: Bridges
Category No. 1-1
Effective Date: December 31, 2013

Bridges:

- **Objectives**
- To ensure safe vehicular and pedestrian passage
- To protect public investment in all bridge structures
- To comply with Ontario Reg. 239/02

Bridges:

- **Level of Service**
- All bridge structures will be cleaned of winter sand and debris in the spring of the year either by manual or flushing operations
- Exposed metal surfaces will be painted and sealed as required
- Approach roads to bridges will be properly maintained to reduce any unnecessary impact on the bridge deck
- Bridge signing shall be checked and replaced as neccessary
- Load limits will be posted, where required.
- Bridge deck spalls and bridge deck surfaces shall be repaired in accordance with O. Reg 239/02
- All bridges will be inspected every second year by a Professional Engineer to ensure compliance with provincial legislation and regulations
- Bridges will be replaced within their projected lifespan subject to the availability of funds
- Municipality shall endevour to maintain a minimum Overall Bridge Condition Index of 60 with single bridge having condition below 30

Section 1 – Bridges and Culverts

Asset Type: Road Culverts
Category No. 1-2
Effective Date: December 31, 2013

Road Culverts:

- **Objectives**
- To ensure safe vehicular and pedestrian passage on municipal roads
- To maintain road culverts free of obstructions that may impede proper surface water flow
- To comply with Ontario Reg. 239/02

Road Culverts:

- **Level of Service**
- All culverts will be inspected once a year through routine road patrols.
- Inlets and outlets shall be cleared of obstructions on an as needed basis
- During major rainfall events culverts in known problem areas will be checked and cleared of obstructions
- All "structural" culverts as defined by the Canadian Highway Bridge Design Code, will be inspected every second year by a Professional Engineer to ensure compliance with provincial legislation and regulations. Recommended repairs will be carried out in accordance with the Engineer's recommendations.
- Culverts will be replaced within their projected lifespan

Section 1 – Bridges and Culverts

Asset Type: New Culverts (New Construction)
Category No. 1-3
Effective Date: December 31, 2013

Road Culverts:

- **Objectives**
- To provide for proper stormwater runoff on municipal roads that will limit the damage to a travelled road and surrounding properties due to standing water or the impact of heavy rainfall
- To comply with Ontario Reg. 239/02

Road Culverts:

- **Level of Service**
- New culverts will be installed in conjuction with adjacent road works, to the maximum extent possible, when and where appropriate.
- New culverts will be installed prior to road reconstruction, where required.
- Culverts will be sized properly prior to installation to accommodate surrounding surface drainage. Consider MTO Drainage Manual for minimum standards related to roadway function, e.g. local, collector, arterial.
- During major rainfall events culverts in known problem areas will be checked and cleared of obstructions
- New culvert material selection shall be based on achieving a useful service life that is consistent, or a multiple of, the above roadway service life. Only new approved culverts will be used.
- Road surfaces above culverts will be reinstated to equal or better than original. Consideration will be given to planned future road works. Road surfaces may remain gravel in anticipation of future resurfacing works, however in no case will the road surface above a culvert remain in a lesser state than adjacent road over the winter.

Section 1 – Bridges and Culverts

Asset Type: Entrance Culvert Maintenance
Category No. 1-4
Effective Date: December 31, 2013

Entrance Culverts:

- **Objectives**
- To conduct the free flow of water in roadside ditches
- To provide for safe ingress and egress from public roads to private property
- To comply with Ontario Reg. 239/02

Entrance Culverts:

- **Level of Service**
- Damaged or non-functioning entrance culverts shall be scheduled for repairs or replacement where drainage function has been compromised or where failure of the culvert represents an unacceptable risk to safety.
- Entrance culverts shall be cleared of obstructions and debris on an as needed basis
- Damaged inlets and outlets shall be repaired or corrected where the damage causes a negative impact to the culverts drainage function.
- The maintenance or replacement of a hard surface on an entranceway (driveway) shall be the responsibility of the property owner

Section 2 - Roads

Asset Type: Capital Planning for Roads
Category No. 2-1
Effective Date: December 31, 2013

Capital Planning for Roads:

- **Objectives**
- To maintain the municipal road network in a safe and functional condition
- To review road conditions on a regularly scheduled basis
- To comply with Ontario Reg. 239/02

Capital Planning for Roads:

- **Level of Service**
- Routine road patrols shall be conducted in accordance with Ontario Reg. 239/02, as a minimum.
- A roads needs assessment will be prepared by a qualified professional at least every 5 years.
- The Municipality adopts a preservation management approach to road infrastructure management.
- Gravel Roads shall be resurfaced (gravelled) every 3-5 years.
- Roads with the highest traffic volumes will receive priority for capital improvements. The Municipality shall endeavor to maintain a road surface consistent with the volume of traffic carried by the road, as follows:
  - AADT 0 to 199 - Gravel
  - AADT 200 to 399 - Low Class Bituminous (Surface Treated)
  - AADT 400+ - High Class Bituminous (Hot Mix Asphalt)
- Roads shall not be reconstructed strictly due to surface width deficiency provided there is no history of safety or operational concerns.

Section 2 – Roadside Maintenance

Asset Type: Ditching
Category No. 2-2
Effective Date: December 31, 2013

Ditching:

- **Objectives**
- To maintain the municipal drainage system so as to control and remove surface water within the road allowance
- To prevent erosion and unsafe conditions on the traveled road
- To prevent damage to the road caused by excessive water saturating the road sub-base
- To comply with Ontario Reg. 239/02

Ditching:

- **Level of Service**
- The council recognizes a free draining roadbed is critical to the long-term health of the roadbed and road surface. An annual ditching program shall be maintained to ensure ditches remain free of debris and sediment and serve their intended function.
- Ditches shall be constructed to direct surface runoff to a suitable outlet
- Ditches shall be constructed with a minimum 2:1 slope, flatter sideslopes are preferred to improve roadside safety, where possible. Ditch depths shall be as required to ensure positive drainage and drainage of the roadbed, in accordance with Ontario Provincial Standards.
- Obstructions to the flow line shall be removed on an as-needed basis

Section 2 – Roadside Maintenance

Asset Type: Brushing
Category No. 2-3
Effective Date: December 31, 2013

Brushing:

- **Objectives**
- To maintain safe sightline distances
- To reduce or eliminate snow drifting conditions and reduce or eliminate road frosting by reducing road shading.
- To protect the road base structure by removing brush and trees rooting in the sub-base
- To enhance the aesthetics of municipal roads
- To comply with Ontario Reg. 239/02

Brushing:

- **Level of Service**
- Dangerous trees, brush and limbs on or overhanging the right-of-way will be removed where they present a traffic hazard
- Brush growing in such a manner that restricts drainage or sight lines shall be removed. Priority will be given to brushing on curves, at intersections/entrances , and locations prone to wildlife crossing.
- Stumps will be cut at the ground line
- Permission shall be obtained from a property owner to enter onto private property to remove encroaching trees or limbs.
- Brushing shall be a priority in those locations which are prone to road frosting to remove shading of the road.

Section 2 – Roadside Maintenance

Asset Type: Stormwater Management
Category No. 2-4
Effective Date: December 31, 2013

Stormwater:

- **Objectives**
- To ensure adequate function and operation of storm drainage facilities where present.
- To comply with Ontario Reg. 239/02

Stormwater:

- **Level of Service**
- Rainfall run-off from private development will be regulated to protect municipal roads, ditches and culverts.

Section 2 – Roadside Maintenance

Asset Type: Beaver Management
Category No. 2-5
Effective Date: September 30, 2013

Beavers:

- **Objectives**
- To avoid damage to roads or wash-outs caused by beaver dams.
- To protect public investment in municipal infrastructure

Beavers:

- **Level of Service**
- Known problem areas will be monitored.
- Beaver dams or structures which may cause a flood or wash-out condition will be removed as required.
- Beavers will be trapped where necessary to remove threats to municipal roads and culverts

Section 2 – Roadside Maintenance

Asset Type: Litter Pick-up
Category No. 2-6
Effective Date: December 31,, 2013

Litter Pick-up:

- **Objectives**
- To keep roadsides and traveled surfaces in a clean, safe condition by removing unsightly and hazardous objects
- To remove obstructions from drainage courses
- To comply with Ontario Reg. 239/02

Litter Pick-up:

- **Level of Service**
- Debris such as cans, tire treads, bottles, animal carcasses, branches and other hazardous objects will be removed as part of daily surveillance or through public complaint.
- Debris will be removed from drainage courses on an as needed basis
- Debris will not be allowed to accumulate on lightly traveled roads thus encouraging illegal dumping
- Debris and litter will be disposed of at a licensed waste disposal facility
- Priority will be given to removal of litter causing a safety hazard to motorists

Section 3 - Hardtop Surfaces

Asset Type: Bituminous Surfaces
Category No. 3-1
Effective Date: December 31, 2013

Bituminous Surfaces

OBJECTIVES:

- **Objectives**
- To provide a smooth, safe riding surface free from defects
- To eliminate hazards to vehicular traffic
- To protect the investment in the road surface
- To comply with Ontario Reg. 239/02

Bituminous Surfaces

LEVEL OF SERVICE:

- **Level of Service**
- Road surface condition rating shall be maintained at or above a **6 out of 10**, as defined in the MTO Inventory Manual for Municipal Roads, February 1991 subject to the availability of funding. Road surfaces less than a rating of 6 will be programmed for rehabilitation.
  A 6/10 rating implies " 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 or eneven crown, or a feeling that the car is taking undue punishment." For an 80km/h speed limit, the minimum tolerable speed is considered 65 km/h. For a 50 km/h speed limit, the minimum tolerable speed is considered 45km/h.
- Potholes and cracks will be repaired to Ontario Reg. 239/02 standards
- Chip-sealed surfaces will be repaired and resealed where damaged.
- Loose gravel on hard surfaces will be removed
- Cold weather repairs will be made with cold mix asphalt
- Water shall not be allowed to accumulate on hard surfaces where it can be avoided.
- Hardtop surfaces will be resurfaced /replaced within the projected lifespan of the road surface subject to the availability of funding.

Section 3 – Hardtop Surfaces

Asset Type: Sweeping
Category No. 3-2
Effective Date: September 30, 2013

Sweeping:

- **Objectives**
- To remove accumulated winter sand from road surfaces, asphalt boulevards, sidewalks and bridge decks
- To prevent injuries to public arising from accumulated street debris and dirt
- To prevent clogging of culverts
- To comply with Ontario Reg. 239/02

Sweeping:

- **Level of Service**
- Rural hardtop intersections will be swept on an as needed basis

Section 3 – Hardtop Surfaces

Asset Type: Shoulder Maintenance
Category No. 3-3
Effective Date: December 31, 2013

Shoulder Maintenance

- **Objectives**
- To maintain a safe, smooth shoulder relatively free from defects
- To safely accommodate emergency stopping of vehicles
- To provide lateral support for the riding surface
- To prevet ponding on the traveled road surface
- To comply with Ontario Reg. 239/02

Shoulder Maintenance

- **Level of Service**
- Shoulder dop-offs shall be maintained to Ontario Reg. 239/02 standards
- Washouts from heavy rains shall be repaired
- Persistent soft areas shall be repaired
- The crossfall from the edge of pavement to the outer edge of shoulder shall be maintained at a minumum of 4% and a maximum of 8%
- Debris, rocks and hazardous materials shall be removed
- Gravel or sand windrows at edge of pavement shall be removed to permit surface drainage
- Shoulder grading shall be carried out annually in the spring to provide lateral support to all paved road surfaces

Section 3 – Hard Top Surfaces

Asset Type: Road Base Repairs
Category No. 3-4
Effective Date: December 31, 2013

Hard Top Surfaces:

- **Objectives**
- To provide a free draining road base suitable to carry the expected traffic volumes and loads for the class of road.
- To support the road surface and prevent premature deterioration of the surface.
- To protect the investment in the road
- To comply with Ontario Reg. 239/02

Hard Top Surfaces:

- **Level of Service**
- Upon reconstruction of a road, the road base will be improved to the level required to support the expected traffic loading over the life of the overlying hard top surface
- Frequent or extensive areas of pavement deterioration or distress shall be investigated to confirm the root cause.
- Localized areas of deterioration or distress will be repaired where feasible, by municipal forces.
- Road sections exhibiting severe deterioration or distress along more than 15% of its length i.e. a structural adequacy score of less than **12/20 as per the MTO Inventory Manual for Municipal Roads, February 1991**, shall be programmed for reconstruction subject to the availability of funding.

Section 4 - Loose Top Surfaces

Asset Type: Grading Loose Top
Category No. 4-1
Effective Date: December 31, 2013

Loose Top Surfaces:

- **Objectives**
- To provide a smooth, safe riding surface free from defects
- To eliminate hazards to vehicular traffic
- To protect the investment in the road
- To comply with Ontario Reg. 239/02

Loose Top Surfaces:

- **Level of Service**
- All gravel surfaces will be graded at least once annually and more frequently on higher traffic volume roads as needed
- Gravel will be added to resurface gravel roads when there is a general loss of surface material
- Grading and gravelling will be undertaken prior to any dust control
- A crown crossfall of **3%** measured from the centreline to edge of the road will be maintained
- The outside edge of the road surface shall be maintained flush with the grassed roadside to allow for proper drainage
- Rocks greater than **three (3) inches** in diameter heaved to surface by frost action will be removed
- Potholes will be repaired to Ontario Reg. 239/02 standards

Section 4 – Loose Top Surfaces

Asset Type: Road Base Repairs
Category No. 4-2
Effective Date: September 30, 2013

Road Base Repairs:

- **Objectives**
- To correct areas where the stress created by traffic loads has caused deformation, displacement or hazardous conditions
- To correct areas where adequate drainage of the road bed has not been provided or needs repair, resulting in distress manifestation in the road.
- To comply with Ontario Reg. 239/02 subject to the avilability of funding

Road Base Repairs:

- **Level of Service**
- Frequent or extensive areas of deterioration or distress shall be investigated to confirm the root cause.
- Localized areas of deterioration or distress will be repaired where feasible, by municipal forces.
- Road sections exhibiting severe deterioration or distress along more than 15% of its length i.e. a structural adequacy score of less than 12/20 as per the MTO Inventory Manual for Municipal Roads, February 1991, shall be programmed for reconstruction subject to the availability of funds.
- Areas subject to the percolating of mud and water shall be repaired.
- The riding surface shall be reinstated to an equal or better condition.
- Contaminated sub-base materials shall be disposed of off-site and replaced with dry granular materials.

Section 4 – Loose Top Surfaces

Asset Type: Dust Control
Category No. 4-3
Effective Date: September 30, 2013

Dust Control:

- **Objectives**
- To protect the health and safety of the public by controlling airborne dust on graveled roads
- To protect the riding surface by consolidating the granular material
- To comply with Ontario Reg. 239/02

Dust Control:

- **Level of Service**
- An approved dust supressant will be applied annually in late spring
- Dust supressants will be applied to areas of residential and other developed areas which are in close proximity to the road, also at intersections and on steep grades
- Additional dust dupressant will be applied on an as needed basis during the summer months
- Dust supressants will only be added after annual surface graveling or grading

Section 5 - Winter Control

Asset Type: Snowplowing
Category No. 5-1
Effective Date: December 31, 2013

Snow Plowing:

- **Objectives**
- To maintain safe, passable road surfaces during winter conditions
- To comply with Ontario Reg. 239/02

Snow Plowing:

- **Level of Service**
- Roads shall be plowed in compliance with Ontario Reg. 239/02
- Predetermined routes for plowing shall be followed except for emergency situations

Section 5 – Winter Control

Asset Type: Snow Removal - Roadway
Category No. 5-2
Effective Date: December 31, 2013

Snow Removal:

- **Objectives**
- To maintain safe, passable road surfaces and intersections during winter conditions
- To maintain visibility at intersections and pedestrian crossings and to maintain a suitable travelled lane width.
- To comply with Ontario Reg. 239/02

Snow Removal:

- **Level of Service**
- Removal of snow accumulation shall be in compliance with Ontario Reg. 239/02
- Snow acccumulation at key intersections will be removed where sight distances are impaired
- Snow removal in other locations will be at the discretion of the public works manager to achieve the above objectives

Section 5 – Winter Control

Asset Type: Sanding / Salting
Category No. 5-3
Effective Date: December 31, 2013

Sanding:

- **Objectives**
- To maintain safe, passable road surfaces and intersections during winter conditions
- To reduce the hazards of icy roads
- To facilitate the handling of emergencies by police, fire and paramedic services
- To comply with Ontario Reg. 239/02

Sanding:

- **Level of Service**
- Ice formation prevention and treatment of icy roadways shall be in compliance with Ontario Reg. 239/02
- Predetermined routes for sanding will be followed except in emergency situations
- Sanding will be performed on steep grades, curves and intersections after the road has been plowed
- Sanding of other areas shall be at the discretion of the public roads manager
- Continuous sanding shall be carried out to address freezing rain conditions only

Section 5 – Winter Control

Asset Type: Snow Removal - Other
Category No. 5-4
Effective Date: December 31, 2013

Winter Drainage:

- **Objectives**
- To reduce the hazards created by allowing water to accumulate on the traveled road during the winter months and spring thaw
- To comply with Ontario Reg. 239/02

Winter Drainage:

- **Level of Service**
- Restricted or blocked culverts shall be cleared of ice and snow to allow for proper flow of spring runoff
- Ditches shall be cleared of packed snow that is restricting flow or runoff

Section 6 - Safety Devices and Standards

Asset Type: Signs
Category No. 6-1
Effective Date: December 31, 2013

Signs

- **Objectives**
- To regulate, safeguard and expedite traffic movements
- To provide information as to routes, directions, road/street destinations
- To designate parking limitations and other regulations as they apply to the safe use of a municipal road and public highway
- To comply with Ontario Reg. 239/02

Signs

- **Level of Service**
- The use and maintainence of traffic control signs and systems shall be in compliance with Ontario Reg. 239/02
- All damaged, defaced or illegible signs shall be repaired or replaced. Stop signs shall be repaired or replaced immediately upon notification
- Obstructions of signs caused by brush, high weeds and tree limbs shall be removed
- All highway signs shall conform and be installed in accordance with the Ontario Traffic Manual and the Highway Traffic Act

Section 6 – Safety Devices and Standards

Asset Type: Protective Barriers and Guiderails
Category No. 6-2
Effective Date: September 30, 2013

Protective Barriers:

- **Objectives**
- To maintain barriers so as to effectively serve as a guide to vehicular traffic and protection to the travelling public
- To define and protect against sharp curves, steep inclines and hazards off the travelled roadway
- To comply with Ontario Reg. 239/02

Protective Barriers:

- **Level of Service**
- Guiderail damaged because of vehicular accidents shall be replaced as soon as possible after the damage occurred
- New guiderail installations and/or upgrades to existing guiderail installations will be undertaken at those locations where traffic operations or safety concerns have been identified
- All new or replacement installations or maintenance of protective barriers shall be in strict compliance with current Ontario Provincial Standard Specifications (OPSS) and Ontario Provincial Standards Drawings (OPSD)
- Protective barriers associated with bridges and culverts shall be reviewed for protective barrier requirements per the recommendations of the bridge and culvert inspection report, where applicable

Section 6 – Safety Devices and Standards

Asset Type: Road Patrol
Category No. 6-3
Effective Date: September 30, 2013

Road Patrol:

- **Objectives**
- To provide for the routine inspection of all municipal roads
- To record and maintain records of defects requiring action
- To maintain roads in a safe condition
- To comply with Ontario Reg. 239/02

Road Patrol:

- **Level of Service**
- The patrol person shall conduct patrols in accordance with Ontario Reg. 239/02 or more frequently as directed by the public works manager
- The patrol person shall identify and record all deficiencies including snow accumulation, ice and freezing rain conditions, potholes, shoulder drop-offs, cracks, washouts, damaged road signs, blocked drainage and any other hazardous conditions
- The patrol person in consultation with the public works manager shall arrange for the repair or necessary corrective action in a timely fashion

Section 7 - Municipal Vehicles

Asset Type: Public Works, Fire, Recreation and Other Municipal Vehicles
Category No. 7-1
Effective Date: September 30, 2013

Municipal Vehicles:

- **Objectives**
- To maintain and prolong the lifespan of all municipal vehicles
- To ensure the readiness of municipal vehicles for their intended use including emergency use
- To comply with Provincial legislation for the licensing and operation of vehicles

Municipal Vehicles:

- **Level of Service**
- All vehicles shall be maintained in accordance with the applicable vehicle maintenance manual issued by the dealership or manufacturer
- The appropraite department head shall organize for regularly scheduled maintenance (i.e. oil changes, fluids, tire pressure etc.)
- Drivers and operators shall report any equipment problems to their supervisor or mechanic
- Major refits or equipment modifications shall be carried out in the off-season except for emergency repairs
- Operational records or logs shall be kept ion vehicle usage
- All vehicles shall be fuelled and left in a "ready-to-go" state after each shift or emergency operation
- All vehicles shall be maintained in a clean condition and washed on a regular basis to remove dirt or road salt
- The residual lifespan of a vehicle shall be evaluated annually and a report shall be submitted to the clerk
- All vehicles shall be operated in accordance with the relevant provincial legislation

Section 8 – Municipal Buildings and Equipment

Asset Type: Municipal Facilities
Category No. 8-2
Effective Date: September 30, 2013

Municipal Facilities:

- **Objectives**
- To maintain municipal facilities in a good state of repair
- To prolong the life of municipal facilities

Municipal Facilities:

- **Level of Service**
- Maintain tennis courts, boat launches and other outdoor facilities in a usable condition on a seasonal basis for users
- Repair vandalized or damaged facilities
- Maintain lighting and security systems on an as needed basis

Section 8 – Municipal Buildings and Equipment

Asset Type: Municipal Equipment
Category No. 8-3
Effective Date: September 30, 2013

Municipal Equipment:

- **Objectives**
- To maintain municipal equipment in a good state of repair
- To prolong the life of municipal equipment

Municipal Equipment:

- **Level of Service**
- Execute and maintain contracts for arrangements for the maintenance of all technical equipment (i.e. computers, photocopiers, fax machines, communication equipment)
- All small tools willl be kept in a safe, operable condition and stored in a secure location
- Schedule regular testing of equipment to meet industry standards (i.e. bunker gear, breathing apparatus, fire hoses, generators, defribrillators etc.)

Township of Chisholm - Road Needs Study 2013- Road Inventory

Priority Rating	Revised Priority Rating*	Sect. No	Boundary Road	Road Name	Location - From	To	Length (km)	AADT Est./Act. Year	AADT	Critical Deficiency: Surface Type	Surface Width	Struct. Adequc.	Drain	Resurfacing (Capital Reconstruction Costs: $10,314): Preliminary Improvement Type Recommendation	Cost ($1,000'S)	Roadside Environment
28	11	1944004301		GOLF COURSE RD	Memorial Park Drive	Chiswick Line	2.13	A2003C	480	NOW	ADEQ	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$274	R
27	10	1944013422		S SHORE RD	River Road	Twp Boundary West	2.17	A2003C	166	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$85	R
25	20	1944342228		VILLAGE RD	Township Boundary	River Road	2.06	A2003C	706	NOW	ADEQ	6 - 10	6 - 10	Recon 1R - Full Reconstruction + 1 Lift	$918	R
24	20	1944246973		GOLF COURSE RD	River Road	Booth Road	2.03	A2003C	467	NOW	ADEQ	6 - 10	6 - 10	Recon 1R - Full Reconstruction + 1 Lift	$905	R
24	8	1944463301		GRAVELLE RD	Chiswick Line	Pioneer Road	2.03	A2003C	100	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$80	R
23	19	1944149389		GOLF COURSE RD	Booth Road	Memorial Park Drive	2.04	A2003C	467	NOW	ADEQ	6 - 10	6 - 10	Recon 1R - Full Reconstruction + 1 Lift	$909	R
23	9	1944355162		WASING RD	Maple Road	Algonquin Road	4.13	A2003C	66	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$163	R
23	8	1944253474		VILLAGE RD	River Road	Grahamvale Road	2.21	A2003C	109	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$87	R
22	7	1944482458		MAPLE RD	Bear Mountain Road	Wasing Road	4.57	A2003C	73	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$180	R
22	9	1944088977		MEMORIAL PARK DI	Golf Course Road	End	4.09	A2003C	100	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$161	R
22	9	1944088221		GOLF COURSE RD	Chiswick Line	Pioneer Road	2.03	A2003C	166	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$80	R
22	7	1944211451		CHISWICK LINE	Golf Course Road	Gravelle Road	2.03	A2003C	196	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$80	R
21	7	1944332342		GRAHAMVALE RD	Alderdale Road	Village Road	1.47	A2003C	50	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$58	R
21	10	1944435274		PIONEER RD	Maple Road/Kells Rd	Golf Course Road	4.09	A2003C	120	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$161	R
21	8	1944370777		MEMORIAL PARK DI	Memory Lane	Green Point Road	0.94	A2003C	283	NOW	NOW	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$121	R
21	16	1944265315		ALDERDALE RD	Grahamvale Road	Memorial Park Drive	1.84	A2003C	600	NOW	ADEQ	ADEQ	6 - 10	Recon 1R - Full Reconstruction + 1 Lift	$820	R
20	7	1944188657		MAPLE RD	Pioneer Road	Wasing Road	2.03	A2003C	157	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$80	R
20	7	1944136872		RIVER RD	Golf Course Road	Twp Road	2.07	A2003C	230	NOW	NOW	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$267	R
20	8	1944045562		HS SIDING RD	Private Road	Alderdale Road	1.75	A2003C	73	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$69	R
20	8	1944157935		HS SIDING RD	Twp Boundary	Private Drive	0.34	A2003C	73	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$13	R
20	9	1944215803		BELLCAIRN RD	Chiswick Line	Pioneer Road	2.08	A2006E	125	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$82	R
19	8	1944138707		CHISWICK LINE	Gravelle Road	End	0.87	A2003C	56	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$34	R
19	7	1944144903		WASING RD	Algonquin Road	Golf Course Road	0.3	A2003C	66	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$12	R
19	6	1944044863		PIONEER RD	Golf Course Road	Gravelle Road	2.05	A2003C	57	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$81	R
18	9	1944119614		GOLF COURSE RD	Pioneer Road	Wasing Road	2.21	A2003C	133	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$87	R
18	7	1944299070		KELLS RD	Memorial Park Drive	Church Road	1.01	A2003C	77	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$40	R
17	7	1944010896		BEACH RD	Green Point Road	Memorial Park Drive	0.98	A2003C	53	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$39	R
16	16	1944321375		MEMORIAL PARK DI	Trapper Road	Alderdale Road	1.94	A2003C	663	ADEQ	ADEQ	6 - 10	6 - 10			R
16	8	1944195515	Yes	S SHORE RD	River Road	East Twp Limit	1.46	A2003C	235	NOW	ADEQ	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$188	R
16	9	1944478763		PIONEER RD	Boundary Road	Bellcairn Road	1.94	A2003C	87	ADEQ	ADEQ	ADEQ	6 - 10			R
16	7	1944008231		RIVER RD	Two Road to Two Rd	South Shore Road	2.1	A2003C	170	ADEQ	ADEQ	ADEQ	6 - 10			R
15	7	1944197246		CHISWICK LINE	Beach Road	Golf Course Road	2.03	A2003C	206	NOW	ADEQ	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$261	R
15	7	1944049185		KELLS RD	Chiswick Line	Pioneer Road	2.02	A2003C	150	ADEQ	ADEQ	ADEQ	6 - 10			R
15	8	1944056279		CHISWICK LINE	Alderdale Road	Bellcairn Road	0.3	A2003C	383	NOW	ADEQ	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$37	R
14	6	1944397264		KELLS RD	Church Road	Chiswick Line	1.03	A2003C	77	ADEQ	NOW	ADEQ	6 - 10	GGW - Gravel (75mm) with 1m Gravel Widening	$41	R
14	10	1944383667		ALDERDALE RD	Memorial Park Drive	Chiswick Line	2.04	A2003C	396	ADEQ	ADEQ	ADEQ	6 - 10			R
14	9	1944383581		RIVER RD	Village Road	Mallard Haven Road	1.04	A2003C	700	NOW	ADEQ	ADEQ	6 - 10	Recon 1R - Full Reconstruction + 1 Lift	$463	R
14	8	1944484008		MEMORIAL PARK DI	Green Point Road	Beach Road	1.13	A2003C	283	NOW	ADEQ	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$146	R
13	8	1944174128		MEMORIAL PARK DI	Beach Road	Golf Course Road	2.04	A2003C	177	ADEQ	ADEQ	ADEQ	6 - 10			R
13	10	1944014703		ALDERDALE RD	Grahamvale Road	River Road	2.04	A2003C	409	NOW	ADEQ	ADEQ	6 - 10	Recon 1R - Full Reconstruction + 1 Lift	$909	R
13	9	1944016138		CHISWICK LINE	Boundary Road	Point on Road	0.02	A2003C	270	ADEQ	ADEQ	ADEQ	6 - 10			R
13	8	1944385205		RIVER RD	Laporte Road	Golf Course Road	1.15	A2003C	443	NOW	ADEQ	ADEQ	6 - 10	Recon 1R - Full Reconstruction + 1 Lift	$512	R
13	8	1944335170		RIVER RD	Mallard Haven Road	Laporte Road	1.94	A2003C	443	NOW	ADEQ	ADEQ	6 - 10	Recon 1R - Full Reconstruction + 1 Lift	$864	R
13	8	1944465277		ALDERDALE RD	Memorial Park Drive	Memorial Park Drive W	0.19	A2003C	600	ADEQ	ADEQ	ADEQ	6 - 10			R
13	9	1944072294		CHISWICK LINE	Bell Cairn Road	Kells Road	1.85	A2003C	383	NOW	ADEQ	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$233	R
12	8	1944402585		MEMORIAL PARK DI	Alderdale Road	Kells Road	2.23	A2003C	346	ADEQ	ADEQ	ADEQ	6 - 10			R
12	10	1944060044		CHISWICK LINE	Kells Road	Beach Road	2.09	A2003C	206	NOW	ADEQ	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$269	R
11	8	1944052096		MEMORIAL PARK DI	Kells Road	Memory Lane	0.02	A2003C	283	ADEQ	ADEQ	ADEQ	6 - 10			R
11	7	1944016140		CHISWICK LINE	Point On Road	Alderdale Road	1.85	A2003C	270	NOW	ADEQ	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$238	R
11	8	1944016139		CHISWICK LINE	Point on Road	Point on Road	0	A2003C	270	NOW	ADEQ	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$0	R
11	10	1944038730		ALDERDALE RD	Twp Boundary	Hill Siding Road	1.72	A2003C	320	ADEQ	ADEQ	ADEQ	6 - 10			R
11	8	1944113714	Yes	BOUNDARY RD	Chiswick Line	Pioneer Road	1.98	A2003C	110	ADEQ	ADEQ	ADEQ	6 - 10			R
10	7	1944217337		PIONEER RD	Bellcairn Road	Maple Road/Kells Ro	2.02	A2003C	117	ADEQ	ADEQ	ADEQ	6 - 10			R
10	9	1944193803		RIVER RD	Alderdale Road	Village Road	2.02	A2003C	230	NOW	ADEQ	ADEQ	6 - 10	ST2A - Double Surface Treatment with Granular A	$260	R
8	8	1944062483		ALDERDALE RD	Hill Siding Road	River Road	0.31	A2003C	320	ADEQ	ADEQ	ADEQ	6 - 10		$10,314	R
1	1	1944025447	Yes	BOUNDARY RD	Chiswick Line	End	0.55	A2009E	49	ADEQ	NOW	NOW	NOW			R
1	1	1944004443	Yes	BOUNDARY RD	Concession Rd 8	End	0.11	A2009E	49	ADEQ	NOW	NOW	NOW			R
1	1	1944462876	Yes	BOUNDARY RD	Pioneer Road	Robson Lane/Con 8 R	0.05	A2006E	49	ADEQ	NOW	ADEQ	6 - 10			R
1	1	1944143958		CHURCH RD	Kells Road	End	1.05	A2006E	49	ADEQ	NOW	ADEQ	6 - 10			R
1	1	1944322935		GRAHAMVALE RD	Village Road	End	0.53	A2006E	49	ADEQ	NOW	ADEQ	6 - 10			R
1	1	1944373163		GREEN POINT RD	Beach Road	End	0.87	A2006E	49	ADEQ	NOW	NOW	NOW			R
1	1	1944405674		PIONEER RD	Gravelle Road	End	1.33	A2006E	49	ADEQ	ADEQ	ADEQ	6 - 10			R
1	1	1944189288		POPLARVALE RD	Poplarvale Rd	End	0.46	A2009E	49	ADEQ	NOW	NOW	NOW			R
1	1	1944016621		TRAPPERS RD	Memorial Park Drive	End	0.09	A2009E	49	ADEQ	NOW	NOW	NOW			R
1	1	1944059532		WASING RD	Maple Road	End	0.97	A2006E	49	ADEQ	NOW	ADEQ	6 - 10			R
1	1	1944426653		GRAVELLE RD	Polarvale Road	Pioneer Road	2.12	A2003C	40	ADEQ	ADEQ	ADEQ	6 - 10			R
1	1	1944318412		ISLANDVIEW LANE	End	Private Drive	0.44	A2006E	40	ADEQ	NOW	NOW	NOW			R
1	1	1944393725		ISLANDVIEW LANE	Private Drive	Beach Road	0.08	A2006E	40	ADEQ	NOW	NOW	NOW			R
1	1	1944348719		MALLARD HAVEN R	Private Drive	End	0.31	A2006E	40	ADEQ	NOW	NOW	NOW			R

Sect. No	Surface Type	Platform Width (m)	Entered Surface Width (m)	Surface Width (m)	Entered Shoulder Width (m)	Shoulder Width (m)	Drain	Terrain and Soil Type	Speed Limit (km/h)	Operating Speed (km/h) - Comfort Criteria	Traffic Operation	# of Lanes	Road Class	Horiz Align (10)	Vert Align (10)	Surface Cond (10)*	Shoulder Width (10)	Surface Width	Level of Service (20)	Str. Adeq (20)*	Drain (15)*	Maint. Demand (10)*	Condition Rating (100)	Revised Condition Rating (55)*	Photo ID
1944004301	G	8	6	6	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	400	10	10	7	5.5	1	0	17	13	7	71	44	41
1944013422	G	6.6	4.6	4.6	1	1	(ND) N	(NF) Non-Roc	50	50	o Way Undivi	2	200	9	7	7	5.5	1	0	15	12	8	65	42	72
1944342228	LCB	8.5	6.5	6.5	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	400	10	10	6	5.5	15	0	14	12	4	77	36	80
1944246973	LCB	8.7	6.7	6.7	1	1	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	400	10	10	5	5.5	15	0	14	12	3	75	34	66,67
1944463301	G	7	5	5	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	200	10	6	5	5.5	1	0	17	13	5	66	43	31
1944149389	LCB	8.8	6.8	6.8	1	1	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	400	10	10	5	5.5	15	0	14	12	4	76	35	64
1944355162	G	7	5	5	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	200	9	8	7	5.5	1	0	16	12	6	65	41	22
1944253474	G	7	5	5	1	1	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	200	7	10	7	5.5	1	0	16	13	8	68	44	77
1944482458	G	6.6	4.6	4.6	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	200	8	6	8	5.5	1	0	17	13	7	66	45	17
1944088977	G	6.6	4.6	4.6	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	200	10	9	8	5.5	1	0	16	12	6	68	42	42,43
1944088221	G	7.2	5.2	5.2	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	200	10	9	7	5.5	4	0	16	13	7	71	43	34
1944211451	G	6.8	4.8	4.8	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	200	10	10	8	5.5	1	0	17	14	7	73	46	33
1944332342	G	6.4	4.4	4.4	1	1	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	100	10	6	7	5.5	1	0	16	12	8	66	43	78
1944435274	G	7.2	5.2	5.2	1	1	(ND) N	(NR) Non-Ro	60	60	o Way Undivi	2	200	10	10	7	5.5	4	0	15	13	6	70	41	38
1944370777	G	7.2	5.2	5.2	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	300	10	10	6	5.5	4	0	17	13	8	75	46	62
1944265315	LCB	9.6	7.6	7.6	1	1	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	400	10	10	6	5.5	15	0	15	12	6	80	39	50
1944188657	G	7.4	5.4	5.4	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	200	9	7	8	5.5	7	0	17	13	7	73	45	16
1944136872	G	7.2	5.2	5.2	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	300	10	10	8	5.5	4	0	17	13	8	75	46	68
1944045562	G	6.6	4.6	4.6	1	1	(OD) O	(NR) Non-Ro	50	50	o Way Undivi	2	200	10	10	7	5.5	1	0	15	13	8	70	43	46
1944157935	G	6.6	4.6	4.6	1	1	(OD) O	(NR) Non-Ro	50	50	o Way Undivi	2	200	10	10	7	5.5	1	0	13	13	8	70	43	47
1944215803	G	7.2	5.2	5.2	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	200	10	10	8	5.5	4	0	16	13	6	72	43	10 South, 11 north
1944138707	G	6.8	4.8	4.8	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	200	10	10	7	5.5	1	0	16	13	7	70	43	32
1944144903	G	6.8	4.8	4.8	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	200	10	10	8	5.5	1	0	16	13	7	71	44	24
1944044863	G	7	5	5	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	200	10	9	8	5.5	1	0	17	13	7	71	45	36
1944119614	G	7.4	5.4	5.4	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	200	10	10	7	5.5	7	0	16	13	7	75	43	35
1944299070	G	7.2	5.2	5.2	1	1	(OD) O	(NR) Non-Ro	50	50	o Way Undivi	2	200	10	10	7	5.5	4	0	16	13	8	73	44	55
1944010896	G	7.2	5.2	5.2	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	200	10	10	7	5.5	4	0	16	13	8	73	44	60
1944321375	HCB	11	7	7	2	2	(OD) O	(RR) Rocky, H	80	80	o Way Undivi	2	400	10	10	5	10	15	0	13	13	8	84	39	1
1944195515	G	7.6	5.6	5.6	1	1	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	300	10	10	8	5.5	9	0	16	13	8	80	45	71
1944478763	G	7.6	5.6	5.6	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	200	10	10	8	5.5	9	0	13	13	7	76	41	8,9
1944008231	G	7.5	5.5	5.5	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	200	10	10	8	5.5	8	0	17	13	8	80	46	70
1944197246	G	7.6	5.6	5.6	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	300	10	10	8	5.5	9	0	17	14	7	81	46	40
1944049185	G	7.6	5.6	5.6	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	200	10	10	8	5.5	9	0	16	14	7	80	45	14
1944056279	G	7.8	5.8	5.8	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	300	10	10	8	5.5	12	0	17	14	7	84	46	12
1944397264	G	7.4	5.4	5.4	1	1	(OD) O	(NR) Non-Ro	50	50	o Way Undivi	2	200	10	10	8	5.5	7	0	17	13	8	78	46	57
1944383667	LCB	8.7	6.7	6.7	1	1	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	300	10	10	8	5.5	15	0	16	13	7	85	44	2
1944383581	LCB	9	7	7	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	400	10	10	8	5.5	15	0	17	13	8	87	46	75
1944484008	G	7.8	5.8	5.8	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	300	10	10	8	5.5	12	0	17	13	8	84	46	61
1944174128	G	7.8	5.8	5.8	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	200	10	10	8	5.5	12	0	17	12	8	83	45	63
1944014703	LCB	9.7	7.4	7.4	1.15	1.15	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	400	10	10	7	6.85	15	0	16	13	8	86	44	49
1944016138	LCB	8.2	6.2	6.2	1	1	(OD) O	(NF) Non-Roc	80	80	o Way Undivi	2	300	10	10	7	5.5	15	0	17	14	6	85	44	5
1944385205	LCB	9	7	7	1	1	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	400	10	10	8	5.5	15	0	17	13	8	87	46	73
1944335170	LCB	9	7	7	1	1	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	400	10	10	8	5.5	15	0	17	13	8	87	46	74
1944465277	HCB	9.8	7.8	7.8	1	1	(OD) O	(NF) Non-Roc	70	70	o Way Undivi	2	400	10	10	8	5.5	15	0	18	13	8	88	47	51
1944072294	G	8.6	6.6	6	1	1.3	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	300	10	8	8	8.2	15	0	17	14	6	86	45	13
1944402585	LCB	9	7	7	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	300	10	10	8	5.5	15	0	17	13	8	87	46	52
1944060044	G	8.4	6.4	6	1	1.2	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	300	10	10	7	7.3	15	0	16	13	7	85	43	39
1944052096	LCB	9	7	7	1	1	(ND) N	(NR) Non-Ro	60	60	o Way Undivi	2	300	10	10	8	5.5	15	0	17	13	8	87	46	53
1944016140	G	8.2	6.2	6	1	1.1	(OD) O	(NF) Non-Roc	80	80	o Way Undivi	2	300	10	8	9	6.4	15	0	17	14	7	86	47	3
1944016139	G	8.2	7.2	6	0.5	1.1	(OD) O	(NF) Non-Roc	70	70	o Way Undivi	2	300	10	10	7	6.4	15	0	17	14	7	86	45	4
1944038730	LCB	9.4	6.8	6.8	1.3	1.3	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	300	10	10	8	8.2	15	0	17	13	6	87	44	45
1944113714	G	8	6	6	1	1	(OD) O	(NF) Non-Roc	70	60	o Way Undivi	2	200	10	10	8	5.5	15	0	16	13	7	85	44	6
1944217337	G	8	6	6	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivi	2	200	10	10	8	5.5	15	0	17	13	7	86	45	15
1944193803	G	8.7	6.7	6	1	1.35	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	300	10	10	7	8.65	15	0	16	13	8	88	44	76
1944062483	LCB	9.8	6.8	6.8	1.5	1.5	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	300	10	10	8	10	15	0	17	13	8	91	46	48
1944025447				0		0					Two Way Undivi	2	100	10	10		1	1	0				22	0	
1944004443				0		0					Two Way Undivi	2	100	10	10		1	1	0				22	0	
1944462876	G	6.8	4.8	4.8	1	1	(OD) O	(NF) Non-Roc	70	60	o Way Undivi	2	100	10	10	8	5.5	1	0	16	13	7	71	44	7
1944143958	G	6.2	4.2	4.2	1	1	(OD) O	(NF) Non-Roc	50	50	o Way Undivi	2	100	10	10	8	5.5	1	0	17	13	8	73	46	56
1944322935	G	5.4	4.4	4.4	0.5	0.5	(OD) O	(NR) Non-Ro	70	70	o Way Undivi	2	100	10	10	7	1	1	0	16	12	8	65	43	79
1944373163				0		0					Two Way Undivi	2	100	10	10		1	1	0				22	0	
1944405674	G	7	5	5	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	100	10	8	8	5.5	1	0	17	13	7	70	45	37
1944189288				0		0					Two Way Undivi	2	100	10	10		1	1	0				22	0	
1944016621				0		0					Two Way Undivi	2	100	10	10		1	1	0				22	0	
1944059532	G	5.6	4.6	4.6	0.5	0.5	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	100	1	1	7	1	1	0	17	12	7	47	43	21
1944426653	G	7	5	5	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivi	2	100	9	10	8	5.5	1	0	17	13	5	69	43	30
1944318412				0		0					Two Way Undivi	2	100	10	10		1	1	0				22	0	
1944393725				0		0					Two Way Undivi	2	100	10	10		1	1	0				22	0	
1944348719				0		0					Two Way Undivi	2	100	10	10		1	1	0				22	0	

Sect. No	Comments	Length (km)	Replacement Cost per m: Surface	Base	Sub-Base	Total Replacement Cost: Surface	Base	Sub-Base
1944004301	South 1.8m gravel, 0.2 LCB	2.13	$ 28.80	$ 57.60	$ 99.36	$ 61,344.00	$ 122,688.00	$ 211,636.80
1944013422		2.17	$ 23.76	$ 47.52	$ 84.24	$ 51,559.20	$ 103,118.40	$ 182,800.80
1944342228	lots of patches, alligator cracks and bumps	2.06	$ 99.53	$ 61.20	$ 104.76	$ 205,034.38	$ 126,072.00	$ 215,805.60
1944246973	lots of patches, alligator cracks and bumps	2.03	$ 102.59	$ 62.64	$ 106.92	$ 208,265.31	$ 127,159.20	$ 217,047.60
1944463301		2.03	$ 25.20	$ 50.40	$ 88.56	$ 51,156.00	$ 102,312.00	$ 179,776.80
1944149389	lots of patches, alligator cracks and bumps	2.04	$ 104.13	$ 63.36	$ 108.00	$ 212,415.00	$ 129,254.40	$ 220,320.00
1944355162	Could use some gravel at west end	4.13	$ 25.20	$ 50.40	$ 88.56	$ 104,076.00	$ 208,152.00	$ 365,752.80
1944253474		2.21	$ 25.20	$ 50.40	$ 88.56	$ 55,692.00	$ 111,384.00	$ 195,717.60
1944482458		4.57	$ 23.76	$ 47.52	$ 84.24	$ 108,583.20	$ 217,166.40	$ 384,976.80
1944088977	3km good, than narrows with steep hill	4.09	$ 23.76	$ 47.52	$ 84.24	$ 97,178.40	$ 194,356.80	$ 344,541.60
1944088221		2.03	$ 25.92	$ 51.84	$ 90.72	$ 52,617.60	$ 105,235.20	$ 184,161.60
1944211451		2.03	$ 24.48	$ 48.96	$ 86.40	$ 49,694.40	$ 99,388.80	$ 175,392.00
1944332342		1.47	$ 23.04	$ 46.08	$ 82.08	$ 33,868.80	$ 67,737.60	$ 120,657.60
1944435274	Needs grading	4.09	$ 25.92	$ 51.84	$ 90.72	$ 106,012.80	$ 212,025.60	$ 371,044.80
1944370777		0.94	$ 25.92	$ 51.84	$ 90.72	$ 24,364.80	$ 48,729.60	$ 85,276.80
1944265315	patches, bumpy, rutting	1.84	$ 116.38	$ 69.12	$ 116.64	$ 214,130.00	$ 127,180.80	$ 214,617.60
1944188657		2.03	$ 26.64	$ 53.28	$ 92.88	$ 54,079.20	$ 108,158.40	$ 188,546.40
1944136872	Fresh gravel	2.07	$ 25.92	$ 51.84	$ 90.72	$ 53,654.40	$ 107,308.80	$ 187,790.40
1944045562		1.75	$ 23.76	$ 47.52	$ 84.24	$ 41,580.00	$ 83,160.00	$ 147,420.00
1944157935	needs grading	0.34	$ 23.76	$ 47.52	$ 84.24	$ 8,078.40	$ 16,156.80	$ 28,641.60
1944215803	Loose Gravel	2.08	$ 25.92	$ 51.84	$ 90.72	$ 53,913.60	$ 107,827.20	$ 188,697.60
1944138707		0.87	$ 24.48	$ 48.96	$ 86.40	$ 21,297.60	$ 42,595.20	$ 75,168.00
1944144903		0.3	$ 24.48	$ 48.96	$ 86.40	$ 7,344.00	$ 14,688.00	$ 25,920.00
1944044863		2.05	$ 25.20	$ 50.40	$ 88.56	$ 51,660.00	$ 103,320.00	$ 181,548.00
1944119614		2.21	$ 26.64	$ 53.28	$ 92.88	$ 58,874.40	$ 117,748.80	$ 205,264.80
1944299070	needs grading	1.01	$ 25.92	$ 51.84	$ 90.72	$ 26,179.20	$ 52,358.40	$ 91,627.20
1944010896		0.98	$ 25.92	$ 51.84	$ 90.72	$ 25,401.60	$ 50,803.20	$ 88,905.60
1944321375	CL crack throughout, bad alligator cracks, lots of bumps	1.94	$ 107.19	$ 79.20	$ 131.76	$ 207,943.75	$ 153,648.00	$ 255,614.40
1944195515		1.46	$ 27.36	$ 54.72	$ 95.04	$ 39,945.60	$ 79,891.20	$ 138,758.40
1944478763	Loose gravel. Ringler Bridge one lane	1.94	$ 27.36	$ 54.72	$ 95.04	$ 53,078.40	$ 106,156.80	$ 184,377.60
1944008231		2.1	$ 27.00	$ 54.00	$ 93.96	$ 56,700.00	$ 113,400.00	$ 197,316.00
1944197246		2.03	$ 27.36	$ 54.72	$ 95.04	$ 55,540.80	$ 111,081.60	$ 192,931.20
1944049185		2.02	$ 27.36	$ 54.72	$ 95.04	$ 55,267.20	$ 110,534.40	$ 191,980.80
1944056279	Loose gravel, not HCB as shown	0.3	$ 28.08	$ 56.16	$ 97.20	$ 8,424.00	$ 16,848.00	$ 29,160.00
1944397264		1.03	$ 26.64	$ 53.28	$ 92.88	$ 27,439.20	$ 54,878.40	$ 95,666.40
1944383667	few areas with edge cracks, 1 bump & 1 culvert bump	2.04	$ 102.59	$ 62.64	$ 106.92	$ 209,291.25	$ 127,785.60	$ 218,116.80
1944383581		1.04	$ 107.19	$ 64.80	$ 110.16	$ 111,475.00	$ 67,392.00	$ 114,566.40
1944484008		1.13	$ 28.08	$ 56.16	$ 97.20	$ 31,730.40	$ 63,460.80	$ 109,836.00
1944174128	water in ditches	2.04	$ 28.08	$ 56.16	$ 97.20	$ 57,283.20	$ 114,566.40	$ 198,288.00
1944014703	Some patches, slight rutting	2.04	$ 115.31	$ 69.84	$ 117.72	$ 231,157.50	$ 142,473.60	$ 240,148.80
1944016138		0.02	$ 94.94	$ 59.04	$ 101.52	$ 1,898.75	$ 1,180.80	$ 2,030.40
1944385205		1.15	$ 107.19	$ 64.80	$ 110.16	$ 123,265.63	$ 74,520.00	$ 126,684.00
1944335170		1.94	$ 107.19	$ 64.80	$ 110.16	$ 207,943.75	$ 125,712.00	$ 213,710.40
1944465277		0.19	$ 119.44	$ 70.56	$ 118.80	$ 22,693.13	$ 13,406.40	$ 22,572.00
1944072294	Little rough, needs grading	1.85	$ 30.96	$ 61.92	$ 105.84	$ 57,276.00	$ 114,552.00	$ 195,804.00
1944402585		2.23	$ 107.19	$ 64.80	$ 110.16	$ 239,028.13	$ 144,504.00	$ 245,656.80
1944060044		2.09	$ 30.24	$ 60.48	$ 103.68	$ 63,201.60	$ 126,403.20	$ 216,691.20
1944052096		0.02	$ 107.19	$ 64.80	$ 110.16	$ 2,143.75	$ 1,296.00	$ 2,203.20
1944016140		1.85	$ 29.52	$ 59.04	$ 101.52	$ 54,612.00	$ 109,224.00	$ 187,812.00
1944016139		0	$ 29.52	$ 59.04	$ 101.52	$ -	$ -	$ -
1944038730	North half good, South half little rougher	1.72	$ 104.13	$ 67.68	$ 114.48	$ 179,095.00	$ 116,409.60	$ 196,905.60
1944113714	Loose gravel	1.98	$ 28.80	$ 57.60	$ 99.36	$ 57,024.00	$ 114,048.00	$ 196,732.80
1944217337		2.02	$ 28.80	$ 57.60	$ 99.36	$ 58,176.00	$ 116,352.00	$ 200,707.20
1944193803		2.02	$ 31.32	$ 62.64	$ 106.92	$ 63,266.40	$ 126,532.80	$ 215,978.40
1944062483		0.31	$ 104.13	$ 70.56	$ 118.80	$ 32,278.75	$ 21,873.60	$ 36,828.00
1944025447	PRIVATE	0.55	$ -	$ -	$ 12.96	$ -	$ -	$ 7,128.00
1944004443	PRIVATE	0.11	$ -	$ -	$ 12.96	$ -	$ -	$ 1,425.60
1944462876		0.05	$ 24.48	$ 48.96	$ 86.40	$ 1,224.00	$ 2,448.00	$ 4,320.00
1944143958		1.05	$ 22.32	$ 44.64	$ 79.92	$ 23,436.00	$ 46,872.00	$ 83,916.00
1944322935		0.53	$ 19.44	$ 38.88	$ 71.28	$ 10,303.20	$ 20,606.40	$ 37,778.40
1944373163	PRIVATE	0.87	$ -	$ -	$ 12.96	$ -	$ -	$ 11,275.20
1944405674		1.33	$ 25.20	$ 50.40	$ 88.56	$ 33,516.00	$ 67,032.00	$ 117,784.80
1944189288	PRIVATE	0.46	$ -	$ -	$ 12.96	$ -	$ -	$ 5,961.60
1944016621	PRIVATE	0.09	$ -	$ -	$ 12.96	$ -	$ -	$ 1,166.40
1944059532		0.97	$ 20.16	$ 40.32	$ 73.44	$ 19,555.20	$ 39,110.40	$ 71,236.80
1944426653		2.12	$ 25.20	$ 50.40	$ 88.56	$ 53,424.00	$ 106,848.00	$ 187,747.20
1944318412	PRIVATE	0.44	$ -	$ -	$ 12.96	$ -	$ -	$ 5,702.40
1944393725	PRIVATE	0.08	$ -	$ -	$ 12.96	$ -	$ -	$ 1,036.80
1944348719	PRIVATE	0.31	$ -	$ -	$ 12.96	$ -	$ -	$ 4,017.60

Priority Rating	Revised Priority Rating*	Sect No	Boundary Road	Road Name	Location - From	To	Length (km)	AADT Est./Act. Year	AADT	Surface Type	Surface Width	Struct. Adequc	Drain	Preliminary Improvement Type Recommendation	Cost ($1,000'S)
1	1	1944449021		MALLARD HAVEN R	River Road	Private drive	1.42	A2006E	40	ADEQ	NOW	NOW	NOW		
1	1	1944446446		BEAR MOUNTAIN RI	Maple Road	End - north	0.28	A2006E	35	ADEQ	NOW	ADEQ	1-5		
1	1	1944111203		FOSSMILL RD	Golf Course Road	Polarvale Road	2.34	A2003C	30	ADEQ	ADEQ	ADEQ	6 - 10		
1	1	1944352076		FOSSMILL RD	Polarvale Road	End	0.38	A2006E	30	ADEQ	NOW	ADEQ	6 - 10		
1	1	1944490733		POPLARVALE RD	Fossmill Road	Poplarvale Rd	1.14	A2003C	30	ADEQ	NOW	ADEQ	6 - 10		
1	1	1944478009		POPLARVALE RD	Gravelle Road	End	0.56	A2006E	30	ADEQ	NOW	ADEQ	6 - 10		
1	1	1944214293		POPLARVALE RD	Poplarvale Rd	Gravelle Road	0.29	A2003C	30	ADEQ	ADEQ	ADEQ	6 - 10		
1	1	1944473644		BOOTH RD	Golf Course Road	End	1.39	A2003C	23	ADEQ	NOW	ADEQ	6 - 10		
1	1	1944392306		CEDAR RD	River Road	End	0.27	A2003C	23	ADEQ	NOW	ADEQ	6 - 10		
1	1	1944491434		BEACH RD	Memorial Park Drive	Chiswick Line	2.04	A2006E	20	ADEQ	NOW	NOW	1-5		
1	1	1944033831		ALGONQUIN RD	Wasing Road	End	1.41	A2003C	10	ADEQ	NOW	ADEQ	6 - 10		
1	1	1944135141		BEAR MOUNTAIN RI	Maple Road	End - South	1.75	A2003C	10	ADEQ	NOW	ADEQ	6 - 10		
1	1	1944391379		MAPLE RD	Twp Boundary	Bear Mountain Road	1.92	A2003C	4	ADEQ	ADEQ	ADEQ	6 - 10		

Sect No	Roadside Environment	Surface Type	Platform Width (m)	Entered Surface Width (m)	Surface Width (m)	Entered Shoulder Width (m)	Shoulder Width (m)	Drain	Terrain and Soil Type	Speed Limit (km/h)	Operating Speed (km/h) - Comfort Criteria	Traffic Operation	# of Lanes	Road Class
1944449021	R				0		0					Two Way Undivic	2	100
1944446446	R	G	6.2	4.2	4.2	1	1	(OD) O	(NF) Non-Roc	60	60	o Way Undivic	2	100
1944111203	R	G	7.4	5.4	5.4	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivic	2	100
1944352076	R	G	5.5	4.5	4.5	0.5	0.5	(OD) O	(NF) Non-Roc	60	60	o Way Undivic	2	100
1944490733	R	G	6.6	4.6	4.6	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivic	2	100
1944478009	R	G	5	4.5	4.5	0.25	0.25	(OD) O	(NR) Non-Ro	60	60	o Way Undivic	2	100
1944214293	R	G	7.2	5.2	5.2	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivic	2	100
1944473644	R	G	6.2	4.2	4.2	1	1	(OD) O	(NF) Non-Roc	50	50	o Way Undivic	2	100
1944392306	R	G	5	4	4	0.5	0.5	(ND) Nc	(NF) Non-Roc	40	30	o Way Undivic	2	100
1944491434	R	G	4.5	4	4	0.5	0.25	(OD) O	(NF) Non-Roc	40	20	o Way Undivic	1	100
1944033831	R	G	6.8	4.8	4.8	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivic	2	100
1944135141	R	G	6.2	4.2	4.2	1	1	(OD) O	(NG) Non-Rc	60	60	o Way Undivic	2	100
1944391379	R	G	7	5	5	1	1	(OD) O	(NR) Non-Ro	60	60	o Way Undivic	2	100

Sect No	Horiz Align (10)	Vert Align (10)	Surface Cond (10)*	Shoulder Width (10)	Surface Width	Level of Service (20)	Str. Adeq. (20)*	Drain (15)*	Maint Demand (10)*	Condition Rating (100)	Revised Condition Rating (55)*	Photo ID
1944449021	10	10		1	1	0				22	0	
1944446446	10	10	5	5.5	1	0	12	11	8	63	36	18
1944111203	10	10	8	5.5	7	0	17	13	7	77	45	25
1944352076	10	10	7	1	1	0	16	13	7	65	43	26
1944490733	10	7	8	5.5	1	0	16	13	7	68	44	27
1944478009	1	10	7	1	1	0	16	13	6	55	42	29
1944214293	10	10	8	5.5	4	0	16	13	7	73	44	28
1944473644	10	10	7	5.5	1	0	15	12	7	68	41	65
1944392306	10	10	8	1	1	0	16	12	8	66	44	69
1944491434	10	10	4	1	1	0	7	10	4	47	25	58,59
1944033831	10	6	7	5.5	1	0	16	13	7	66	43	23
1944135141	10	7	7	5.5	1	0	16	12	6	65	41	19
1944391379	10	5	7	5.5	1	0	16	12	6	63	41	20

Sect No	Comments	Length (km)	Surface	Base	Sub-Base	Surface	Base	Sub-Base
1944449021	PRIVATE	1.42	$ -	$ -	$ 12.96	$ -	$ -	$ 15,403.20
1944446446	Potholes, needs gravel	0.28	$ 22.32	$ 44.64	$ 79.92	$ 6,249.60	$ 12,499.20	$ 22,377.60
1944111203		2.34	$ 26.64	$ 53.28	$ 92.88	$ 62,337.60	$ 124,675.20	$ 217,339.20
1944352076	Few potholes, needs grading	0.38	$ 19.80	$ 39.60	$ 72.36	$ 7,524.00	$ 15,048.00	$ 27,496.80
1944490733		1.14	$ 23.76	$ 47.52	$ 84.24	$ 27,086.40	$ 54,172.80	$ 96,033.60
1944478009	Could use some gravel	0.56	$ 18.00	$ 36.00	$ 66.96	$ 10,080.00	$ 20,160.00	$ 37,497.60
1944214293		0.29	$ 25.92	$ 51.84	$ 90.72	$ 7,516.80	$ 15,033.60	$ 26,308.80
1944473644		1.39	$ 22.32	$ 44.64	$ 79.92	$ 31,024.80	$ 62,049.60	$ 111,088.80
1944392306	Fresh gravel	0.27	$ 18.00	$ 36.00	$ 66.96	$ 4,860.00	$ 9,720.00	$ 18,079.20
1944491434	bumpy, potholes, not much gravel	2.04	$ 16.20	$ 32.40	$ 61.56	$ 33,048.00	$ 66,096.00	$ 125,582.40
1944033831		1.41	$ 24.48	$ 48.96	$ 86.40	$ 34,516.80	$ 69,033.60	$ 121,824.00
1944135141	I very steep hill, 2 areas trapping water along shoulder	1.75	$ 22.32	$ 44.64	$ 79.92	$ 39,060.00	$ 78,120.00	$ 139,860.00
1944391379	Needs gravel on westerly 1/4	1.92	$ 25.20	$ 50.40	$ 88.56	$ 48,384.00	$ 96,768.00	$ 170,035.20
						$ -	$ -	$ -
						$ 4,798,379.86	$ 6,280,509.60	$ 10,978,556.40
							Total Road Replacement Cost	$ 22,057,445.86

Total	120.2 km		
	'NOW' Needs	91.63	km
	NOW' Needs < 50 AADT	16.15	km
	NOW' Needs Excluding Surface Width and < 50 AADT	29	km
System Adequacy	37% (excludes AADT < 50)		
(Adjusted) System Adequacy	76% (excludes AADT < 50 and surface width deficiencies)		

ROAD IMPROVEMENT COSTS
Township of Chisholm

Unit Costs	Units	Unit Cost
Granular A	t	$20.00
Granular B	t	$18.00
Hot Mix	t	$125.00
Earth Excavation	m3	$15.00
Asphalt Removal	m2	$4.00
Asphalt Removal - Partial Depth	m2	$2.75
Removal of Concrete Curb & Gutter	m	$19.00
Concrete Curb & Gutter	m	$125.00
In-Place Full Depth Reclamation	m2	$1.20
Granular A Conversion	2.4	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	2.4	t		1260	$20.00	$ 25
							G	**$ 25**

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	$15.00	$ 5
Granular A	7.0	150	2.4	t		126	$20.00	$ 3
Granular B	8.0	650	2	t		520	$18.00	$ 9
							FT	**17**

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	$2.00	$ 14
							ST1	**14**

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	$4.00	$ 28
							ST2	**28**

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	$4.00	$ 28
Removal Asphalt Pavement	7.0	16		m2		7000	$4.00	$ 28
							ST2R	**56**

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	$4.00	$ 28
Granular A	7.0	300	2.4	t		5040	$20.00	$ 101
							ST2A	**129**

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	$125.00	$ 55
Granular A	1.5	50	2.4	t		180	$20.00	$ 4
Minor Items @ 15%								$ 9
							RO1	**68** (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	$125.00	$ 91
Granular A	1.5	90	2.4	t		324	$20.00	$ 6
Minor Items @ 15%								$ 15
							RO2	**112** (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	$125.00	$ 65
Remove Curb and Gutter				m		200	$19.00	$ 3.80
Curb and Gutter - 20%				m		200	$125.00	$ 25.00
Milling	4.25			m2		4250	$2.75	$ 11.69
Minor Items @ 25%								$ 26
							RMP1	**132** (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	$125.00	$ 117
Remove Curb and Gutter				m		200	$19.00	$ 3.80
Curb and Gutter - 20%				m		200	$125.00	$ 25.00
Milling	4.25			m2		4250	$3.75	$ 15.94
Minor Items @ 25%								$ 40
							RMP2	**202** (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	$125.00	$ 46
Granular A	1.5	50	2.4	t		180	$20.00	$ 4
Pulverize	3			m2		3000	$1.20	$ 3.60
Minor Items @ 25%								$ 13
							PP1	**66** (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	$125.00	$ 83	
Granular A	1.5	90	2.4	t		324	$20.00	$ 6	
Pulverize	3			m2		3000	$1.20	$ 4	
Minor Items @ 25%								$ 23	
							PP2	**116**	(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	500		m3		1000	$15.00	$ 15	
Granular A	5	150	2.4	t		1800	$20.00	$ 36	
Granular B	5	300	2	t		3000	$18.00	$ 54	
Hot Mix	8	50	2.45	t	196	1176	$125.00	$ 147	
Milling	4			m2		4000	$2.75	$ 11	
Minor Items @ 25%								$ 66	
							RW1	**329**	(per Lane Kilometre) (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	$15.00	$ 18	
Granular A	5	150	2.4	t		1800	$20.00	$ 36	
Granular B	5	450	2	t		4500	$18.00	$ 81	
Hot Mix	8	90	2.45	t	353	2117	$125.00	$ 265	
Milling	4			m2		4000	$2.75	$ 11	
Minor Items @ 25%								$ 103	
							RW2	**513**	(per Lane Kilometre) (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	450		m3		900	$15.00	$ 14	
Granular A	1	150	2.4	t		360	$20.00	$ 7	
Granular B	1	300	2	t		600	$18.00	$ 11	
Minor Items @ 25%								$ 8	
							GW	**39**	(per Lane Kilometre) (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	450		m3		2250	$15.00	$ 34	
Granular A	3	150	2.4	t		1080	$20.00	$ 22	
Granular B	5	300	2	t		3000	$18.00	$ 54	
Minor Items @ 25%								$ 27	
							Recon G	**137**	(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	$4.00	$ 12	
Earth Excavation	5	500		m3		2500	$15.00	$ 38	
Granular A	4	150	2.4	t		1440	$20.00	$ 29	
Granular B	5	300	2	t		3000	$18.00	$ 54	
Hot Mix	3	50	2.45	t		368	$125.00	$ 46	
Minor Items @ 25%								$ 45	
							Recon 1R	**223**	(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	$4.00	$ 12	
Earth Excavation	5	500		m3		2500	$15.00	$ 38	
Granular A	4	150	2.4	t		1440	$20.00	$ 29	
Granular B	5	300	2	t		3000	$18.00	$ 54	
Hot Mix	3	50	2.45	t		368	$125.00	$ 46	
Minor Items @ 25%								$ 45	
							Recon 1S	**223**	(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	$4.00	$ 12	
Earth Excavation	5	500		m3		2500	$15.00	$ 38	
Granular A	4	150	2.4	t		1440	$20.00	$ 29	
Granular B	5	300	2	t		3000	$18.00	$ 54	
Hot Mix	3	90	2.45	t		662	$125.00	$ 83	
Minor Items @ 25%								$ 54	
							Recon 2S	**269**	(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	$4.00	$ 17	
Earth Excavation	5.5	500		m3		2750	$15.00	$ 41	
Granular A	4.5	150	2.4	t		1620	$20.00	$ 32	
Granular B	5.5	300	2	t		3300	$18.00	$ 59	
Hot Mix	4.25	90	2.45	t		937	$125.00	$ 117	
Remove Curb and Gutter				m		1000	$19.00	$ 19.00	
Curb and Gutter				m		1000	$125.00	$ 125.00	
Minor Items @ 25%								$ 67	
							Recon 2U	**478**	(per Lane Kilometre)

Appendix A-1 : Asset Information Summary - Bridges

Bridge Number	Bridge Name	Bridge Type	Year Built (Age)	Year of Last Rehab	Number of Spans	Total Length (Parallel to Roadway) (m)	Width (Perpendicular to roadway) (m)	Roadway Width (m)	Existing Surface Area (m^2)	Replacement Cost - Existing Geometry ($000)	Replacement Cost - Current Geometric Standards ($000)	BCI	Benchmark Budget Costs			
													Rehabilitation Costs ($000)			Engineering Investigation Costs ($000)
													< 1 year	1-5 Years	6-10 Years	Normal
001	South Shore Road Bridge	Steel Girder	1935	-	1	7.40	4.75	4.50	35	281	569	70	17.6	9.0	0.0	11.0
002	Depot Creek Bridge	Concrete Rigid Frame	1989	-	1	8.00	10.20	6.00	82	612	852	75	18.0	0.0	0.0	11.0
004	River Road Bridge	Timber Girder	1930	-	3	14.40	8.50	7.90	122	918	992	34	0.0	1,100.0	0.0	36.5
005	Beach Road Bridge (Billiards Bridge)	Bailey Bridge	2003	-	1	24.40	6.50	4.10	159	1,031	1,664	74	2.5	0.0	0.0	0.0
006	Memorial Park Road Bridge	Timber Girder	1985	-	2	12.2	9.80	8.60	120	897	888	74	30.6	0.0	0.0	11.0
009	West of Golf Course Road Bridge	Timber Girder	1960	-	3	14.20	5.90	4.90	84	628	1,015	49	0.0	1,100.0	0.0	38.5
010	Wasing Road Bridge	Concrete Girder	1919	-	1	8.5	5.10	4.00	43	347	708	60	57.0	15.0	0.0	11.0
013	Jim Owens Bridge	Steel Girder	2009	-	1	14.40	7.00	7.00	101	756	936	75	0.0	0.0	0.0	0.0
016	Pioneer Road Bridge (Ringler Bridge)	Steel Girder	2008	-	1	15.40	4.70	4.70	72	543	1,001	75	13.0	0.0	0.0	5.5
										6,013	**8,625**		**139**	**2,224**	**0**	**125**

NOTES:

1. BCI as calculated by HP Engineering.

Appendix A-2 : Asset Information Summary - Culverts

Culvert Number	Culvert Name	Culvert Type	Year Built (Age)	Year of Last Rehab	Number of Barrels	Total Length (Parallel to Roadway) (m)	Width (Perpendicular to roadway) (m)	Roadway Width (m)	Existing Surface Area (m^2)	Replacement Cost - Existing Geometry ($000)	Replacement Cost - Current Geometric Standards ($000)	BCI	Benchmark Budget Costs			
													Rehabilitation Costs ($000)			Engineering Investigation Costs ($000)
													< 1 Year	1-5 Years	6-10 Years	Normal
003	Village Road Culvert	Double SP-CSP	2014	-	2	9.00	23.00	8.00	90	720	825	75	18	0	0	5.5
007	Chiswick Line Culvert	CSP Arch	2001	-	1	4.00	17.20	6.00	35	280	413	72	67	0	0	5.5
008	Chiswick Line Culvert	CSP Arch	1980	-	1	4.50	17.20	6.00	39	308	454	72	57	0	0	5.5
011	River Road Culvert	Round CSP	1999	-	2	7.60	21.00	6.80	67	537	710	73	0	710	0	20.0
012	Grahamville Road Culvert	CSP Arch	1980	-	1	5.60	20.70	6.40	49	391	545	72	0	545	0	20.0
014A	Wasing Road Culvert	Round CSP	1970	-	1	1.70	12.50	7.00	22	173	223	25	0	223	0	20.0
014B	Maple Road Culvert	Round CSP	-	-	1	0.90	11.25	7.00	15	122	157	68	57	0	0	5.5
014C	Maple Road Culvert	CSP	1980	-	1	2.10	12.50	5.90	21	171	256	26	0	256	0	20.0
015	Chiswick Line Culvert	CSP	1999	-	1	3.60	21.80	6.00	32	258	380	68	57	0	0	5.5
020	- (Replacement of Memorial Park Road Bridge)	Double Round CSP	2016	-	2	3.60	11.00	6.10	33	261	380	75	57	0	0	5.5
										3,220	**4,340**		**312**	**1,734**	**0**	**113.0**

NOTES:

1. BCI as calculated by HP Engineering.

SUMMARY OF PRIORITIZED CAPITAL EXPENDITURES FOR BRIDGE AND CULVERT STRUCTURES

Bridge No	Name	Additional Investigations (From 2015 OSIM Inspections)		Repair and Rehabilitation Needs (From 2015 OSIM Inspections and Current Bridge Information)						Prioritization of Major/Minor Capital Work									
		Investigation	Cost	<1 Year	Cost	1-5 Years	Cost	6-10 Years	Cost	Prioritize Year of Need - Major Capital Works	Prioritized Year of Need - Minor Capital Works	Estimated Major/Minor Capital Work Expenditure per Year[1]							
												2017	2018	2019	2020	2021	2022	2023	Total
01	South Shore Road Bridge	Deck Condition Survey Rehabilitation / Replacement Study	$ 5,500.00 $ 5,500.00		-	Replace Damaged Sections on Barrier Replace End Treatments Replace Damaged Sections on Barrier	$ 3,000.00 $ 17,600.00 $ 6,000.00		-	-	2022						$ 26,600.00		
02	Depot Creek Bridge	Deck Condition Survey Rehabilitation / Replacement Study	$ 5,500.00 $ 5,500.00	Install Code Compliant End Treatments and Replace Damaged Posts	$ 18,000.00		-		-	-	2021					$ 18,000.00			
03	Village Road Culvert	Rehabilitation / Replacement Study	$ 5,500.00	Install Code Compliant End Treatments	$ 17,600.00		-		-	-	2023							$ 17,600.00	
04	River Road Bridge	Rehabilitation / Replacement Study Structure Evaluation	$ 25,500.00 $ 11,000.00	Install Code Compliant Approach Barrier	$ -	Replace Structure	$ 1,100,000.00		-	2018	-		$ 1,100,000.00						
05	Beach Road Bridge (Billiards Bridge)			Replace Damaged Approach Barrier	$ 2,500.00		-		-	-	2023							$ 2,500.00	
06	Memorial Park Road Bridge	Rehabilitation / Replacement Study Deck Condition Survey	$ 5,500.00 $ 5,500.00	Install Code Compliant End Treatments Install Code Compliant Connections to Structure	$ 17,600.00 $ 13,000.00		-		-	-	2021					$ 30,600.00			
07	Chiswik Line Culvert	Deck Condition Survey	$ 5,500.00	Install Code Compliant Approach Barrier	$ 66,800.00		-		-	-	2021					$ 66,800.00			
08	Chiswik Line Culvert	Rehabilitation / Replacement Study	$ 5,500.00	Install Code Compliant Approach Barrier	$ 58,000.00		-		-		2021					$ 58,000.00			
09	West of Golf Course Road Bridge	Rehabilitation / Replacement Study Structure Evaluation	$ 27,500.00 $ 11,000.00	Install Code Compliant Approach Barrier	-	Replace Structure	$ 1,100,000.00		-	2017	-	$ 1,100,000.00							
10	Wasing Road Bridge	Rehabilitation / Replacement Study Deck Condition Survey	$ 5,500.00 $ 5,500.00	Install Approved Approach Barrier[1]	$ 57,000.00	Repair Stone Masonry	$ 15,000.00		-	-	2019			$ 72,000.00					
11	River Road Culvert	Rehabilitation / Replacement Study	$ 20,000.00	Install Code Compliant Approach Barrier	-	Replace Barrels	$ 710,000.00		-	2020					$ 710,000.00				
12	Grahamville Road Culvert	Rehabilitation / Replacement Study	$ 20,000.00	Install Code Compliant End Treatments	-	Replace Barrel	$ 545,000.00		-	2022	-							$ 545,000.00	
13	Jim Owens Bridge				-		-		-	-	-								
14A	Wasing Road Culvert	Rehabilitation / Replacement Study	$ 20,000.00	Install Code Compliant Approach Barrier	-	Replace Barrel	$ 223,000.00		-	2019				$ 223,000.00					
14B	Maple Road Culvert	Rehabilitation / Replacement Study	$ 5,500.00	Install Code Compliant Approach Barrier	$ 57,000.00		-		-	-	2021					$ 57,000.00			
14C	Maple Road Culvert	Rehabilitation / Replacement Study	$ 20,000.00	Install Code Compliant Traffic Barrier [1]	-	Replace Barrel	$ 256,000.00		-	2019	-			$ 256,000.00					
15	Chiswik Line Culvert	Rehabilitation / Replacement Study	$ 5,500.00	Install Code Compliant Approach Barrier	$ 57,000.00		-		-	-	2021					$ 57,000.00			
16	Pioneer Road Bridge (Ringler Bridge)	Rehabilitation / Replacement Study	$ 5,500.00	Install Code Compliant Barrier Connections [1]	$ 13,000.00		-		-	-	2023							$ 13,000.00	
20	(Replacement of Memorial Park Road Bridge)	Rehabilitation / Replacement Study	$ 5,500.00	Install Code Compliant Approach Barrier	$ 57,000.00		-		-	-	2021					$ 57,000.00			
TOTALS												**$ 1,100,000**	**$ 1,100,000**	**$ 551,000**	**$ 710,000**	**$ 344,400**	**$ 571,600**	**$ 33,100**	**$ 4,410,100**

Notes:

(1) For bridges scheduled for Major Rehabilitation / Replacement, it has been assumed that barrier work will be completed at the same time that the structure is replaced Therefore for these structures, the barrier costs have not been included in the 'Prioritization of Capital Work and Engineering Investigations' section of the table above