



BURNSIDE

Township of Amaranth 2016 Asset Management Plan

**R.J. Burnside & Associates Limited
15 Townline
Orangeville ON L9W 3R4 CANADA**

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R.J. Burnside & Associates Limited

Report Prepared By:



Arunas Kalinauskas
Business Manager – Asset Management / GIS
AK:sr

Executive Summary

This report contains the Asset Management Plan for the Township of Amaranth (Township). The report has been organized as follows:

- Chapter 1: Introduction;
- Chapter 2: State of Local Infrastructure;
- Chapter 3: Expected Levels of Service;
- Chapter 4: Asset Management Strategy;
- Chapter 5: Financing Strategy; and
- Chapter 6: Recommendations.

The "state of local infrastructure" chapter provides an overview of the capital assets owned by the Township. This includes detailed information on asset inventory, including asset attributes, accounting valuations, replacement costs, useful life, age and asset condition where available. This information provides the foundation for other sections of the asset management plan.

Based on data provided by the Township and discussions with Township Staff, it is believed that the Township's assets have a weighted average condition (with the weighting based on asset replacement cost) of the following table. Please note that weighted average conditions do not fully reflect the many assets that need to have capital improvement investments, but provide an overall perspective of all the assets found in that asset grouping/network.

Asset Type	Asset Sub-Type	Condition (weighted average)	Risk (weighted average)
Roads	Road Surface	Average	Moderate
	Road Base	Average	Moderate
	Bridges & Culverts	Average	High
	Cross Road Culverts	Average	Moderate
	Street Lights	Average	Moderate
	Signs	Average	Moderate
	Barriers	Average	Moderate
	Sidewalks	Average	Moderate
Facilities	Municipal Office	Average	Moderate
	Public Works	Average	Moderate
	Salt Dome	Average	Moderate

Vehicles		Good	Low
Storm Water	Storm Mains	Average	Moderate
	Catch Basins	Average	Moderate
	Storm Manholes	Good	Moderate
	Discharge Point	Good	Low
	Storm Ponds	Good	Moderate
Equipment & Machinery		Good	Low
Land Improvements		Good	Low
Software & Hardware		Average	Moderate

"Expected levels of service" compares the current level of service provided by the Township, and the recommended levels of service that will help extend the life of the above mentioned asset types. Amaranth Township takes great care in the service levels they offer their constituents and public. This report has made a few additional Levels of Service (LOS) recommendations that can extend the life of Township's tangible capital assets and therefore reduce the total lifecycle costs of Township assets.

The "asset management strategy" provides a long term operating and capital forecast for asset related capital costs, indicating the requirements for maintaining, rehabilitating, replacing/disposing and expanding the Township's assets, while moving towards the specified expected levels of service identified above. The goal of the asset management strategy is to have the Township moving towards a more sustainable asset management position over the 20 year forecast period. We have also taken into consideration the potential risk of each asset by identifying the asset consequence of failure and probability of failure.

Asset risk was assessed based on the asset's age, condition, consequence of failure, and probability of failure. The following have been identified based on Township data as assets that need to be replaced or improved as soon as practicable:

Roads

- 20th Sideroad, from 7th Line to 8th Line – Recommendation is to replace the surface of this asphalt road (approximate cost \$106,884; 2018).
- Amaranth/Grand Valley Townline, from 20th Sideroad to 1.8 km north of 20th Sideroad – Recommendation is to replace the surface of this asphalt road (approximate cost \$144,000; 2018).
- 20th Sideroad from County Road 11 to 4th Line – Recommendation is to replace the surface of this asphalt road (approximate cost \$121,527; 2019).

- 20th Sideroad from 4th Line to 5th Line – Recommendation is to replace the surface of this asphalt road (approximate cost \$104,098; 2019).
- 5th Sideroad from 2nd Line to County Road 11 – Recommendation is to replace the surface of this asphalt road (approximate cost \$100,960; 2019).
- Amaranth/Grand Valley Townline from 1.6 km north of 15th Sideroad to 20th Sideroad – Recommendation is to replace the surface of this asphalt road (approximate cost \$103,950; 2019).
- Devonleigh Drive from 30th Sideroad to 30th Sideroad – Recommendation is to replace the surface of this asphalt road (approximate cost \$51,277; 2019).
- Station Street from 10th Line/Mill Street to St. John Street – Recommendation is to replace the surface of this asphalt road (approximate cost \$19,539; 2019).
- Station Street from St. John Street to Peter Street – Recommendation is to replace the surface of this asphalt road (approximate cost \$22,479; 2019).
- Road bases are not expected to be fully replaced but improved and in localized places dug out and repacked. However there are several road pavements showing that their road bases need some additional support and stabilization. One of these is the following:
 - 5th Sideroad from 2nd Line to County Road 11 (approximate cost \$100,000; 2019).

Bridges

- Bridge 17 – This bridge was recommended to be replaced by the Township bridge inspection report. The Province of Ontario is providing an Ontario Community Infrastructure Fund (OCIF) Grant to pay 90% of the cost to replace this bridge (approximate cost to the Township \$100,000; 2017).
- Bridge 15 – The Township had to close this bridge since it did not have sufficient funds to replace it last year. It is scheduled to be replaced (approximate cost \$600,000; 2017).

Facilities

- Municipal Office HVAC System (Air Conditioner) – The old system is well past its life and not working properly therefore needs to be replaced (approximate cost \$28,000; 2017).
- Public Works Garage Windows – Old windows are scheduled to be replaced in 2017. (approximate cost \$6,000; 2017).
- Municipal Office Well – Water supply being critical for the proper functioning of this building the well and pump are still working and potentially in good condition but there is concern over its age, and this is recommended to be investigated. The Township may want to ensure that money is set aside for a replacement as soon as it is required (approximate cost \$15,000; 2018).

- Public Works Garage – Is an old facility and with growing need for more space for equipment. The expansion of this building is identified (approximate cost \$125,000; 2018).

Vehicles

- 2000 Ford Sterling Plow Truck – Has exceeded its life expectancy and therefore is recommended to be replaced. These types of trucks are critical to ensuring that the Township roads are in good repair and safe to drive (approximate cost \$275,000; 2017)
- 2009 Ford F-150 Pickup Truck – Has exceeded its life expectancy and therefore is recommended to be replaced. This is a vehicle that has been well used by Township Road staff (approximate cost \$32,000)
- 1994 Grader Champion 740S4 – Is well past its expected life and is recommended to be replaced. These types of vehicles are critical to ensuring that Township roads are in good repair and safe to drive (approximate cost \$415,000; 2018).

Street Lights

- Township Street Lights – The Township has not yet converted their street lights to LED lighting. The conversion will save the Township 40%-50% in electrical costs annually which can be over \$5,000 per year which will pay off the capital investment expense in less than 10 years (approximate cost \$45,000; 2018).

Storm Ponds

- Storm Retention Pond James Street – Runoff from the neighbouring agricultural land has caused for some cleanout work required to ensure that this storm pond is functioning well (approximate cost \$4,500; 2017).

Water System

- Waldemar Water System Generator – Requires some rehabilitation to ensure it is functioning at appropriate service levels (approximate cost \$7,500; 2017).
- Waldemar Water Scada System – The data logger is expected to need upgrading (approximate cost \$2,000; 2018).
- Waldemar Water Pump House Process Piping – It was revealed that the valves are old and are becoming more and more challenging to engage. This is best to be completed in phases. If the Township has a large development come on line in the near future the new water system for that development may provide water to the community while this process piping is replaced (approximate cost \$125,000; 2021).

The above clearly identifies a growing gap in infrastructure funding, which is found not only in the Township of Amaranth but throughout Ontario and across Canada. The Township has been making steps over the last few years to start to close this funding gap, and obtaining the OCIF funding grant to assist with the replacement of Bridge 17

will really help. However, more needs to be done to ensure that the Township can offer appropriate levels of service to the public. We have recommended that further more detailed inspections (eg. Road Needs Study, Storm Sewer Inspections) of some assets be undertaken to provide a more accurate asset condition, remaining life and potential risk of failure. We also recommend that the bi-annual bridge inspections provide additional information that can assist with better long term asset management analysis.

The "financing strategy" described in Chapter 5 of this report identifies a funding plan for the recommended asset management strategy, including a review of historical results and recommendations with respect to the required amounts and types of funding (revenue) annually over the forecast period. Also, any infrastructure funding gaps are identified and recommendations are made regarding potential approaches to reduce and mitigate these gaps over the 20 year forecast period.

Overall, this asset management plan is a tool to be used by the Township for capital and financial decision making. It can be tied to various existing reports (such as budget, official plan and strategic planning reports) to ensure the asset management plan can be updated to reflect any changes in the Township of Amaranth's priorities.

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Appendix B Draft Data Verification and Condition Assessment Policy
Appendix C 20 Year Detailed Asset Management Strategy & Financing Strategy

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1.0 Introduction

1.1 Overview

R.J. Burnside & Associates Limited (Burnside) was retained by the Township of Amaranth (Township) to prepare an asset management plan. This plan is intended to be a tool for the Township to use during various decision making processes, including the annual budget process and Provincial/Federal capital grant application processes. This plan will serve as a road map for sustainable infrastructure planning going forward.

Assets included in this asset management plan are the following:

- Roadside Barriers;
- Bridges & Culverts;
- Cross Road Culverts;
- Equipment & Machinery (Office, Public Works, Other);
- Facilities (Administration Office, Public Works Garage, and Salt Dome);
- Land Improvements (Playing Surfaces, Parking Lots, Parks, Playground Equipment, Shelters);
- Roads (Bases and Surfaces - Asphalt, Gravel);
- Sidewalks;
- Signs;
- Software & Hardware;
- Storm Water (Catch basins, Mains, Manholes, Headwalls, Storm Ponds);
- Street Lights;
- Vehicles; and
- Water (Facilities, Mains, Fittings, Valves, Hydrants, Wells).

It is recommended that this plan be updated on an annual basis to ensure that it is kept up to date. As water system assets have their own sustainable financing plan as per Provincial Guidelines, they are grouped and discussed separately. All other assets listed above are tax supported and are discussed more thoroughly in this report.

1.2 Plan Objectives

The Township's goals and objectives with respect to their capital assets relate to the level of service being provided to Township constituents. Services should be provided at expected levels, as defined within this asset management plan. Township infrastructure and other capital assets are anticipated to be maintained at condition levels that provide for a safe and functional environment for its residents and visitors. Therefore, the asset management plan and its implementation will be evaluated based on the Township's ability to meet these goals and objectives.

1.3 Plan Development

The development of the Township's asset management plan was based on the steps summarized below:

1. Develop a complete listing of capital assets to be included in the plan, including attributes such as useful life, age, accounting valuation and current replacement valuation. Update the replacement cost of assets to 2016 dollars, and where required, using applicable inflationary indices.
2. Assess current condition of the assets, based on a combination of the following:
 - Existing reports;
 - Burnside field and/or desktop assessments;
 - Staff assessments; and
 - Asset age analysis.
3. Assess the risk of asset failure for each asset, based on determining the probability of each asset failing, as well as, the consequence of the asset failing. This risk analysis is one of the components used to identify priority projects for inclusion in the asset management plan, as well as, asset risk levels that require mitigation.
4. Determine current levels of service, based on standard practices and discussions with Township staff. Further analysis of the practices and identification of additional maintenance measures that can be applied to the assets to extend their lifecycle and potentially provide a lower asset total lifecycle cost.
5. Prepare an asset management strategy (i.e., operating and capital forecast) based on the asset inventory, identified priorities, forecast scenarios and level of service analysis discussed above.
6. Determine a financial strategy to support the asset management strategy, thus determining how the operating and capital related expenditure forecast will be funded over the plan period.
7. Prepare a final report, summarizing the process, strategy and results of the asset management plan.

1.4 Maintaining the Asset Management Plan

The asset management plan should be updated as the capital needs and priorities of the Township changes. This can be accomplished in conjunction with the Township's budget process. The Township will have the tools available to perform updates to the plan when needed.

When updating the asset management plan, note that the state of local infrastructure, expected levels of service, asset management strategy and financing strategy are integrated and impact each other. Looking at these components in reverse order, one can see the financing strategy outlines how the asset management strategy will be funded. The asset management strategy illustrates the costs required to maintain expected levels of service at a sustainable level. The expected levels of service component summarizes and links each service area to specific assets contained in the state of local infrastructure section and thus determines how these assets will be used to provide expected service levels.

This report covers a forecast period of 20 years; however, it is suggested that more focus and attention be put on the first 5 years of the asset management plan, to ensure accurate capital planning in the short term.

1.5 Plan Integration

The municipal environment is continually changing and demanding when it comes to legislation and other responsibilities. Integrating the asset management plan with Township's budget process, as well as, Public Standards Accounting Board Handbook Section 3150 (tangible capital asset) requirements can make updates in all three areas more efficient.

With respect to integrating the Township's budget process with asset management planning, both require a projection of capital and operating costs over a future period. The budget outlines total operating and capital requirements for the Township, while the asset management plan focuses in on specific asset related requirements. With this link to the annual budget, the budget update process can also become an asset management plan update process.

Both asset management and PSAB 3150 require a complete and accurate asset inventory. The significant difference between the two lies in valuation approaches (PSAB 3150 requires historical cost valuation, while asset management requires future replacement cost valuation). Using a single asset inventory as the developed Township asset management spreadsheets contain both historic and current replacement valuation methods as an effective approach to maintaining the Township's asset data (digital spreadsheets of all Township assets are provided in Appendix A).

2.0 State of Local Infrastructure

2.1 Scope and Process

This section of the plan provides an opportunity to develop a greater understanding of the capital assets owned by the Township. The state of local infrastructure analysis includes:

- An asset inventory documenting asset types, sub-types including quantities, materials and other similar asset attributes (where available);
- Financial accounting valuation (where available);
- Replacement cost valuation;
- Asset age distribution analysis and asset age as a proportion of expected useful life;
- Asset condition information (mostly based on report and/or staff assessment as well as the age of the asset, except where field or desktop assessments were completed);
- Draft Data Verification and Asset Condition policies; and
- Documentation of assumptions made in creating the asset inventory.

Burnside developed a detailed asset inventory listing for the Township which was used as a starting point in fulfilling the requirements for this report. This inventory provides current financial accounting valuations (i.e., historical cost, accumulated amortization and net book value), as well as, attributes such as replacement cost, useful life, and age). With respect to replacement cost, the Township provided various recent valuations, which were inflated in order to estimate current 2016 replacement costs. Other valuations were made using a current 2016 replacement cost and deflating the value to the year or estimated year that the asset was constructed and/or acquired.

The following data and reports were used to develop the Township's asset inventory during this project:

- Township PSAB 3150 asset inventory;
- Township reports;
- Township 2016 Bridge Inspection Report;
- Recent purchases information from the Township; and
- Discussions with Township staff.

Some adjustments to asset useful lives has been made but further analysis may reveal that the Township will want to update some useful life values so that they better reflect the lifecycle and remaining life of the Township's assets. Burnside engineers and the Township staff have reviewed the useful lives of the asset types identified in this project and believe they now reflect the conditions, maintenance practices and management of Township assets.

2.2 Capital Asset Overview

Amaranth Township presently owns capital assets with a 2016 replacement value of approximately \$103.8 million. Tax supported assets compose approximately \$96.7 million or \$29.5 million excluding the road base assets for tax supported assets. Table 2-1, Figure 2-1 and Figure 2-2 outline the breakdown of these tax supported totals into the Township's asset categories. The Water assets owned by the Township have a 2016 replacement cost of approximately \$7.1 million, as listed in Table 2-2 and Figure 2-3.

The capital asset inventory was organized in a Microsoft Excel spreadsheet and delivered to the Township in digital form in Appendix A. Each of the asset types were assessed for their age, condition (where available) and for data accuracy and completeness. The Township reviewed the asset inventory over the course of this project.

Table 2-1 and Figure 2-1 show the Township's financial accounting valuation summary by asset type for tax supported and water supported assets. Since 2009, municipalities have been required under the Public Sector Accounting Board Handbook Section 3150 (PSAB 3150) to maintain asset listings complete with historical cost (i.e., the original cost to purchase or construct an asset), accumulated amortization and net book value. These values were to be reported on the municipality's audited financial statements each year. Burnside has done the additional work of developing the Opening/Historic Cost for assets that have been added to the Township's asset inventory. If the Township chooses to use the asset inventory developed in this project to report the PSAB 3150 values the data/information is found in Appendix A.

Including all Township assets, the total tangible capital asset historical cost is approximately \$28.5 million. This is approximately 27% of the total replacement cost of all the assets or 54% without road base replacement costs included. It is expected that historical cost totals are less than replacement cost totals, given inflationary adjustments that would occur between the original asset purchase/construction date and 2016. Total accumulated amortization for the Township's assets is \$12.3 million or 43% of the total asset historical cost and \$7.7 million or 39% without road base historic costs included. This represents the proportion of tangible capital assets that have been amortized (i.e. used up) to date from a financial valuation perspective.

Clearly Township owned road assets have the greatest percentage tax supported replacement cost if the road base values were included in the calculation (see Figure 2-2). Road bases are considered assets that will never be totally replaced, but will from time to time be improved and in small locations reconstructed on an as needed basis. Therefore by excluding road base asset values, Township bridges percentage replacement costs are over 40% of any other tax supported asset type. Other major tax supported asset types are Roads (made up of Road Surfaces, Barriers, Cross Road

Culverts, Signs, Street Lights, and Sidewalks) with 18%, Facilities with 17%, Vehicles with 13%, and Storm Water with 10%. More in depth discussion of these asset types follows below.

The Township water assets are critical to the Waldemar community. Figure 2-3 provides the percentage replacement cost breakdown of these asset groups.

Figure 2-1: Township Tax Supported Asset Distribution Replacement Costs (2016)

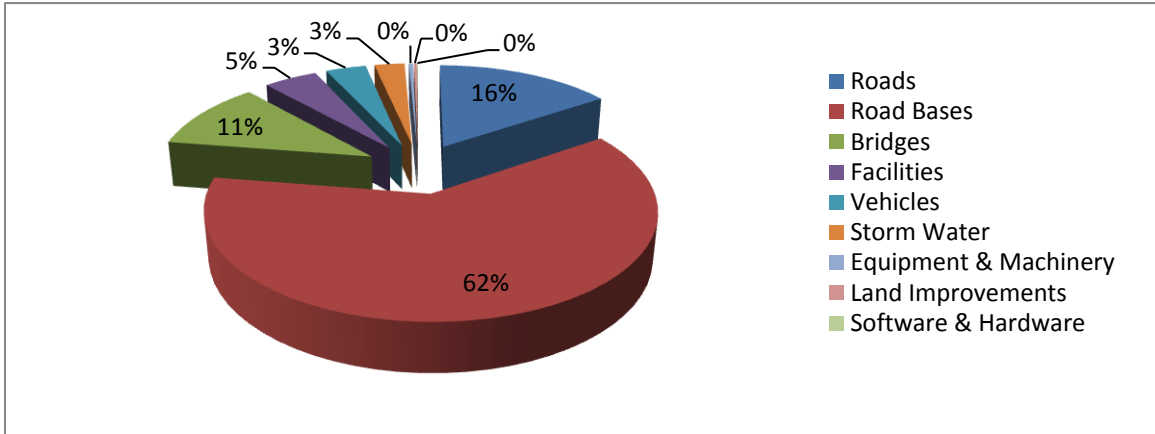


Figure 2-2: Township Tax Supported Asset Distribution Replacement Costs, Without Road Bases (2016)

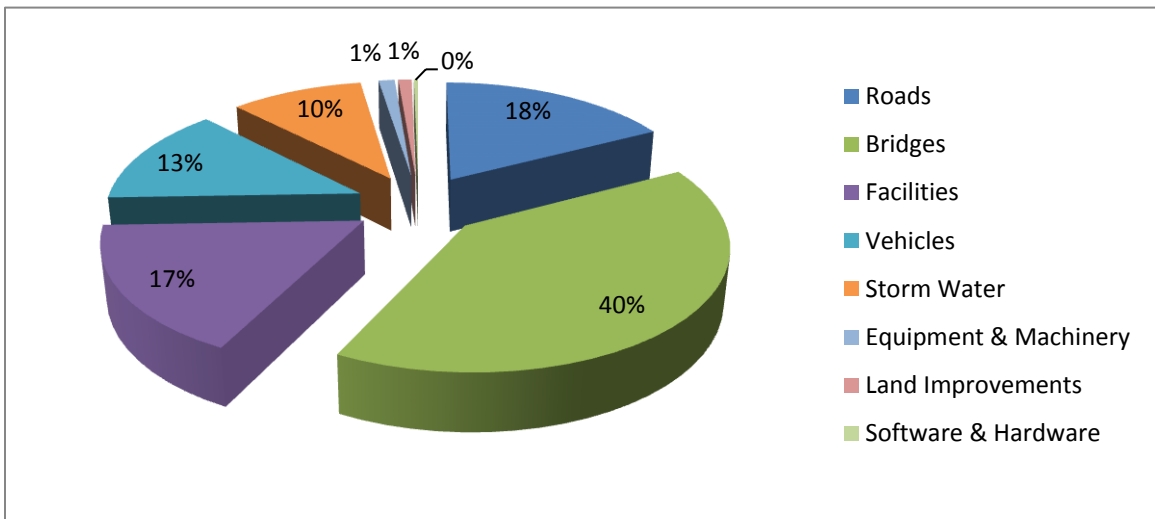


Table 2-1: Township Tax Supported Asset Summary

Asset Type	Asset Sub-Type	Historic Cost	2015 Accumulated Amortization	2015 Net Book Value	2016 Replacement Cost	Condition (weighted average)		Useful Life (years)	Age (weighted average)	Remaining Life (weighted average)	Risk (weighted average)	
						Value	Text				Value	Text
Roads	Road Surface	\$2,524,522	\$799,394	\$687,541	\$4,130,178	6.9	Average	15, 3	10.3	6	2	Moderate
	Road Base	\$8,607,429	\$4,554,257	\$4,145,550	\$67,132,719	5.4	Average	60	123	7	2	Moderate
	Bridges & Culverts	\$4,654,146	\$1,391,214	\$3,262,933	\$11,831,022	5.8	Average	75, 30	59	29	3	High
	Cross Road Culverts	\$190,476	\$117,409	\$73,067	\$606,002	5.4	Average	30	44	5	2	Moderate
	Street Lights	\$148,684	\$129,536	\$19,148	\$91,500	5.4	Average	25	26	4	2	Moderate
	Signs	\$180,176	\$153,574	\$26,562	\$214,927	5.4	Average	15	12	3	2	Moderate
	Barriers	\$18,589	\$12,490	\$6,099	\$23,951	5.1	Average	30	21	9	2	Moderate
	Sidewalks	\$16,077	\$9,968	\$6,109	\$70,000	6.0	Average	50	31	19	2	Moderate
Facilities	Municipal Office	\$942,943	\$315,388	\$627,556	\$1,802,500	6.9	Average	100, 50, 40, 30, 25, 15	25	58	2	Moderate
	Public Works	\$168,543	\$70,278	\$105,782	\$2,680,500	6.1	Average	80, 50, 40, 30, 15	49	29	3	Moderate
	Salt Dome	\$493,996	\$217,467	\$276,529	\$550,000	6.5	Average	25	12	14	2	Moderate
Vehicles	\$2,389,341	\$1,311,512	\$1,182,951	\$3,904,000	7.0	Good	20, 15, 8	8	8	1	Low	
Storm Water	Storm Mains	\$1,286,684	\$491,675	\$795,009	\$2,039,079	6.5	Average	100, 75, 50	27	45	2	Moderate
	Catch Basins	\$276,838	\$79,810	\$197,028	\$460,000	6.7	Average	75	28	47	2	Moderate
	Storm Manholes	\$184,081	\$47,861	\$136,220	\$262,000	7.0	Good	100	26	74	2	Moderate
	Discharge Point	\$13,353	\$7,422	\$5,931	\$45,000	7.0	Good	50	28	22	1	Low
	Storm Ponds	\$36,615	\$9,980	\$26,635	\$80,000	7.0	Good	100	28	73	2	Moderate
Equipment & Machinery	\$340,438	\$189,974	\$150,464	\$354,494	7.2	Good	50, 40, 30, 25, 20, 15, 10, 5	6	4	1	Low	
Land Improvements	\$310,825	\$188,246	\$122,579	\$301,500	7.1	Good	30, 20, 15, 10	16	9	1	Low	
Software & Hardware	\$276,992	\$247,982	\$29,010	\$83,247	6.2	Average	10, 5, 4	8	3	2	Moderate	
Total		\$23,060,749	\$10,345,437	\$11,882,702	\$96,662,619	6.0	Average		66	20	2	Moderate
Total without Road Base Replacement Costs					\$29,529,900	6.2	Average		41	28	2	Moderate

Calculated for Asphalt Roads Only

Figure 2-3: Township Water Supported Asset Distribution Replacement Costs (2016)

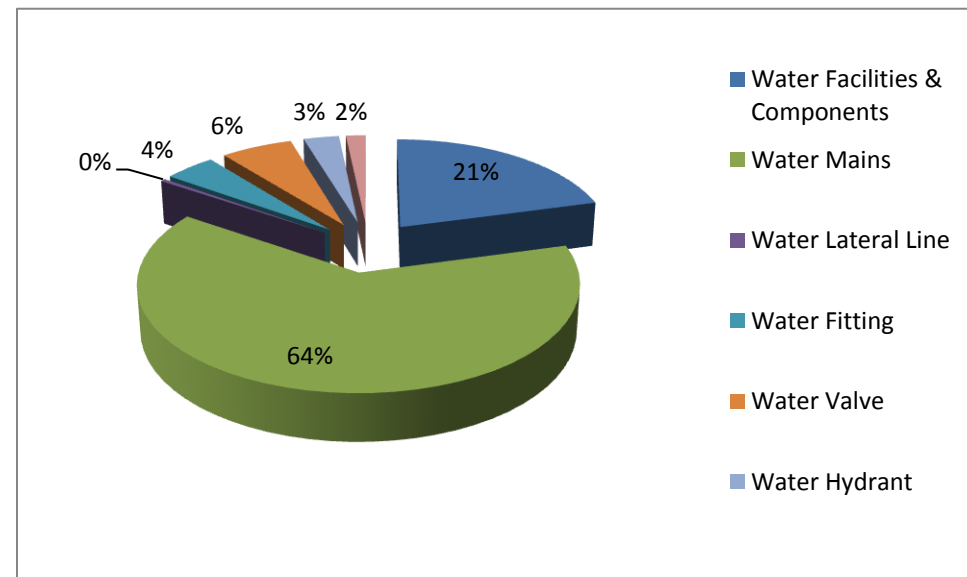


Table 2-2: Township Water Supported Asset Summary

Asset Type	Asset Sub-Type	Historic Cost	2015 Accumulated Amortization	2015 Net Book Value	2016 Replacement Cost	Condition (weighted average)		Useful Life (years)	Age (weighted average)	Remaining Life (weighted average)	Risk (weighted average)	
						Value	Text				Value	Text
Water Facilities & Components	Waldemar Pump House	\$1,279,661	\$897,011	\$382,651	\$1,492,000	6.6	Average	75, 50, 25, 15	24	41	2	Moderate
	Acchione Pump House	\$8,995	\$6,146	\$2,849	Not Expected to be Replaced							Moderate
Water Mains		\$3,353,600	\$736,283	\$2,617,317	\$4,554,086	7.4	Good	100	23	77	2	Moderate
Water Lateral Line		\$21,211	\$5,517	\$15,694	\$30,189	7.0	Good	100	26	74	2	Moderate
Water Fitting		\$205,733	\$74,864	\$130,869	\$315,000	6.6	Average	75	27	48	2	Moderate
Water Valve		\$304,310	\$100,558	\$203,752	\$437,000	7.0	Good	75	25	50	2	Moderate
Water Hydrant		\$151,762	\$52,614	\$99,148	\$216,000	7.0	Good	75	26	49	2	Moderate
Water Wells		\$95,048	\$77,958	\$17,090	\$120,000	5.0	Average	25	22	4	2	Moderate
Total		\$5,420,319	\$1,950,950	\$3,469,369	\$7,164,275	7.0	Average		24	65	2	Moderate

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The Equipment & Machinery assets are mostly composed of Municipal Office equipment, and Public Works equipment. These assets are numerous and a standard requirement for general operations of these department areas of the municipality. These assets also are used and/or tested for safety on a regular basis by Township staff and therefore maintained or replaced on a regular schedule or when required.

Land Improvements assets are mostly made up of parking lots and playing surfaces, as sports fields and park equipment. Township staff regularly inspect these assets to ensure they are well maintained. It is recommended that the Township review the lifecycles of these assets to ensure that they are appropriate for the Amaranth Township environment.

The Software and Hardware asset group is also regularly used by Township staff. Assets as computers are replaced when required to ensure staff effectiveness. Therefore this asset group is well maintained and controlled via appropriate timely replacements.

The Township sidewalks are only located in the west part of the Waldemar community and are inspected annually for deficiencies. The identified issues are recorded and corrected as soon as practicable.

The Township has many street signs throughout the community which include both regulatory and non-regulatory signs. With over \$200,000 replacement value this asset type is critical to safe travel through the Township. Township signs are regularly reviewed by the Township staff and are replaced when necessary, and only require an annual budget of \$4,500 to ensure proper signage is maintained.

Township street lights have not been replaced with new LED lights which will effectively reduce the Township's electrical energy consumption and light bulb replacements. In 2016 the Township paid over \$13,500 in street light electrical consumption, plus additional costs for bulb replacements. We recommend that the Township replace all of their street lights with LED lights which is an approximate cost of \$45,000. Most communities are receiving an electrical consumption savings of 40%-50% or approximately \$5,400, which can pay for the capital investment over a short period of time.

2.3 Road Environment Assets

The Township's road assets make up a key service that reflects the economic and social development of the community. The road environment assets are made up of the following asset types:

- Road Surface Asphalt – 22% of the total Township Road asset replacement costs;
- Road Surface Gravel – 8% of the Total Township Road asset replacement costs;

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- Bridges – 70% of the total Township Road asset replacement costs;
- Cross Road Culverts – 4% of the total Township Road asset replacement costs;
- Street Lights – 1% of the total Township Road asset replacement costs;
- Signs – 1% of the total Township Road asset replacement costs;
- Barriers – less than 1% of the total Township Road asset replacement costs; and
- Sidewalks – less than 1% of the total Township Road asset replacement costs.

Below we provide more detail on the two key asset groups in the Road Environment group of assets, Roads, and Bridges.

2.3.1 Roads

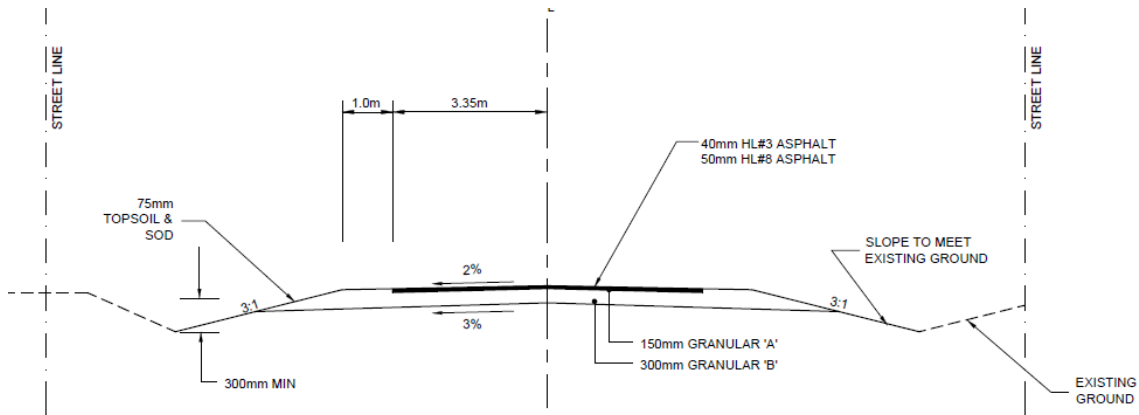
At the current replacement cost the road environment assets account for \$16.9 million dollars or 57% of the Township's tax supported assets excluding road bases. The composition of the road surfaces are outlined in Table 2-3.

Table 2-3: Road Surface Composition

Road Surface	Length (km)	Condition (weighted average)	Condition (text)	Replacement Cost
Asphalt	46,129	6.9	Average	\$3,690,358
Gravel	182,965	6.3	Average	\$439,820
Total	229,094		Average	\$4,130,178

Burnside completed a desktop review of all Township roads to establish the road inventory. Many discussions with the Township Director of Public Works, helped to identify the road conditions, and identified needs for both asphalt and gravel surface roads.

It was identified that the Township is falling behind in trying to maintain good asphalt road surfaces, which can and eventually do affect the road bases. Figure 2-4 outlines cross section of a standard road. It is very important to maintain the road surfaces which are comparatively a minor replacement cost to the major cost to replace a road base. Due to other major projects as bridge replacements funding has not been available to re-enforce some road bases and replace their asphalt surfaces. For a few asphalt roads it is recommended that the asphalt surface be ground into the base along with some additional gravel. This will help to develop a more secure road base. Once the road base becomes soft it cannot economically support a hardtop road surface and it can be best to convert it to a gravel road until the base has been reinforced.

Figure 2-4: Typical Road Cross-Section

The gravel surface roads are on an approximate three year rotation, of surface gravel replacement/top-up. In some locations additional gravel is at times required to help reinforce the road base. This rotation is recommended to continue to ensure that these roads remain safe.

To gain a better understanding of the road conditions it is recommended that the Township complete a Road Needs study. This will provide a more detailed report of condition related deficiencies, and other deficiencies that may impact longevity or operations of Township roads, including road widths, drainage, surface type, alignment, and brushing maintenance where required.

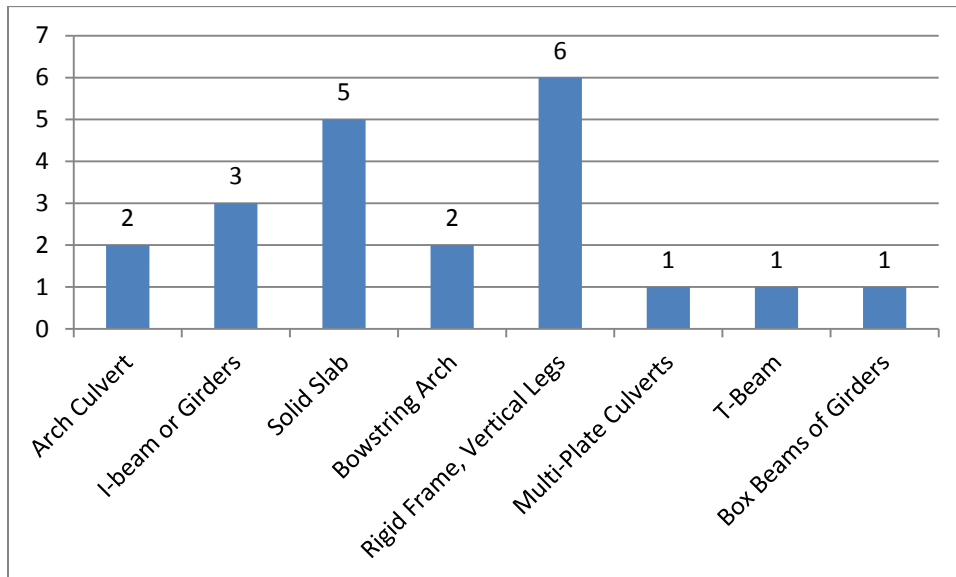
2.3.2 Bridges & Culverts

The Township had their 21 bridges and culverts structures over the span of 3.0 m inspected in 2016 inspected. The inspection report was reviewed and information used in this asset management analysis. Visual inspections are required to be carried out every two years in accordance with the Ministry of Transportation – Ontario Structure Inspection Manual (OSIM). The inspections were to be completed under the direction of a Professional Engineer to assess their condition and identify any material defects, performance deficiencies, maintenance needs, additional studies and/or repairs/rehabilitation work required on a structure by structure basis.

The Township has a total of just under \$12 million replacement cost of bridge and culvert assets. Figure 2-5 provides the distribution of the types of bridges that the Township owns.

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Figure 2-5: Township of Amaranth Types of Bridge Structures



The inspection report made recommendations based on the data. Depending on the condition of each structure, the remedial needs were provided in three classifications; routine maintenance, additional investigations and repairs and rehabilitations (Capital Works).

The routine maintenance work often requires a minimal scope of work, and in most cases can be carried out by Township staff. The total estimated value of the maintenance work to be completed by the Township is \$100,600. We recommend that this be completed over a ten year period to ensure that the appropriate levels of service are maintained.

The capital works needs include any repair, rehabilitation or replacement work which would typically be completed by a Township hired Contractor, to assist in extending the service life of a structure and increasing the Bridge Condition Index (BCI). In accordance with the OSIM, the capital works required are based on a priority of six to ten years, one to five years, within one year, and urgent and have been estimated and presented in Table 2-4.

Table 2-4: Bridge Capital Works Costs

Time Frame	Capital Cost
< 1 year	\$600,000
1 – 5 years	\$3,287,300
6 – 10 years	\$650,000
Total	\$4,537,300

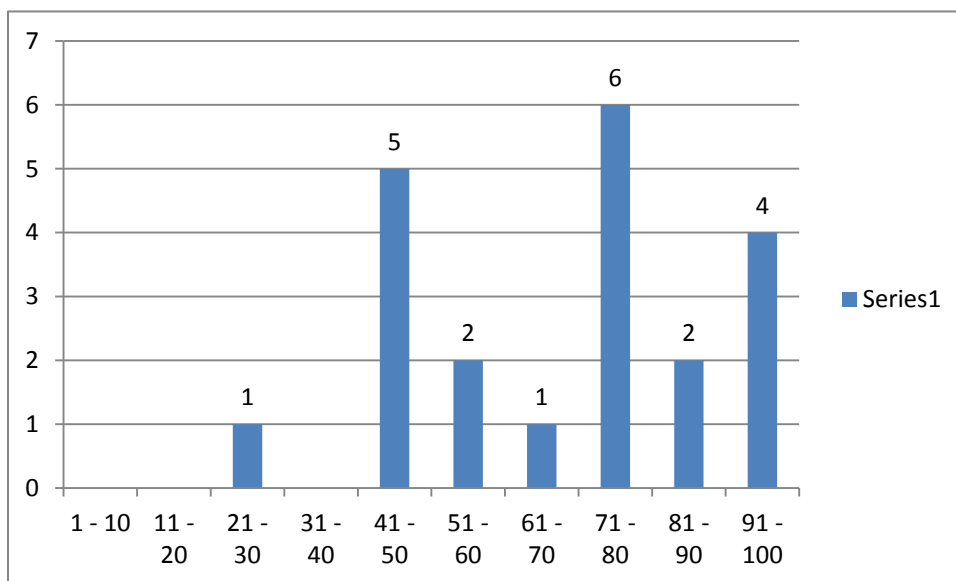
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It should be noted that the Capital Works costs include recommended replacement or rehabilitation costs for structures in need.

Taking into consideration the structures calculated BCI's, several structures have been identified for rehabilitation. Within the next six years, three structures have been identified for rehabilitation capital works.

Based on the biennial inspection of each structure, the Bridge Condition Index (BCI) is calculated for each structure. The Bridge Condition Index Distribution graph, shown in Figure 2-6 below, provides a summary of the current state of the Township's structures.

Figure 2-6: Bridge Condition Index Distribution (2016)



Currently, only approximately 57% of the Municipality's structures are within the "good" range (over 70 BCI), with 14% of the structures classified as "fair" (50 - 70 BCI) and 29% classified as "poor" (under 50 BCI), as illustrated in Figure 2-6. Of interest, the MTO has established a goal to have 85% of their structures in "good" condition (BCI \geq 70) by the year 2021, and to maintain that condition moving forward by addressing rehabilitations and replacements as necessary. Burnside recognizes that the above goal was not established by the Township, but it is noted that, with the reconstruction of Bridge 15 and Bridge 17 the state of the inspected structures, will be improving. There will be 7 more bridges that will need some improvements or replacement to achieve the Province MTO's established goal.

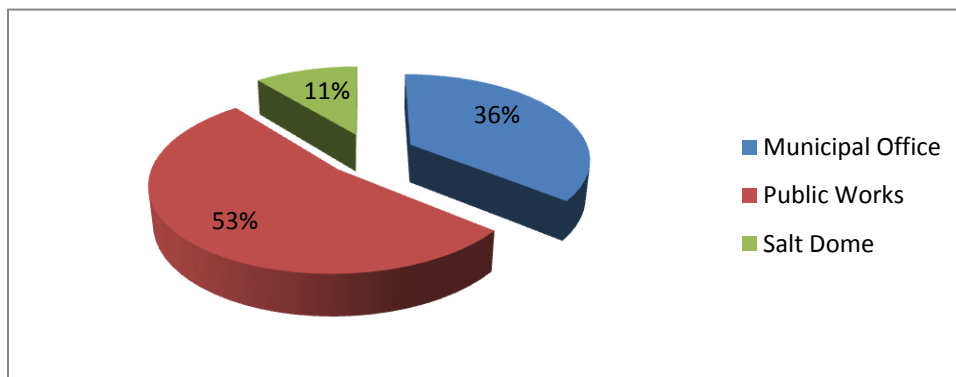
Continued maintenance and completion of rehabilitative or replacement works as recommended in the Bridge report will help to continue a trend of overall improvement of the Municipality's bridge assets.

2.4 Facilities

Facilities account for \$5.0 million or 17% of the Township's assets replacement costs excluding the Road Bases. Figure 2-7 shows the distribution of this \$5.0 million across the asset type owned by the Township. A total of 3 facilities were identified as requiring an opinion of remaining life and replacement cost. Clearly the Township has invested in their facilities by incorporating a community type room part of the main administration office. Renovations are expected to proceed on the Public Works Garage in 2018 to expand this facility for more covered area for vehicles and other maintenance work.

Information that was provided by the Township as well as data included in the Township's asset management database was reviewed and organized for this project.

Figure 2-7: Facilities Replacement Cost Distribution



2.4.1 Facilities Condition Rating

A rating system consisting of five categories, Very Good, Good, Fair, Poor, and Very Poor, was utilized in order to provide a general description of the condition of each facility or component thereof as compared with the average life expectancy of that facility or component. Condition ratings for individual components or groups of components within a facility was provided by the Township, or assumed based on age and average life expectancy where no rating was provided. Table 2-5 provides a weighted average condition to replacement cost perspective of the Township facilities.

Table 2-5: Facility Weighted Average Condition

Facility	Condition (weighted average)	Replacement Cost
Municipal Office	6.9	\$1,802,500
Public Works	6.1	\$2,680,500
Salt Dome	6.5	\$550,000
Total		\$5,033,000

2.5 Vehicles

The Township as most municipalities maintain their vehicles very well. This is potentially due to staff's regular hands-on use of these assets. When vehicle assets are used regularly the end users want to ensure that they are maintained to their manufacturer's specifications. Even though there are many vehicles that have exceeded their identified useful lives they are still safe to use. This does not mean that they will never have to be replaced.

It should not be surprising that all of the Township's vehicles have been identified for replacement over the 20 year period of this study. Some of these are currently only being used to cover more busy periods, and will eventually be replaced.

The Township owns \$3.9 million in replacement cost vehicles. This is 13% of the Township's assets (without road bases included), however they are a key functional asset used to provide clear drivable roads, and safe recreational fields and facilities.

Over the next ten years it is recommended that the Township invest approximately \$265,000 annually to overcome the Township's vehicle needs. This will not overcome the short term (next 5 years) needs, as this requires \$350,000 per year to cover the vehicle replacement needs.

2.6 Storm Water Assets

The Township has catch basins, storm manholes, discharge points, storm ponds, and storm sewer pipes estimated at potentially just under \$2.9 million in replacement cost assets. These assets are expected to have a long lifecycle of over 50 years, however it is important to inspect these assets as they approach their half-life period. Inspections with Closed Circuit Television cameras will provide a better understanding of the asset condition.

Table 2-1 provides more insight into the storm water assets. Please note that weighted averages do not fully reflect potential current needs, but provides a relative expression including all of the assets in this asset grouping.

The expected pipe lifecycle of 100 years indicates, as long as the asset is well maintained it provides for a long lasting cost effective storm water system. Ensuring that these pipes do not degrade beyond two thirds of their lifecycle will enable the Township to re-line the storm mains and ensure they provide appropriate levels of service for many more years.

2.7 Water Supported Assets

The Township water supported assets provide potable water to the Waldemar community. These assets total \$7.1 million in 2016 replacement cost value which is

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20% of all the Township assets excluding the Road Bases. Table 2-3 provides a summary of all of the water supported assets. A more detailed review of these assets can be found in Appendix A.

Each water supported asset component identified in Table 2-3 is critical to the acquiring, treating and distributing potable water to the community with sufficient quantity and pressure. As this is a water supported asset grouping we shall only comment on the condition and capacity of the system.

In general the condition of the water assets are fair to good. There are only three main concerns:

1. The water wells and pumps are aging and need to be better assessed for their potential remaining service life.
2. The water treatment process piping in the pump house has shown some valves difficult to turn. This can provide for greater difficulty when requiring some potential service to the system. It is expected that this process piping will be replaced in the next few years, however it is best to be completed in a phased approach. If a new large development proceeds then a new water system will be required which will provide for an opportunity to complete the work while the new system provides water to the current residence in the Waldemar community.
3. Water distribution capacity, will be reaching its limits once the current approved developments are completed adding some 70 new homes to the community. The Township water operator has identified that once all 70 homes are integrated to the distribution network there will be limited room for water losses. This has not been incorporated into this study, however future water rate studies and water financing plans will have to address this potential issue.

2.8 Asset Condition

Each asset was tracked based on estimated total useful life and remaining service life. Using this data, along with staff information, and age analysis of Township assets assisted in identifying potential areas of focus where inspected asset condition was not available. We do wish to state that asset condition is always best defined via engineering best practices. Engineering based condition assessments can provide more realistic estimates of an asset's remaining service life, which can then be used to establish rehabilitation and/or replacement schedules. Age related condition values can be problematic if the asset's useful life is not appropriately defined. For example, if a useful life of an asset is defined shorter than the asset's true performance, this will result in a lower/poorer age assessed condition rating. This method of condition approximation was only used when inspected or staff commented conditions were not available.

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A rating out of 10 was established for all assets and was based on a combination of past reported physical inspections, current inspections, staff assessment, and asset age analysis. This rating was then converted to a condition description of “Very Poor” to “Very Good” as shown in Table 2-6.

Table 2-6: Asset Condition Format for All Assets

Condition (Value 0-10)	Condition
9 – 10	Very Good
7 – 8	Good
5 – 6	Average
3 – 4	Poor
1 – 2	Very Poor

The condition of the assets is an important element of any lifecycle assessment process. The condition assessment process also identifies maintenance and operating practices that can be applied to ensure appropriate service, as well as extending the life of the asset to its maximum service life.

A draft policy has been proposed that will ensure all the Township’s assets are reviewed using established engineering methods and practices. Appendix B contains the draft Data Verification and Condition Assessment Policy, which identifies how often the Township tax supported assets are recommended to be assessed.

A high level summary of the average conditions for the Township assets are shown in Table 2-1 and Table 2-2. The conditions listed in Table 2-1 and Table 2-2 are for weighted average conditions. The weighting was to use the asset replacement costs so that the greater the cost the greater the weighting of that asset’s condition is used to determine the average. Using this method provides for more emphasis on the more expensive to replace assets. However please note that averages are a composition of many assets in a group. Averages can be misleading with respect to immediate needs as the new assets offset the old assets requiring urgent replacement.

2.9 Data Accuracy and Completeness

An important element of this asset management plan is ensuring that tools and procedures are in place to maintain accuracy and completeness of the asset data and calculations moving forward. As time passes, assets are used, maintained, improved, disposed of and replaced.

All of these lifecycle events can trigger changes to the asset database used within the asset management plan. Therefore, tools and procedures are essential to ensure the asset data remains accurate and complete. Please refer to Appendix B of this report for the draft “Data Verification and Condition Assessment Policy” for the Township. This policy illustrates how the asset data can be updated and verified going forward. This includes the timing of condition assessments for each asset type and what should be included within the condition assessment procedures.

3.0 Expected Levels of Service

The Township of Amaranth has been offering and maintaining for its municipality good service levels, during challenging economic times. The Province has become more demanding of all municipalities requiring residents to invest more and more into replacing older infrastructure. Reviewing past records has shown that small investments were being made into maintaining and replacing Township infrastructure. The last few years have seen improvements with greater investments in retaining proper service levels on Township assets. It is important to note that the long term objective of the Township needs to be infrastructure sustainability. In general the Township is performing maintenance activities when required, however with the potential of a development which may add 300 new homes will push the Township to hire more staff and acquire more much needed equipment to be able to maintain expected levels of service.

3.1 Scope and Process

A levels of service (LOS) analysis gives the Township an opportunity to document the levels of service that are currently being provided and compare it to the levels of service that will ensure the assets achieve their full lifecycle potential. This can be done through a review of current practices and procedures, an examination of trends or issues facing the Township and/or through an analysis of performance measures and targets that staff can use to measure performance.

Expected LOS can be impacted by a number of factors, including:

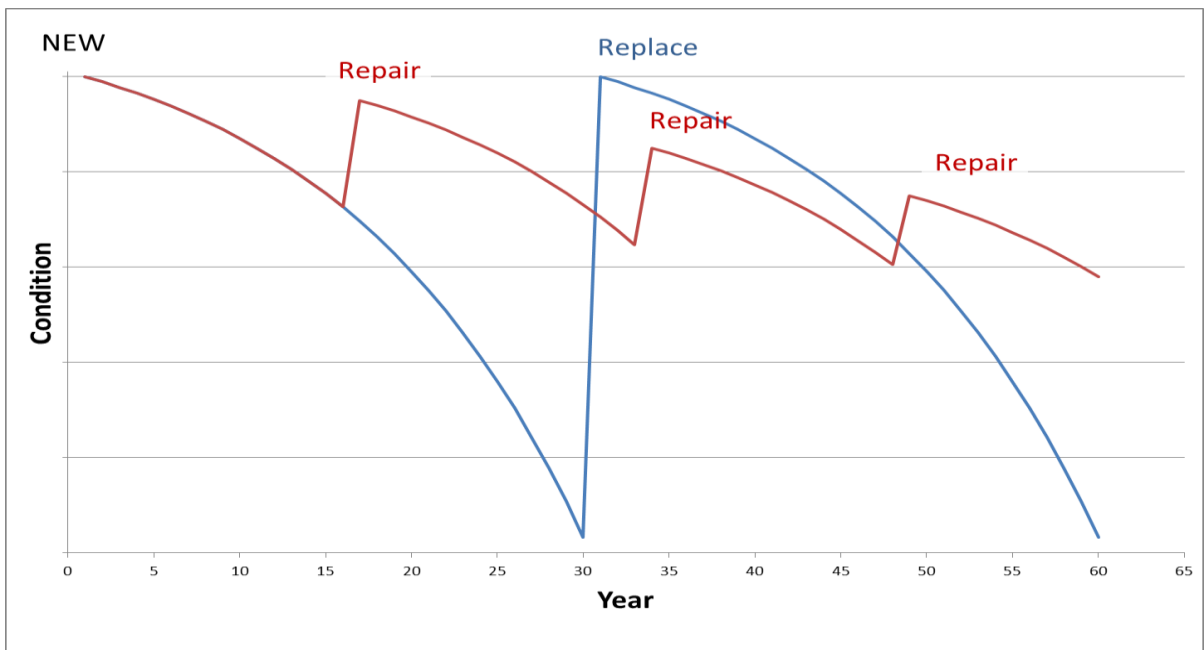
- Legislative requirements (eg. Minimum maintenance standards for roads, water guidelines, etc.);
- Strategic planning goals and objectives;
- Resident expectations;
- Visitor expectations;
- Council expectations; and
- Financial or resource constraints.

The previous task of determining the state of the Township's local infrastructure establishes the asset inventory and condition, as well as asset management policies and principles to guide the refinement and upkeep of asset infrastructure. The LOS analysis will utilize this information and factor in the impact of asset service level targets. It is important to document an expected LOS that is realistic to the community. It is common to strive for the highest LOS; however, these service levels usually come at a cost. It is also helpful to consider the risk associated with a certain LOS. Therefore, expected LOS should be determined in a way that balances both level of investment and associated risk to the Township.

Burnside received verbal confirmation of maintenance practices that the Township undertakes. The only additional practices that we recommend are to complete more rigorous condition assessments on Township owned assets, as this will help better determine the remaining life of the municipality’s assets. This then will provide the Township staff with time to find/develop appropriate funding to improve or replace these assets.

Figure 3-1 illustrates the recommended strategy of investing more often in smaller amounts provide higher levels of service and better asset condition with over all lower total cost over the lifecycle of the asset.

Figure 3-1: Small and Timely Renewal Investments Save Money



3.2 Current Levels of Service versus Expected Levels of Service

The Township’s current LOS has resulted in the current state of infrastructure as discussed in the previous section of the report. This current LOS also relates to the risk assessment discussed in later report sections. Regarding the cost of this LOS, the municipality has established an operating and capital budget for the current year that includes the cost of providing this LOS to residents. Therefore in moving from the current LOS to an expected LOS, consideration has to be made for the associated cost (or impact on the Township’s current budget) in moving to an enhanced or expected LOS.

Table 3-1 outlines broad LOS descriptions (both current and enhanced LOS). This analysis was noted through discussions with the Township and engineering best practices. Based on the information provided there are a few enhanced maintenance

related LOS identified. The levels of service cost impact analysis was factored into the financial strategy discussed in Chapter 5 of this report.

3.3 Level of Service Performance Measures

As mentioned above, using performance measures in the LOS review can also be helpful in measuring the Township's goals and objectives when it comes to capital assets. The municipality currently tracks specific performance measures as part of their Minimum Maintenance Standards for Roads. The Township also follows the Provincial water guidelines which are tracked and documented. It is recommended that the Township start tracking some other key performance measures as this will assist the municipality to better define and achieve their desired LOS and asset strategies. As the municipality's asset management plan evolves over time, performance measures can be introduced to further measure the LOS being provided in each service area. It is expected that the Province will be asking municipalities to incorporate more performance measures to ensure that appropriate service levels are being offered to the public.

Table 3-1: Township Expected Levels of Service

	Expected Strategic LOS	Level of Service (LOS) Analysis				
		Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost of Expected LOS	Cost Description
Roads & Related Assets	Safe Roads	Meet "Minimum Maintenance Standards" as defined by Ontario Regulation 239/02	Meet "Minimum Maintenance Standards" as defined by Ontario Regulation 239/02	Regulation Standard	\$1,800	Township may want to incorporate a system that will assist in proving compliance to the Provincial Regulation
	Fix Public Identified Issues Quickly	Track complaints and resolve them as quickly as possible	Track complaints by road segment.	Respond to Public Inquiry within 7 days		Township delivers the Level of Service well
	Maintain Road System Network Condition for Safe Use	Road Maintenance is completed regularly and when required	Maintain adequate road network condition index to ensure safe roads	Assess Road Conditions every 10 years with Internal assessment annually	\$25,000 + \$15,000 + \$8,500	Roads Needs Study every 10 years to include Network Condition analysis, and crack seal program and line painting
	Asphalt Roads are Clean and Clear	Street sweeping and flushing are completed annually	Roads are swept and flushed to ensure they are clear of debris and safe.		\$8,500	Township delivers the Level of Service well
	Gravel Roads are Well Maintained and Dust Inhibited	Gravel roads are smoothed when required, and Calcium Chloride applied to control dust	Gravel roads are smoothed when required, and Calcium Chloride applied to control dust		\$110,000	Township delivers the Level of Service well
	Safe and Well Maintained Roadsides	Township provides brushing, ditching, grass mowing, and shoulder maintenance to ensure roadsides are safe and well maintained	Roadsides are clear of obstructions and well maintained for safe road travel		\$1,000	Township delivers the Level of Service well
	Signs can be Seen Clearly	Signs: Visual inspections done in the evening. Replaced when required/needed.	Signs: Visual inspections. Replace when needed.	Reflectivity Standard		Township delivers the Level of Service well
	Sidewalks are Clear and Safe	Visual Inspections done annually	Annual visual inspections correcting all identified deficiencies	Regulation Standard		Township delivers the Level of Service well
	Safe Well-lit Urban/Semi-Urban Street Areas	Maintenance activated by Public Notice for Street Lights	Maintenance activated by Public Notice for Street Lights	Correction of Issues within MMS	\$45,000	Recommendation for conversion to LED lights

	Expected Strategic LOS	Level of Service (LOS) Analysis				
		Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost to Move to Expected LOS	Cost Description
Building Assets	Safe Buildings	Meet legislative requirement (Building Code, Fire Code, Health & Safety, etc.)	Meet legislative requirement (Building Code, Fire Code, Health & Safety, etc.)	Provincial Guidelines		Township is completing this LOS
	Facility are Well Maintained	Condition assessments performed when needed	Facility Condition Assessments showing remaining life of major asset components and required improvements completed			On-Site inspections completed when required
	Health & Safety Equipment is in Good Working Order	Health & Safety component assessments to ensure emergency alarms, lighting, generators, etc. are functioning to specifications	Health & Safety component assessments to ensure emergency alarms, lighting, generators, etc. are functioning to specifications	Provincial Guidelines		Township is completing this LOS
	All Facilities meet Accessibility Standards	All facilities meeting current accessibility standards	All Facilities meet accessibility standards.	Provincial Guidelines		Township is completing this LOS
	Maximizing Energy Savings	Energy Audit has been undertaken by the Township	Resource Efficiency: Energy Audit - for all facilities			Township does not have any outstanding issues to complete from the Energy audit for buildings
	Township Office Water is Safe to Drink	Reverse Osmosis and water coolers are used to ensure safe drinking water.	Water is tested regularly and safe to drink	Provincial Guidelines		Township is completing this LOS
	Mechanical Systems are Inspected and Maintained	HVAC systems are inspected and maintained annually	Assess efficiencies in Maintenance contracts (i.e. generators, HVAC).			Township is completing this LOS
	Clean and Well Maintained Facilities	Township has well maintained facilities	Proactive facility maintenance.			Township is completing this LOS

	Expected Strategic LOS	Level of Service (LOS) Analysis				
		Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost to Move to Expected LOS	Cost Description
Land Improvements	Safe & Accessible Parks	Meet legislative requirement (Inspections, Health & Safety, etc.)	Meet legislative requirement (Inspections, Health & Safety, etc.)	Provincial Guidelines		Township Staff complete inspections
	Parks are Well Maintained	Condition assessments performed when needed. Monthly inspections of playground equipment	Monthly inspections of playgrounds and equipment	Provincial Guidelines		Township is completing this LOS
	Playgrounds are in Good Working Order	Health & Safety component assessments to ensure functioning to specifications	Health & Safety component assessments to ensure functioning to specifications	Provincial Guidelines		Appropriate maintenance measures are being undertaken by the Township.
	Parking Facilities are in Good Condition	Maintenance for Parking areas when required	Annual Inspections for maintenance for Parking areas			Township staff to complete and report
	Sports Fields are Safe and Maintained	Appropriate Maintenance for safe use	Appropriate Maintenance for safe use			Township is completing this LOS
	Township Trails are Safe and Maintained	Appropriate Maintenance for safe use	Appropriate Maintenance for safe use			Township is completing this LOS
	Fencing Is Safe	Responding to Public complaints	Annual inspection and fixing of maintenance issues	Annual Review		Township to review when complaints submitted. Inspections are completed by staff

	Expected Strategic LOS	Level of Service (LOS) Analysis				
		Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost to Move to Expected LOS	Cost Description
Vehicles & Equipment Assets	Safe & Well Maintained Vehicles	Proactive maintenance plan, as per Manufacturer's Guidelines	Proactive maintenance plan, as per Manufacturer's Guidelines			Township is completing this LOS
	Safe & Well Maintained Equipment	Proactive maintenance plan, as per Manufacturer's Guidelines	Proactive maintenance plan, as per Manufacturer's Guidelines			Township is completing this LOS
	Optimal Replacement of Vehicles & Equipment	Replace Equipment/Vehicles as required (some areas based on legislated replacements, others minimum safety)	Replace Equipment/Vehicles as required (some areas based on legislated replacements, others minimum safety)			Some concern over the age of some of the vehicles/equipment the Township uses, however they are safe to use. The older vehicles are being used sparingly

	Expected Strategic LOS	Level of Service (LOS) Analysis				
		Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost to Move to Expected LOS	Cost Description
Storm Water Assets	Effective Storm Water Management	Investigate and respond based on public complaints/concerns	Proper flows and clear system with little to no inhibitors	No storm water back-up incidents		Township is completing this LOS
	Catch Basins are Clear and Well Maintained	Annual Catch Basin cleaning	Annual Catch Basin cleaning		\$2,000	Township is completing this LOS
	Storm Water Mains are Clear and Well Maintained	No identified issues	CCTV review and assessment completed every 15 yrs. Implement plan for repairs & maintenance that result in system efficiencies.		\$20,000	CCTV program every 15 years

	Expected Strategic LOS	Level of Service (LOS) Analysis				
		Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost of Expected LOS	Cost Description
Water Assets	Source Water is Well Protected	Maintaining appropriate Zoning and Planning to ensure Source Water Protection	Maintaining appropriate Zoning and Planning to ensure Source Water Protection			Township is completing this LOS
	Production Wells are Well Maintained	Appropriate maintenance is undertaken when required	Appropriate maintenance is undertaken when required			Township is completing this LOS
	Treatment Processes Meet Legislative Requirements	Meet all legislative requirements	Meet all Provincial legislative requirements	Provincial Guidelines		Township is completing this LOS
	Well Maintained Generator	Tested monthly	Tested and well maintained generators		\$3,000	Township is completing this LOS. Annual service maintenance
	Appropriate Water Storage for Distribution Network	Water Storage is sufficient for currently approved developments. Beyond that the system may be reaching capacity levels	Water Storage meets the needs of the Water Distribution Network		\$5,000	Need to address capacity if the Township wishes to grow beyond the current approved development in the Waldemer area. Use robotic camera every 5 years to inspect storage tank.
	Efficient Water Distribution System	Water losses are tracked and at a minimum	Water Losses are tracked and minimized		\$2,000	Township is completing this LOS. Annual effort to gain access to exersize valves.
	Sufficient Water Pressure for Fire Protection	Water pressure meets and exceeds Fire Protection Standards with over 50 psi at high point and over 90 psi at pump house	Water Pressure meets Fire Protection Standards of 50 psi			Township is completing this LOS
	Hydrants are Flushed and Swabbed	System is flushed twice a year, and annual refurbishing program	Flushing Program meets Guideline Standards		\$5,000	Township is completing this LOS. Annual refurbishing program

4.0 Asset Management Strategy

4.1 Scope and Process

The asset management strategy provides the recommended course of actions required to maintain (or move towards) a sustainable asset position while delivering the levels of service discussed in the previous chapter. The course of actions, when combined together, form a long-term operating and capital forecast that includes:

- Non-infrastructure solutions: Reduce costs and/or extend expected useful life estimates;
- Maintenance activities: Regularly scheduled activities to maintain existing levels of service levels, or repairs needed due to unplanned events;
- Renewal/Rehabilitation: Significant repairs or maintenance planned to maintain the levels of service and increase the remaining life of assets; and
- Replacement/Disposal: Complete disposal and replacement of assets, when renewal or rehabilitation is no longer an option.

Priority identification becomes a critical process during the development of an asset management strategy. Priorities have been determined based on assessment of the overall risk of asset failure, which is determined by looking at both the probability of an asset failing, as well as, the consequences of failure. The consequences of the municipality not meeting desired levels of service must also be considered in determining risk. As discussed in Chapter 3, adding enhanced levels of service results in both operating and capital budget impacts over the 20 year forecast period. This has to be taken into consideration, with the overall objective of reaching sustainable levels while mitigating risk.

4.2 Risk Assessment

The risk of an asset failing is defined by the following calculation:

Risk of Asset Failure = Probability of Failure X Consequence of Failure

Probability of failure has been linked to the condition assessment for each asset, assuming that an asset in “very good” condition has a “rare” probability of failure. The following table outlines the probability factor tied to each condition rating:

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Table 4-1: Probability of Failure Matrix

Condition (Value)	Condition	Probability of Failure
9 – 10	Very Good	Rare
7 – 8	Good	Unlikely
5 – 6	Average	Possible
3 – 4	Poor	Likely
1 – 2	Very Poor	Almost Certain

Consequence of failure has been determined by examining each asset type separately. Consequence refers to the impact on the municipality if a particular asset were to fail.

Types of impacts include the following:

- Cost Impacts: the cost of failure to the Township (i.e., capital replacement, rehabilitation, fines and penalties, damages, etc.);
- Social impacts: potential injury or death to residents;
- Environmental impacts: the impact of the asset failure on the environment; and
- Service delivery impacts: the impact of the asset failure on the Township's ability to provide services at desired levels.

Each type of impact was reviewed and consequence of failure for each asset type was determined by using the information contained in Table 4-2 as a guide to assess the level of impact. Levels of impact were documented as ranging from "significant" to "insignificant".

Table 4-2: Consequence of Failure Matrix

	Cost	Social	Environmental	Service Delivery
Significant	Significant Cost – Difficult to Recover	Death, Serious Injury	Long-term Impact – Permanent	Major Interruptions
Major	Substantial Cost – Multi-year Budget Impacts	Major Injury	Long-term Impact – Fixable	Significant Interruptions
Moderate	Considerable Cost – Requires Revisions to Budget	Moderate Injury	Medium-term Impact – Fixable	Moderate Interruptions
Minor	Small/Minor Cost – Within Budget Allocations	Minor Injury	Short-term/Minor Impact – Fixable	Minor Interruptions
Insignificant	Negligible or Insignificant Cost	No Injury	No Impact	No Interruptions

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With both probability of failure and consequence of failure documented, total risk of asset failure was determined using the matrix contained in Table 4-3. Total risk has been classified under the following categories:

- Extreme Risk (E): Risk beyond acceptable levels;
- High Risk (H): Risk slightly beyond acceptable levels;
- Medium/Moderate Risk (M): Risk at acceptable levels, monitoring required to ensure risk does not become high; and
- Low Risk (L): Very little risk.

Table 4-3: Total Risk of Asset Failure Matrix

Probability of Failure	Consequence of Failure				
	Significant	Major	Moderate	Minor	Insignificant
Almost Certain	E	E	H	H	M
Likely	E	H	H	M	M
Possible	E	H	M	M	L
Unlikely	H	M	M	L	L
Rare	H	M	L	L	L

Risk levels can be reduced or mitigated through planned maintenance, rehabilitation and/or replacement of an asset. An objective of this asset management plan is to reduce risk levels where they are deemed to be too high, as well as, ensure assets are maintained in a way that keeps risk at acceptable levels.

4.3 Priority Identification

Through a review of the asset risk of failure assessment, the assets/categories listed below were identified as being priorities of the Township for over the next few years.

Roads

- 20th Sideroad, from 7th Line to 8th Line – Recommendation is to replace the surface of this asphalt road (approximate cost \$106,884; 2018).
- Amaranth/Grand Valley Townline, from 20th Sideroad to 1.8 km north of 20th Sideroad – Recommendation is to replace the surface of this asphalt road (approximate cost \$144,000; 2018).
- 20th Sideroad from County Road 11 to 4th Line – Recommendation is to replace the surface of this asphalt road (approximate cost \$121,527; 2019).
- 20th Sideroad from 4th Line to 5th Line – Recommendation is to replace the surface of this asphalt road (approximate cost \$104,098; 2019).

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- 5th Sideroad from 2nd Line to County Road 11 – Recommendation is to replace the surface of this asphalt road (approximate cost \$100,960; 2019).
- Amaranth/Grand Valley Townline from 1.6 km north of 15th Sideroad to 20th Sideroad – Recommendation is to replace the surface of this asphalt road (approximate cost \$103,950; 2019).
- Devonleigh Drive from 30th Sideroad to 30th Sideroad – Recommendation is to replace the surface of this asphalt road (approximate cost \$51,277; 2019).
- Station Street from 10th Line/Mill Street to St. John Street – Recommendation is to replace the surface of this asphalt road (approximate cost \$19,539; 2019).
- Station Street from St. John Street to Peter Street – Recommendation is to replace the surface of this asphalt road (approximate cost \$22,479; 2019).
- Road bases are not expected to be fully replaced but improved and in localized places dug out and repacked. However there are several road pavements showing that their road bases need some additional support and stabilization. One of these is the following:
 - 5th Sideroad from 2nd Line to County Road 11 (approximate cost \$100,000; 2019).

Bridges

- Bridge 17 – This bridge was recommended to be replaced by the Township bridge inspection report. The Province of Ontario is providing an Ontario Community Infrastructure Fund (OCIF) Grant to pay 90% of the cost to replace this bridge (approximate cost to the Township \$100,000; 2017).
- Bridge 15 – The Township had to close this bridge since it did not have sufficient funds to replace it last year. It is scheduled to be replaced (approximate cost to the Township \$600,000; 2017).

Facilities

- Municipal Office HVAC System (Air Conditioner) – The old system is well past its life and not working properly therefore needs to be replaced (approximate cost \$28,000; 2017).
- Public Works Garage Windows – Old windows are scheduled to be replaced in 2017. (approximate cost \$6,000; 2017).
- Municipal Office Well – Water supply being critical for the proper functioning of this building the well and pump are still working and potentially in good condition but there is concern over its age, and this is recommended to be investigated. The Township may want to ensure that money is set aside for a replacement as soon as it is required (approximate cost \$15,000; 2018).
- Public Works Garage – Is an old facility and with growing need for more space for equipment. The expansion of this building is identified (approximate cost \$125,000; 2018).

Vehicles

- 2000 Ford Sterling Plow Truck – Has exceeded its life expectancy and therefore is recommended to be replaced. These types of trucks are critical to ensuring that the Township roads are in good repair and safe to drive (approximate cost \$275,000; 2017).
- 2009 Ford F-150 Pickup Truck – Has exceeded its life expectancy and therefore is recommended to be replaced. This is a vehicle that has been well used by Township Road staff (approximate cost \$32,000).
- 1994 Grader Champion 740S4 – Is well past its expected life and is recommended to be replaced. These types of vehicles are critical to ensuring that Township roads are in good repair and safe to drive (approximate cost \$415,000; 2018).

Street Lights

- Township Street Lights – The Township has not yet converted their street lights to LED lighting. The conversion will save the Township 40% - 50% in electrical costs annually which can be over \$5,000 per year which will pay off the capital investment expense in less than 10 years (approximate cost \$45,000; 2018).

Storm Ponds

- Storm Retention Pond James Street – Runoff from the neighbouring agricultural land has caused for some cleanout work required to ensure that this storm pond is functioning well (approximate cost \$4,500; 2017).

Water System

- Waldemar Water System Generator - Requires some rehabilitation to ensure it is functioning at appropriate service levels (approximate cost \$7,500; 2017).
- Waldemar Water Scada System – The data logger is expected to need upgrading (approximate cost \$2,000; 2018).
- Waldemar Water Pump House Process Piping – It was revealed that the valves are old and are becoming more and more challenging to engage. This is best to be completed in phases. If the Township has a large development come on line in the near future the new water system for that development may provide water to the community while this process piping is replaced (approximate cost \$125,000; 2021).

This list of capital asset replacements are only for the next few years, and do not limit the needs that the Township requires to become fully sustainable. The Finance Strategy will further outline the needs for investing in assets annually via reserves to ensure that funds are available for future asset replacements.

4.4 Long-term Forecast

For many years, lifecycle costing has been used in the field of engineering to evaluate the advantages of using alternative materials in construction or production design. The method has gained wider acceptance and use recently in the management of capital assets. By definition, lifecycle costs are all the costs which are incurred during the lifecycle of a capital asset, from the time it is purchased or constructed, to the time it is taken out of service for disposal.

In defining the long-term forecast for the Township's asset management strategy, costs incurred through an asset's lifecycle, the assets condition, expected LOS, and risk were considered and documented. Asset Replacement Analysis in forecasting the municipality's asset replacement needs are summarized in Figure 4-1, which we are calling Asset Strategy Scenario 1 based on expected levels of service. This asset strategy was further developed into a Scenario 2a, and 2b. This second developed scenario takes the developed asset strategy and applies a Capital Phased-In Approach as shown in Figure 4-2. Scenario 2 is fully discussed in Chapter 5.

The asset strategy incorporated all of the information discussed above in this report and based on the information provided by the Township, the completed field asset assessments, past reports, staff input, and understanding of the asset's reaction in their current environment as well as the expected asset maintenance levels, and the current asset condition, which is expected to produce a reduced asset potential risk of failure. The outcome of this scenario approach was to provide appropriate asset service levels, and assets are expected to meet or exceed their useful life which reduces expected infrastructure deficits. In total, \$25.6 million in assets (inflated to appropriate year) are shown as replacement needs in the 20 year forecast. This is the recommended asset strategy for the Township of Melancthon.

Assets like Bridges, Storm Water, and Facility Structures, are not expected to be replaced for usually over 50 years. It needs to be stated to ensure that these assets have reserve funding for their replacement schedule in the future. These assets will need to be replaced beyond the 20 year analysis period and not having reserve funds to do so will elevate the risk of failure to extreme levels in the future. Scenario 2b makes an attempt at providing the Township with an investment plan into Township reserve accounts.

For the recommended scenario to be feasible, the expected level of service adjustments discussed in Chapter 3 are needed in conjunction with the current level of service amounts in order to effectively maintain and rehabilitate the assets as required.

The financing strategy discussed in the next chapter will incorporate the level of service adjustments into the recommended financing analysis. Please refer to Appendix C for the full 20 year details.

Figure 4-1: Scenario 1 - Proposed Tax Supported Asset Strategy Based on Expected Levels of Service

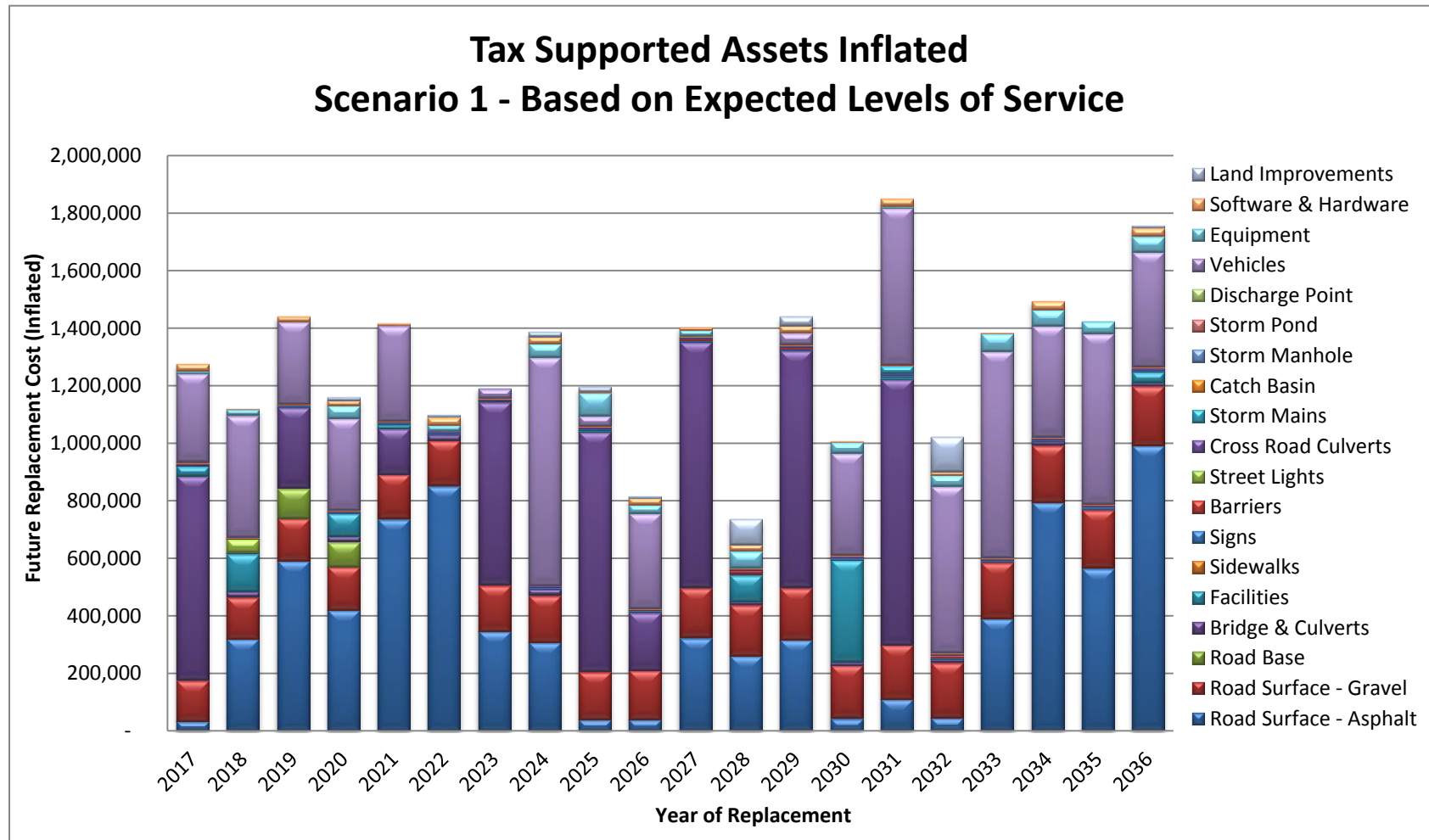
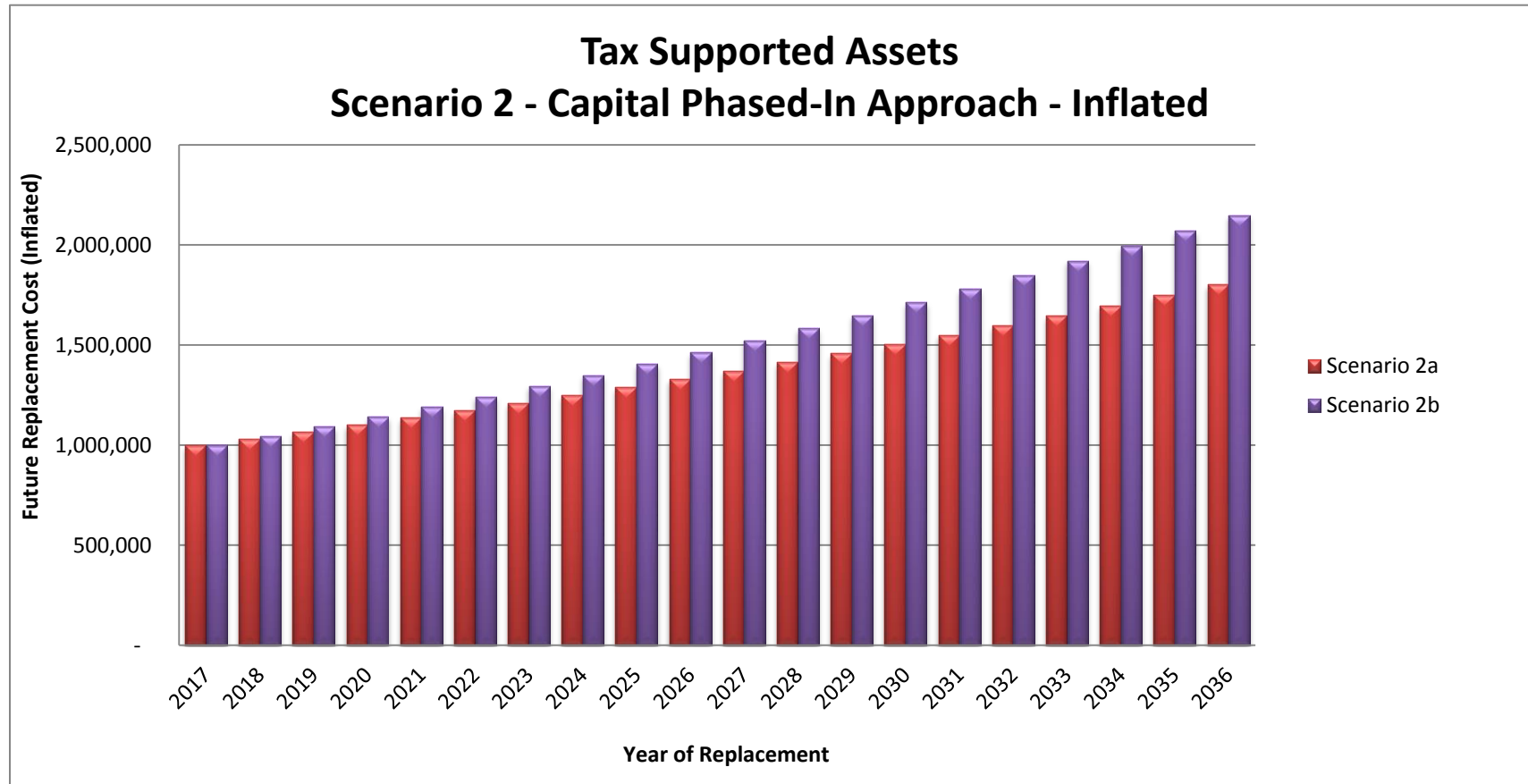


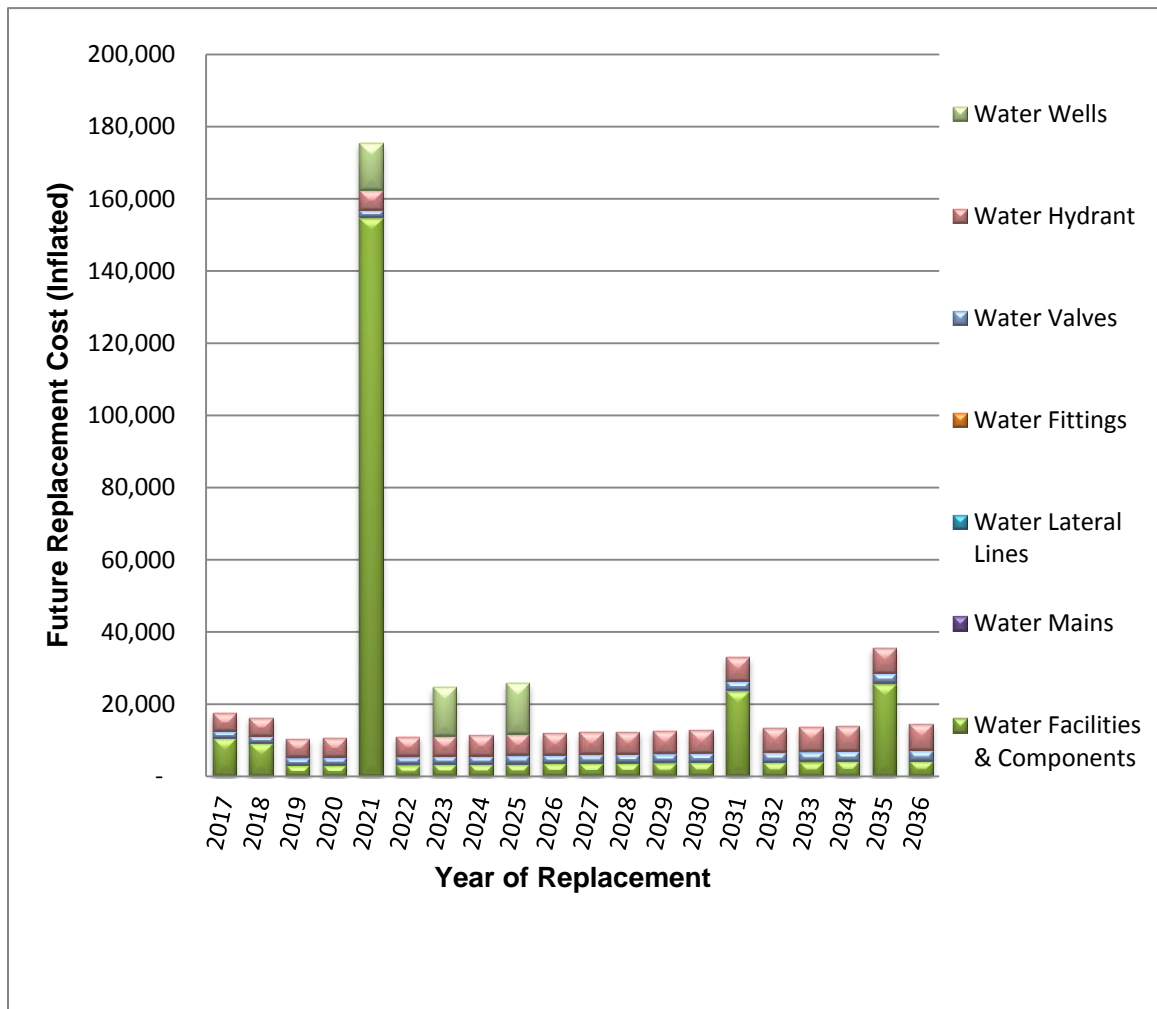
Figure 4-2: Scenario 2 – Capital Phased In Approach



4.4.1 Water Supported Assets

A representation of the water supported assets is being presented here for completeness. As noted above these assets undertake their own sustainability Financing Plan and Rate Studies. Based on the information provided Figure 4-3 shows the 20 year distribution of water supported asset strategy.

Figure 4-3: Proposed Water Supported Asset Strategy for 20 Year Period



5.0 Financing Strategy

5.1 Scope and Process

The financing strategy outlines the suggested financial approach to funding the tax supported asset management strategies outlined in Chapter 4, while utilizing the Township's existing budget structure and available funding sources. This section of the asset management plan includes:

- Annual expenditure forecasts broken down by lifecycle cost, including:
 - Maintenance/non-infrastructure solutions;
 - Renewal/rehabilitation activities;
 - Replacement/disposal activities; and
 - Expansion activities.
- Actual expenditures in the above-named categories for 2015 and 2016, and budgeted expenditures for 2017;
- An approximation of the annual funding devoted to Capital improvements/ Replacements;
- Identification of the funding shortfall and the infrastructure gap, including how the impact will be managed; and
- All key assumptions documented.

The financing strategy forecasts (including both expenditure and approximate capital revenue sources) were prepared consistent with the Township's budget structure so that it can be used in conjunction with the annual budget process. Various financing options, including user fees, reserve funds, debt, and grants were considered during the process.

For all financing strategy scenarios, a detailed 20 year plan was generated. The plan identifies specific lifecycle costs and associated funding sources required for the asset management strategies described in Chapter 4.

5.2 Historical Results

Table 5-1 outlines the historical results for 2015-2016 and the 2017 budget for Township services (all tax supported), which includes all capital (i.e., renewal/ rehabilitation, replacement/disposal, and expansion). Over the last three years the township seems to have been trying to increase its efforts to close the infrastructure gap. Based on the past three years a value of \$1,000,000 is the approximate capital funding the Township has provided to capital annually. This includes the use of development charges for growth (expansion) related costs, reserve funds, Gas Tax funds, and grants/subsidies. Please note that the Township was successful in obtaining the one-time Ontario Community Infrastructure Fund (OCIF) funding in 2016 for the construction of a new Bridge 15. This will help but not eliminate the infrastructure gap. This funding has been taken into account for only the Township portion of replacement cost is included in our analysis.

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Table 5-1: Tax Supported Historical Results - Renewal/Rehabilitation, Replacement/Disposal & Expansion

Description	Actual	Actual	Budget
	2015	2016	2017
Prior Capital Expenses			
Road Surface - Asphalt	\$127,494	\$230,100	
Road Surface - Gravel	\$267,188	\$320,833	\$311,750
Bridges & Culverts	\$32,769	\$226,965	\$600,000
Cross Road Culverts	\$2,328	\$2,276	\$3,000
Signs	\$3,794	\$2,168	\$3,000
Municipal Office	\$4,042	\$25,686	\$32,500
Public Works Garage	\$6,238	\$5,903	\$6,000
Vehicles	\$233,272	\$148,163	\$307,000
Equipment & Machinery	\$42,164	\$38,094	
Land Improvements		\$5,068	
Software & Hardware	\$19,447	\$4,660	
Total	\$738,737	\$1,009,916	\$1,263,250

5.3 Tax Supported Financing Strategies

As discussed in Chapter 4, two asset management strategies were developed to provide different avenues of moving towards sustainable asset management planning. Scenario 1 outlines the preferred approach, allocating rehabilitation and replacement needs based on asset condition, risk and expected levels of service. Scenario 2, the recommended approach, provides for the same capital needs as Scenario 1 over the 20 year forecast period, however, some potential capital deferrals are used to phase-in the impact over earlier years to assist with affordability. Included in this chapter are three distinct financing strategies, one for Scenario 1 and two for Scenario 2 (referred to as 2a and 2b), that attempt to move the Township towards asset management sustainability.

Table 5-2 below provides a costing overview of the three financing strategies and the cumulative, non-inflated and inflated capital expenses over five, ten, and twenty years of the forecast. Please note that the totals below include not only rehabilitation and replacement needs identified in Chapter 4, but also levels of service and expansion related capital costs. Scenarios 2a and 2b provide the same capital forecast; however provide different options on how to finance the recommended asset management scenario. As noted above, Scenario 2 ensures all capital identified in Scenario 1 is completed by the end of the 20 year forecast, but achieves so at a marginally higher price due to capital inflation.

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Table 5-2: Tax Supported Financing Strategy Scenarios

Capital	Over 5 Years	Total Potential Added to Reserves	Over 10 Years	Total Potential Added to Reserves	Over 20 Years	Total Potential Added to Reserves
Non-Inflated						
Scenario 1	\$6,161,115	\$0	\$11,124,804	\$0	\$21,223,103	\$0
Scenario 2a	\$5,125,000	(\$1,036,115)	\$10,562,500	(\$562,304)	\$22,375,000	\$1,151,897
Scenario 2b	\$5,250,000	(\$911,115)	\$11,125,000	\$196	\$24,750,000	\$3,526,897
Inflated						
Scenario 1	\$6,413,833	\$0	\$12,102,481	\$0	\$25,621,940	\$0
Scenario 2a	\$5,336,717	(\$1,077,116)	\$11,587,989	(\$514,492)	\$27,382,139	\$1,760,199
Scenario 2b	\$5,469,394	(\$944,439)	\$12,226,257	\$123,776	\$30,466,908	\$4,844,968

Several methods of funding capital expenditures are utilized across all three financing strategy scenarios, in particular:

- Taxation funding is suggested for all maintenance costs, reserve fund transfers, as well as levels of service adjustment related costs related to operations.
- Formula based Ontario Community Infrastructure Fund (OCIF) proceeds and Gas Tax proceeds are expected to be stable and long-term funding sources for capital projects.
- External Debt financing may be an additional measure required to help smooth capital financing in years where there are increases in funding requirements. This is in particular a good method over the first five years of the 20 year plan.
- Internal debt issued from the Township's Reserve Fund (when accumulated) can be utilized to help fund annual capital needs. Understanding that these Reserve Funds need continuous investment to provide for potential unexpected capital needs as well as long term capital needs.
- The portion of newly acquired or constructed assets that are growth (DC) related can be financed by development charges.

The Township will be dependent upon maintaining healthy capital reserve funds in order to provide the remainder of the required funding over the forecast period. This will require the Township to proactively increase amounts being transferred to these capital reserve funds during the annual budget process. Scenario 2b is the most applicable for the Township to implement and increase the capital reserve accounts, as beyond the 20 year plan there will be additional capital needs that will need funding.

5.3.1 Scenario 1: Expected Levels of Service

Figure 5-1 below presents the first 10 years of the capital forecast for Scenario 1. This forecast ensures that capital assets are rehabilitated or replaced as identified, based on levels of service, risk and condition (see Chapter 4).

Figure 5-1: Tax Supported Assets Scenario 1 – Based on Expected Levels of Service

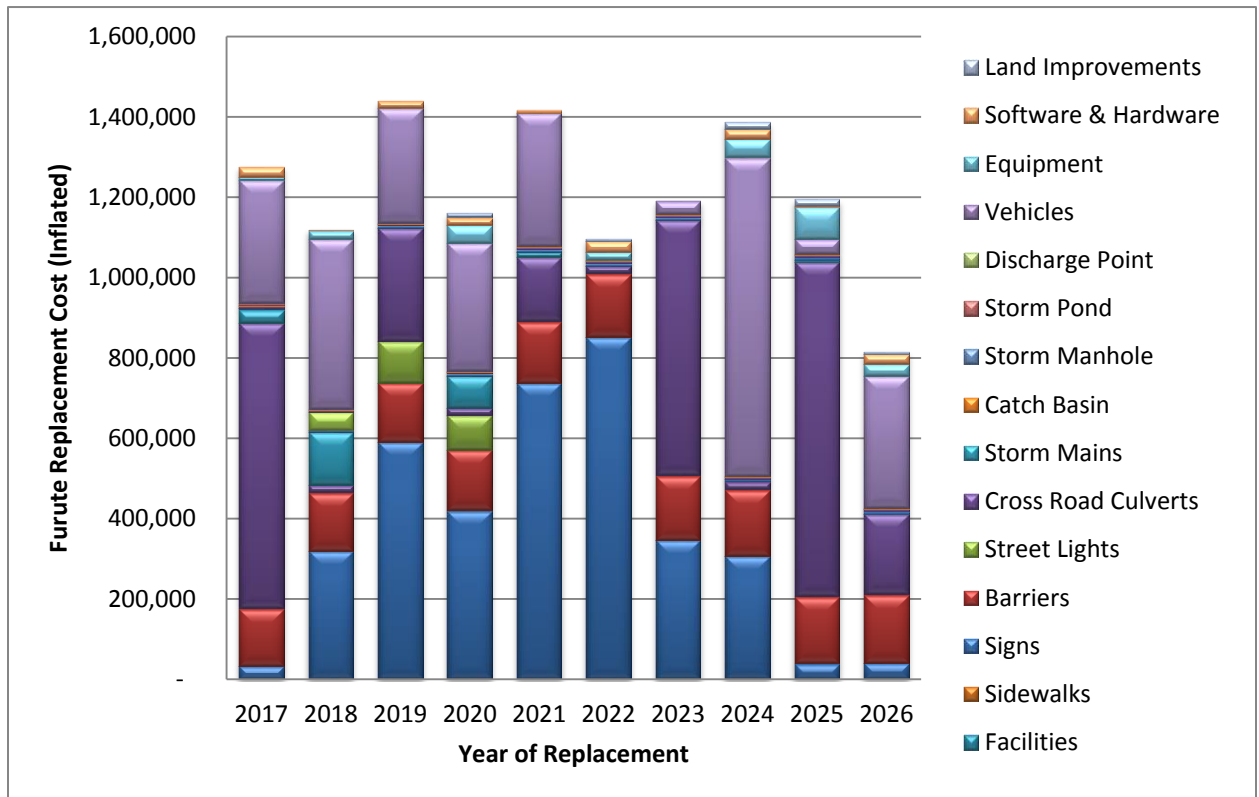


Table 5-3 shows the tax supported expenditure forecast for maintenance, renewal/rehabilitation, replacement/disposal and expansion for the first 10 years of the forecast. While this summary only shows high-level cost classifications, further detail (including the full 20-year forecast) can be obtained from Appendix A and Appendix C.

Table 5-3: Tax Supported Capital Expenditure Forecast Scenario 1: Expected LOS

Asset Type	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Total Scheduled Capital – Inflated	1,276,436	1,119,852	1,440,236	1,160,340	1,416,970	1,097,772	1,192,428	1,386,805	1,195,800	815,842
Road Surface - Asphalt	33,800	319,958	590,563	420,721	737,029	852,257	346,817	308,145	39,602	40,394
Road Surface - Gravel	142,000	144,840	147,737	150,692	153,705	156,779	159,915	163,113	166,376	169,703
Road Base	1,000	1,020	105,080	85,958	1,082	1,104	1,126	1,149	1,172	1,195
Bridge & Culverts	710,060	18,217	280,970	18,953	160,048	19,719	636,349	20,516	831,948	200,608
Facilities	34,000	132,090	-	79,591	12,989	-	-	-	5,858	-
Sidewalks	-	-	-	-	-	-	-	-	-	598
Signs	4,500	4,590	4,682	4,775	4,871	4,968	5,068	5,169	5,272	5,378
Barriers	-	-	-	-	-	895	-	-	-	-
Street Lights	-	45,900	520	531	541	552	563	574	586	598
Cross Road Culverts	4,500	4,590	4,682	4,775	4,871	4,968	5,068	5,169	5,272	5,378
Storm Mains	-	-	-	-	-	-	-	-	-	-
Catch Basin	2,000	2,040	2,081	2,122	2,165	2,208	2,252	2,297	2,343	2,390
Storm Manhole	-	-	-	-	-	-	-	-	-	-
Storm Pond	4,376	-	-	-	-	-	-	-	-	-
Discharge Point	-	-	-	-	-	-	-	-	-	-
Vehicles	307,000	423,300	286,110	318,362	332,307	-	33,785	792,593	37,493	328,650
Equipment	8,000	20,757	416	45,101	1,191	20,094	676	46,924	79,139	29,877
Software & Hardware	25,200	2,550	17,395	18,147	6,170	27,602	810	23,925	3,163	24,499
Land Improvements	-	-	-	10,612	-	6,624	-	17,230	17,575	6,573

Table 5-4: Identified and Expected Levels of Service

Asset Type	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Total Scheduled Capital – Inflated	156,860	239,353	163,717	175,269	170,332	182,350	177,213	189,717	184,372	197,979
Road Surface - Asphalt	33,800	59,976	35,166	35,869	36,586	37,318	38,064	38,826	39,602	40,394
Road Surface - Gravel	110,000	112,200	114,444	116,733	119,068	121,449	123,878	126,355	128,883	131,460
Road Base	1,000	1,020	1,040	1,061	1,082	1,104	1,126	1,149	1,172	1,195
Bridge & Culverts	10,060	18,217	10,466	18,953	10,889	19,719	11,329	20,516	11,787	21,344
Facilities	-	-	-	-	-	-	-	-	-	-
Sidewalks	-	-	-	-	-	-	-	-	-	598
Signs	-	-	-	-	-	-	-	-	-	-
Barriers	-	-	-	-	-	-	-	-	-	-
Street Lights	-	45,900	520	531	541	552	563	574	586	598
Cross Road Culverts	-	-	-	-	-	-	-	-	-	-
Storm Mains	-	-	-	-	-	-	-	-	-	-
Catch Basin	2,000	2,040	2,081	2,122	2,165	2,208	2,252	2,297	2,343	2,390
Storm Manhole	-	-	-	-	-	-	-	-	-	-
Storm Pond	-	-	-	-	-	-	-	-	-	-
Discharge Point	-	-	-	-	-	-	-	-	-	-
Vehicles	-	-	-	-	-	-	-	-	-	-
Equipment	-	-	-	-	-	-	-	-	-	-
Software & Hardware	-	-	-	-	-	-	-	-	-	-
Land Improvements	-	-	-	-	-	-	-	-	-	-

Items in Table 5-4 labelled as “Levels of Service” refer to the expanded levels of service analysis discussed in Chapter 3 and found for the 20 year period in Appendix C.

In order to fund the recommended asset requirements over the forecast period using the Township’s own available funding sources (i.e., using taxation, Gas Tax funding, OCIF funding, reserves/reserve funds, and internal and external debentures), an increase in the Township’s taxation levy of approximately 1% – 2% annually would be required. However, if other funding sources become available (i.e., grant funding) or if maintenance and rehabilitation practices allow for the deferral of capital works, then the impact on the Township’s taxation levy would decrease under Scenario 1 implementation.

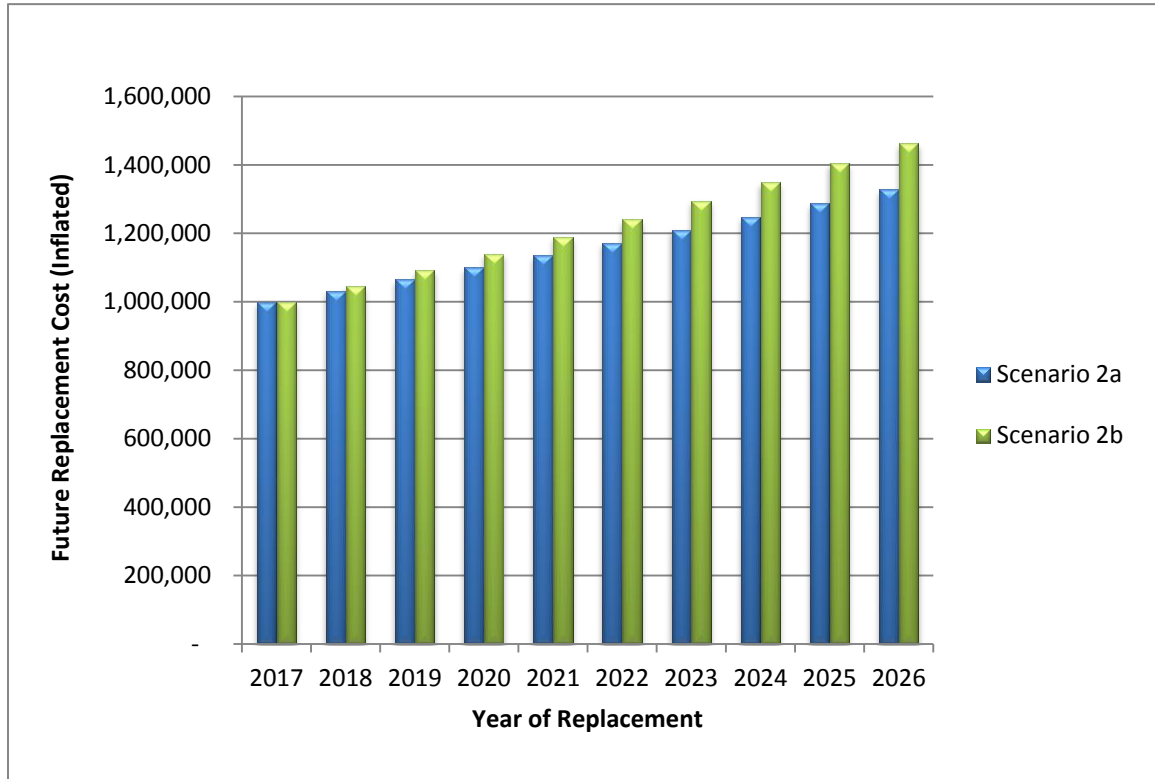
5.3.2 Scenarios 2a, and 2b

As previously mentioned, Scenarios 2a and 2b present different funding options to finance the recommended asset management strategy. The major difference between these two approaches is the extent to which capital assets are either financed through external debt, or deferred until funds are available as well as the resulting impact on projected taxation rates. Scenario 2b opts to use less external debentures, resulting in higher taxation rates, while Scenario 2a utilizes more potential external debentures, which has the effect of reducing the impact on taxation (by spreading capital costs out over many years). Note that even with a 1% annual tax increase towards capital funding it will take over 10 years in Scenario 2b to attain a positive investment into Capital Reserves.

Figure 5-2 below presents the first 10 years of the capital forecast for the recommended Scenario 2 asset management strategy. In this figure, the different Scenarios 2a and 2b are shown.

This forecast gradually increases the investment in capital assets over the forecast period. Both Scenario 2a and 2b start at \$1,000,000. The difference between Scenario 2a and 2b is that Scenario 2b has a higher annual increase in annual taxation. Scenario 2a increases by 0.5% and Scenario 2b increases by 1%, each year over the 20 year period.

Figure 5-2: Tax Supported Assets Scenario 2a and 2b



The Scenario 2 asset management strategy defers the timing of some of the capital assets identified in the early years of Scenario 1 to assist in implementing sustainable funding. Please note that if additional funding is identified (i.e., grants) or cost efficiencies are found through annual budget processes going forward, this infrastructure gap could be reduced further.

Table 5-5: Tax Supported Capital Expenditure Forecast

Asset Type	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Scenario 2a	1,000,000	1,032,750	1,066,410	1,101,003	1,136,554	1,173,086	1,210,625	1,249,196	1,288,825	1,329,540
Scenario 2b	1,000,000	1,045,500	1,092,420	1,140,799	1,190,675	1,242,091	1,295,087	1,349,706	1,405,991	1,463,988

Table 5-5 shows the tax supported expenditure forecast for maintenance, renewal/rehabilitation, replacement/disposal and expansion for the first 10 years of the forecast. While this summary only shows required investment, further detail (including the full 20 year forecast) can be found in Appendix C.

In order to fund the recommended asset requirements over the forecast period using the Township's own available funding sources (i.e., using taxation, Gas Tax funding, OCIF funding, reserves/reserve funds, and internal and external debentures), an increase in the Township's taxation levy (which includes inflationary operating adjustments,

assumed to be 2.0%). Scenario 2a and 2b have a starting point at \$1,000,000 in year 2017, and increasing at a lower rate than Scenario 2b, starting at \$1,000,000 but increasing at a higher rate each year. The objective of these two scenarios was to ensure that the total funding required was in place to complete the capital works over the 20 year period.

This Scenario 2 may require some debt or initial draining of reserve funds or capital project deferral. It is important to point out that debt would be a short term need as the tax levies catch up with the capital requirements of the Township in the second half of the 20 year forecast period. However, if other funding sources become available (i.e., grant funding) or if maintenance and rehabilitation practices allow for the deferral of capital works, then the impact on the Township's taxation levy would decrease.

5.3.3 Financing Strategies Summary

The main differences between the scenarios:

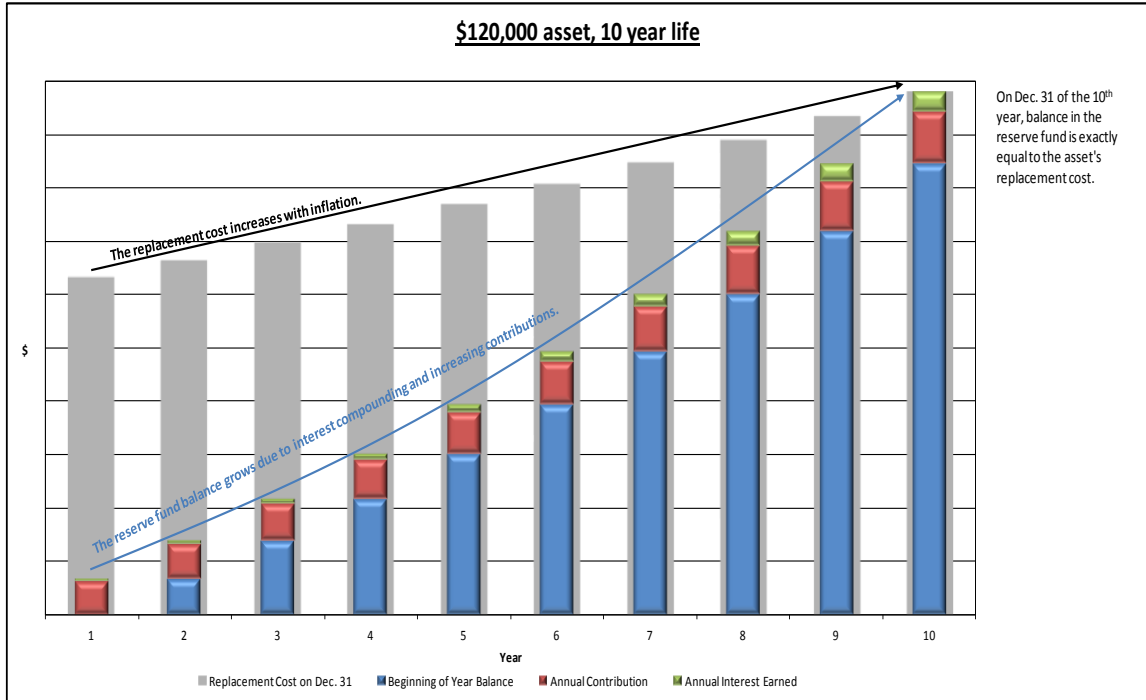
- The deferral of capital within the 20 year forecast period in Scenarios 2a, and 2b;
- The use of external debentures to help finance capital in the early years of the forecast period; and
- The year-over-year increases to the taxation rate.

Assuming the Township maintains adequate capital reserve funds, both financing strategies will fully fund all capital identified for replacement via their expected levels of service. While the annual funding requirement may fluctuate, it is important for the Township to implement a consistent, yet increasing annual investment in capital so that the excess annual funds can accrue in capital reserve funds.

5.4 Infrastructure Funding Gap

A fundamental approach to calculating the cost of using a capital asset and for the provision of the revenue required when the time comes to retire and replace it is the "sinking fund method." This method first estimates the future value of the asset at the time of replacement, by inflating the current value of the asset at an assumed annual capital inflation rate. A calculation is then performed to determine annual contributions which, when invested in a reserve fund, will grow with interest to a balance equal to the future replacement cost. The contributions are calculated such that they also increase annually with inflation. Under this approach, an annual capital investment amount is calculated where funds are available for short-term needs while establishing a funding plan for long-term needs. Annual contributions in excess of capital costs in a given year would be transferred to a "capital replacement reserve fund" for future capital replacement needs. This approach provides for a stable funding base, eliminating variances in annual funding requirements, particularly in years when capital replacement needs exceed typical capital levy funding. Please refer to Figure 5-3 for an illustration of this method.

Figure 5-3: Sinking Fund Method



This is the recommended approach to developing the optimal capital investment amounts that feeds into the Financing Strategy and infrastructure funding deficit calculation below.

5.4.1 Tax Supported Services

Capital investment is hereto referred as the sum of annual contributions to fund capital asset rehabilitation, replacement, and/or expansion. For the purposes of the Township, this can take the form of contributions to capital reserves/reserve funds, internal and external debt payments and consistent capital grant funding. This differs from the Township's annual budget and forecast, which includes asset maintenance from an operating perspective and one time funding for capital projects. The annual capital investment represents ongoing and constant investments in capital over the forecast period. From a tax supported asset base perspective, the estimated optimal annual capital investment is approximately \$1.1 million. Based on the Township's 2017 budget, current annual capital investment is approximately \$1,000,000. This would provide a high-level estimate of the Township's annual tax supported infrastructure funding gap at \$100,000.

5.4.2 Improving the Annual Funding Deficit

Under the recommended financing strategies (2a or 2b), the Township would be making proactive attempts to mitigate these funding gaps over the forecast period.

To further mitigate the potential infrastructure funding deficit, the Township could consider:

- Decreasing expected levels of service to make available capital funding;
- Issuing more debt for significant and/or unforeseen capital projects, in addition to the debt recommended within this report, while staying within the Township's debt capacity limits (this would have the impact of spreading out the capital repayment over a defined term);
- Actively seeking out and applying for grants;
- Consider approaching the community for funding assistance with respect to growth/expansion related projects;
- Rate increases, where needed (i.e., taxation); and/or
- Implementing net operating reductions or efficiencies. For example:
 - Reduced operating costs to allow for more capital investment.

6.0 Recommendations

The following recommendations have been provided for the Township of Amaranth consideration:

- That this Asset Management Plan be received and approved by the Township of Amaranth Council; and
- That consideration of this Asset Management Plan be given as part of the annual budgeting process to ensure sufficient capital funds are available to fund capital requirements over the long-term.

The current level of funding for asset replacement and renewal at the Township will not sufficiently fund required capital needs or close the infrastructure funding gap. As such, it is recommended that the following be considered:

- That Council approve one of the recommended financing strategy scenarios, for Township staff to implement moving forward;
- That the “levels of service” strategies discussed in this report be approved;
- That the Township use “reserve funds” for asset management planning purposes;
- That this Asset Management Plan be updated and improved as needed over time to reflect the current priorities of the Township; and
- That the Township consider the capital priorities identified within this report when applying for future grants or deciding on how to utilize Gas Tax, OCIF funding and/or other funding that becomes available.

Substantial investment in asset capital needs will be required over the 20 year forecast period and beyond. Through the recommendations provided above, proactive steps will be made to increase capital investment, as well as, reduce the annual infrastructure funding gap for Township assets. Enhanced maintenance plans will assist in maintaining adequate asset conditions, mitigate asset risk as well as potentially defer capital needs within the forecast period. In addition, the Township of Amaranth is recommended to pursue all available capital grants wherever possible to further reduce the infrastructure funding gap.

Through the creation of this plan, the Township has been provided with Excel spreadsheets in which amendments and revisions can be made as needed by the Township. It is anticipated that this plan adopted by Township Council will be monitored and updated frequently as part of the budget process, with refinements and specific recommendations being provided with respect to the priority of each individual project.



BURNSIDE

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Appendix A

Township Asset Inventory & Asset Management Plan Assumptions

APPENDIX A: ASSET MANAGEMENT PLAN ASSUMPTIONS

The following assumptions were made and applied during the creation of the Township of Amaranth's asset management plan.

1. STATE OF LOCAL INFRASTRUCTURE

- a) All replacement costs were estimates based on current 2016 pricing.
- b) Historic Costs of assets that were added to the Township's asset inventory and did not have a historic cost identified made use of deflation tables from estimated current 2016 costs back to the installation date of the asset. Indexes were using Non-Residential Building Construction Price Index (NRBCPI).
- c) Amortization of assets was using a straight line amortization, starting the year after the year of acquisition.
- d) Useful life of an asset were provided by the Township, discussed with Township Staff and/or obtained from similar assets in other communities/municipalities.
- e) Condition was from asset inspections (live and/or desktop), from staff's understanding of the asset's relative condition, and finally via estimation from the asset's age were used to provide estimated remaining life to the assets.

2. ASSET MANAGEMENT STRATEGY

- a) Capital inflation rate was assumed to be 2.0% annually.
- b) Operating budget inflation rate was assumed to be 2.0% annually.
- c) Regarding operating expenses included in the Township's current budget, it is assumed that they will increase at an operating inflation rate annually.

3. FINANCING STRATEGY

- a) Gas Tax and OCIF Formula Based Funding revenue have been identified as a funding source for the purposes of this analysis (i.e. for asset replacement purposes), and has been assumed to continue throughout the forecast period.
- b) Interest rate earned on a Capital Replacement Reserve Funds will be 1.0% annually.
- c) Township of Amaranth past Annual Capital Investment was identified as \$1,000,000.

Current Levels of Service
Replacement/Improvement Year Based on Current Levels
Service

Expected Levels of Service
Replacement/Improvement Year Based on Expected
Levels Service

FIXED ASSET ID	Subtype	Asset Name	Asset Type	Install Year	Useful Life	Remaining Useful Life	Age	Historic Cost	2015 Accumulated Amortization	2015 Net Book Value	Replacement Cost	Condition Based On Useful Life	Staff Assessed Condition	Condition Used for Analysis	Asset Condition (As per Priority Rating)	Probability of Failure (Based on Condition or Expected Condition)	Consequence of Failure	Risk of Failure	Numerical Value of Risk of Failure	Year Replacement due to minimal maintenance practices	Current Levels of Service % benefit	Revised Levels Service Replacement Year	Year Replacement Applying Risk Score	Subsequent Replacement Year	Revised Remaining Useful Life	Proposed Rehabilitation Cost (2016 \$)	Year for Rehabilitation	Extended Life (Years) due to Betterment	Expected Levels of Service % benefit over Current + Condition better then expected for age		Expected Levels of Service Replacement/Improvement Year Based on Expected Levels Service			
																													Revised Service Replacement Year	Year Replacement Applying Risk Score - or Staff Override	Subsequent Replacement Year	Revised Remaining Useful Life	Revised Service Replacement Year	Year Replacement Applying Risk Score - or Staff Override
						74	26	\$ 21,211	\$ 5,517	\$ 15,694	\$ 30,189			7				2							\$ -			0	2090	2090	2190	74		
2869	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,146	\$298	\$848	\$1,631	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2870	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,192	\$310	\$882	\$1,697	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2871	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,187	\$309	\$878	\$1,690	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2872	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,214	\$316	\$898	\$1,728	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2873	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,078	\$280	\$798	\$1,534	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2874	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,276	\$332	\$944	\$1,816	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2875	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,115	\$290	\$825	\$1,586	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2876	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,585	\$412	\$1,173	\$2,256	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2877	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,072	\$279	\$793	\$1,526	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2878	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,046	\$272	\$774	\$1,488	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2879	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,133	\$295	\$838	\$1,613	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2880	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,294	\$336	\$958	\$1,841	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2881	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,153	\$300	\$853	\$1,641	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2882	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,281	\$333	\$948	\$1,823	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2883	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,188	\$309	\$879	\$1,691	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2884	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,050	\$273	\$777	\$1,494	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2885	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$991	\$258	\$733	\$1,411	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		
2886	Water - Lateral Line	Hydrant Lateral Line	Hydrant Laterals	1990	100	74	26	\$1,211	\$315	\$896	\$1,723	7	7	Good	Unlikely	Major	M	2	2080	10	2090	2090	2190	74				0	2090	2090	2190	74		

Amaranth
Water - Well Inventory

FIXED ASSET ID	Subtype	Asset Name	Asset Type	Road GIS ID	Road Name	Install Year	Useful Life	Remaining Useful Life	Age	Historic Cost	2015 Accumulated Amortization	2015 Net Book Value	Replacement Cost	Condition Based On Useful Life	Staff Assessed Condition	Condition Used for Analysis	Asset Condition (As per Priority Rating)	Probability of Failure (Based on Condition or Expected Condition)	Consequence of Failure	Risk of Failure	Numerical Value of Risk of Failure	Year Replacement due to minimal maintenance practices	Current Levels of Service % benefit	Current Levels of Service						Expected Levels of Service					
																								Replacement/Improvement Year Based on Current Levels Service						Replacement/Improvement Year Based on Expected Levels Service					
																	Revised Service Replacement Year	Year Replacement Applying Risk Score	Subsequent Replacement Year	Revised Remaining Useful Life	Proposed Rehabilitation Cost (2016 \$)	Year for Rehabilitation	Extended Life (Years) due to Betterment	Expected Levels of Service % benefit over Current + Condition better than	Revised Service Replacement Year	Year Replacement Applying Risk Score - or Staff Override	Subsequent Replacement Year	Revised Remaining Useful Life							
																					\$ 36,000														
2814	Water - Well	Municipal Production Well - St John Street	Municipal Production Well	2417	St. John Street	2002	25	11	14	\$38,840	\$21,750	\$17,090	\$40,000	4	5	5	Average	Possible	Moderate	M	2	2025	10	2028	2028	2054	12	\$12,000	2025	25	5	2050	2050	2075	34
2815	Water - Well	Municipal Production Well - St John Street	Municipal Production Well	2417	St. John Street	1990	25	0	26	\$28,104	\$28,104	\$0	\$40,000	0	5	5	Average	Possible	Moderate	M	2	2013	10	2016	2017	2044	1	\$12,000	2021	25	40	2046	2046	2071	30
2816	Water - Well	Municipal Production Well - Russel Hill Road	Municipal Production Well	2418	Russel Hill Road	1990	25	0	26	\$28,104	\$28,104	\$0	\$40,000	0	5	5	Average	Possible	Moderate	M	2	2013	10	2016	2017	2044	1	\$12,000	2023	25	40	2048	2048	2073	32

Amaranth
Roads - Sidewalk Inventory

Fixed Asset #	Subtype	Asset Name	Length (m)	Street ID	Install Year	Useful Life	Remaining Useful Life	Age	Historic Cost	2015 Accumulated Amortization	2015 Net Book Value	Replacement Cost	Condition Based On Useful Life	Assessed Condition	Condition Used for Analysis	Asset Condition (As per Priority)	Probability of Failure (Based on Condition or)	Consequence of Failure	Risk of Failure	Numerical Value of Failure	Year Replacement due to minimal	Current Level of Service						Expected Level of Service												
																						Replacement/Improvement Year Based on Current Levels Service	Current Levels of Service % benefit	Revised Levels Service Replacement Year	Year Replacement Applying Risk Score	Subsequent Replacement Year	Revised Remaining Useful Life	Rehabilitation Year	Rehabilitation Cost (2016)	Extended Life (Years) due to Betterment	Expected Levels of Service % benefit over	Revised Levels Service Replacement Year	Year Replacement Applying Risk Score - or	Subsequent Replacement Year	Revised Remaining Useful Life					
			assume 1.5 m width				19	31	\$ 16,077	\$ 9,968	\$ 6,109	\$ 70,000								2																				
		Sidewalk - James St.	300		1985	50	19	31	\$9,646	\$5,981	\$3,665	\$42,000	4	6	6	Good	Unlikely	Moderate	M	2	2030	10	2035	2035	2085	19							5	2038	2038	2088	22			
		Sidewalk Evans Ave	50		1985	50	19	31	\$1,608	\$997	\$611	\$7,000	4	6	6	Good	Unlikely	Moderate	M	2	2030	10	2035	2035	2085	19							5	2038	2038	2088	22			
		Sidewalk Henry St.	150		1985	50	19	31	\$4,823	\$2,990	\$1,833	\$21,000	4	6	6	Good	Unlikely	Moderate	M	2	2030	10	2035	2035	2085	19							5	2038	2038	2088	22			

Annam...
Roads - Sign Inventory

Table with columns: Field #, Subtype, Asset Name, Asset Type, Year, Useful Life, Remaining Useful Life, Age, Historic Cost, 2015 Accumulated Depreciation, 2015 Net Book Value, Replacement Cost, Condition Based on Useful Life, Staff Assessed Condition, Condition Used for Analysis, Asset Condition (Per Rating), Probability of Failure (Based on Condition or Rating), Consequence of Failure, Risk of Failure, Numerical Value of Risk of Failure, Replacement due to minimal maintenance, Current Levels of Service, Expected Levels of Service, Replacement/Improvement Year Based on Current Levels Service, Subsequent Replacement Year, Revised Remaining Useful Life, Rehabilitation Year, Rehabilitation Cost (2016), Extended Life (Years due to Replacement), Expected Levels of Service/Improvement Year Based on Expected Levels Service, Replacement/Improvement Year Based on Expected Levels Service, Subsequent Replacement Year, Revised Remaining Useful Life.

Fund	Asset	Map	Subtype	Year Acquired	Serial No.	Description	Quantity	Unit Cost	Total Cost	Current Value	Depreciation	Useful Life (Years)	Condition	Status	Location	Estimated Useful Life										Actual Useful Life																																																																																									
																Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21	Y22	Y23	Y24	Y25	Y26	Y27	Y28	Y29	Y30																																																																						
101	101-001	101-001	101-001	2010	001	Computer Equipment	1	1000	1000	750	250	Good	Active	IT Dept	5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	101-002	101-002	101-002	2010	002	Computer Equipment	1	1000	1000	750	250	Good	Active	IT Dept	5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	101-003	101-003	101-003	2010	003	Computer Equipment	1	1000	1000	750	250	Good	Active	IT Dept	5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

General Information		Financial Performance																				Operational Performance									
Year	Quarter	Revenue	Expenses	Profit	Margin	Assets	Liabilities	Equity	Current Ratio	Debt to Equity	ROE	ROA	EPS	Dividend	Dividend Yield	Market Cap	Volume	Price	Volatility	Correlation	Beta	Alpha	Risk	Rating	Industry	Region	Country	Company			
2023	Q1	100	70	30	30%	50	30	20	1.67	0.5	15%	10%	1.5	0.5	2%	100	1000	100	10%	0.8	0.2	0.1	High	A	Tech	North America	USA	Apple			
2023	Q2	110	75	35	32%	55	35	20	1.57	0.5	16%	11%	1.6	0.5	2%	110	1100	110	10%	0.8	0.2	0.1	High	A	Tech	North America	USA	Apple			
2023	Q3	120	80	40	33%	60	40	20	1.5	0.5	17%	12%	1.7	0.5	2%	120	1200	120	10%	0.8	0.2	0.1	High	A	Tech	North America	USA	Apple			
2023	Q4	130	85	45	35%	65	45	20	1.44	0.5	18%	13%	1.8	0.5	2%	130	1300	130	10%	0.8	0.2	0.1	High	A	Tech	North America	USA	Apple			
2023	YTD	460	310	150	33%	220	150	70	1.47	0.5	16%	12%	1.7	0.5	2%	460	4600	460	10%	0.8	0.2	0.1	High	A	Tech	North America	USA	Apple			

FIXED ASSET ID	Subtype	Asset Name	Description	Install Year	Useful Life	Remaining Useful Life	Age	Historic Cost	2015 Accumulated Amortization	2015 Net Book Value	Replacement Cost	Condition Based On Useful Life	Staff Assessed Condition	Condition Used for Analysis	Asset Condition (As per Priority Rating)	Probability of Failure (Based on Condition or Expected Condition)	Consequence of Failure	Risk of Failure	Numerical Value of Risk of Failure	Year Replacement due to minimal maintenance practices	Current Levels of Service % benefit	Current Levels of Service				Expected Levels of Service																		
																						Replacement/Improvement Year Based on Current Levels Service					Replacement/Improvement Year Based on Expected Levels Service																	
																						Revised Levels Service Replacement Year	Year Replacing Risk Score	Subsequent Replacement Year	Revised Remaining Useful Life	Proposed Rehabilitation Cost (2016 \$)	Year for Rehabilitation	Extended Life (Years) due to Betterment	Expected Levels of Service % benefit over Current + Condition better then	Revised Levels Service Replacement Year	Year Replacing Risk Score - or Staff Override	Subsequent Replacement Year	Revised Remaining Useful Life											
						9	21	\$ 18,589	\$ 12,490	\$ 6,099	\$ 23,951			5.1				2																										
836	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 7 - 5th SR	Road Barrier	1991	30	5	25	\$1,132	\$944	\$189	\$1,547	2	5	5	Average	Possible	Minor	M	2	2018	10		2021	2021	2051	5									20		2027	2027	2057	11				
838	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 7 - 5th SR	Road Barrier	1991	30	5	25	\$717	\$598	\$120	\$980	2	5	5	Average	Possible	Minor	M	2	2018	10		2021	2021	2051	5									20		2027	2027	2057	11				
853	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 4 - 9th Line	Road Barrier	1995	30	9	21	\$3,113	\$2,179	\$934	\$4,045	3	5	5	Average	Possible	Minor	M	2	2022	10		2025	2025	2055	9									10		2028	2028	2058	12				
854	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 4 - 9th Line	Road Barrier	1995	30	9	21	\$3,055	\$2,138	\$916	\$3,970	3	5	5	Average	Possible	Minor	M	2	2022	10		2025	2025	2055	9									10		2028	2028	2058	12				
855	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 8 - 9th Line	Road Barrier	1993	30	7	23	\$986	\$756	\$230	\$1,314	2	5	5	Average	Possible	Minor	M	2	2020	10		2023	2023	2053	7									20		2029	2029	2059	13				
857	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 8 - 9th Line	Road Barrier	1993	30	7	23	\$713	\$547	\$166	\$950	2	5	5	Average	Possible	Minor	M	2	2020	10		2023	2023	2053	7									20		2029	2029	2059	13				
858	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 8 - 9th Line	Road Barrier	1993	30	7	23	\$406	\$311	\$95	\$541	2	5	5	Average	Possible	Minor	M	2	2020	10		2023	2023	2053	7									20		2029	2029	2059	13				
860	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 8 - 9th Line	Road Barrier	1993	30	7	23	\$1,545	\$1,184	\$360	\$2,059	2	5	5	Average	Possible	Minor	M	2	2020	10		2023	2023	2053	7									20		2029	2029	2059	13				
871	Roads - barrier	Steel Beam Guide Rail Road Barrier - for old Bridge 9 - 8th Line	Road Barrier	2008	30	22	8	\$792	\$211	\$581	\$792	7		7	Good	Unlikely	Minor	L	1	2035	10		2038	2038	2068	22									0		2038	2038	2068	22				
892	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 19 - 6th Line	Road Barrier	2002	30	16	14	\$1,031	\$481	\$550	\$1,158	5		5	Average	Possible	Minor	M	2	2029	10		2032	2032	2062	16										0		2032	2032	2062	16			
894	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 19 - 6th Line	Road Barrier	2002	30	16	14	\$1,047	\$488	\$558	\$1,176	5		5	Average	Possible	Minor	M	2	2029	10		2032	2032	2062	16										0		2032	2032	2062	16			
895	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 19 - 6th Line	Road Barrier	2002	30	16	14	\$1,049	\$490	\$560	\$1,179	5		5	Average	Possible	Minor	M	2	2029	10		2032	2032	2062	16										0		2032	2032	2062	16			
897	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 19 - 6th Line	Road Barrier	2002	30	16	14	\$1,065	\$497	\$568	\$1,196	5		5	Average	Possible	Minor	M	2	2029	10		2032	2032	2062	16										0		2032	2032	2062	16			
902	Roads - barrier	Steel Beam Guide Rail Road Barrier - East end of Henry St.	Road Barrier	1980	30	0	36	\$305	\$305	\$0	\$811	0	5	5	Average	Possible	Minor	M	2	2007	10		2010	2017	2054	1									40		2022	2022	2052	6				
911	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 7 - 5th SR	Road Barrier	1991	30	5	25	\$725	\$605	\$121	\$991	2	5	5	Average	Possible	Minor	M	2	2018	10		2021	2021	2051	5										20		2027	2027	2057	11			
912	Roads - barrier	Steel Beam Guide Rail Road Barrier - Bridge 7 - 5th SR	Road Barrier	1991	30	5	25	\$909	\$757	\$151	\$1,241	2	5	5	Average	Possible	Minor	M	2	2018	10		2021	2021	2051	5										20		2027	2027	2057	11			

Amaranth
Storm/Sanitary - Discharge Point Inventory

Fixed Asset #	Subtype	Asset Type	Asset Name	Install Year	Useful Life	Remaining Useful Life	Age	Historic Cost	2015 Accumulated Amortization System	2015 Net Book Value System	Replacement Cost	Condition Based On Useful Life	Staff Assessed Condition	Condition Used for Analysis	Asset Condition (As per Priority Rating)	Probability of Failure (Based on Condition or Expected Condition)	Consequence of Failure	Risk of Failure	Numerical Value of Risk of Failure	Current Levels of Service										Expected Levels of Service				
																				Replacement/Improvement Year Based on Current Levels Service										Replacement/Improvement Year Based on Expected Levels Service				
																				Replacement Year	Current Levels of Service % benefit	Revised Levels Service Replacement Year	Year Replacement Applying Risk Score	Subsequent Replacement Year	Revised Remaining Useful Life	Rehabilitation Year	Rehabilitation Cost (2016)	Extended Life (Years) due to Betterment	Expected Levels of Service % benefit over Current	Revised Levels Service Replacement Year	Year Replacement Applying Risk Score - or Staff Override	Subsequent Replacement Year	Revised Remaining Useful Life	
2760	Storm/Sanitary - Discharge Point	DischargePoint - Outfall w/ Headwall	Storm Water Discharge Point - off of St. Johns St.	1990	30	24	26	7377.3	3836.2	3541.1	25000	5	7	7	Good	Unlikely	Minor	L	1	2035	10	2040	2040	2090	24			\$ -		0	2040	2040	2090	24
3017	Storm/Sanitary - Discharge Point	DischargePoint - Outfall w/ Headwall	Storm Water Discharge Point - at east end of Henry St.	1986	30	20	30	5975.55	3585.33	2390.22	20000	4	7	7	Good	Unlikely	Minor	L	1	2031	10	2036	2036	2086	20					5	2039	2039	2089	23

Amaranth
Storm Pond
sets after 2017 Review

Fixed Asset #	Subtype	Asset Name	Road Section GIS ID	Road Name	Address	Volume Capacity (m3)	Water Type	Install Year	Useful Life	Remaining Useful Life	Age	Historic Cost	2015 Accumulated Amortization	2015 Net Book Value	Replacement Cost	Condition Based On Useful Life	Assessed Condition	Condition Used for Analysis	Asset Condition (As per Priority Rating)	Probability of Failure (Based on Condition or Expected Condition)	Consequence of Failure	Risk of Failure	Numerical Value of Risk of Failure	Current Levels of Service								Expected Levels of Service											
																								Year Replacement due to minimal maintenance practices	Current Levels of Service % benefit	Revised Levels Service Replacement Year	Year Replacement Applying Risk Score	Subsequent Replacement Year	Revised Remaining Useful Life	Rehabilitation Year	Rehabilitation Cost (2016)	Subsequent Rehab Year	Subsequent Rehab Costs	Extended Life (Years) due to Betterment	Expected Levels of Service % benefit over Current	Revised Levels Service Replacement Year	Year Replacement Applying Risk Score - or Staff Override	Subsequent Replacement Year	Revised Remaining Useful Life				
										73	28	\$ 36,615	\$ 9,980	\$ 26,635	\$ 80,000			7.0				2																					
4377	DetentionPond	Storm Retention Pond - JAMES STREET	2447	JAMES STREET		Storm	1986	100	70	30	\$11,514	\$3,454	\$8,060	\$30,000	7		7	Good	Unlikely	Moderate	M	2	2076	10	2086	2086	2186	70	2017	\$ 5,500	\$ 4,000	2027	\$1,000		0	2086	2086	2186	70				
4378	DetentionPond	Storm Retention Pond - ST. JOHN STREET	2417	ST. JOHN STREET		Storm	1990	100	74	26	\$25,101	\$6,526	\$18,575	\$50,000	7		7	Good	Unlikely	Moderate	M	2	2080	10	2090	2090	2190	74	2017	\$1,500		2027	\$1,500		0	2090	2090	2190	74				



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Appendix B

Draft Data Verification and Condition Assessment Policy

APPENDIX B: Draft Data Verification and Condition Assessment Policy

Data Verification

1. The main source of asset data updating and editing will be through Township of Amaranth's PSAB 3150 compliance procedures and/or annual reporting process.
2. Asset additions, disposals, betterments, and write-offs will be recorded based on the Township's PSAB 3150 Compliance Policies and/or general updates to the Asset Management Spreadsheets.
3. Verification of the correct treatment of asset revisions will be completed through frequent annual reviews by Township staff, as well as an annual review by the Township's auditor.
4. During years which condition assessments are not being performed, asset replacement cost will be determined based on a combination of inflating previous values or through the use of the current year's historical invoice data. Where indices are being used, the Non-Residential Building Construction Price Index (NRBCP) shall be used for construction related assets (i.e., infrastructure) and Consumer Price Index (CPI) shall be used for all other assets (i.e., furniture, interior finishes, appliances, etc.).

Condition Assessment

1. Condition assessments shall be performed as outlined in Table B-1 below.
2. Condition assessments shall be performed by qualified individuals (or companies) and shall include a review of the following:
 - a) Current asset condition (consistent with the rating format used within this report, unless the Township stipulates a new format, or regulatory body required format);
 - i. Identify any unusual wear from asset use that may hinder asset performance and eventually reduce useful life.
 - ii. Assess asset performance and identify (if any) capital improvements that can be applied to extend the asset's useful life and/or bring the asset back to proper service levels.
 - b) Current asset replacement cost. This is to be based on replacing the asset under current legislation/requirements using Township specification; and
 - c) Remaining service life, assuming current identified maintenance and usage levels.

Table B-1

Condition Assessment Time Table

Asset Type	Frequency of Condition Assessment	Comments
Bridges	Every two years	As per Provincial Regulation using OSIM Inspection format
Equipment (Office, Other)		As identified by Staff, so Equipment is safe and in good working order
Facilities	Every ten - fifteen years	Complete detailed assessment every ten years but annual staff and specialized inspection/cleaning of some components (eg. HVAC, Fans, Pumps, etc.)
Land Improvements (Playing Surfaces, Parking Lots, Parks, Landscaping)	Annually	Staff assessment annually
Roads	Every five - ten years	Complete Roads Needs study every five years but internal staff review annually
Road Signs		As per Regulation 239 Minimum Maintenance Standards
Sidewalks		As per Regulation 239 Minimum Maintenance Standards
Software & Hardware		As identified by Staff, so software and hardware operating well
Storm Water Mains	Every fifteen years	CCTV scans and review of Storm Water system
Storm Water (Catch Basins, Manholes, Stormceptors)	Annually	To be assessed while doing a clean out
Street Lights	Every month	To ensure they are working
Vehicles		As per Manufacturer's Warranty and Maintenance Program
Generators	Every season	Minimum four times per year



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Appendix C

20 Year Detailed Asset Management Strategy & Financing Strategy

Township of Amaranth
2016 Asset Management Plan
Level of Service Analysis

Level of Service (LOS) Analysis						
Expected Strategic LOS	Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost of Expected LOS	Cost Description	
Roads & Related Assets	Safe Roads	Meet "Minimum Maintenance Standards" as defined by Ontario Regulation 239/02.	Meet "Minimum Maintenance Standards" as defined by Ontario Regulation 239/02.	Regulation Standard	\$1,800	Township may want to incorporate a system that will assist in proving compliance to the Provincial Regulation
	Fix Public Identified Issues Quickly	Track complaints and resolve them as quickly as possible	Track complaints by road segment.	Respond to Public Inquiry within 7 days		Township delivers the Level of Service well
	Maintain Road System Network Condition for safe use	Road Maintenance is completed regularly and when required	Maintain adequate road network condition index to ensure safe roads	Assess Road Conditions every 10 years with Internal assessment annually	\$25,000 + \$15,000 + \$8,500	Roads Needs Study every 10 years to include Network Condition analysis, and crack seal program and line painting
	Asphalt Roads are Clean and Clear	Street sweeping and flushing are completed annually	Roads are swept and flushed to ensure they are clear of debris and safe.		\$8,500	Township delivers the Level of Service well
	Gravel Roads are well maintained and Dust Inhibited	Gravel roads are smoothed when required, and Calcium Chloride applied to control dust	Gravel roads are smoothed when required, and Calcium Chloride applied to control dust		\$110,000	Township delivers the Level of Service well
	Safe and well maintained RoadSides	Township provides brushing, ditching, grass mowing, and shoulder maintenance to ensure roadsides are safe and well maintained	Roadsides are clear of obstructions and well maintained for safe road travel.		\$1,000	Township delivers the Level of Service well
	Signs can be seen clearly	Signs: Visual inspections done in the evening. Replaced when required/needed.	Signs: Visual inspections. Replace when needed.	Reflectivity Standard		Township delivers the Level of Service well
	Sidewalks are clear and Safe	Visual Inspections done annually	Annual visual inspections correcting all identified deficiencies	Regulation Standard		Township delivers the Level of Service well
Safe Well lit Urban/Semi-Urban Street areas	Maintenance activated by Public Notice for Street Lights	Maintenance activated by Public Notice for Street Lights	Correction of Issues within MMS	\$45,000	Recommendation for conversion to LED lights	

Level of Service (LOS) Analysis						
Expected Strategic LOS	Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost of Expected LOS	Cost Description	
Bridge & Culvert Assets	Safe Bridges	Maintain good bridge condition and 8 bridges with load limits.	Maintain good condition and no load limits.	MTO bridge guides		Township is working towards completing this LOS. Closed Bridge 17 will be re-opened after new construction in 2017, and Bridge 15 will be replaced.
	Bridges Maintained	Follow Bridge Inspection Report recommendations for Bridge and Culvert maintenance.	Proactive Bridge and Culvert maintenance (based on bridge report).		\$100,600	Township is completing this LOS, with improving the maintenance issues identified in the Township's Bridge Inspection Report over the next 10 years. Required funds are identified in the LOS tables
	Proper Bridge Spring Maintenance	Blowing out Expansion Joints & Washing of Bridges in Spring	Blowing out Expansion Joints & Washing of Bridges in Spring			Township is completing this LOS
	Bridge Inspections	Bridge inspections (i.e. using OSIM reports) required every 2 years.	Bridge inspections (i.e. using OSIM reports) required every 2 years.	Completed every 2 years	\$7,800	Township is completing this LOS

Level of Service (LOS) Analysis						
Expected Strategic LOS	Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost to Move to Expected LOS	Cost Description	
Building Assets	Safe Buildings	Meet legislative requirement (Building Code, Fire Code, Health & Safety, etc.)	Meet legislative requirement (Building Code, Fire Code, Health & Safety, etc.)	Provincial Guidelines		Township is completing this LOS
	Facility are Well Maintained	Condition assessments performed when needed.	Facility Condition Assessments showing remaining life of major asset components and required improvements completed			On-Site inspections completed when required
	Health & Safety Equipment is in good working order	Health & Safety component assessments to ensure emergency alarms, lighting, generators, etc. are functioning to specifications	Health & Safety component assessments to ensure emergency alarms, lighting, generators, etc. are functioning to specifications	Provincial Guidelines		Township is completing this LOS
	All Facilities meet Accessibility Standards	All facilities meeting current accessibility standards.	All Facilities meet accessibility standards.	Provincial Guidelines		Township is completing this LOS
	Maximizing Energy Savings	Energy Audit has been undertaken by the Township	Resource Efficiency: Energy Audit - for all facilities			Township does not have any outstanding issues to complete from the Energy audit for buildings
	Township Office Water is Safe to Drink	Reverse Osmosis and water coolers are used to ensure safe drinking water.	Water is tested regularly and safe to drink	Provincial Guidelines		Township is completing this LOS
	Mechanical Systems are Inspected and Maintained	HVAC systems are inspected and maintained annually	Assess efficiencies in Maintenance contracts (i.e. generators, HVAC).			Township is completing this LOS
	Clean and well Maintained Facilities	Township has well maintained facilities	Proactive facility maintenance.			Township is completing this LOS

Level of Service (LOS) Analysis						
Expected Strategic LOS	Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost to Move to Expected LOS	Cost Description	
Land Improvements	Safe & Accessible Parks	Meet legislative requirement (Inspections, Health & Safety, etc.)	Meet legislative requirement (Inspections, Health & Safety, etc.)	Provincial Guidelines		Township Staff complete inspections
	Parks are well Maintained	Condition assessments performed when needed. Monthly inspections of playground equipment.	Monthly inspections of playgrounds and equipment	Provincial Guidelines		Township is completing this LOS
	Playgrounds are in good working order	Health & Safety component assessments to ensure functioning to specifications	Health & Safety component assessments to ensure functioning to specifications	Provincial Guidelines		Appropriate maintenance measures are being undertaken by the Township.
	Parking Facilities are in Good Condition	Maintenance for Parking areas when required	Annual Inspections for maintenance for Parking areas			Township staff to complete and report
	Sports Fields are Safe and Maintained	Appropriate Maintenance for safe use	Appropriate Maintenance for safe use			Township is completing this LOS
	Township Trails are Safe and Maintained	Appropriate Maintenance for safe use	Appropriate Maintenance for safe use			Township is completing this LOS
	Fencing is Safe	Responding to Public complaints	Annual inspection and fixing of maintenance issues	Annual Review		Township to review when complaints submitted. Inspections are completed by staff

Level of Service (LOS) Analysis						
Expected Strategic LOS	Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost to Move to Expected LOS	Cost Description	
Vehicles & Equipment Assets	Safe & Well Maintained Vehicles	Proactive maintenance plan, as per Manufacturer's Guidelines	Proactive maintenance plan, as per Manufacturer's Guidelines			Township is completing this LOS
	Safe & Well Maintained Equipment	Proactive maintenance plan, as per Manufacturer's Guidelines	Proactive maintenance plan, as per Manufacturer's Guidelines			Township is completing this LOS
	Optimal Replacement of Vehicles & Equipment	Replace Equipment/Vehicles as required (some areas based on legislated replacements, others minimum safety).	Replace Equipment/Vehicles as required (some areas based on legislated replacements, others minimum safety).			Some concern over the age of some of the vehicles/equipment the Township uses, however they are safe to use. The older vehicles are being used sparingly

Level of Service (LOS) Analysis						
Expected Strategic LOS	Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost to Move to Expected LOS	Cost Description	
Storm Water Assets	Effective Storm Water Management	Investigate and respond based on public complaints/concerns	Proper flows and clear system with little to no inhibitors	No storm water back-up incidents		Township is completing this LOS
	Catch Basins are clear and well Maintained	Annual Catch Basin cleaning	Annual Catch Basin cleaning		\$2,000	Township is completing this LOS
	Storm Water Mains are clear and well Maintained	No identified issues	CCTV review and assessment completed every 15 yrs. Implement plan for repairs & maintenance that result in system efficiencies.		\$20,000	CCTV program every 15 years

Level of Service (LOS) Analysis						
Expected Strategic LOS	Current LOS	Expected LOS	Benchmark (if Applicable)	Estimated Cost of Expected LOS	Cost Description	
Water Assets	Source Water is well Protected	Maintaining appropriate Zoning and Planning to ensure Source Water Protection	Maintaining appropriate Zoning and Planning to ensure Source Water Protection			Township is completing this LOS
	Production Wells are well Maintained	Appropriate maintenance is undertaken when required	Appropriate maintenance is undertaken when required			Township is completing this LOS
	Treatment Processes Meet Legislative Requirements	Meet all legislative requirements.	Meet all Provincial legislative requirements.	Provincial Guidelines		Township is completing this LOS
	Well Maintained Generator	Tested monthly	Tested and well maintained generators		\$3,000	Township is completing this LOS. Annual service maintenance
	Appropriate Water Storage for Distribution Network	Water Storage is sufficient for currently approved developments. Beyond that the system may be reaching capacity levels	Water Storage meets the needs of the Water Distribution Network		\$5,000	Need to address capacity if the Township wishes to grow beyond the current approved development in the Waldemer area. Use robotic camera every 5 years to inspect storage tank.
	Efficient Water Distribution System	Water losses are tracked and at a minimum	Water Losses are tracked and minimized		\$2,000	Township is completing this LOS. Annual effort to gain access to exersize valves.
	Sufficient Water pressure for Fire Protection	Water pressure meets and exceeds Fire Protection Standards with over 50psi at high point and over 90psi at pump house	Water Pressure meets Fire Protection Standards of 50psi			Township is completing this LOS
	Hydrants are Flushed and Swabbed	System is flushed twice a year, and annual refurbishing program	Flushing Program meets Guideline Standards		\$5,000	Township is completing this LOS. Annual refurbishing program

2016 Asset Management Plan
 Scheduled Capital Replacement - Uninflated
 Scenario 2

Capital Start \$1,000,000

Tax Supported Assets

Asset Type	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	TOTAL
Scenario 2a - \$1,000,000 + 0.5%	1,000,000	1,012,500	1,025,000	1,037,500	1,050,000	1,062,500	1,075,000	1,087,500	1,100,000	1,112,500	1,125,000	1,137,500	1,150,000	1,162,500	1,175,000	1,187,500	1,200,000	1,212,500	1,225,000	1,237,500	22,375,000
Scenario 2b - \$1,000,000 + 1%	1,000,000	1,025,000	1,050,000	1,075,000	1,100,000	1,125,000	1,150,000	1,175,000	1,200,000	1,225,000	1,250,000	1,275,000	1,300,000	1,325,000	1,350,000	1,375,000	1,400,000	1,425,000	1,450,000	1,475,000	24,750,000

2016 Asset Management Plan
 Scheduled Capital Replacement - Inflated
 Scenario 2: Capital Phased-In Approach - Medium Deferral (Recommended)

Tax Supported Assets

Inflation Factor 100.0% 102.0% 104.0% 106.1% 108.2% 110.4% 112.6% 114.9% 117.2% 119.5% 121.9% 124.3% 126.8% 129.4% 131.9% 134.6% 137.3% 140.0% 142.8% 145.7%

Asset Type	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	TOTAL
Scenario 2a	1,000,000	1,032,750	1,066,410	1,101,003	1,136,554	1,173,086	1,210,625	1,249,196	1,288,825	1,329,540	1,371,369	1,414,338	1,458,478	1,503,818	1,550,388	1,598,219	1,647,343	1,697,793	1,749,602	1,802,804	27,382,139
Scenario 2b	1,000,000	1,045,500	1,092,420	1,140,799	1,190,675	1,242,091	1,295,087	1,349,706	1,405,991	1,463,988	1,523,743	1,585,302	1,648,714	1,714,029	1,781,296	1,850,569	1,921,900	1,995,344	2,070,957	2,148,796	30,466,908