The Asset Management Plan for the Township of Severn

January 2021

PSD RESEARCH CONSULTING SOFTWARE

Key Statistics

$317.6 million Replacement cost of asset portfolio	**$58,436** Replacement cost of infrastructure per household (2016)
2.73% Target average annual infrastructure reinvestment rate	**1.20%** Actual average annual infrastructure reinvestment rate
85% Percentage of assets in fair or better condition	**48%** Percentage of assets with assessed condition data
52% Percentage of sustainable capital funding that comes from the grants/transfers	**44%** Percentage of annual infrastructure needs funded from sustainable revenue sources
$4.9 million Annual capital infrastructure deficit	**15 years** Recommended timeframe for eliminating annual infrastructure deficit

Table of Contents

Executive Summary

Municipal infrastructure provides the foundation for the economic, social and environmental health and growth of a community through the delivery of critical services. The goal of asset management is to deliver an adequate level of service in the most cost-effective manner. This involves the development and implementation of asset management strategies and long-term financial planning.

All municipalities in Ontario are required to complete an asset management plan (AMP) in accordance with Ontario Regulation 588/17 (O. Reg. 588/17). This AMP outlines the current state of asset management planning in the Township of Severn. It identifies the current practices and strategies that are in place to manage public infrastructure and makes recommendations where they can be further refined. Through the implementation of sound asset management strategies, the Township can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP includes the following asset categories:

Asset Category	Source of Funding
Road Network	Tax Levy
Bridges & Culverts	
Stormwater System	
Buildings & Facilities	
Vehicles	
Land Improvements	
Machinery & Equipment	
Water System	User Rates
Wastewater System	

The overall replacement cost of the asset categories included in this AMP totals $317.6 million. 85% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 48% of assets. For the remaining 52% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

The development of a long-term, sustainable financial plan requires an analysis of whole lifecycle costs. This AMP has used a combination of proactive lifecycle strategies (paved roads) and replacement only strategies (all other assets) to determine the lowest cost option to maintain the current level of service.

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital

requirement totals $8.7 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $3.8 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $4.9 million.

A financial strategy was developed to address the annual capital funding gap. The following table compares to total and average annual tax/rate change required to eliminate the Township's infrastructure deficit:

Funding Source	Years Until Full Funding	Total Tax/Rate Change	Average Annual Tax/Rate Change
Tax-Funded Assets	15 Years	35.9%	2.4%
Rate-Funded (Water)	15 Years	49.8%	3.3%
Rate-Funded (Sanitary)	15 Years	61.5%	4.1%

This AMP represents a snapshot in time and is based on the best available processes, data, and information at the Township. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources. Several recommendations have been developed to guide the continuous refinement of the Township's asset management program. These include:

a) regular and ongoing asset inventory data review to ensure that asset management planning and long-term projections are based on completed and accurate data

b) the development of a condition assessment strategy on a regular schedule according to defined criteria

c) the continuous review, development and implementation of optimal lifecycle management strategies

d) the development of long-term capital plans for each asset category to ensure adequate revenue is available to meet capital requirements

e) the measurement of current levels of service across all asset categories and eventually the identification of proposed levels of service that are realistic and sustainable

The evaluation of the above items and further development of a data-driven, best-practice approach to asset management is recommended to ensure the Township is providing optimal value through its management of infrastructure and delivery of services.

With the development of this AMP the Township has achieved compliance with O. Reg. 588/17 to the extent of the requirements that must be completed by July 1, 2021. There are additional requirements concerning proposed levels of service and growth that must be met by July 1, 2023 and 2024.

AM Program Recommendations

Asset management is an ongoing practice that requires dedicated time and resources across all departments. The above recommendations include many key activities designed to enhance the accuracy and reliability of asset management planning.

However, it is far from a comprehensive list of all activities required to manage a municipal asset management program. Timelines, resources and effort for the above recommendations and all regular asset management activities should be reviewed regularly. Roles and responsibilities should be clearly defined and delegated to assigned resources to ensure that the Township's asset management program is progressing towards its strategic goals and objectives.

The following table provides a summarized list of recommendations to further the development of the Township's asset management program. A more detailed description of each recommendation can be found within the appropriate Asset Category in **Section 4** of the AMP.

Recommendation Category	Recommendation Details	Applicable Asset Categories
Asset Inventory/Data Refinement	Review Replacement Unit Costs	Road Network
	Align Financial/AM Inventory Data	Road Network Water System Wastewater System
Condition Assessment Strategies	Develop a Condition Assessment Strategy	Stormwater System Water System Wastewater System
Lifecycle Management Strategies	Develop a Long-Term Capital Plan	Road Network Stormwater System Water System Wastewater System
Levels of Service	Measure Current Levels of Service	All Asset Categories
	Identify Additional Level of Service Metrics	All Asset Categories
	Identify Proposed Level of Service	All Asset Categories

1 Introduction & Context

Key Insights

1. The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value taxpayers receive from the asset portfolio

2. The Township's asset management policy provides clear direction to staff on their roles and responsibilities regarding asset management

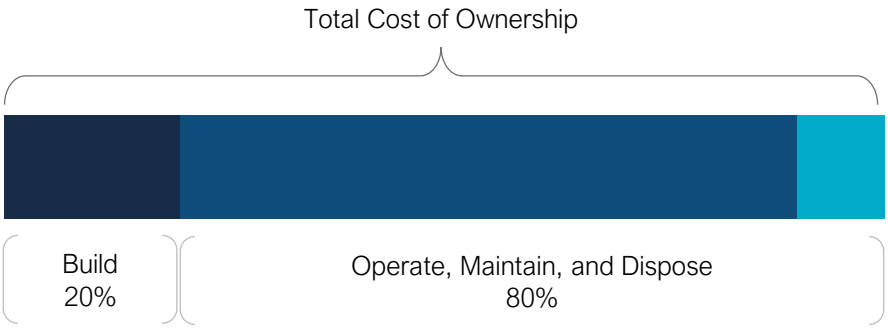
3. An asset management plan is a living document that should be updated regularly to inform long-term planning

4. Ontario Regulation 588/17 outlines several key milestones and requirements for asset management plans in Ontario between July 1, 2021 and 2024

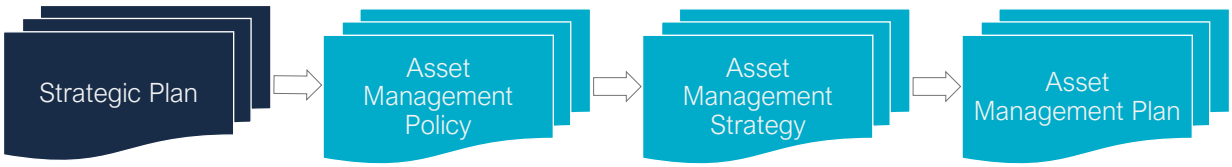
1.1 An Overview of Asset Management

Municipalities are responsible for managing and maintaining a broad portfolio of infrastructure assets to deliver services to the community. The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value ratepayers receive from the asset portfolio.

The acquisition of capital assets accounts for only 10-20% of their total cost of ownership. The remaining 80-90% comes from operations and maintenance. This AMP focuses its analysis on the capital costs to maintain, rehabilitate and replace existing municipal infrastructure assets.



These costs can span decades, requiring planning and foresight to ensure financial responsibility is spread equitably across generations. An asset management plan is critical to this planning, and an essential element of a broader asset management program. The diagram below depicts an industry-standard approach and sequence to developing a practical asset management program.



The diagram, adopted from the Institute of Asset Management (IAM), illustrates the concept of 'line of sight', or alignment between the corporate strategic plan and various asset management documents. The strategic plan has a direct, and cascading impact on asset management planning and reporting.

1.1.1 Asset Management Policy

An asset management policy represents a statement of the principles guiding the Township's approach to asset management activities. It aligns with the organizational strategic plan and provides clear direction to municipal staff on their roles and responsibilities as part of the asset management program.

The Township's Asset Management Policy was developed in 2019 in compliance with the requirements outlined in O. Reg. 588/17.

This Asset Management Plan satisfies policy statement 4:

> "*4. The municipality will develop an asset management plan that incorporates all municipal infrastructure assets that meet the capitalization threshold outlined in the organization's Tangible Capital Asset Policy. The asset management plan will be updated at least every five years in accordance with O. Reg. 588/17 requirements, to promote, document and communicate continuous improvement of the asset management program.*"

1.1.2 Asset Management Strategy

An asset management strategy outlines the translation of organizational objectives into asset management objectives and provides a strategic overview of the activities required to meet these objectives. It provides greater detail than the policy on how the Township plans to achieve asset management objectives through planned activities and decision-making criteria.

The Township's Asset Management Policy contains many of the key components of an asset management strategy and may be expanded on in future revisions or as part of a separate strategic document.

1.1.3 Asset Management Plan

The asset management plan (AMP) provides a snapshot in time of the current state of municipal infrastructure assets as well as the current strategies in place to assist with planning and decision-making.

The focus of the AMP is not simply about identifying the money or resources that are required to meet lifecycle needs of infrastructure and maintain an adequate level of service. It should also identify the processes and strategies that are and can be implemented to improve decision-making outcomes.

The AMP is a living document that should be updated regularly as additional asset and financial data becomes available. This will allow the Township to re-evaluate the state of infrastructure and identify how the organization's asset management and financial strategies are progressing.

1.2 Key Concepts in Asset Management

Effective asset management integrates several key components, including lifecycle management, risk management, and levels of service. These concepts are applied throughout this asset management plan and are described below in greater detail.

1.2.1 Lifecycle Management Strategies

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. Asset deterioration has a negative effect on the ability of an asset to fulfill its intended function, and may be characterized by increased cost, risk and even service disruption.

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

There are several field intervention activities that are available to extend the life of an asset. These activities can be generally placed into one of three categories: maintenance, rehabilitation and replacement. The following table provides a description of each type of activity and the general difference in cost.

Lifecycle Activity	Description	Example (Roads)	Cost
Maintenance	Activities that prevent defects or deteriorations from occurring	Crack Seal	$
Rehabilitation/ Renewal	Activities that rectify defects or deficiencies that are already present and may be affecting asset performance	Mill & Re-surface	$$
Replacement/ Reconstruction	Asset end-of-life activities that often involve the complete replacement of assets	Full Reconstruction	$$$

Depending on initial lifecycle management strategies, asset performance can be sustained through a combination of maintenance and rehabilitation, but at some point, replacement is required. Understanding what effect these activities will have on the lifecycle of an asset, and their cost, will enable staff to make better recommendations.

The Township's approach to lifecycle management is described within each asset category outlined in this AMP. Developing and implementing a proactive lifecycle strategy will help staff to determine which activities to perform on an asset and when they should be performed to maximize useful life at the lowest total cost of ownership.

1.2.2 Risk Management Strategies

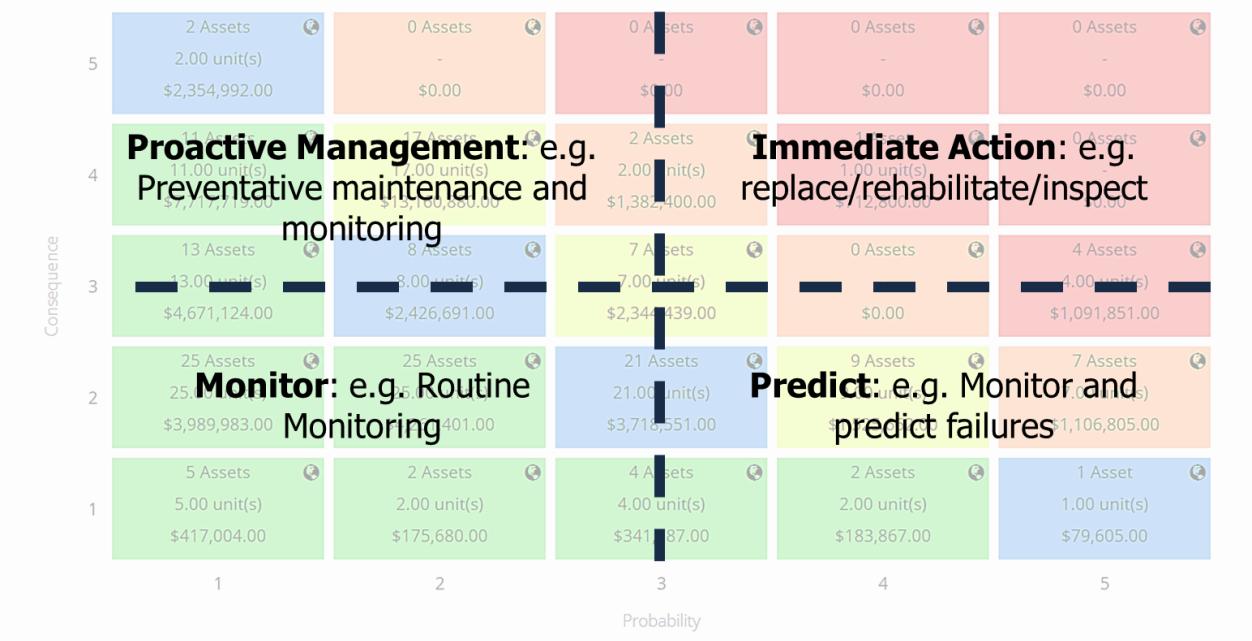
Municipalities generally take a 'worst-first' approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal, and some assets pose a greater risk to service delivery if they were to fail.

For example, a road with a high volume of traffic that provides access to critical services poses a higher risk than a low volume rural road servicing a handful of properties. Asset risk and criticality is a key component of both short- and long-term planning.

$$\textbf{\textit{Risk Rating}} = \textit{Probability of Failure x Consequence of Failure}$$

This AMP includes a high-level evaluation of asset risk and criticality. Each asset has been assigned a probability of failure score and consequence of failure score based on available asset data. These risk scores can be used to prioritize maintenance, rehabilitation and replacement strategies for critical assets.

Risk matrices are a useful tool used to visualize risk across a group of assets. The following image provides an example of the actions or strategies that may be considered depending on an asset's risk rating.



1.2.3 Levels of Service

A level of service (LOS) is a measure of what the Township is providing to the community and the nature and quality of that service. Within each asset category in this AMP, technical metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available.

These measures include a combination of those that have been outlined in O. Reg. 588/17 in addition to performance measures identified by the Township as worth measuring and evaluating. The Township measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service.

Community Levels of Service

Definition: a simple, plain language description or measure of the service that the community receives.

Example: Description or images that illustrate the different levels of road class pavement condition

Technical Levels of Service

Definition: Technical levels of service are a measure of key technical attributes of the service being provided to the community. These include mostly quantitative measures and tend to reflect the impact of the Township's asset management strategies on the physical condition of assets or the quality/capacity of the services they provide.

Example: Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)

Current and Proposed Levels of Service

This AMP focuses on measuring the current level of service provided to the community. Once current levels of service have been measured, the Township will need to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17.

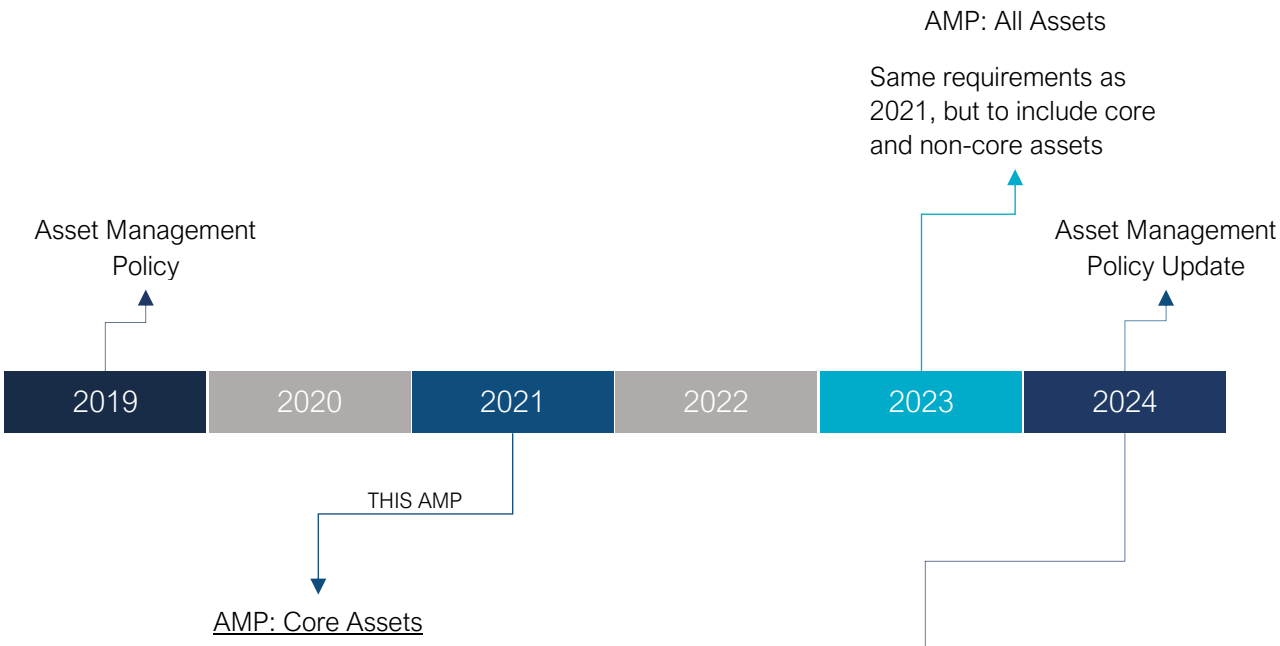
Proposed levels of service should be realistic and achievable within the timeframe outlined by the Township. They should also be determined with consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals and long-term sustainability.

Once proposed levels of service have been established, and prior to July 2024, the Township must identify a lifecycle management and financial strategy which allows these targets to be achieved.

1.3 Ontario Regulation 588/17

As part of the *Infrastructure for Jobs and Prosperity Act, 2015*, the Ontario government introduced Regulation 588/17 - Asset Management Planning for Municipal Infrastructure (O. Reg 588/17). Along with creating better performing organizations, more liveable and sustainable communities, the regulation is a key, mandated driver of asset management planning and reporting. It places substantial emphasis on current and proposed levels of service and the lifecycle costs incurred in delivering them.

The diagram below outlines key reporting requirements under O. Reg 588/17 and the associated timelines.



1. Current levels of service
2. Inventory analysis
3. Lifecycle activities to sustain LOS
4. Cost of lifecycle activities
5. Population and employment forecasts
6. Discussion of growth impacts

1. Proposed levels of service for next 10 years
2. Updated inventory analysis
3. Lifecycle management strategy
4. Financial strategy and addressing shortfalls
5. Discussion of how growth assumptions impacted lifecycle and financial strategy

1.3.1 O. Reg. 588/17 Compliance Review

The following table identifies the requirements outlined in Ontario Regulation 588/17 for municipalities to meet by July 1, 2021. Next to each requirement a page or section reference is included in addition to any necessary commentary.

Requirement	O. Reg. Section	AMP Section Reference	Status
Summary of assets in each category	S.5(2), 3(i)	4.1.1 - 5.2.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1.1 - 5.2.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.1.3 - 5.2.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.1.2 – 5.2.2	Complete
Description of Township's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.1.2 – 5.2.2	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.1.6 - 5.2.6	Complete for Core Assets Only
Current performance measures in each category	S.5(2), 2	4.1.6 - 5.2.6	Complete for Core Assets Only
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.1.4 - 5.2.4	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix A	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	6.1-6.2	Complete

2 Scope and Methodology

Key Insights

1. This asset management plan includes 9 asset categories and is divided between tax-funded and rate-funded categories

2. The source and recency of replacement costs impacts the accuracy and reliability of asset portfolio valuation

3. Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life

2.1 Asset Data Hierarchy

This asset management plan uses a two-tier asset hierarchy to sort assets into both a primary functional category (e.g. Road Network) and a secondary departmental or characteristic-based segment (e.g. Paved Roads or Transportation Services).

2.1.1 Asset Categories

This asset management plan for the Township of Severn is produced in compliance with Ontario Regulation 588/17. The July 2021 deadline under the regulation—the first of three AMP updates—requires analysis of only core assets (roads, bridges & culverts, water, wastewater, and stormwater). This AMP includes both core and non-core asset categories.

The AMP summarizes the state of the infrastructure for the Township's asset portfolio, establishes current levels of service and the associated technical and community oriented key performance indicators (KPIs), outlines lifecycle strategies for optimal asset management and performance, and provides financial strategies to reach sustainability for the asset categories listed below.

Asset Category	Source of Funding
Bridges & Culverts	Tax Levy
Buildings & Facilities	
Land Improvements	
Machinery & Equipment	
Road Network	
Vehicles	
Stormwater System	
Water System	User Rates
Wastewater System	

2.1.2 Asset Segments

Within each asset category a series of segments have been developed to allow for a more granular level of analysis. This secondary level of the asset data hierarchy aims to group assets together based on either departmental ownership or assets with similar characteristics. Examples of both approaches are found in the tables below

Asset Category	Asset Segment (Departmental)
Vehicles	Fire Vehicles
	Public Works Vehicles
	Recreation Vehicles

Asset Category	Asset Segment (Characteristics)
Road Network	Paved Roads
	Sidewalks
	Streetlights

2.2 Deriving Replacement Costs

Replacement costs should reflect the total costs associated with the full replacement or reconstruction of an asset. They should include the combined cost of materials, plant, labour, engineering and administrative costs.

This AMP relies on two methods to determine asset replacement costs:

- Unit Cost: A unit-based cost (e.g. per metre) determined through a review of recent contracts, reports and/or staff estimates

- Historical Cost Inflation: Inflation of the asset cost recorded at the time it was initially acquired to today's value using an index (e.g. CPI or NRBCPI)

Historical cost inflation is typically used in the absence of reliable unit cost data. It is a fairly reliable method for recently purchased and/or constructed assets where the cost is reflective of the total capital costs that the Township incurred. As assets age, and new products and technologies impact procurement costs and construction methods, cost inflation becomes a less reliable technique to determine replacement cost.

The following table identifies the methods employed to determine replacement costs across each asset category:

Asset Category	Replacement Cost Method	
	Unit Cost	Cost Inflation
Bridges & Culverts	99%	1%
Buildings & Facilities	-	100%
Land Improvements	-	100%
Machinery & Equipment	-	100%
Road Network	99%	1%
Vehicles	47%	53%
Stormwater System	87%	13%
Water System	99%	1%
Wastewater System	96%	4%
Overall:	**86%**	**14%**

All unit costs were reviewed by Township of Severn staff and determined to be the best available cost estimates at the time this AMP was developed.

2.3 Estimated Useful Life and Service Life Remaining

The estimated useful life (EUL) of an asset is the period over which the Township expects the asset to be available for use and remain in service before requiring replacement or disposal. The EUL for each asset in this AMP was assigned according to the knowledge and expertise of municipal staff and supplemented by existing industry standards when necessary.

By using an asset's in-service data and its EUL, the Township can determine the service life remaining (SLR) for each asset. Using condition data and the asset's SLR, the Township can more accurately forecast when it will require replacement. The SLR is calculated as follows:

$$Service\ Life\ Remaining\ (SLR) = In\ Service\ Date + Estimated\ Useful\ Life(EUL) - Current\ Year$$

2.4 Reinvestment Rate

As assets age and deteriorate they require additional investment to maintain a state of good repair. The reinvestment of capital funds, through asset renewal or replacement, is necessary to sustain an adequate level of service. The reinvestment rate is a measurement of available or required funding relative to the total replacement cost.

By comparing the actual vs. target reinvestment rate the Township can determine the extent of any existing funding gap. The reinvestment rate is calculated as follows:

$$Target\ Reinvestment\ Rate = \frac{Annual\ Capital\ Requirement}{Total\ Replacement\ Cost}$$

$$Actual\ Reinvestment\ Rate = \frac{Annual\ Capital\ Funding}{Total\ Replacement\ Cost}$$

2.5 Deriving Asset Condition

An incomplete or limited understanding of asset condition can mislead long-term planning and decision-making. Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life.

The table below outlines the condition rating system used in this AMP to determine asset condition. This rating system is aligned with the Canadian Core Public Infrastructure Survey which is used to develop the Canadian Infrastructure Report Card. When assessed condition data is not available, service life remaining is used to approximate asset condition.

Condition	Description	Criteria	Service Life Remaining (%)
Very Good	Fit for the future	Well maintained, good condition, new or recently rehabilitated	80-100
Good	Adequate for now	Acceptable, generally approaching mid-stage of expected service life	60-80
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies	40-60
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20-40
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-20

The following asset types use an adapted version of the above rating scale according to the criteria that was used for their most recent condition assessment.

Condition	Paved Roads (PCI)	Bridges & Culverts (BCI)
Very Good	90-100	90-100
Good	75-90	80-90
Fair	55-75	70-80
Poor	40-55	60-70
Very Poor	<40	<60

The analysis in this AMP is based on assessed condition data only as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition. Appendix D includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

3 Portfolio Overview

Key Insights

1. The total replacement cost of the Township's asset portfolio is $317.6 million

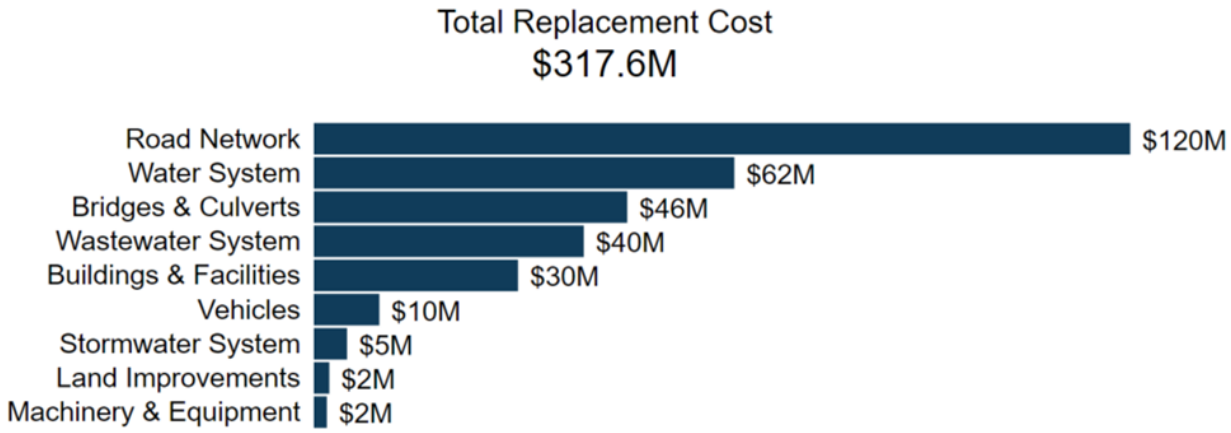
2. The Township's target re-investment rate is 2.73%, and the actual re-investment rate is 1.20%, contributing to an expanding infrastructure deficit

3. 83% of all assets are in fair or better condition

4. Average annual capital requirements total $8.6 million per year across all assets

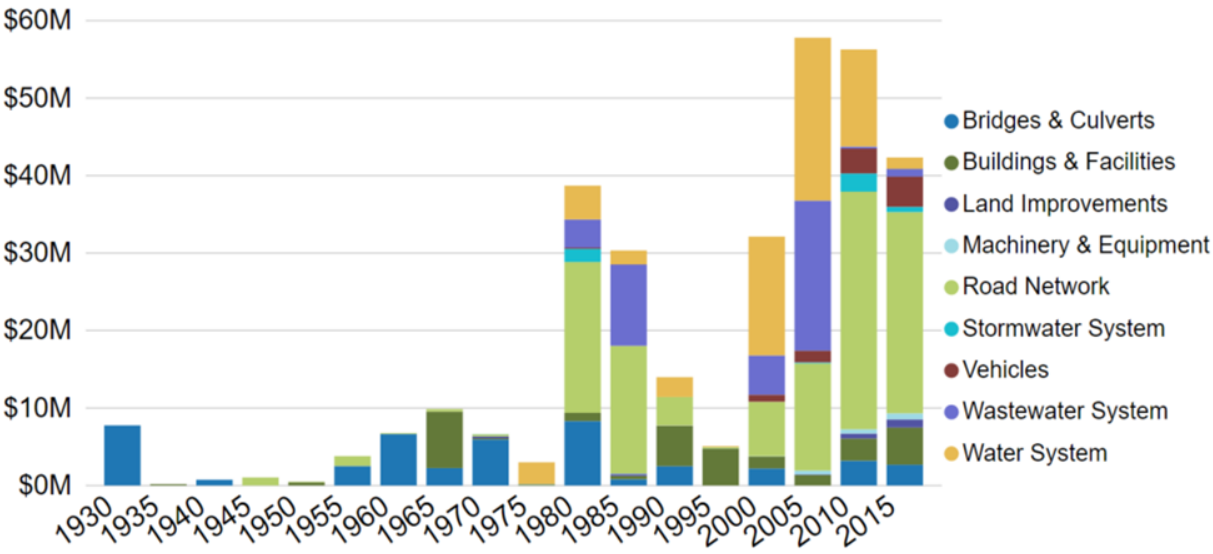
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analyzed in this AMP have a total replacement cost of $317.6 million. This total was determined based on a combination of unit costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.



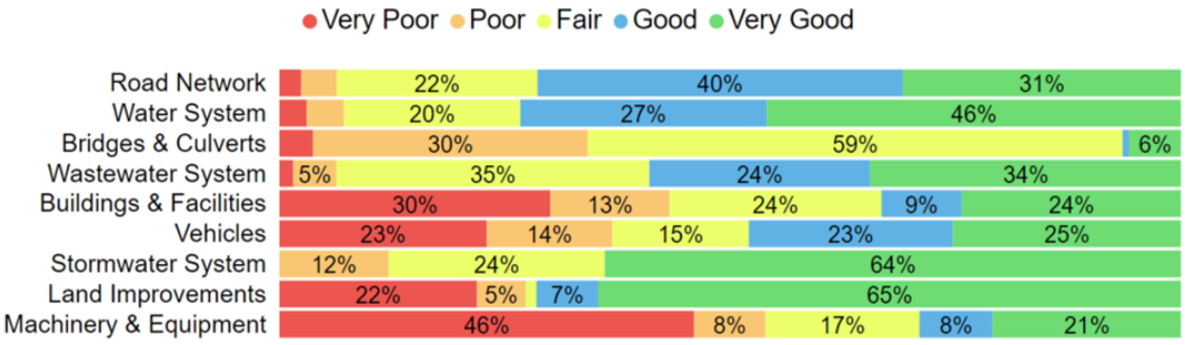
3.2 Installation Profile

The following graph illustrates the installation profile for the assets analysed in this AMP based on their in-service date and current replacement value.



3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, **85%** of assets in Severn are in fair or better condition.



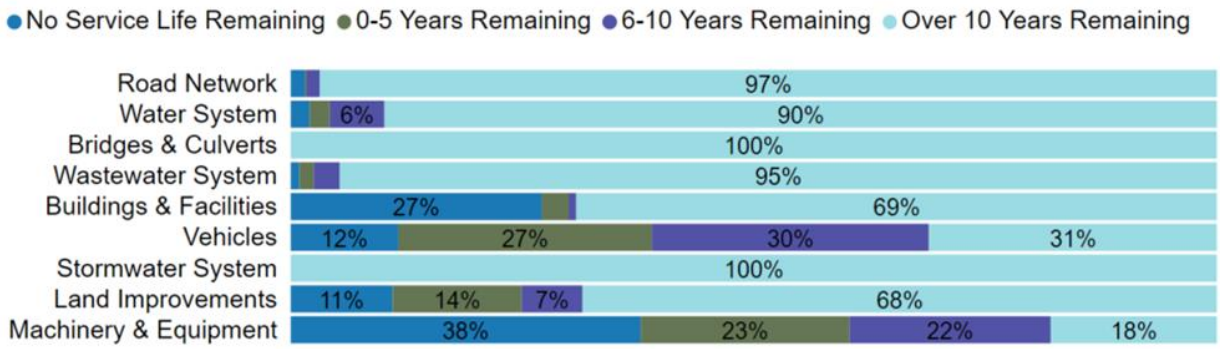
This AMP relies on assessed condition data for **48%** of assets. For all assets without assessed condition data, age is used as an approximation of current condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	% of Assets with Assessed Condition	Source of Condition Data
Road Network	89%	2017 Road Needs Study
Water System	0%	Age-Based Estimates
Bridges & Culverts	99%	2019 OSIM Inspections
Wastewater System	0%	Age-Based Estimates
Buildings & Facilities	0%	Age-Based Estimates
Vehicles	0%	Age-Based Estimates
Stormwater System	0%	Age-Based Estimates
Land Improvements	0%	Age-Based Estimates
Machinery & Equipment	0%	Age-Based Estimates
Overall:	**48%**	

The development of a condition assessment program across all asset categories is critical to confidence in long-term asset management planning. **Appendix D** provides a high-level overview of the role of asset condition data and key considerations in the development of a condition assessment program.

3.4 Service Life Remaining

Based on asset age, available assessed condition data, and estimated useful life, **9%** of the Township's assets have less than 10 years of service life remaining. Capital requirements over the next 10 years are identified in **Appendix A**.



Category	Estimated Useful Life Range (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Road Network	30-50	20.8	19.0
Water System	2-75	14.1	27.8
Bridges & Culverts	50-75	47.0	51.2
Wastewater System	3-75	18.6	30.1
Buildings & Facilities	4-50	15.1	21.2
Vehicles	8-25	7.3	5.3
Stormwater System	50-75	26.7	38.7
Land Improvements	5-50	6.1	19.9
Machinery & Equipment	3-25	7.1	3.3
Total:	**2-75**	**17.3**	**23.6**

While capital planning horizons tend to be short (<10 Years), a sustainable lifecycle and financial strategy should consider the full lifecycle of all assets.

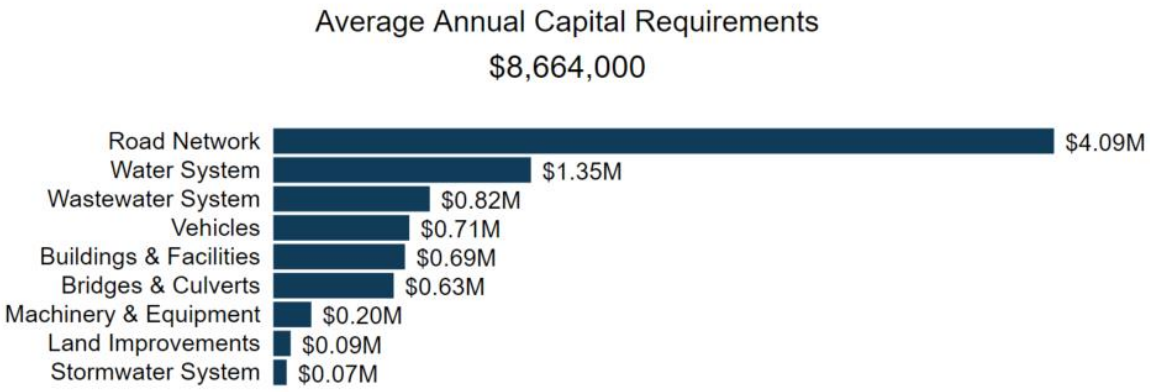
Short-term capital costs may be low for asset categories with long useful lives where infrastructure is relatively new. However, planning and saving for long-term capital costs is a key component of asset management planning.

The calculation of an average annual capital requirement considers the estimated useful life and cost of infrastructure to identify the amount that the Township should be allocating to meet capital needs regardless of whether the project costs will be incurred in the short- or long-term.

3.5 Forecasted Capital Requirements

3.5.1 Average Annual Capital Requirements

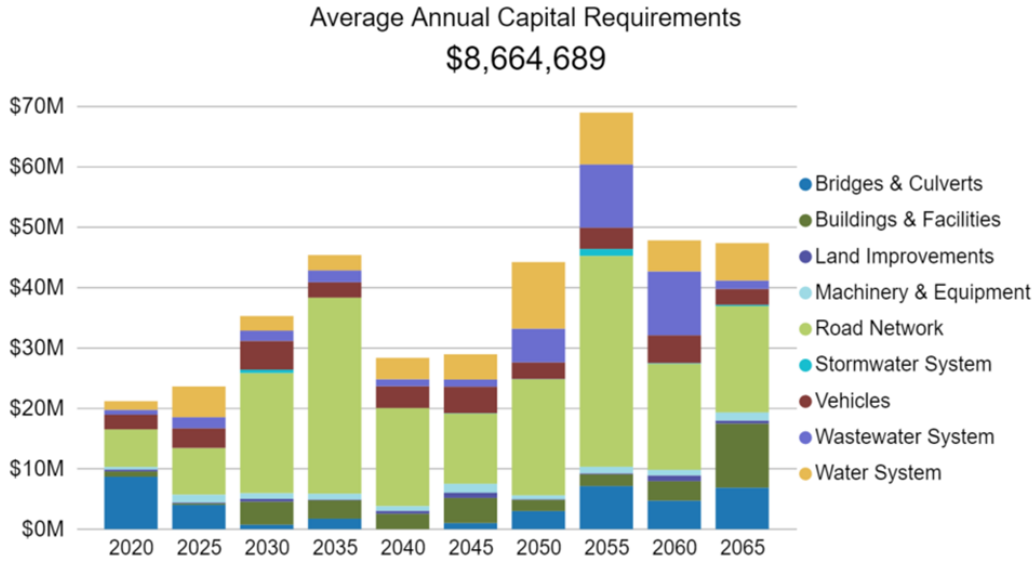
Annual capital requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability.



In total, the Township must allocate approximately $8.6 million annually to address capital requirements for the assets included in this AMP.

3.5.2 Projected Capital Requirements (50 Years)

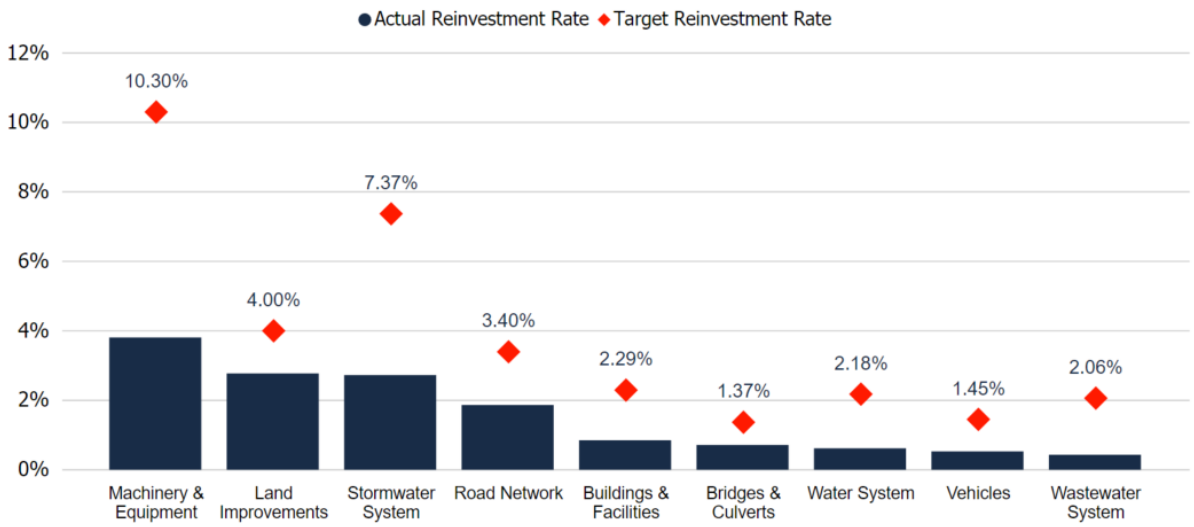
The following graph identifies projected capital requirements over the next 50 years.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

3.6 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township should be allocating approximately $8.7 million annually, for a target reinvestment rate of 2.73%. Actual annual spending from sustainable revenue sources totals approximately $3.8 million, for an actual reinvestment rate of 1.2%.



4 Analysis of Tax-funded Assets

Key Insights

1. Tax-funded assets are valued at $215.7 million

2. 77% of tax-funded assets are in fair or better condition

3. The average annual capital requirement to sustain the current level of service for tax-funded assets is approximately $7.1 million

4.1 Road Network

The Road Network is a critical component of the provision of safe and efficient transportation services. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure including, sidewalks, and streetlights.

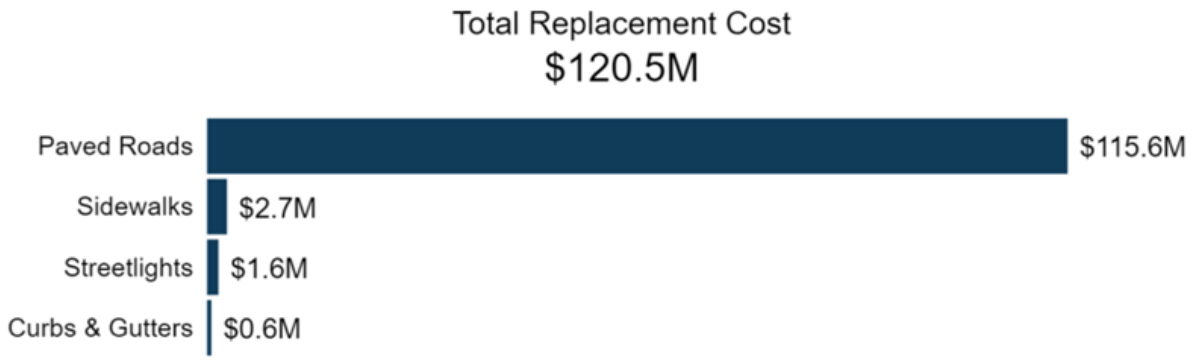
The Roads department, under the direction of the Director of Public Works, is responsible for the construction and maintenance of all Township roads.

Other administrative responsibilities include the preservation, maintenance and rehabilitation of municipal roads, bridges, sidewalks, streetlights, drainage, winter control, signage, maintenance and removal of trees on municipal properties and the acquisition, maintenance and repair of corporate vehicles and equipment.

4.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township's Road Network inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Paved Roads	89.1 km	Unit Costs	$115,594,210
Gravel Roads	52.3 km	Not Planned for Replacement[1]	
Curbs & Gutters	5.5 km	Unit Costs	$602,594
Sidewalks	9 km	Cost Inflation	$2,700,999
Streetlights	542	Unit Costs	$1,554,871

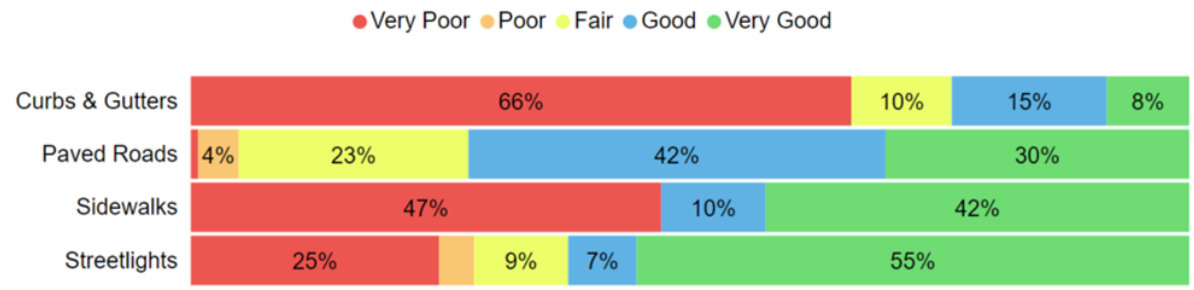


[1] Gravel roads have been included as they comprise a significant portion of the Township's road network. However, the lifecycle management strategies for these assets consist of perpetual maintenance activities and do not require capital costs for rehabilitation or replacement.

4.1.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Curbs & Gutters	25%	Poor	Age-Based
Paved Roads	81%	Very Good	93% Assessed
Sidewalks	44%	Fair	Age-Based
Streetlights	61%	Good	Age-Based
	79%	**Good**	**89% Assessed**



Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- The most recent Road Needs Study was completed in 2017 by and external consultant (Burnside) with plans to assess the full road network every 5 years moving forward

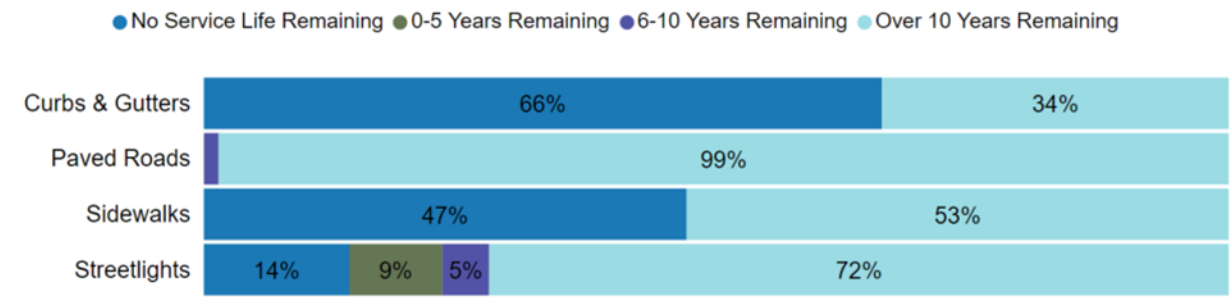
- Included in the Road Needs Study is a Pavement Condition Index (PCI) rating for every road in addition to a broader rating on the structural condition of the road structure

4.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Road Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Curbs & Gutters	40	34.6	5.4
Paved Roads	40	19.6	19.9
Sidewalks	50	30.3	19.7
Streetlights	30	13.8	16.2
		20.8	**19.0**



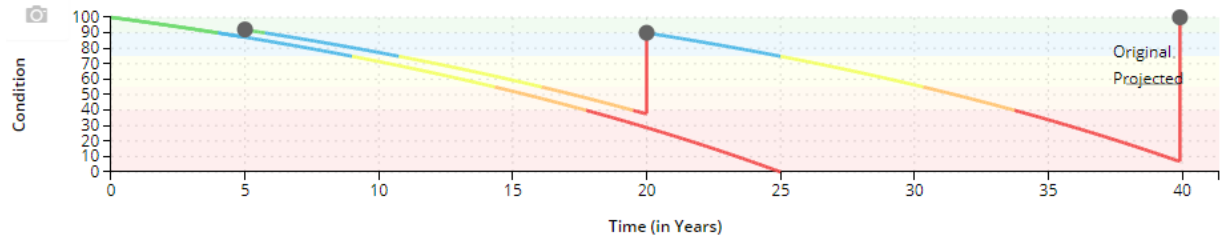
Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.1.4 Lifecycle Management Strategy

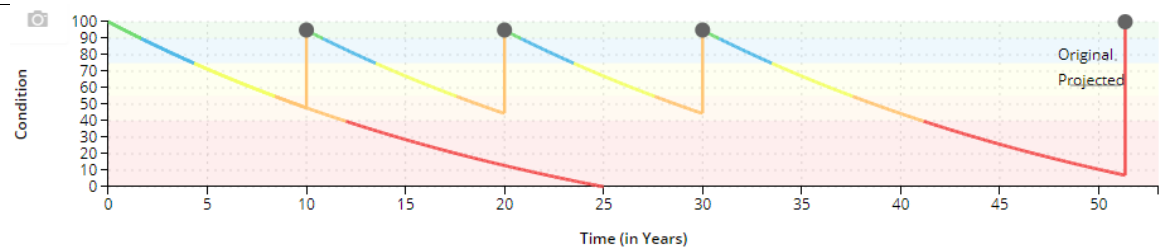
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment.

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of Paved Roads. Instead of allowing the roads to simply deteriorate until replacement is required, strategic intervention is expected to extend the service life of roads at a lower total cost.

Paved Roads (HCB)		
Event Name	Event Class	Event Trigger
Asphalt Patching/Crack Sealing	Preventative Maintenance	Every 5 Years (as-needed)
Pulverize & Re-Surface	Rehabilitation	Every 20 Years (Condition: ~40)
Full Reconstruction	Replacement	Year 40



Paved Roads (LCB)		
Event Name	Event Class	Event Trigger
Surface Treatment & Slurry Seal (3 Cycles)	Rehabilitation	Every 10 Years (~Condition: 50)
Full Reconstruction	Replacement	Year: 52



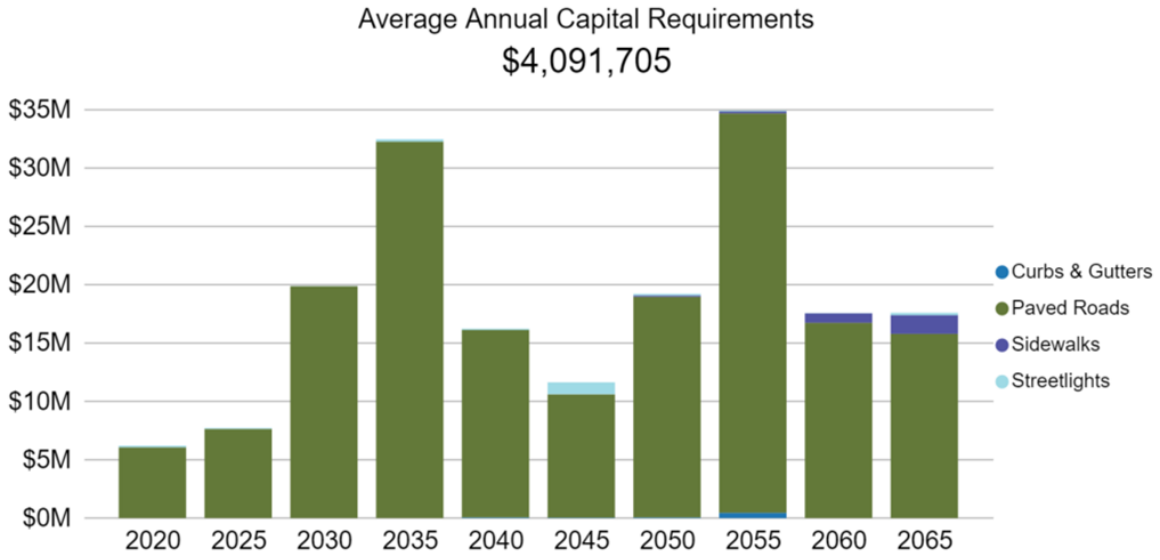
The following table further expands on the Township's current approach to lifecycle management:

Activity Type	Description of Current Strategy
Maintenance	Hard Top – patching, sweeping, shoulder maintenance
	Loose top – patching, grading and scarifying, dust control, re-surfacing
	Roadside Maintenance – grass mowing and weed spray, brushing and tree trimming, ditching, debris and litter pick-up
	Winter Maintenance – snow plowing and removal, sanding and salting
Rehabilitation	Pulverize and re-surface – milling and resurfacing urban roads and pulverizing and resurfacing semi-urban and rural roads completed once advanced deteioration of the pavement surface is observed
Replacement	Most gravel and surface treated roads are in the process of being upgraded to asphalt paved road surfaces.
	Township staff are in the process of moving to a 5 or 10-year planning horizon for road renewal and replacement

Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for Paved Roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the Road Network.

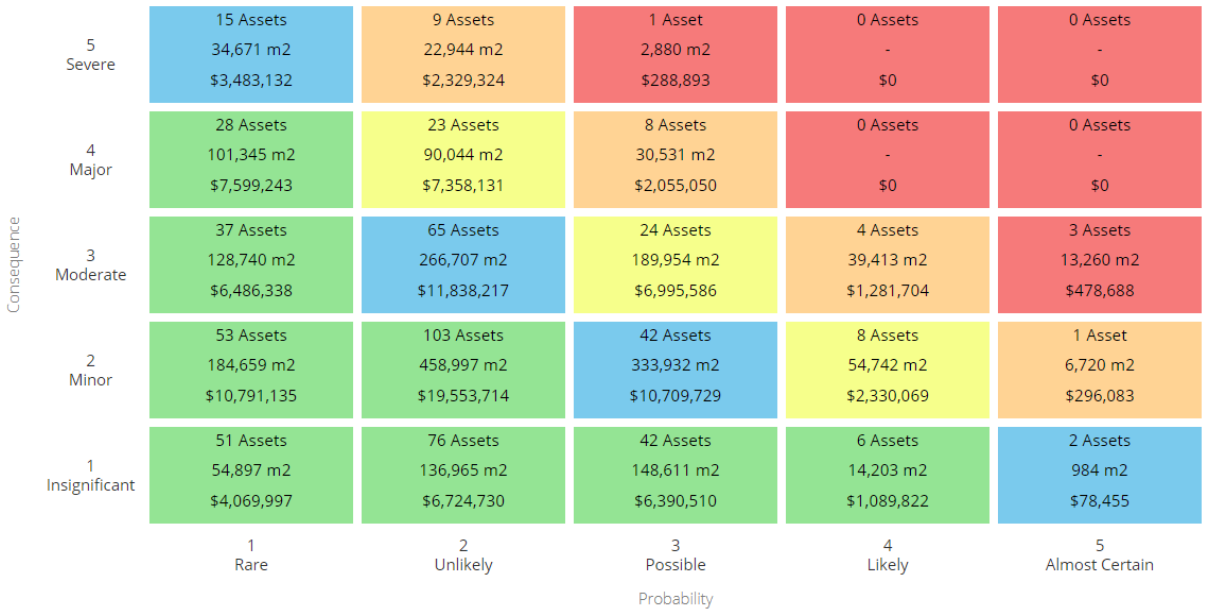
The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.1.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

The identification of critical assets will allow the Township to determine appropriate risk mitigation strategies and treatment options. This may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

4.1.6 Levels of Service

The following tables identify the Township's current level of service for the Road Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by the Road Network.

Service Attribute	Qualitative Description	Current LOS (2019)
Scope	Description, which may include maps, of the road network in the Township and its level of connectivity	See Appendix B
Quality	Description or images that illustrate the different levels of road class pavement condition	The Township's recent Road Needs Study (2017) provided a Pavement Condition Index for all road sections. The PCI considers surface distresses and ride conditions, resulting in a rating between 1 and 100. Higher PCI ratings reflect better road conditions. A road in very good condition (PCI: 90-100) is considered well maintained, exhibits few pavement distresses with a low severity and provides a smooth and pleasant ride for drivers. A road in poor condition (PCI: 40-55) exhibits several pavement distresses of increasing severity and is very rough and bumpy for drivers.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Road Network.

Service Attribute	Technical Metric	Current LOS (2019)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0.99
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.51
Quality	Average pavement condition index for paved roads in the Township	81 – Very Good
	Average surface condition for unpaved roads in the Township (e.g. excellent, good, fair, poor)	Good
Performance	% of signs inspected for reflectivity	99%
	% of sidewalks inspected	99%
	Capital reinvestment rate	1.86%

4.1.7 Recommendations

Asset Inventory/Data Refinement

- Review Replacement Unit Costs – The total replacement cost for Paved Roads represents a large portion of the entire infrastructure portfolio (36%) and any changes to costing assumptions may have a significant impact on long-term financial planning. As a result, the unit costs should be reviewed regularly, updated according to the best available source of costs and compared to recently completed construction projects to confirm accuracy.

- Align Financial/AM Inventory Data – This AMP used road inventory data from the Township's most recent Road Needs Study. It was determined that this inventory was more accurate and reliable than the current road inventory that is in CityWide and is used for financial reporting requirements. The Township should evaluate next steps to align the asset inventories used for financial reporting and asset management planning.

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan – While short-term capital cost projections are relatively small, they are expected to increase significantly over the next 15 years based on the current age and condition of roads. Extending the Township's planning horizon will ensure that future capital requirements are identified with sufficient time to develop an adequate funding strategy. Staff are in the process of moving to a 5 or 10-year capital planning horizon for road replacement and renewal.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Township's current levels of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current levels of service according to these metrics to allow for trend analysis that informs long-term planning.

- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short and long-term asset management planning. See Appendix E for examples.

- Identify Proposed Levels of Service - Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.2 Bridges & Culverts

Bridges & Culverts are a critical component of the Township's transportation network. They facilitate the movement of passenger vehicles, trucks, pedestrians, and cyclists.

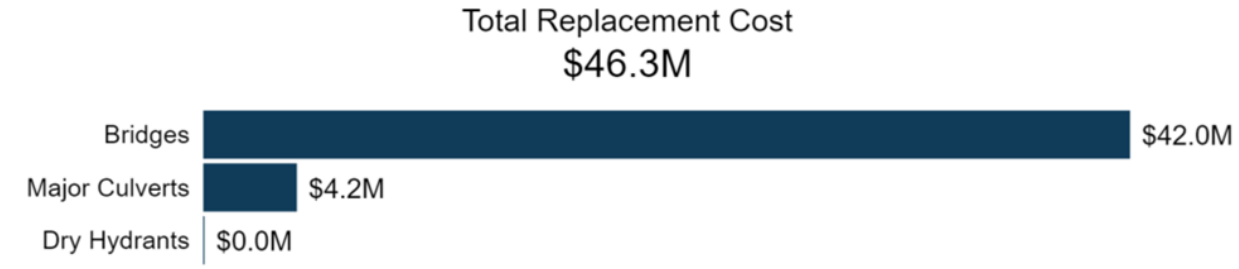
All bridges and structural culverts are subject to biennial inspections as per the Ontario Bridge Inspection Manual (OSIM).

The Township's Bridges & Culverts are maintained by the Public Works Department.

4.2.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township's Bridges & Culverts inventory.

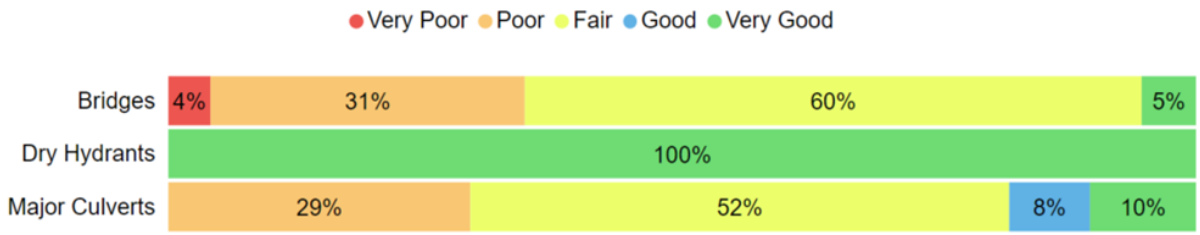
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Bridges	31	Unit Costs	$41,989,000
Dry Hydrants	2	Cost Inflation	$17,442
Major Culverts	8	Unit Costs	$4,249,383
			$46,255,825



4.2.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Bridges	71%	Good	100% Assessed
Dry Hydrants	96%	Very Good	Age-Based
Major Culverts	74%	Good	90% Assessed
			99% Assessed



Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

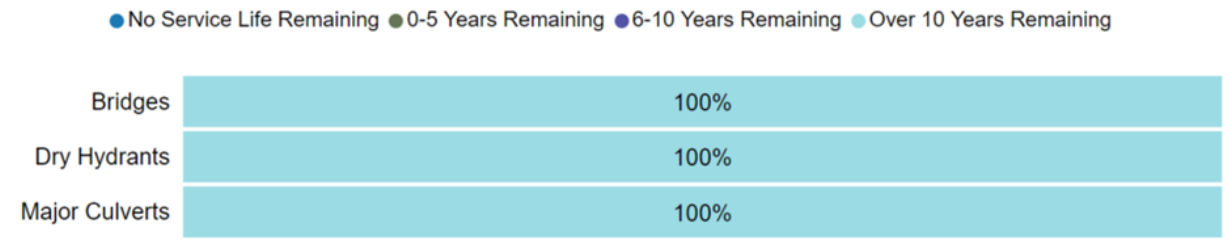
- OSIM Inspections completed every two years by a licensed bridge inspector as per Provincial regulations
- BCI ratings provided for each structure and used to inform the development of a prioritized capital programme

4.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Bridges & Culverts assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Bridges	75	50.8	53.3
Dry Hydrants	60	2.7	57.3
Major Culverts	50 - 75	43.3	41.5
		47.0	**51.2**



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.2.4 Lifecycle Management Strategy

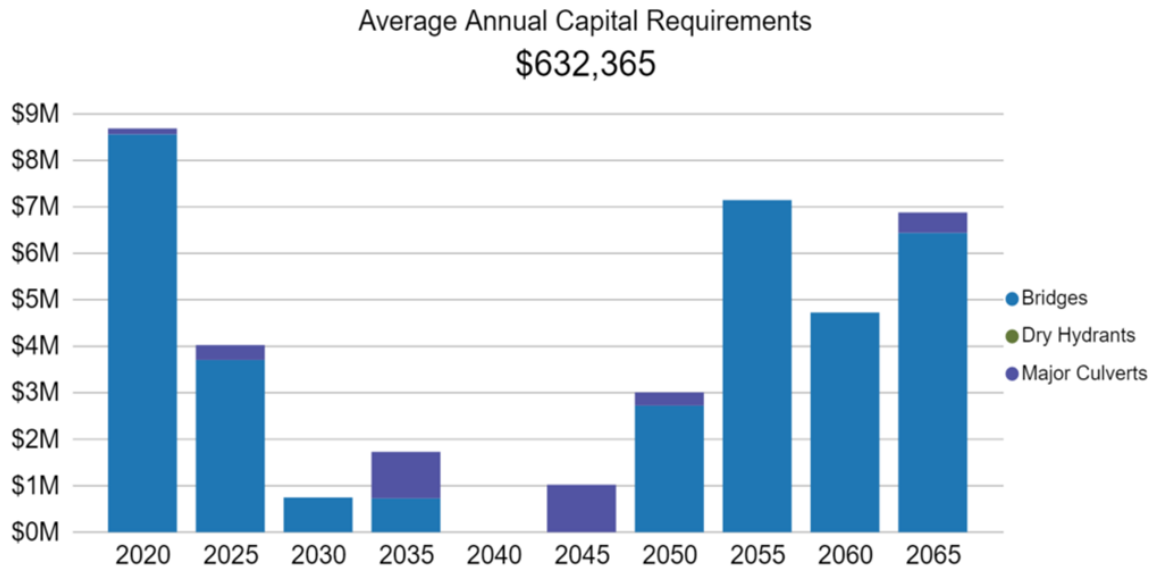
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Staff follow recommendations from OSIM inspections in addition to annual sweeping and drain cleaning programmes
	Guardrail maintenance and replacement is completed regularly
Rehabilitation /Replacement	Staff rely primarily on the list of rehabilitation and replacement events identified in OSIM inspection reports completed every 2 years

Forecasted Capital Requirements

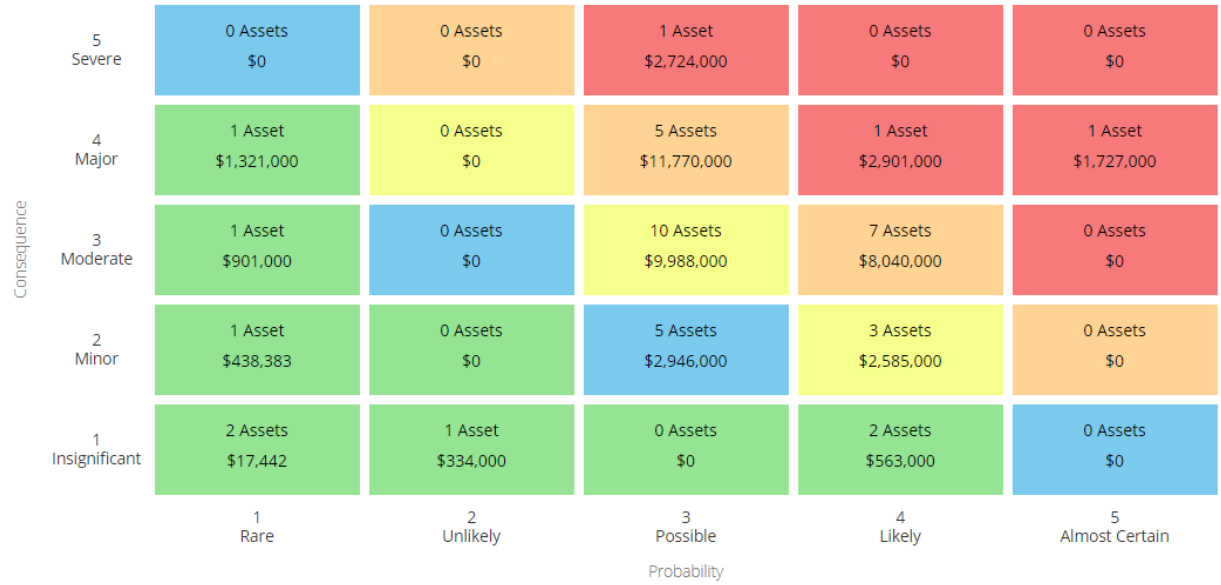
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.2.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

The identification of critical assets will allow the Township to determine appropriate risk mitigation strategies and treatment options. This may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

4.2.6 Levels of Service

The following tables identify the Township's current level of service for the Bridges & Culverts. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by the Bridges & Culverts.

Service Attribute	Qualitative Description	Current LOS (2019)
Scope	Description of the traffic that is supported by municipal bridges (e.g. heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	The Township owns 39 bridges and structural culverts that represent a critical component of the transportation network. Many bridges support the passage of diverse traffic including heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians and cyclists. Some bridges have load or dimensional restrictions which may limit the ability of larger or heavier transport vehicles. These limits are clearly posted at relevant bridge approaches.
Quality	Description or images of the condition of bridges and how this would affect use of the bridges	See Appendix B
	Description or images of the condition of culverts and how this would affect use of the culverts	See Appendix B

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Bridges & Culverts.

Service Attribute	Technical Metric	Current LOS (2019)
Scope	% of bridges and structural culverts in the Township with loading or dimensional restrictions	15%
Quality	Average bridge condition index value for bridges in the Township	71
	Average bridge condition index value for structural culverts in the Township	74
Performance	% of bridges inspected within the past two years	100%
	Capital reinvestment rate	0.71%

4.2.7 Recommendations

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Township's current levels of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning.

- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short and long-term asset management planning. See Appendix E for examples.

- Identify Proposed Levels of Service - Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.3 Stormwater System

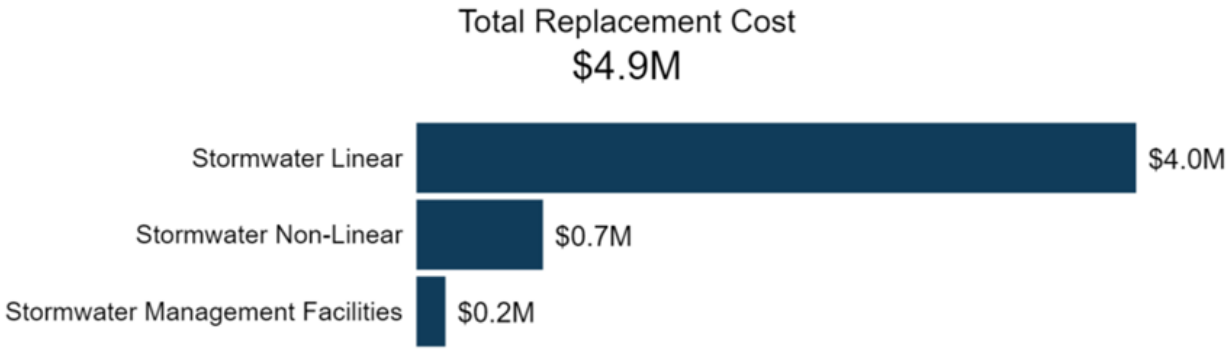
The Township is owns and maintains a Stormwater System consisting of 7.9 kilometres of storm sewer mains, 400 kilometres of open ditches, catch basins, manholes, and stormwater management facilities.

The Stormwater System is maintained throughout the year by the Public Works Department.

4.3.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township's Stormwater System inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Stormwater Linear	7,951 m	89% Unit Costs 11% Cost Inflation	$4,045,341
Stormwater Non-Linear	66	Unit Costs	$712,000
Stormwater Management Facilities	2	Cost Inflation	$164,076
Open Ditches	400 km	Not Planned for Replacement[2]	
			$4,921,417

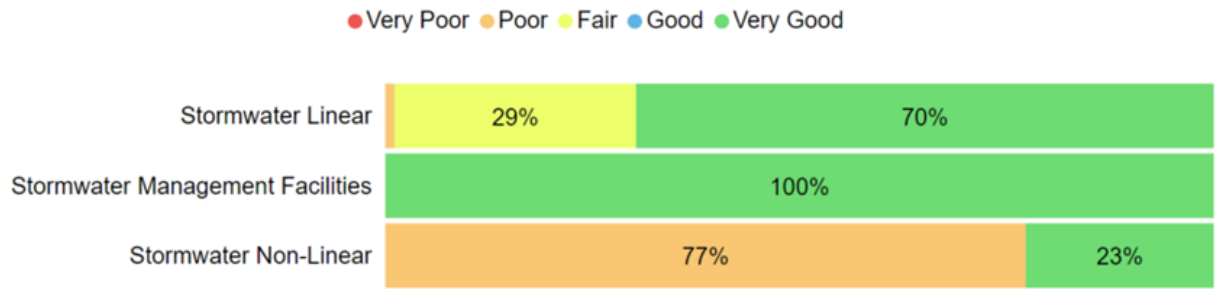


[2] Open ditches are considered a perpetual maintenance asset. There are no ongoing capital costs to rehabilitate or replace ditches.

4.3.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Stormwater Linear	78%	Good	Age-Based
Stormwater Non-Linear	42%	Fair	Age-Based
Stormwater Management Facilities	94%	Very Good	Age-Based
	73%	**Good**	**100% Age-Based**



To ensure that the Township's Stormwater System continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Stormwater System.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

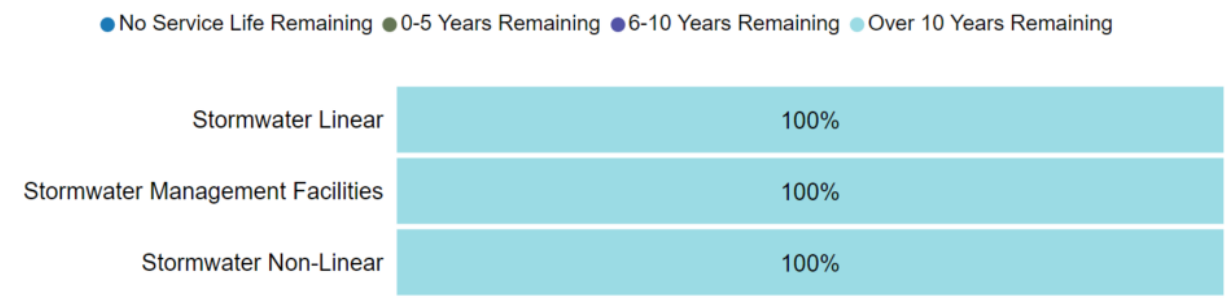
- There are few formal condition assessment strategies in place for the storm sewer network currently
- Staff hope to develop a more proactive assessment program for stormwater infrastructure soon

4.3.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Stormwater System assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Stormwater Linear	75	25.7	49.3
Stormwater Non-Linear	50	26.8	23.2
Stormwater Management Facilities	50	3.3	46.8
		26.7	**38.7**



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.3.4 Lifecycle Management Strategy

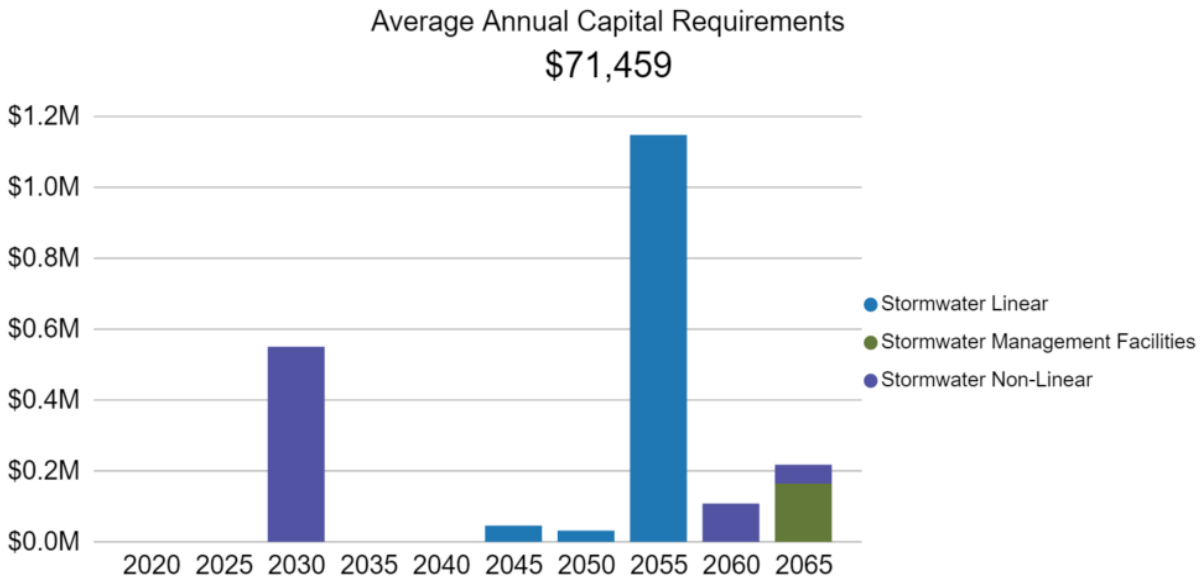
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Sewer blockages cleared on an as-needed
	Cross-drainage culverts replaced at end-of-life and typically completed in conjunction with planned road work
	Catchbasins across the entire network are cleaned annually
Replacement	Any replacement of storm sewer infrastructure Is aligned with planned road work and as needed

Forecasted Capital Requirements

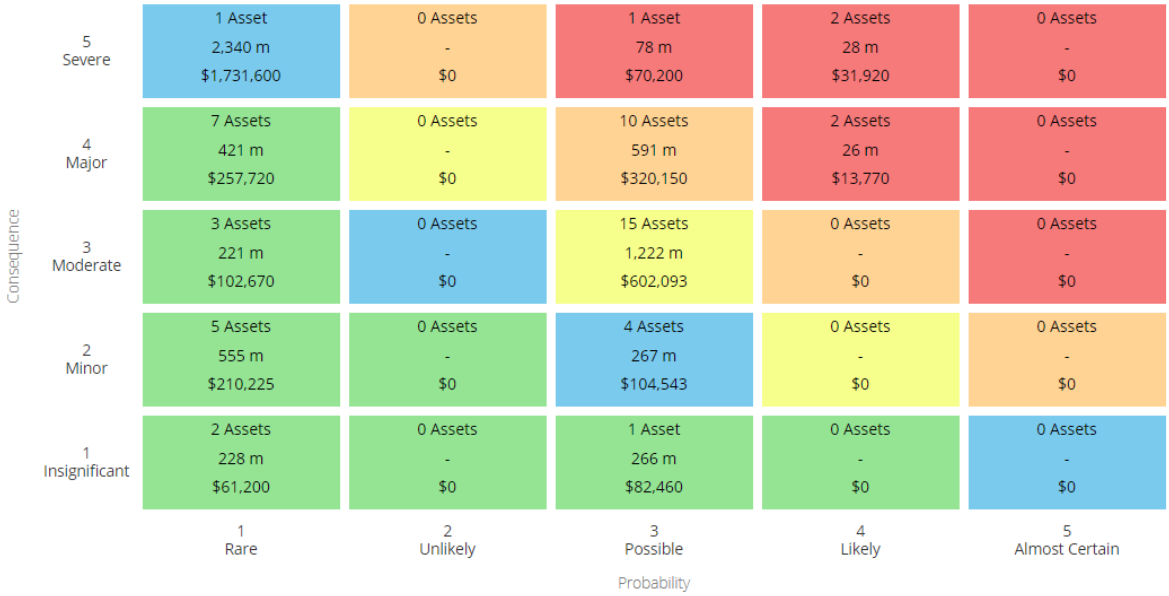
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.3.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

The identification of critical assets will allow the Township to determine appropriate risk mitigation strategies and treatment options. This may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

4.3.6 Levels of Service

The following tables identify the Township's current level of service for Stormwater System. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Stormwater System.

Service Attribute	Qualitative Description	Current LOS (2019)
Scope	Description, which may include map, of the user groups or areas of the Township that are protected from flooding, including the extent of protection provided by the municipal stormwater system	Storm sewers are generally designed to accommodate 1:5 year storm flows. The Township does not currently have hydraulic modelling or floodplain mapping to confidently determine the extent of protection provided by the municipal stormwater system

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Stormwater System.

Service Attribute	Technical Metric	Current LOS (2019)
Scope	% of properties in Township resilient to a 100-year storm	91%[3]
	% of the municipal stormwater management system resilient to a 5-year storm	99%
Performance	% of catch basins cleaned	100%
	Km of channel maintenance per year	7
	Capital reinvestment rate	2.73%

[3] All properties except those in the Coldwater settlement area (600 households) and a few along the North River

4.3.7 Recommendations

Condition Assessment Strategies

- Develop a Condition Assessment Strategy - This AMP relies entirely on age-based estimates of asset condition for the Stormwater System. The completion of regular condition assessments will build confidence in the timing and magnitude of projected capital costs. The Township should develop a formal condition assessment strategy which may include the use of CCTV cameras to inspect storm sewer mains.

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan - While short-term capital project costs may be minimal based on age-based estimates of condition, staff should start planning for future requirements to ensure that adequate reserves are available when those needs become realized.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Township's current level of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning.

- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short and long-term asset management planning. See Appendix E for examples.

- Identify Proposed Levels of Service - Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.4 Other Tax-Funded Asset Categories

This AMP primarily focuses on core asset categories as defined in O. Reg. 588/17. The following asset categories are not considered core municipal infrastructure:

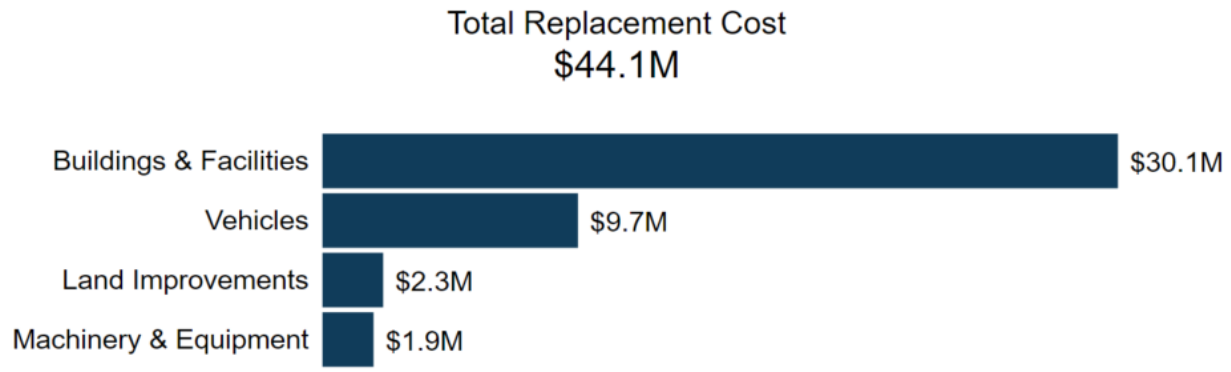
- Buildings & Facilities
- Vehicles
- Land Improvements
- Machinery & Equipment

A high-level analysis of these asset categories. For most of these assets the Township does not currently have assessed condition data available and replacement costs are based primarily on historical cost inflation.

The Township will work towards improving data quality and meeting all requirements required prior to July 1, 2023.

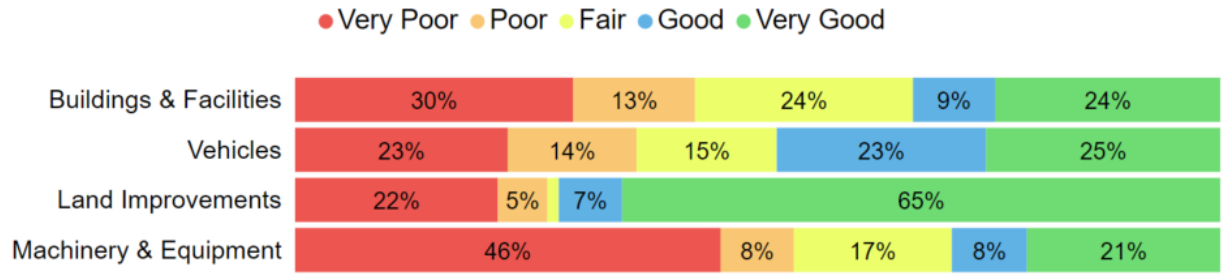
4.4.1 Asset Inventory & Replacement Cost

Asset Category	Quantity	Replacement Cost Method	Total Replacement Cost
Buildings & Facilities	24 structures (98 components)	Cost Inlflation	$30,138,914
Vehicles	55	Cost Inflation	$9,685,767
Land Improvements	57	Cost Inflation	$2,307,734
Machinery & Equipment	1,019	Cost Inflation	$1,943,011
			$44,075,426



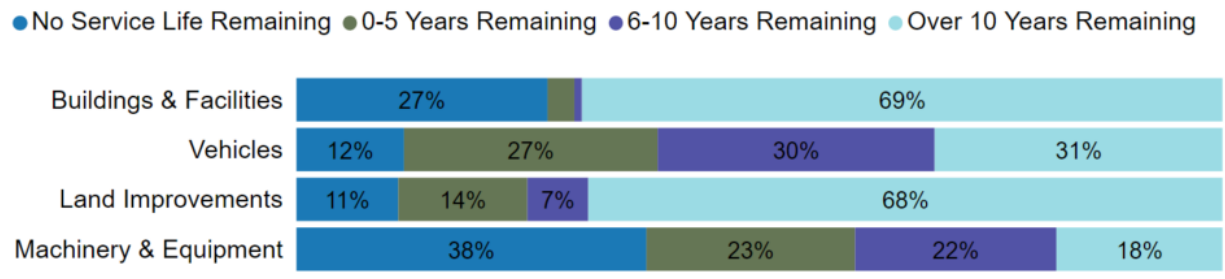
4.4.2 Asset Condition

Asset Category	Average Condition (%)	Average Condition Rating	Condition Source
Buildings & Facilities	45%	Fair	Age-based Estimates
Vehicles	51%	Fair	Age-based Estimates
Land Improvements	66%	Good	Age-based Estimates
Machinery & Equipment	37%	Poor	Age-based Estimates
	47%	**Fair**	



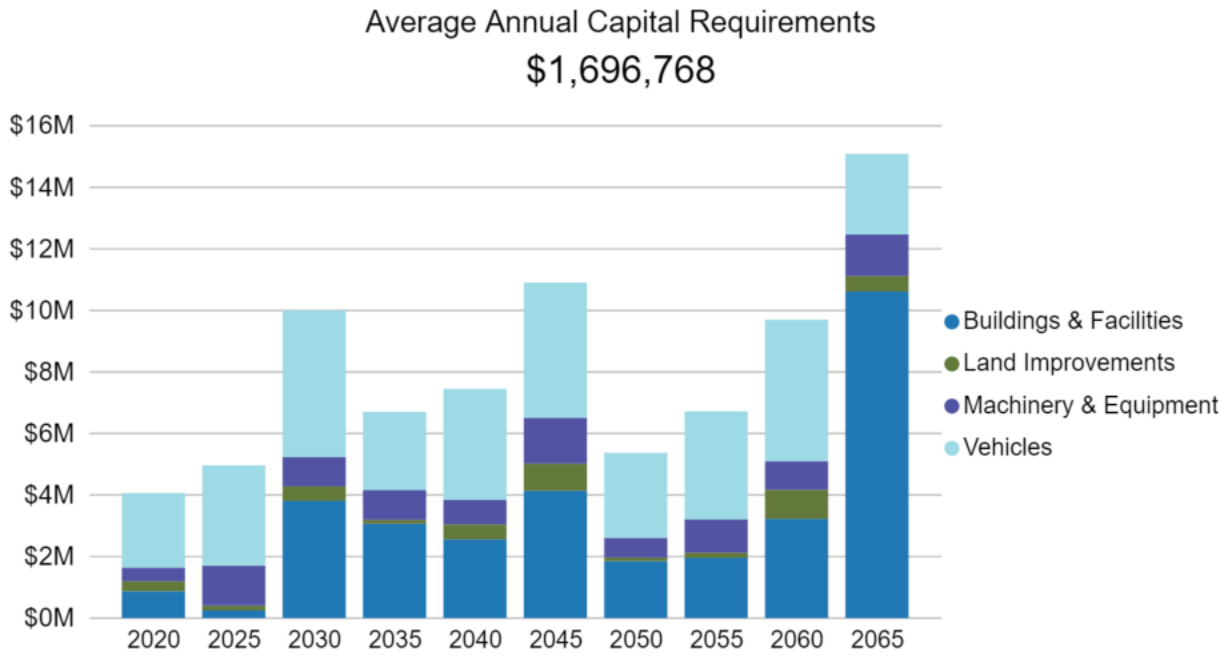
4.4.3 Estimated Useful Life & Average Age

Asset Category	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Buildings & Facilities	4-50	15.1	21.2
Vehicles	8-25	7.3	5.3
Land Improvements	5-50	6.1	19.9
Machinery & Equipment	3-30	7.1	3.3
	3-50	**9.1**	**11.3**



4.4.4 Forecasted Capital Requirements (Replacement Only)

Asset Category	Annual Capital Requirements
Buildings & Facilities	$690,554
Vehicles	$713,699
Land Improvements	$92,339
Machinery & Equipment	$200,176
	$1,696,768



5 Analysis of Rate-funded Assets

Key Insights

1. Rate-funded assets are valued at $101.9 million

2. 94% of rate-funded assets are in fair or better condition

3. The average annual capital requirement to sustain the current level of service for rate-funded assets is approximately $2.2 million

5.1 Water System

The Township of Severn owns and operates the Bass Lake Woodlands, Coldwater, Sandcastle Estates, Severn Estates, Washago and Westshore water treatment and distribution systems.

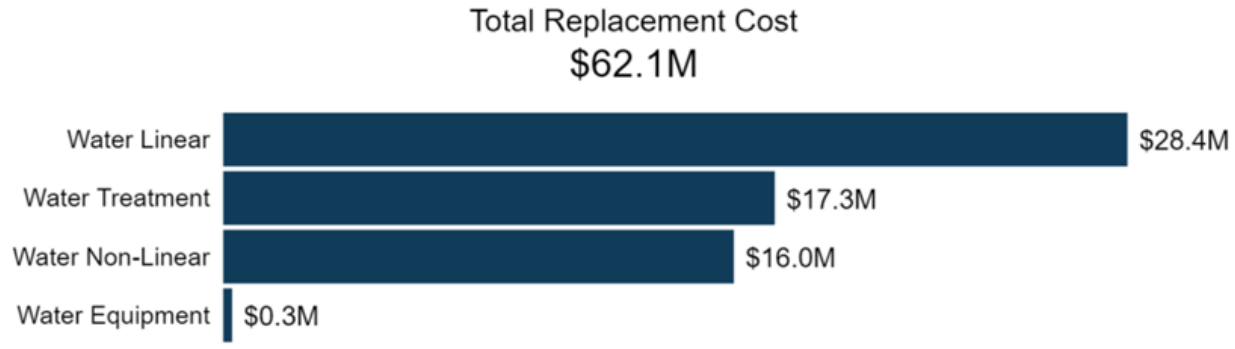
The Utilities Department, under the direction of the Director of Public Works, is committed to ensure a consistent supply of safe, high quality drinking water, and to maintain and continuously improve its quality management system and to meet all applicable regulations.

Key responsibilities of the department include water supply, treatment and distribution operations & maintenance, water meter distribution and customer service, systems operations & maintenance, and regulatory compliance.

5.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township's Water System inventory.

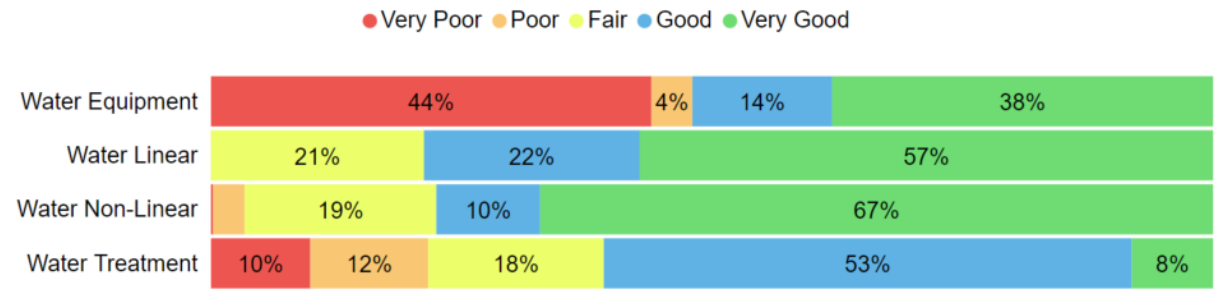
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Water Equipment	17	Cost Inflation	$283,859
Water Linear	60.5 km	Unit Costs	$28,402,885
Water Non-Linear	5,823	Unit Costs	$16,041,180
Water Treatment	6 Plants (313 components)	Unit Costs	$17,326,540
			$62,054,464



5.1.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Water Equipment	47%	Fair	Age-Based
Water Linear	75%	Good	Age-Based
Water Non-Linear	74%	Good	Age-Based
Water Treatment	56%	Fair	Age-Based
	69%	**Good**	**100% Age-Based**



To ensure that the Township's Water System continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Water System.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

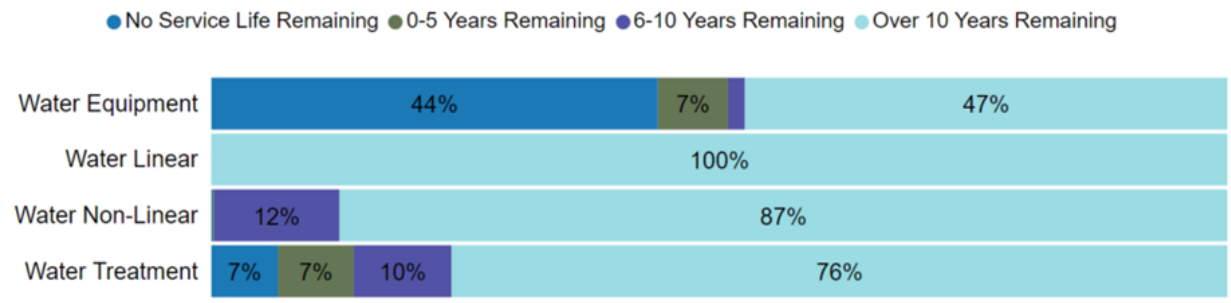
- No formal condition assessment program in place for the Water System, although the entire system is monitored closely though SCADA computer system

5.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Water System assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Water Equipment	5 - 15	6.7	3.1
Water Linear	75	20.0	55.0
Water Non-Linear	10 - 75	14.8	42.0
Water Treatment	2 - 75	11.3	7.1
		14.1	**27.8**



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

5.1.4 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Township's current lifecycle management strategy:

Activity Type	Description of Current Strategy
Maintenance	Water main swabbing, flushing, and valve exercising is completed on a regular basis across the entire network; targeted areas are flushed more regularly to address known operational issues
Rehabilitation /Replacement	Not much rehabilitation of linear water systems is required, and operational issues are addressed on a case-by-case basis
	There is still a significant amount of new infrastructure in the water network and most capital planning has been focused on future growth instead of the replacement of existing water infrastructure.
	There is a 10-year capital plan in place for water network infrastructure

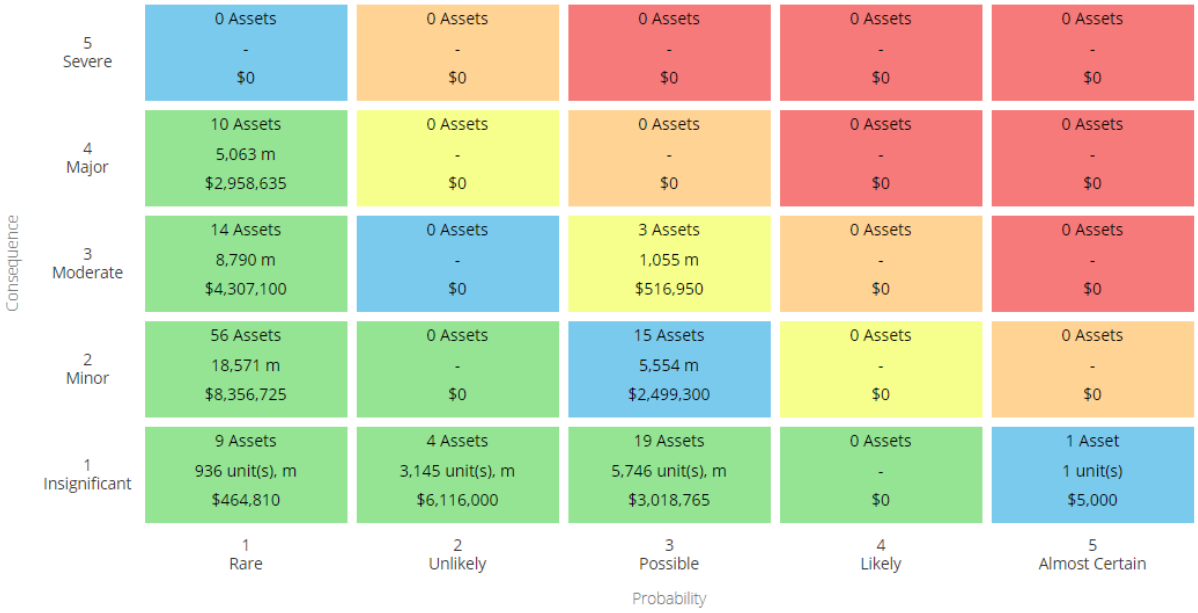
Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.

The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

5.1.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

The identification of critical assets will allow the Township to determine appropriate risk mitigation strategies and treatment options. This may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

5.1.6 Levels of Service

The following tables identify the Township's current level of service for Water System. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Water System.

Service Attribute	Qualitative Description	Current LOS (2019)
Scope	Description, which may include maps, of the user groups or areas of the Township that are connected to the municipal water system	There are 6 separate communities serviced by the municipal water system including: Bass Lake, Coldwater, Sandcastle Estates, Severn Estates, Washago, and Westshore
	Description, which may include maps, of the user groups or areas of the Township that have fire flow	All areas of the municipality that are connected to the municipal water system have access to adequate fire flow
Reliability	Description of boil water advisories and service interruptions	A boil water advisory was issued on May 29, 2019 for Brick Pond Road to John's Street to Early's Court in Coldwater. Advisories are issued when there is a risk of contamination to the drinking water supply.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Water System.

Service Attribute	Technical Metric	Current LOS (2019)
Scope	% of properties connected to the municipal water system	25%
	% of properties where fire flow is available	22%
Reliability	# of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0.001
	# of connection-days per year where water is not available due to water main breaks compared to the total number of properties connected to the municipal water system	0.0003[4]
Performance	% of hydrants inspected	99%
	Capital re-investment rate	0.62%

[4] 1-2 breaks per year is typical

5.1.7 Recommendations

Asset Inventory/Data Refinement

- Align Financial/AM Inventory Data – This AMP newly developed inventory data for the Water System that was developed by the Public Works Department. It was determined that this new inventory was more accurate and reliable than the previous inventory that is in CityWide and is used for financial reporting requirements. The Township should evaluate next steps to align the asset inventories used for financial reporting and asset management planning.

Condition Assessment Strategies

- Develop a Condition Assessment Strategy - This AMP relies on age-based condition data for almost all water network infrastructure. The development of a network-wide condition assessment program will provide greater reliability in the accuracy of the current condition data.

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan - Similar to other sub-surface infrastructure, most of the Water System is comprised of relatively new infrastructure. The average age of linear assets is only 20 years old compared to an estimated useful life of 75 years. As a result, short-term capital costs are forecasted to be relatively low but steadily increase over the next 30 years. To ensure that adequate revenues are available to meet future rehabilitation and replacement requirements a long-term capital plan and reserve funding strategy should be developed.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Township's current level of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning.

- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short and long-term asset management planning. See Appendix E for examples.

- Identify Proposed Levels of Service - Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

5.2 Wastewater System

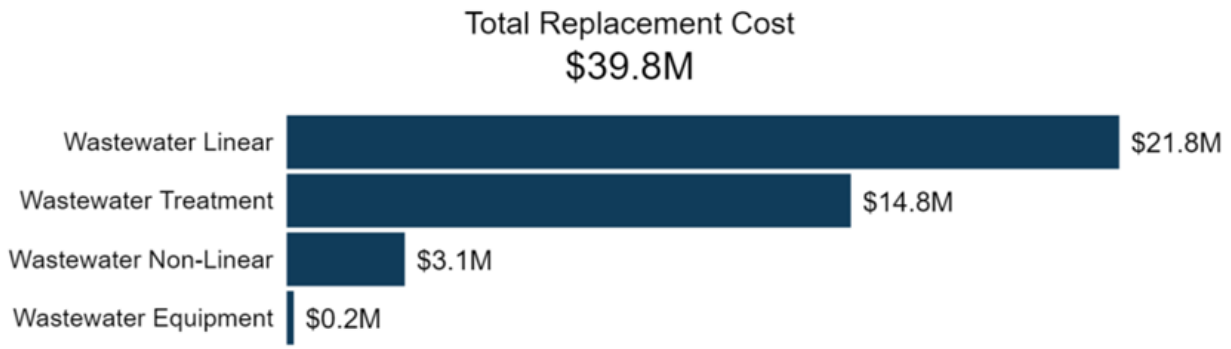
The Utilities Department, under the direction of the Director of Public Works, operates and maintains wastewater collection and treatment facilities in Washago, Westshore, and Coldwater.

Key responsibilities of the department include wastewater collection and treatment, systems operations & maintenance, and regulatory compliance.

5.2.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township's Wastewater System inventory.

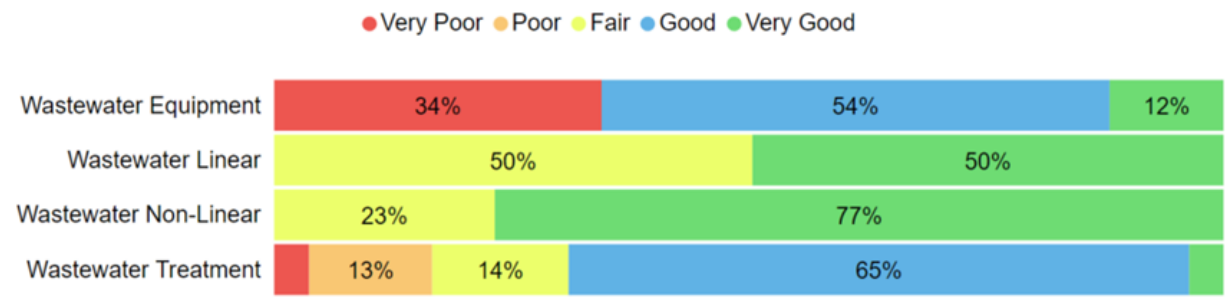
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Wastewater Equipment	12	Cost Inflation	$190,015
Wastewater Linear	38.8 km	Unit Costs	$21,793,279
Wastewater Non-Linear	258	Unit Costs	$3,096,000
Wastewater Treatment	157	91% Unit Costs 9% Cost Inflation	$14,769,016
			$39,848,310



5.2.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Wastewater Equipment	52%	Fair	Age-Based
Wastewater Linear	68%	Good	Age-Based
Wastewater Non-Linear	74%	Good	Age-Based
Wastewater Treatment	61%	Good	Age-Based
	66%	**Good**	**100% Age-Based**



To ensure that the Township's Wastewater System continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Wastewater System.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Sewer flushing and video program is in place and completed on a 5-year cycle across the entire network

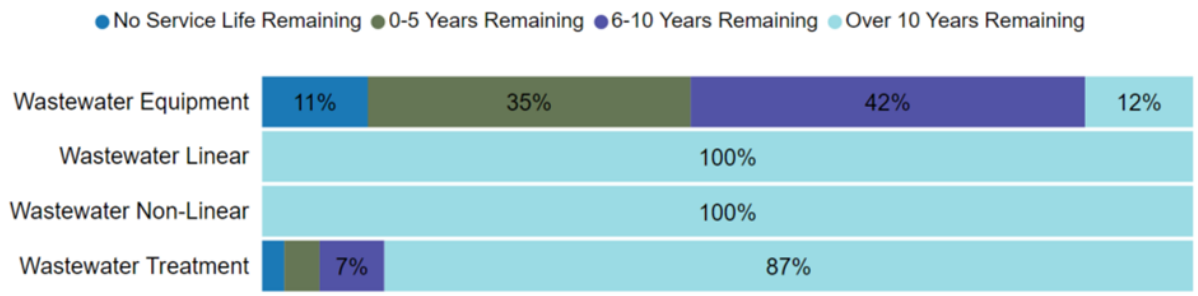
- Staff receive video footage of inspected mains and identification of noted deficiencies to inform operating and capital plans

5.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Wastewater System assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Wastewater Equipment	3.5 - 15	6.2	2.8
Wastewater Linear	75	25.1	49.9
Wastewater Non-Linear	75	24.6	50.4
Wastewater Treatment	3 - 75	12.8	10.9
		18.6	**30.1**



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

5.2.4 Lifecycle Management Strategy

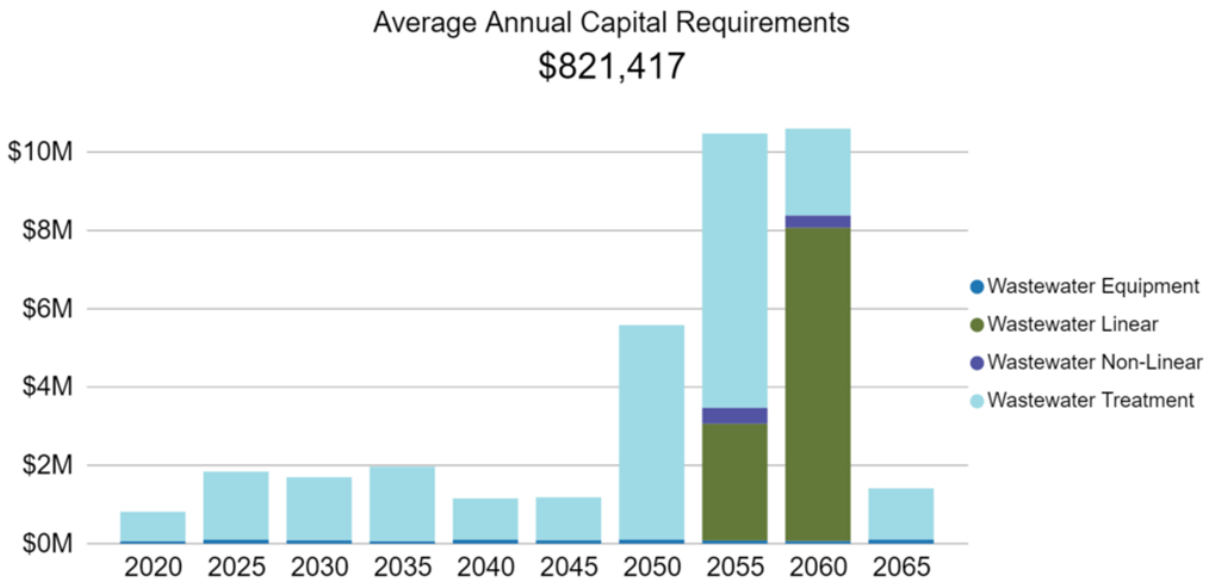
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	A portion of the linear wastewater system is flushed and CCTV inspected annually with the entire network completed every 5 years
Rehabilitation	Non-structural main re-lining is completed on an as-needed basis
Replacement	Given the relatively young age of most wastewater infrastructure there is not much replacement projected over the next several years
	10-year capital plan has been completed for the wastewater system

Forecasted Capital Requirements

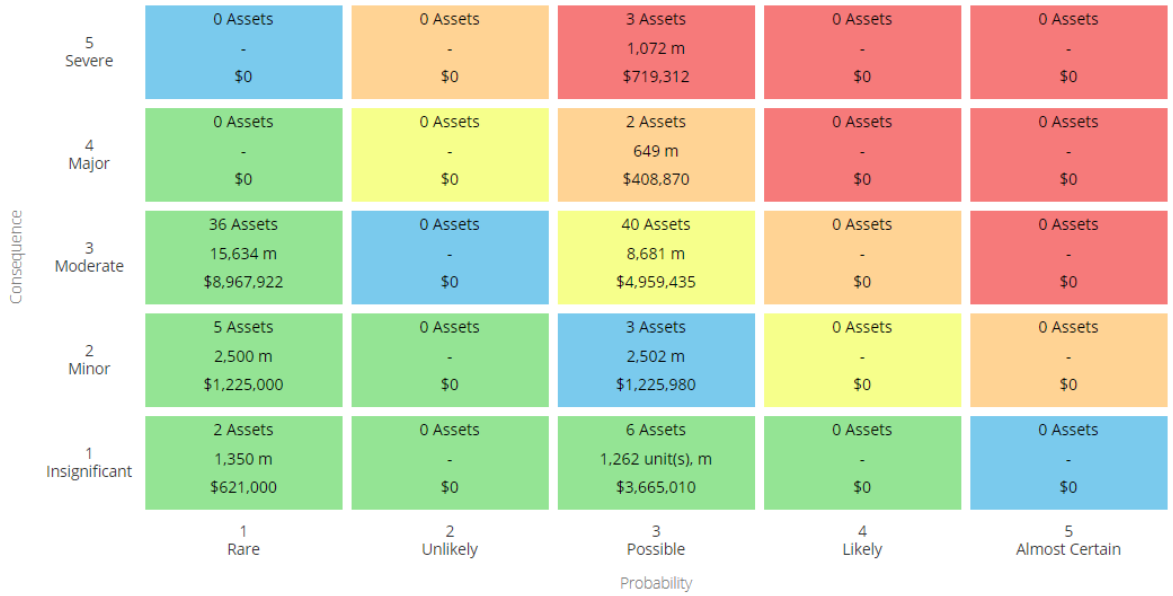
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

5.2.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

The identification of critical assets will allow the Township to determine appropriate risk mitigation strategies and treatment options. This may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

5.2.6 Levels of Service

The following tables identify the Township's current level of service for Wastewater System. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Wastewater System.

Service Attribute	Qualitative Description	Current LOS (2019)
Scope	Description, which may include maps, of the user groups or areas of the Township that are connected to the municipal wastewater system	There are 3 separate communities serviced by the municipal wastewater system including: Westshore, Washago and Coldwater
Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes	The Township does not own any combined sewers
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	The Township does not own any combined sewers
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Stormwater can enter sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its designed capacity. In some cases, this can cause water and/or sewage to overflow backup into homes. The disconnection of weeping tiles from sanitary mains and the use of sump pumps and pits

Service Attribute	Qualitative Description	Current LOS (2019)
		directing storm water to the storm drain system can help to reduce the chance of this occurring.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The Township's Engineering Design Criteria outlines design requirements for the sanitary drainage system. Specifications regarding the class of pipe and the type of bedding to be used in construction have been determined to minimize stormwater infiltration.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Wastewater Systems Effluent Regulation, as established under the Fisheries Act, identifies mandatory minimum effluent quality standards. The Township follows all requirements for monitoring, record-keeping and toxicity testing as specified.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Wastewater System.

Service Attribute	Technical Metric	Current LOS (2019)
Scope	% of properties connected to the municipal wastewater system	22%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	0.003
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0.0018

	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	0
Performance	% of sewer network length CCTV inspected	17%
	Capital re-investment rate	0.43%

5.2.7 Recommendations

Asset Inventory/Data Refinement

- Align Financial/AM Inventory Data – This AMP newly developed inventory data for the Wastewater System that was developed by the Public Works Department. It was determined that this new inventory was more accurate and reliable than the previous inventory that is in CityWide and is used for financial reporting requirements. The Township should evaluate next steps to align the asset inventories used for financial reporting and asset management planning.

Condition Assessment Strategies

- Develop a Condition Assessment Strategy - This AMP relies on age-based condition data for all Wastewater System infrastructure. The development of a network-wide condition assessment program that may include a regular cycle of CCTV inspections will provide greater reliability in the accuracy of current condition data.

Lifecycle Management Strategies

- Develop a Long-term Capital Plan - Similar to other sub-surface infrastructure, most of the Wastewater System is comprised of relatively new infrastructure. The average age of linear assets is only 25 years old compared to an estimated useful life of 75 years. As a result, short-term capital costs are forecasted to be relatively low but steadily increase over the next 30 years. To ensure that adequate revenues are available to meet future rehabilitation and replacement requirements a long-term capital plan and reserve funding strategy should be developed.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Township's current level of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning.

- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short and long-term asset management planning. See Appendix E for examples.

- Identify Proposed Levels of Service - Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

6 Impacts of Growth

Key Insights

1. Understanding the key drivers of growth and demand will allow the Township to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure

2. The costs of growth should be considered in long-term funding strategies that are designed to maintain the current level of service

6.1 Description of Growth Assumptions

The demand for infrastructure and services will change over time based on a combination of internal and external factors. Understanding the key drivers of growth and demand will allow the Township to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

6.1.1 Development Charges Background Study – June 2019

The Township recently completed a Development Charges Background Study in accordance with the methodology required under the Development Charges Act, 1997. This study includes a summary of both residential and non-residential growth as follows:

Measure	10 Year	13 Year	Urban Westshore	Urban Coldwater	Urban Severn Estates	Rural Area
	2019-2028	2019-2031	2019-Buildout	2019-Buildout	2019-Buildout	2019-Buildout
(Net) Population Increase	2,172	2,612	3,556	337	10	1,495
Residential Unit Increase	960	1,140	293	155	4	496
Non-Residential Gross Floor Area Increase (sq.ft.)	215,100	239,600	374,700	59,700	-	79,500

6.2 Impact of Growth on Lifecycle Activities

By July 1, 2024 the Township's asset management plan must include a discussion of how the assumptions regarding future changes in population and economic activity informed the preparation of the lifecycle management and financial strategy.

Planning for forecasted population growth may require the expansion of existing infrastructure and services. As growth-related assets are constructed or acquired, they should be integrated into the Township's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the Township will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

7 Financial Strategy

Key Insights

1. The Township is committing approximately $3.8 million towards capital projects per year from sustainable revenue sources

2. Given the annual capital requirement of $8.7 million, there is currently a funding gap of $4.9 million annually

3. For tax-funded assets, we recommend increasing tax revenues by 2.4% each year for the next 15 years to achieve a sustainable level of funding

4. For the Wastewater System, we recommend increasing rate revenues by 3.3% annually for the next 15 years to achieve a sustainable level of funding

5. For the Water System, we recommend increasing rate revenues by 4.1% annually for the next 15 years to achieve a sustainable level of funding

7.1 Financial Strategy Overview

For an asset management plan (AMP) to be effective and meaningful, it must be integrated with a long-term financial plan (LTFP). The development of a comprehensive LTFP for the Township of Severn would help identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

This report serves as a starting point for initial financial planning, specific for existing capital assets, by presenting several scenarios for consideration and culminating with final recommendations. As outlined below, the scenarios presented model different combinations of the following.

1. The financial requirements for:
    a. Existing assets
    b. Existing service levels
    c. Requirements of changes in service levels (none identified in this plan)
    d. Requirements of anticipated growth (none identified for this plan)

2. Use of traditional sources of municipal funds:[5]
    a. Tax levies
    b. User fees
    c. Reserves
    d. Debt
    e. Development charges

3. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods

4. Use of Senior Government Funds:
    a. Government transfers (e.g. Gas tax)
    b. Annual grants

Note: Periodic grants are normally not included due to Provincial requirements for firm commitments. However, if moving a specific project forward is wholly dependent on receiving a one-time grant, the replacement cost included in the financial strategy is the net of such grant being received.

If the financial plan component results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the Province may evaluate a Township's approach to the following:

[5] The traditional funding sources modeled without consideration for growth or change in policies.

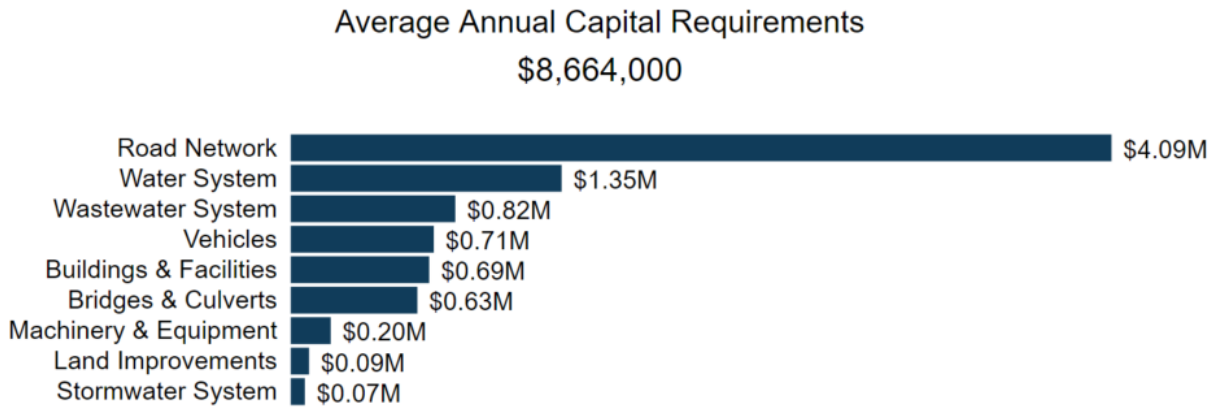
1. consideration given to revising service levels downward; and

2. asset management and financial strategies considered. For example:
    a. If a zero-debt policy is in place, is it warranted? If not the use of debt should be considered.
    b. Do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

7.1.1 Annual Requirements & Capital Funding

Annual Requirements

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability (as defined for the purpose of this AMP). In total, based on the approach of this AMP, the Township may require approximately $8.6 million annually to address capital expenditures (CapEx) for the assets included in this AMP.



For most asset categories the annual requirement has been calculated based on a "replacement only" scenario, in which capital costs are only incurred at the construction and replacement of each asset.

However, for the Road Network, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal of the Township's roads and sanitary sewer mains respectively. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares two scenarios for the Road Network:

1. Replacement Only Scenario: Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life.

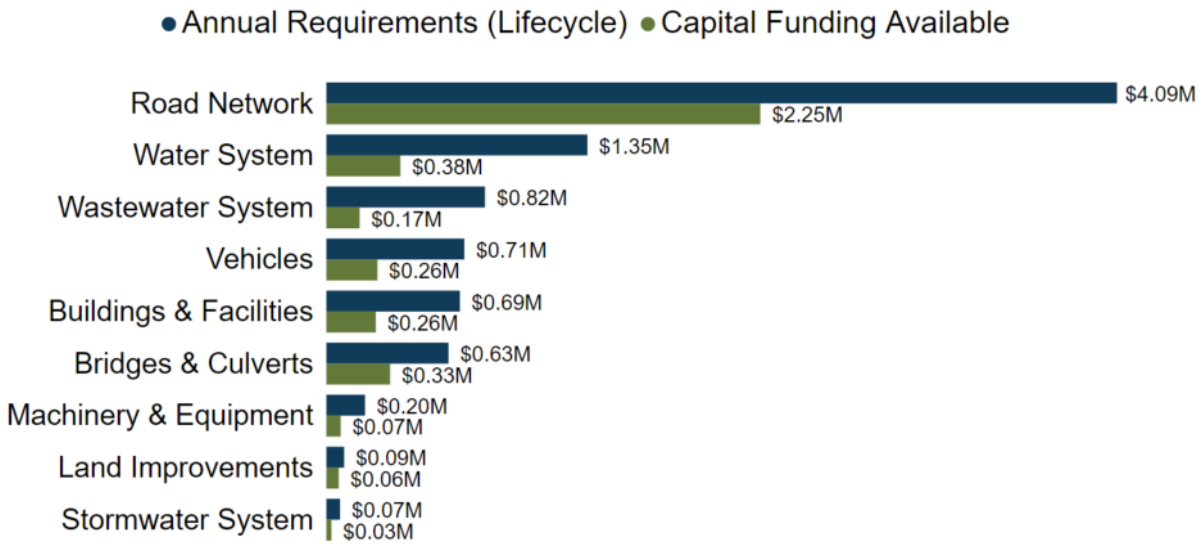
2. **Lifecycle Strategy Scenario**: Based on the assumption that lifecycle activities are performed at strategic intervals to extend the service life of assets until replacement is required.

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$4,745,000	$4,092,000	**$653,000**

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $653,000 for the Road Network. As the lifecycle strategy scenario represents the lowest cost option available to the Township, we have used these annual requirements in the development of the financial strategy.

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $3.8 million towards capital projects per year. Given the annual capital requirement of $8.7 million, there is currently a funding gap of $4.9 million annually.



7.2 Funding Objective

We have developed a scenario that would enable Severn to achieve full funding within 5 to 20 years for the following assets:

1. **Tax Funded Assets:** Bridges & Culverts, Buildings & Facilities, Land Improvements, Machinery & Equipment, Road Network, Vehicles, Stormwater System
2. **Rate-Funded Assets:** Water System, Wastewater System

Note: For the purposes of this AMP, we have excluded gravel roads since they are a perpetual maintenance asset and end of life replacement calculations do not normally apply. If gravel roads are maintained properly, they can theoretically have a limitless service life.

7.3 Financial Profile: Tax Funded Assets

7.3.1 Current Funding Position

The following tables show, by asset category, Severn's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by taxes.

Asset Category	Avg. Annual Requirement	Annual Funding Available							Annual Deficit
		Taxes	Gas Tax	Simcoe County Trails Grant	TCCP Grant	Ministry of Natural Resources Grant	OMPF Funding	Total Available	
Bridges & Culverts	$632,000	$124,000	-	-	$96,000	-	$110,000	$330,000	$302,000
Buildings & Facilities	$691,000	$136,000	-	-	-	-	$120,000	$256,000	$435,000
Land Improvements	$92,000	$18,000	-	$30,000	-	-	$16,000	$64,000	$28,000
Machinery & Equipment	$200,000	$39,000	-	-	-	-	$35,000	$74,000	$126,000
Road Network	$4,092,000	$804,000	$409,000	-	-	$320,000	$713,000	$2,246,000	$1,846,000
Vehicles	$714,000	$140,000	-	-	-	-	$124,000	$264,000	$450,000
Stormwater System	$71,000	$14,000	-	-	-	-	$12,000	$26,000	$45,000
	$6,492,000	**$1,275,000**	**$409,000**	**$30,000**	**$96,000**	**$320,000**	**$1,130,000**	**$3,260,000**	**$3,232,000**

The average annual investment requirement for the above categories is $6,492,000. Annual revenue currently allocated to these assets for capital purposes is $3,260,000 leaving an annual deficit of $3,232,000. Put differently, these infrastructure categories are currently funded at 50.2% of their long-term requirements.

7.3.2 Full Funding Requirements

In 2020, the Township of Severn has budgeted annual tax revenues of $9,003,000. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Asset Category	Tax Change Required for Full Funding
Bridges & Culverts	3.4%
Buildings & Facilities	4.8%
Land Improvements	0.3%
Machinery & Equipment	1.4%
Road Network	20.5%
Vehicles	5.0%
Stormwater System	0.5%
	35.9%

In the following table we present several scenarios to address the infrastructure deficit over a phase-in period of up to 20 years:

	Without Capturing Changes			
	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	$3,232,000	$3,232,000	$3,232,000	$3,232,000
Tax Increase Required	35.9%	35.9%	35.9%	35.9%
Annually:	**7.2%**	**3.6%**	**2.4%**	**1.8%**

7.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 15-year option. This involves full funding being achieved over 15 years by:

a) increasing tax revenues dedicated to CapEx by approx. 2.4% each year for the next fifteen years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP; and

b) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes and key assumptions:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. Based on best practices, this periodic funding should not be incorporated into an AMP unless there are firm commitments in place. [6]

2. At the request of the Township's management, government transfers have been excluded from the forecasting in the model and the financial strategy recommendations:
    a. External funding sources dedicated for Operations are excluded from any forecasting to meet CapEx requirements, and
    b. Ontario Community Infrastructure Fund (OCIF) of $340K per annum.

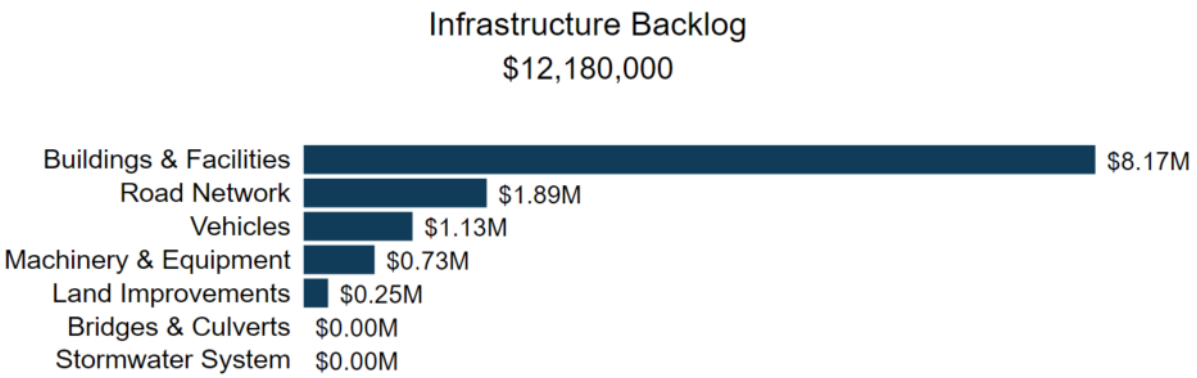
3. At the request of the Township's management, debt financing for CapEx and the associated annual principal and interest payments (as disclosed in the audited financial statements) has been excluded from the forecasting and the financial strategy recommendations.

[6] The Township should take advantage of all available grant funding programs and transfers from other levels of government. The financial strategy within this AMP has only included the known capital funding as provided by the finance department, and there is an expectation the Township should be eligible for additional capital funding from senior governments within the next fifteen years that could reduce the tax burden. Depending on the outcome of this review there may be changes that impact its availability.

4. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes may be challenging. However, a lack of intentional asset funding planning today may have even greater consequences in terms of infrastructure failure.

Although this option achieves full funding on an annual basis in 15 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding envelope available.

Current data shows a pent-up investment demand for various service areas including the Buildings & Facilities and the Road Network. The most significant areas of capital investment requirements that are primarily tax funded are:



Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

7.4 Financial Profile: Rate Funded Assets

7.4.1 Current Funding Position

The following tables show, by asset category, Severn's average annual CapEx requirements, current funding positions, and the annual deficit across the rate funded utilities.

Asset Category	Avg. Annual Requirement	Annual Funding Available			Annual Deficit
		Rates	To Oper	Total Available	
Wastewater System	$821,000	$1,303,000	-$1,131,000	$172,000	$649,000
Water System	$1,351,000	$1,573,000	-$1,190,000	$383,000	$968,000
	$2,172,000	**$2,876,000**	**-$2,321,000**	**$555,000**	**$1,617,000**

The average annual investment requirement for the above categories is $2,172,000. Annual revenue currently allocated to these assets for capital purposes is $555,000 leaving an annual deficit of $1,617,000. Put differently, these infrastructure categories are currently funded at 25.6% of their long-term requirements.

7.4.2 Full Funding Requirements

In 2020, Severn had annual sanitary revenues of $1,303,000, annual water revenues of $1,351,000. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following changes over time:

Asset Category	Tax Change Required for Full Funding
Wastewater System	49.8%
Water System	61.5%

In the following table we present several scenarios to address the infrastructure deficit over a phase-in period of up to 20 years:

	Water System				Sanitary Sewer System			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	$968,000	$968,000	$968,000	$968,000	$649,000	$649,000	$649,000	$649,000
Tax Increase Required	61.5%	61.5%	61.5%	61.5%	49.8%	49.8%	49.8%	49.8%
Annually:	**12.3%**	**6.2%**	**4.1%**	**3.1%**	**10.0%**	**5.0%**	**3.3%**	**2.5%**

7.4.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 15-year option for the CapEx required on the utility rate funded assets. This involves full funding being achieved over the next 15 years by:

a) increasing rates, and revenues dedicated for CapEx purposes, by 4.1% for water services and 3.3% for wastewater services each year for the next fifteen years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP, and

b) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

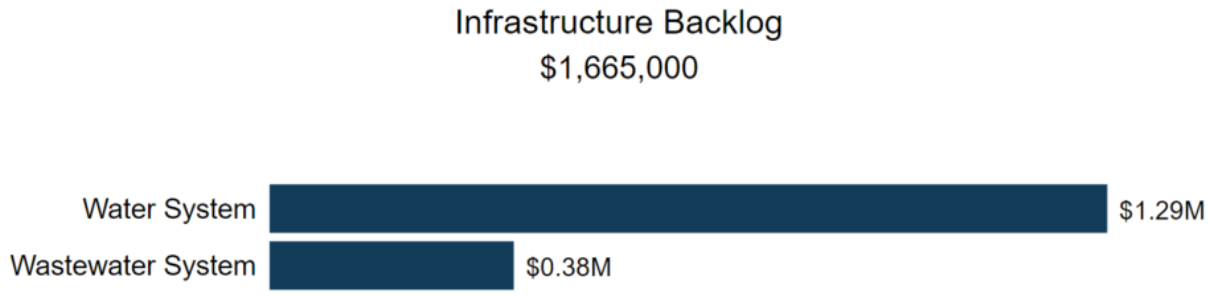
Notes and key assumptions:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. Based on best practices, this periodic funding should not be incorporated into an AMP unless there are firm commitments in place.

2. At the request of the Township's management, debt financing for CapEx and the associated annual principal and interest payments (as disclosed in the audited financial statements) has been excluded from the forecasting and financial strategy recommendations:
    a. Specific to utilities, $7M approx. Debt from Ontario Strategic Infrastructure Financing Authority and the annual payments. The financial strategy model does NOT account for the debt servicing costs of $710K+ per annum. Therefore, reallocating the debt cost reductions (if, and when realized) to the infrastructure deficit has not been considered as an option in the financial strategy.

3. We realize that raising user rates by the amounts recommended above for infrastructure purposes may be challenging. However, a lack of intentional asset funding planning today may have even greater consequences in terms of infrastructure failure.

Although this option achieves full funding on an annual basis in 15 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a total pent-up investment demand (infrastructure backlog) of $1.7 million for all rate-funded assets.



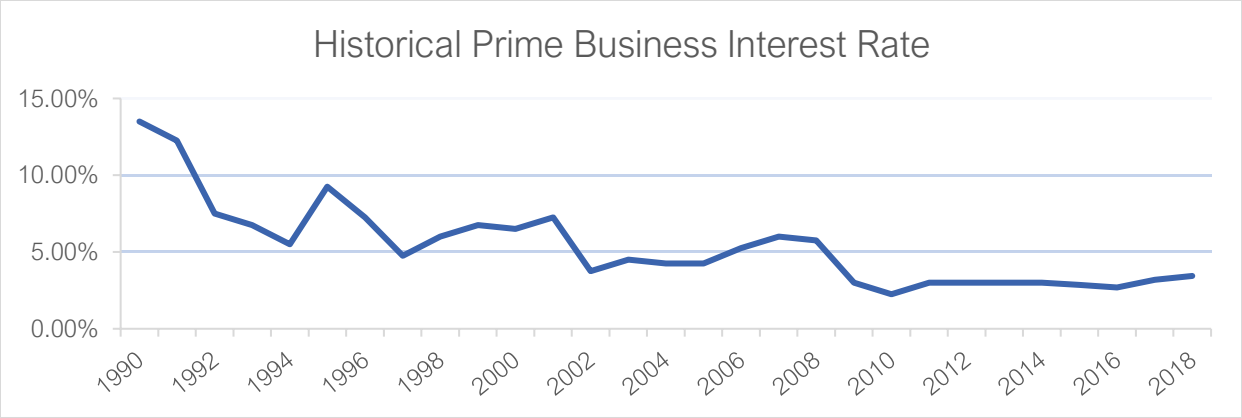
Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

7.5 Use of Debt

For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a $1M project financed at 3.0%[7] over 15 years would result in a 26% premium or $260,000 of increased costs due to interest payments. For simplicity, the table does not consider the time value of money or the effect of inflation on delayed projects.

Interest Rate	Number of Years Financed					
	5	10	15	20	25	30
7.0%	22%	42%	65%	89%	115%	142%
6.5%	20%	39%	60%	82%	105%	130%
6.0%	19%	36%	54%	74%	96%	118%
5.5%	17%	33%	49%	67%	86%	106%
5.0%	15%	30%	45%	60%	77%	95%
4.5%	14%	26%	40%	54%	69%	84%
4.0%	12%	23%	35%	47%	60%	73%
3.5%	11%	20%	30%	41%	52%	63%
3.0%	9%	17%	26%	34%	44%	53%
2.5%	8%	14%	21%	28%	36%	43%
2.0%	6%	11%	17%	22%	28%	34%
1.5%	5%	8%	12%	16%	21%	25%
1.0%	3%	6%	8%	11%	14%	16%
0.5%	2%	3%	4%	5%	7%	8%
0.0%	0%	0%	0%	0%	0%	0%

It should be noted that current interest rates are near all-time lows. Sustainable funding models that include debt need to incorporate the risk of rising interest rates. The following graph shows where historical lending rates have been:



[7] Current municipal Infrastructure Ontario rates for 15-year money is 3.2%.

A change in 15-year rates from 3% to 6% would change the premium from 26% to 54%. Such a change would have a significant impact on a financial plan.

The revenue options outlined in this plan allow Severn to fully fund its long-term infrastructure requirements without the use of debt.

7.6 Use of Reserves

7.6.1 Available Reserves

Reserves play a critical role in long-term financial planning. The benefits of having reserves available for infrastructure planning include:

a) the ability to stabilize tax rates when dealing with variable and sometimes uncontrollable factors
b) financing one-time or short-term investments
c) accumulating the funding for significant future infrastructure investments
d) managing the use of debt
e) normalizing infrastructure funding requirement

By asset category, the table below outlines the details of the reserves currently available to Severn.

Asset Category	Balance at December 31, 2019
Bridges & Culverts	$1,263,000
Buildings & Facilities	$2,377,000
Land Improvements	$91,000
Machinery & Equipment	$653,000
Road Network	$6,222,000
Vehicles	$3,431,000
Stormwater System	$91,000
Total Tax Funded:	**$14,128,000**
Water System	$3,471,000
Wastewater System	$1,480,000
Total Rate Funded:	**$4,951,000**

There is considerable debate in the municipal sector as to the appropriate level of reserves that a Township should have on hand. There is no clear guideline that has gained wide acceptance. Factors that municipalities should consider when determining their capital reserve requirements include:

a) breadth of services provided
b) age and condition of infrastructure

c) use and level of debt
d) economic conditions and outlook
e) internal reserve and debt policies.

These reserves are available for use by applicable asset categories during the phase-in period to full funding. This coupled with Severn's judicious use of debt in the past, allows the scenarios to assume that, if required, available reserves and debt capacity can be used for high priority and emergency infrastructure investments in the short- to medium-term.

7.6.2 Recommendation

In 2024, Ontario Regulation 588/17 will require Severn to integrate proposed levels of service for all asset categories in its asset management plan update. We recommend that future planning should reflect adjustments to service levels and their impacts on reserve balances.

8 Appendices

Key Insights

1. Appendix A identifies projected 10-year capital requirements for each asset category

2. Appendix B includes several maps that have been used to visualize the current level of service

3. Appendix C identifies the criteria used to calculate risk for each asset category

4. Appendix D provides additional guidance on the development of a condition assessment program

Appendix A: 10-Year Capital Requirements

The following tables identify the capital cost requirements for each of the next 10 years in order to meet projected capital requirements and maintain the current level of service.

Road Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Paved Roads	$398,750	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Curbs & Gutters	$0	$0	$0	$62,593	$0	$0	$0	$57,992	$1,343,297	$221,785	$819,122
Sidewalks	$1,272,600	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Streetlights	$221,027	$0	$37,123	$85,041	$18,802	$0	$24,870	$29,145	$0	$0	$16,968
	$1,892,377	**$0**	**$37,123**	**$147,634**	**$18,802**	**$0**	**$24,870**	**$87,137**	**$1,343,297**	**$221,785**	**$836,090**

Bridges & Culverts											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Bridges	$0	$2,494,000	$4,434,000	$0	$198,000	$1,436,000	$2,471,000	$1,233,000	$0	$0	$0
Dry Hydrants	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Major Culverts	$0	$0	$0	$0	$0	$126,000	$322,000	$0	$0	$0	$0
	$0	**$2,494,000**	**$4,434,000**	**$0**	**$198,000**	**$1,562,000**	**$2,793,000**	**$1,233,000**	**$0**	**$0**	**$0**

Stormwater System											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Stormwater Linear	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Stormwater Non-Linear	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Stormwater Management Facilities	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Water System											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Water Equipment	$124,796	$0	$0	$1,750	$9,839	$7,988	$0	$0	$9,756	$4,716	$9,738
Water Linear	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Non-Linear	$19,500	$1,750	$16,250	$3,250	$1,750	$0	$1,750	$0	$381,990	$50,500	$1,549,350
Water Treatment	$1,140,200	$78,500	$96,500	$212,500	$611,500	$303,000	$225,200	$122,000	$131,000	$1,659,900	$224,500
	$1,289,496	**$80,250**	**$112,750**	**$217,500**	**$623,089**	**$310,988**	**$226,950**	**$122,000**	**$522,746**	**$1,715,116**	**$1,783,588**

Wastewater System											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Wastewater Equipment	$21,593	$1,624	$1,433	$40,900	$0	$21,921	$0	$22,786	$23,217	$1,433	$57,696
Wastewater Linear	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Wastewater Non-Linear	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Wastewater Treatment	$354,500	$106,000	$76,000	$147,000	$176,000	$54,000	$312,000	$150,000	$145,000	$798,000	$272,000
	$376,093	**$107,624**	**$77,433**	**$187,900**	**$176,000**	**$75,921**	**$312,000**	**$172,786**	**$168,217**	**$799,433**	**$329,696**

All Asset Categories											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Road Network	$1,892,377	$0	$37,123	$147,634	$18,802	$0	$24,870	$87,137	$1,343,297	$221,785	$836,090
Bridges & Culverts	$0	$2,494,000	$4,434,000	$0	$198,000	$1,562,000	$2,793,000	$1,233,000	$0	$0	$0
Stormwater System	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water System	$1,289,496	$80,250	$112,750	$217,500	$623,089	$310,988	$226,950	$122,000	$522,746	$1,715,116	$1,783,588
Wastewater System	$376,093	$107,624	$77,433	$187,900	$176,000	$75,921	$312,000	$172,786	$168,217	$799,433	$329,696
Buildings & Facilities	$8,174,488	$0	$11,894	$175,448	$84,992	$601,090	$0	$0	$0	$244,243	$3,828
Vehicles	$1,126,221	$44,253	$244,580	$1,020,137	$568,916	$548,906	$254,179	$814,415	$422,656	$671,289	$1,098,373
Land Improvements	$254,171	$0	$0	$251,554	$0	$69,846	$57,915	$29,440	$0	$0	$67,898
Machinery & Equipment	$734,212	$130,722	$47,926	$86,055	$88,578	$87,893	$166,368	$52,239	$368,767	$183,823	$128,163
	$13,847,058	**$4,248,491**	**$5,706,023**	**$4,202,080**	**$2,770,631**	**$3,997,637**	**$4,701,837**	**$2,974,479**	**$4,134,082**	**$6,683,455**	**$3,966,411**

Appendix B: Level of Service Maps & Images

Images of Bridge in Very Good Condition
Bridge No. 3: Townline
Inspected: May 13th, 2019

Image 34

East elevation

Image 24

North approach

Image 25

Upstream channel

Image 26

Downstream channel

Image 27

South approach

Image 28

SE guide rail connection

Images of Culvert in Fair Condition
Culvert No. 33: Wainman Line
Inspected: May 15th, 2019

Image 18

Upstream elevation

Image 13

SE approach

Image 14

NW approach

Image 15

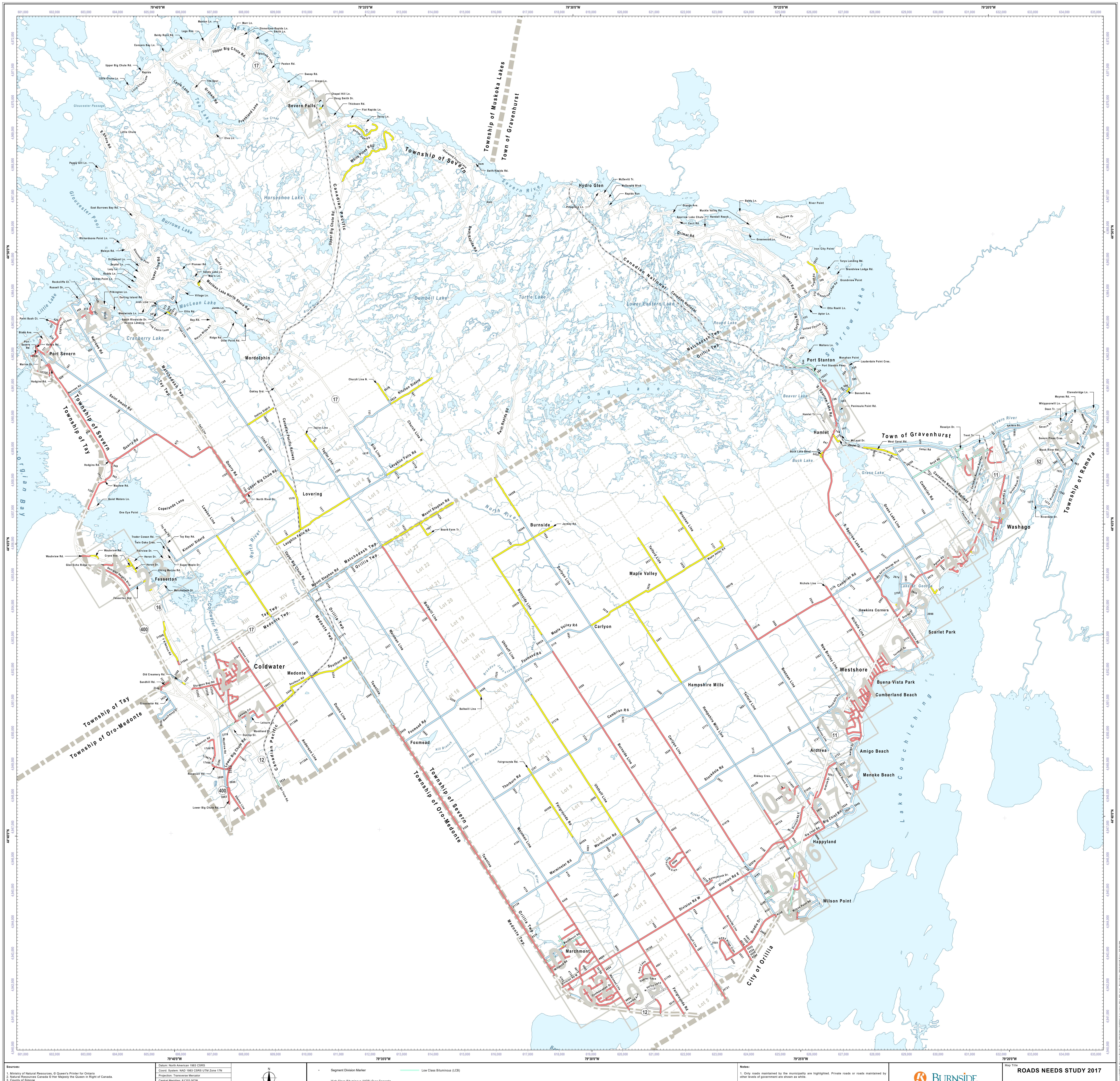
Downstream channel

Image 17

Upstream channel

Image 19

SE wall



Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. County of Simcoe

Disclaimer:

R.J. Burnside & Associates Limited and the above mentioned sources and agencies are not responsible for the accuracy of the spatial, temporal, or other aspects of the data represented on this map. It is recommended that users confirm the accuracy of the information represented.

This map is the product of a Geographic Information System (GIS). As such, the data represented on this map may be subject to updates and future reproductions may not be identical.

Datum: North American 1983 CSRS	
Coord. System: NAD 1983 CSRS UTM Zone 17N	
Projection: Transverse Mercator	
Central Meridian: 81°0'0.00"W	
False Easting: 500,000m	False Northing: 0m
Rotation: 0	Scale Factor: 0.99960

Grid North

0 1,000 2,000 3,000
Metres

- Segment Division Marker
- High Class Bituminous (HCB) Over Concrete (CON)
- High Class Bituminous (HCB)
- Intermediate Class Bituminous (ICB)
- Low Class Bituminous (LCB)
- Gravel Surface Treatment
- Non-Applicable
- Detail Map: 1:10,000

Notes:

1. Only roads maintained by the municipality are highlighted. Private roads or roads maintained by other levels of government are shown as white.

2. Road Section ID's appear as numbers perpendicular to the road and are based on the County of Simcoe's Road ID. Any segmentation of a roads section for the purposes of the roads needs study resulted in the appending of a letter to the original Simcoe County ID (e.g. 12345 became 12345A and 12345B).

3. Not all roads names and numbers could be effectively displayed at the scale this map is presented at. This map is intended to be read in conjunction with the 1:10,000 scale map book detailing areas with clusters of roads.

BURNSIDE

Client: **TOWNSHIP OF SEVERN**

Map Title: **ROADS NEEDS STUDY 2017**

ROAD INVENTORY AND SURFACE TYPE

Drawn	Checked	Date	Figure No.
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Appendix C: Risk Rating Criteria

Probability of Failure

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Probability of Failure Score
Stormwater System (Mains) Water System (Mains) Wastewater System (Mains)	Condition	100%	80-100	1
			60-80	2
			40-60	3
			20-40	4
			0-20	5
Bridges & Culverts	Condition	100%	90-100	1
			80-90	2
			70-80	3
			60-70	4
			0-60	5
Road Network (Roads)	Condition	100%	90-100	1
			75-90	2
			55-75	3
			40-55	4
			0-40	5

Consequence of Failure

Asset Category	Risk Criteria	Value/Range	Consequence of Failure Score
Road Network (Roads)	AADT (100%)	<100	1
		100-300	2
		300-1000	3
		1000-2500	4
		2500+	5
Bridges & Culverts	Replacement Cost (100%)	<$350,000	1
		$350,000-$500,000	2
		$500,000-$1,000,000	3
		$1,000,000-$1,500,000	4
		$1,500,000+	5
Stormwater System (Mains)	Pipe Diameter (100%)	<200	1
		200-300	2
		300-400	3
		400-550	4
		550+	5
Water System (Mains)	Pipe Diameter (100%)	>100	1
		100-150	2
		150-200	3
		200-300	4
Wastewater System (Mains)	Pipe Diameter (100%)	300+	5
		<100	1
		100-150	2
		200-250	3
		250-350	4

Appendix D: Condition Assessment Guidelines

The foundation of good asset management practice is accurate and reliable data on the current condition of infrastructure. Assessing the condition of an asset at a single point in time allows staff to have a better understanding of the probability of asset failure due to deteriorating condition.

Condition data is vital to the development of data-driven asset management strategies. Without accurate and reliable asset data, there may be little confidence in asset management decision-making which can lead to premature asset failure, service disruption and suboptimal investment strategies. To prevent these outcomes, the Township's condition assessment strategy should outline several key considerations, including:

- The role of asset condition data in decision-making
- Guidelines for the collection of asset condition data
- A schedule for how regularly asset condition data should be collected

Role of Asset Condition Data

The goal of collecting asset condition data is to ensure that data is available to inform maintenance and renewal programs required to meet the desired level of service. Accurate and reliable condition data allows municipal staff to determine the remaining service life of assets, and identify the most cost-effective approach to deterioration, whether it involves extending the life of the asset through remedial efforts or determining that replacement is required to avoid asset failure.

In addition to the optimization of lifecycle management strategies, asset condition data also impacts the Township's risk management and financial strategies. Assessed condition is a key variable in the determination of an asset's probability of failure. With a strong understanding of the probability of failure across the entire asset portfolio, the Township can develop strategies to mitigate both the probability and consequences of asset failure and service disruption. Furthermore, with condition-based determinations of future capital expenditures, the Township can develop long-term financial strategies with higher accuracy and reliability.

Guidelines for Condition Assessment

Whether completed by external consultants or internal staff, condition assessments should be completed in a structured and repeatable fashion, according to consistent and objective assessment criteria. Without proper guidelines for the completion of condition assessments there can be little confidence in the validity of condition data and asset management strategies based on this data.

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating criteria, in a format that can be used for asset management decision-making. As a result, it is important that staff adequately define the condition rating criteria that should be used and the assets that require a discrete

condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project.
There are many options available to the Township to complete condition assessments. In some cases, external consultants may need to be engaged to complete detailed technical assessments of infrastructure. In other cases, internal staff may have sufficient expertise or training to complete condition assessments.

Developing a Condition Assessment Schedule

Condition assessments and general data collection can be both time-consuming and resource intensive. It is not necessarily an effective strategy to collect assessed condition data across the entire asset inventory. Instead, the Township should prioritize the collection of assessed condition data based on the anticipated value of this data in decision-making. The International Infrastructure Management Manual (IIMM) identifies four key criteria to consider when making this determination:

1. Relevance: every data item must have a direct influence on the output that is required
2. Appropriateness: the volume of data and the frequency of updating should align with the stage in the assets life and the service being provided
3. Reliability: the data should be sufficiently accurate, have sufficient spatial coverage and be appropriately complete and current
4. Affordability: the data should be affordable to collect and maintain