

Asset management at the Township of Cavan Monaghan

# Asset Management Plan

**June 2022**

Based on the asset inventory as of Dec. 31, 2021

TOWNSHIP OF  
**CAVAN MONAGHAN**



This Asset Management Plan was prepared by:



Empowering your organization through advanced  
asset management, budgeting & GIS solutions

# Key Statistics



**\$215.03 million**

Replacement cost of asset portfolio



**\$14,457**

Replacement cost of infrastructure  
per 100,000 Residential Assessment



**62%**

Percentage of assets in fair or better condition



**38%**

Percentage of assets that have had condition  
assessments conducted



**\$7.03 million**

Total annual capital requirements



**\$3.81 million**

Total annual capital funding

# Key Statistics



Annual capital infrastructure deficit

**\$2.01 million** for Tax-Funded

**\$0.01 million** for Water Rate-Funded

**\$1.19 million** for Sanitary Rate-Funded



Recommended annual tax/rate increase and timeframe for eliminating infrastructure deficit

**1.9% for 10 Years** for Tax-Funded

**0.2% for 10 Years** for Water Rate-Funded

**4.6% for 15 Years** for Sanitary Rate-Funded



Target annual re-investment rate

**3.9%** for Tax-Funded

**1.3%** for Water Rate-Funded

**3.0%** for Sanitary Rate-Funded



Actual annual re-investment rate

**2.2%** for Tax-Funded

**1.2%** for Water Rate-Funded

**1.4%** for Sanitary Rate-Funded

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# 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.

## Scope

This Asset Management Plan (AMP) 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 of Cavan Monaghan can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP include the following asset categories:

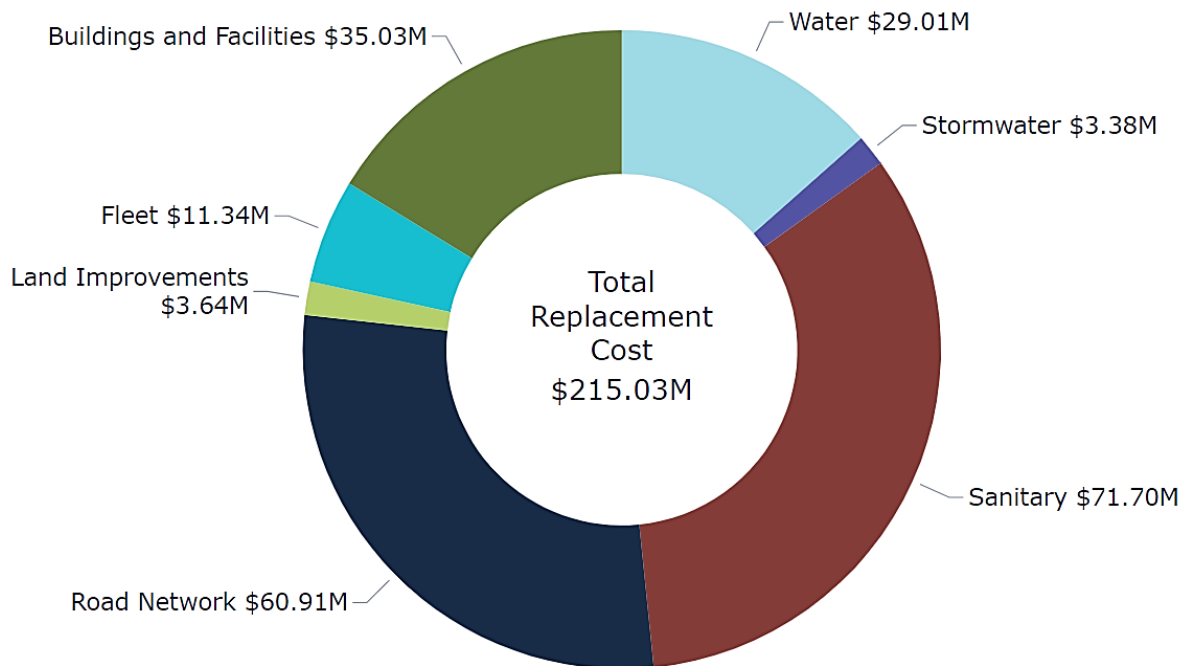
### Asset Category

 Road Network	 Water
 Stormwater	 Buildings and Facilities
 Sanitary	 Fleet
 Land Improvements	

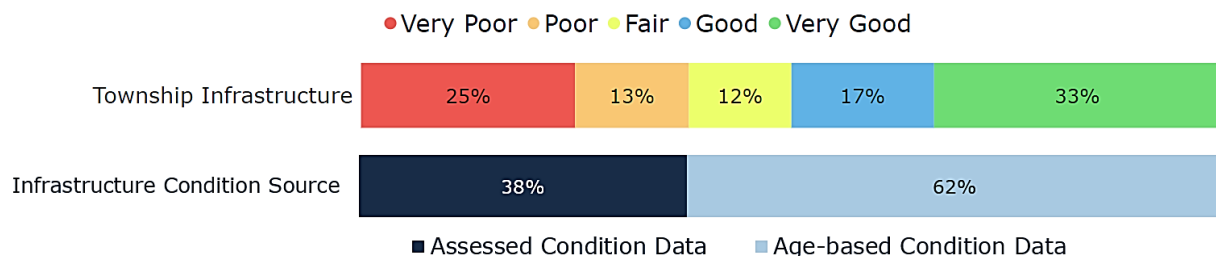
With the development of this AMP, the Township has achieved compliance with O. Reg. 588/17 to the extent of the requirements that must be completed by July 1, 2022. There are additional requirements concerning non-core asset categories, proposed levels of service and growth that must be met by July 1, 2024 and 2025.

## Findings

The overall replacement cost of the asset categories included in this AMP totals \$215 million and is based on the Township's tangible capital asset inventory as of December 31<sup>st</sup>, 2021.



About 62% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 38% of assets.



For the remaining 62% of assets, assessed condition data was not available, 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 asset management planning, and a recurring recommendation in this AMP.

Another essential element to asset management planning is the accuracy and completeness of the primary asset inventory. It is important to review and update the current inventory to ensure that it is at a higher level of data maturity and reliability for the next iteration of the AMP.

The development of a long-term, sustainable financial plan requires an analysis of whole lifecycle costs. This AMP uses a combination of proactive lifecycle strategies (for paved roads and sanitary mains) 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 \$7.0 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 capital deficit of \$3.2 million.

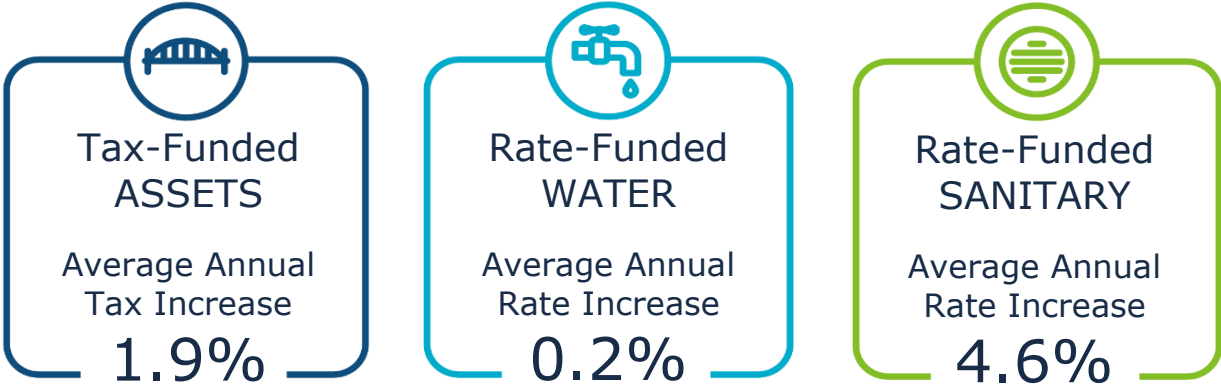


It is important to note that this AMP represents a snapshot in time and is based on the best available processes, data, and information at the Township. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources.



# Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphics shows annual tax/rate increase required to eliminate the Township’s infrastructure deficit based on a 10-year plan for Tax-Funded assets, a 10-year plan for Water Rate-Funded assets, and a 15-year plan for Sanitary Rate-Funded assets:



Recommendations to guide continuous refinement of the Township’s asset management program. These include:

- Reviewing asset data to develop a complete and accurate asset inventory in a centralized database
- Implementing a data governance strategy to increase confidence and continuing to operationalize asset management through the use of the database and database functionality
- Developing a condition assessment strategy with a regular schedule
- Reviewing and updating lifecycle management strategies
- Developing and regularly reviewing short- and long-term plans to meet capital requirements
- Continuing to measure current levels of service and identifying sustainable proposed levels of service

# 1 Introduction & Context

## Key Insights

- 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 Township's asset management policy provides clear direction to staff on their roles and responsibilities regarding asset management
- An asset management plan is a living document that should be updated regularly to inform long-term planning
- Ontario Regulation 588/17 outlines several key milestone and requirements for asset management plans in Ontario between July 1, 2022 and 2025

# 1.1 Cavan Monaghan Community Profile

<b>Census Characteristic</b>	<b>Township of Cavan Monaghan</b>	<b>Ontario</b>
Population 2021	10,016	14,223,942
Population Change 2016-2021	13.4	5.8
Total Private Dwellings	3,704	5,929,250
Population Density	32.7/km <sup>2</sup>	15.9/km <sup>2</sup>
Land Area	306.39 km <sup>2</sup>	892,411.76 km <sup>2</sup>

The Township of Cavan Monaghan is located 20 kilometres southwest of the City of Peterborough, in Peterborough County. It is a rural municipality, comprising of several small hamlets and villages. The region was first established in the 1810s by settlers from County Cavan and County Monaghan in Ireland, and the Township's history and culture has been a reflection of the Country.

As with many rural Townships, Cavan Monaghan was created through the amalgamation of different Townships in the late 1990s. The Township was renamed and shortened in 2007 to the Township of Cavan Monaghan.

Cavan Monaghan's current land use includes agricultural, employment, rural residential, villages and hamlets and natural areas. The close proximity to the City of Peterborough and the City of Toronto as well as convenient access to several highways, allows residents to commute to larger cities for work.

Demand in the region is notably driven by considerable population growth. Population growth is largely due to urban sprawl and low housing prices. The Township generates a total revenue of \$12.1 million from taxes and rates and has an annual capital budget of \$4.3 million as of 2021.

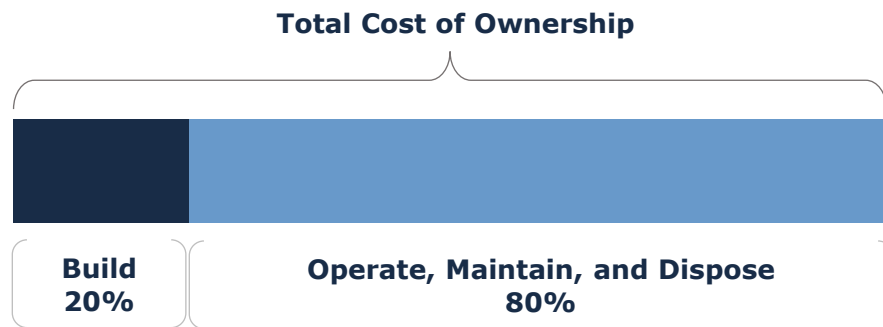
Municipal staff have acknowledged the need to operationalize asset management through the establishment of a centralized asset inventory, identifying missing infrastructure data, and ensuring that infrastructure data from new developments is consolidated. This will allow for effective decision-making and the use of risk-based project prioritization, which is essential for capital planning since major infrastructure projects are heavily reliant on the availability of grants.

Staff intend to support continuous growth within the Township by investing in critical infrastructure and advancing their asset management program.

# 1.2 An Overview of Asset Management

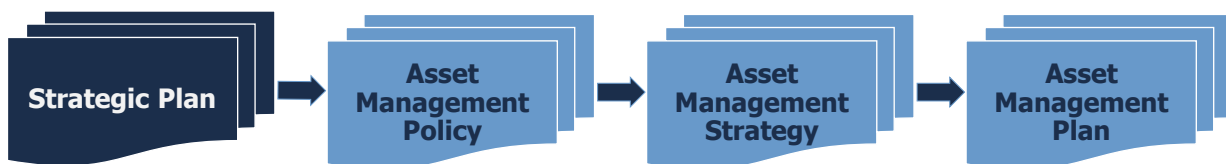
Municipalities are responsible for managing and maintaining a broad portfolio of infrastructure assets to deliver services to the community. The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value ratepayers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

The diagram below depicts an industry standard approach and sequence developing a practical asset management program. Beginning with a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan.



This industry standard, defined by the Institute of Asset Management (IAM), emphasizes the 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.

# 1.2.1 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 of Cavan Monaghan’s “Corporate Strategic Asset Management Policy” was approved by Council as Policy No. 2019-07 in accordance with Ontario Regulation 588/17.

The policy provides a foundation for the development of an asset management program within the Township. It covers key components that define a comprehensive asset management policy:

- The policy’s statements dictate the use of asset management practices to ensure all assets meet the agreed levels of service in the most efficient and effective manner;
- the policy commits to, where appropriate, incorporating asset management in the Township’s other plans;
- there are formally defined roles and responsibilities of internal staff and stakeholders;
- the guiding principles include the use of a cost/benefit analysis in the management of risk; and
- the policy statements are well defined.

As per Ontario Regulation 588/17, the Township will be required to review and update its Strategic Asset Management Policy in 2024.

## 1.2.2 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 strategy provides a long-term outlook on the overall asset management program development and strengthening key elements of its framework. Unlike the asset management plan, the asset management strategy should not evolve and change frequently

The Township's Strategic 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.

## 1.2.3 Asset Management Plan

The AMP presents the outcomes of the Township's asset management program and identifies the resource requirements needed to achieve a defined level of service. The AMP typically includes the following content:

- State of Infrastructure
- Asset Management Strategies
- Levels of Service
- Financial Strategies

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.

The Township's last iteration of the AMP was completed in 2013. Since then, the asset inventory has been updated with additional non-core asset categories and undergone revisions and updates for mandatory core assets. This document is an AMP that uses the updated asset inventory and has been prepared in accordance with O. Reg. 588/17.

# 1.3 Key Concepts in Asset Management

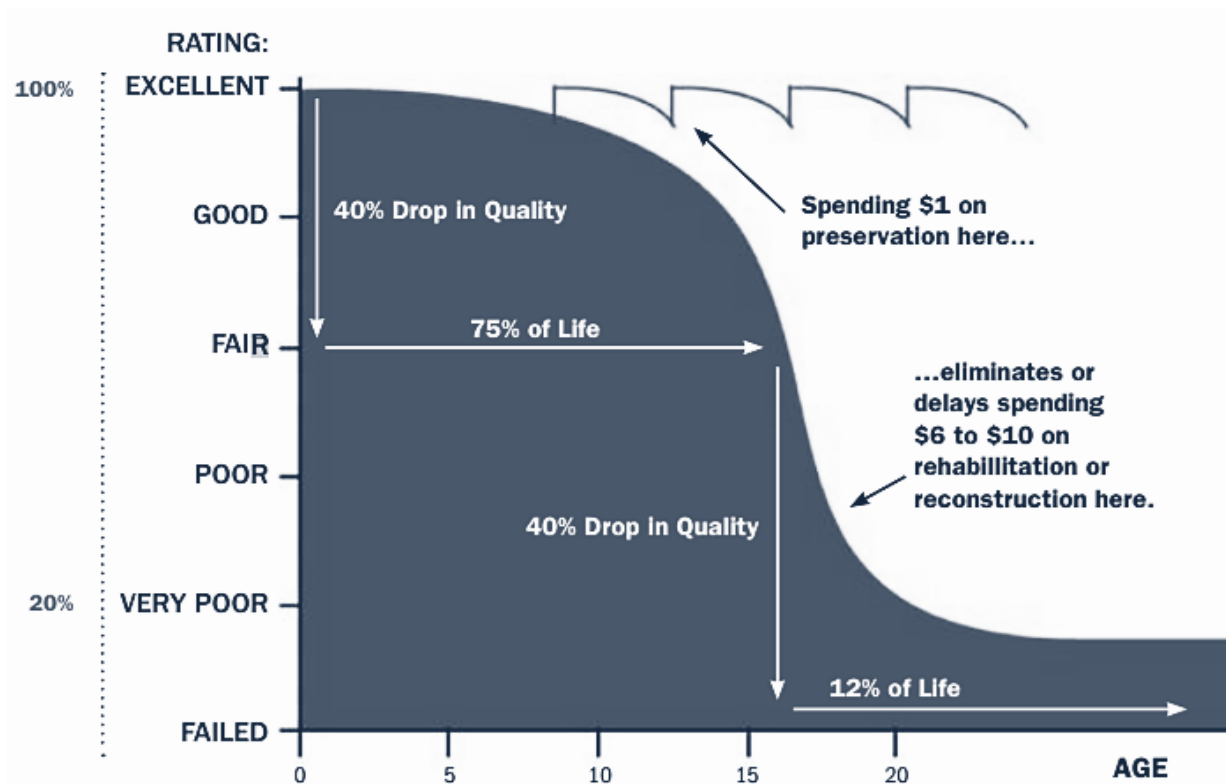
Effective asset management integrates several key components, including lifecycle management, risk management, and levels of service. These concepts are applied throughout this asset management plan and are described below in greater detail.

## 1.3.1 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. Since costs to rehabilitate tend to increase towards the end of life of an asset, proactive and timely intervention will lead to lower lifecycle costs.

This concept is further illustrated by the figure below, highlighting the cost impact of a maintenance activity contrasted by the cost impact of a rehabilitative activity later in the life of the asset.



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.

<b>Lifecycle Activity</b>	<b>Description</b>	<b>Example (Roads)</b>	<b>Cost</b>
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	\$\$\$
Replacement Upgrade	Asset end-of-life activities that involve the replacement of an asset to an 'upgraded' asset	Gravel Road to a Surface Treated Road	\$\$\$

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 core 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.



## 1.3.2 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. Some are more important than others, and their failure or disrepair poses more risk to the community than that of others. 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. These high-value assets should receive funding before others.

By identifying the various impacts of asset failure and the likelihood that it will fail, risk management strategies can identify critical assets, and determine where maintenance efforts, and spending, should be focused.

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.

## 1.3.3 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

Community levels of service are a simple, plain language description or measure of the service that the community receives.

For core asset categories (roads, bridges and culverts, water, wastewater, stormwater) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. These descriptions can be found in the Levels of Service subsection within each asset category.

For non-core asset categories, the Township will need to define the qualitative descriptions that will be used to determine the established levels of service by the July 2024 deadline.

## Technical Levels of Service

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.

For core asset categories (Roads, Bridges & Culverts, Water, Sanitary, Storm Water) the Province, through O. Reg. 588/17, has provided technical key performance indicators (KPIs) that are required to be included in this AMP. These KPIs can be found in the Levels of Service subsection within each asset category.

For non-core asset categories, the Township will need to define the technical KPIs that will be used to determine the established level of service by the July 2024 deadline.

## 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 plans 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 2025, the Township must identify a lifecycle management and financial strategy which allows these targets to be achieved.

## 1.4 Climate Change

Climate change can cause severe impacts on human and natural systems around the world. The effects of climate change include increasing temperatures, higher levels of precipitation, droughts, and extreme weather events. In 2019, Canada's Changing Climate Report (CCCR 2019) was released by Environment and Climate Change Canada (ECCC).

The report revealed that between 1948 and 2016, the average temperature increase across Canada was 1.7°C; moreover, during this time period, Northern Canada experienced a 2.3°C increase. The temperature increase in Canada has doubled that of the global average. If emissions are not significantly reduced, the temperature could increase by 6.3°C in Canada by the year 2100 compared to 2005 levels. Observed precipitation changes in Canada include an increase of approximately 20% between 1948 and 2012. By the late 21st century, the projected increase could reach an additional 24%. During the summer months, some regions in Southern Canada are expected to experience periods of drought at a higher rate. Extreme weather events and climate conditions are more common across Canada. Recorded events include droughts, flooding, cold extremes, warm extremes, wildfires, and record minimum arctic sea ice extent.

The changing climate poses a significant risk to the Canadian economy, society, environment, and infrastructure. The impacts on infrastructure are often a result of climate-related extremes such as droughts, floods, higher frequency of freeze-thaw cycles, extended periods of high temperatures, high winds, and wildfires. Physical infrastructure is vulnerable to damage and increased wear when exposed to these extreme events and climate variabilities. Canadian Municipalities are faced with the responsibility to protect their local economy, citizens, environment, and physical assets.

## 1.4.1 Cavan Monaghan's Climate Profile

The Township of Cavan Monaghan is located in central-eastern Ontario along the shore of Lake Erie. The Township is expected to experience notable effects of climate change which include higher average annual temperatures, an increase in total annual precipitation, and an increase in the frequency and severity of extreme events. According to [Climatedata.ca](http://Climatedata.ca) – a collaboration supported by Environment and Climate Change Canada (ECCC) – the Township of Cavan Monaghan will likely experience the following trends:

### **Higher Average Annual Temperature:**

1. Between the years 1981 to 2010 the annual average temperature was 6.8 °C
2. Under a high emissions scenario, the annual average temperatures are projected to increase by 1.9 °C by the year 2050 and over 5 °C by the end of the century.

### **Increase in Average Annual Precipitation:**

3. Under a high emissions scenario, Cavan Monaghan is projected to experience an 7% increase in precipitation by the year 2050 and a 15% increase by the end of the century.

### **Increase in Frequency of Extreme Weather Events:**

4. It is expected that the frequency and severity of extreme weather events will change.
5. In some areas, extreme weather events will occur with greater frequency and severity than others.

## 1.4.2 Integrating Climate Change into Asset Management

Asset management practices aim to deliver sustainable service delivery - the delivery of services to residents today without compromising the services and well-being of future residents. Climate change threatens sustainable service delivery by reducing the useful life of an asset and increasing the risk of asset failure. Desired levels of service can be more difficult to achieve as a result of climate change impacts such as flooding, high heat, drought, and more frequent and intense storms.

In order to achieve the sustainable delivery of services, climate change considerations should be incorporated into asset management practices. The integration of asset management and climate change adaptation observes industry best practices and enables the development of a holistic approach to risk management.

The Township has been collaborating with Peterborough County and neighbouring municipalities since 2012 to develop a number of official documents to inform sustainability, climate change adaptation and mitigation strategies. This has culminated in the development of the Greater Peterborough Area Climate Change Action Plan in 2014. This plan has identified a priority action with the Climate Change theme for each community to become active members of the Partners for Climate Protection (PCP) program and establish a baseline and climate action plan to reduce greenhouse gas emissions.

# 1.5 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.



# 1.5.1 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, 2022. Next to each requirement a page or section reference is included in addition to any necessary commentary.

<b>Requirement</b>	<b>O. Reg. Section</b>	<b>AMP Section Reference</b>	<b>Status</b>
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 municipality’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 B	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

- This asset management plan includes 7 asset categories and is divided between tax-funded and rate-funded categories
- Asset data from various data sources was consolidated into the Township's tangible capital asset inventory to establish it as the primary asset inventory
- The source and recency of replacement costs impacts the accuracy and reliability of asset portfolio valuation
- 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 categories in this AMP

This asset management plan for the Township of Cavan Monaghan is produced in compliance with Ontario Regulation 588/17. The July 2022 deadline under the regulation—the first of three AMPs—requires analysis of only core assets (roads, bridges and culverts, water, sanitary, and stormwater).

The AMP summarizes the state of the infrastructure for the Township’s asset portfolio and for core assets it establishes current levels of service and the associated technical and customer oriented 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
Road Network	
Stormwater	
Buildings and Facilities	Tax Levy and Development Charges
Fleet	
Land Improvements	
Water <sup>1</sup>	User Rates and Development Charges
Sanitary <sup>2</sup>	

<sup>1</sup> The water asset category includes all relevant buildings, facilities and fleet assets that facilitate the delivery of water services.

<sup>2</sup> The sanitary asset category includes all relevant buildings, facilities and fleet assets that facilitate the delivery of sanitary services.

## 2.2 The Asset Inventory

The asset information presented in this AMP has been developed from the asset inventory that is stored in the Citywide™ Asset Manager database as of December 31, 2021. This inventory serves as the Township’s tangible capital asset inventory and has been consolidated with additional asset data from the data sources listed below.

<b>Asset Category</b>	<b>Asset Data Sources</b>
Road Network	2020 Road Needs Study Report by D.M. Wills Associates Limited
	Public Works Capital Works Forecast with input from RV Anderson Associates Limited
Stormwater	2020 Municipal Structure Inspection Program
	Staff, Consultant and Market Data
Buildings and Facilities	2021 Insurance Assessment
	Staff, Consultant and Market Data
Fleet	2021 Insurance Assessment
	Staff, Consultant and Market Data
Land Improvements	2021 Insurance Assessment
	Staff, Consultant and Market Data
Water	Public Works Capital Works Forecast with input from RV Anderson Associates Limited
	Staff, Consultant and Market Data
Sanitary	Public Works Capital Works Forecast with input from RV Anderson Associates Limited
	Staff, Consultant and Market Data

## 2.3 Deriving Replacement Costs

There are a range of methods to determine the replacement cost of an asset, and some are more accurate and reliable than others. This AMP relies on two methodologies:

- **User-Defined Cost and Cost/Unit:** Based on costs provided by municipal staff which could include average costs from recent contracts; data from engineering reports and assessments; staff estimates based on knowledge and experience
- **Cost Inflation/CPI Tables:** Historical cost of the asset is inflated based on Consumer Price Index or Non-Residential Building Construction Price Index

User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost is reflective of the actual costs that the Township incurred. As assets age, and new products and technologies become available, cost inflation becomes a less reliable method.

## 2.4 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:

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

## 2.5 Deriving Annual Capital Requirements

By dividing the replacement cost of an asset with the asset's estimated useful life and factoring in the cost and impact of any lifecycle activities, the average annual capital requirements can be derived. The average annual requirement is calculated as follows:

$$\begin{aligned} \text{Annual Capital Requirement (Lifecycle Scenario)} &= \\ &= \frac{(\text{Replacement Cost} + \text{Cost of Lifecycle Activities})}{(\text{Estimated Useful Life (EUL)} + \text{Impact of Lifecycle Activities})} \end{aligned}$$

$$\text{Annual Capital Requirement (Replacement Only Scenario)} = \frac{\text{Replacement Cost}}{\text{Estimated Useful Life (EUL)}}$$

## 2.6 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:

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

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

## 2.7 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.

A condition assessment rating system provides a standardized descriptive framework that allows comparative benchmarking across the Township’s asset portfolio. 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.

<b>Condition</b>	<b>Description</b>	<b>Criteria</b>	<b>Service Life Remaining (%)</b>
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 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 C includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

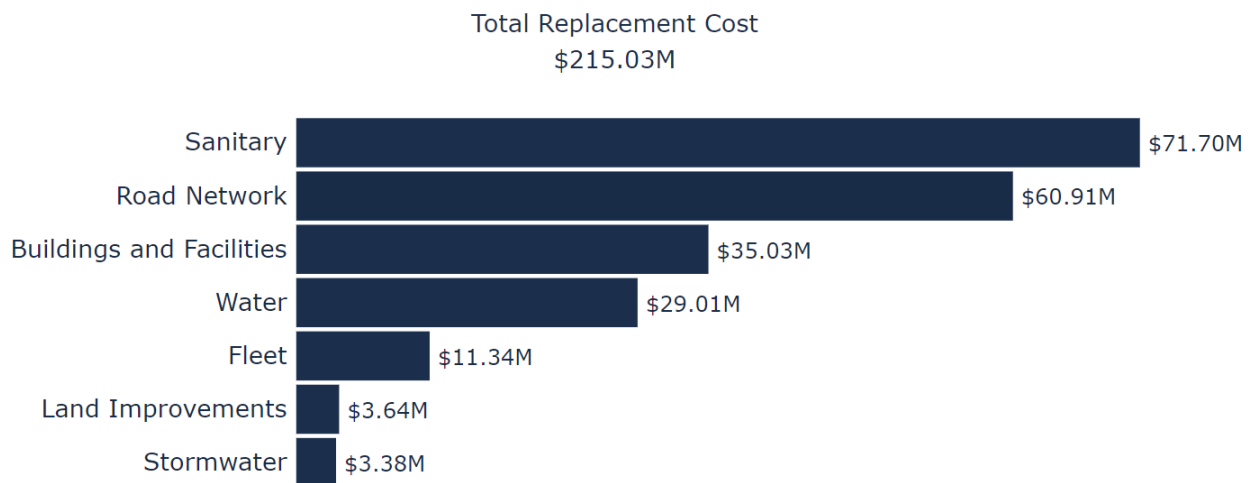
# 3 Portfolio Overview

## Key Insights

- The total replacement cost of the Township's asset portfolio is \$215 million
- The Township's total target re-investment rate is 3.27%, and the actual total re-investment rate is 1.77%, contributing to an expanding infrastructure deficit
- 62% of all assets are in fair or better condition
- 54% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total \$7.03 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 \$215.03 million based on inventory data from 2021. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.

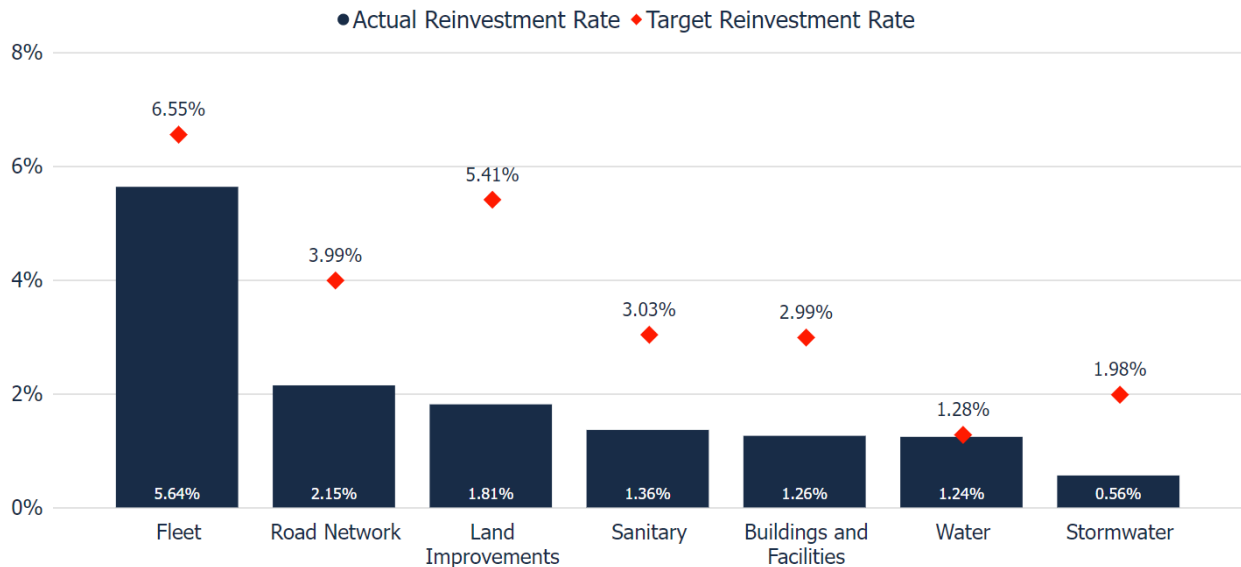


The following table identifies the methods employed to determine replacement costs across each asset category:

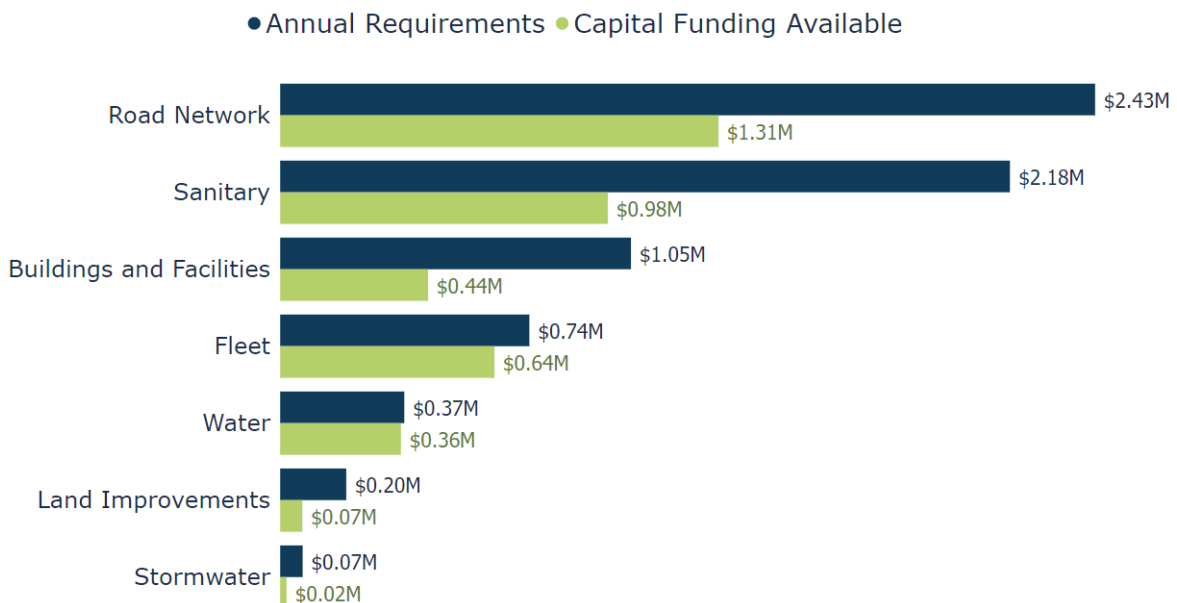
Asset Category	Replacement Cost Method		
	Defined Replacement Cost	Historical Cost Indexing	Replacement Cost Source
Sanitary	49%	51%	Staff, Consultant and Market Data
Road Network	82%	18%	2020 Road Needs Study Report; Staff, Consultant and Market Data
Buildings and Facilities	94%	6%	2021 Insurance Assessment
Water	80%	20%	Staff, Consultant and Market Data
Fleet	1%	99%	2021 Insurance Assessment
Land Improvements	3%	97%	2021 Insurance Assessment
Stormwater	31%	69%	Staff, Consultant and Market Data
<b>Overall</b>	<b>67%</b>	<b>33%</b>	

## 3.2 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 \$7.02 million annually, for a target reinvestment rate of 3.27%. Actual annual spending on infrastructure totals approximately \$3.81 million, for an actual reinvestment rate of 1.77%.



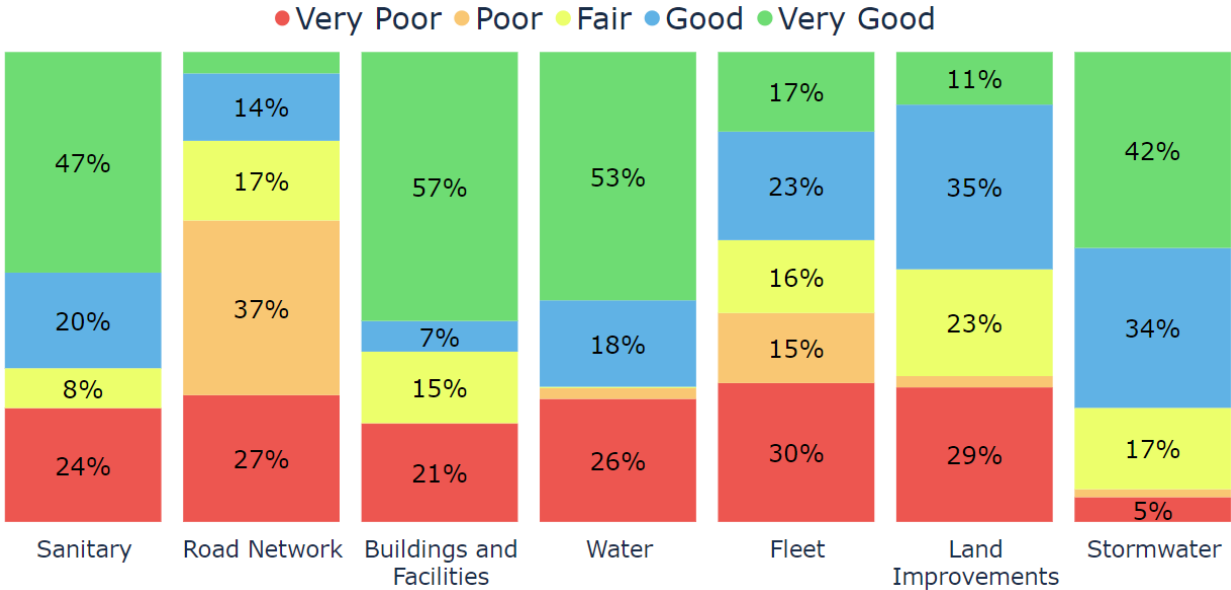
To highlight the monetary magnitude of the reinvestment rates, the graph below compares the annual capital requirements (target reinvestment) versus the current annual capital funding (actual reinvestment) that is available. This comparison is examined in more detail under Section 7.1.1.





### 3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 62% of assets in the Township are in fair or better condition. This estimate relies on both age-based and field condition data.

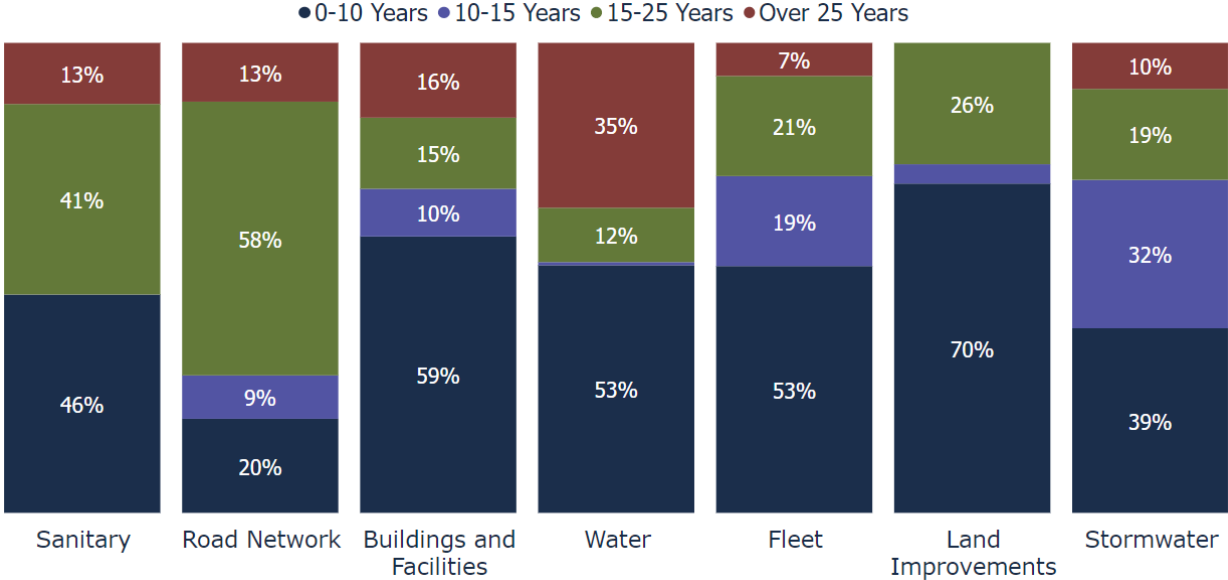


This AMP relies on assessed condition data for 38% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	% of Assets with Age-based Condition	% of Assets with Assessed Condition	Source of Condition Data
Road Network	13%	87%	2020 Road Needs Study Staff Assessments and Consultant Input
Stormwater	100%	0%	Age-based
Buildings & Facilities	100%	0%	
Fleet	100%	0%	
Parks & Land Improvements	100%	0%	
Water	64%	36%	Staff Assessment and Consultant Input
Sanitary	85%	15%	
<b>Overall</b>	<b>62%</b>	<b>38%</b>	

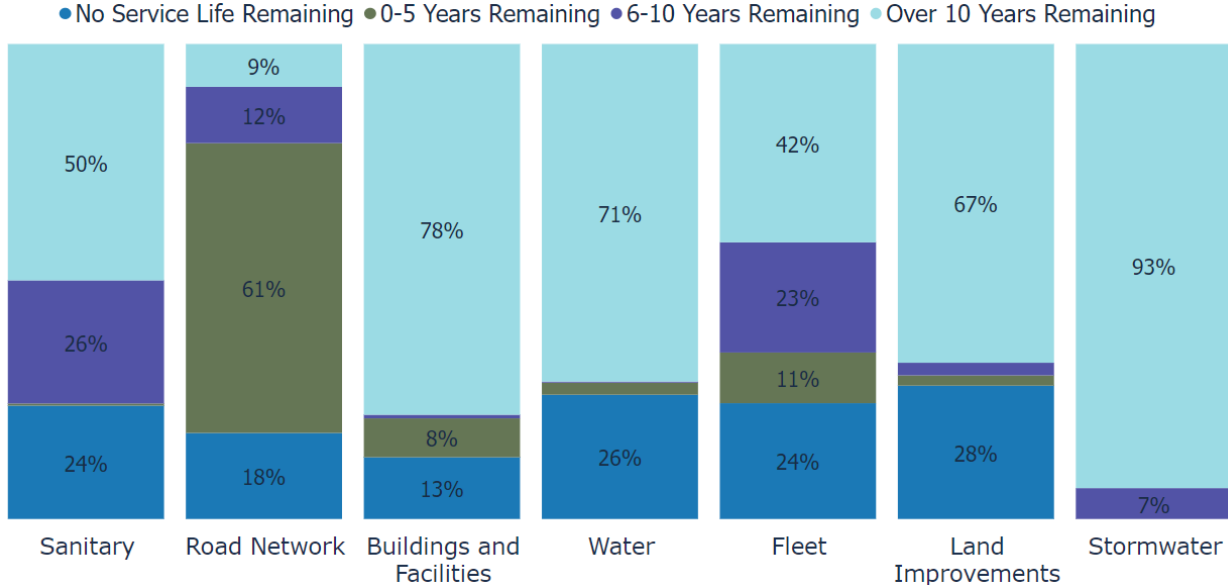
# 3.4 Asset Age

Based on the asset inventory, asset age, and estimated useful life, 16% of the Township’s assets are over 25 years old and 42% have been installed in the last 10 years.



# 3.5 Service Life Remaining

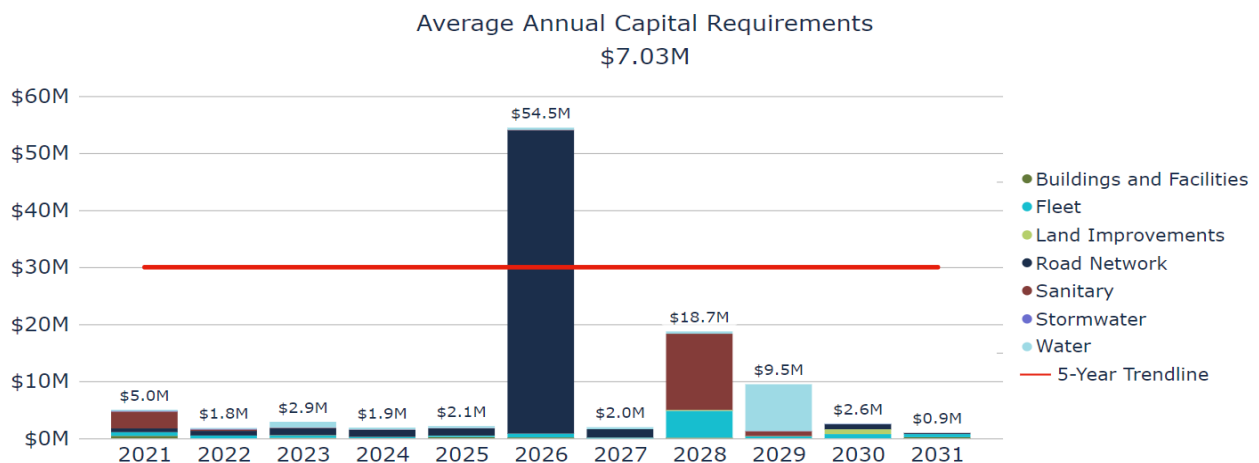
Based on the asset inventory, asset age, available assessed condition data and estimated useful life, 54% of the Township’s assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B.



## 3.6 Forecasted Capital Requirements

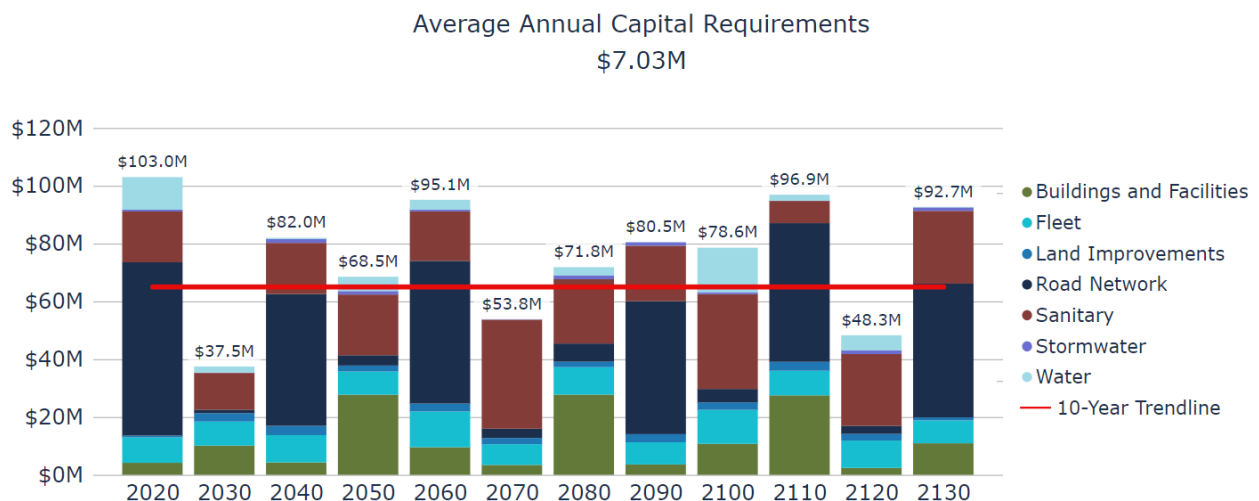
The development of a long-term capital forecast should include both asset rehabilitation and replacement requirements. With the development of asset-specific lifecycle strategies that include the timing and cost of future capital events, the Township can produce an accurate long-term capital forecast.

The graph below identifies the average annual capital requirements over the next 10 years and is based on the Township’s inventory as of the end of 2021, not including assets that may be required due to growth.



The specific projected cost of lifecycle activities required over the next 10 years, in order to maintain the current level of service, can be found in Appendix B.

The graph below identifies capital requirements over the next 110 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 10-year bins, are based on the Township’s asset inventory as of the end of 2021 and do not include assets that may be required for growth. The trend line represents the average 10-year capital requirements.



# 4 Road Network

The road network is a critical component of the provision of safe and efficient transportation services and represents one of the highest value asset categories in the Township’s asset portfolio. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure including sidewalks, pedestrian crossing and streetlights.

The Township’s road network is maintained by the Public Works department who are responsible for the maintenance, rehabilitation and construction of roads and supporting roadside infrastructure. The department is also responsible for winter snow clearing, ice control and snow removal operations.

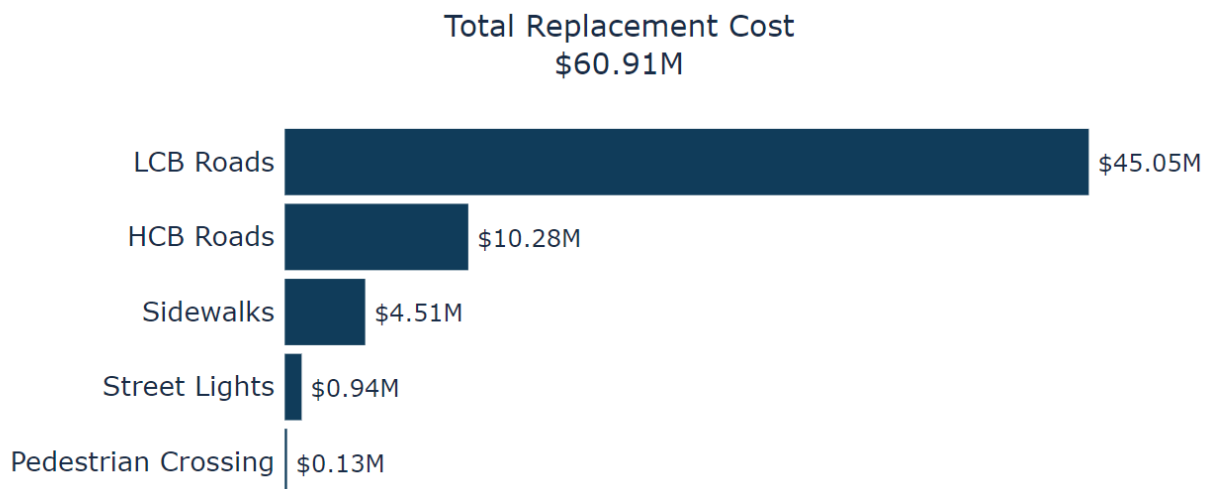
The state of the infrastructure for the road network is summarized in the following table.

<b>Replacement Cost</b>	<b>Condition</b>	<b>Financial Capacity</b>	
\$60.9 million	Fair (40%)	Annual Requirement:	\$2,430,000
		Funding Available:	\$1,307,000
		Annual Deficit:	\$1,123,000

## 4.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township’s road network inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Gravel Roads	58 km	\$13,503,772 <sup>3</sup>	
LCB Roads	184 km	\$45,052,816	\$2,087,389
HCB Roads	37 km	\$10,282,510	\$173,058
Sidewalks	148,831 sq. ft	\$4,506,077	\$114,805
Street Lights	253	\$944,980	\$49,614
Pedestrian Crossing	1	\$127,565	\$5,207
<b>Total</b>		<b>\$60,913,948</b>	<b>\$2,430,072</b>



Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent capital requirements.

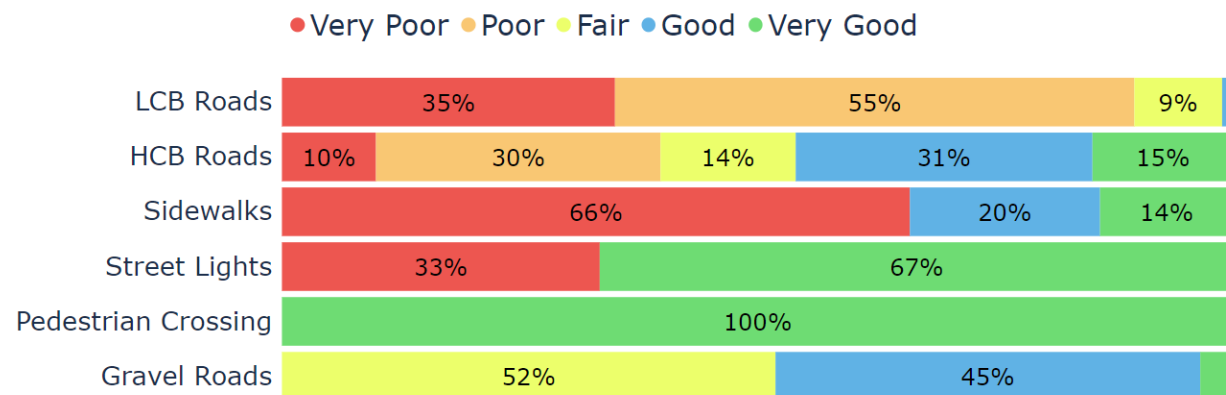
<sup>3</sup> Gravel roads undergo perpetual operating and maintenance activities, and therefore are not capitalized. If maintained properly, they can theoretically have a limitless service life. This valuation is based on the complete replacement of all of the gravel roads using cost indexing.

## 4.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
LCB Roads	7 - 50	5.7	35% (Poor)
HCB Roads	15	7.3	59% (Fair)
Sidewalks	40	25.2	44% (Fair)
Street Lights	15 - 25	13.3	64% (Good)
Pedestrian Crossing	25	7.6	98% (Very Good)
Gravel Roads	50	10	62% (Fair)
<b>Average</b>		<b>9.1</b>	<b>40% (Fair)</b>

The graph below visually illustrates the average condition for each asset segment on a very good to very poor.



To ensure that the Township’s road network 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 roads.

Each asset’s estimated useful life should also 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.

## 4.2.1 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:

- A road needs study through an external source is conducted every 5 years. The most recent study was completed in 2020.
- Road patrols are undertaken every 2 weeks, granular roads are also visually inspected during grading activities
- Other road network assets are inspected as per O. Reg. 239/02

In this AMP the following rating criteria is used to determine the current condition of road segments and forecast future capital requirements:

<b>Condition (Roads)</b>	<b>PCI Rating</b>
Very Good	85-100
Good	70-85
Fair	55-70
Poor	40-55
Very Poor	20-40

For all other assets the following rating criteria is used to determine the current condition and forecast future capital requirements:

<b>Condition</b>	<b>Condition Rating</b>
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

## 4.3 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 table outlines the Township’s current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Pothole repairs are completed annually based on deficiencies identified through regular road patrols and feedback from the public.
	Seasonal maintenance activities include asphalt patching, graveling, and tree cutting.
	Summer maintenance activities include sidewalk repairs, grading, re-gravelling, applying dust suppressant, ditching, roadside mowing, tree trimming, brush cleanup, road sign installation/maintenance, and line painting.
	Winter maintenance activities include snow plowing, slating, and snow removal.
Rehabilitation	Some crack sealing has been conducted in the past.
	Rehabilitation activities include slurry seal, microsurfacing, surface treatments, asphalt overlay and pulverize and pave.
Replacement	Road replacement prioritization is determined by consideration of growth, risk, condition, health and safety, and social impact.
Replacement	Road reconstruction projects (base and surface) are identified based on road condition, risk, and sub-surface asset requirements (water/sanitary/storm)

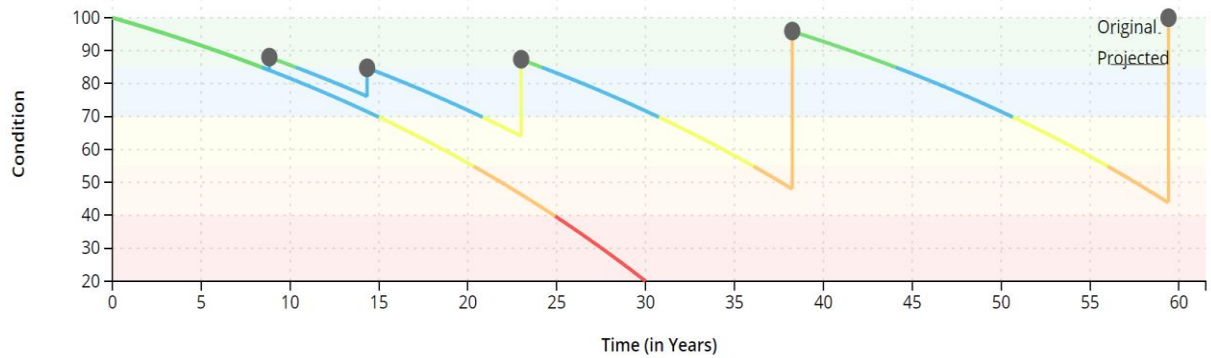
The following lifecycle strategies have been developed to formalize the current approach to managing the lifecycle of HCB and LCB roads.

Instead of allowing the roads to deteriorate until replacement is required, strategic preventative maintenance and rehabilitation is expected to extend the service life of roads at a lower total cost.



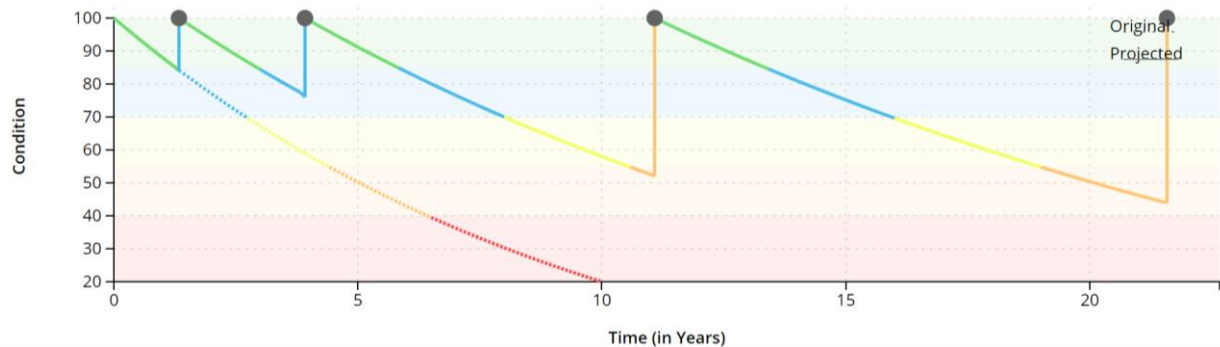
### HCB Roads

Event Name	Event Class	Event Trigger
General Maintenance	Maintenance	As needed
Crack Sealing	Preventative Maintenance	Condition: 84 - 92
Slurry Seal	Preventative Maintenance	Condition: 76 - 84
Overlay	Rehabilitation	Condition: 64 - 76
Pulverize and Pave	Rehabilitation	Condition: 48 - 64
Full Reconstruction	Replacement	Condition: 44



### LCB Roads

Event Name	Event Class	Event Trigger
General Maintenance	Maintenance	As needed
Slurry Seal	Preventative Maintenance	Condition: 84 - 92
Double Surface Treatment 1 <sup>st</sup>	Rehabilitation	Condition: 76 - 84
Double Surface Treatment 2 <sup>nd</sup>	Rehabilitation	Condition: 52 - 76
Full Reconstruction	Replacement	Condition: 44

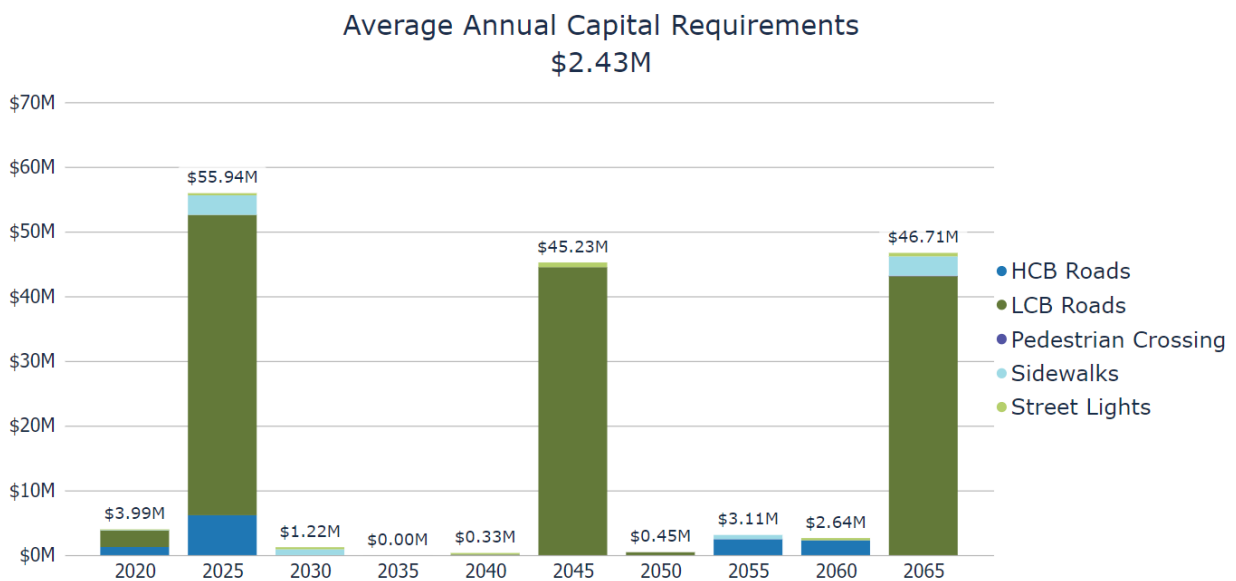


### 4.3.1 Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for HCB and LCB roads, and assuming the end-of-life replacement of all other assets in this category, 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 graph identifies capital requirements over the next 45 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and do not include assets that may be required due to growth.

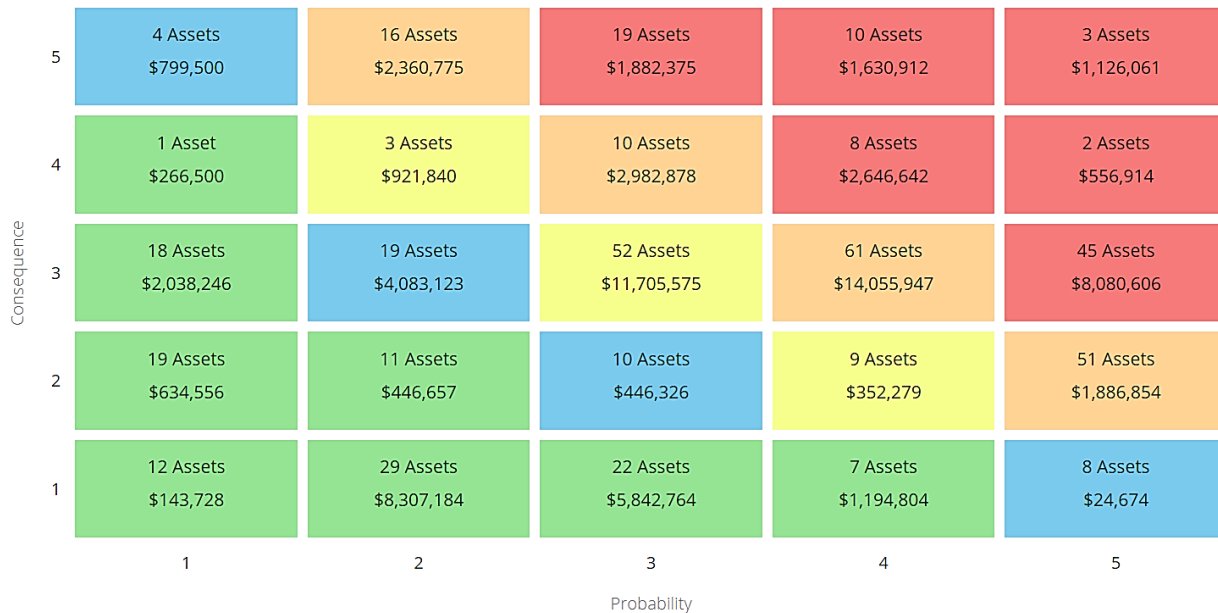


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

## 4.4 Risk & Criticality

### 4.4.1 Risk Matrix

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 based on 2021 inventory data.



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.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the road network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Average Annual Daily Traffic (Operational)
	Number of Lanes (Operational)

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

## 4.4.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township is currently facing:



### **Climate Change and Extreme Events**

An increase in freeze/thaw cycles causes road pavement to heave and settle. This can cause the accelerated deterioration of road surface pavement which leads to an increased need for maintenance and rehabilitation. The uncertainty surrounding the impact of extreme weather events can make changing conditions difficult to plan for.



### **Asset Data and Information**

There is a lack of confidence in the available inventory for some of the road network assets. Some of the asset data is pooled, missing in the inventory, and/or incomplete. Both short- and long-term planning requires the regular collection, storage and maintenance of infrastructure data to support asset management decision-making. Staff find it a continuous challenge to dedicate resource time towards data collection and refinement.

## 4.5 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.

### 4.5.1 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 (2021)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	The Township’s road infrastructure system spans a total of 245 km primarily within a rural setting, with small areas of urban and semi-urban development. The road network consists of approximately 36 km of gravel roads, 182 km of low class bituminous (LCB) roads and 27 km of high class bituminous roads. The road network also contains other roadside appurtenances such as sidewalks, streetlights and pedestrian crossing.
Quality	Description or images that illustrate the different levels of road class pavement condition	<p>The Township completed a Road Needs Study report in July 2020 in coordination with D.M. Wills Associates Limited. In addition to the assessment of roads, surface condition ratings and structural adequacy ratings were also determined for each road section.</p> <p>Every road section received a structural adequacy rating (1-10).</p> <p>(1-5) Road surface exhibits moderate to significant deterioration and requires renewal or full replacement within 1-5 years</p> <p>(6-10) Road surface is in good condition or has been recently re-surfaced. Renewal or reconstruction is not required for 6-10+ years</p>

## 4.5.2 Technical Levels of Service

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

<b>Service Attribute</b>	<b>Technical Metric</b>	<b>Current LOS (2021)</b>
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km <sup>2</sup> )	0
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km <sup>2</sup> )	0.07
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km <sup>2</sup> )	0.75
Quality	Average pavement condition index for paved roads in the municipality	HCB: 59% LCB: 35%
	Average surface condition for unpaved roads in the municipality (e.g., excellent, good, fair, poor)	Good
Performance	Target reinvestment rate	3.99%
	Capital reinvestment rate	2.15%

## 4.6 Recommendations

### Asset Inventory

- Review assets in the asset inventory to verify that only active tangible capital assets are included
- Review and standardize the unit of measure for consistency across each road network segment
- The streetlight inventory includes several pooled assets that should be broken down into individual assets to allow for coordinated planning and analysis
- Continue to consolidate critical road network asset information from other asset data sources into the Township's centralized asset inventory.

### Lifecycle Management Strategies

- Gather unit costs for assets that have relied primarily on historical inflation and review periodically to ensure a higher level of accuracy and within the context of current market condition
- Evaluate the efficacy of the Township's lifecycle management strategies at regular intervals to determine the impact cost, condition and risk.

### Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

### Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the Township believes to provide meaningful and reliable inputs into asset management planning.
- 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 Stormwater

The Township is responsible for owning and maintaining a stormwater network of around 2 km of storm sewer mains, structural culverts that fall under the Ontario Structure Inspection Manual (OSIM) requirement, non-structural culverts, catch basins and other supporting infrastructure such as stormwater management ponds.

The Township's Public Works department is responsible for planning and managing stormwater infrastructure.

Stormwater infrastructure generally poses the greatest uncertainty for municipalities, including Cavan Monaghan. Staff have expressed a lack of confidence in the current inventory but are working towards improving the accuracy and reliability to assist with long-term asset management planning.

The state of the infrastructure for the stormwater network is summarized in the following table. It is important to acknowledge that the current stormwater inventory is incomplete, and the resulting output values will be revised.

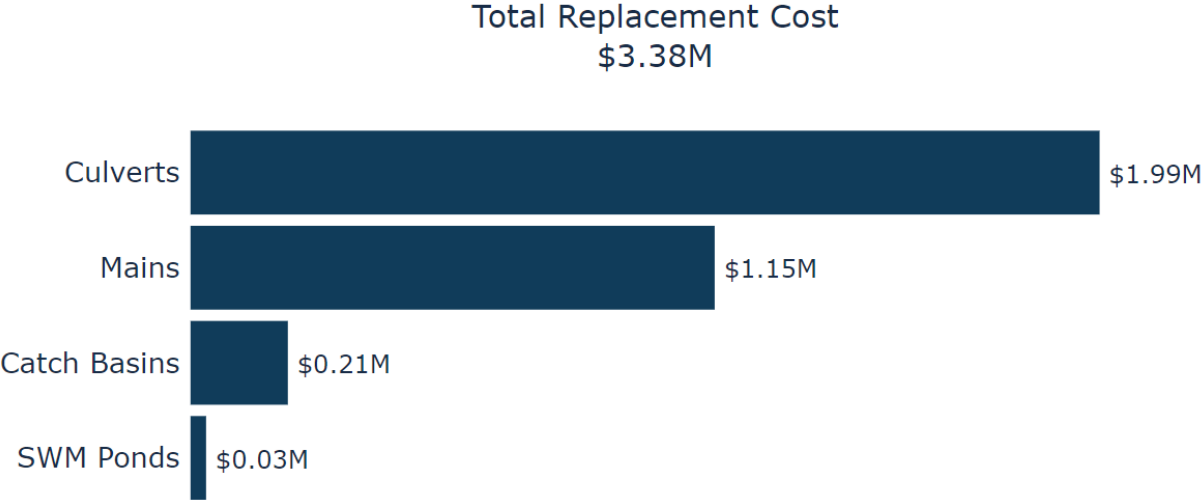
<b>Replacement Cost</b>	<b>Condition</b>	<b>Financial Capacity</b>	
\$3.38 million	Good (77%)	Annual Requirement:	\$67,000
		Funding Available:	\$19,000
		Annual Deficit:	\$48,000



# 5.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township’s stormwater network inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Culverts	139	\$1,989,385	\$39,788
Mains	2 km	\$1,147,073	\$22,941
Catch Basins	71	\$213,000	\$4,260
SWM Ponds	4	\$34,058	\$454
<b>Total</b>		<b>\$3,383,516</b>	<b>\$67,443</b>



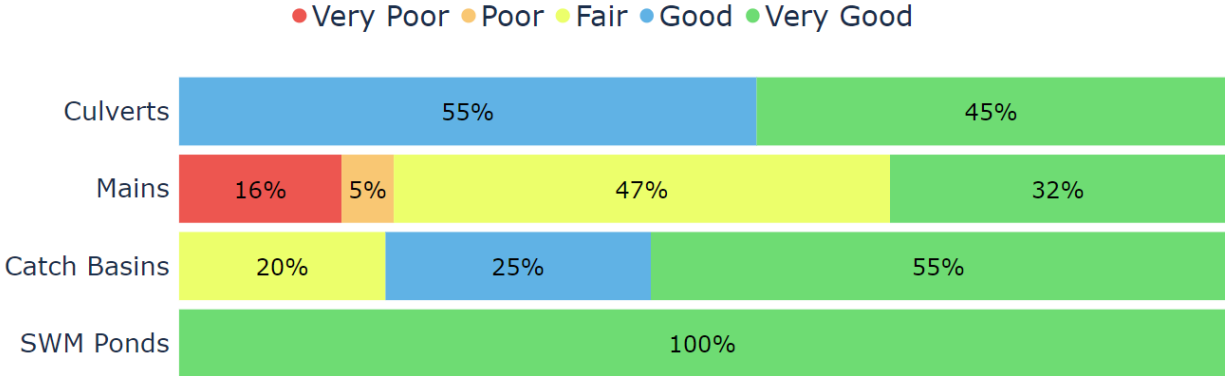
Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

# 5.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Culverts	50	6.3	84% (Very Good)
Mains	50	19.8	62% (Good)
Catch Basins	50	28.5	81% (Very Good)
SWM Ponds	75	17.5	98% (Very Good)
<b>Average</b>		<b>18.4</b>	<b>77% (Good)</b>

The graph below visually illustrates the average condition for each asset segment on a very good to very poor.



To ensure that the Township’s stormwater assets continue 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 network.

Each asset’s estimated useful life should also 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.

## 5.2.1 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:

- Condition assessments of all structural culverts with a span greater than or equal to 3 meters are completed every 2 years in accordance with the OSIM requirements
- There are no other formal condition assessment programs in place for stormwater infrastructure
- Currently age-based estimates are used to determine asset condition, although confidence in the accuracy of these estimates is low
- As the Township refines the available asset inventory for the stormwater network a regular assessment cycle should be established

In this AMP the following rating criteria is used to determine the current condition of stormwater segments and forecast future capital requirements:

<b>Condition</b>	<b>Rating</b>
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

# 5.3 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.

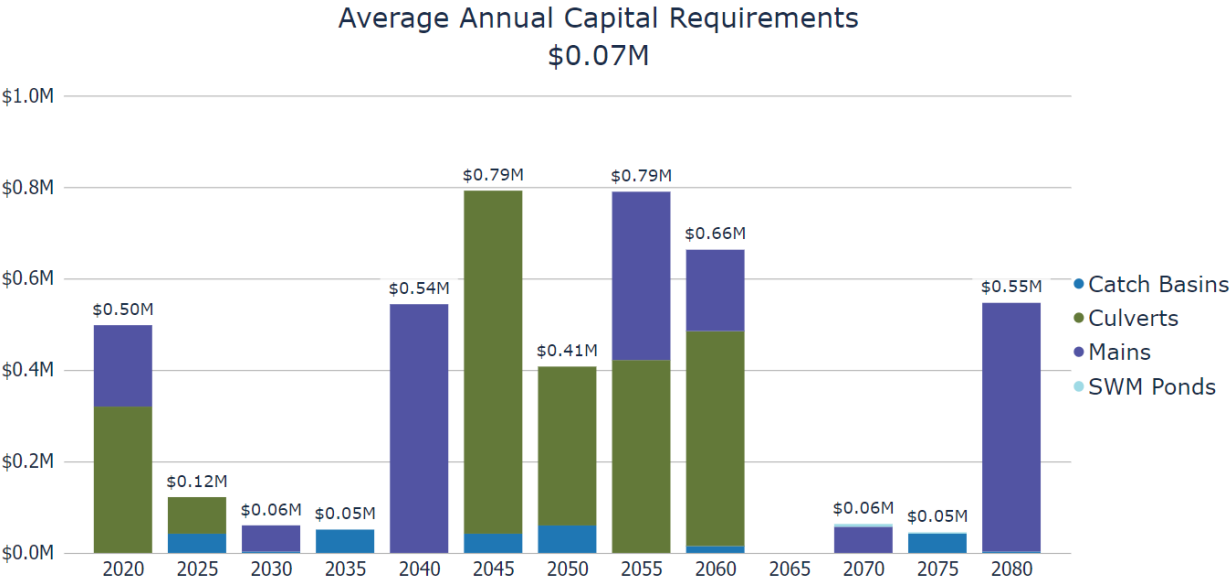
<b>Activity Type</b>	<b>Description of Current Strategy</b>
Maintenance	Maintenance activities are completed to a lesser degree compared to other underground linear infrastructure
	Primary activities include catch basin cleaning and reactive storm main flushing
	All other maintenance activities are completed on a reactive basis when operational issues are identified (e.g., blockages, backups)
Rehabilitation	Trenchless re-lining has the potential to reduce total lifecycle costs but would require a formal condition assessment program to determine viability
Replacement	Without the availability of up-to-date condition assessment information replacement activities are purely reactive in nature

### 5.3.1 Forecasted Capital Requirements

Based on the current asset inventory and assuming end-of-life replacement of all assets in this category, 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 graph identifies capital requirements over the next 60 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and do not include assets that may be required due to growth.

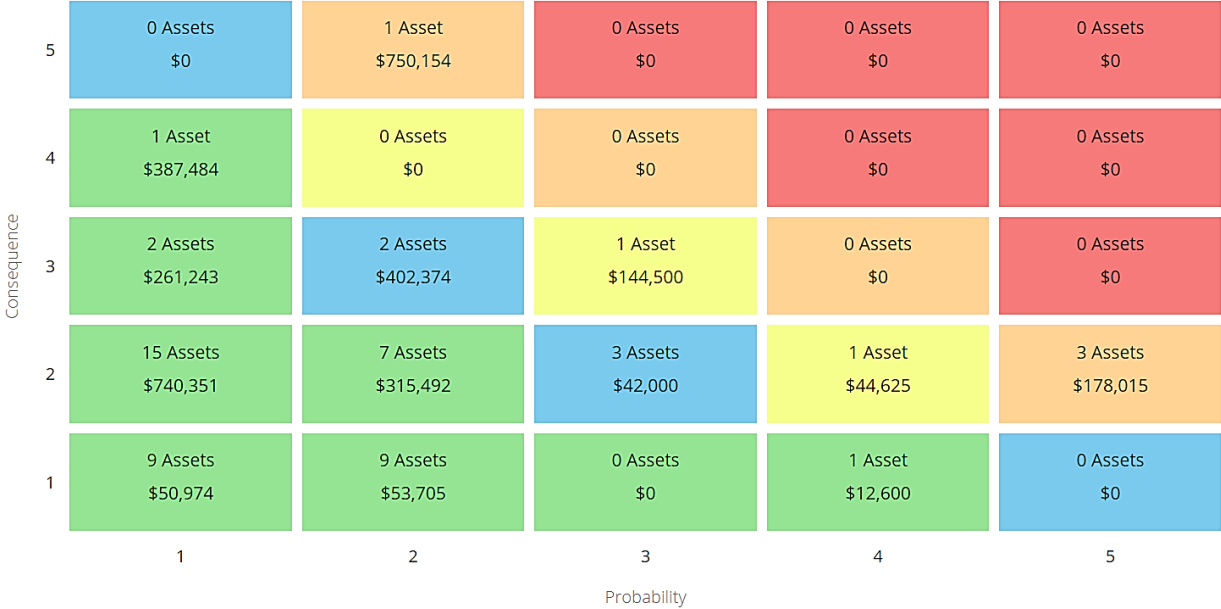


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

# 5.4 Risk & Criticality

## 5.4.1 Risk Matrix

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 based on 2021 inventory data.



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.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the stormwater network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Pipe Material (linear assets)	Pipe Diameter (linear assets) (Operational)
Service Life Remaining	Asset Type (Strategic)

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

## 5.4.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township is currently facing:



### **Asset Data and Information**

There is a lack of confidence in the available inventory data for stormwater infrastructure. Some of the asset data, including an inventory of storm non-linear assets is missing, not available, and/or incomplete. Flows can be very unpredictable compared to water and sanitary systems. This poses a significant risk when trying to manage assets and planning future work.



### **Capital Funding Strategies**

Partially owing to the lacking asset data, operations tend to be reactive rather than proactive for this category. Problems are generally only known when issues arise, and complaints are made.

# 5.5 Levels of Service

The following tables identify the Township’s current level of service for the stormwater 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.

## 5.5.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal stormwater system	Description and/or mapping are not available at this time. Staff will have this metric determined for the next iteration of the AMP.
		New subdivisions within the Township do have stormwater infrastructure.

## 5.5.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of properties in municipality resilient to a 100-year storm	TBD <sup>4</sup>
	% of the municipal stormwater management system resilient to a 5-year storm	TBD <sup>4</sup>
Performance	Target reinvestment rate	1.98%
	Capital reinvestment rate	0.56%

<sup>4</sup> The Township does not currently have data available to determine this technical metric but will have it for the next iteration of the AMP.



## 5.6 Recommendations

### Asset Inventory

- The Township's stormwater inventory remains at a basic level of maturity and staff do not have a high level of confidence in its accuracy or reliability. The development of a comprehensive inventory of stormwater assets should be priority.

### Condition Assessment Strategies

- The development of a comprehensive inventory should be accompanied by a system-wide assessment of the condition of all stormwater assets through CCTV inspections.

### Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

### Lifecycle Management Strategies

- Document and review lifecycle management strategies for stormwater assets on a regular basis to achieve the lowest total cost of ownership while maintaining adequate service levels.

### Levels of Service

- Measure current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- 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 Buildings and Facilities

The Township of Cavan Monaghan owns and maintains several facilities and recreation centres that provide key services to the community. These include:

- administrative offices
- schools and public libraries
- fire halls and associated offices and facilities
- public works garages and storage sheds
- arenas and community centres
- park shelters and structures

The current buildings and facilities asset inventory poses limitations for accurate and long-term asset management planning due to a lack of standardization and incomplete component data.

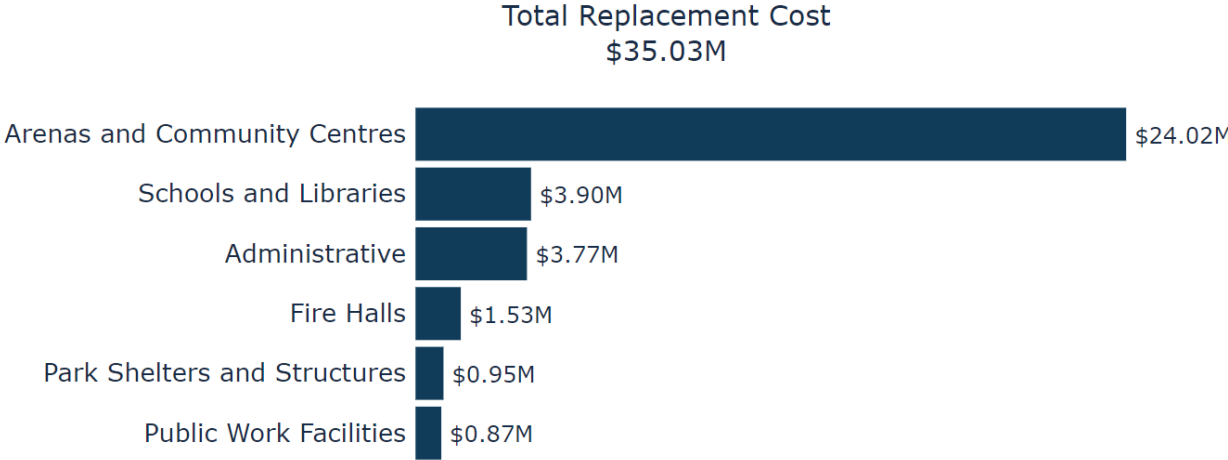
The state of the infrastructure for the buildings and facilities is summarized in the following table.

<b>Replacement Cost</b>	<b>Condition</b>	<b>Financial Capacity</b>	
\$35.03 million	Good (68%)	Annual Requirement:	\$1,046,000
		Funding Available:	\$441,000
		Annual Deficit:	\$605,000

# 6.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township’s buildings and facilities inventory.

Asset Segment	Number of Facilities	Replacement Cost	Annual Capital Requirement
Arenas and Community Centres	3	\$24,015,500	\$700,426
Schools and Libraries	2	\$3,903,691	\$150,814
Administrative	3	\$3,766,103	\$106,417
Fire Halls	2	\$1,530,000	\$40,958
Park Shelters and Structures	1	\$945,243	\$23,631
Public Work Facilities	5	\$871,762	\$23,501
<b>Total</b>		<b>\$35,032,299</b>	<b>\$1,045,747</b>



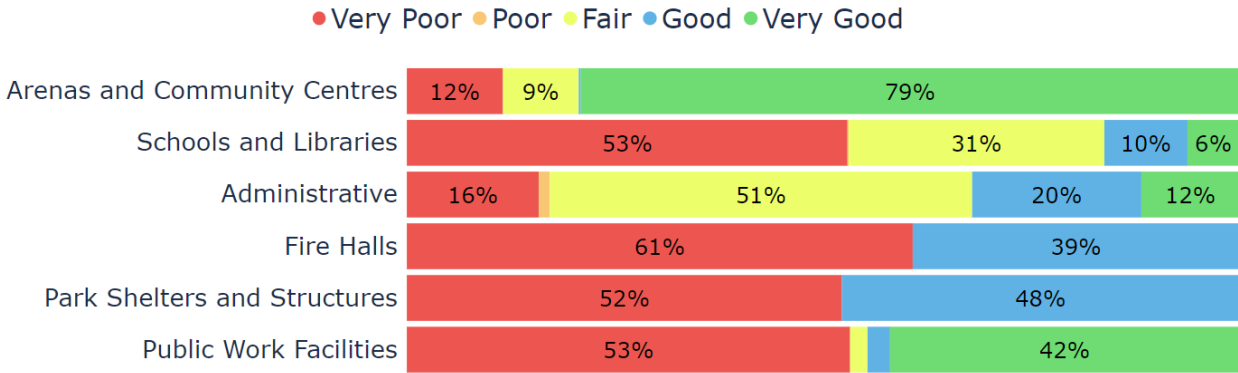
Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

# 6.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Arenas and Community Centres	7 - 40	12.3	80% (Very Good)
Schools and Libraries	10 - 40	11.8	33% (Poor)
Administrative	15 - 40	12.8	57% (Fair)
Fire Halls	15 - 40	20.7	30% (Poor)
Park Shelters and Structures	40	13.9	35% (Poor)
Public Work Facilities	5 - 75	19.3	42% (Fair)
<b>Average</b>		<b>14.3</b>	<b>68% (Good)</b>

The graph below visually illustrates the average condition for each asset segment on a very good to very poor.



The current condition overview of buildings and facilities is based on an asset inventory that is somewhat componentized, as such this should be considered supplementary and/or discarded if a building condition assessment is ever conducted.

To ensure that the Township’s buildings and facilities 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 buildings and facilities.

Each asset’s estimated useful life should also 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.

### 6.2.1 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:

- Formal workplace inspections conducted every year through the Township’s health and safety program.
- High-level assessments by internal staff are performed annually to determine the condition of facilities and identify deficiencies.

In this AMP the following rating criteria is used to determine the current condition of building and facilities segments and forecast future capital requirements:

<b>Condition</b>	<b>Rating</b>
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

# 6.3 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.

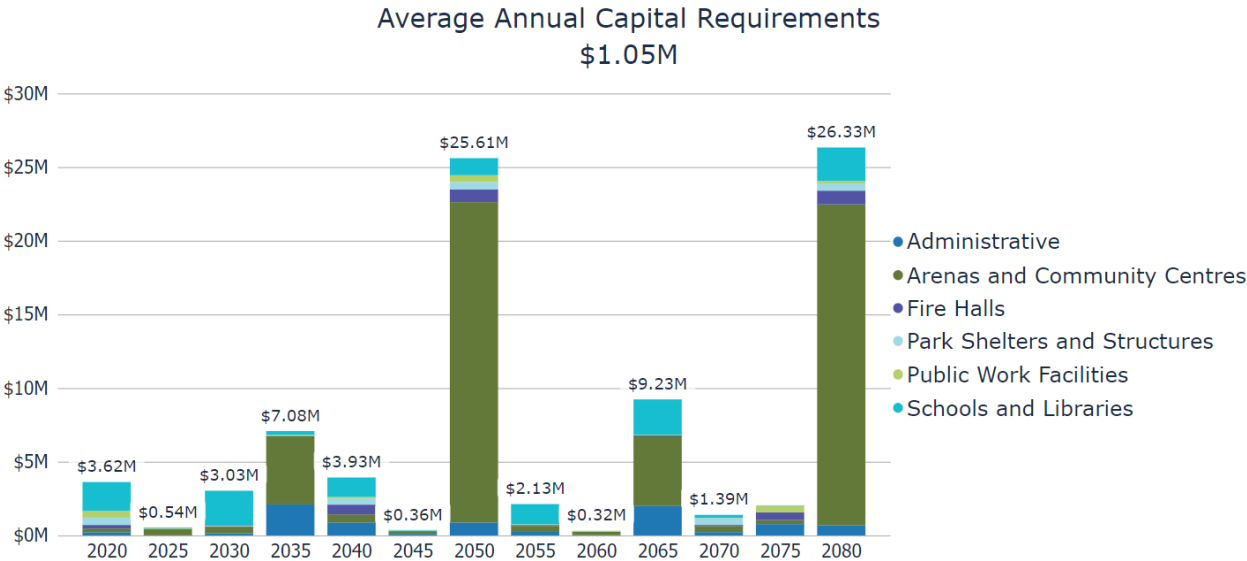
<b>Activity Type</b>	<b>Description of Current Strategy</b>
Maintenance / Rehabilitation	<p>Municipal buildings are subject to regular inspections to identify health &amp; safety requirements as well as structural deficiencies that require additional attention</p> <hr/> <p>Critical buildings (Fire Halls, Arenas, Treatment Plants, etc.) have a detailed maintenance and rehabilitation schedule, while the maintenance of other facilities are dealt with on a case-by-case basis</p>
Replacement	<p>Assessments are completed strategically as buildings approach their end-of-life to determine whether replacement or rehabilitation is appropriate</p>

### 6.3.1 Forecasted Capital Requirements

Based on the current asset inventory and assuming end-of-life replacement of all assets in this category, 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 graph identifies capital requirements over the next 60 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and do not include assets that may be required due to growth.



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 B.

It is important to acknowledge the limitations of the current buildings and facilities inventory due to missing asset data and a lack of component standardization. Accuracy and reliability can be improved by collecting asset data on the specific components that make up the facilities and consolidating it into the current inventory.

# 6.4 Risk & Criticality

## 6.4.1 Risk Matrix

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 based on 2021 inventory data.



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.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of buildings and facilities are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Facility Function / Facility Type

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



## 6.5 Levels of Service

Buildings and Facilities is considered a non-core asset category. As such, the Township has until July 1, 2024, to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

## 6.6 Recommendations

### Asset Inventory

- The Township’s asset inventory contains componentization for some facilities, but overall, there is a lack of standardization and missing asset data. Facilities consist of several separate capital components that have unique estimated useful lives and require asset-specific lifecycle strategies. Staff should work towards a component-based inventory of all facilities to allow for component-based lifecycle planning.

### Condition Assessment Strategies

- A comprehensive structural assessment or a Building Condition Assessment (BCA) of all buildings and facilities that is based on the UNIFORMAT data structure is highly recommended to gain a better understanding of the overall health and condition of each facility to identify accurate short- and long-term capital requirements.

### Replacement Costs

- With the completion of a BCA for all buildings and facilities, the Township should gather accurate component-based replacement costs and update on a regular basis to ensure the accuracy of capital projections.

### Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

### Levels of Service

- Determine the qualitative and technical metrics needed to measure current levels of service for the 2024 deadline as per O. Reg. 588/17.
- Work towards identifying proposed levels of service for the 2025 deadline as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

# 7 Fleet

Fleet assets include machinery, equipment and vehicles and allow staff to efficiently deliver municipal services and personnel. These assets include

- Light-duty and heavy-duty vehicles to support the maintenance of municipal infrastructure and address service requests
- Emergency service vehicles and equipment to support first responders
- IT equipment for communication, entertainment and data management
- Furniture and fixtures for facilities, offices and buildings
- Recreation equipment for parks and recreational spaces
- Tools, shop and garage machinery equipment to ensure proper maintenance of vehicles and machinery

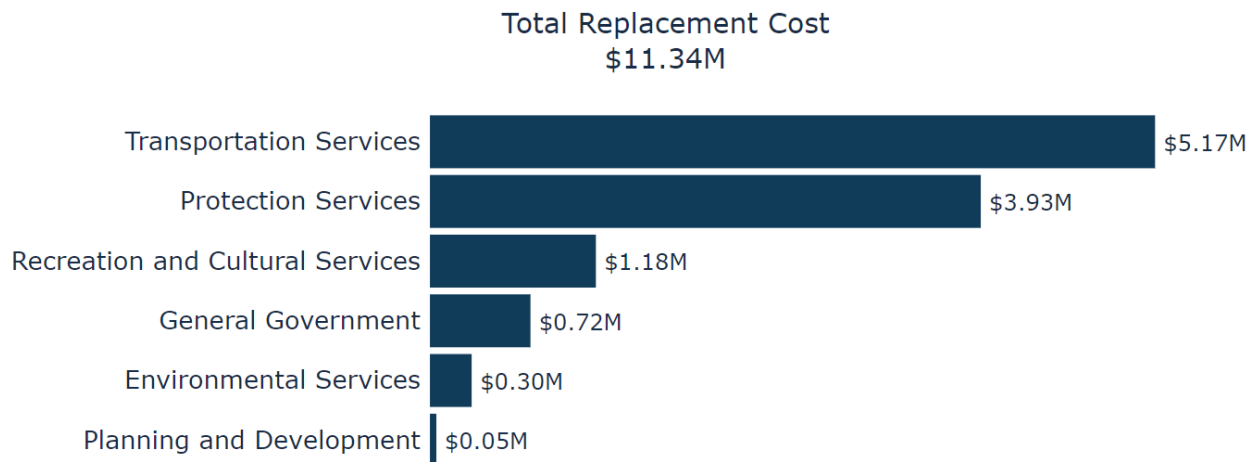
The state of the infrastructure for fleet assets is summarized in the following table.

<b>Replacement Cost</b>	<b>Condition</b>	<b>Financial Capacity</b>	
\$11.34 million	Fair (48%)	Annual Requirement:	\$743,000
		Funding Available:	\$639,000
		Annual Deficit:	\$104,000

## 7.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township’s fleet inventory.

Asset Segment	Number of Assets	Replacement Cost	Annual Capital Requirement
Transportation Services	57	\$5,169,522	\$247,878
Protection Services	110	\$3,926,943	\$248,295
Recreation and Cultural Services	45	\$1,183,034	\$110,365
General Government	105	\$716,736	\$119,867
Environmental Services	2	\$297,398	\$12,426
Planning and Development	3	\$45,781	\$4,578
<b>Total</b>		<b>\$11,339,414</b>	<b>\$743,408</b>



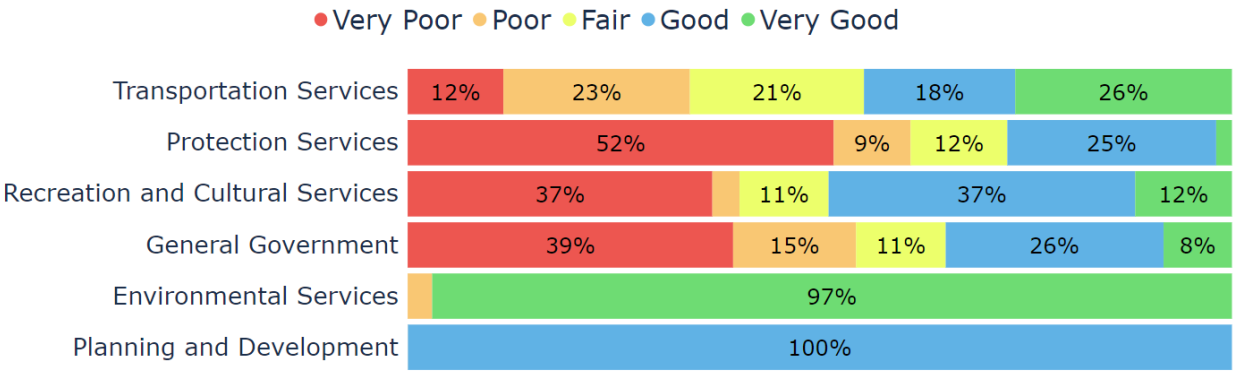
Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

# 7.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Transportation Services	3 - 50	8.3	59% (Fair)
Protection Services	10 - 15	9.1	32% (Poor)
Recreation and Cultural Services	5 - 25	6.1	49% (Fair)
General Government	3 - 20	3.3	48% (Fair)
Environmental Services	15 - 25	4.6	83% (Very Good)
Planning and Development	10 - 15	4.3	89% (Very Good)
<b>Average</b>		<b>6.5</b>	<b>48% (Fair)</b>

The graph below visually illustrates the average condition for each asset segment on a very good to very poor.



To ensure that the Township’s fleet assets continue 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 vehicles.

Each asset’s estimated useful life should also 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.

## 7.2.1 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:

- Staff complete regular visual inspections of fleet assets to ensure they are in state of adequate repair prior to operation
- The mileage of vehicles is used as a proxy to determine remaining useful life and relative vehicle condition
- Condition assessments are conducted on Fire & Emergency fleet assets in accordance with regulations for health and safety regulations including National Fire Protection Association (NFPA) codes and standards for fire service-related fleet assets

In this AMP the following rating criteria is used to determine the current condition of fleet segments and forecast future capital requirements:

<b>Condition</b>	<b>Rating</b>
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

## 7.3 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.

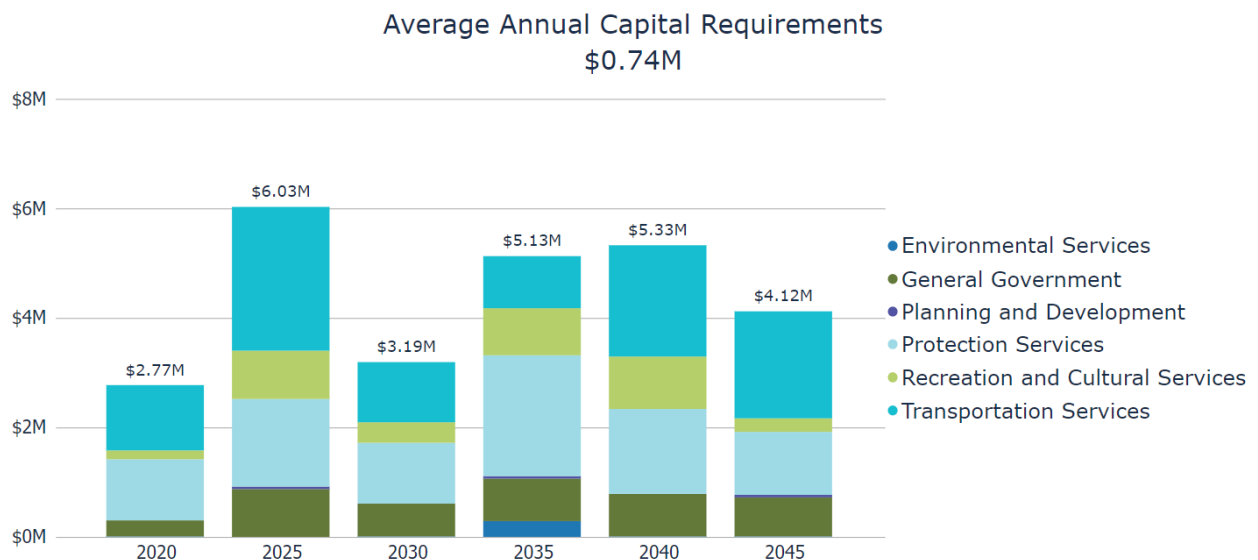
Activity Type	Description of Current Strategy
	Maintenance program varies by department
Maintenance / Rehabilitation	Visual inspections on some fleet assets completed and documented daily; fluids inspected at every fuel stop; tires inspected monthly
	Annual preventative maintenance activities include system components check and additional detailed inspections
Replacement	Age, kilometres and annual repair costs are taken into consideration when determining appropriate treatment options for vehicle assets
	The replacement of machinery and equipment assets depends on deficiencies identified by operators that may impact their ability to complete required tasks

### 7.3.1 Forecasted Capital Requirements

Based on the current asset inventory, the 10-year capital forecast provided by staff and assuming end-of-life replacement of all assets in this category, 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 graph identifies capital requirements over the next 25 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and do not include assets that may be required due to growth.



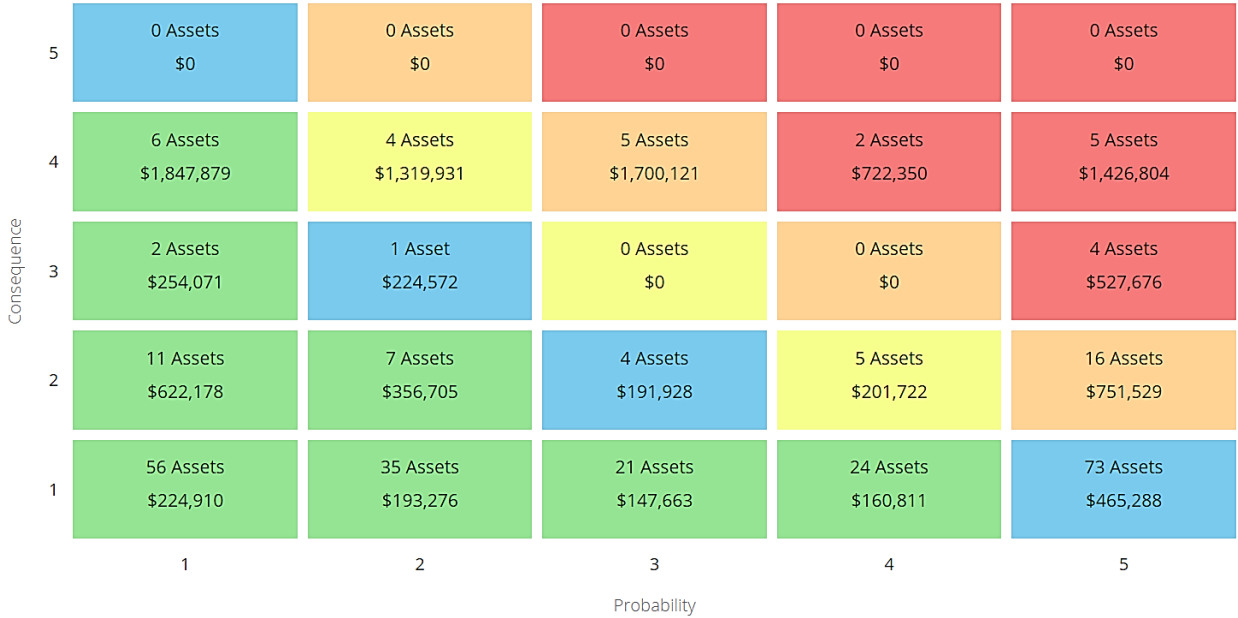
The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.



# 7.4 Risk & Criticality

## 7.4.1 Risk Matrix

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 based on 2021 inventory data.



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.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of vehicles are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Fleet Asset Function (Strategic)

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

## 7.5 Levels of Service

Fleet assets are considered a non-core asset category. As such, the Township has until July 1, 2024, to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

## 7.6 Recommendations

### Replacement Costs

- Gather accurate replacement costs and update on a regular basis to ensure the accuracy of capital projections.

### Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk fleet assets.
- Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

### Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

### Levels of Service

- Determine the qualitative and technical metrics needed to measure current levels of service for the 2024 deadline as per O. Reg. 588/17.
- Work towards identifying proposed levels of service for the 2025 deadline as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

# 8

## Land Improvements

The Township of Cavan Monaghan owns a number of assets that are considered land improvements. This category includes:

- Parking lots for municipal facilities
- Recreational play spaces
- Sport Fields & Courts
- Miscellaneous landscaping and other assets

The state of the infrastructure for the land improvements is summarized in the following table.

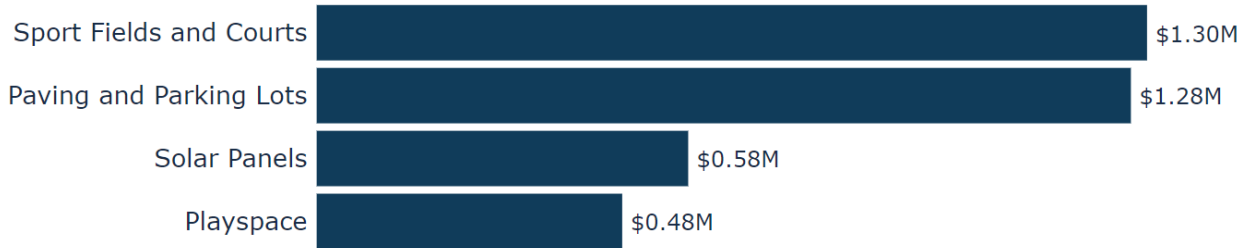
<b>Replacement Cost</b>	<b>Condition</b>	<b>Financial Capacity</b>	
\$3.6 million	Fair (54%)	Annual Requirement:	\$197,000
		Funding Available:	\$66,000
		Annual Deficit:	\$131,000

## 8.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township’s land improvements inventory.

Asset Segment	Number of Assets	Replacement Cost	Annual Capital Requirement
Sport Fields and Courts	6	\$1,302,831	\$65,022
Paving and Parking Lots	19	\$1,277,478	\$85,904
Solar Panels	8	\$582,920	\$14,573
Playspace	17	\$479,382	\$31,525
<b>Total</b>		<b>\$3,642,611</b>	<b>\$197,023</b>

Total Replacement Cost  
\$3.64M



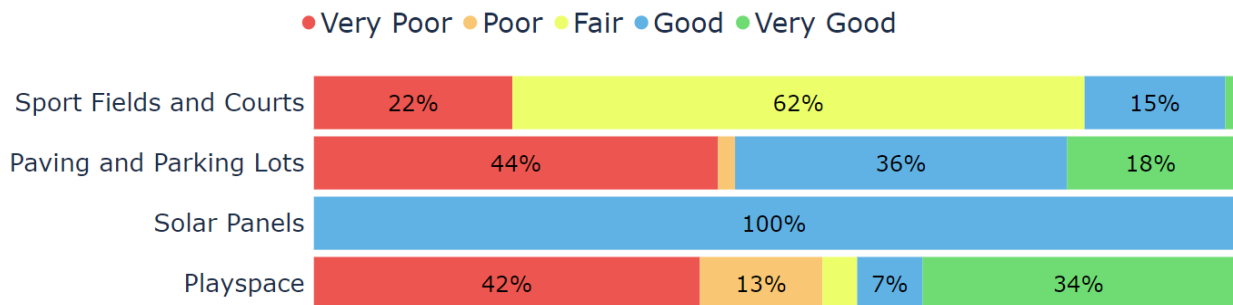
Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

## 8.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Sport Fields and Courts	15 - 25	12.7	51% (Fair)
Paving and Parking Lots	10 - 30	9.7	48% (Fair)
Solar Panels	40	8.1	80% (Very Good)
Playspace	10 - 20	9.5	46% (Fair)
<b>Average</b>		<b>9.8</b>	<b>54% (Fair)</b>

The graph below visually illustrates the average condition for each asset segment on a very good to very poor.



To ensure that the Township’s land improvements assets continue 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 land improvements.

Each asset’s estimated useful life should also 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.

## 8.2.1 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:

- Staff complete regular visual inspections of land improvements assets to ensure they are in state of adequate repair
- Staff conduct formal inspections of outdoor play space, fixed play structures and surfacing in accordance with CAN/CSA-Z614 and required as per O. Reg. 137/15
- There are no other formal condition assessment programs in place for other land improvements assets

In this AMP the following rating criteria is used to determine the current condition of land improvements segments and forecast future capital requirements:

<b>Condition</b>	<b>Rating</b>
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

# 8.3 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.

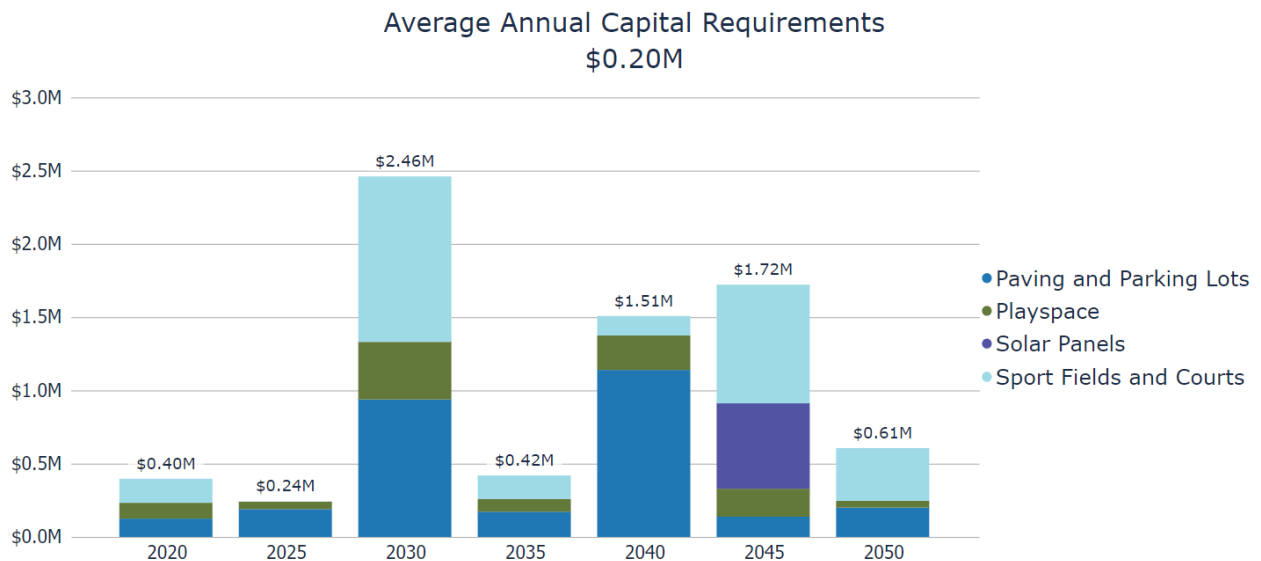
<b>Activity Type</b>	<b>Description of Current Strategy</b>
Maintenance, Rehabilitation & Replacement	The Land improvements asset category includes several unique asset types and lifecycle requirements are dealt with on a case-by-case basis

### 8.3.1 Forecasted Capital Requirements

Based on the current asset inventory, the 10-year capital forecast provided by staff, and assuming end-of-life replacement of all assets in this category, 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 graph identifies capital requirements over the next 30 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and do not include assets that may be required due to growth.



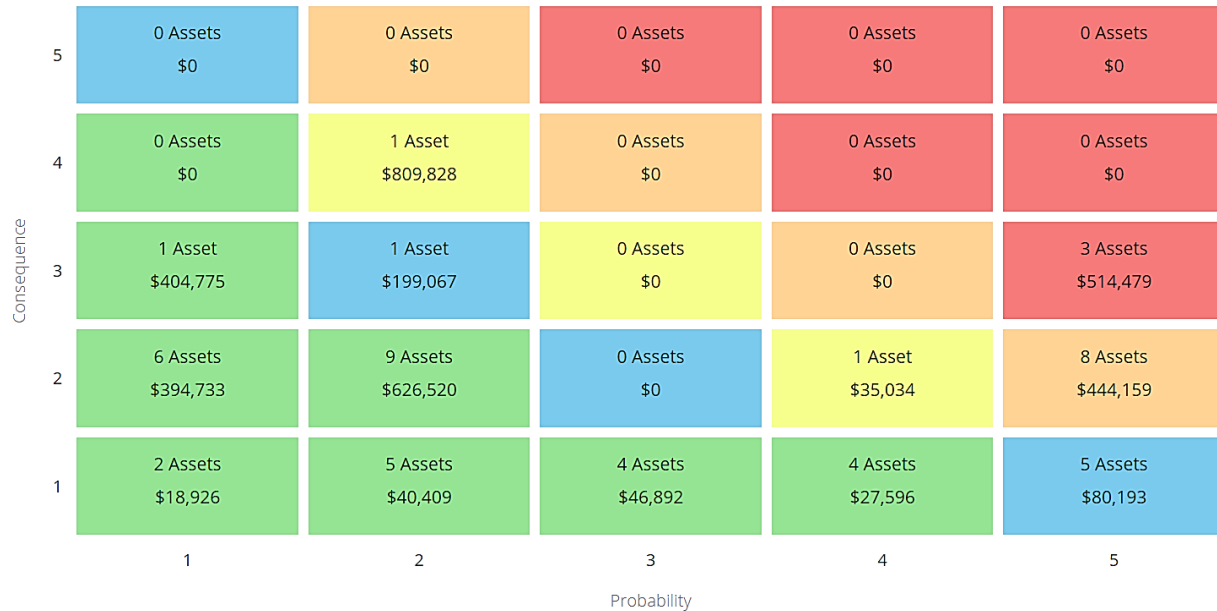
The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.



# 8.4 Risk & Criticality

## 8.4.1 Risk Matrix

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 based on 2021 inventory data.



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.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of land improvements are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Land Improvements Asset Type (Strategic)

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

## 8.5 Levels of Service

Land improvements is considered a non-core asset category. As such, the Township has until July 1, 2024, to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

## 8.6 Recommendations

### Asset Inventory

- The current land improvements asset inventory is incomplete and lacking a consistent asset hierarchy. The Township should conduct an inventory review, collect and consolidate asset data to ensure all relevant assets are accounted for.

### Replacement Costs

- Most of the replacement costs derived for this asset category were based on the inflation of historical costs. These costs should be evaluated to determine their accuracy and reliability. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

### Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk assets.
- Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

### Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

### Levels of Service

- Determine the qualitative and technical metrics needed to measure the current levels of service for the 2024 deadline as per O. Reg. 588/17.
- Work towards identifying proposed levels of service for the 2025 deadline as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

# 9 Water

Water services are provided to residents in the Township through either the water system in the Millbrook Ward or by private wells in the Cavan and North Monaghan Wards. Along with coordination from the current service provider – the City of Peterborough, the Township is responsible for managing the following assets:

- 24 km of water mains
- 120 hydrants
- 970 water meters
- Various buildings and facilities such as a booster pumping station, bulk water stations, water wells and a treatment plant
- Specialized machinery and equipment for the treatment and storage of water

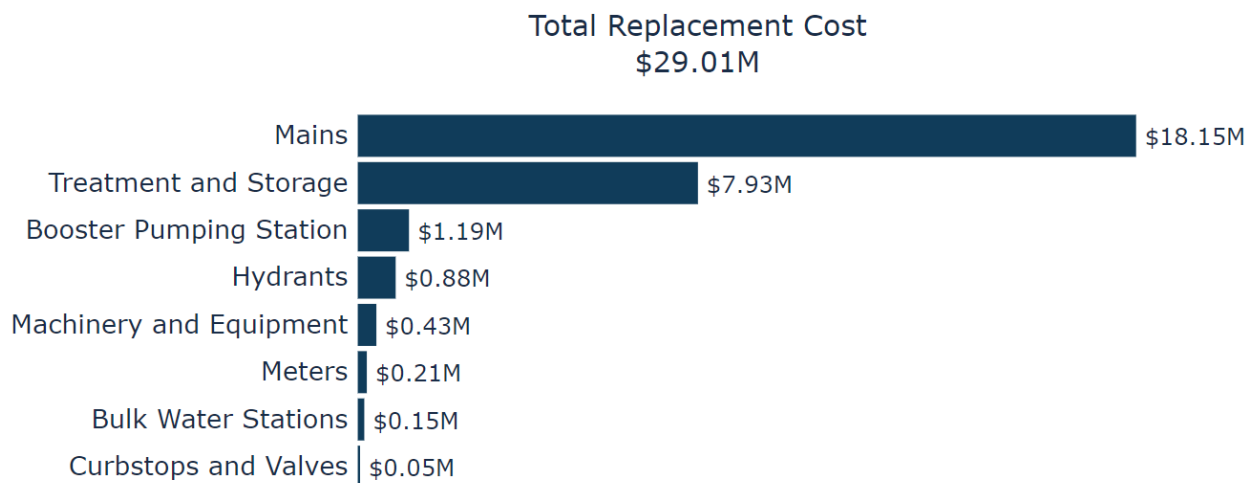
The state of the infrastructure for water assets is summarized in the following table:

<b>Replacement Cost</b>	<b>Condition</b>	<b>Financial Capacity</b>	
\$29.01 million	Good (67%)	Annual Requirement:	\$370,000
		Funding Available:	\$360,000
		Annual Deficit:	\$10,000

## 9.1 Asset Inventory & Costs

The table below includes the quantity, replacement cost method, and annual capital requirements of each asset segment in the Township’s water asset inventory.

Asset Segment	Number of Assets	Replacement Cost	Annual Capital Requirement
Mains	24.2 km	\$18,149,100	\$231,444
Treatment & Storage	21	\$7,932,295	\$101,156
Booster Pumping Station	1	\$1,194,627	\$15,234
Hydrants	104	\$884,000	\$11,273
Machinery & Equipment	13	\$434,123	\$5,536
Meters	970 <sup>5</sup>	\$211,376	\$2,696
Bulk Water Stations	2	\$152,321	\$1,942
Curbstops & Valves	3	\$53,936	\$688
<b>Total</b>		<b>\$29,011,778</b>	<b>\$369,970</b>



Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

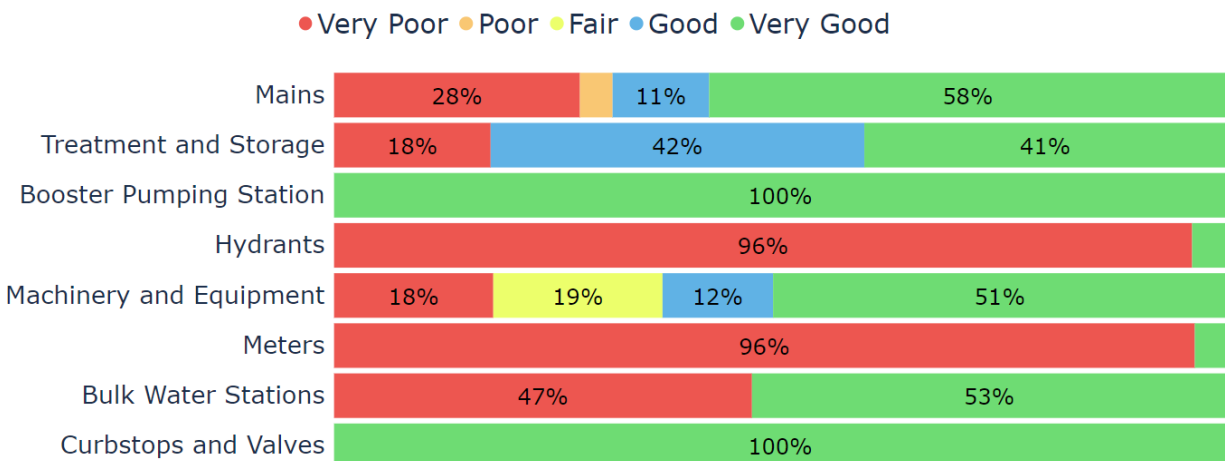
<sup>5</sup> The current water meter inventory in the Township’s central asset inventory is incomplete and will be updated by staff for the next iteration of the AMP.

## 9.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Mains	50 - 80	29.1	67% (Good)
Treatment & Storage	20 - 75	22.9	74% (Fair)
Booster Pumping Station	20 - 75	5.8	96% (Very Good)
Hydrants	30 - 40	14.3	4% (Very Poor)
Machinery & Equipment	10 - 50	9.7	68% (Good)
Meters	15 - 20	15.3	3% (Very Poor)
Bulk Water Stations	20 - 75	7.3	51% (Fair)
Curbstops & Valves	50	6.8	99% (Very Good)
<b>Average</b>		<b>2.2</b>	<b>67% (Good)</b>

The graph below visually illustrates the average condition for each asset segment on a very good to very poor scale.



To ensure that the Township’s water assets continue 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 network.

Each asset’s Estimated Useful Life should also 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.

### 9.2.1 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:

- Staff primarily rely on the age and material of water mains to determine the projected condition of water mains
- Pumps are assessed weekly
- Water storage tanks are inspected 2-3 years by municipal staff and every 5 years by an external contractor
- Aside from the inspections required under O. Reg. 170/3 and multi-year forecasts provided by the City of Peterborough, there are no formal condition assessment programs in place in for water assets

In this AMP the following rating criteria is used to determine the current condition of water assets and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

## 9.3 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.

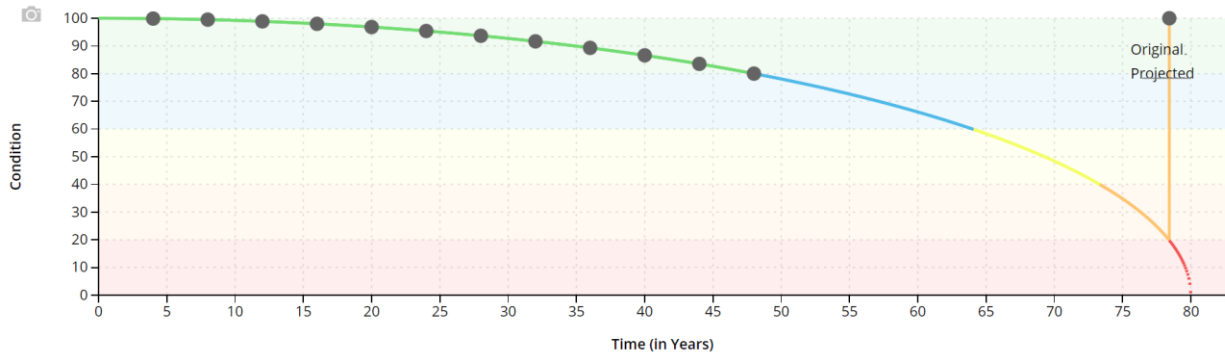
Activity Type	Description of Current Strategy
Maintenance	Annual maintenance program includes: <ul style="list-style-type: none"> <li>• valve exercising</li> <li>• water main flushing</li> <li>• hydrant inspections</li> <li>• air relief valve and chamber inspections</li> </ul>
Rehabilitation/ Replacement	Multi-year capital forecasts are provided by the current service provider and further reviewed by Staff and Consultants  Replacement activities are identified based on an analysis of the main break rate as well as any issues identified during regular maintenance activities
	Similar to other sub-surface infrastructure staff attempt to coordinate water reconstruction projects with road reconstruction projects to produce cost efficiencies



The following lifecycle strategies have been developed to formalize the current approach to managing the lifecycle of water mains.

Instead of allowing water mains to deteriorate until the probability of a water main break is highly likely, strategic preventative maintenance is expected to identify deficiencies and defects on water mains leading to timely and proactive intervention.

Water Mains		
Event Name	Event Class	Event Trigger
CCTV inspection	Preventative Maintenance	As needed
Annual main flushing	Maintenance	Annual
Annual hydrant flushing	Maintenance	Annual
Valve exercising	Maintenance	Repeat every 4 years
Asset Replacement	Replacement	Condition:20

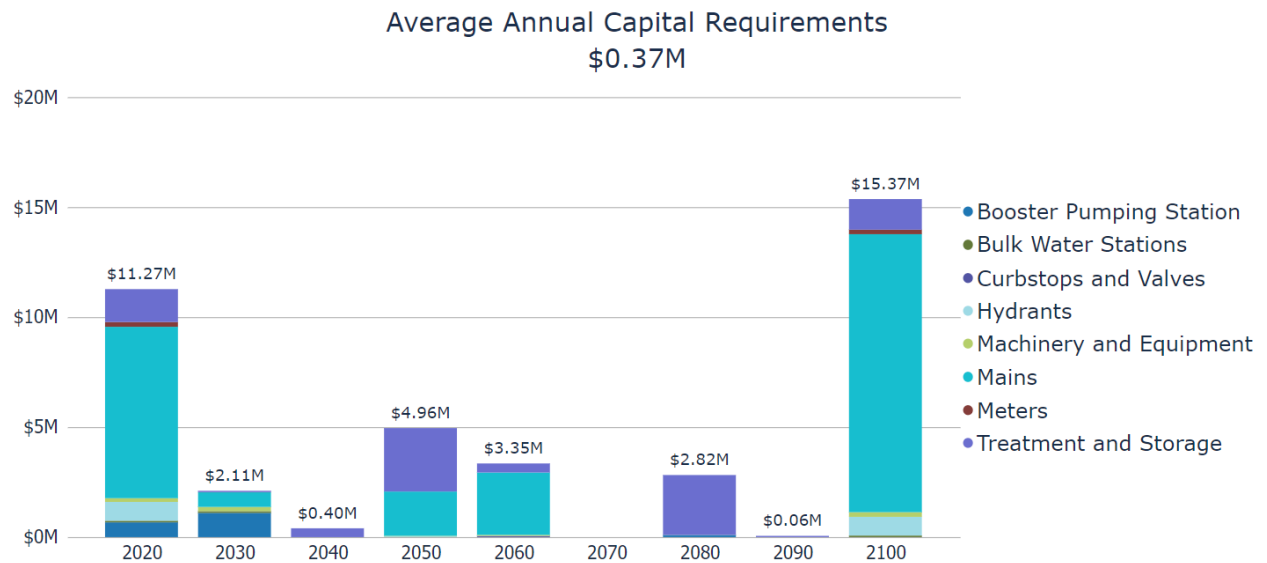


### 9.3.1 Forecasted Capital Requirements

Based on the current asset inventory, a 10-year capital forecast provided by staff assuming end-of-life replacement of all assets in this category, 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 graph identifies capital requirements over the next 80 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 10-year bins and do not include assets that may be required due to growth.

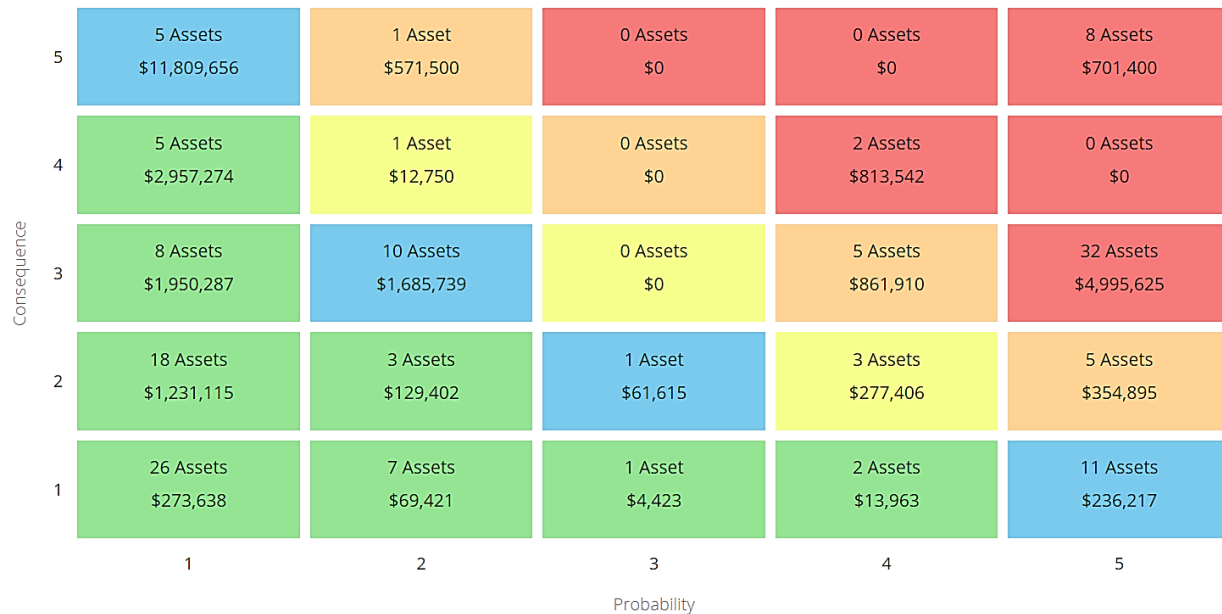


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

# 9.4 Risk & Criticality

## 9.4.1 Risk Matrix

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 based on 2021 inventory data.



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.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the water network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Pipe Material (Linear Assets)	Pipe Diameter (Linear Assets) (Operational)
Service Life Remaining	Asset Type (Strategic)

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

## 9.4.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township is currently facing:



### **Asset Data and Information**

There is a misalignment in the current inventory data for water assets. This includes a pooled listing of water meters, critical water valves as well as an incomplete inventory of water facility components. Some of the asset data has not been consolidated into the Township's central asset inventory. This poses a risk and will lead to discrepancies when trying to manage assets and planning future work.



### **Assessed Condition Data**

Water assets such as mains are difficult to visually inspect, in contrast to storm and sanitary mains which can have CCTV inspections. Water main condition assessments generally rely on age-based estimates of current condition and pipe material to try and predict when mains need to be replaced.

## 9.5 Levels of Service

The following tables identify the Township’s current level of service for water 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.

### 9.5.1 Community Levels of Service

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

<b>Service Attribute</b>	<b>Qualitative Description</b>	<b>Current LOS (2021)</b>
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	The current water network is limited to the Millbrook Ward area, all households and businesses are connected to the network. The network comprises of 24 km of water mains, 970 water meters and various facilities for treatment and distribution.
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	The current water network located in the Millbrook Ward area has fire flow.
Reliability	Description of boil water advisories and service interruptions	The Township has not experienced recent boil water advisories

## 9.5.2 Technical Levels of Service

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

<b>Service Attribute</b>	<b>Technical Metric</b>	<b>Current LOS (2021)</b>
Scope	% of properties connected to the municipal water system	28%
	% of properties where fire flow is available	28%
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
	# 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
Performance	Target reinvestment rate	1.28%
	Capital reinvestment rate	1.24%

## 9.6 Recommendations

### Asset Inventory

- Continue to refine and consolidate asset infrastructure data into the Township's centralized asset inventory to ensure all critical assets are accounted for and to support accurate capital forecasting.
- Review and revise replacement costs and critical attribute data periodically

### Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water assets.

### Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

### Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- 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.

# 10 Sanitary

Sanitary services are provided to residents in the Township through either the sanitary system in the Millbrook Ward or by septic systems in the Cavan and North Monaghan Wards. Along with coordination from the current service provider – the City of Peterborough, the Township is responsible for managing the following assets:

- 13 km of sanitary mains
- 132 maintenance holes
- Facilities such as a pumping station and various facilities associated with treatment and disposal
- Specialized machinery and equipment for the treatment and disposal of sanitary waste

The state of the infrastructure for sanitary assets is summarized in the following table:

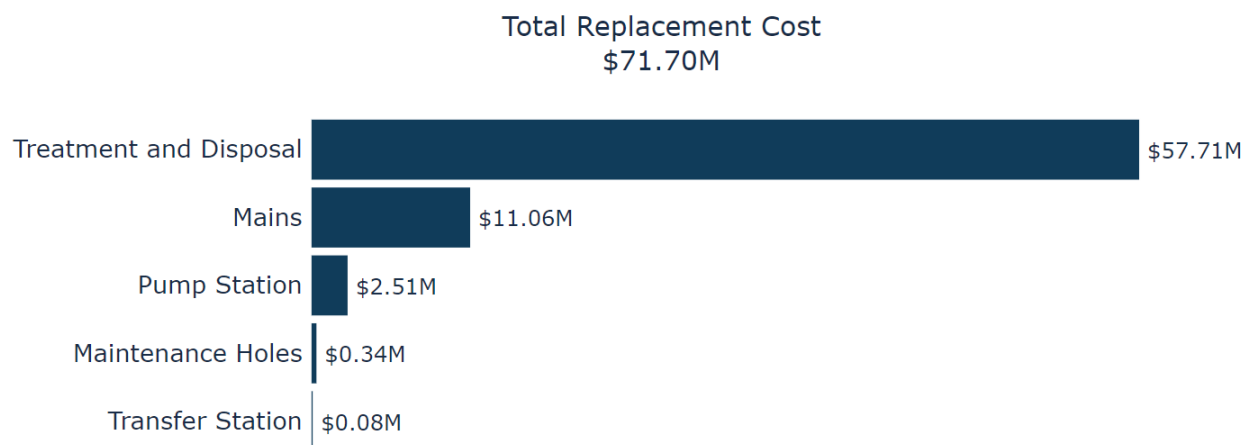
<b>Replacement Cost</b>	<b>Condition</b>	<b>Financial Capacity</b>	
\$71.7 million	Good (65%)	Annual Requirement:	\$2,176,000
		Funding Available:	\$977,000
		Annual Deficit:	\$1,199,000



# 10.1 Asset Inventory & Costs

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

Asset Segment	Number of Assets	Replacement Cost	Annual Capital Requirement
Treatment and Disposal	363	\$57,707,969	\$2,014,178
Mains	12.7 km	\$11,060,577	\$92,364
Pump Station	1	\$2,514,704	\$63,162
Maintenance Holes	30	\$342,360	\$4,635
Transfer Station	1	\$79,062	\$1,931
<b>Total</b>		<b>\$71,704,672</b>	<b>\$2,176,270</b>



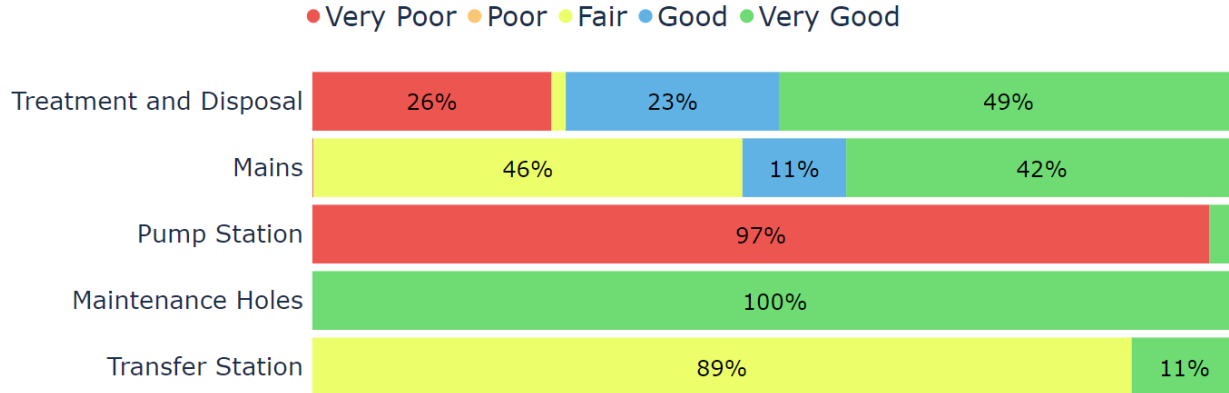
Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

## 10.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition (%)
Treatment and Disposal	10 - 75	7.6	66% (Good)
Mains	40 - 80	27.8	72% (Good)
Pump Station	35 - 50	33.9	5% (Very Poor)
Maintenance Holes	50 - 75	5.6	100% (Very Good)
Transfer Station	40 - 50	33.8	51% (Fair)
<b>Average</b>		<b>14.7</b>	<b>65% (Good)</b>

The graph below visually illustrates the average condition for each asset segment on a very good to very poor scale.



To ensure that the Township’s sanitary assets continue 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 sanitary assets.

Each asset’s Estimated Useful Life should also 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.

# 10.2.1 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:

- CCTV inspections are conducted on as-needed basis as well as in coordination with main relining and/or road construction projects
- Sanitary facilities are inspected under an established schedule and deficiencies are tracked through the Supervisory Control and Data Acquisition (SCADA) system
- Staff rely on a variety of metrics including age, pipe material and diameter, location, and available CCTV assessments to determine the projected condition of linear assets
- Multi-year forecasts from the City of Peterborough also help Staff and Consultants in identifying assets in need of repair

In this AMP the following rating criteria is used to determine the current condition of sanitary assets and forecast future capital requirements:

<b>Condition</b>	<b>Rating</b>
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

## 10.3 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.

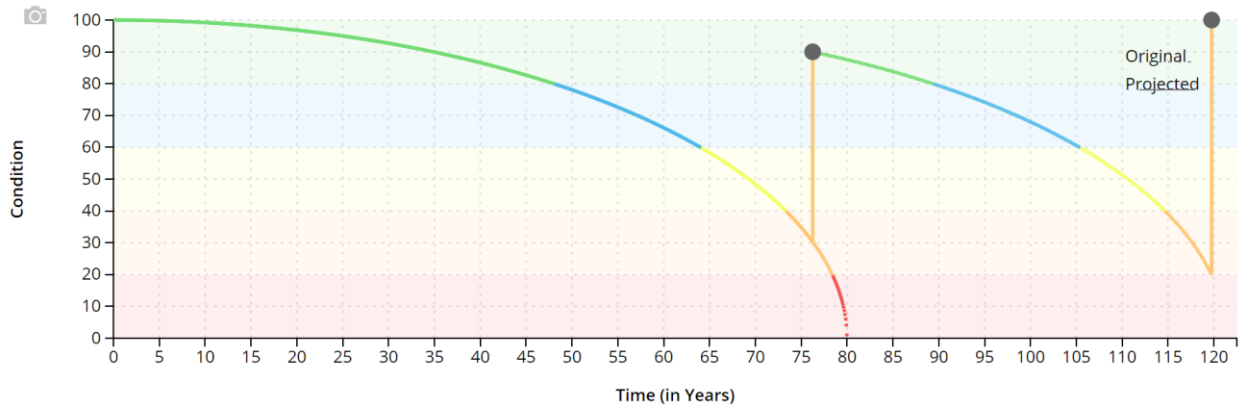
The following table outlines the Township’s current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Annual maintenance of mains that consists of main flushing, rodding and inspections
	Annual maintenance of manholes that consists of manhole inspection, lid replacement, lining and grouting
Rehabilitation	There is a sanitary main relining program in place and significant relining has been undertaken the past 4 years. Staff have also observed a reduction of Inflow and Infiltration (I/I) issues as a result of this rehabilitative activity.
Replacement	Multi-year capital forecasts are provided by the current service provider and further reviewed by Staff and Consultants
	Similar to other sub-surface infrastructure staff attempt to coordinate sanitary reconstruction projects with road reconstruction projects to produce cost efficiencies

The following lifecycle strategies have been developed to formalize the current approach to managing the lifecycle of sanitary mains.

Instead of allowing the sanitary mains to deteriorate until replacement is required, strategic preventative maintenance and rehabilitation is expected to identify deficiencies and defects and also extend the service life of mains at a lower total cost

Sanitary Mains		
Event Name	Event Class	Event Trigger
Main flushing, rodding and inspections	Maintenance	Annually
Maintenance Hole inspection	Maintenance	Annually
CCTV inspection	Preventative Maintenance	As needed
Sewer Relining	Rehabilitation	Condition: 30-40
Asset Replacement	Replacement	Condition: 20

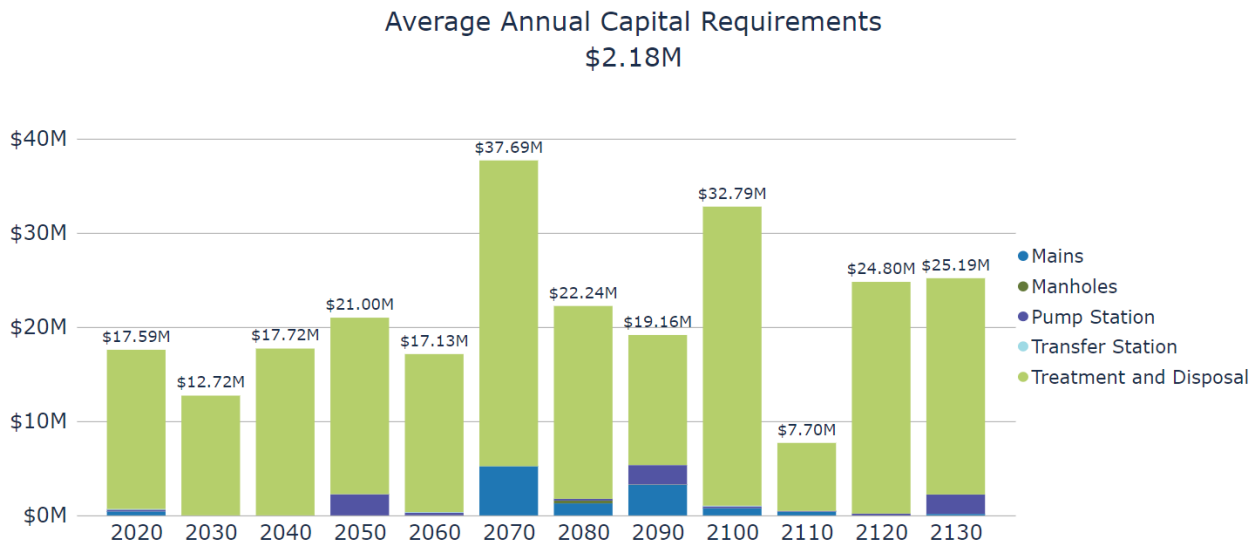


### 10.3.1 Forecasted Capital Requirements

Based on the current asset inventory, a proactive relining program in place for sanitary mains, a 10-year capital forecast provided by staff and assuming end-of-life replacement of all assets in this category, 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 graph identifies capital requirements over the next 110 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 10-year bins and do not include assets that may be required due to growth.

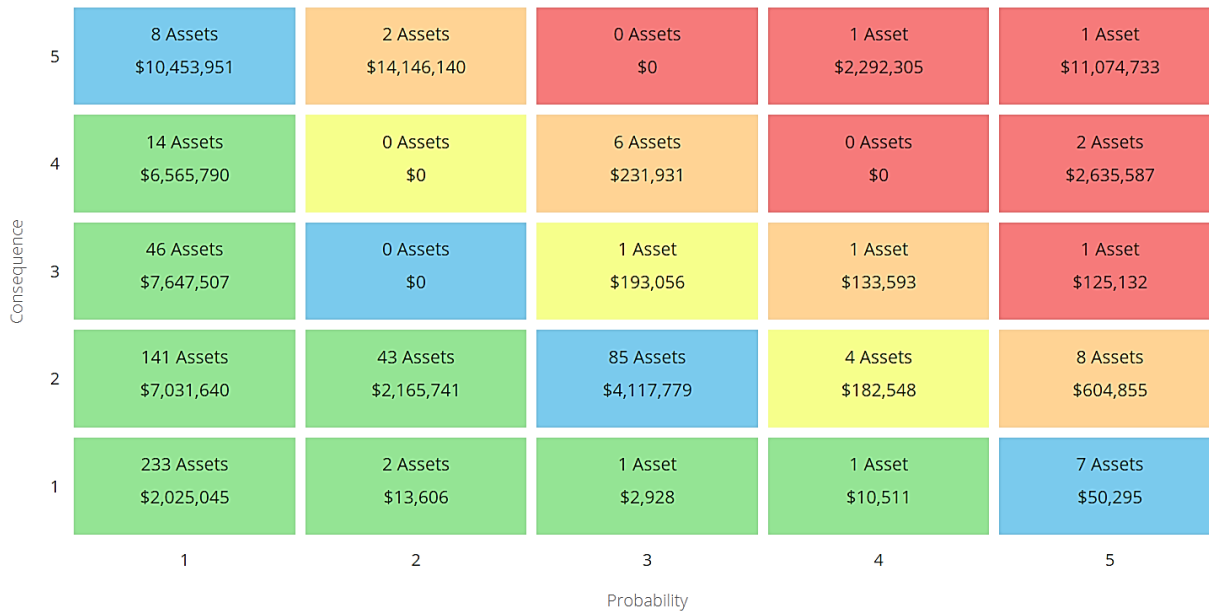


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

# 10.4 Risk & Criticality

## 10.4.1 Risk Matrix

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 based on 2021 inventory data.



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.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the sanitary network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Pipe Material (Linear Assets)	Pipe Diameter (Linear Assets) (Operational)
Service Life Remaining	Asset Type (Strategic)

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

# 10.4.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township is currently facing:



### **Asset Data and Information**

There is a misalignment in the current inventory data for critical sanitary assets. Some of the asset data has not been consolidated into the Township’s central asset inventory while some assets in the inventory are pooled. This poses a risk and will lead to discrepancies when trying to manage assets and planning future work.



### **Climate Change & Extreme Weather Events**

With the intensity and frequency of climate change and extreme weather events increasing, the Township’s sanitary system faces a higher probability of inflow and infiltration issues.



## 10.5 Levels of Service

The following tables identify the Township’s current level of service for sanitary 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.

### 10.5.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	The current sanitary network is limited to the Millbrook Ward area, all households and businesses are connected to the network. The network comprises of 13 km of sanitary mains, 30 maintenance holes, and various facilities for treatment and disposal.
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	There are no combined sewers within the Township
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	

<b>Service Attribute</b>	<b>Qualitative Description</b>	<b>Current LOS (2021)</b>
	<p>Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes</p>	<p>Stormwater can enter into sanitary sewers due to damaged 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 directing storm water to the storm drain system can help to reduce the chance of this occurring.</p> <p>The Township follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups.</p> <p>Staff have also indicated that there is a possibility that some of the sump pumps connected to the sanitary network could lead to overflow. As part of the Township’s relining program, Staff will be addressing this vulnerability.</p>
	<p>Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration</p>	<p>The Township has experienced localized infiltration in the past that has been addressed through a robust sewer relining program.</p>

Service Attribute	Qualitative Description	Current LOS (2021)
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 Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.	

## 10.5.2 Technical Levels of Service

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

<b>Service Attribute</b>	<b>Technical Metric</b>	<b>Current LOS (2021)</b>
Scope	% of properties connected to the municipal wastewater system	27%
	# 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
Reliability	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0.002
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	0.002
Performance	Target reinvestment rate	3.03%
	Capital reinvestment rate	1.36%

# 10.6 Recommendations

## Asset Inventory

- A number of assets in the inventory have been identified as non-capital assets. The Township should conduct an inventory data review to verify and revise accordingly
- Continue to refine and consolidate asset infrastructure data into the Township's centralized asset inventory to ensure all critical assets are accounted for and to support accurate capital forecasting.
- Review and revise replacement costs and critical attribute data periodically

## Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk sanitary assets.

## Risk Management Strategies

- Continue monitoring the infiltration and inflow issues and plan appropriately
- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

## Lifecycle Management Strategies

- Evaluate the efficacy of the Township's lifecycle management strategies at regular intervals to determine the impact cost, condition and risk.

## Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- 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.

# 11 Impacts of Growth

## Key Insights

- 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
- Considerable population and employment growth is expected with growth in the Millbrook Urban Area representing about 70% of all of the growth in the Township
- Growth in the Hamlets will be contingent on the ability to provide adequate individual on-site, sewage and water services on a sustainable basis
- The costs of growth should be considered in long-term funding strategies that are designed to maintain the current level of service

# 11.1 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.

## 11.1.1 Cavan Monaghan Official Plan (2012)

The Township adopted the Official Plan in 2012. The Official Plan was then approved by the County of Peterborough in 2013, followed by approvals from the Ontario Municipal Board (OMB) in 2015.

The Plan also incorporates local land use directions and required Provincial policies, including the Oak Ridges Moraine Conservation Plan, the Provincial Policy Statement, the 2005 Growth Plan for the Greater Golden Horseshoe and recent amendments to the County of Peterborough Official Plan.

The most recent consolidation of the plan occurred in October of 2021.

The Official Plan is a planning document that contains detailed policies regarding general development, the designation of land uses, the provision of community services, road class designation, infrastructure development and management. The Plan also establishes goals, actions and policies to shape, guide and direct the physical growth and composition of the urban and rural areas of the Township.

The Plan is intended to serve as the basis for managing change in the Township and as a major policy document to the year 2031. The provincial policy also requires that the Township's Official Plan be updated to the year of 2051 and to be completed by the Township.

The Settlement Area policies apply to the Township's Millbrook Urban Area and the designated Hamlets. The Settlement Policy Area designation is intended to be the areas of the Township where growth will be focused in order to optimize the use of public services and infrastructure, and to minimize outward sprawl of development into areas of natural resources and natural heritage.

According to the Official Plan, the Township's population is forecasted to reach 11,560 by the year 2031. This growth represents approximately 2,730 persons between 2006 and 2031. In terms of employment opportunities, the Township will establish a target of one new job for each three new residents over the planning

period to 2031. This full-time employment growth represents approximately 900 new jobs between 2006 and 2031.

## 11.1.2 County of Peterborough Official Plan (1994)

In 1994, the County of Peterborough adopted the Official Plan in order to direct and guide the actions of local municipalities and the County in policy development and physical planning on a very broad basis.

For the Township of Cavan Monaghan, the Official Plan serves as the upper tier Official Plan for the County. It establishes a vision in which planning and stewardship protect and enhance a diverse landscape, lifecycle and a sense of community for the County.

The County is responsible for the allocation of growth to the local municipalities, which is based on a combination of local factors including: local planning policy; historic and recent growth trends; market demand; and the capacity to accommodate growth from land supply and servicing perspectives.

The Official Plan also directs conformance with required Provincial policies such as the 2005 Growth Plan for the Greater Golden Horseshoe.

The most recent consolidation of the plan occurred in March of 2020.

## 11.1.3 Development Charges Background Study (2022)

The Township of Cavan Monaghan prepared a Development Charges Background Study in 2022, pursuant to Section 10 of the Development Charges Act, 1007 (DCA).

The following tables outline the population and employment forecasts allocated to the Township in the study:

<b>Population Forecast from 2016 to 2032</b>			
<b>Municipality</b>	<b>2016</b>	<b>2022</b>	<b>2032</b>
Cavan Monaghan	9,050	10,480	13,330

<b>Employment Forecast from 2016 to 2032</b>			
<b>Municipality</b>	<b>2016</b>	<b>2022</b>	<b>2032</b>
Cavan Monaghan	3,417	4,084	5,910



As a requirement of the Development Charges Act under subsection 10(2)(c), an analysis must be undertaken to assess the long-term capital and operating cost impacts for the capital infrastructure projects identified within the Development Charges.

The background study must also include an asset management plan that deals with all assets proposed to be funded, in whole or in part, by D.C.s. The asset management plan must show that the assets are financially sustainable over their full lifecycle.

## 11.2 Impact of Growth on Lifecycle Activities

By July 1, 2025, 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.

# 12 Financial Strategy

## Key Insights

- The Township is committing approximately \$3.81 million towards capital projects per year from sustainable revenue sources
- Given the annual capital requirement of \$7.03 million, there is currently a funding gap of \$3.22 million annually
- For tax-funded assets, we recommend increasing tax revenues by 1.9% each year for the next 10 years to achieve a sustainable level of funding
- For water rate-funded assets, we recommend reviewing the Water & Wastewater User Fees and Charges Study to ensure the rate revenues include a 0.2% increase annually over a 10-year period to achieve a sustainable level of funding
- For sanitary rate-funded assets, we recommend reviewing the Water & Wastewater User Fees and Charges Study to ensure the rate revenues include a 4.6% increase annually over a 15-year period to achieve a sustainable level of funding

## 12.1 Financial Strategy Overview

For an asset management plan to be effective and meaningful, it must be integrated with financial planning and long-term budgeting. The development of a comprehensive financial plan will allow the Township of Cavan Monaghan to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

This report develops such a financial plan by presenting several scenarios for consideration and culminating with final recommendations. As outlined below, the scenarios presented model different combinations of the following components:

1. The financial requirements for:
  - a. Existing assets
  - b. Existing service levels
  - c. Requirements of contemplated changes in service levels (none identified for this plan)
  - d. Requirements of anticipated growth (none identified for this plan)
2. Use of traditional sources of municipal funds:
  - a. Tax levies
  - b. User fees
  - c. Reserves
  - d. Debt
3. Use of non-traditional sources of municipal funds:
  - a. Reallocated budgets
  - b. Partnerships
  - c. Procurement methods
4. Use of Senior Government Funds:
  - a. 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.

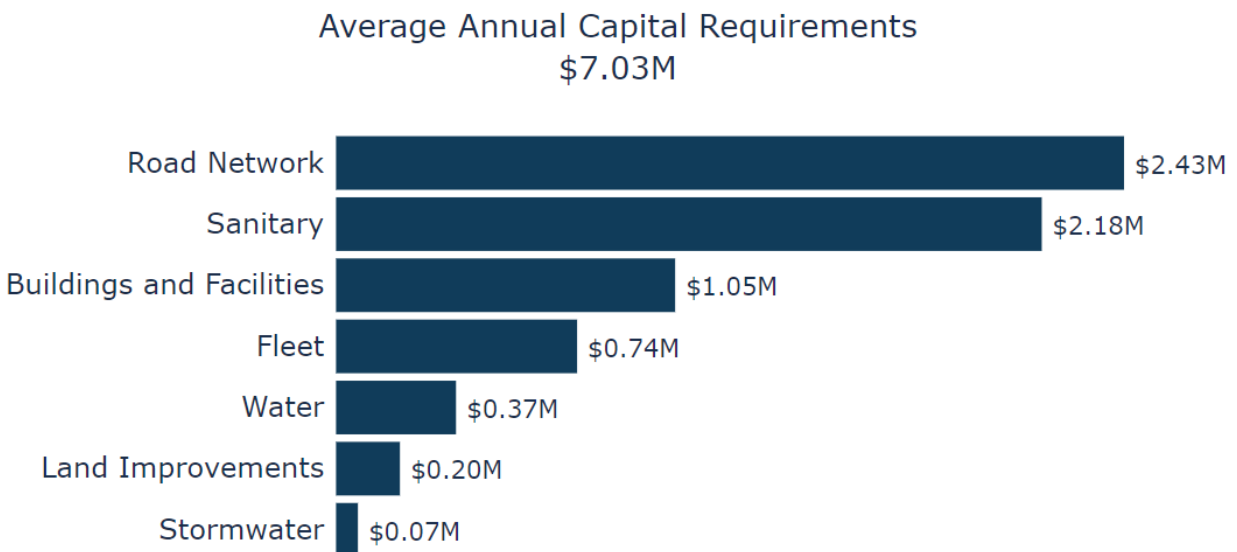
If the financial plan component results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the Province may evaluate a Township's approach to the following:

1. In order to reduce financial requirements, consideration has been given to revising service levels downward.
2. All asset management and financial strategies have been 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.

## 12.1.1 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. In total, the Township must allocate approximately \$7.0 million annually to address capital requirements 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 HCB roads, LCB roads, and sanitary mains, 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 HCB roads, LCB roads, and Sanitary mains:

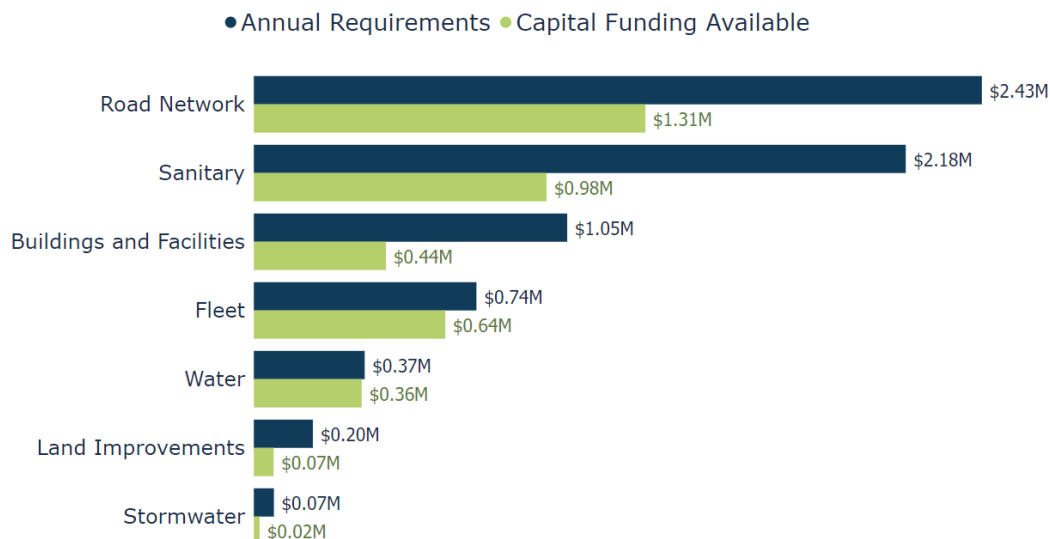
1. **Replacement Only Scenario:** Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life.
2. **Lifecycle Strategy Scenario:** Based on the assumption that lifecycle activities are performed at strategic intervals to extend the service life of assets until replacement is required.

Asset Segment	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
HCB Roads	\$342,750	\$173,058	\$169,692
LCB Roads	\$4,505,282	\$2,087,389	\$2,417,893
Sanitary Mains	\$138,257	\$92,364	\$45,893
<b>Total</b>	<b>\$4,986,289</b>	<b>\$2,352,811</b>	<b>\$2,633,478</b>

The implementation of a proactive lifecycle strategy for HCB roads, LCB roads and sanitary mains leads to a potential annual cost avoidance of \$2,587,585 for roads assets and \$45,893 for sanitary assets. This represents an overall reduction of the annual requirements by 53%. As the lifecycle strategy scenario represents the lowest cost option available to the Township, we have used this annual requirement 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 \$3,809,000 towards capital projects per year from sustainable revenue sources. Given the annual capital requirement of \$7,029,933, there is currently a funding gap of \$3,220,000 annually.



## 12.2 Funding Objective

We have developed a scenario that would enable Cavan Monaghan to achieve full funding within 15 years for the following assets:

1. **Tax Funded Assets:** Road Network, Stormwater, Buildings and Facilities, Fleet, Land Improvements
2. **Rate-Funded Assets:** Water, Sanitary

**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.

For each scenario developed we have included strategies, where applicable, regarding the use of cost containment and funding opportunities.

## 12.3 Financial Profile: Tax Funded Assets

### 12.3.1 Current Funding Position

The following tables show, by asset category, Cavan Monaghan’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	Taxes to Reserves		
Road Network	2,430,000	355,000	280,000	672,000	1,307,000	1,123,000
Stormwater	67,000	0	0	19,000	19,000	48,000
Buildings and Facilities	1,046,000	152,000	0	289,000	441,000	605,000
Fleet	743,000	434,000	0	205,000	639,000	104,000
Land Improvements	197,000	12,000	0	54,000	66,000	131,000
	<b>4,483,000</b>	<b>953,000</b>	<b>280,000</b>	<b>1,239,000</b>	<b>2,472,000</b>	<b>2,011,000</b>

The average annual investment requirement for the above categories is \$4,483,000. Annual revenue currently allocated to these assets for capital purposes is \$2,472,000 leaving an annual deficit of \$2,011,000. Put differently, these infrastructure categories are currently funded at 55% of their long-term requirements.

### 12.3.2 Full Funding Requirements

In 2021, Township of Cavan Monaghan has annual tax revenues of \$10,143,383. 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 Increase Required for Full Funding
Road Network	11.1%
Stormwater	0.5%
Buildings and Facilities	6.0%
Fleet	1.3%
Land Improvements	1.0%
	<b>19.9%</b>

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above. The table below outlines this concept and presents several options:

	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	2,011,000	2,011,000	2,011,000	2,011,000	2,011,000	2,011,000	2,011,000	2,011,000
Change in Debt Costs	N/A	N/A	N/A	N/A	0	0	0	0
Change in OCIF Grants	N/A	N/A	N/A	N/A	0	0	0	0
<b>Resulting Infrastructure Deficit</b>	<b>2,011,000</b>	<b>2,011,000</b>	<b>2,011,000</b>	<b>2,011,000</b>	<b>2,011,000</b>	<b>2,011,000</b>	<b>2,011,000</b>	<b>2,011,000</b>
Tax Increase Required	19.9%	19.9%	19.9%	19.9%	19.9%	19.9%	19.9%	19.9%
<b>Annually</b>	<b>3.8%</b>	<b>1.9%</b>	<b>1.3%</b>	<b>1.0%</b>	<b>3.8%</b>	<b>1.9%</b>	<b>1.3%</b>	<b>1.0%</b>



### 12.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 10-year option. This involves full CapEx funding being achieved over 10 years by:

- a) increasing tax revenues by 1.9% each year for the next 10 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
- b) allocating the current gas tax and OCIF revenue as outlined previously.
- c) should the scheduled OCIF grant increase, the Township should reduce the annual tax increase by an amount equal to the grant increase as it occurs.
- d) reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
- e) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable since this funding is a multi-year commitment<sup>6</sup>.
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full CapEx funding on an annual basis in 10 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 pent-up investment demand of \$4,457,000 for the Buildings & Facilities, \$780,000 for Land Improvements, and \$2,235,000 for Fleet.

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.

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<sup>6</sup> The Township should take advantage of all available grant funding programs and transfers from other levels of government. While OCIF has historically been considered a sustainable source of funding, the program is currently undergoing review by the provincial government. Depending on the outcome of this review, there may be changes that impact its availability.

## 12.4 Financial Profile: Rate Funded Assets

### 12.4.1 Current Funding Position

The following tables show, by asset category, Cavan Monaghan’s average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by rates.

Asset Category	Avg. Annual Requirement	Annual Funding Available					Annual Deficit
		Rates	To Operations	OCIF	Taxes to Reserves	Total Available	
Water	2,176,000	1,258,000	-1,035,000	117,000	637,000	977,000	1,199,000
Sanitary	370,000	963,000	-693,000	0	90,000	360,000	10,000
	<b>2,546,000</b>	<b>2,221,000</b>	<b>-1,728,000</b>	<b>117,000</b>	<b>727,000</b>	<b>1,337,000</b>	<b>1,209,000</b>

The average annual investment requirement for the above categories is \$2,546,000. Annual revenue currently allocated to these assets for capital purposes is \$1,337,000 leaving an annual deficit of \$1,209,000. Put differently, these infrastructure categories are currently funded at 53% of their long-term requirements.

### 12.4.2 Full Funding Requirements

In 2020, Cavan-Monaghan had annual sanitary revenues of \$1,258,000 and annual water revenues of \$963,000. 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
Water	95.3%
Sanitary	1.0%

In the following tables, we have expanded the above scenario to present multiple options. Due to the significant increases required, we have provided phase-in options of up to 20 years:

	Water				Sanitary			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	1,199,000	1,199,000	1,199,000	1,199,000	10,000	10,000	10,000	10,000
Rate Increase Required	95.3%	95.3%	95.3%	95.3%	1.0%	1.0%	1.0%	1.0%
<b>Annually:</b>	<b>14.4%</b>	<b>7.0%</b>	<b>4.6%</b>	<b>3.5%</b>	<b>0.3%</b>	<b>0.2%</b>	<b>0.1%</b>	<b>0.1%</b>

### 12.4.3 Financial Strategy Recommendations

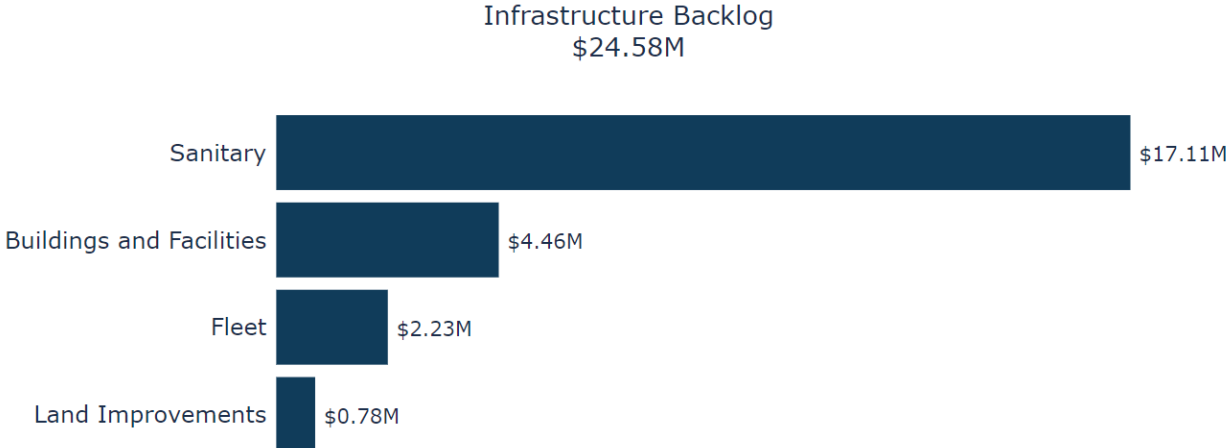
Considering the above information, we recommend the 15-year option for sanitary assets and the 10-year option for the Water assets. This involves full CapEx funding being achieved over 15 years by:

- a) increasing rate revenues by 4.6% each year for the next 15 years for Sanitary assets and increasing rate revenues by 0.2% each year for the next 10 years for the Water assets.
- b) These rate revenue increases are solely for the purpose of phasing in full funding to the respective asset categories covered in this AMP.
- c) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. This periodic funding should not be incorporated into an AMP unless there are firm commitments in place.
2. We realize that raising rate revenues for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.
3. Any increase in rates required for operations would be in addition to the above recommendations.

Although this strategy achieves full CapEx funding for rate-funded assets over 20 years, the recommendation does require prioritizing capital projects to fit the annual funding available. Current data shows a pent-up investment demand of \$17,110,000 for sanitary assets.



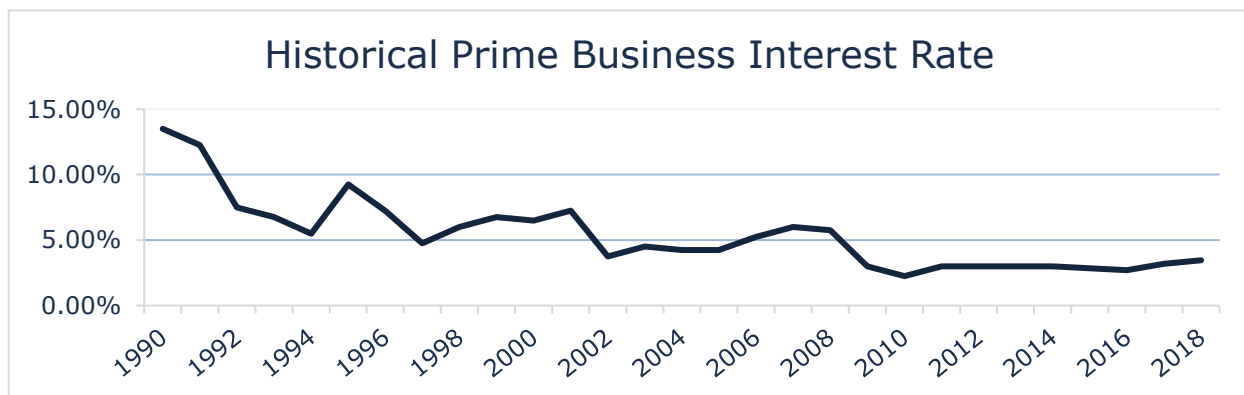
Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

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



<sup>7</sup> 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 following tables outline how Cavan-Monaghan has historically used debt for investing in the asset categories as listed. There is currently \$7,219,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of \$506,000, well within its provincially prescribed maximum of \$2,728,000

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2017	2018	2019	2020	2021
Road Network	0	0	0	0	0	0
Stormwater	0	0	0	0	0	0
Buildings & Facilities	0	0	0	0	0	0
Fleet	0	0	0	0	0	0
Land Improvements	0	0	0	0	0	0
<b>Total Tax Funded:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Water	7,219,000	0	8,243,000	0	0	0
Sanitary	0	0	0	0	0	0
<b>Total Rate Funded:</b>	<b>7,219,000</b>	<b>0</b>	<b>8,243,000</b>	<b>0</b>	<b>0</b>	<b>0</b>

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2022	2023	2024	2025	2026	2027	2032
Road Network	0	0	0	0	0	0	0
Stormwater	0	0	0	0	0	0	0
Buildings & Facilities	0	0	0	0	0	0	0
Fleet	0	0	0	0	0	0	0
Land Improvements	0	0	0	0	0	0	0
<b>Total Tax Funded:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Water	506,000	506,000	506,000	506,000	504,000	504,000	506,000
Sanitary	0	0	0	0	0	0	0
<b>Total Rate Funded:</b>	<b>506,000</b>	<b>506,000</b>	<b>506,000</b>	<b>506,000</b>	<b>504,000</b>	<b>504,000</b>	<b>506,000</b>

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

# 12.6 Use of Reserves

## 12.6.1 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 totals of the reserves currently available towards the Township’s capital asset inventory.

<b>Funding Source</b>	<b>Balance on December 31, 2021</b>
Tax Funded Assets	8,637,708
Rate Funded Assets	5,068,292
<b>Total:</b>	<b>13,706,000</b>

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 take into account 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 Cavan Monaghan’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.

## 12.6.2 Recommendation

In 2025, Ontario Regulation 588/17 will require Cavan Monaghan 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.



# 13 Appendices

## Key Insights

- Appendix A includes a one-page report card with an overview of key data from each asset category
- Appendix B identifies projected 10-year capital requirements for each asset category
- Appendix C provides additional guidance on the development of a condition assessment program
- Appendix D provides a tailored list of next steps to advance the Township's asset management program
- Appendix E provides an O. Reg. 588/17 compliance snapshot

# Appendix A: Infrastructure Report Card

Asset Category	Replacement Cost (millions)	Asset Condition	Financial Capacity	
Road Network	\$60.9	Fair	Annual Requirement:	\$2,430,000
			Funding Available:	\$1,307,000
			<b>Annual Deficit:</b>	<b>\$1,123,000</b>
Stormwater	\$3.4	Good	Annual Requirement:	\$67,433
			Funding Available:	\$19,000
			<b>Annual Deficit:</b>	<b>\$48,000</b>
Buildings & Facilities	\$35.0	Good	Annual Requirement:	\$1,046,000
			Funding Available:	\$441,000
			<b>Annual Deficit:</b>	<b>\$605,000</b>
Fleet	\$11.3	Fair	Annual Requirement:	\$743,000
			Funding Available:	\$639,000
			<b>Annual Deficit:</b>	<b>\$104,000</b>
Land Improvements	\$3.6	Fair	Annual Requirement:	\$197,000
			Funding Available:	\$66,000
			<b>Annual Deficit:</b>	<b>\$131,000</b>
Water	\$29.0	Good	Annual Requirement:	\$370,000
			Funding Available:	\$360,000
			<b>Annual Deficit:</b>	<b>\$10,000</b>
Sanitary	\$71.7	Good	Annual Requirement:	\$2,176,000
			Funding Available:	\$977,000
			<b>Annual Deficit:</b>	<b>\$1,199,000</b>
<b>Overall</b>	<b>\$215.0</b>	<b>Fair</b>	Annual Requirement:	\$7,029,933
			Funding Available:	\$3,809,000
			<b>Annual Deficit:</b>	<b>\$3,220,000</b>

# Appendix B: 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.

<b>Road Network</b>											
Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
HCB Roads	\$0	\$352,520	\$295,469	\$300,402	\$304,210	\$5,859,618	\$0	\$0	\$0	\$0	\$0
LCB Roads	\$0	\$382,000	\$912,631	\$934,248	\$950,933	\$44,015,498	\$1,463,310	\$0	\$0	\$0	\$0
Sidewalks	\$0	\$15,000	\$20,000	\$20,000	\$20,000	\$2,993,470	\$0	\$0	\$0	\$900,540	\$0
Street Lights	\$0	\$72,100	\$20,000	\$0	\$0	\$335,601	\$0	\$0	\$0	\$0	\$190,615
	<b>\$0</b>	<b>\$821,620</b>	<b>\$1,248,100</b>	<b>\$1,254,650</b>	<b>\$1,275,143</b>	<b>\$53,204,187</b>	<b>\$1,463,310</b>	<b>\$0</b>	<b>\$0</b>	<b>\$900,540</b>	<b>\$190,615</b>

<b>Stormwater</b>											
Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Catch Basins	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$42,000	\$0	\$0
Culverts	\$0	\$120,000	\$40,000	\$40,000	\$40,000	\$40,000	\$0	\$0	\$0	\$0	\$0
Mains	\$0	\$178,015	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$57,225	\$0
	<b>\$0</b>	<b>\$298,015</b>	<b>\$40,000</b>	<b>\$40,000</b>	<b>\$40,000</b>	<b>\$40,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$42,000</b>	<b>\$57,225</b>	<b>\$0</b>

## Buildings and Facilities

Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Administrative	\$444,653	\$98,722	\$93,050	\$5,609	\$4,428	\$0	\$0	\$0	\$0	\$0	\$0
Arenas and Community Centre	\$2,738,343	\$34,855	\$0	\$0	\$0	\$166,380	\$190,045	\$86,094	\$0	\$0	\$0
Fire Halls	\$704,089	\$225,590	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Park Shelters and Structures	\$0	\$493,893	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Public Work Facilities	\$464,124	\$0	\$0	\$0	\$0	\$25,739	\$0	\$18,256	\$0	\$25,739	\$0
Schools and Libraries	\$105,879	\$1,960,202	\$0	\$0	\$28,014	\$0	\$0	\$0	\$16,172	\$4,771	\$10,525
	<b>\$4,457,088</b>	<b>\$2,813,261</b>	<b>\$93,050</b>	<b>\$5,609</b>	<b>\$32,442</b>	<b>\$192,119</b>	<b>\$190,045</b>	<b>\$104,350</b>	<b>\$16,172</b>	<b>\$30,510</b>	<b>\$10,525</b>

## Fleet

Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Environmental Services	\$0	\$0	\$0	\$8,839	\$0	\$0	\$0	\$0	\$0	\$0	\$0
General Government	\$260,341	\$22,649	\$94,691	\$109,961	\$188,104	\$113,017	\$19,136	\$134,667	\$205,574	\$302,350	\$90,468
Planning & Development	\$0	\$0	\$15	\$0	\$0	\$0	\$0	\$0	\$45,766	\$0	\$0
Protection Services	\$1,605,689	\$424,012	\$3,961	\$29,335	\$39,143	\$451,184	\$76,075	\$389,095	\$69,344	\$597,677	\$418,917
Recreation & Cultural Services	\$368,529	\$68,802	\$26,630	\$12,390	\$4,197	\$129,396	\$0	\$412,185	\$8,732	\$403,951	\$26,630
Transportation Services	\$0	\$319,197	\$249,373	\$0	\$0	\$49,875	\$0	\$2,575,078	\$0	\$606,389	\$48,284
	<b>\$2,234,559</b>	<b>\$834,660</b>	<b>\$374,670</b>	<b>\$160,525</b>	<b>\$231,444</b>	<b>\$743,472</b>	<b>\$95,211</b>	<b>\$3,511,025</b>	<b>\$329,416</b>	<b>\$1,910,367</b>	<b>\$584,299</b>

### Land Improvements

Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Paving & Parking Lots	\$501,108	\$55,785	\$16,327	\$11,269	\$0	\$0	\$0	\$0	\$45,321	\$154,857	\$0
Playspace	\$158,571	\$42,432	\$35,034	\$0	\$28,803	\$0	\$18,089	\$4,498	\$0	\$23,598	\$0
Sport Fields & Courts	\$120,047	\$161,691	\$627	\$0	\$0	\$125	\$0	\$753	\$0	\$809,828	\$0
	<b>\$779,726</b>	<b>\$259,908</b>	<b>\$51,988</b>	<b>\$11,269</b>	<b>\$28,803</b>	<b>\$125</b>	<b>\$18,089</b>	<b>\$5,251</b>	<b>\$45,321</b>	<b>\$988,283</b>	<b>\$0</b>

### Water

Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Booster Pumping Station	\$0	\$0	\$663,000	\$0	\$0	\$0	\$0	\$0	\$4,899	\$0	\$0
Bulk Water Stations	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$71,957	\$0	\$0
Curbstops & Valves	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$221	\$0	\$0
Hydrants	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$853,625	\$0	\$0
Machinery & Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$168,997	\$46,357	\$0
Mains	\$0	\$83,344	\$345,012	\$300,000	\$331,671	\$350,000	\$350,000	\$400,000	\$5,458,026	\$0	\$0
Meters	\$0	\$10,000	\$0	\$0	\$0	\$0	\$0	\$0	\$204,744	\$0	\$0
Treatment & Storage	\$0	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$1,424,265	\$0	\$0
	<b>\$0</b>	<b>\$143,344</b>	<b>\$1,008,012</b>	<b>\$300,000</b>	<b>\$331,671</b>	<b>\$350,000</b>	<b>\$350,000</b>	<b>\$400,000</b>	<b>\$8,186,734</b>	<b>\$46,357</b>	<b>\$0</b>

### Sanitary

Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Mains	\$10,636	\$0	\$57,549	\$0	\$19,183	\$0	\$0	\$0	\$0	\$0	\$0
Pump Station	\$2,245,102	\$193,056	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Transfer Station	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$70,000	\$0	\$0	\$0
Treatment & Disposal	\$14,853,821	\$49,411	\$0	\$28,183	\$0	\$52,424	\$0	\$13,298,711	\$861,035	\$0	\$0
	<b>\$17,109,560</b>	<b>\$242,467</b>	<b>\$57,549</b>	<b>\$28,183</b>	<b>\$19,183</b>	<b>\$52,424</b>	<b>\$0</b>	<b>\$13,368,711</b>	<b>\$861,035</b>	<b>\$0</b>	<b>\$0</b>

### Asset Portfolio 10-Year Forecast

Asset Category	Backlog	2022	2023	2024	2025	2026
Road Network	\$0	\$821,620	\$1,248,100	\$1,254,650	\$1,275,143	\$53,204,187
Stormwater	\$0	\$298,015	\$40,000	\$40,000	\$40,000	\$40,000
Buildings and Facilities	\$4,457,088	\$2,813,261	\$93,050	\$5,609	\$32,442	\$192,119
Fleet	\$2,234,559	\$834,660	\$374,670	\$160,525	\$231,444	\$743,472
Land Improvements	\$779,726	\$259,908	\$51,988	\$11,269	\$28,803	\$125
Water	\$0	\$143,344	\$1,008,012	\$300,000	\$331,671	\$350,000
Sanitary	\$17,109,560	\$242,467	\$57,549	\$28,183	\$19,183	\$52,424
	<b>\$24,580,932</b>	<b>\$5,413,276</b>	<b>\$2,873,369</b>	<b>\$1,800,236</b>	<b>\$1,958,686</b>	<b>\$54,582,327</b>

### Asset Portfolio 10-Year Forecast

Asset Category	2027	2028	2029	2030	2031
Road Network	\$1,463,310	\$0	\$0	\$900,540	\$190,615
Stormwater	\$0	\$0	\$42,000	\$57,225	\$0
Buildings and Facilities	\$190,045	\$104,350	\$16,172	\$30,510	\$10,525
Fleet	\$95,211	\$3,511,025	\$329,416	\$1,910,367	\$584,299
Land Improvements	\$18,089	\$5,251	\$45,321	\$988,283	\$0
Water	\$350,000	\$400,000	\$8,186,734	\$46,357	\$0
Sanitary	\$0	\$13,368,711	\$861,035	\$0	\$0
	<b>\$2,116,655</b>	<b>\$17,389,336</b>	<b>\$9,480,678</b>	<b>\$3,933,282</b>	<b>\$785,439</b>

# Appendix C: 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

## Appendix D: Next Steps

A workplan has been provided to the Municipality to advance its Asset Management Program. These steps are ranked based on their overall asset management value to the Township. Value considers the priority and impact of a recommendation relative to its cost. Steps with a high program value have significant impact and priority and low cost.

Next Steps	AM Program Value
Conduct a TCA data review to identify missing and/or incomplete assets in the CityWide™ asset inventory.	<b>1 (Highest)</b>
Componentize buildings and facilities and obtain component based assessed condition scores.	<b>2</b>
Review and confirm that all assets have been accounted for in the asset inventory, particularly for non-core assets.	<b>3</b>
Verify the discrepancy in the water and sanitary sewer system inventories and cross-reference with existing datasets to develop a centralized inventory for water and sanitary sewer systems.	<b>4</b>
Regularly review & update replacement costs for all asset classes, incorporating industry standard costing references and local market pricing.	<b>5</b>
Continue to integrate data from various studies, reports, and staff journals within CityWide™ to ensure a centralized, comprehensive, and current asset inventory.	<b>6</b>
Implement a data governance strategy and framework to maintain the level of data maturity	<b>7</b>
Identify and develop Levels of Service statements and relevant metrics for non-core assets	<b>8</b>
Develop detailed LOS frameworks for all assets and identify proposed LOS	<b>9</b>
Educate and train key personnel on broader asset management best practices including database management and the optimal use of CityWide™	<b>10</b>

Next Steps	AM Program Value
Review, consider, and as appropriate, account for growth and demand changes to infrastructure management.	11
Provide opportunities for staff and elected officials to attend webinars, educational conferences, and workshops to expand their technical knowledge of asset management principles and practices	12
Develop a process for reporting on LOS and considering LOS results in infrastructure operational and capital decisions.	13
Develop a medium- to long-term external communication strategy to engage public on asset management and obtain feedback to inform development of proposed LOS	14
Increase team capacity by recruiting a dedicated asset management staffing resource, e.g., asset management coordinator	15
An asset management strategy enforces the asset management policy and aligns it to the asset management plan. Consider developing a formalized, documented asset management strategy.	16
Financial strategies are inextricably linked to LOS (current and proposed) and risk, both of which guide lifecycle decision-making. Frameworks for linking financial strategies to LOS and risk should be established.	17
Consider developing an infrastructure master plan that considers the strategic plan and integrates with land use planning to guide investments.	18 (Least)

# Appendix E: O. Reg. 588/17 - Compliance Snapshot

O. Reg. Requirement	2022 Compliance		2024 Compliance		2025 Compliance
	Core	Non-Core	Core	Non-Core	Core & Non-Core
<b>1.0 Asset Inventory</b>					
1.1 Asset Summary	Yes	N/A	Yes	Yes	No
1.2 Replacement Cost	Yes		Yes	Yes	No
1.3 Average Age	Yes		Yes	Yes	No
1.4 Condition	Yes		Yes	Yes	No
1.5 Condition Assessment Approach	Yes		Yes	Yes	No
<b>2.0 Lifecycle Activities</b>					
2.1 Identify Full Asset Lifecycle	Yes	N/A	Yes	No	No
2.2 Document Lifecycle Activities	Yes		Yes	No	No
2.3 Quantify Asset Risk	Yes		Yes	No	No
2.4 Lifecycle Cost Analysis	Yes		Yes	No	No
<b>3.0 Growth</b>					
3.1 Population & Economic assumptions	Yes	N/A	No	No	No
3.2 Document impact of growth on capital planning	N/A		No	No	No
<b>4.0 Current Level of Service</b>					
4.1 Define and document current LOS metrics	Yes	N/A	No	No	No
<b>5.0 Proposed Level of Service</b>					
5.1 Define Proposed LOS	N/A	N/A	N/A	N/A	No
5.2 Difference b/w Current & Proposed LOS					No
5.3 Required Lifecycle Activities and associated Risk					No
5.4 Achievability of Proposed LOS					No
5.5 Affordability of Proposed LOS					No
5.6 Lifecycle activities and risk associated with potential funding shortfall					No