Asset Management Plan

Township of Otonabee-South Monaghan

2022

This Asset Management Program was prepared by:

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

Key Statistics

Replacement cost of asset portfolio
$98.0 million

Replacement cost of infrastructure per household
$32.137 (2021)

Percentage of assets in fair or better condition
31%

Percentage of assets with assessed condition data
61%

Target reinvestment rate
2.61%

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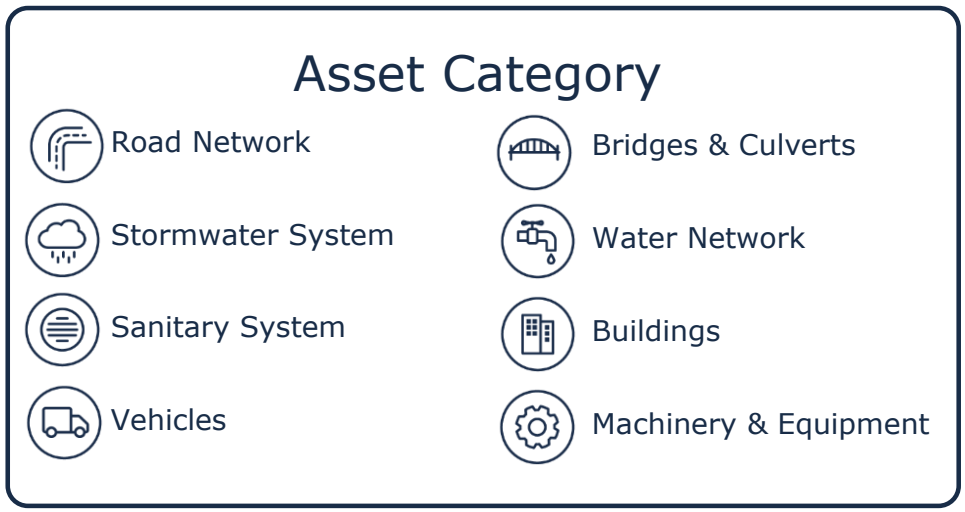
Executive Summary

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 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 can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP include the following asset categories:



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, 2024. There are additional requirements concerning proposed levels of service and growth that must be met by July 1, 2025.

Findings

The overall replacement cost of the asset categories included in this AMP totals $98.0 million. 31% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 61% of assets. For the remaining 39% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.
The development of a long-term, sustainable financial plan requires an analysis of whole lifecycle costs. This AMP uses a combination of proactive lifecycle strategies (paved roads) and replacement only strategies (all other assets) to determine the lowest cost option to maintain the current level of service.

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $2.6 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

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

- Review data to update and maintain a complete and accurate dataset
- Develop a condition assessment strategy with a regular schedule
- Review and update lifecycle management strategies
- Development and regularly review short and long-term plans to meet capital requirements
- Measure current levels of service and identify sustainable proposed levels of service

1 Introduction & Context

Key Insights

- The Township of Otonabee-South Monaghan is located in the County of Peterborough in Central Ontario
- 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 Otonabee-South Monaghan Community Profile

Census Characteristic	Otonabee-South Monaghan	Ontario
Population 2021	7,087	14,223,942
Population Change 2016-2021	6.3	5.8
Total Private Dwellings	3,050	5,929,250
Population Density	20.5	15.9
Land Area In Square Kilometers	346.15	892,411.76

The Township of Otonabee-South Monaghan is located in the County of Peterborough in Central Ontario. The township is located along the Trent-Severn Waterway and is comprised of the communities of Assumption, Bailieboro, Bensfort, Fraserville, Indian River, Keene, Lang, South Monaghan, Stewart Hall, Villiers and Woodview.

The township of Otonabee-South Monaghan was formed in 1998 and the majority of the community is only fluent in English. Hiawatha First Nation reserve lands are located on the north shore of Rice Lake surrounded by the Township of Otonabee-South Monaghan. The area was known for the abundance of wild rice (manoomin) and so the origin of the name Rice Lake.

Agriculture has been the predominant land use in the Township for a long history and the township will continue to encourage the growth of a strong agricultural community. The Township recognizes the opportunities of economic development by providing businesses and services catering to the touring public with the attraction of its unique location, century farms, historical and cultural landmarks, environmental features and rural lifestyle. The township will continue to encourage the controlled growth of the residential development with the pressure due to the proximity to the City of Peterborough.

Demand in the region is notably driven by moderate population growth and an aging population above the provincial average. The Growth Plan for the Greater Golden Horseshoe establishes the population projection for County of Peterborough to Year 2051 as 82,000. the County of Peterborough Official Plan indicates the population allocation to the Township of Otonabee-South Monaghan is 9 percent of the population growth in the County.

Commented [EO1]: Community Profile Outline
- Census data
- Municipality location (add climate info if relevant)
- Community demographics (add brief history if relevant)
- Key economic sectors
- Demand drivers
- Total Municipal Revenue and annual capital budget
- Infrastructure priorities

Fin Strat Details

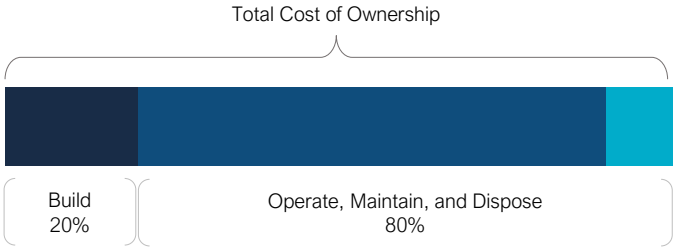
Commented [EO2]: Informal Survey conducted at Kick-Off:
- Tell me about your community; what makes it unique?
- Community's strategic priorities? (Research ahead of time)
- Growth & Demand Drivers? (Research ahead of time)
- Council's Infrastructure Priorities?
- Staff's Infrastructure Priorities?
- Planned Infrastructure Projects?
- Grant Reliability and funding gaps?

I conducted this survey at the beginning of the kick-off and found that it was a great way to build rapport.

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 industry-standard approach and sequence to developing a practical asset management program begins 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 adopted the Asset Management Policy on May 6th, 2019 in accordance with Ontario Regulation 588/17. The Asset Management Policy provides guidance for the Township's future growth and development while providing municipal services and protecting the natural resources and assets in a sustainable manner.

Guided by this policy, the Township will focus its infrastructure efforts on providing the appropriate levels of service, encouraging engagement of asset management practices, meeting legislative and regulatory requirements, ensuring adequate resources to support transparent and responsible asset management.

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

1.2.3 Asset Management Plan

The asset management plan (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.

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.

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

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

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

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

1.3.2 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. For non-core asset categories, the Township has determined the qualitative descriptions that will be used to determine the community level of service provided. These descriptions can be found in the Levels of Service subsection within each asset category.

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 and culverts, water, wastewater, stormwater) the Province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP. For non-core asset categories, the Township has determined the technical metrics that will be used to determine the technical level of service provided. These metrics can be found in the Levels of Service subsection within each asset category.

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 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.

2019

Strategic Asset Management Policy

2022

Asset Management Plan for Core Assets with the following components:

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

2024

Asset Management Plan for Core and Non-Core Assets (same components as 2022) and Asset Management Policy Update

2025

Asset Management Plan for All Assets with the following additional components:

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

1.4.1 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, 2024. Next to each requirement a page or section reference is included in addition to any necessary commentary.

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

2 Scope and Methodology

Key Insights

- This asset management plan includes 8 asset categories and is divided between tax-funded and rate-funded categories
- 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 Included in this AMP

This asset management plan for the Township of Otonabee-South Monaghan is produced in compliance with Ontario Regulation 588/17. The July 2024 deadline under the regulation requires analysis of both core and non-core assets.

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

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

2.2 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.

2.3 Estimated Useful Life and Service Life Remaining

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

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

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

2.4 Reinvestment Rate

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

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

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

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

2.5 Deriving Asset Condition

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

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.

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

The 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.

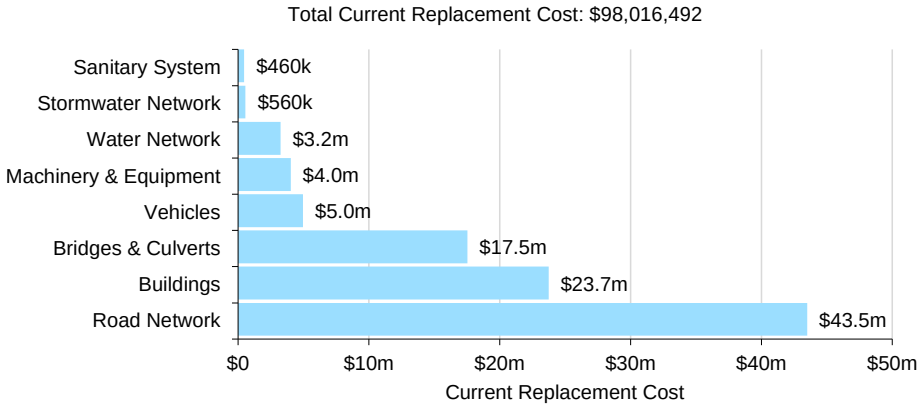
3 Portfolio Overview

Key Insights

- The total current replacement cost of the Township's asset portfolio is $98 million
- 31% of all assets are in fair or better condition
- 29% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total $2.6 million per year across all assets

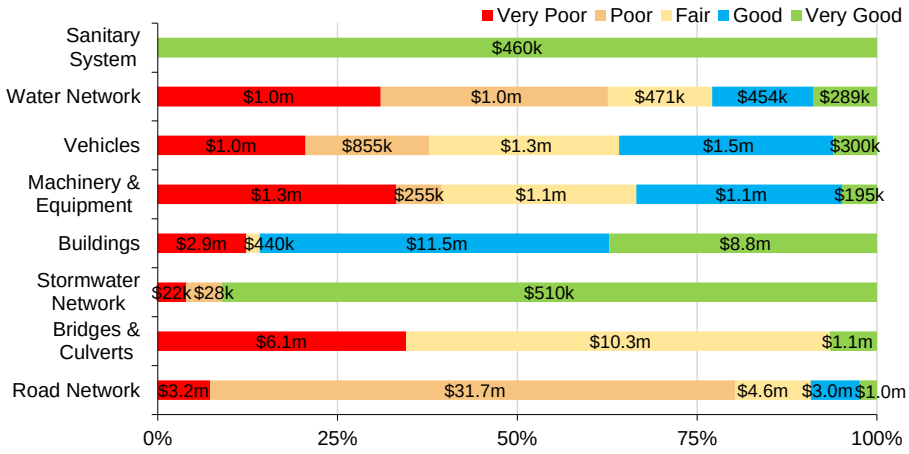
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analyzed in this AMP have a total current replacement cost of $98 million based on inventory data from 2022. 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.



3.2 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 31% of assets in Otonabee-South Monaghan are in fair or better condition. This estimate relies on both age-based and field condition data.



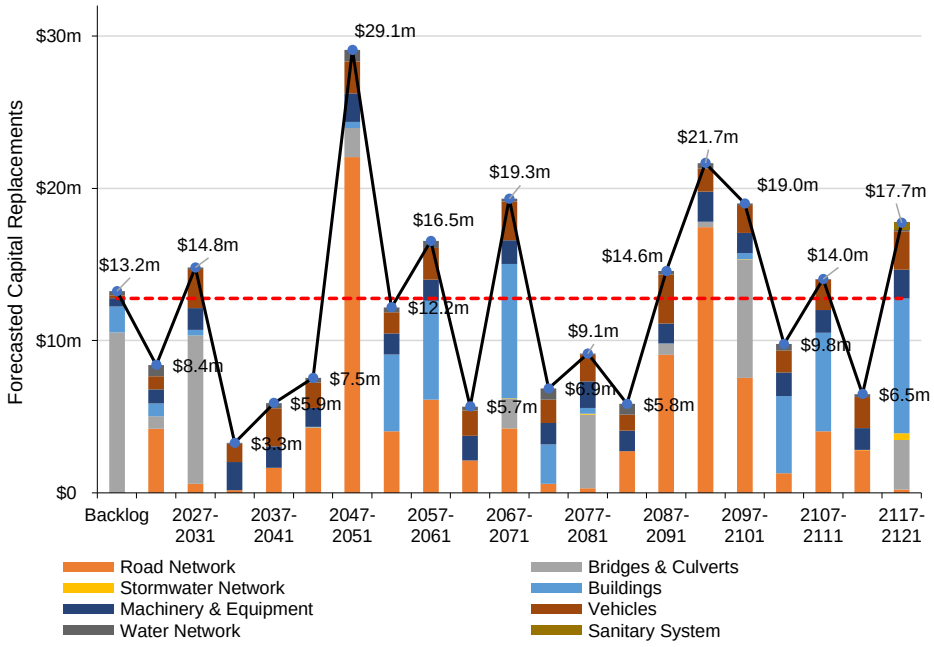
Value and Percentage of Assets by Replacement Cost

This AMP relies on assessed condition data for 61% 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	Asset Segment	% of Assets with Assessed Condition	Source of Condition Data
Road Network	Paved Roads	100%	2020 Road Needs Study
Bridges & Culverts	Bridges	100%	2020 OSIM Report
	Structural Culverts	100%	2020 OSIM Report
Stormwater Network	All	0%	N/A
Buildings	All	0%	N/A
Machinery & Equipment	All	12%	Staff
Vehicles	All	0%	N/A
Water Network	All	0%	N/A
Sanitary Network	All	0%	N/A

3.3 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 following graph identifies capital requirements over the next 100 years, including assumed assets only. 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 the trend line represents the average capital requirements. Capital requirements vary by as low as $3.3 million or as high as $29.1 million per five year band, or less than $1 million or more than $6 million in a single year. The Township can expect to $2.5 million per year, on average, and should plan for variability in needs.



4 Analysis of Tax-funded Assets

Key Insights

- Tax-funded assets are valued at $94 million
- 48% of tax-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for tax-funded assets is approximately $2.5 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

4.1 Road Network

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

The Township's roads and sidewalks are maintained by the Public Works department who is also responsible for winter snow clearing, ice control, snow removal and dust control operations.

Commented [MS3]: I usually refer to language on their website or in any internal docs that speak to the services provided by the asset category/ who is responsible for maintaining them; and a high-level overview of types of infrastructure.

You don't need to include all this info, but some sort of written info helps to provide context.

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

Replacement Cost	Condition	Financial Capacity	
$43.5 million	Poor (35%)	Annual Requirement:	$ 1,047,553

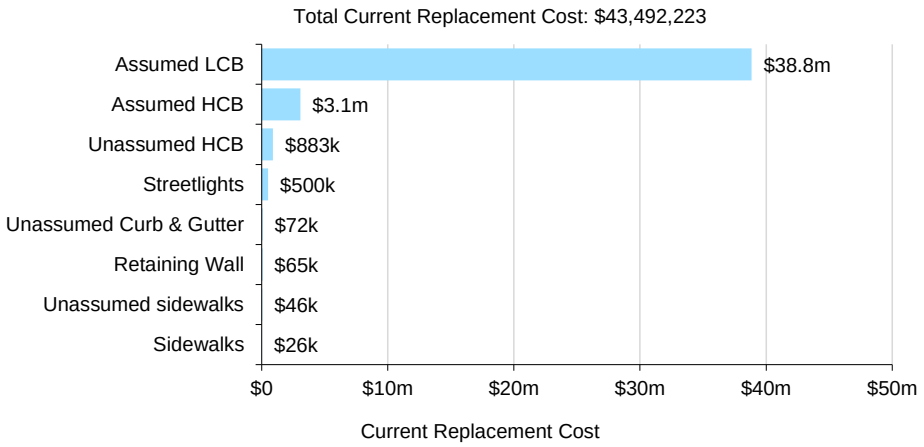
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Scope	The road network service is conveniently accessible to the whole community in sufficient capacity (meets traffic demands) and is available under most conditions.
Quality	The road network is in poor condition which may result in unplanned service interruptions and road closures.

4.1.1 Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Primary Replacement Cost Method	Total Replacement Cost
Assumed HCB	6.6 km	Cost/Unit	$3,060,000
Assumed LCB	97 km	Cost/Unit	$38,840,000
Retaining Wall	1	CPI Tables	$65,171
Sidewalks	310 m	CPI Tables	$25,719
Streetlights	99	Cost/Unit	$500,380
Unassumed Curb & Gutter	1,250 m	CPI Tables	$72,018
Unassumed HCB	1.5 km	CPI Tables	$882,947
Unassumed sidewalks	552 m	CPI Tables	$45,988
Gravel Roads	194.9 km	Not Planned for Replacement[1]	
			$43,492,223



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

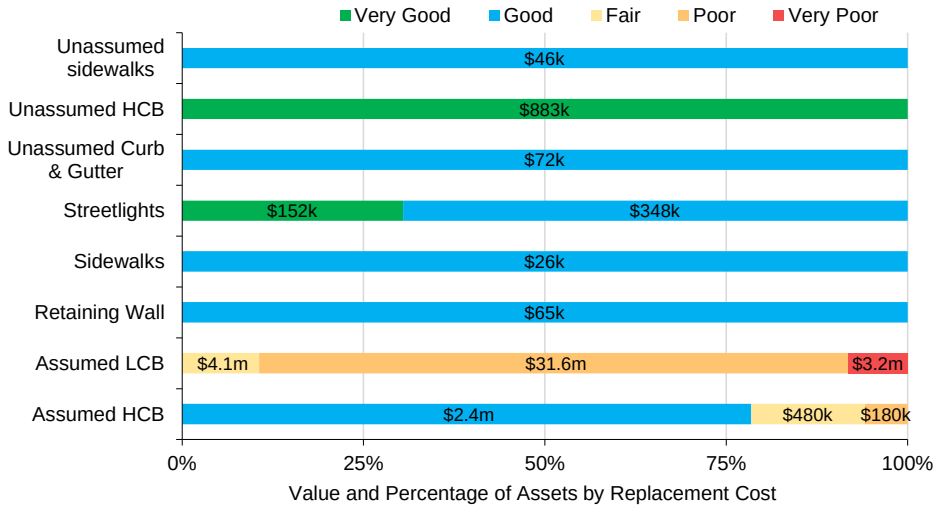
[1] Gravel roads have been included as they comprise a significant portion of the Township's road network. However, the lifecycle management strategies for these assets consist of perpetual maintenance activities and do not require capital costs for rehabilitation or replacement.

4.1.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Assumed HCB	65%	Good	100% Assessed
Assumed LCB	30%	Poor	100% Assessed
Retaining Wall	70%	Good	Age-Based
Sidewalks	64%	Good	Age-Based
Streetlights	73%	Good	Age-Based
Unassumed Curb & Gutter	80%	Good	Age-Based
Unassumed HCB	83%	Very Good	Age-Based
Unassumed sidewalks	80%	Good	Age-Based
	35%	**Poor**	**96% Assessed**

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 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 road network.

Current Approach to Condition Assessment

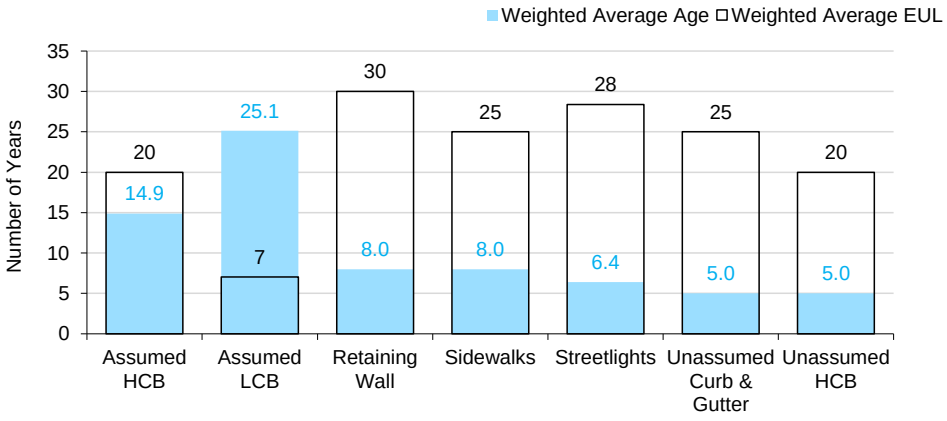
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Road patrols are completed by internal staff weekly based on the minimum maintenance standards. However, road condition is not documented as part of this process.
- A Road Needs Study was completed in 2020 that included a detailed assessment of the condition of each road segment
- The Road Needs Study is reviewed every four years by external contractors

4.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for road network assets has been assigned according to a combination of established industry standards and staff knowledge. The weighted average estimated useful life and weighted average age are weighted by replacement cost, representing an average across the segment. Finally, the figure below represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Weighted Average Estimated Useful Life (Years)	Weighted Average Age (Years)
Assumed HCB	20 Years	14.9
Assumed LCB[2]	7 Years	25.1
Retaining Wall	30 Years	8.0
Sidewalks	25 Years	8.0
Streetlights	28 Years	6.4
Unassumed Curb & Gutter	25 Years	5.0
Unassumed HCB	20 Years	5.0
Unassumed sidewalks	25 Years	5.0



[2] LCB roads are continually surface treated, each time extending the service life. For this reason the LCB roads can be used beyond their estimated useful life.

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

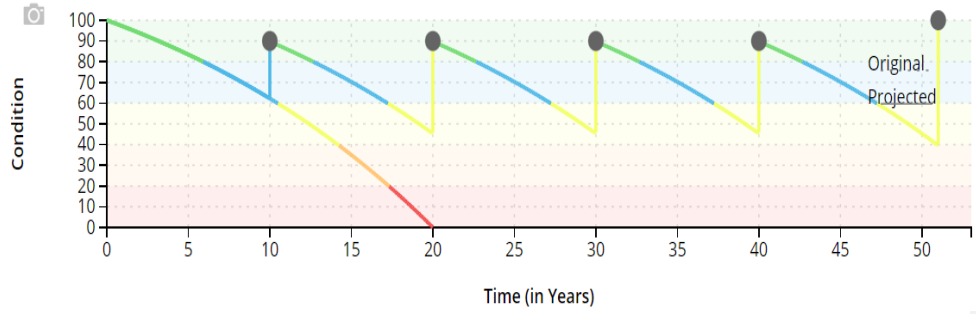
4.1.4 Lifecycle Management Strategy

Commented [MS4]: For asset categories that have lifecycle models I take a slightly different approach compared to those that don't. You'll see the difference later in the doc.

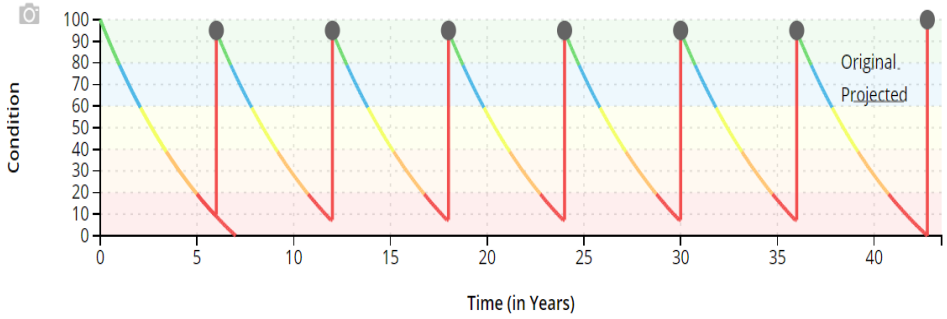
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment.

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

Paved Roads (HCB)		
Event Name	**Event Class**	**Event Trigger**
Mill and Pave	Rehabilitation	10 Years (Repeated 1 time after 20 years)
Pulverize and Pave	Rehabilitation	20 Years (Repeated 1 times after 20 years)
Full Reconstruction	Replacement	40 Condition



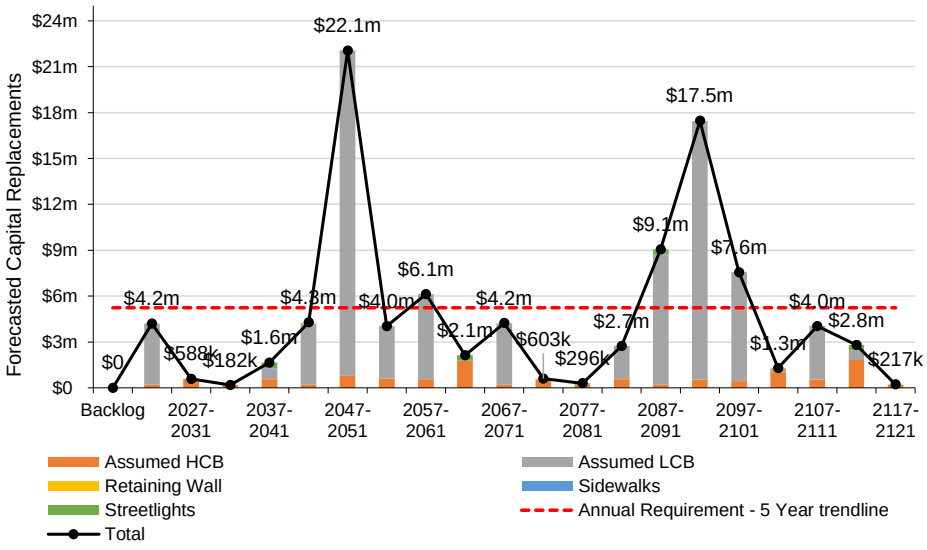
Paved Roads (LCB)		
Event Name	**Event Class**	**Event Trigger**
Double Surface Treatment	Rehabilitation	Year 6, 18, and 30
Pulverize and Double Surface Treatment	Rehabilitation	Year 12, 24, and 36
Full Reconstruction	Replacement	0 Condition



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 capital requirements for the road network.

The following graph forecasts long-term capital requirements for assumed assets. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 100 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 the trend line represents the average 5-year capital requirements.



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

4.1.5 Risk & Criticality

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 2022 inventory data.

For Assumed assets:

For Unassumed assets:

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 (Economic)
	Average Annual Daily Traffic (Social)
	Speed Limit (Health and Safety)

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.

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 & Extreme Events

The trend of climate change-induced extreme precipitation events is projected to continue. High frequency and intensity of precipitation can cause flooding in poor drainage areas. This accelerates the deterioration of road surfaces and weakening the foundation. An increase in cracking, sinkholes and other damages in freeze/thaw cycles are anticipated because of heavy precipitation. As a result, higher maintenance and rehabilitation requirements are expected to maintain the same level of service. To improve asset resiliency, staff should identify the critical areas and improve drainage through enhanced lifecycle strategies.

Asset Data & Capital Funding Strategies

Major capital rehabilitation projects for roads are dependant on the availability of grant funding opportunities. When grants are not available, roadway projects may be deferred. The Township has developed a 5-year capital plan based on the road needs study. The road needs study is reviewed every 4 years. Currently, there is no annual road condition assessment programs in place to keep the project list up to date. The Township can consider develop an annual capital funding strategy by utilizing the roadway condition from regular road patrols. The annual capital funding strategy could reduce dependency on grant funding and help prevent deferral of capital works.

4.1.6 Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	See Appendix B
Quality	Description or images that illustrate the different levels of road class pavement condition	The Township completed a Road Needs Study in 2020, by Engage Engineering. Every road section received a surface condition rating (1-10). (1-5) Road surface exhibits moderate to significant deterioration and requires renewal or full replacement within 1-5 years (6-10) Road surface is in good condition or has been recently re-surfaced. Renewal or reconstruction is not required for 6-10+ years

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.86
Quality	Average pavement condition index for paved roads in the municipality	50%
	Average surface condition for unpaved roads in the municipality (e.g. excellent, good, fair, poor)	Poor

4.1.7 Recommendations

Asset Inventory

- Review roads inventory to determine whether all municipal assets within these asset segments have been accounted for.
- Continue to update the unit replacement costs which reflect current tender pricing.

Condition Assessment Strategies

- The last comprehensive assessment of the road network was completed in 2020. Consider completing an updated assessment of all roads within the next 1-2 years.
- Consider developing a condition score that utilizes the routine inspection records

Lifecycle Management Strategies

- Implement the identified lifecycle management strategies for HCB and LCB roads to realize potential cost avoidance and maintain a high quality of road pavement 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.

4.2 Bridges & Culverts

Bridges and culverts represent a critical portion of the transportation services provided to the community. The Department of Public Works is responsible for the maintenance of all bridges and culverts located across municipal roads with the goal of keeping structures in an adequate state of repair and minimizing service disruptions.

The state of the infrastructure for the bridges & culverts is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$17.5 million	Fair (49%)	Annual Requirement:	$ 279,978

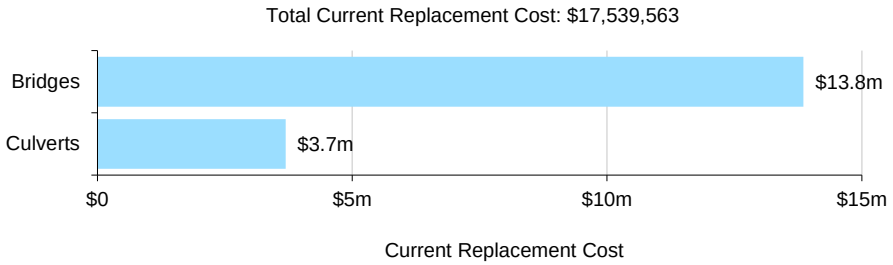
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Scope	Bridges and culverts are conveniently accessible to the whole community in sufficient capacity (meets traffic demands) and are available under most weather conditions. None of the bridges have dimensional or loading restrictions.
Quality	The road network is in fair condition with minimal unplanned service interruptions and road closures.

4.2.1 Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Primary Replacement Cost Method	Total Replacement Cost
Bridges	192 m	User-Defined Cost	$13,849,063
Structural Culverts	175 m	User-Defined Cost	$3,690,500
			$17,539,563



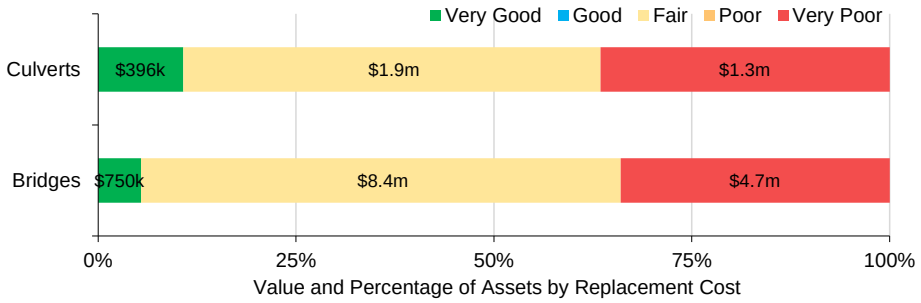
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

4.2.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Bridges	50%	Fair	100% Assessed
Structural Culverts	47%	Fair	100% Assessed
	49%	**Fair**	**100% Assessed**

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 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 bridges and culverts.

Current Approach to Condition Assessment

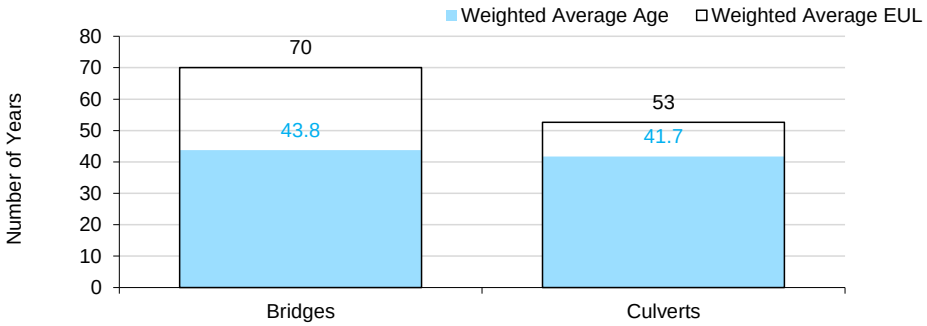
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Condition assessments of all bridges and culverts with a span greater than or equal to 3 meters are completed every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM)

4.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for bridges and culverts assets has been assigned according to a combination of established industry standards and staff knowledge. The weighted average estimated useful life and weighted average age are weighted by replacement cost, representing an average across the segment. Finally, the figure below represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Weighted Average Estimated Useful Life (Years)	Weighted Average Age (Years)
Bridges	70 Years	43.8
Structural Culverts	53 Years	41.7



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

4.2.4 Lifecycle Management Strategy

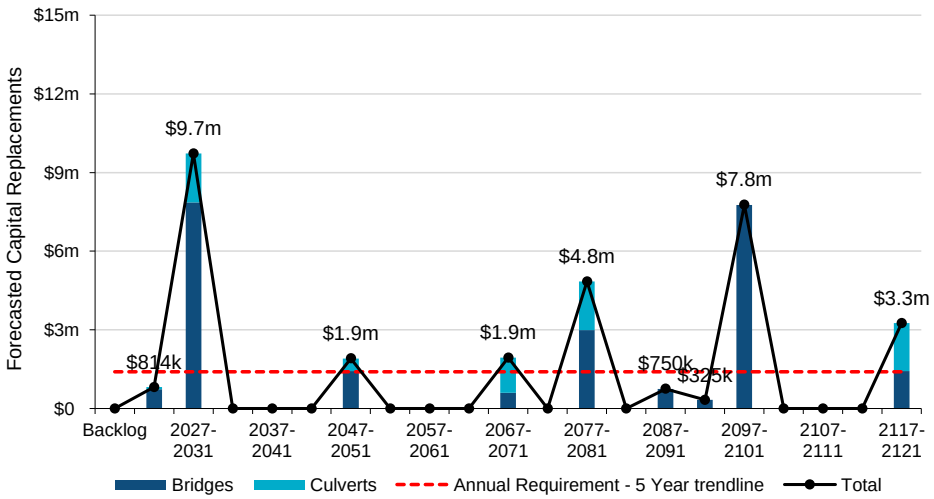
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance, Rehabilitation and Replacement	Winter manitenance and sweeping are completed periodically
	All lifecycle activities are driven by the results of mandated structural inspections competed according to the Ontario Structure Inspection Manual (OSIM)
Inspection	The most recent inspection report was completed in 2020 by Engage Engineering Ltd.

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 100 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 the trend line represents the average 5-year capital requirements.



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

4.2.5 Risk & Criticality

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 2022 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 bridges and culverts are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
	Traffic Volume (Social)
	Special Route (Social)

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.

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 & Extreme Events
Flooding and extreme weather causes damage to multiple components of the Township's bridges including the deck, superstructure, substructure, and approaches. The rising levels of freshwater and the increased frequency and intensity of precipitation events are likely to increase the deterioration of bridge components. The Township also should consider prioritizing infrastructure maintenance, rehabilitation, and replacement based on susceptibility to climate impacts.

4.2.6 Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description of the traffic that is supported by municipal bridges (e.g. heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Bridges and structural culverts are a key component of the municipal transportation network. None of the Township's structures have loading or dimensional restrictions meaning that most types of vehicles, including heavy transport, motor vehicles, emergency vehicles and cyclists can cross them without restriction.
Quality	Description or images of the condition of bridges and how this would affect use of the bridges	See Appendix B
	Description or images of the condition of culverts and how this would affect use of the culverts	See Appendix B

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by bridges and culverts.

Service Attribute	Technical Metric	Current LOS (2022)
Scope	% of bridges in the Township with loading or dimensional restrictions	0%
Quality	Average bridge condition index value for bridges in the Township	0.7
	Average bridge condition index value for structural culverts in the Township	0.58

4.2.7 Recommendations

Data Review/Validation

- Continue to review and validate inventory data, assessed condition data and replacement costs for all bridges and structural culverts upon the completion of OSIM inspections every 2 years.

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

- This AMP only includes capital costs associated with the reconstruction of bridges and culverts. The Township should work towards identifying projected capital rehabilitation and renewal costs for bridges and culverts and integrating these costs into long-term planning.

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 believe 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.

4.3 Stormwater System

The Township is responsible for owning and maintaining a stormwater network of a 1.2 km of storm sewer mains, catch basins and other supporting infrastructure.

Staff are working towards improving the accuracy and reliability of their stormwater network inventory to assist with long-term asset management planning.

The state of the infrastructure for the stormwater system is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$560,199	Very Good (88%)	Annual Requirement:	$ 6,511

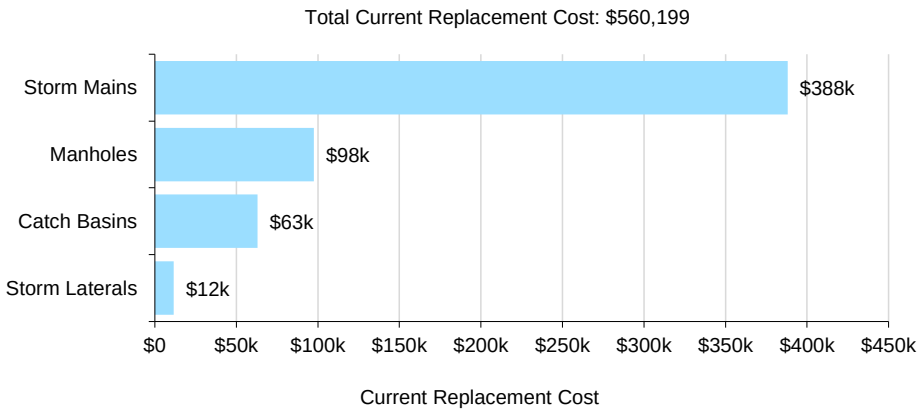
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Scope	Some areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal stormwater system. 50% of stormwater network service is in municipality resilient to a 5-year storm and 5% is resilient to a 100-year storm.

4.3.1 Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Primary Replacement Cost Method	Total Replacement Cost
Catch Basins	21	Cost/Unit	$63,000
Manholes	15	Cost/Unit	$97,500
Storm Laterals	58	Cost/Unit	$11,600
Storm Mains	1,157 m	Cost/Unit	$388,099
			$560,199



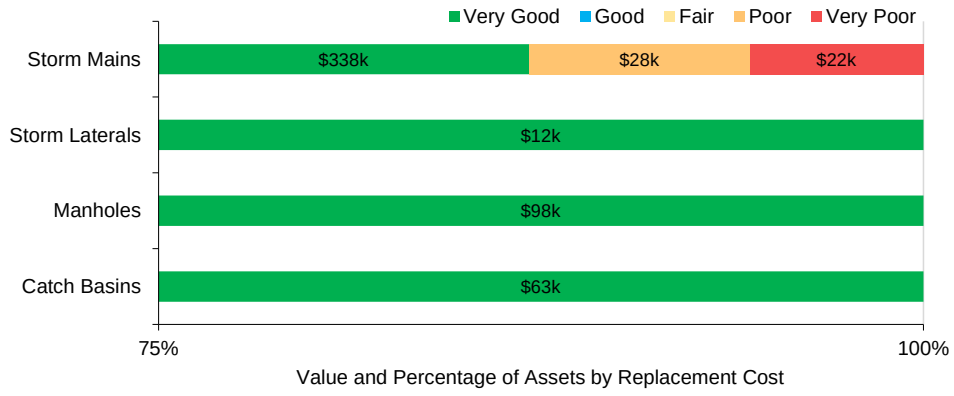
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

4.3.2 Asset Condition

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

	Average Condition (%)	Average Condition Rating	Condition Source
Catch Basins	91%	Very Good	Age-based
Manholes	94%	Very Good	Age-based
Storm Laterals	95%	Very Good	Age-based
Storm Mains	86%	Very Good	Age-based
	88%	**Very Good**	**Age-based**

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 stormwater 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 stormwater network.

Current Approach to Condition Assessment

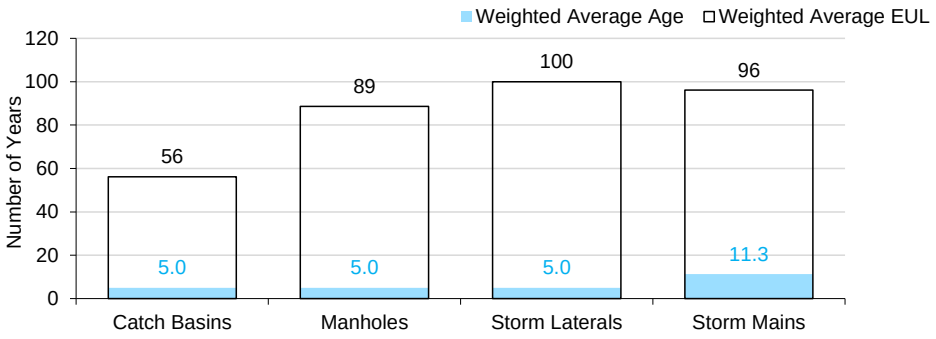
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- There are no formal condition assessment programs in place for the stormwater network
- As the Township refines the available asset inventory for the stormwater network, a regular assessment cycle should be established

4.3.3 Estimated Useful Life & Average Age

The Estimated Useful Life for stormwater network assets has been assigned according to a combination of established industry standards and staff knowledge. The weighted average estimated useful life and weighted average age are weighted by replacement cost, representing an average across the segment. Finally, the figure below represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Weighted Average Estimated Useful Life (Years)	Weighted Average Age (Years)
Catch Basins	56 Years	5.0
Manholes	89 Years	5.0
Storm Laterals	100 Years	5.0
Storm Mains	96 Years	11.3



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

4.3.4 Lifecycle Management Strategy

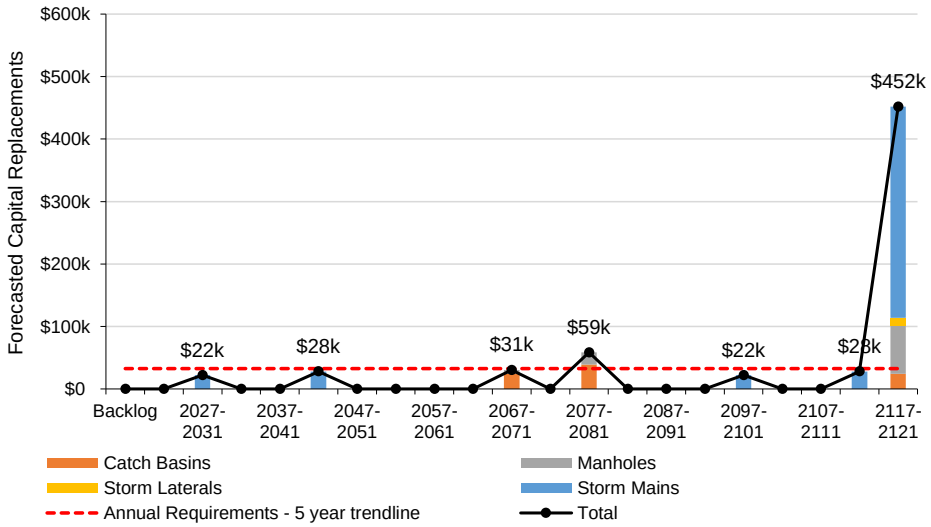
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Catch basin and flushing occur reactively on an as-needed basis
	Currently, no regular maintenance program is in place
Rehabilitation	Re-lining activities may be utilized in the future; however, storm mains are relatively new and don't require rehabilitation in the near future
Replacement	Full replacement is undertaken once it reaches its end-of-life
	Without the availability of up-to-date condition assessment information replacement activities are purely reactive in nature

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 100 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 the trend line represents the average 5-year capital requirements.



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

4.3.5 Risk & Criticality

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 2022 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	Pipe Diameter (Social)

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.

Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies
The current lifecycle management strategy for stormwater network is reactive. There are no formal condition assessment programs in place for the stormwater network. Without an understanding of the condition of the network, unexpected failures are more likely to occur.

4.3.6 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.

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 (2022)
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	A piped drainage system is present in the Burnham Meadows subdivision. All other areas of the Municipality rely on ditch drainage. Stormwater protection in the Burnham Meadows subdivision is more reliable, and new properties developed here can expect to receive better drainage.

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 (2022)
Scope	% of properties in municipality resilient to a 100-year storm	5%[3]
	% of the municipal stormwater management system resilient to a 5-year storm	50%[4]

[3] This is based on the observations of municipal staff.
[4] This is based on the observations of municipal staff.

4.3.7 Recommendations

Asset Inventory

- There is no location or identification system available for the storm pipes. As the network grows the Municipality should consider specifying identifiers for the start and end points of each linear asset.
- Continue to update the unit replacement costs which reflect current tender pricing.

Condition Assessment Strategies

- The development of a comprehensive inventory should be accompanied by a system-wide assessment of the condition of storm mains and storm laterals in the stormwater network through CCTV inspections.
- Consider determining a consistent condition rating criteria to assess the manholes and catch basins.

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

- The piped stormwater system is relatively new and in good condition. As the system ages the Municipality should explore maintenance and renewal activities to ensure proper functioning of the system. This can include relining critical pipes, routine flushing, and flow monitoring.

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.

4.4 Buildings

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

- General Government Buildings
- Public Libraries
- Fire Halls
- Storage Buildings and Garage
- Medical Centre
- Recreation Buildings

The state of the buildings is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$23.7 million	Good (68%)	Annual Requirement:	$ 475,210

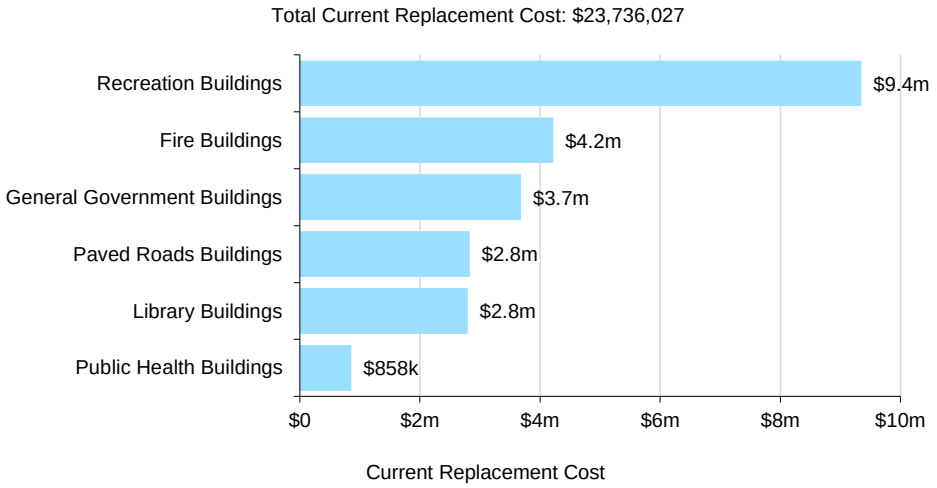
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Performance	The buildings in the Township are in good condition, 88% of the buildings are in fair or better condition.

4.4.1 Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Primary Replacement Cost Method	Total Replacement Cost
Fire Buildings	3	CPI Tables	$4,219,671
General Government Buildings	3	CPI Tables	$3,683,266
Library Buildings	2	CPI Tables	$2,796,464
Paved Roads Buildings	6	User-Defined Cost	$2,828,151
Public Health Buildings	1	CPI Tables	$858,031
Recreation Buildings	4	CPI Tables	$9,350,444
			$23,736,027



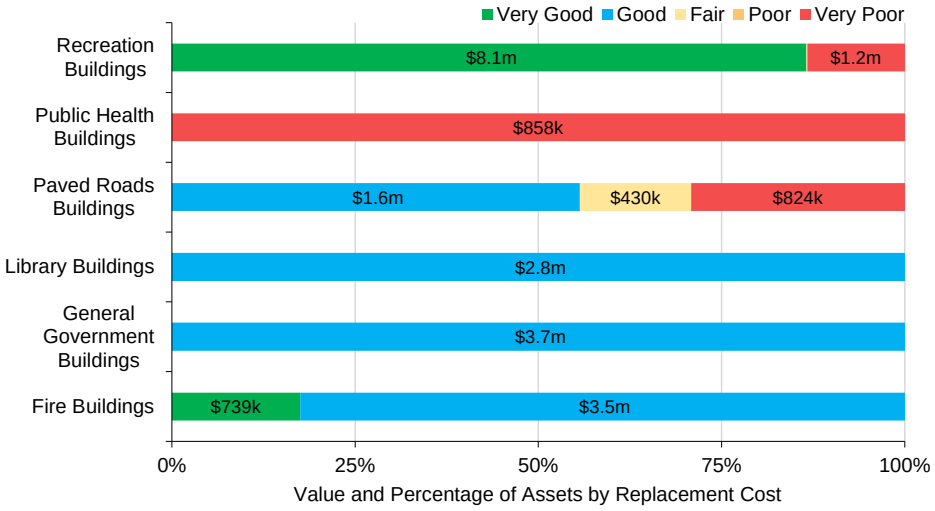
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

4.4.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Fire Buildings	71%	Good	Age-Based
General Government Buildings	74%	Good	Age-Based
Library Buildings	63%	Good	Age-Based
Paved Roads Buildings	51%	Fair	Age-Based
Public Health Buildings	0%	Very Poor	Age-Based
Recreation Buildings	76%	Good	Age-Based
	68%	**Good**	**Age-Based**

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 buildings and facilities 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 buildings and facilities.

Current Approach to Condition Assessment

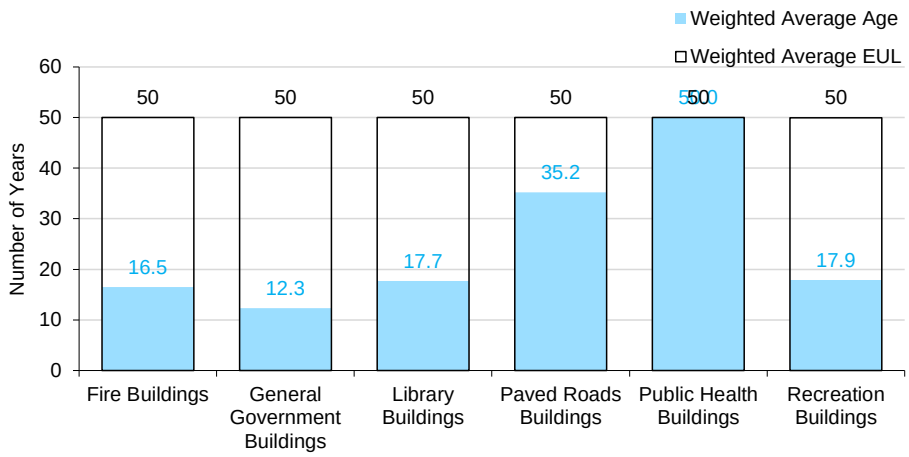
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Health and safety inspection by internal staff is completed regularly
- Annual inspections for HVAC are completed by municipal staff
- The arena undergoes a third-party building condition assessment every five years. However, no other building have planned routine assessments.

4.4.3 Estimated Useful Life & Average Age

The Estimated Useful Life for building and facility assets has been assigned according to a combination of established industry standards and staff knowledge. The weighted average estimated useful life and weighted average age are weighted by replacement cost, representing an average across the segment. Finally, the figure below represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Weighted Average Estimated Useful Life (Years)	Weighted Average Age (Years)
Fire Buildings	50 Years	16.5
General Government Buildings	50 Years	12.3[5]
Library Buildings	50 Years	17.7
Paved Roads Buildings	50 Years	35.2
Public Health Buildings	50 Years	50.0[6]
Recreation Buildings	50 Years	17.9



[5] The original Lion's Centre building was constructed in 1880. Since then, the building was restored in 2010, which resets the age. The age reflected in the above figure assumes new condition in 2010.
[6] The Medical Centre has exceeded its useful life of 50 years. However, this building is still in relatively fair condition and can support services for the Municipality

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

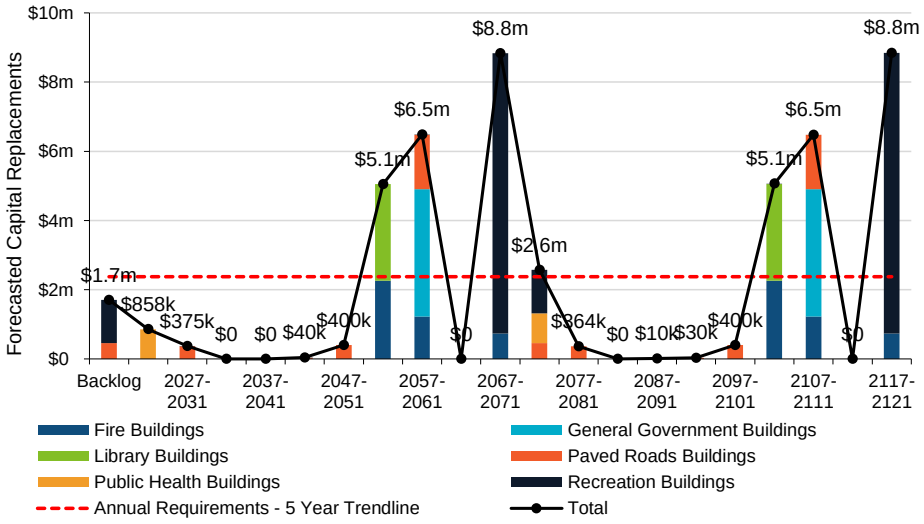
4.4.4 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meet 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	Municipal buildings are subject to regular inspections for health & safety requirements
	Currently no formal condition structural assessment for municipal building assets in place
	Critical buildings (Fire Stations etc.) have a regular inspection, maintenance and rehabilitation schedule
Rehabilitation / Replacement	Minor buildings, plubing and electrical deficiencies are repaired by internal staff while major rehabilitation are conducted by external contractors
	Currently no maintenance and rehabilitation schedule for municipal builidngs in place, the maintenance are dealt with on needed basis

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 100 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 the trend line represents the average 5-year capital requirements.



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

4.4.5 Risk & Criticality

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 2022 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 (Economic)
	Building Type (Economic)

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.

Risks to Current Asset Management Strategies

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

Growth

As the population continues to grow, the Township must prioritize expanding its capacity to serve a larger population. Population and employment growth increases the demand, and the community expectation becomes higher on buildings and facilities. Developing a comprehensive long-term capital plan with considerations for growth and proactive lifecycle strategy can be helpful to minimize dependency on grant funding and increase the capacity.

Asset Information & Lifecycle Management Strategies

The estimated useful life for most building assets are age-based. Condition-based estimated useful life can be determined by completing a detailed assessment for all building components. This can increase confidence in the development of data-driven strategies to address infrastructure needs, prioritize the inspections/maintenance activities. An enhanced proactive strategy can extend the service life of assets with lower funding requirement.

Aging Infrastructure & Capital Funding Strategies

Many building assets in the township are reaching the end of their estimated useful life. Several buildings require replacements of major components, such as garage and salt barn, in the coming years. Major capital rehabilitation projects for buildings will be heavily reliant on the availability of grant funding opportunities. Currently, no capital plan or reserve fund in place for building assets to support the recommended activities. An annual capital funding strategy can be helpful to prevent deferral of capital works.

4.4.6 Levels of Service

The following table outlines the Township's current quantitative metrics that determine the technical level of service provided by the buildings.

Service Attribute	Technical Metric	Current LOS (2022)
Performance	% of buildings in fair or better condition	88%
	% of buildings in poor or very poor condition	12%
	Capital reinvestment rate	TBD

4.4.7 Recommendations

Asset Inventory

- The Township's asset inventory contains a single record for all buildings. Buildings consist of several separate capital components that have unique estimated useful life and require asset-specific lifecycle strategies. Staff should work towards a component-based inventory of all facilities to allow for component-based lifecycle planning.
- Improvements on existing buildings, such as renovations, are tracked as separate assets, rather than tagging this information on the existing asset. Going forward the Township should update the condition and value to reflect all additions and upgrades.
- The estimated useful life values should be reviewed to ensure they match the true service life of each building.

Replacement Costs

- A number of replacement costs for buildings were based on the inflation of historical costs. These costs should be evaluated to determine their accuracy and reliability. Going forward, the Township may consider using insurance records or third party assessments to better account for the true building replacement cost.

Condition Assessment Strategies

- The Township should implement and expand the scope of regular condition assessments for all buildings to better inform short and long-term capital requirements.

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 measuring 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.

4.5 Vehicles

Vehicles allow staff to efficiently deliver municipal services and personnel. Municipal vehicles are used to support several service areas, including:

- Winter control vehicles for winter control activities
- Fire vehicles to provide emergency services
- Parks vehicles to address service requests for Environmental Services and Parks & Recreation
- Roads vehicles to support the maintenance of the transportation network
- Parks vehicles to support the maintenance of the buildings and facilities

The state of the vehicles is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$5.0 million	Fair (46%)	Annual Requirement:	$ 362,820

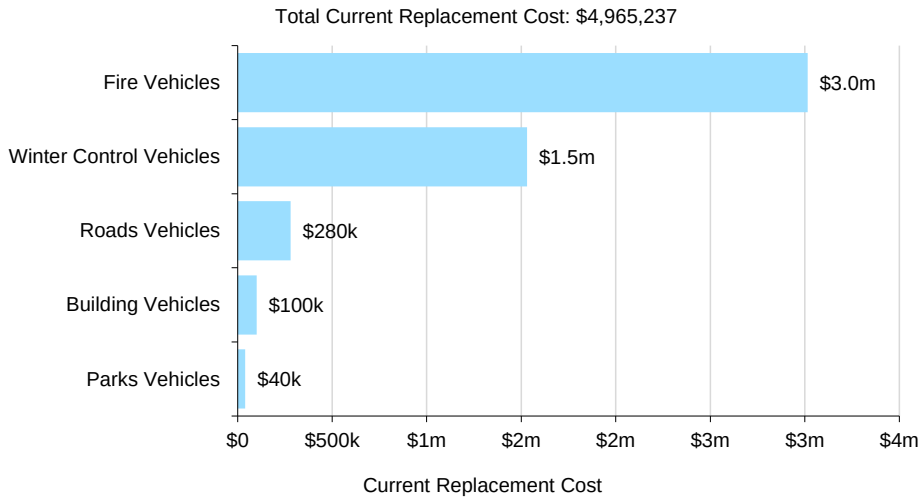
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Performance	The vehicles owned by the Township are in fair condition.

4.5.1 Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Primary Replacement Cost Method	Total Replacement Cost
Building Vehicles	2	User-Defined Cost	$100,000
Fire Vehicles	12	User-Defined Cost	$3,015,000
Parks Vehicles	1	User-Defined Cost	$40,000
Roads Vehicles	5	User-Defined Cost	$280,237
Winter Control Vehicles	6	User-Defined Cost	$1,530,000
			$4,965,237



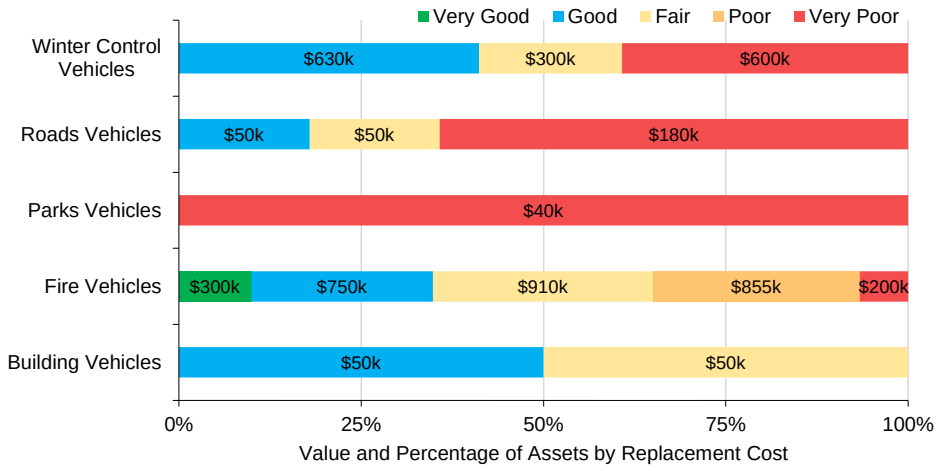
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

4.5.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Building Vehicles	60%	Fair	Age-Based
Fire Vehicles	50%	Fair	Age-Based
Parks Vehicles	0%	Very Poor[7]	Age-Based
Roads Vehicles	20%	Very Poor	Age-Based
Winter Control Vehicles	45%	Fair	Age-Based
	46%	**Fair**	**Age-Based**

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 Vehicles 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.

[7] The parks vehicle is nearing the end of it's service life, and is expected to be replaced in 2023.

Current Approach to Condition Assessment

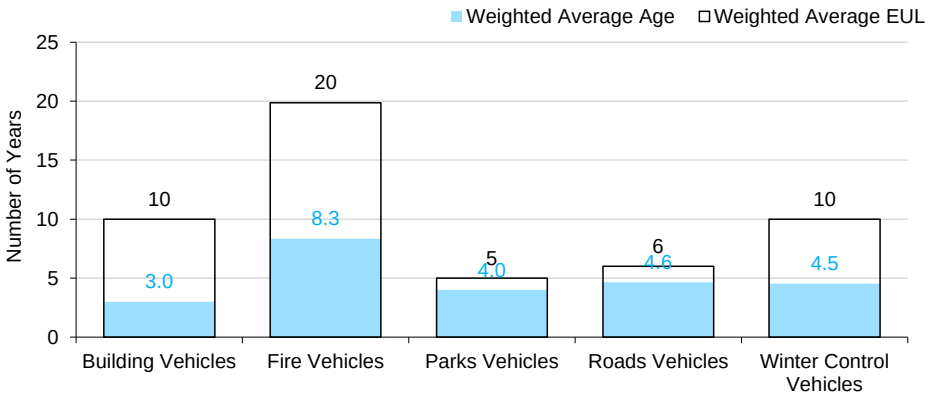
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Staff complete regular daily inspections of vehicles to ensure they are in state of adequate repair prior to operation
- Pump tests and mechanical Assessment are completed annually by third party contractors
- Annual testing for fire vehicles are completed to ensure they are in a state of adequate repair and meets the Nation Fire Protection Agency (NFPA) standards
- The age of vehicles is used as a proxy to determine remaining useful life and relative vehicle condition except for the Fire Department

4.5.3 Estimated Useful Life & Average Age

The Estimated Useful Life for vehicles assets has been assigned according to a combination of established industry standards and staff knowledge. The weighted average estimated useful life and weighted average age are weighted by replacement cost, representing an average across the segment. Finally, the figure below represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Weighted Average Estimated Useful Life (Years)	Weighted Average Age (Years)
Building Vehicles	10 Years	3.0
Fire Vehicles	20 Years	8.3
Parks Vehicles	5 Years	4.0
Roads Vehicles	6 Years	4.6
Winter Control Vehicles	10 Years	4.5



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

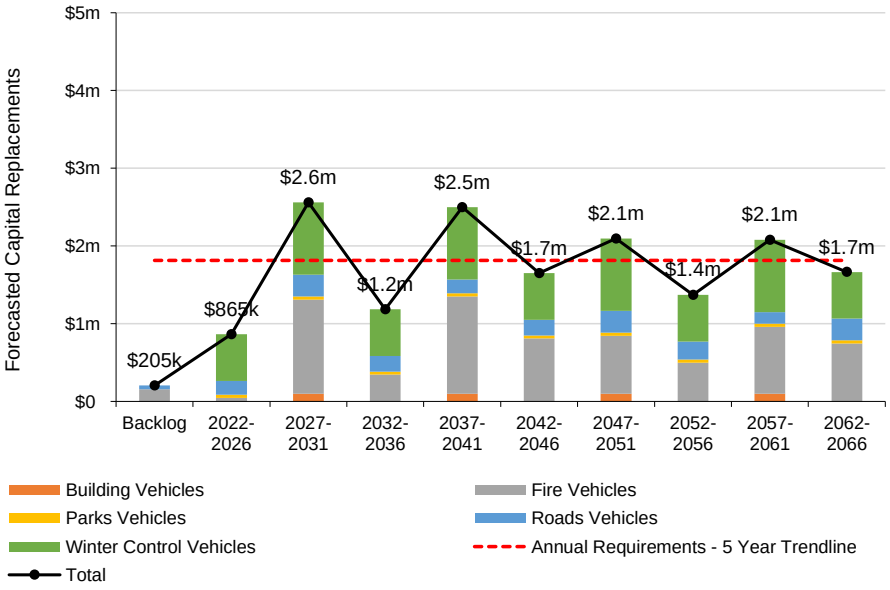
4.5.4 Lifecycle Management Strategy

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

Activity Type	Description of Current Strategy
Maintenance / Rehabilitation	Visual inspections completed and documented daily
	Pump test and mechanic assessement completed annually
	Testing for fire vehicles are completed annually and certification for fire vehicles are maintened annually through CVOR
Replacement	Replacement and maintenance costs for vehicles are forecasted for the next 10 years
	Some fire vehicles in good condition may be transferred to other departments after retirement
	Vehicle age, kilometres and annual O&M costs are taken into consideration when determining appropriate treatment options

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following 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 the trend line represents the average 5-year capital requirements.



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

4.5.5 Risk & Criticality

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 2022 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 (Economic)
	Vehicle Type (Economic)

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.

Risks to Current Asset Management Strategies

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

Supply Chain Uncertainty

When repairing some aged vehicles, the supply chain uncertainty presents difficulties to order replacement parts. The Township needs to take longer periods or higher costs to get these parts. If the critical parts are discontinued, the vehicles may need to be disposed or renewed earlier than their estimated useful lives.

Aging Infrastructure and Funding Strategies

Several vehicles within the Township are approaching or have exceeded their estimated useful life. As vehicles age, they will require exponentially increasing O&M costs to ensure compliance with MTO standards and to function adequately. As capital budgets become more constrained, more maintenance will be postponed, which will further amplify this risk. Replacement and major rehabilitation of the vehicles are entirely dependant on the availability of reserve fund. When funds are not available, it will cause the deferral for vehicles renewal or vehicles purchase. Commit to a dedicated vehicle reserve contribution can help prevent deferral of capital works.

4.5.6 Levels of Service

The following table outlines the Township's current quantitative metrics that determine the technical level of service provided by vehicles.

Service Attribute	Technical Metric	Current LOS (2022)
Performance	% of vehicles in fair or better condition	38%
	% of vehicles in poor or very poor condition	62%
	Capital reinvestment rate	TBD

4.5.7 Recommendations

Inventory

- Several vehicles have exceeded their estimated useful life. Review the estimated useful life values and ensure they reflect the true service life as utilized by staff.

Condition Assessment Strategies

- Consider a vehicle rating system to better estimate the remaining service life of each vehicle.

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.

4.6 Machinery & Equipment

In order to maintain the high quality of public infrastructure and support the delivery of core services, Township staff own and employ various types of machinery and equipment. This includes:

- Park equipment to maintain public parks
- Arena equipment to maintain recreation services
- Fire equipment to support the delivery of emergency services
- Roads and Bridges equipment to provide winter control activities
- General government equipment to support administration services
- Library books

Keeping machinery and equipment in an adequate state of repair is important to maintain a high level of service.

The state of the machinery & equipment is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$4.0 million	Fair (41%)	Annual Requirement:	$ 304,264

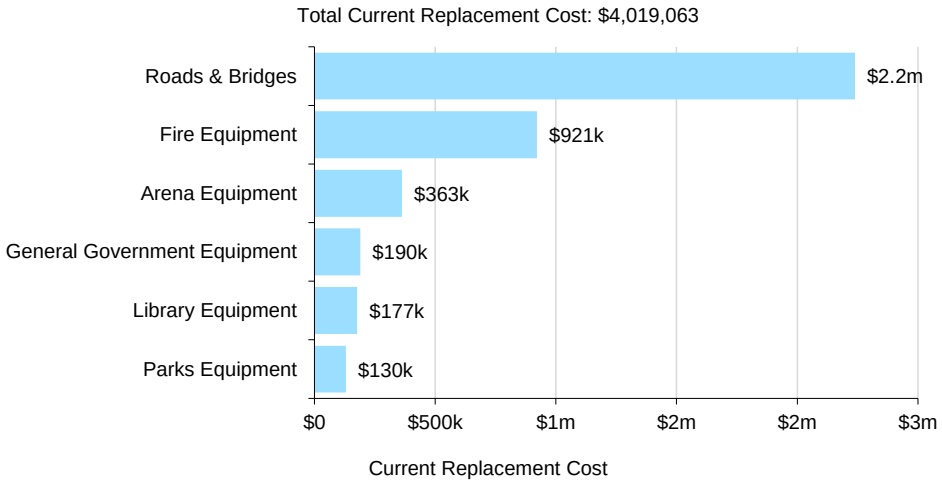
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Performance	The machinery & equipment owned by the Township are in fair condition. However, 40% of the machinery & equipment is in poor or very poor condition.

4.6.1 Asset Inventory & Replacement Cost

The following table includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township's machinery and equipment inventory.

Asset Segment	Quantity	Primary Replacement Cost Method	Total Replacement Cost
Arena Equipment	257	User-Defined Cost	$362,601
Fire Equipment	26	User-Defined Cost	$921,159
General Government Equipment	6	User-Defined Cost	$190,000
Library Equipment	7	CPI Tables	$176,999
Parks Equipment	8	CPI Tables	$129,867
Roads & Bridges	21	User-Defined Cost	$2,238,437
			$4,019,063



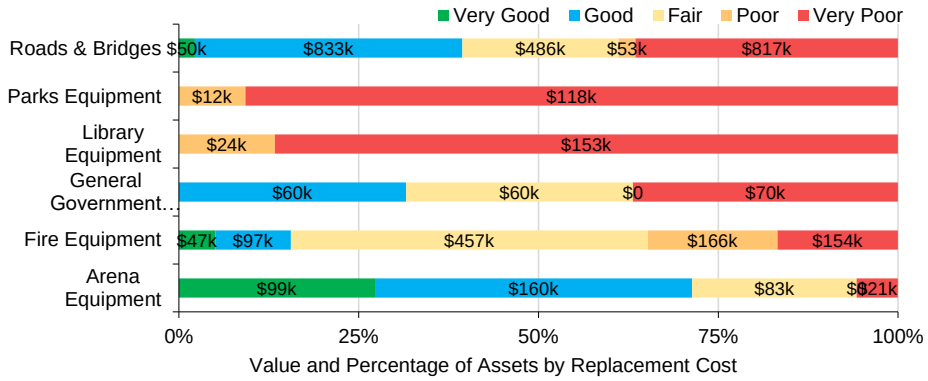
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

4.6.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Arena Equipment	64%	Good	Age-Based
Fire Equipment	43%	Fair	Age-Based
General Government Equipment	37%	Poor	Age-Based
Library Equipment	6%	Very Poor[8]	Age-Based
Parks Equipment	7%	Very Poor[9]	Age-Based
Roads & Bridges	41%	Fair	Age-Based
	41%	**Fair**	**Age-Based**

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



[8] Library equipment is made up of the collections, which have a useful life of seven years. Without any assessment of condition, these collections appear to be at the end of their service life. However, these materials are still in circulation, and are likely in better condition than the age suggests.

[9] Parks equipment is still operational, and likely providing service beyond the manufacturer recommended estimated useful life.

To ensure that the Township's machinery and equipment 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 machinery and equipment.

Current Approach to Condition Assessment

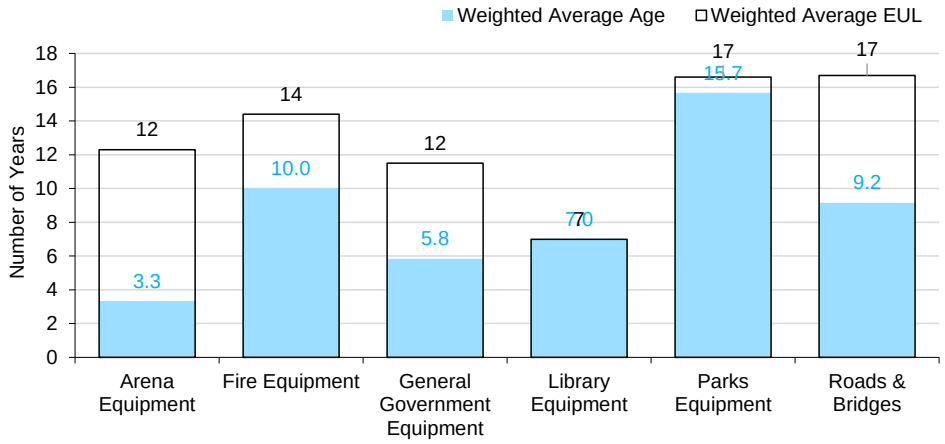
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Regular visual inspections of machinery & equipment are completed by staff to ensure they are in state of adequate repair
- Annual inspections and cleaning of equipment are completed to follow the regulatory requirements
- Annual testing of pumps and ladders is completed by third party mechanician, other fire equipment is inspected regularly by staff

4.6.3 Estimated Useful Life & Average Age

The Estimated Useful Life for machinery and equipment assets has been assigned according to a combination of established industry standards and staff knowledge. The weighted average estimated useful life and weighted average age are weighted by replacement cost, representing an average across the segment. Finally, the figure below represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Weighted Estimated Useful Life (Years)	Weighted Average Age (Years)
Arena Equipment	12 Years	3.3
Fire Equipment	14 Years	10.0
General Government Equipment	12 Years	5.8
Library Equipment	7 Years	7.0
Parks Equipment	17 Years	15.7
Roads & Bridges	17 Years	9.2



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

4.6.4 Lifecycle Management Strategy

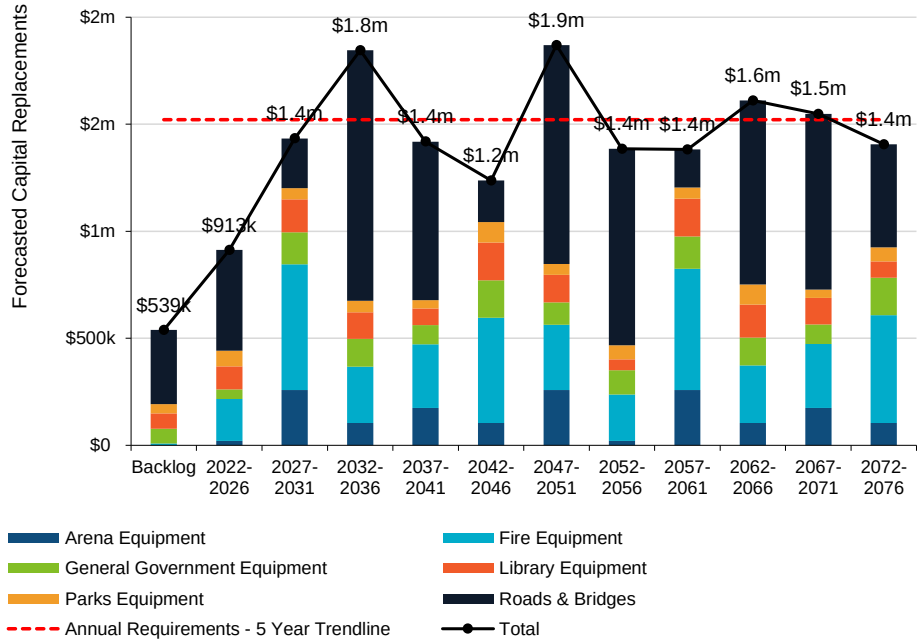
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance/ Rehabilitation	Maintenance program varies by department
	Anuual inspections and cleaning for equipment are completed
	Machinery and equipment is maintained according to manufacturer recommended actions and supplemented by the expertise of municipal staff
Replacement	The replacement of machinery and equipment depends on its expected useful life, usage and deficiencies identified by mechanicians
	Bunker gear is replaced on a 10-year cycle, as per manufacturer reccomendations

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 50 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 the trend line represents the average 5-year capital requirements.



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

4.6.5 Risk & Criticality

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 2022 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 machinery and equipment are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
	Machinery & Equipment Type (Economic)

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.

Risks to Current Asset Management Strategies

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

Supply Chain Uncertainty

Due to supply chain uncertainty, there are extended wait times to receive replacement equipment. This can lead to the Township using equipment beyond their useful life, rather than disposing and acquiring new equipment.

Aging Infrastructure and Funding Strategies

As machines and equipment age, they will require increasing O&M costs to function adequately. As capital budgets become more constrained, more maintenance will be postponed, which will further amplify this risk. Replacement and major rehabilitation of the machinery and equipment are entirely dependant on the availability of reserve funds. When funds are not available, it will cause the deferral for vehicles renewal or vehicles purchase. Commit to a dedicated vehicle reserve contribution can help prevent deferral of capital works.

4.6.6 Levels of Service

The following table outlines the Township's current qualitative descriptions that determine the community levels of service provided by the machinery and equipment.

Service Attribute	Technical Metric	Current LOS (2022)
Performance	% of machinery and equipment in fair or better condition	40%
	% of machinery and equipment in poor or very poor condition	60%
	Capital reinvestment rate	TBD

4.6.7 Recommendations

Replacement Costs

- A number of replacement costs for machinery and equipment were based on the inflation of historical costs. These costs should be evaluated to determine their accuracy and reliability. Continue to 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 equipment. Consider developing the condition rating criteria and document the condition rating of the assets for rehabilitation / replacement projection.
- 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

- 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.

5 Analysis of Rate-funded Assets

Key Insights

- Rate-funded assets are valued at $3.7 million
- 45% of rate-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for rate-funded assets is approximately $78,000
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

5.1 Water Network

There are two municipal drinking water network, Elgeti-Crystal Springs in Stewart Hall and Keene Heights in Keene, owned by the Township of Otonabee-South Monaghan and operated by the Ontario Clean Water Agency (OCWA). The water system in Burnham Meadows is maintained and owned by the Peterborough Utilities Group.

The water networks in the Township include the following:

- Water Treatment Plant
- Watermains
- Water Valves, water meters and other Appurtenances

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

Replacement Cost	Condition	Financial Capacity	
$3.2 million	Fair (38%)	Annual Requirement:	$ 73,054

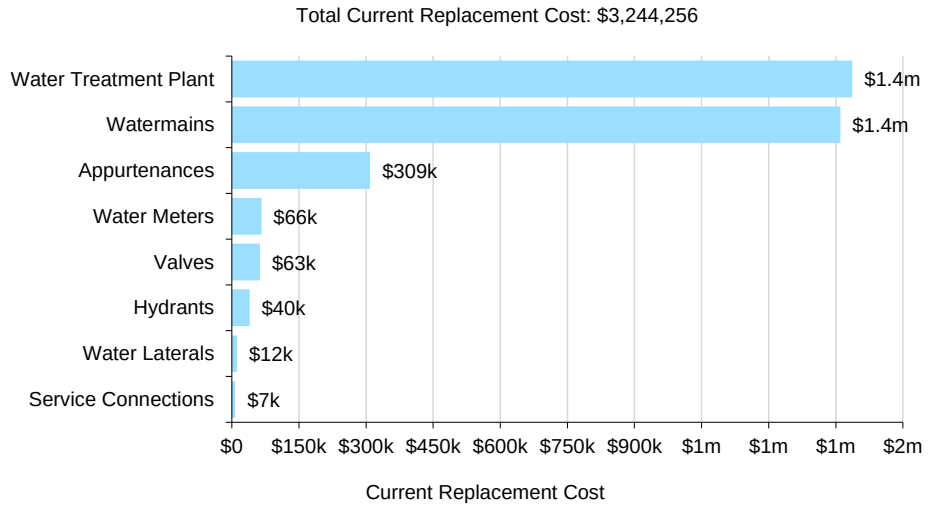
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Scope	The municipal water is accessible to 5% of the community. There are no hydrants in the Township outside of the Burnham Meadows subdivision. However, water tanker shuttle accreditation is in place for emergency services.
Quality/Reliability	The water network is in fair condition with minimal reports of low water quality and pressure. There are no unplanned service interruptions due to main breaks and boil water advisories.

5.1.1 Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Appurtenances	4	Cost/Unit	$309,200
Hydrants	8	Cost/Unit	$40,000
Service Connections	37	Cost/Unit	$7,400
Valves	21	Cost/Unit	$63,000
Water Laterals	58	Cost/Unit	$11,600
Water Meters	143	CPI Tables	$66,245
Water Treatment Plant	118	CPI Tables	$1,386,631
Watermains	5,397 m	Cost/Unit	$1,360,180
			$30,601,614



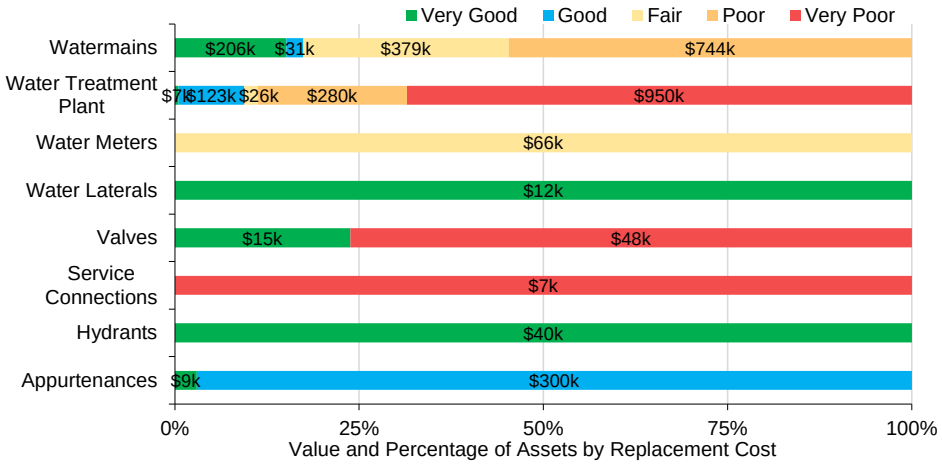
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

5.1.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Appurtenances	79%	Good	Age-Based
Hydrants	90%	Very Good	Age-Based
Service Connections	5%	Very Poor	Age-Based
Valves	25%	Poor	Age-Based
Water Laterals	93%	Very Good	Age-Based
Water Meters	45%	Fair	Age-Based
Water Treatment Plant	16%	Very Poor[10]	Age-Based
Watermains	49%	Fair	Age-Based
	38%	**Poor**	**Age-Based**

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



[10] The condition of the treatment plant is entirely based on age. Staff indicate the plant is in better condition than age suggests; however, no formal assessments have taken place yet.

To ensure that the Township's water 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 water network.

Current Approach to Condition Assessment

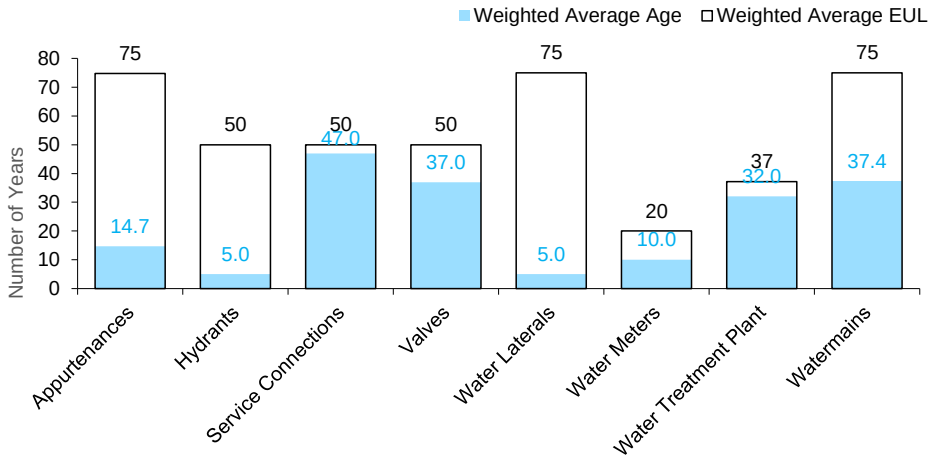
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- The Township owns the water treatment plant and it is operated by Ontario Clean Water Agency (OCWA)
- Staff primarily rely on the historical break records, water quality, age and material types to determine the projected condition of water mains

5.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for water network assets has been assigned according to a combination of established industry standards and staff knowledge. The weighted average estimated useful life and weighted average age are weighted by replacement cost, representing an average across the segment. Finally, the figure below represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Weighted Estimated Useful Life (Years)	Weighted Average Age (Years)
Appurtenances	75 Years	14.7 Years
Hydrants	50 Years	5.0 Years
Service Connections	50 Years	47.0 Years
Valves	50 Years	37.0 Years
Water Laterals	75 Years	5.0 Years
Water Meters	20 Years	10.0 Years
Water Treatment Plant	37 Years	32.0 Years
Watermains	75 Years	37.4 Years



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

5.1.4 Lifecycle Management Strategy

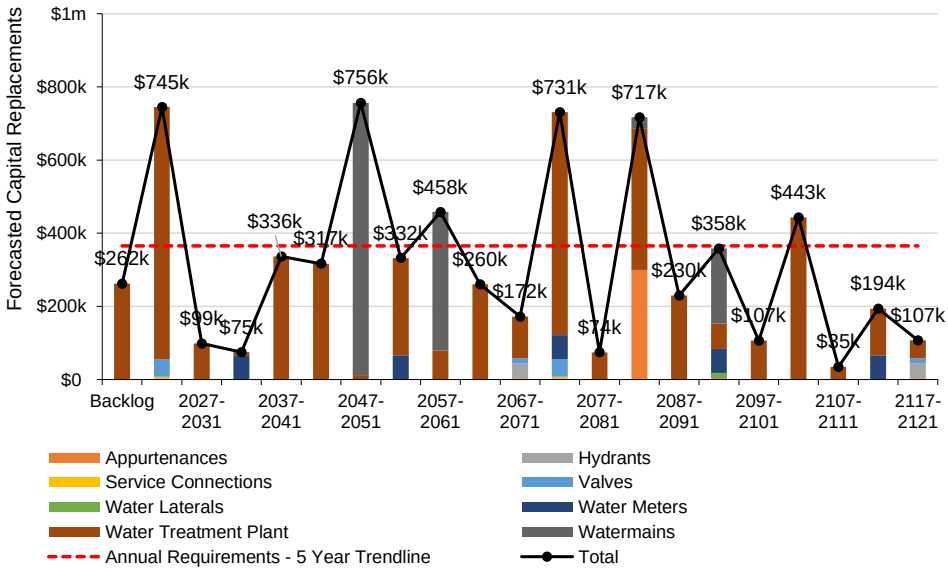
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Main flushing is completed for the whole network twice per year during spring and fall seasons
	The Township is planning to develop a program to identify deficiencies and potential leaks
Rehabilitation	Currently no rehabilitation program is in place for water network
	OCWA recommends replacements and refurbishments for the treatment plant
Replacement	In the absence of mid-lifecycle rehabilitative events, full replacement for most mains is completed once it reaches its end-of-life
	Water network replacement schedule is based on the break records, water quality, ages and material types

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 100 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 the trend line represents the average 5-year capital requirements.



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

5.1.5 Risk & Criticality

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 2022 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 (Economic)
Pipe Material	Pipe Diameter (Social)

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.

Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies

The current lifecycle management strategy for water network is considered reactive. Replacement of watermain is dependent on break records, water quality, age and material type. This poses a risk of service disruption when assets failure occurs. An enhanced proactive strategy can help to extend the service life of the assets, reduce dependency on grant funding and minimize the deferral of capital works.

Capital Funding Strategies

The current renewal strategy for water network is to fully replace the main once it reaches its end-of-life. Replacement of the water network is entirely dependant on the availability of grant funding opportunities. This poses a risk of service disruption when asset failure occurs. Developing a capital plan or committing to a dedicated water network reserve contribution can be helpful to prevent deferral of capital works.

5.1.6 Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	There are two municipal water drinking systems in the Township: one located in Elgeti-Crystal Springs, and the other at Keene Heights. Each of these systems have a water treatment plant and a network of mains, valves, and connections. These assets are owned by the Township but maintained and operated on by OCWA. Residents in the Burnham Meadows subdivision have access to a water system owned and maintained by Peterborough Utilities Group.
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	A network of watermains and hydrants are available for residents in Burnham Meadows. No hydrants exist outside of this subdivision; however, the remaining Township has tanker shuttle accreditation.
Reliability	Description of boil water advisories and service interruptions	N/A

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Scope	% of properties connected to the municipal water system	5%
	% of properties where fire flow is available	100%[11]
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	Capital re-investment rate	TBD

[11] Shuttle tanker accreditation means that all properties within the Township are serviced by the Fire Department in the event of an emergency.

5.1.7 Recommendations

Asset Inventory

- The water treatment plant in-service dates, estimated useful life and condition should be verified. Many components are beyond their stated estimated useful life, but are still continuing to provide service.

Replacement Costs

- All treatment plant replacement costs are based on inflated historical 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 water network assets. Consider developing the condition rating criteria and document the condition rating of the assets for rehabilitation / replacement projection.

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.

5.2 Sanitary System

Burnham Meadows is the only area within the Township where sewage services are offered. The sanitary system is owned by the Township, but it is maintained and operated by the Peterborough Utilities Group. The system includes the following:

- Manholes
- Sanitary Laterals
- Sewer mains

The state of the infrastructure for the sanitary system is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$459,925	Very Good (95%)	Annual Requirement:	$ 4,599

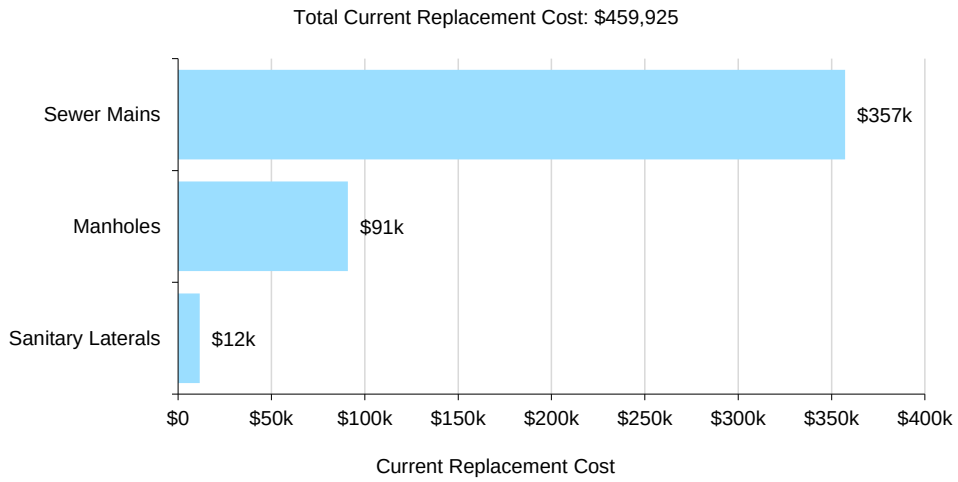
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Scope	The municipal sanitary system is accessible to 5% of the community. The Municipal stormwater system will likely need expansion in the near future.
Quality/Reliability	The sanitary system is in very good condition with minimal unplanned service interruptions due to backups and effluent violations.

5.2.1 Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Manholes	14	Cost/Unit	$91,000
Sanitary Laterals	58	Cost/Unit	$11,600
Sewer Mains	1,334 m	Cost/Unit	$357,325
			$459,925



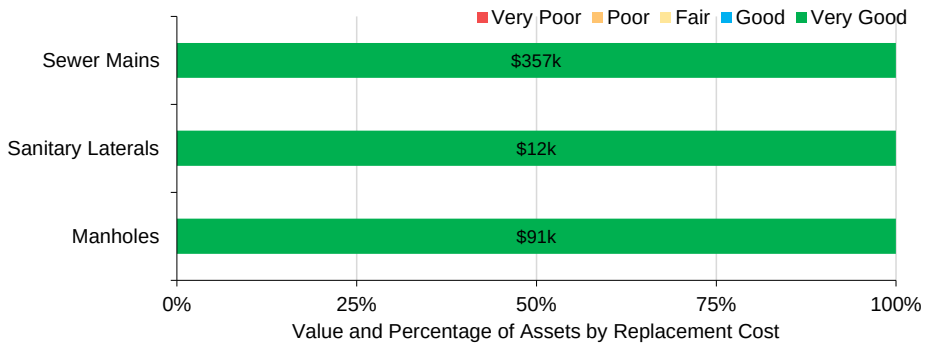
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

5.2.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Manholes	95%	Very Good	Age-Based
Sanitary Laterals	95%	Very Good	Age-Based
Sewer Mains	95%	Very Good	Age-Based
	95%	**Very Good**	**Age-Based**

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 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 sanitary network.

Current Approach to Condition Assessment

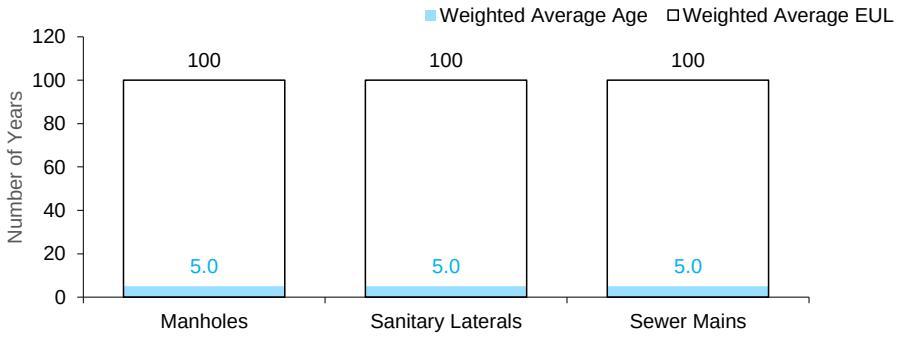
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- CCTV inspections and pumping are completed for sanitary mains by the City of Peterborough

5.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for sanitary network assets have been assigned according to a combination of established industry standards and staff knowledge. The weighted average estimated useful life and weighted average age are weighted by replacement cost, representing an average across the segment. Finally, the figure below represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Weighted Estimated Useful Life (Years)	Weighted Average Age (Years)
Manholes	100 Years	5.0
Sanitary Laterals	100 Years	5.0
Sewer Mains	100 Years	5.0



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

5.2.4 Lifecycle Management Strategy

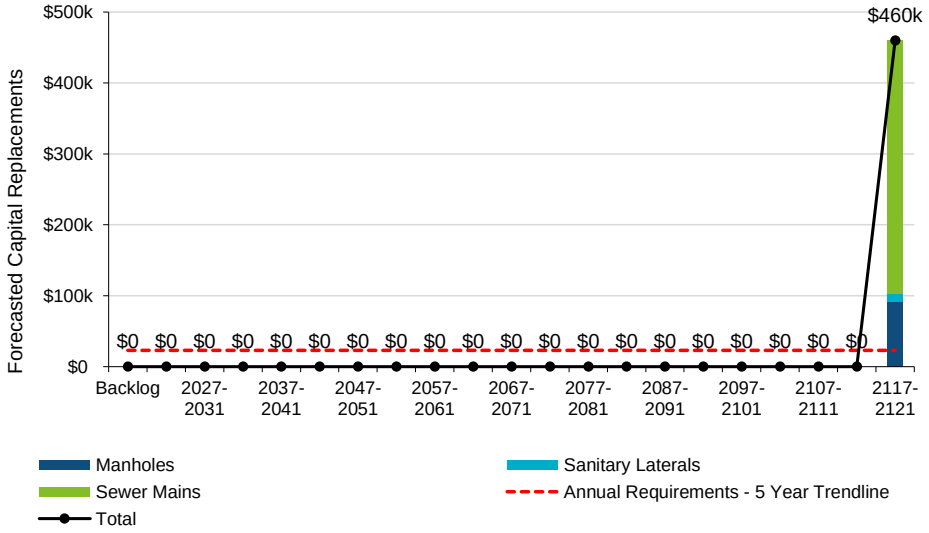
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance / Rehabilitation / Replacement	Main flushing is completed as needed basis by The City of Peterborough
	Periodic CCTV testing may be employed by The City of Peterborough to identify deficiencies and potential leaks.
	In the absence of mid-lifecycle rehabilitative events, most mains are simply maintained with the goal of full replacement once it reaches its end-of-life.
	Replacement activities are identified based on an analysis of the main break rate as well as any issues identified during regular maintenance activities.

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 100 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 the trend line represents the average 5-year capital requirements.



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

5.2.5 Risk & Criticality

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 2022 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)
Pipe Material	Replacement Cost (Economic)
Condition	Pipe Diameter (Social)

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.

Risks to Current Asset Management Strategies

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

Growth

The population growth in the Township is expected to continue. Population and employment growth will increase the demand on municipal services and potentially decrease the lifecycle of certain assets. Currently, the sewage services are only available at Burnham Meadows and it is operated and maintained by the Peterborough Utilities Group. As the population continues to grow, the Township must prioritize expanding its capacity to serve a larger population. Staff are working towards developing a comprehensive long-term capital plan with considerations for growth.

5.2.6 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.

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 (2022)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	Only the Burnham Meadows subdivision has access to a piped wastewater network, consisting of sewer mains, laterals, and manholes. All other properties across the Township rely on a septic system
Reliability	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	The sewer system is relatively new, and does not at this point in time have any inflow and infiltration issues identified. As the system ages it is expected that water can infiltrated through cracks in the joints and through manholes.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The sewer system is designed to be water tight, minimizing infiltration. However, there is no program in place to prevent private connections.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	All wastewater treatment is managed by the Peterborough Utilities Group.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Scope	% of properties connected to the municipal sanitary system	5%
Reliability	# of connection-days per year having sewer backups compared to the total number of properties connected to the municipal sanitary system	0
Performance	Capital re-investment rate	TBD

5.2.7 Recommendations

Asset Inventory

- There are a number of pooled sanitary laterals and manholes assets that require further segmentation and length measurements to allow for asset-specific lifecycle planning and costing.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water network assets.
- Consider employing CCTV inspections on a regular basis to proactively monitor the system connection.
- As the system ages, consider flow monitoring to identify areas prone to inflow and infiltration.

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

- A trenchless re-lining strategy is expected to extend the service life of sanitary mains at a lower total cost of ownership. The Township can consider implementing re-lining to extend the life of infrastructure at the lowest total cost of ownership.
- 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.

6 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
- Moderate population and employment growth is expected
- The costs of growth should be considered in long-term funding strategies that are designed to maintain the current level of service

6.1 Description of Growth Assumptions

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

6.1.1 Otonabee-South Monaghan Official Plan (November 2014)

The Township of Otonabee-South Monaghan's Official Plan is intended to provide long-term planning objectives, set out the polices for development and use of land, guide the implementation and management of the Plan with consideration of the policies of the County of Peterborough Official Plan, the Provincial Policy Statement, and the Growth Plan for the Greater Golden Horseshoe. The vision statement in the Plan states that the Township will strive to balance the economic needs and the environment preservation while promoting the health, safety and well-being of the residents. The document planning horizon spans 20 years, covering it to the year 2023.

The Official Plan was approved by the County of Peterborough on November 2nd, 2005. The updated Official Plan included the 11 amendments and approved by the Ontario Municipal Board in 2014. The Township will continue to sustain the growth of a strong agricultural community, seek opportunities for expansion of the tourism industry as well as strengthen commercial and industrial growth based on sound environmental and land use planning practices. The Township focuses on directing the population growth and development primarily to the designated Hamlet settlement areas. The development is encouraged in locations where minimal demands on public services will be required, where can most effectively utilize existing services or where new services can be provided most economically.

The permanent population of the Township is projected to increase to approximately 8,308 persons over the life of this Official Plan. The Township is intended to promote the designation and development of central nodes of Employment Lands as a focus for new and expanding industrial and commercial land uses. The following table outlines population, private dwellings and employment changes to the Township between 2011-2021 from Statistics Canada, for which the Township will be required to provide services.

Year	Population	Private Dwellings	Employment
2021	7,087	3,050	N/A
2016	6,670	2,944	3,465
2011	6,581	2,851	3,630

6.1.2 Other Related Documents

The Growth Plan for the Greater Golden Horseshoe (the "Growth Plan") and its Amendment 1 was approved by the Lieutenant Governor in Council to take effect on August 28, 2020. The Plan emphasis on optimizing the use of existing infrastructure and services public service facilities before expanding the urban area. The Growth Plan establishes the population and employment forecasts for County of Peterborough to 2051 as the following: Population 82,000, Employment 26,000.

Under the Plan, the County of Peterborough Official Plan is responsible for allocating growth among the eight local municipalities and the County has allocated 11.2 percent of the new population growth in the County to the Township of Otonabee-South Monaghan. Within the County of Peterborough, the Official Plan has set up the minimum residential development target as 15% of all occurring annually within the delineated built-up area and the minimum density target as 20 jobs per net hectare of employment areas within settlement areas.

6.2 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.

The official plan for Otonabee-South Monaghan has indicated the vision statement as fostering healthy change and growth. The Township will ensure the sewage treatment, waste disposal services, water supply services, stormwater management, transport pathways, utilities and emergency services are planned and developed to provide for the growth targets outlined in the Official Plan. As growth-related assets are constructed or acquired, they should be integrated into the Township's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the Township will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

7 Financial Summary

Key Insights

- Annual Capital Requirements of over $2.5 million expected over the long term
- A funding strategy should be developed to examine what funding shortfall exists, and how this shortfall can be closed

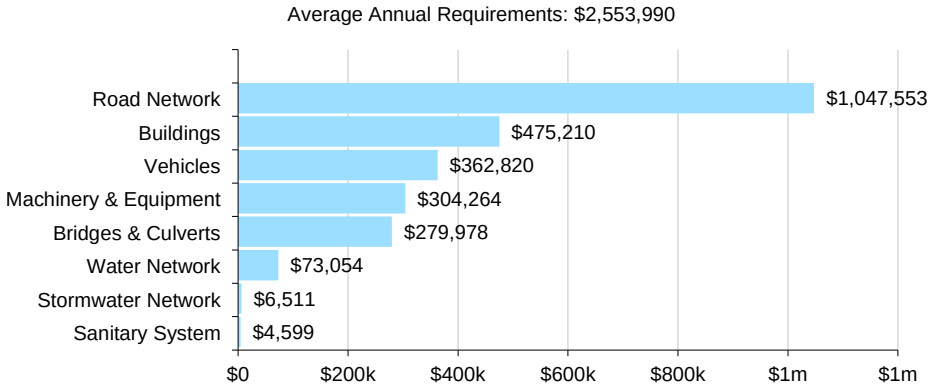
7.1 Financial Strategy Overview

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 Otonabee-South 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 outlines the funding needs to obtain and maintain the current levelof service. These funding needs comprise of the renewal and rehabilitations of infrastructure assets. Funds typically come from the following sources:

1. Use of traditional sources of municipal funds:
    a. Tax levies
    b. User fees
    c. Reserves
    d. Debt
    e. Development charges
2. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods
3. Use of Senior Government Funds:
    a. Gas tax
    b. Annual grants

7.2 Annual Requirements and Capital Funding

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlog and achieve long-term sustainability. In total, the Town must allocate approximately $2.5 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 the Road Network and Bridges and Culverts, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal of the Town's assets. The development of these strategies allows for a more accurate representation of the true costs of renewing roads, under the current strategy.

7.3 Impacts of Growth on the Financial Strategy

The financial strategy presented in the previous sections identifies the deficit between capital funding needs and capital funding available for existing assets, maintaining current levels of service. As the Township grows, new assets will be acquired, which will create additional operating and capital requirements. The cost of acquiring new assets due to growth, in addition to the renewal and maintenance needs, should be captured to understand the financial impacts of growth.

7.4 Recommendations

1. The 2025 requirements of O. Reg. 588/17 will require the Township to develop a financial strategy that states the funding requirements to achieve the proposed levels of service, funding available from sustainable funding sources, and identifies the gap between the funding need and funding available
    a. The Township should identify all available sustainable funding sources. Sustainable sources are those that have historically been received at least three years in a row, and are expected to continue to be received indefinitely
    b. The Township should allocate the available funding to each asset category, considering historical budgets and levels of service needs.
    c. The Township should calculate a funding shortfall, defined as the difference between funding needs and sustainable funding available.
    d. Finally, if a funding shortfall exists, the Township should consider several options to close the gap. These options can consider changes to tax and rate increases, multiple funding horizons, and reallocating budgets between asset categories
2. Reviewing historical operating spending can be used to approximate future operating needs. These needs can be scaled with the growth of new assets to approximate the full funding needs into the future.
3. Consider internalizing infrastructure projects to reduce the need on external contractors.
4. Consider the impact of changing technology, staffing levels, and standard operating processes on capital, maintenance, and operating requirements.

8 Appendices

Key Insights

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

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

- Appendix C provides additional guidance on the development of a condition

Appendix A: 10-Year Capital Requirements

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

Road Network

gment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
HCB	$0	$0	$0	$80k	$16k	$112k	$56k	$14k	$0	$30k	$488k
LCB	$0	$0	$0	$920k	$1.5m	$1.6m	$0	$0	$0	$0	$0
Wall	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
s	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$1.0m**	**$1.5m**	**$1.7m**	**$56k**	**$14k**	**$0**	**$30k**	**$488k**

Bridges & Culverts

gment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
	$0	$339k	$226k	$33k	$57k	$76k	$97k	$0	$0	$7.8m	$0
Culverts	$0	$0	$35k	$0	$0	$49k	$0	$0	$0	$1.9m	$0
	$0	**$339k**	**$261k**	**$33k**	**$57k**	**$125k**	**$97k**	**$0**	**$0**	**$9.6m**	**$0**

Stormwater System

gment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
ns	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
erals	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ns	$22k	$0	$0	$0	$0	$0	$0	$0	$0	$22k	$0
	$22k	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$22k**	**$0**

Buildings

Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
ngs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
overnment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ildings	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ds	$364k	$0	$0	$0	$0	$0	$0	$364k	$0	$0	$0
lth	$858k	$858k	$0	$0	$0	$0	$0	$0	$0	$0	$0
Buildings	$10k	$0	$0	$0	$0	$0	$0	$0	$0	$10k	$0
	$1.2m	**$858k**	**$0**	**$0**	**$0**	**$0**	**$0**	**$364k**	**$0**	**$10k**	**$0**

Machinery & Equipment

egment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
pment	$0	$0	$21k	$0	$0	$0	$0	$0	$51k	$162k	$45k
ment	$8k	$34k	$34k	$43k	$34k	$49k	$34k	$71k	$118k	$329k	$34k
overnment	$70k	$0	$0	$0	$45k	$0	$0	$45k	$30k	$30k	$45k
uipment	$70k	$30k	$27k	$26k	$24k	$0	$0	$0	$100k	$27k	$26k
pment	$43k	$0	$34k	$0	$0	$40k	$20k	$20k	$0	$0	$12k
ridges	$347k	$30k	$0	$0	$10k	$430k	$33k	$0	$0	$0	$200k
	$2.3m	**$94k**	**$116k**	**$69k**	**$113k**	**$520k**	**$87k**	**$136k**	**$300k**	**$548k**	**$362k**

Vehicles

egment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
ehicles	$0	$0	$100k	$0	$100k	$0	$100k	$0	$100k	$0	$100k
es	$155k	$45k	$1.2m	$345k	$1.3m	$810k	$745k	$500k	$860k	$745k	$1.2m
cles	$0	$40k	$40k	$40k	$40k	$40k	$40k	$40k	$40k	$40k	$40k
icles	$50k	$180k	$280k	$200k	$180k	$200k	$280k	$230k	$150k	$280k	$280k

trol	$0	$600k	$930k	$600k	$930k	$600k	$930k	$600k	$930k	$600k	$930k
	$205k	**$865k**	**$2.6m**	**$1.2m**	**$2.5m**	**$1.7m**	**$2.1m**	**$1.4m**	**$2.1m**	**$1.7m**	**$2.6m**

Water Network

egment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
nces	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
nnections	$0	$0	$0	$0	$7k	$0	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$48k	$0	$0	$0	$0	$0	$0
rals	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
tment	$262k	$0	$25k	$16k	$634k	$14k	$3k	$1k	$4k	$90k	$1k
s	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$262k	**$0**	**$25k**	**$16k**	**$690k**	**$14k**	**$3k**	**$1k**	**$4k**	**$90k**	**$1k**

Sanitary System

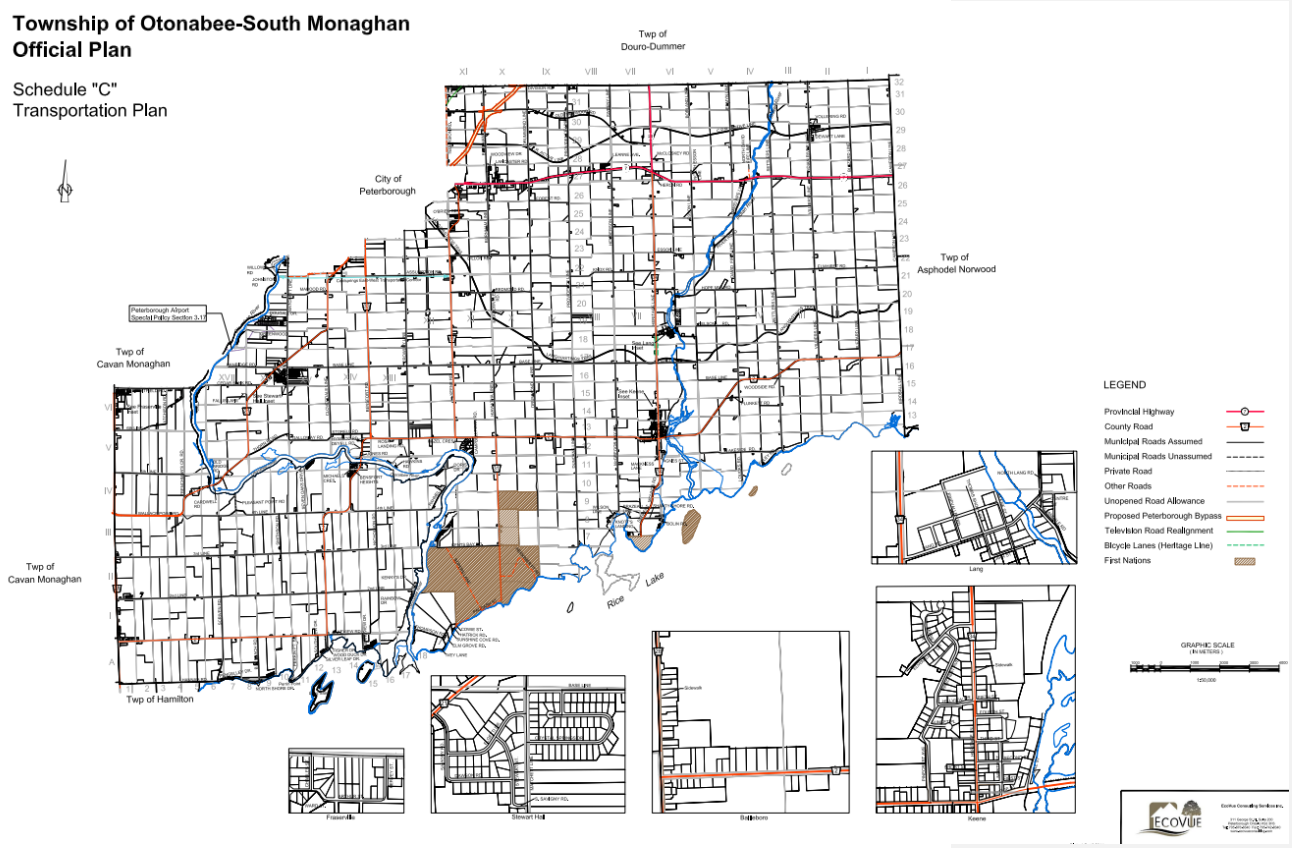
egment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
aterals	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

All Asset Categories

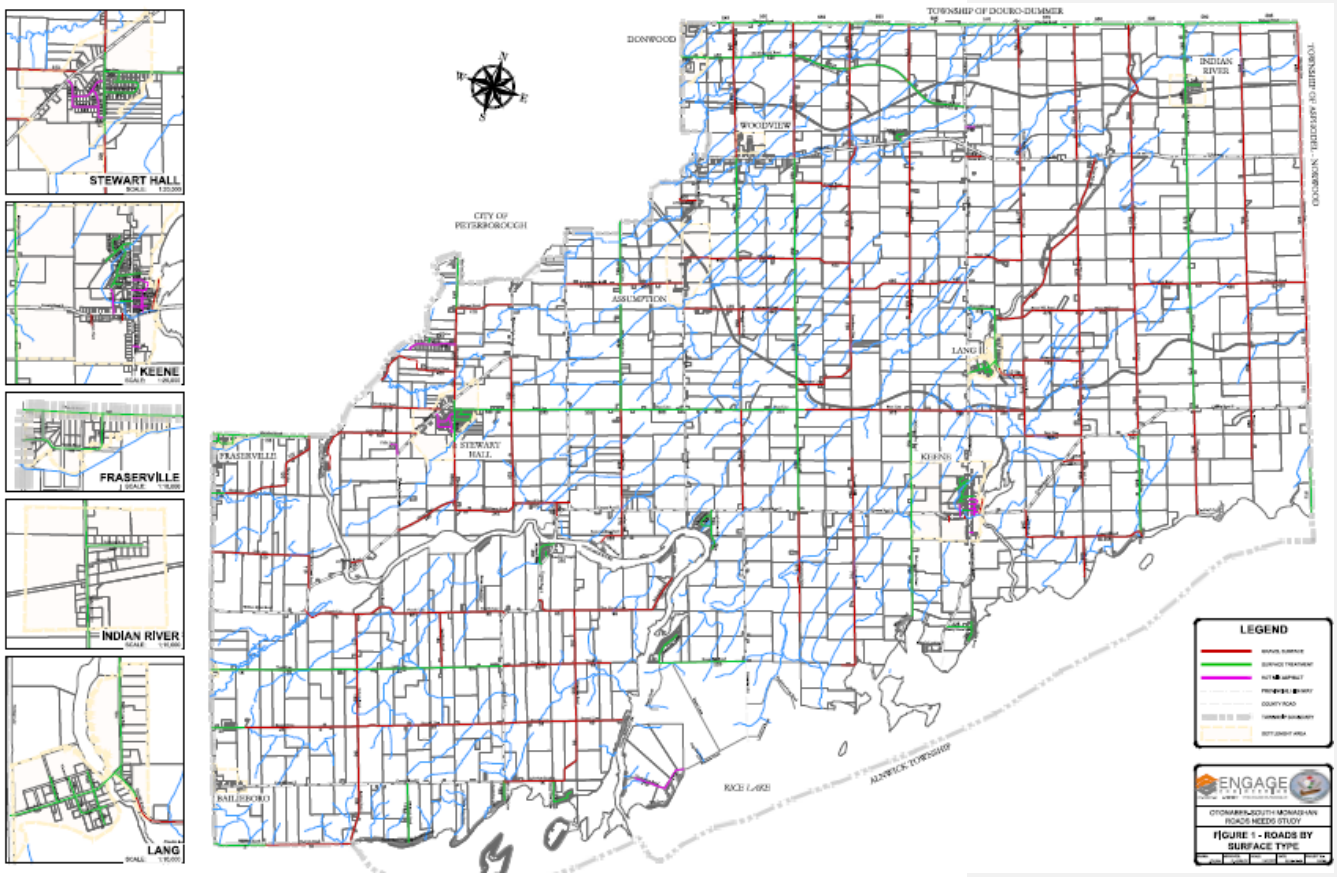
ment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
t	$0	$0	$0	$1.0m	$1.5m	$1.7m	$56k	$14k	$0	$30k	$488k
verts	$0	$339k	$261k	$33k	$57k	$125k	$97k	$0	$0	$9.6m	$0
ystem	$22k	$0	$0	$0	$0	$0	$0	$0	$0	$22k	$0
	$1.2m	$858k	$0	$0	$0	$0	$0	$364k	$0	$10k	$0
	$205k	$865k	$2.6m	$1.2m	$2.5m	$1.7m	$2.1m	$1.4m	$2.1m	$1.7m	$2.6m
	$2.3m	$94k	$116k	$69k	$113k	$520k	$87k	$136k	$300k	$548k	$362k
k	$262k	$0	$25k	$16k	$690k	$14k	$3k	$1k	$4k	$90k	$1k
em	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$2.7m	**$1.3m**	**$572k**	**$1.5m**	**$2.7m**	**$2.3m**	**$593k**	**$1.6m**	**$504k**	**$11.1m**	**$1.1m**

Appendix B: Level of Service Maps

Road Network Map



Road Network Map By Surface Type


STEWART HALL
KEENE
FRASERVILLE
INDIAN RIVER
LANG
TOWNSHIP OF DOURO-DUMMER
DONWOOD
WOODVIEW
INDIAN RIVER
CITY OF PETERBOROUGH
ASSUMPTION
LANG
STEWART HALL
FRASERVILLE
KEENE
BAILIEBORO
RICE LAKE
ALNWICK/HAVELOCK
LEGEND
ENGAGE
OTONABEE-SOUTH MONAGHAN ROADS NEEDS STUDY
FIGURE 1 - ROADS BY SURFACE TYPE

Images of Bridge in Poor Condition
Lot 6/7, Conc III, South Monaghan
Inspected: September 14th, 2020

Photo 1: Approach (Looking South)

Photo 2: West Deck Top – Picture 1

Photo 3: West Deck Top – Picture 2

Photo 4: West Soffit

Photo 5: East Deck Top

Lot 13, Conc III/IV, Otonabee

orth)

Images of Bridge in Good Condition
Lot 31, Conc II/III, Otonabee
Inspected: October 23rd, 2020

Photo 2: East Elevation

Photo 4: North East Abutment Wall Spalling

Images of Culvert in Excellent Condition
Lot 9, Conc II/III, South Monaghan
Inspected: September 15th, 2020

Inspected: September 12nd, 2020

Photo 1: Approach (Looking North)

Photo 2: East Retaining Wall

/est)

Photo 2: North Elevation

Photo 3: South East Retaining Wall

Photo 4: North West Retaining Wall

Photo 4: South Elevation

Photo 5: South West Retaining Wall

Photo 6: Looking Downstream

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.

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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