Asset Management Plan

Township of Russell

2024

This Asset Management Plan was prepared by:

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

Key Statistics[1]

Replacement cost of asset portfolio
$396.3 million

Replacement cost of infrastructure per household
$54,035 (2021)

Percentage of assets in fair or better condition
77%

Percentage of assets with assessed condition data
73%

Annual capital infrastructure deficit
TBD

Recommended timeframe for eliminating annual infrastructure deficit
TBD

Target reinvestment rate
2.5%

Actual reinvestment rate
TBD

[1] As per O.Reg. 588/17, the Township of Russell will be completing a 10-year financial strategy for its asset portfolio by July 1, 2025.

Table of Contents

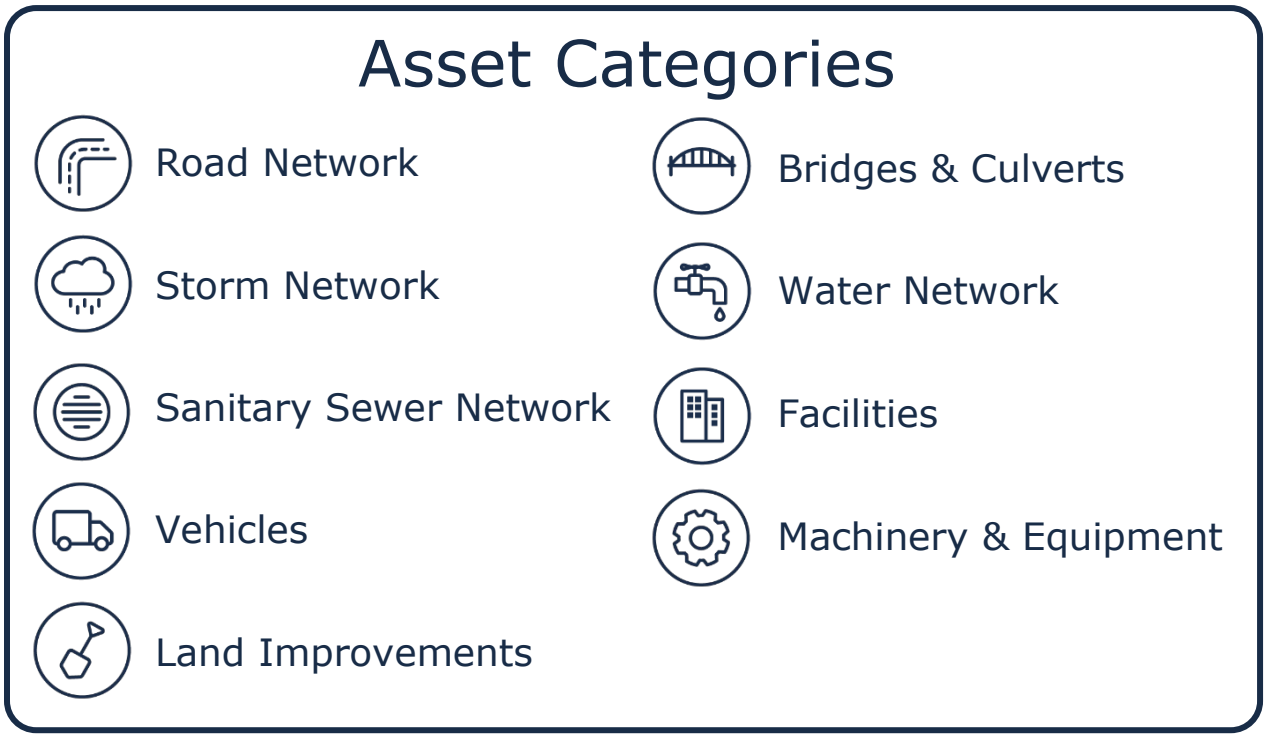
Executive Summary

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

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 $396.3 million. 77% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 73% of assets. For the remaining 27% 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 (where appliable), and replacement only strategies 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 $10.0 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:

- Reviewing asset data to update and maintain a complete and accurate centralized asset register
- Developing various condition assessment strategies with a regular schedule
- Reviewing and updating lifecycle management strategies
- Developing and regularly reviewing short- and long-term plans to meet capital requirements
- Continuing to measure current levels of service and identify sustainable proposed levels of service
- Developing a 10-year financial strategy that will support proposed levels of service

1 Introduction & Context

Key Insights

- The Township of Russell is situated in Eastern Ontario, between the Ottawa and St. Lawrence Rivers
- 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. This plan meets 2024 requirements

1.1 Russell Community Profile

Census Characteristic	Township of Russell	Ontario
Population 2021	19,598	14,223,942
Population Change 2016-2021	18.6%	5.8%
Total Private Dwellings	7,335	5,929,250
Population Density	98.6/km^2	15.9/km^2
Land Area	198.78 km^2	892,411.76 km^2

The Township of Russell is a lower-tier municipality, part of United Counties of Prescott and Russell, which is located within eastern Ontario. It is situated east of Ottawa, Ontario.

Russell was incorporated as a Township in 1854. This incorporation marked the official recognition of the Russell as a municipal entity, allowing it to establish local governance and provide services to its residents. The Township comprises several communities, including Embrun, Russell, Limoges, and Marionville. Embrun and Russell are the largest, serving as the primary hubs for residential, commercial, and social activities.

The Township offers a variety of rich rural settings, including farms, forests, and rivers, along with facilities for outdoor activities. With plenty of parks and trails, it's easy for residents to enjoy walking, biking, and getting closer to nature. It's a welcoming place with a strong sense of community, highlighted by regular events and festivals that celebrate its culture and history, providing entertainment and opportunities for community engagement.

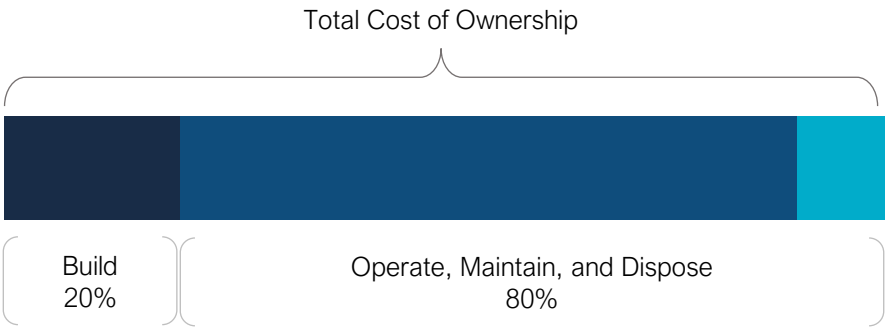
Demand in the Township of Russell is driven by its proximity to Ottawa, offering a quiet lifestyle with easy urban access. Beautiful landscapes, and a close-knit community attract diverse individuals. The area's growth brings new residential and commercial opportunities while maintaining its rural charm. Agriculture supports the rural character and green spaces, fostering a lifestyle connected to nature. This blend of urban accessibility, community services, and agricultural landscapes fuels demand in the Township.

The infrastructure priorities of the Township include sustainable and efficient development. The Township aims to ensure new growth is compatible with existing infrastructure, minimizing adverse impacts on current services and the character of established areas.

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 their Asset Management Policy in June of 2018, in accordance with Ontario Regulation 588/17. The Policy outlines the Town's commitment to managing their assets with improved accountability and transparency using consistent standards that reflect the Town's present and future needs.

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 2023-2026 Strategic Plan focuses on six key strategies: leadership in sustainable development, modernized service delivery, fiscal and infrastructure sustainability, balanced environmental initiatives, inclusive community practices, and enhanced safety and well-being through improved services and infrastructure.

This strategy aims to build a thriving, innovative, and sustainable community for current and future residents. It reflects the Township's dedication to long-term progress and quality of life for residents. The strategy demonstrates a commitment to strategic growth and community resilience, including targeted investments in infrastructure to support economic development and enhance public amenities.

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. An 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 Climate Change

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

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

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

1.4.1 Russell Climate Profile

The Township of Russell is situated in Eastern Ontario within the United Counties of Prescott and Russell. The Township is expected to experience notable effects of climate change which include higher average annual temperatures, an increase in total annual precipitation, and an increase in the frequency and severity of extreme events. According to Climatedata.ca – a collaboration supported by Environment and Climate Change Canada (ECCC) – the Township of Russell may experience the following trends:

Higher Average Annual Temperature:

- Between the years 1971 and 2000 the annual average temperature was 6.0 ºC

- Under a high emissions scenario, the annual average temperatures are projected to increase by 4.8 ºC by the year 2050 and over 6.6 ºC by the end of the century.

Increase in Total Annual Precipitation:

- Under a high emissions scenario, Russell is projected to experience an 13% increase in precipitation by the year 2051 and a 16% increase by the end of the century.

Increase in Frequency of Extreme Weather Events:

- It is expected that the frequency and severity of extreme weather events will change.

1.4.2 Integrating Climate change and Asset Management

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

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

1.5 Ontario Regulation 588/17

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

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

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 strategies

1.5.1 O. Reg. 588/17 Compliance Review

The following table identifies the requirements outlined in Ontario Regulation 588/17 for municipalities to meet by July 1, 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. - 12.2.	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1. - 12.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.2 -12.2	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.2 -12.2	Complete
Description of municipality's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.2.1 – 12.2.1	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.5.1 - 12.5.1	Complete
Current performance measures in each category	S.5(2), 2	4.5.2 - 12.5.2	Complete
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.3 - 12.3	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)	13	Complete

2 Scope and Methodology

Key Insights

- This asset management plan includes 9 asset 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 Russell is produced in compliance with Ontario Regulation 588/17. The July 2024 deadline, under the regulation, requires analysis of all asset categories.

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

Asset Category	Source of Funding
Road Network	Tax Levy
Bridges & Culverts	
Storm Network	
Facilities	
Vehicles	
Machinery & Equipment	
Land Improvements	
Water Network	User Rates
Sanitary Sewer Network	

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
- **Cost Inflated User Defined Costs**: Based on costs provided by municipal staff which are inflated or deflated to the data effective date

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. Cost Inflated User Defined Costs tend to be fairly accurate as well, provided that the cost being inflated is relatively recent. 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. Unless otherwise specified, 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.

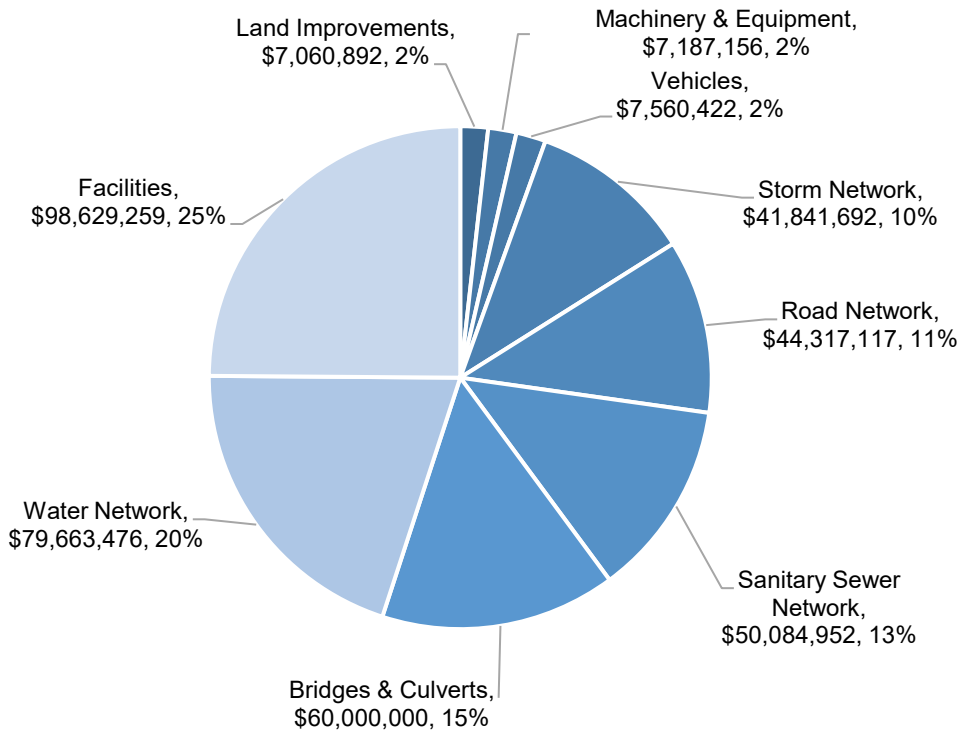
3 Portfolio Overview

Key Insights

- The total replacement cost of the Township’s asset portfolio is $396 million
- 77% of all assets are in fair or better condition
- Average annual capital requirements total $10 million per year across all assets

3.1 Total Replacement Cost of Asset Portfolio

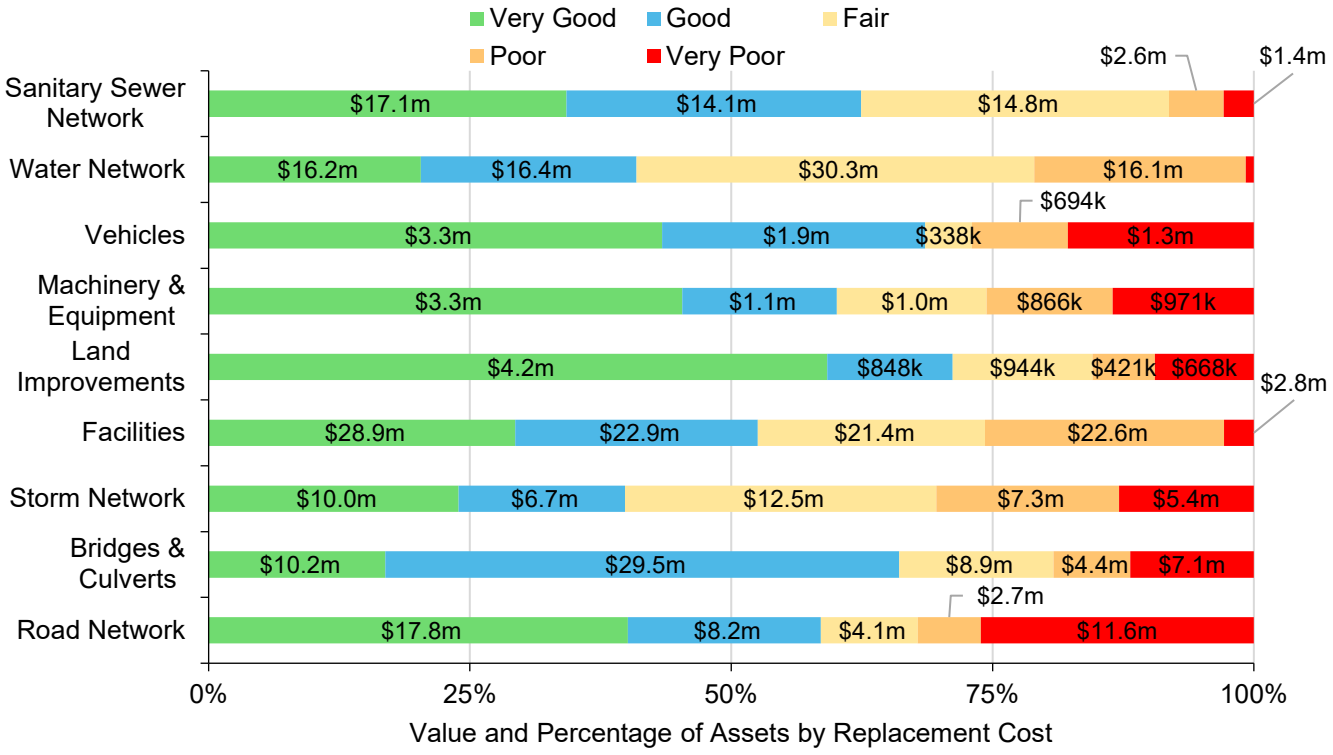
The asset categories analyzed in this AMP have a total replacement cost of $396 million based on inventory data from 2023. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.

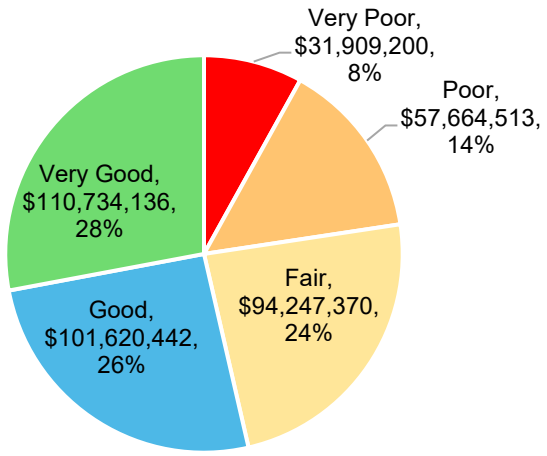


Total Current Replacement Cost: $396,344,965

3.2 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 77% of assets in Russell are in fair or better condition. This estimate relies on both age-based and field condition data.



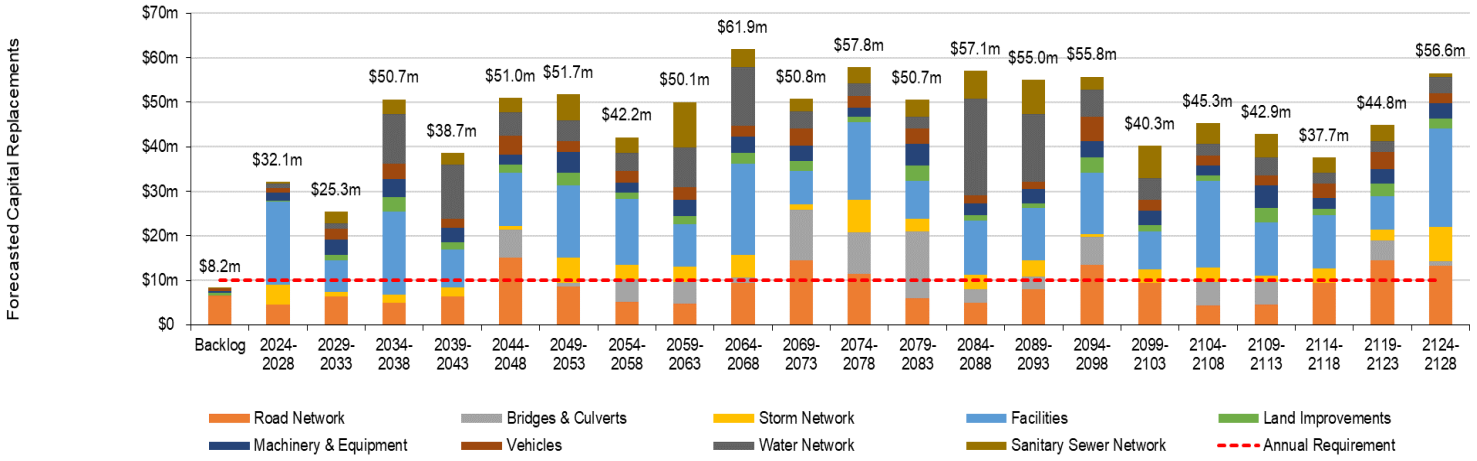


This AMP relies on assessed condition data for 73% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table 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	96%	Road Needs Studies Internal Staff Assessments
Bridges & Culverts	Bridges	100%	2023 OSIM Report
	Structural Culverts	100%	2023 OSIM Report
Storm Network	All	26%	2018 Storm Masterplan
Facilities	All	100%	2023 Building Condition Assessment
Vehicles	All	85%	Staff Assessments
Machinery & Equipment	All	82%	Staff Assessments
Land Improvements	All	92%	Staff Assessments
Water Network	All	35%	2023 Building Condition Assessment Staff Assessments
Sanitary Sewer Network	All	58%	2023 Building Condition Assessment Staff Assessments

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. This projection is used as it ensures that every asset has gone through one full iteration of replacement.



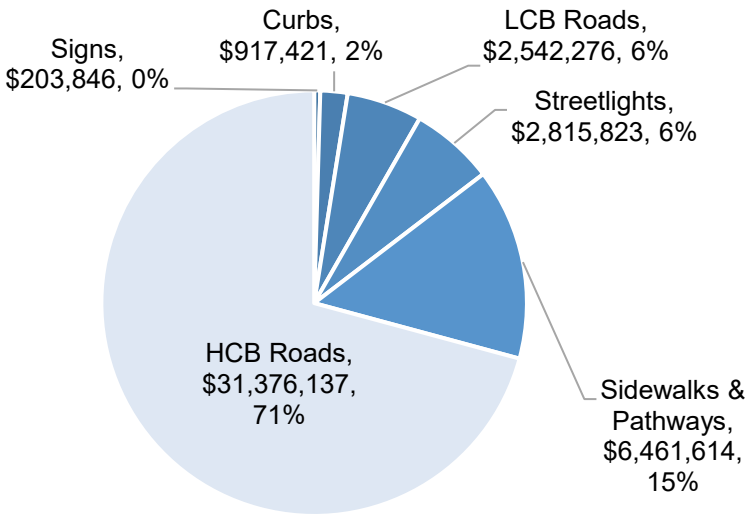
4 Road Network

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

4.1 Asset Inventory & Costs

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

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Curbs	14,157	Meters	$917,000	CPI
HCB Roads	176,157	Meters	$31,376,000	CPI
LCB Roads	24,930	Meters	$2,542,000	CPI
Sidewalks & Pathways	20,824	Meters	$6,462,000	CPI
Signs	1,300	Assets	$204,000	CPI
Streetlights	1,653	Assets	$2,816,000	CPI
Gravel Roads	25,300	Meters	Not Planned for Replacement	
Surface - Earth	29,885	Meters	Not Planned for Replacement	

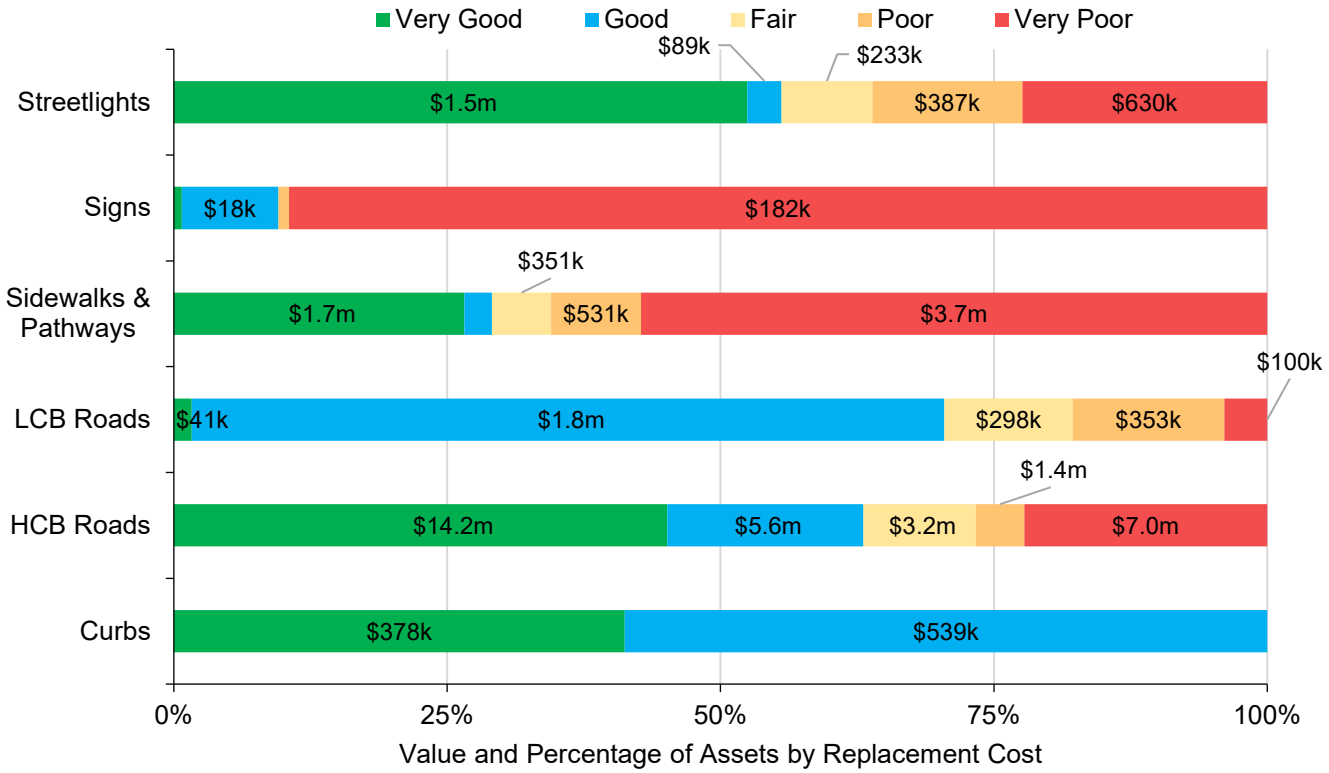


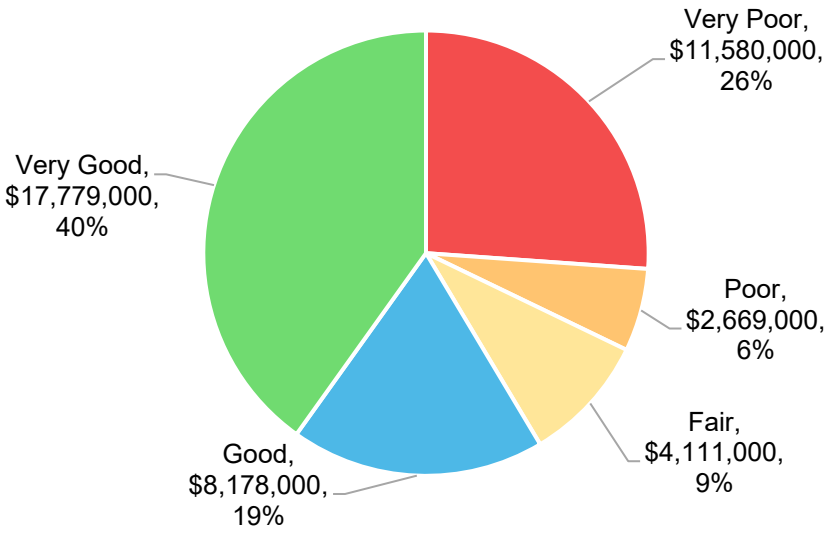
Total Current Replacement Cost: $44,317,117

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

4.2 Asset Condition

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





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

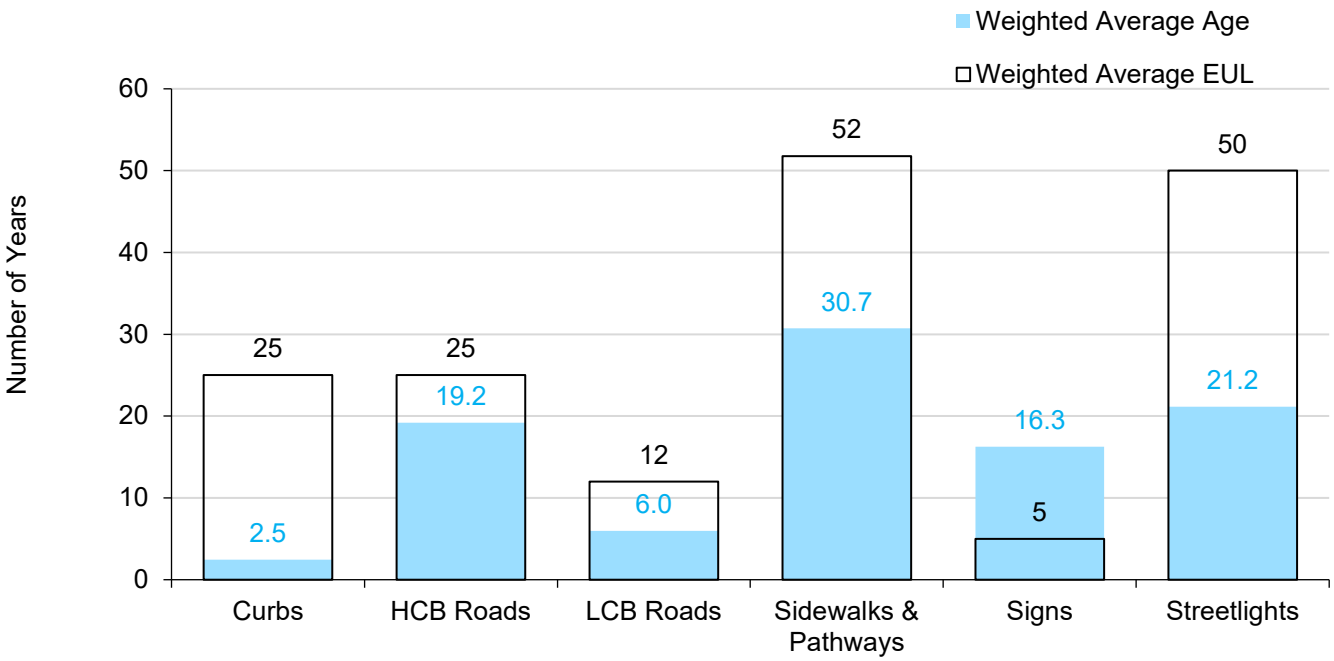
4.2.1 Current Approach to Condition Assessment

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

- Road assessments are performed every 5 years by a third-party consultant. The last assessment was in 2019, with the next one scheduled for 2024. There is a goal to eventually conduct condition assessments every 3 years
- Streetlights are inspected once per year, at night, to ensure they function properly
- Sidewalks are inspected annually for accessibility concerns and evaluated for tripping hazards
- Street signs are evaluated annually for reflectivity
- Supporting infrastructure assessments are performed internally, as per MMS

4.3 Estimated Useful Life & Average Age

The Estimated Useful Life for road network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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 Lifecycle Management Strategy

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

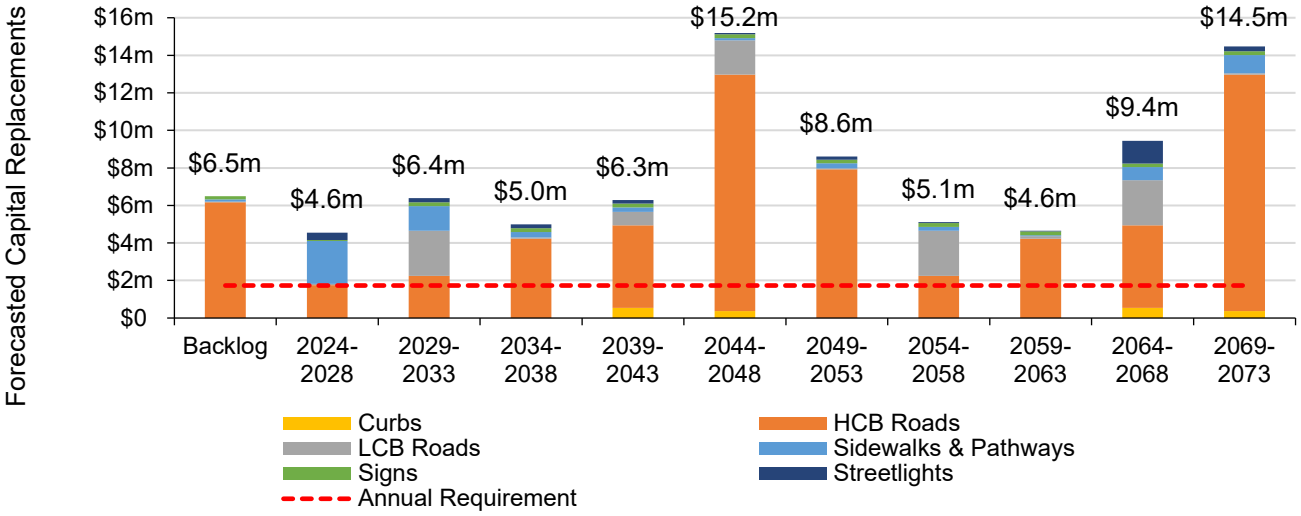
The following table outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Routine road patrols are performed in accordance with Ontario Minimum Maintenance Standards (MMS). Maintenance is triggered by visual inspection during routine patrols or upon notification from residents
	Pot holes are repaired when notified by residents or discovered through road patrols
	Street sweeping is performed every spring season
	Vegetation control within road ditches and around guiderails is performed as necessary
	Crack sealing and overlay are undertaken on roads wherever feasible. Crack sealing is initiated when the total length of cracks equals the total length of the road and is inspected annually.
Rehabilitation	To streamline projects, the Township will concurrently rehabilitate aging sewers pipes (via CIPP), provided that the piping ovality remains intact
Replacement	Replacement is considered when an asset's condition has deteriorated significantly, making rehabilitation no longer cost-effective. Assets are replaced upon failure or prior to road paving if the asset is not expected to last longer than the surface

4.4.1 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.

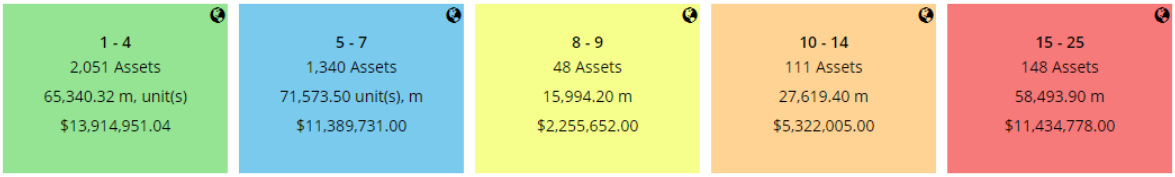


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.5 Risk & Criticality

4.5.1 Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2023 inventory data.



This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining (%)	
AADT	

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

4.5.2 Risks to Current Asset Management Strategies

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

Aging Infrastructure and Capital Funding Strategies
Aging infrastructure and insufficient reinvestment, pose significant risks, as many roads have exceeded their useful life and require more extensive rehabilitation. Current investment levels only cover road preservation and rehabilitation, not reconstruction. Major projects frequently depend on securing grants or planning applications. This approach leaves the road network vulnerable to further deterioration and increased repair costs over time.

Asset Data Confidence and Lifecycle Management Strategies
The lack of confidence in asset data and inadequate lifecycle management strategies pose significant risks to the Township's road network. The asset inventory, compiled from various outdated and inconsistent spreadsheets, has not been routinely updated, leading to inaccuracies. This has made it challenging to create effective and proactive maintenance plans. As a result, the Township is unable to optimize asset lifecycle costs and conditions, increasing the risk of unexpected failures and higher maintenance expenses. Until the asset data is thoroughly reviewed and confirmed, the Township's road network remains vulnerable to deterioration and inefficiencies.

4.6 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.

4.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2023)
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 Roads Needs Study in 2019 in coordination with Roads Management Services Inc. Roads are classified under 4 categories: (Now) These roads require immediate reconstruction or major rehabilitation due to being in poor condition with little or no service life left. They may have significant drainage or capacity issues. (1-5) Road sections in fair condition that are anticipated to need reconstruction within the next five years. These roads are good candidates for resurfacing treatments that can extend their life and defer the need for full reconstruction. (6-10) Road sections in good condition, expected to require reconstruction within six to ten years. These roads can also benefit from resurfacing treatments to further extend their life and delay full

	reconstruction. (Adequate) Road sections that do not need reconstruction or resurfacing but can require minor maintenance such as crack sealing or spot drainage. These roads are in good to excellent condition.

4.6.2 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 (2023)
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)	1.12
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.97
Quality	Average pavement condition index for paved roads in the municipality	61
	Average surface condition for unpaved roads in the municipality (e.g. excellent, good, fair, poor)	Good
Performance	Annual capital reinvestment rate	TBD

4.7 Recommendations

Asset Inventory

- A thorough review of the Township's asset register will ensure that pertinent attribute details are up to date. This includes, but is not limited to, in-service dates, replacement cost methodology, quantities, engineered estimated useful life, etc.

Condition Assessment Strategies

- The last comprehensive assessment of the road network was completed in 2019. The Township should consider completing an updated assessment of all road segments on a regular scheduled basis.

Lifecycle Management Strategies

- The Township is currently in the process of integrating proactive lifecycle management strategies for both HCB and LCB roads, into its CityWide software. Doing so can potentially lead to 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.
- The Township is currently reviewing its quantitative risk models. Going forward, it is recommended to review models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the Township believes to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

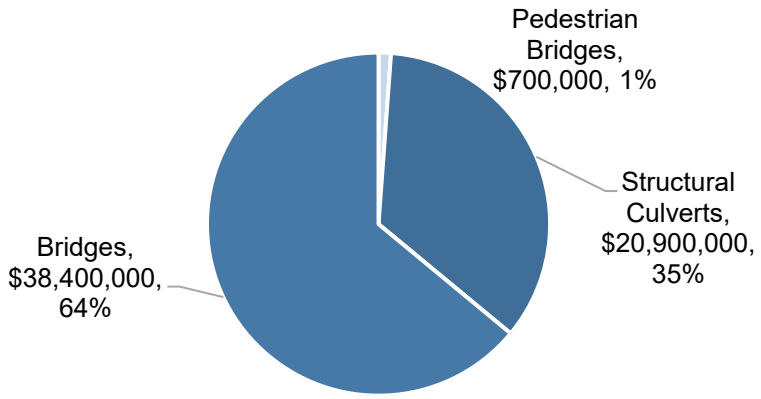
5 Bridges & Culverts

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

5.1 Asset Inventory & Costs

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

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Bridges	66	Assets	$38,400,000	User-defined
Pedestrian Bridges	2	Assets	$700,000	User-defined
Structural Culverts	13	Assets	$20,900,000	User-defined

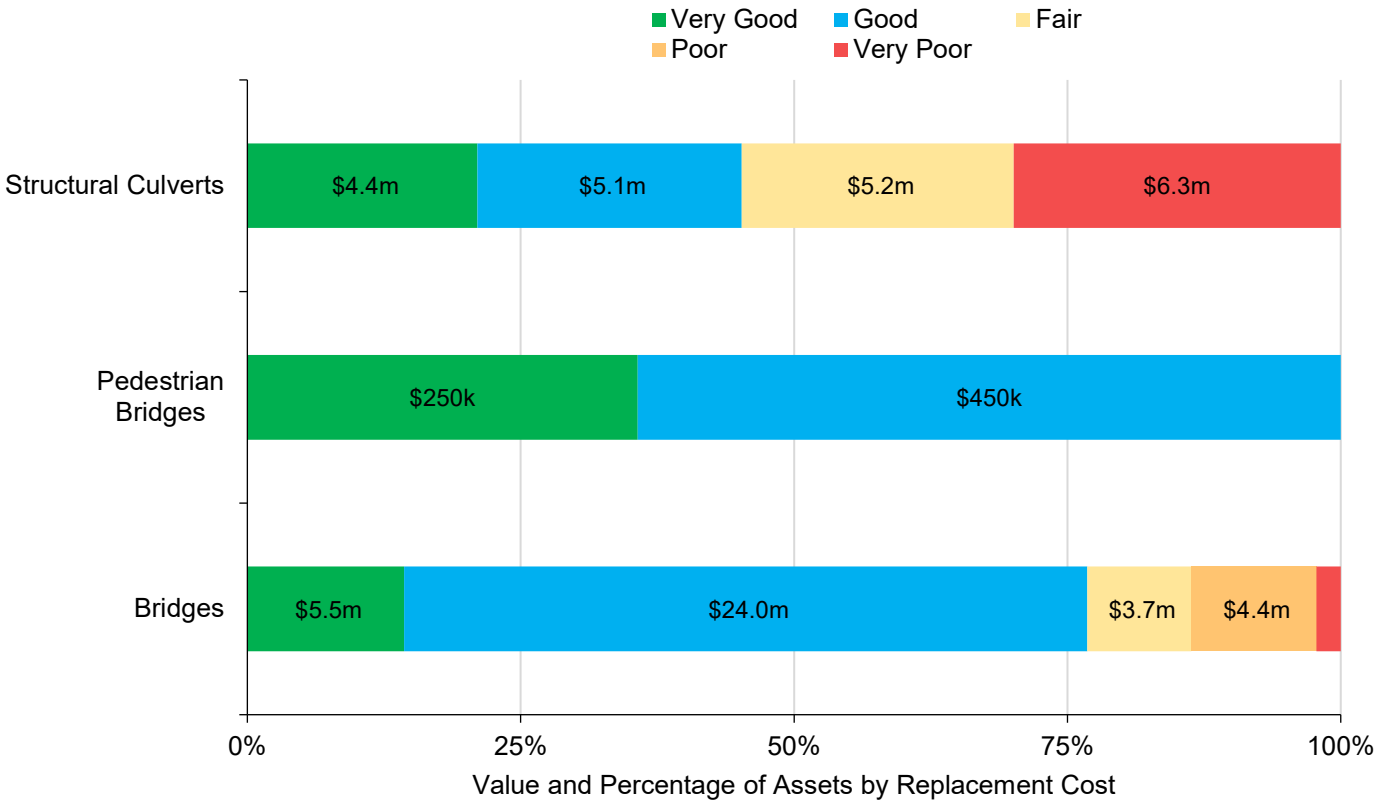


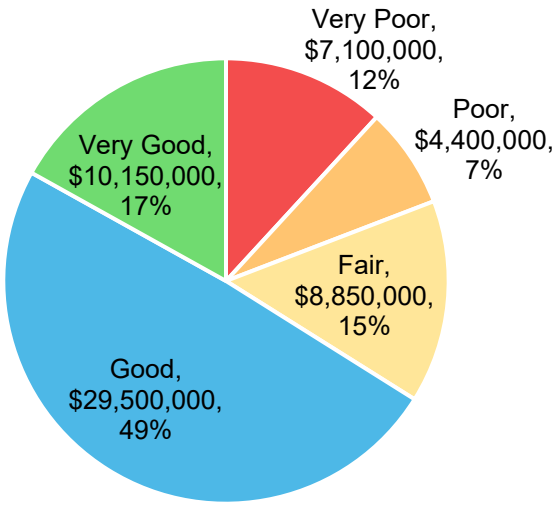
Total Current Replacement Cost: $60,000,000

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

5.2 Asset Condition

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





To ensure that the Municipality's bridges & culverts continue to provide an acceptable level of service, the Municipality 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.

5.2.1 Current Approach to Condition Assessment

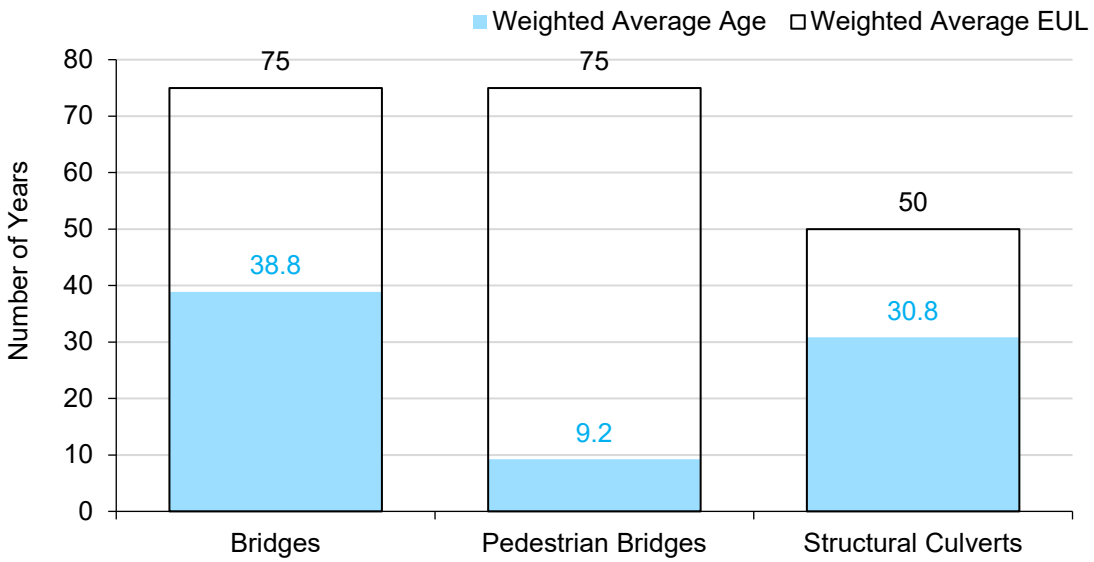
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Condition assessments for all bridges and culverts within the Township are conducted biennially, following the guidelines of the Ontario Structure Inspection Manual (OSIM). The last inspection was performed in 2023 by TSI Inc.
- In this AMP, the following rating criteria is used to determine the current condition of bridges and culverts and forecast future capital requirements:

Condition	Rating
Very Good	>80
Good	70-79
Fair	60-69
Poor	50-59
Very Poor	<49

5.3 Estimated Useful Life & Average Age

The Estimated Useful Life for bridge & culvert assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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.

5.4 Lifecycle Management Strategy

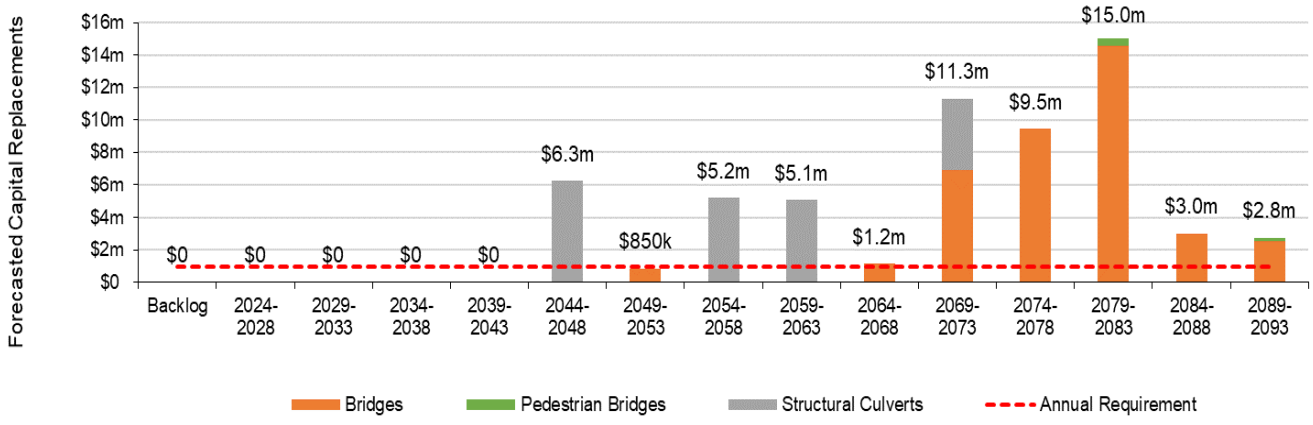
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance activities for bridges and culverts include inspections, cleaning, minor repairs, and vegetation management
	Cleaning and minor repairs are completed annually or on an as-needed basic
Rehabilitation / Replacement	Rehabilitation and replacement 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 2023 by TSI Inc.

5.4.1 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 70 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement.
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.



5.5 Risk & Criticality

5.5.1 Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2023 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)
Service Life Remaining (%)	

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

5.5.2 Risks to Current Asset Management Strategies

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

Asset Data Confidence and Lifecycle Management Strategies
The Township is currently in the process of reviewing and updating its database to ensure that vital asset attribute data is up to date. Current asset data within the Township's asset register (CityWide) is inconsistent. For example, while some bridges and culverts have a componentized asset breakdown, consisting of specific estimated useful lives and replacement costs, others do not. This data gap hampers the ability to develop proactive and effective lifecycle management strategies, leaving the Township unable to optimize asset lifecycle costs and condition scores.

5.6 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.

5.6.1 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 (2023)
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. Structures allow for most types of vehicles, including heavy transport, emergency vehicles, and cyclists Within the Township, only bridge structure R-027 has a loading limit (14 tons).
Quality	Description or images of the condition of bridges and culverts and how this would affect use of the bridges and culverts	See Appendix B

5.6.2 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 (2023)
Scope	% of bridges in the Township with loading or dimensional restrictions	1.4%[2]
Quality	Average bridge condition index value for bridges in the Township	72
	Average bridge condition index value for structural culverts in the Township	70
Performance	Capital re-investment rate	TBD

[2] 1 of the Township's 29 bridges and culvert assets (3.4%) has a loading limit/restriction. Replacement cost weighted: 1.4%

5.7 Recommendations

Asset Inventory

- 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. Incorporate any repair and capital rehabilitation recommendations into the database so that forecasted costs are accurately reflected.

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.

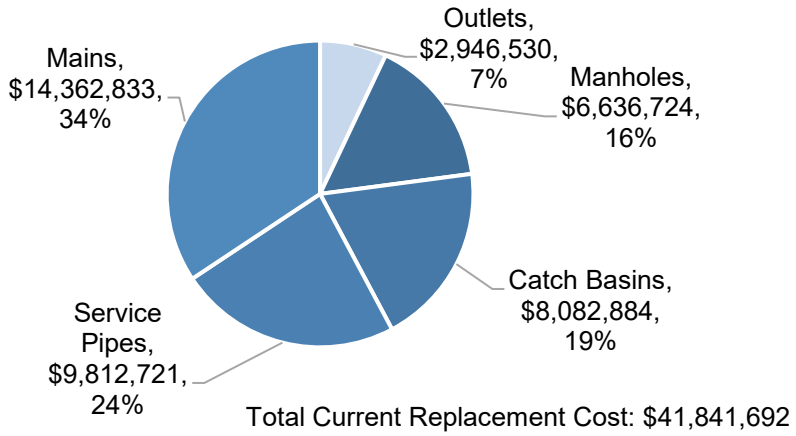
6 Storm Network

The Township owns and maintains a storm network consisting of mains, catch basins, manholes, outlets, and service pipes.

6.1 Asset Inventory & Costs

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

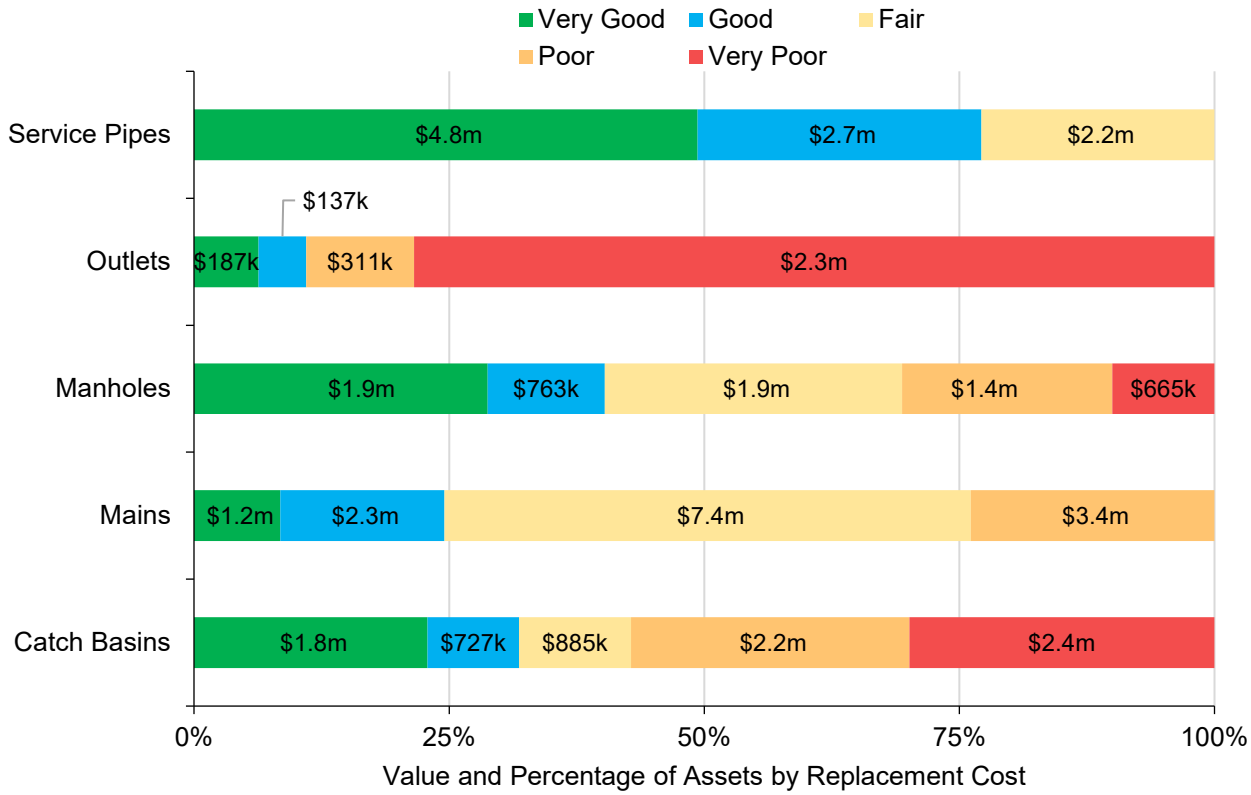
Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Catch Basins	1,636	Assets	$8,083,000	User-defined
Mains	52,049	Meters	$14,363,000	Cost per unit
Manholes	720	Assets	$6,637,000	Cost per unit
Outlets	3,247	Meters	$2,947,000	CPI
Service Pipes	48,705	Meters	$9,813,000	CPI

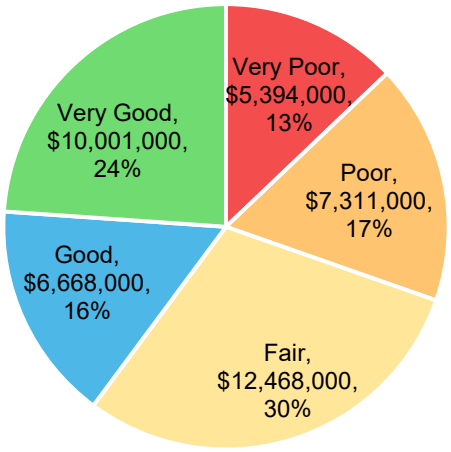


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

6.2 Asset Condition

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





To ensure that the Township's storm 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 storm network.

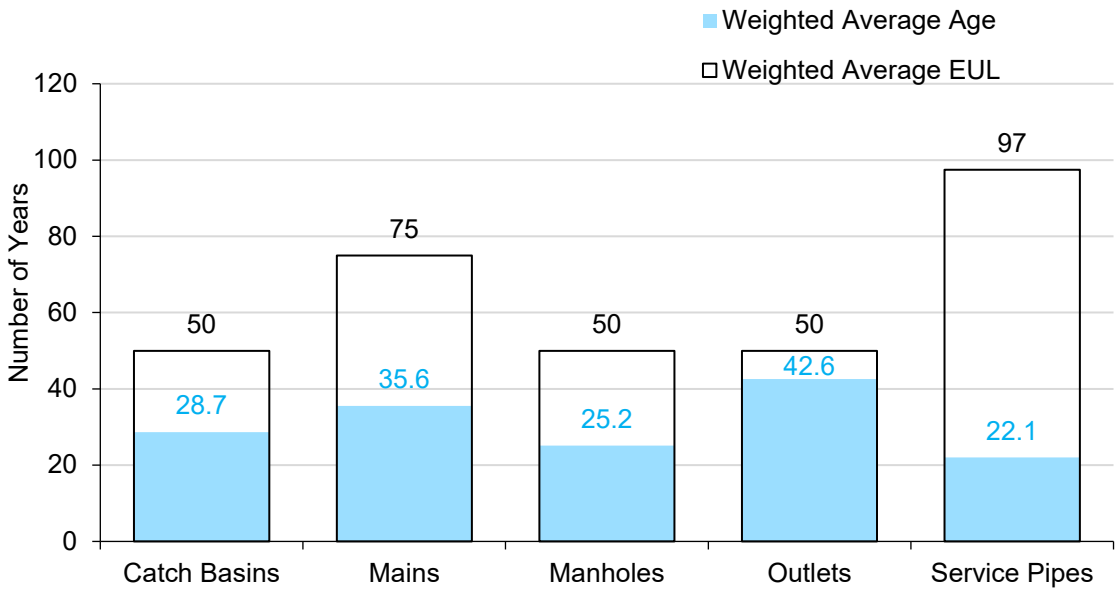
6.2.1 Current Approach to Condition Assessment

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

- Storm sewer assets were partially assessed in 2012. Visual inspections have identified that sewers constructed prior to 1982 were not built using modern practices, making them difficult to maintain or inspect effectively
- Coordination and management of cleaning and CCTV inspections are performed internally. CCTV inspection reports are then submitted to an external consultant for a comprehensive masterplan study, ensuring thorough evaluation and planning. The last storm masterplan was conducted in 2018, with the next tentatively scheduled for 2025/2026
- Initial assessments of supporting infrastructure are performed internally. If concerns are identified, third-party consultants are retained for further review and to provide solutions on a reactive basis

6.3 Estimated Useful Life & Average Age

The Estimated Useful Life for storm network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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.

6.4 Lifecycle Management Strategy

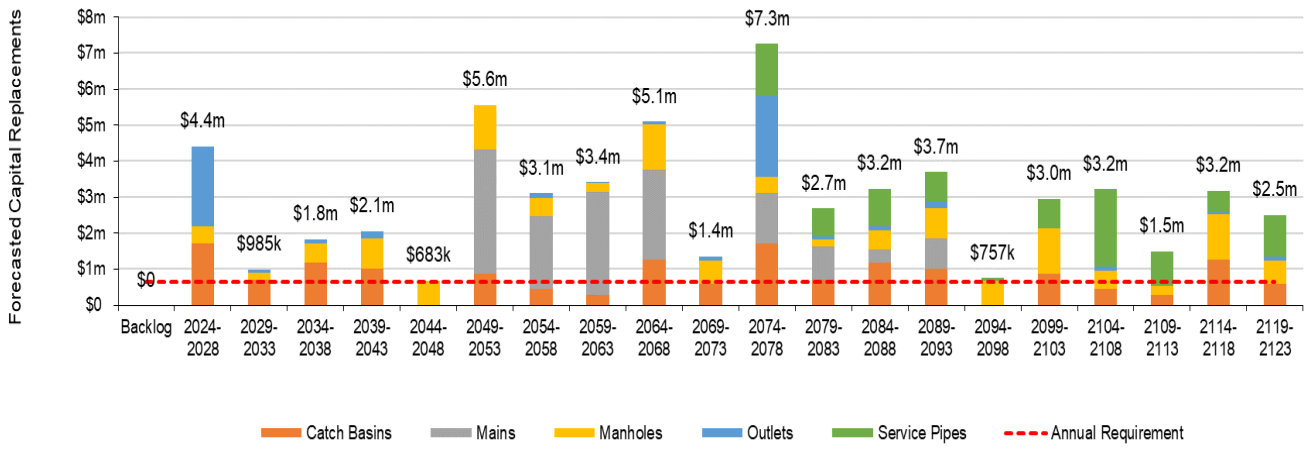
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Maintenance activities are often triggered by complaints or issues observed during routine patrols
	Catch basins are cleaned every two years to maintain proper drainage function
	Storm water management ponds undergo vegetation management twice a year to prevent overgrowth
	Stormwater management ponds are measured for sediment accumulation every five years, and cleanouts are scheduled based on these measurements
Rehabilitation	Rehabilitation needs are identified through CCTV inspections, which assess the ovality of the pipe to determine suitability for relining
Replacement	Replacement is considered when an asset's condition has significantly deteriorated, the asset has failed, or it no longer has sufficient capacity. Replacements are prioritized when rehabilitation is not cost-effective and if they can be coordinated with other linear assets, such as failing road surfaces

6.4.1 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 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.

6.5 Risk & Criticality

6.5.1 Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2023 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 storm network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining (%)	

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

6.5.2 Risks to Current Asset Management Strategies

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

Asset Data Confidence and Lifecycle Management Strategies
Aging infrastructure and a lack of proactive asset management strategies pose significant risks to the Township's storm network. Currently, there is a lack of confidence in the asset data available for asset management planning. The inventory was compiled from various outdated and inconsistent spreadsheets, leading to inaccuracies. Consequently, this has made it difficult to develop proactive and effective lifecycle management strategies. Without accurate data, the township cannot optimize asset lifecycle costs and conditions, resulting in potential failures and increased maintenance costs. Until the asset data is thoroughly reviewed and confirmed, the storm network remains vulnerable to further deterioration and inefficiencies.

Infrastructure Design and Aging Infrastructure
Infrastructure design and aging infrastructure pose significant risks due to many stormwater sewers being installed before 1982 which lack modern engineering practices and are difficult to inspect or clean. Additionally, approximately 20 km of these sewers have exceeded their useful life, increasing the likelihood of failures. Climate change and extreme weather events further exacerbate these risks, as outdated capacity calculations leave many sewers undersized and vulnerable to overloading. This combination of outdated design, aging infrastructure, and evolving climate conditions creates a vulnerable situation for the Township's asset managers.

Capital Funding Strategies
The current level of investment makes it challenging to meet lifecycle requirements and maintain a good state of repair. Major projects are heavily dependent on grants, which are not always guaranteed. This reliance on external funding means that essential maintenance and upgrades are often delayed or underfunded, increasing the likelihood of system failures and inefficiencies. Without consistent and sufficient investment, the storm network remains vulnerable to deterioration and operational issues.

6.6 Levels of Service

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

6.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2023)
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	See Appendix B

6.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2023)
Scope	% of properties in municipality resilient to a 100-year storm	Embrun: 78% Russell: 75% Marionville: 100%
	% of the municipal stormwater management system resilient to a 5-year storm	Embrun: 13% Russell: 59% Marionville: 100%
Performance	Annual capital reinvestment rate	TBD

6.7 Recommendations

Asset Inventory

- The Township's storm network inventory remains at a basic level of maturity and staff do not have a high level of confidence in its accuracy or reliability. The development of a comprehensive inventory of the storm network should be priority, going forward.

Condition Assessment Strategies

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

Risk Management Strategies

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

Lifecycle Management Strategies

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

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.

7 Facilities

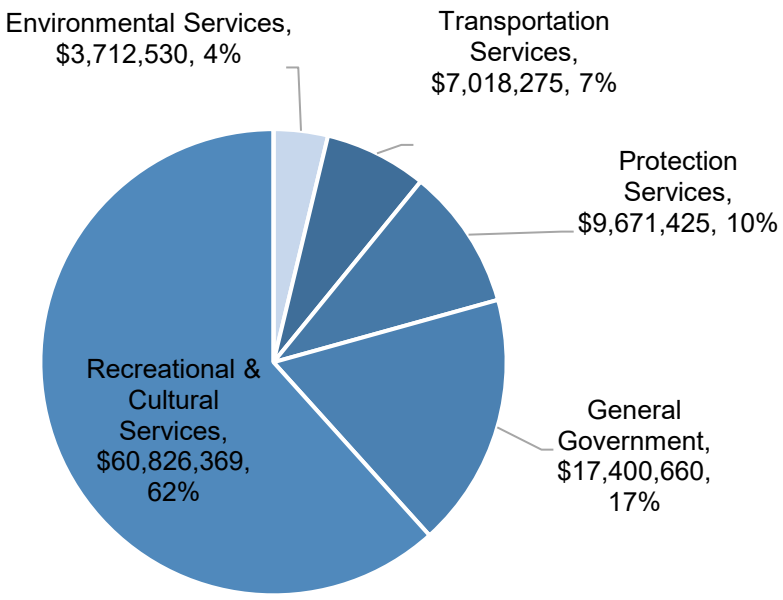
The Township of Russell owns and maintains several facilities that provide key services to the community. These include:

- administrative offices
- public libraries
- fire stations and associated offices
- public works garages and storage sheds
- arenas and community centres

7.1 Asset Inventory & Costs

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

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Environmental Services	2	Facilities	$3,713,000	User-defined
General Government	5	Facilities	$17,401,000	User-defined
Protection Services	3	Facilities	$9,671,000	User-defined
Recreational & Cultural Services	12	Facilities	$60,826,000	User-defined
Transportation Services	3	Facilities	$7,018,000	User-defined

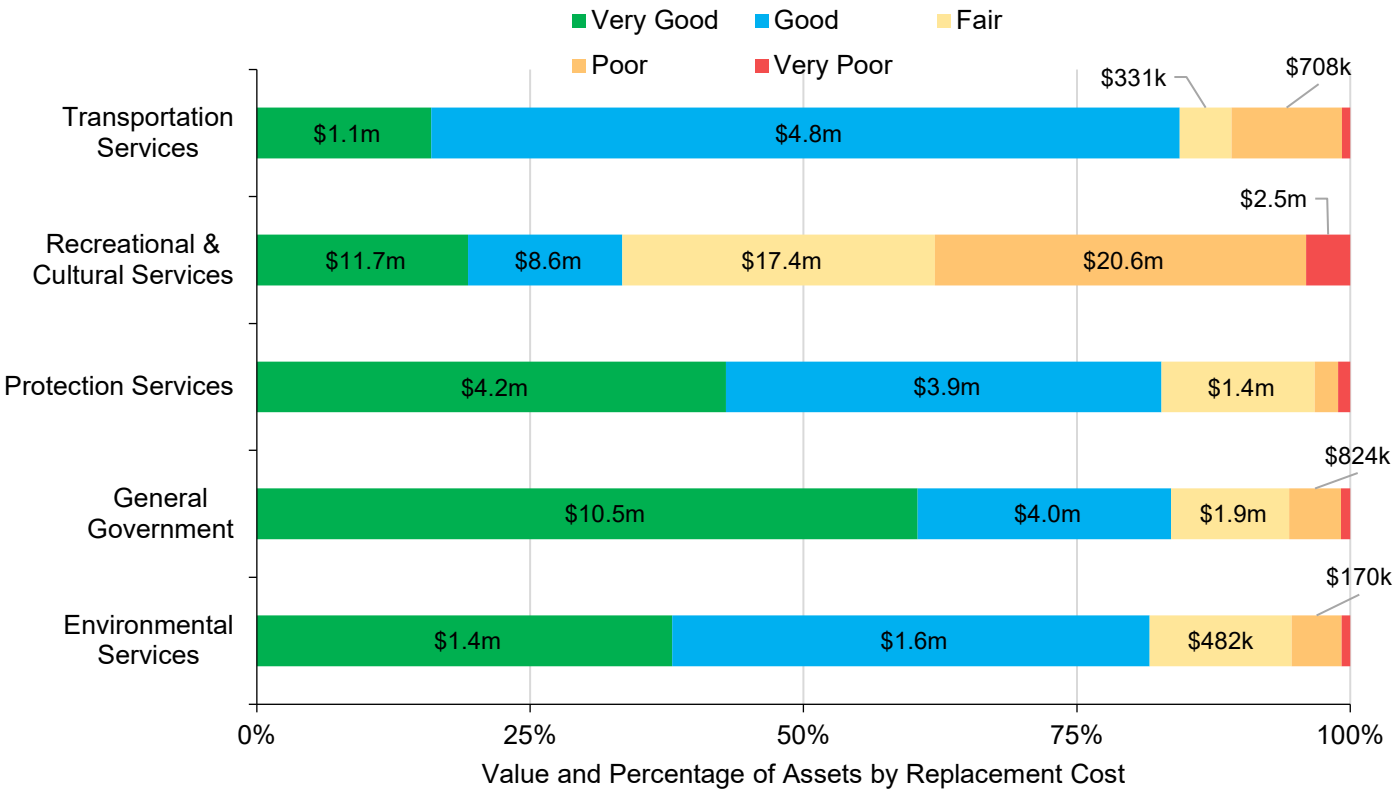


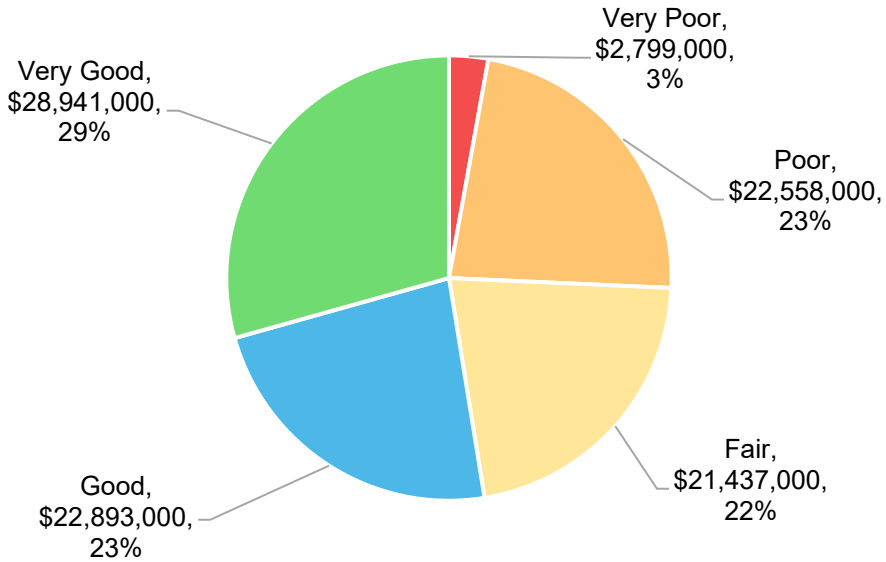
Total Current Replacement Cost: $98,629,259

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

7.2 Asset Condition

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





To ensure that the Township's 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 facilities.

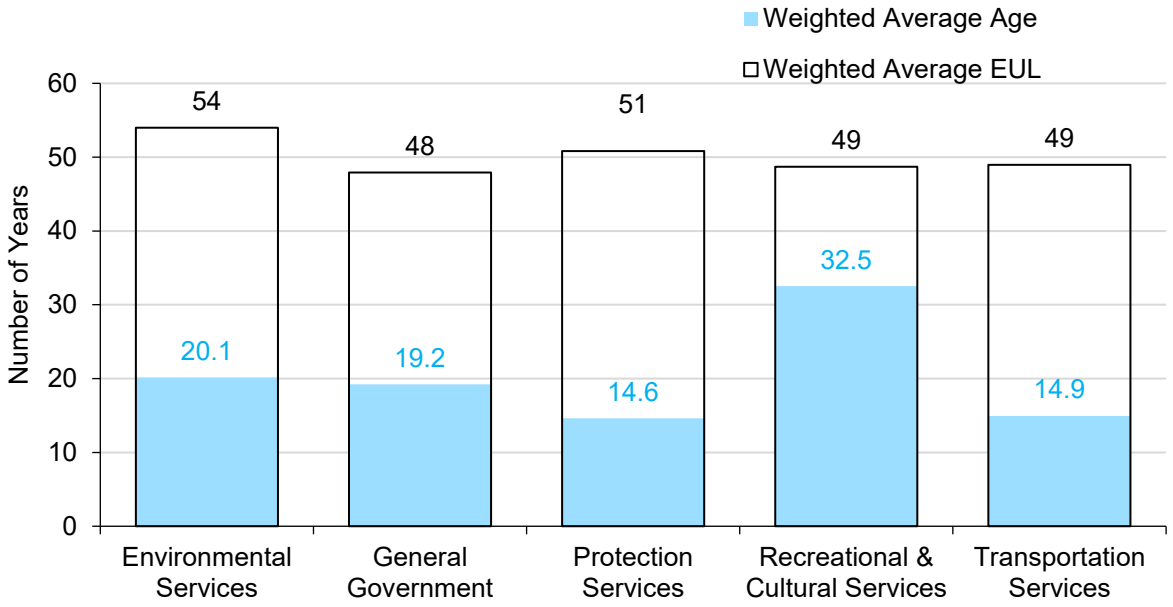
7.2.1 Current Approach to Condition Assessment

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

- Buildings are assessed every 5 years for structural, mechanical, and other conditions. Building Condition Assessments (BCAs) are conducted by external consultants
- The last assessment was conducted in 2023 by Accent Building Sciences Inc (ABSI)

7.3 Estimated Useful Life & Average Age

The Estimated Useful Life for facility assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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.

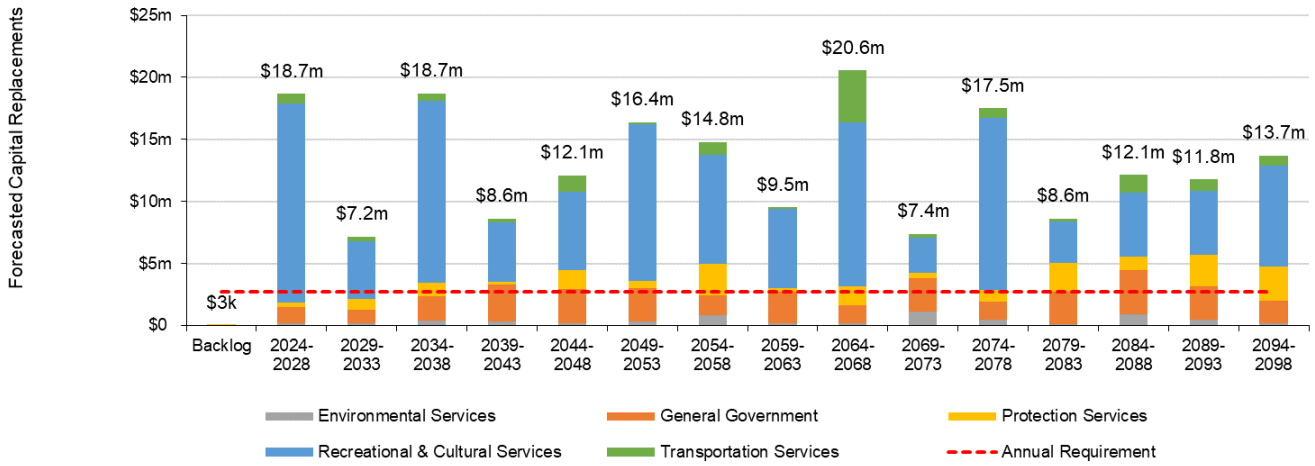
7.4 Lifecycle Management Strategy

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	Routine maintenance includes furnaces, AC units, fire protection equipment, doors, HVAC repairs, electrical systems, and general housekeeping
	Maintenance is triggered by manufacturer recommendations, regulatory requirements, and inspections identifying safety, accessibility, and structural issues. It is performed as recommended through staff observations and routine checks of operating systems
	Rehabilitation activities involve roof replacements, pump repairs, structural component repairs, and HVAC system updates
	Rehabilitation is based on inspections and consultant recommendations
Replacement	Replacement is considered when an asset's condition has significantly deteriorated, making maintenance and rehabilitation no longer cost-effective
	Assets nearing the end of their expected service life or those with frequent and costly repairs are prioritized for replacement

7.4.1 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 75 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement.

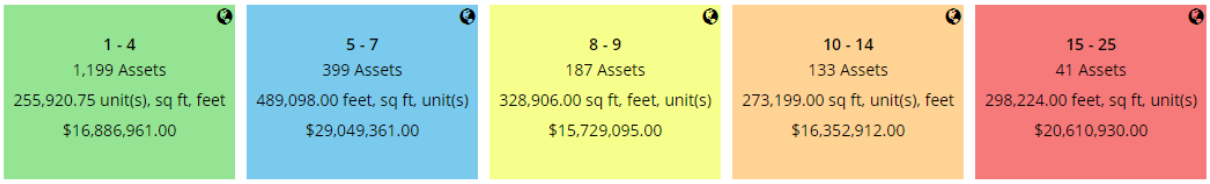


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

7.5 Risk & Criticality

7.5.1 Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2023 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 facilities are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining (%)	

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

7.5.2 Risks to Current Asset Management Strategies

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

Growth

The Township of Russell has experienced significant growth in recent years. From 2016 to 2021, the Township's population increased by 18.6%. To accommodate for rapid population growth, the Township has taken necessary action. For example, a new recreational complex is projected to be completed and operational in 2026, to meet the needs of its expanding population. Despite this, internal staff have indicated that several existing facilities have been identified for upgrades, to accommodate for growth; specifically, the Township's water/sanitary sewer facilities (see section 11 & 12). Without timely investment and upgrades, the Township risks falling short of community expectations, leading to potential dissatisfaction and strain on existing resources.

7.6 Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include maps, of the types of facilities that the Township operates and maintains	Refer to section 7.1
Quality	Describe criteria for rehabilitation and replacement decisions and any related long-term forecasts	Refer to sections 7.2 & 7.4

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average condition for facilities in the municipality	70%
Performance	Annual capital reinvestment rate	TBD

7.7 Recommendations

Asset Inventory

- In 2023, the Township utilized an external engineering firm to conduct building condition assessments of all facilities. Currently, the Township's database consists of both TCA and a componentized asset listing. It is recommended that when resources become available, that the Township reconcile its asset register.

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.

8 Vehicles

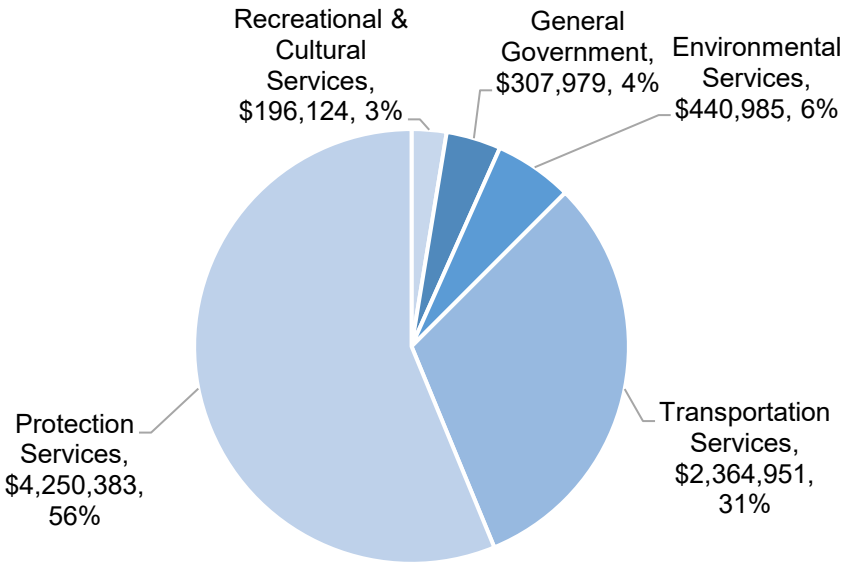
Vehicles allow staff to efficiently deliver municipal services and personnel. Municipal vehicles are used to support several service areas, including:

- Snowplows for winter control activities
- Fire protection vehicles including pumpers and rescue trucks
- Various vehicles to support the maintenance of the transportation network and address service requests for Environmental Services and Recreational & Cultural Services

8.1 Asset Inventory & Costs

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

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Environmental Services	8	Assets	$441,000	CPI
General Government	6	Assets	$308,000	User-defined
Protection Services	14	Assets	$4,250,000	CPI
Recreational & Cultural Services	5	Assets	$196,000	CPI
Transportation Services	11	Assets	$2,365,000	CPI

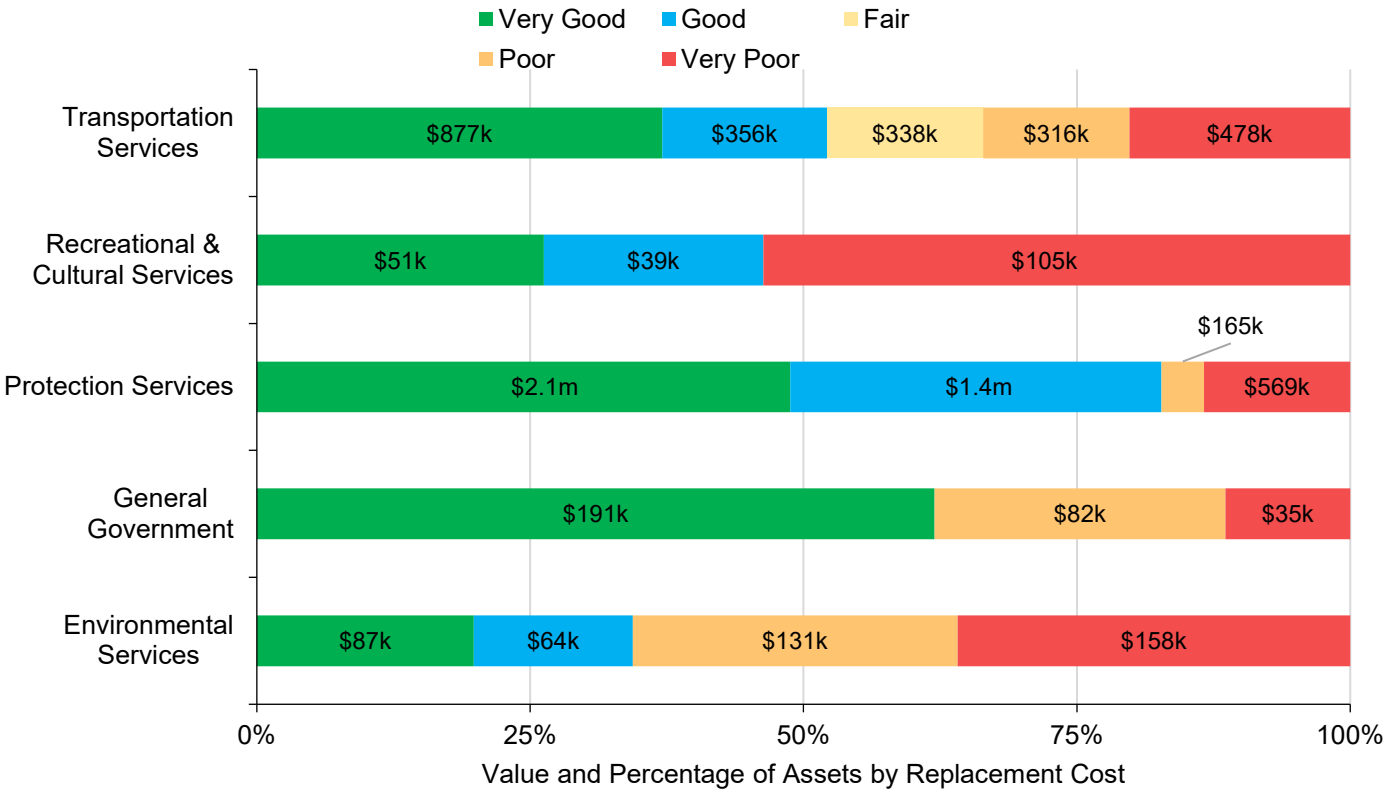


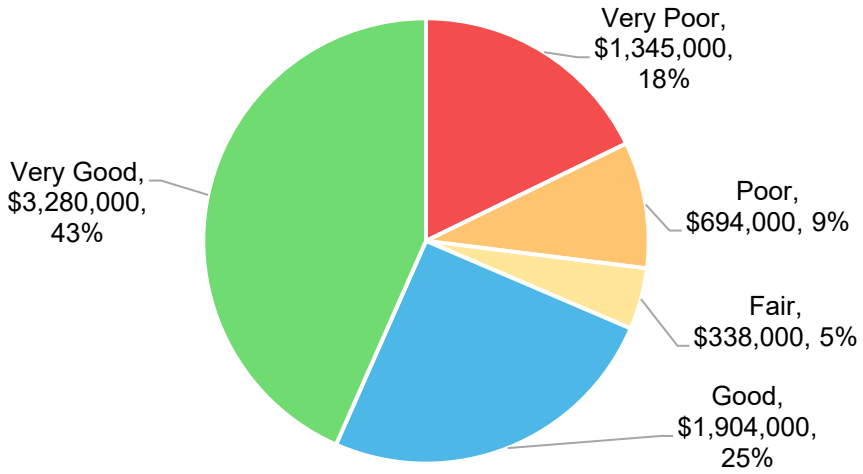
Total Current Replacement Cost: $7,560,422

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

8.2 Asset Condition

The graphs below visually illustrate 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.

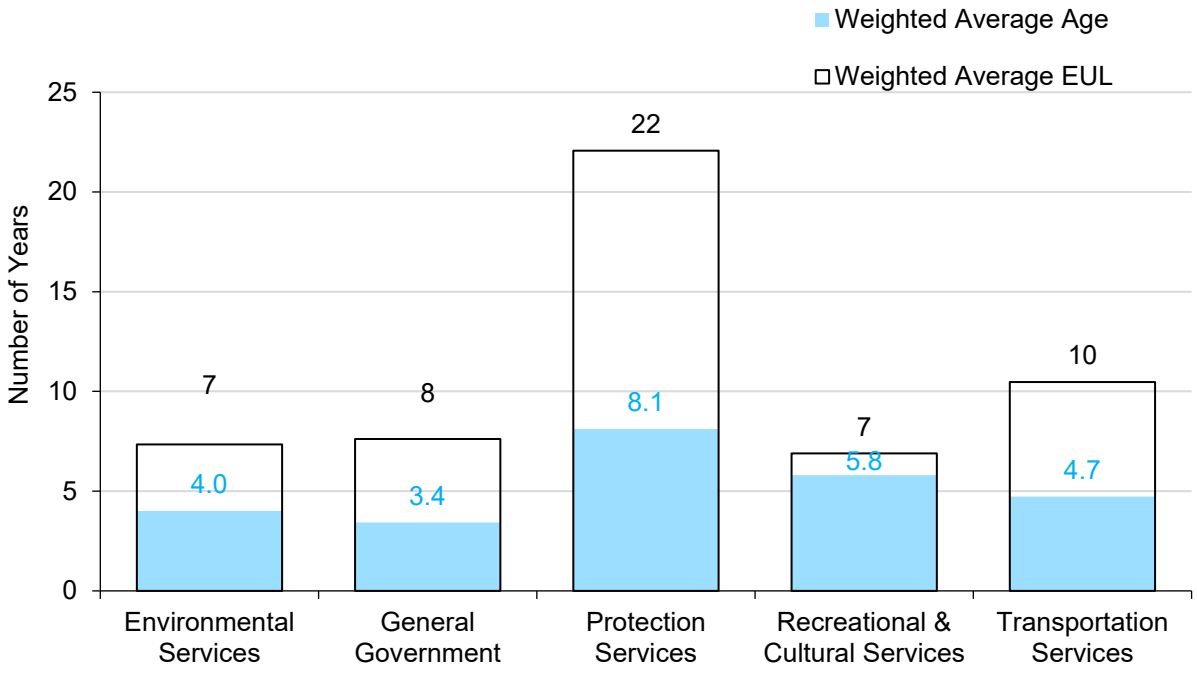
8.2.1 Current Approach to Condition Assessment

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

- As per the Township's Fleet policy, vehicles are evaluated annually for condition and suitability based on its Fleet Replacement Strategy. Furthermore, the Township has developed a condition rating scale, along with a 5-year replacement and acquisition plan
- Vehicles also undergo an annual safety inspection as per MTO and are performed externally
- Vehicles listed under CVOR are inspected yearly, with the last inspection conducted in 2023
- All protection vehicles with a pump are tested annually in accordance with MTO and NFPA standards
- Internal staff conduct monthly cab lifts and biweekly truck checks

8.3 Estimated Useful Life & Average Age

The Estimated Useful Life for vehicle assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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.

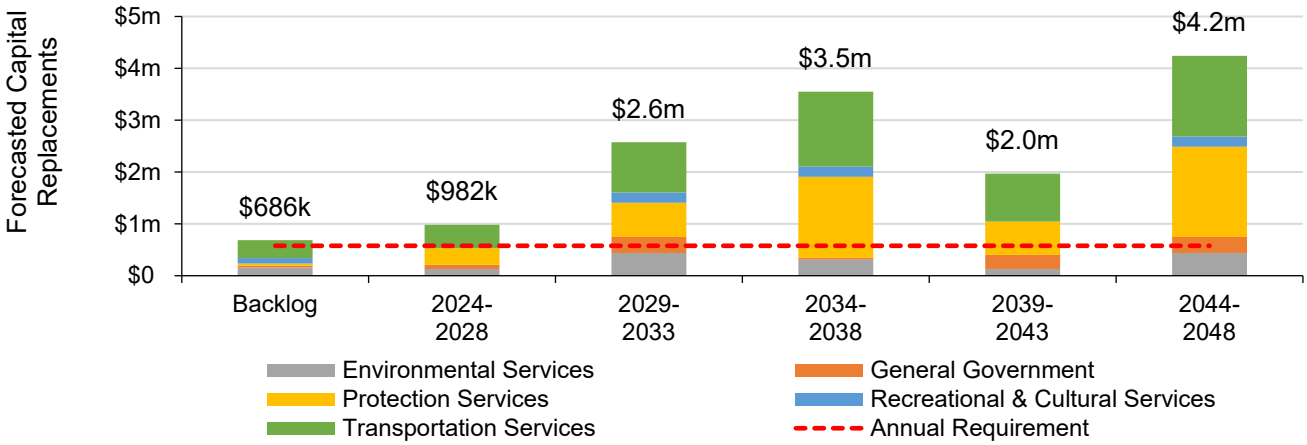
8.4 Lifecycle Management Strategy

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	Daily circle checks are performed and every two weeks, all vehicles receive a maintenance check, including fluid levels, air brakes, pump checks, and functional checks of all items on the vehicles
	Routine maintenance includes oil changes, tire replacements, and necessary repairs
	Cab-over vehicles have their cabs lifted, with fluids and belts checked on a monthly basis
	Annually, pump tests, aerial inspections, a five-year NDT, and safety checks are performed by a licensed mechanic
	Maintenance is triggered by legislated requirements or if issues such as leaks or breaks occur between maintenance intervals.
Replacement	Pumper trucks, tankers, and aerial ladders are replaced at 20-year intervals as required by Fire Underwriters Survey requirements
	Although not mandated, reescue vehicles are replaced every 25-30 years
	Vehicle replacement is considered based on age requirements listed in the fleet policy, significant deterioration, minimal estimated useful life, and when maintenance is no longer cost-effective

8.4.1 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 25 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement.

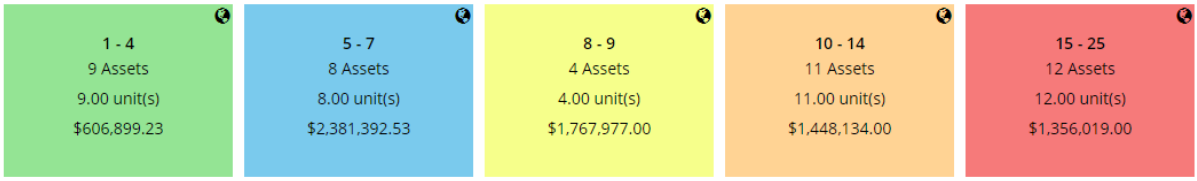


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

8.5 Risk & Criticality

8.5.1 Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2023 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)
Service Life Remaining (%)	

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

8.5.2 Risks to Current Asset Management Strategies

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

Infrastructure Reinvestment

The Township owns several protection vehicles which serve critical functions for the community. The current level of investment pertaining to fleet assets, makes it difficult to ensure vehicles are constantly in a good state of repair. Without increased reserves, the Township will struggle to fund necessary maintenance and timely replacements, leading to more frequent breakdowns, higher repair costs, and reduced reliability of vital fleet assets. This shortfall threatens the township's ability to provide essential services and respond effectively during emergencies.

8.6 Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description or images of the types of vehicles that the Township operates and the services that they help to provide to the community	Refer to section 8.1
Quality	Describe criteria for rehabilitation and replacement decisions and any related long-term forecasts	Refer to sections 8.2 & 8.4

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average condition of vehicles in the municipality	64%
Performance	Annual capital reinvestment rate	TBD

8.7 Recommendations

Asset Inventory

- 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.
- 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 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.

9 Machinery & Equipment

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:

- Landscaping equipment to maintain public parks
- Fire equipment to support the delivery of emergency services
- Sand hoppers to provide winter control activities
- IT equipment

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

9.1 Asset Inventory & Costs

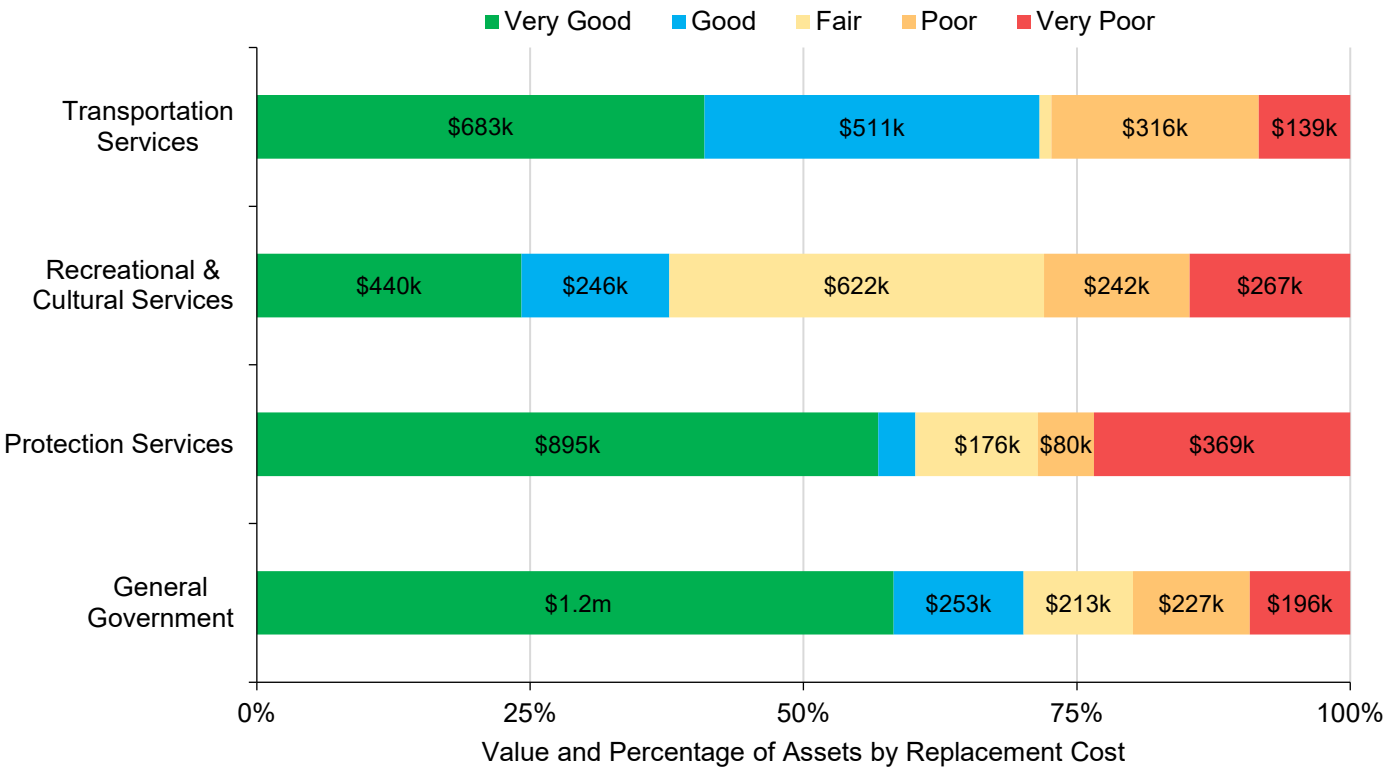
The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Township's machinery and equipment inventory.

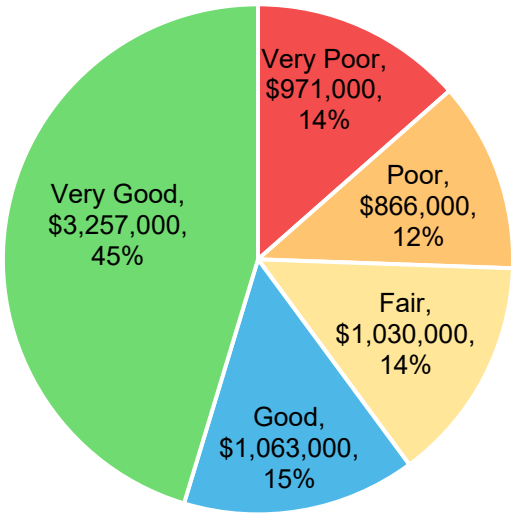
Segment	Components	Unit of Measure	Replacement Cost	Primary RC Method
General Government	268	Assets	$2,128,000	CPI
Protection Services	392	Assets	$1,574,000	CPI
Recreational & Cultural Services	274	Assets	$1,816,000	CPI
Transportation Services	62	Assets	$1,669,000	CPI

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

9.2 Asset Condition

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 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.

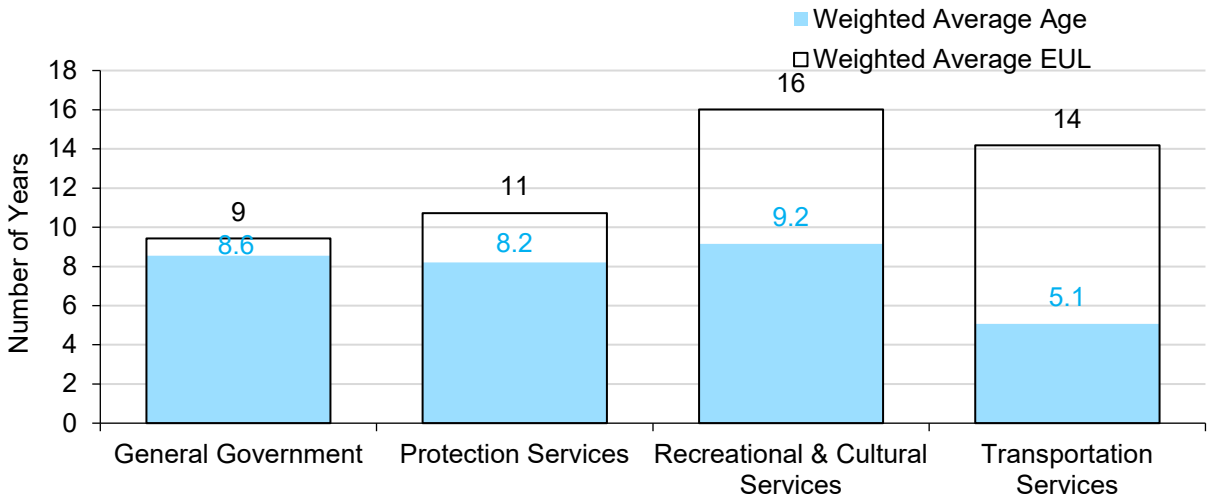
9.2.1 Current Approach to Condition Assessment

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

- Machinery and equipment are inspected before each use, though there are no formal policies or scheduled assessments
- Other equipment is spot-checked and tested according to manufacturers' recommendations or regulatory requirements
- Backup generators are assessed annually by an external contractor

9.3 Estimated Useful Life & Average Age

The Estimated Useful Life for machinery & equipment assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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.

9.4 Lifecycle Management Strategy

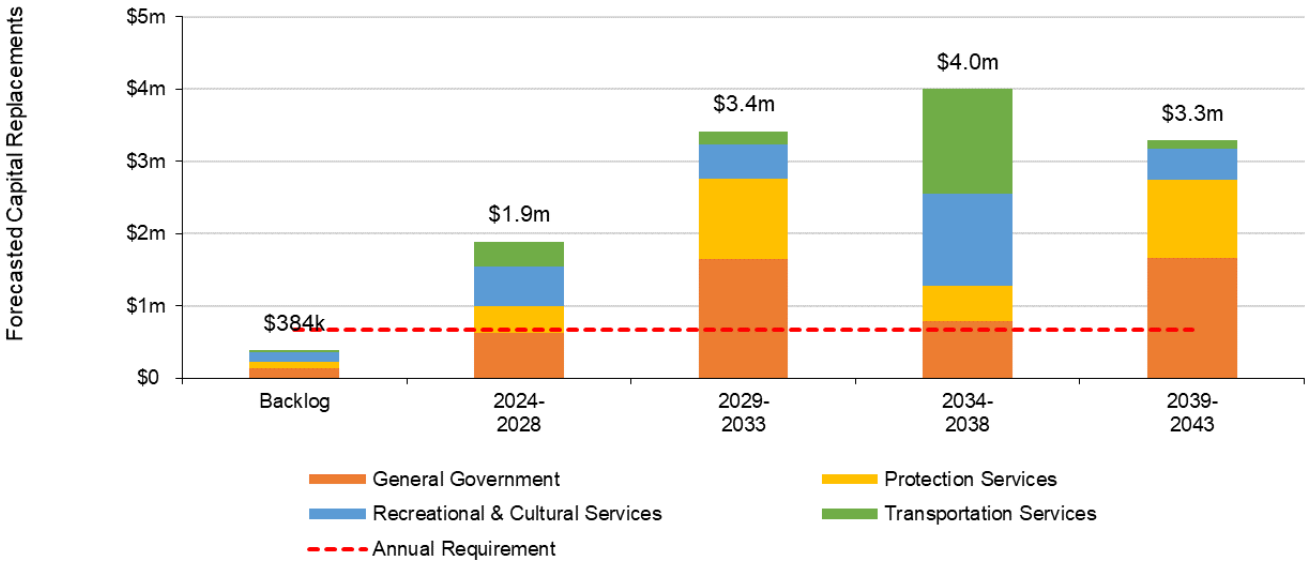
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance/ Rehabilitation	Manufacturers' recommended practices and any other regulatory requirements are followed for maintenance
	Operational tests are conducted biweekly on small equipment and as per manufacturers' recommendations and regulatory requirements for other equipment
	Routine maintenance activities include inspections, minor repairs, and oil changes
	Inspections are conducted monthly, while minor repairs are performed as required
Replacement	Replacement is considered when an asset's condition has deteriorated significantly, making maintenance no longer cost-effective
	Assets nearing the end of their life as per regulation or manufacturers' recommendations are prioritized for replacement

9.4.1 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 20 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement.

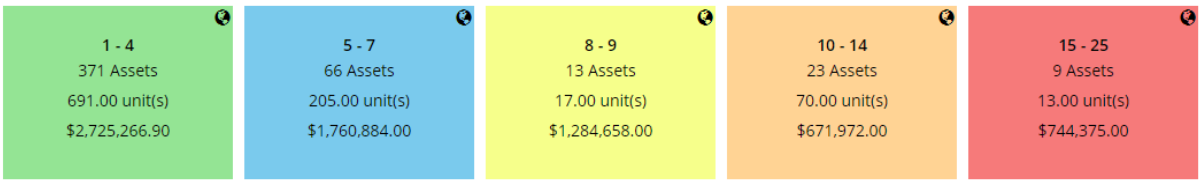


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

9.5 Risk & Criticality

9.5.1 Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2023 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)
Service Life Remaining (%)	

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

9.5.2 Risks to Current Asset Management Strategies

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

Climate Change and Extreme Weather Events
Increased frequency of severe weather events, such as windstorms and heavy snow, leads to more frequent and intense use of machinery and equipment during emergency responses. This unexpected additional usage can accelerate wear and tear, leading to more frequent breakdowns and higher maintenance costs. Backup generators may be used more extensively during significant storms, further straining their operational lifespan and reliability. This heightened demand requires additional maintenance for assets and timely replacements to ensure the machinery and equipment remain functional during critical times.

Capital Funding Strategies
The current level of investment makes it challenging to meet to meet lifecycle requirements and maintain a good state of repair. Furthermore, as the Township aims to transition to greener equipment, additional funds will be required to replace gas operated machinery. Furthermore, with the Township's growth, the acquisition of more machinery will increase the associated repair and maintenance costs. Without adequate capital funding, the Township risks not being able to properly maintain and replace its machinery and equipment, leading to higher operational costs and reduced efficiency.

9.6 Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description or images of the types of machinery and equipment that the Township operates and the services that they help to provide to the community	Refer to section 9.1
Quality	Describe criteria for rehabilitation and replacement decisions and any related long-term forecasts	Refer to sections 9.2 & 9.4

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average condition of machinery and equipment in the municipality	64%
Performance	Annual capital reinvestment rate	TBD

9.7 Recommendations

Asset Inventory

- 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.
- 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 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.

10 Land Improvements

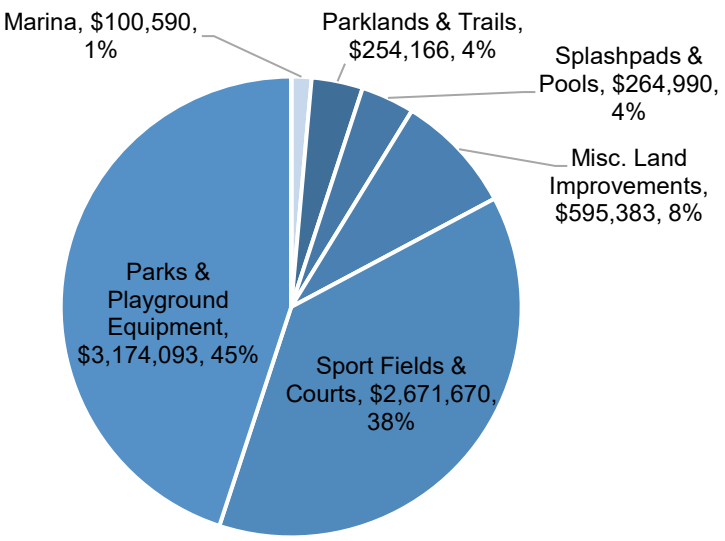
The Township of Russell owns various land improvement assets including:

- Parklands and trails
- Playground equipment
- Marina
- Miscellaneous landscaping and other assets

10.1 Asset Inventory & Costs

The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Township's land improvements inventory.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Marina	6	Assets	$101,000	CPI
Misc. Land Improvements	76	Assets	$595,000	User-defined
Parklands & Trails	11	Assets	$254,000	CPI
Parks & Playground Equipment	186	Assets	$3,174,000	CPI
Splashpads & Pools	15	Assets	$265,000	User-defined
Sport Fields & Courts	120	Assets	$2,672,000	User-defined

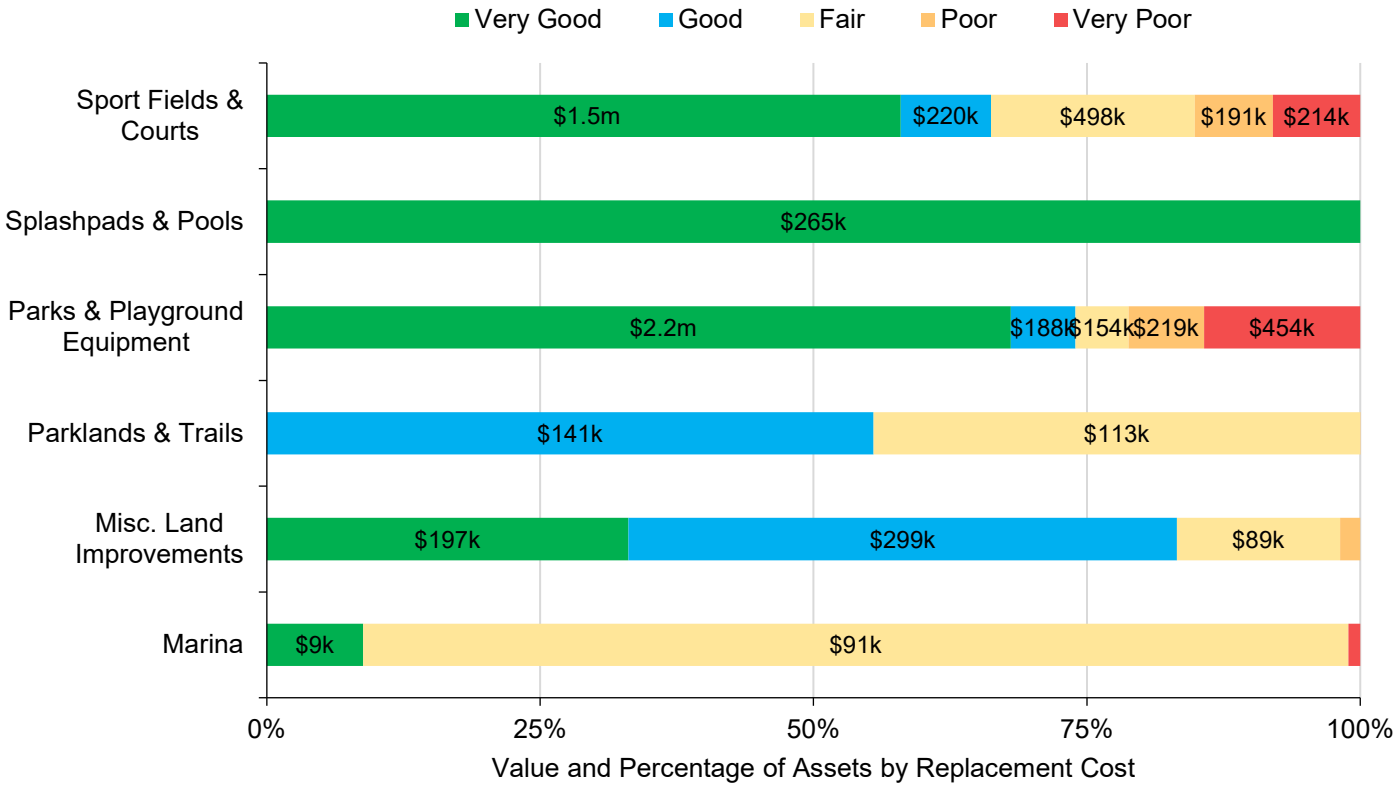


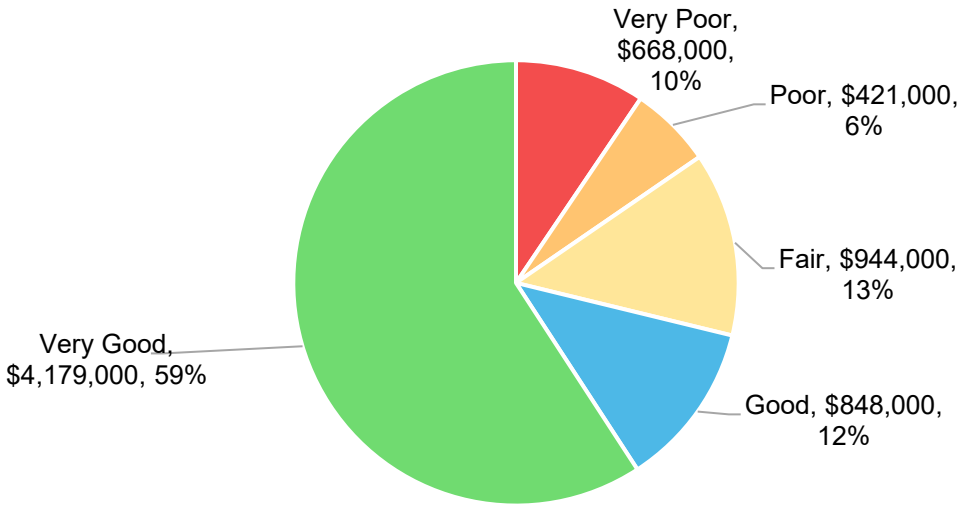
Total Current Replacement Cost: $7,060,892

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

10.2 Asset Condition

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





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

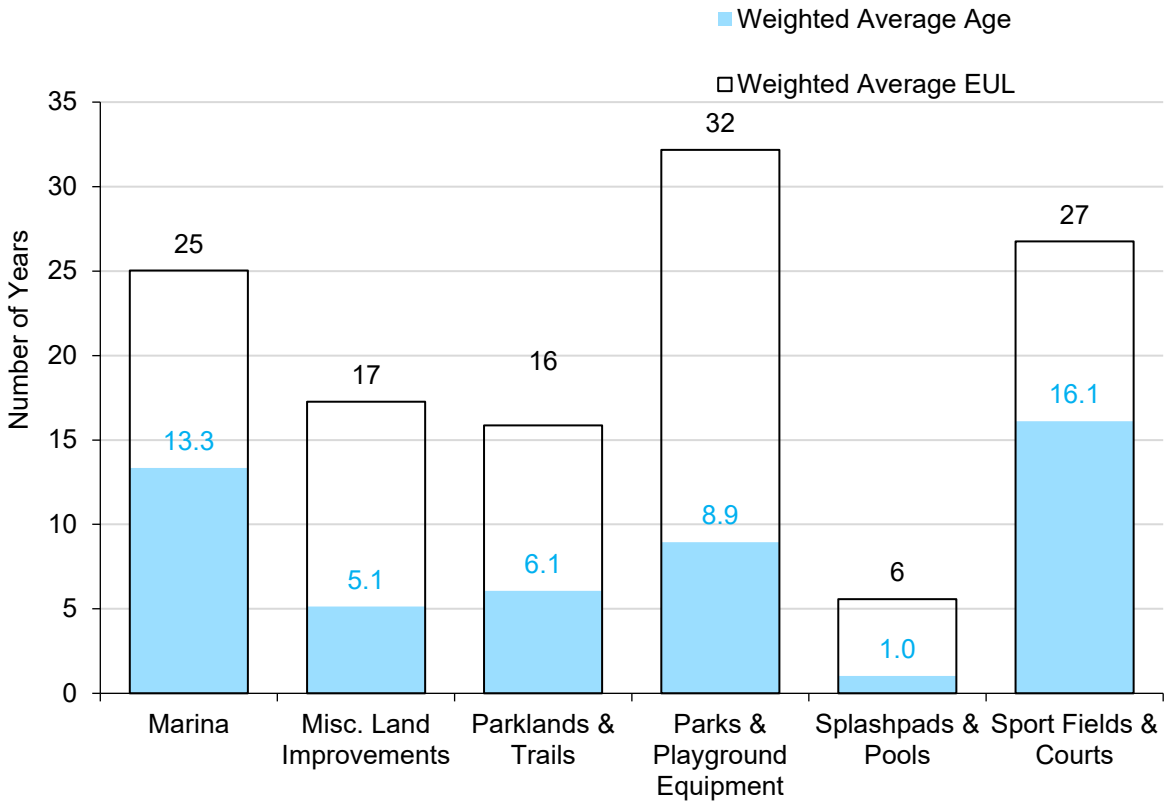
10.2.1 Current Approach to Condition Assessment

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

- Land improvements and park assets are assessed annually by internal staff to ensure they meet safety and maintenance standards. The most recent inspection was conducted in Spring 2023

10.3 Estimated Useful Life & Average Age

The Estimated Useful Life for land improvement assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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.

10.4 Lifecycle Management Strategy

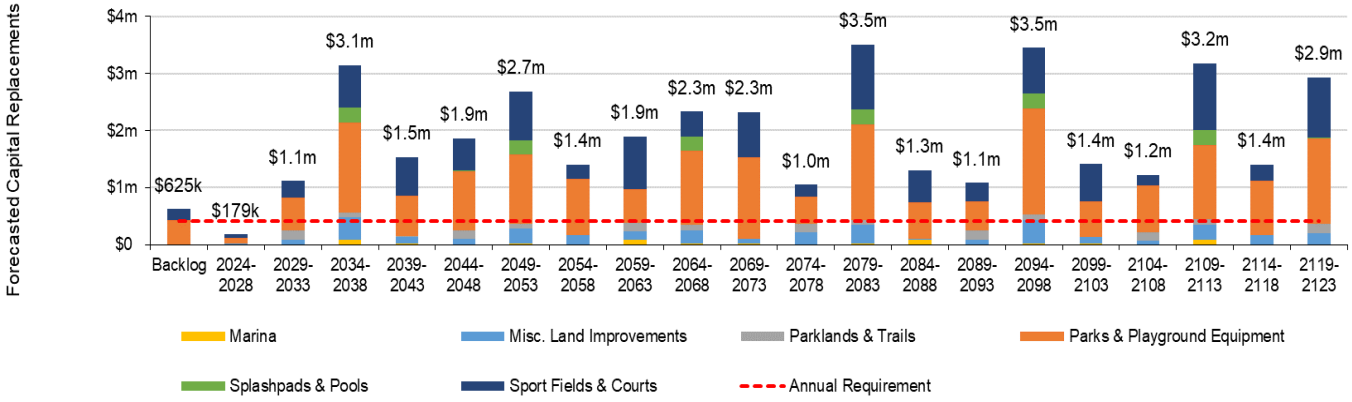
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenanace & Rehabilitation	Yearly assessments and inspections are completed in the spring on all parks to ensure safety for all users
	Routine maintenance is conducted throughout the summer months, with weekly checks to ensure consistency
	Inspections are completed in early spring, with periodic inspections carried out monthly as a minimum standard
	Maintenance is triggered by visual inspections performed weekly
Replacement	Replacement is considered when an asset's condition has significantly deteriorated, making maintenance no longer cost-effective
	If structures are deemed aging and recommended for replacement, a capital submission is made along with the condition assessment of the structure

10.4.1 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.

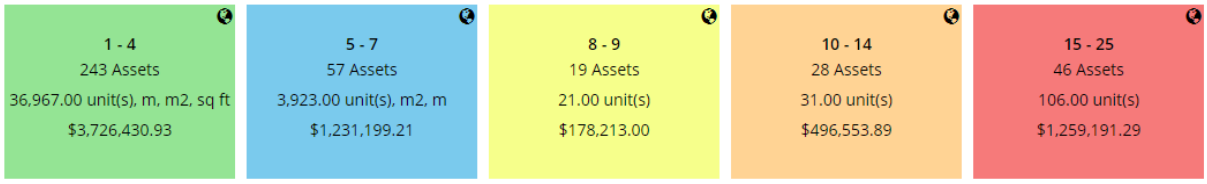


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

10.5 Risk & Criticality

10.5.1 Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2023 inventory data.



This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining (%)	

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

10.5.2 Risks to Current Asset Management Strategies

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

Climate Change & Extreme Events
Climate change and extreme weather events pose significant risks to the Township's land improvements and parks. Outdoor assets such as trails and recreational structures are particularly vulnerable to these conditions. Severe weather can accelerate the aging process of these assets and cause substantial damage, leading to increased maintenance and repair costs. Frequent and intense weather events can erode trails, damage playground equipment, and compromise the safety and usability of parks. Addressing these challenges will require proactive planning and additional resources to maintain and protect the Township's outdoor infrastructure.

10.6 Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description or images of the types of land improvement assets that the Township operates and the services that they help to provide to the community	Refer to section 10.1
Quality	Describe criteria for rehabilitation and replacement decisions and any related long-term forecasts	Refer to sections 10.2 & 10.4

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by land improvement assets.

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average condition of land improvements in the municipality	73%
Performance	Annual capital reinvestment rate	TBD

10.7 Recommendations

Asset Inventory

- Staff should continue refining its asset register by updating replacement costs. Replacement costs should be updated according to the best available information on the cost to replace the asset, using today's value.

Condition Assessment Strategies

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

Risk Management Strategies

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

Levels of Service

- 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.

11 Water Network

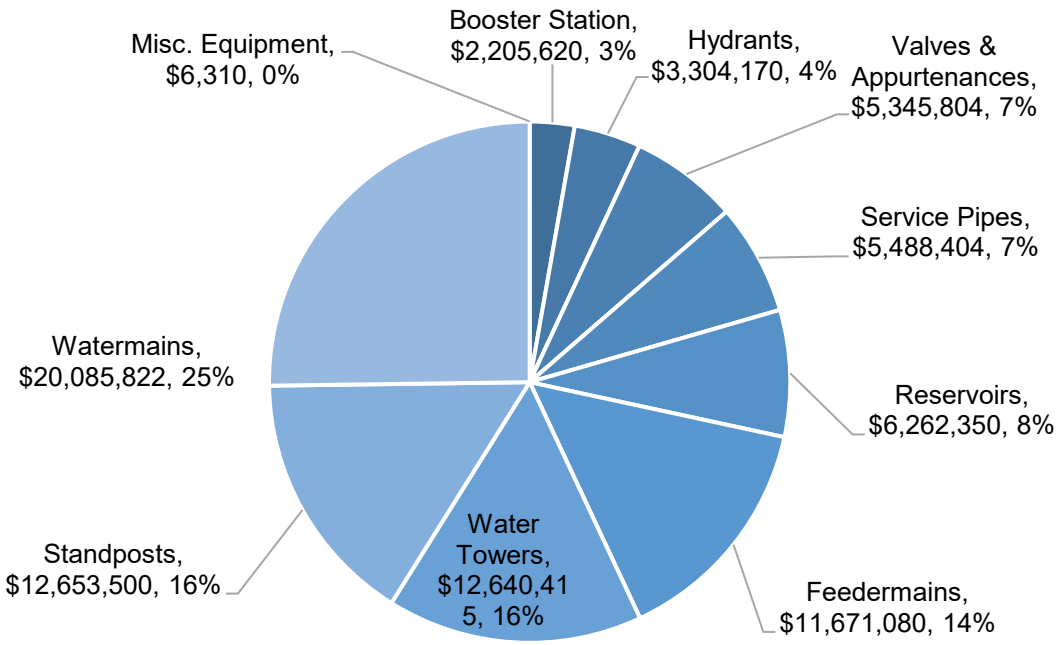
The Township manages an extensive water network consisting of various assets including:

- Facilities
- Underground infrastructure
- Hydrants & standposts
- Miscellaneous equipment

11.1 Asset Inventory & Costs

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

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Booster Station	1	Facilities	$2,206,000	User-defined
Feedermains	38,904	Meters	$11,671,000	Cost per unit
Hydrants	606	Assets	$3,304,000	Cost per unit
Misc. Equipment	2	Assets	$6,000	CPI
Reservoirs	1	Facilities	$6,262,000	User-defined
Service Pipes	34,284	Meters	$5,488,000	CPI
Standposts	3,669	Assets	$12,654,000	Cost per unit
Valves & Appurtenances	5,127	Assets	$5,346,000	Cost per unit
Water Towers	3	Facilities	$12,640,000	User-defined
Watermains	76,628	Meters	$20,086,000	Cost per unit

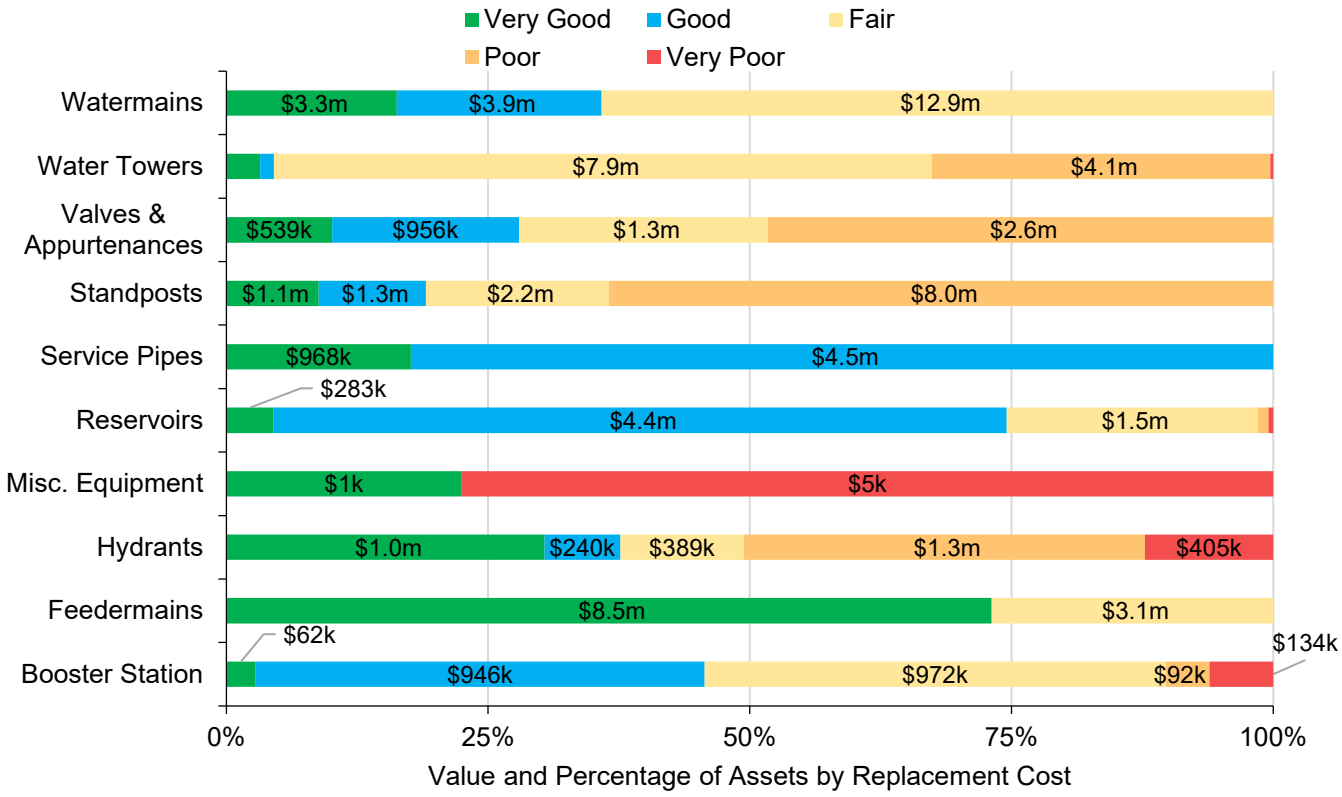


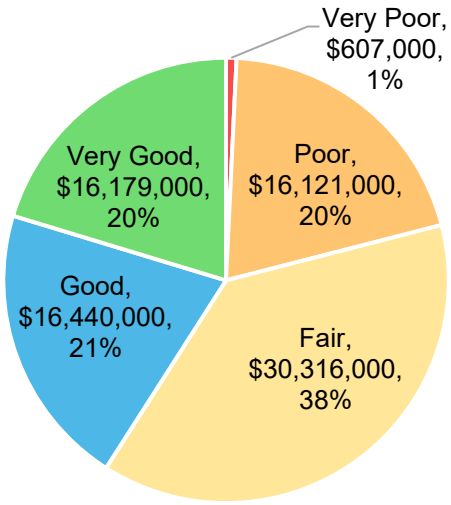
Total Current Replacement Cost: $79,663,476

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

11.2 Asset Condition

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





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.

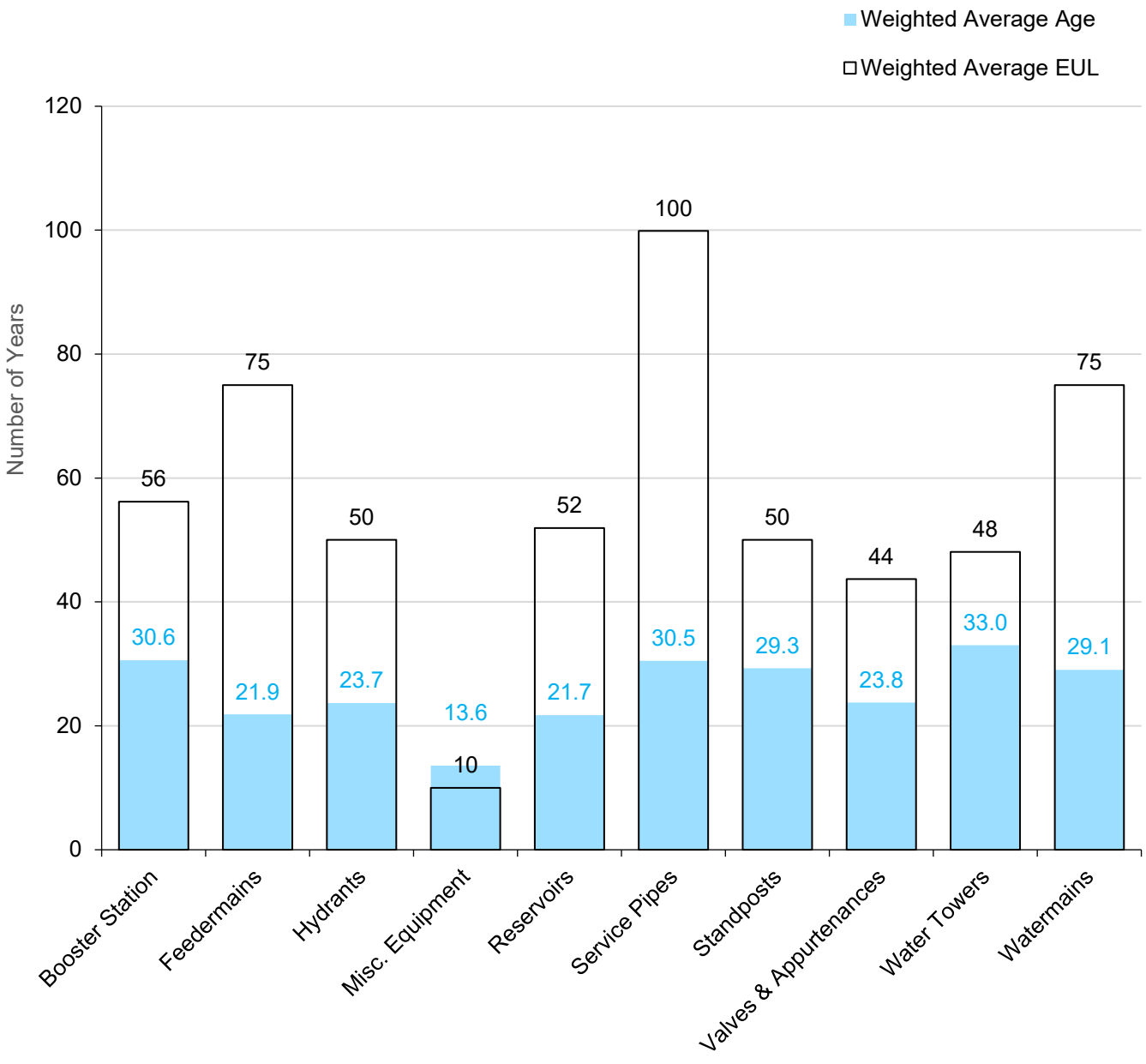
11.2.1 Current Approach to Condition Assessment

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

- There is currently no program in place for the condition assessment of water main pipes and standposts
- Valves, valve chambers, pumps, and air release valves are inspected annually, and fire hydrants are inspected semi-annually to ensure safety and functionality
- The reservoir and booster station, along with their components, are inspected weekly through visual and audible checks
- A standardized checklist is used for inspecting hydrants, components of the booster stations, and the reservoir
- Condition assessments for supporting infrastructure are performed by internal staff

11.3 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 Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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.

11.4 Lifecycle Management Strategy

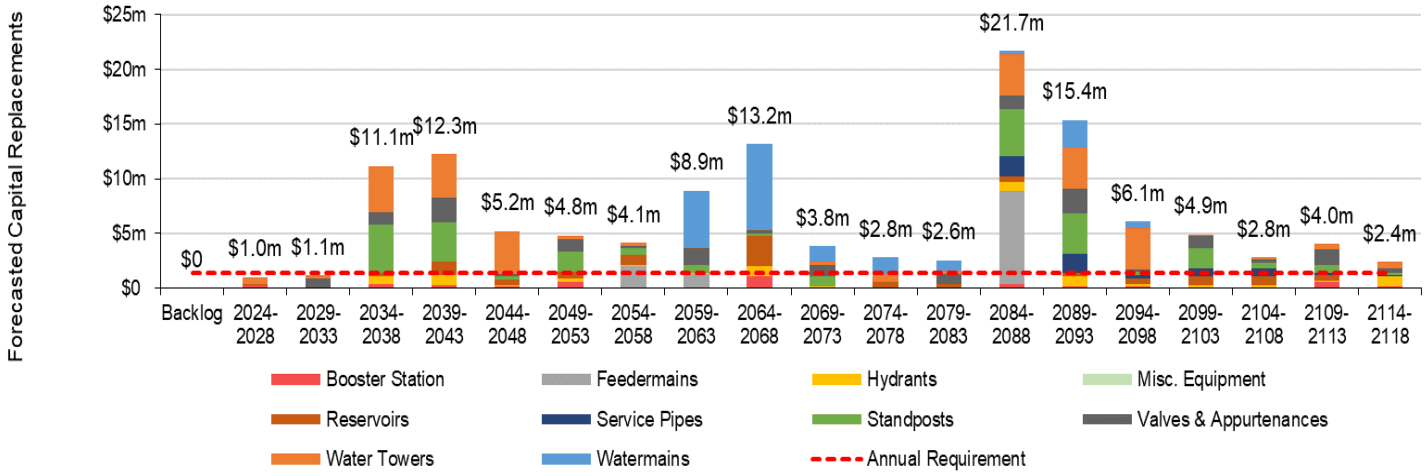
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance / Rehabilitation	Routine maintenance activities include flushing, flow testing, minor repairs, and valve turning. Flushing is conducted annually, flow testing every five years, valve turning annually, and minor repairs as required. Inspections are typically performed weekly, with maintenance triggered by visual inspections
	Rehabilitation programs are initiated as required, often triggered by component failure or visual inspections indicating deterioration
Replacement	Pump components, water valve components, hydrant components, or entire hydrants, and standposts are replaced on an as-needed basis
	Assets nearing the end of their expected service life, or those incurring frequent and costly repairs, are prioritized for replacement. Additionally, assets with a higher risk or consequence of failure are given priority for replacement

11.4.1 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 95 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement.

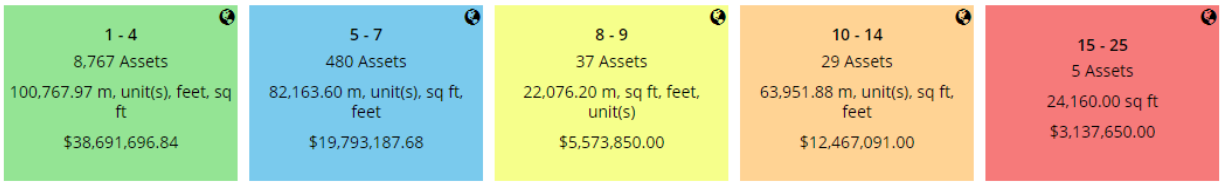


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

11.5 Risk & Criticality

11.5.1 Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2023 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)
Service Life Remaining (%)	Pipe Size (mm) (Operational)

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

11.5.2 Risks to Current Asset Management Strategies

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

Asset Data Confidence and Lifecycle Management Strategies
The lack of confidence in asset data and ineffective lifecycle management strategies pose significant risks to the Township's water network. Without reliable data, making informed decisions for asset management is challenging. Current strategies are not proactive which can lead to higher maintenance costs and unexpected failures. This hampers the ability to prioritize critical repairs and replacements, compromising the reliability of the water network.

Climate Change & Extreme Weather Events
According to the Township’s most recent risk assessment, the highest risk comes from severe droughts, which could severely limit the water supply. While the consequences are currently listed as manageable, persistent drought conditions could strain the water infrastructure, necessitating more robust planning and investment to ensure long-term water availability and system resilience.

11.6 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.

11.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	See Appendix B
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	See Appendix B
Reliability	Description of boil water advisories and service interruptions	The Township did not experience any service interruptions in 2023. The Township follows Ontario's Drinking Water Quality Management Standard (DWQMS). The Municipality delivers boil water advisories to affected households.

11.6.2 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 (2023)
Scope	% of properties connected to the municipal water system	65%
	% of properties where fire flow is available	100%
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	<1
Performance	Annual capital reinvestment rate	TBD

11.7 Recommendations

Asset Inventory

- Continue to refine and consolidate asset data into the central asset inventory to ensure all relevant assets are accounted for.
- Review and revise replacement costs and critical asset attribute data on a regular basis.

Condition Assessment Strategies

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

Risk Management Strategies

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

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

12 Sanitary Sewer Network

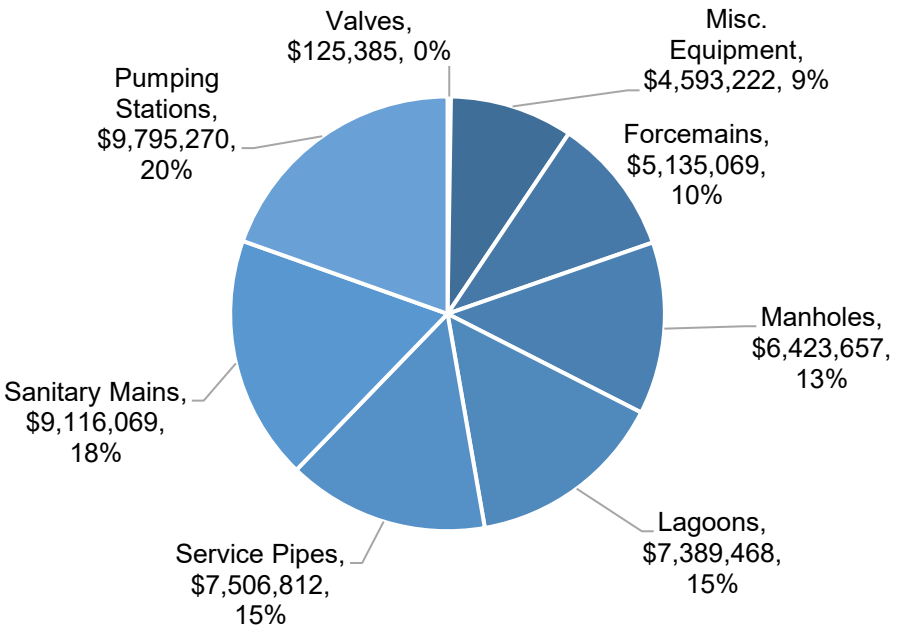
The Township manages an extensive sanitary sewer network consisting of various assets including:

- Facilities
- Underground infrastructure
- Miscellaneous equipment

12.1 Asset Inventory & Costs

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

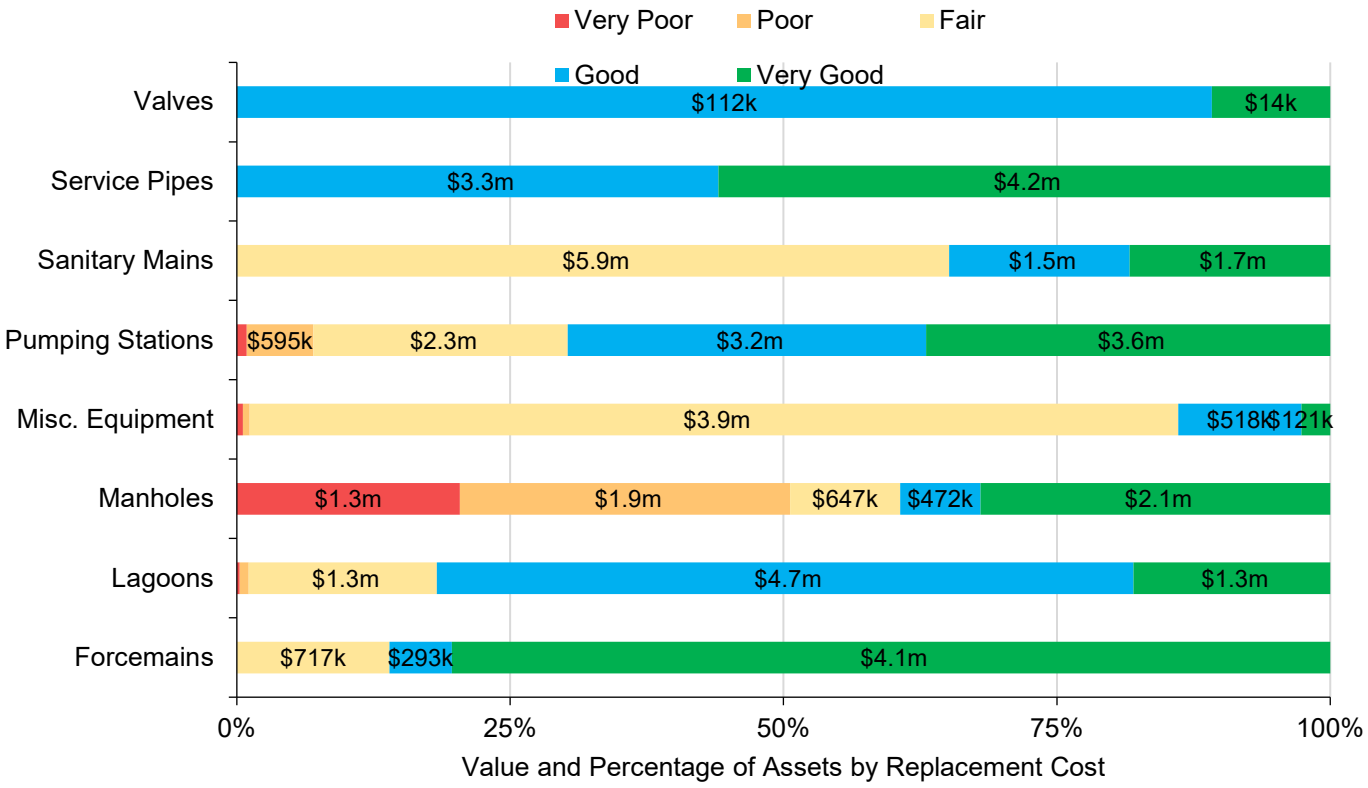
Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Forcemains	12,665	Meters	$5,135,000	CPI
Lagoons	236	Assets	$7,389,000	CPI
Manholes	735	Assets	$6,424,000	Cost per unit
Misc. Equipment	21	Assets	$4,593,000	CPI
Pumping Stations	12	Facilities	$9,795,000	User-defined
Sanitary Mains	40,800	Meters	$9,116,000	Cost per unit
Service Pipes	36,516	Meters	$7,507,000	CPI
Valves	5	Assets	$125,000	CPI

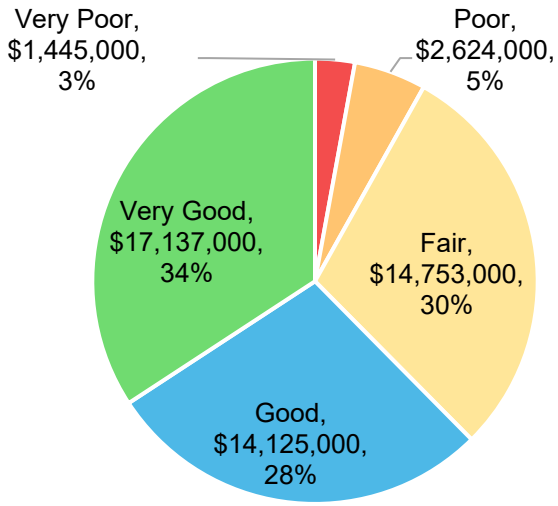


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

12.2 Asset Condition

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





To ensure that the Township's sanitary sewer 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.

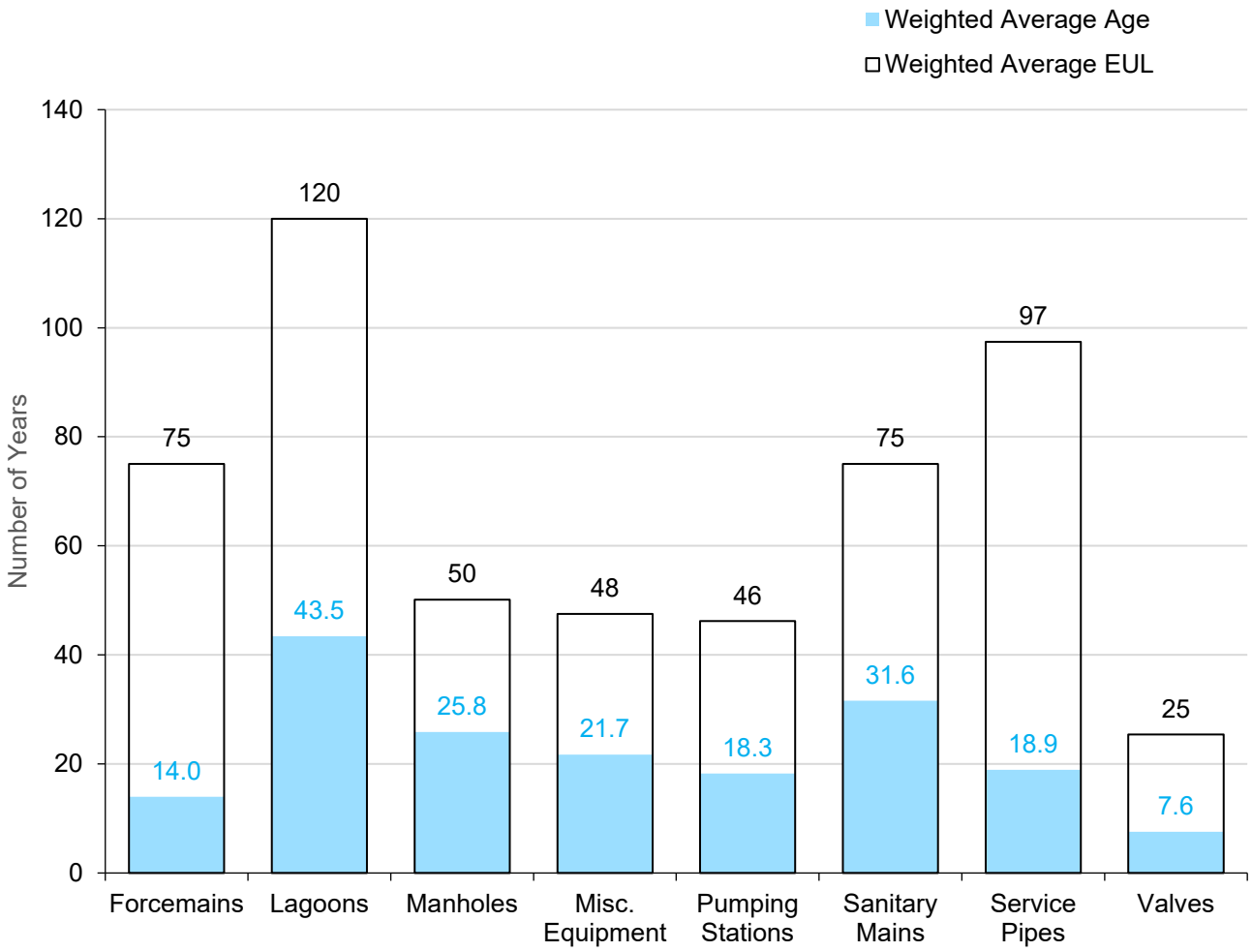
12.2.1 Current Approach to Condition Assessment

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

- There is currently no dedicated program in place for the condition assessment of sanitary mains
- Maintenance holes are inspected on an annual basis
- Pump stations and lagoons are inspected weekly to ensure safety and functionality
- A standardized checklist is used for assessments, covering factors such as structural adequacy
- Assessments are primarily conducted by the internal maintenance team, with external contractors engaged for specialized assessments

12.3 Estimated Useful Life & Average Age

The Estimated Useful Life for sanitary sewer network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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.

12.4 Lifecycle Management Strategy

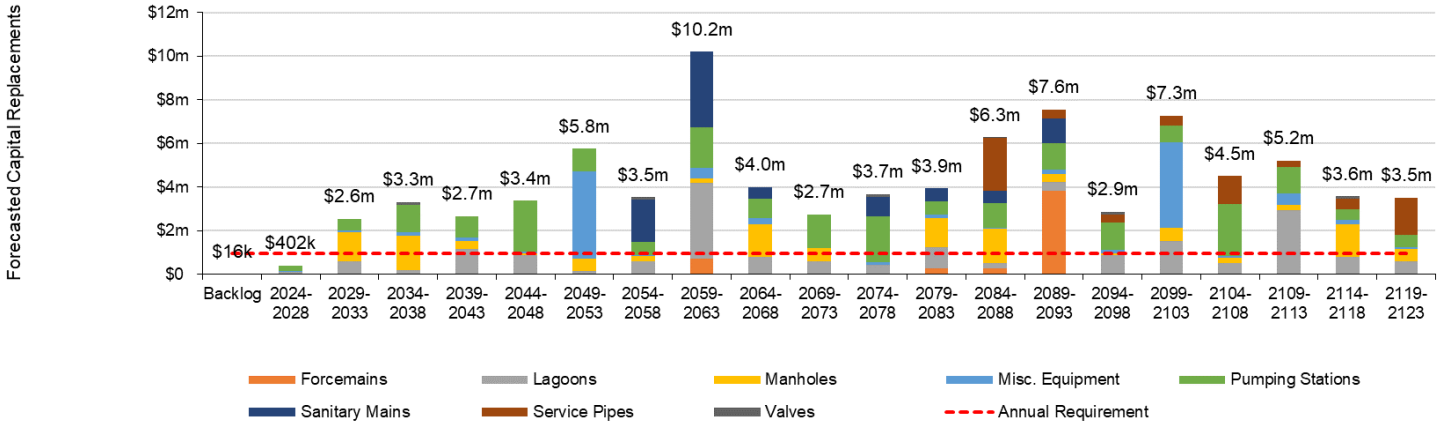
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance activities include inspections, flushing or cleaning, lagoon desludging (5-year cycle), and minor repairs. Cleaning and minor repairs are performed annually, triggered by visual inspections
Rehabilitation	When applicable, rehabilitation activities include trenchless relining, structural repairs, and upgrading outdated systems
	Currently, there is no formal rehabilitation program, and rehabilitation is only initiated when an issue occurs
Replacement	Asset replacement occurs upon failure or when an asset is nearing the end of its life, and the consequence of failure is significant
	Trigger points for replacement are periodically reviewed to ensure they align with asset conditions and evolving best practices

12.4.1 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

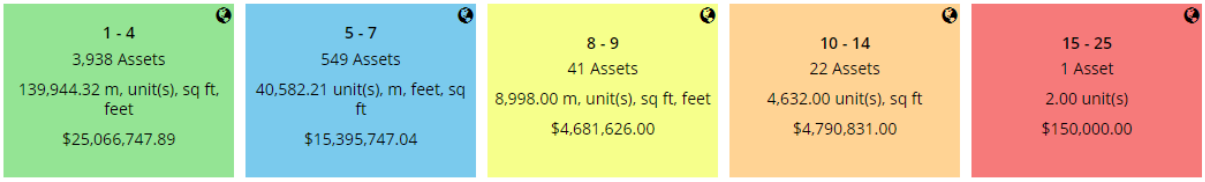


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

12.5 Risk & Criticality

12.5.1 Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2023 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 sewer network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining (%)	Pipe Size (mm) (Operational)

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

12.5.2 Risks to Current Asset Management Strategies

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

Climate Change & Extreme Events

Infiltration from severe weather events can strain infrastructure, leading to issues such as increased water contamination and pressure on treatment facilities. These events necessitate proactive planning and robust infrastructure to mitigate their impact and ensure the water network's resilience and reliability.

Asset Data Confidence and Lifecycle Management Strategies

The lack of confidence in asset data and inadequate lifecycle management strategies pose risks to the Township's sanitary sewer network. Without accurate asset data, making informed decisions for maintenance and upgrades is difficult. Current strategies are not proactive, leading to higher costs and potential system failures. This undermines the ability to prioritize essential repairs and replacements, jeopardizing the reliability and efficiency of the sanitary network.

Infrastructure Reinvestment

The current level of investment makes it challenging to meet lifecycle requirements and maintain a good state of repair. Major projects are heavily dependent on grants, which are not always guaranteed. This lack of consistent funding leads to deferred maintenance and upgrades, increasing the likelihood of system failures and inefficiencies. Without adequate reinvestment, the sanitary sewer network's reliability and long-term functionality are at risk.

12.6 Levels of Service

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

12.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	See Appendix B
Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes	The Township does not own any combined sewers
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	The Township does not own any combined sewers
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to	Stormwater can enter sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and

Service Attribute	Qualitative Description	Current LOS (2023)
	overflow into streets or backup into homes	sewage that exceeds its designed capacity. In some cases, this can cause water and/or sewage to overflow backup into homes. the disconnection of weeping tiles from sanitary mains and the use of sump pumps and pits directing storm water to the storm drain system can help to reduce the chance of this occurring. To mitigate the negative impacts of this, the Township ensures that all new homes are installed with backwater valves
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The Township follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.

12.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2023)
Scope	% of properties connected to the municipal wastewater system	62%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	0
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	<1
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	3
Performance	Annual capital reinvestment rate	TBD

12.7 Recommendations

Asset Inventory

- Continue to refine and consolidate asset data into the central asset inventory to ensure all relevant assets are accounted for.
- Review and revise replacement costs and critical asset attribute data on a regular basis.

Condition Assessment Strategies

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

Risk Management Strategies

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

Lifecycle Management Strategies

- A formalized trenchless re-lining strategy can extend the service life of sanitary mains at a lower total cost of ownership and can be implemented 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.

13 Impacts of Growth

Key Insights

- Understanding the key drivers of growth and demand will allow the Town to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure
- Significant increases in population and employment are expected
- The costs of growth should be considered in long-term funding strategies that are designed to maintain the current level of service

13.1 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 aid the Township to 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.

13.1.1 Russell Official Plan (March 2018)

The Township of Russell's Official Plan outlines a vision for the future growth of the municipality and a set of policies to guide infrastructure development over the next 20 years, up to 2036. It aims to oversee and influence land use within the four villages of Embrun, Russell, Limoges, and Marionville, as well as the Commercial Parks and the Industrial Park near Highway 417 in the Township of Russell.

The Official Plan's objectives prioritize developing pedestrian-friendly villages that encourage community interaction and retain a distinct local identity through design and architecture. It aims to provide a variety of community services and facilities to meet the needs of each neighborhood and the Township as a whole. Additionally, the plan focuses on ensuring that residential and workspaces are in close proximity, particularly around the Commercial and Industrial Parks, to leverage local employment opportunities. High standards for architectural design are set across all types of buildings, promoting energy conservation and preserving significant historical structures.

The principles of growth within the Township of Russell's official plan are focussed on intensifying and directing development in a sustainable and efficient manner. The plan promotes intensification across all land use designations to optimize infrastructure use and reduce the Township's carbon footprint. It includes strategies like redevelopment of brownfield sites, infill development, and the expansion or conversion of existing buildings, aiming for a 15% target of all new residential units within the serviceable area of development. Compatibility with existing areas and infrastructure needs are key considerations, ensuring that new growth doesn't adversely impact current services or the character of existing areas.

The following table outlines the recorded population and total number of private dwellings for Russell, from 1996 to 2021 according to Statistics Canada.

Historical Figures	1996	2001	2006	2011	2016	2021
Population	11,877	12,412	13,883	15,247	16,520	19,598
Population Change	N/A	4.5%	11.9%	9.8%	8.3%	18.6%
Private Dwellings	N/A	4,105	4,730	5,285	6,008	7,335

According to the Official Plan, the population is projected to reach 23,830 by 2036. Current trends from the 2021 census suggest that the actual population may meet or potentially exceed these expectations.

13.2 Impact of Growth on Lifecycle Activities

By July 1, 2025, the Town's asset management plan must include a discussion of how the assumptions regarding future changes in population and economic activity informed the preparation of the lifecycle management and financial strategy.

Planning for forecasted population growth may require the expansion of existing infrastructure and services. As growth-related assets are constructed or acquired, they should be integrated into the Town'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 Town 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.

14 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 assessment program

Appendix A: 10-Year Capital Requirements

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

Category	Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Road Network	Curbs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	HCB Roads	$6.2m	$537k	$265k	$2k	$135k	$816k	$0	$430k	$989k	$591k	$238k
	LCB Roads	$36k	$0	$0	$0	$64k	$0	$0	$366k	$285k	$1.8m	$0
	Sidewalks & Pathways	$122k	$258k	$115k	$869k	$553k	$493k	$193k	$443k	$257k	$97k	$324k
	Signs	$163k	$20k	$2k	$0	$18k	$1k	$182k	$2k	$0	$18k	$1k
	Streetlights	$0	$0	$402k	$0	$0	$0	$0	$213k	$0	$15k	$0

Category	Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Bridges & Culverts	Bridges	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Pedestrian Bridges	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Category	Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Storm Network	Catch Basins	$0	$0	$0	$1.6m	$74k	$0	$326k	$193k	$0	$69k	$114k
	Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Manholes	$0	$0	$71k	$310k	$71k	$9k	$151k	$9k	$0	$18k	$27k
	Outlets	$0	$0	$0	$2.2m	$0	$0	$66k	$0	$0	$0	$13k
	Service Pipes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Category	Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Facilities	Environmental Services	$0	$100k	$5k	$2k	$12k	$51k	$85k	$27k	$12k	$0	$41k
	General Government	$0	$550k	$37k	$221k	$2k	$484k	$116k	$320k	$263k	$20k	$393k
	Protection Services	$3k	$161k	$94k	$30k	$71k	$21k	$668k	$9k	$78k	$2k	$112k
	Recreational & Cultural Services	$0	$3.8m	$1.6m	$398k	$329k	$10.0m	$567k	$763k	$158k	$638k	$2.5m
	Transportation Services	$0	$261k	$55k	$4k	$487k	$3k	$2k	$101k	$14k	$151k	$80k

Category	Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Vehicles	Environmental Services	$158k	$0	$75k	$56k	$0	$0	$0	$152k	$158k	$75k	$56k
	General Government	$35k	$0	$0	$82k	$0	$0	$0	$0	$226k	$0	$82k
	Protection Services	$44k	$224k	$95k	$0	$0	$0	$255k	$104k	$44k	$260k	$0
	Recreational & Cultural Services	$105k	$0	$0	$0	$0	$0	$39k	$51k	$105k	$0	$0
	Transportation Services	$344k	$0	$117k	$333k	$0	$0	$338k	$356k	$60k	$214k	$0

Category	Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Machinery & Equipment	General Government	$130k	$65k	$53k	$145k	$214k	$144k	$130k	$92k	$97k	$1.2m	$99k
	Protection Services	$88k	$259k	$32k	$14k	$70k	$0	$108k	$49k	$34k	$319k	$589k
	Recreational & Cultural Services	$139k	$102k	$35k	$30k	$57k	$325k	$26k	$14k	$115k	$108k	$216k
	Transportation Services	$26k	$79k	$0	$21k	$222k	$20k	$55k	$0	$109k	$2k	$20k

Category	Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Land Improvements	Marina	$0	$0	$1k	$0	$0	$0	$0	$0	$0	$0	$0
	Misc. Land Improvements	$0	$0	$0	$0	$0	$11k	$20k	$47k	$0	$22k	$0
	Parklands & Trails	$0	$0	$0	$0	$0	$0	$0	$0	$6k	$98k	$47k
	Parks & Playground Equipment	$434k	$20k	$30k	$9k	$42k	$9k	$303k	$39k	$21k	$210k	$17k
	Splashpads & Pools	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Sport Fields & Courts	$191k	$1k	$13k	$0	$44k	$0	$76k	$29k	$0	$151k	$31k

Category	Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Water Network	Booster Station	$0	$175k	$11k	$2k	$0	$40k	$0	$13k	$750	$0	$20k
	Feedermains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Hydrants	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Misc. Equipment	$0	$5k	$0	$0	$0	$0	$0	$0	$0	$1k	$0
	Reservoirs	$0	$78k	$42k	$3k	$30k	$22k	$0	$42k	$0	$0	$6k
	Service Pipes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Standposts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Valves & Appurtenances	$0	$0	$0	$0	$0	$0	$843k	$0	$0	$0	$0
	Water Towers	$0	$405k	$48k	$1k	$1k	$151k	$30k	$3k	$159k	$0	$27k
	Watermains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Category	Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Sanitary Sewer Network	Forcemains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Lagoons	$0	$38k	$28k	$5k	$6k	$47k	$43k	$4k	$0	$4k	$547k
	Manholes	$0	$0	$0	$0	$0	$0	$1.3m	$0	$0	$0	$0
	Misc. Equipment	$16k	$15k	$0	$17k	$0	$0	$19k	$5k	$46k	$5k	$5k
	Pumping Stations	$0	$162k	$9k	$49k	$0	$28k	$217k	$45k	$185k	$2k	$113k
	Sanitary Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Service Pipes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Valves	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Appendix B: Level of Service Maps

Road Network Map

Images of a Bridge in Good Condition
St-Jacques Road
Inspected: May 22, 2023

East Elevation

Street Looking North

North Expansion Joint

Concrete End Post

Images of a Bridge in Fair Condition
Bridge – R-14 on St-Pierre Road
Inspected: May 22, 2023

East Elevation

Street Looking South

Southwest SBGR

Interior Soffit – Medium Delamination

West Exterior Girder and Soffit

Interior Span

Wide Vertical Crack on South Abutment

Footing Bracing – Severe Section Loss

Images of a Culvert in Very Good Condition
Culvert – RC-006 on Route 300
Inspected: May 22, 2023


East Elevation Outlet


Street Looking South


SBGR Steel Post Condition


Northwest Embankment


South Cell Looking East (Downstream)


Energy Attenuator

Images of a Culvert in Fair Condition
Culvert - RC-001 on Route 200 at St. Thomas Road
Inspected: May 22, 2023


Southeast Elevation (Inlet)


Street Looking North

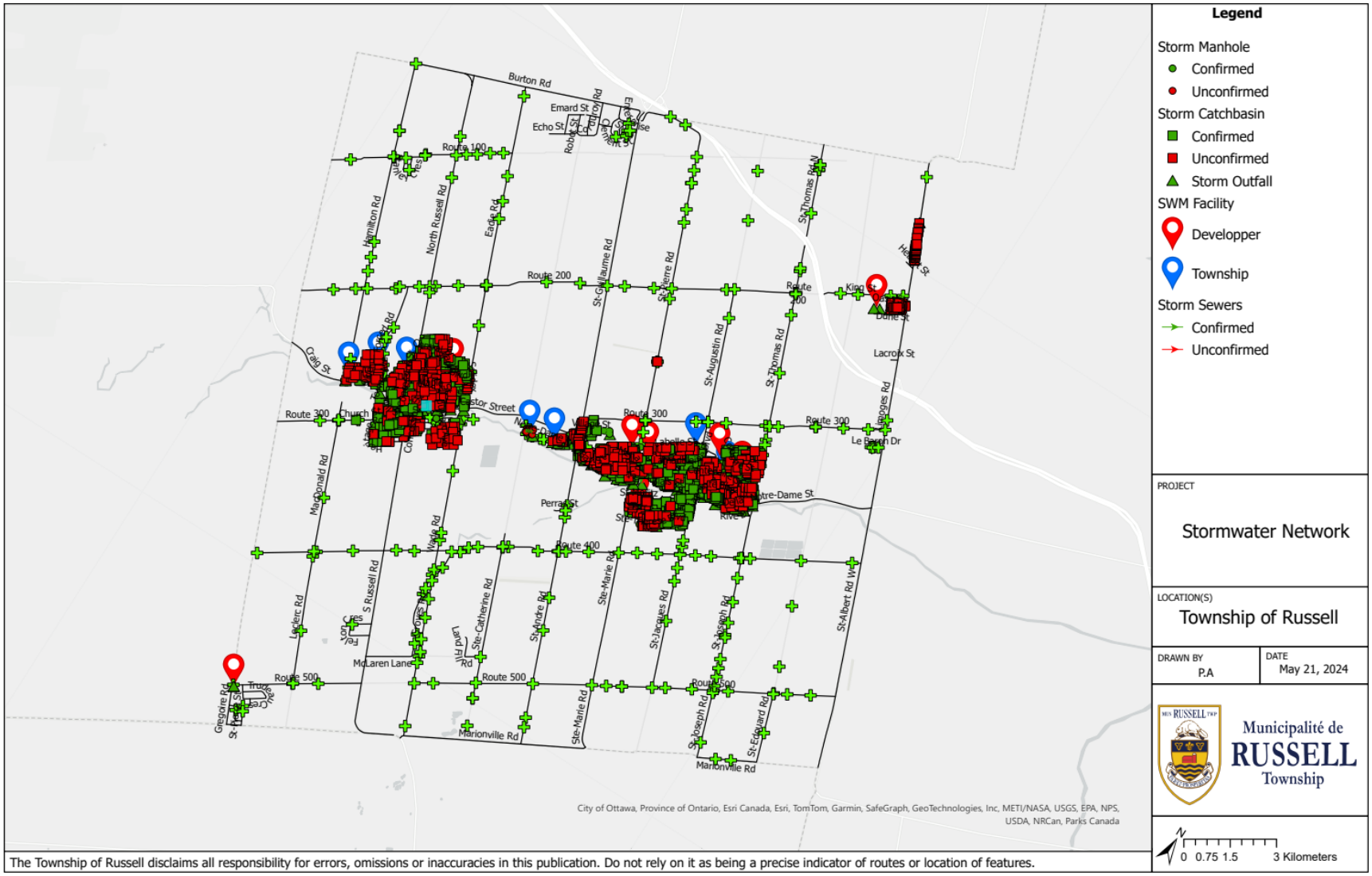

Southwest SBGR - Collision Damage


SBGR Wood Post Condition – Medium Rot

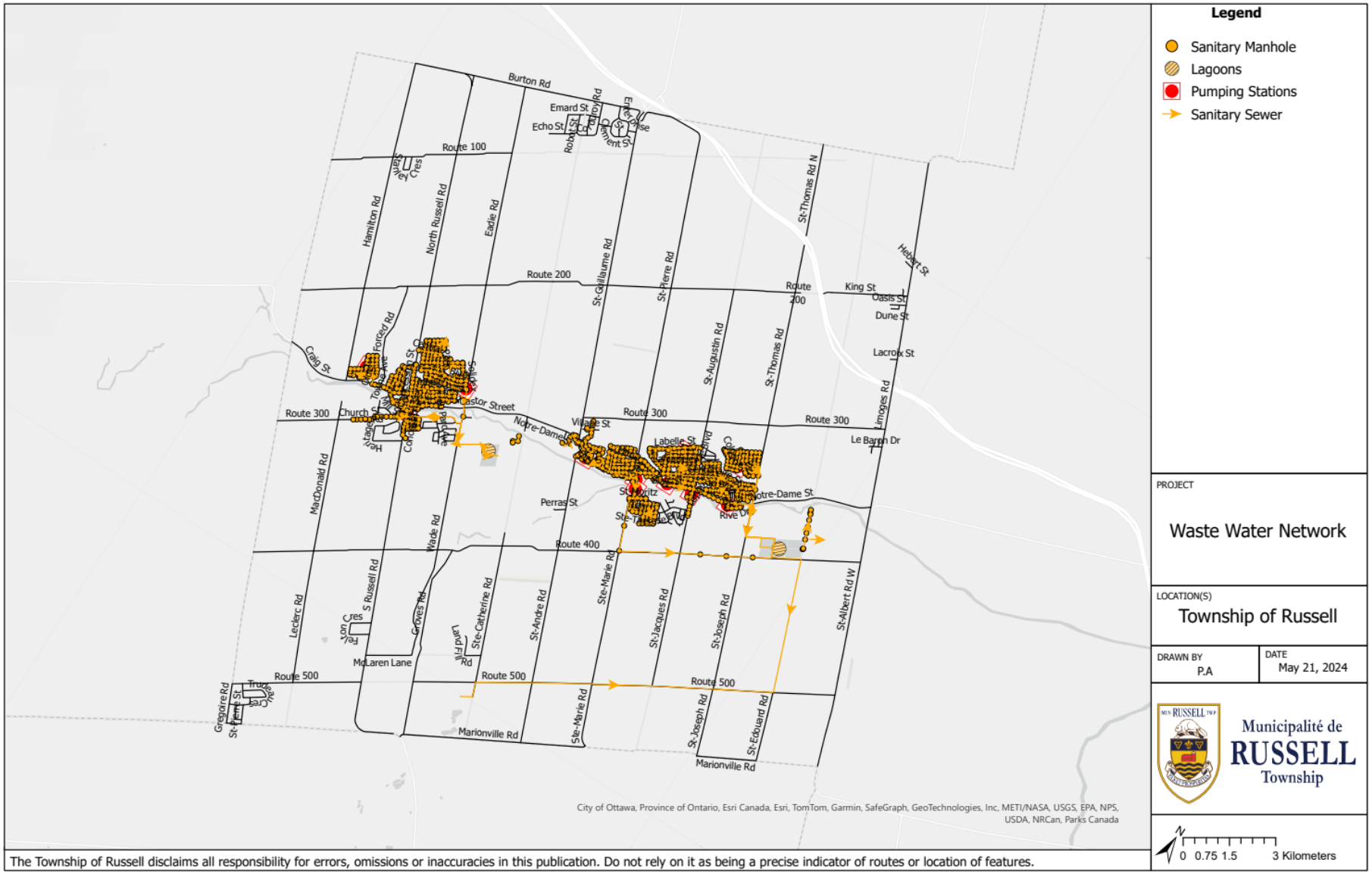

North Embankment


Outlet Component

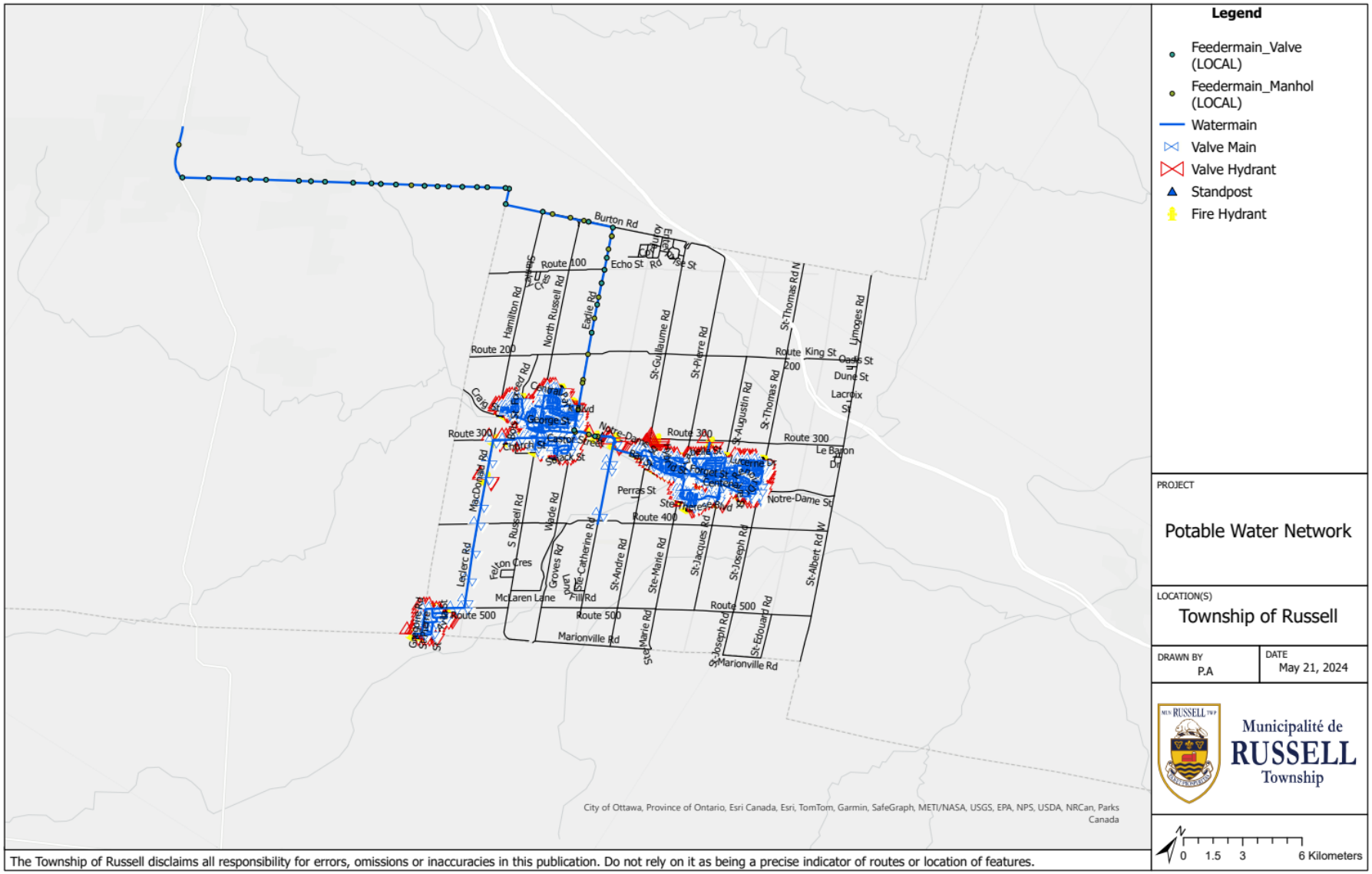
Storm Network Map



Sanitary Sewer Network Map



Water Network Map



The Township of Russell disclaims all responsibility for errors, omissions or inaccuracies in this publication. Do not rely on it as being a precise indicator of routes or location of features.

Appendix C: Condition Assessment Guidelines

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

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

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

Role of Asset Condition Data

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

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

Guidelines for Condition Assessment

Whether completed by external consultants or internal staff, condition assessments should be completed in a structured and repeatable fashion, according to consistent and objective assessment criteria. Without proper guidelines for the completion of

condition assessments there can be little confidence in the validity of condition data and asset management strategies based on this data.

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating criteria, in a format that can be used for asset management decision-making. As a result, it is important that staff adequately define the condition rating criteria that should be used and the assets that require a discrete condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project. There are many options available to the Township to complete condition assessments. In some cases, external consultants may need to be engaged to complete detailed technical assessments of infrastructure. In other cases, internal staff may have sufficient expertise or training to complete condition assessments.

Developing a Condition Assessment Schedule

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

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