Asset Management Plan

Township of Essa

June 2025

TOWNSHIP of ESSA
Where Town and Country Meet

psdcitywide

This Asset Management Program was prepared by:

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

Key Statistics

$432.5M	2023 Replacement Cost of Asset Portfolio
$52.5K	Replacement Cost of Infrastructure Per Household
75%	Percentage of Assets in Fair or Better Condition
53%	Percentage of Assets with Assessed Condition Data
$9.7M	Annual Capital Infrastructure Deficit
3.2%	Target Investment Rate
1.0%	Actual Investment Rate

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1. Executive Summary

Municipal infrastructure delivers critical services that are foundational to the economic, social, and environmental health and growth of a community. The goal of asset management is to enable infrastructure to deliver an adequate level of service in the most cost-effective manner. This involves the ongoing review and update of infrastructure information and data alongside the development and implementation of asset management strategies and long-term financial planning.

1.1. Scope

This Asset Management Plan (AMP) identifies the current practices and strategies that are in place to manage public infrastructure and makes recommendations where they can be further refined. Through the implementation of sound asset management strategies, the Township of Essa can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP includes the following asset categories:

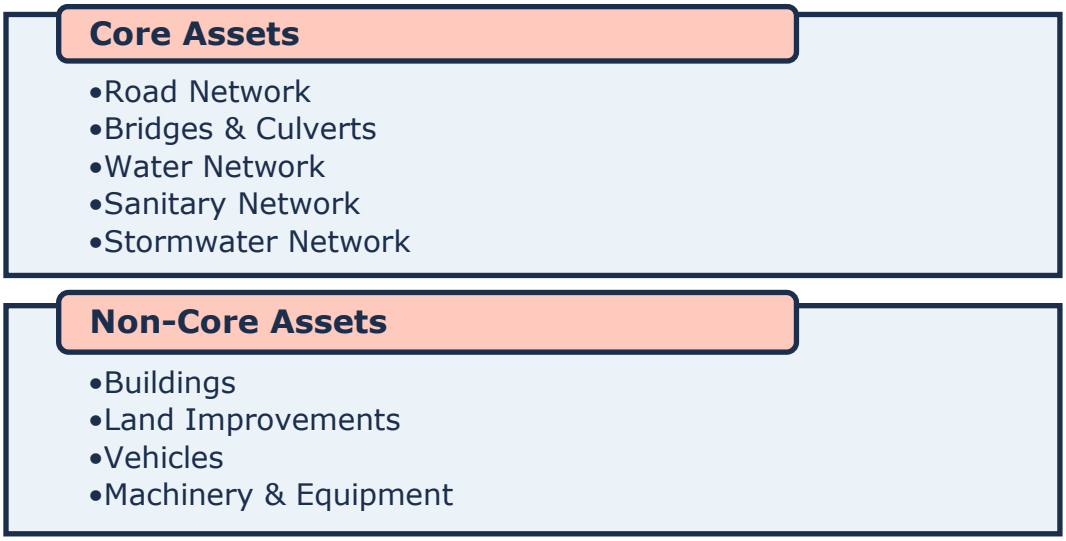


Figure 1: Core and Non-core Asset Categories

1.2. Compliance

With the development of this AMP the Township of Essa has achieved compliance with July 1, 2025, requirements under O. Reg. 588/17. This includes requirements for proposed levels of service and inventory reporting for all asset categories.

1.3. Findings

The overall replacement cost of the asset categories included in this AMP totals $432.5 million. 75% of all assets analyzed in this AMP are in fair or better condition and assessed condition data was available for 53% of assets. For the

remaining 47% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

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

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $13.8 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $4.1 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $9.7 million.

For tax-funded assets, the Township has selected a strategy aimed at achieving 75% of full funding. This phased approach will gradually increase reinvestment levels over 15 years, allowing the Township to address priority infrastructure needs. For rate-funded assets, a fully funded approach was selected, aiming to close the funding gap within 15 years, ensuring timely maintenance and compliance with regulatory standards.

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.

1.4. Limitations and Constraints

The asset management program development required substantial effort by staff, it was developed based on best-available data, and is subject to the following broad limitations, constrains, and assumptions:

- The analysis is highly sensitive to several critical data fields, including an asset's estimated useful life, replacement cost, quantity, and in-service date. Inaccuracies or imprecisions in any of these fields can have substantial and cascading impacts on all reporting and analytics.
- User-defined and unit cost estimates, based typically on staff judgment, recent projects, or established through completion of technical studies, offer the most precise approximations of current replacement costs. When this isn't possible, historical costs incurred at the time of asset acquisition or construction can be inflated to present day. This approach, while sometimes necessary, can produce inaccurate estimates.
- In the absence of condition assessment data, age was used to estimate asset condition ratings. This approach can result in an over- or understatement of asset needs. As a result, financial requirements generated through this approach can differ from those produced by in-field assessments.

- The risk models are designed to support objective project prioritization and selection. However, in addition to the inherent limitations that all models face, they also require availability of important asset attribute data to ensure that asset risk ratings are valid, and assets are properly stratified within the risk matrix. Missing attribute data can misclassify assets.

These limitations have a direct impact on most of the analysis presented, including condition summaries, age profiles, long-term replacement and rehabilitation forecasts, and shorter term, 10-year forecasts that are generated from Citywide, the Township's primary asset management system.

These challenges are quite common and require long-term commitment and sustained effort by staff. As the Township's asset management program evolves and advances, the quality of future AMPs and other core documents that support asset management will continue to increase.

2. Introduction and Context

2.1. Community Profile

Census Characteristic	Township of Essa	Ontario
Population 2021	22,970	14,223,942
Population Change 2016-2021	9.0%	5.8%
Total Private Dwellings	8,232	5,929,250
Population Density	82.1/km^2	15.9/km^2
Land Area	279.92 km^2	892,411.76 km^2

Table 1: Township of Essa Community Profile

The Township of Essa is a lower-tier municipality within Simcoe County, located in south-central Ontario. It lies west of the City of Barrie and north of the Town of Alliston, offering a strategic position with both rural charm and access to urban amenities.

The area has a rich history, originally inhabited by Indigenous peoples prior to European settlement. Officially established in the 19th century, Essa has deep agricultural roots that continue to influence its character today. The Township encompasses several small communities, including Angus, Baxter, Egbert, Thornton, and Colwell. Angus, the largest of these, serves as the primary residential and commercial hub.

Essa offers a unique blend of countryside living with convenient access to nearby cities. Its scenic landscapes, including the Nottawasaga River and an array of trails, make it a popular destination for outdoor enthusiasts and those seeking a quieter, family-friendly lifestyle.

The Township's appeal lies in its affordability, natural surroundings, and local employment opportunities. Lower housing costs compared to neighbouring urban centres attract a diverse population, from young families to retirees. Proximity to Canadian Forces Base Borden, a strong agricultural presence, and a growing business sector further support local job creation. Essa's potential for continued growth also makes it an attractive option for investors and new residents alike.

Infrastructure development is a key priority for the Township. This includes expanding water and wastewater services to support population growth, upgrading road networks to handle increased traffic, and investing in community facilities and diverse housing options. Efforts are also being made to preserve natural and cultural heritage assets and improve stormwater management to maintain Essa's rural identity amidst development.

2.2. Climate Change

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

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

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

2.2.1. Essa Climate Profile

The Township of Essa is located in south-central Ontario within Simcoe County. 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 Essa may experience the following trends:

Higher Average Annual Temperature:

- Between the years 1971 and 2000 the annual average temperature was 6.7 ºC
- Under a high emissions scenario, the annual average temperatures are projected to increase by 4.7 ºC by the year 2050 and over 6.5 ºC by the end of the century.

Increase in Total Annual Precipitation:

- Under a high emissions scenario, Essa is projected to experience an 13% increase in precipitation by the year 2051 and a 18% 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.

2.2.2. Integration 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 as a result of climate change impacts such as flooding, high heat, drought, and more frequent and intense storms.

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

2.3 Asset Management Overview

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

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

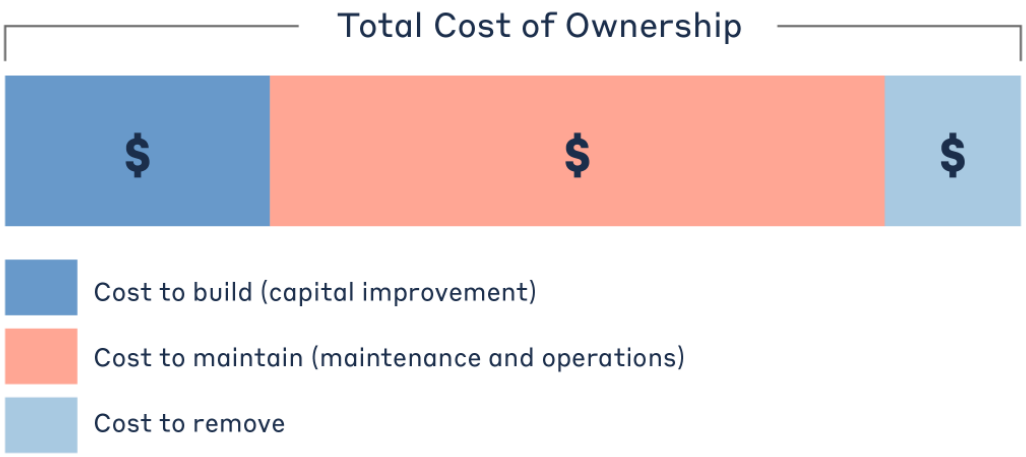


Figure 2: Total Cost of Asset Ownership

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.

2.3.1. Foundational Documents

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.

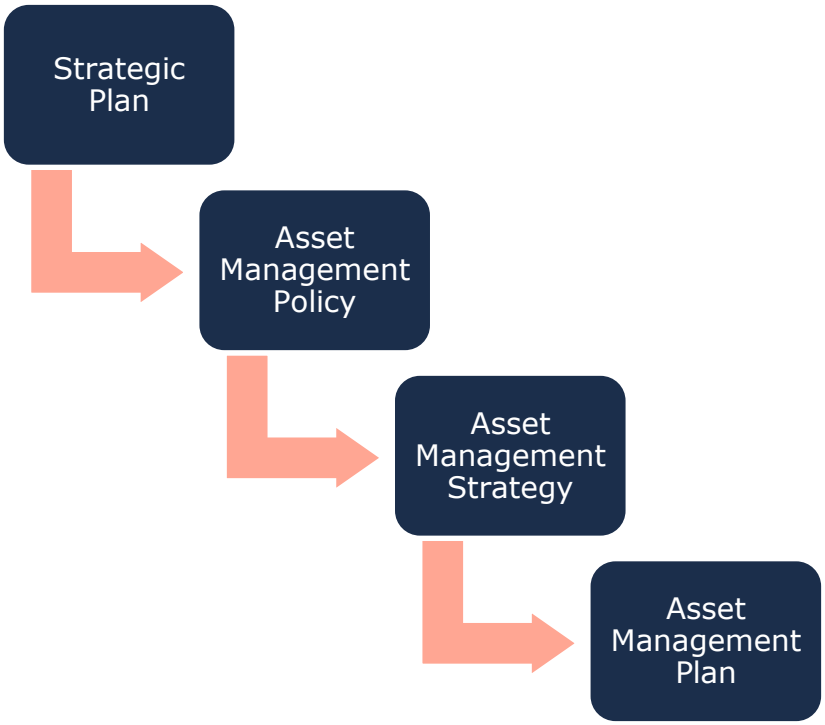


Figure 3: Foundational Asset Management Documents

Strategic Plan

The strategic plan has a direct, and cascading impact on asset management planning and reporting, making it a foundational element. At the beginning of each term, Council holds strategic planning exercises and discussions to identify major initiatives and administrative improvements it wishes to achieve during its tenure. Staff then identify the scope, resources, timing & other logistical matters associated with proposed initiatives.

Asset Management Policy

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

The Township of Essa adopted an Asset Management Policy in September 2022, in accordance with Ontario Regulation 588/17. The Township's Asset Management Policy provides a framework for managing these assets to deliver value to the community, ensuring sustainability and reducing risks. Key elements of the Policy include:

- Strategic Integration
  - Asset management will be integrated across all departments, encouraging collaboration and data-sharing to optimize service delivery and decision-making.
- Public and Stakeholder Engagement
  - The Township will involve residents and neighboring municipalities in planning, ensuring decisions reflect community needs and priorities.

Communication channels will include public consultations, surveys, and project updates on the Township's website.

- Environmental Responsibility
  - The Township will invest in environmentally sustainable projects, reducing its carbon footprint and aligning with its broader climate change goals.
- Continuous Improvement
  - The Township is committed to continual improvement of its asset management practices, including regular reviews and the adoption of innovative solutions to meet evolving needs.

This Policy aims to provide a clear direction for managing the Township's infrastructure, aligning asset management with strategic goals, and ensuring that assets are maintained at optimal levels to deliver reliable services to the community.

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

Asset Management Plan

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

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

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

2.4. Key Concepts in Asset Management

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

2.4.1. Lifecycle Management Strategies

The condition or performance of 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 table below provides a description of each type of activity and the general difference in cost.

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.

Maintenance

- General level of cost is **$**
- All actions necessary for retaining an asset as near as practicable to its original condition, but excluding rehabilitation or renewal. Maintenance does not increase the service potential of the asset
- It slows down deterioration and delays when rehabilitation or replacement is necessary.

Rehabilitation / Renewal

- General level of cost is **$$$**
- Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification.
- Generally involves repairing the asset to deliver its original level of service (i.e. milling and paving of roads) without resorting to significant upgrading or replacement, using available techniques and standards.

Replacement

- General level of cost is **$$$$$**
- The complete replacement of an asset that has reached the end of its life, so as to provide a similar, or agreed alternative, level of service.
- Existing asset disposal is generally included.

Figure 4: Lifecycle Management Typical Lifecycle Interventions

The Township's approach to lifecycle management is described within each asset category. 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.

2.4.2. Risk and Criticality

Asset risk and criticality are essential building blocks of asset management, integral in prioritizing projects and distributing funds where they are needed most based on a variety of factors. Assets in disrepair may fail to perform their intended function, pose substantial risk to the community, lead to unplanned expenditures, and create liability for the municipality. In addition, some assets are simply more important to the community than others, based on their financial significance, their role in delivering essential services, the impact of their failure on public health and safety, and the extent to which they support a high quality of life for community stakeholders.

Risk is a product of two variables: the probability that an asset will fail, and the resulting consequences of that failure event. It can be a qualitative measurement, (i.e. low, medium, high) or quantitative measurement (i.e. 1-5), that can be used to rank assets and projects, identify appropriate lifecycle strategies, optimize short- and long-term budgets, minimize service disruptions, and maintain public health and safety.

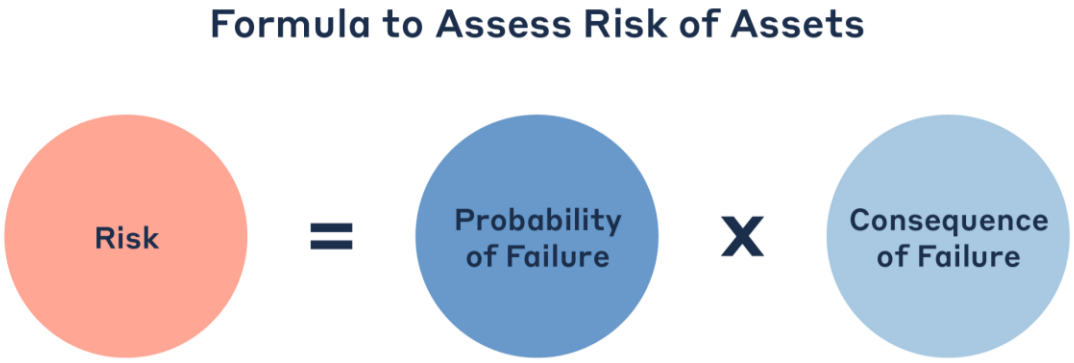


Figure 5: Risk Equations

The approach used in this AMP relies on a quantitative measurement of risk associated with each asset. The probability and consequence of failure are each scored from 1 to 5, producing a minimum risk index of 1 for the lowest risk assets, and a maximum risk index of 25 for the highest risk assets.

Probability of Failure

Several factors can help decision-makers estimate the probability or likelihood of an asset's failure, including its condition, age, previous performance history, and exposure to extreme weather events, such as flooding and ice jams—both a growing concern for municipalities in Canada.

Consequence of Failure

Estimating criticality also requires identifying the types of consequences that the organization and community may face from an asset's failure, and the magnitude of those consequences. Consequences of asset failure will vary across the infrastructure portfolio; the failure of some assets may result primarily in high direct financial cost but may pose limited risk to the community. Other assets may have a relatively minor financial value, but any downtime may pose significant health and safety hazards to residents. See Appendix D: Risk Rating Criteria for definitions and the developed risk models.

The table below illustrates the various types of consequences that can be integrated in developing risk and criticality models for each asset category and segments within. We note that these consequences are common, but not exhaustive.

Type of Consequence	***Description***
Direct Financial	Direct financial consequences are typically measured as the replacement costs of the asset(s) affected by the failure event, including interdependent infrastructure.
Economic	Economic impacts of asset failure may include disruption to local economic activity and commerce, business closures, service disruptions, etc. Whereas direct financial impacts can be seen immediately or estimated within hours or days, economic impacts can take weeks, months and years to emerge, and may persist for even longer.
Socio-political	Socio-political impacts are more difficult to quantify and may include inconvenience to the public and key community stakeholders, adverse media coverage, and reputational damage to the community and the Municipality.
Environmental	Environmental consequences can include pollution, erosion, sedimentation, habitat damage, etc.
Public Health and Safety	Adverse health and safety impacts may include injury or death, or impeded access to critical services.
Strategic	These include the effects of an asset's failure on the community's long-term strategic objectives, including economic development, business attraction, etc.

Table 2: Risk Analysis - Types of Consequences of Failure

This AMP includes a preliminary 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.

These models have been built in Citywide for continued review, updates, and refinements.

2.4.3. Levels of Service

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

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, the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required. For non-core asset categories, the Township has determined the qualitative descriptions that will be used. The metrics can be found in the levels of service subsection within each asset category.

Technical Levels of Service

Technical LOS 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, the Province, through O. Reg. 588/17, has provided technical metrics that are required. For non-core asset categories, the Township determined the technical metrics that will be used. The metrics can be found in the levels of service subsection within each asset category.

Current and Proposed Levels of Service

Current LOS are the past performance metrics of an asset category up until present day. In contrast, Proposed LOS looks toward the municipality's goal for asset performance by a defined future date.

It is important to note that O. Reg 588/17 does not dictate which proposed LOS metrics municipality's need to strive for. A proposed LOS will be very specific to each community's resident desires, political goals, and financial capacity. This can range from increasing service levels and costs, to maintaining or even reducing current performance in order to mitigate future cost increases. Regardless of the proposed LOS chosen, O. Reg 588/17 requires municipalities to demonstrate the achievability of their selected metrics.

2.5. Scope and Methodology

2.5.1. Asset Categories for this AMP

This asset management plan for the Township of Essa is produced in compliance with O. Reg. 588/17. The AMP summarizes the state of the infrastructure for Essa's asset portfolio, establishes current levels of service and the associated technical and customer-oriented key metrics, outlines lifecycle strategies for optimal asset management and performance, and provides financial strategies to reach sustainability for the asset categories listed below.

Tax-Funded Assets

- Road Network
- Bridges & Culverts
- Buildings
- Stormwater Network
- Land Improvements
- Vehicles
- Machinery & Equipment

Rate-Funded Assets

- Water Network
- Sanitary Network

Table 3: Tax- and Rate-Funded Assets

2.5.2. Data Effective Date

It is important to note that this plan is based on data as of December 31, 2023; therefore, it represents a snapshot in time using the best available processes, data, and information at the Township. Strategic asset management planning is an ongoing and dynamic process that requires continuous data updates and dedicated data management resources.

2.5.3. 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. The two methodologies are:

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

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

2.5.4. Estimated Useful Life and Service Life Remaining

The estimated useful life (EUL) of an asset is the period over which the Township expects the asset to be available for use and remain in service before requiring replacement or disposal. The EUL for each asset 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 date 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:

Figure 6: Service Life Remaining Calculation

2.5.5. 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.

Figure 7: Target Reinvestment Rate Calculation

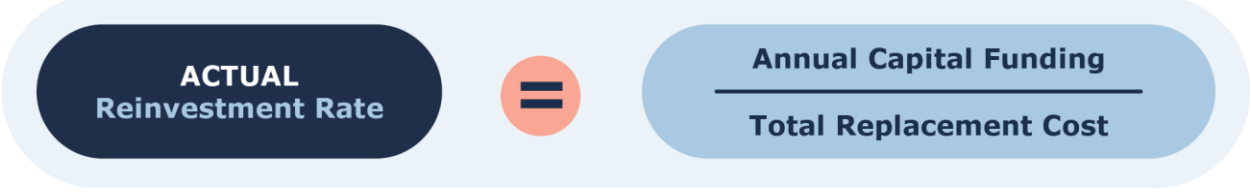


Figure 8: Actual Reinvestment Rate Calculation

2.5.6. Asset Condition

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

A condition assessment rating system provides a standardized descriptive framework that allows comparative benchmarking across the Township's asset portfolio. The table below outlines the condition rating system used in this AMP to determine asset condition. This rating system is aligned with the Canadian Core Public Infrastructure Survey which is used to develop the Canadian Infrastructure Report Card. When assessed condition data is not available, service life remaining is used to approximate asset condition.

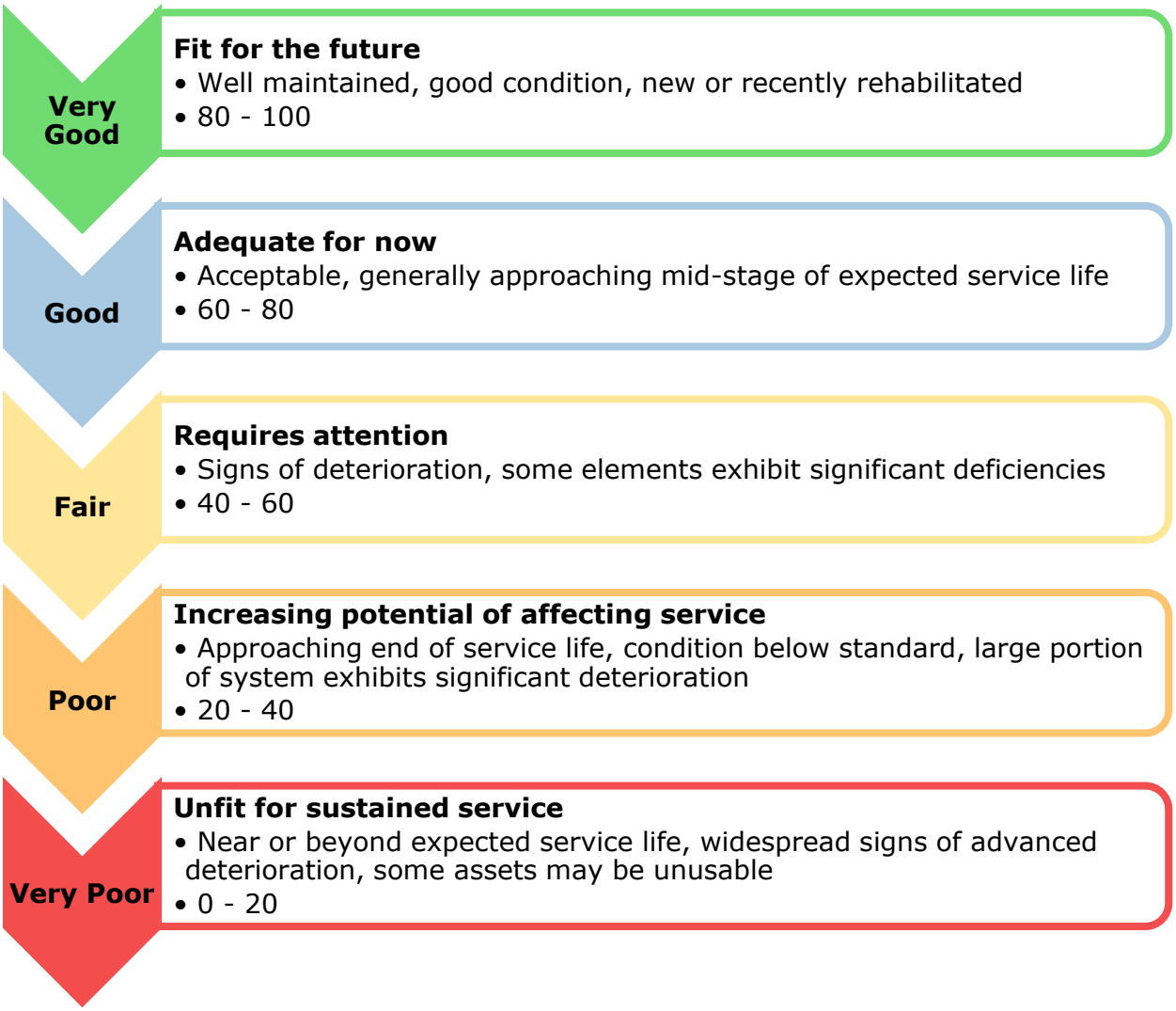


Figure 9: Standard Condition Rating Scale

The analysis 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: Condition Assessment Guidelines includes additional

information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

2.6. 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)[1]. 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.

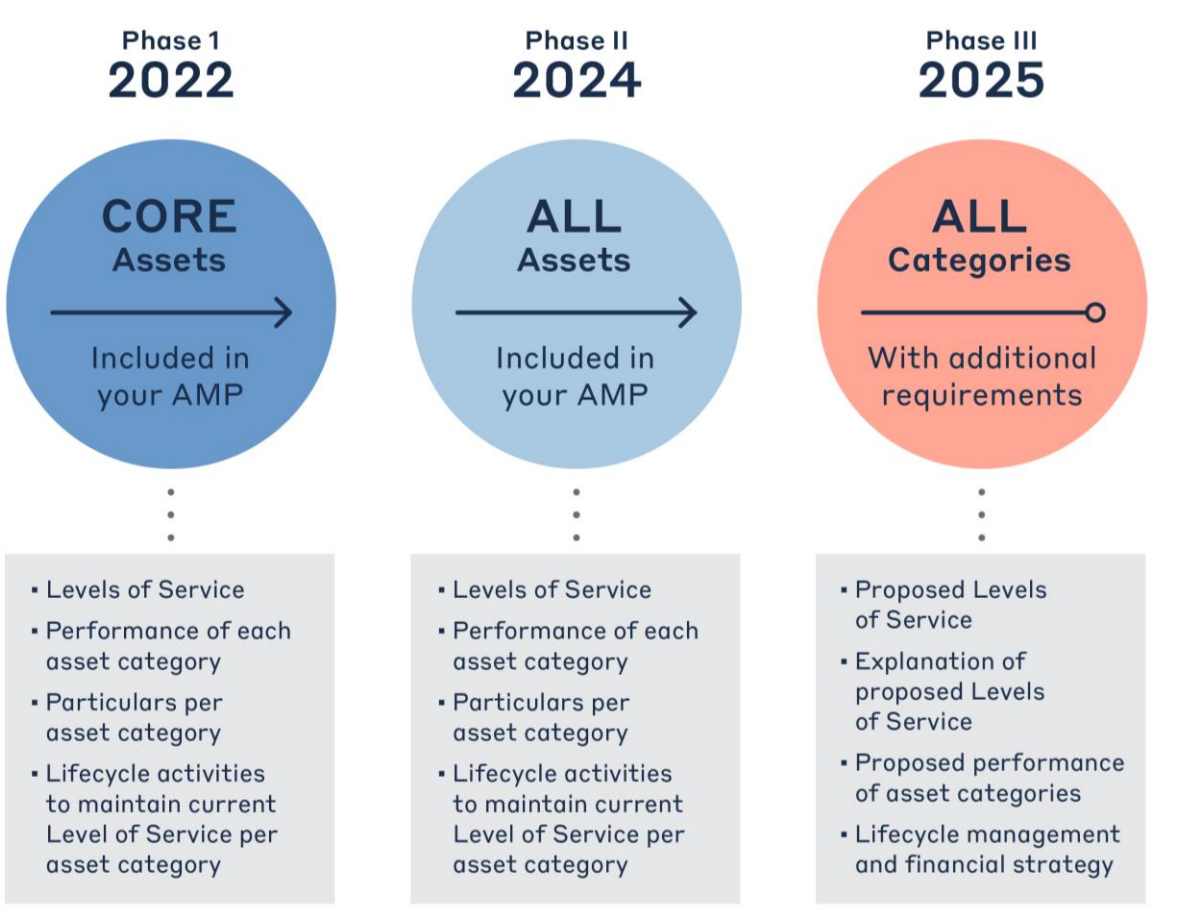


Figure 10: O. Reg. 588/17 Requirements and Reporting Deadlines

[1] O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure https://www.ontario.ca/laws/regulation/170588

2.6.1. O. Reg. 588/17 Compliance Review

Requirement	O. Reg. 588/17 Section	AMP Section Reference	Status
Summary of assets in each category	S.5(2), 3(i)	5.1 – 13.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	5.1 – 13.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	5.3 – 13.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	5.3 – 13.3	Complete
Description of municipality's approach to assessing the condition of assets in each category	S.5(2), 3(v)	5.3.1 - 13.3.1	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	5.7 – 13.7	Complete
Current performance measures in each category	S.5(2), 2	5.7 – 13.7	Complete
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	5.4 – 13.4	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	5.5 – 13.5	Complete
Growth considerations	S.6(1), 5	15.1 – 15.5	Complete
Proposed levels of service for each category for next 10 years	S.6(1), 1(i-ii)	5.8 – 13.8	Complete
Explanation of appropriateness of proposed levels of service	S.6(1), 2(i-iv)	4.7	Complete
Lifecycle management activities for proposed levels of service	S.6(1), 4(i)	4.4.1 - 4.6.1	Complete
10-year capital costs for proposed levels of service	S.6(1), 4(ii)	Appendix A	Complete
Annual funding availability projections	S.6(1), 4(iii)	4.4.2 - 4.6.2	Complete

Table 4: O. Reg. 588/17 Compliance Review

Portfolio Overview

3. State of the Infrastructure

The state of the infrastructure (SOTI) summarizes the inventory, condition, age profiles, and other key performance indicators for the Township's infrastructure portfolio. These details are presented for all core and non-core asset categories.

3.1. Asset Hierarchy/Data Classification

Asset hierarchy illustrates the relationship between individual assets and their components, and a wider, more expansive network and system. How assets are grouped in a hierarchy structure can impact how data is interpreted. Key category details are summarized at the asset segment level.

Figure 11: Asset Hierarchy and Data Classification - Core Assets

Figure 12: Asset Hierarchy and Data Classification - Non-core Assets

3.2. Portfolio Overview

3.2.1. Replacement Cost

All Essa's asset categories have a total replacement cost of $432.5 million based on available inventory data. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects the replacement of historical assets with similar, not necessarily identical, assets available for procurement today.

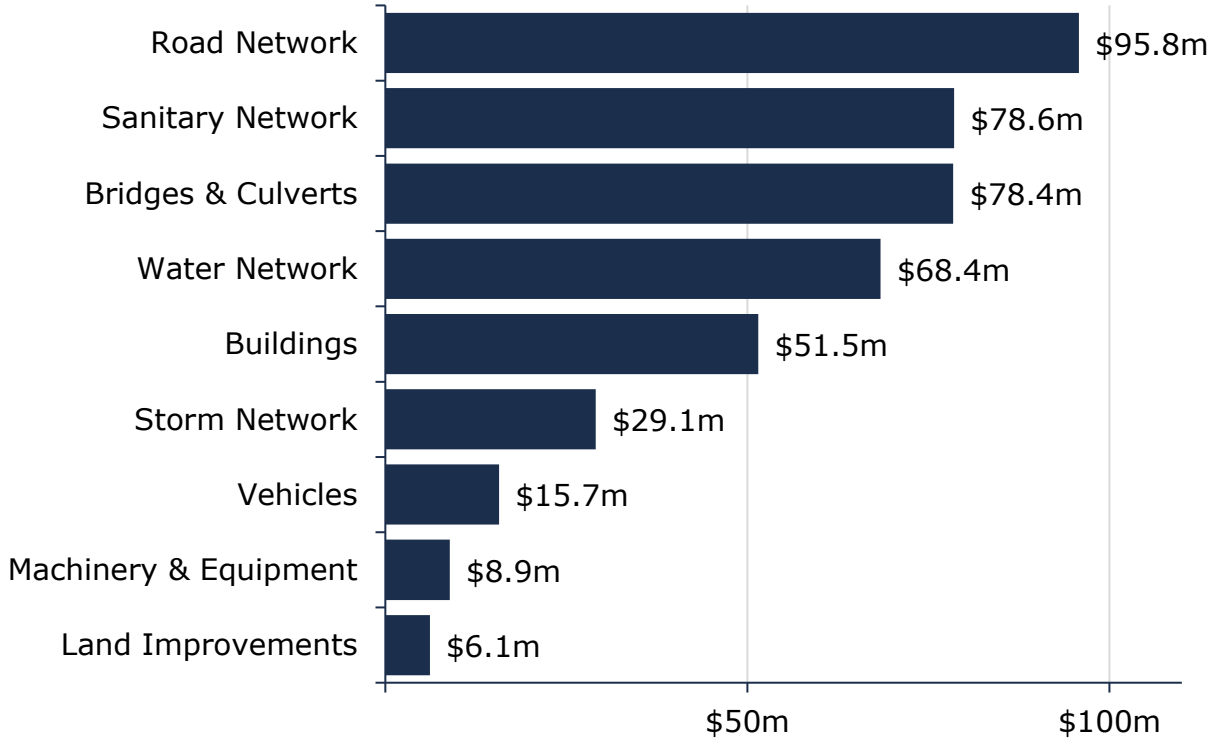


Figure 13: Current Replacement Cost by Asset Category

3.2.2. Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township is recommended to be allocating approximately $13.8 million annually, for a target reinvestment rate of 3.2%. Actual annual spending on infrastructure totals approximately $4.1 million, for an actual reinvestment rate of 1.0%.

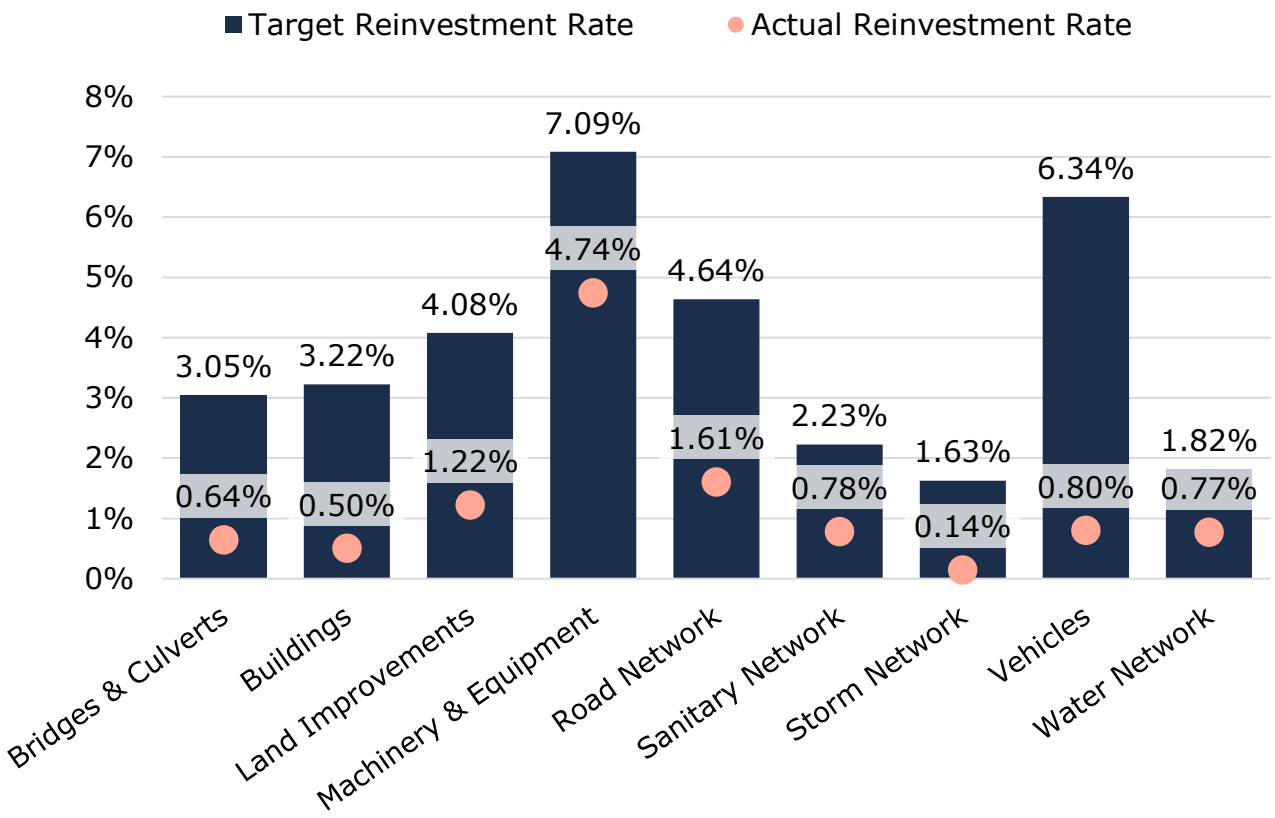


Figure 14: Target vs Actual Reinvestment Rates

3.2.3. Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 75% of assets in Essa are in fair or better condition. This estimate relies on both age-based and field condition data.

Assessed condition data is available for the road network, bridges and culverts and a portion of the land improvements, machinery & equipment, vehicles and sanitary network categories; 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.

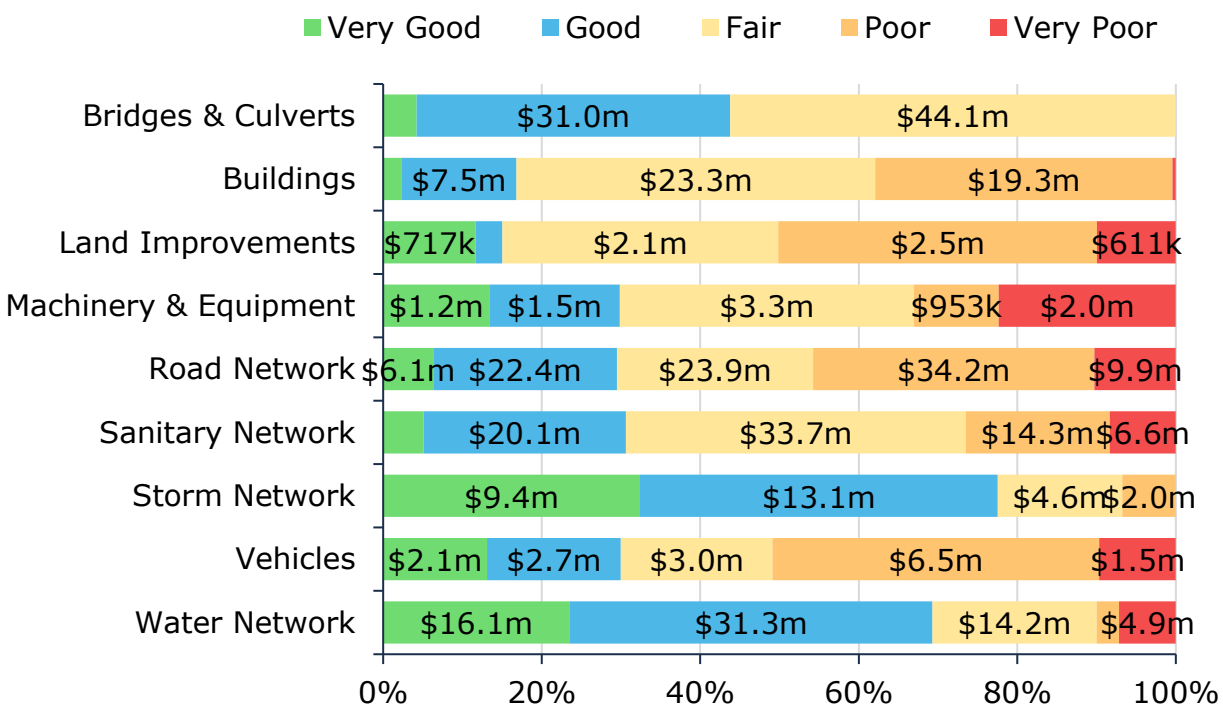


Figure 15: Asset Condition by Asset Category

Source of Condition Data

This AMP relies on assessed condition for 53% of assets, based on and weighted by replacement cost. For the remaining assets, 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(s)	% of Assets with Assessed Conditions	Source of Condition Data
Road Network	Culverts	80%	Township Staff
	Ditches	95%	
	Paved Roads	100%	Roads Needs Study (2020)
	Unpaved Roads	100%	
Bridges & Culverts	All	98%	Planmac Engineering Inc. (2024)
Buildings	All	94%	

Land Improvements	Athletic Fields & Courts	51%	Township Staff
	Parking Lots	100%	
	Parks Equipment	52%	
	Playgrounds & Splash Pads	62%	
Machinery & Equipment	Library Equipment	<1%	Township Staff
	Parks & Recreation Equipment	14%	
	Public Works Equipment	3%	
Vehicles	General Government Vehicles	100%	Township Staff
	Parks & Recreation Vehicles	6%	
	Protection Vehicles	30%	
	Public Works Vehicles	87%	
Sanitary Network	Sanitary Mains	23%	Wessuc Inc. (2024)

Figure 16: Source of Condition Data

3.2.4. Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 22% of the Township's assets will require replacement within the next 10 years. Refer to Appendix B – 10-Year Capital Requirements.

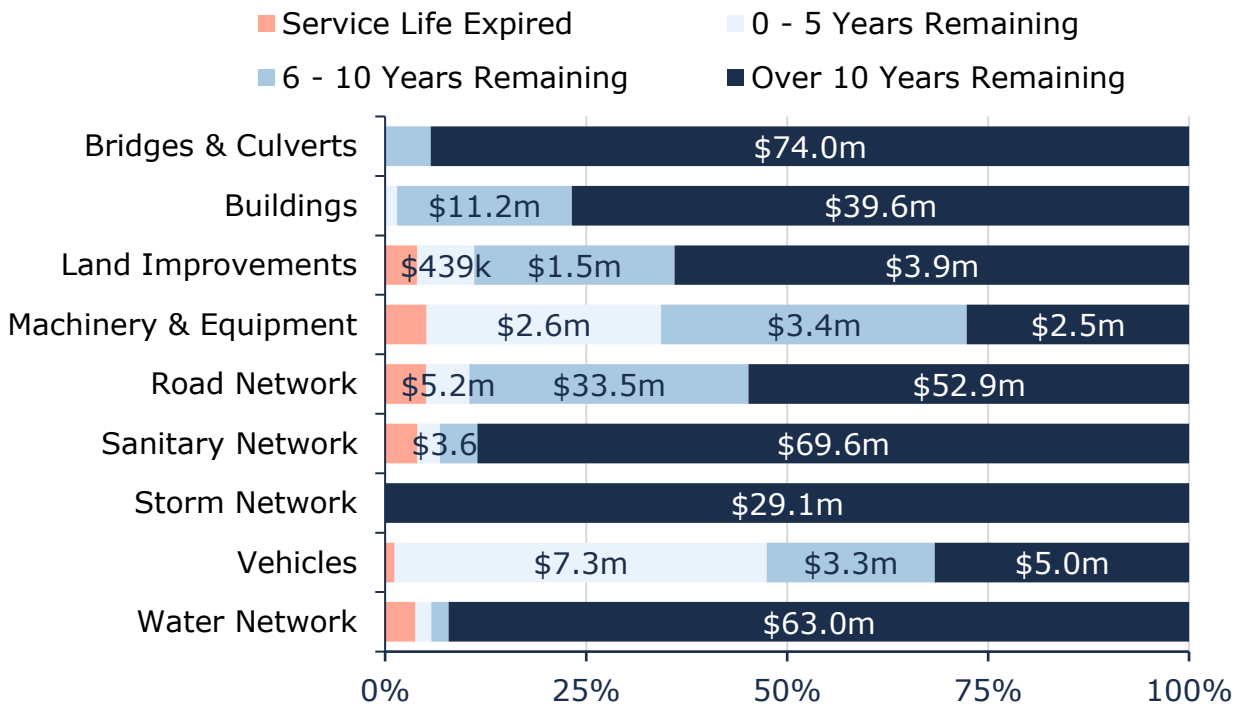


Figure 17: Service Life Remaining by Asset Category

3.2.5. Risk Matrix

Using the risk equation and preliminary risk models, the overall asset risk breakdown for Essa's asset inventory is portrayed in the figure below.

1 - 4 **Very Low** $123,510,365 (29%)	5 - 7 **Low** $77,014,669 (18%)	8 - 9 **Moderate** $98,333,338 (23%)	10 - 14 **High** $87,919,469 (20%)	15 - 25 **Very High** $46,467,830 (11%)

Figure 18: Risk Matrix - All Assets

Reviewing the list of very high-risk assets to evaluate how best to mitigate the level of risk the Township is experiencing will help advance Essa's asset management program.

3.2.6. Forecasted Capital Requirements

Aging assets require maintenance, rehabilitation, and replacement. The table below illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for all asset categories analyzed in this AMP over a 50-year time horizon. On average, $13.8 million is required each year to remain current with capital replacement needs for the Township's asset portfolio (red dotted line). Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise. This figure relies on age and available condition data.

The chart also illustrates a backlog of $11.5 million, comprising assets that remain in service beyond their estimated useful life. It is unlikely that all such assets are in a state of disrepair, requiring immediate replacements. This makes continued and expanded targeted and consistent condition assessments integral. Risk frameworks, proactive lifecycle strategies, and levels of service targets can then be used to prioritize projects, continuously refine estimates for both backlogs and ongoing capital needs and help select the right treatment for each asset. In addition, more effective componentization of buildings will improve these projections, including backlog estimates.

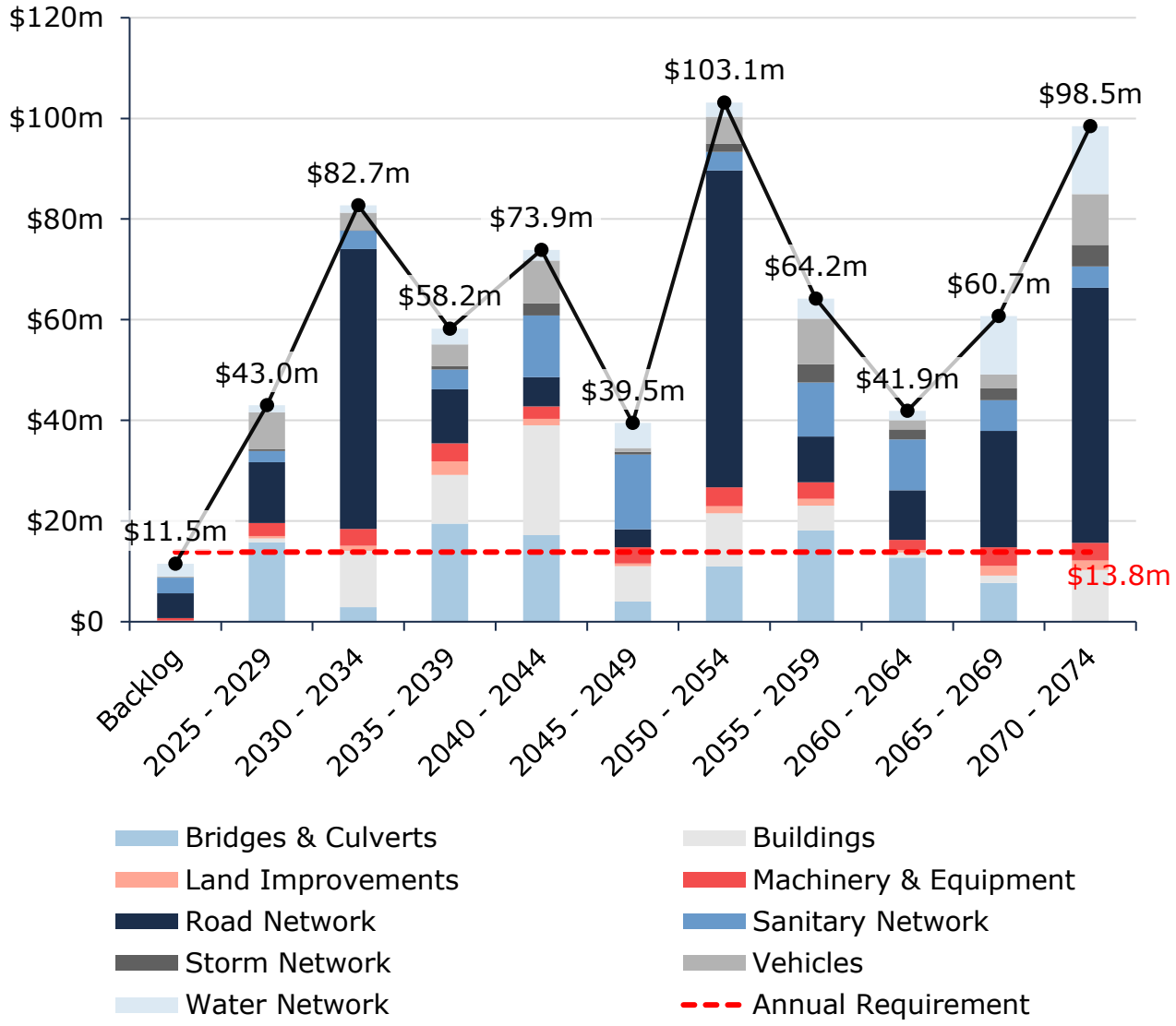


Figure 19: Forecasted Capital Requirements by Asset Category

Proposed Levels of Service

4. Proposed Levels of Service

4.1. Scope

4.1.1. Ontario Regulation 588/17 Proposed Levels of Service

The 2025 deadline requires that proposed Levels of Service (LOS) are demonstrated to be appropriate based on an assessment of:

1. Proposed LOS options and the risks associated with these options (i.e., asset reliability, safety, affordability) when considering the long-term sustainability of the municipality.
2. How proposed LOS may differ from current LOS.
3. Whether proposed LOS are achievable.
4. The municipality's ability to afford proposed LOS.

Additionally, a lifecycle management and financial strategy to support these LOS must be identified, covering a 10-year period and including:

1. Identification of lifecycle activities needed to provide the proposed LOS with consideration for:
    - Full lifecycle of assets.
    - Lifecycle activities options available to meet proposed LOS.
    - Risks associated with the options identified in sub-paragraph B, above.
    - Identification of which lifecycle activities identified in sub-paragraph B carry the lowest cost.
2. An estimate of the annual cost of meeting proposed LOS for a period of 10 years, separated by capital and operating expense.

4.1.2. Methodology

Target levels of service for the Township have been developed through comprehensive engagement with Township staff and referencing resident satisfaction surveys. To achieve a target level of service goal, careful consideration of the following should be considered.

Financial Impact Assessment

- Assess historical expenditures/budget patterns to gauge feasibility of increasing budgets to achieve LOS targets
- Consider implications of LOS adjustments on other services, and other infrastructure programs (trade-offs)

Infrastructure Condition Assessment

- Regularly assess the condition of critical infrastructure components.
- Use standardized condition indices or metrics to quantify the state of infrastructure.

- Identify non-critical components where maintenance can be deferred without causing severe degradation.
- Adjust condition indices or metrics to reflect the reduced maintenance budget.

Service Metrics

- Measure user satisfaction, response times, and other relevant indicators for the specific service.

Service Impact Assessment

- Evaluate potential impacts on user satisfaction and service delivery due to decreased infrastructure condition.

Risk Management

- Identify potential risks to infrastructure and service quality.
- Develop contingency plans to address unforeseen challenges without compromising service quality.
- Monitor performance closely to ensure that the target investment translates into achieving the desired infrastructure condition.

Service Improvement Metrics

- Analyze the performance of target levels of service regularly and incorporate more ambitious targets based on user satisfaction if required.

Timelines

- Although O. Reg requires identification of expenditures for a 10-year period in pursuit of LOS targets, it does not require municipalities to identify the timeframe to achieve them.
- Careful consideration should be given to setting realistic targets for when LOS targets are to be achieved.

4.1.3. General Considerations for All Scenarios

- **Stakeholder Engagement:**
  - Regularly engage with stakeholders to gather feedback and communicate changes transparently.
- **Data-Driven Decision Making:**
  - Use data analytics to inform decision-making processes and identify areas for improvement.
- **Flexibility and Adaptability:**
  - Design the methodology to be flexible, allowing for adjustments based on evolving conditions and priorities.
- **Continuous Improvement:**
  - Establish a process for continuous review and improvement of the LOS methodology itself.

4.2. Community Engagement Survey

As part of the development of the Asset Management Plan, the Township of Essa conducted a community engagement survey to gather feedback on current service levels. Community input has been crucial in ensuring that the proposed Levels of Service align with both community expectations and municipal goals. The results of the survey indicate that most respondents feel municipal services generally meet expectations, with some areas identified for potential improvement.

The survey revealed that most respondents (66.3%) were from the urban center of Angus. Key concerns included infrastructure costs, with 49.5% open to making trade-offs to keep costs down, 31.3% willing to pay more for better services, and 12.1% not willing to pay more at all. These findings highlight a preference for balancing service quality with manageable tax increases.

In terms of specific infrastructure services, roads (48.7% satisfied), water and sanitary services (48.9% satisfied), and bridges (58.0% satisfied) were the top priorities for residents. Satisfaction with parks and trails was also relatively high, with 47.7% of respondents expressing satisfaction, while recreational facilities and community centers had a lower satisfaction rate of 38.5%. Stormwater drainage was identified as an area for improvement, with only 50% of respondents satisfied with the service. The survey also highlighted that managing infrastructure costs, preserving the community's character, supporting local businesses, and protecting the environment are key concerns for residents.

The community engagement survey has provided valuable insights into public satisfaction with municipal services, highlighting areas of strength and opportunities for improvement. The feedback highlights a strong preference for balancing service levels with moderate tax rates, as most respondents prioritized cost management while still valuing essential infrastructure investments. While limiting tax increases is important, strategic investments may still be necessary to support key community priorities, such as environmental protection, economic growth, and infrastructure maintenance. These insights will help shape the Asset Management Plan, ensuring future decisions align with both financial sustainability and community needs.

4.3. Proposed Levels of Service Scenarios

The following three scenarios have been considered for establishing target levels of service for all asset categories included in this Asset Management Plan.

While all three scenarios were reviewed, the Township of Essa selected Scenario 2 for tax-funded assets, and Scenario 1 for rate-funded assets as their preferred path forward regarding proposed levels of service, which is reflected in the financial strategy and 10-year capital replacement forecasts.

Scenario 1: Achieving Full Funding in 15 Years

Approach: This scenario assumes a phased annual tax increase of approximately 3.4%, 2.2% for water rates, and 2.3% for wastewater rates, achieving full funding in 15 years.

Scenario 2: Achieving 75% Funding in 15 Years

Approach: This scenario assumes a phased annual tax increase of approximately 2.4%, 1.1% for water rates, and 1.2% for wastewater rates, reaching 75% funding within 15 years.

Scenario 3: Achieving 50% Funding in 15 Years

Approach: This scenario assumes a phased annual tax increase of approximately 1.2%, 0.1% for water rates, and no increase to wastewater rates, reaching 50% funding within 15 years.

This methodology provides a structured approach for managing infrastructure conditions and levels of service under different budget scenarios, emphasizing adaptability and stakeholder communication.

Through a comprehensive assessment, the following levels of service for 9 asset categories have been developed, aligning with the long-term interests of the Township. Achievability is the key consideration, with measures in place to ensure realistic targets. The Township's financial capacity was thoroughly reviewed, confirming its ability to sustain the proposed service levels. Complementing this, a detailed lifecycle management and financial strategy was developed, delineating necessary activities for each asset category. This strategy outlines the full lifecycle of assets, presents viable options for lifecycle activities, evaluates associated risks, and prioritizes cost-effective measures to maintain the proposed service standards.

These funding strategies reflect the Township's consideration of long-term service levels, financial capacity, and the risks of underinvestment, as outlined in Section 6.2 of Ontario Regulation 588/17.

4.4. Scenario 1: Achieving Full Funding in 15 Years

This scenario outlines a phased funding approach, with an annual tax increase of approximately 3.4%, along with 2.2% increases in water rates and 2.3% increases in sanitary rates, aiming to achieve full funding within 15 years. The approach focuses on ensuring the Township can fully fund its infrastructure needs over a set period. The following analysis considers the affordability, achievability, and associated risks of this scenario, evaluating how the proposed funding strategy aligns with both community expectations and long-term infrastructure sustainability.

4.4.1. Lifecycle Changes Required

Increasing capital investment to achieve full funding would significantly improve the Township's ability to manage its infrastructure assets, extending asset lifecycles and reducing the need for major repairs. For all asset categories, more funding would allow for proactive maintenance, timely upgrades, and earlier replacements, preventing costly emergencies. This level of investment would significantly improve the Township's ability to achieve full regulatory compliance, addressing all infrastructure needs and maximizing water and wastewater infrastructure reliability. Increasing funding could also contribute to reducing loading restrictions on bridges to ensure that transportation networks remain fully accessible and functional. Additionally, one of Council's key goals is to pave all roads in the Township. With full funding, this goal could be achieved sooner, improving road safety and the overall transportation network. These improvements would support the Township's goal of enhancing infrastructure reliability and service delivery over the long term.

4.4.2. Sustainability and Feasibility of Proposed Service Levels

Of the three scenarios analyzed, Scenario 1 requires the highest tax increase. Reaching full funding immediately would require an increase of 64.9% in tax revenue. This is not reasonable or realistic to achieve in a short period of time. With the recommended implementation timeframe of 15 years, tax revenue would be increased gradually from $12.1 million to $20 million, water revenue from $1.9 million to $2.6 million, and wastewater revenue from $2.0 million to $2.8 million.

Based on these gradual proposed increases, while maintaining existing sustainable grant funding, the available capital funding over the next 10 years for Scenario 1 is indicated in the table below:

Source	Available Capital Funding									
	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Tax Revenue	$5.0m	$5.4m	$5.9m	$6.3m	$6.8m	$7.3m	$7.9m	$8.5m	$9.0m	$9.6m

Water Rates	$654k	$693k	$734k	$775k	$817k	$860k	$904k	$949k	$995k	$1.0m
Waste-water Rates	$572k	$619k	$666k	$714k	$763k	$814k	$1.2m	$1.3m	$1.3m	$1.4m

Table 5: Scenario 1 Available Capital Funding Over Next 10 Years

The above table accounts for both current and future expenditures in order to achieve and maintain the service level option. This requires a combination of capital spending and saving (i.e. reserves) to ensure future large expenditures can be financed.

4.4.3. Risk Analysis

Evaluating the risks associated with each service level option is essential for balancing infrastructure needs, financial sustainability, and community expectations. By identifying and assessing these risks, the Township can make informed decisions that support long-term service reliability.

Scenario 1 Risks

- Delayed Improvement: The Township will not see significant improvements in asset conditions or service levels until full funding is reached after 15 years. However, gradual improvements will be made over time as funding increases.
- Infrastructure Backlog: Without immediate funding, there is a risk that the existing infrastructure backlog could continue to grow, potentially leading to higher long-term costs and service disruptions.
- Resource Constraints: Implementing and maintaining this service level option may stretch the Township's operational capacity, particularly if there are limited resources or capacity to handle the expanded scope of work over the long term.
- Taxation Increase: While these increases are technically achievable, there’s a possibility that residents may not fully support sustained increases over the long term, especially given the preference for moderate tax rates and the general satisfaction with current services.

4.5. Scenario 2: Achieving 75% Funding in 15 Years

This scenario outlines a phased funding approach, with an annual tax increase of approximately 2.4%, along with 1.1% increases in water rates and 1.2% increases in sanitary rates, aiming to achieve 75% funding within 15 years. This approach represents a more moderate level of funding while still addressing infrastructure needs. The following analysis considers the affordability, achievability, and associated risks of this scenario, evaluating how the proposed funding strategy aligns with both community expectations and long-term infrastructure sustainability.

4.5.1. Lifecycle Changes Required

Increasing capital investment to achieve 75% funding would improve the Township's ability to manage infrastructure, extending asset lifecycles and reducing the need for major repairs. For all asset categories, more funding would enable proactive maintenance, timely upgrades, and early replacements. This scenario would contribute to gradual improvements in infrastructure conditions and help reduce the existing backlog. With this level of investment, the Township would maintain strong regulatory compliance and minimize risks to water and wastewater service. Additionally, one of Council's key goals is to pave all roads in the Township. With 75% funding, this goal could be achieved at a more gradual pace, but it would still significantly improve road safety and the overall transportation network over time. Increased funding could also support reducing loading restrictions on bridges, helping ensure transportation networks remain accessible and functional. These improvements would support the Township's goal of enhancing infrastructure reliability and service delivery over the long term.

4.5.2. Sustainability and Feasibility of Proposed Service Levels

Of the three scenarios analyzed, Scenario 2 requires a moderate tax increase. Reaching 75% of full funding immediately would require an increase of 42.5% in tax revenue. This is not reasonable or realistic to achieve in a short period of time. With the recommended implementation timeframe of 15 years, tax revenue would be increased gradually from $12.1 million to $17.3 million, water revenue from $1.9 million to $2.3 million, and wastewater revenue from $2.0 million to $2.3 million.

Based on these gradual proposed increases, while maintaining existing sustainable grant funding, the available capital funding over the next 10 years for Scenario 2 is indicated in the table below:

Source	Available Capital Funding									
	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Tax Revenue	$4.9m	$5.2m	$5.5m	$5.8m	$6.1m	$6.5m	$6.9m	$7.3m	$7.6m	$8.0m

Water Rates	$636k	$658k	$680k	$702k	$724k	$747k	$770k	$793k	$816k	$840k
Waste-water Rates	$551k	$575k	$599k	$623k	$648k	$673k	$1.0m	$1.1m	$1.1m	$1.1m

Table 6: Scenario 2 Available Capital Funding Over Next 10 Years

The above table accounts for both current and future expenditures in order to achieve and maintain the service level option. This requires a combination of capital spending and saving (i.e. reserves) to ensure future large expenditures can be financed.

4.5.3. Risk Analysis

Evaluating the risks associated with each service level option is essential for balancing infrastructure needs, financial sustainability, and community expectations. By identifying and assessing these risks, the Township can make informed decisions that support long-term service reliability.

Scenario 2 Risks

- Delayed Improvement: The Township will not see significant improvements in asset conditions or service levels until 75% funding is reached after 15 years. While some improvements will occur, they may not be as rapid as those seen with a higher funding approach.
- Infrastructure Backlog: This scenario would help address the infrastructure backlog but may still leave some backlog unresolved. The growing demand for infrastructure, particularly aging assets, poses a risk that may lead to higher long-term costs and operational challenges.
- Resource Constraints: Implementing and maintaining this service level option may stretch the Township's operational capacity, particularly if there are limited resources or capacity to handle the expanded scope of work over the long term.
- Reserve Funding: The Township may need to draw on its Asset Management Reserve for unforeseen infrastructure needs, which could deplete the reserve over time. Continued reliance on the reserve may limit the ability to address future infrastructure challenges and achieve long-term asset management goals.

4.6. Scenario 3: Achieving 50% Funding in 15 Years

This scenario involves a phased tax increase of approximately 1.2% annually, along with 0.1% increases in water rates and no increase in sanitary rates, aiming to achieve 50% funding within 15 years. The goal of this scenario is to provide a lower tax burden while making incremental progress toward meeting the Township's infrastructure funding needs. The following analysis considers the affordability, achievability, and associated risks of this scenario, evaluating how the proposed funding strategy aligns with both community expectations and long-term infrastructure sustainability.

4.6.1. Lifecycle Changes Required

Increasing capital investment to achieve 50% funding would lead to gradual improvements in managing infrastructure assets. This level of investment would support some proactive maintenance and early replacements but may not fully address aging infrastructure or reduce the backlog as effectively. The Township would maintain basic regulatory compliance but may face challenges in fully addressing infrastructure needs, potentially affecting the consistency of water and wastewater service delivery. While asset lifecycles would extend, repairs and replacements may remain suboptimal and reducing loading restrictions on bridges may take longer to accomplish. Additionally, one of Council's key goals is to pave all roads in the Township. With 50% funding, this goal would be achievable, but progress would be slower, potentially extending the timeline for improving road safety and the overall transportation network. Overall, this scenario would maintain infrastructure reliability, but service delivery improvements would be less significant.

4.6.2. Sustainability and Feasibility of Proposed Service Levels

Scenario 3 requires a conservative tax increase, requiring the lowest increase of the three scenarios analyzed. Reaching 50% of full funding immediately would require an increase of 20.2% in tax revenue. This is not reasonable or realistic to achieve in a short period of time. With the recommended implementation timeframe of 15 years, tax revenue would be increased gradually from $12.1 million to $14.5 million, water revenue from $1.9 million to $2.0 million, and wastewater revenue would remain stable at its current level.

Based on these gradual proposed increases, while maintaining existing sustainable grant funding, the available capital funding over the next 10 years for Scenario 3 is indicated in the table below:

Source	Available Capital Funding									
	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Tax Revenue	$4.7m	$4.9m	$5.0m	$5.2m	$5.3m	$5.5m	$5.8m	$6.0m	$6.1m	$6.3m

Water Rates	$617k	$619k	$621k	$622k	$624k	$626k	$628k	$630k	$632k	$634k
Waste-water Rates	$527k	$527k	$527k	$527k	$527k	$527k	$874k	$874k	$874k	$874k

Table 7: Scenario 3 Available Capital Funding Over Next 10 Years

The above table accounts for both current and future expenditures in order to achieve and maintain the proposed levels of service. This requires a combination of capital spending and saving (i.e. reserves) to ensure future large expenditures can be financed.

4.6.3. Risk Analysis

Evaluating the risks associated with each service level option is essential for balancing infrastructure needs, financial sustainability, and community expectations. By identifying and assessing these risks, the Township can make informed decisions that support long-term service reliability.

Scenario 3 Risks

- Slow Improvement: While this investment level will address some maintenance needs, progress may be limited, leading to ongoing challenges in infrastructure management.
- Infrastructure Backlog: This investment level will likely leave a considerable backlog in infrastructure repairs and replacements. While it helps maintain some asset lifecycles, the backlog may continue to grow, leading to increased risks of service disruptions and higher costs over time.
- Taxation Increase: While the annual increases are the most manageable, it may not provide enough funding to meet future service demands. This scenario may be more acceptable in the short term, but could become unsustainable in the long run if infrastructure needs continue to rise.
- Reserve Funding: The Township may need to draw on its Asset Management Reserve for unforeseen infrastructure needs, which could deplete the reserve over time. Continued reliance on the reserve may limit the ability to address future infrastructure challenges and achieve long-term asset management goals.

4.7. Proposed Levels of Service Analysis

4.7.1. Tax-Funded Assets

Scenario 2 was selected by the Township for tax-funded assets as it offers a practical, phased approach to improving asset management while respecting the community's financial capacity. Although it does not fully close the infrastructure funding gap, this scenario allows the Township to gradually increase reinvestment levels in a way that balances affordability with long-term sustainability. This approach supports strategic decision-making, addresses high-priority needs, and helps minimize financial strain on residents.

This strategy prioritizes informed decision-making and targets high-need areas, helping to manage risks without placing undue pressure on taxpayers. Key components of this approach include ongoing contributions to the Asset Management Reserve, which will serve as a critical tool in bridging funding shortfalls and supporting long-term infrastructure planning. In addition, the Township will make strategic use of one-time or non-sustainable revenue sources such as grants, surpluses, and reserves, to supplement capital funding and address priority projects.

While this measured strategy may result in some delays to infrastructure improvements and a continued backlog in the near term, it reflects a commitment to maintaining service levels and ensuring the reliability of essential assets. By focusing on targeted reinvestment, proactive maintenance, and financial responsibility, the Township is laying the foundation for more resilient infrastructure and sustainable growth.

4.7.2. Rate-Funded Assets

For rate-funded assets, the Township has selected Scenario 1, which achieves full funding in 15 years. This proactive approach reflects a strong commitment to financial sustainability and ensures that the full cost of maintaining and replacing rate-supported infrastructure is accounted for in long-term planning.

By fully funding these assets, the Township is able to minimize infrastructure backlogs and ensure that systems remain safe, reliable, and compliant with regulatory standards.

To support this strategy, the Township will continue to monitor and adjust rate structures as needed to reflect changing costs, service demands, and infrastructure needs. Ongoing reinvestment will be guided by lifecycle costing and asset condition data, allowing the Township to prioritize repairs, upgrades, and replacements in a timely and cost-effective manner.

This fully funded approach positions the Township to deliver consistent levels of service, protect public health and the environment, and maintain critical infrastructure well into the future. It also enhances the Township's resilience by reducing long-term financial risks and supporting stable, predictable service delivery for residents and businesses alike.

Categorical Analysis

5. Road Network

5.1. State of the Infrastructure

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

The state of the infrastructure for the road network is summarized below.

Replacement Cost	Condition	Financial Capacity	
$95,790,390	47% (Fair)	Annual Requirement:	$4,441,006
		Funding Available:	$1,538,155
		Annual Deficit:	$2,902,852

5.2. Inventory & Valuation

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

Segment	Quantity	Primary Replacement Cost Method	Replacement Cost
Culverts	107 Assets	User-Defined	$2,805,060
Ditches	215 km	CPI	$33,833,680
Paved Roads	206 km	CPI	$36,999,994
Road	47 km	CPI	$6,185,893
Sidewalks	43 km	CPI	$7,383,704
Slope Stabilization	3 km	CPI	$467,584
Streetlights	1,572 Assets	CPI	$7,316,707
Traffic Signals	2 Assets	CPI	$797,768
Unpaved Roads	9 km	Not Planned for Replacement	
Total			**$95,790,390**

The figure below displays the replacement cost of each asset segment in the Township's road inventory.

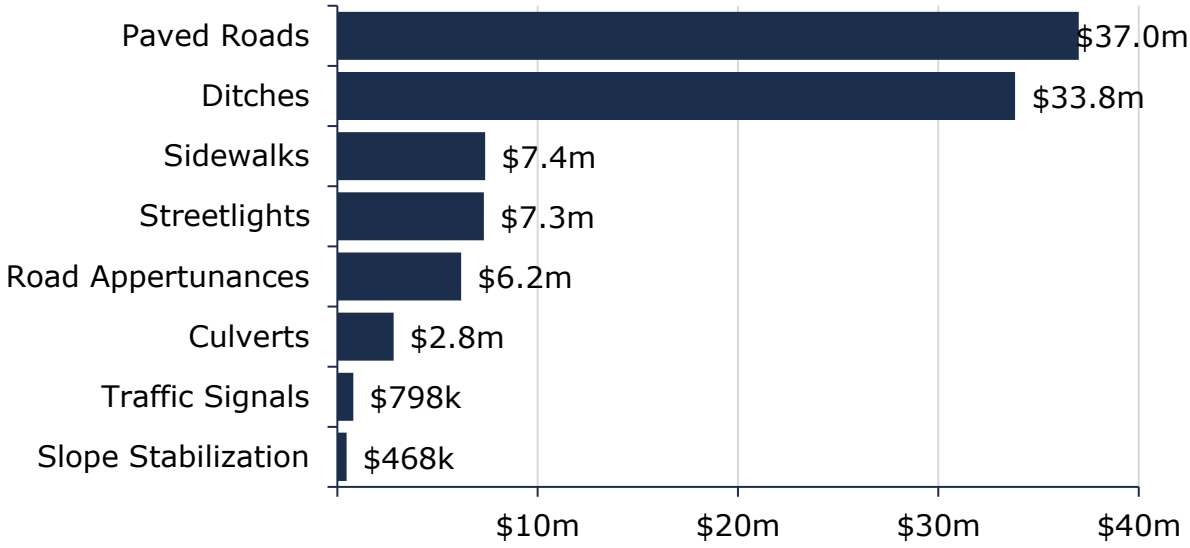


Figure 20: Road Network Replacement Value

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

5.3. Asset Condition & Age

The graph below identifies the average age, and the estimated useful life for each asset segment[2]. It is all weighted by replacement cost.

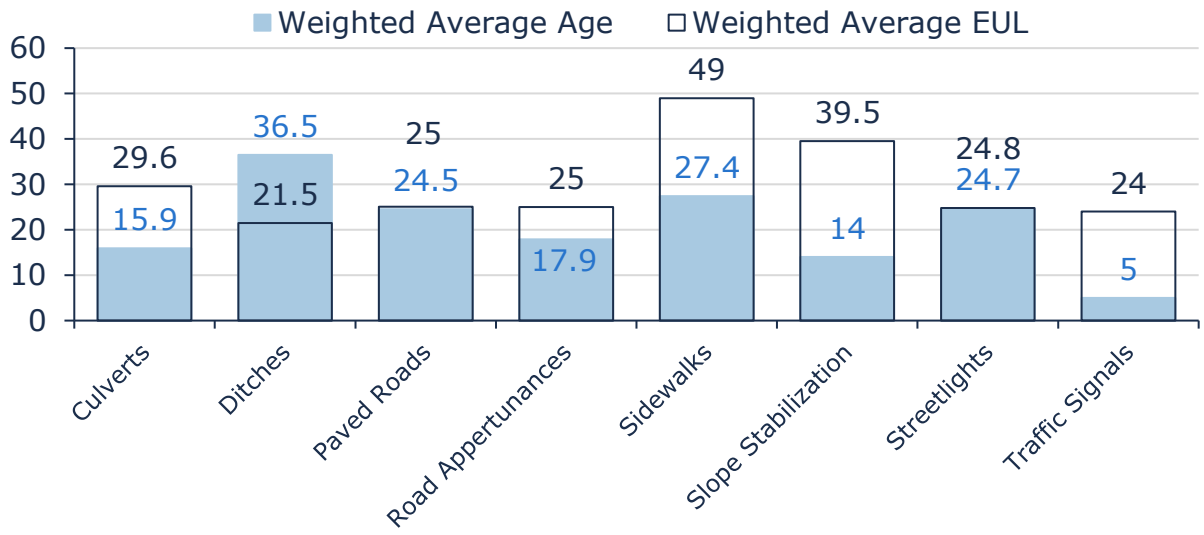


Figure 21: Road Network Average Age vs Average EUL

[2] Gravel roads undergo perpetual operating and maintenance activities. If maintained properly, they can theoretically have a limitless service life.

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

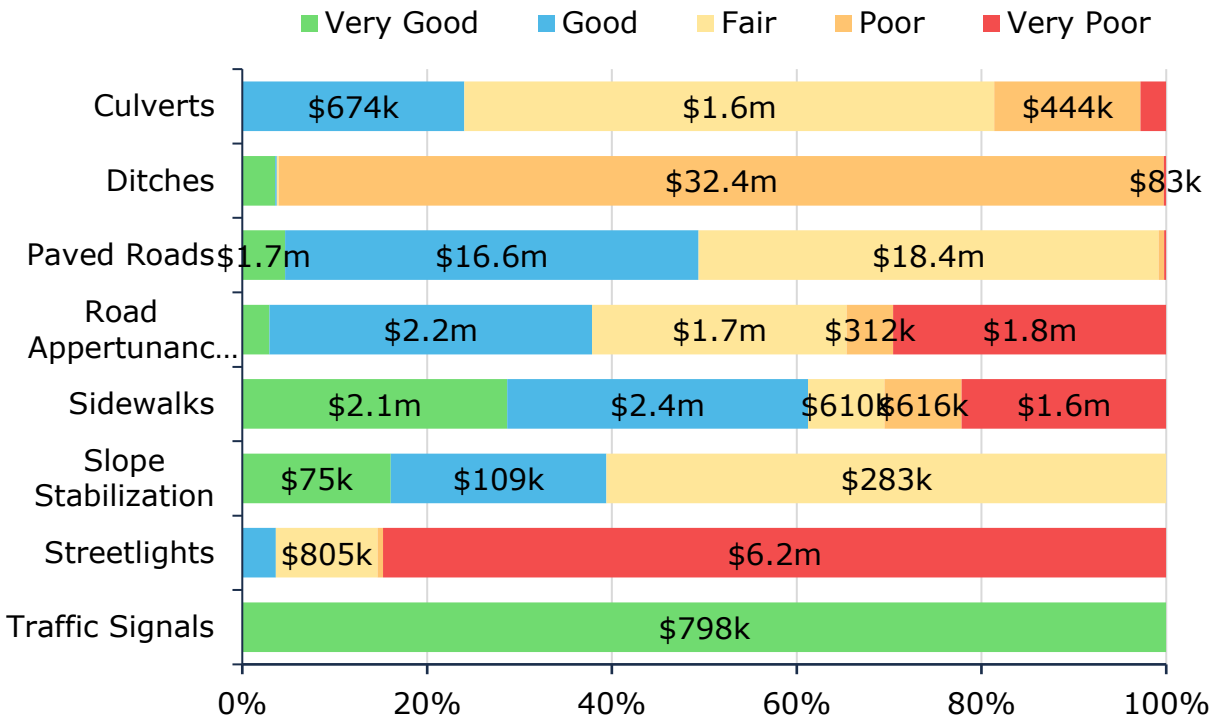


Figure 22: Road Network Condition Breakdown

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

5.3.1. Current Approach to Condition Assessment

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

- A road needs study is completed every 5-7 years for the paved and unpaved roads in the Township. Between studies, staff assess and update road conditions during road patrols.
- Annual inspections of the sidewalks are performed by staff based on Minimum Maintenance Standards requirements.
- Road appurtenances are inspected on an as-needed basis by staff.

5.4. Lifecycle Management Strategy

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

The following lifecycle strategies shown in the Figures below have been developed as a proactive approach to managing the lifecycle of municipally owned roads. Instead of allowing the roads to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of roads at a lower total cost.

HCB Roads		
Event Name	**Event Class**	**Event Trigger**
Crack Sealing	Preventative Maintenance	50 to 70 Condition
Mill & Pave	Rehabilitation	40 Condition
Asset Replacement	Replacement	20 Condition

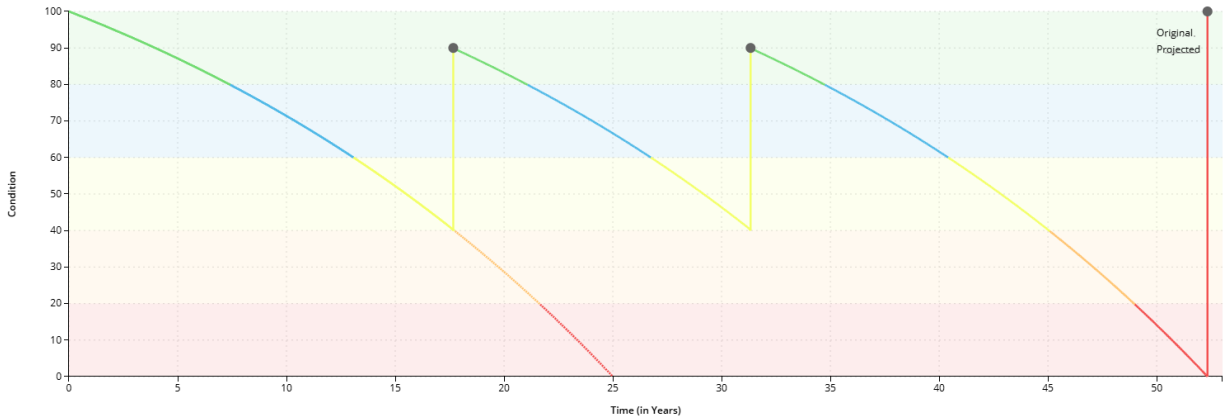


Figure 23: HCB Road Strategy

LCB Roads		
Event Description	**Event Class**	**Event Trigger**
Slurry Seal	Preventative Maintenance	50 to 70 Condition
Double Surface Treatment	Rehabilitation	50 Condition
Asset Replacement	Replacement	20 Condition

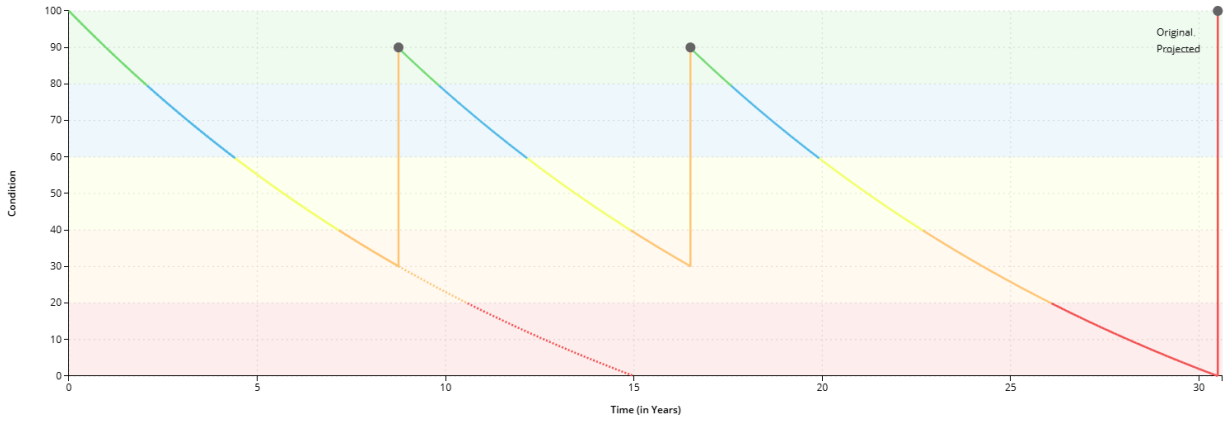


Figure 24: LCB Roads Strategy

5.5. Forecasted Capital Requirements

The Figure below illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's Road Network. This analysis was run until 2079 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Township's primary asset management system and asset register. The Township's average annual requirements (red dotted line) total $4.4 million for all assets in the road network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates substantial capital needs through the forecast period. It also shows a backlog $4.9 million. These projections are based on asset replacement costs, age analysis, and condition data when available, as well as lifecycle modeling (roads only). They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

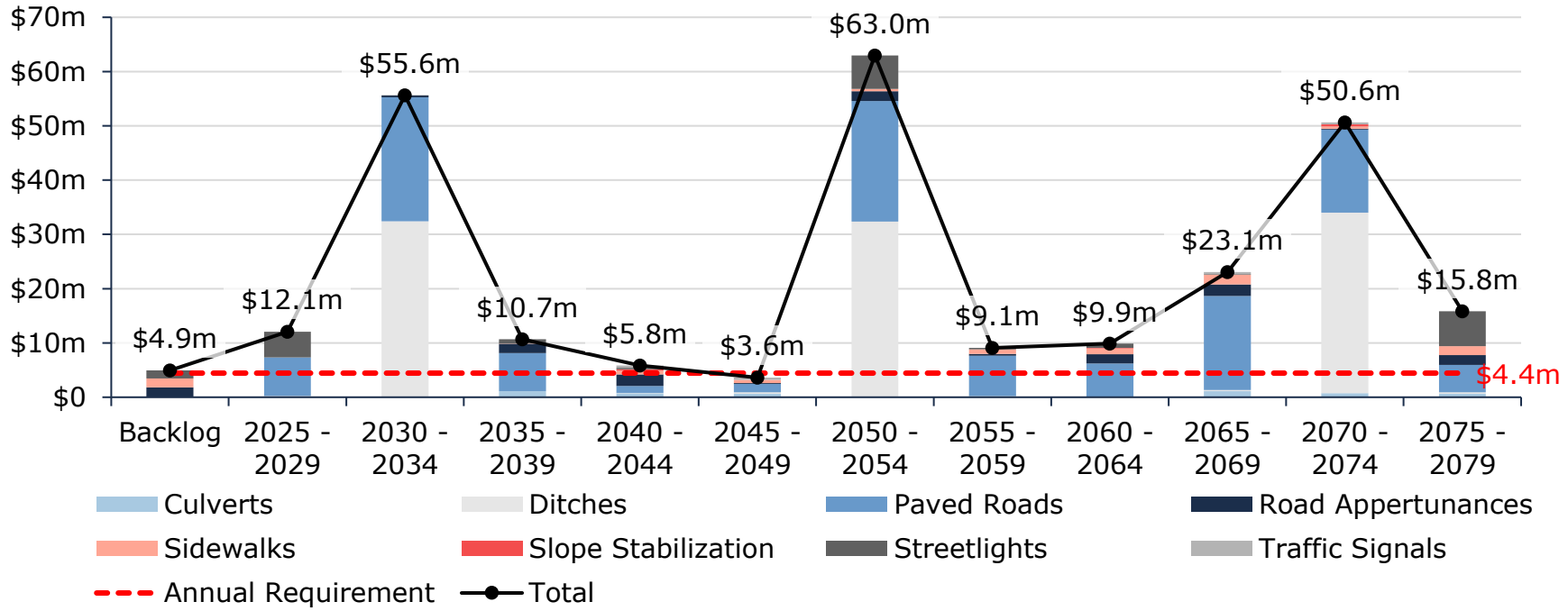


Figure 25: Road Network Forecasted Capital Replacement Requirements

The Table below summarizes the projected cost of lifecycle activities (rehabilitation and replacement) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register. These projections can be different from actual capital forecasts. Consistent data updates, especially condition, will improve the alignment between the system-generated expenditure requirements, and the Township's capital expenditure forecasts.

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Culverts	-	-	-	-	-	$71k	-	-	$17k	$21k
Ditches	-	-	$83k	-	$135k	-	$32.3m	-	-	-
Paved Roads	-	$669k	$1.9m	$627k	$4.0m	$7.5m	$6.1m	$4.0m	$2.1m	$3.1m
Road Appurtenances	-	-	-	-	-	-	$225k	$87k	-	-
Sidewalks	-	-	-	-	-	-	-	-	-	-
Slope Stabilization	-	-	-	-	-	-	-	-	-	-
Streetlights	-	$4.6m	-	$24k	$86k	-	-	$25k	$8k	$11k
Traffic Signals	-	-	-	-	-	-	-	-	-	-
Total	**-**	**$5.3m**	**$1.9m**	**$651k**	**$4.2m**	**$7.7m**	**$38.6m**	**$4.1m**	**$2.2m**	**$3.1m**

Table 8: Road Network System-generated 10-Year Capital Costs

5.6. Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix D: Risk Rating Criteria. for the criteria used to determine the risk rating of each asset.

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$35,983,457 (37%)	$15,606,870 (16%)	$23,825,732 (25%)	$10,705,641 (11%)	$10,363,131 (11%)

Figure 26: Road Network Risk Matrix

This is a high-level model developed by Township staff and it should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. 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.

5.6.1. 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 Weather Events

An increase in the frequency and intensity of precipitation events can result in flooding of sections of the road network. Further issues can arise because of flooding and poor drainage including accelerated deterioration caused by freeze/thaw cycles. To improve asset resiliency, Staff should identify problem areas and improve drainage through enhanced lifecycle strategies

5.7. Current Levels of Service

The following tables identify the Township's metrics to identify their current level of service for the Road Network.

5.7.1. Community Levels of Service

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

Values	Qualitative Description	Current LOS (2023)
Cost Efficient	Description, which may include maps, of the road network in the Township and its level of connectivity	See Appendix B.
Sustainable	Description or images that illustrate the different levels of road class pavement condition	Township staff conduct road condition assessments on a regular basis. Every road section received a surface condition rating (1-100). (1-60) Road surface exhibits moderate to significant deterioration and requires renewal or full replacement within 1-5 years (60-100) Road surface is in good condition or has been recently re-surfaced. Renewal or reconstruction is not required for 6 - 10+ years

Table 9: Road Network Community Levels of Service

5.7.2. 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	Curent LOS
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area in the municipality (km/km^2)	0 km/km2
	Lane-km of collector roads (MMS classes 3 and 4) per land area in the municipality (km/km^2)	1.64 km/km2
	Lane-km of local roads (MMS classes 5 and 6) per land area in the municipality (km/km^2)	0.35 km/km2
Quality	Average pavement condition index for paved roads in the municipality	61%
	Average surface condition for unpaved roads in the municipality	Fair
Performance	Current Capital Reinvestment Rate	1.6%

Table 10: Road Network Technical Levels of Service

5.8. Proposed Levels of Service

As per O. Reg. 588/17, by July 1, 2025, municipalities are required to consider proposed levels of service (PLOS), discuss the associated risks and long-term sustainability of these service levels, and explain the municipality's ability to afford the PLOS.

The tables and graphs below explain the proposed levels of service scenarios that were analyzed for the Road Network. Further PLOS analysis at the portfolio level can be found in Proposed Levels of Service Scenarios Section.

5.8.1. PLOS Scenarios Analyzed

Scenario	Description
Scenario 1: Achieving Full Funding in 15 Years	This scenario assumes a phased tax increase of approximately 3.4% annually, reaching full funding within 15 years
Scenario 2: Achieving 75% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 2.4% annually, reaching 75% funding within 15 years
Scenario 3: Achieving 50% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 1.2% annually, reaching 50% funding within 15 years

Table 11: PLOS Scenarios Analyzed

5.8.2. PLOS Analysis Results

The following table compares three funding scenarios, illustrating how varying levels of capital investment impact asset condition, risk, and overall performance over time.

Scenario	Technical LOS Outcomes	Initial Value (2025)	10 Year Projection (2035)	25 Year Projection (2050)	Scenario Average
Scenario 1	Average Condition	60.29%	60.96%	57.86%	59.16%
	Average Asset Risk	9.46	9.68	10.14	9.81
	Average Annual Investment	$4,441,006			
	Capital re-investment rate	4.6%			
Scenario 2	Average Condition	60.29%	58.74%	55.23%	58.01%
	Average Asset Risk	9.46	9.95	10.64	10.06
	Average Annual Investment	$3,330,755			
	Capital re-investment rate	3.5%			
Scenario 3	Average Condition	60.29%	54.60%	51.57%	55.66%
	Average Asset Risk	9.46	10.48	11.39	10.52
	Average Annual Investment	$2,220,503			
	Capital re-investment rate	2.3%			

Table 12: Road Network pLOS Scenario Analysis

The following figure illustrates the projected condition of the asset category under each of the three investment level scenarios, demonstrating how varying reinvestment strategies impact overall asset condition over time.

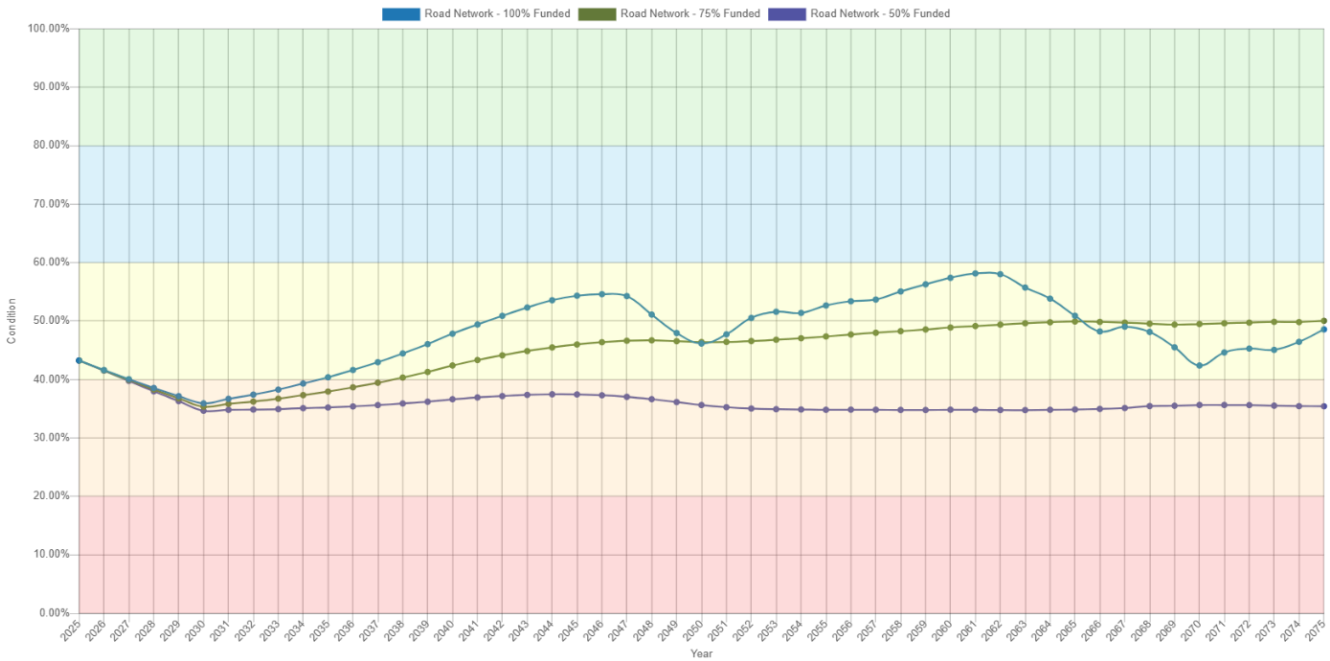


Figure 27: Road Network Scenario Comparison

6. Bridges & Culverts

6.1. State of the Infrastructure

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

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

Replacement Cost	Condition	Financial Capacity	
$78,437,489	62% (Good)	Annual Requirement:	$2,390,363
		Funding Available:	$503,026
		Annual Deficit:	$1,887,337

6.2. Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Bridges	15	Assets	User-Defined	$62,736,077
Structural Culverts	14	Assets	User-Defined	$15,701,412
Total	**29**	**Assets**	**User-Defined**	**$78,437,489**

The figure below displays the replacement cost of each asset segment in the Township's bridges and culverts inventory.

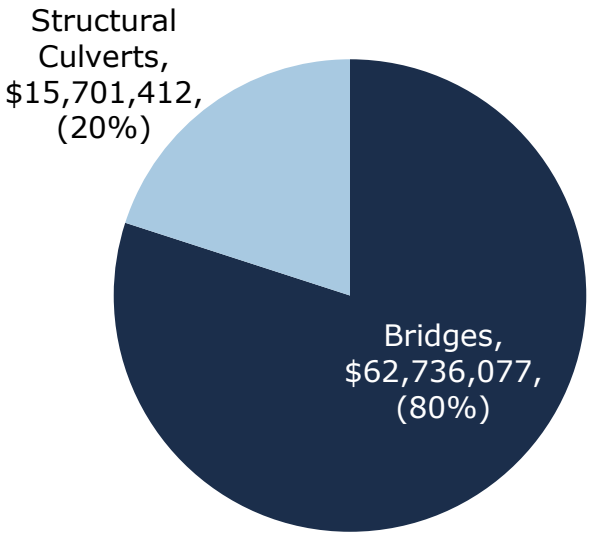


Figure 28: Bridges & Culverts Replacement Cost

Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed. This can be included in the Ontario Structures Inspection Manual (OSIM) inspections as the replacement cost is part of the calculation for the bridge condition index (BCI).

6.3. Asset Condition & Age

The graph below identifies the average age and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

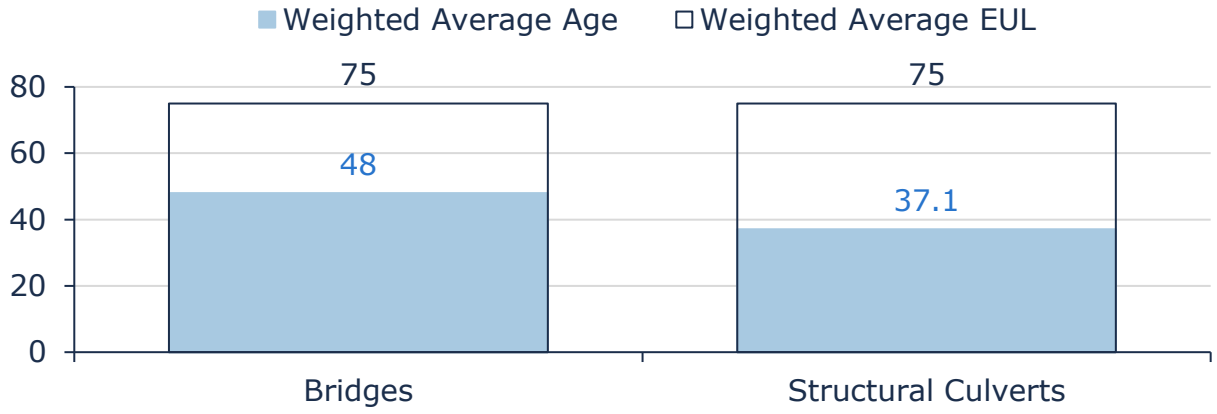


Figure 29: B&C Average Age vs Average EUL

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

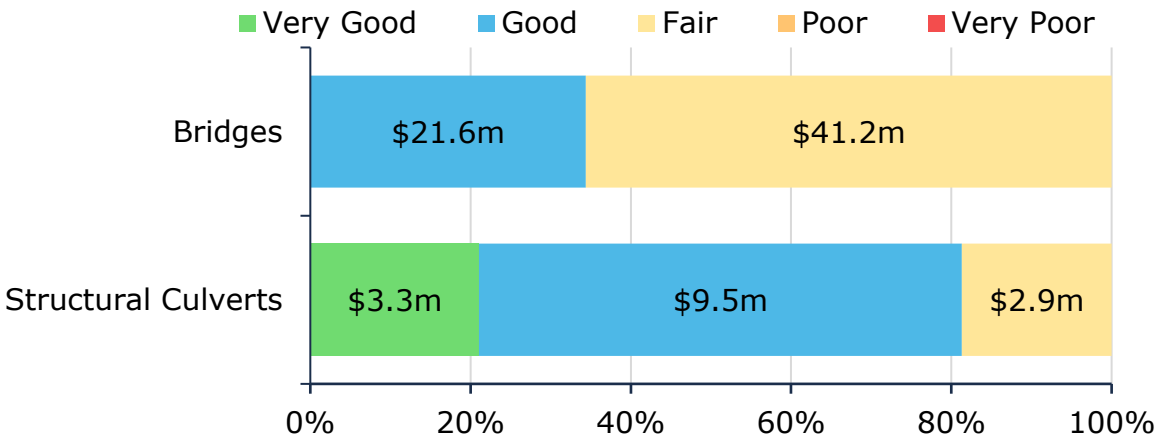


Figure 30: B&C Condition Breakdown

To ensure that the Township's bridges and culverts continue to provide an acceptable level of service, the staff should monitor the average condition of all assets. Each asset's estimated useful life should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

6.3.1. Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Essa's current approach is to assess the bridges and structural culverts every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM). The most recent assessment was completed by Planmac Engineering in October 2024.

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 Figure below outlines Essa's current lifecycle management strategy.

Maintenance

- All lifecycle activities are driven by the results of mandated structural inspections competed according to the Ontario Structure Inspection Manual (OSIM)

Rehabilitation / Renewal / Replacement

- Rehbailitation activities identified in the OSIM Report are used to maintain the current condtion of the bridge, and not improve the condition. If the condition of the bridge is 65%, the strategy is to let the bridge continue to deterioriate until the end of it's lifecycle then full replacement.

Figure 31: B&C Current Lifecycle Strategy

6.5. Forecasted Capital Requirements

The Figure below illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's bridges and culverts. These projections are based on asset replacement costs, age analysis, and condition data. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

The following analysis was run until 2089, and the resulting graph identifies capital requirements over the next 65 years. Essa's average annual requirements (red dotted line) for bridges and culverts total $2.4 million. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

OSIM condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including rehabilitation and replacement activities.

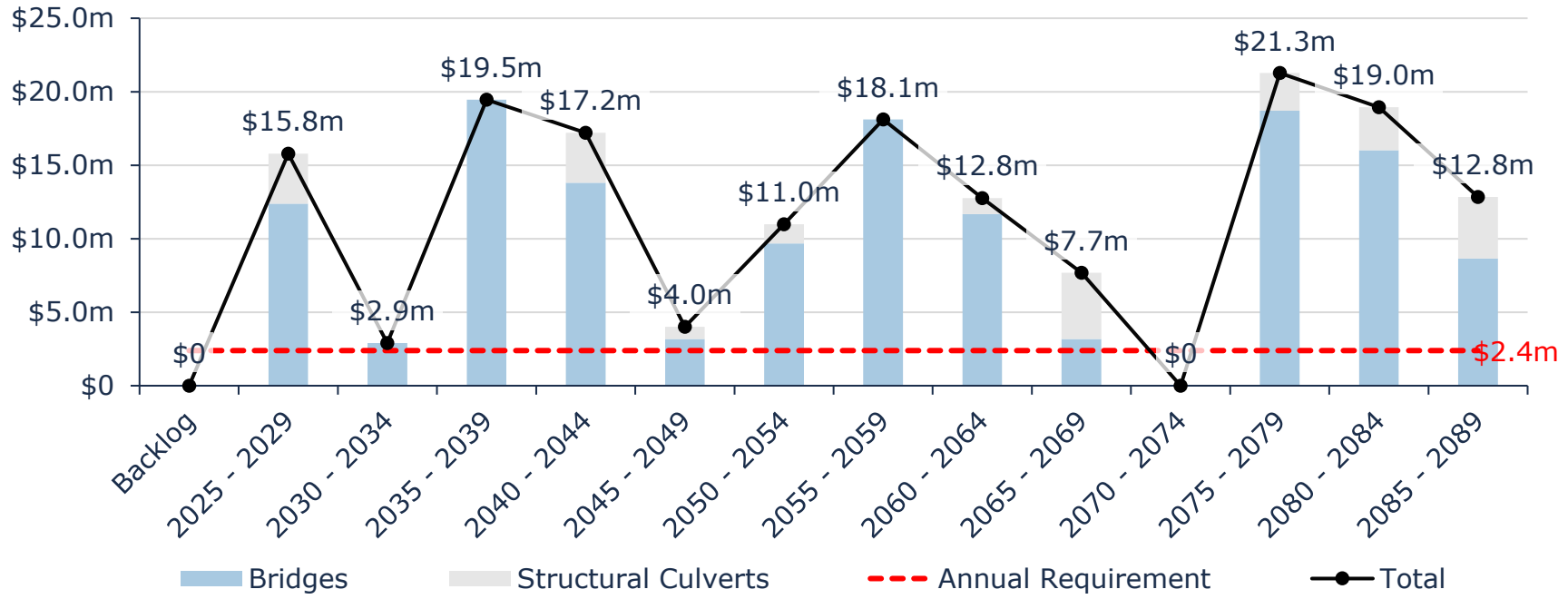


Figure 32: B&C Forecasted Capital Replacement Requirements

The Table below summarizes the projected cost of lifecycle activities (as previously described) that may need to be undertaken over the next 10 years to support current levels of service. These are represented at the major asset level.

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Bridges	$789k	$2.4m	$11.3m	$3.5m	$801k	$2.1m	$70k	-	-	-
Structural Culverts	$2.1m	$1.3m	$200k	-	-	-	-	-	-	-
Total	**$2.9m**	**$3.7m**	**$11.5m**	**$3.5m**	**$801k**	**$2.1m**	**$70k**	-	-	-

Table 13: B&C System-generated 10-Year Capital Costs

These projections are generated in Citywide and rely on the data available in the asset register. Assessed condition data and replacement costs were used to assist in forecasting replacement needs for bridges and structural culverts.

6.6. Risk & Criticality

The 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 available inventory data. See Appendix D: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$13,684,017 (17%)	$16,343,652 (21%)	$27,588,122 (35%)	$20,821,698 (27%)	- (0%)

Figure 33: B&C Risk Matrix

This is a high-level model developed by municipal staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. 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.

6.6.1. Risks to Current Asset Management Strategies

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

Capital Funding Strategies

The Township has a large inventory of bridges which require regular maintenance and assessment. Major capital rehabilitation projects for bridges and culverts may be deferred depending on the availability of grant funding opportunities. A long-term capital funding strategy can reduce dependency on grant funding and help prevent deferral of necessary capital works.

6.7. Current Levels of Service

The following tables identify the Township's metrics to identify their current level of service for the bridges and culverts.

6.7.1. 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, motor, emergency vehicles, pedestrians, cyclists)	Bridges and structural culverts are a key component of the municipal transportation network. Most types of vehicles, including heavy transport, motor vehicles, emergency vehicles and cyclists can cross them without restriction.
Quality	Description or images of the condition of bridges and culverts and how this would affect use of the bridges and culverts	Bridges and structural culverts receive a bridge condition index (BCI) during OSIM inspections. BCI values range from 0 to 100 and are broken into the following ranges: 70-100 BCI: Considered to be in good/excellent condition and only routine maintenance is recommended. 50-70 BCI: Considered to be in fair condition and rehabilitation is recommended within the next 5 years. <50 BCI: Considered to be in poor/very poor condition with imminent replacement required in the next 1-3 years.

Table 14: B&C Community Levels of Service

6.7.2. 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	4%
Quality	Average bridge condition index value for bridges in the municipality	60%

	Average BCI value for structural culverts in the municipality	72%
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.6%

Table 15: B&C Technical Levels of Service

6.8. Proposed Levels of Service

As per O. Reg. 588/17, by July 1, 2025, municipalities are required to consider proposed levels of service (PLOS), discuss the associated risks and long-term sustainability of these service levels, and explain the municipality's ability to afford the PLOS.

The tables and graphs below explain the proposed levels of service scenarios that were analyzed for Bridges & Culverts. Further PLOS analysis at the portfolio level can be found in Proposed Levels of Service Scenarios Section.

6.8.1. PLOS Scenarios Analyzed

Scenario	Description
Scenario 1: Achieving Full Funding in 15 Years	This scenario assumes a phased tax increase of approximately 3.4% annually, reaching full funding within 15 years
Scenario 2: Achieving 75% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 2.4% annually, reaching 75% funding within 15 years
Scenario 3: Achieving 50% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 1.2% annually, reaching 50% funding within 15 years

Table 16: PLOS Scenarios Analyzed

6.8.2. PLOS Analysis Results

The following table compares three funding scenarios, illustrating how varying levels of capital investment impact asset condition, risk, and overall performance over time.

Scenario	Technical LOS Outcomes	Initial Value (2025)	10 Year Projection (2035)	25 Year Projection (2050)	Scenario Average
Scenario 1	Average Condition	63.32%	48.52%	57.92%	58.61%
	Average Asset Risk	10.16	13.33	11.78	11.2
	Average Annual Investment		$2,390,363		
	Capital re-investment rate		3.0%		
	Average Condition	63.32%	48.52%	49.71%	51.06%

Scenario 2	Average Asset Risk	10.16	13.33	13.61	12.84
	Average Annual Investment		$1,792,772		
	Capital re-investment rate		2.3%		
Scenario 3	Average Condition	63.32%	48.52%	40.88%	44.26%
	Average Asset Risk	10.16	13.33	15.51	14.28
	Average Annual Investment		$1,195,181		
	Capital re-investment rate		1.5%		

Table 17: Bridges & Culverts pLOS Scenario Analysis

The following figure illustrates the projected condition of the asset category under each of the three investment level scenarios, demonstrating how varying reinvestment strategies impact overall asset condition over time.

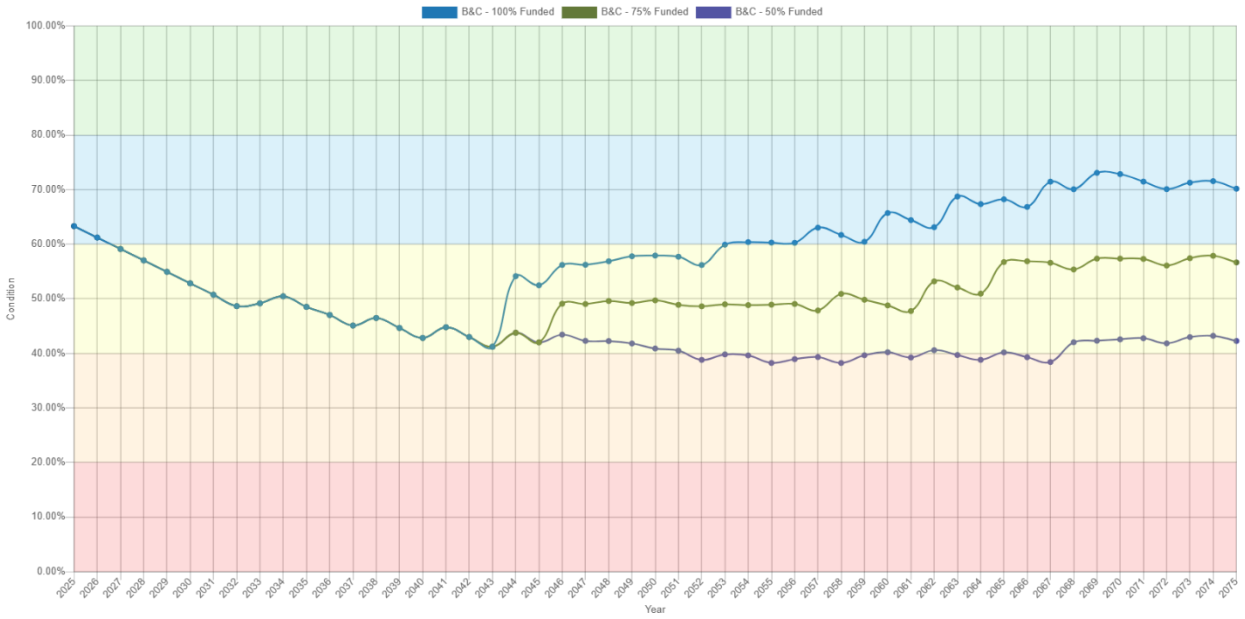


Figure 34: Bridges & Culverts Scenario Comparison

7. Water Network

7.1. State of the Infrastructure

The Township works in conjunction with the Ontario Clean Water Association (OCWA) to provide water services. Water services provided by the Township include a network of 74 km of watermains, hydrants, reservoirs and pumphouses, and valves.

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

Replacement Cost	Condition	Financial Capacity	
$68,409,494	65% (Good)	Annual Requirement:	$1,246,216
		Funding Available:	$527,240
		Annual Deficit:	$718,976

7.2. Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Hydrants	413	Assets	CPI	$3,950,456
Reservoir/Pumphouse	6	Assets	CPI	$16,975,504
Valves	606	Assets	CPI	$3,099,741
Watermains	74.2	Kilometers	CPI	$44,383,793
Total				**$68,409,494**

The graph below displays the total replacement cost of each asset segment in Essa's water network inventory.

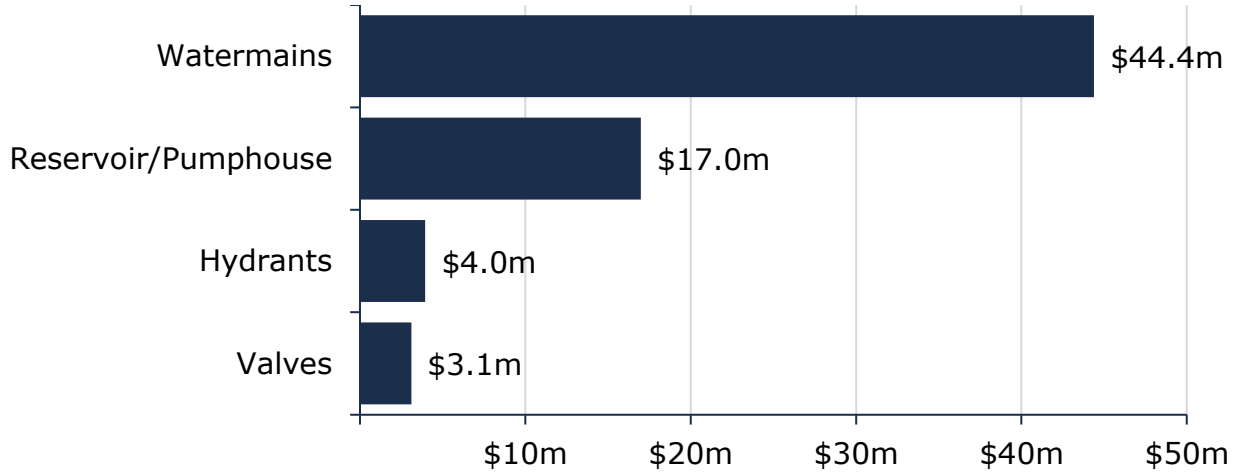


Figure 35: Water Network Replacement Cost

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

7.3. Asset Condition & Age

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

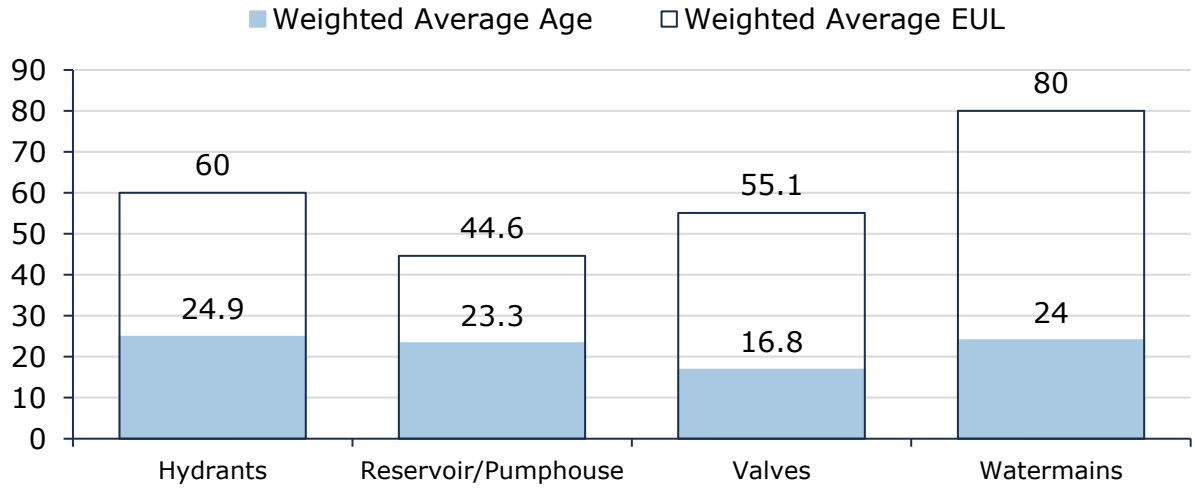


Figure 36: Water Network Average Age vs Average EUL

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

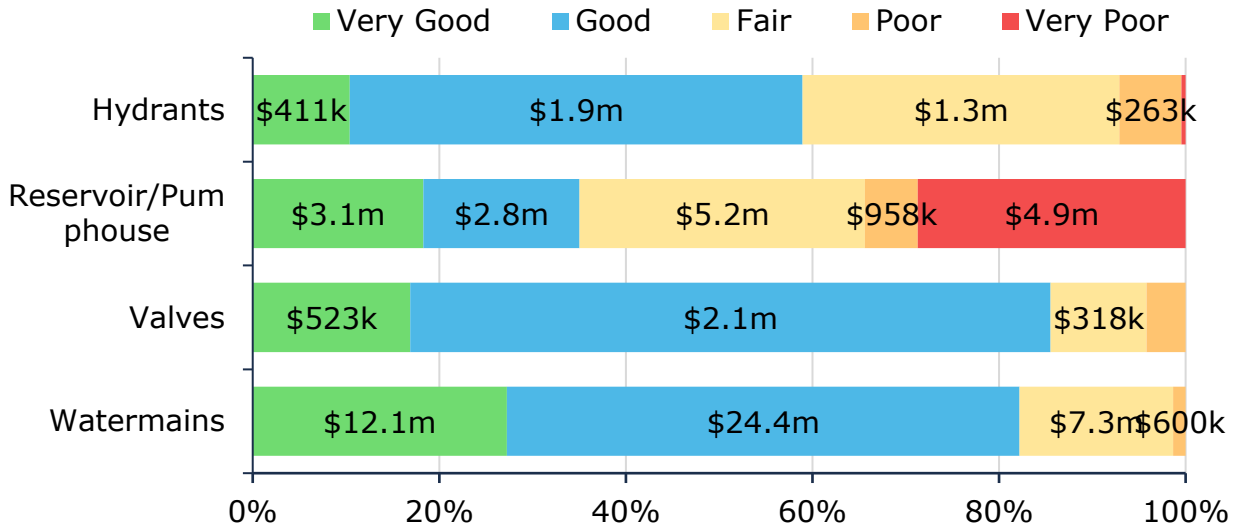


Figure 37: Water Network Condition Breakdown

To ensure that the municipal 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.

Each asset's estimated useful life should also be reviewed to determine whether adjustments need to be made to better align with the observed service life.

7.3.1. Current Approach to Condition Assessment

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

- Staff primarily rely on the age, pipe material, and breaks per segment of water mains to determine the projected condition.
- Reservoirs are inspected annually in the spring, based on a schedule provided by the ministry. Each component of the reservoirs has their own schedule that dictate when inspection should occur.
- Water point assets are inspected on an as-needed basis by staff

7.4. Lifecycle Management Strategy

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.

Maintenance / Rehabilitation / Replacement

- Routine maintenance activities for the Water Network are conducted by the Township's service provider, Ontario Clean Water Agency.
- Rehabilitation of the Water Network is outlined by the service provider. These reports detail all non-routine maintenance activities, capital project forecasting, and estimated costs. The Township utilizes grant funding for prioritized projects whenever funding opportunities are available.
- Replacement is considered when an asset has significantly deteriorated or failed, and when continued rehabilitation is no longer cost-effective. Assets that require frequent and costly repairs are prioritized for replacement to ensure efficiency and reliability of the storm network.

Figure 38: Water Network Current Lifecycle Strategy

7.5. Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that Essa should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 80 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirement of $1.2 million.

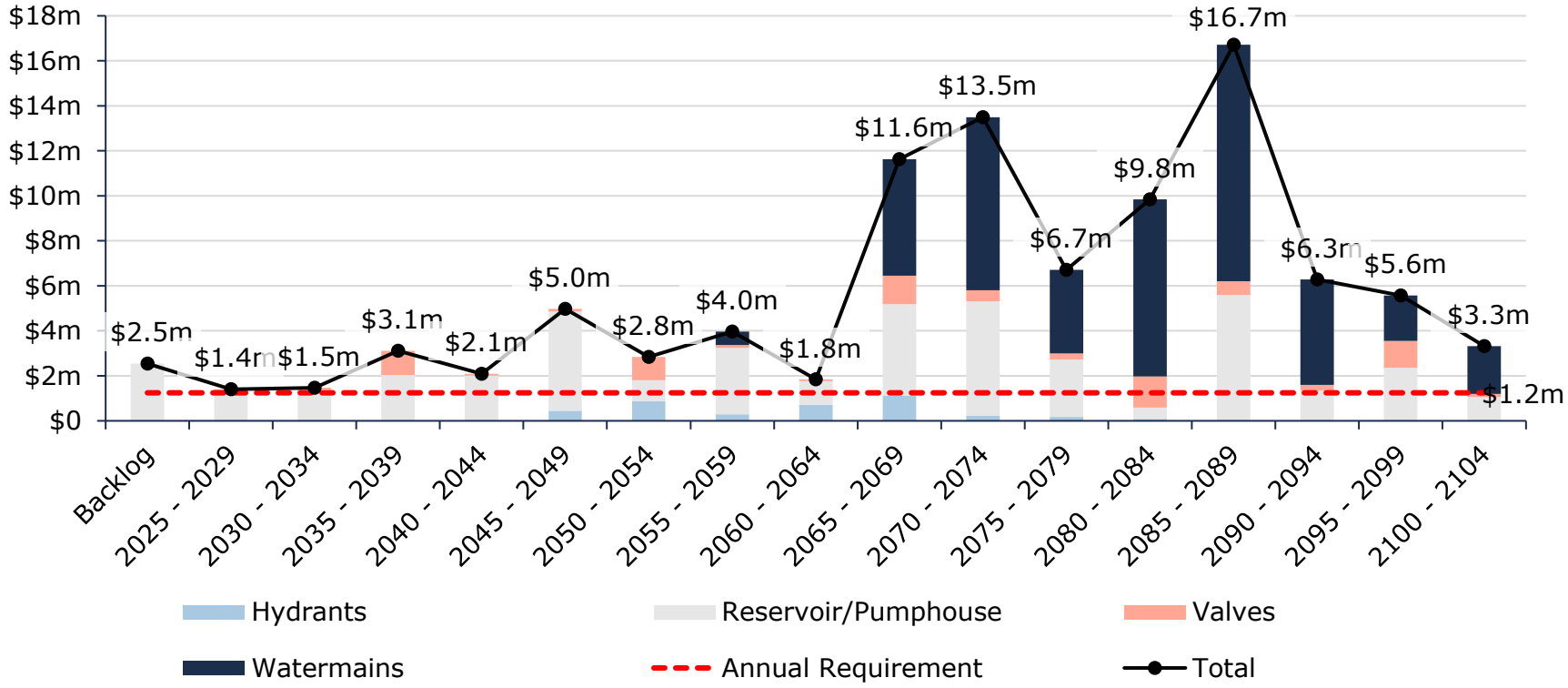


Figure 39: Water Network Forecasted Capital Replacement Requirements

The table below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Hydrants	-	-	-	-	-	-	-	-	-	-
Reservoir/Pumphouse	$110k	$172k	$643k	$64k	$299k	$205k	$979k	-	$94k	$106k
Valves	-	-	-	$114k	-	-	$82k	-	-	-
Watermains	-	-	-	-	-	-	-	-	-	-
Total	**$110k**	**$172k**	**$643k**	**$179k**	**$299k**	**$205k**	**$1.1m**	**-**	**$94k**	**$106k**

Table 18: Water Network System-Generated 10-Year Capital Costs

These projections are generated in Citywide and rely on the data available in the asset register. Assessed condition data and replacement costs were used to assist in forecasting replacement needs for water network assets.

7.6. Risk & Criticality

The 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 available inventory data. See Appendix D: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$20,391,462 (30%)	$17,477,478 (26%)	$17,853,121 (26%)	$10,179,247 (15%)	$2,508,186 (4%)

Figure 40: Water Network Risk Matrix

This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. 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.

7.6.1. 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 Design

The coating applied to the Township's watermains was anticipated to last 10 years however, it usually only lasts roughly 6-7 years, failing much earlier than anticipated. As a result, staff are having to perform emergency repairs to the water system and struggle to find funding for these repairs. The shorter than anticipated service life of the watermains makes it very difficult for staff to proactively plan for rehabilitation and replacement of the water network.

7.7. Current Levels of Service

The following tables identify the Township's metrics to identify their current level of service for the Water Network.

7.7.1. 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	Hydraulic modelling was completed in 2021 for the Township. The urban areas in the Township have sufficient fire flow, while fire flow is available to rural areas on case by case basis.
Reliability	Description of boil water advisories and service interruptions	The Township did not experience any boil water advisories or service interruptions in 2023

Table 19: Water Network Community Levels of Service

7.7.2. 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	60%[3]
	% of properties where fire flow is available	18%
	Average Risk Rating	16.39 (Very High)
Reliability	# of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system	0 : 4,946
	# 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 : 4,946
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.77% - 1.82%

Table 20: Water Network Technical Levels of Service

[3] 4,946 out of 8,232 households are connected to the municipal water system.

7.8. Proposed Levels of Service

As per O. Reg. 588/17, by July 1, 2025, municipalities are required to consider proposed levels of service (PLOS), discuss the associated risks and long-term sustainability of these service levels, and explain the municipality's ability to afford the PLOS.

The tables and graphs below explain the proposed levels of service scenarios that were analyzed for the Water Network. Further PLOS analysis at the portfolio level can be found in Proposed Levels of Service Scenarios Section.

7.8.1. PLOS Scenarios Analyzed

Scenario	Description
Scenario 1: Achieving Full Funding in 15 Years	This scenario assumes a phased rate increase of approximately 2.2% annually, reaching full funding within 15 years
Scenario 2: Achieving 75% Funding in 15 Years	This scenario assumes a phased rate increase of approximately 1.1% annually, reaching 75% funding within 15 years
Scenario 3: Achieving 50% Funding in 15 Years	This scenario assumes a phased rate increase of approximately 0.1% annually, reaching 50% funding within 15 years

Table 21: PLOS Scenarios Analyzed

7.8.2. PLOS Analysis Results

The following table presents the outcomes for three funding scenarios, illustrating how varying levels of capital investment impact asset condition, risk, and overall performance over time.

Scenario	Technical LOS Outcomes	Initial Value (2025)	10 Year Projection (2035)	25 Year Projection (2050)	Scenario Average
Scenario 1	Average Condition	63.73%	53.52%	48.78%	55.16%
	Average Asset Risk	8.22	10.51	11.63	9.98
	Average Annual Investment		$1,246,216		
	Capital re-investment rate		1.8%		
Scenario 2	Average Condition	63.73%	53.52%	48.78%	43.91%
	Average Asset Risk	8.22	10.51	11.63	12.03
	Average Annual Investment		$934,662		
	Capital re-investment rate		1.4%		
	Average Condition	63.73%	53.52%	48.21%	39.68%

Scenario 3	Average Asset Risk	8.22	10.51	11.74	12.7
	Average Annual Investment		$623,108		
	Capital re-investment rate		0.9%		

Table 22: Water Network pLOS Scenario Analysis

The following figure illustrates the projected condition of the asset category under each of the three investment level scenarios, demonstrating how varying reinvestment strategies impact overall asset condition over time.

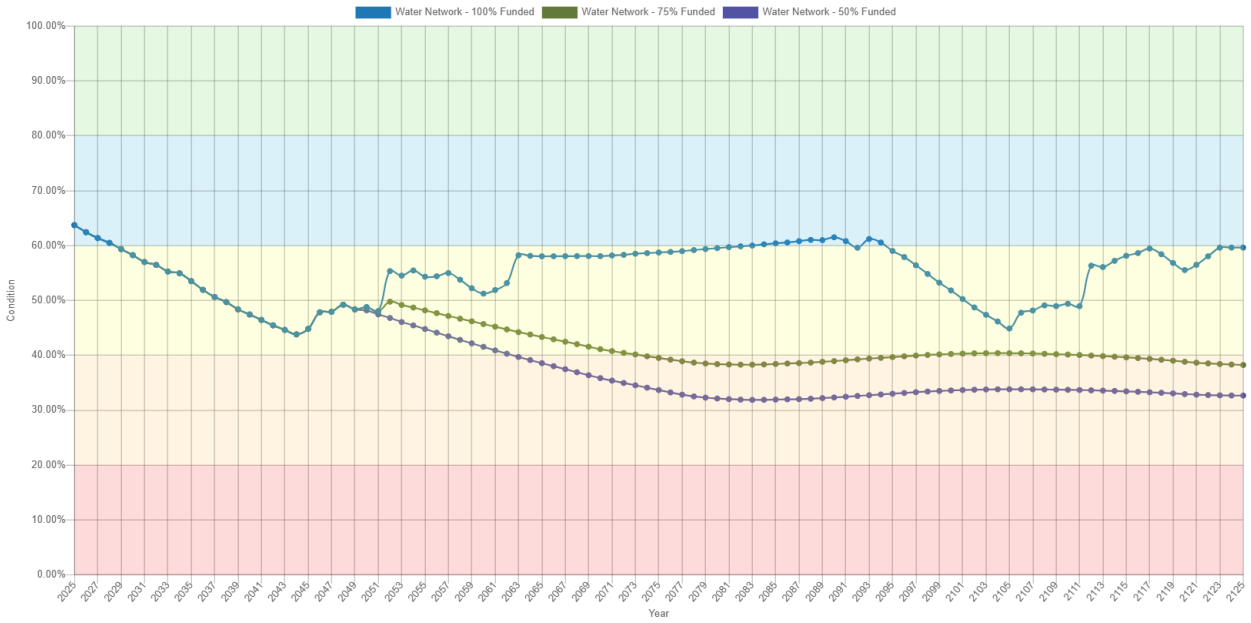


Figure 41: Water Network Scenario Comparison

8. Sanitary Network

8.1. State of the Infrastructure

The sewer services provided by the Township include 51 kms of sanitary mains, manholes, pumping stations, and the Angus Wastewater Treatment Plant. The Township works with the Ontario Clean Water Association (OCWA) to manage and maintain these assets.

The state of the infrastructure for the Sanitary Sewer Network is summarized in the following table:

Replacement Cost	Condition	Financial Capacity	
$78,560,504	55% (Fair)	Annual Requirement:	$1,750,064
		Funding Available:	$614,667
		Annual Deficit:	$1,135,397

8.2. Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Manholes	664	Quantity	CPI	$9,331,161
Pumping Station	40	Quantity	CPI	$6,922,635
Sanitary Mains	51,443	Length (m)	CPI	$27,751,063
Wastewater Treatment Plant	1 (116)	Components	CPI	$34,555,645
Total				**$78,560,504**

The graph below displays the total replacement cost of each asset segment in Essa's Sanitary Network inventory.

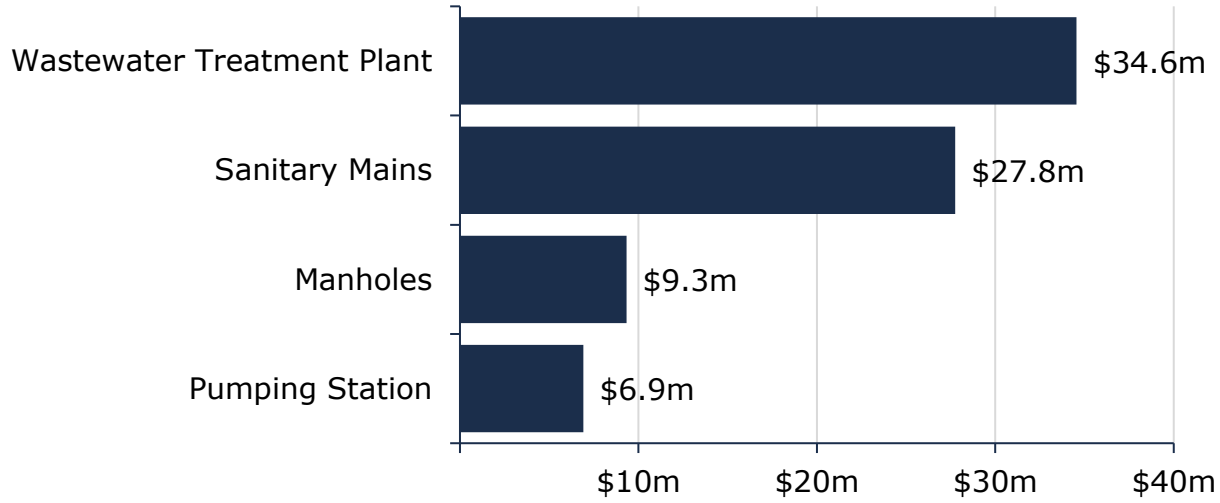


Figure 42: Sanitary Network Replacement Cost

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

8.3. Asset Condition & Age

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

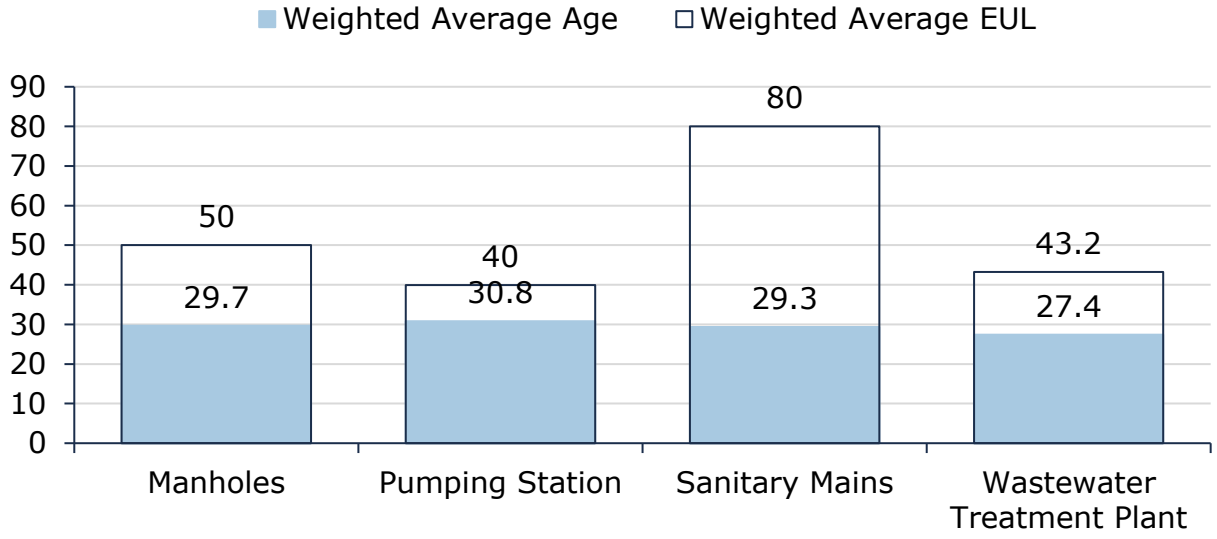


Figure 43: Sanitary Network Average Age vs Average EUL

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

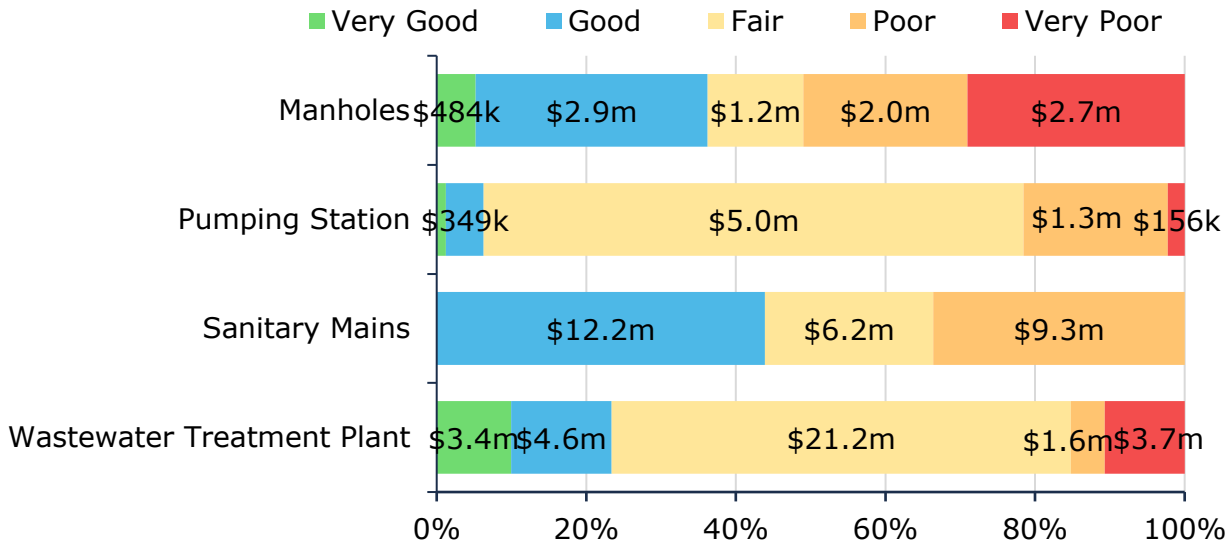


Figure 44: Sanitary Network Condition Breakdown

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

Each asset's estimated useful life should also be reviewed to determine whether adjustments need to be made to better align with the observed service life.

8.3.1. Current Approach to Condition Assessment

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

- CCTV inspections are completed for sanitary mains annually. The areas targeted are based on community complaints, and if any related capital projects are underway. Roughly 10% of the system is inspected each year
- OCWA performed inspection on the Wastewater Treatment Plant. All facilities are inspected annually and OCWA provides a report of the findings and any required rehabilitation

8.4. Lifecycle Management Strategy

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.

Maintenance / Rehabilitation / Replacement
• Periodic pressure testing may be employed to identify deficiencies and potential leaks on an as-needed basis based on user complaints • In the absence of mid-lifecycle rehabilitative events, most mains are simply maintained with the goal of full replacement once it reaches its end-of-life. • OCWA recommendations based on Wastewater Treatment Plant are budgeted for and completed in the following year, unless any emergency repairs are required

Figure 45: Sanitary Network Current Lifecycle Strategy

8.5. Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that Essa should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 85 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $1.8 million.

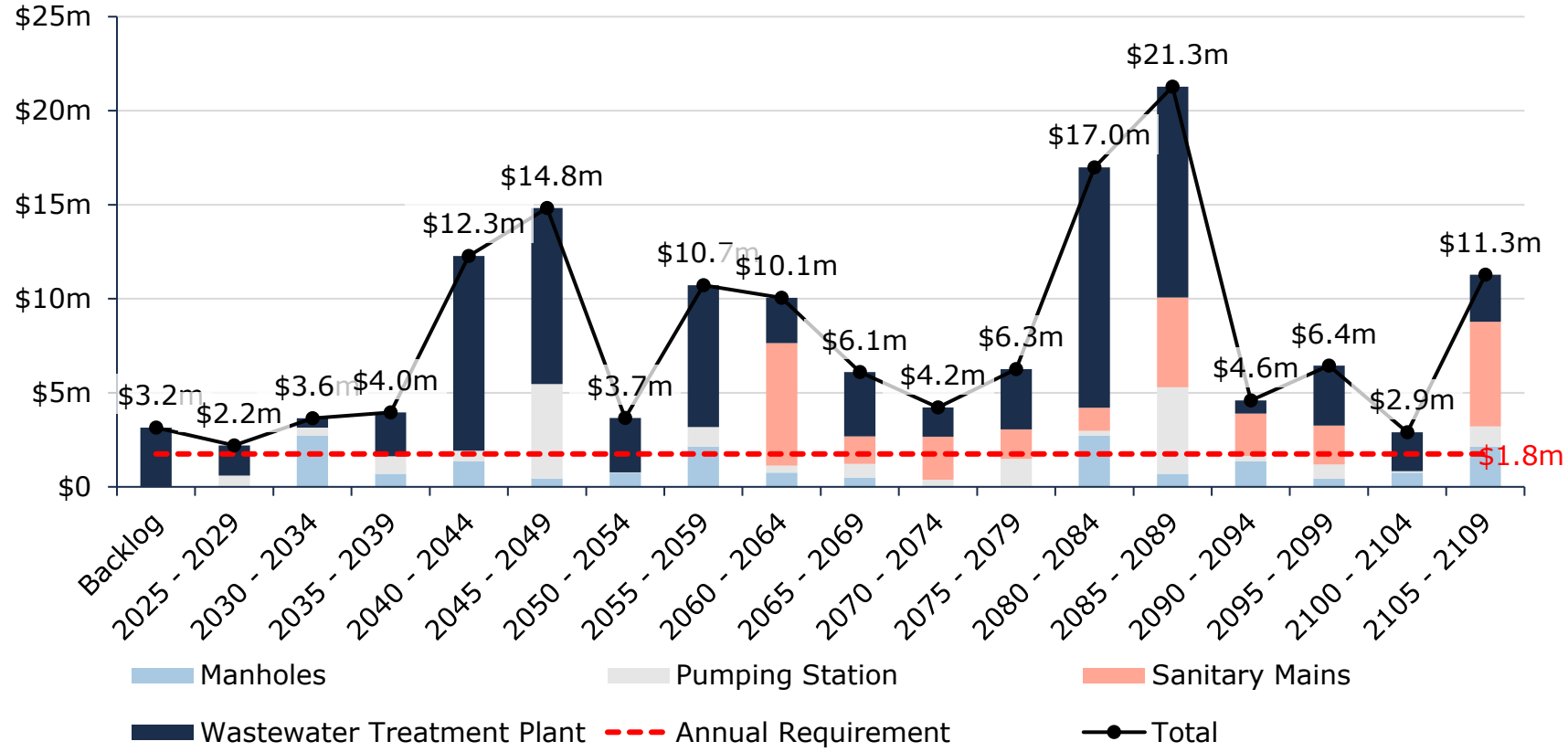


Figure 46: Sanitary Network Forecasted Capital Replacement Requirements

The Table below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Manholes	-	-	-	-	-	-	-	$2.7m	-	-
Pumping Station	-	-	$605k	-	-	$277k	-	-	-	$156k
Sanitary Mains	-	-	-	-	-	-	-	-	-	-
Wastewater Treatment Plant	-	$53k	$436k	$1.1m	-	$42k	$407k	$59k	-	-
Total	**-**	**$53k**	**$1.0m**	**$1.1m**	**-**	**$319k**	**$407k**	**$2.8m**	**-**	**$156k**

Table 23: Sanitary Network System-Generated 10-Year Capital Costs

These projections are generated in Citywide and rely on the data available in the asset register. Assessed condition data and replacement costs were used to assist in forecasting replacement needs for sanitary network assets.

8.6. Risk & Criticality

The 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 available inventory data. See Appendix D: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

1 - 4 Very Low $34,246,648 (44%)	5 - 7 Low $17,746,261 (23%)	8 - 9 Moderate $15,437,825 (20%)	10 - 14 High $8,520,290 (11%)	15 - 25 Very High $2,609,480 (3%)

Figure 47: Sanitary Network Risk Matrix

This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. 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.

8.6.1. 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 & Information

There is a lack of confidence in the available inventory data for the sanitary network. Staff plan to prioritize data refinement efforts to increase confidence in the accuracy and reliability of asset data and information. Staff hope to improve the accuracy of condition data by advancing their CCTV inspection program and utilizing the information to provide a condition rating for underground assets. Once completed there will be greater confidence in the development of data-driven strategies to address infrastructure needs.

Capital Funding Strategies

The Township does not presently have sufficient funds to complete all required life cycle management activities for the Sanitary Network. An annual capital funding strategy can help prevent deferral of capital works.

8.7. Current Levels of Service

The following tables identify the Township's metrics to identify their current level of service for the Sanitary Network.

8.7.1. Community Levels of Service

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

Values	Qualitative Description	Current LOS (2023)
Scope	Description, which may include maps, 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.	
Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes.	Stormwater can enter into sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its 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 stormwater to the storm drain system help to reduce the chance of overflow.
Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid stormwater infiltration	The municipality adheres to design standards that incorporate appropriate overflows 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.

Table 24: Sanitary Network Community Levels of Service

8.7.2. Technical Levels of Service

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

Values	Technical Metric	Current LOS (2023)
Scope	% of properties connected to the municipal wastewater systems	53%

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	Not Applicable
	# of connection-days per year with sanitary main backups compared to the total number of properties connected to the municipal wastewater system	0 : 4,376
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	5 : 4,376
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.78% - 2.23%

Table 25: Sanitary Network Technical Levels of Service

8.8. Proposed Levels of Service

As per O. Reg. 588/17, by July 1, 2025, municipalities are required to consider proposed levels of service (PLOS), discuss the associated risks and long-term sustainability of these service levels, and explain the municipality's ability to afford the PLOS.

The tables and graphs below explain the proposed levels of service scenarios that were analyzed for the Sanitary Network. Further PLOS analysis at the portfolio level can be found in Proposed Levels of Service Scenarios Section.

8.8.1. PLOS Scenarios Analyzed

Scenario	Description
Scenario 1: Achieving Full Funding in 15 Years	This scenario assumes a phased rate increase of approximately 2.9% annually, reaching full funding within 15 years
Scenario 2: Achieving 75% Funding in 15 Years	This scenario assumes a phased rate increase of approximately 1.9% annually, reaching 75% funding within 15 years
Scenario 3: Achieving 50% Funding in 15 Years	This scenario assumes stable sanitary rates at 42.3% funding, with reallocated debt payments bringing it to 50% funding within 15 years

Table 26: PLOS Scenarios Analyzed

8.8.2. PLOS Analysis Results

The following table presents the outcomes for three funding scenarios, illustrating how varying levels of capital investment impact asset condition, risk, and overall performance over time.

Scenario	Technical LOS Outcomes	Initial Value (2025)	10 Year Projection (2035)	25 Year Projection (2050)	Scenario Average
Scenario 1	Average Condition	54.00%	43.56%	42.95%	45.34%
	Average Asset Risk	9.7	11.21	11.12	10.99
	Average Annual Investment		$1,750,064		
	Capital re-investment rate		2.2%		
Scenario 2	Average Condition	54.00%	42.65%	36.65%	40.14%
	Average Asset Risk	9.7	11.34	12.34	11.82
	Average Annual Investment		$1,312,548		
	Capital re-investment rate		1.7%		
Scenario 3	Average Condition	54.00%	41.37%	29.75%	34.97%
	Average Asset Risk	9.7	11.45	13.72	12.64
	Average Annual Investment		$875,032		
	Capital re-investment rate		1.1%		

Table 27: Sanitary Network pLOS Scenario Analysis

The following figure illustrates the projected condition of the asset category under each of the three investment level scenarios, demonstrating how varying reinvestment strategies impact overall asset condition over time.

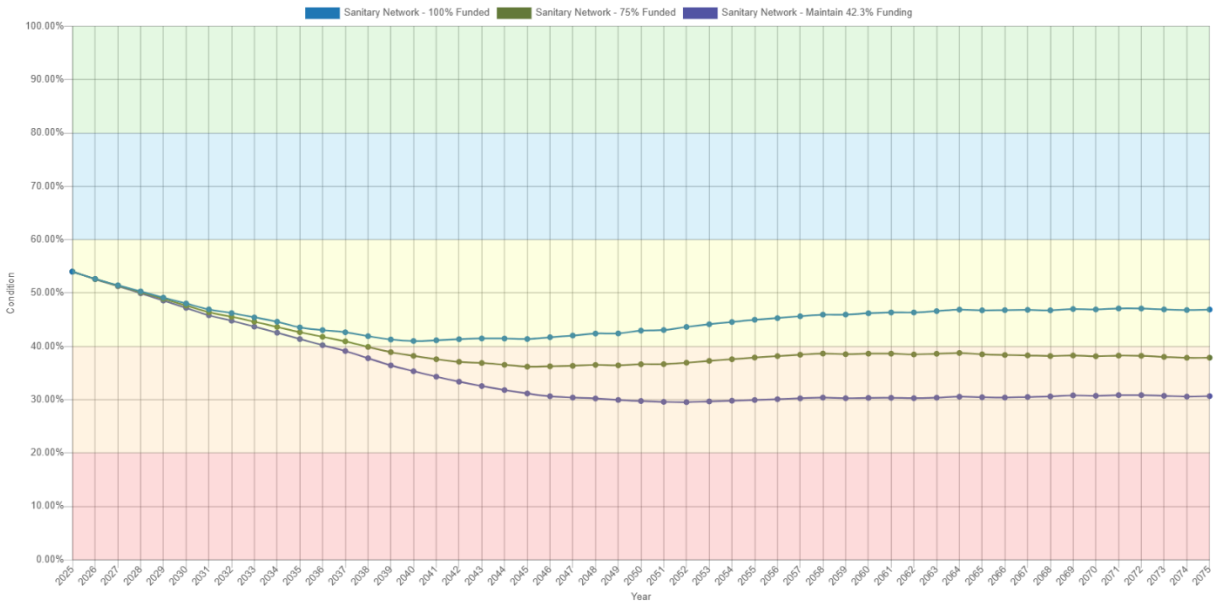


Figure 48: Sanitary Network Scenario Comparison

9. Storm Network

9.1. State of the Infrastructure

The Township is responsible for owning and maintaining a storm network of 29 kms of storm sewer mains, catch basins, stormwater management ponds, and other supporting infrastructure.

The state of the infrastructure for the Storm Network is summarized in the following table:

Replacement Cost	Condition	Financial Capacity	
$29,063,090	70% (Good)	Annual Requirement:	$473,146
		Funding Available:	$41,100
		Annual Deficit:	$432,046

9.2. Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Catch Basins	798	Quantity	CPI	$4,513,498
Headwalls	8	Quantity	CPI	$245,964
Manholes	447	Quantity	CPI	$4,668,545
Storm Mains	29,429	Length (m)	CPI	$17,970,155
Stormwater Management Ponds	5	Quantity	CPI	$1,664,928
Total				**$29,063,090**

The graph below displays the total replacement cost of each asset segment in Essa's Storm Network inventory.

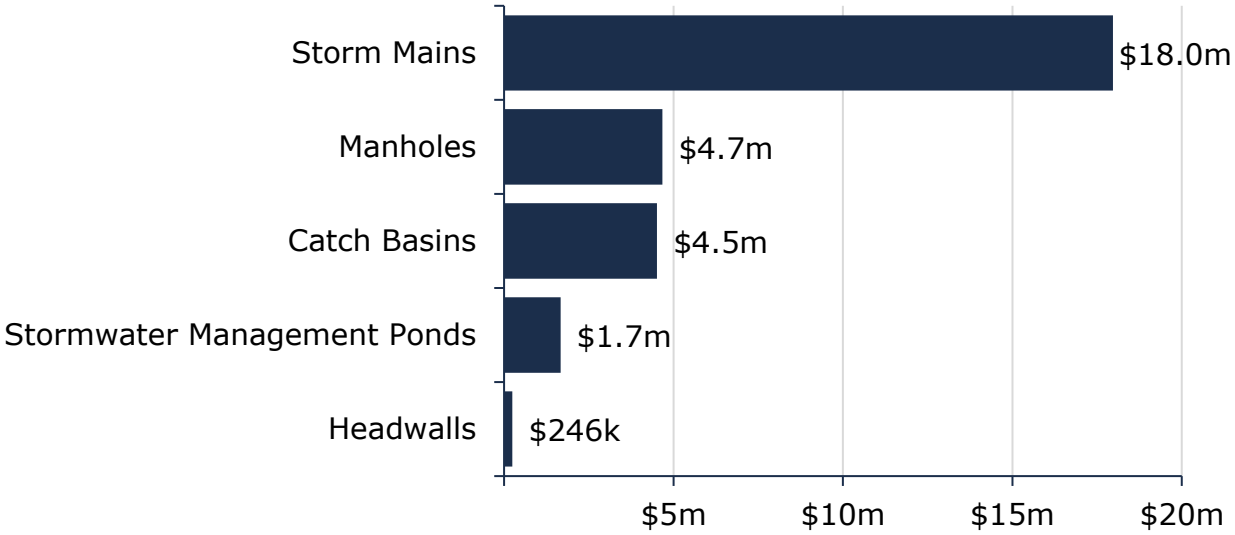


Figure 49: Storm Network Replacement Cost

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

9.3. Asset Condition & Age

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

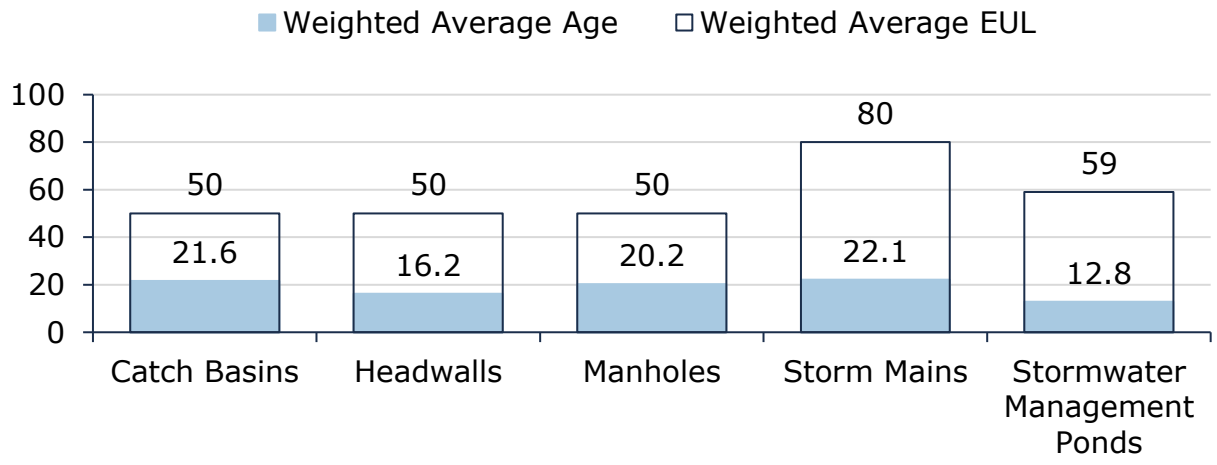


Figure 50: Storm Network Average Age vs Average EUL

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

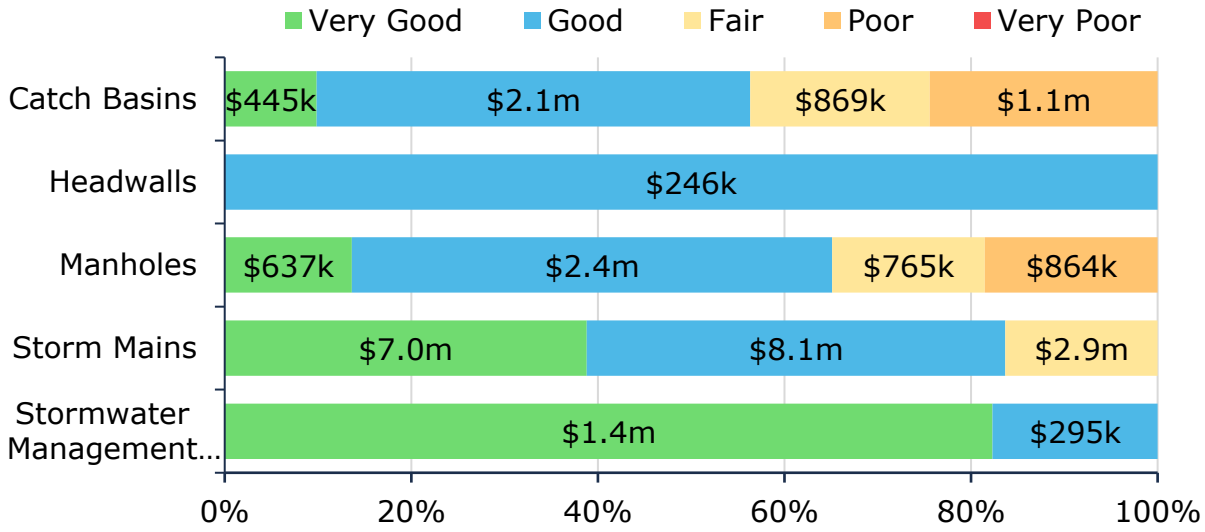


Figure 51: Storm Network Condition Breakdown

To ensure that the municipal 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.

Each asset's estimated useful life should also be reviewed to determine whether adjustments need to be made to better align with the observed service life.

9.3.1. Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Storm sewer lines are inspected through CCTV assessments on a project-by-project basis. Stormwater point assets are inspected on an as-needed basis, in coordination with other water and sanitary assets.

9.4. Lifecycle Management Strategy

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.

Maintenance / Rehabilitation / Replacement

- Catch basin cleaning occurs on an annual basis
- Manholes are rehabilitated and replaced as needed
- Replacement is prioritized based on available condition information, criticality and in coordination with other underground replacement projects. Storm mains are typically replaced with polyvinyl chloride (PVC) pipes because of their durability

Figure 52: Storm Network Current Lifecycle Strategy

9.5. Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that Essa should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 85 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $473k.

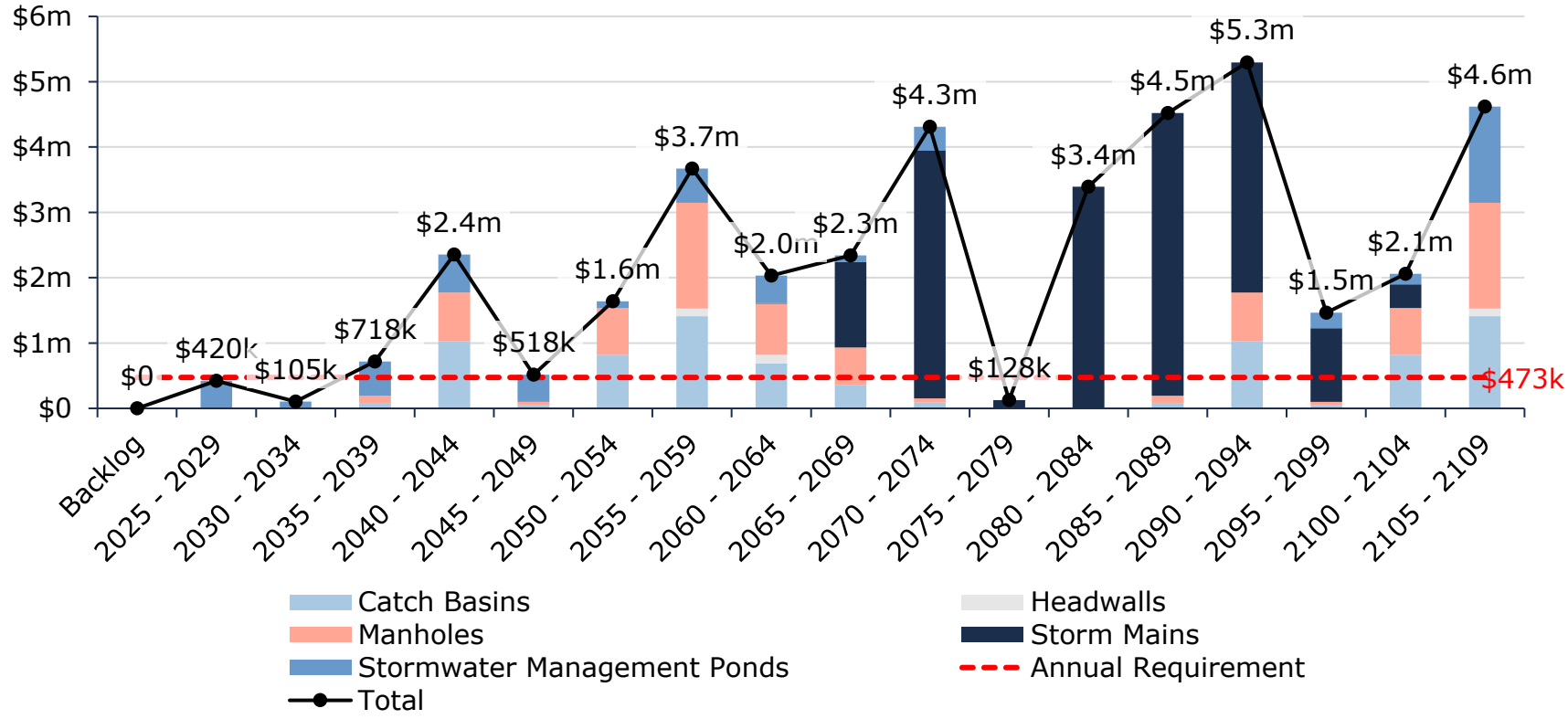


Figure 53: Storm Network Forecasted Capital Replacement Requirements

The Table below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Catch Basins	-	-	-	-	-	-	-	-	-	-
Headwalls	-	-	-	-	-	-	-	-	-	-
Manholes	-	-	-	-	-	-	-	-	-	-
Storm Mains	-	-	-	-	-	-	-	-	-	-
Stormwater Management Ponds	-	-	-	$420k	-	$105k	-	-	-	-
Total	**-**	**-**	**-**	**$420k**	**-**	**$105k**	**-**	**-**	**-**	**-**

Table 28: Storm Network System-Generated 10-Year Capital Costs

These projections are generated in Citywide and rely on the data available in the asset register. Assessed condition data and replacement costs were used to assist in forecasting replacement needs for storm sewer lines assets.

9.6. Risk & Criticality

The 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 available inventory data. See Appendix D: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

1 - 4 Very Low $13,902,152 (48%)	5 - 7 Low $4,308,125 (15%)	8 - 9 Moderate $5,136,099 (18%)	10 - 14 High $3,754,974 (13%)	15 - 25 Very High $1,961,740 (7%)

Figure 54: Storm Network Risk Matrix

This is a high-level model developed by Township staff and it should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. 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.

9.6.1. 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 & Information

There is a lack of confidence in the available inventory data for storm sewers. Staff hope to develop better defined strategies that will extend the network's lifecycle, increase capacity for growth, and the lower total cost. Once completed there will be greater confidence in the development of data-driven strategies to address infrastructure needs.

9.7. Current Levels of Service

The following tables identify the Township's metrics to identify their current level of service for the Storm Network.

9.7.1. Community Levels of Service

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

Values	Qualitative Description	Current LOS (2023)
Sustainable	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.

Table 29: Storm Network Community Levels of Service

9.7.2. Technical Levels of Service

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

Values	Technical Metric	Current LOS (2023)
Scope	% of properties in municipality resilient to a 100-year storm.	4%
	% of the municipal stormwater management system resilient to a 5-year storm	100%
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.14% - 1.63%

Table 30: Storm Network Technical Levels of Service

9.8. Proposed Levels of Service

As per O. Reg. 588/17, by July 1, 2025, municipalities are required to consider proposed levels of service (PLOS), discuss the associated risks and long-term sustainability of these service levels, and explain the municipality's ability to afford the PLOS.

The tables and graphs below explain the proposed levels of service scenarios that were analyzed for the Storm Network. Further PLOS analysis at the portfolio level can be found in Proposed Levels of Service Scenario Analysis.

9.8.1. PLOS Scenarios Analyzed

Scenario	Description
Scenario 1: Achieving Full Funding in 15 Years	This scenario assumes a phased tax increase of approximately 3.4% annually, reaching full funding within 15 years
Scenario 2: Achieving 75% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 2.4% annually, reaching 75% funding within 15 years
Scenario 3: Achieving 50% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 1.2% annually, reaching 50% funding within 15 years

Table 31: PLOS Scenarios Analyzed

9.8.2. PLOS Analysis Results

The following table presents the outcomes for three funding scenarios, illustrating how varying levels of capital investment impact asset condition, risk, and overall performance over time.

Scenario	Technical LOS Outcomes	Initial Value (2025)	10 Year Projection (2035)	25 Year Projection (2050)	Scenario Average
Scenario 1	Average Condition	73.03%	61.50%	43.70%	56.66%
	Average Asset Risk	8.85	10.9	15.2	12.26
	Average Annual Investment		$473,146		
	Capital re-investment rate		1.6%		
Scenario 2	Average Condition	73.03%	61.50%	43.70%	52.58%
	Average Asset Risk	8.85	10.9	15.2	13.2
	Average Annual Investment		$354,860		
	Capital re-investment rate		1.2%		
	Average Condition	73.03%	61.19%	43.70%	46.04%

Scenario 3	Average Asset Risk	8.85	10.99	15.2	14.65
	Average Annual Investment		$236,573		
	Capital re-investment rate		0.8%		

Table 32: Storm Network pLOS Scenario Analysis

The following figure illustrates the projected condition of the asset category under each of the three investment level scenarios, demonstrating how varying reinvestment strategies impact overall asset condition over time.

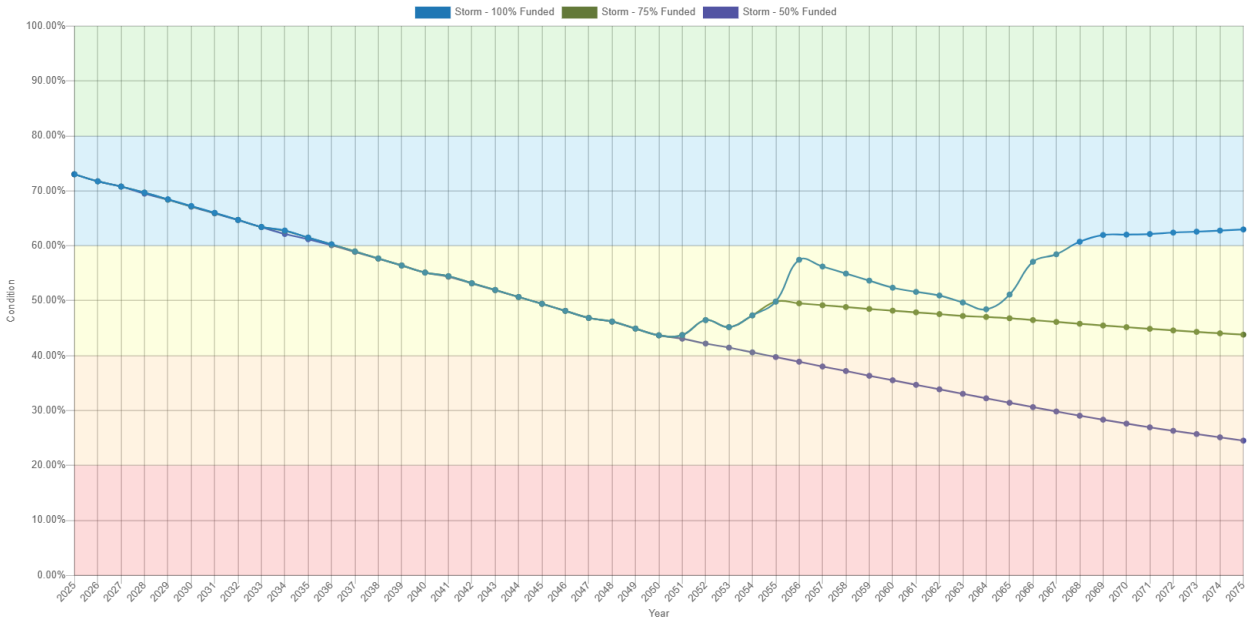


Figure 55: Stormwater Network Scenario Comparison

10. Buildings

10.1. State of the Infrastructure

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

- administrative offices
- fire stations and associated offices and facilities
- public works garages
- arenas and community centres

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

Replacement Cost	Condition	Financial Capacity	
$51,521,613	Fair (44%)	Annual Requirement:	$1,659,880
		Funding Available:	$258,962
		Annual Deficit:	$1,400,918

10.2. Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Admin Building	6	Quantity	CPI	$5,337,313
Angus Arena	16	Quantity	CPI	$11,713,588
Community Buildings	12	Quantity	CPI	$10,897,014
Fire Buildings	11	Quantity	CPI	$8,488,899
Parks	16	Quantity	CPI	$3,557,353
Public Works	9	Quantity	CPI	$2,479,048
Thornton Arena	19	Quantity	CPI	$9,048,398
Total				**$51,521,613**

The graph below displays the total replacement cost of each asset segment in Essa's buildings inventory.

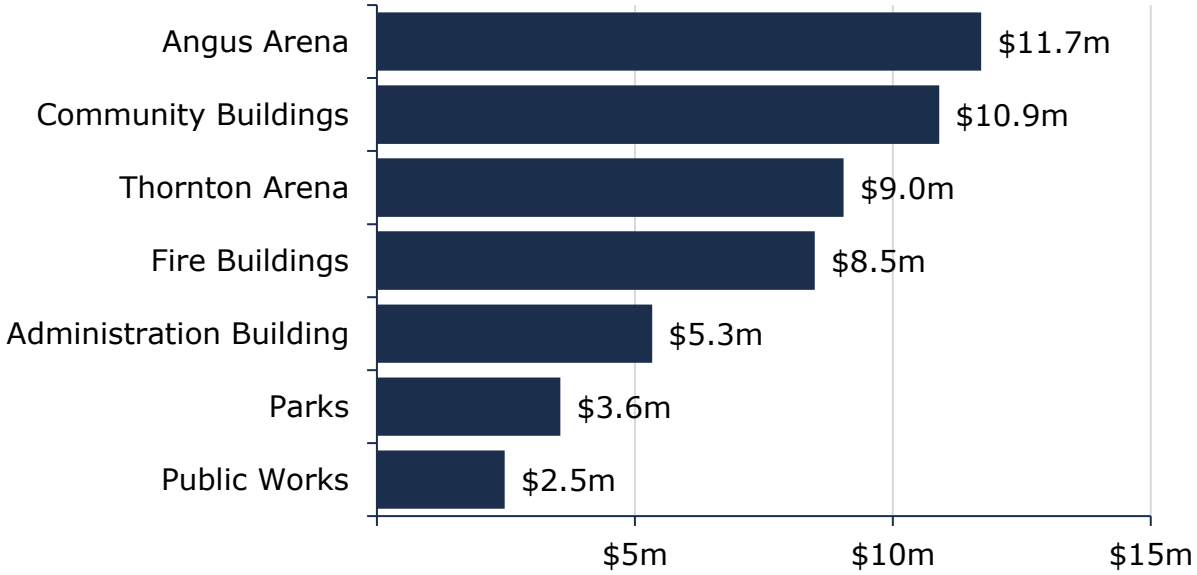


Figure 56: Buildings Replacement Cost

10.3. Asset Condition & Age

The graph below identifies the average age, and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

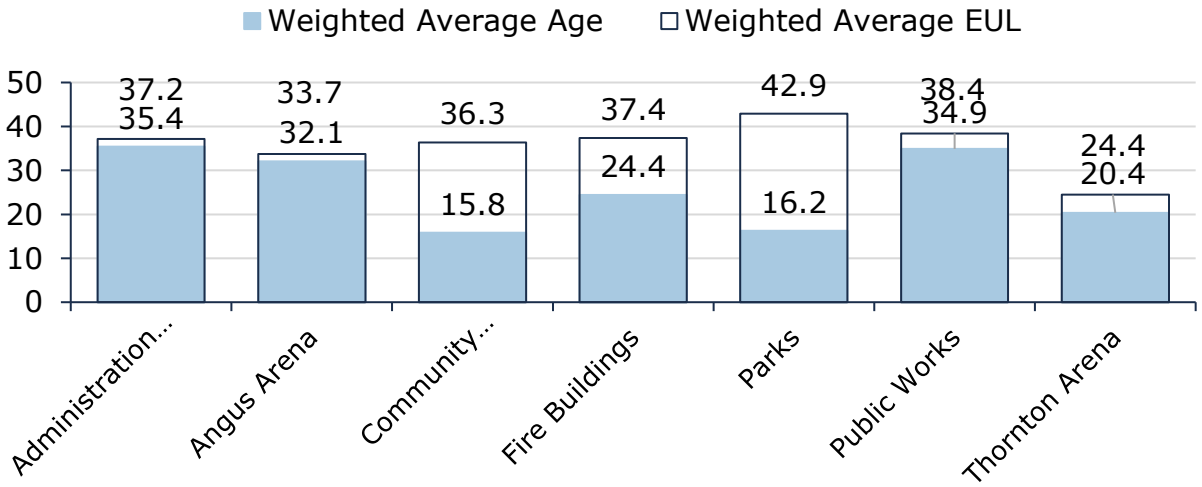


Figure 57: Buildings Average Age vs Average EUL

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

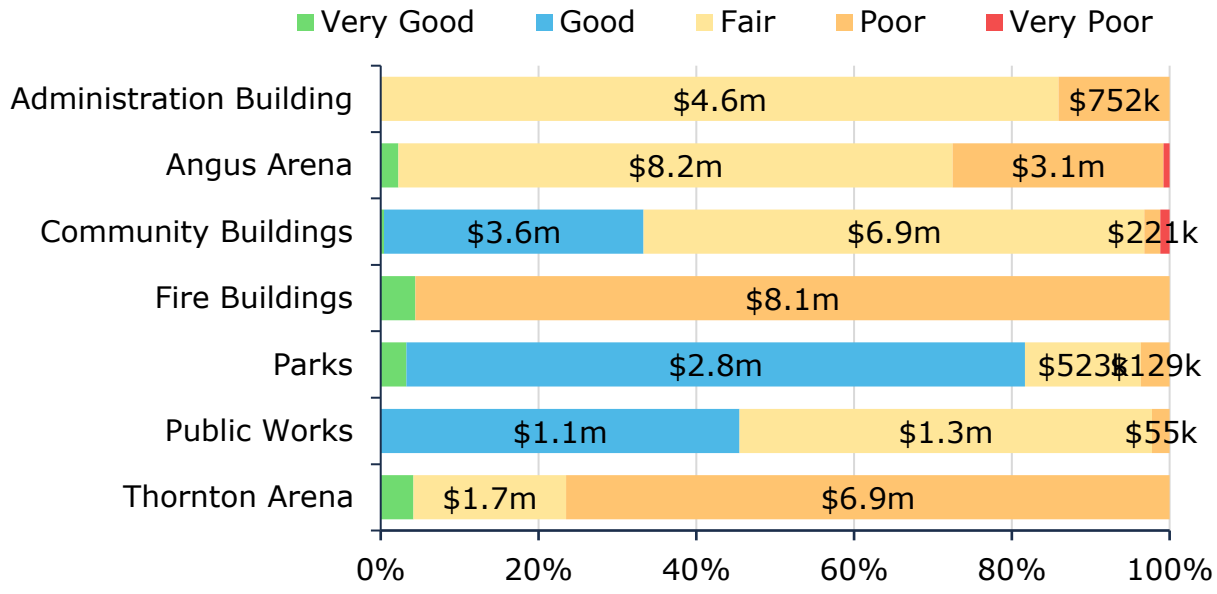


Figure 58: Buildings Condition Breakdown

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

Each asset's estimated useful life should also be reviewed to determine whether adjustments need to be made to better align with the observed service life.

10.3.1. 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:

- Visual inspections are completed by staff on a regular basis.
- A third-party contractor conducts required health and safety inspections on a monthly basis in accordance with Technical Standards and Safety Authority (TSSA).
- Structural inspections are completed by an external contractor, primarily on the recreation buildings, every 4-5 years, with the most recent being in 2018
- Specific components such as elevators, HVAC, and generators are inspected as required by manufacturer recommendations and/or Building Code Act requirements.

10.4. Lifecycle Management Strategy

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.

Maintenance / Rehabilitation / Replacement
• Municipal buildings are subject to regular inspections to identify health & safety requirements as well as structural deficiencies that require additional attention • Regular maintenance is performed on the buildings based on staff expertise, and recommendations that arise from external structural inspections • Recommendations from assessments are taken into consideration as buildings approach their end-of-life to determine whether replacement or rehabilitation is appropriate

Figure 59: Buildings Current Lifecycle Strategy

10.5. Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that Essa should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 34 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $1.7 million.

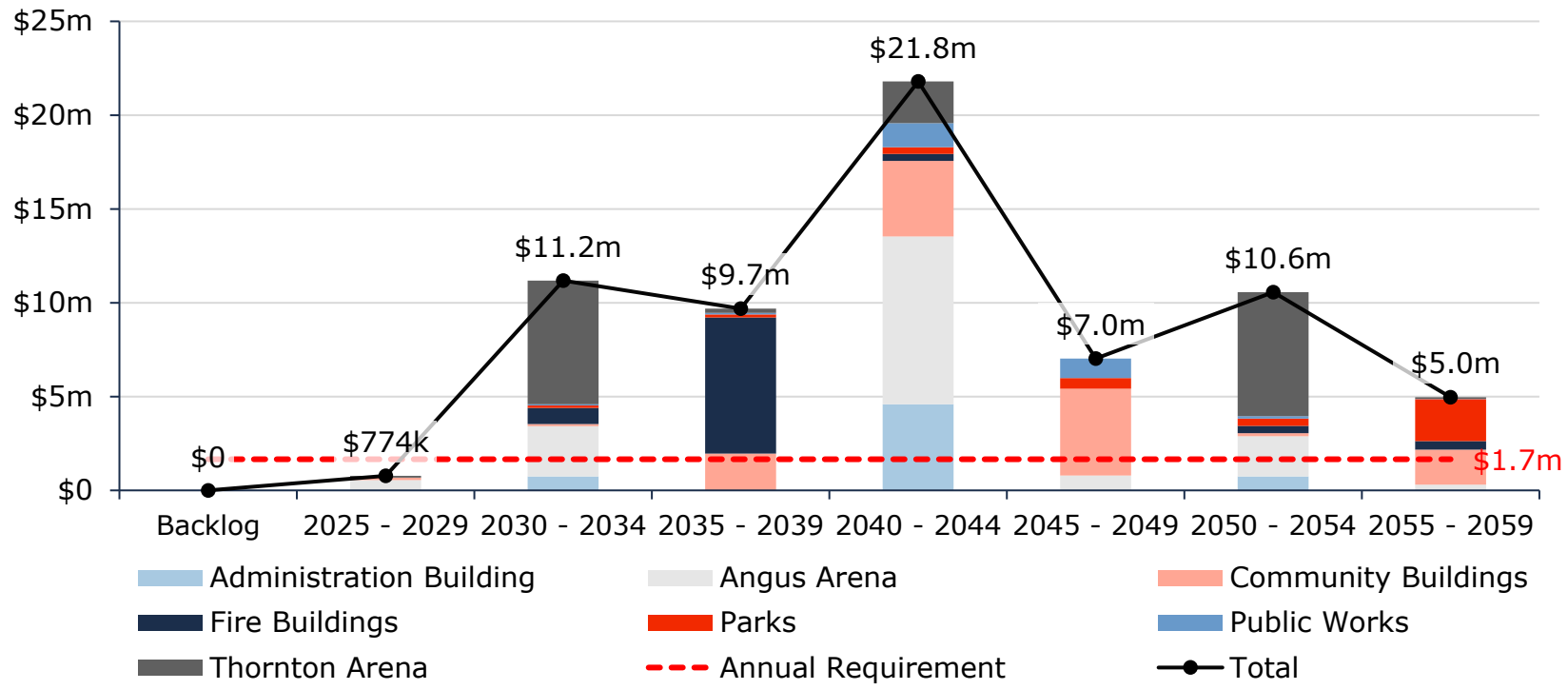


Figure 60: Buildings Forecasted Capital Replacement Requirements

Table 33 below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2025
Administration Building	-	-	-	-	-	-	$752k	-	-	-	-
Angus Arena	$89k	-	-	$272k	$194k	$697k	$1.9m	-	-	$113k	$89k
Community Buildings	$128k	-	-	-	-	-	$115k	-	-	-	$128k
Fire Buildings	-	-	-	-	-	$402k	-	-	$467k	-	-
Total	**$217k**	**-**	**-**	**$272k**	**$284k**	**$1.1m**	**$6.2m**	**$3.3m**	**$467k**	**$113k**	**$217k**

Table 33 Buildings System-Generated 10-Year Capital Costs

These projections are generated in Citywide and rely on the data available in the asset register, which was limited to asset age, replacement cost, and useful life.

10.6. Risk & Criticality

The 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 available inventory data. See Appendix D: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

1 - 4	5 - 7	8 - 9	10 - 14	15 - 25
Very Low	**Low**	**Moderate**	**High**	**Very High**
$123,510,365	$77,014,669	$98,333,338	$87,919,469	$46,467,830
(29%)	(18%)	(23%)	(20%)	(11%)

Figure 61: Buildings Risk Matrix

This is a high-level model developed by Township staff and it should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. 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.

10.6.1. 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

There is a lack of confidence in the available inventory data for storm sewers. Staff hope to develop better defined strategies that will extend the network's lifecycle, increase capacity for growth, and the lower total cost. Once completed there will be greater confidence in the development of data-driven strategies to address infrastructure needs.

Community Growth

As the Township's population continues to grow, the buildings and facilities in the Township no longer have sufficient capacity to meet community needs and expectations. In particular, the Arena does not meet the growing communities needs due to capacity

10.7. Current Levels of Service

The following tables identify the Township's metrics to identify their current level of service for municipal Buildings.

10.7.1. Community Levels of Service

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

Values	Technical Metric	Current LOS (2023)
Scope	Description of the current condition of municipal buildings and the plans that are in place to maintain or improve the provided level of service	The overall condition of the buildings in the Township is Fair. The Township staff plan to continue to perform condition assessments for their buildings to identify required maintenance and rehabilitation activities to ensure the state of the buildings remains in adequate condition.

Table 34 Buildings Community Levels of Service

10.7.2. Technical Levels of Service

The quantitative metrics that determine the technical level of service provided by the buildings in Essa are going to be the analysis of reinvestment rates, asset performance (condition breakdown) and asset risk levels.

Values	Technical Metric	Current LOS (2023)
Scope	Average Condition Rating	Fair (44%)
	% of buildings that meet AODA compliance	100%
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.5% - 3.2%

Table 35 Buildings Technical Levels of Service

10.8. Proposed Levels of Service

As per O. Reg. 588/17, by July 1, 2025, municipalities are required to consider proposed levels of service (PLOS), discuss the associated risks and long-term sustainability of these service levels, and explain the municipality's ability to afford the PLOS.

The tables and graphs below explain the proposed levels of service scenarios that were analyzed for municipal Buildings. Further PLOS analysis at the portfolio level can be found in Proposed Levels of Service Scenario Analysis.

10.8.1. PLOS Scenarios Analyzed

Scenario	Description
Scenario 1: Achieving Full Funding in 15 Years	This scenario assumes a phased tax increase of approximately 3.4% annually, reaching full funding within 15 years
Scenario 2: Achieving 75% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 2.4% annually, reaching 75% funding within 15 years
Scenario 3: Achieving 50% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 1.2% annually, reaching 50% funding within 15 years

Table 36: PLOS Scenarios Analyzed

10.8.2. PLOS Analysis Results

The following table presents the outcomes for three funding scenarios, illustrating how varying levels of capital investment impact asset condition, risk, and overall performance over time.

Scenario	Technical LOS Outcomes	Initial Value (2025)	10 Year Projection (2035)	25 Year Projection (2050)	Scenario Average
Scenario 1	Average Condition	42.25%	33.80%	46.15%	40.70%
	Average Asset Risk	14.65	17.01	14.38	14.98

	Average Annual Investment		$1,659,880		
	Capital re-investment rate		3.2%		
Scenario 2	Average Condition	42.25%	30.47%	29.52%	30.78%
	Average Asset Risk	14.65	17.6	17.64	16.86
	Average Annual Investment		$1,244,910		
	Capital re-investment rate		2.4%		
Scenario 3	Average Condition	42.25%	27.64%	20.29%	22.09%
	Average Asset Risk	14.65	18.19	19.34	18.5
	Average Annual Investment		$829,940		
	Capital re-investment rate		1.6%		

Table 37: Buildings pLOS Scenario Analysis

The following figure illustrates the projected condition of the asset category under each of the three investment level scenarios, demonstrating how varying reinvestment strategies impact overall asset condition over time.

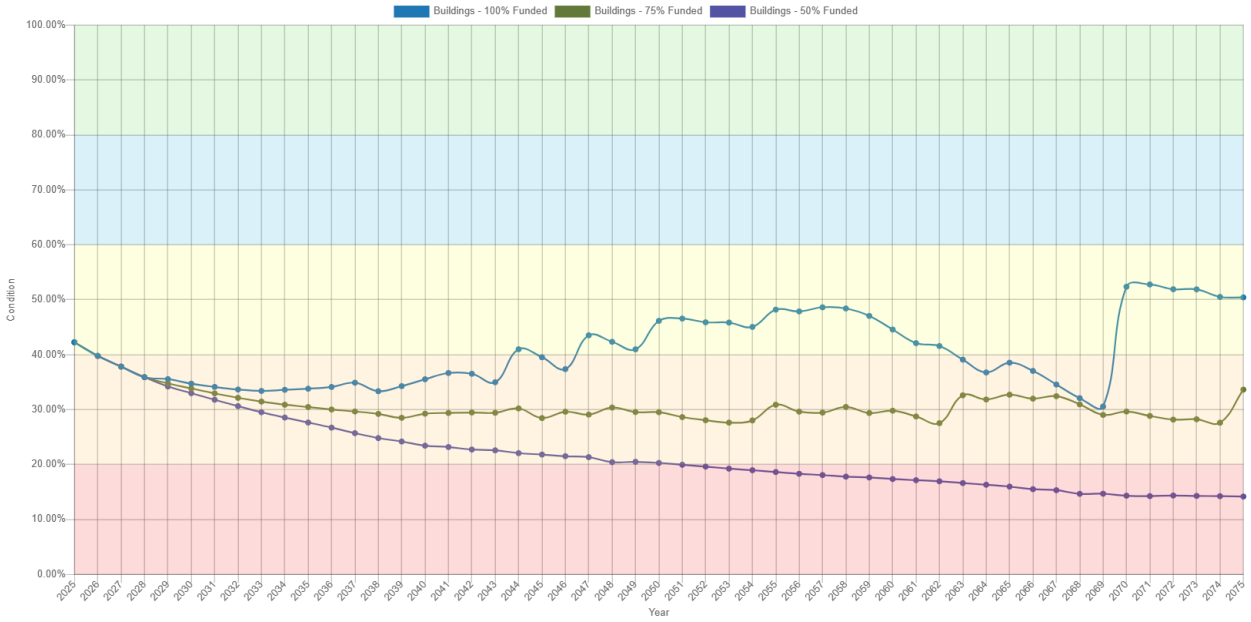


Figure 62: Buildings Scenario Comparison

11. Land Improvements

11.1. State of the Infrastructure

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

- Parking lots for municipal facilities
- Trails and Pathways
- Athletic fields and courts
- Recreational facilities including parks equipment, playgrounds and splashpads

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

Replacement Cost	Condition	Financial Capacity	
$6,149,729	Fair (46%)	Annual Requirement:	$250,803
		Funding Available:	$75,000
		Annual Deficit:	$175,803

11.2. Asset Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Athletic Fields & Courts	32	Assets	CPI	$2,050,378
Parking Lots	16	Assets	CPI	$922,087
Parks Equipment	29	Assets	CPI	$1,421,272
Playgrounds & Splash Pads	19	Assets	CPI	$1,403,260
Trails & Pathways	15.4	Kilometers	CPI	$352,732
Total				**$6,149,729**

The graph below displays the replacement cost of each asset segment in the Township's land improvement inventory.

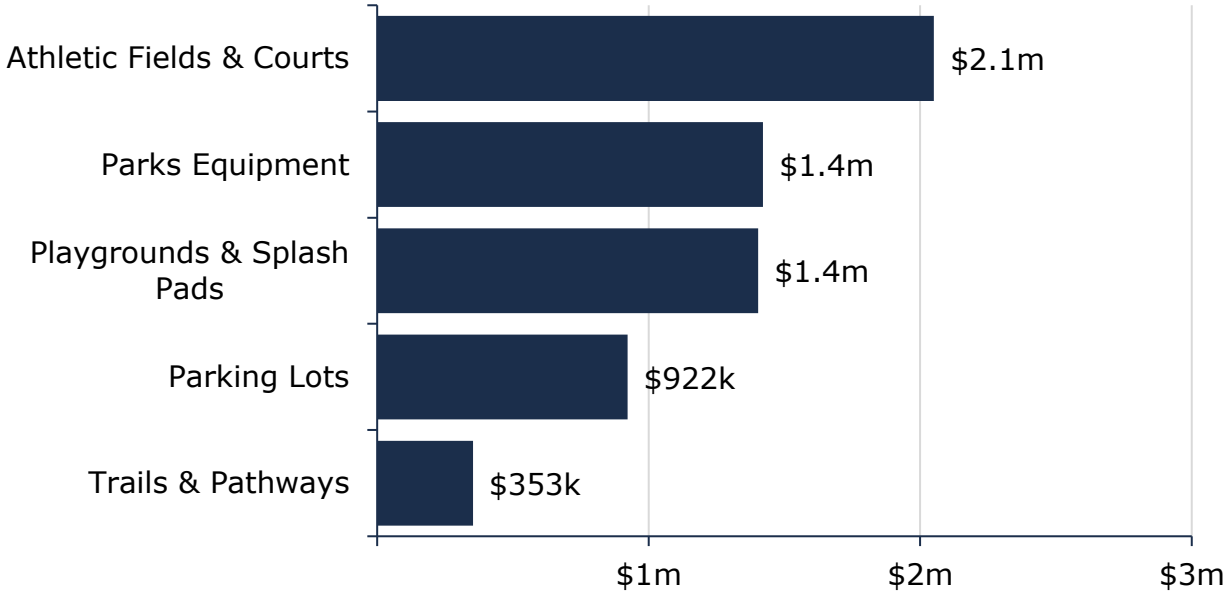


Figure 63: Land Improvements Replacement Cost

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

11.3. Asset Condition & Age

The graph below identifies the average age, and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

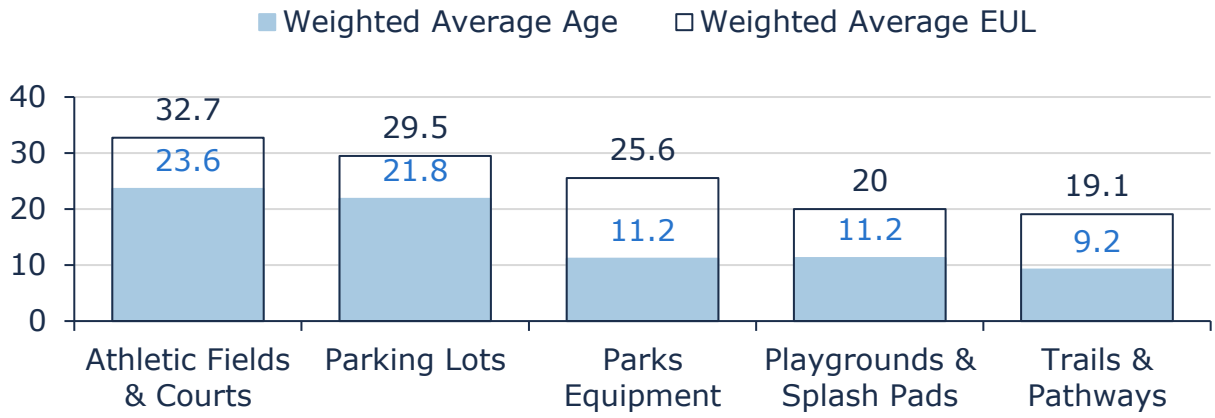


Figure 64: Land Improvements Average Age vs Average EUL

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

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

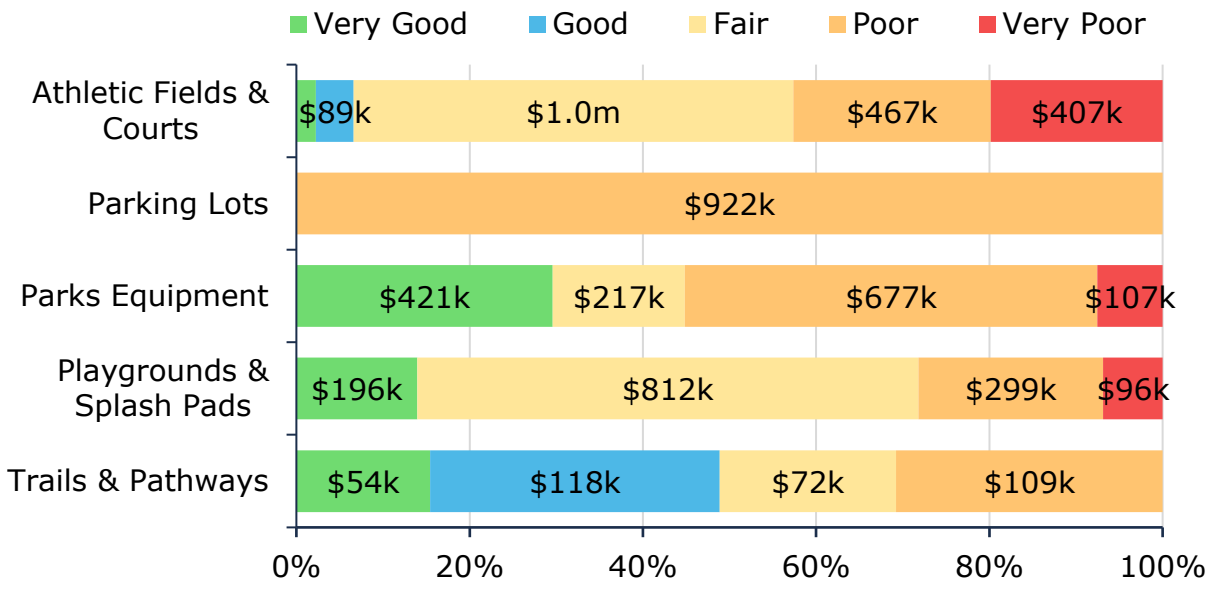


Figure 65: Land Improvement Condition Breakdown

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 activities is required to increase the overall condition of the land improvements.

11.3.1. Current Approach to Condition Assessment

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

- Staff complete regular visual inspections of land improvements assets to ensure they are in state of adequate repair
- The Health Unit inspects all splash pads prior to opening
- Playground equipment is inspected based on Canadian Standards Association (CSA) and Technical Standards and Safety Authority (TSSA) guidelines

The overall condition of land improvements in the Township is fair. Regular inspections performed by the Township ensure that Land Improvement assets remain in an adequate state of repair.

11.4. Lifecycle Management Strategy

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 figures outline Essa's current lifecycle management strategy.

Maintenance / Rehabilitation / Replacement

- Land Improvement maintenance, rehabilitation, and replacement is driven by community complaints and any deficiencies noted by staff during their regular assessments
- Replacement is considered when an asset's condition has significantly deteriorated, and ongoing maintenance is no longer cost-effective. Assets nearing the end of their expected service life or requiring frequent and costly repairs are prioritized for replacement

Figure 66: Land Improvements Current Lifecycle Strategy

11.5. Forecasted Capital Requirements

The Figure below illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's land improvement infrastructure. This analysis was run until 2068 to capture at least one iteration of replacement for the longest-lived asset in the asset register. Essa's average annual requirements (red dotted line) total $250,803 for all land improvement assets. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

These projections and estimates are based on asset replacement costs and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades

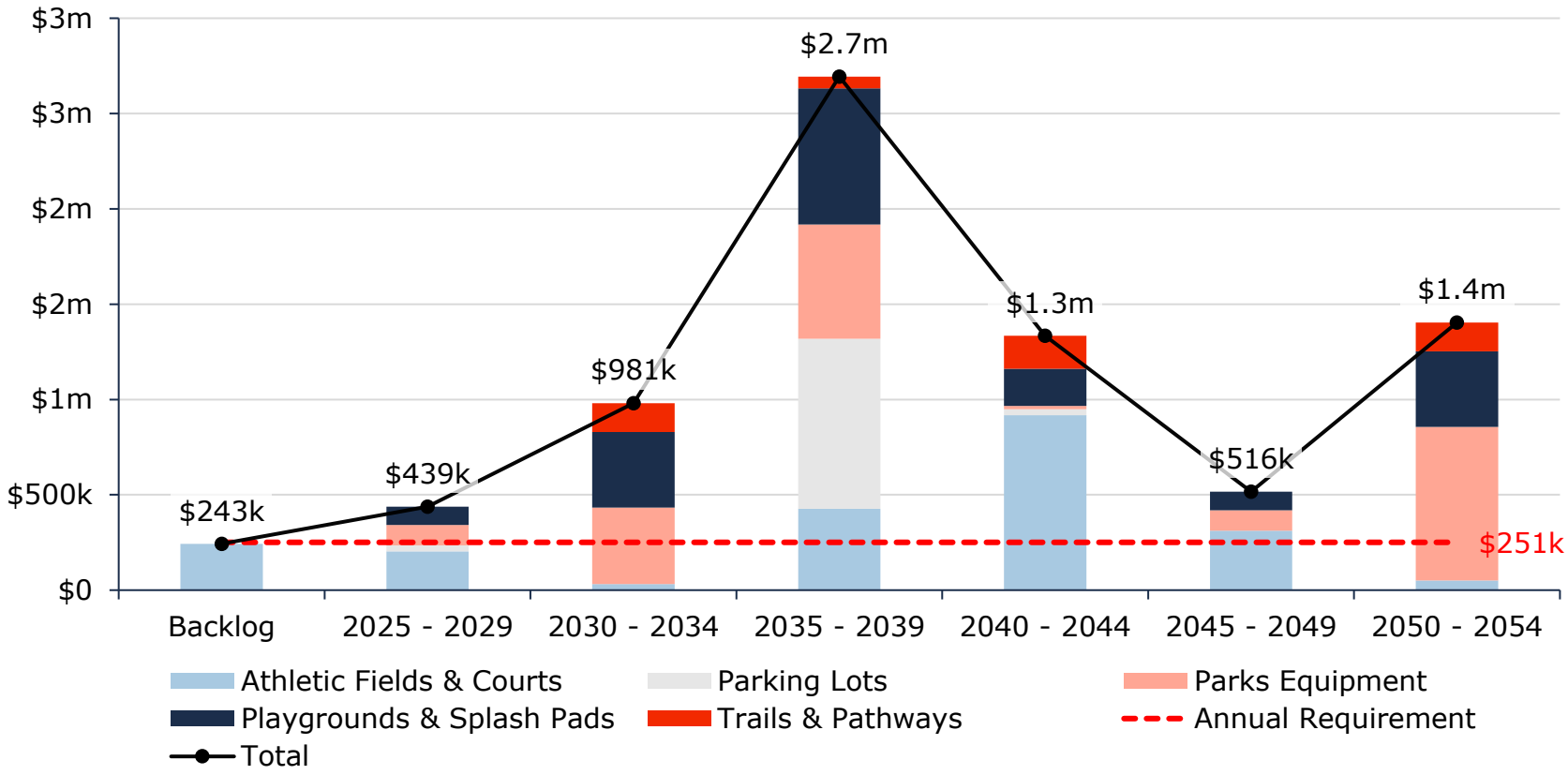


Figure 67: Land Improvements Forecasted Capital Replacement Requirements

It is unlikely that all land improvements will need to be replaced as forecasted. Coordinated projects may help drive replacements and rehabilitations.

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register, which was limited to asset age, replacement cost, and useful life.

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Athletic Fields & Courts	$91k	$73k	-	$40k	-	$5k	-	-	$27k	-
Parking Lots	-	-	-	-	$31k	-	-	-	-	-
Parks Equipment	$39k	$68k	-	-	-	-	$401k	-	-	-
Playgrounds & Splash Pads	-	-	$22k	-	$74k	-	$123k	$176k	-	$98k
Trails & Pathways	-	-	-	-	-	-	-	$109k	$42k	-
Total	**$131k**	**$141k**	**$22k**	**$40k**	**$105k**	**$5k**	**$524k**	**$284k**	**$70k**	**$98k**

Table 38 Land Improvements System-Generated 10-Year Capital Costs

Consistent data updates, especially condition, will improve the alignment between the system-generated expenditure requirements, and the Township's capital expenditure forecasts.

11.6. Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix D: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

1 - 4 Very Low $370,826 (6%)	5 - 7 Low $656,448 (11%)	8 - 9 Moderate $728,202 (12%)	10 - 14 High $1,938,375 (32%)	15 - 25 Very High $2,455,878 (40%)

Figure 68: Land Improvement Risk Matrix

This is a high-level model developed by Township staff and it should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. 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.

11.6.1. Risks to Current Asset Management Strategies

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

Community Expectations

Community expectations are very high for land improvement assets, including parks, playgrounds, athletic courts, etc. Township staff are finding it difficult to prioritize community wants due to budget capacity constraints and available funding.

11.7. Current Levels of Service

The following tables identify the Township's metrics to identify their current level of service for Land Improvement assets.

11.7.1. Community Levels of Service

The following table outlines the quantitative metrics that determine the community level of service provided by the municipal Land Improvements.

Values	Technical Metric	Current LOS (2023)
Scope	Description of the current condition of land improvement assets and the plans that are in place to maintain or improve the provided level of service	The overall condition of land improvements in the Township are moderate. Consistent inspections performed by the Township ensure that Land Improvement assets remain in an adequate state of repair.

Table 39 Land Improvements Community Levels of Service

11.7.2. Technical Levels of Service

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

Values	Technical Metric	Current LOS (2023)
Scope	Average Condition Rating	Fair (46%)
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	1.2% - 4.1%

Table 40 Land Improvements Technical Levels of Service

11.8. Proposed Levels of Service

As per O. Reg. 588/17, by July 1, 2025, municipalities are required to consider proposed levels of service (PLOS), discuss the associated risks and long-term sustainability of these service levels, and explain the municipality's ability to afford the PLOS.

The tables and graphs below explain the proposed levels of service scenarios that were analyzed for Land Improvement assets. Further PLOS analysis at the portfolio level can be found in Proposed Levels of Service Scenario Analysis.

11.8.1. PLOS Scenarios Analyzed

Scenario	Description
Scenario 1: Achieving Full Funding in 15 Years	This scenario assumes a phased tax increase of approximately 3.4% annually, reaching full funding within 15 years
Scenario 2: Achieving 75% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 2.4% annually, reaching 75% funding within 15 years
Scenario 3: Achieving 50% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 1.2% annually, reaching 50% funding within 15 years

Table 41: PLOS Scenarios Analyzed

11.8.2. PLOS Analysis Results

The following table presents the outcomes for three funding scenarios, illustrating how varying levels of capital investment impact asset condition, risk, and overall performance over time.

Scenario	Technical LOS Outcomes	Initial Value (2025)	10 Year Projection (2035)	25 Year Projection (2050)	Scenario Average
Scenario 1	Average Condition	39.41%	26.72%	44.63%	41.64%
	Average Asset Risk	12.77	15.3	11.99	12.54
	Average Annual Investment		$250,803		
	Capital re-investment rate		4.0%		
Scenario 2	Average Condition	39.41%	23.46%	34.86%	33.03%
	Average Asset Risk	12.77	15.68	13.81	14.1
	Average Annual Investment		$188,102		
	Capital re-investment rate		3.0%		
	Average Condition	39.41%	19.64%	21.04%	23.04%

Scenario 3	Average Asset Risk	12.77	16.26	15.96	15.74
	Average Annual Investment		$125,401		
	Capital re-investment rate		2.0%		

Table 42: Land Improvements pLOS Scenario Analysis

The following figure illustrates the projected condition of the asset category under each of the three investment level scenarios, demonstrating how varying reinvestment strategies impact overall asset condition over time.

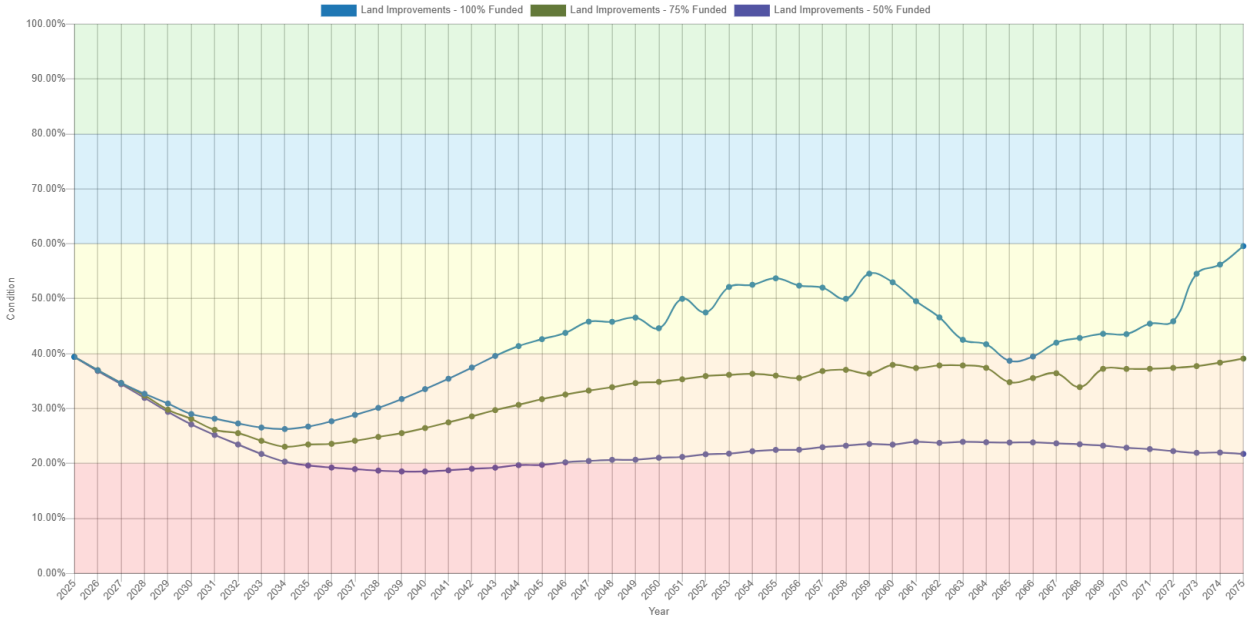


Figure 69: Land Improvements Scenario Comparison

12. Machinery & Equipment

12.1. State of the Infrastructure

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

- Landscaping equipment
- Fire equipment
- Library collections

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

Replacement Cost	Condition	Financial Capacity	
$8,916,951	Fair (47%)	Annual Requirement:	$631,839
		Funding Available:	$422,822
		Annual Deficit:	$209,017

12.2. Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
General Government	6	Assets	CPI	$309,013
Library Equipment	1,718	Assets	CPI	$1,624,382
Parks & Recreation	96	Assets	CPI	$2,793,129
Protective Equipment	930	Assets	CPI	$2,850,252
Public Works	29	Assets	CPI	$1,340,175
Total				**$8,916,951**

The graph below displays the total replacement cost of each asset segment in the Essa's Machinery & Equipment inventory.

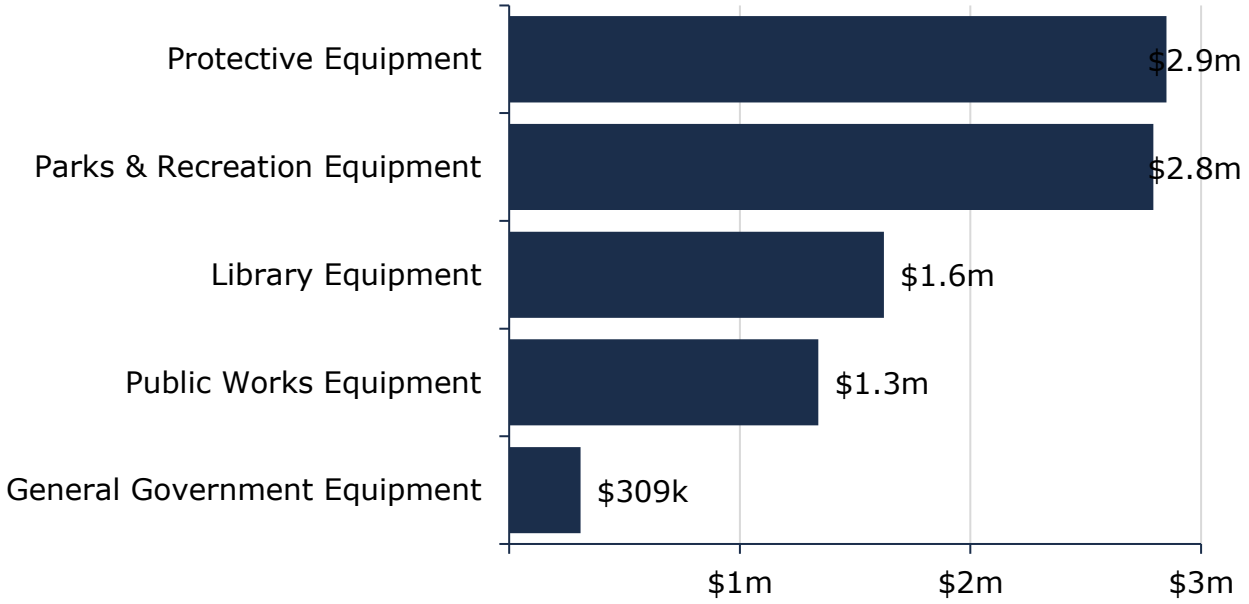


Figure 70: Machinery & Equipment Replacement Costs

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

12.3. Asset Condition & Age

The graph below identifies the average age and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

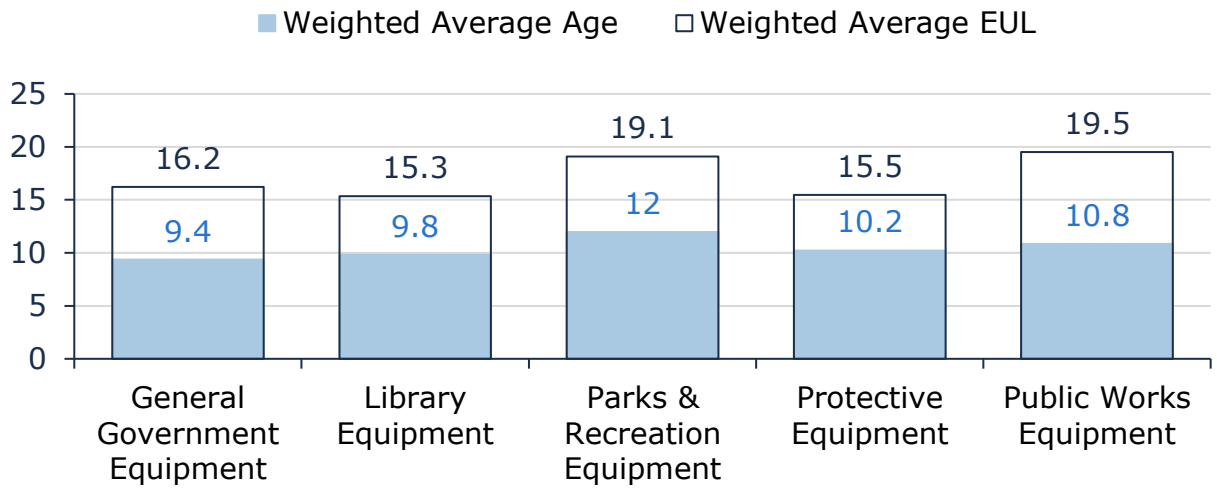


Figure 71: Machinery & Equipment Average Age vs Average EUL

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

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

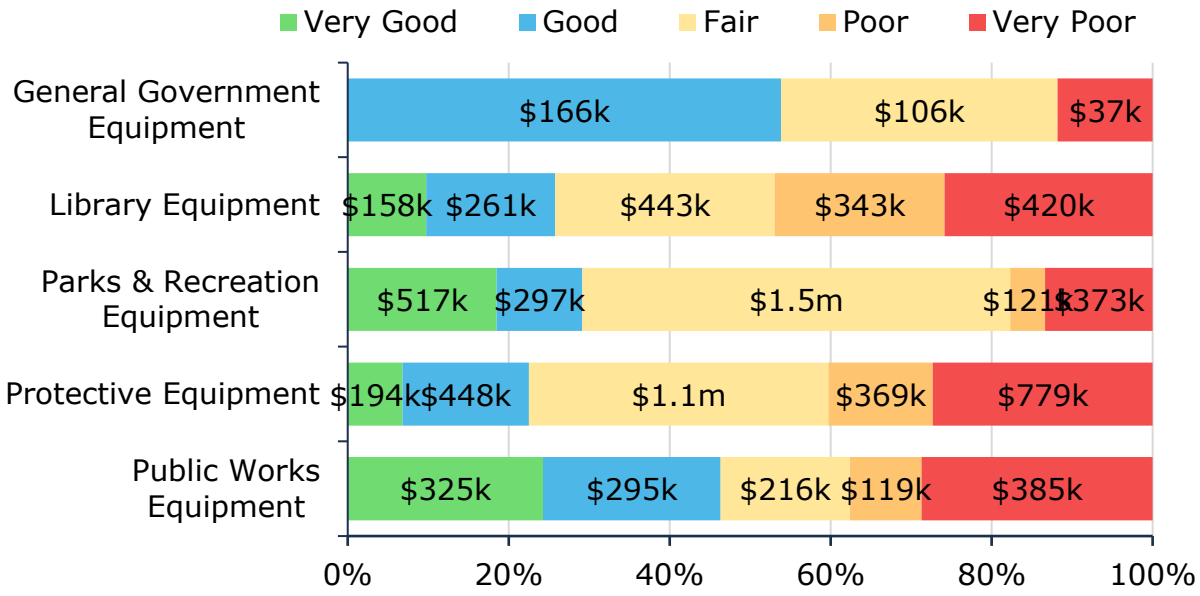


Figure 72: Machinery & Equipment Condition Breakdown

To ensure that the Township's equipment continues to provide an acceptable level of service, Essa should continue to monitor the average condition. 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.

12.3.1. Current Approach to Condition Assessment

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:

- Fire equipment is inspected in accordance with national fire protection association (NFPA). Self-contained breathing apparatuses (SCBAs) also undergo hydrostatic testing annually.
- Annual fire hose testing is completed and given a pass/fail
- Specific components such as generators, HVAC, and elevators are assessed on a cyclical basis as is required by the Building Code Act and manufacturer recommendations.
- Playground equipment is assessed by certified staff based on Canadian Standards Association (CSA) guidelines

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 meet the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

Maintenance / Rehabilitation / Replacement

- Maintenance program varies by department
- Fire Protection Services equipment is subject to a much more rigorous inspection and maintenance program compared to most other departments
- Machinery and equipment is maintained according to manufacturer recommended actions and supplemented by the expertise of municipal staff
- The replacement of machinery and equipment depends on deficiencies identified by operators that may impact their ability to complete required tasks, and identified standards for fire and playground equipment

Figure 73: Machinery & Equipment Current Lifecycle Strategy

12.5. 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 49 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $632,000.

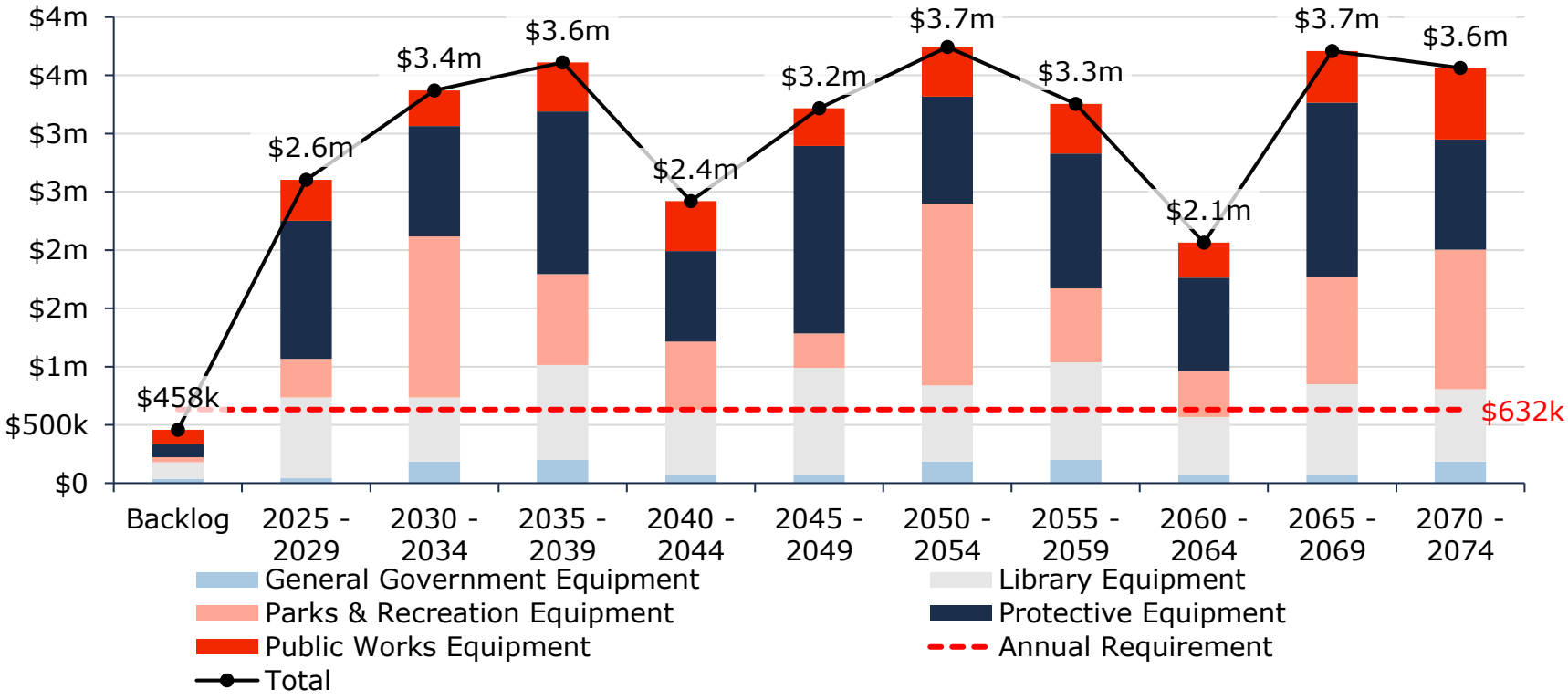


Figure 74: Machinery & Equipment Forecasted Capital Replacement Requirements

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
General Government Equipment	-	-	-	$41k	-	$37k	-	-	$41k	$106k	-
Library Equipment	$125k	$122k	$170k	$153k	$126k	$134k	$84k	$150k	$169k	$16k	$125k
Parks & Recreation Equipment	$55k	$75k	-	$114k	$87k	$44k	$190k	$14k	$110k	$1.0m	$55k

Protective Equipment	$105k	$500k	$178k	$283k	$119k	$123k	$356k	$94k	$16k	$358k	$105k
Public Works Equipment	$222k	$18k	$23k	$89k	-	$32k	$208k	-	-	$66k	$222k
Total	**$507k**	**$714k**	**$371k**	**$680k**	**$332k**	**$370k**	**$837k**	**$258k**	**$337k**	**$1.6m**	**$507k**

Table 43: Machinery & Equipment System-Generated 10-Year Capital Costs

As no assessed condition data was available for the equipment, only age was used to determine forthcoming replacement needs. These projections can be different from actual capital forecasts. Consistent data updates, especially condition, will improve the alignment between the system-generated expenditure requirements, and the Township's capital expenditure forecasts.

12.6. Risk & Criticality

The 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 available inventory data. See Appendix D: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$123,510,365 (29%)	$77,014,669 (18%)	$98,333,338 (23%)	$87,919,469 (20%)	$46,467,830 (11%)

Figure 75: Machinery & Equipment Risk Matrix

This is a high-level model developed by Township staff and it should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. 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.

12.6.1. Risks to Current Asset Management Strategies

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

Regulatory Requirements

Regulatory requirements and standards mandate the replacement of many municipally owned machinery, particularly fire assets. While an asset may still be in good condition, it must be replaced based regulatory requirements due to its age. A concern for the Township is aging assets, risking fire elements not meeting safety requirements. Although this is not a concern currently, it may become critical over time if fire assets are not managed proactively.

12.7. Current Levels of Service

The following tables identify the Township's metrics to identify their current level of service for Machinery & Equipment.

12.7.1. Community Levels of Service

The following table outlines the qualitative metrics that determine the community level of service provided by equipment.

Values	Technical Metric	Current LOS (2023)
Scope	Description of the current condition of municipal machinery & equipment and the plans that are in place to maintain or improve the provided level of service	The overall condition of machinery & equipment in the Township is fair. Township staff work to ensure all machinery & equipment assets remain in an adequate state of repair, with particular emphasis on fire and playground equipment, which is dictated by safety standards.

Table 44 Machinery & Equipment Community Levels of Service

12.7.2. Technical Levels of Service

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

Values	Technical Metric	Current LOS (2023)
Scope	Average condition of Machinery & Equipment	47%

	% of machinery & equipment where asset age exceeds useful life (excludes fire assets)	5%
	Lead time for Fire equipment	1 Year
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.8% - 6.3%

Table 45 Machinery & Equipment Technical Levels of Service

12.8. Proposed Levels of Service

As per O. Reg. 588/17, by July 1, 2025, municipalities are required to consider proposed levels of service (PLOS), discuss the associated risks and long-term sustainability of these service levels, and explain the municipality's ability to afford the PLOS.

The tables and graphs below explain the proposed levels of service scenarios that were analyzed for Machinery & Equipment. Further PLOS analysis at the portfolio level can be found in Proposed Levels of Service Scenario Analysis.

12.8.1. PLOS Scenarios Analyzed

Scenario	Description
Scenario 1: Achieving Full Funding in 15 Years	This scenario assumes a phased tax increase of approximately 3.4% annually, reaching full funding within 15 years
Scenario 2: Achieving 75% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 2.4% annually, reaching 75% funding within 15 years
Scenario 3: Achieving 50% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 1.2% annually, reaching 50% funding within 15 years

Table 46: PLOS Scenarios Analyzed

12.8.2. PLOS Analysis Results

The following table presents the outcomes for three funding scenarios, illustrating how varying levels of capital investment impact asset condition, risk, and overall performance over time.

Scenario	Technical LOS Outcomes	Initial Value (2025)	10 Year Projection (2035)	25 Year Projection (2050)	Scenario Average
Scenario 1	Average Condition	38.16%	34.29%	42.71%	42.95%
	Average Asset Risk	10.49	10.67	9.93	9.6

	Average Annual Investment		$631,839		
	Capital re-investment rate		7.1%		
Scenario 2	Average Condition	38.16%	31.33%	42.29%	38.92%
	Average Asset Risk	10.49	10.86	9.59	9.98
	Average Annual Investment		$473,879		
	Capital re-investment rate		5.3%		
Scenario 3	Average Condition	38.16%	27.78%	33.04%	32.32%
	Average Asset Risk	10.49	11.46	10.75	10.71
	Average Annual Investment		$315,920		
	Capital re-investment rate		3.5%		

Table 47: Machinery & Equipment pLOS Scenario Analysis

The following figure illustrates the projected condition of the asset category under each of the three investment level scenarios, demonstrating how varying reinvestment strategies impact overall asset condition over time.

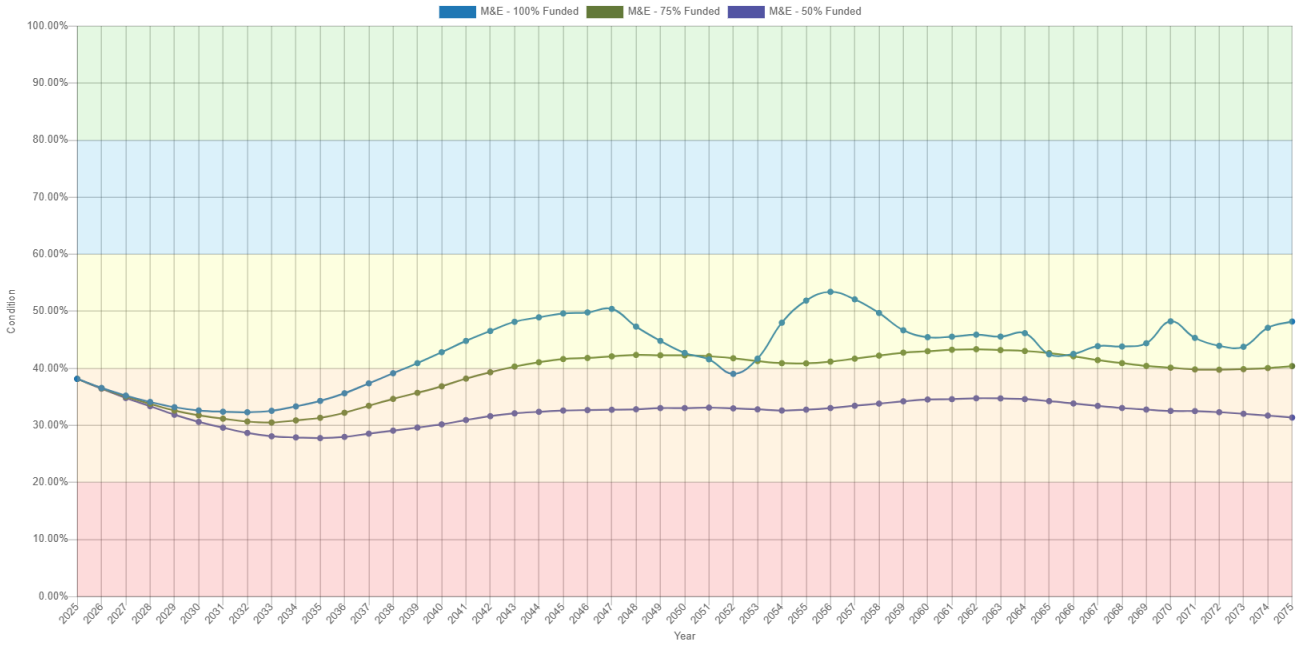


Figure 76: Machinery & Equipment Scenario Comparison

13. Vehicles

13.1. State of the Infrastructure

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

- fire rescue vehicles
- pick-up trucks
- backhoes, bulldozers and graders

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

Replacement Cost	Condition	Financial Capacity	
$15,701,970	Fair (46%)	Annual Requirement:	$994,863
		Funding Available:	$125,916
		Annual Deficit:	$868,948

13.2. Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
General Government Vehicles	2	Quantity	CPI	$45,664
Parks & Recreation	7	Quantity	CPI	$375,516
Protection Vehicles	17	Quantity	CPI	$8,798,635
Public Works Vehicles	27	Quantity	CPI	$6,482,155
Total				**$15,701,970**

The graph below displays the total replacement cost of each asset segment in the vehicle inventory.

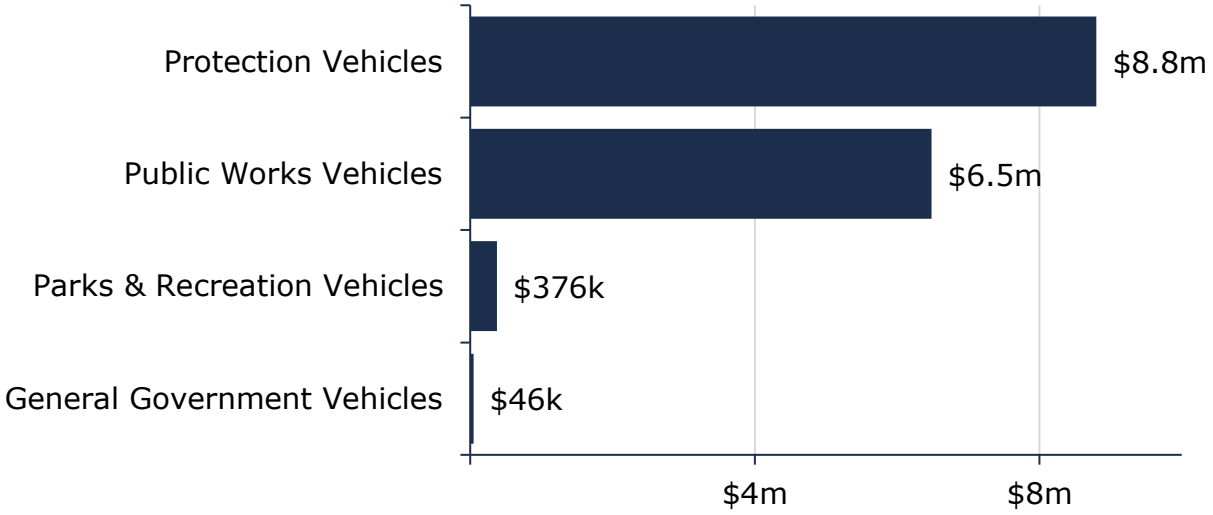


Figure 77: Vehicle Replacement Costs

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

13.3. Asset Condition & Age

The graph below identifies the average age and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

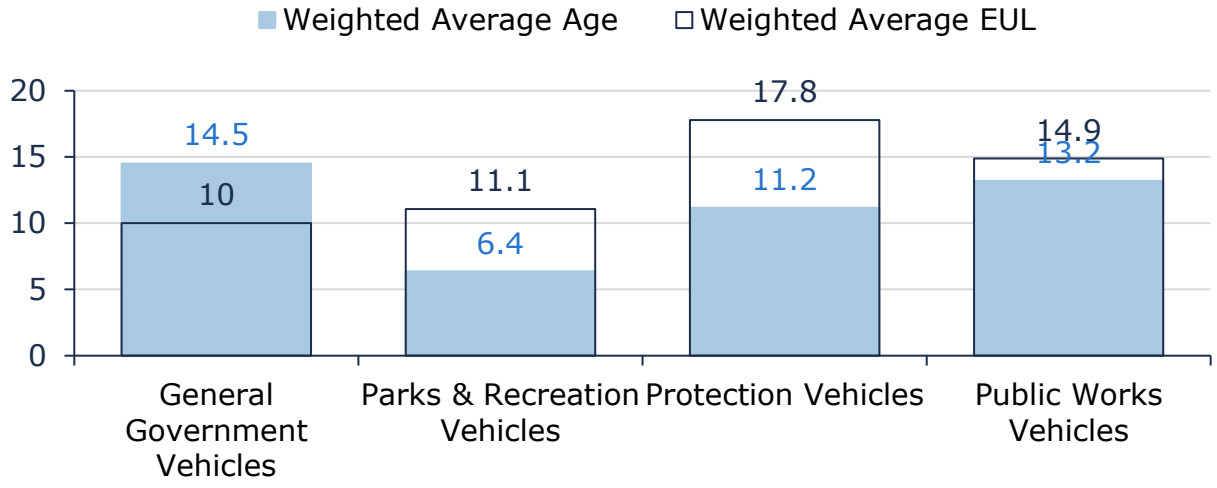


Figure 78: Vehicles Average Age vs Average EUL

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

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

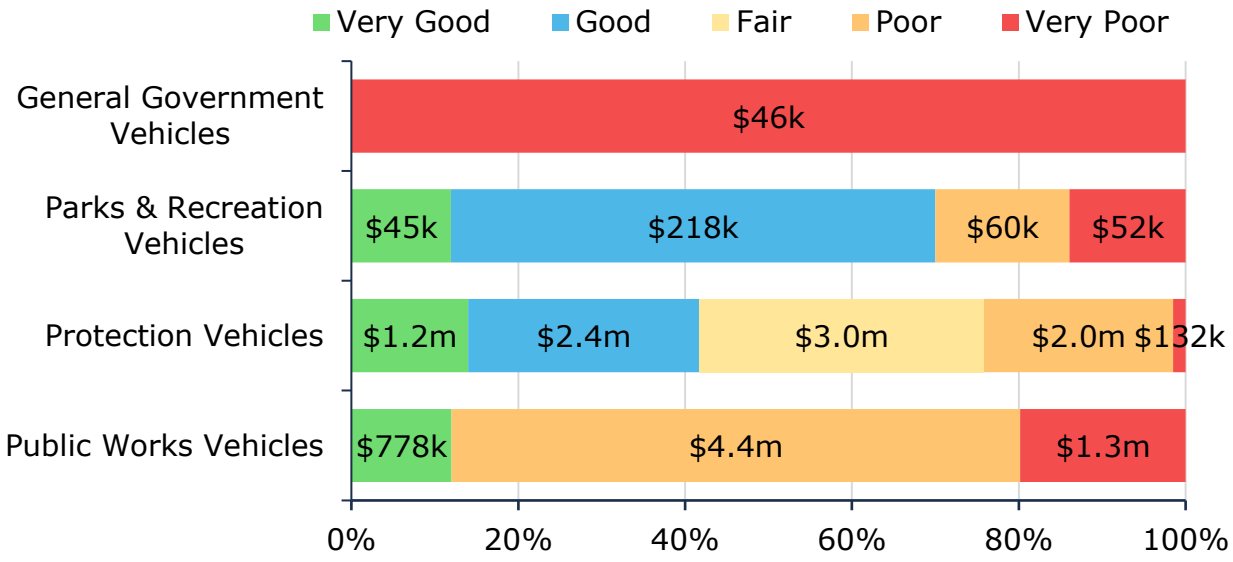


Figure 79: Vehicles Condition Breakdown

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.

13.3.1. Current Approach to Condition Assessment

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

- Staff complete daily visual inspections of vehicles to ensure they are in state of adequate repair prior to operation and document deficiencies
- Annual Commercial Vehicle Operators Registration (CVOR) inspections are completed for applicable vehicles, including vehicles with Z designation (air brakes)
- Fire vehicles are assessed annually in compliance with the National Fire Protection Association (NFPA).

13.4. Lifecycle Management Strategy

The condition or performance of assets will deteriorate over time. To ensure vehicles are performing as expected, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

Maintenance / Rehabilitation / Replacement

- Visual inspections are completed and documented daily
- Annual preventative maintenance activities include rusting spray completed by contractors for all vehicles
- Vehicle age, kilometres and annual repair costs are taken into consideration when determining appropriate treatment options
- Fire vehicles have a replacement schedule based on National Fire Protection Association (NFPA) guidelines

Figure 61: Vehicles Current Lifecycle Strategy

13.5. Forecasted 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 forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $995k.

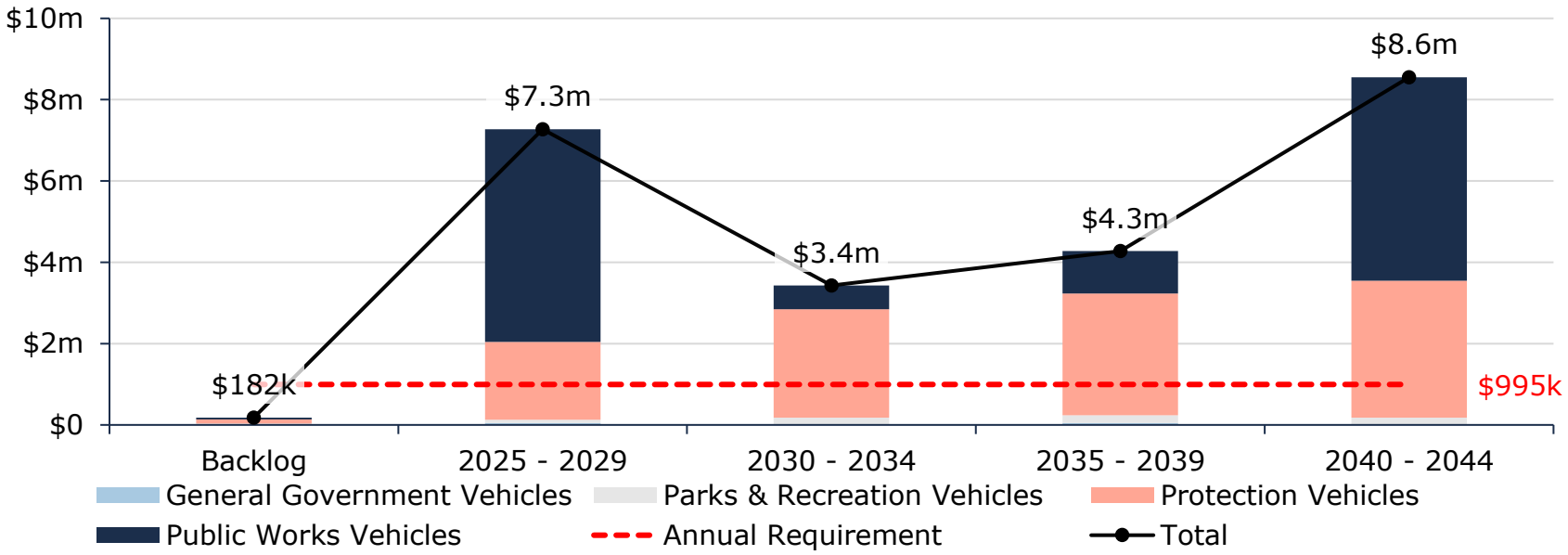


Figure 80: Vehicle Forecasted Capital Replacement Requirements

Table 48 below summarizes the projected cost of lifecycle activities (capital replacement only) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
General Government Vehicles	-	$46k	-	-	-	-	-	-	-	-
Parks & Recreation Vehicles	-	$21k	-	$60k	-	-	-	$138k	$45k	-
Protection Vehicles	-	$26k	-	-	$1.9m	$106k	-	$24k	$750k	$1.8m
Public Works Vehicles	-	$1.2m	-	$311k	$3.7m	-	$430k	$45k	$111k	-
Total	**-**	**$1.3m**	**-**	**$371k**	**$5.6m**	**$106k**	**$430k**	**$207k**	**$906k**	**$1.8m**

Table 48 Vehicles System-Generated 10-Year Capital Costs

As no assessed condition data was available for the vehicles, only age was used to determine forthcoming replacement needs. These projections can be different from actual capital forecasts. Consistent data updates, especially condition, will improve the alignment between the system-generated expenditure requirements, and the Township's capital expenditure forecasts.

13.6. Risk & Criticality

The 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 available inventory data. See Appendix D: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

1 - 4 Very Low $1,329,209 (8%)	5 - 7 Low $1,278,678 (8%)	8 - 9 Moderate $214,604 (1%)	10 - 14 High $2,804,143 (18%)	15 - 25 Very High $10,075,336 (64%)

Figure 81: Vehicles Risk Matrix

This is a high-level model developed by Township staff and it should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. 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.

13.6.1. Risks to Current Asset Management Strategies

Organizational Capacity

Both short- and long-term planning requires the regular collection of infrastructure data to support asset management decision-making. Staff find it a continuous challenge to dedicate resources and time towards data collection and condition assessments to ensure that vehicle condition and asset attribute data is regularly reviewed and updated.

13.7. Current Levels of Service

The following tables identify the Township's metrics to identify their current level of service for municipal Vehicles.

13.7.1. Community Levels of Service

The qualitative descriptions that determine the community levels of service provided by municipal vehicles are based on the service usage outlined below:

Values	Technical Metric	Current LOS (2023)
Scope	Description of the current condition of municipal vehicles and the plans that are in place to maintain or improve the provided level of service	The overall condition of the vehicles in the Township is fair. The daily inspections completed by Township staff have been effective in identifying required maintenance and rehabilitation activities to ensure the state of the vehicles remain in adequate condition

Table 49 Vehicles Community Levels of Service

13.7.2. Technical Levels of Service

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

Values	Technical Metric	Current LOS (2023)
Scope	Average Condition Rating (excluding Fire Vehicles)	Fair (47%)
	Average Condition Rating of Fire Vehicles	Fair (55%)
	Lead time for replacement of light duty vehicles	1 year
	Lead time for replacement of heavy-duty vehicles	3 years
	Lead time for replacement of fire vehicles	3 years
	% of vehicles that are fuel efficient	15%
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.8% - 6.3%

Table 50 Vehicles Technical Levels of Service

13.8. Proposed Levels of Service

As per O. Reg. 588/17, by July 1, 2025, municipalities are required to consider proposed levels of service (PLOS), discuss the associated risks and long-term sustainability of these service levels, and explain the municipality's ability to afford the PLOS.

The tables and graphs below explain the proposed levels of service scenarios that were analyzed for municipal Vehicles. Further PLOS analysis at the portfolio level can be found in Proposed Levels of Service Scenario Analysis.

13.8.1. PLOS Scenarios Analyzed

Scenario	Description
Scenario 1: Achieving Full Funding in 15 Years	This scenario assumes a phased tax increase of approximately 3.4% annually, reaching full funding within 15 years
Scenario 2: Achieving 75% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 2.4% annually, reaching 75% funding within 15 years
Scenario 3: Achieving 50% Funding in 15 Years	This scenario assumes a phased tax increase of approximately 1.2% annually, reaching 50% funding within 15 years

Table 51: PLOS Scenarios Analyzed

13.8.2. PLOS Analysis Results

The following table presents the outcomes for three funding scenarios, illustrating how varying levels of capital investment impact asset condition, risk, and overall performance over time.

Scenario	Technical LOS Outcomes	Initial Value (2025)	10 Year Projection (2035)	25 Year Projection (2050)	Scenario Average
Scenario 1	Average Condition	34.26%	21.73%	52.12%	39.71%
	Average Asset Risk	16.86	18.59	12.27	14.74
	Average Annual Investment		$994,863		
	Capital re-investment rate		6.3%		
Scenario 2	Average Condition	34.26%	15.68%	29.91%	27.04%
	Average Asset Risk	16.86	19.68	16.67	17.38
	Average Annual Investment		$746,148		
	Capital re-investment rate		4.8%		
Scenario 3	Average Condition	34.26%	9.47%	13.14%	13.74%
	Average Asset Risk	16.86	20.9	19.9	19.81
	Average Annual Investment		$497,432		
	Capital re-investment rate		3.1%		

Table 52: Vehicles pLOS Scenario Analysis

The following figure illustrates the projected condition of the asset category under each of the three investment level scenarios, demonstrating how varying reinvestment strategies impact overall asset condition over time.

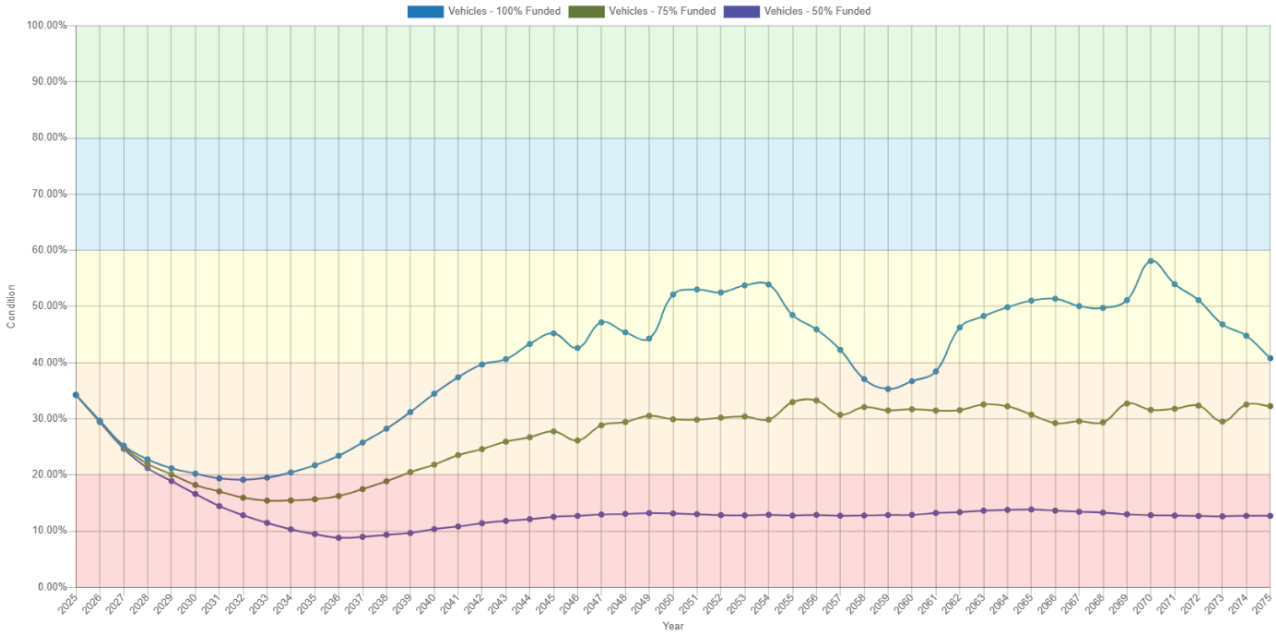


Figure 82: Vehicles Scenario Comparison

Strategies

14. Financial Strategy

14.1. Financial Strategy Overview

Each year, the Township of Essa makes important investments in its infrastructure's maintenance, renewal, rehabilitation, and replacement to ensure assets remain in a state of good repair. However, spending needs typically exceed fiscal capacity. In fact, most municipalities continue to struggle with annual infrastructure deficits. Achieving full-funding for infrastructure programs will take many years and should be phased-in gradually to reduce burden on the community.

This plan identifies the financial requirements necessary to meet the identified proposed levels of service. These requirements are based on the financial requirements for existing assets as of December 31, 2024. However, the required funding is based on meeting the proposed levels of service, with consideration for any additional financial impacts from economic and population growth. The financial plan considers and accounts for traditional and non-traditional sources of municipal funding.

This financial strategy is designed around two key elements: the average annual capital requirement, and the average annual capital funding currently available. The annual requirement is calculated based on the replacement cost and service life of each asset, and, where possible, includes lifecycle modeling. These values are then aggregated to determine category-level funding needs.

Available capital funding is based on an average of historical capital expenditure, including contributions to capital reserves. For Essa, average spending from 2022 and 2023 was used to establish a baseline projection of available capital funding.

Only reliable and predictable sources of capital funding are used to benchmark funds that may be available on any given year. The funding sources include:

- Revenue from taxation allocated to reserves for capital purposes
- Revenue from water and wastewater rates allocated to capital reserves
- The Canada Community Benefits Fund (CCBF), formerly the Federal Gas Tax Fund
- The Ontario Community Infrastructure Fund (OCIF)

As part of the Township's commitment to enhancing road safety, revenue generated from the Automated Speed Enforcement (ASE) program will be allocated toward traffic calming measures, with public safety as the primary priority. Any additional funds will be reinvested directly into the road network and bridge infrastructure, supporting long-term sustainability and targeted improvements. By using these funds in this way, the Township can effectively address immediate safety concerns while ensuring the continued maintenance and improvement of its infrastructure. This approach also helps reduce the financial burden on taxpayers, as it allows for the reinvestment of ASE revenues into critical infrastructure improvements, minimizing the need for additional tax increases.

Although provincial and federal infrastructure programs can change with evolving policy, CCBF, and OCIF are considered as permanent and predictable.

14.2. Annual Capital Requirements

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability. For most asset categories the annual requirement has been calculated based on a "replacement only" scenario, in which capital costs are only incurred at the construction and replacement of each asset.

However, for the road network, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented.

The following table compares two scenarios for the road network:

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

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

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Paved Roads	$2,478,971	$1,956,464	$522,507

Table 53: Annual Requirement Comparison

The implementation of a proactive lifecycle strategy for paved roads leads to a potential annual cost avoidance of approximately $523 thousand for the road network. This represents an overall reduction of the annual requirements by 10%.

As the lifecycle strategy scenario represents the lowest cost option available to the Township, we have used this annual requirement in the development of the financial strategy.

The table below outlines the total average annual capital requirements for existing assets in each asset category. Based on a replacement cost of $432.5 million, annual capital requirements total approximately $13.8 million for all the asset categories analysed.

The table also illustrates the system-generated, equivalent target reinvestment rate (TRR), calculated by dividing the annual capital requirements by the total replacement cost of each category. The cumulative target reinvestment for these categories is estimated at 3.2%.

Asset Category	Replacement Cost	Annual Capital Requirements	Target Reinvestment Rate
Road Network	$95,790,390	$4,441,006	4.6%
Bridges & Culverts	$78,437,489	$2,390,363	3.1%
Storm Network	$29,063,090	$473,146	1.6%
Buildings	$51,521,613	$1,659,880	3.2%

Land Improvements	$6,149,729	$250,803	4.1%
Machinery & Equipment	$8,916,951	$631,839	7.1%
Vehicles	$15,701,970	$994,863	6.3%
Water Network	$68,409,494	$1,246,216	1.8%
Sanitary Network	$78,560,504	$1,750,064	2.2%
Total	**$432,551,230**	**$13,838,181**	**3.2%**

Table 54: Average Annual Capital Requirements

Although there is no industry standard guide on optimal annual investment in infrastructure, the TRRs above provide a useful benchmark for organizations. In 2016, the Canadian Infrastructure Report Card (CIRC) produced an assessment of the health of municipal infrastructure as reported by cities and communities across Canada. The CIRC remains a joint project produced by several organizations, including the Federation of Canadian Municipalities (FCM), the Canadian Society of Civil Engineers (CSCE), the Canadian Network of Asset Managers (CNAM), and the Canadian Public Works Association (CPWA).

The 2016 version of the report card also contained recommended reinvestment rates that can also serve as benchmarks for municipalities. The CIRC suggest that, if increased, these reinvestment rates can "stop the deterioration of municipal infrastructure." The report card contains both a range for reinvestment rates that outlines the lower and upper recommended levels, as well as current municipal averages.

14.3. Financial Profile: Tax Funded Assets

14.3.1. Current Funding Levels

The table below summarizes how current funding levels compare with funding required for each asset category. At existing levels, the Township is funding 29.7% of its annual capital requirements for all infrastructure analyzed. This creates a total annual funding deficit of $9.7 million.

Asset Category	Annual Capital Requirements	Annual Funding Available	Annual Infrastructure Deficit	Funding Level
Road Network	$4,441,006	$1,538,155	$2,902,852	34.6%
Bridges & Culverts	$2,390,363	$503,026	$1,887,337	21.0%
Storm Network	$473,146	$41,100	$432,046	8.7%
Buildings	$1,659,880	$258,962	$1,400,918	15.6%
Land Improvements	$250,803	$75,000	$175,803	29.9%
Machinery & Equipment	$631,839	$422,822	$209,017	66.9%
Vehicles	$994,863	$125,916	$868,948	12.7%
Water Network	$1,246,216	$527,240	$718,976	42.3%
Sanitary Network	$1,750,064	$614,667	$1,135,397	35.1%
Total	**$13,838,181**	**$4,106,887**	**$9,731,294**	**29.7%**

Table 55: Current Funding Levels

Asset Category	Avg. Annual Requirement	Annual Funding Available					Annual Deficit
		Taxes	CCBF	OCIF	Reserve Allocation	Total Available	
Road Network	$4,441,006	$307,104	$697,722	$533,328		$1,538,155	$2,902,852
Bridges & Culverts	$2,390,363			$436,359	$66,667	$503,026	$1,887,337
Storm Network	$473,146				$41,100	$41,100	$432,046
Buildings	$1,659,880	$89,187			$169,775	$258,962	$1,400,918
Land Improvements	$250,803	$75,000				$75,000	$175,803
Machinery & Equipment	$631,839	$361,831			$60,992	$422,822	$209,017
Vehicles	$994,863	$125,916				$125,916	$868,948
	$10,841,901	**$959,037**	**$697,722**	**$969,687**	**$338,533**	**$2,964,980**	**$7,876,921**

Table 56: Required Funding vs Current Funding Position

The average annual investment requirement for the above categories is $10,841,901. Annual revenue currently allocated to these assets for capital purposes is $2,964,980 leaving an annual deficit of $7,876,921. Put differently, these infrastructure categories are currently funded at 27.3% of their long-term requirements.

14.3.2. Closing the Gap

Eliminating annual infrastructure funding shortfalls is a difficult and long-term endeavor for municipalities. Achieving recommended funding levels to support the proposed levels of service, while maintaining affordability for residents, will require time and deliberate financial planning.

This section outlines how Essa can gradually work toward closing the annual capital funding shortfall using its own-source revenues, such as property taxes and utility rates. This approach avoids the use of additional debt for existing assets and supports the Township's goal of sustainably increasing investment to maintain and improve service delivery. By phasing in additional funding as financial capacity allows, the Township can begin to align infrastructure spending with service level expectations and the priorities identified through community and stakeholder engagement.

Full Funding Requirements Tax Revenues

In 2024, Essa had an annual tax revenue of $12,135,979. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require a 64.9% tax change over time.

To achieve this increase, several scenarios have been developed using phase-in periods ranging from five to twenty years. Shorter phase-in periods may place too high a burden on taxpayers, whereas a phase-in period beyond 20 years may see a continued deterioration of infrastructure, leading to larger backlogs.

Asset Category	Tax Change Required for Full Funding
Road Network	23.9%
Bridges & Culverts	15.6%
Buildings	11.5%
Vehicles	7.2%
Storm Network	3.6%
Machinery & Equipment	1.7%
Land Improvements	1.4%
	64.9%

Table 57: Phasing in Annual Tax Increases – Full Funding

Funding 100% of annual capital requirements ensures that major capital events, including replacements, are completed as required. Under this scenario, projects are unlikely to be deferred to future years. This delivers the highest asset performance and customer levels of service.

The following changes in costs and/or revenues over the next number of years should also be considered in the financial strategy:

- Essa's debt payments for these asset categories will be decreasing by $150,322 over the next 5 to 10 years.

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above.

	Phase-in Period for full funding			
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	7,876,921	7,876,921	7,876,921	7,876,921
Change in Debt Costs	-8,639	-150,322	-150,322	-150,322
Resulting Infrastructure Deficit:	7,868,282	7,726,599	7,726,599	7,726,599
Tax Increase Required	64.8%	63.7%	63.7%	63.7%
Annually:	**10.6%**	**5.1%**	**3.4%**	**2.5%**

Table 58: Phase-in Period for tax-funded assets

75% Funding Requirements Tax Revenues

As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, achieving 75% of full funding would require a 42.5% tax change over time.

To achieve this increase, several scenarios have been developed using phase-in periods ranging from five to twenty years. Shorter phase-in periods may place too high a burden on taxpayers, whereas a phase-in period beyond 20 years may see a continued deterioration of infrastructure, leading to larger backlogs.

Asset Category	Tax Change Required for 75% of full Funding
Road Network	14.8%
Bridges & Culverts	10.6%
Storm Network	2.6%
Buildings	8.1%
Land Improvements	0.9%
Machinery & Equipment	0.4%
Vehicles	5.1%
	42.5%

Table 59: Phasing in Annual Tax Increases – 75% of full Funding

Funding 75% of the annual capital requirements ensures that major capital events, such as replacements, are completed as needed. While the remaining funding gap will need to be supplemented with other revenue sources, the municipality will also draw from reserves as necessary to support high-priority projects. Project prioritization will help guide the allocation of these funds, ensuring that the most critical infrastructure needs are addressed first. With this approach, most projects are unlikely to be deferred to future years, helping to maintain high asset performance and community service levels.

The following changes in costs and/or revenues over the next number of years should also be considered in the financial strategy:

- Essa's debt payments for these asset categories will be decreasing by $150,322 over the next 5 to 10 years.

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above.

	Phase-in Period for 75% of full funding			
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	5,166,446	5,166,446	5,166,446	5,166,446
Change in Debt Costs	-8,639	-150,322	-150,322	-150,322
Resulting Infrastructure Deficit:	5,157,806	5,016,124	5,016,124	5,016,124
Tax Increase Required	42.5%	41.3%	41.3%	41.3%
Annually:	**7.4%**	**3.6%**	**2.4%**	**1.8%**

Table 60: Phase-in Period for 75% of full funding

Proposed levels of service play a role in the development of the Annual Average Requirement discussed above. For comparison, the tax rate impact for achieving full funding, 75% funding and 50% funding are provided below:

Annual Impact on Taxation				
Change in Levels of Service	**5 Year**	**10 Year**	**15 Year**	**20 Year**
Fully Funded	10.6%	5.1%	3.4%	2.5%
75% Funded	7.4%	3.6%	2.4%	1.8%
50% Funded	3.8%	1.8%	1.2%	0.9%
Recommended	7.4%	3.6%	2.4%	1.8%

Table 61: Scenarios Annual Impact on Taxation

14.3.3. Financial Strategy Recommendations

Considering all the above information, we recommend the 15-year option to achieve 75% of full funding. This involves 75% funding being achieved over 15 years by:

a) Increasing tax revenues by 2.4% each year for the next 15 years solely for the purpose of phasing in 75% funding to the asset categories covered in this section of the AMP.
b) Allocating the current Canada Community-Building Fund (Formerly known as Gas Tax Fund) and OCIF revenue as outlined previously.
c) Increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

d) Continuing annual contributions to the Asset Management Reserve to help bridge the funding gap and support the long-term sustainability of the Township's asset base.
e) Leveraging additional, non-sustainable revenue sources such as one-time grants, surpluses, and reserves, as supplementary funding to advance asset management goals.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable, since this funding is a multi-year commitment[4].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves 75% funding on an annual basis in 15 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $4.9m for the Road Network, $458k for the Machinery & Equipment, $182k for Vehicles, $243k for Land Improvements.

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

14.4. Financial Profile: Rate Funded Assets

14.4.1. Current Funding Levels

The table below summarizes how current funding levels compare with funding required for each asset category. At existing levels, the Township is funding 38.1% of its annual capital requirements for rate-funded infrastructure.

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Rates	CCBF	OCIF	Total Available	
Water Network	$1,246,216	$527,240			$527,240	$407,422
Sanitary Network	$1,750,064	$614,667			$614,667	$697,881
	$2,996,280	**$1,141,907**			**$1,141,907**	**$1,854,373**

Table 62: Required Funding vs Current Funding Position

The average annual investment requirement for the above categories is $2,996,280. Annual revenue currently allocated to these assets for capital purposes is $1,141,907 leaving an annual deficit of $1,854,373. Put differently, these infrastructure categories are currently funded at 38.1% of their long-term requirements.

14.4.2. Closing the Gap

Eliminating annual infrastructure funding shortfalls is a difficult and long-term endeavor for municipalities. Considering the Township's current funding position, it will require many years to reach full funding for current assets.

This section outlines how the Township of Essa can close the annual funding deficits using own-source revenue streams, i.e., utility rates, and without the use of additional debt for existing assets.

Full Funding Requirements Rate Revenues

In 2023, Essa had annual water revenues of $1,946,961 and annual sanitary revenues of $1,961,482. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require a 47.4% rate change over time.

Asset Category	Rate Change Required for Full Funding
Water Network	36.9%
Sanitary Network	57.9%
	47.4%

Table 63: Phasing in Annual Rate Increases

Funding 100% of annual capital requirements ensures that major capital events, including replacements, are completed as required. Under this scenario, projects are unlikely to be deferred to future years. This delivers the highest asset performance and customer levels of service.

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above.

	Water Network				Sanitary Sewer Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	$719k	$719k	$719k	$719k	$1.1m	$1.1m	$1.1m	$1.1m
Decrease in debt payments	N/A	N/A	N/A	N/A	-	-$347k	-$347k	-$347k
Resulting Infrastructure Deficit:	$719k	$719k	$719k	$719k	$1.1m	$788k	$788k	$788k
Rate Increase Required	36.9%	36.9%	36.9%	36.9%	57.9%	40.2%	40.2%	40.2%
Annually:	**6.5%**	**3.2%**	**2.2%**	**1.6%**	**9.6%**	**3.5%**	**2.3%**	**1.8%**

Table 64: Phase-in Period for full funding - Water and Wastewater

Similarly to the Tax Funded asset, the proposed levels of service play a role in the development of the Annual Average Requirement. For comparison, the rate impact for achieving full funding, 75% funding and 50% funding are provided below:

Annual Impact on Rates					
	Changes in Levels of Service	**5 year**	**10 Year**	**15 Year**	**20 Year**
Water	Fully Funded	6.5%	3.2%	2.2%	1.6%
	75% Funded	3.2%	1.6%	1.1%	0.8%
	50% Funded	0.3%	0.2%	0.1%	0.1%
	Recommended	5.9%	2.9%	2.0%	1.5%
	Changes in Levels of Service	**5 year**	**10 Year**	**15 Year**	**20 Year**
Sanitary	Fully Funded	9.6%	3.5%	2.3%	1.8%
	75% Funded	6.3%	1.7%	1.2%	0.9%
	50% Funded	0.0%	0.0%	0.0%	0.0%
	Recommended	9.6%	3.5%	2.3%	1.8%

Table 65: Scenarios Annual Impact on User Rates

Financial Strategy Recommendations

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

a) when realized, reallocating the debt cost reductions of $347 thousand for sanitary services to the applicable infrastructure deficit.
b) increasing rate revenues by 2.2% for water services each year and 2.3% for sanitary services each year for the next 15 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
c) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

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

Although this option achieves full funding on an annual basis in 15 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $3.2m for the Sanitary Network and $2.5m for the Water Network.

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

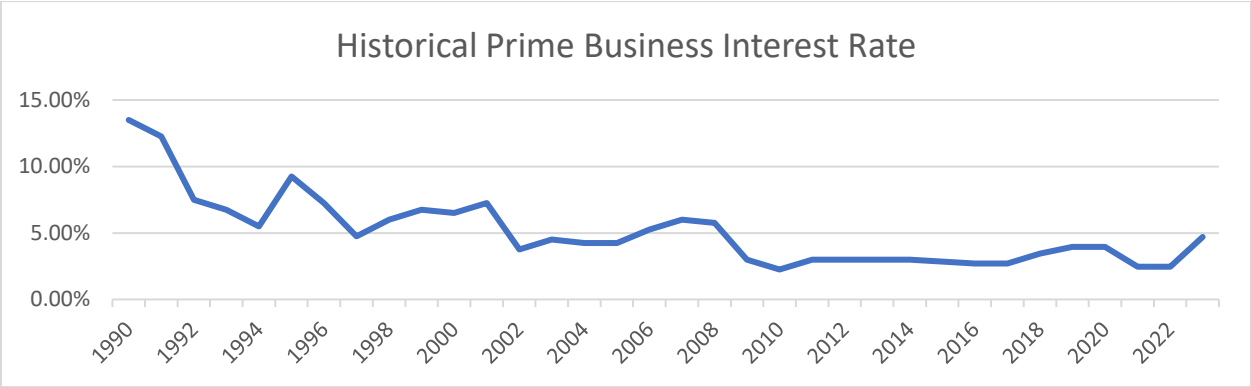
14.5. Use of Debt

Debt can be strategically utilized as a funding source with in the long-term financial plan. The benefits of leveraging debt for infrastructure planning include:

a) the ability to stabilize tax & user rates when dealing with variable and sometimes uncontrollable factors
b) equitable distribution of the cost/benefits of infrastructure over its useful life
c) a secure source of funding

d) flexibility in cash flow management

Debt management policies and procedures with limitations and monitoring practices should be considered when reviewing debt as a funding option. In efforts to mitigate increasing commodity prices and inflation, interest rates have been rising. Sustainable funding models that include debt need to incorporate the now current realized risk of rising interest rates. The following graph shows the historical changes to the lending rates:



A change in 15-year rates from 5% to 7% would change the premium from 45% to 65%. Such a change would have a significant impact on a financial plan.

The following tables outline how Essa has historically used debt for investing in the asset categories as listed. There is currently $3,208,005 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $573,513. This amount is well within the municipality's provincially prescribed maximum of $5,052,174, which is a limit set by the province to ensure that municipalities maintain a responsible level of debt in relation to their financial capacity.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2018	2019	2020	2021	2022
Road Network						
Bridges & Culverts						
Storm Network						
Buildings						
Land Improvements	$967,587	$1.7m	$1.5m	$1.4m	$1.2m	$1.1m
Machinery & Equipment						
Vehicles						

Total Tax Funded:	**$967,587**	**$1.7m**	**$1.5m**	**$1.4m**	**$1.2m**	**$1.1m**
Water Network	$75,346	$780k	$646k	$508k	$368k	$223k
Sanitary Network	$2,165,072	$3.2m	$3.0m	$2.8m	$2.6m	$2.4m
Total Rate Funded:	**$2,240,418**	**$4.0m**	**$3.7m**	**$3.3m**	**$3.0m**	**$2.6m**

Table 66: Use of Debt in the last Five Years

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2024	2025	2026	2027	2028	2029	2034
Road Network							
Bridges & Culverts							
Storm Network							
Buildings							
Machinery & Equipment							
Land Improvements	$150k	$149k	$147k	$145k	$143k	$142k	
Vehicles							
Total Tax Funded:	**$150k**	**$149k**	**$147k**	**$145k**	**$143k**	**$142k**	**0**
Water Network	$76k	-	-	-	-	-	
Sanitary Network	$347k	$347k	$347k	$347k	$347k	$347k	
Total Rate Funded:	**$423k**	**$347k**	**$347k**	**$347k**	**$347k**	**$347k**	**0**

Table 67: Principal & Interest Payments in the Next Ten Years

14.6. Use of Reserves

14.6.1. Available Reserves

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

e) the ability to stabilize tax rates when dealing with variable and sometimes uncontrollable factors
f) financing one-time or short-term investments

g) accumulating the funding for significant future infrastructure investments
h) managing the use of debt
i) normalizing infrastructure funding requirement

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

Asset Category	Balance at December 31, 2023
Road Network	$2,379,800
Bridges & Culverts	$1,934,662
Storm Network	$716,842
Buildings	$1,270,782
Machinery & Equipment	$307,158
Land Improvements	$151,683
Vehicles	$471,499
Total Tax Funded:	**$7,232,426**
Water Network	$7,007,777
Sanitary Network	$3,597,217
Total Rate Funded:	**$10,604,994**

Table 68: Reserve Balances

As part of ongoing efforts to address the infrastructure deficit, the Township has committed to increasing the annual tax contribution towards the Asset Management Reserve starting in 2022. This reserve plays a critical role in bridging the funding gap for infrastructure needs. The annual contributions and reserve balances are as follows:

Reserve Name	2022 Tax allocation to Reserve	2023 Tax allocation to Reserve	2024 Tax allocation to Reserve (Budget)	Balance at December 31, 2024
Asset Management Reserve	$285,000	$417,360	$695,600	**$5,304,590**

Table 69: Asset Management Reserve Allocations

As of 2024, the closing balance of the Asset Management Reserve was $5,304,590, and the anticipated closing balance for 2025 is projected to be $6,528,980, following an estimated 7.5% tax contribution of $931,600.

The Township's commitment to increasing the annual tax contribution ensures a steady and ongoing effort to close the infrastructure funding gap. This reserve is integral to the financial strategy and will continue to be bolstered each year, further supporting long-term asset management goals.

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

a) breadth of services provided
b) age and condition of infrastructure
c) use and level of debt
d) economic conditions and outlook
e) internal reserve and debt policies.

These reserves are available to support reinvestment needs in applicable asset categories during the transition to the Township's chosen funding approach. This allows the scenarios to assume that, if required, available reserves and debt capacity can be used for high priority and emergency infrastructure investments in the short- to medium-term.

15. Growth

15.1. Description of Growth Assumptions

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

15.2. Essa Official Plan (September 2013)

The Township of Essa's Official Plan, approved in July 2001, outlines planning policies to steer the Township's development, focusing on directing growth to serviced Settlement Areas like Angus for urban development, while preserving its rural and agricultural essence.

The Official Plan's goals are to direct key developments to specific regions, maintain land for diverse applications, provide a range of housing options. This will encourage development that blends various densities with open areas and assesses how new developments affect environmental and cultural landscapes. It allows for lower density development in Thornton and Baxter, with potential for water system expansion, and permits limited development in Utopia, Colwell, and Ivy that aligns with their current development plan.

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

Historical Figures	1996	2001	2006	2011	2016	2021
Population	16,363	16,808	16,901	18,505	21,083	22,970
Population Change	N/A	2.7%	0.6%	9.5%	13.9%	9.0%
Private Dwellings	N/A	5,943	6,212	6,408	7,478	8,232

The Township of Essa is in the process of developing a new Official Plan to update the existing policies and ensure alignment with the latest provincial guidelines and the evolving needs of the community. SGL Planning & Design Inc. and Dillon Consulting have been chosen to lead the Official Plan Review for the Township.

The finalization and adoption of the updated Official Plan are expected to take place in the summer and fall of 2025, with the process anticipated to be completed by the end of the year.

15.3. Essa Strategic Plan (2022-2026)

The Township of Essa's Strategic Plan focuses on addressing challenges related to growth, aging infrastructure, and staff retention. Developed after a December 2022 planning session with Council, the plan prioritizes several key areas. The Township aims to enhance recreational opportunities by creating new green spaces, expanding parks, and increasing trails. It also seeks to develop a safe, accessible transportation network by adding traffic calming measures, crosswalks, and paving all roads.

The plan includes completing Environmental Assessments for water and wastewater projects in Angus and supporting continued housing development in line with a Servicing Policy. Efforts to attract industrial land will help reduce the tax burden.

Council's main goals are staff retention, infrastructure, and road safety, with priorities including road repairs, pedestrian improvements, and recreational programming. Moving forward, Council will review progress annually during budget deliberations to adjust priorities and ensure responsive growth.

15.4. County of Simcoe Official Plan (November 2008)

The County of Simcoe Official Plan, adopted by the County Council on November 25, 2008, and updated on January 22, 2013, aligns with Provincial policies, including the Growth Plan and Lake Simcoe Protection Plan.

The Official Plan outlines growth management strategies for its municipalities including Essa, focusing on directing development to serviced settlement areas, managing resource-based development, protecting natural and cultural heritage, and developing complete communities with economic diversity and housing options. The plan emphasizes directing new development to settlement areas, promoting intensification within built boundaries to achieve compact communities, and establishing density and intensification targets to guide development.

The 2031 population forecast for the Township's settlement areas was set at 21,500. However, census data from 2021 already shows a population of 22,970, suggesting that Essa is expanding faster than anticipated. To support this accelerated growth, the Township may need to consider further enhancements to existing infrastructure.

15.5. Development Charges Background Study (2023)

Essa Township is growing steadily, with an expected population increase of more than 4,000 people and almost 1,400 new jobs by 2032. This growth is expected to occur mostly in the Angus area and will lead to more homes, businesses, and demand for services.

While this Asset Management Plan focuses on the Township's existing infrastructure, growth projections from the 2023 Development Charges Background Study were considered as part of long-term planning. These forecasts help the Township:

- Plan future infrastructure projects in high-growth areas
- Understand how service demands will change over time
- Ensure capital costs from growth are shared fairly between new and existing residents

As new infrastructure is added to support development, the Township is planning ahead by setting aside funds for future rehabilitation and replacement. For example, by 2033, the Township will need to contribute over $2.8 million each year to support the long-term costs of new infrastructure tied to growth, such as roads, water, sewer, and community facilities.

Although development charges help fund growth-related projects, not all costs are covered. The Township also plans for the portion of costs that benefit the existing community, including ongoing maintenance and operating costs. This is part of ensuring that growth is financially sustainable and that essential services remain reliable for both current and future residents.

15.5.1. Impact of Growth on Lifecycle Activities

The Township's Development Charges Background Study provides detailed population, housing, and employment growth forecasts, offering important insight into how demand for municipal services and infrastructure will evolve over time. These projections, along with planning direction from the Township's Official Plan and County of Simcoe growth strategies, help shape a forward-looking approach to asset management and capital investment.

Although this Asset Management Plan focuses on existing assets, growth expectations have informed the Township's broader lifecycle and financial planning. In particular, the DC Study estimates that over 1,700 new households and 1,400 new jobs will be added by 2032, leading to increased pressure on infrastructure, especially in high-growth areas like Angus. The Township has already identified future capital needs and calculated annual funding provisions to address the long-term costs of newly constructed, growth-related assets.

Lifecycle costs associated with new infrastructure such as roads, water, wastewater, and community facilities, are being considered through the Township's DC strategy and are expected to be funded in part through annual contributions to reserves. By 2033, it is anticipated that over $2.8 million per year will be needed to support the full lifecycle replacement of DC-funded infrastructure. While development charges cover a portion of these costs, the Township also plans for operating expenses and replacement costs that fall outside the scope of DC eligibility.

As new subdivisions are built and infrastructure is assumed by the Township, those assets will be integrated into future AMP updates. In the meantime, Essa's asset management approach remains adaptable, using scalable, phased investment strategies and financial tools to maintain service levels in the face of ongoing growth. This growth-aware planning ensures the Township is positioned to manage both current and future infrastructure demands in a fiscally responsible and sustainable way.

16. Recommendations & Key Considerations

16.1. Financial Strategies

1. Review the feasibility of adopting the funding required to meet the proposed levels of service for the asset categories analyzed. This includes:
    a. Increasing taxes by 2.4% per year over a period of 15 years;
    b. Increasing water rates by 2.2% per year over a period of 15 years; and
    c. Increasing sanitary rates by 2.3% per year over a period of 15 years.
2. Continued allocation of OCIF and CCBF funding as previously outlined.
3. Reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
4. Increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.
5. Continue to apply for project specific grant funding to supplement sustainable funding sources

16.2. Asset Data

1. Continuously review, refine, and calibrate lifecycle and risk profiles to better reflect actual practices and improve capital projections. In particular:
    a. the timing of various lifecycle events, the triggers for treatment, anticipated impacts of each treatment, and costs
    b. the various attributes used to estimate the likelihood and consequence of asset failures, and their respective weightings
2. Asset management planning is highly sensitive to replacement costs. Periodically update replacement costs based on recent projects, invoices, or estimates, as well as condition assessments, or any other technical reports and studies. Material and labour costs can fluctuate due to local, regional, and broader market trends, and substantially so during major world events. Accurately estimating the replacement cost of like-for-like assets can be challenging. Ideally, several recent projects over multiple years should be used. Staff judgement and historical data can help attenuate extreme and temporary fluctuations in cost estimates and keep them realistic.
3. Like replacement costs, an asset's established serviceable life can have dramatic impacts on all projections and analyses, including condition, long-range forecasting, and financial recommendations. Periodically reviewing and updating these values to better reflect infield performance and staff judgement is recommended.

16.3. Risk & Levels of Service

1. Risk models and matrices can play an important role in identifying high-value assets, and developing an action plan which may include repair, rehabilitation, replacement, or further evaluation through condition assessments. As a result, project selection and the development of multi-year capital plans can become more strategic and objective. Initial models have been built into Citywide for all asset groups. These models reflect current data, which was limited. As the data evolves and new attribute information is obtained, these models should also be refined and updated.
2. Available data on current performance should be centralized and tracked to support any calibration of service levels for long-term tracking of O. Reg. 588's requirements on proposed levels of service.
3. Staff should monitor evolving local, regional, and environmental trends to identify factors that may shape the demand and delivery of infrastructure programs. These can include population growth, and the nature of population growth; climate change and extreme weather events; and economic conditions and the local tax base. This data can also be used to review service level targets.

Appendices

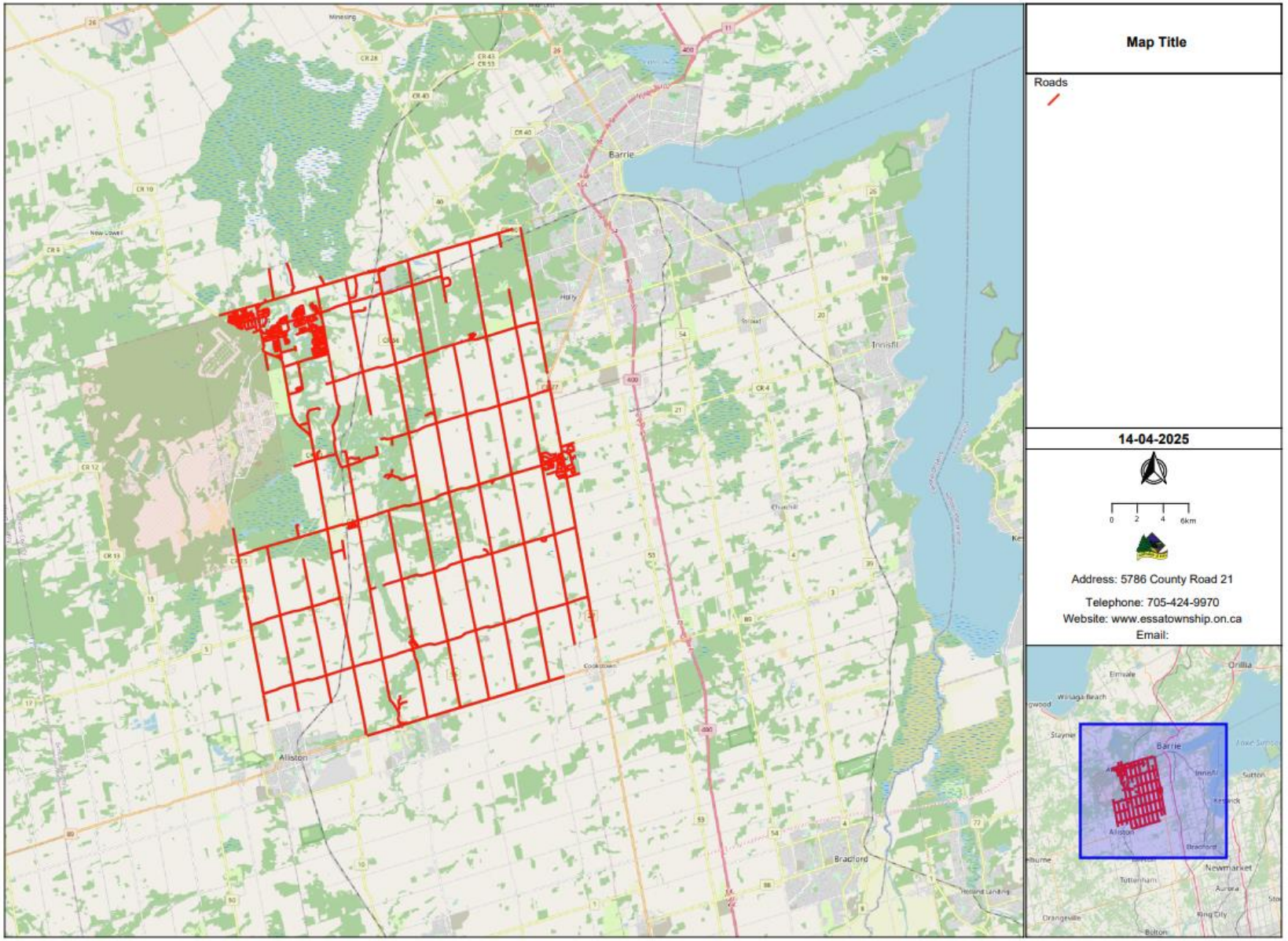
Appendix A: Proposed Levels of Service 10-Year Capital Requirements

The table below outlines the capital cost requirements for recommended lifecycle activities, as generated through the Township's asset management software. These projections are based on annual budgets that start at current funding levels and gradually increase over a 15-year period to reach recommended funding, using Scenario 2 for tax-funded assets and Scenario 1 for rate-funded assets, as outlined in the Levels of Service analysis. For more information, please refer to the Financial Strategy section.

Asset Category	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Road Network	$1.5m	$2.3m	$2.4m	$2.5m	$2.6m	$2.7m	$2.8m	$3.0m	$3.1m	$3.3m
Bridges & Culverts	-	$4.1m	$4.6m	$10.7m	-	-	-	-	$1.6m	$1.0m
Buildings	$217k	-	$272k	$284k	$697k	$780k	$548k	$617k	$708k	$749k
Land Improvements	$72k	$81k	$92k	$93k	$78k	$131k	$90k	$173k	$125k	$118k
Machinery & Equipment	$334k	$372k	$383k	$394k	$405k	$416k	$428k	$449k	$460k	$472k
Vehicles	$97k	$152k	$189k	$222k	$254k	$269k	$379k	$375k	$432k	$489k
Stormwater Network	-	-	$105k	$105k	-	$105k	$105k	$105k	-	$315k
Water Network	$7k	$151k	$260k	$361k	$229k	$249k	$170k	$537k	$199k	$164k
Sanitary Network	$527k	$569k	$617k	$671k	$710k	$767k	$810k	$1.2m	$1.3m	$1.3m
TOTAL	**$2.8m**	**$7.7m**	**$8.9m**	**$15.3m**	**$5.0m**	**$5.4m**	**$5.4m**	**$6.5m**	**$7.9m**	**$7.9m**

Appendix B: Levels of Service Maps

Road Network



Bridges & Culverts Images

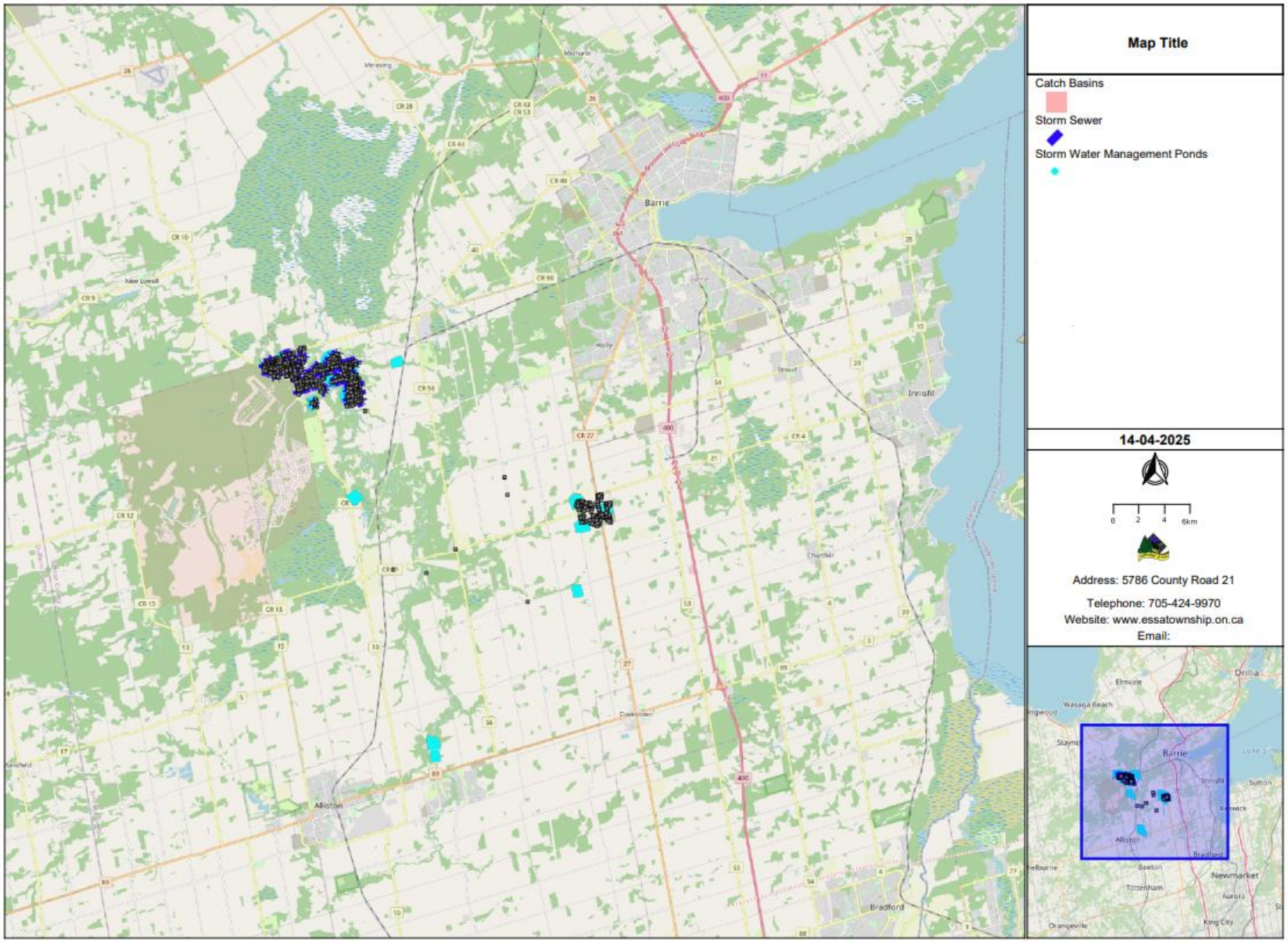
The condition scale for bridges & culverts utilized is from 0 to 100 from Very Poor to Very Good. See the following images as examples of a Bridge and a Structural Culvert in Good condition, as well as a Structural Culvert in Fair condition.

Bridge No. 2 – Center Street (BCI = 65 Good)

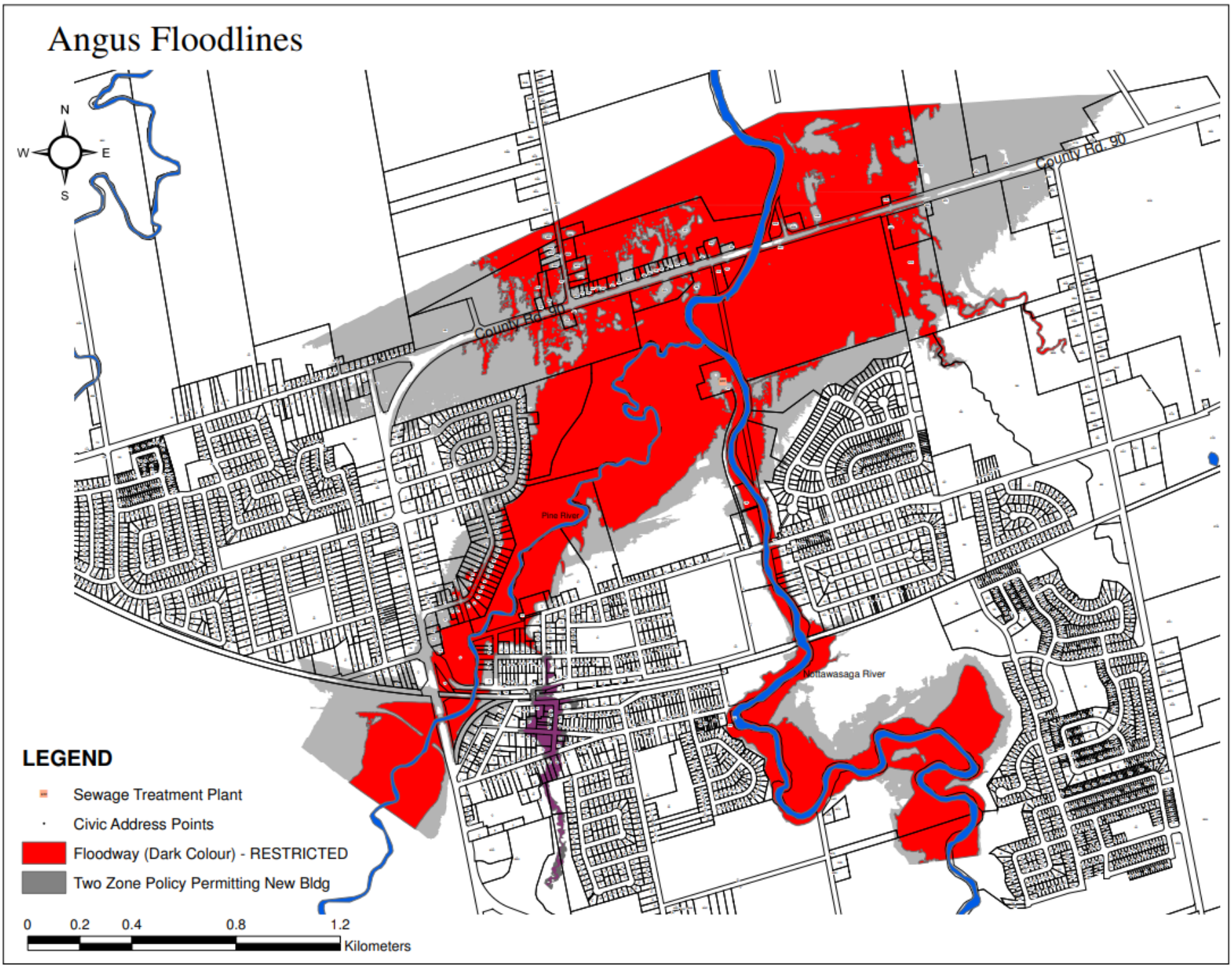
Culvert No. 14 – 5th Line (BCI = 60 Good)

Culvert No. 24 – 8th Line (BCI = 73.2 Good)

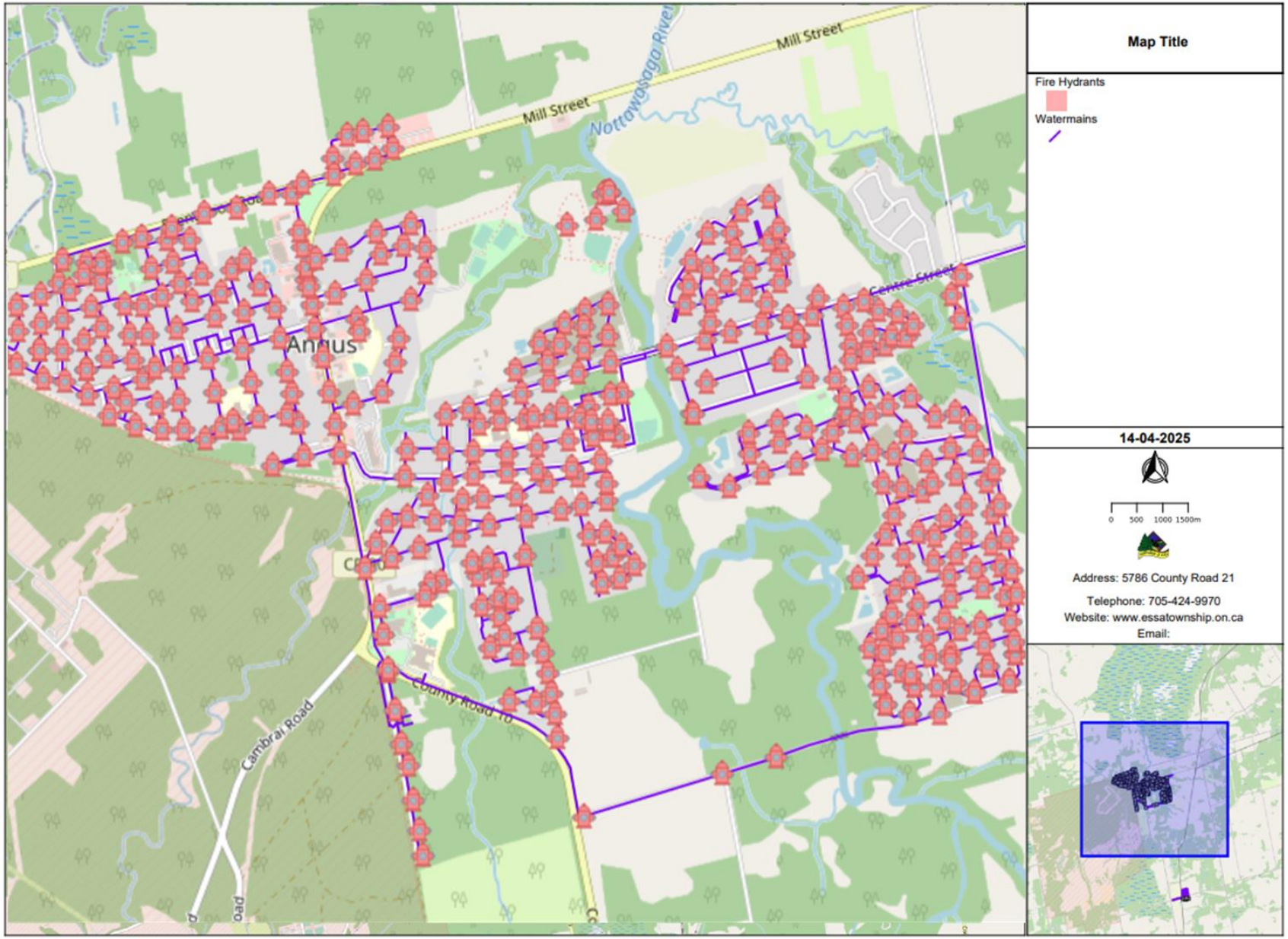
Storm Network Map



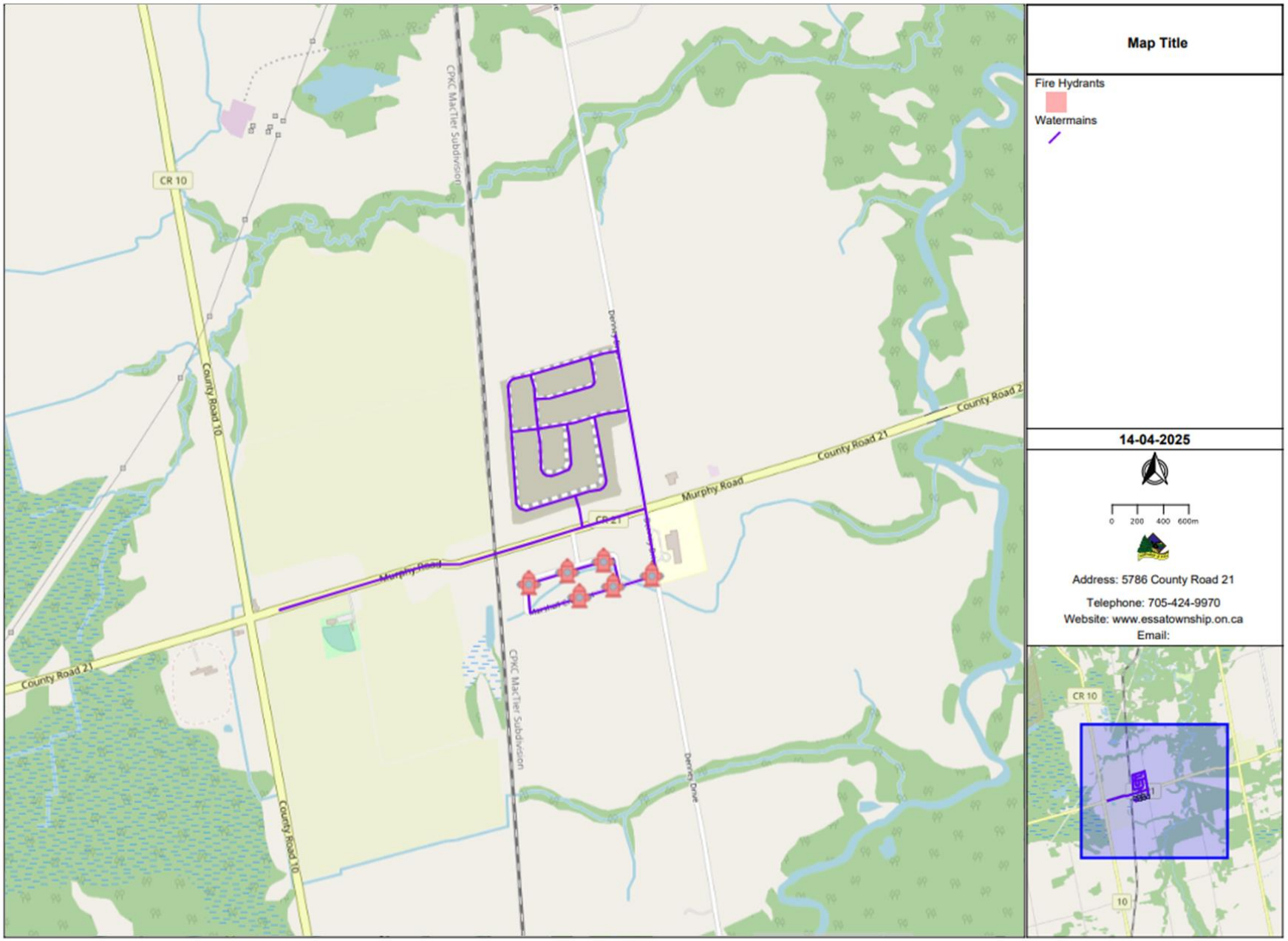
Angus Floodlines



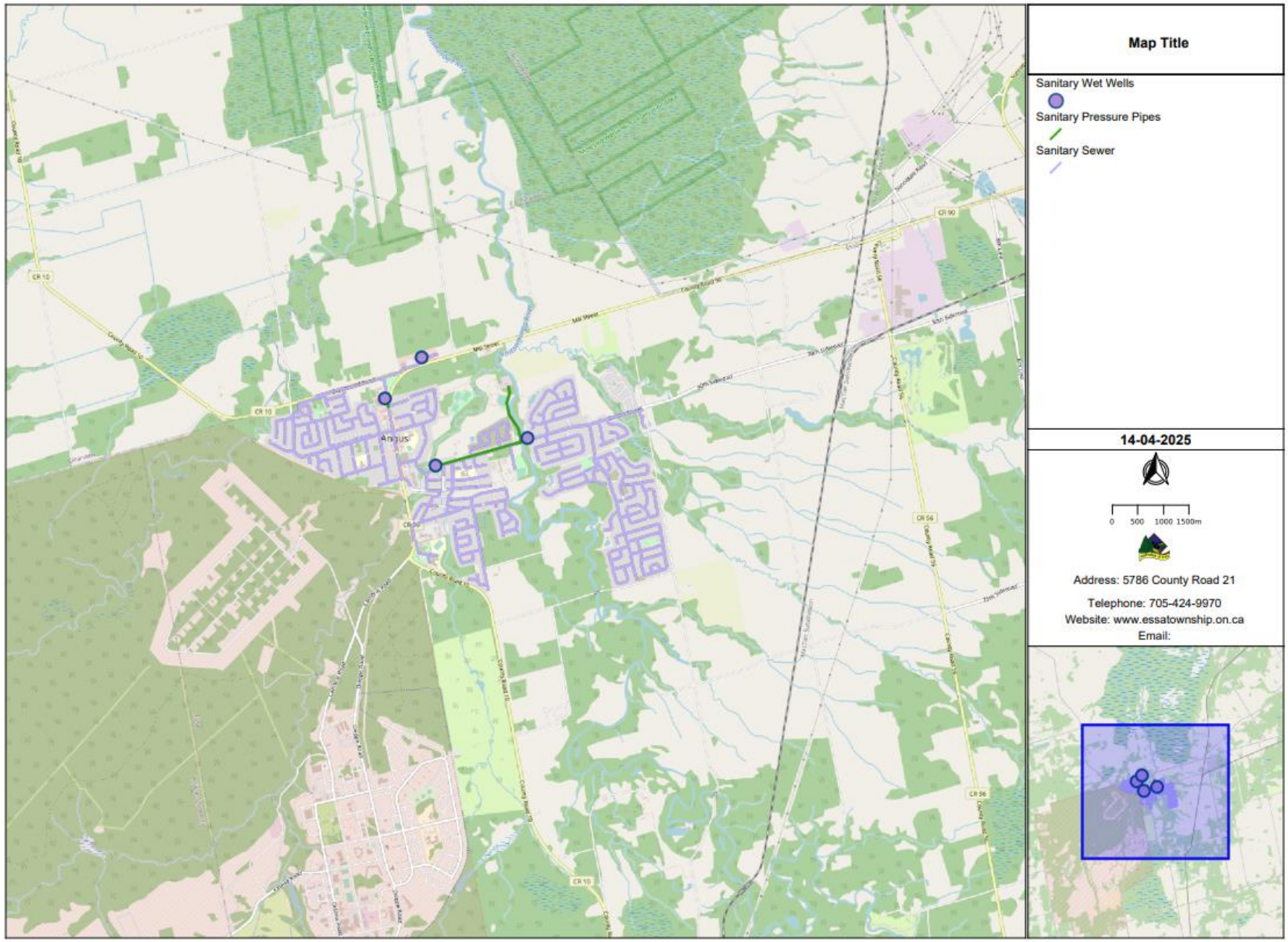
Water Network Map




Map Title
Fire Hydrants
Watermains
14-04-2025
0 200 400 600m
Address: 5786 County Road 21
Telephone: 705-424-9970
Website: www.essatownship.on.ca
Email:
Innisfil
21
CR 27
Robert Street
County Road 21
11th Line
7th Line
Essa
County Road 27
400


Map Title
Fire Hydrants
Watermains
14-04-2025
0 200 400 600m
Address: 5786 County Road 21
Telephone: 705-424-9970
Website: www.essatownship.on.ca
Email:
CR 10
County Road 10
County Road 21
Murphy Road
CPKC MacTier Subdivision
Denney Drive

Sanitary Network Map



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:

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

Appendix D: Risk Rating Criteria

Risk Definitions

Risk	Integrating a risk management framework into your asset management program requires the translation of risk potential into a quantifiable format. This will allow you to compare and analyze individual assets across your entire asset portfolio. Asset risk is typically defined using the following formula: **Risk = Probability of Failure (POF) x Consequence of Failure (COF)**
Probability of Failure (POF)	The probability of failure relates to the likelihood that an asset will fail at a given time. The current physical condition and service life remaining are two commonly used risk parameters in determining this likelihood.
POF - Structural	The likelihood of asset failure due to aspects of an asset such as load carrying capacity, condition or breaks
POF - Functional	The likelihood of asset failure due to its performance
POF - Range	**1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain**
Consequences of Failure (COF)	The consequence of failure describes the overall effect that an asset's failure will have on an organization's asset management goals. Consequences of failure can range from non-eventful to impactful: a small diameter water main break in a subdivision may cause several rate payers to be without water service for a short time. However, a larger trunk water main may break outside a hospital, leading to significantly higher consequences.
COF - Financial	The monetary consequences of asset failure for the organization and its customers
COF - Social	The consequences of asset failure on the social dimensions of the community
COF - Environmental	The consequence of asset failure on an asset's surrounding environment
COF - Operational	The consequence of asset failure on the Town's day-to-day operations
COF - Health & safety	The consequence of asset failure on the health and well-being of the community
COF - Economic	The consequence of asset failure on strategic planning
COF - Range	**1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe**

Risk Frameworks

Road Network – Paved Roads

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/ Range**	**Score**
Performance	Asset Condition	0-29	5 - Almost Certain
		30-49	4 - Likely
		50-74	3 - Possible
		75-84	2 - Unlikely
		85-100	1 - Rare
Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial (60%)	Replacement Cost ($)	>$2,000,000	5 – Severe
		$1,000,000	4 – Major
		$500,000	3 - Moderate
		$250,000	2 – Minor
		<$50,000	1 – Insignificant
Operational (40%)	Road Classification	Arterial	4 – Major
		Collector	3 – Moderate
		Local	2 – Minor

Bridges & Culverts

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/ Range**	**Score**
Performance	Asset Condition	0-29	5 - Almost Certain
		30-49	4 - Likely
		50-74	3 - Possible
		75-84	2 - Unlikely
		85-100	1 - Rare
Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial (80%)	Replacement Cost ($)	>$2,000,000	5 – Severe
		$1,000,000	4 – Major
		$500,000	3 - Moderate
		$100,000	2 – Minor
		<$25,000	1 – Insignificant
Social (20%)	No. of Lanes	1	4 – Major
		2	2 – Minor

Water Network – Watermains

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Performance	Asset Condition	0-29	5 - Almost Certain
		30-49	4 - Likely
		50-74	3 - Possible
		75-84	2 - Unlikely
		85-100	1 - Rare
Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 60%	Replacement Cost	>$1,000,000	5 - Severe
		$750,000	4 - Major
		$500,000	3 - Moderate
		$100,000	2 - Minor
		<$25,000	1 - Insignificant
Health & Safety 20%	Pipe Size (mm)	>600mm	5 - Severe
		351-450mm	4 - Major
		251-350mm	3 - Moderate
		151-250mm	2 - Minor
		<150mm	1 - Insignificant

Sanitary Network – Sanitary Mains

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Performance	Asset Condition	0-29	5 - Almost Certain
		30-49	4 - Likely
		50-74	3 - Possible
		75-84	2 - Unlikely
		85-100	1 - Rare
Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 60%	Replacement Cost	>$1,000,000	5 - Severe
		$750,000	4 - Major
		$500,000	3 - Moderate
		$100,000	2 - Minor
		<$25,000	1 - Insignificant
Health & Safety 20%	Pipe Size (mm)	>600mm	5 - Severe
		351-450mm	4 - Major
		251-350mm	3 - Moderate
		151-250mm	2 - Minor
		<150mm	1 - Insignificant

Storm Network – Storm Mains

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Performance	Asset Condition	0-29	5 - Almost Certain
		30-49	4 - Likely
		50-74	3 - Possible
		75-84	2 - Unlikely
		85-100	1 - Rare
Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 70%	Replacement Cost ($)	>$750,000	5 - Severe
		$500,000	4 - Major
		$250,000	3 - Moderate
		$100,000	2 - Minor
		<$25,000	1 - Insignificant
Operational 30%	Pipe Size (mm)	>801	5 - Severe
		601-800	4 - Major
		401-600	3 - Moderate
		251-400	2 - Minor
		<250	1 - Insignificant

Land Improvements

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Performance	Asset Condition	0	5 - Almost Certain
		20	4 - Likely
		40	3 - Possible
		60	2 - Unlikely
		80	1 - Rare

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 80%	Replacement Cost	>$400,000	5 - Severe
		$200,000	4 - Major
		$80,000	3 - Moderate
		$30,000	2 - Minor
		<$15,000	1 - Insignificant

Buildings

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Performance	Asset Condition	0-29	5 - Almost Certain
		30-49	4 - Likely
		50-74	3 - Possible
		75-84	2 - Unlikely
		85-100	1 - Rare
Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 80%	Replacement Cost	$3,200,000	5 - Severe
		$750,000	4 - Major
		$150,000	3 - Moderate
		$750,000	2 - Minor
		$20,000	1 - Insignificant
Health & Safety 20%	AMP Segment	Fire Buildings	5 - Severe
		Public Works	4 - Major
		Administration Building	3 - Moderate
		Angus Arena	2 - Minor
		Thornton Arena	2 - Minor
		Community Buildings	2 - Minor
		Parks	2 - Minor

Vehicles

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Performance	Asset Condition	0-29	5 - Almost Certain
		30-49	4 - Likely
		50-74	3 - Possible
		75-84	2 - Unlikely
		85-100	1 - Rare

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 80%	Replacement Cost	$200,000	5 - Severe
		$125,000	4 - Major
		$75,000	3 - Moderate
		$25,000	2 - Minor
		$0	1 - Insignificant
Health & Safety 20%	AMP Segment	Protection Vehicles	5 - Severe
		Public Works Vehicles	4 - Major
		Parks & Rec Vehicles	3 - Moderate
		General Government	2 - Minor

Machinery & Equipment

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Performance	Asset Condition	0-29	5 - Almost Certain
		30-49	4 - Likely
		50-74	3 - Possible
		75-84	2 - Unlikely
		85-100	1 - Rare

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 80%	Replacement Cost	$300,000	5 - Severe
		$150,000	4 - Major
		$100,000	3 - Moderate
		$50,000	2 - Minor
		$20,000	1 - Insignificant
Health & Safety 20%	Department	Protective Equipment	5 - Severe
		Public Works Equipment	4 - Major
		Parks Equipment	2 - Minor
		Parks & Rec Equipment	2 - Minor
		Library Equipment	2 - Minor
		General Government	2 - Minor