Asset Management Plan 2024

Municipality of Markstay-Warren

September 2025

psdcitywide

This Asset Management Plan was prepared by:

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

Key Statistics

$128m	2024 Replacement Cost of Asset Portfolio
$107k	Replacement Cost of Infrastructure Per Household
69%	Percentage of Assets in Fair or Better Condition
38%	Percentage of Assets with Assessed Condition Data
$3M	Annual Capital Infrastructure Deficit
15-20 Years	Recommended Timeframe for Eliminating Annual Infrastructure Deficit
2.77%	Target Reinvestment Rate
0.39%	Actual Reinvestment 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 Municipality can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP includes the following asset categories:

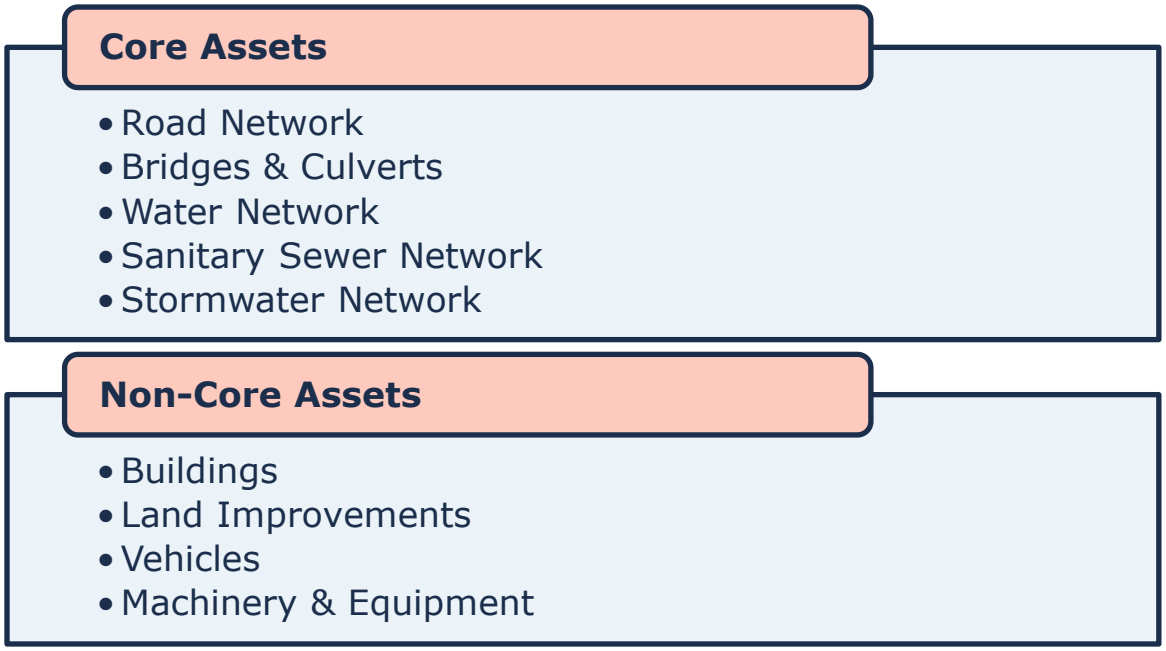

Figure 1 Core and Non-Core Asset Categories

1.2 O. Reg. 588/17 Compliance

With the development of this AMP the Municipality has achieved compliance with July 1, 2024, requirements under O. Reg. 588/17. This includes requirements for levels of

service and inventory reporting for all asset categories. More details on compliance can be found in section 2.5.1 O. Reg. 588/17 Compliance Review.

1.3 Findings

The overall replacement cost of the asset categories included in this AMP totals $128,152,000. Over two-thirds (69%) of assets analyzed in this AMP are in fair or better condition and assessed condition data was available for 38% of assets. For the remaining 62% of assets, assessed condition data was unavailable, and asset age relative to estimate useful life 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 bridges and culverts) 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 Municipality's average annual capital requirement totals $3,667,000. Based on a historical analysis of sustainable capital funding sources, the Municipality is committing approximately $503,000 towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $3,040,000.

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 Municipality. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources.

1.4 Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphics show the annual tax/rate change required to eliminate the Municipality's infrastructure deficit based on a 15-year plan for tax-funded assets and sewer assets and a 20-year plan for the rate-funded water network assets:

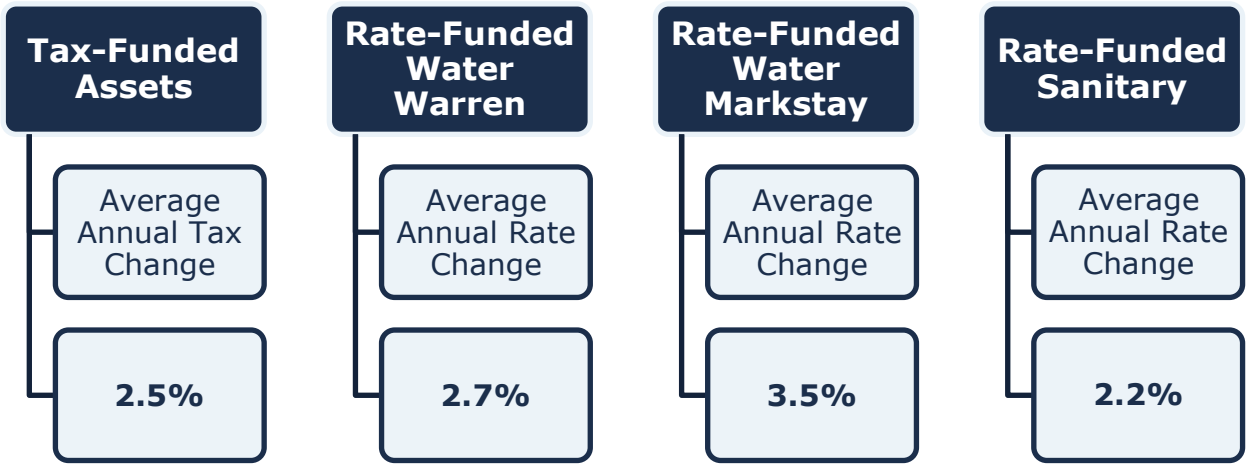

Figure 2 Proposed Tax/Rate Changes[1]

[1] Due to financial arrangements specific to Markstay and Warren water systems respectively, the financial strategy is separated by system location. Analysis of the water network (reported in Section 6) including condition, replacement costs, lifecycle strategy and risks, represents the *entire* water network.

2. Introduction & Context

2.1 Community Profile

The Municipality of Markstay-Warren is a lower-tier municipality located in the Sudbury District of Ontario, Canada. It encompasses the communities of Markstay and Warren, along with surrounding rural areas, and is situated along Highway 17, providing convenient access to the nearby urban centers of Sudbury and North Bay.

Markstay-Warren is celebrated for its tranquil rural charm and natural beauty. The area is characterized by lush forests, agricultural lands, and the Veuve River, offering residents and visitors a variety of outdoor recreational opportunities. The municipality contains local schools, parks, and community facilities, all of which support quality of life for families and individuals alike.

The community provides a harmonious blend of rural living and accessibility to urban amenities. Its strategic location near major transportation routes supports economic development opportunities in sectors such as agriculture, small business, tourism, and recreation. The natural surroundings and peaceful environment make it an attractive place to live, work, and visit.

Markstay-Warren has experienced relatively low population growth over recent years. Based on the 2021 Census, the municipality had a population of 2,708, reflecting a 2% increase from 2016. The population is diverse in age distribution: approximately 17% are seniors aged 65 or older, while working-age adults (15-64 years) make up about 67% of residents. Children aged 0-14 account for roughly 16%.

Census Characteristic	Municipality of Markstay-Warren	Ontario
Population 2021	2,708	14,223,942
Population Change 2016-2021	2.0%	5.8%
Total Private Dwellings	1,199	5,929,250
Population Density	5.4/km^2	15.9/km^2
Land Area	505.92 km^2	892,411.76 km^2

Table1 Municipality of Markstay-Warren Community Profile

The municipality's vision emphasizes a friendly, family focused community, with strong access to nature, and a welcoming attitude towards business. With its welcoming spirit, affordable living conditions, and proximity to major cities, Markstay-Warren continues to be a desirable location for both residents and businesses seeking a balance between progress and tranquility.

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. 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 Municipality of Markstay-Warren Climate Profile

The Municipality of Markstay-Warren is in Northern Ontario, within the Sudbury District. The region experiences a humid continental climate, characterized by warm summers, cold winters, and significant seasonal variations.

Like many areas in Ontario, Markstay-Warren is expected to experience significant effects of climate change, including higher average annual temperatures, increased total annual precipitation, and more frequent and severe extreme weather events. These changes may affect infrastructure durability, increase flooding risks, and create greater demand on municipal services.

According to historical data and climate projections, Markstay-Warren may experience the following key trends:

Higher Average Annual Temperature:

- Between 1948 and 2008, the average annual temperature in Ontario increased by approximately 1.5°C.

- Under a high emissions scenario, average temperatures in Ontario are projected to rise by 3°C to 8°C over the next century.
- By the 2050s, the average annual temperature in Ontario is projected to increase by approximately 2.6°C to 2.7°C, with further increases by the end of the century.

Increase in Total Annual Precipitation:

- Markstay-Warren is projected to experience an increase in total annual precipitation, particularly during the winter and spring months.
- More frequent and intense rainfall events are expected, leading to an increased risk of flooding and stormwater management challenges.
- Under a high emissions scenario, Ontario may experience up to a 17% increase in total annual precipitation by the end of the century.

Increase in Frequency of Extreme Weather Events:

- The frequency and severity of extreme weather events in Markstay-Warren are expected to change significantly.
- More severe storms, floods, droughts, and heat waves are anticipated, impacting both natural and built environments.
- Winter storms may become more intense and frequent, potentially affecting transportation networks, power infrastructure, and municipal operations.

2.2.2 Integration of Climate Change and Asset Management

Asset management practices aim to deliver sustainable service delivery - providing services to residents today without compromising the well-being of future residents. Climate change poses a significant threat to sustainable service delivery by potentially reducing the useful life of assets and increasing the risk of asset failure. Desired levels of service may become more challenging to achieve due to climate change impacts such as flooding, extreme heat, drought, and more frequent and intense storms.

To ensure the sustainable delivery of services, it is crucial to incorporate climate change considerations into asset management practices. The integration of asset management and climate change adaptation aligns with 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.

Typically, the acquisition of capital assets accounts for about 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.

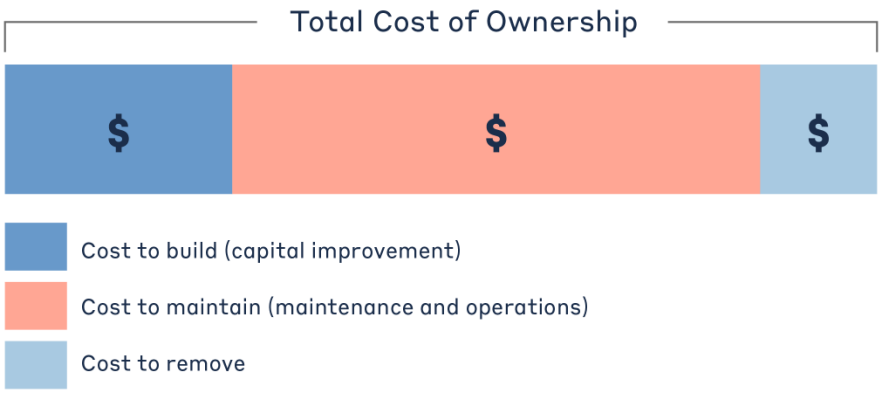

Figure 3 Total Cost of Asset Ownership

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 Asset Management Documentation

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.

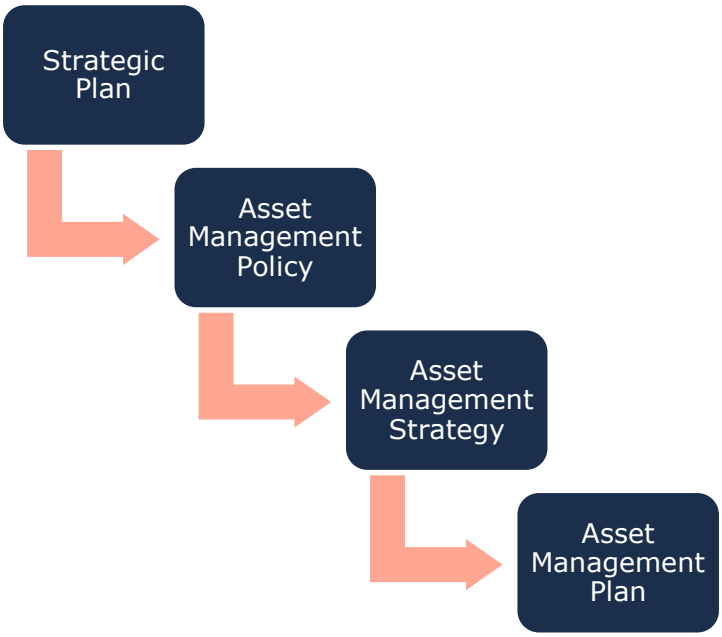

Figure 4 Foundational Asset Management Documents

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Asset Management Policy

An asset management policy represents a statement of the principles guiding the Municipality'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.

Markstay-Warren's asset management policy identifies staff roles and responsibilities in asset management. Key details include:

- The Treasurer shall assume the lead role in asset management with support from department heads and staff
- The council shall hold responsibility for setting the asset management policy, and maintaining staff capacity to support the development, implementation, and ongoing maintenance of the Town's asset management program.

The asset management policy also establishes guiding principles which include key details such as:

- Scope of assets included in the asset registry and associated asset management reporting
- Maintenance of an asset registry with key details such as description, estimate useful life, lifecycle costs and estimated timing

- The long-term view that asset management programs and recommendations shall follow
- The commitment to encouraging participation of ratepayers in the provision of feedback on asset management activities

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 Municipality plans to achieve asset management objectives through planned activities and decision-making criteria.

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

Asset Management Plan

The asset management plan (AMP) presents the outcomes of the Municipality'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 Municipality to re-evaluate the state of infrastructure and identify how the organization's asset management and financial strategies are progressing.

2.3.2 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.

Lifecycle Management Strategies

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

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

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

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.

Lifecycle Activity	Cost	Typical Associated Risks
Maintenance Activities that prevent defects or deteriorations from occurring	**$**	• Balancing limited resources between planned maintenance and reactive, emergency repairs and interventions; • Diminishing returns associated with excessive maintenance activities, despite added costs; • Intervention selected may not be optimal and may not extend the useful life as expected, leading to lower payoff and potential premature asset failure;
Rehabilitation/ Renewal Activities that rectify defects or deficiencies that are already present and may be affecting asset performance	**$$$**	• Useful life may not be extended as expected; • May be costlier in the long run when assessed against full reconstruction or replacement; • Loss or disruption of service, particularly for underground assets;
Replacement/ Reconstruction	**$$$$$**	• Incorrect or unsafe disposal of existing asset; • Costs associated with asset retirement obligations; • Substantial exposure to high inflation and cost overruns; • Replacements may not meet capacity needs for a larger population;

Lifecycle Activity	Cost	Typical Associated Risks
Asset end-of-life activities that often involve the complete replacement of assets		• Loss or disruption of service, particularly for underground assets;

Table 2 Lifecycle Management: Typical Lifecycle Interventions

The Municipality's approach to lifecycle management is described within each asset category outlined in this AMP. Staff will continue to evolve and innovate current practices for developing and implementing proactive lifecycle strategies 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.

Risk & 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.

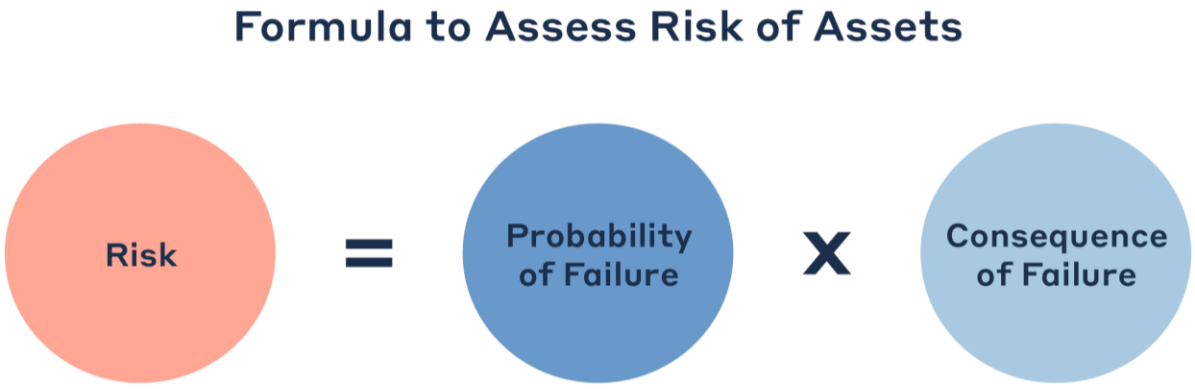


Figure 5 Risk Equations

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.

Table 3 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 3 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, an asset management software tool, for continued review, updates, and refinements.

Levels of Service

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

The Municipality measures the level of service provided at two levels: Community Levels of Service and Technical Levels of Service. This AMP includes those LOS that are required under O. Reg. 588/17 as well as any additional metrics the Municipality wishes to track.

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 as applicable (Roads, Bridges & Culverts, Stormwater, Water, and Sanitary) the province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP.

Technical Levels of Service

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

For core asset categories as applicable (Roads, Bridges & Culverts, Stormwater, Water, and Sanitary) the province, through O. Reg. 588/17, has also provided technical metrics that are required to be included in this AMP.

Current and Proposed Levels of Service

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

Proposed levels of service should be realistic and achievable within the timeframe outlined by the Municipality. They should also be determined with consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals and long-term sustainability. Once proposed levels of service have been established, and prior to July 2025, the Municipality must identify a lifecycle management and financial strategy which allows these targets to be achieved.

2.4 Scope & Methodology

2.4.1 Asset Categories for this AMP

This asset management plan for the Municipality of Markstay-Warren is produced in compliance with O. Reg. 588/17. The July 2024 deadline under the regulation—the second of three AMPs—requires analysis of core and non-core asset categories.

The AMP summarizes the state of the infrastructure for the Municipality'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.

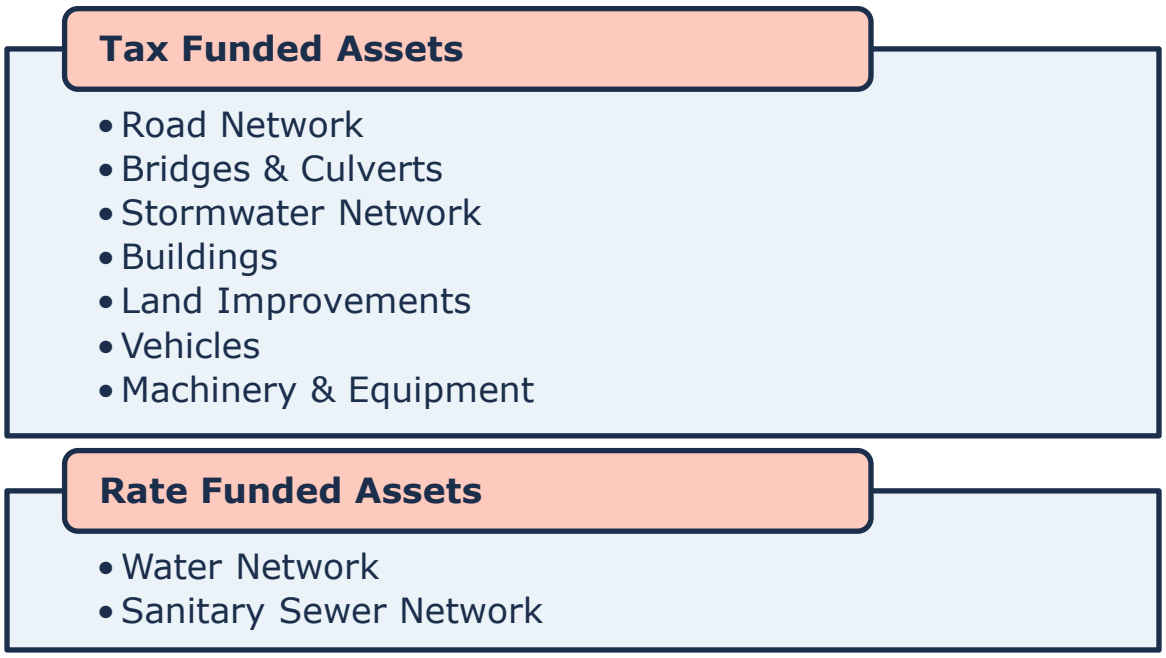


Figure 6 Tax Funded and Rate Funded Asset Categories

2.4.2 Data Effective Date

It is important to note that this plan is based on assets in ownership as of December 2023 with all costs and analysis based on December 2024. The data in this report represents a snapshot in time using the best available processes, data, and information at the Municipality. Strategic asset management planning is an ongoing and dynamic process that requires continuous data updates and dedicated data management resources.

2.4.3 Deriving Replacement Costs

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

User-Defined Cost and Cost Per 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 costs of the assets are 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 Municipality incurred. As assets age, and new products and technologies become available, cost inflation becomes a less reliable method.

2.4.4 Estimated Service Life & Service Life Remaining

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

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

Figure 7 Service Life Remaining Calculation

2.4.5 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 Municipality can determine the extent of any existing funding gap. The reinvestment rate is calculated as follows:

Figure 8 Target Reinvestment Rate Calculation

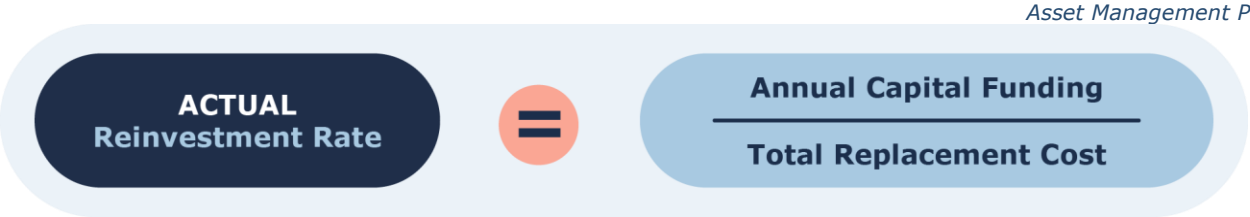


Figure 9 Actual Reinvestment Rate Calculation

2.4.6 Deriving Asset Condition

An incomplete or limited understanding of asset conditions 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 Municipality's asset portfolio. The table below outlines the condition rating system used in this AMP to determine asset condition. This rating system is aligned with the Canadian Core Public Infrastructure Survey which is used to develop the Canadian Infrastructure Report Card. When assessed condition data is not available, service life remaining is used to approximate asset condition.

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

Table 4 Standard Condition Rating Scale

The analysis in this AMP is based on assessed condition data only as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition.

Condition vs. Suitability

It is important to note that condition is only one aspect of determining an asset's suitability to providing the service intended. Other factors, such as capacity, should be considered on a category level.

For example, a Town Hall Office Facility may be in good condition with sufficient service life remaining, but only has office space for 20 employees. If the municipality requires office space for 30 employees, solutions should be considered which may include replacement amongst other alternatives such as secondary office space, remote work options, etc. As these considerations are nuanced for the specific asset, suitability factors may not be directly addressed as part of this Asset Management Plan.

2.5 Ontario Regulation 588/17

As part of the Infrastructure for Jobs and Prosperity Act, 2015, the Ontario government introduced Regulation 588/17 - Asset Management Planning for Municipal Infrastructure (O. Reg 588/17)[2]. 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 below outlines key reporting requirements under O. Reg 588/17 and the associated timelines.

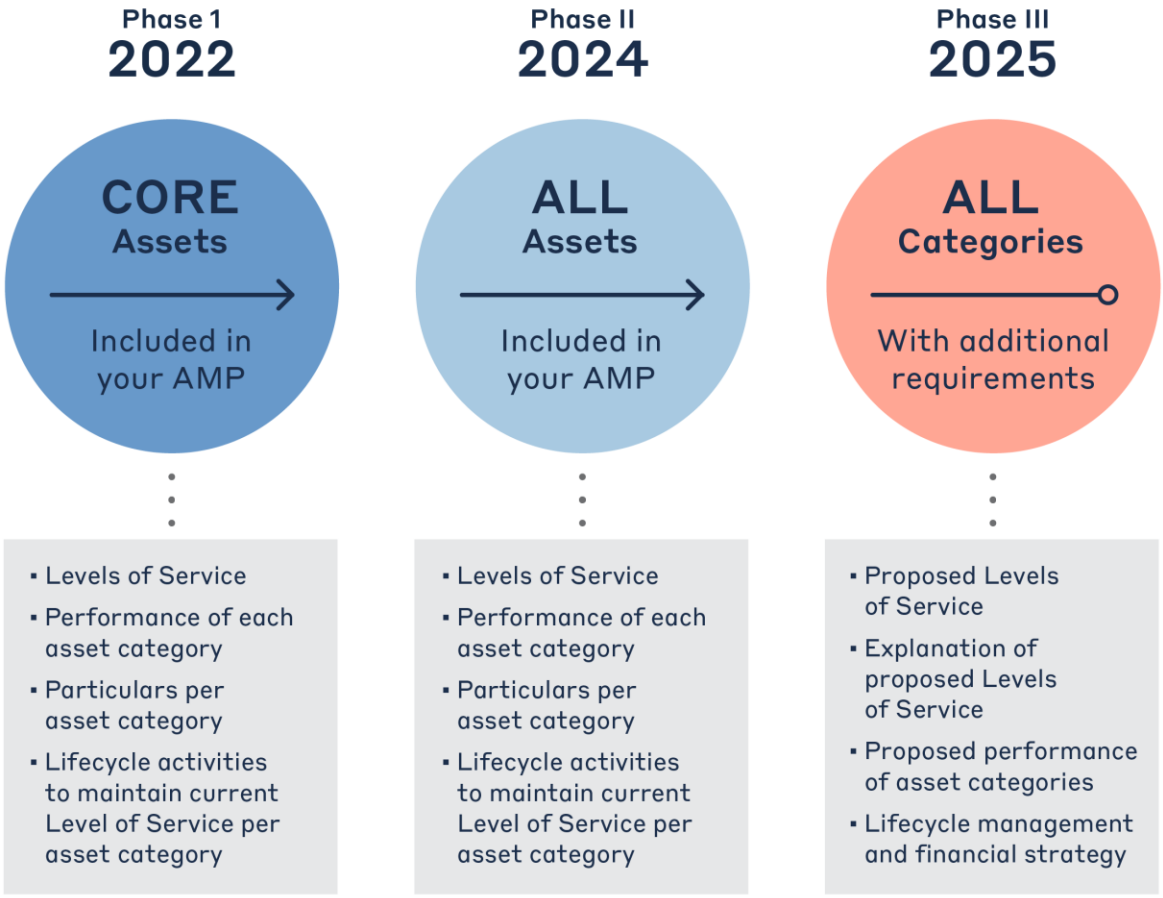


Figure 10 O. Reg. 588/17 Requirements and Reporting Deadlines

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

2.5.1 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)	4.1 – 12.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1 – 12.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.3 – 12.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.2 – 12.2	Complete
Description of municipality's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.4 – 12.4	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.7 – 12.7	Complete
Current performance measures in each category	S.5(2), 2	4.7 – 12.7	Complete
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.4 – 12.4	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix B	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	13.1 – 13.2	Complete

Table 5 O. Reg. 588/17 Compliance Review

3. Portfolio Overview – State of the Infrastructure

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

3.1 Asset Hierarchy & Data Classification

Asset hierarchy explains 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. Assets were structured to support meaningful, efficient reporting and analysis. Key category details are summarized at asset segment level.

Figure 11 Asset Hierarchy and Data Classification

3.2 Portfolio Overview

3.2.1 Total Replacement Cost of Asset Portfolio

The nine asset categories analyzed in this Asset Management Plan have a total current replacement cost of $128 million. This estimate was calculated using user-defined costing, as well as inflation of historical or original costs to current date. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today. Figure 12 illustrates the replacement cost of each asset

category; at 29% of the total portfolio, the water network forms the largest share of the Municipality's asset portfolio, followed by the road network at 21%.

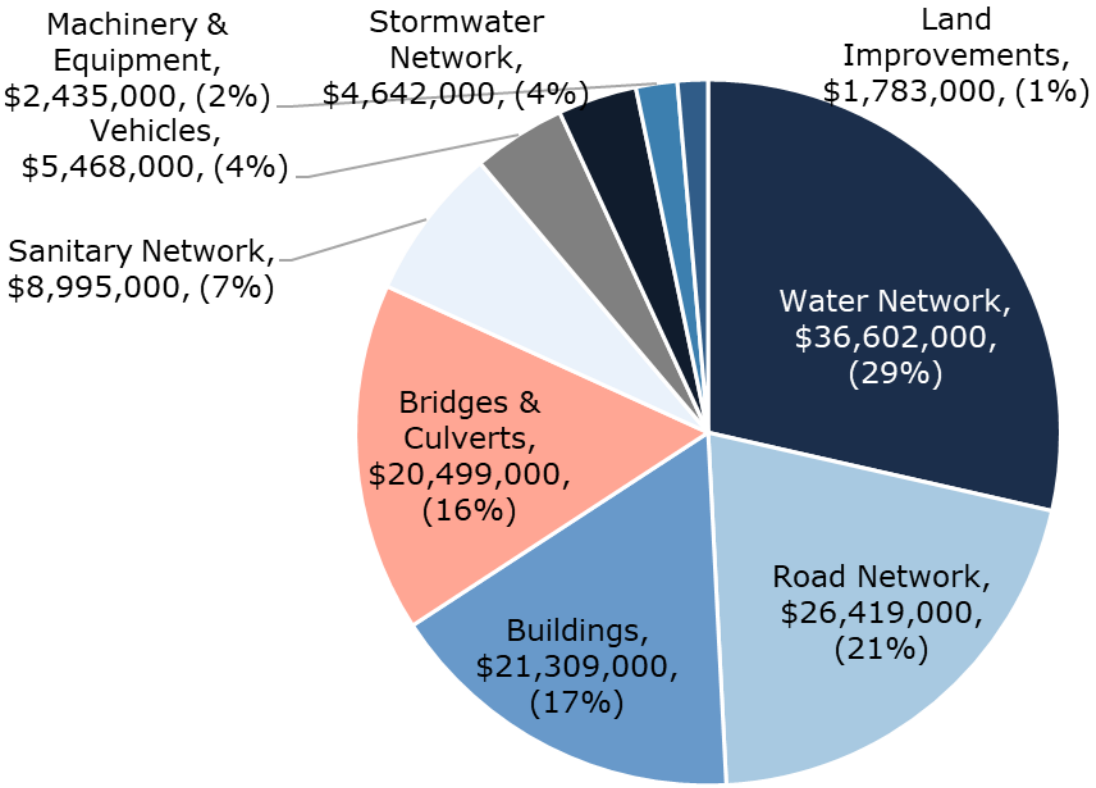


Figure 12 Current Replacement Cost by Asset Category

3.2.2 Target vs. Actual Reinvestment Rate

Figure 13 below depicts funding gaps by comparing the target to the current reinvestment rate. To meet the existing long-term capital requirements, the Municipality requires an annual capital investment of $3.5 million, for a target portfolio reinvestment rate of 2.77%. Currently, the annual investment from sustainable revenue sources is $503,000 for a current portfolio reinvestment rate of 0.39%[3]. Target and current re-investment rates by asset category are detailed below.

[3] As discussed in the financial strategy section, at the time of this reports publication the Town was unable to provide reliable historical capital investment information for the water and sanitary networks. As a result, the financial strategy is premised on no sustainable capital funding to these asset categories and consequently the actual reinvestment rate is 0%. When additional or new capital investment records are available, they may indicate a higher rate of capital investment. If this is the case, the actual reinvestment rate would increase for water and sanitary networks and the portfolio overall.

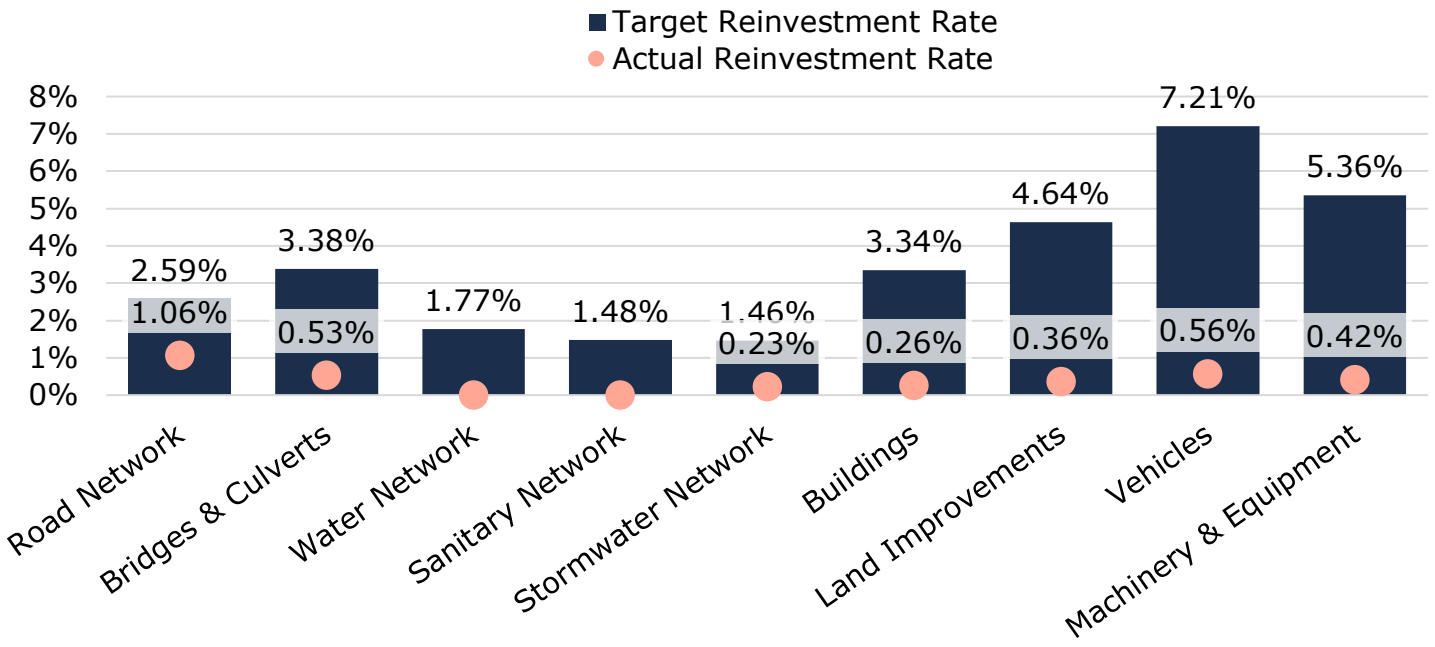


Figure 13 Current Vs. Target Reinvestment Rate

3.2.3 Condition of Asset Portfolio

Figure 14 and Figure 15 summarize asset condition at the portfolio and category levels, respectively. Based on both assessed conditions and age-based analysis, 69% of the Municipality's infrastructure portfolio is in fair or better condition, with the remaining 31% in poor or worse condition. Typically, assets in poor or worse conditions may require replacement or major rehabilitation in the immediate or short-term. Targeted condition assessments may help further refine the list of assets that may be candidates for immediate intervention, including potential replacement or reconstruction.

Similarly, assets in fair condition should be monitored for disrepair over the medium term. Keeping assets in fair or better condition is typically more cost-effective than addressing assets needs when they enter the latter stages of their lifecycle or decline to a lower condition rating, e.g., poor or worse.

Condition data was available for majority of vehicles, land improvement, road network and bridges & culvert assets. A moderate proportion of the sanitary network (primarily manholes) and stormwater network (primarily catch basins) had condition assessments. For all remaining assets, including major infrastructure such as water network and buildings, age was used as an approximation of condition for most of these assets. Age-based condition estimations can skew data and lead to potential under- or overstatement of asset needs.

Further, when assessed condition data was available, it was projected to the data effective year (2024). This 'projected condition' can generate lower condition ratings than those established at the time of the condition assessment. The rate of this deterioration will also depend on lifecycle curves used to project conditions over time.

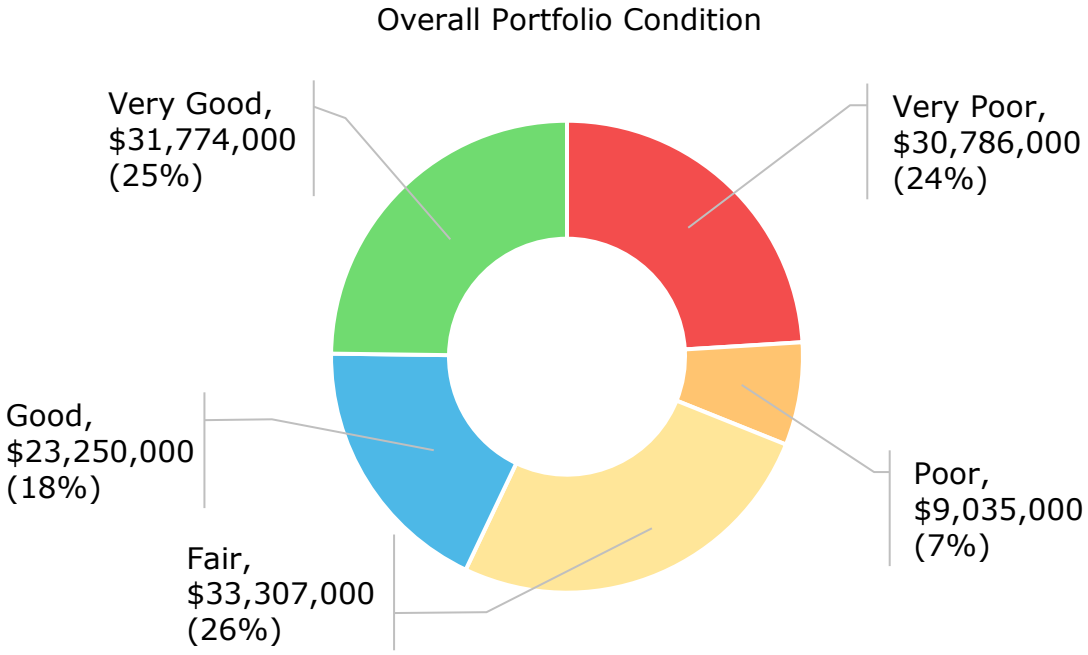
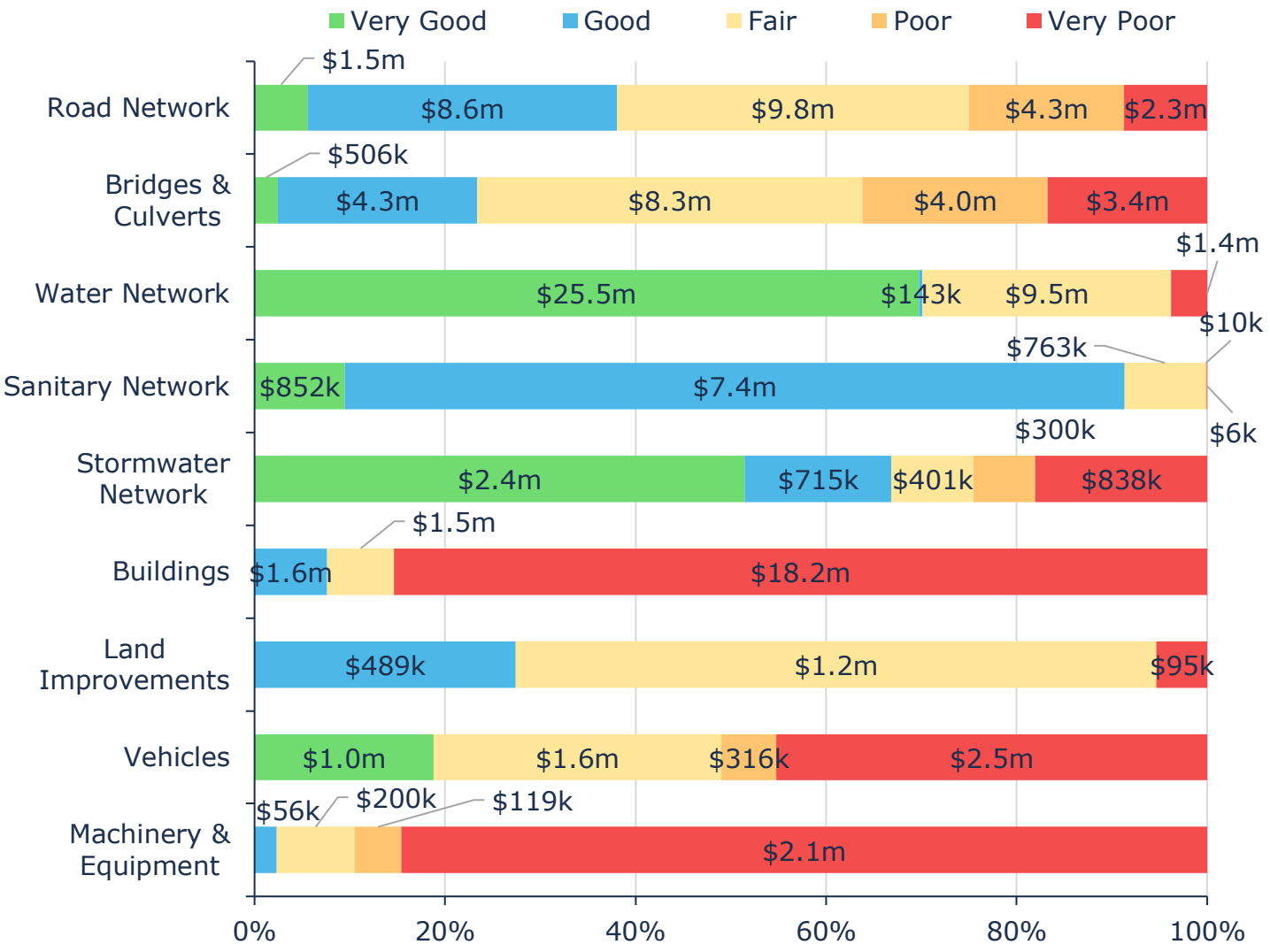


Figure 14 Asset Condition: Portfolio Overview

As further illustrated in Figure 15 at the category level, the majority of major, core infrastructure including roads, bridges, and structural culverts, water network, sanitary network, and stormwater network are in fair or better condition, based on in-field condition assessment data and age-based condition projections. See Table 6 for details on how condition data was derived for each asset segment.



Value and Percentage of Asset Segments by Replacement Cost

Figure 15 Asset Condition by Asset Category

Buildings and facilities are not componentized into their individual major elements and components. This limits the validity of current condition estimates as they are presented only at the 'parent' asset level, such as 'Fire Station #3', or 'Municipality Office'.

Source of Condition Data

This AMP relies on assessed condition for 38% 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	Surface Treated roads	29%	2022 External Condition Assessments
	Gravel Roads	100%	
	Asphalt Roads	25%	
Bridges & Culverts	Bridges Structural Culverts	100%	2024 OSIM Report
Water Network	All	0%	N/A
Sanitary Network	Manholes	100%	2020 Assessments
	Sanitary Mains	0%	N/A
Stormwater Network	Catch Basins	89%	2022 Assessment
	Stormwater Mains	0%	N/A
Buildings	All	0%	N/A
Land Improvements	All	100%	Staff Assessments
Vehicles	All	100%	Staff Assessments
Machinery & Equipment	All	0%	N/A

Table 6 Source of Condition Data

3.2.4 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 45% of the Municipality's assets will require replacement within the next 10 years (not accounting for asset replacement backlog).

3.2.5 Risk Matrix

For each asset category risk models were developed to reflect the asset specific parameters that reflect the probability and consequence of asset failure. The risk models are summarized in Appendix D of this report. Figure 16 summarizes portfolio wide asset risks levels.

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$35,900,803 (28%)	$18,653,721 (15%)	$14,958,500 (12%)	$24,452,322 (19%)	$34,187,102 (27%)

Figure 16 Risk Matrix: All Assets

The analysis shows that based on current risk models, approximately 45% of the Municipality's assets, with a current replacement cost of approximately $58,131,000, carry a risk rating of 15 or higher (red) out of 25. Assets in this group have a high probability of failure, most often due to low condition, and often also a high consequence of failure, most often due to significant replacement cost and/or their high social or operational impacts (i.e. no detour options, high traffic counts, critical service delivery).

As new asset attribute information and condition assessment data are integrated with the asset register, asset risk ratings will evolve, resulting in a redistribution of assets within the risk matrix. Staff should also continue to calibrate risk models.

We caution that since risk ratings rely on many factors beyond an asset's physical condition or age, assets in a state of disrepair can sometimes be classified as low-risk, despite their poor condition rating. In such cases, although the probability of failure for these assets may be high, their consequences of failure ratings were determined to be low based on the attributes used and the data available.

Similarly, assets with very high condition ratings can receive a moderate to high-risk rating despite a low probability of failure. These assets may be deemed as highly critical to the Municipality based on their costs, economic importance, social significance, and other factors. Continued calibration of an asset's criticality and regular data updates are needed to ensure these models more accurately reflect an asset's actual risk profile.

Qualitative Risk

In addition to quantified risk as summarized above, the Town has noted key trends, challenges, and risks to service delivery that they are currently facing. The most prominent risks identified are:

Aging Infrastructure and Lifecycle Management Strategies

The municipality's current lifecycle management strategies are generally more reactive than proactive. Many assets are approaching or have reached the end of their useful life across multiple categories, creating a growing backlog of renewal needs. Without consistent mid-lifecycle rehabilitative interventions, most assets are maintained only until they require full replacement. This approach increases the risk of higher lifecycle costs, emergency repairs, and service disruptions. Developing well-defined rehabilitation and renewal strategies, supported by sustainable annual funding, will be essential to reducing reliance on reactive management and minimizing the deferral of critical capital works.

Organizational Capacity

Limited staff capacity and reliance on external funding create challenges for proactive asset management. While staff have strong knowledge of asset conditions, competing operational priorities limit the time and resources available for strategic lifecycle planning. Major renewal projects in multiple asset categories depend heavily on grants or other external sources, which can delay implementation when funding is not secured. Establishing predictable, sustainable funding streams and ensuring adequate staffing resources will be critical to improving long-term planning, reducing deferred works, and maintaining service levels.

3.2.6 Forecasted Capital Requirements

Aging assets require maintenance, rehabilitation, and replacement. Figure 17 below illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for all asset categories analyzed in this AMP over a 100-year time horizon. On average, $3.5 million is required each year to remain current with capital replacement needs for the Municipality's asset portfolio ($18.5 million allocated to each 5-year time block), represented by the 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.

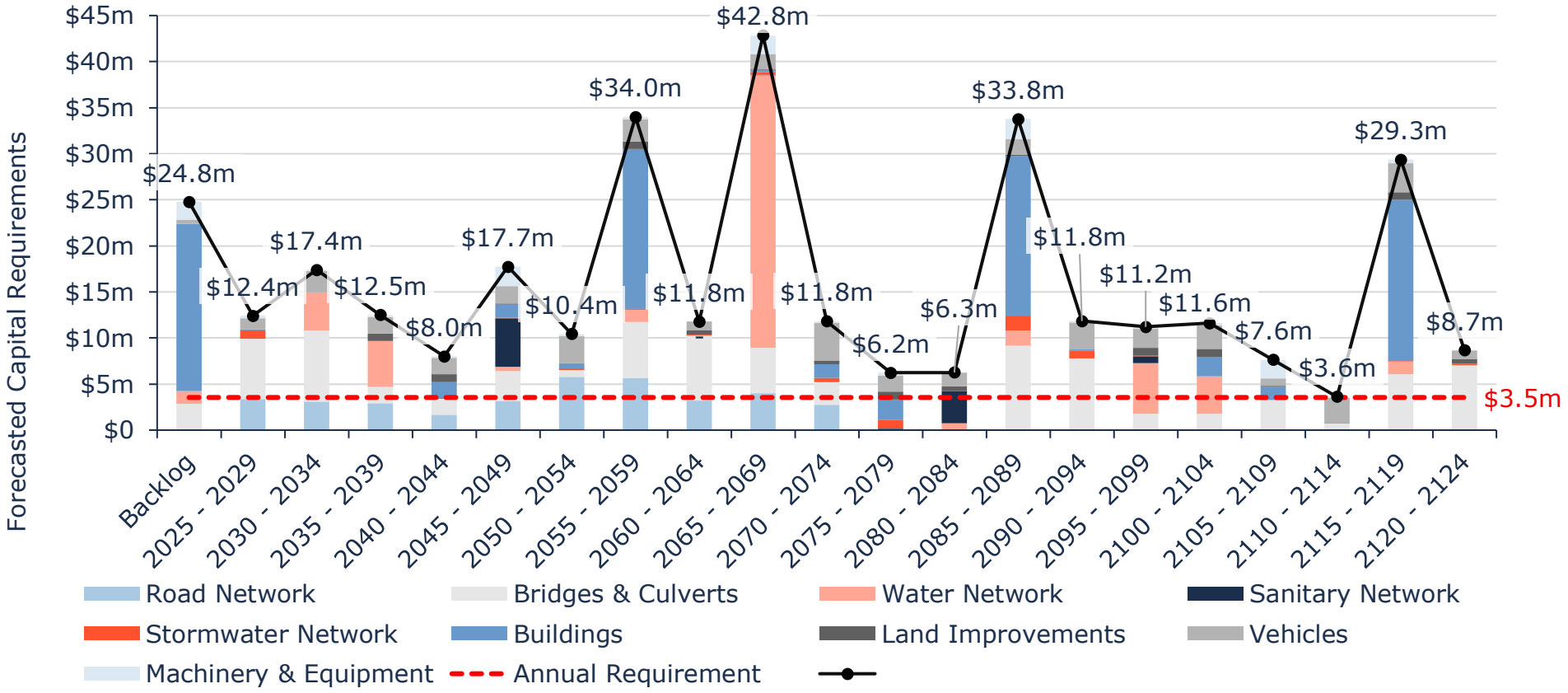


Figure 17 Capital Replacement Needs: Portfolio Overview 2024-212

Replacement needs are forecasted to fluctuate significantly over the planning horizon. Major reinvestment peaks are projected in 2055–2059 ($34.0M), 2065–2069 ($42.8M), and 2085–2089 ($33.8M), primarily driven by the water, stormwater, and building portfolios. Conversely, several intervals, including 2080–2084 ($6.3M over 5 years; $1.26 M annually) and 2110–2114 ($3.6M over 5 years; $0.72 M annually), fall closer to or below the annual requirement of $3.7 million. These peaks and valleys illustrate opportunities to redistribute investments more evenly over time to enhance support project execution and financial sustainability.

There is a backlog of more than $24 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.

Core Assets

Road Network

Replacement Cost	Average Condition	Financial Capacity	
$26.4 m	**Fair (54%)**	Annual Requirement:	$683,000
		Funding Available:	$280,000
		Annual Deficit:	**$403,000**

Bridges & Culverts

Replacement Cost	Average Condition	Financial Capacity	
$20.4 m	**Fair (45%)**	Annual Requirement:	$693,000
		Funding Available:	$109,000
		Annual Deficit:	**$582,000**

Water Network

Replacement Cost	Average Condition	Financial Capacity	
$36.6 m	**Good (77%)**	Annual Requirement:	$647,000
		Funding Available:	$0
		Annual Deficit:	**$647,000**

Sanitary Network

Replacement Cost	Average Condition	Financial Capacity	
$8.9 m	**Good (74%)**	Annual Requirement:	$133,000
		Funding Available:	$0
		Annual Deficit:	**$133,000**

Stormwater Network

Replacement Cost	Average Condition	Financial Capacity	
$4.6 m	**Good (62%)**	Annual Requirement:	$68,000
		Funding Available:	$11,000
		Annual Deficit:	**$58,000**

4. Road Network

The Municipality's road network comprises the largest share of its infrastructure portfolio, with a current replacement cost of more than $26 million.

4.1 Inventory & Valuation

Table 7 summarizes the quantity and current replacement cost of the Municipality's various road network assets as managed in its primary asset management register, Citywide.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Asphalt Roads	7,949	Length (m)	$5,500,708	Cost per Unit
Gravel Roads	187,833	Length (m)	$14,729,864	Cost per Unit
Surface Treated Roads	12,205	Length (m)	$6,187,935	Cost per Unit
TOTAL			**$26,418,507**	

Table 7 Detailed Asset Inventory: Road Network

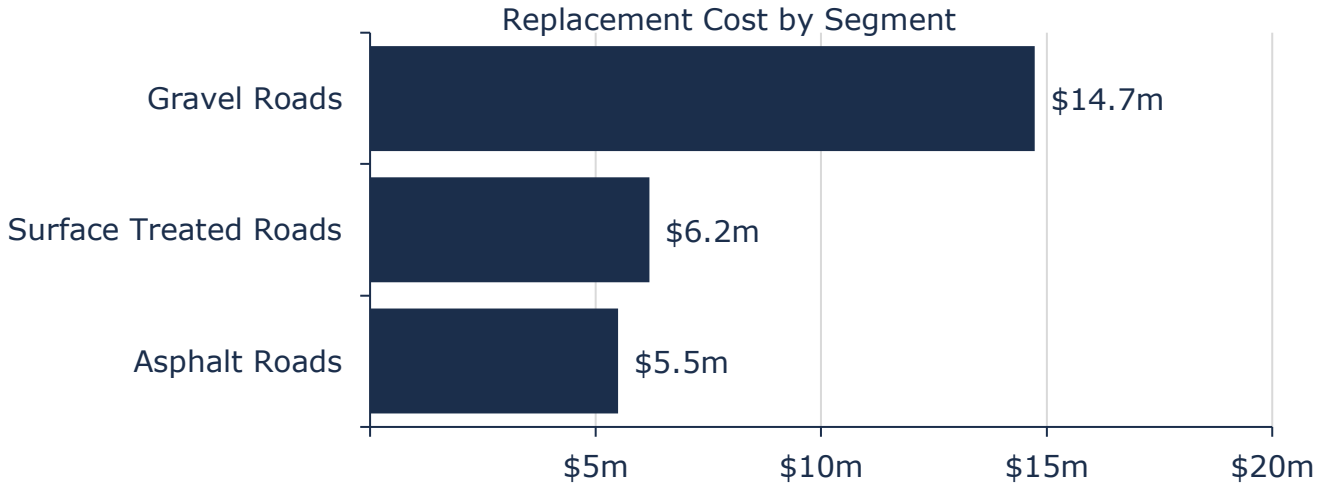


Figure 18 Portfolio Valuation: Road Network

4.2 Asset Condition

Figure 19 summarizes the replacement cost-weighted condition of the Municipality's road network. Based on a combination of field inspection data and age, 75% of assets are in fair or better condition; the remaining 25% of assets are in poor to very poor condition. For roads assets, conditions are determined based on the age of an asset and its

Estimated Useful Life (EUL). Condition assessments were available for 100% of gravel roads, 25% of asphalt, and 29% of surface treated roads based on replacement cost. This condition data was projected from inspection date to current year to estimate their condition today. No condition data was available for the remaining asset types.

Assets in poor or worse conditions may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. As illustrated in Figure 19, most the Municipality's road network assets are in fair or better condition.

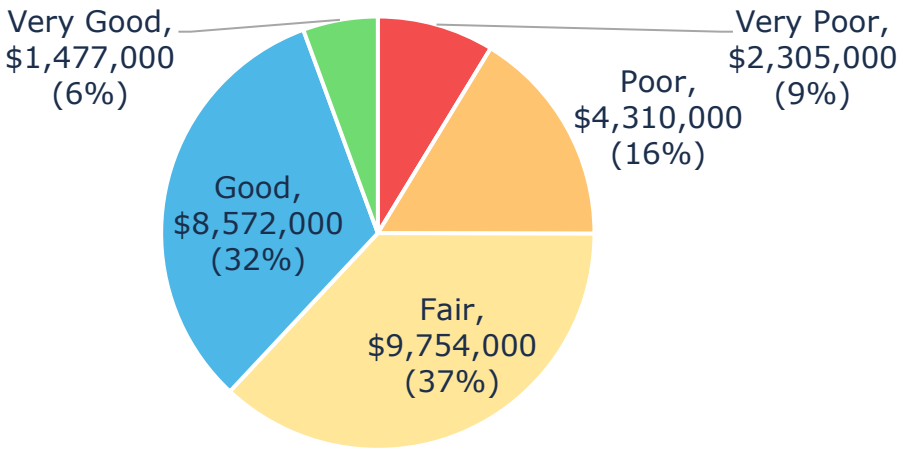


Figure 19 Asset Condition: Road Network Overall

As illustrated in Figure 20, based on condition assessments, most asphalt and gravel roads are in fair or better condition. Surface treated roads have a comparatively lower proportion of roads in fair or better condition.

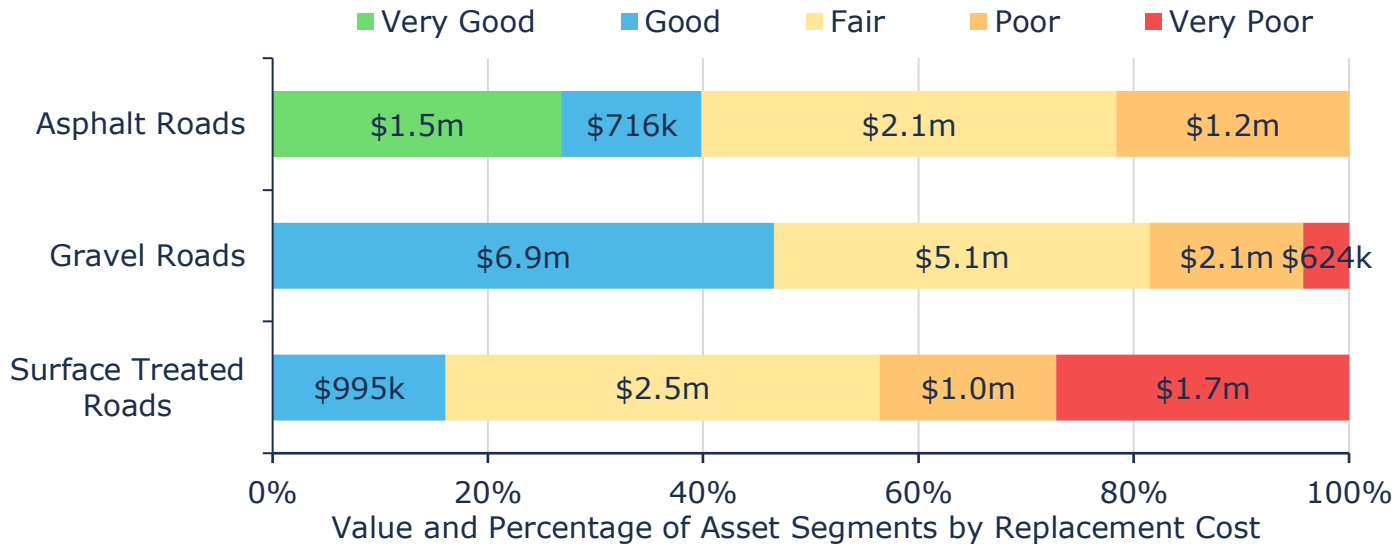


Figure 20 Asset Condition: Road Network by Segment

4.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential long-term replacement spikes.

Figure 21 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

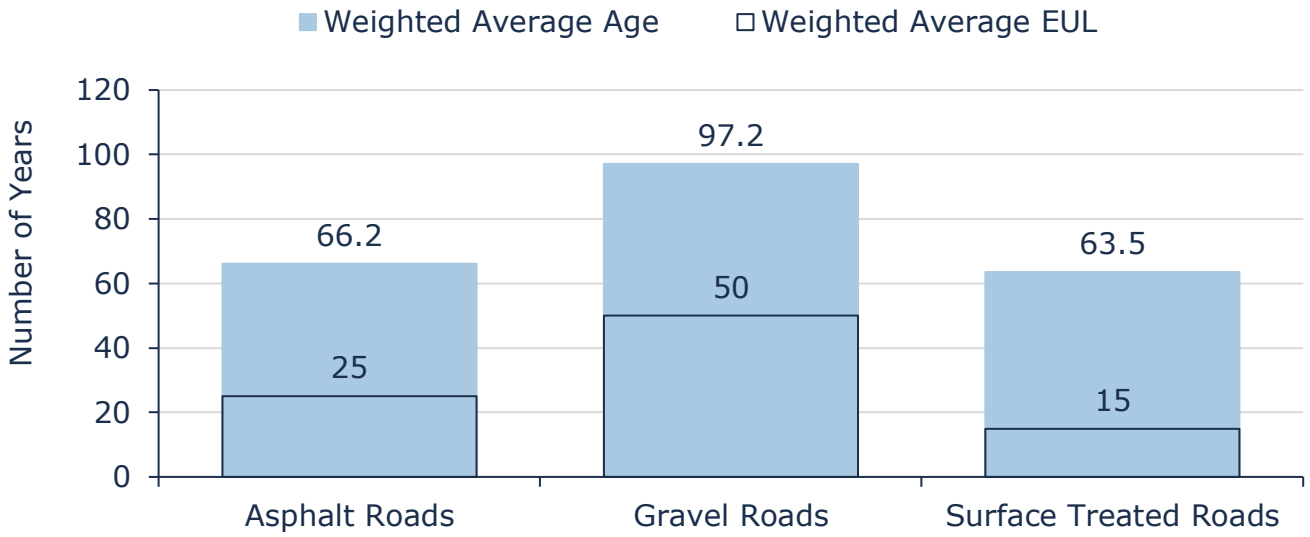


Figure 21 Estimated Useful Life vs. Asset Age: Road Network

Age analysis shows that all road types have significantly surpassed their expected useful lives. Asphalt roads have an average age of 66.2 years compared to a design life of 25 years, gravel roads average 97.2 years compared to a design life of 50 years, and surface treated roads average 63.5 years compared to design life of 15 years.

Although asset age is an important measurement for long-term planning, condition assessments provide a more accurate indication of actual asset needs. Further, useful life estimates established as part of the PSAB 3150 implementation may not be accurate and may not reflect in-field asset performance.

4.4 Current Approach to Lifecycle Management

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

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of asphalt and surface treated roads. Due to funding limitations, the Town is unable to execute on the below noted strategy, however this represents the industry's best practice for road interventions. It is the Town's intention to move towards a proactive and consistently applied road management strategy. For this reason, they have elected to model the preferred road management strategy. Such an approach shifts away from allowing the roads to deteriorate until replacement is required, and instead complete strategic rehabilitation that extends the service life of roads at a lower total cost. Table 8 summarizes the events to occur, and their associated trigger. The graph below represents how the road condition is forecasted to change over time and from lifecycle events (black dots).

Asphalt Roads		
Event Name	**Event Class**	**Event Trigger**
Crack Sealing	Maintenance	4 Years
50 mm Resurfacing	Rehabilitation	18 Years
Crack Sealing	Maintenance	22 Years
50 mm Resurfacing	Rehabilitation	33 Years
Full Reconstruction	Replacement	50 Years

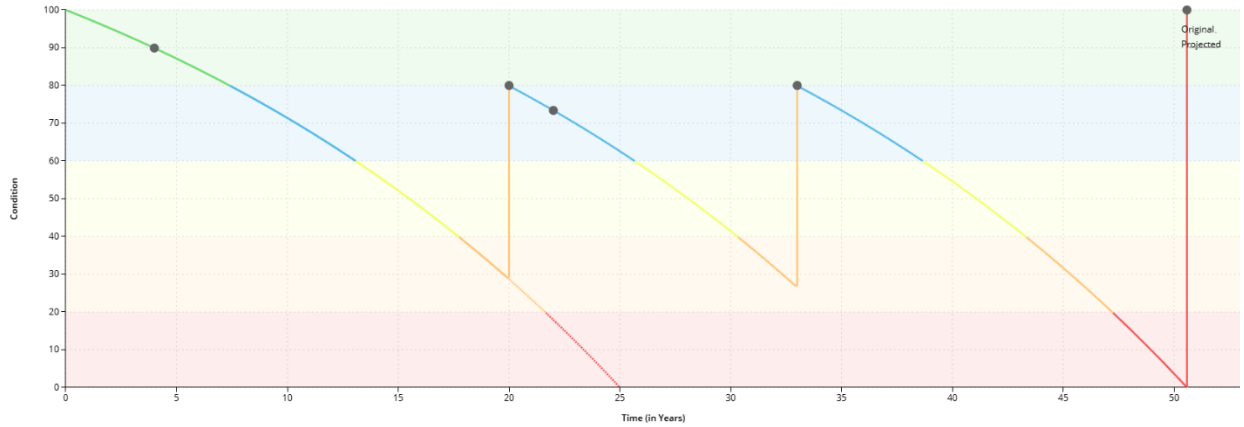


Table 8 Lifecycle Management Strategy: Road Network (Asphalt Roads)

Table 9 below summarizes the surface treated roads lifecycle strategy, including the events to occur, and their associated trigger. The graph represents how the road condition is forecasted to change over time and from lifecycle events.

Surface Treated Roads		
Event Name	**Event Class**	**Event Trigger**
Single Surface Treatment	Rehabilitation	4 Years
Single Surface Treatment	Rehabilitation	10 years
Single Surface Treatment	Rehabilitation	16 years
Single Surface Treatment	Rehabilitation	18 years
Pulverize and Double Surface Treatment	Rehabilitation	22 years
Single Surface Treatment	Rehabilitation	26 years
Full Reconstruction	Replacement	37 Years

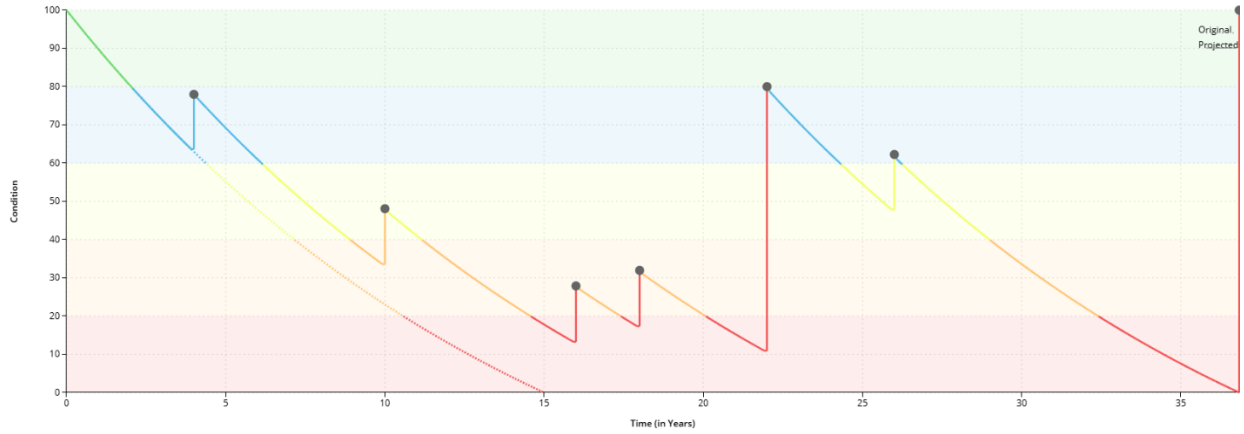


Table 9 Lifecycle Management Strategy: Road Network (Surface Treated Roads)

Table 10 below expands on maintenance and inspection activities for road network assets. This represents the activities that the Town currently conducts across their road network assets.

Activity Type	Description of Current Strategy
Inspection	Road inspections are completed every 30 days based on Minimum Maintenance Standards (MMS)

<table>
<tr><th>Activity Type</th><th>Description of Current Strategy</th></tr>
<tr><td></td><td>Condition inspections are typically completed every 3-5 years for the entire road network. The last condition assessment was complete in 2022 and is reflected in this document.</td></tr>
<tr><td></td><td>Condition is assessed on a scale of 0-100 based on the following rating scale:
<table>
<tr><th>Descriptor</th><th>Range</th><th>Definition</th></tr>
<tr><td>Very Good</td><td>80-100</td><td>Well maintained, good condition, new or recently rehabilitated.</td></tr>
<tr><td>Good</td><td>60-79</td><td>Good condition, few elements exhibit minor deficienceis.</td></tr>
<tr><td>Fair</td><td>40-59</td><td>Some elements exhibit significant deficiencies. Asset required attention.</td></tr>
<tr><td>Poor</td><td>20-39</td><td>A large portion of the system exhibits significant deficiencies. Asset mostly below standard and approaching end of service life.</td></tr>
<tr><td>Very Poor 0-19</td><td></td><td>Widespread signs of deterioration, service is affected.</td></tr>
</table></td></tr>
<tr><td rowspan="5">Maintenance</td><td>Grading gravel roads forms part of the largest maintenance schedule.</td></tr>
<tr><td>Calcium is applied to approximately 20% of Municipal gravel roads yearly.</td></tr>
<tr><td>Ditching and brushing is performed sporadically.</td></tr>
<tr><td>Culvert replacement is prioritized based on a worst first approach and the efficiency of moving equipment. Where several geographically proximate culverts have failed their replacement is prioritized.</td></tr>
<tr><td>Potholes are repaired according to the minimum road standards.</td></tr>
<tr><td></td><td>Moving forward the Town is adding a 3” lift to problem areas of the road.</td></tr>
<tr><td>Minor Rehabilitation</td><td>Historically, project selection has been primarily determined by availability of grant funding.</td></tr>
</table>

Activity Type	Description of Current Strategy
	Patching and Mill and Pave rehabilitations are completed based on asset conditions; with target intervention occurring between Fair and Good Condition.
	Chip seal rehabilitation is completed based on asset condition, with target intervention occurring between fair and very good.
Replacement	When a road asset is in poor or worse condition full replacement is considered.
	Sidewalks, streetlights, and signs are reconstructed when they are poor or worse condition.

Table 10 Lifecycle Management Strategy: Road Network

4.5 Forecasted Long-Term Replacement Needs

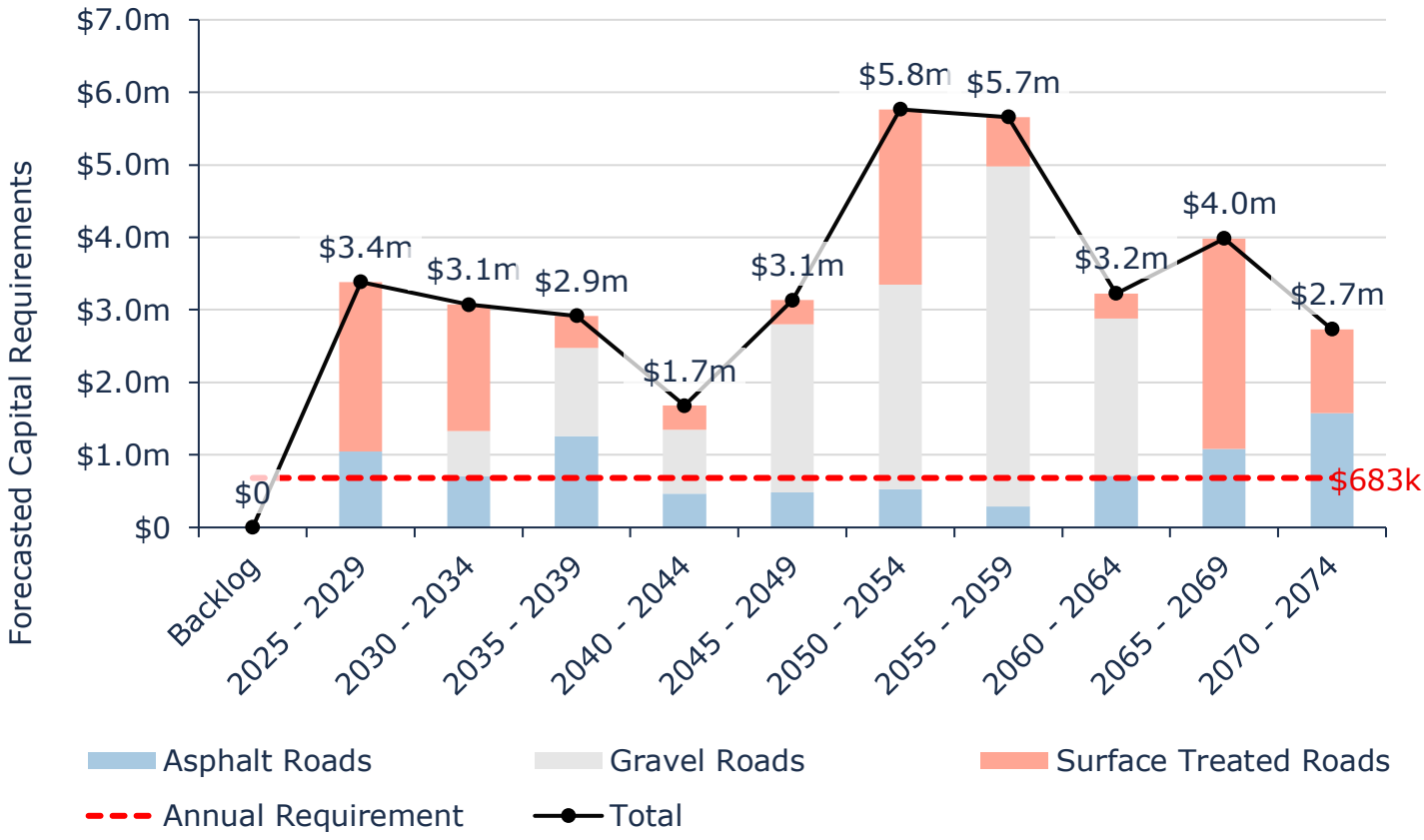


Figure 22 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Municipality's road network. This analysis was run until 2074 to capture at least one iteration of replacement for the longest-lived asset in the road network. The Municipality's average annual requirements

(red dotted line) total $683,000 ($3.4 million per 5-year bucket) 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 significant investment needs in the short and long term. The highest peaks occur between 2050-2054 ($5.8M) and 2055-2059 ($5.7M), primarily driven by gravel and surface treated road renewal. The associated average annual requirement is $1.16M and $1.14 million respectively, which is greater than the average annual requirement of $683,000. Peaks and valleys in capital investment requirements are very common in infrastructure and simply indicate the importance of long-term capital and project planning to ensure there are funds and resources available in a timely manner.

These projections are based on capital costs associated with asset replacement and strategic rehabilitation activities as detailed in Table 8 and Table 9 above. The capital projections provide a long-term, portfolio-level overview of capital needs and should be used to support improved long-term financial and project planning.

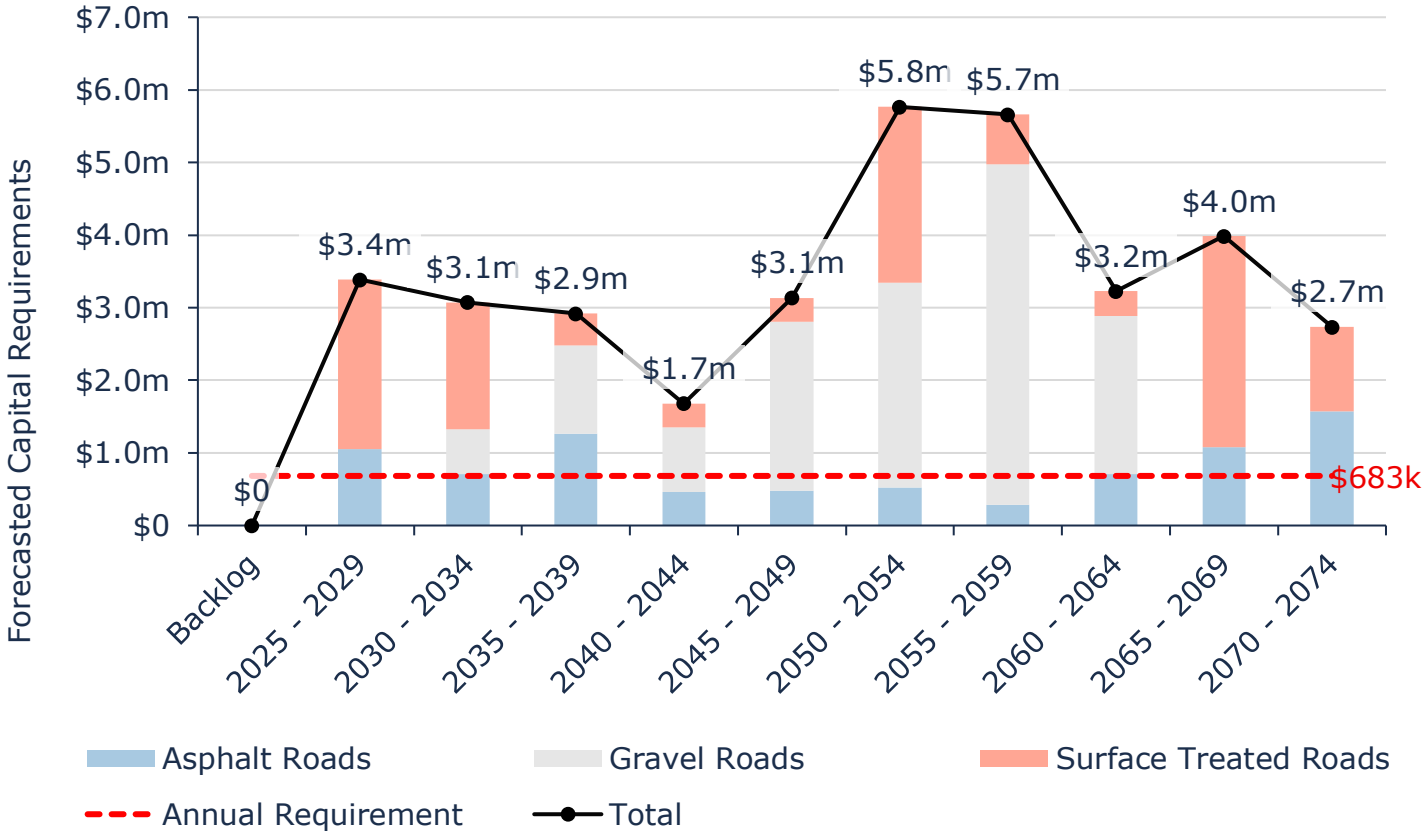


Figure 22 Forecasted Capital Replacement Needs: Road Network 2024-2074

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial

planning, including establishing dedicated reserves. Regular pavement condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

4.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, replacement costs, traffic data, and road class. Risk Rating Criteria for road assets is provided in Appendix D. An overview of the methodology applied for calculating and classifying asset risks is provided in Section 2.3.2.

The matrix stratifies assets based on their individual probability and consequence of failure; each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Municipality may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

As detailed in Figure 23, most road assets hold a low-risk rating. The overall high-risk rating is due to a concentration of assets in fair or worse conditions, high replacement costs, and high traffic volumes.

1 - 4 **Very Low** $2,825,004 (11%)	5 - 7 **Low** $11,078,641 (42%)	8 - 9 **Moderate** $3,820,857 (14%)	10 - 14 **High** $5,266,634 (20%)	15 - 25 **Very High** $3,427,371 (13%)

Figure 23 Risk Matrix: Road Network

4.7 Levels of Service

The tables that follow summarize the Municipality's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17, as well as any additional performance measures that the Municipality selected for this AMP.

4.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	The municipalities road network contains a total of 218 kilometers of roads composed of earth roads, gravel roads, surface treated roads, and asphalt roads. Roads include local roads designed primarily for property access, and collector roads designed to connect local roads to arterial roads, which are roads that handle high-volume traffic between major destinations.
Quality	Description or images that illustrate the different levels of road class pavement condition	The Road network has varied asset conditions which are based on a road's needs study conducted in 2022. The condition scale range is 0 (the lowest condition) to 100 (the highest condition). Overall, the average condition of the road network is 68. Condition is described as follows: • (80-100) Road surface is in good condition or has been recently constructed or rehabilitated. Renewal or reconstruction is not required in the short term. • (60-79) Road surface exhibits moderate deterioration. It is a candidate for rehabilitation in the mid-term • (40-59)Road surface exhibits more significant deterioration. It is a candidate for rehabilitation in the short-term. • (20-39)Road is functional but performing poorly. • (0-19) Road is in very poor condition and requires very immediate replacement and/or rehabilitation

Table 11 O. Reg. 588/17 Community Levels of Service: Road Network

4.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	Not Applicable

	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0.02 km/km^2
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)[4]	0.84 km/km^2
Quality	Average pavement condition index for paved roads in the Municipality	Asphalt Roads: 60%
		Surface Treated Roads: 42%
	Average surface condition for unpaved roads in the Municipality (e.g. excellent, good, fair, poor)	Fair
Performance	Target vs. Actual capital reinvestment rate	2.59% vs. 1.06%

Table 12 O. Reg. 588/17 Technical Levels of Service: Road Network

[4] Includes both paved and gravel roads.

4.8 Recommendations

Asset Inventory

- Review the inventory of assets to ensure they reflect the best-available information. In particular, the inventory of roadside appurtenances like sidewalks, street signs, and streetlights should be reviewed and where assets and/or new information is identified these should be reflected in the asset inventory.

Condition Assessment Strategies

- Consider implementing a standardized condition assessment program that provides for a regular frequency of assessment, a standardized condition scale, and data collection and verification requirements.
- If an updated condition assessment is conducted, ensure the information is also updated in the asset registry
- Review condition information annually for accuracy and update as required (e.g. upon completion of a road rehabilitation).

Lifecycle Management Strategies

- Work towards a more proactive roads lifecycle management approach and consider the developed lifecycle strategy as a framework. Recognizing that the available budget will often be less than the identified need, prioritize investment to more critical roads and consider risk scores to do so.

Risk Management Strategies

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

Levels of Service

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

5. Bridges & Culverts

The Municipality's transportation network also includes bridges and structural culverts, with a current replacement cost of approximately $20 million.

5.1 Inventory & Valuation

Table 13 summarizes the quantity and current replacement cost of bridges and culverts. The Municipality owns and manages 14 bridges and 19 structural culverts.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Bridges	14	Quantity	$16,374,293	CPI
Culverts	287	Length (m)	$4,124,350	CPI
TOTAL			**$20,498,643**	

Table 13 Detailed Asset Inventory: Bridges & Culverts

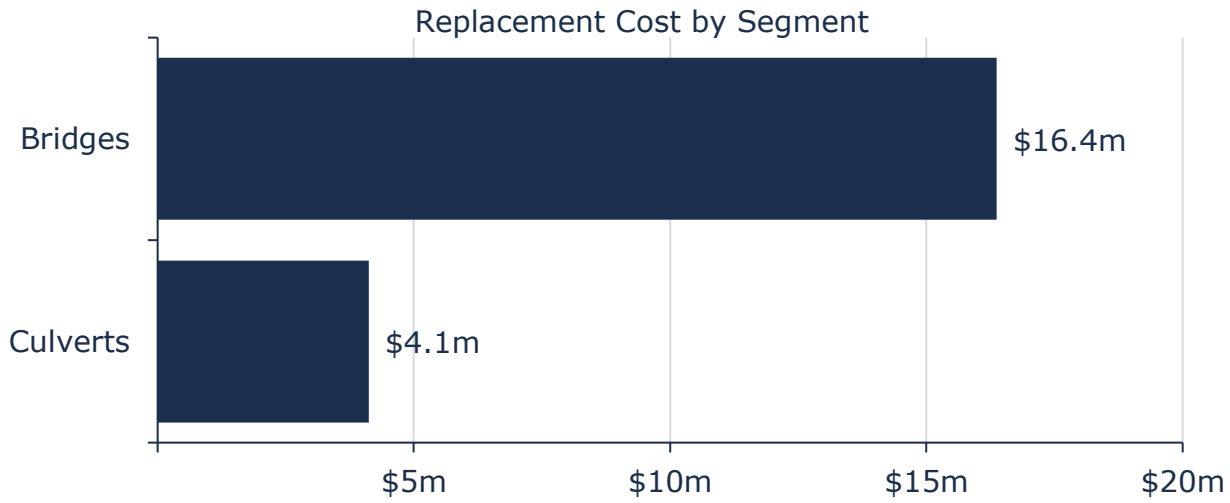


Figure 24 Portfolio Valuation: Bridges & Culverts

5.2 Asset Condition

Figure 25 summarizes the replacement cost-weighted condition of the Municipality's bridges and structural culverts. Based on the Municipality's most recent Ontario Structures Inspection Manual (OSIM) assessments (completed in 2024), 64% of bridges and culverts are in fair or better condition. Some elements or components of these structures may be candidates for replacement or rehabilitation in the medium term and should be monitored for further degradation in condition. At 36% of the total bridges

and culverts portfolio, assets in poor or worse condition may require replacement in the immediate or short term.

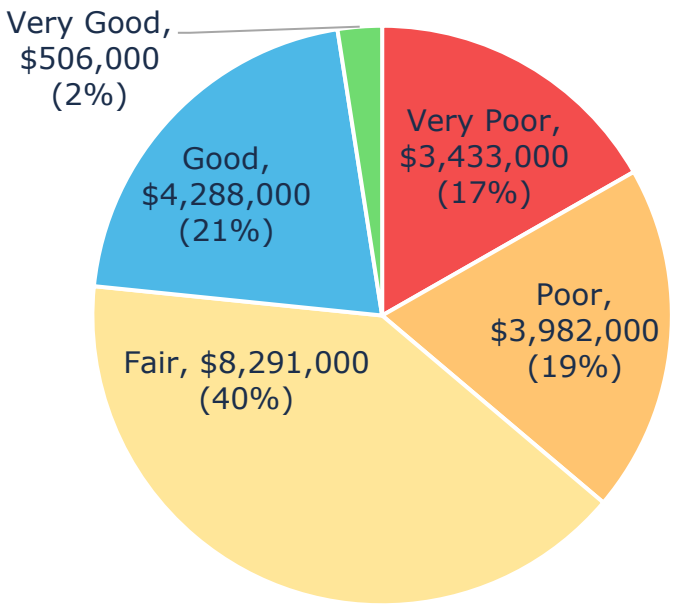


Figure 25 Asset Condition: Bridges & Culverts Overall

As further detailed in Figure 26, based on in-field condition assessments, the majority of bridges were found to be in fair or better condition, while most culverts were identified as being in poor or worse condition. As bridges and structures reach a poor or worse rating (i.e., a bridge condition index of less than 40), they are not necessarily unsafe for regular use, individual circumstances must be considered. The OSIM ratings are designed to identify repairs needed to elevate condition ratings.

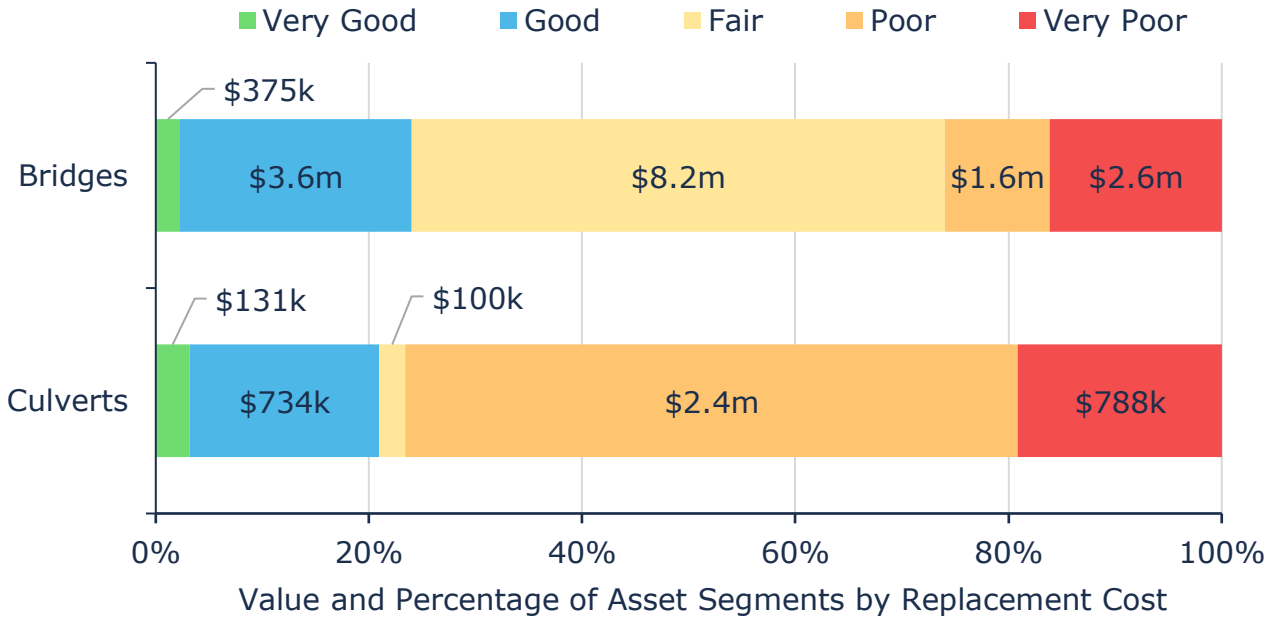


Figure 26 Asset Condition: Bridges & Culverts by Segment

5.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 27 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

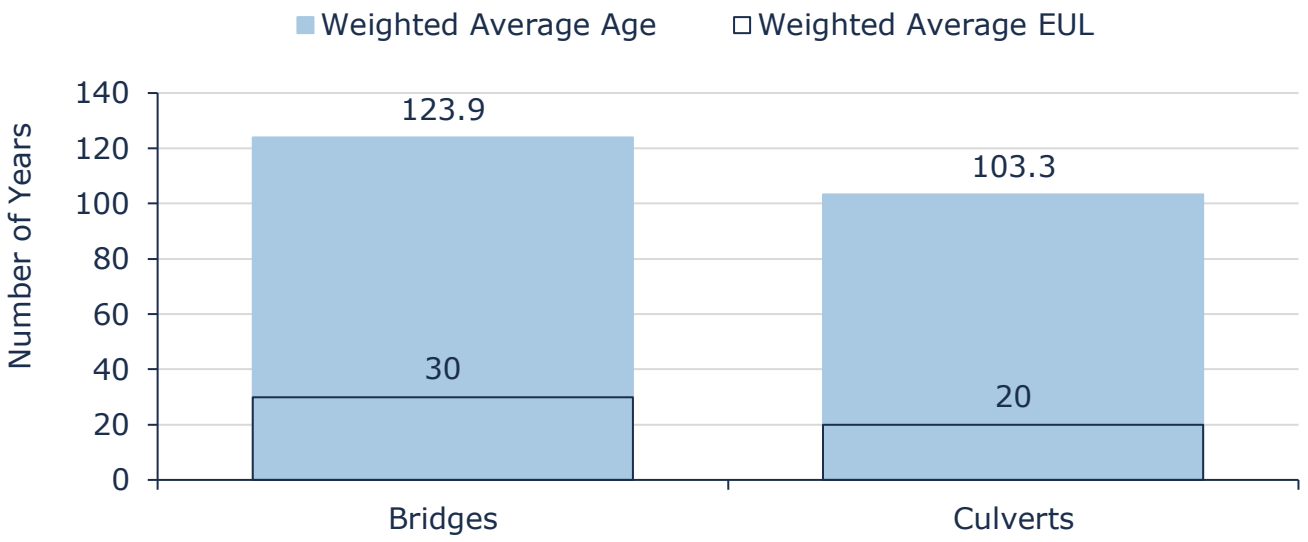


Figure 27 Estimated Useful Life vs. Asset Age: Bridges & Culverts

Age analysis reveals that both Bridges and Culverts are significantly beyond their expected useful life. Bridges have a weighted average age of 123.9 years compared to an EUL of 30 years, while Culverts average 103.3 years in age against a 20-year EUL. OSIM assessments should continue to be used in conjunction with age and asset criticality to prioritize capital and maintenance expenditures.

5.4 Current Approach to Lifecycle Management

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.

Bridge and structural culvert rehabilitation events are based on recommendations from the 2024 OSIMs report. These recommended interventions have been modeled against the applicable asset. Associated costs are specific to each bridge and event, however the impacts are standardized and defined as follows:

Bridges & Structural Culverts		
Event Name	**Event Class**	**Event Impact**
Repairs	Maintenance	None
Minor Rehabilitation	Rehabilitation	Adds 25% condition
Major Rehabilitation	Rehabilitation	Adds 50% Condition

In addition to the above noted interventions, the Town completes various inspection and maintenance activities and holds replacement and rehabilitation considerations as follows:

Activity Type	Description of Current Strategy
Maintenance & Inspection	Bi-annual inspections per Ontario Structure Inspection Manual (OSIM) by a professional engineer. The assessments provide a Bridge Performance Index (BPI) and detailed ratings of the severity and extent of deterioration.The last inspection was completed in 2024.
	Inspection reports recommend rehabilitation and maintenance actions, with timelines to extend or maintain the asset's useful life. Rehabilitation recommendations are reflected in the capital forecasts of this Asset Managment Plan.
Rehabilitation / Replacement	Priority for replacement is based on class of road, surface type, population served, Traffic counts, alternate access routes, roadside environment
	The current budget for capital projects is $17,000. Investment prioritization considers cost-benefit analysis of near failed structures.

Table 14 Lifecycle Management Strategy: Bridges & Culverts

5.5 Forecasted Long-Term Replacement Needs

Figure 28 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Municipality's bridges and culverts. This analysis was run until 2059 to capture at least one iteration of replacement for the longest-lived asset. The Municipality's average annual requirements (red dotted line) for bridges and culverts is $693,000. 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.

Capital requirements for bridges and culverts are projected to peak significantly in the near term, with $6.6 million needed between 2025–2029 and $7.8 million between 2030–2034. These peaks are driven largely by replacement and rehabilitation activities as recommended by the 2024 OSIMs report. A backlog of $2.9 million also exists at the outset, reflecting immediate reinvestment needs. After 2034, capital needs decline sharply, remaining below $2 million until rising again to $6.1 million in 2055–2059. These projections and estimates are based on asset replacement costs, age analysis, and condition data produced in the 2024 OSIMs report. 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.

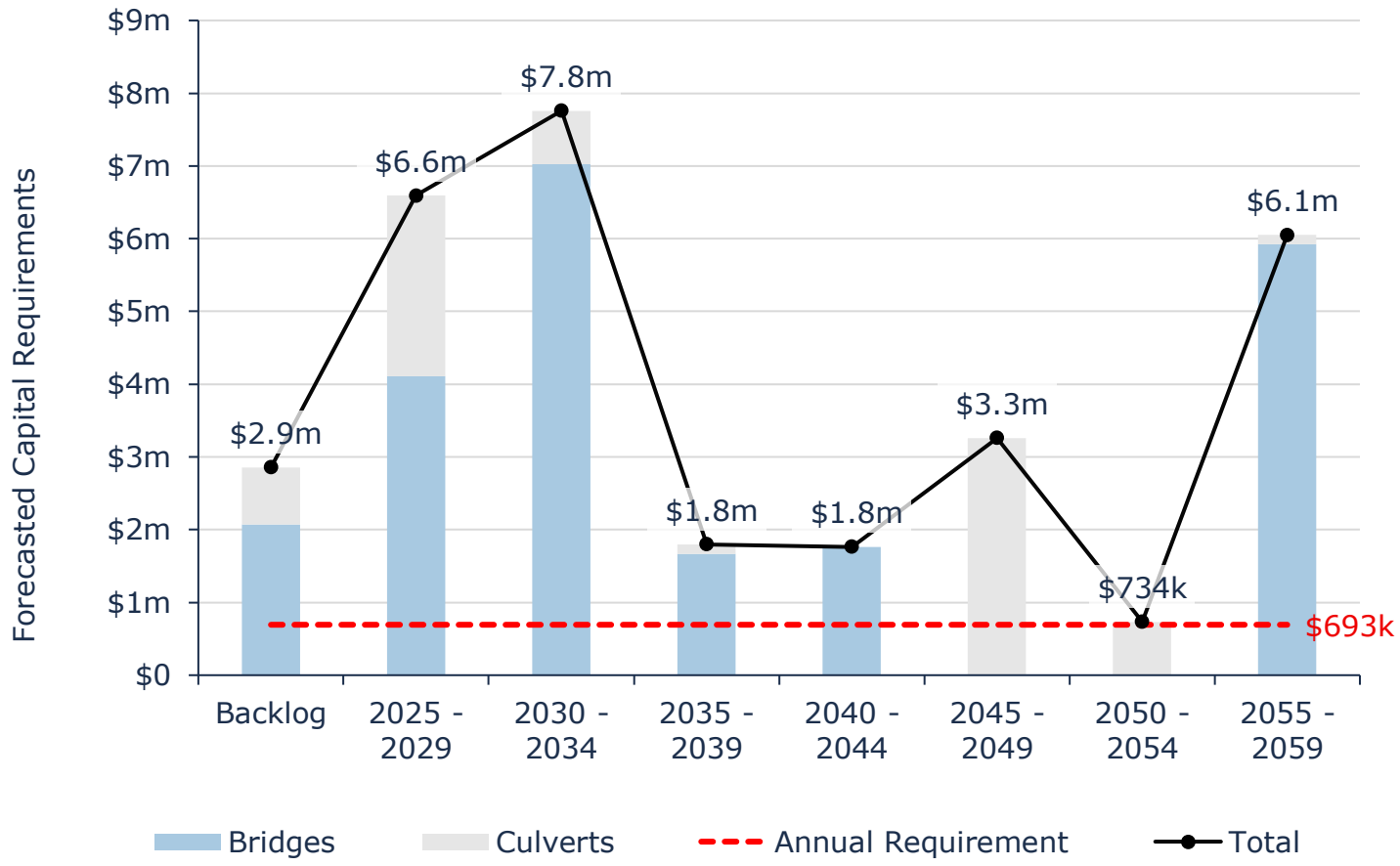


Figure 28 Forecasted Capital Replacement Needs: Bridges & Culverts 2024-2059

Often, the magnitude of capital investment needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. OSIM condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

5.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition and replacement costs. Risk Rating Criteria for bridge and structural culvert assets is provided in Appendix D. An overview of the methodology applied for calculating and classifying asset risks is provided in Section 2.3.2.

The matrix stratifies assets based on their individual probability and consequence of failure; each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Municipality may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

As detailed in Figure 29 below, most bridge and structural culvert assets hold a high or very high-risk rating. The overall high-risk rating is due to a concentration of assets in fair or worse conditions, high replacement costs, and limited alternative route options.

1 - 4	5 - 7	8 - 9	10 - 14	15 - 25
Very Low	**Low**	**Moderate**	**High**	**Very High**
$672,306	$2,555,368	$1,665,882	$8,765,587	$6,839,500
(3%)	(12%)	(8%)	(43%)	(33%)

Figure 29 Risk Matrix: Bridges & Culverts

5.7 Levels of Service

The tables that follow summarize the Municipality's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17 as well as any additional performance measures that the Municipality has selected for this AMP.

5.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Bridges and structural culverts are a key component of the municipal transportation network. Like roads, bridges support primarily personal vehicles, with occasional use from pedestrians, bicyclists and larger commercial vehicles.
Quality	Description or images of the condition of bridges & culverts and how this would affect the use of the bridges & culverts	See Appendix C for a map of the municipality's bridge and culverts. The condition of bridges and structural culverts varies widely as summarized in Figures 26. As of 2024, two bridges (Griffith Road and Sutcliffe Road) in total held a loading or dimensional restriction with a third bridge expected to be included by late 2025. These restrictions have impacts to users of these bridges.

Table 15 O. Reg. 588/17 Community Levels of Service: Bridges & Culverts

5.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Scope	% of bridges in the Municipality with loading or dimensional restrictions	6%[5]
Quality	Average bridge condition index value for bridges in the Municipality	48%
	Average bridge condition index value for structural culverts in the Municipality	32%
Performance	Target vs. Actual capital reinvestment rate	3.38% vs. 0.53%

Table 16 O. Reg. 588/17 Technical Levels of Service: Bridges & Culverts

[5] There is currently one bridge with a loading restriction and another bridge that has been closed due to structural concerns. The reported figure represents the two above noted bridges and is divided by the total number of structural bridges and culverts (33). Please note that Ross Road Culvert is not included as a bridge with a loading or dimensional restriction in the 2024 LOS metric as it was opened in 2024. As of June 2025, the Municipality noted it remained open, but it is expected to be closed in the very near future.

5.8 Recommendations

Asset Inventory

- Review the inventory of assets to ensure they reflect the best-available information. In particular, the in-service date of bridges and culverts was an identified gap that the Municipality should seek to improve wherever possible. Dates may be obtainable from historic building drawings, permits, or records otherwise.

Condition Assessment Strategies

- Continue to align information collected through specialized studies, particularly the bi-annual bridge studies to the assets in the database. When asset information, such as condition changes due to capital investments, updated assessments, or events otherwise, ensure the associated asset data and information is updated to reflect.

Lifecycle Management Strategies

- Follow the recommendations from the bi-annual bridge studies to preserve asset conditions as much as possible. Ensure that budget decisions consider the identified investment requirements for both rehabilitations and replacements

Risk Management Strategies

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

Levels of Service

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

6. Water Network

The City of Greater Sudbury is the operating authority for Markstay-Warren's drinking water system. The water network provides for the safe production and distribution of drinking water and includes assets such as:

- Water Tower
- Ground Water Wells
- Chlorination Building for Disinfection
- Water Distributions Mains

6.1 Inventory & Valuation

Table 17 and Figure 30 summarizes the quantity and/or current replacement cost of the Municipality's various water network assets. As represented below, the largest proportion of the water networks' total replacement cost is associated with water mains.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Valves	84	Quantity	$142,800	Cost per Unit
Water Mains	20,719	Length (m)	$29,609,847	Cost Per Unit [6]
Water Tower	1	Quantity	$1,388,600	User-Defined
Water Treatment	2	Quantity	$5,460,600	User-Defined
TOTAL			**$36,601,847**	

Table 17 Detailed Asset Inventory: Water Network

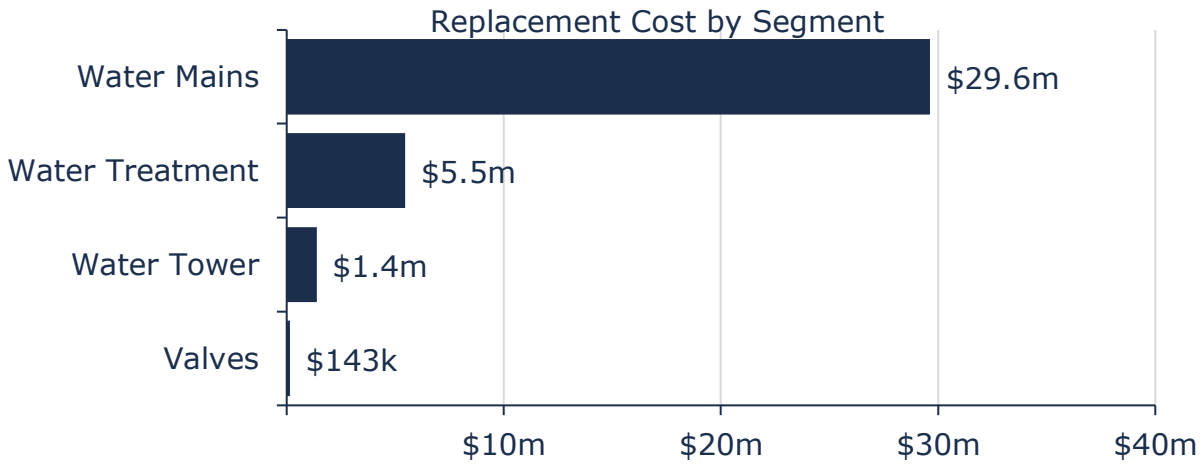


Figure 30 Portfolio Valuation: Water Network

[6] Transmission mains are costed on a user-defined basis.

6.2 Asset Condition

Figure 31 summarizes the replacement cost-weighted condition of the Municipality's water network. Based on age-based condition data, 96% of assets are in fair or better condition; the remaining 4% of assets are in poor to very poor condition. For water network assets, conditions are determined based on the age of an asset and its Estimated Useful Life (EUL). No assessed condition data was available for water network assets.

Assets in poor or worse conditions may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. As illustrated in Figure 31, most of the Municipality's water network assets are in fair or better condition.

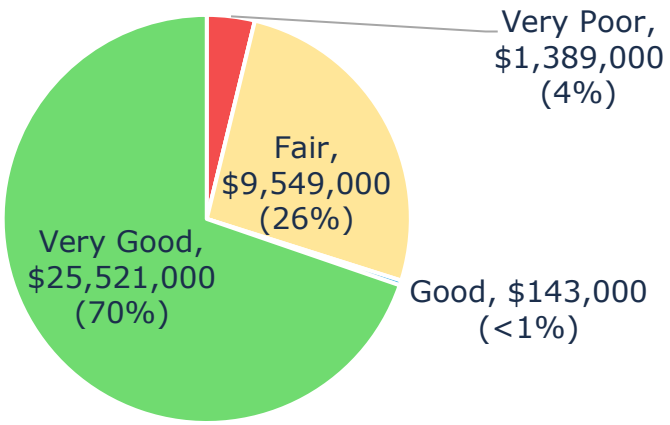


Figure 31 Asset Condition: Water Network Overall

As illustrated in Figure 32, based on age-based conditions, most of the Municipality's water mains are in good condition. In contrast, the water tower is in very poor condition. It is important to note, however, that onsite condition assessments of the water tower may conclude that the asset is in better condition.

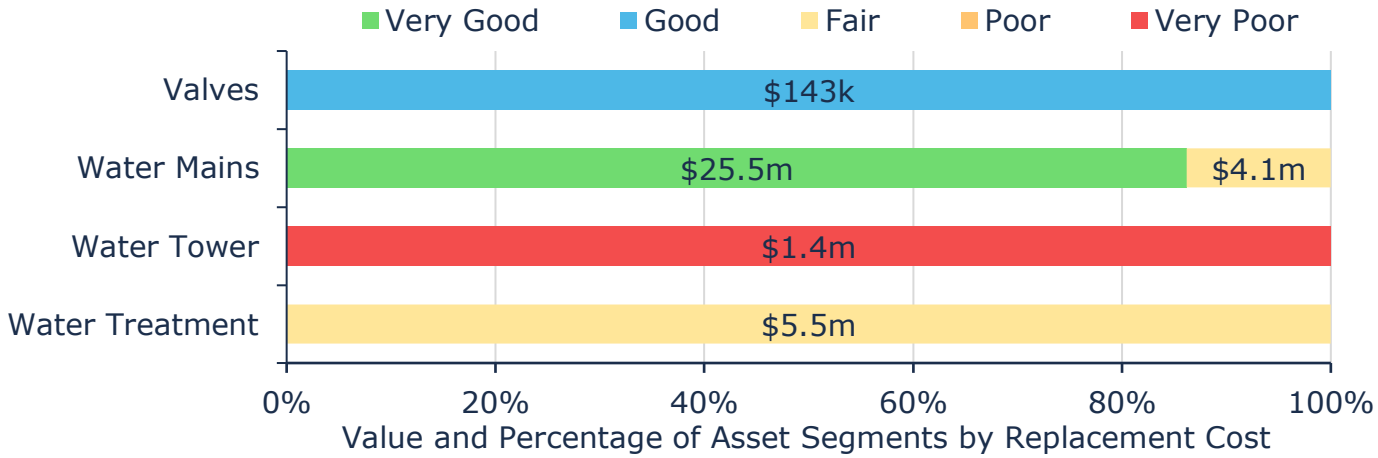


Figure 32 Asset Condition: Water Network by Segment

6.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential long-term replacement spikes.

Figure 33 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

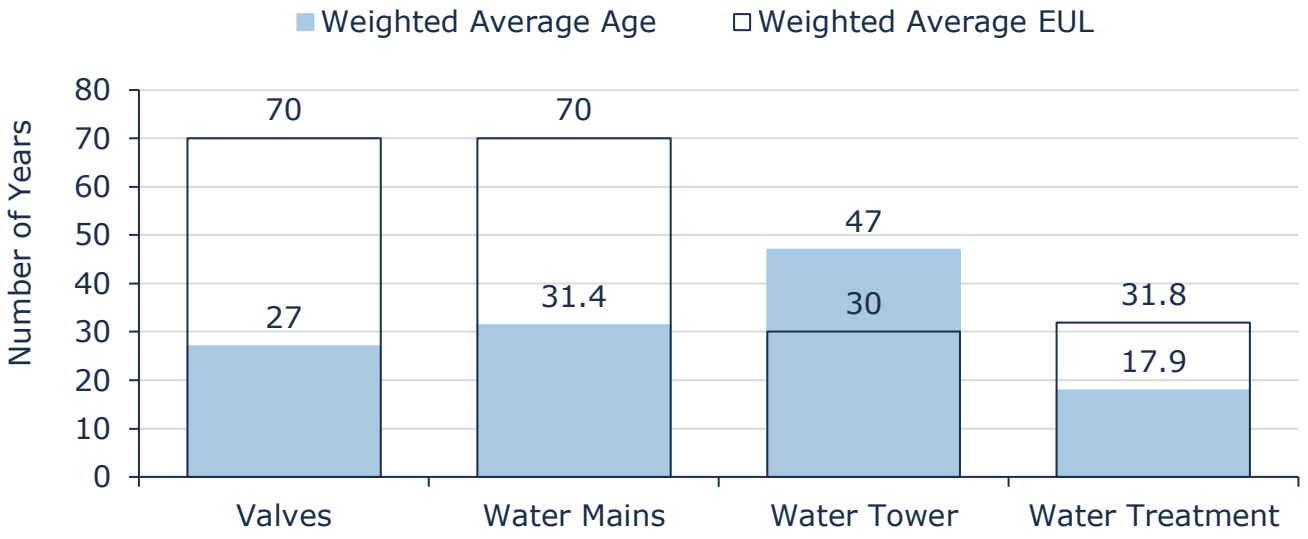


Figure 33 Estimated Useful Life vs. Asset Age: Water Network

Age analysis shows that most water system asset categories are within their expected useful life. Valves and water mains have weighted average ages of 27 and 31.4 years, respectively, against an EUL of 70 years, while water treatment assets average 17.9 years of age with an EUL of 31.8 years—indicating they are in the early to mid-stages of their lifecycle. The exception is the water tower, which has is 47 years of age compared to a 30-year EUL, suggesting it is well beyond its expected service life and may require reinvestment attention. This is the primary reason for its very poor condition as reported in Figure 32 above.

6.4 Current Approach to Lifecycle Management

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

The following table outlines the Municipality's current lifecycle management strategy for their water network assets:

Activity Type	Description of Current Strategy
Maintenance & Inspection	Condition assessments are primarily based on asset age, expected useful life (EUL), and historical data from past inspections
	Physical inspections are limited; most condition ratings for underground infrastructure are inferred from age and deterioration curves
	Through a contract with the City of Sudbury, hydrants are regularly pressure tested.
Rehabilitation/ Replacement	Recommended inspections of the water tower have been completed. An inspection of the warren well is to be completed 2025, and is the first inspection on record.
	End of line hydrants are flushed regularly (i.e. weekly) while most hydrants are checked as part of the annual program. Key points will be exercised more regularly. Flushing may occur more frequently based on complaints or water quality monitoring activities
	Rehabilitation typically involves changing sections of the system (i.e., partial replacement).
	Replacement priorities are guided by break history, condition data, and coordination with road and other utility projects.

Table 18 Lifecycle Management Strategy: Water Network

6.5 Forecasted Long-Term Replacement Needs

Figure 34 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Municipality's water network. This analysis was run until 2089 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Municipality's primary asset management system and asset register. average annual requirements (red dotted line) of water network assets total $647,000 ($3.2 million per 5-year bucket). 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 throughout the forecast period. It shows two major peaks, with $5.0 million required in 2035–2039 for Water Treatment assets, and a significant spike of $29.6 million in 2065–2069 for Water Mains. A smaller initial backlog of $1.4 million is also identified, along with moderate needs in 2030–2034 ($4.1 million), and late-period investments of $1.7 million in 2085–2089. Capital demands are minimal or nonexistent in many other periods. These projections are based on asset replacement costs, age analysis, and condition data when available. 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.

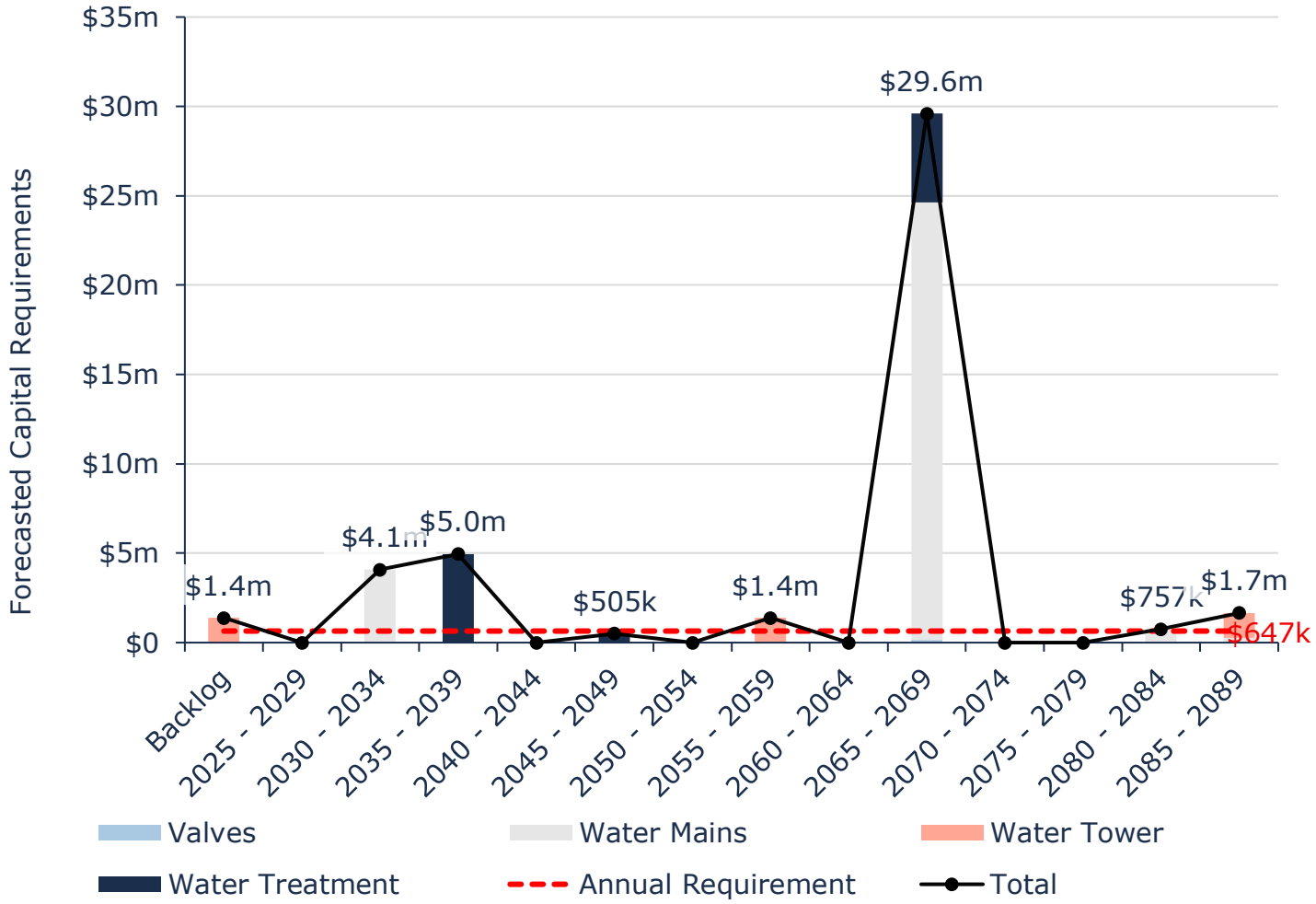


Figure 34 Forecasted Capital Replacement Needs: Water Network 2024-2089

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. Regular condition assessments and

a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

6.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, replacement costs. Risk Rating Criteria for water network assets is provided in Appendix D. An overview of the methodology applied for calculating and classifying asset risks is provided in Section 2.3.2.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Municipality may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

As detailed in Figure 35 below, most water network assets hold a very low-risk rating. The overall high-risk rating is due to a concentration of assets in fair or worse conditions, high replacement costs, and limited alternative route options.

1 - 4 **Very Low** $26,511,794 (72%)	5 - 7 **Low** $1,340,073 (4%)	8 - 9 **Moderate** $1,900,780 (5%)	10 - 14 **High** $5,460,600 (15%)	15 - 25 **Very High** $1,388,600 (4%)

Figure 35 Risk Matrix: Water Network

6.7 Levels of Service

The tables that follow summarize the Municipality's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17 as well as any additional performance measures that the Municipality has selected for this AMP.

6.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Scope	Description, which may include maps of the user groups or	Most residential properties in the Villages of Markstay and Warren are

Service Attribute	Qualitative Description	Current LOS (2024)
	areas of the municipality that are connected to the municipal water system	connected to the municipal water system. Please refer to Appendix C for a map of the water network.
	Description, which may include maps of the user groups or areas of the municipality that have fire flow	Fire flow is available to 100% of the households in the villages of Markstay and Warren that are connected to the municipal water system. A map of the water network is provided in Appendix C.
Reliability	Description of boil water advisories and service interruptions	No boil water advisories were issued in 2024 for Markstay or Warren Drinking water systems.

Table 19 O. Reg. 588/17 Community Levels of Service: Water Network

6.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Scope	% of properties connected to the municipal water system	31.5%
	% of properties where fire flow is available	31.5%
Reliability	# of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0 vs. 1276
	# of connection-days per year where water is not available due to water main breaks compared to the total number of properties connected to the municipal water system	8 vs. 1276
Quality	Weighted Average Condition of Assets	77%
Sustainability	Target vs. Actual capital reinvestment rate	1.77% vs. 0%[7]
	Average Risk Score	6.65

Table 20 O. Reg. 588/17 Technical Levels of Service: Water Network

[7] As discussed in the financial strategy section, at the time of this reports publication the Town was unable to provide reliable historical capital investment information for the water and sanitary networks. As a result, the financial strategy is premised on no sustainable capital funding to these asset categories and consequently the actual reinvestment rate is 0%. When additional or new capital investment records are available, they may indicate a higher rate of capital investment. If this is the case, the actual reinvestment rate would increase for water and sanitary networks and the portfolio overall.

6.8 Recommendations

Asset Inventory

- Work to consolidate asset data from various studies and reports into the asset inventory so that the listing is more comprehensive. This may include information from Operational Plans, Master Plans, and inspection reports.
- Water Hydrant inventory data was not available to be reported and is not reflected in this asset management plan. It is important to collect asset inventory information for water hydrants and to update the asset management system accordingly.
- The Chlorination Plant and reservoir are currently recorded as single assets, however they each respectively contain numerous components each with varied useful life, condition, and replacement cost information. To improve the Town's understanding of what it owns, what condition it is in, and its projected investment needs, consider componentizing these assets.

Condition Assessment Strategies

- Currently none of the water mains have condition information and age-based condition is used. Consider the procurement of CCTV assessments for the mains, beginning with the most problematic areas and expanding from there. Improved information on asset conditions will provide strong insights into what to prioritize for rehabilitation and/or replacement.

Lifecycle Management Strategies

- Consider rehabilitation strategies like pipe re-lining.
- Consolidate break history information into the asset management database so that it can actively be considered alongside other asset data and information and potentially included in the risk model.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models (when applicable), on a regular basis and adjust as new asset data becomes available (e.g. assessed condition, asset attributes) and as the Town's understanding of risk evolves.

Levels of Service

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

7. Sanitary Network

The Markstay-Warren lagoon and associated treatment assets are owned by the Municipality of Markstay-Warren and operated by the City of Greater Sudbury. All other sanitary sewer network assets are both owned and managed by the Municipality of Markstay-Warren.

7.1 Inventory & Valuation

Table 21 and Figure 36summarizes the quantity and/or current replacement cost of the Municipality's various sanitary network assets. As represented below, the largest proportion of replacement cost is represented by sanitary mains.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Manholes	39	Quantity	$124,800	Cost per Unit
Sanitary Lift Station	1	Quantity	$756,800	User-Defined
Sanitary Mains	5,349	Length (m)	$5,348,600	Cost per Unit
Wastewater Lagoon	1	Quantity	$2,764,830	CPI
TOTAL			**$8,995,030**	

Table 21 Detailed Asset Inventory: Sanitary Sewer Network

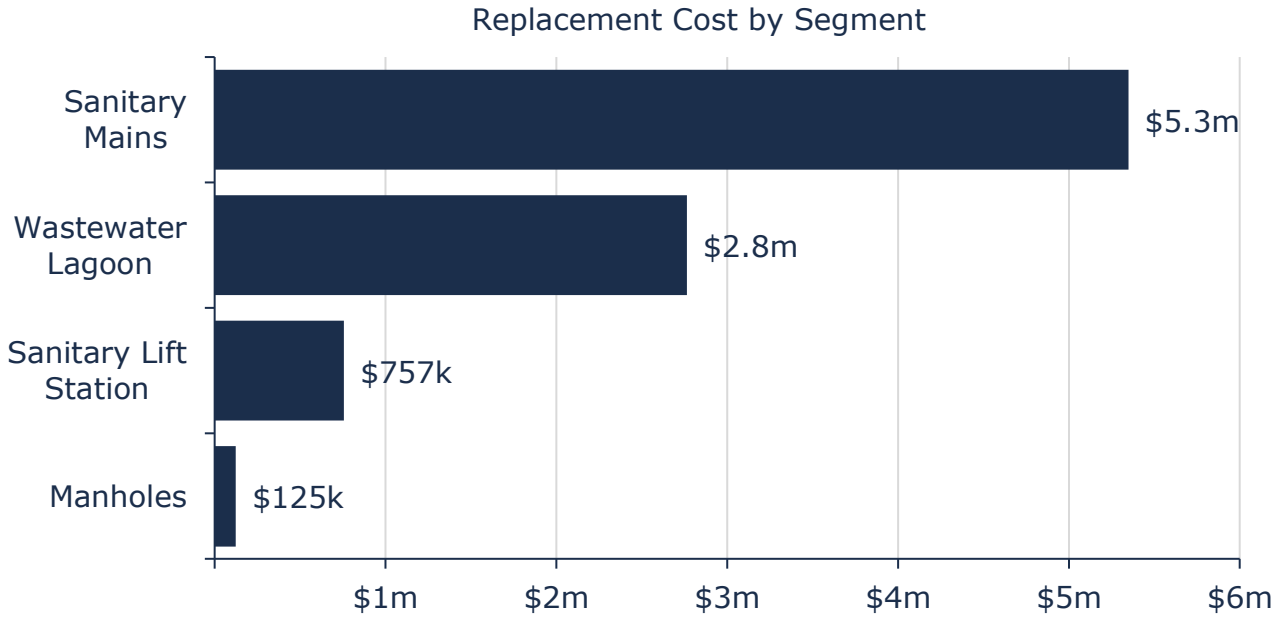


Figure 36 Portfolio Valuation: Sanitary Sewer Network

7.2 Asset Condition

Figure 37 summarizes the replacement cost-weighted condition of the Municipality's sanitary sewer network. Based on a combination of field inspection data and age, 91% of assets are in fair or better condition; the remaining 9% of assets are in poor to very poor condition. For sanitary network assets, conditions are determined based on the age of an asset and its Estimated Useful Life (EUL). Condition assessments were available for all manholes and the wastewater lagoon. This condition data was projected from inspection date to the data effective year. No condition data was available for sanitary mains or lift stations.

Assets in poor or worse conditions may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. As illustrated in Figure 37 almost all (90%) of the Municipality's sanitary network assets are in fair or better condition.

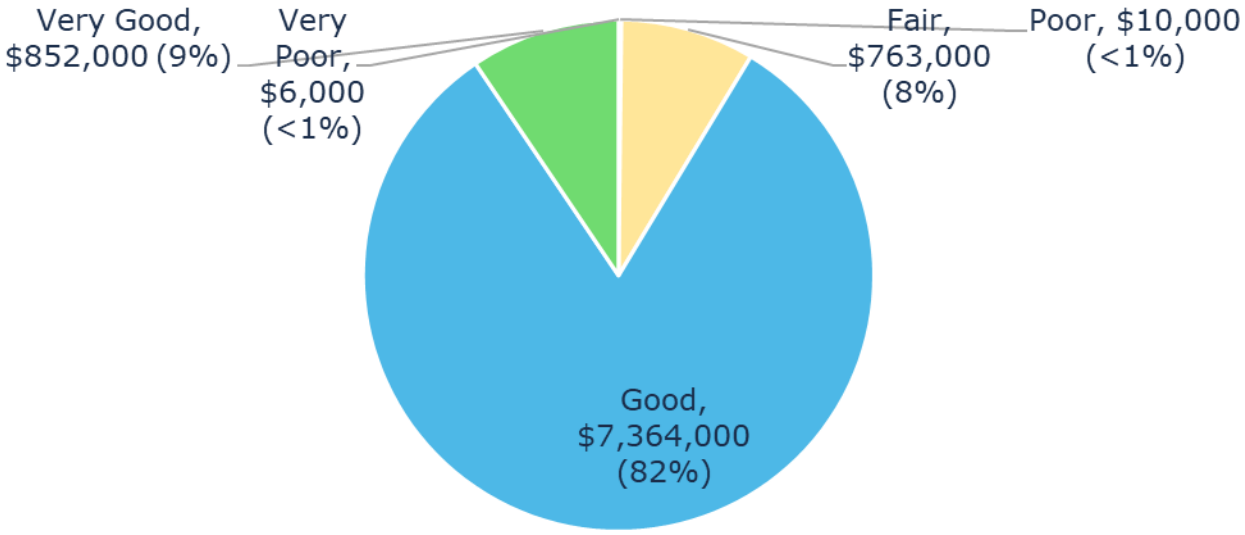


Figure 37 Asset Condition: Sanitary Sewer Network Overall

As illustrated in Figure 38, based on condition assessments and age-based conditions, the large majority of sanitary assets are in fair or better condition, with the small exception of a small portion of manholes in poor or very poor condition.

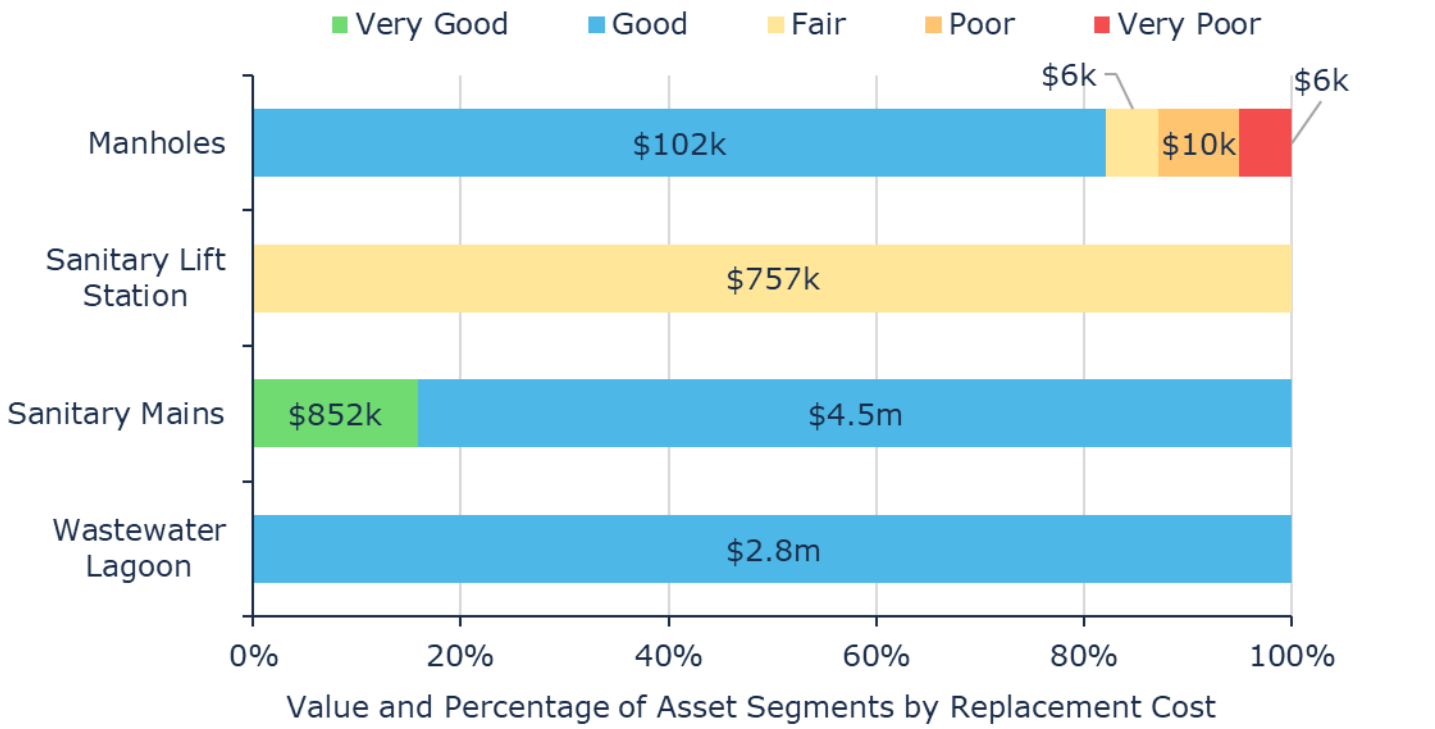


Figure 38 Asset Condition: Sanitary Sewer Network by Segment

7.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential long-term replacement spikes.

Figure 39 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

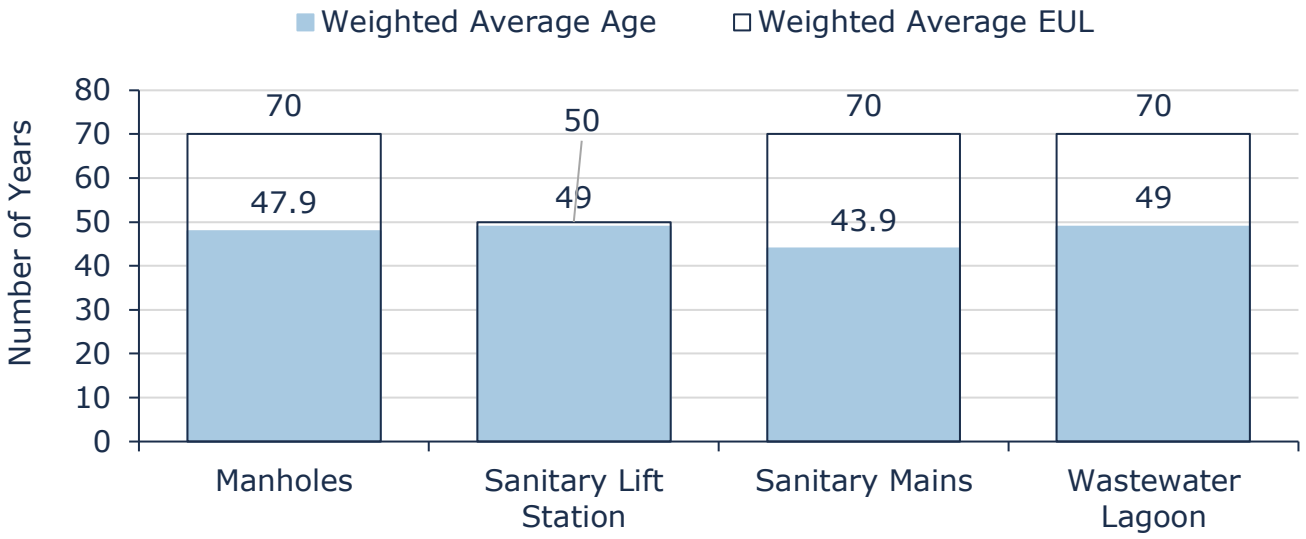


Figure 39 Estimated Useful Life vs. Asset Age: Sanitary Sewer Network

Age analysis shows that all sanitary asset categories are within their expected useful life but are approaching the later stages of their lifecycle, especially for sanitary lift stations. Manholes, sanitary mains, and the wastewater lagoon have weighted average ages ranging from 43.9 to 49 years against an EUL of 70 years. Sanitary lift stations are the most aged relative to their EUL, with an average age of 49 years compared to a 50-year EUL, indicating they are nearing the end of their expected service life. However, staff condition assessments for the sanitary lift station indicate that the asset is in fair condition and based on this they are anticipated to remain in functional use beyond their estimated useful life.

7.4 Current Approach to Lifecycle Management

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.

Table 22 outlines the Municipality's current lifecycle management strategy for the sanitary network.

Activity Type	Description of Current Strategy
Maintenance & Inspection	The entire network is flushed annually. This program is performed by the City of Greater Sudbury. Additional flushing may occur as needed based on maintenance acitvities and/or complaints.
	There have been no regular CCTV inspections of mains to date.

Activity Type	Description of Current Strategy
Rehabilitation/ Replacement	Relining has occurred and is considered a viable rehabilitation approach.
	Prioritization and rehabilitation projects are prioritized based on: - Blockage history - Condition data - Coordination with other infrastructure project

Table 22 Lifecycle Management Strategy: Sanitary Sewer Network

7.5 Forecasted Long-Term Replacement Needs

Figure 40 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Municipality's sanitary sewer network. This analysis was run until 2084 to capture at least one iteration of replacement for the longest-lived asset. The Municipality's average annual requirements (red dotted line) total $133,000 ($665,000 per 5-year bucket) for all assets in the sanitary sewer 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 throughout the forecast period. It also shows that capital requirements for sanitary assets are relatively low across most periods, with two major investment spikes. Between 2045-2049 the total capital investment requirement is $5.3M; this is due to capital investment needed for sanitary mains and sanitary lift stations. Most sanitary mains were constructed in 1975 and are therefore due for replacement within a short time period. The second largest spike occurs in 2080-2084 at $3.5M with capital investment needed for the Wastewater Lagoon and the sanitary mains. Other periods show minimal to no capital needs. These projections are based on asset replacement costs, age analysis, and condition data when available. 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.

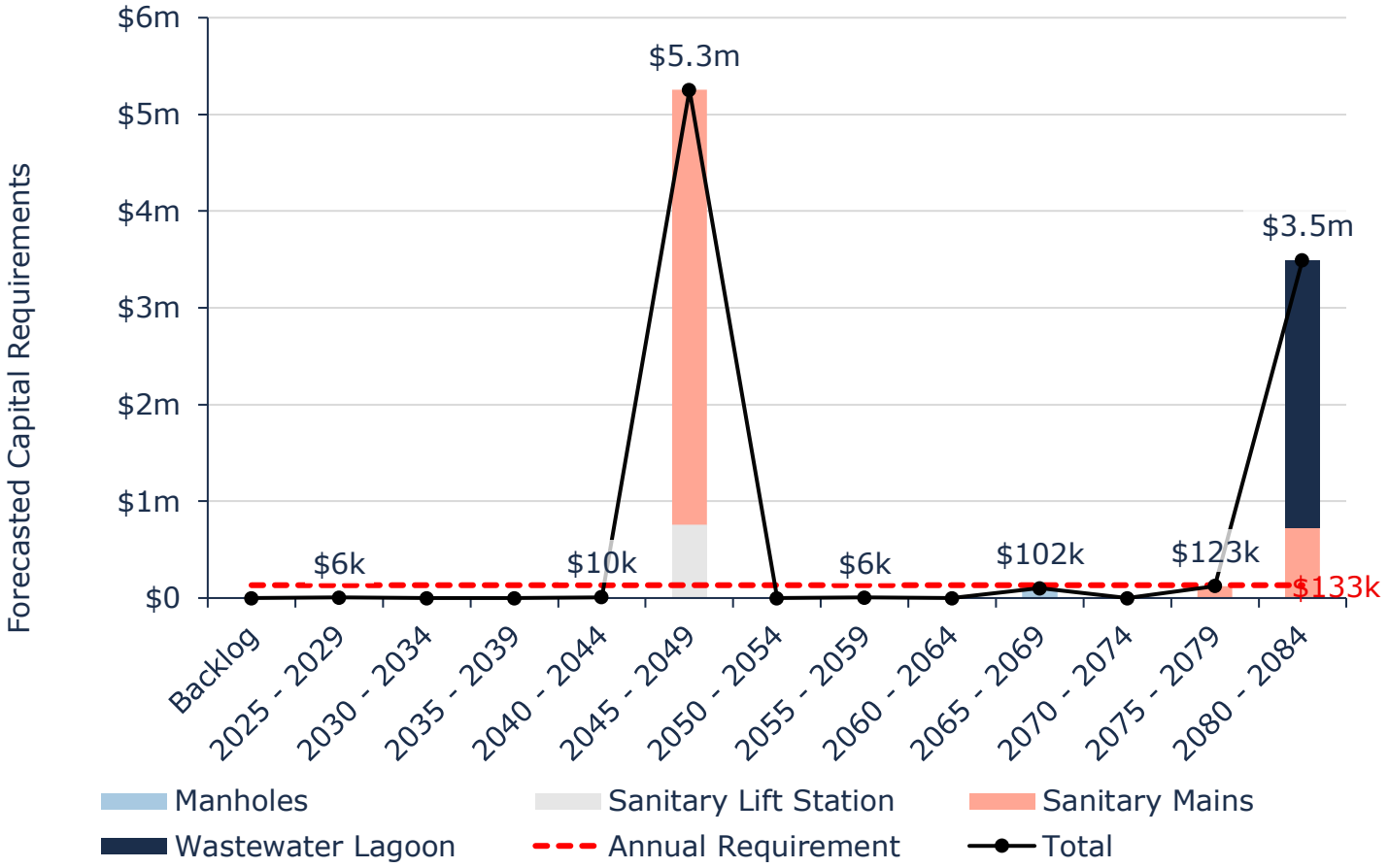


Figure 40 Forecasted Capital Replacement Needs: Sanitary Sewer Network 2024-2084

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, further investigation into asset conditions may indicate that the projected replacement date is earlier than required. Regardless, quantifying and monitoring these spikes is essential for long-term financial and project planning, including establishing dedicated reserves. Conducting and regularly updating condition assessments and deploying a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

7.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, replacement costs. Risk Rating Criteria for sanitary network culvert assets is provided in Appendix D. An overview of the methodology applied for calculating and classifying asset risks is provided in Section 2.3.2.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25.

Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Municipality may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

As detailed in Figure 41, most sanitary network assets hold a moderate-risk rating. The rating is due to a concentration of assets in fair or worse conditions, high replacement costs, and the operational impact of failure.

1 - 4 **Very Low** $997,300 (11%)	5 - 7 **Low** $371,800 (4%)	8 - 9 **Moderate** $6,558,830 (73%)	10 - 14 **High** $310,300 (3%)	15 - 25 **Very High** $756,800 (8%)

Figure 41 Risk Matrix: Sanitary Sewer Network

7.7 Levels of Service

The tables that follow summarize the Municipality's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17 as well as any additional performance measures that the Municipality has selected for this AMP.

7.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	Please refer to Appendix C for a map of the Sanitary Network. As the map shows, most properties in the villages of Markstay and Warren are connected to the sanitary network.
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 Municipality does not own any combined sewers

Service Attribute	Qualitative Description	Current LOS (2024)
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	The Municipality does not own any combined sewers
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Stormwater can enter sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its designed capacity. In some cases, this can cause water and/or sewage to overflow backup into homes. The disconnection of weeping tiles from sanitary mains and the use of sump pumps and pits directing storm water to the storm drain system can help to reduce the chance of this occurring.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The municipality follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent refers to water pollution that is discharged from a treated wastewater, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment. Markstay-Warren's wastewater is treated through a lagoon-based system which is subject to semi-annual discharge in the spring and fall.

Table 23 O. Reg. 588/17 Community Levels of Service: Sanitary Sewer Network

7.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Scope	% of properties connected to the municipal wastewater system	15%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	0 vs. 191
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0 vs. 191
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	0
Quality	Weighted Average Condition of Assets	74%
Sustainability	Target vs. Current Reinvestment Rate	1.48% vs. 0%[8]
	Average Risk Score	9.61

Table 24 O. Reg. 588/17 Technical Levels of Service: Sanitary Sewer Network

[8] As discussed in the financial strategy section, at the time of this reports publication the Town was unable to provide reliable historical capital investment information for the water and sanitary networks. As a result, the financial strategy is premised on no sustainable capital funding to these asset categories and consequently the actual reinvestment rate is 0%. When additional or new capital investment records are available, they may indicate a higher rate of capital investment. If this is the case, the actual reinvestment rate would increase for water and sanitary networks and the portfolio overall.

7.8 Recommendations

Aset Inventory

- Work to consolidate asset data from various studies and reports into the asset inventory so that the listing is more comprehensive. This may include information from Operational Plans, Master Plans, and inspection reports.
- The lagoon is currently recorded as a single asset; however, it contains numerous components each with varied useful life, condition, and replacement cost information. To improve the Town's understanding of what it owns, what condition it is in, and its projected investment needs, consider componentizing these assets.

Condition Assessment Strategies

- Currently none of the mains have condition information and age-based condition is used. Consider the procurement of CCTV assessments for the mains, beginning with the most problematic areas and expanding from there. Accurate asset condition information will provide stronger insights into what to prioritize for rehabilitation and/or replacement.
- Work towards obtaining more accurate condition information for treatment assets
- Where asset condition information is collected, ensure it is updated in the asset management system.

Lifecycle Management Strategies

- Consider rehabilitation strategies like pipe re-lining.
- Consolidate blockage history information into the asset management database so that it can actively be considered alongside other asset data and information

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models (when applicable), on a regular basis and adjust according to an evolving understanding of risk and/or as the information available to evaluate risk changes.

Levels of Service

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

8. Stormwater Network

The Municipality is responsible for owning and maintaining a stormwater network of storm mains and catch basins.

8.1 Inventory & Valuation

Table 25 summarizes the quantity and current replacement cost of all stormwater management assets available in the Municipality's asset register. As represented below, the storm mains represent the largest proportion of the network's replacement cost.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Catch Basins	104	Quantity	$598,000	Cost per Unit
Storm Mains	3,942	Length (m)	$4,044,380	Cost per Unit
TOTAL			**$4,642,380**	

Table 25 Detailed Asset Inventory: Stormwater Network

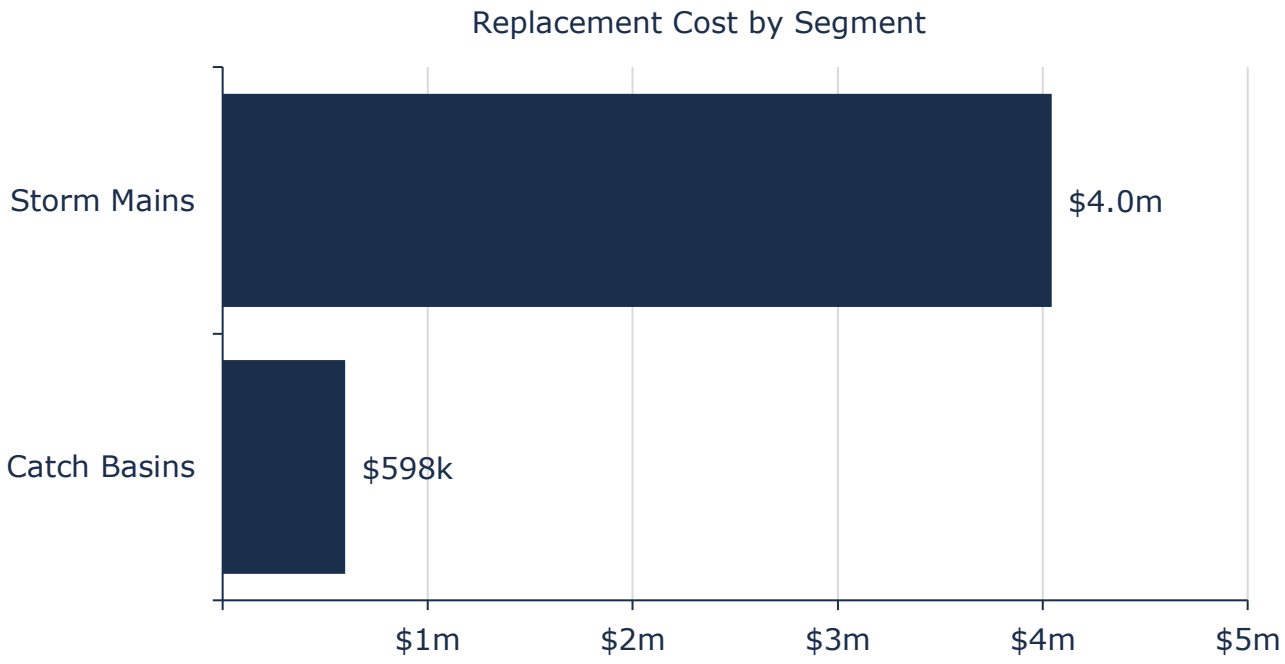


Figure 42 Portfolio Valuation: Stormwater Network

8.2 Asset Condition

Figure 43 summarizes the replacement cost-weighted condition of the Municipality's stormwater management assets. Based on assessed conditions where available (most storm culverts) and age data otherwise (mains and some storm culverts), approximately 75% of the stormwater assets are in fair or better condition while 25% of assets are in poor to very poor condition. For stormwater network assets, conditions are determined based on the age of an asset and its Estimated Useful Life (EUL). These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

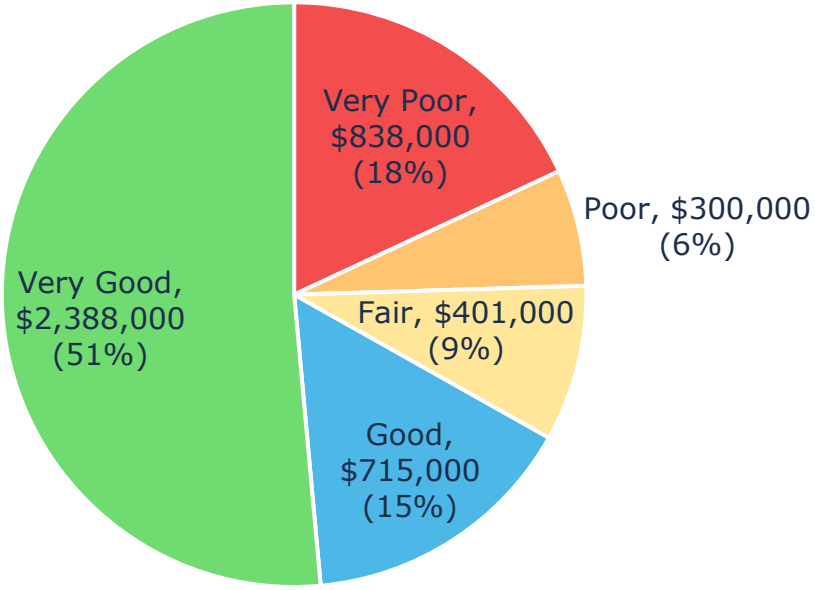


Figure 43 Asset Condition: Stormwater Network Overall

Figure 44 summarizes the condition of stormwater assets. The analysis illustrates that most stormwater mains are in fair or better condition. However, 25% of mains, with a current replacement cost of $1,000,000, are in poor or worse condition. It is important to note that none of the stormwater mains have assessed conditions and instead rely on age-based conditions. A camera inspection of the mains is likely to indicate a different distribution than the one presented.

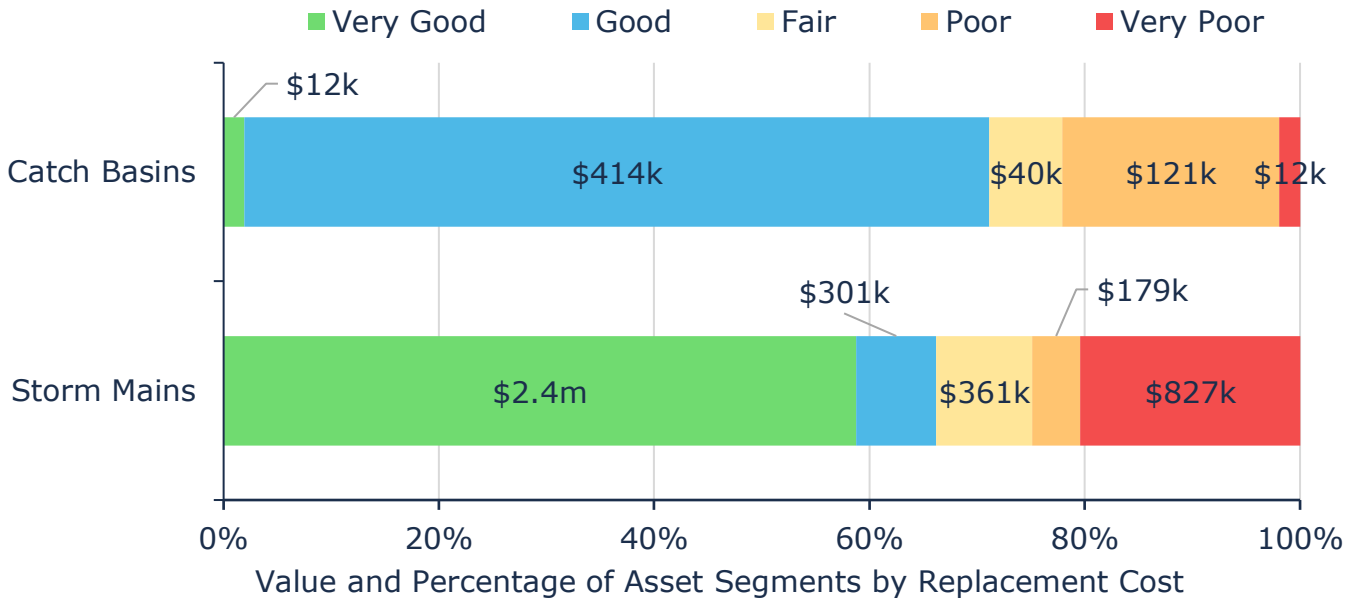


Figure 44 Asset Condition: Stormwater Network by Segment

8.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 45 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

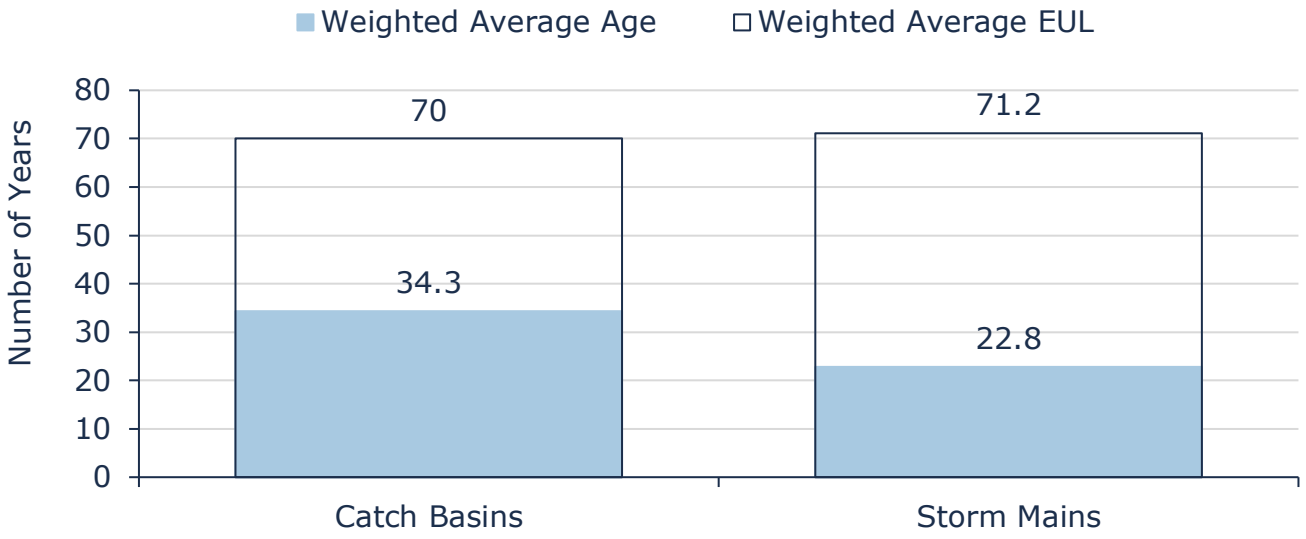


Figure 45 Estimated Useful Life vs. Asset Age: Stormwater Network

Age analysis indicates that both catch basins and storm mains are in the early to mid-stages of their expected service life. Catch basins have a weighted average age of 34.3 years compared to 70-year EUL, while storm mains average 22.8 years with a slightly longer EUL of 71.2 years. Age profiles and CCTV inspections will help to identify mains in need of replacements and/or upgrades. Extensions to EULs for mains may also be considered based on performance history to date.

8.4 Current Approach to Lifecycle Management

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

The following table outlines the Municipality's current lifecycle management strategy for the stormwater network.

Activity Type	Description of Current Strategy
Maintenance & Inspection	The entire network is flushed every 3 to 5 years. The last cleaning was done 3 years ago. The Town plans to flush the Warren section of their system in late spring 2025.
	Physical inspections are limited to mains where there are known issues. Most condition ratings for underground infrastructure are inferred from age and deterioration curves.

Activity Type	Description of Current Strategy
Rehabilitation	Rehabilitation activities are primarily triggered by localized flooding, especially where roadways are undermined. Rehabilitation would include exposing the asset and completed small section replacements. This is rarely done however, and full replacement is more common.
Replacement	Replacement decisions consider the extent and degree of localized collapses, material type, upsizing requirements as well as coordination with the road's replacement program
	The annual capital allocation to stormwater is $20,000. Investment may be higher in years where grant funding is accessible.

Table 26 Lifecycle Management Strategy: Stormwater Network

It is worth noting that the Municipality is considering increasing their inspections to include ditch assessments to ensure comprehensive infrastructure management.

8.5 Forecasted Long-Term Replacement Needs

Figure 46 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Municipality's stormwater network assets. This analysis was run until 2124 to capture at least one iteration of replacement for the longest-lived asset. The Municipality's average annual requirements (red dotted line) totals $68,000 ($340,000 per 5-year bucket) for all assets in the stormwater network. There are four notable spikes in the table; the first in 2025-2029 ($838K total), and the following in 2075-2079 ($827K total), 2085-2089 ($1.6M total), and 2090-2094 ($859K total) respectively. In each instance, most of the cost is associated with storm mains. Many of the storm mains have similar in-service dates (1975, 2014, 2020) and therefore their projected replacement dates are clustered and resultantly the capital costs are high. Catch basins capital costs contribute more gradually, with notable activity in 2065–2069 ($253k) and 2070–2074 ($451k). 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.

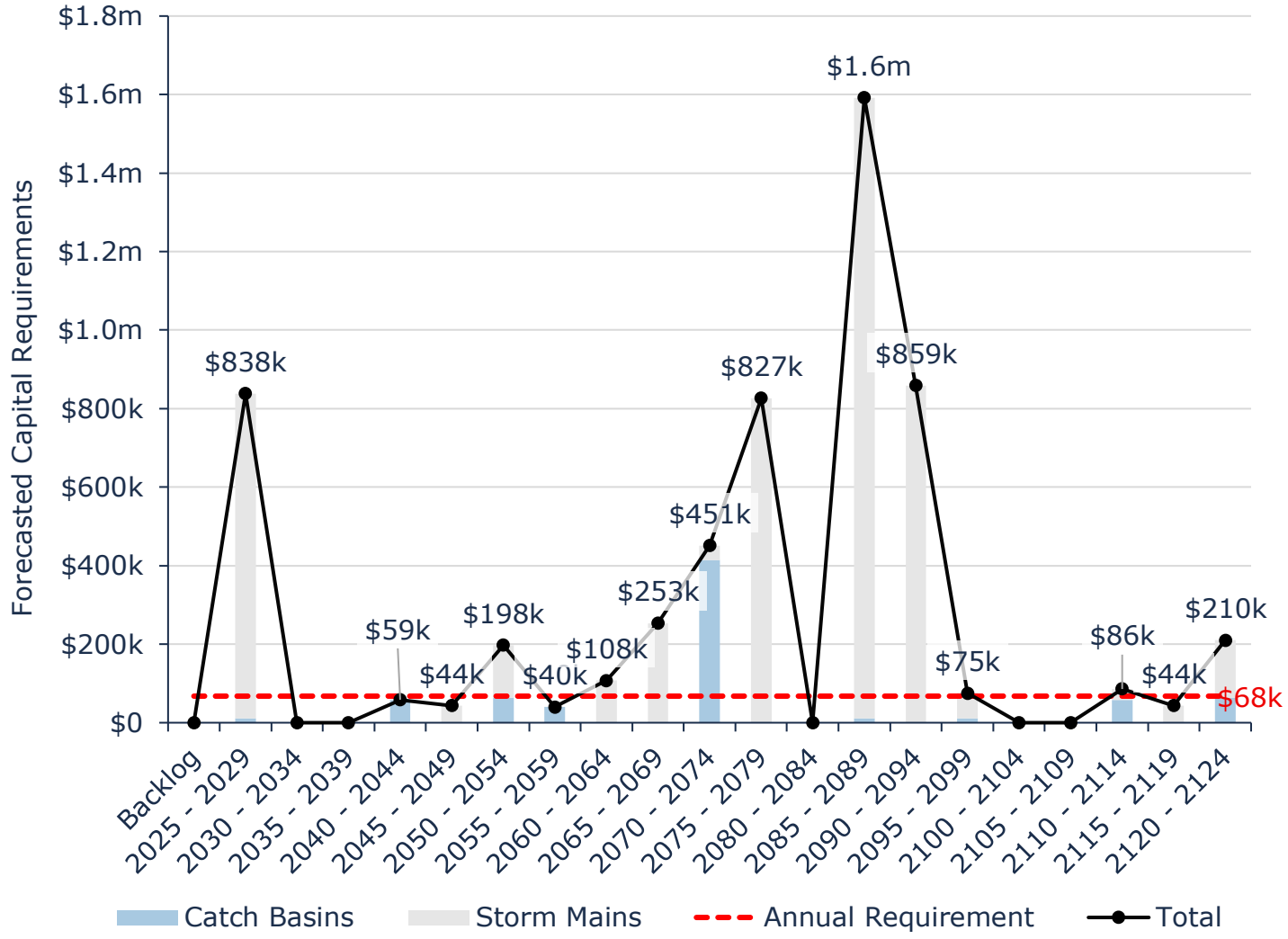


Figure 46 Forecasted Capital Replacement Needs Stormwater Network 2024-2124

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.

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. Forthcoming CCTV inspections may reveal a higher backlog. The inspections may also help reduce long-term projections by providing more accurate condition data for mains than age. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

8.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, and replacement costs. Risk Rating Criteria for stormwater network assets is provided in Appendix D. An overview of the methodology applied for calculating and classifying asset risks is provided in Section 2.3.2.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Municipality may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

As detailed in Figure 47, most stormwater network assets hold a very low-risk rating. The predominantly low risk rating is due to most assets having a fair or better condition and therefore a low probability of failure and/or a relatively love replacement cost and small pipe diameter resulting in a low consequence of failure.

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$2,825,180 (61%)	$378,400 (8%)	$186,500 (4%)	$411,600 (9%)	$840,700 (18%)

Figure 47 Risk Matrix: Stormwater Network

8.7 Levels of Service

The tables that follow summarize the Municipality's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17 as well as any additional performance measures that the Municipality has selected for this AMP.

8.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Scope	Description, which may include maps of the user groups or areas of the Municipality that are protected from flooding, including the extent of protection provided by the municipal storm water network	A map of the storm water collection system is provided in Appendix C. It is assumed that areas with stormwater collection are protected from flooding.

Table 27 O. Reg. 588/17 Community Levels of Service: Stormwater Network

8.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Scope	% of properties in municipality designed to be resilient to a 100-year storm	TBD[9]
	% of the municipal stormwater management system designed to be resilient to a 5-year storm	100%[10]
Sustainable	Target vs. Current Reinvestment Rate	1.46% vs. 0.23%

Table 28 O. Reg. 588/17 Technical Levels of Service: Stormwater Network

[9] The Municipality does not currently have data available to determine this technical metric. The rate of properties that are expected to be resilient to a 100-year storm is expected to be low.
[10] This is based on the observations of municipal staff.

8.8 Recommendations

Asset Inventory

- Currently only stormwater mains and culverts are recorded in the inventory. Other stormwater infrastructure like storm manholes and outfalls may exist. Verify the inventory and as needed add new assets where they are confirmed to exist.
- As attribute data is collected (i.e. inspections, etc.) work to update it in the asset inventory. For storm culverts, consider collection of asset diameter and asset material.

Condition Assessment Strategies

- Continue to complete and update condition assessments for stormwater culverts, which last received an assessment in 2022.
- Currently, none of the stormwater mains have received condition assessments. Consider the procurement of CCTV assessments for the mains, beginning with the most problematic areas and expanding from there. Accurate asset condition information will provide stronger insights into what to prioritize for rehabilitation and/or replacement.
- Wherever condition information is collected (i.e. mains with issues as noted in lifecycle strategies), update the asset registry with that information.

Lifecycle Management Strategies

- Continue the practice of regular storm main flushing, record where blockages are identified, seek to determine the cause and as appropriate consider implementing more frequent flushing and/or inspection in problematic areas.

Risk Management Strategies

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

Levels of Service

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

Non-Core Assets

Buildings

Replacement Cost	Average Condition	Financial Capacity	
$21.3 m	**Very Poor (10%)**	Annual Requirement:	$713,000
		Funding Available:	$56,000
		Annual Deficit:	**$657,000**

Land Improvements

Replacement Cost	Average Condition	Financial Capacity	
$1.7 m	**Good (62%)**	Annual Requirement:	$83,000
		Funding Available:	$7,000
		Annual Deficit:	**$76,000**

Vehicles

Replacement Cost	Average Condition	Financial Capacity	
$5.4 m	**Poor (36%)**	Annual Requirement:	$394,000
		Funding Available:	$31,000
		Annual Deficit:	**$363,000**

Machinery & Equipment

Replacement Cost	Average Condition	Financial Capacity	
$ 2.4 m	**Very Poor (7%)**	Annual Requirement:	$130,000
		Funding Available:	$10,000
		Annual Deficit:	**$120,000**

9. Buildings

The Municipality's buildings portfolio includes fire stations, various administrative and public works facilities, as well as parks and recreation buildings such as the arena and Senior's Clubs. The total current replacement of buildings is estimated at approximately $21 million.

9.1 Inventory & Valuation

Table 29 summarizes the quantity and current replacement cost of all building assets available in the Municipality's asset register. Currently, building assets are not componentized. The quantity listed represents the number of assets. As represented below, the largest proportion of replacement costs is with parks and recreation buildings.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Administration	1	Quantity	$1,096,800	User-Defined
Fire Department	4	Quantity	$5,150,000	User-Defined
Parks & Recreation	6	Quantity	$12,842,663	User-Defined
Public Works	5	Quantity	$2,220,000	User-Defined
TOTAL			**$21,309,463**	

Table 29 Detailed Asset Inventory: Buildings

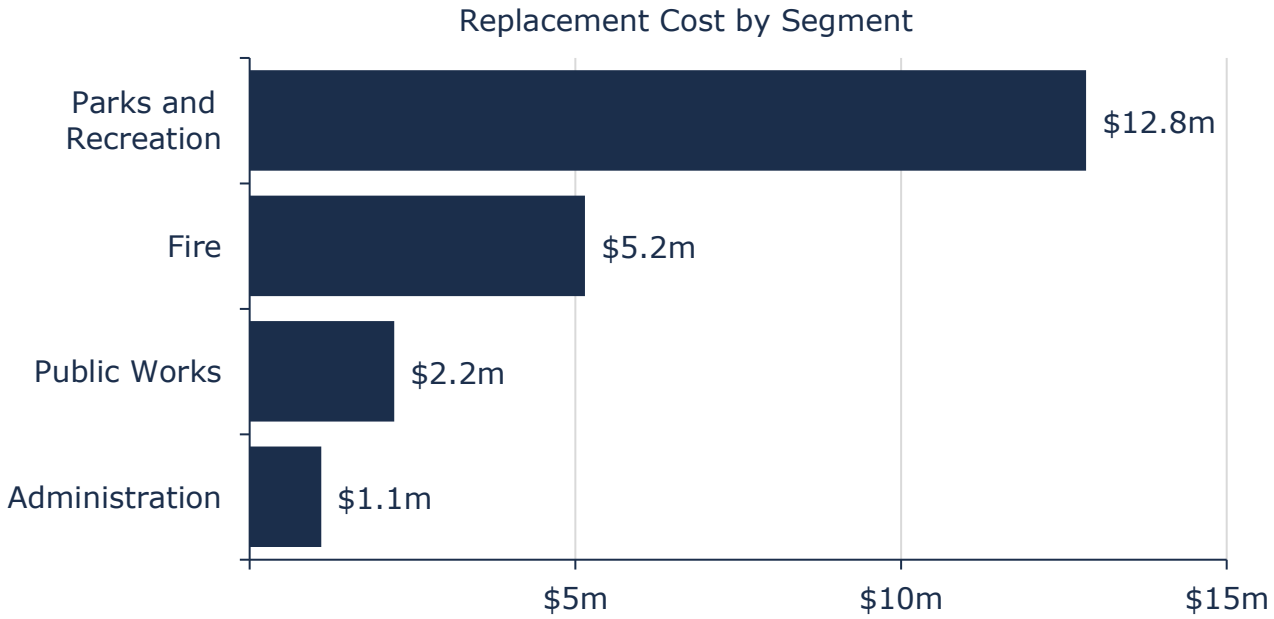


Figure 48 Portfolio Valuation: Buildings

9.2 Asset Condition

Figure 49 summarizes the replacement cost-weighted condition of the Municipality's buildings portfolio. Based on age-based data, 15% of buildings assets are in fair or better condition; however, 85%, with a current replacement cost of more than $18 million are in poor or worse condition. For building assets, conditions are determined based on the age of an asset and its Estimated Useful Life (EUL). It is important to note that currently all of the building assets are represented as one single asset item. However, a building contains numerous components (e.g. foundation, windows, roof, interior finishes) which typically have a unique construction date and condition. Due to the current data structures these components are not represented. Therefore, it is expected that the overall condition of the buildings may be significantly different than the age-based non-componentized data reflects. It is anticipated that componentized building data would indicate a higher overall average condition than noted below.

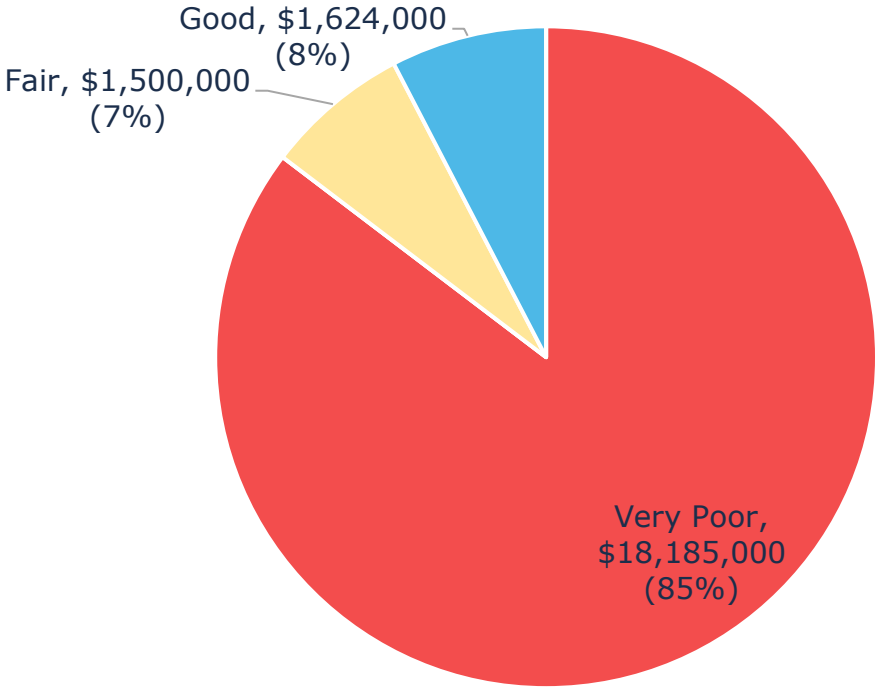


Figure 49 Asset Condition: Buildings Overall

Figure 50 summarizes the age-based condition of buildings by each department. Most building assets are in poor or very poor condition. However, in the absence of componentization, this data has limited value. Componentization of assets and integration of condition assessments will provide a more accurate and reliable estimation of the condition of various facilities.

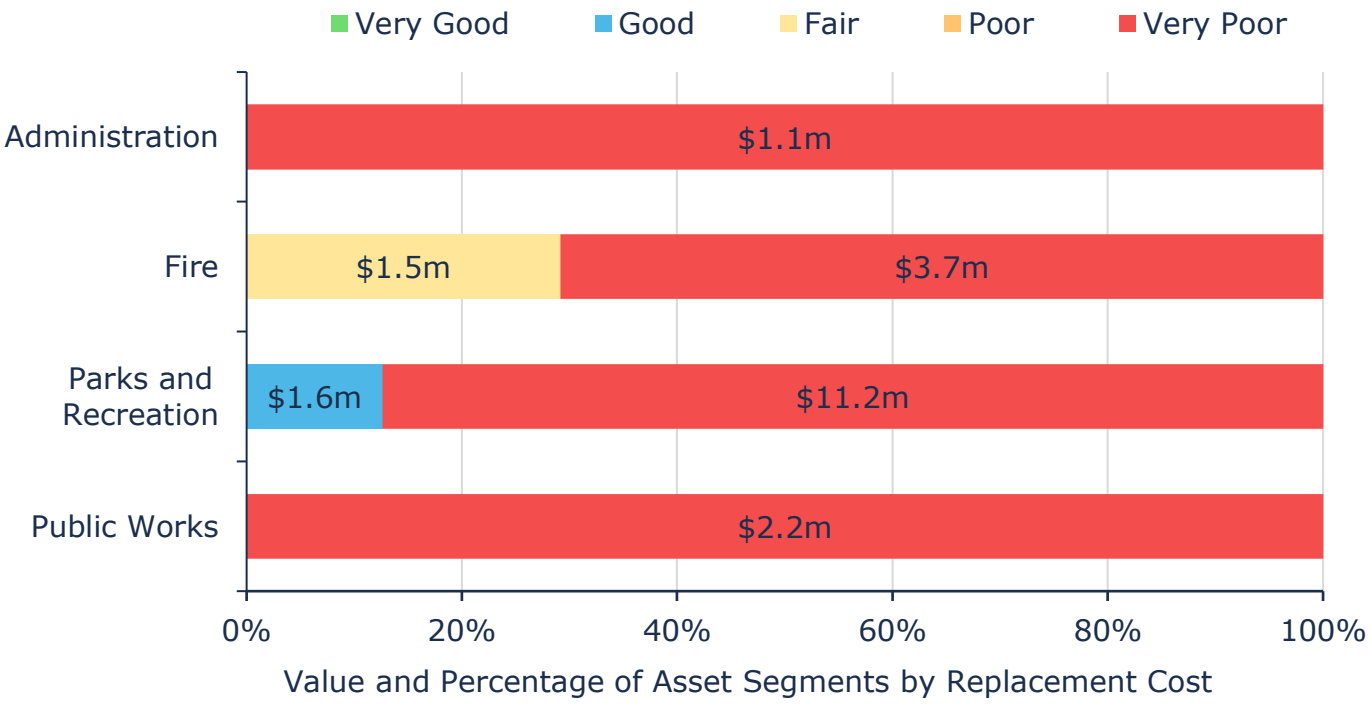


Figure 50 Asset Condition: Buildings by Segment

Building assets are unique in that they rarely require the need for replacement based solely on condition. It is typical that, in addition to condition, other factors, such as capacity, will impact the asset's ability to serve the purpose originally intended.

9.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 51 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

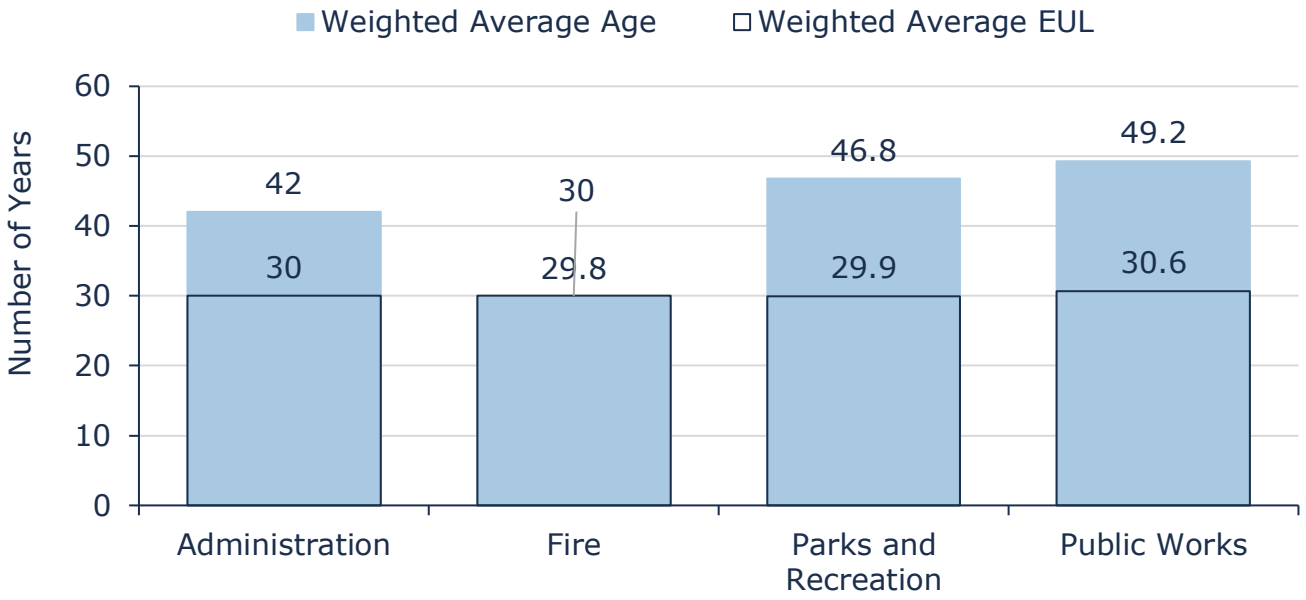


Figure 51 Estimated Useful Life vs. Asset Age: Buildings

Age analysis indicates that most asset categories are nearing or exceeding their expected useful life. Administration, Parks and Recreation, and Public Works assets all have weighted average ages well above their typical service life—42, 46.8, and 49.2 years, respectively, compared to EULs of around 30 years—signaling a need for reinvestment. Fire assets are an exception, with an average age of 29.8 years closely aligned with their 30-year EUL, suggesting they are approaching renewal but not yet overdue.

9.4 Current Approach to Lifecycle Management

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.

Table 30 outlines the Municipality's current lifecycle management strategy for their building assets.

Activity Type	Description of Current Strategy
Inspection	Buildings valued at over $500,000 are assessed every five years, supported by internal annual safety walks. Detailed assessments are conducted by external consultants, while health and safety checks are performed by internal staff. At present, these assessments review potential operating efficiencies, capital cost avoidance, service level impacts, labor resource impacts and capital plan implications. The last assessment was completed in 2024 by an architectural firm
Maintenance	Routine maintenance includes inspections and HVAC repairs. Maintenance is triggered by inspections identifying structural, safety, or accessibility issues. Inspections are conducted every five years, and repairs are performed based on recommendations. The estimated annual cost of maintenance activities is $65,000
Rehabilitation	Rehabilitation activities include roof replacements, HVAC system upgrades, and refinishing of doors, windows, and building exteriors. These actions are initiated based on inspection results and consultant recommendations.
Replacement	Replacement is considered when an asset has deteriorated significantly and when maintenance and rehabilitation are no longer cost-effective. Priority is given to assets nearing end-of-life or requiring frequent and costly repairs. Budget allocation is based on condition assessments, with contingency needs funded through general reserves.

Table 30 Lifecycle Management Strategy: Buildings

Forecasted Long-Term Replacement NeedsFigure 52 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Municipality's buildings portfolio. This analysis was run until 2049 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Municipality's primary asset management system and asset register. The Municipality's average annual requirements (red dotted line) total $713,000 ($3.5 million per 5-year bucket) for all buildings. 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.

Figure 52 Forecasted Capital Replacement Needs Buildings 2024-2049

Forecasted capital requirements are dominated by a significant backlog of $18.2 million, primarily associated with Parks and Recreation, Fire, and Public Works assets. Following this, capital needs drop substantially, with only $30k projected between 2025–2029 and no planned investments through 2039. Modest capital requirements reappear in 2040–2044 ($1.7 million) and 2045–2049 ($1.4 million), again mostly tied to Parks and Recreation assets.

These projections and estimates are based on current asset records, their 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.

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements. In the case of buildings and facilities, detailed componentization is necessary to develop more reliable lifecycle forecasts that reflect the needs of individual elements and components.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

9.5 Risk Analysis

The risk matrix below is generated using available asset data, including service life remaining, replacement costs, and building department. Risk Rating Criteria for building assets is provided in Appendix D. An overview of the methodology applied for calculating and classifying asset risks is provided in Section 2.3.2

The matrix classifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Municipality may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

As detailed in Figure 53, most building assets hold a high or very high-risk rating. The overall high-risk rating is due to the poor condition of assets combined with their high replacement cost.

1 - 4	5 - 7	8 - 9	10 - 14	15 - 25
Very Low	**Low**	**Moderate**	**High**	**Very High**
$180,000	$134,063	$1,444,100	$1,675,000	$17,876,300
(<1%)	(<1%)	(7%)	(8%)	(84%)

Figure 53 Risk Matrix: Buildings

9.5.1 Risks to Current Asset Management Strategies

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

Aging Infrastructure

Several key building assets, including firehalls and public works buildings, are approaching the end of their useful life. These aging facilities face increased risks of failure and rising maintenance costs. While some rehabilitative actions are taken, the growing number of buildings nearing replacement age indicates mounting pressure on capital planning and facility performance.

Lifecycle Management Strategies

The current lifecycle management strategy for buildings remains largely reactive. While inspections and maintenance are completed, and rehabilitation activities such as roof and HVAC replacements are performed as recommended, a significant number of buildings have already been flagged for replacement within the next 10 years. This backlog is partly attributed to earlier gaps in strategic lifecycle planning. Trigger points are reviewed periodically to align with best practices, but the pace of reinvestment may not be sufficient to mitigate future condition-related risks.

Capital Funding Strategies

While operational needs are funded through condition-based budgeting, major capital projects are currently dependent on external grant opportunities. There is no dedicated funding stream set aside for building maintenance, and the contingency budget is covered through general reserves. This approach may limit the municipality's ability to proactively address major building renewals when grant funding is unavailable.

9.6 Levels of Service

The tables that follow summarize the Municipality's current levels of service. There are no prescribed KPIs under Ontario Regulation 588/17 for non-core assets, therefore the KPIs below represent performance measures that the Municipality has selected.

9.6.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Quality	Description of the lifecycle management activities conducted	Using age-based condition building assets range in condition from 0 to 74% and are in average in condition 10% (very poor). Parks and recreation focused facility assets include the arena and senior's club buildings. Administration buildings consist of the Municipal Office, Fire buildings include all Fire Stations and the OPP Building. Public Works includes the two public works garages in Warren and Markstay respectively.
Sustainability	There are long-term plans in place for the renewal and replacement of assets.	Facility asset rehabilitation and replacement activities typically include component replacements such as roofs, windows, doors, building exteriors and HVAC systems. Primary considerations for investment are asset functionality, cost of rehabilitation or replacement compared with cost of maintenance, and component criticality.

Table 31 Community Levels of Service: Buildings

9.6.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Quality	Weighted Average Condition of Assets	10%
	Average Risk Score	19.56
Sustainability	Target vs. Current v Capital Reinvestment	3.34% vs. 0.26%

Table 32 Technical Levels of Service: Buildings

9.7 Recommendations

Asset Inventory

- Review the inventory of assets to ensure they reflect the best-available information.

Condition Assessment Strategies

- Continue to align information collected through specialized studies to the assets in the database.
- Consider the procurement of Building Condition Assessments (BCA) to provide for a better inventory of assets and more relevant information about associated conditions and recommended interventions. If a BCA is procured, ensure that the scope includes collection and/or provision of the following information for every component: replacement cost, in-service date, estimated useful life, assessed condition, quantity and associated unit of measure. Additional details such as recommended interventions, description, location, and photo capturing should also be considered for collection.
- When asset information such as condition changes due to capital investments or events otherwise, ensure the associated asset data and information is updated to reflect.

Lifecycle Management Strategies

- To ensure that larger capital investments are appropriately funded identify significant building components (e.g. roof, HVAC, windows) and their approximate replacement dates and plan for these future investment needs.

Risk Management Strategies

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

Levels of Service

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

10. Land Improvements

The Municipality's land improvements portfolio includes fields and courts, outdoor, and play structures. The total current replacement of land improvements is estimated at approximately $1.8 million.

10.1 Inventory & Valuation

Table 33 and Figure 54 summarizes the quantity and/or current replacement cost of all land improvements assets available in the Municipality's asset register. As represented below the largest proportion of replacement cost is associated with fields and courts.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Fields & Courts	8	Quantity	$1,106,016	User-Defined
Outdoor Structures	5	Quantity	$147,627	CPI
Play Structures	14	Quantity	$529,595	CPI
TOTAL			**$1,783,238**	

Table 33 Detailed Asset Inventory: Land Improvements

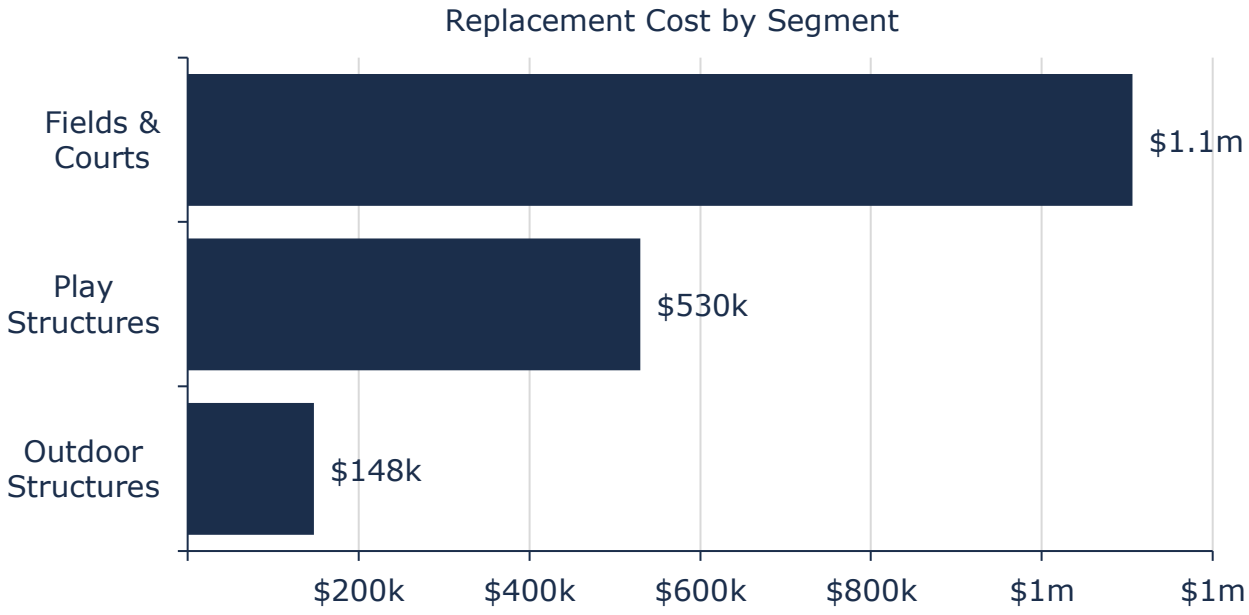


Figure 54 Portfolio Valuation: Land Improvements

10.2 Asset Condition

Figure 55 summarizes the replacement cost-weighted condition of the Municipality's land improvement portfolio. Based condition assessment data, 95% of assets are in fair or better condition, the remaining 5% are in very poor condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

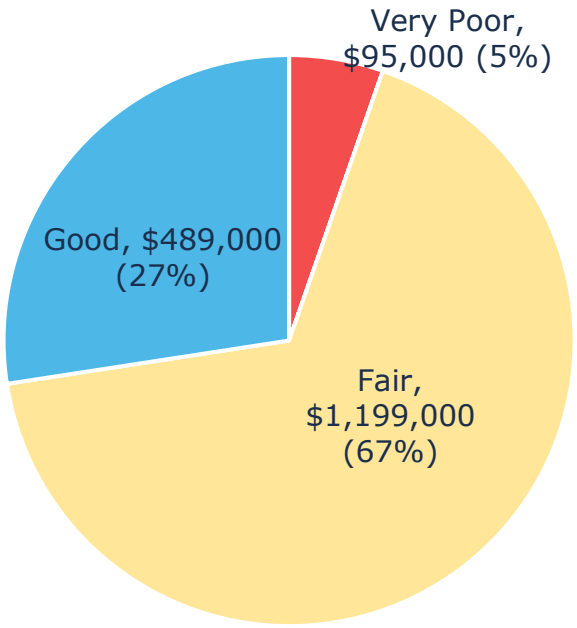


Figure 55 Asset Condition: Land Improvements Overall

Figure 56 summarizes the condition of land improvements by segment. While outdoor structures and play structure segments have some assets in very poor condition, most assets across all segments are in fair or good condition.

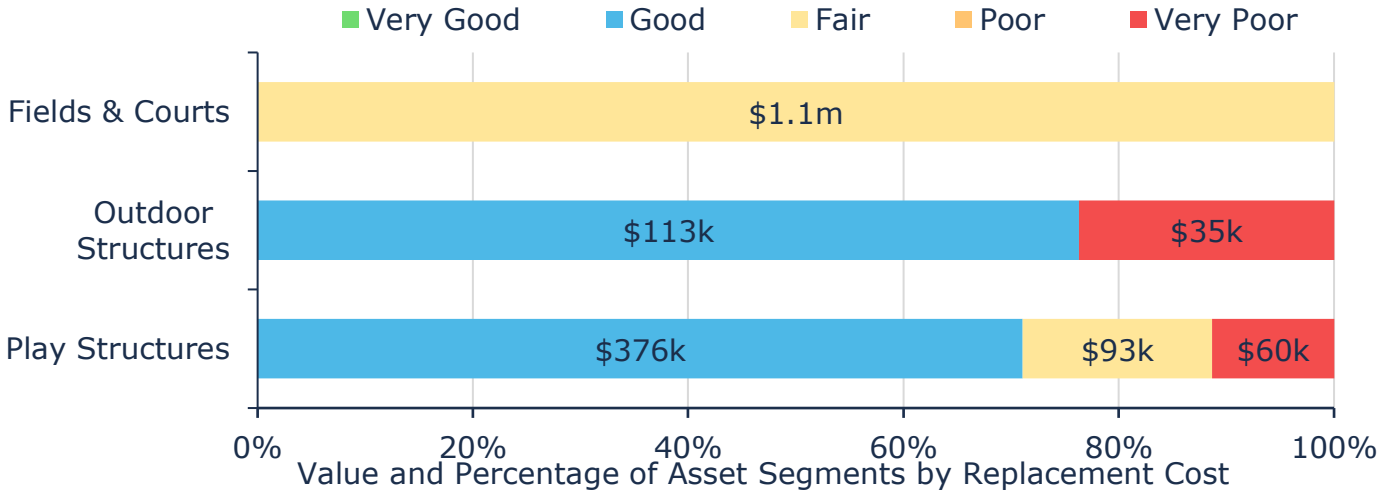


Figure 56 Asset Condition: Land Improvements by Segment

10.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 57 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

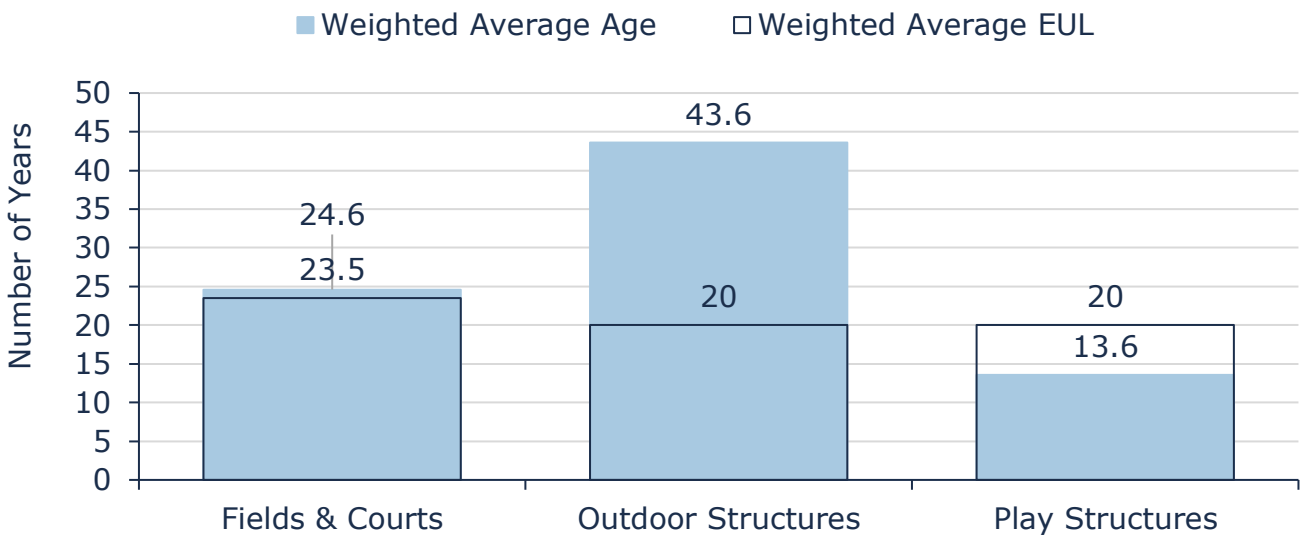


Figure 57 Estimated Useful Life vs. Asset Age: Land Improvements

Age analysis shows that Outdoor Structures are significantly beyond their expected useful life, with a weighted average age of 43.6 years compared to a 20-year EUL. Fields & Courts are slightly over their EUL at 24.6 years against an expected life of 23.5 years, while Play Structures are still within their lifecycle, averaging 13.6 years out of a 20-year EUL. Current Approach to Lifecycle Management

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.

10.4 Current Approach to Lifecycle Management

Table 34 outlines the Municipality's current lifecycle management strategy for land improvement assets.

Activity Type	Description of Current Strategy
Inspections	Land improvements and parks are assessed annually in the spring and inspected weekly during the operating season by internal Parks and Recreation staff.
	A basic condition scale of good, fair, and poor is used, though no formal assessment policy is in place
Maintenance	Routine maintenance includes weekly or bi-weekly mowing, cleaning, vegetation management, and refuse removal, as well as quarterly minor repairs or repairs triggered by significant safety issues. Maintenance actions are guided by weekly inspections. The estimated annual cost is approximately $45,000 (including salaries).
Rehabilitation	No formal rehabilitation programs are in place for land improvements. Most park components are manufacturer-specific, and there is no routine application of restorative work.
Replacement	Replacement is considered when asset conditions deteriorate significantly or when maintenance is no longer cost-effective. Assets nearing end-of-life or requiring frequent/costly repairs are prioritized. Funding is guided by condition assessments and safety concerns. There is no dedicated contingency; unplanned needs draw from general reserves

Table 34 Lifecycle Management Strategy: Land Improvements

10.5 Forecasted Long-Term Replacement Needs

Figure 58 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Municipality's land improvements portfolio. This analysis was run until 2044 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Municipality's primary asset management system and asset register. The Municipality's average annual requirements (red dotted line) total $83,000 ($415,000 per 5-year bucket) for all land improvements. 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.

Replacement needs are forecasted to rise significantly over the long term, with major investments of $813k and $875k projected for 2035–2039 and 2040–2044, respectively. These increases are primarily driven by Fields & Courts, with additional contributions from Play Structures and Outdoor Structures. In contrast, near-term needs are minimal, with only $95k forecasted for 2025–2029 and no identified backlog. 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.

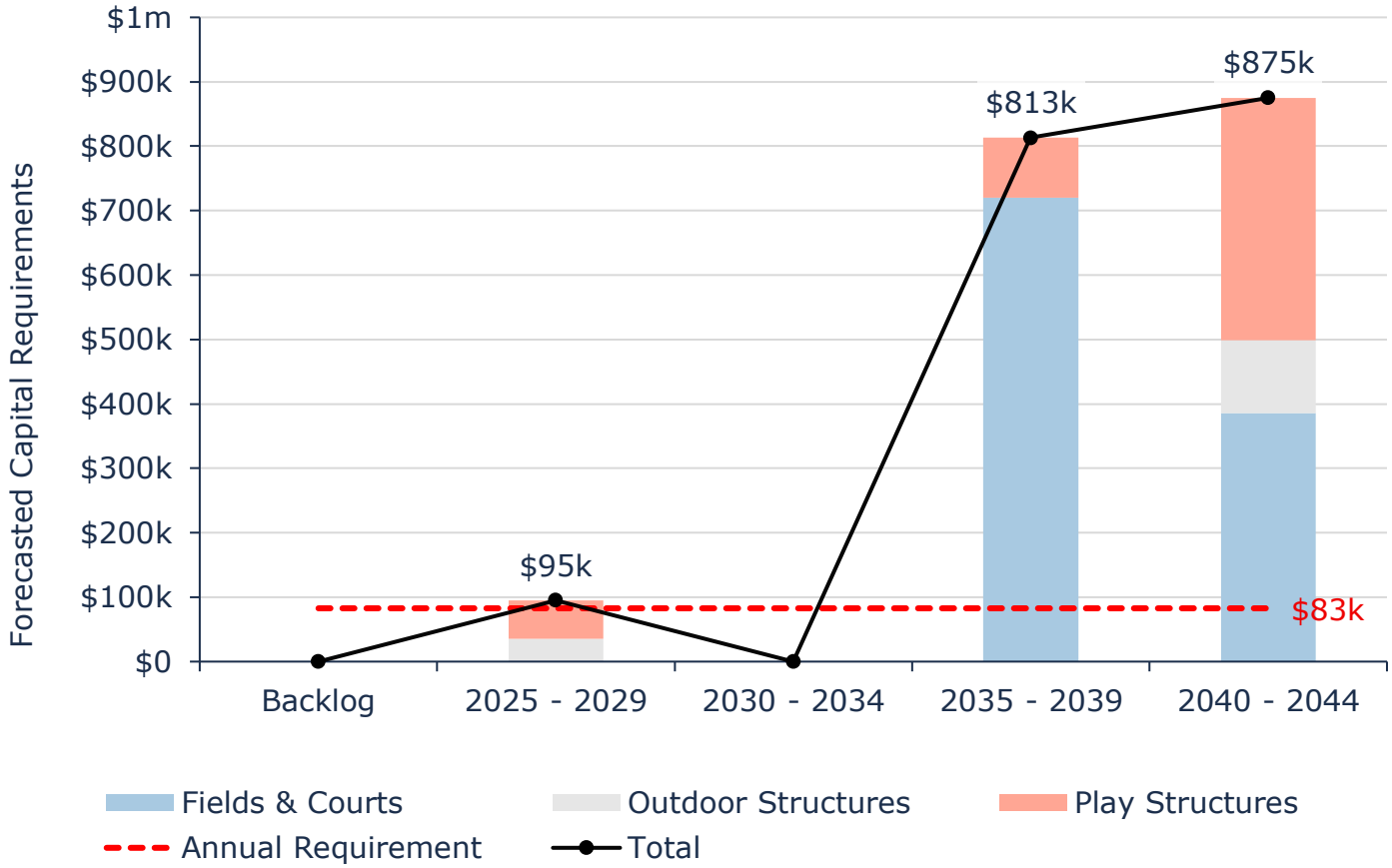


Figure 58 Forecasted Capital Replacement Needs: Land Improvements 2024-2044

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

10.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, and replacement costs. Risk Rating Criteria for land improvements assets is provided in Appendix D. An overview of the methodology applied for calculating and classifying asset risks is provided in Section 2.3.2

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Municipality may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

As detailed in Figure 59, most land improvements assets hold a very low risk rating. The overall high-risk rating is due to a concentration of assets in fair or better condition combined with a low replacement cost and a low-risk asset categorization.

1 - 4 **Very Low**	**5 - 7** **Low**	**8 - 9** **Moderate**	**10 - 14** **High**	**15 - 25** **Very High**
$902,269 (51%)	$495,000 (28%)	$385,969 (22%)	- (0%)	- (0%)

Figure 59 Risk Matrix: Land Improvements

10.6.1 Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies

The current lifecycle management strategy for land improvements is largely reactive. While routine maintenance activities such as inspections, vegetation control, and minor repairs are completed regularly, there are currently no formal rehabilitation programs in place. Replacements are typically initiated once conditions have significantly declined, and maintenance is no longer cost-effective. As a result, long-term planning for capital renewal remains limited. Staff continue to monitor asset conditions and prioritize critical safety-related interventions as part of ongoing service delivery efforts.

Capital Funding Strategies

Capital investment in land improvement assets is supported through general reserves, as there is no dedicated contingency fund in place. Larger projects often rely on external funding sources, and staff note that while grant funding has supported new projects, reinvestment in existing assets is becoming more difficult to maintain at the desired pace. These challenges are not uncommon in smaller municipalities and highlight the importance of a long-term funding strategy to sustain service levels and minimize the risk of deferred maintenance.

10.7 Levels of Service

The tables that follow summarize the Municipality's current levels of service. There are no specifically prescribed KPIs under Ontario Regulation 588/17 for non-core assets, therefore the KPIs below represent performance measures that the Municipality has selected for this AMP.

10.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Quality	Description of the lifecycle management activities conducted	Land improvement assets are inspected annually each spring and observed weekly in the operating season by Municipal staff. For most land improvement assets, rehabilitation is not a viable solution due to their manufacturer specific components. Instead, replacement is considered based on the condition and cost of repairs.
Sustainability	There are long-term plans in place for the renewal and replacement of assets.	Land improvement asset investment decisions are predominantly based on asset conditions and expected future utility alongside existing rate of use. Replacement typically occurs when asset conditions deteriorate significantly or when maintenance is no longer cost-effective.

Table 35 Community Levels of Service: Land Improvements

10.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Quality	Weighted Average Condition of Assets	62%
	Average Risk Score	5.2

Service Attribute	Technical Metric	Current LOS (2024)
Sustainability	Target vs. Current v Capital Reinvestment	4.64% vs. 0.36%

Table 36 Technical Levels of Service: Land Improvements

10.8 Recommendations

Asset Inventory

- Review the inventory of assets to ensure they reflect the best-available information. It is recommended to conduct annual reviews with updates as needed.

Condition Assessment Strategies

- Consider implementing a standardized condition assessment program that provides for a regular frequency of assessment, a standardized condition scale, and data collection and verification requirements.
- If an updated condition assessment is conducted, ensure the information is also updated in the asset registry
- Review condition information annually for accuracy and update as required (e.g. upon completion of a road rehabilitation).

Lifecycle Management Strategies

- For larger, more complex, and costly assets such as the splash pad and the outdoor rink, work to understand what lifecycle cost are to be expected and add these as events to the assets. This will improve the Town's understanding of the total cost of ownership and improve the ability to plan for it.

Risk Management Strategies

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

Levels of Service

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

11. Vehicles

The Municipality's vehicles portfolio includes 26 assets that support a variety of general and essential services, including public works, the fire department, and recreation. The total current replacement of vehicles is estimated at approximately $5 million.

11.1 Inventory & Valuation

Table 37 and Figure 60 summarizes the quantity and/or current replacement cost of all vehicle assets available in the Municipality's asset register. The Public works department accounts for the largest share of the vehicle's portfolio total replacement cost.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Fire	8	Quantity	$1,938,521	User-Defined
Parks and Recreation	1	Quantity	$65,000	User-Defined
Public Works	17	Quantity	$3,464,772	User-Defined
TOTAL			**$5,468,293**	

Table 37 Detailed Asset Inventory: Vehicles

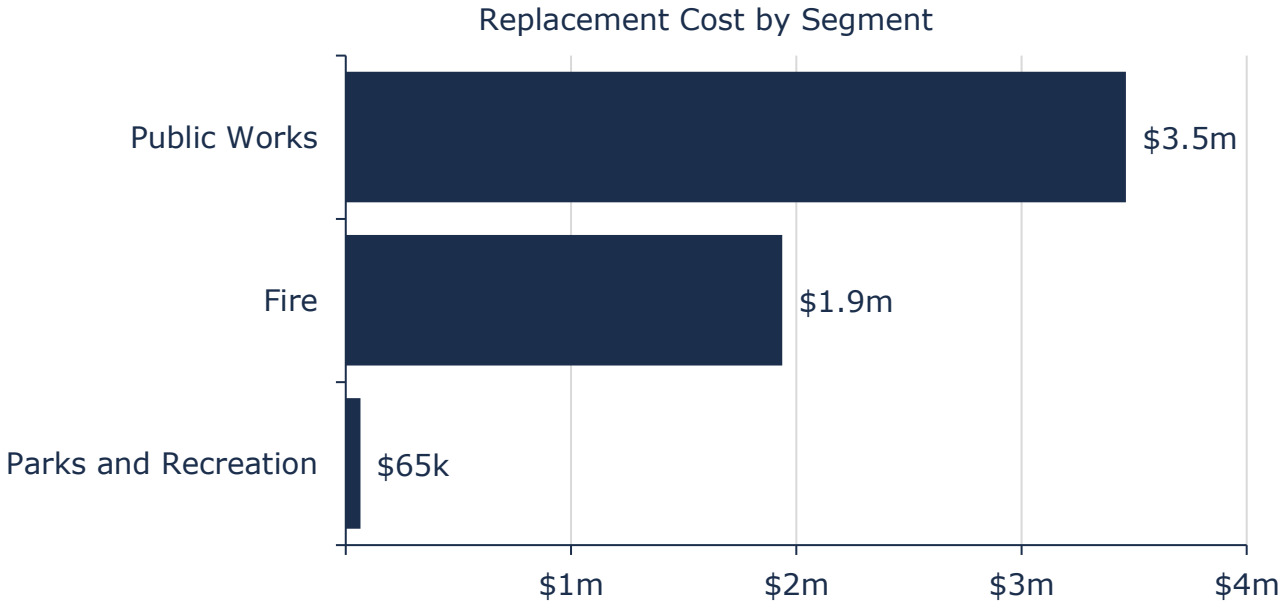


Figure 60 Portfolio Valuation: Vehicles

11.2 Asset Condition

Figure 61 summarizes the replacement cost-weighted condition of the Municipality's vehicles portfolio. Based condition assessment data, 49% of vehicles are in fair or better condition, with the remaining 51% are in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. Condition data was available for 100% of vehicles.

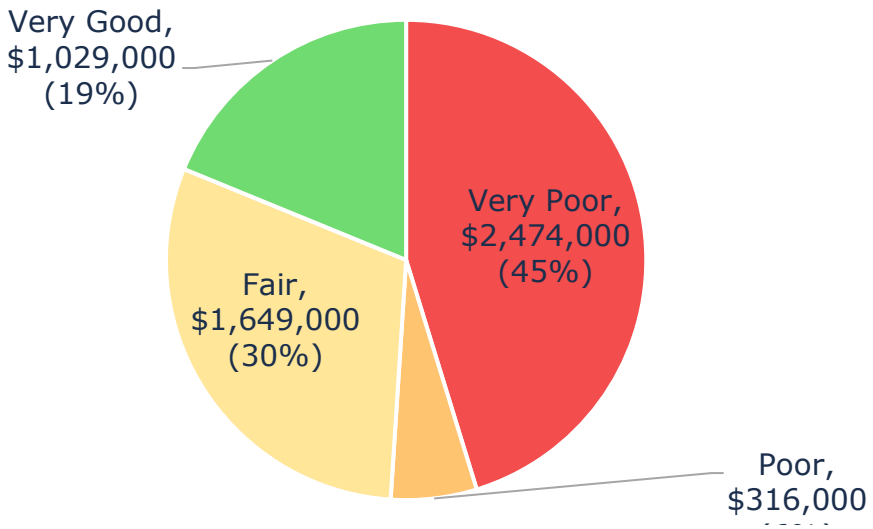


Figure 61 Asset Condition: Vehicles Overall

Figure 62 summarizes the condition of vehicles by each department. Most of parks and recreation, and public works vehicles are in poor or worse condition.

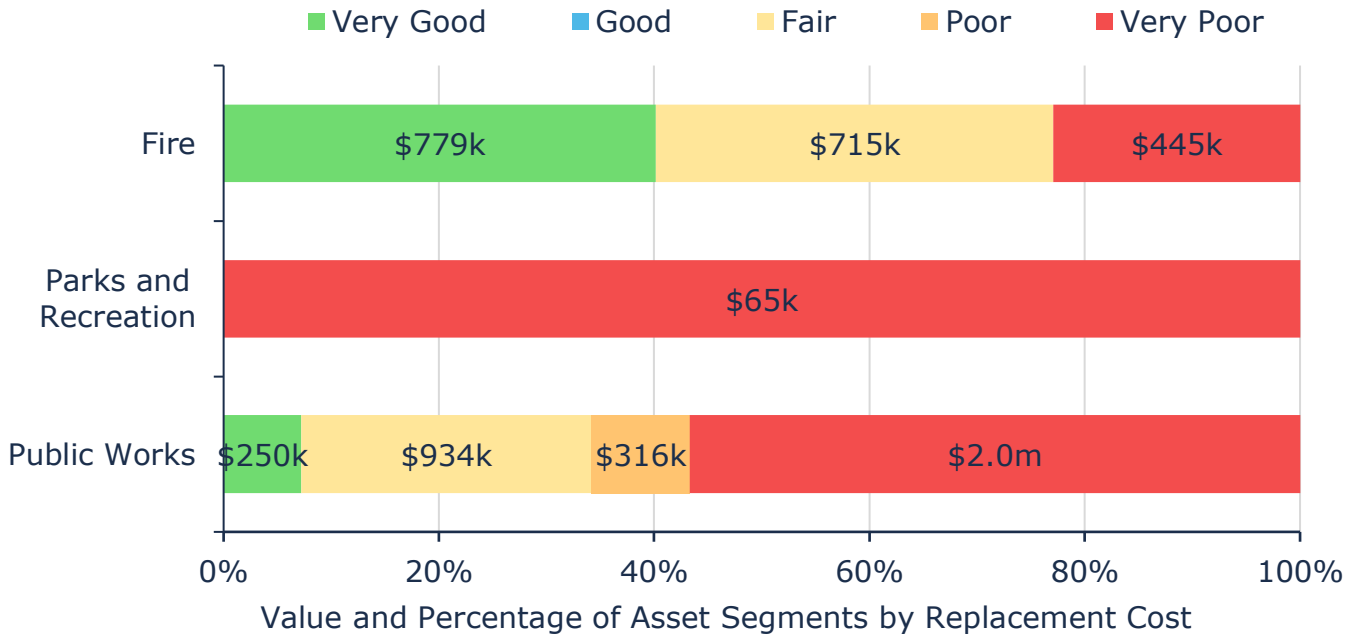


Figure 62 Asset Condition: Vehicles by Segment

11.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 63 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

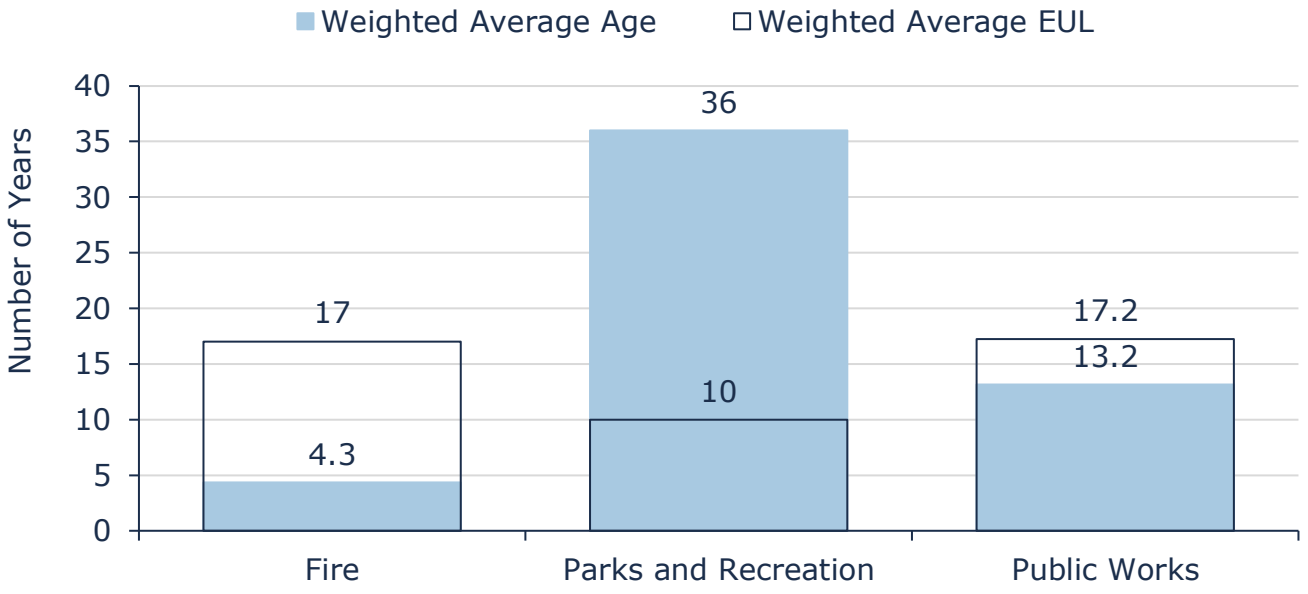


Figure 63 Estimated Useful Life vs. Asset Age: Vehicles

Age-based analysis shows that all asset categories are currently within their expected useful life, except for Parks and Recreation. Fire and Public Works assets are relatively new, with weighted average ages of 4.3 and 13.2 years, respectively, compared to EULs of 17 and 17.2 years. In contrast, Parks and Recreation assets are significantly beyond their expected lifespan, with an average age of 36 years against EUL of just 10 years.

11.4 Current Approach to Lifecycle Management

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.

Table 38 below outlines the Municipality's current lifecycle management strategy for vehicle assets

Table 38: Vehicle Lifecycle Management Strategies

Activity Type	Description of Current Strategy
Inspection	Vehicles are assessed annually, typically during their annual service inspections. Internal staff conduct assessments, supported by input from mechanics. Attachments and accessories are not covered by these inspections and are evaluated separately. A condition scale of good, fair, and poor is used.
Maintenance	Routine maintenance includes daily inspections, tire rotation, oil changes, and minor repairs. Detailed inspections are performed quarterly. Maintenance is triggered by inspections identifying mechanical or safety issues.
	The estimated annual cost for maintenance is approximately $70,000.
Rehabilitation	Rebuilding specific vehicle components is undertaken as needed. These activities are based on remaining useful life, vehicle condition, and replacement feasibility.
Replacement	Replacement is considered when a vehicle is no longer cost-effective to maintain, has significant downtime, or must be replaced for regulatory reasons. Priority is given to assets nearing end-of-life or requiring frequer costly repairs. Budgeting is informed by condition assessments, and a general reserve is used for contingency, though reserve allocations have recently been constrained.

11.5 Forecasted Long-Term Replacement Needs

Figure 64 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Municipality's vehicles portfolio. This analysis was run until 2049 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Municipality's primary asset management system and asset register. The Municipality's average annual requirements (red dotted line) total $394,000 ($1.9 million per 5-year bucket) for all vehicles. 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.

Replacement needs are forecasted to increase steadily over time, peaking at $2.4 million in 2030–2034, with continued high levels of investment ranging from $1.8 to $1.9 million in each subsequent five-year period through 2049. These capital needs are largely driven by Public Works assets, followed by significant contributions from Fire and Parks and Recreation. An initial backlog of $445k is also identified. 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.

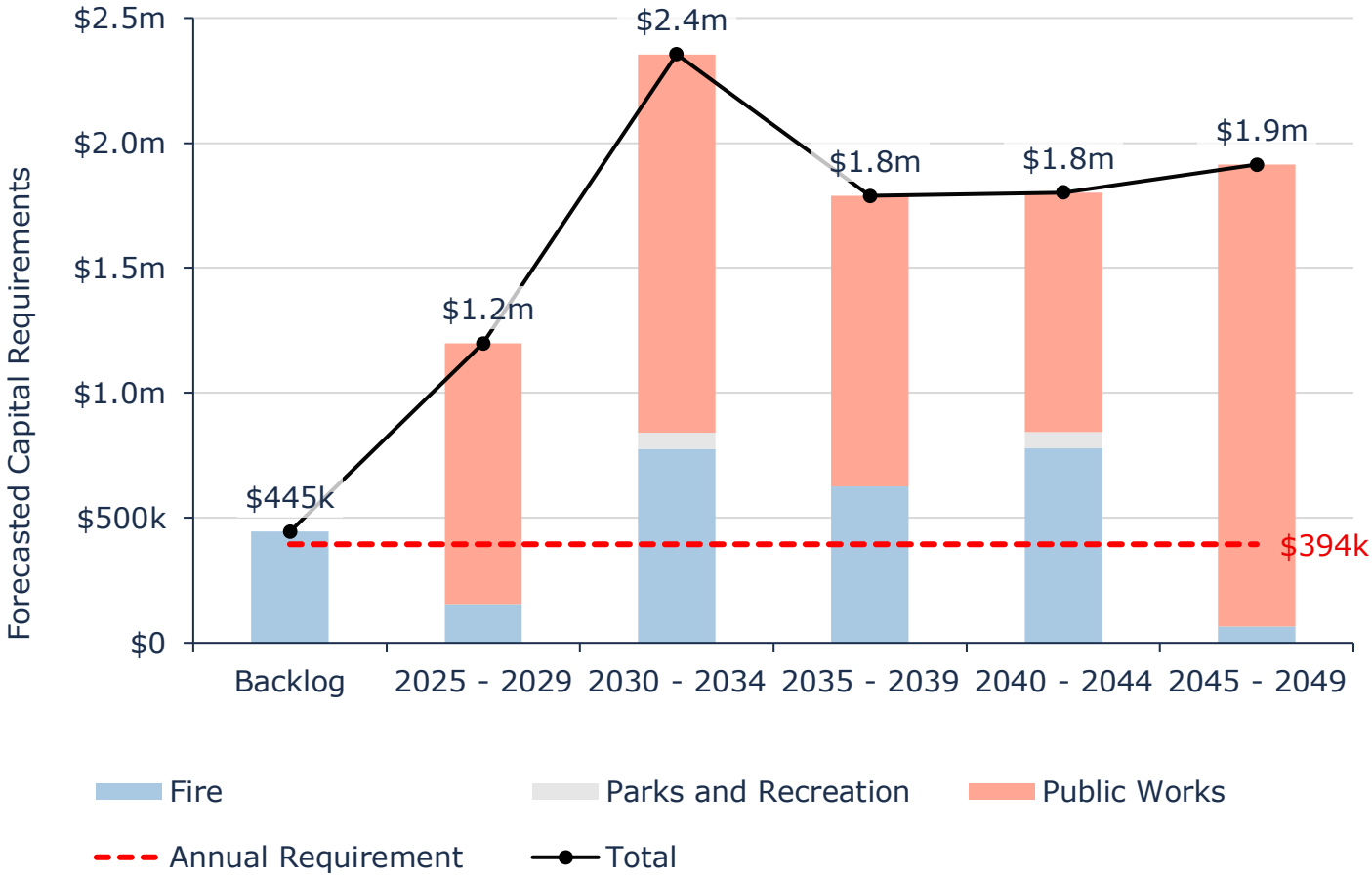


Figure 64 Forecasted Capital Replacement Needs: Vehicles 2024-2049

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

11.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, replacement costs, and department or service area. Risk Rating Criteria for vehicle assets is provided in Appendix D. An overview of the methodology applied for calculating and classifying asset risks is provided in Section 2.3.2.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Municipality may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

As detailed in Figure 65, most vehicle assets hold a high -risk rating. This is most often due to their condition as poor or worse creating a high probability of failure combined with a high replacement cost, especially for fire related assets, and therefore a high consequence of failure.

1 - 4	5 - 7	8 - 9	10 - 14	15 - 25
Very Low	**Low**	**Moderate**	**High**	**Very High**
$1,203,759	$458,005	$377,071	$2,892,413	$537,045
(22%)	(8%)	(7%)	(53%)	(10%)

Figure 65 Risk Matrix: Vehicles

11.6.1 Risks to Current Asset Management Strategies

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

Aging Infrastructure

A growing portion of the municipal fleet is reaching the end of its expected service life. Reliability concerns have started to emerge, with older vehicles requiring more frequent service and experiencing increased downtime. This adds pressure to operational planning and reinforces the need for ongoing renewal efforts and replacement prioritization.

Lifecycle Management Strategies

Lifecycle management practices for vehicles are primarily reactive. While daily and quarterly inspections are completed and basic maintenance is performed regularly, there was a period during which formal strategies were not applied, leading to a concentration of aging vehicles requiring attention at the same time. This backlog has placed additional pressure on planning, service continuity, and replacement scheduling. Staff continue to review maintenance triggers to align with evolving best practices, but sustained reinvestment and structured lifecycle planning will be important in managing long-term fleet performance.

11.7 Levels of Service

The tables that follow summarize the Municipality's current levels of service. There are no specifically prescribed KPIs under Ontario Regulation 588/17 for non-core assets, therefore the KPIs below represent performance measures that the Municipality has selected for this AMP.

11.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Quality	Appropriate actions and interventions are taken to ensure the regular safe use of vehicles assets so that they can provide important services.	Vehicles are assessed annually by staff with support from a licensed mechanic. Assets receive regular maintenance (i.e. tire rotation, oil changes) throughout life. When appropriate based on remaining useful life, condition, and feasibility rebuilding specific vehicles components may be undertaken. All these activities are completed with the aim of cost-effectively extending the asset lifespan and condition while improving asset performance and reliability.
Sustainability	There are long-term plans in place for the renewal and replacement of assets.	Replacement requirements and timelines are informed by asset condition and age. It is anticipated that longer-term financial planning will improve through advancements in asset management and that this will improve the sustainability of asset replacement.

Table 39 Community Levels of Service: Vehicles

11.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Quality	Weighted Average Condition of Assets	36%
	Average Risk Score	10.66
Sustainability	Target vs. Current v Capital Reinvestment	7.21% vs. 0.56%

Table 40 Technical Levels of Service: Vehicles

11.8 Recommendations

Asset Inventory

- As regular practice, review asset inventory information for accuracy and completeness and make updates as needed. Consider adding additional asset attributes such as VIN to the asset inventory listing.

Condition Assessment Strategies

- The most recent condition assessments were completed in 2024 or 2025. On an annual basis review and update condition assessments
- Review condition scales and criteria and formalize and document them so that condition assessments are applied in a uniform and repeatable manner.

Lifecycle Management Strategies

- Review the information documented from the detailed inspections completed quarterly. Ensure that records are retained, available, and considered when completing condition assessments.

Risk Management Strategies

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

Levels of Service

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

12. Machinery & Equipment

The Municipality's machinery and equipment portfolio includes a variety of assets that support a combination of general and essential services. The total current replacement of machinery and equipment assets is over $2 million. Most of the total replacement cost is associated with miscellaneous equipment which includes generators, fire equipment, and recreation equipment.

12.1 Inventory & Valuation

Table 41 and Figure 66 summarizes the quantity and/or current replacement cost of all machinery & equipment assets available in the Municipality's asset register.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Communications	1	Quantity	$54,556	CPI
Heavy Equipment	3	Quantity	$185,658	CPI
Library	1	Quantity	$16,905	CPI
Misc. Equipment	14	Quantity	$2,177,928	CPI
TOTAL			**$2,435,047**	

Table 41 Detailed Asset Inventory: Machinery & Equipment

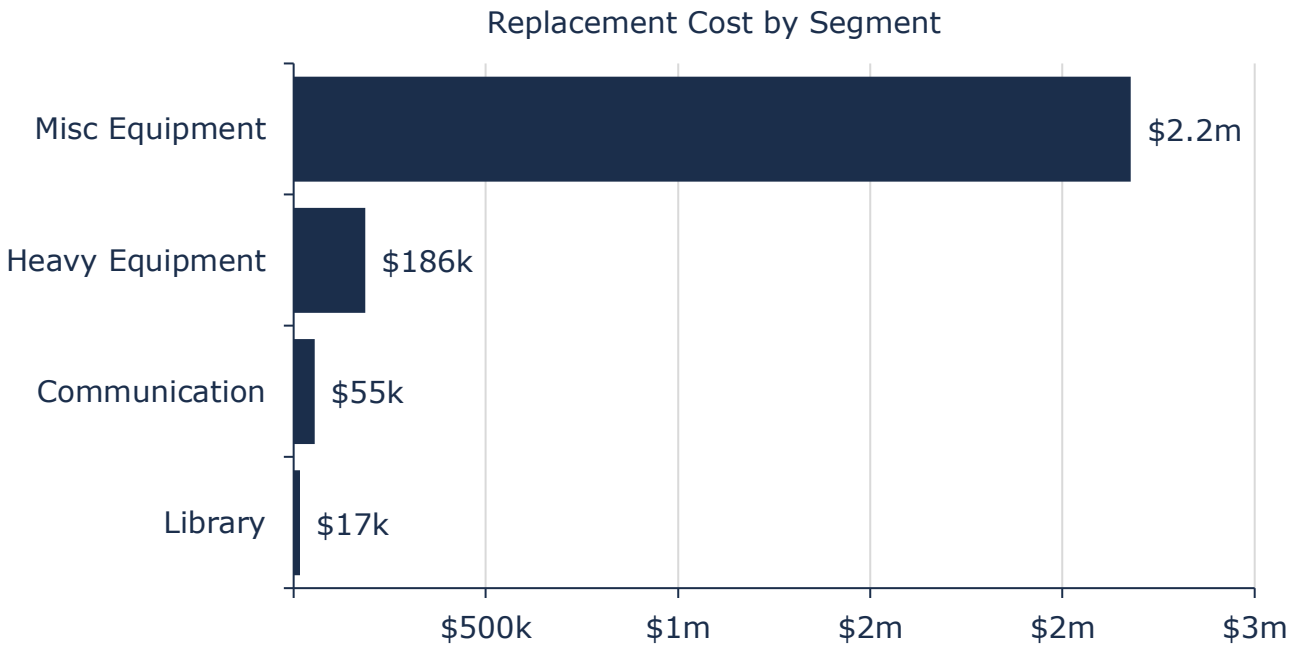


Figure 66 Portfolio Valuation: Machinery & Equipment

12.2 Asset Condition

Figure 67 summarizes the replacement cost-weighted condition of the Municipality's machinery and equipment portfolio. Based on age data, 11% of assets are in fair or better condition; the remaining 89% are in poor or worse condition. For water network assets, conditions are determined based on the age of an asset and its Estimated Useful Life (EUL). These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

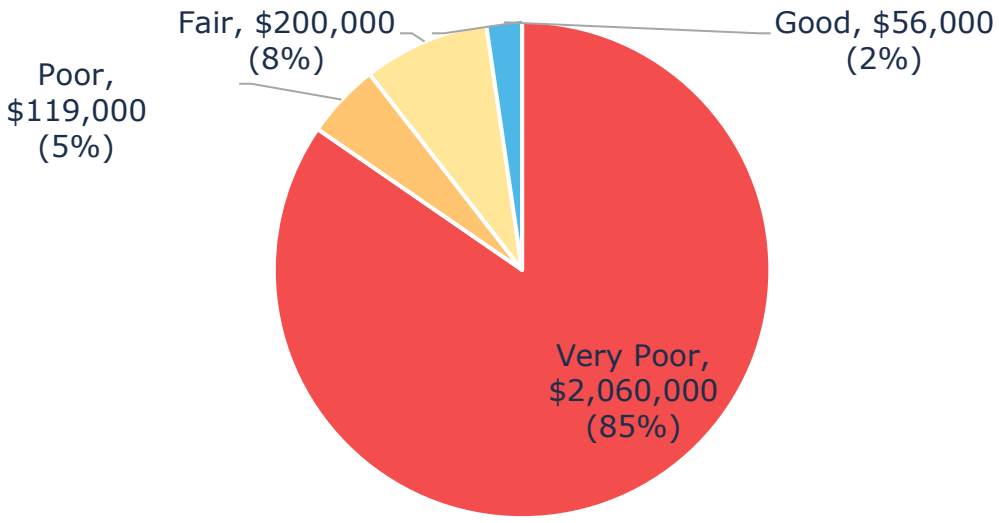


Figure 67 Asset Condition: Machinery & Equipment Overall

Figure 68 summarizes the age-based condition of machinery & equipment by each department. Most assets in communication, libraries, and misc. equipment are in poor or worse condition.

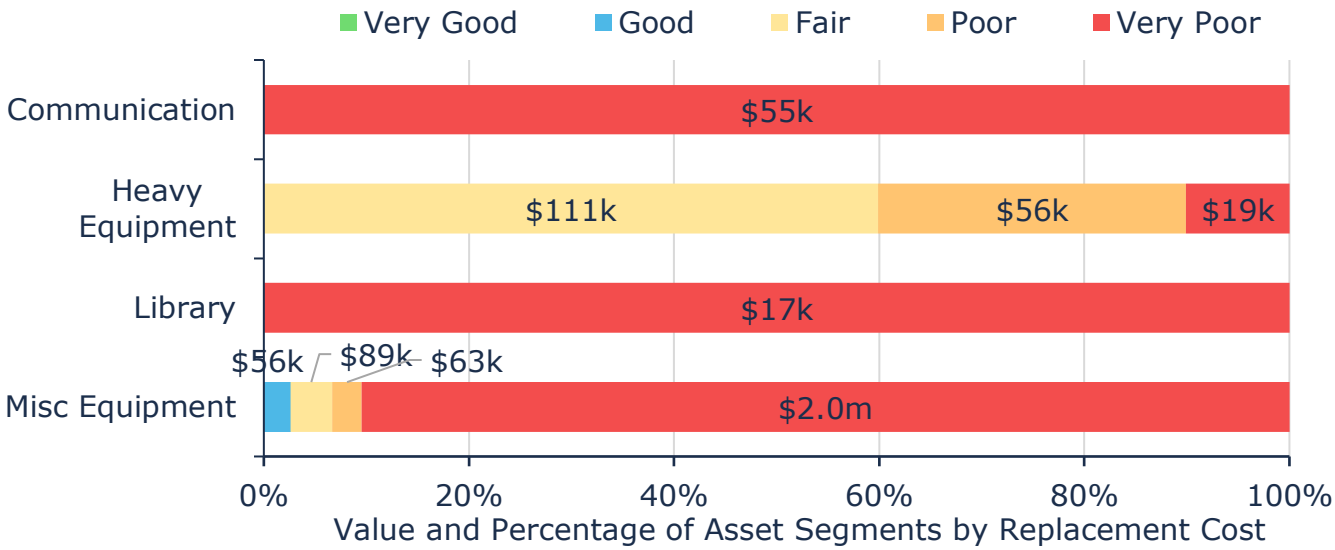


Figure 68 Asset Condition: Machinery & Equipment by Segment

12.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 69 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

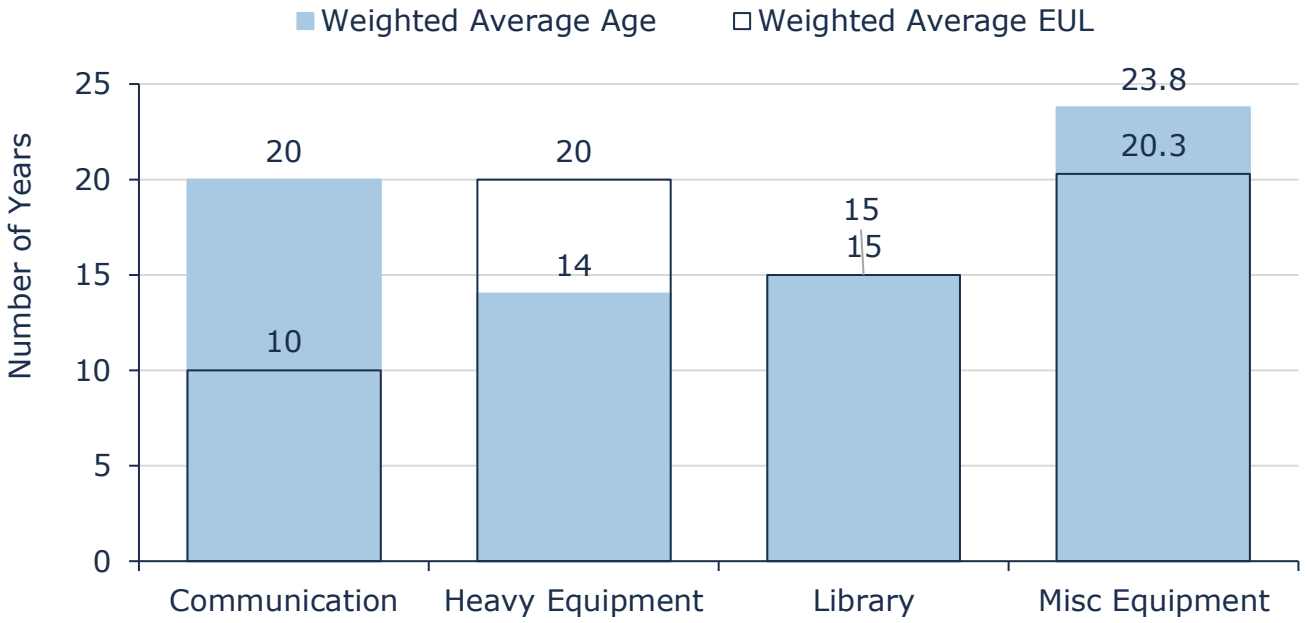


Figure 69 Estimated Useful Life vs. Asset Age: Machinery & Equipment

Age analysis shows that Communication and Miscellaneous Equipment assets have exceeded their expected useful life, with average ages of 20 and 23.8 years, respectively, compared to EULs of 20 and 20.3 years. Library assets have reached the end of their service life at 15 years. Heavy Equipment remains within its lifecycle, with a weighted average age of 14 years against a 20-year EUL.

12.4 Current Approach to Lifecycle Management

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is

important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Inspection	Machinery and equipment assets valued over $5,000 are assessed every two years in alignment with the asset management plan. The last inspection was completed in 2022. Assessments are conducted internally using a condition rating scale of good, fair, and poor.
Maintenance	Routine maintenance includes annual inspections by external mechanics, oil changes, and minor repairs. Daily pre-use checks are conducted by staff, with more in-depth inspections monthly. Minor repairs are performed quarterly, and critical repairs are handled as needed.
	Maintenance is triggered by inspections or component wear. Estimated annual cost: $50,000.
Rehabilitation /Replacement	No formal rehabilitation program exists. Critical repairs and part replacements are completed as issues are discovered, depending on asset age and scope of required work.
	Replacement is considered when an asset has significantly deteriorated, is no longer cost-effective to maintain, or its downtime impacts operations. Assets nearing end-of-life or requiring frequent and costly repairs are prioritized. Budgeting considers component wear, asset condition, and critical needs. No dedicated contingency fund exists; reserves are used if needed.

Table 42 Lifecycle Management Strategy: Machinery & Equipment

12.5 Forecasted Long-Term Replacement Needs

Figure 70 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Municipality's machinery and equipment portfolio. This analysis was run until 2049 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Municipality's primary asset management system and asset register. The Municipality's average annual requirements (red dotted line) total $130,000 ($650,000 million per 5-year bucket) for all machinery and equipment. 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.

Replacement needs are forecasted to peak in the long term, with $2.1 million projected for 2045–2049, primarily driven by Miscellaneous Equipment. An additional $1.9 million in backlog represents deferred reinvestment needs already due. Between 2025 and 2044, capital requirements remain relatively low, ranging from $111k to $267k, with minor contributions from Communication, Heavy Equipment, and Library assets. 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.

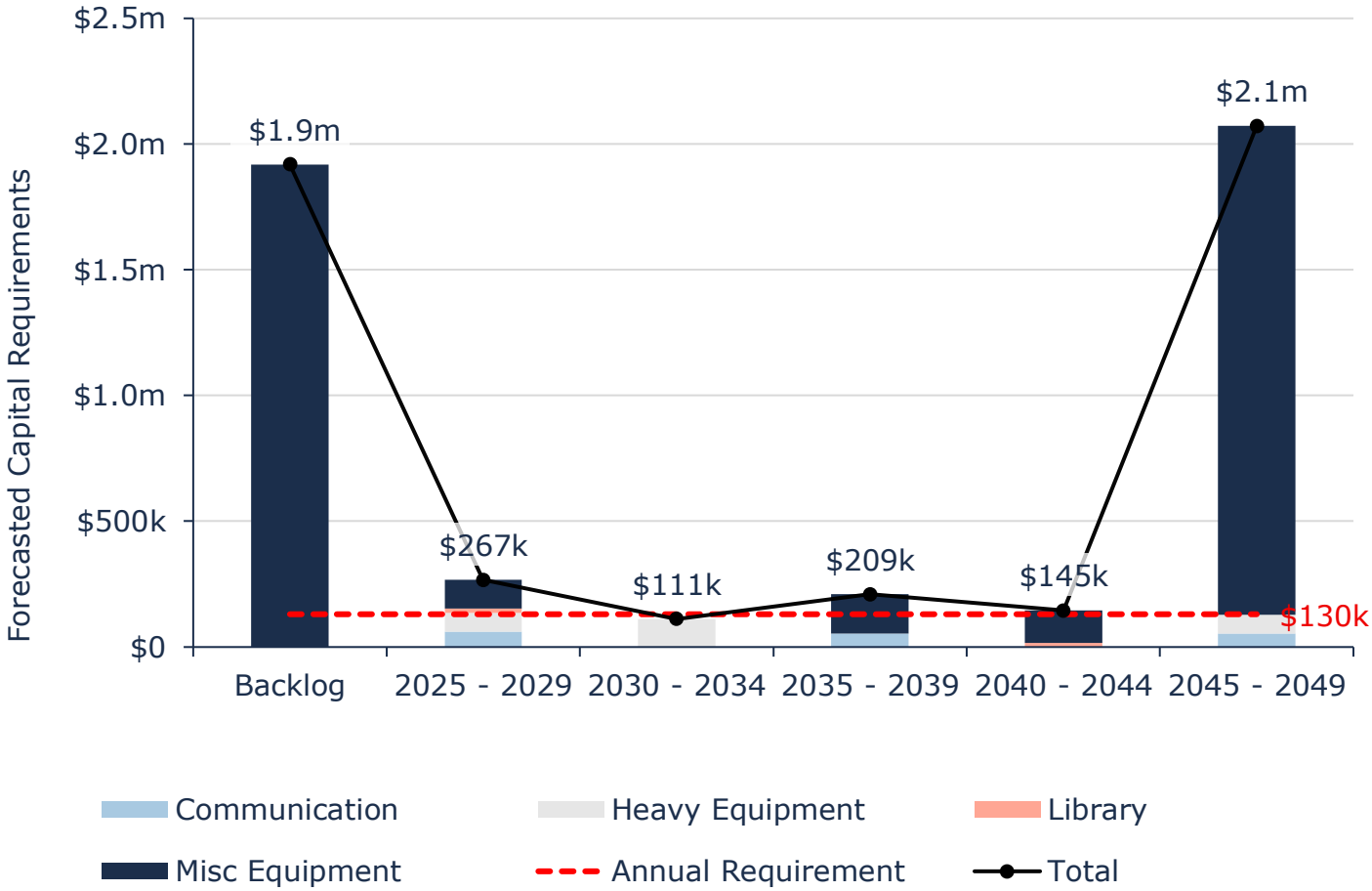


Figure 70 Forecasted Capital Replacement Needs: Machinery & Equipment 2024-2049

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

12.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, and replacement costs. Risk Rating Criteria machinery & equipment assets is provided in Appendix D. An overview of the methodology applied for calculating and classifying asset risks is provided in Section 2.3.2.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Municipality may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

As detailed in Figure 29Figure 71, most machinery & equipment assets hold a very high-risk rating. The overall high-risk rating is due to a concentration of assets in fair or worse conditions, high replacement costs, and moderate impact due to asset functionality.

1 - 4 **Very Low**	5 - 7 **Low**	8 - 9 **Moderate**	10 - 14 **High**	15 - 25 **Very High**
$145,228 (6%)	$606,773 (25%)	- (0%)	$194,972 (8%)	$1,488,074 (61%)

Figure 71 Risk Matrix: Machinery & Equipment

12.6.1 Risks to Current Asset Management Strategies

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

Aging Infrastructure

A cluster of machinery and equipment assets is approaching the end of their expected service life. While some routine maintenance and repairs continue, aging equipment becomes increasingly prone to failure, may no longer perform efficiently, and requires greater effort and cost to maintain in working conditions. In addition, newer units have shown lower reliability than anticipated, adding further strain to replacement planning and fleet dependability.

Lifecycle Management Strategies

The current lifecycle strategy is predominantly reactive. Although equipment is inspected frequently and maintenance is triggered by wear or safety needs, there is no structured rehabilitation program. Critical repairs are performed as needed, and replacements are driven by failure risk and operational impact. While daily and monthly inspections are strong operational practices, the absence of a formal rehabilitation layer limits the ability to extend asset life at a reduced cost.

12.7 Levels of Service

The tables that follow summarize the Municipality's current levels of service. There are no prescribed KPIs under Ontario Regulation 588/17 for non-core assets, therefore the KPIs below represent performance measures that the Municipality has selected for this AMP.

12.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Quality	Description of the lifecycle management activities conducted	Machinery and equipment assets are assessed on a bi-annual basis; the last assessment was completed in 2024. Routine maintenance is conducted and completed by an external mechanic as needed. Assets may be replaced if the cost of repairs is significant, especially relative to replacement cost.
Sustainability	There are long-term plans in place for the renewal and replacement of assets.	Machinery and equipment assets are assessed on a bi-annual basis; the last assessment was completed in 2022. Routine maintenance is conducted and completed by an external mechanic as needed. Replacement is considered when an asset has significantly deteriorated, is no longer cost-effective to maintain, or its downtime impacts operations

Table 43 Community Levels of Service: Machinery & Equipment

12.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Quality	Weighted Average Condition of Assets	36%
Performance	Average Risk Score	16.48
Sustainability	Target vs. Current v Capital Reinvestment	5.36% vs. 0.42%

Table 44 Technical Levels of Service: Machinery & Equipment

12.8 Recommendations

Asset Inventory

- As regular practice, review asset inventory information for accuracy and completeness and make updates as needed. Consider adding additional asset attributes such as asset location, make, and model to the asset inventory listing.

Condition Assessment Strategies

- Ensure that all completed condition assessments are recorded, accessible, and uploaded to the asset inventory. If resources to complete assessments are limited, begin with the highest valued and most operationally important assets first.
- Work towards documenting the standard condition assessment scale and associated criteria so that assessments are completed in a consistent, standardized, and referenceable manner. This is especially helpful in the event of staff changes.

Lifecycle Management Strategies

- Ensure that all maintenance and critical repairs are documented on a log and that such records are easily accessible.
- Work to identify larger rehabilitations required for fleet assets and update the asset lifecycle strategy to include these events. Incorporate this information both into work plans and budgets so that future activities are supported with financial and human resources.

Risk Management Strategies

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

Levels of Service

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

Strategies

Growth

Financial Strategy

Recommendations

13. Growth

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 Municipality to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

13.1 Municipality of Markstay-Warren Official Plan

Markstay-Warren is committed to fostering community growth and enhancing the quality of life for its residents while preserving its rural character. The municipality's development strategy is centered around strengthening economic opportunities, improving infrastructure, and ensuring sustainable land-use planning to accommodate growth effectively.

A key focus of the municipality's growth plan is economic development. Markstay-Warren aims to expand its economic capacity by supporting entrepreneurship, agriculture, tourism, and small business growth. By encouraging local investment and fostering a business-friendly environment, the municipality seeks to stimulate economic activity while preserving its natural surroundings and rural charm. Economic development initiatives are designed to attract new businesses, retain existing enterprises, and create employment opportunities that contribute to the long-term sustainability of the community.

Infrastructure improvements are another major priority for Markstay-Warren. The municipality has plans to invest in upgrading road infrastructure, expanding high-speed internet access, and enhancing recreational amenities. These improvements are essential for supporting both current residents and future growth. By improving connectivity and access to essential services, the municipality aims to make Markstay-Warren an even more attractive place to live and work. Expanding infrastructure also plays a vital role in facilitating economic growth, as improved transportation networks and digital connectivity enable local businesses to thrive and attract new opportunities.

Planning and zoning efforts are crucial in ensuring that growth occurs in an organized and sustainable manner. The Sudbury East Planning Board provides planning services to Markstay-Warren, overseeing land use policies that align with the municipality's growth objectives. This includes managing property zoning, guiding development initiatives, and ensuring that new growth is in harmony with community values. Thoughtful urban and rural planning help balance economic expansion with environmental preservation, ensuring that Markstay-Warren continues to offer a high quality of life while accommodating new residents and businesses in a structured way.

13.2 Recent Growth Trends and Initiatives

Markstay-Warren has experienced steady population growth in recent years. According to the 2021 Canadian Census, the municipality had a population of 2,708, reflecting a 2% increase from 2016. This trend is expected to continue, driven by various factors, including affordable housing initiatives, commuter-friendly accessibility, and the appeal of a rural lifestyle. The municipality has partnered with Habitat for Humanity to develop a five-year affordable housing strategy, aiming to construct multiple homes and provide accessible housing options. Its location between Sudbury and North Bay makes it attractive to individuals who work in these urban centers but prefer the affordability and tranquility of a rural setting. Furthermore, the community's scenic environment and outdoor recreational opportunities appeal to both young families and retirees seeking a balanced and peaceful way of life.

Infrastructure improvements are also playing a role in shaping the municipality's growth. The planned extension of Highway 17's freeway alignment near Markstay is expected to enhance regional connectivity and attract further residential and commercial development. Additionally, the Sudbury East Planning Board continues to support zoning and land-use planning to ensure that growth occurs in a structured and sustainable manner while maintaining the municipality's rural character. These efforts are aimed at creating a community that balances economic expansion with environmental preservation and quality of life improvements.

13.3 Impact of Growth on Lifecycle Activities

As Markstay-Warren continues to grow, the municipality must manage its infrastructure and services to meet increasing demand. New residential and commercial developments will require the expansion of essential services such as roads, water systems, and community facilities. As these assets are introduced, they must be incorporated into the municipality's Asset Management Plan (AMP) to ensure service levels remain consistent.

Financial planning will be a critical component of managing growth-related infrastructure. While new developments will contribute to the municipality's tax base, careful assessment of the lifecycle costs of new assets is necessary to maintain long-term sustainability. Expanding infrastructure requires not only initial capital investment but also ongoing maintenance and eventual replacement. Ensuring that financial strategies align with growth projections will be essential for sustaining services over time.

In addition to infrastructure and financial considerations, growth must be managed responsibly to maintain Markstay-Warren's rural charm and natural environment. The municipality's Economic Development Strategic Plan highlights the importance of balanced development, ensuring that economic expansion does not come at the expense of environmental and community well-being. The municipality must also continue to

promote a diverse range of housing options to accommodate the evolving demographics, including young families and seniors who may have specific housing needs.

By integrating growth projections, infrastructure planning, and financial strategies, Markstay-Warren can ensure that it develops sustainably. Thoughtful planning will allow the municipality to maintain its high quality of life, attract new residents and businesses, and ensure that infrastructure and services evolve in line with the community's changing needs.

14. Financial Strategy

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

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

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

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

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

1. To reduce financial requirements, consideration has been given to revising service levels downward.
2. All asset management and financial strategies have been considered. For example:

a. If a zero-debt policy is in place, is it warranted? If not the use of debt should be considered.
b. Do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

14.1 Annual Requirements & Capital Funding

14.1.1 Annual Requirements

The annual requirements represent the amount the Municipality should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. In total, the Municipality must allocate approximately $3.5 million annually to address capital requirements for the assets included in this AMP.

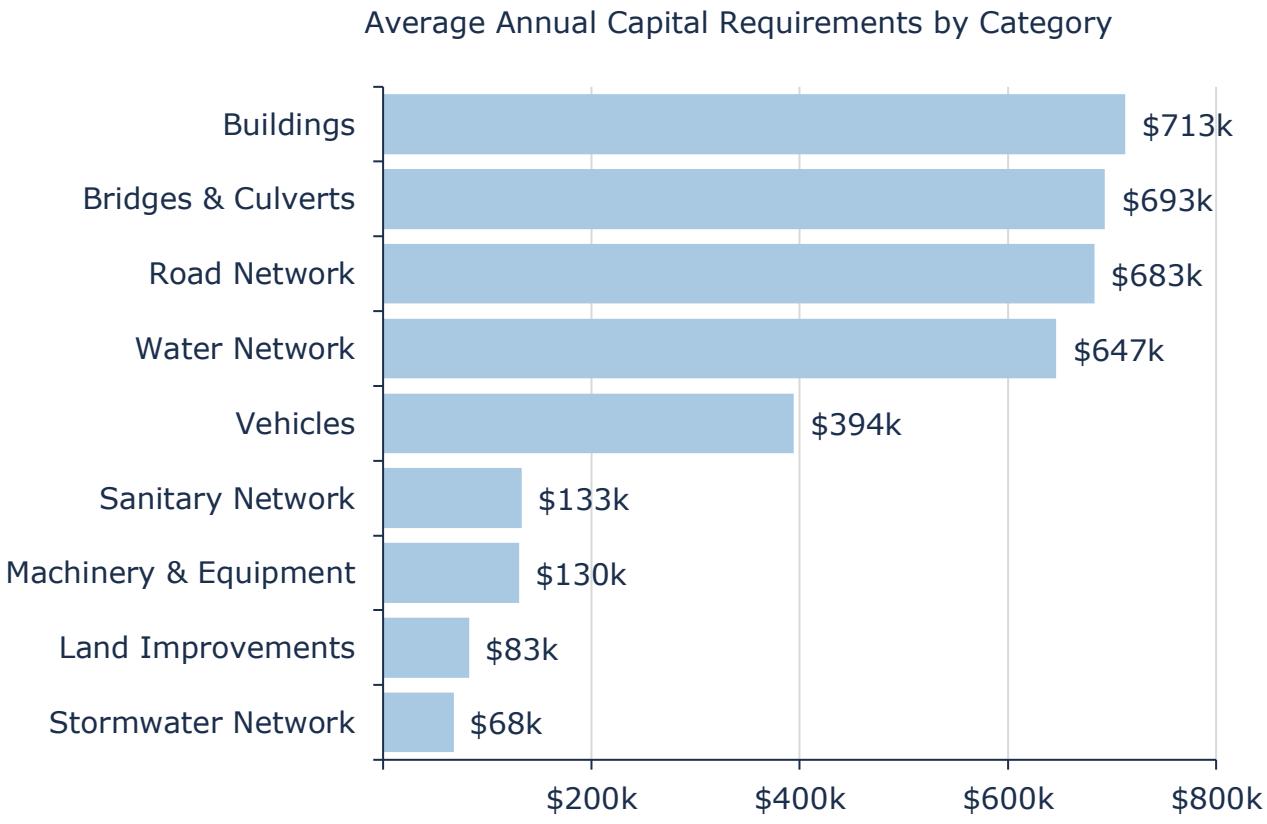


Figure 72 Annual Capital Funding Requirements by Asset Category

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

However, for the Road Network and bridges and culverts lifecycle management strategies have been developed to identify capital costs that are realized through

strategic rehabilitation and renewal of the Municipality's roads. 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 and Sanitary Sewer Network:

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

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$927,000	$683,000	$244,00
Bridges & Structural Culverts	$752,000	$693,000	$59,000

Table 45 Lifecycle Strategies Annual Savings

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $244,210 for the Road Network and $58,686 for the bridges and structural culverts. This represents an overall reduction of the annual requirements for each category by 26% and 8% respectively. As the lifecycle strategy scenario represents the lowest cost option available to the Municipality, we have used these annual requirements in the development of the financial strategy.

14.1.2 Annual Funding Available: Tax Funded Assets Only

Based on a historical analysis of sustainable capital funding sources, the Municipality is committing approximately $503,000 towards capital projects per year. Given the annual capital requirement of $2,764,000 million, there is currently a funding gap of $2,261,000 annually.

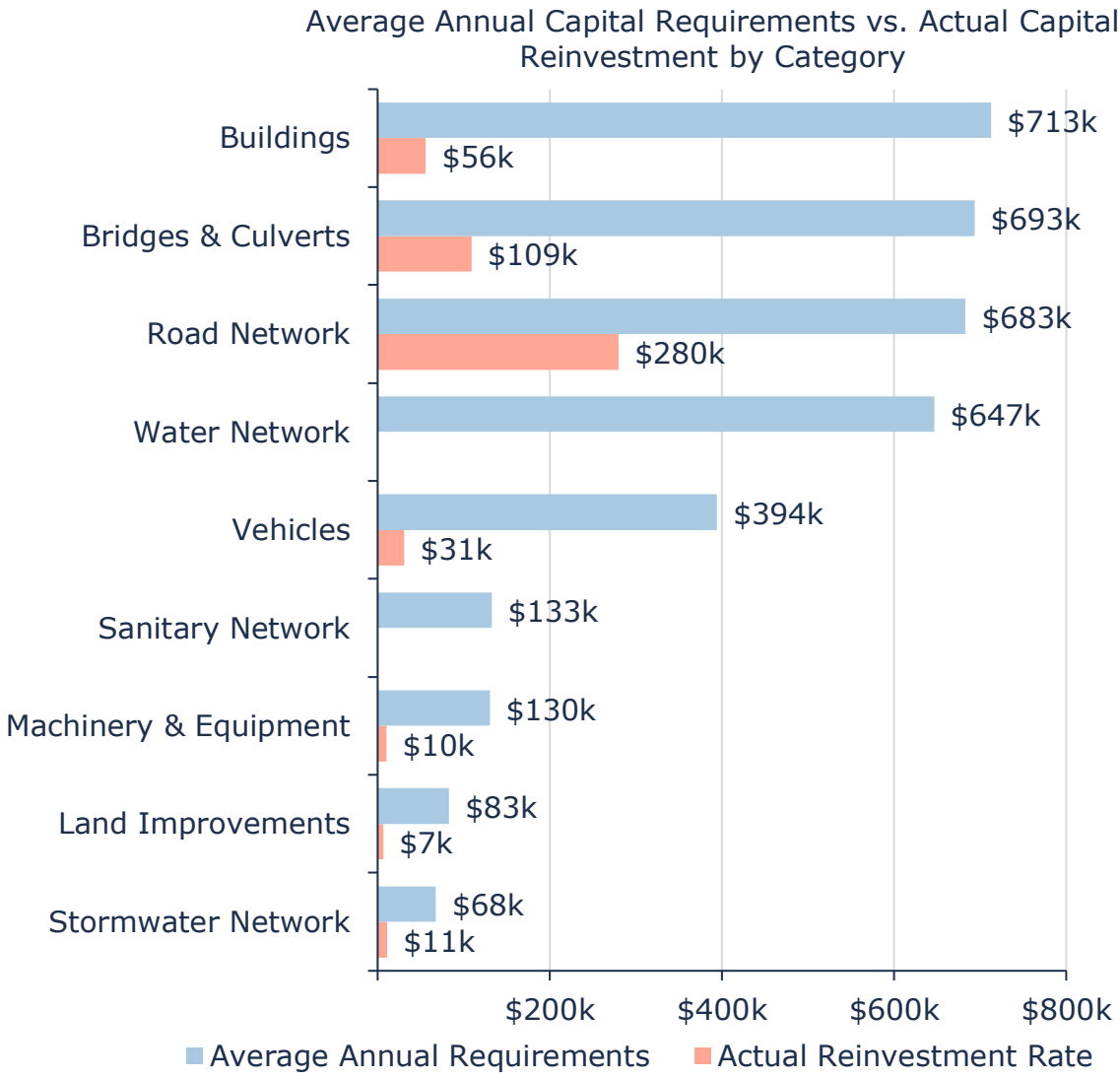


Figure 73 Annual Requirements vs. Capital Funding Available

14.2 Funding Objective

We have developed scenarios that would enable Markstay-Warren to achieve full funding within 15 and 20 years for the following assets:

1. **Tax Funded Assets:** Road Network, Stormwater Network, Bridges & Culverts, Buildings, Machinery & Equipment, Land Improvements, Vehicles

2. **Rate-Funded Assets:** Water Network, Sanitary Network

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

14.3 Financial Profile: Tax Funded Assets

14.3.1 Current Funding Position

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

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Taxes	CCBF	OCIF	Total Available	
Road Network	683,000	53,521	171,515	55,000	280,036	402,964
Stormwater Network	68,000	5,328		5,000	10,795	57,205
Bridges & Culverts	693,000	53,521		56,000	109,242	583,758
Buildings	713,000	55,871			55,871	657,129
Machinery & Equipment	130,000	10,187			10,187	119,813
Land Improvements	83,000	6,504			6,504	76,496
Vehicles	394,000	30,874			30,874	363,126
Total	2,764,000	215,806	171,515	116,188	503,509	2,260,491

Table 46 Annual Available Funding for Tax Funded Assets

The average annual investment requirement for the above categories is $2.76 million. Annual revenue currently allocated to these assets for capital purposes is $503,000 leaving an annual deficit of $2.26 million. Put differently, these infrastructure categories are currently funded at 18.2% of their long-term requirements.

14.3.2 Full Funding Requirements

In 2024, the Municipality of Markstay-Warren had budgeted annual tax revenues of approximately $4,316,000. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Asset Category	Tax Change Required for Full Funding
Road Network	9.3%
Stormwater Network	1.3%
Bridges & Culverts	13.5%
Buildings	15.2%

Asset Category	Tax Change Required for Full Funding
Machinery & Equipment	2.8%
Land Improvements	1.8%
Vehicles	8.4%
Total	52.3%

Table 47 Tax Increase Requirements for Full Funding

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

a) Assuming no additional debt is incurred, Markstay-Warren's debt payments for these asset categories will be decreasing progressively over the next 5, 10, 15 and 20 years.

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

	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	2,260,491	2,260,491	2,260,491	2,260,491
Change in Debt Costs	-40,285	-222,901	-350,799	-398,624
Resulting Infrastructure Deficit:	2,220,206	2,037,590	1,909,692	1,861,867
Tax Increase Required	51.4%	47.2%	44.2%	43.1%
Annually:	8.7%	4.0%	2.5%	1.9%

Table 48 Tax Increase Options 5-20 Years

14.3.3 Financial Strategy Recommendations

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

a) increasing tax revenues by 2.5% 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.
b) allocating the current CCBF 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.

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[11].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full 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 significant pent-up investment demand, most of which is attributed to buildings ($18.2M) with the balance related to Bridges and Culverts ($2.9M), machinery and equipment ($1.9M) and vehicles ($445,000).

Prioritizing future projects would benefit from the replacement of age-based condition data with assessed data of sanitary, water, and stormwater mains. Building assets, which are not currently componentized, would benefit from a componentized asset inventory and condition information. Although our recommendations include no further use of debt, the results of the condition-based analysis may be required otherwise.

14.4 Financial Profile: Rate Funded Assets

14.4.1 Current Funding Position

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

The water network analysis reflects average annual requirements and annual funding available based on assets located in Markstay and Warren respectively. This distinction reflects the Town's separate billing systems for each respective geographic area.

At this time of this report's publication historic capital investment funding and/or capital allocations for the water and sanitary networks were unavailable. Considering this limitation, the financial analysis for rate funded assets is based on no sustainable capital funding for water and sewer network assets. Therefore, the average annual requirement is equal to the annual deficit. Table 49 below summarizes these values.

[11] The Municipality 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.

Asset Category	Avg. Annual Requirment and Deficit
Warren Water Network	$280,712
Markstay Water Network	$365,905
Sanitary Network	$133,000
Total	**$779,000**

Table 49 Annual Available Funding for Rate Funded Assets

14.4.2 Full Funding Requirements

The revenues collected in 2023 for water in Warren and Markstay are $377,000 and $346,000 respectively. The 2024 budget revenues for the sanitary sewer network are $723,000. As illustrated in Table 50 below, without consideration of any other sources of revenue, full funding would require the following changes over time:

Asset Category	Rate Change Required for Full Funding
Warren Water Network	74.4%
Markstay Water Network	105.8%
Sanitary Sewer Network	18.4%%

Table 50 Rate Increase Requirements for Full Funding

In the following tables, we have expanded the above scenario to present multiple options. Decreases in debt payments are reflected in the Warren Water Network. There are no debts associated with Markstay Water network or Sanitary sewer network assets. Due to the significant increases required, we have provided phase-in options for up to 20 years:

Warren Water Network				
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit Warren	$280,712	$280,712	$280,712	$280,712
Less: decrease in debt payments		-17,147	-17,147	-17,147
Resulting Infrastructure Deficit	**$280,712**	**$263,565**	**$263,565**	**$263,565**
Rate Increase Required	74.4%	69.8%	69.8%	69.8%
Annually	11.8%	5.5%	3.6%	2.7%

Table 51 Warrant Water Rate Increase Options 5-20 Years

Markstay Water Network				
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit Markstay	$365,905	$365,905	$365,905	$365,905
Rate Increase Required	105.8%	105.8%	105.8%	105.8%
Annually:	14.6%	7.1%	4.7%	3.5%

Table 52: Markstay Water Rate Increase Options 5-20 Years

Sanitary Sewer Network				
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	$133,000	$133,000	$133,000	$133,000
Rate Increase Required	18.4%	18.4%	18.4%	18.4%
Annually:	6.8%	3.4%	2.2%	1.7%

Table 53 Sanitary Rate Increase Options 5-20 Years

14.4.3 Financial Strategy Recommendations

Considering all of the above information, we recommend the 20-year option for all water network assets and the 15-year option for the sanitary sewer network. This involves full funding being achieved over 15 and 20 years by:

a) Increasing rates by 2.7 % and 3.5% for the Warren and Markstay Water Networks respectively and doing so each year for the next 20 years. Increasing rates by 2.2% each year for the next 15 years for sanitary sewer network. These funding

changes are solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.

b) 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 and 20 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 $1.4 million for the Water Network and $123 thousand for the Sanitary Sewer 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 within 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

The following table outlines the forthcoming debt principle and interest payments that Markstay-Warren is responsible for. This is based on debts in existence as of 2024-year end and does not consider any potential future debts.

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2025	2026	2027	2028	2029	2030	2034
Road Network	0	0	0	0	0	0	0
Stormwater Network	0	0	0	0	0	0	0
Bridges & Culverts	39,688	39,688	39,688	39,688	39,688	$39,688	$9,185
Buildings	68,402	68,402	68,402	68,402	68,402	$68,402	0
Machinery & Equipment	0	0	0	0	0	0	0
Land Improvements	0	0	0	0	0	0	0
Vehicles	290,534	342,849	317,006	274,467	250,249	$233,501	$166,537
Total Tax Funded	**398,624**	**450,940**	**425,096**	**382,557**	**358,339**	**341,592**	**$175,723**
Water Network (Warren)	17,147	17,147	17,147	17,147	17,147	$17,147	0
Water Network (Markstay)	0	0	0	0	0	0	0
Sanitary Network	0	0	0	0	0	0	0
Total Rate Funded	**17,147**	**17,147**	**17,147**	**17,147**	**17,147**	**$17,147**	**0**

Table 54 Markstay-Warren Principal and Interest Payments

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

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:

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

By asset category, the table below outlines the details of the reserves currently available to Markstay-Warren.

Asset Category	Balance at December 31, 2024
Road Network	$210,663
Stormwater Network	$20,974
Bridges & Culverts	$213,747
Buildings	$219,916
Machinery & Equipment	$40,097
Land Improvements	$25,600
Vehicles	$121,524
Total Tax Funded:	**$852,521**
Warren Water Network	$86,582
Markstay Water Network	$112,859
Sanitary Network	$40,968
Total Rate Funded:	**$240,409**

Table 55 Markstay-Warren Reserve Balances

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

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

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

14.6.2 Recommendation

In 2025, Ontario Regulation 588/17 will require Markstay-Warren to integrate proposed levels of service for all asset categories in its asset management plan update. We recommend that future planning should reflect adjustments to service levels and their impacts on reserve balances.

15. Recommendations & Key Considerations

15.1 Financial Strategies

1. Review the feasibility of adopting a full-funding scenario to achieve 100% of average annual funding requirement for the asset categories analyzed. This includes:
    a. Increasing taxes by 2.5% per year over a period of 15 years;
    b. Increasing water rates by 2.7 % and 3.5% for Warren and Markstay Water Network over a period of 20 years; and
    c. Increasing sanitary rates by 2.2% 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.

15.2 Asset Data

1. On an annual basis review asset inventory information for completeness and accuracy and work to update as needed. Commonly this may include the addition and disposal of assets, updates to asset conditions to reflect capital projects, new, better or additional asset information. Specific data improvements identified in this plan include:
    a. Updates to road inventory information especially for appurtenances like sidewalks and streetlights
    b. Review and confirmation of bridge and structural culverts in-service dates
    c. Addition of more comprehensive inventory information for water hydrants and storm network assets like outfall and manholes.
    d. The timing of roads lifecycle events, the estimated impact of them, and the unit cost
    e. The various attributes used to estimate the likelihood and consequence of asset failures, and their respective weightings

2. When procuring external studies, ensure that the scope includes provision of data in a tabular format (i.e. excel) and that the data makes clear reference to the corresponding Citywide Asset IDs. Updating the asset registry with the collected

information is of crucial importance. Often the following information is of value to collect and upload to the registry:

a. Asset Condition Numerical Score (common types include a Bridge Condition Index, Pavement Condition Index)
b. Priority Rating: this may consider factors such as asset condition, traffic volumes, availability of alternative routes to rank asset investment prioritization
c. Asset Specific Attributes: Quantity details (length, width, lane kilometers and associated unit of measure), roadside environment, traffic information (AADT), road classification (in line with O. Reg. 239/02 Minimum Maintenance Standards for Municipal Highways), recommended asset interventions (i.e. repairs, rehabilitations) and suggested intervention date.

3. 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.

4. 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 in-field performance and staff judgement is recommended.

15.3 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 in some cases 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 ahead of O. Reg. 588's 2025 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 – Infrastructure Report Card

Appendix B – 10-Year Capital Requirements

Appendix C – Level of Service Maps

Appendix D – Risk Rating Criteria

Appendix A – Infrastructure Report Card

Asset Category	Replacement Cost	Average Condition	Financial Capacity	
Road Network	**$26.4 m**	**Fair**	Annual Requirement:	$683,000
			Funding Available:	$280,000
			Annual Deficit:	**$403,000**
Bridges & Culverts	**$20.5 m**	**Fair**	Annual Requirement:	$693,000
			Funding Available:	$59,000
			Annual Deficit:	**$634,000**
Water Network	**$36.6 m**	**Good**	Annual Requirement:	$647,000
			Funding Available:	$0
			Annual Deficit:	**$647,000**
Sanitary Network	**$8.9 m**	**Good**	Annual Requirement:	$133,000
			Funding Available:	$0
			Annual Deficit:	**$133,000**
Stormwater Network	**$4.6 m**	**Good**	Annual Requirement:	$68,000
			Funding Available:	$61,000
			Annual Deficit:	**$7,000**
Buildings	**$21.3 m**	**Very Poor**	Annual Requirement:	$713,000
			Funding Available:	$56,000
			Annual Deficit:	**$657,000**
Land Improvements	**$1.8 m**	**Good**	Annual Requirement:	$83,000
			Funding Available:	$7,000
			Annual Deficit:	**$76,000**
Vehicles	**$5.5 m**	**Poor**	Annual Requirement:	$394,000
			Funding Available:	$31,000
			Annual Deficit:	**$363,000**
Machinery & Equipment	**$ 2.4m**	**Very Poor**	Annual Requirement:	$130,000
			Funding Available:	$10,000
			Annual Deficit:	**$120,000**

Appendix B – 10-Year Capital Requirements

The tables below summarize the projected cost of lifecycle activities (rehabilitation and replacements) that may 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. Assessed condition data and replacement costs were used to assist in forecasting replacement needs for roads. For all remaining assets, only age was used to determine forthcoming replacement needs.

The projections can be different from actual capital forecasts. Consistent data updates, particularly condition, replacement costs, and regular upkeep of lifecycle models, will improve the alignment between the system generated expenditure requirements, and the Municipality's capital expenditure forecasts.

Road Network

Segment	Back-log	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Asphalt Roads	-	-	-	-	-	$1.1m	-	$138k	-	$361k	$206k
Gravel Roads	-	-	-	-	-	-	-	-	$268k	-	$355k
Surface Treated Roads	-	$12k	$115k	$128k	$1.1m	$995k	-	$504k	$256k	$157k	$827k
Total	**-**	**$12k**	**$115k**	**$128k**	**$1.1m**	**$2.0m**	**-**	**$643k**	**$524k**	**$518k**	**$1.4m**

Table 56 System Generated 10-Year Capital Replacement Forecast: Road Network

Bridges & Culverts

Segment	Back-log	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Bridges	$2.1m	$1.0m	$594k	$1.9m	$159k	$457k	$3.5m	-	-	$2.2m	$1.4m
Culverts	$788k	$2.1m	$317k	-	$100k	-	$734k	-	-	-	-
Total	**$2.9m**	**$3.1m**	**$911k**	**$1.9m**	**$259k**	**$457k**	**$4.2m**	**-**	**-**	**$2.2m**	**$1.4m**

Table 57 System Generated 10-Year Capital Replacement Forecast: Bridges & Culverts

Water Network

Segment	Back-log	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Hydrants	-	-	-	-	-	-	-	-	$4.1m	-	-
Valves	$1.4m	-	-	-	-	-	-	-	-	-	-
Water Mains	-	-	-	-	-	-	-	-	-	-	-
Water Tower	-	-	-	-	-	-	-	-	-	-	-
Total	**$1.4m**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$4.1m**	**-**	**-**

Table 58 System Generated 10-Year Capital Replacement Forecast: Water Network

Sanitary Sewer Network

Segment	Back-log	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Manholes	-	-	-	$6k	-	-	-	-	-	-	-
Sanitary Lift Station	-	-		-	-	-	-	-	-	-	-
Sanitary Mains	-	-	-	-	-	-	-	-	-	-	-
Wastewater Lagoon	-	-	-	-	-	-	-	-	-	-	-
Total	**-**	**-**	**-**	**$6k**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Table 59 System Generated 10-Year Capital Replacement Forecast: Sanitary Sewer Network

Stormwater Network

Segment	Back-log	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Catch Basins	-	-	-	-	-	$12k	-	-	-	-	-
Storm Mains	-	$827k	-	-	-	-	-	-	-	-	-
Total	**-**	**$827k**	**-**	**-**	**-**	**$12k**	**-**	**-**	**-**	**-**	**-**

Table 60 System Generated 10-Year Capital Replacement Forecast: Stormwater Network

Buildings

Segment	Back-log	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Administration	$1.1m	-	-	-	-	-	-	-	-	-	-
Fire Department	$3.7m	-	-	-	-	-	-	-	-	-	-
Parks & Recreation	$11.2m	$30k	-	-	-	-	-	-	-	-	-
Public Works	$2.2m	-	-	-	-	-	-	-	-	-	-
Total	**$18.2 m**	**$30k**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Table 61 System Generated 10-Year Capital Replacement Forecast: Buildings & Facilities

Note: These projections are generated in Citywide and rely on the data available in the asset register. As assessed condition data was not available for many buildings assets, age was used to determine forthcoming replacement needs. Buildings often contain thousands of assets, each with its own estimated useful life. Currently, however, as the Municipality's buildings are not componentized, there are only 16 assets in the register. Over time, with improved and effective componentization, the alignment between the system generated expenditure requirements, and the Municipality's capital expenditure forecasts will also increase.

Land Improvements

Segment	Back-log	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Fields & Courts	-	-	-	-	-	-	-	-	-	-	-
Outdoor Structures	-	-	-	-	$35k	-	-	-	-	-	-
Play Structures	-	-	-	-	$60k	-	-	-	-	-	-
Total	**-**	**-**	**-**	**-**	**$95k**	**-**	**-**	**-**	**-**	**-**	**-**

Table 62 System Generated 10-Year Capital Replacement Forecast: Land Improvements

Vehicles

Segment	Back-log	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Fire	$445k	-	-	$90k	$65k	-	$150k	$560k	-	$65k	-
Parks and Recreation	-	-	-	-	-	-	-	$65k	-	-	-
Public Works	-	$241k	$600k	$130k	$52k	$20k	$300k	$300k	$250k	$65k	$600k
Total	**$445k**	**$241k**	**$600k**	**$220k**	**$117k**	**$20k**	**$450k**	**$925k**	**$250k**	**$130k**	**$600k**

Table 63 System Generated 10-Year Capital Replacement Forecast: Vehicles

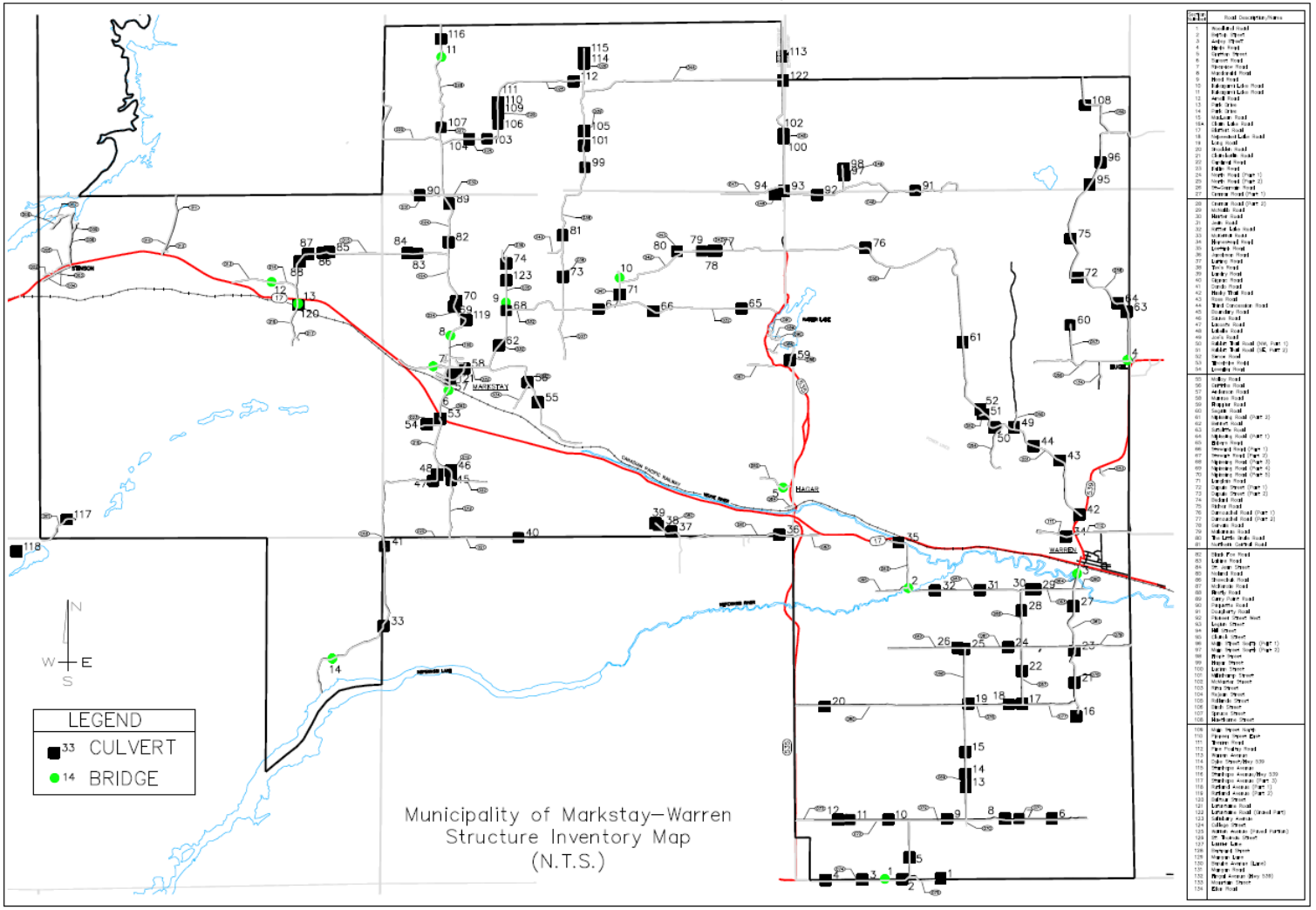
Machinery & Equipment

Segment	Back-log	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Communications	-	-	$62k	-	-	-	-	-	-	-	-
Heavy Equipment	-	$19k	-	-	-	$56k	-	-	-	$111k	-
Library	-	$17k	-	-	-	-	-	-	-	-	-
Misc. Equipment	$1.9m	-	$51k	-	$63k	-	-	-	-	-	-
Total	**$1.9m**	**$36k**	**$113k**	**-**	**$63k**	**$56k**	**-**	**-**	**-**	**$111k**	**-**

Table 64 System Generated 10-Year Capital Replacement Forecast: Machinery & Equipment

Appendix C – Level of Service Maps & Photos

Bridge and Structural Culvert Locations



Images of Bridge in Good Condition

Bedard Bridge

Inspected: October 7th, 2024

5. Inside Barrel (looking south)

3. Wearing Surface (looking east)

4. North Elevation

1. East Approach (looking west)

Noland Road Bridge

Inspected: October 7th, 2024

1. East Approach (looking west)

5. North Elevation

6. Inside Barrel (looking north)

3. Wearing Surface (looking east)

Images of Bridge in Fair Condition

Nipissing Road

Inspected: October 7th, 2024

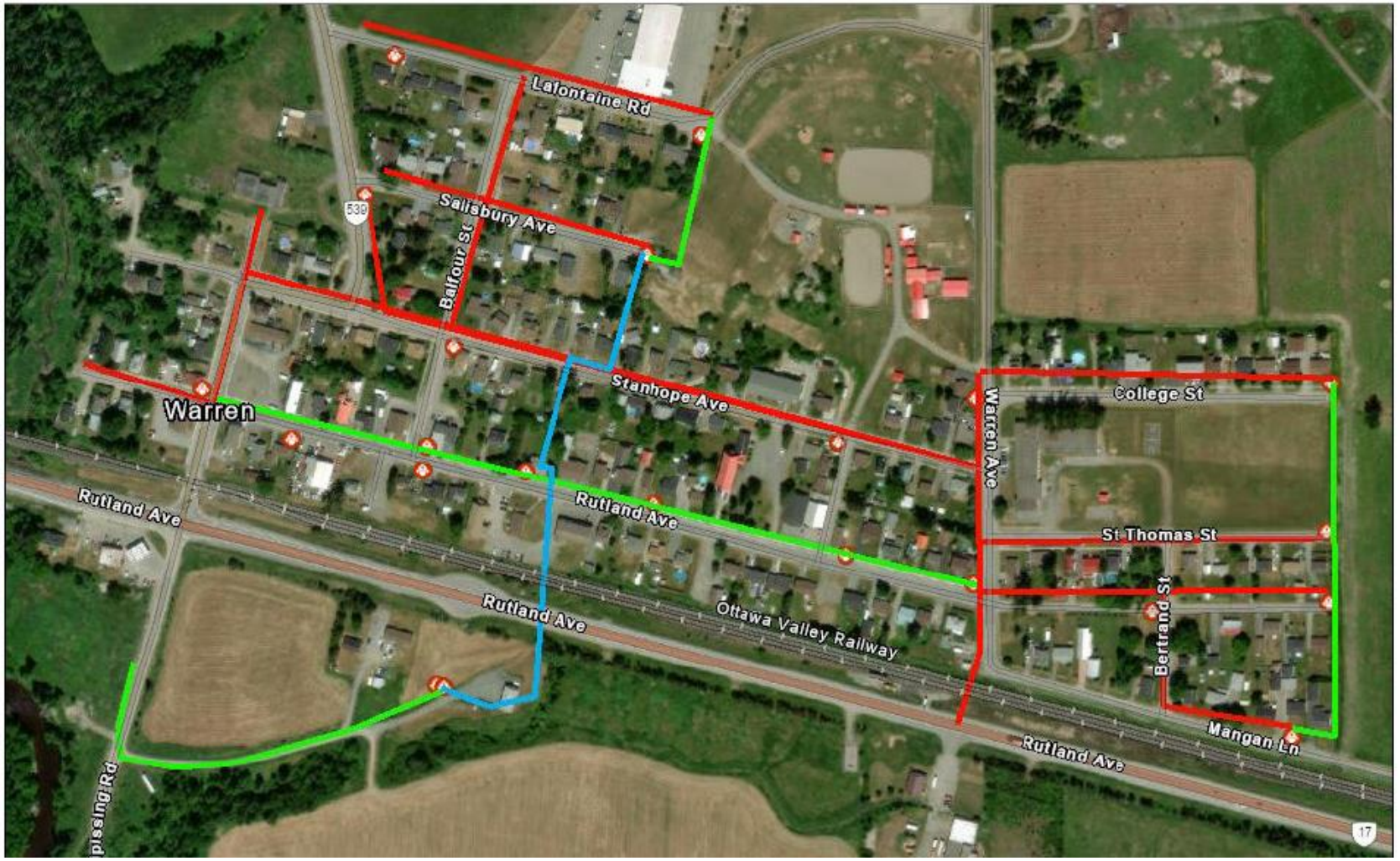
1. North Approach (looking south)

3. Wearing Surface (looking north)

4. Barrier (typ.)

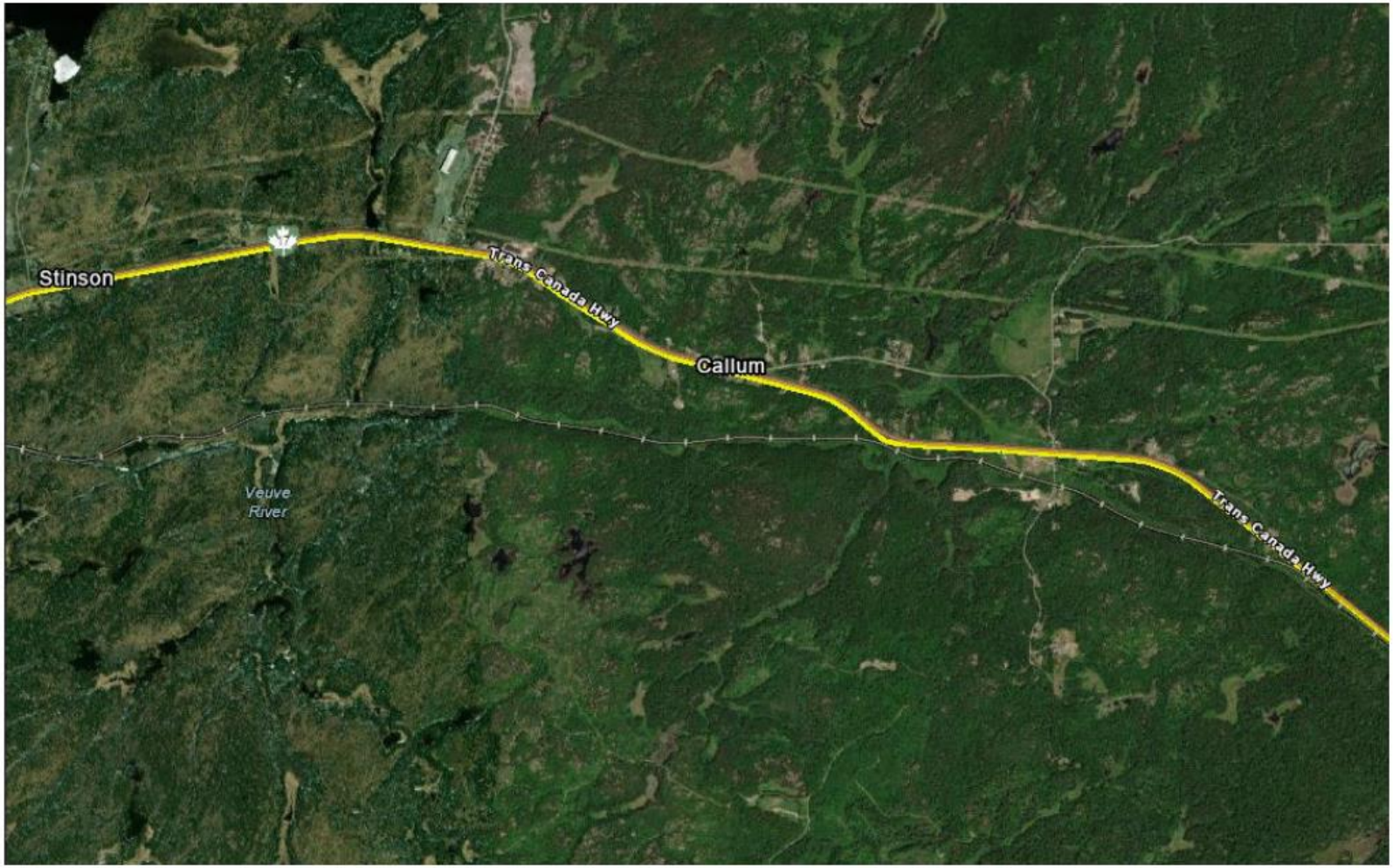
5. East Elevation

Water Network Map – Warren Distribution System



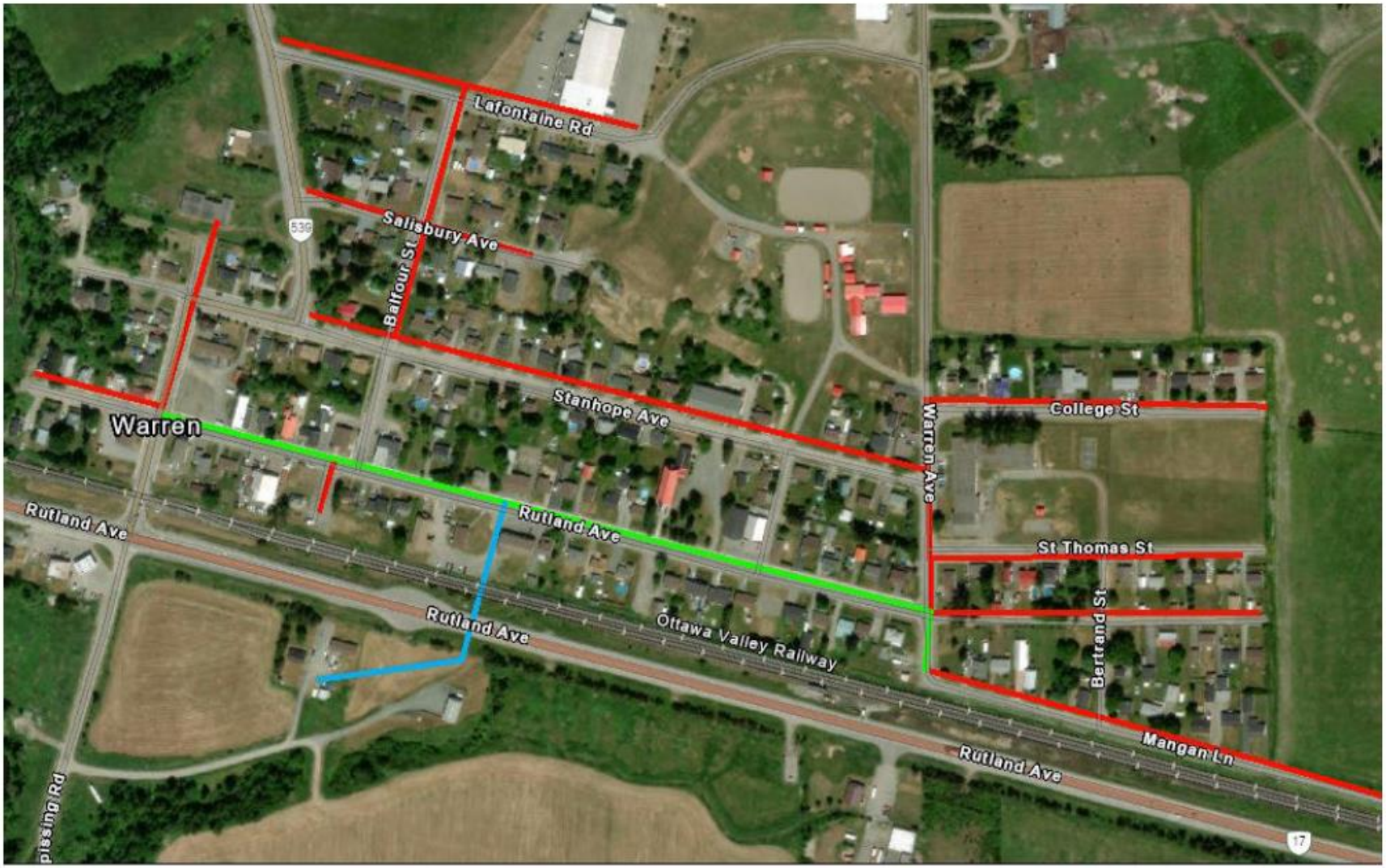
Water Network Map – Markstay Water Distribution Map

Water Transmission Main: Map



ASSET MANAGEMENT PLAN FINAL REVIEW

Sanitary Collection System: Warren Map



Storm Mains: Warren Map

Storm Mains: Markstay Map

Appendix D – Risk Rating Criteria

Probability of Failure

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Probability of Failure Score
Road Network (Surface Treated & Asphalt Roads)	Condition	100%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5
Bridges & Culverts Sanitary, Storm, & Water (Mains) All Others	Condition	100%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5

Consequence of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Road Network (Surface Treated & Asphalt Roads)	Economic (60%)	Replacement Cost (100%)	$1,000,000	5
			$800,000	4
			$600,000	3
			$400,000	2
			$200,000	1
	Operational (20%)	Underground Sewer (33%)	Yes	4
			No	1
		Underground Water (33%)	Yes	4
			No	1
		Underground Storm (33%)	Yes	4
			No	1
	Social (20%)	Average Annual Daily Traffic (AADT)	1,000 and below	5
			300 and below	4
			200 and below	3
			100 and below	2
			50 and below	1
Bridges & Culverts	Economic (80%)	Replacement Cost (100%)	$100,000	1
			$500,000	2
			$1,000,000	3

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
			$1,500,000	4
			$3,500,000	5
	Social (20%)	Alternative Routet (100%)	Yes	4
			No	1
Water Mains	Economic (70%)	Replacement Cost (100%)	$100,000 and below	1
			$200,000 and below	2
			$400,000 and below	3
			$800,000 and below	4
			$1,000,000 and below	5
	Operational (30%)	Diameter (mm)	50 and below	1
			100 and below	2
			150 and below	3
			200 and below	4
			250 and below	5
Storm Mains	Economic (80%)	Replacement Cost (100%)	$20,000 and below	1
			$40,000 and below	2
			$60,000 and below	3
			$80,000 and below	4
			$100,000 and below	5
	Operational (20%)	Diameter (mm)	100 and below	1
			300 and below	2

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
			400 and below	3
			800 and below	4
			1200 and below	5
Water Mains	Economic (30%)	Replacement Cost (100%)	$25,000 and below	1
			$75,000 and below	2
			$150,000 and below	3
			$225,000 and below	4
			$300,000 and below	5
	Operational (20%)	Diameter (mm) (100%)	100 and below	1
			150 and below	2
			200 and below	3
			250 and below	4
			350 and below	5
All Others	Economic (70%)	Replacement Cost (100%)	$50,000	1
			$100,000	2
			$200,000	3
			$400,000	4
			$500,000	5
	Operational (30%)	Category (100%)	Land Improvements	2
			Buildings, Machinery & Equipment, Vehciles	3

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
			Road Network, Sanitary Netowrk, Stormwater Netowrk, Water Network	4