2024

ASSET MANAGEMENT PLAN

Schedule "A" to By-Law Number 2025-04

This Asset Management Program was prepared by:

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

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Executive Summary

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

The overall replacement cost of the asset categories owned by Black River-Matheson total $378 million. 27% of all assets analysed are in fair or better condition. Assessed condition data was available for all bridge assets, for the remaining assets, assessed condition data was unavailable, and asset age was used to approximate condition. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation.

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

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent future infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $6.1 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $779 thousand towards capital projects or reserves per year. As a result, the Township is funding 13% of its annual capital requirements. This creates a total annual funding deficit of $5.3 million.

Addressing annual infrastructure funding shortfalls is a difficult and long-term endeavour for municipalities. Considering the Township's current funding position, it will require many years to reach full funding for current assets. Short phase-in periods to meet these funding targets may place too high a burden on taxpayers too quickly, whereas a phase-in period beyond 20 years may see a continued deterioration of infrastructure, leading to larger backlogs.

To close annual deficits for capital contributions from tax revenues for asset needs, it is recommended the Township review the feasibility of implementing a 4.7% annual increase in revenues over a 15-year phase-in period. Funding scenarios over longer time frames are also presented which reduce the annual increases.

To close annual deficits for capital contributions from water and sanitary revenues for asset needs, it is recommended the Township review the feasibility of implementing a 1.3% and 3.6% annual increase respectively in revenues over a 15-year phase-in period. Funding scenarios over longer time frames are also presented which reduce the annual increases.

In addition to annual needs, there is also an infrastructure backlog of $32.3 million, comprising assets that remain in service beyond their estimated useful life. It is highly unlikely that all such assets are in a state of disrepair, requiring immediate

replacements or full reconstruction. This makes targeted and consistent condition assessments integral to refining long-term replacement and backlog estimates.

Risk frameworks and levels of service targets can then be used to prioritize projects and help select the right lifecycle intervention for the right asset at the right time—including replacement or full reconstruction. The Township has developed preliminary risk models which are integrated with its asset register. These models can produce risk matrices that classify assets based on their risk profiles.

Most municipalities in Ontario, and across Canada, continue to struggle with meeting infrastructure demands. This challenge was created over many decades and will take many years to overcome. To this end, several recommendations should be considered, including:

- Continuous and dedicated improvement to the Township's infrastructure datasets, which form the foundation for all analysis, including financial projections and needs.
- Continuous refinements to the risk and lifecycle models as additional data becomes available. This will aid in prioritizing projects and creating more strategic long-term capital budgets.
- Development of key performance indicators for all infrastructure programs to establish benchmark data to calibrate levels of service targets for 2025 regulatory requirements.
- Continue conducting network-wide assessments to ensure condition information remains reliable.

The Township has taken important steps in building its asset management program, including developing a more complete and accurate asset register—a substantial initiative. Continuous improvement to this inventory will be essential in maintaining momentum, supporting long-term financial planning, and delivering affordable service levels to the community.

About this Document

The Black River-Matheson Asset Management Plan was developed in accordance with Ontario Regulation 588/17 ("O. Reg 588/17"). It contains a comprehensive analysis of Black River-Matheson's infrastructure portfolio. This is a living document that should be updated regularly as additional asset and financial data becomes available.

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. Along with creating better performing organizations, more livable 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.

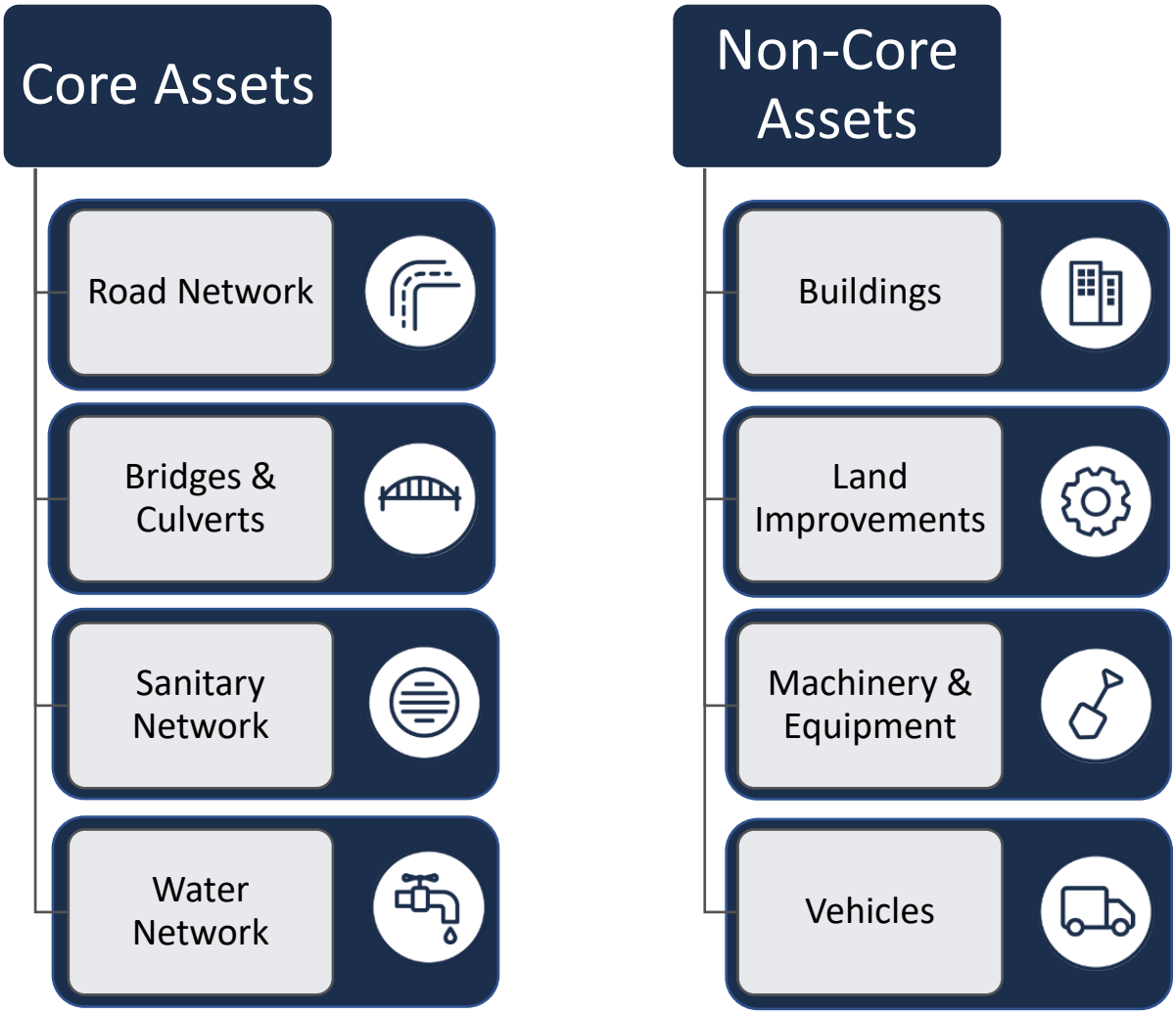
Table 1 Ontario Regulation 588/17 Requirements and Reporting Deadlines

Requirement	2019	2022	2024	2025
1. Asset Management Policy	✓		✓	
2. Asset Management Plans		✓	✓	●
State of infrastructure for core assets		✓		
State of infrastructure for all assets			✓	●
Current levels of service for core assets		✓		
Current levels of service for all assets			✓	
Proposed levels of service for all assets				●
Lifecycle costs associated with current levels of service		✓	✓	
Lifecycle costs associated with proposed levels of service				●
Growth impacts		✓	✓	●
Financial strategy				●

Scope

The scope of this document is to identify the current practices and strategies that are in place to manage the public infrastructure and to make recommendations where they can be further refined. Through the implementation of sound asset management strategies, the Township can ensure that public infrastructure is managed to support the sustainable delivery of services.

The following asset categories are addressed in further detail in the Appendix.



Limitations and Constraints

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

- The analysis is highly sensitive to several critical data fields, including an asset's estimated useful life, replacement cost, quantity, and in-service date. Inaccuracies or imprecisions in any of these fields can have substantial and cascading impacts on all reporting and analytics.
- User-defined and unit cost estimates, based typically on staff judgment, recent projects, or established through completion of technical studies, offer the most precise approximations of current replacement costs. When this isn't possible, historical costs incurred at the time of asset acquisition or construction can be inflated to present day. This approach, while sometimes necessary, can produce inaccurate estimates.
- In the absence of condition assessment data, age was used to estimate asset condition ratings. This approach can result in an over- or understatement of asset needs. As a result, financial requirements generated through this approach can differ from those produced by in-field assessments.
- The risk models are designed to support objective project prioritization and selection. However, in addition to the inherent limitations that all models face, they also require availability of important asset attribute data to ensure that asset risk ratings are valid, and assets are properly stratified within the risk matrix. Missing attribute data can misclassify assets.

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

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

An Overview of Asset Management

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

Lifecycle 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 the 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 (AMP).

This industry standard, defined by the Institute of Asset Management (IAM), emphasizes the alignment between the corporate strategic plan and various asset management documents.

Foundational Documents

In the municipal sector, 'asset management strategy' and 'asset management plan' are often used interchangeably. Other concepts such as 'asset management framework', 'asset management system', and 'strategic asset management plan' further add to the confusion; lack of consistency in the industry on the purpose and definition of these elements offers little clarity. To make a clear distinction between the policy, strategy, and the plan see the following sections for detailed descriptions of the document types.

Strategic Plan

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

Asset Management Policy

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

Asset Management Strategy

An asset management strategy outlines the translation of organizational objectives into asset management objectives and provides a strategic overview of the activities required to meet these objectives. It provides greater detail than the

policy on how the Township plans to achieve its asset management objectives through planned activities and decision-making criteria.

Asset Management Plan

The asset management plan is often identified as a key output within the strategy. The AMP has a sharp focus on the current state of the Township's asset portfolio, and its approach to managing and funding individual asset groups. It is tactical in nature and provides a snapshot in time.

Key Technical Concepts

Effective asset management integrates several key components, including data management, lifecycle management, risk management, and levels of service.

Asset Hierarchy and Data Classification

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

Table 2 Asset Hierarchy

CLASS	AM CATEGORY	AM SEGMENT
Infrastructure	Road Network	Gravel Roads HCB Roads LCB Roads Streetlights
	Bridges & Culverts	Bridges Culverts
	Sanitary Network	Force mains Lagoons Lift Stations Manholes Sanitary Mains Sanitary Treatment
	Water Network	Hydrants Reservoirs Valves Water Treatment Watermains
General Capital	Buildings	Administration Cemetery Fire Public Works Recreation
	Land Improvements	Administration Fire Public Works Recreation Waste Management
	Machinery & Equipment	Administration Cemetery Fire Public Works Recreation Waste Management
	Vehicles	Environmental Fire Public Works Recreation

Replacement Costs

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

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

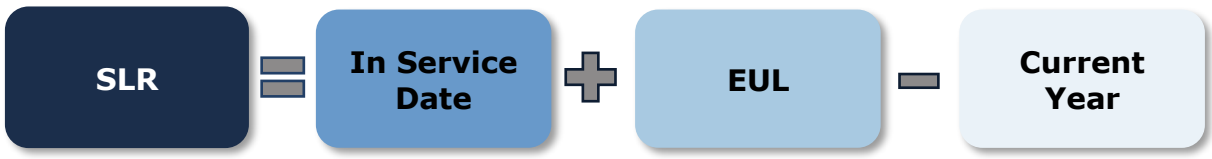
User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost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

Estimated Useful Life and Service Life Remaining

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

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

Figure 1: Service Life Remaining Calculation

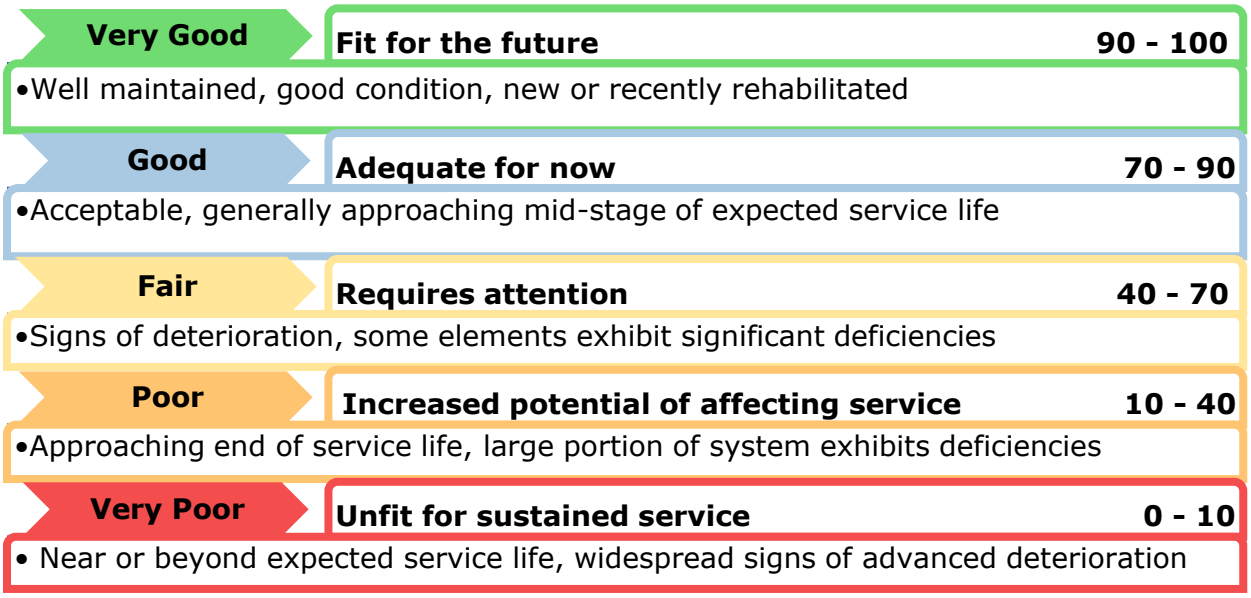


Asset Condition

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

A condition assessment rating system provides a standardized descriptive framework that allows comparative benchmarking across the Township's asset portfolio. The figure below outlines the condition rating system used to determine asset condition for all assets in Black River-Matheson.

Figure 2: Standard Condition Rating Scale



The analysis is based on assessed condition data (only as available). In the absence of assessed condition data, asset age is used as a proxy to determine asset condition. Appendix I: Condition Assessment Guidelines includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

Lifecycle Management Strategies

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

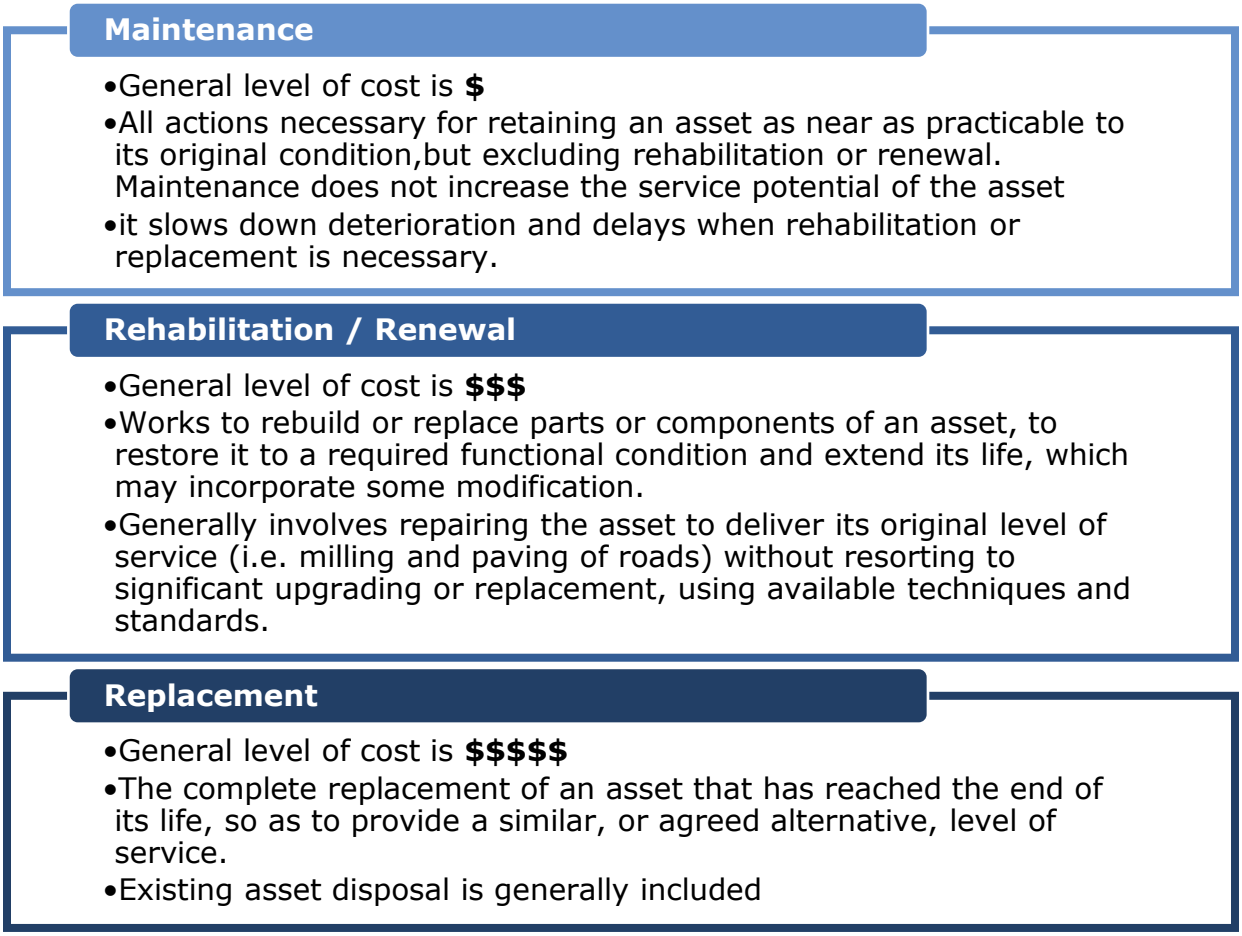
To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

There are several field intervention activities that are available to extend the life of an asset. These activities can be generally placed into one of three categories: maintenance, rehabilitation, and replacement. The Figure 3 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.

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

Figure 3: Lifecyle Management Typical Interventions



Risk Management Strategies

Municipalities generally take a 'worst-first' approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal. Some are more important than others, and their failure or disrepair poses more risk to the community. For example, a road with a high volume of traffic that provides access to critical services poses a higher risk than a low volume rural road. These high-value assets should receive funding before others.

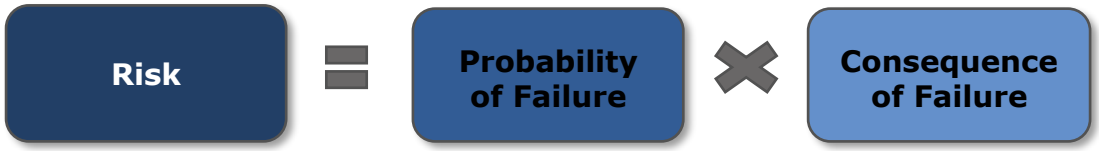
By identifying the various impacts of asset failure and the likelihood that it will fail, risk management strategies can identify critical assets, and determine where maintenance efforts, and spending, should be focused.

A high-level evaluation of asset risk and criticality was performed. 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.

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, (low, medium, high) or quantitative measurement (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 4: Risk Equation



Probability of Failure

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

Consequence of Failure

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

Levels of Service

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

At this stage, three strategic levels of service are measured for every asset category, and they are:

- Financial –targeted reinvestment rate compared to the actual current reinvestment rate.
- Performance – this is the condition breakdown for the asset category.
- Risk – this is the risk profile for the asset category.

Only those LOS that are required under O. Reg for core asset categories are included in addition to the strategic LOS.

Community Levels of Service

Community LOS are a simple, plain language description or measure of the service that the community receives. For core asset categories, the Province through O. Reg. 588/17, has provided qualitative descriptions that are required. For non-core asset categories, the Township must determine the qualitative descriptions that will

be used. The community LOS can be found in the Levels of Service subsection within each asset category section.

Technical Levels of Service

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

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

Current and Proposed Levels of Service

Black River-Matheson is focused on measuring the current LOS provided to the community. Once current LOS have been measured and trended the Township plans to establish their proposed LOS over a 10-year period, in accordance with O. Reg. 588/17.

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

Climate Change

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

The report revealed that between 1948 and 2016, the average temperature increase across Canada was 1.7°C; moreover, during this period, Northern Canada experienced a 2.3°C increase. The temperature increase in Canada has doubled that of the global average. If emissions are not significantly reduced, the temperature could increase by 6.3°C in Canada by the year 2100 compared to 2005 levels. Observed precipitation changes in Canada include an increase of approximately 20% between 1948 and 2012.

By the late 21st century, the projected increase could reach an additional 24%. During the summer months, some regions in Southern Canada are expected to experience periods of drought at a higher rate. Extreme weather events and climate conditions are more common across Canada. Recorded events include droughts, flooding, cold extremes, warm extremes, wildfires, and record minimum arctic sea ice extent.

The changing climate poses a significant risk to the Canadian economy, society, environment, and infrastructure. 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.

Integration Climate Change and Asset Management

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

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

Impacts of 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 Township 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.

Impact of Growth on Lifecycle Activities

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

As the municipality's population is expected to remain the same with potential moderate increases and declines in the coming years, demand will evolve, and it is likely that funding will need to be reprioritized. As growth-related assets are constructed, retired, or acquired, they should be integrated into the AMP. Furthermore, the municipality will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, to maintain the current level of service.

Reinvestment Rate

As assets age and deteriorate they require additional investment to maintain a state of good repair. The reinvestment of capital funds, through asset renewal or replacement, is necessary to sustain an adequate level of service. The reinvestment rate is a measurement of available or required funding relative to the total replacement cost. By comparing the actual vs. target reinvestment rate the Township can determine the extent of any existing funding gap.

Portfolio Overview

Community Profile

The Township of Black River-Matheson is a single tier municipality in the Cochrane District within Northeastern Ontario. The Township is located along Lake Abitibi.

In 1912, Black River-Matheson was officially incorporated. The Matheson station was built in 1908 by the Temiskaming and Northern Ontario Railway. The Temiskaming railway contributed to economic growth throughout the province. The Great Fire of 1916 was a forest fire which passed through many municipalities including Black River-Matheson. The fire burned an area of about 2,000 square kilometers which heavily impacted the Township's economy. This natural disaster led to the creation the Ministry of Natural Resources and Forestry and the Forest Fires Prevention Act in Ontario.

The Township has an abundance of natural resources within the mining, forestry, and farming industry. These are the primary economic drivers for the Township. The Croesus Mine, one of the richest mines in Canada, is in the Albitbi Greenstone Belt and hosts several deposits of rich minerals. The Township attracts seasonal tourists with activities such as fishing, hunting, canoeing, and camping in the summer, and activities such as ice fishing, cross country skiing, skating, and hockey in the winter.

After years of steady population decline, Black River-Matheson has experienced moderate population growth since 2011, with a growth rate of 5.5% between 2016 and 2021. The Township has an aging population above the provincial average.

Table 3 Black River-Matheson & Ontario Census Information

Census Characteristic	Black River-Matheson	Ontario
Population 2021	2,572	14,223,942
Population Change 2016-2021	5.5%	5.8%
Total Private Dwellings	1,403	5,929,250
Population Density	2.2/km^2	15.9/km^2
Land Area	1.16 km^2	892,411.76 km^2

State of the Infrastructure

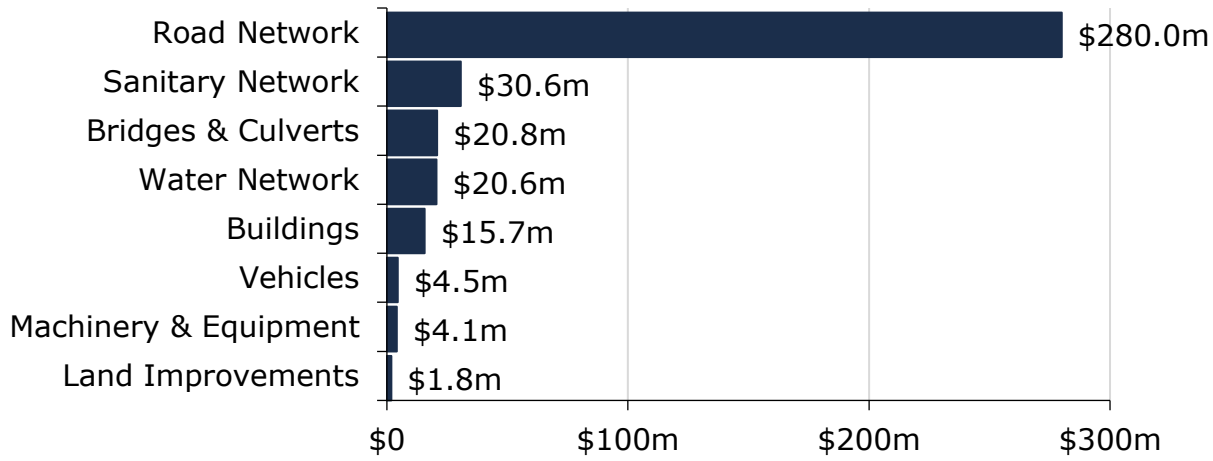
Table 4 Black River-Matheson State of the Infrastructure

Asset Category	Replacement Cost	Asset Condition	Financial Capacity	
Road Network	$280,011,801	Very Poor (4.5%)	Annual Requirement:	$4,160,466
			Funding Available:	$473,551
			Annual Deficit:	$3,686,915
Bridges & Culverts	$20,840,987	Fair (47%)	Annual Requirement:	$328,055
			Funding Available:	$0
			Annual Deficit:	$328,055
Buildings	$15,658,117	Poor (31%)	Annual Requirement:	$314,967
			Funding Available:	$0
			Annual Deficit:	$314,967
Land Improvements	$1,781,618	Fair (57%)	Annual Requirement:	$71,613
			Funding Available:	$0
			Annual Deficit:	$71,613
Vehicles	$4,472,978	Poor (38%)	Annual Requirement:	$225,536
			Funding Available:	$0
			Annual Deficit:	$225,536
Machinery & Equipment	$4,105,458	Poor (27.5%)	Annual Requirement:	$273,296
			Funding Available:	$0
			Annual Deficit:	$273,296
Water Network	$20,625,040	Poor (24%)	Annual Requirement:	$302,550
			Funding Available:	$197,720
			Annual Deficit:	$104,830
Sanitary Network	$30,611,500	Fair (48%)	Annual Requirement:	$444,162
			Funding Available:	$107,750
			Annual Deficit:	$336,412
Overall	$378,107,499	Very Poor (13%)	Annual Requirement:	$6,120,644
			Funding Available:	$779,021
			Annual Deficit:	$5,341,623

Replacement Cost

All Black River-Matheson's asset categories have a total replacement cost of $378 million based on available inventory data. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.

Figure 5: Portfolio Replacement Value

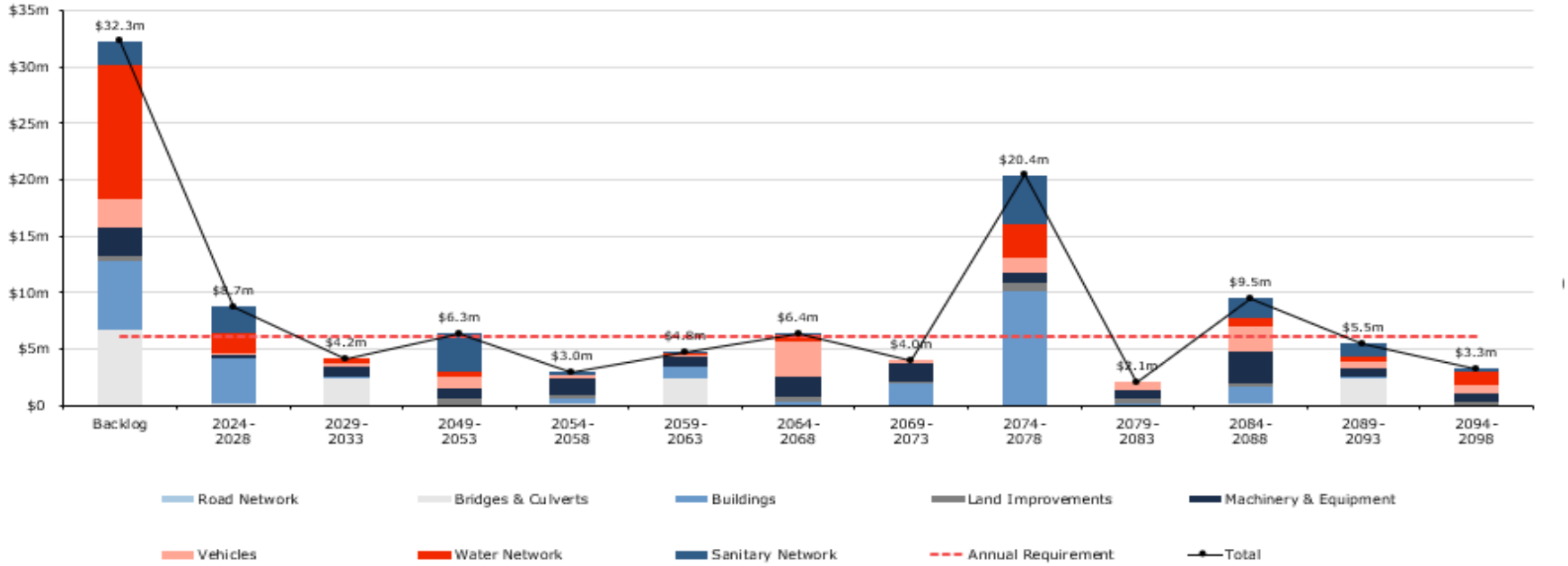


Forecasted Capital Requirements

Aging assets require maintenance, rehabilitation, and replacement. Figure 6 below illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for all asset categories analyzed. On average, $6.1 million is required each year to remain current with capital replacement needs for Black River-Matheson's asset portfolio (red dotted line).

Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise. This figure relies on age and available condition data. Based on the current replacement cost of the portfolio, estimated at $378 million, this represents an annual target reinvestment rate of 1.62%.

Figure 6: Forecasted Capital Requirements



The chart also illustrates a backlog of $32.3 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 or major renewals. This makes 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.

Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 27% of assets in Black River-Matheson are in fair or better condition. This estimate relies on both age-based and field condition data.

Assessed condition data is available for bridges and culverts; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions.

Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 85% of the Township's assets will require rehabilitation / replacement within the next 10 years. Details of the capital requirements are identified in each asset section.

Risk & Criticality

Black River-Matheson has noted key trends, challenges, and risks to service delivery that they are currently facing:

Funding & Staff Capacity

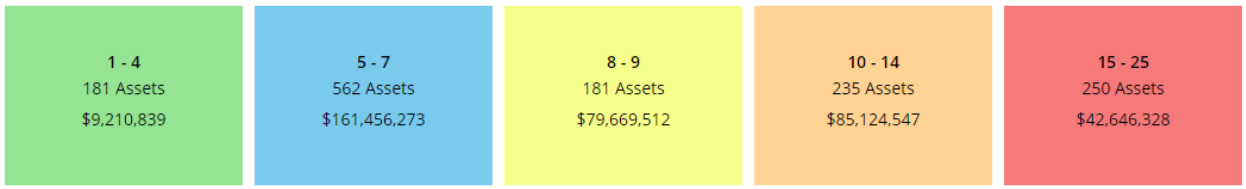
Staff capacity and expertise are sometimes insufficient to deploy optimal maintenance and assessment strategies. Major capital rehabilitation projects may also be deferred depending on the availability of grant funding opportunities.

Aging Infrastructure

The lifecycle management strategy has been reactive. In recent years staff have focused on replacing poor condition assets but are still playing catch up on deferred lifecycle activities. Staff plan to pivot from build/replace strategy towards the implementation of a proactive maintenance and capital rehabilitation strategy to extend the service life at a lower cost.

The overall asset risk breakdown for Black River-Matheson's asset inventory is portrayed in the figure below.

Figure 7: Overall Asset Risk Breakdown



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

Levels of Service

Levels of service are a measure of the quality and scope of the services that municipal infrastructure provides to the community. Both quantitative and qualitative metrics are used to measure the current level of service.

Strategic Plan Line of Site

Collective Vision

The Township of Black River-Matheson aspires to be an inclusive, thriving, and sustainable community, harmonizing rural and urban areas while creating opportunities for present and future generations. We are dedicated to nurturing and enriching our economic landscape through the promotion of a sustainable economy. Our commitment extends to developing a resilient strategy for economic development, fostering economic health and vitality for all stakeholders in Black River-Matheson. Recognized for its exceptional quality of life, vibrant entrepreneurial spirit, responsible resource management, and deep sense of pride, our community stands as a beacon of progress and prosperity.

Mission Statement

Our mission is to deliver effective, efficient municipal services grounded in prudent planning, accountability, and good governance, guided by democratic principles. We are dedicated to fostering a prosperous future for all citizens of Black River-Matheson. We strive to advise Council, organizations, and committees on a comprehensive spectrum of economic issues and policies aimed at ensuring the success and well-being of our community.

Core Values

As the moral compass guiding decision-making and actions within the Township, our Values embody the core principles essential for shaping the culture and direction of both the Township and its Council and employees:

- **Leadership:** Encouraging innovation, creativity, and initiative.
- Reputation: Stressing excellence, integrity, accountability, honesty, and transparency.
- **Service:** Fair, friendly, helpful, caring, and supportive.
- **Community:** Respect and promote our community.
- **Stewardship:** Consider the long-term consequences of actions, think broadly across issues, disciplines and boundaries and act accordingly.
- **Innovation & Excellence:** A philosophy of the workplace where problem-solving, teamwork, and leadership results in a continuous improvement in the Township by developing solutions that address unmet ratepayer needs.
- **Human Resources:** Recognizing that our staff are our most valuable resource.

Level of Service Statement

Utilizing the strategic plan as a guide for determining the Township's levels of service, the corporate service statement was developed by staff as follows:

"The Township of Black River-Matheson is committed to providing **cost efficient**, **safe**, and **sustainable** municipal services and infrastructure, ensuring their longevity for the benefit of our residents and future generations."

Black River-Matheson Climate Profile

The Township of Black River-Matheson is in Northeastern Ontario along the shore of Hudson Bay. The Township is expected to experience notable effects of climate change which include higher average annual temperatures, an increase in total annual precipitation, and an increase in the frequency and severity of extreme events. According to Climatedata.ca – a collaboration supported by Environment and Climate Change Canada (ECCC) – the Township of Black River-Matheson may experience the following trends:

Higher Average Annual Temperature:

- Between the years 1971 and 2000 the annual average temperature was 1.3 ºC
- Under a high emissions scenario, the annual average temperatures are projected to increase by 2.6 ºC by the year 2050 and over 6.9 ºC by the end of the century.

Increase in Total Annual Precipitation:

- Under a high emissions scenario, Black River-Matheson is projected to experience a 15% increase in precipitation by the year 2050 and a 20% increase by the end of the century.

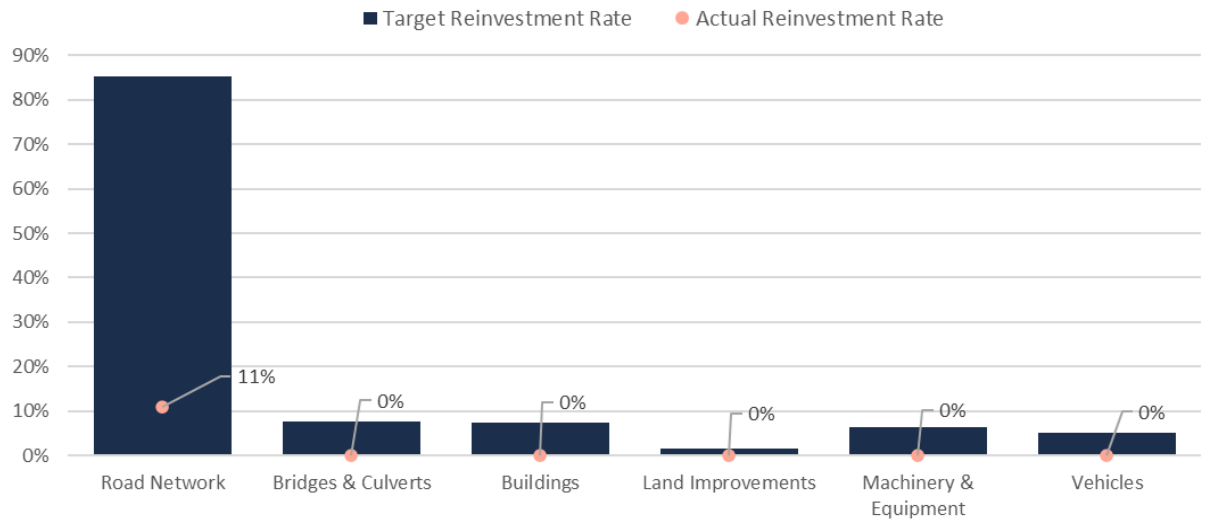
Increase in Frequency of Extreme Weather Events:

- It is expected that the frequency and severity of extreme weather events will change.
- In some areas, extreme weather events will occur with greater frequency and severity than others especially those impacted by Black River watershed.

Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township is recommended to be allocating approximately $6.1 million annually, for a target reinvestment rate of 1.62%. Actual annual spending on infrastructure totals approximately $779 thousand, for an actual reinvestment rate of 0.2%.

Figure 8: Target vs Actual Reinvestment Rates



Impacts of Growth

Understanding the key drivers of growth and demand will allow the Township 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.

Black River-Matheson Official Plan (August 2003)

The Township of Black River-Matheson adopted their Official Plan in 2017 which bases its projections on the Growth Plan for Northern Ontario and reflects the goals of the Planning Act.

The purpose of the Official Plan is to guide the physical development for the community over the next 20 years. It establishes a vision, guiding principles and objectives to manage physical development, and their effects on physical, social, cultural, economic, and natural environments. The Township will prioritize industries such as mining and mineral exploration, residential construction, and agriculture for future growth and development.

The settlement area will be the focus of residential and employment growth. There is a sufficient supply of vacant land available in the Township's designated settlement areas to meet the predicted needs for housing and employment, and even allow for additional supply in case the demand rises in the future. The emphasis of the development will be on settlement areas where there is an appropriate level of public infrastructure that is presently accessible or can be made available at a reasonable cost. The rural area will maintain its' focus for agricultural activities, as well as mining and mineral exploration.

The Official Plan projects a steady population decrease until 2036 based on 2011 census data. However, census data over the past 10 years has indicated moderate

population growth, which may indicate a potential population increase in the future. The following table was developed using census data from 1996 to 2021.

Historical Figures	1996	2001	2006	2011	2016	2021
Population	3,222	2,886	2,619	2,410	2,438	2,572
Population Change	N/A	-10%	-9%	-8%	1%	5%
Private Dwellings	N/A	1,489	1,249	1,172	1,149	1,403

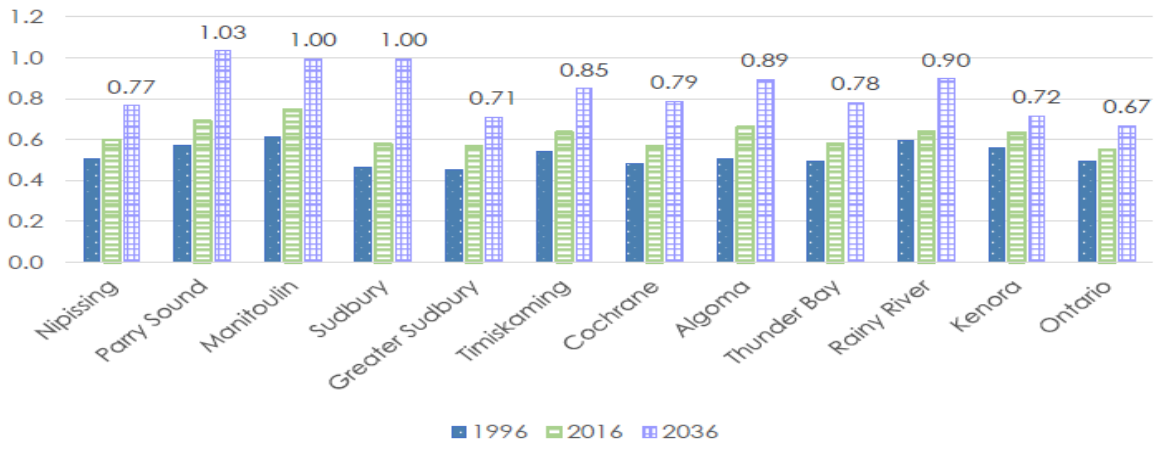
The population of Black River-Matheson ranged from 3,222 in 1996 to 2,572 in 2021. Between the years of 1996 and 2011 there were significant drops in population. However, 2016 saw a slight increase in population, which could indicate population growth or stability for the Township.

Regional Growth

In 2021 the Come North Conference Report was produced by FedNor and Government of Canada. The document describes short, medium, and long-term objectives for all communities in Northern Ontario as it relates to population growth.

According to the report all 11 Census Districts in Northern Ontario (Nipissing, Parry Sound, Manitoulin, Sudbury, Greater Sudbury, Timiskaming, Cochrane, Algoma, Thunder Bay, Rainy River, Kenora) are currently experiencing the following trends: population decline, population aging, or labour shortages. The report highlights a risk of these communities becoming economically unsustainable unless population retention and attraction numbers improve. The risk is the result of the dependency ratio increasing. The dependency ratio is the ratio of people unable to support themselves without assistance; people between the ages of 0 and 14 and 64 and older.

The goal is to achieve a dependency ratio of 0.5. In 1996, every Census District was at or near the goal but by 2016, none were below and more than half had a ratio more than 0.6. The following graph displays the dependency ratio for each Census District in 1996 and 2016 along with a projected ratio for the year 2036.



The Township of Black River-Matheson is found in the Cochrane district, which is expected to reach a dependency ratio of 0.79.

The population trends overall in the Cochrane District are in decline. The following graph from the 2019 Northern Projections Cochrane District Human Capital Series report by the Northern Policy Institute, displays the population trends from 1986 to 2016.

The following table, found in the same report, shows population projections in the Cochrane District for the years 2021 to 2041.

Year	Ages 0-19	Ages 20-64	Ages 65+	Total
2021	17,163	45,475	15,951	78,589
2026	16,627	41,520	18,681	76,828
2031	15,892	38,676	20,566	75,134
2036	15,260	37,319	20,962	73,541
2041	14,894	36,535	20,669	72,098

The most recent census data from 2021, shows a slight decrease in the population, reaching a total of 77,963. According to census data, the population increase is entirely restricted to the population of 65 and older; thus, further increasing the dependency ratio.

Financial Strategy

Financial Strategy Overview

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

This financial strategy is designed for the Township's existing asset portfolio and is premised on two key inputs: the average annual capital requirements and the average annual funding typically available for capital purposes. The annual requirements are based on the replacement cost of assets and their serviceable life, and where available, lifecycle modeling. This figure is calculated for each individual asset and aggregated to develop category-level values.

The annual funding typically available is determined by averaging historical capital expenditures on infrastructure, inclusive of any allocations to reserves for capital purposes.

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

- Revenue from taxation allocated to reserves for capital purposes
- The Canada Community Benefits Fund (CCBF)
- The Ontario Community Infrastructure Fund (OCIF)

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

Annual Capital Requirements

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

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

The following table compares two scenarios:

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

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

Table 5 Road Network Annual Capital Requirement Comparison

Asset Segment	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
HCB Roads	$4,369,792	$3,328,638	$1,041,154
LCB Roads	$983,333	$824,361	$158,972
Streetlights	$7,467	$7,467	$0

The implementation of a proactive lifecycle strategy for paved roads (asphalt and surface treatment), leads to a potential annual cost avoidance of approximately $1.2 million. This represents a reduction of the annual capital requirement for paved roads by 22%.

Gravel roads lifecycle costs are not considered capital and gravel roads are not planned for replacement. As the lifecycle strategy scenario represents the lowest cost option available to the Township, this annual capital requirement was used in the development of the financial strategy.

Table 6 outlines the total average annual capital requirements for existing assets in each asset category. Based on a replacement cost of $378 million, annual capital requirements total approximately $6.1 million for all the asset categories analysed.

The table also illustrates the system-generated, equivalent target reinvestment rate (TRR), calculated by dividing the annual capital requirements by the total replacement cost of each category. The cumulative target reinvestment for these categories is estimated at 1.62%.

Table 6 Average Annual Capital Requirements

Asset Category	Replacement Cost	Annual Capital Requirements	Target Reinvestment Rate
Road Network	$280,011,801	$4,160,466	1.5%
Bridges & Culverts	$20,840,987	$328,055	1.6%
Buildings	$15,658,117	$314,967	2.0%
Land Improvements	$1,781,618	$71,613	4.0%
Machinery & Equipment	$4,105,458	$273,296	6.7%
Vehicles	$4,472,978	$225,536	5.0%
Water Network	$20,625,040	$302,550	1.5%
Sanitary Network	$30,611,500	$444,162	1.5%
Total	**$378,107,499**	**$6,120,644**	**1.62%**

Although there is no industry standard guide on optimal annual investment in infrastructure, the Target Reinvestment Rates above provide a useful benchmark for organizations. In 2016, the Canadian Infrastructure Report Card (CIRC)

produced an assessment of the health of municipal infrastructure as reported by cities and communities across Canada. The CIRC remains a joint project produced by several organizations, including the Federation of Canadian Municipalities (FCM), the Canadian Society of Civil Engineers (CSCE), the Canadian Network of Asset Managers (CNAM), and the Canadian Public Works Association (CPWA).

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

Current Funding Levels

Table *7* summarizes how current capital funding levels compare with funding required for each asset category. At existing levels, the Township is funding 13% of its annual capital requirements for all infrastructure analyzed. This creates a total annual funding deficit of $5.3 million.

Table 7 Current Funding Position vs Required Funding

Asset Category	Annual Capital Requirements	Annual Funding Available	Annual Infrastructure Deficit	Funding Level
Road Network	$4,160,466	$473,551	$3,686,915	11%
Bridges & Culverts	$328,055	$-	$328,055	0%
Buildings	$314,967	$-	$314,967	0%
Land Improvements	$71,613	$-	$71,613	0%
Machinery & Equipment	$273,296	$-	$273,296	0%
Vehicles	$225,536	$-	$225,536	0%
Water Network	$302,550	$197,720	$104,830	65%
Sanitary Network	$444,162	$107,750	$336,412	24%
Total	**$6,120,644**	**$779,021**	**$5,341,623**	**13%**

Closing the Gap

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

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

Full Funding Requirements Tax Revenues

In 2023, Black River-Matheson will have an annual tax revenue of $4,977,109. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require an 98.5% tax change over time.

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

Table 8 Phasing in Annual Tax Increases

Total % Increase Needed in Annual Property Taxation Revenues	Phase-in Period			
	5 Years	10 Years	15 Years	20 Years
98.5%	14.7%	7.1%	4.7%	3.5%

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

Full Funding Requirements Utility Rate Revenues

Annual capital requirements for both the water and sanitary network total $746,712, against available funding of $305 thousands. This creates a funding deficit of $441 thousand. To close this annual gap, the Township's total utility revenues would need to increase by 59.1%.

To achieve this increase, several scenarios have been developed using phase-in periods ranging from five to twenty years. As with tax revenues, short phase-in periods may require excessive rate increases, whereas more extended timeframes may lead to larger backlogs and more unpredictable spending on emergency repairs and replacements.

Table 9 Phasing in Rate Increases

Category	Phase-in Period			
	5 Years	10 Years	15 Years	20 Years
Water Network (21.6%)	4.0%	2.0%	1.3%	1.0%
Sanitary Network (77.7%)	11.1%	5.4%	3.6%	2.7%

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

Recommendations and Key Considerations

Financial Strategies

1. Review feasibility of adopting a full-funding scenario that achieves 100% of average annual requirements for the asset categories analyzed. This involves:
    - implementing a 4.7% annual tax increase over a 15-year phase-in period and allocating the full increase in revenue towards capital funding
    - continued allocation of OCIF and CCBF funding as previously outlined
    - implementing a 1.3% and 3.6% annual water and sanitary increases both over a 15-year phase-in period and allocating the full increase in revenue towards capital funding
    - using risk frameworks and staff judgement to prioritize projects, particularly to aid in elimination of existing infrastructure backlogs

NOTE: Although difficult to capture inflation costs, supply chain issues, and fluctuations in commodity prices will also influence capital expenditures.

Asset Data

1. Continuously review, refine, and calibrate lifecycle and risk profiles to better reflect actual practices and improve capital projections. In particular:
    - the timing of various lifecycle events, the triggers for treatment, anticipated impacts of each treatment, and costs
    - the various attributes used to estimate the likelihood and consequence of asset failures, and their respective weightings
2. Asset management planning is highly sensitive to replacement costs. Periodically update replacement costs based on recent projects, invoices, or estimates, as well as condition assessments, or any other technical reports and studies. Material and labour costs can fluctuate due to local, regional, and broader market trends, and substantially so during major world events. Accurately estimating the replacement cost of like-for-like assets can be challenging. Ideally, several recent projects over multiple years should be used.
3. Continue conducting network-wide assessments to ensure condition information remains reliable. Condition assessments are vital to asset management plans as they provide crucial insights into the health and performance of assets over time. By evaluating the condition of assets regularly, the Township can prioritize maintenance and repair efforts, optimize resource allocation, and extend the lifespan of assets. This proactive approach can ensure the efficient and cost-effective operation of infrastructure and equipment.

Appendix A: Road Network

State of the Infrastructure

Black River-Matheson's road network comprises the second largest share of its infrastructure portfolio, with a current replacement cost of $280 million, distributed primarily between HCB, LCB and gravel roads.

The Township also owns and manages other supporting infrastructure and capital assets, including streetlights.

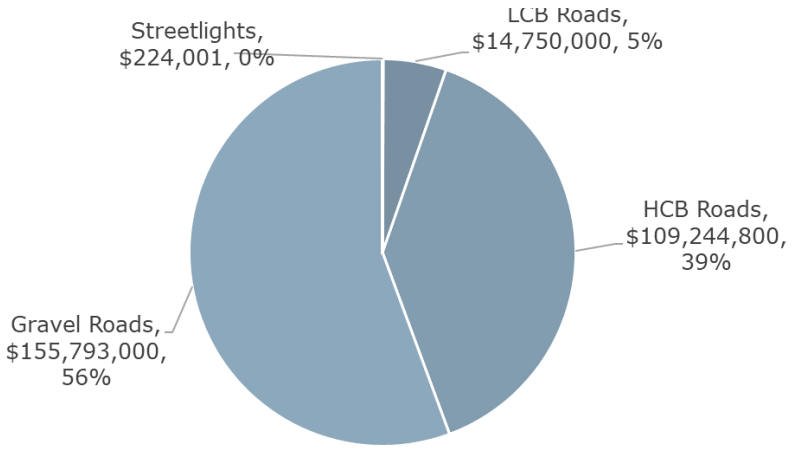
The state of the infrastructure for the road network is summarized below.

Replacement Cost	Condition	Financial Capacity	
$280,011,801	Very Poor (4.5%)	Annual Requirement:	$4,160,466
		Funding Available:	$473,551
		Annual Deficit:	$3,686,915

Inventory & Valuation

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

Figure 9: Road Network Replacement Value

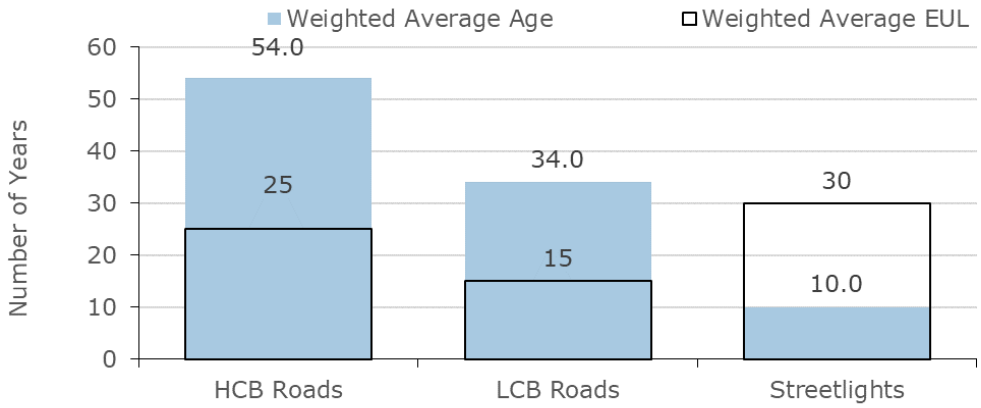


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

Asset Condition & Age

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

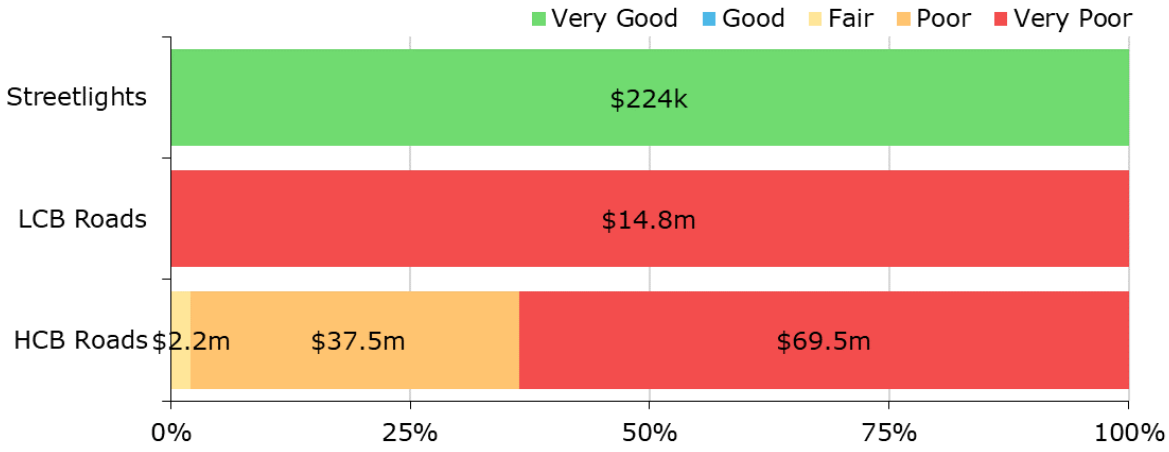
Figure 10: Road Network Average Age vs Average EUL



The analysis shows that, based on in-service dates, roads continue to remain in operation beyond their expected useful life. This is due to the life cycle management strategies currently being utilized.

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

Figure 11: Road Network Condition Breakdown



To address the challenges posed by the deteriorating condition of Black River-Matheson's roads, the Township must implement proactive measures to enhance the level of service provided by its road infrastructure.

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

Current Approach to Condition Assessment

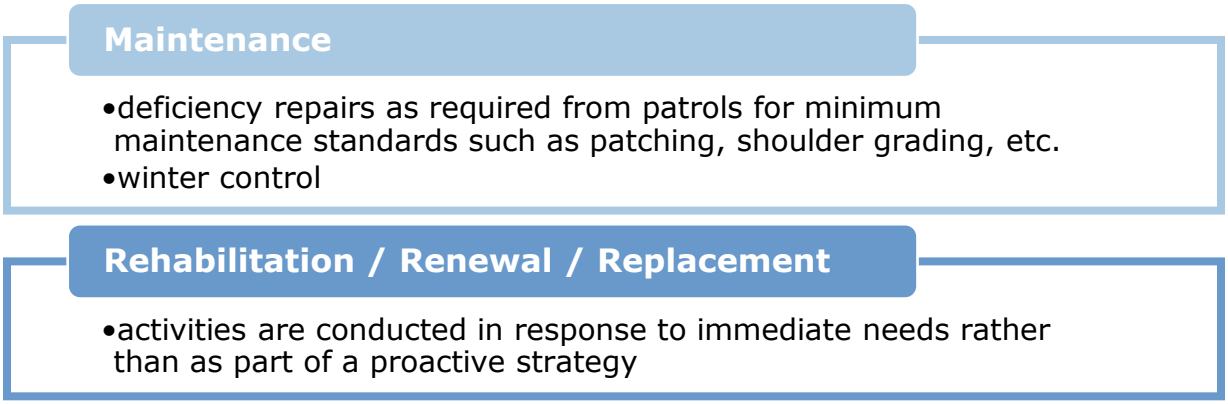
Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. At present, the Township is in the process of exploring options for implementing a comprehensive asset condition assessment strategy.

Lifecycle Management Strategy

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

The following lifecycle strategies shown in Figure 12 have been developed as a proactive approach to managing the lifecycle of municipally owned roads. Instead of allowing the roads to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of roads at a lower total cost.

Figure 12: Road Network Current Lifecycle Strategy



PCI scores, staff judgment, traffic loads, and opportunity to bundle projects help inform the optimal lifecycle intervention, ranging from pothole repairs to overlays and potential replacements. Lifecycle models used to estimate the savings to annual capital requirement are shown below in Figure 13 for Paved (LCB) roads, Figure 14 for Asphalt (HCB) Roads, and **Error! Reference source not found.** for gravel roads.

Figure 13: Paved Roads (LCB) Road Lifecycle Model

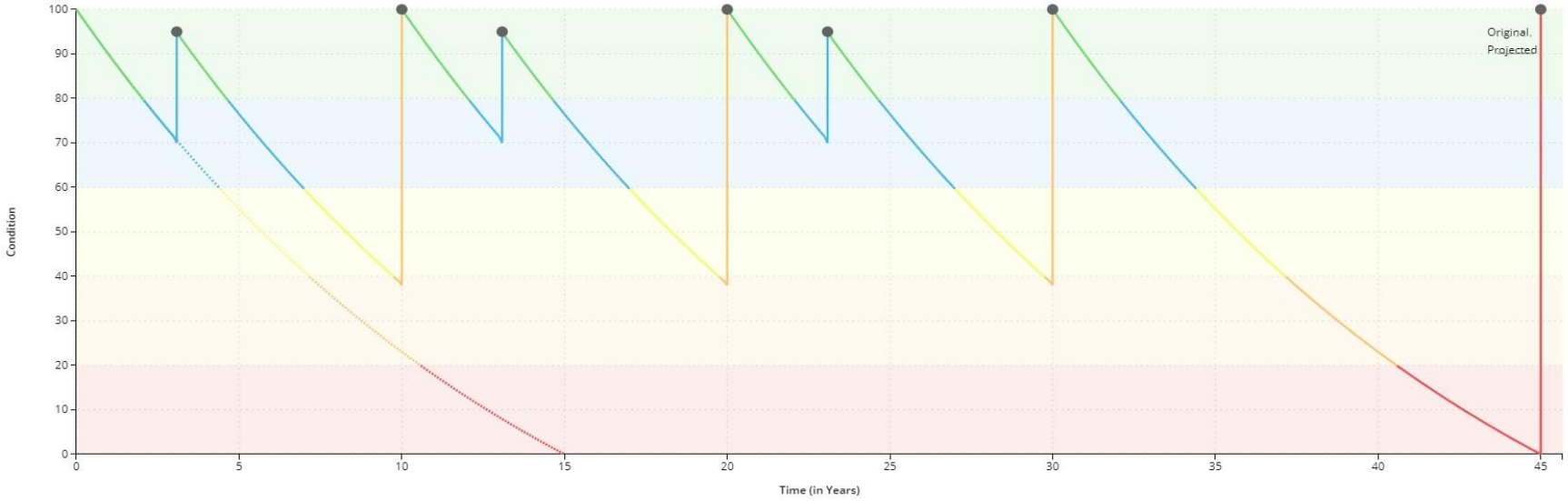
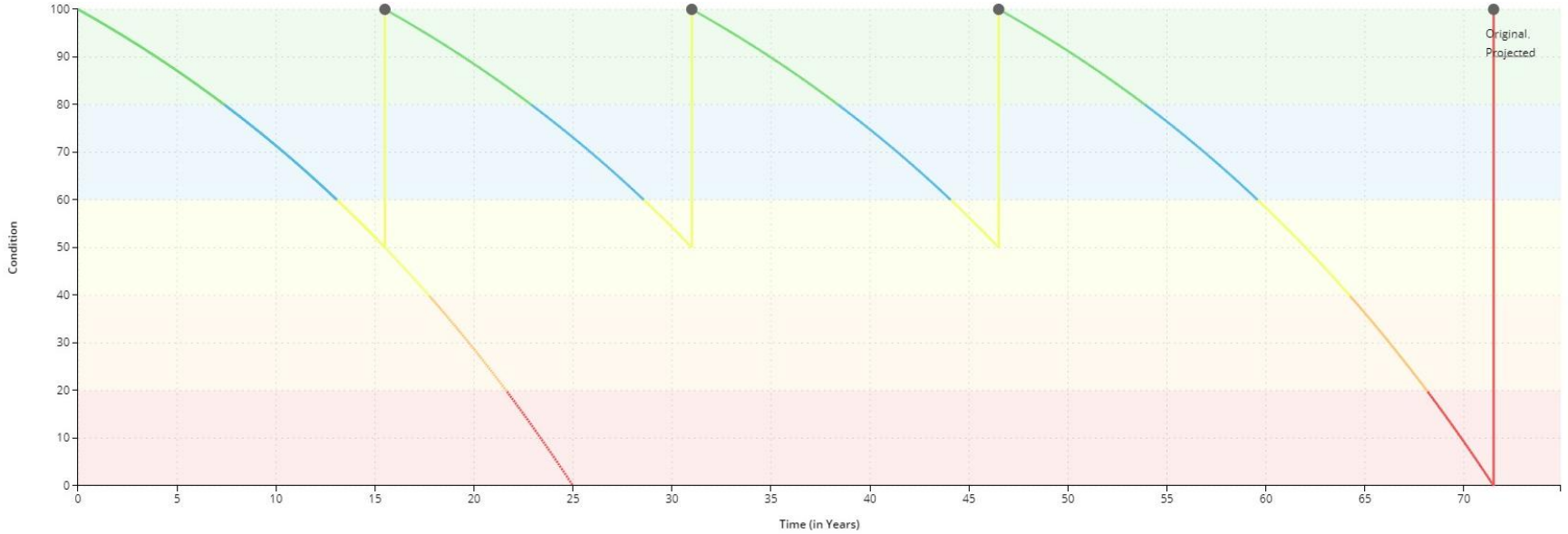


Figure 14: Asphalt Roads (HCB) Road Lifecycle Model



Forecasted Capital Requirements

Figure 15 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's road network. Based on the lifecycle strategies identified previously for HCB and LCB roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the road network. This analysis was run until 2083 to capture at least one iteration of replacement for the longest-lived asset in the asset register.

Black River-Matheson's average annual requirements (red dotted line) total $4.2 million for all assets in the road network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise. The chart illustrates capital needs through the forecast period in 5-year intervals.

The projections 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. They are based on asset replacement costs, age analysis, and condition data when available, as well as lifecycle modeling (roads only identified above).

Figure 15: Road Network Forecasted Capital Replacement Requirements

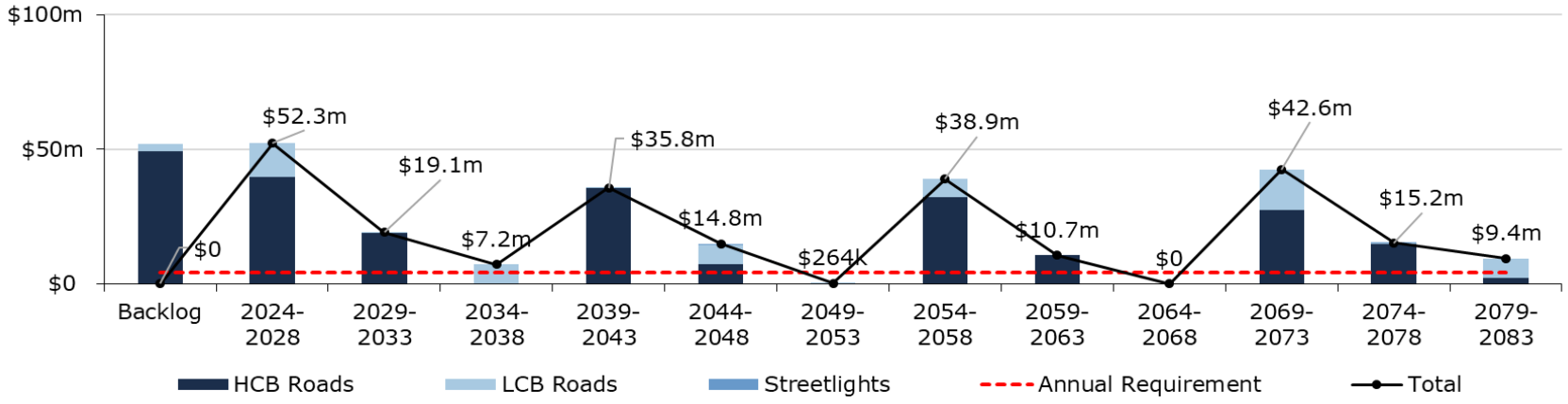


Table 10 below summarizes the projected cost of lifecycle activities (rehabilitation and replacement) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

These projections can be different from actual capital forecasts. Consistent data updates, especially condition, will improve the alignment between the system-generated expenditure requirements, and the Township's capital expenditure forecasts.

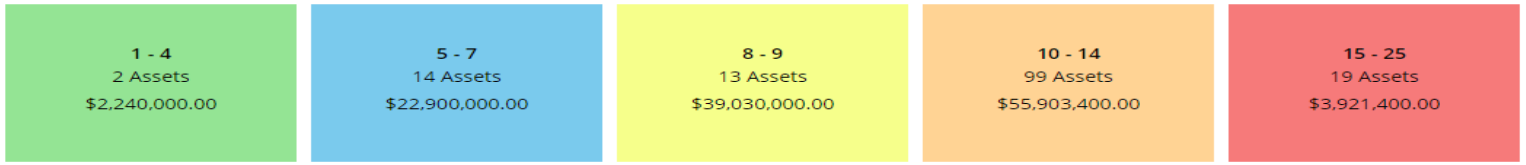
Table 10 Road Network System-generated 10-Year Capital Costs

Segment	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
HCB Roads	$58.5m	$10.8m	$10.1m	$0	$10.4m	$8.3m	$0	$18.2m	$679k	$0	$0
LCB Roads	$13.0m	$7.1m	$5.1m	$0	$534k	$14k	$264k	$0	$0	$0	$0
Streetlights	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$71.5m**	**$17.9m**	**$15.2m**	**$0**	**$10.9m**	**$8.3m**	**$264k**	**$18.2m**	**$679k**	**$0**	**$0**

Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix J: Risk Rating Criteria**Error! Reference source not found.** for the criteria used to determine the risk rating of each asset.

Figure 16: Road Network Risk Matrix



This is a high-level model developed by municipal staff and it should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the road network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
	Average Daily Traffic Counts (Operational)

Road Classification (Operational)

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

Levels of Service

The following tables identify the Township's metrics to identify their current level of service for the roads. By comparing the cost, performance (average condition) and risk year-over-year, Black River-Matheson will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025. The tables that follow summarize Black River-Matheson's current levels of service.

Community Levels of Service

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

Table 11 Road Network Community Levels of Service

Values	Qualitative Description	Current LOS
Cost Efficient	Description, which may include maps, of the road network in the Township and its level of connectivity	See Figure 17
Sustainable	Description or images that illustrate the different levels of road class pavement condition	See Figure 2 for the description of road condition

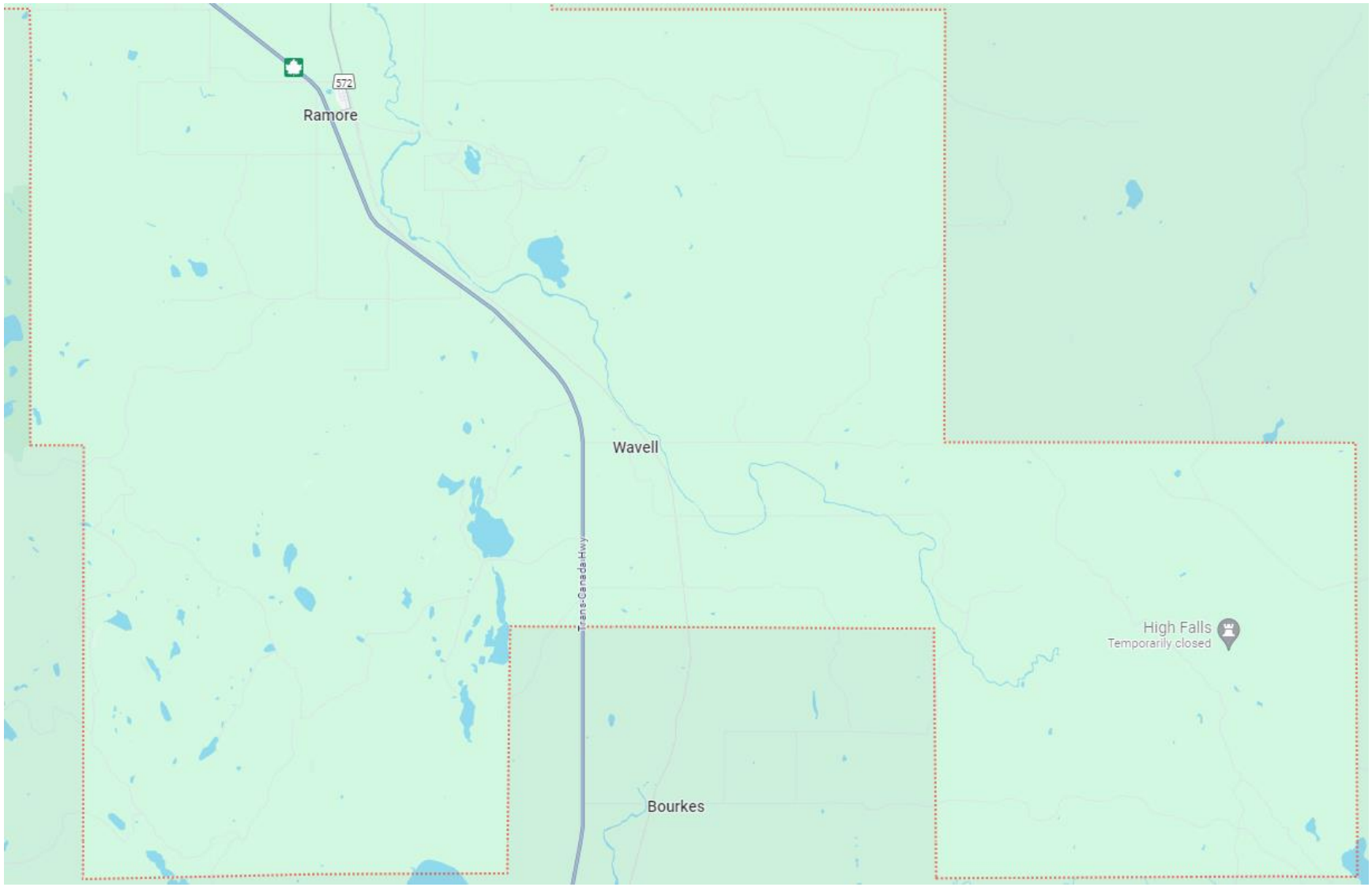
Technical Levels of Service

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

Table 12 Road Network Technical Levels of Service

Values	Technical Metric	Curent LOS
Sustainable	Lane-km of arterial roads (MMS classes 1 and 2) per land area in the municipality (km/km^2)	18.46 lane km/km^2
	Lane-km of collector roads (MMS classes 3 and 4) per land area in the municipality (km/km^2)	54.01 lane km/km^2
	Lane-km of local roads (MMS classes 5 and 6) per land area in the municipality (km/km^2)	275.9 lane km/km^2
	Average pavement condition index for paved roads in the municipality	11.9
	Average surface condition for unpaved roads in the municipality	Very Poor
Cost Efficient	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.2% - 1.5%
Safe	Average Risk Rating	High (10.2)

Figure 17: Map of Roads


572
Ramore
Wavell
Trans-Canada Hwy
High Falls
Temporarily closed
Bourkes

Appendix B: Bridges & Culverts

State of the Infrastructure

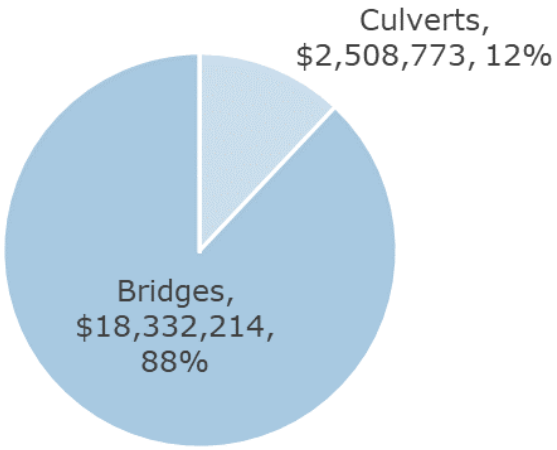
Bridges and culverts (B&C) represent a critical portion of the transportation services provided to the community. The state of the infrastructure for bridges and culverts is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$20,840,987	Fair (46.61%)	Annual Requirement:	$328,055
		Funding Available:	$0
		Annual Deficit:	$328,055

Inventory & Valuation

Figure 18 below displays the replacement cost of each asset segment in the Township's bridges and culverts inventory.

Figure 18 Bridges & Culverts Replacement Cost

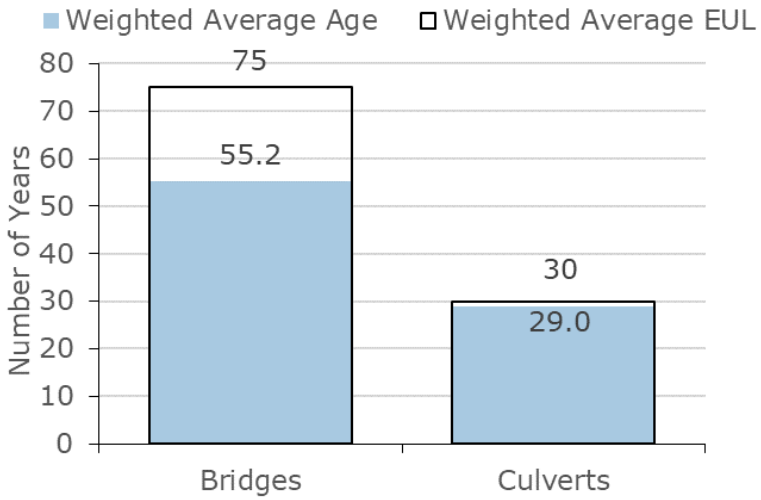


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed. This can be included in the Ontario Structures Inspection Manual (OSIM) inspections as the replacement cost is part of the calculation for the bridge condition index (BCI).

Asset Condition & Age

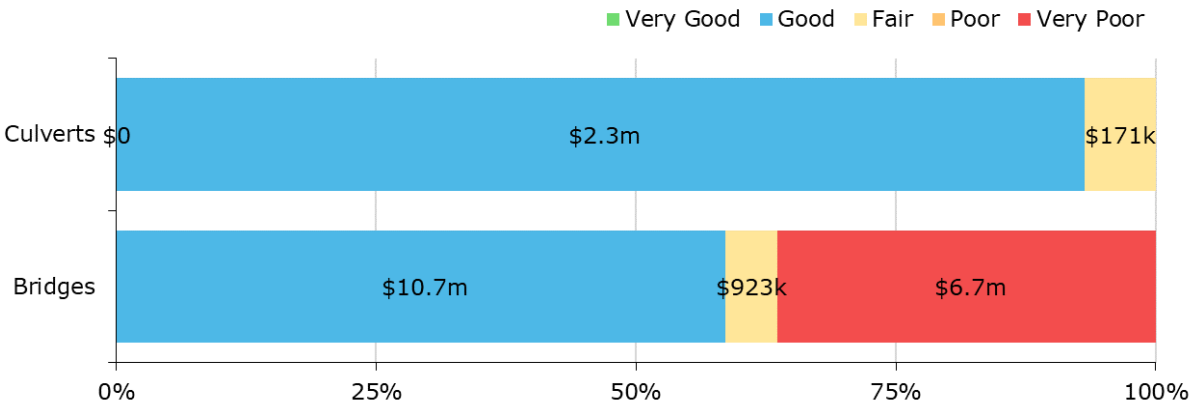
The graph below identifies the average age and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

Figure 19: B&C Average Age vs Average EUL



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

Figure 20: B&C Condition Breakdown



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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Black River-Matheson's current approach is to assess the 20 bridges and culverts every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM). The most recent assessment was completed in 2023 by McIntosh Perry Consulting Engineers.

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

Figure 21: B&C Condition Images

Lava Mountain Road Bridge (BCI=74.4 Good)

Cardinal Road West Culvert (BCI=71.1 Good)

Pine Road Bridge (BCI=59.8 Fair)

Burton Road South Culvert (BCI=49.2 Fair)

Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. Figure 22 outlines Black River-Matheson's current lifecycle management strategy.

Figure 22: B&C Current Lifecycle Strategy

Maintenance

- All maintenance and repair activities are driven by the results of inspections competed according to the Ontario Structure Inspection Manual (OSIM)

Rehabilitation / Renewal / Replacement

- Replacement occurs upon OSIM inspection recommendation and is subject to the availability of funding

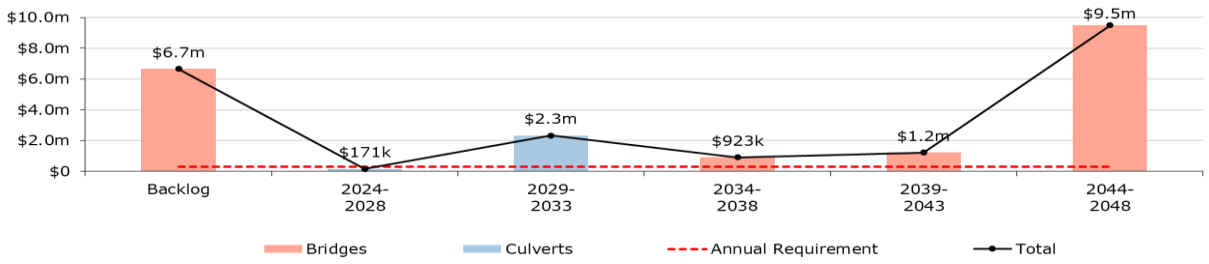
Forecasted Capital Requirements

Figure 23 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's bridges and culverts. These projections are based on asset replacement costs, age analysis, and condition data. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

The analysis was run until 2048 to capture at least one iteration of replacement for the longest-lived asset in the asset register. Black River-Matheson's average annual requirements (red dotted line) for bridges and culverts total $328 thousand. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

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

Figure 23: B&C Forecasted Capital Replacement Requirements



These are represented at the major asset level.

Table 13 below summarizes the projected cost of lifecycle activities (as previously described) that may need to be undertaken over the next 10 years to support current levels of service. These are represented at the major asset level.

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

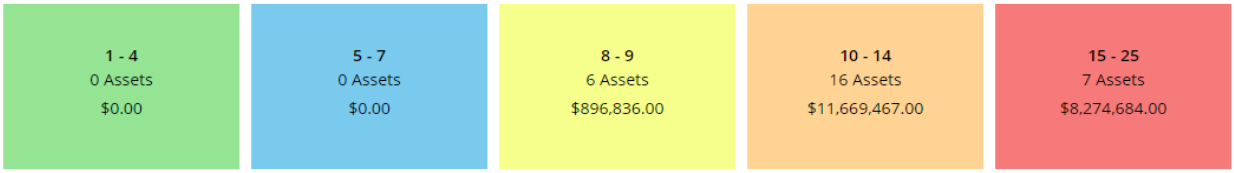
Segment	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Bridges	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Culverts	$2.5m	$0	$0	$0	$171k	$0	$0	$0	$0	$1.1m	$1.2m
Total	**$2.5m**	**$0**	**$0**	**$0**	**$171k**	**$0**	**$0**	**$0**	**$0**	**$1.1m**	**$1.2m**

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

Risk & Criticality

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

Figure 24: B&C Risk Matrix



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

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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)

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

Levels of Service

The following tables identify the Township's metrics to identify their current level of service for the bridges and culverts. By comparing the cost, performance (average condition) and risk year-over-year Black River-Matheson will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025.

Community Levels of Service

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

Table 14 Community Levels of Service

Values	Qualitative Description	Current LOS
Safe	Description of the traffic that is supported by municipal bridges (e.g. heavy transport, motor, emergency vehicles, pedestrians, cyclists)	The traffic supported by the municipal bridges is varied. Large agricultural equipment, heavy transport vehicles, motor and emergency vehicles, cyclists, pedestrians all utilize the bridges throughout the Township.
Sustainable	Description or images of the condition of bridges and culverts and how this would affect use of the bridges and culverts	See Figure 21: B&C Condition Images Lava Mountain Road Bridge (BCI=74.4 Good)

Technical Levels of Service

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

Table 15 B&C Technical Levels of Service

Values	Technical Metric	Current LOS
Cost Efficient	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0% - 1.6%
Sustainable	Average bridge condition index value for bridges in the municipality	45
	Average bridge condition index value for structural culverts in the municipality	69
Safe	% of bridges in the municipality with loading or dimensional restrictions	0%
	Average Risk Rating	Very High (15.11)

Appendix C: Water Network

State of the Infrastructure

The Township owns water distribution infrastructure in four separate communities of Matheson, Holtyre, Ramore, and Val Gagne.

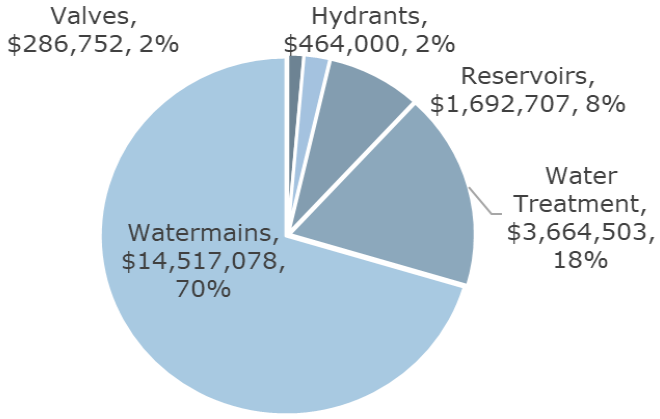
The state of the infrastructure for the water network is summarized in the following table:

Replacement Cost	Condition	Financial Capacity	
$20,625,040	Poor (23.9%)	Annual Requirement:	$302,550
		Funding Available:	$197,720
		Annual Deficit:	$104,830

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Black River-Matheson's water network inventory.

Figure 25: Water Network Replacement Cost

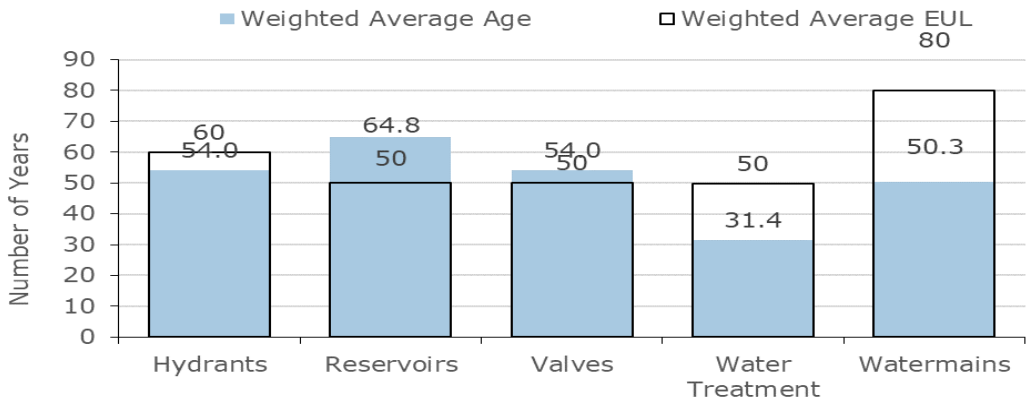


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

Asset Condition & Age

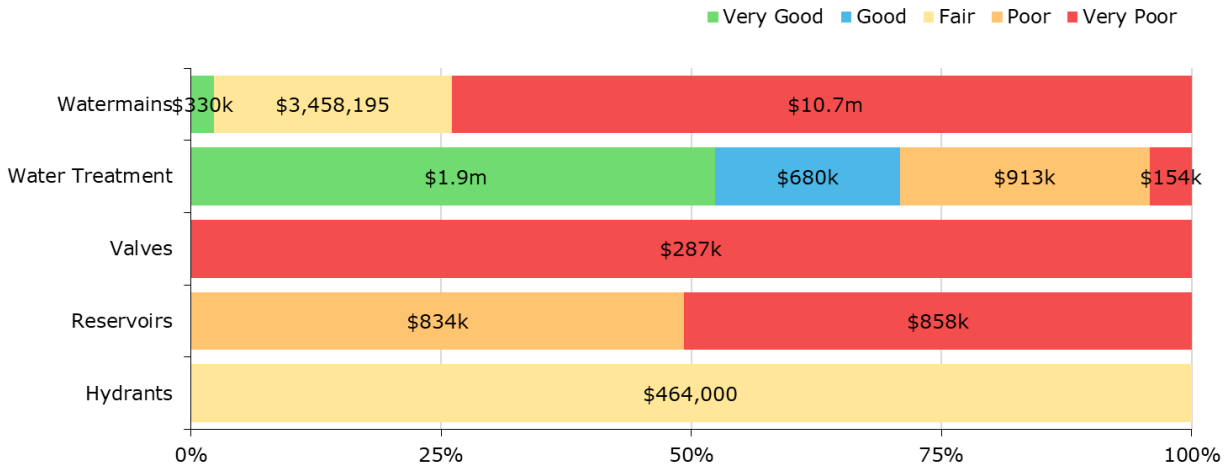
The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Figure 26: Water Network Average Age vs Average EUL



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

Figure 27: Water Network Condition Breakdown



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

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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. At present, the Township is in the process of exploring options for implementing a comprehensive asset condition assessment strategy.

Lifecycle Management Strategy

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

Figure 28: Water Network Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Main flushing and valve exercising is completed on the water network on an as-needed basis
- Replacement activities are identified based on an analysis of breakdown rates as well as any issues identified during regular maintenance activities

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that Black River-Matheson should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 70 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $303 thousand.

Figure 29: Water Network Forecasted Capital Replacement Requirements

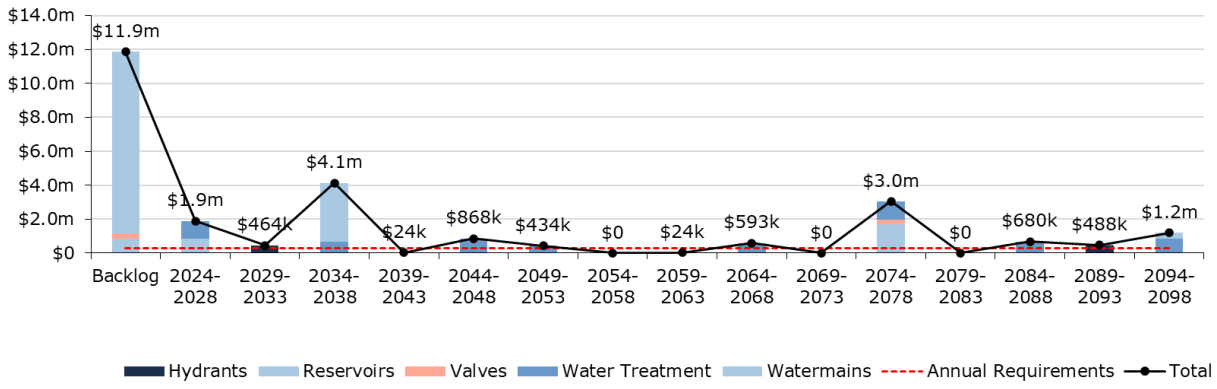


Table 16 Water Network System-Generated 10-Year Capital Costs below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Table 16 Water Network System-Generated 10-Year Capital Costs

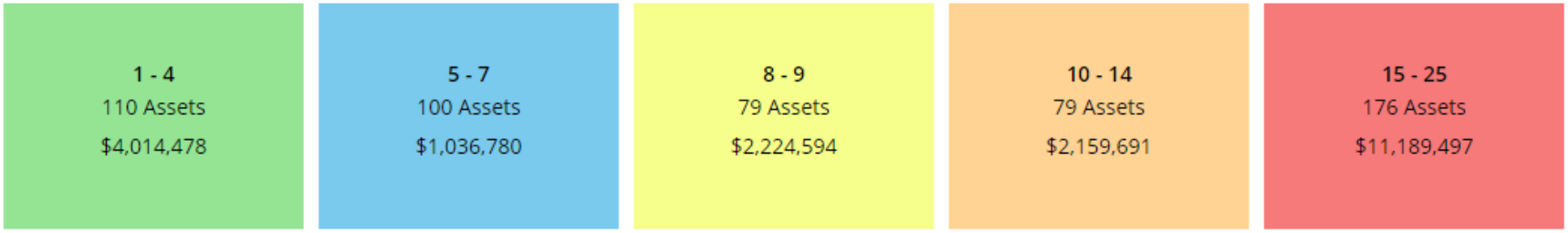
Segment	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Hydrants	$464k	$0	$0	$0	$0	$0	$0	$464k	$0	$0	$0
Reservoirs	$834k	$0	$0	$0	$0	$834k	$0	$0	$0	$0	$0
Valves	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment	$1.1m	$154k	$0	$269k	$0	$644k	$0	$0	$0	$0	$0
Watermains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$2.4m**	**$154k**	$0	**$269k**	$0	**$1.5m**	$0	**$464k**	$0	$0	$0

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

Risk & Criticality

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

Figure 30: Water Network Risk Matrix



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

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

Levels of Service

By comparing the cost, performance (average condition) and risk year-over-year, the Township will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025.

Community Levels of Service

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

Table 17 Water Network Technical Levels of Service

Values	Qualitative Description	Current LOS
Sustainable	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	The Black River-Matheson water system serves four separate communities: • Holtyre - This system is comprised of 2 wells and one treatment plant. The water plant serves approximately 255 residents of Holtyre. • Matheson – This system is comprised of 4 wells, 1 treatment plant and 1 reservoir. The water treatment system is located on the northwest shore of Lake Belleck, two kilometers east of the Town of Matheson. • Raemore – the Raemore system has 3 wells and 1 treatment plant. The water treatment plant is located in the Town of Raemore. • Val Gagne – 3 wells and 1 treatment plant. The Val Gagne water treatment plant is located in the community of Val Gagne and provides drinking water to approximately 175 residents. All of the systems are served by a network of water mains, hydrants, curb stops and other appurtenances
Safe	Description of boil water advisories and service interruptions	Boil water advisories are issued to inform consumers that they need to boil their water to protect their health. Water interruption means any anticipated and unanticipated interruptions in the supply of potable water.

Technical Levels of Service

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

Table 18 Water Network Technical Levels of Service

Values	Technical Metric	Current LOS
Cost Efficient	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	1% - 1.5%
	% of properties connected to the municipal water system	64%
Sustainable	Average Condition Rating	Poor (23.9)
	% of properties where fire flow is available	100%
Safe	# of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system	UNK
	# 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	UNK
	Average Risk Rating	High (12.06)

Note: The Township is currently in a complete staff turnover and are working on determining the technical levels of service numbers.

Appendix D: Sanitary Network

State of the Infrastructure

The Township owns Sanitary Network infrastructure for collection, conveyance, treatment, and disposal.

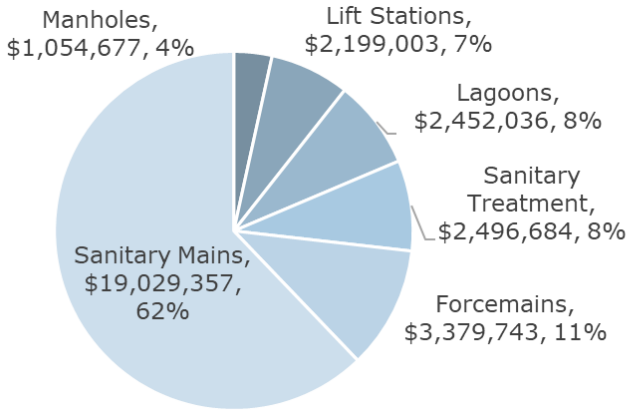
The state of the infrastructure for the sanitary network is summarized in the following table:

Replacement Cost	Condition	Financial Capacity	
$30,611,500	Fair (48.3%)	Annual Requirement:	$444,162
		Funding Available:	$107,750
		Annual Deficit:	$336,412

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Black River-Matheson's sanitary network inventory. As the Township has not had a complete componentization of their buildings their inventory tracks buildings as a main asset with some small as replaced componentization.

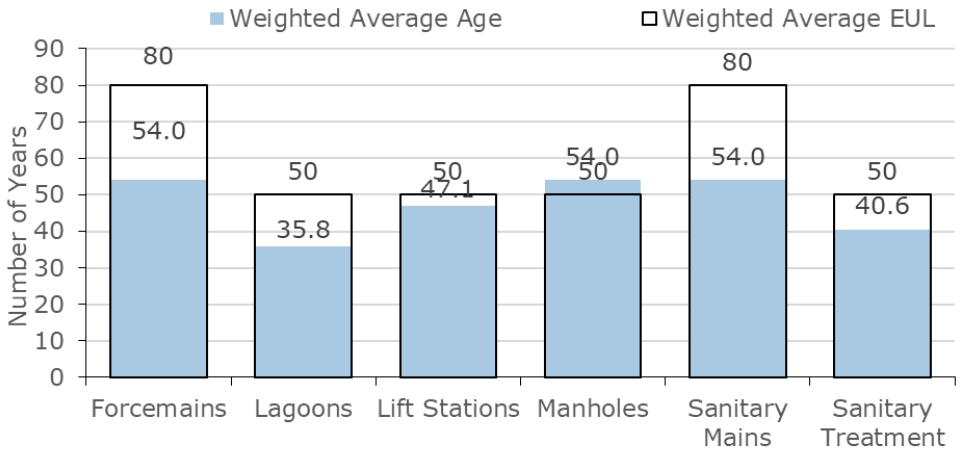
Figure 31: Sanitary Network Replacement Cost



Asset Condition & Age

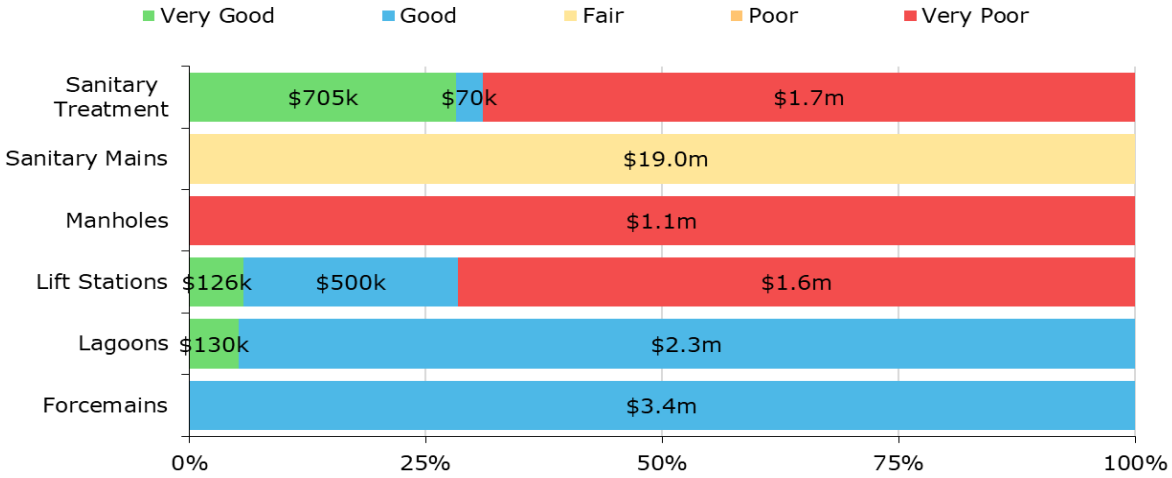
The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Figure 32: Sanitary Network Average Age vs Average EUL



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

Figure 33: Sanitary Network Condition Breakdown



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

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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. At present, the Township is in the process of exploring options for implementing a comprehensive asset condition assessment strategy.

Lifecycle Management Strategy

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

Figure 34: Sanitary Network Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Repairs to sanitary mains and manholes are completed on an as-needed basis
- Replacement activities are identified based on an analysis of breakdown rates as well as any issues identified during regular maintenance activities

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that Black River-Matheson should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 45 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $444 thousand.

Figure 35: Sanitary Network Forecasted Capital Replacement Requirements

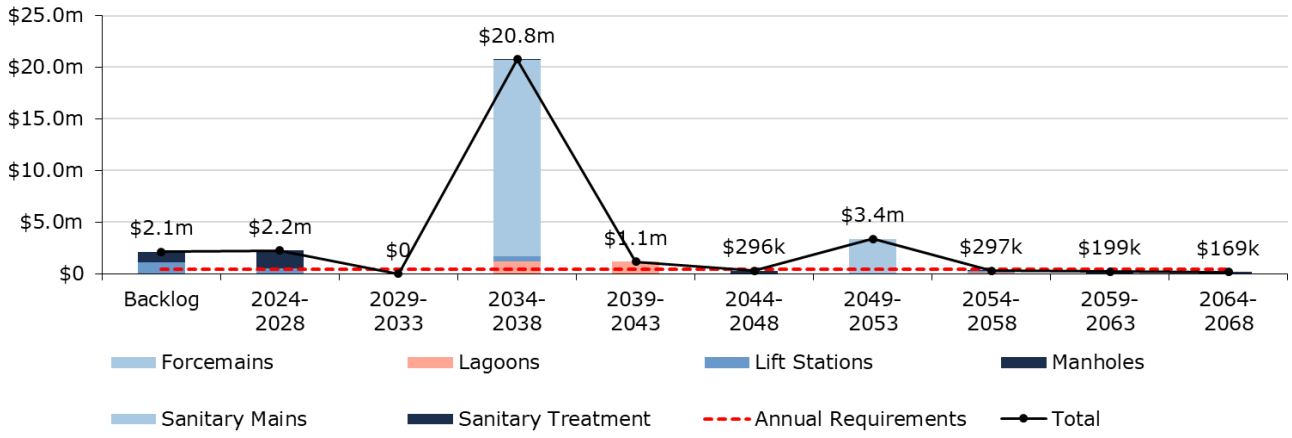


Table 19 Sanitary Network System-Generated 10-Year Capital Costs below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Table 19 Sanitary Network System-Generated 10-Year Capital Costs

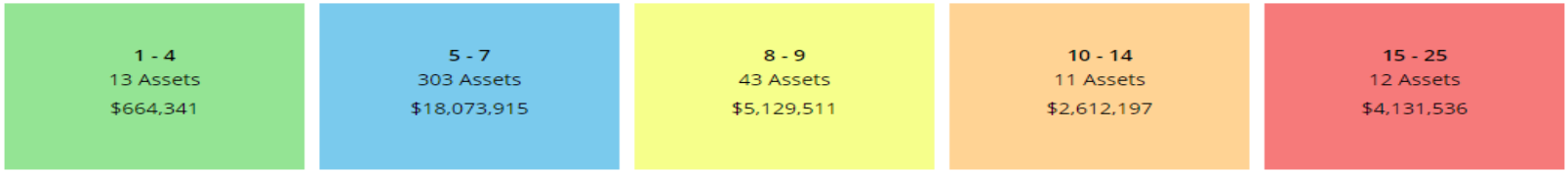
Segment	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Hydrants	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Reservoirs	$509k	$509k	$0	$0	$0	$0	$0	$0	$0	$0	$0
Valves	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment	$1.7m	$1.7m	$0	$0	$0	$0	$0	$0	$0	$0	$0
Watermains	$2.2m	$2.2m	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$4.5m**	**$4.5m**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

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

Risk & Criticality

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

Figure 36: Sanitary Network Risk Matrix



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

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

Levels of Service

By comparing the cost, performance (average condition) and risk year-over-year, the Township will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025.

Community Levels of Service

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

Table 20 Sanitary Network Technical Levels of Service

Values	Qualitative Description	Current LOS
Sustainable	Description, which may include maps, areas of the municipality that are connected to the municipal wastewater system	Matheson Sewage Treatment Plant with 16.8 km of main and 145 manholes and 3 km of forcemains
Safe	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid stormwater infiltration	The design and construction of sanitary and storm sewers is in accordance with the latest design standards issued by the MECP to eliminate or minimize inflow and infiltration within the sanitary sewer system.

Technical Levels of Service

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

Table 21 Sanitary Network Technical Levels of Service

Values	Technical Metric	Current LOS
Cost Efficient	% of properties connected to the municipal wastewater systems	64%
	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.4% - 1.5%
Sustainable	Average Condition Rating	Fair (48.3)
	# 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	No combined sewer
Safe	# of connection-days per year with sanitary main backups compared to the total number of properties connected to the municipal wastewater system	TBD
	# of connection-days per year with sanitary service backups compared to the total number of properties connected to the municipal wastewater system	TBD
	Average Risk Rating	Moderate (9.7)
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	TBD

Note: The Township is currently in a complete staff turnover and are working on determining the technical levels of service numbers.

Appendix E: Buildings

State of the Infrastructure

Black River-Matheson owns and maintains several facilities that provide key services to the community. These include:

- administrative offices
- cemeteries
- fire stations
- public works garages and storage sheds
- recreation facilities

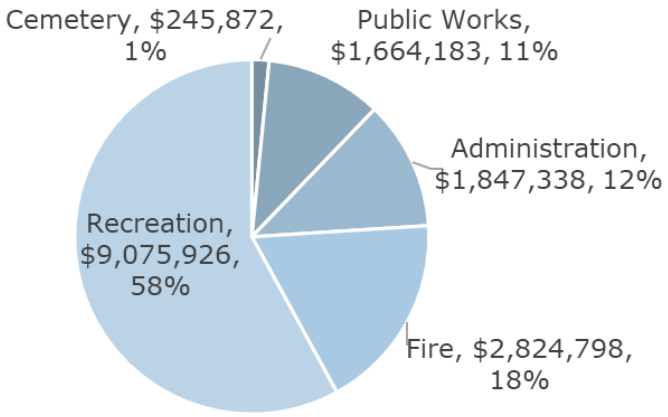
The state of the infrastructure for the buildings and facilities is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$15,658,117	Poor (31%)	Annual Requirement:	$314,967
		Funding Available:	$0
		Annual Deficit:	$314,967

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Black River-Matheson's buildings inventory. As the Township has not had a complete componentization of their buildings their inventory tracks buildings as a main asset with some small as replaced componentization.

Figure 37: Buildings Replacement Cost

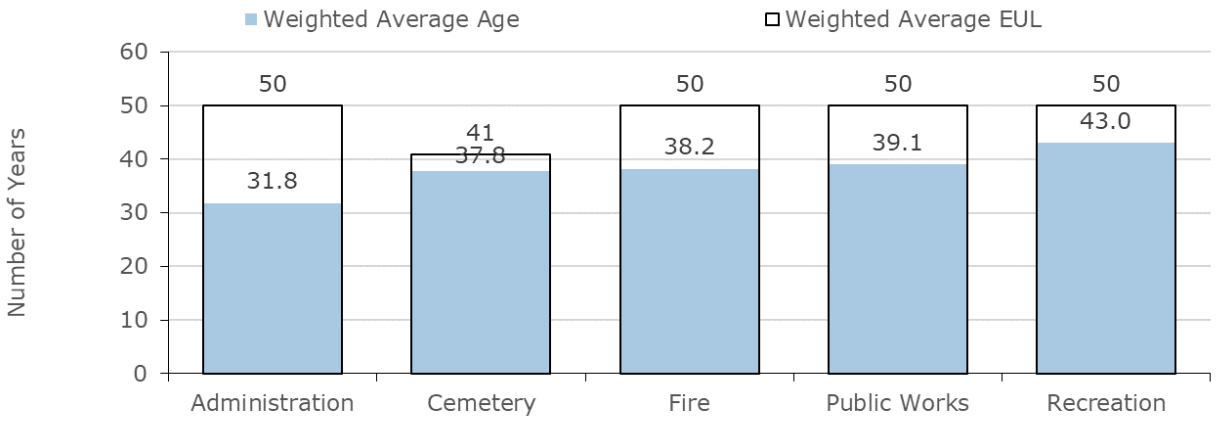


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

Asset Condition & Age

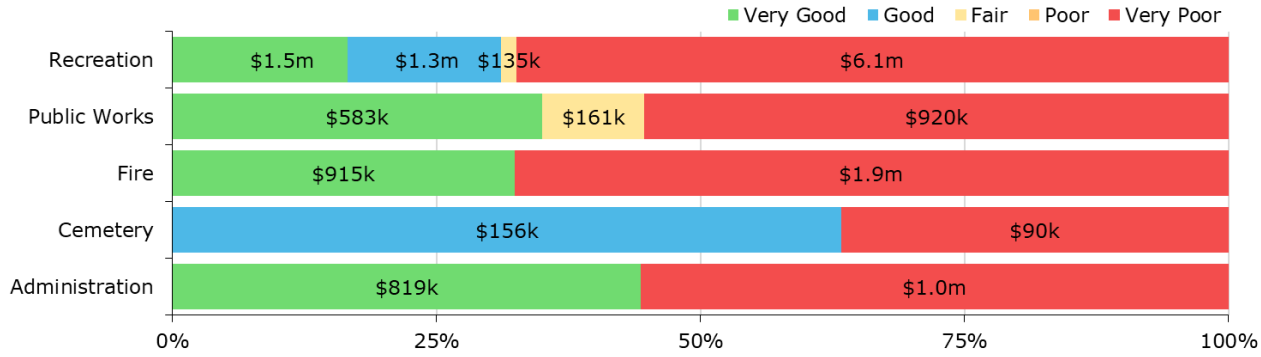
The graph below identifies the average age, and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

Figure 38: Buildings Average Age vs Average EUL



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

Figure 39: Buildings Condition Breakdown



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

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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Buildings are repaired as required based on deficiencies identified by outside experts, staff, or residents.

Lifecycle Management Strategy

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

Figure 40: Buildings Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement
•Staff identify building maintenance needs in reaction to breakdowns

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that Black River-Matheson should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 50 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $315 thousand.

Figure 41: Buildings Forecasted Capital Replacement Requirements

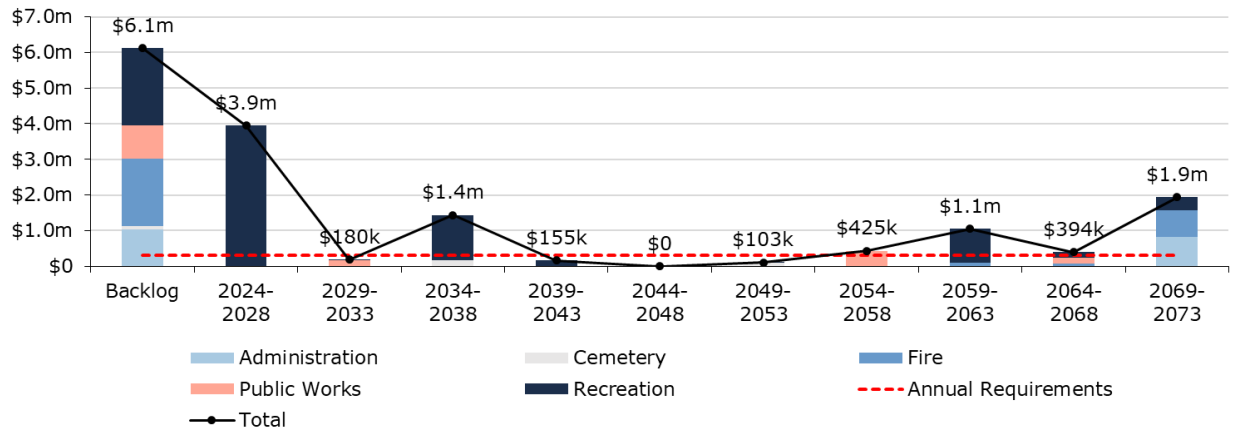


Table 22 below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Table 22 Buildings System-Generated 10-Year Capital Costs

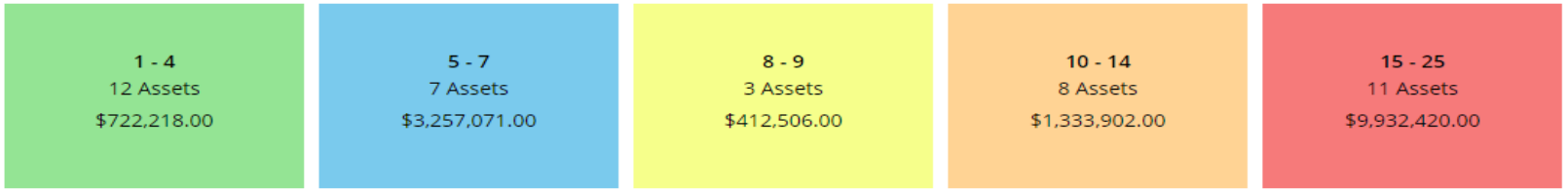
Segment	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Administration	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cemetery	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Fire	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Public Works	$161k	$0	$0	$0	$0	$0	$0	$161k	$0	$0	$0
Recreation	$4.0m	$0	$3.9m	$0	$0	$0	$0	$19k	$0	$0	$0
Total	**$4.1m**	$0	**$3.9m**	$0	$0	$0	$0	**$180k**	$0	$0	$0

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

Risk & Criticality

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

Figure 42: Buildings Risk Matrix



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

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

Levels of Service

By comparing the cost, performance (average condition) and risk year-over-year, the Township will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025.

Community Levels of Service

The qualitative descriptions that determine the community levels of service provided by municipal buildings are based on the types of facilities outlined below:

- administrative offices
- cemeteries
- public works garages and storage sheds
- fire stations
- recreation facilities

Technical Levels of Service

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

Table 23 Buildings Technical Levels of Service

Values	Technical Metric	Current LOS
Cost Efficient	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0% - 2.0%
Sustainable	Average Condition Rating	Fair (31)
Safe	Average Risk Rating	Very High (18.06)

Appendix F: Land Improvements

State of the Infrastructure

Black River-Matheson's land improvement infrastructure is made up of playground equipment, general improvements such as fencing as well as parking lots.

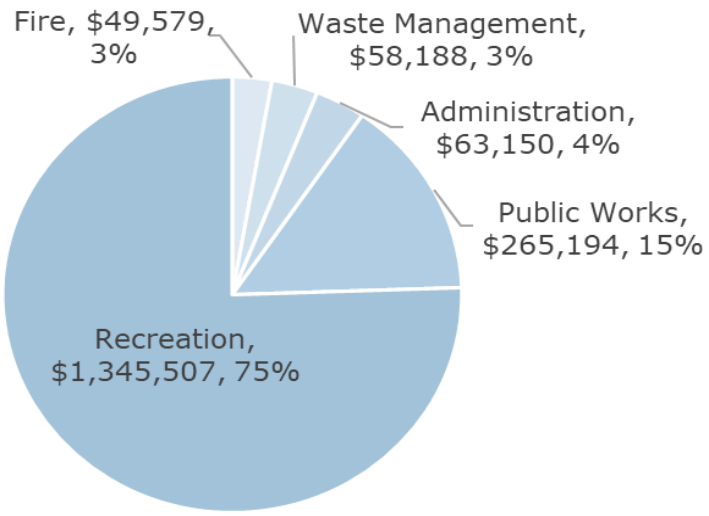
The state of the infrastructure for the land improvements is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$1,781,618	Fair (57.25%)	Annual Requirement:	$71,613
		Funding Available:	$0
		Annual Deficit:	$71,613

Asset Inventory & Valuation

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

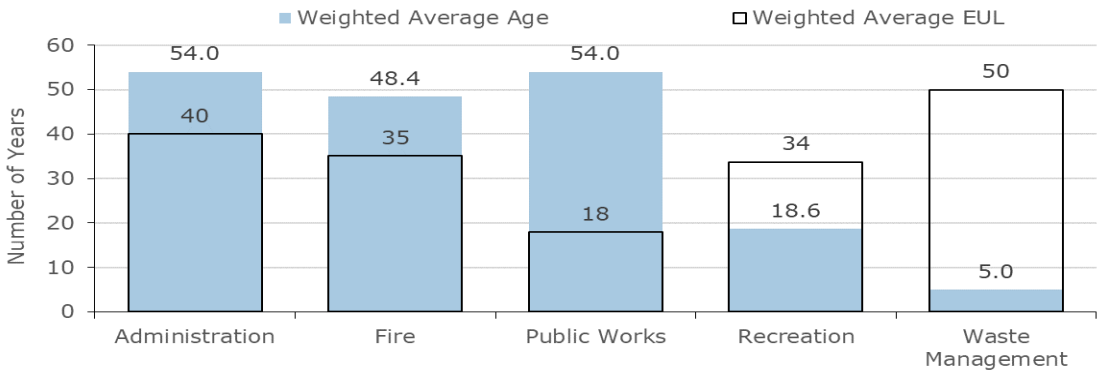
Figure 43: Land Improvements Replacement Cost



Asset Condition & Age

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

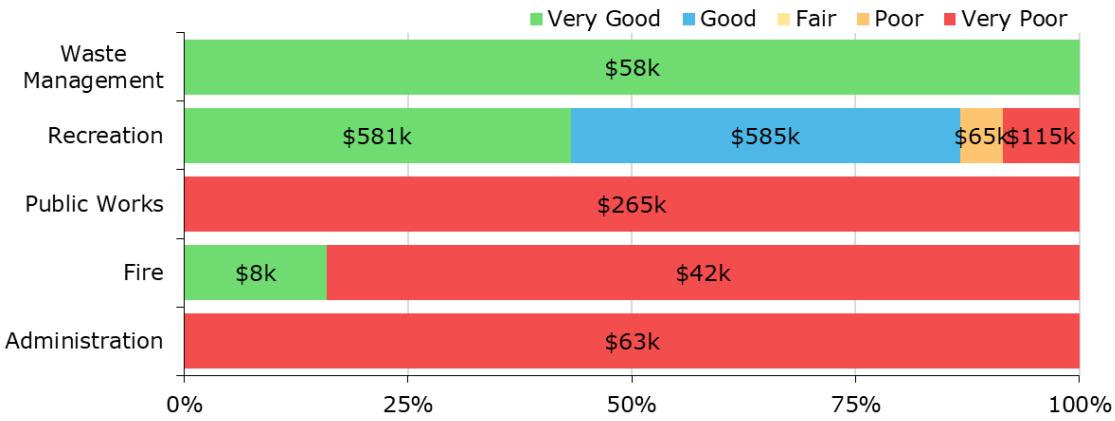
Figure 44: Land Improvements Average Age vs Average EUL



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

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

Figure 45: Land Improvement Condition Breakdown



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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Due to the varied nature of the asset category the assets are managed individually.

Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following figures outline Black River-Matheson's current lifecycle management strategy.

Figure 46: Land Improvements Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

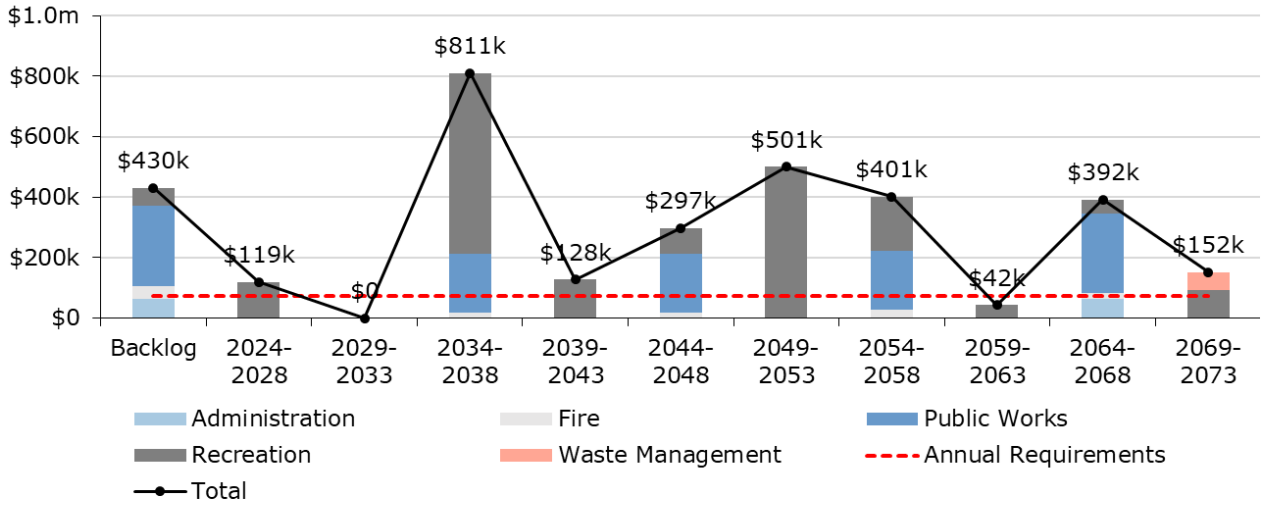
- Similar to condition, lifecycle management activities are dependent on equipment type and department

Forecasted Capital Requirements

Figure 47 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's land improvement infrastructure. This analysis was run until 2073 to capture at least one iteration of replacement for the longest-lived asset in the asset register. Black River-Matheson's average annual requirements (red dotted line) total $72 thousand for all land improvement assets. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

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

Figure 47: Land Improvements Forecasted Capital Replacement Requirements



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

Table 24 below summarizes the projected cost of lifecycle activities (capital replacement only) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register, which was limited to asset age, replacement cost, and useful life.

Table 24 Land Improvements System-Generated 10-Year Capital Costs

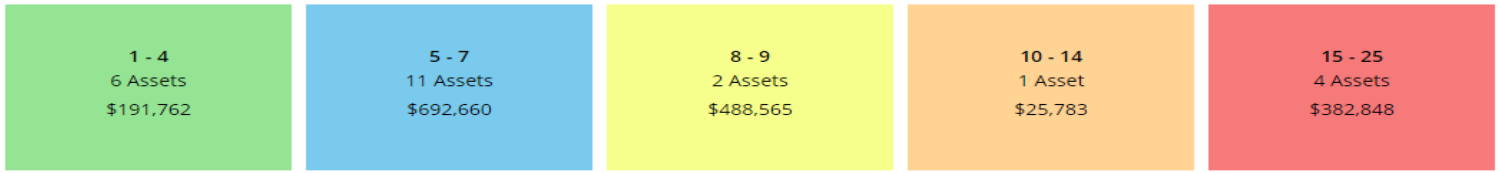
Segment	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Administration	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Fire	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Public Works	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Recreation	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Management	$119k	$55	$65k	$0	$0	$0	$0	$0	$0	$0	$0
Total	**119k**	**$55**	**$65k**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

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

Risk & Criticality

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

Figure 48: Land Improvement Risk Matrix



This is a high-level model developed by municipal staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. The identification of critical assets allows the Township to determine appropriate risk mitigation strategies and treatment options.

Levels of Service

The following tables identify Black River-Matheson's metrics to identify the current level of service for the land improvement assets. By comparing the cost, performance (average condition) and risk year-over-year the Township will be able to evaluate how their services/assets are trending. Black River-Matheson will use this data to set a target level of service and determine proposed levels for the regulation by 2025.

Community Levels of Service

The qualitative descriptions that determine the community levels of service provided by municipal land improvements are based on the types of facilities outlined below:

- Administration building parking lots
- Fire – Ramore, Matheson, Val Gagne, and Holtyre parking lots and fences
- Public works parking lots
- Recreation parks, playgrounds, parking lots and fencing

Technical Levels of Service

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

Table 25 Land Improvements Technical Levels of Service

Values	Technical Metric	Current LOS
Cost Efficient	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0% - 4.0%
Sustainable	Average Condition Rating	Fair (41.89)
Safe	Average Risk Rating	Moderate (8.36)

Appendix G: Machinery & Equipment

State of the Infrastructure

To maintain the quality stewardship of Black River-Matheson's infrastructure and support the delivery of services, municipal staff own and employ various types of equipment. This includes:

- Computers, furniture and phone systems to support all municipal services
- Roads equipment to support roadway maintenance
- Equipment for the fire department to effectively respond to emergencies
- Landfill equipment to support solid waste disposal management
- Lawn, arena and gym equipment for recreational services

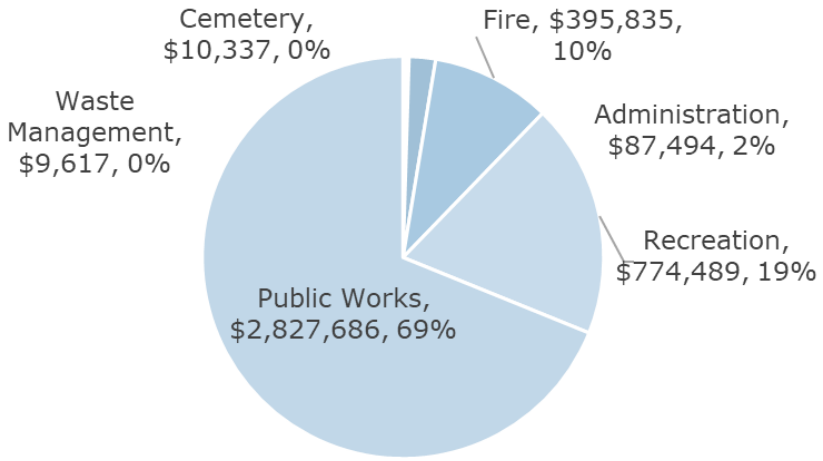
The state of the infrastructure for equipment is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
		Annual Requirement:	$273,296
$4,105,458	Poor (27.46%)	Funding Available:	$0
		Annual Deficit:	$273,296

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in the Black River-Matheson's equipment inventory.

Figure 49: Machinery & Equipment Replacement Costs

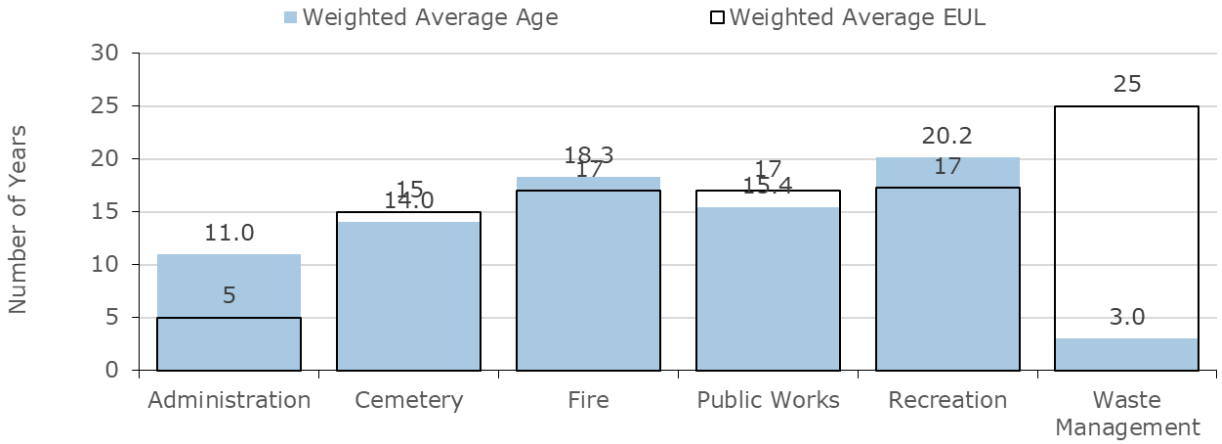


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent capital requirements.

Asset Condition & Age

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

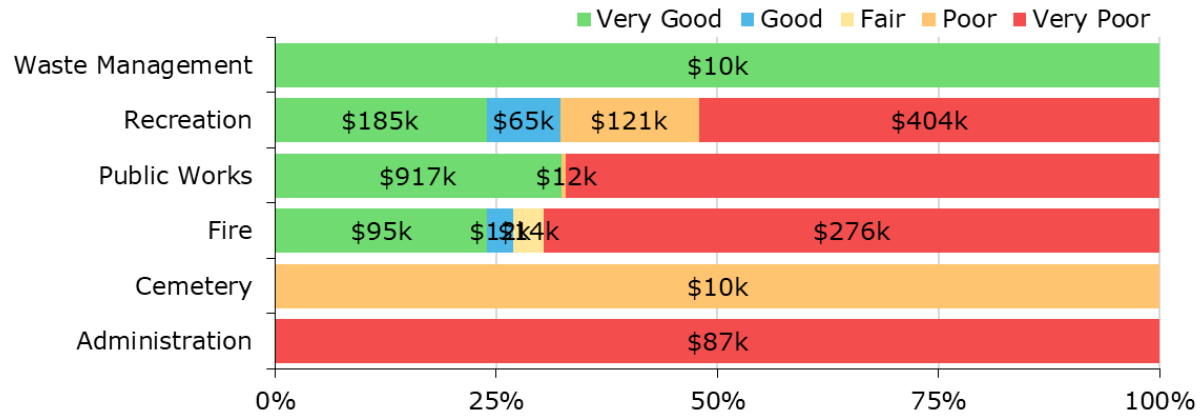
Figure 50: Machinery & Equipment Average Age vs Average EUL



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

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

Figure 51: Machinery & Equipment Condition Breakdown



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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The current approach is varied because of the broad range of types of equipment included in this category.

Lifecycle Management Strategy

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

Figure 52: Machinery & Equipment Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Lifecycle activities are tailored to the specific characteristics, needs and priorities of each equipment type and department.

Forecasted Capital Requirements

The following graph identifies capital requirements over the next 25 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $273 thousand.

Figure 53: Machinery & Equipment Forecasted Capital Replacement Requirements

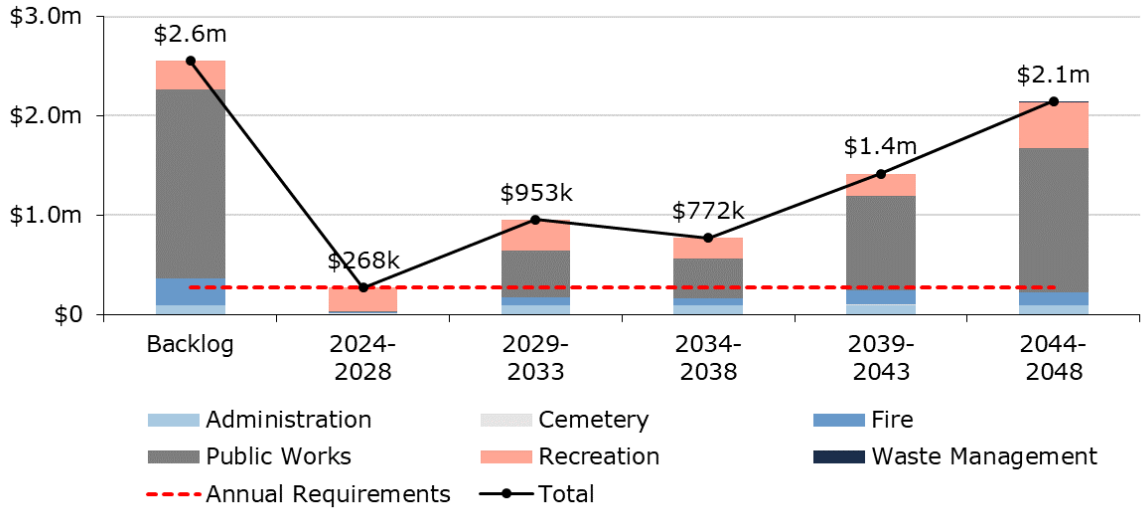


Table 26 below summarizes the projected cost of lifecycle activities (capital replacement only) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

Table 26 Machinery & Equipment System-Generated 10-Year Capital Costs

Segment	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Administration	$87k	$0	$0	$0	$0	$0	$87k	$0	$0	$10	$0
Cemetery	$10k	$0	$10k	$0	$0	$0	$0	$0	$0	$0	$0
Fire	$96k	$0	$0	$14k	$0	$0	$12k	$20k	$0	$23k	$27k
Public Works	$483k	$0	$12k	$0	$0	$0	$0	$0	$20k	$421k	$30k
Recreation	$543k	$112k	$121k	$0	$9k	$0	$0	$60k	$251k	$0	$0
Waste Management	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$1.2m**	**$112k**	**$143k**	**$14k**	**$0**	**$0**	**$99k**	**$80k**	**$271k**	**$445k**	**$58k**

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

Risk & Criticality

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

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

Figure 54: Machinery & Equipment Risk Breakdown

Levels of Service

By comparing the cost, performance (average condition) and risk year-over-year, Black River-Matheson will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025.

Community Levels of Service

The qualitative descriptions that determine the community levels of service provided by municipal machinery & equipment are based on the types of equipment outlined below:

- Administration equipment
- Fire equipment
- Public works equipment
- Recreation equipment
- Waste management equipment
- Cemetery equipment

Technical Levels of Service

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

Table 27 Machinery & Equipment Technical Levels of Service

Values	Technical Metric	Current LOS
Cost Efficient	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0% - 6.7%
Sustainable	Average Condition Rating	Fair (50.40)
Safe	Average Risk Rating	High (14.83)

Appendix H: Vehicles

State of the Infrastructure

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

- Roads vehicles for road maintenance and winter control activities
- Fire vehicles for emergency services
- Environmental services vehicles for equipment transportation
- Recreation services vehicles for equipment transportation

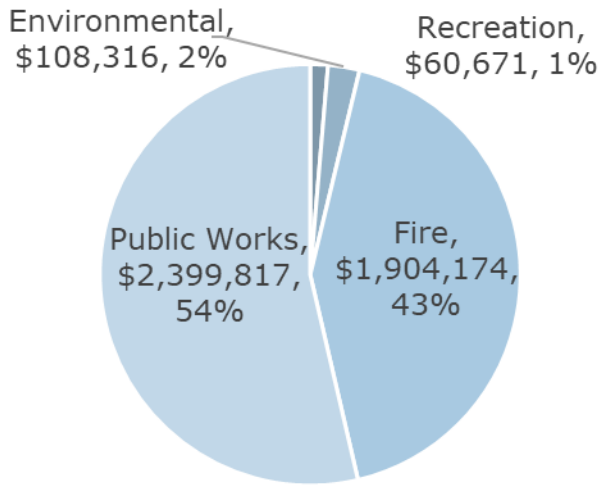
The state of the infrastructure for the vehicles is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$4,472,978	Poor (37.84%)	Annual Requirement:	$225,536
		Funding Available:	$0
		Annual Deficit:	$255,536

Inventory & Valuation

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

Figure 55: Vehicle Replacement Costs

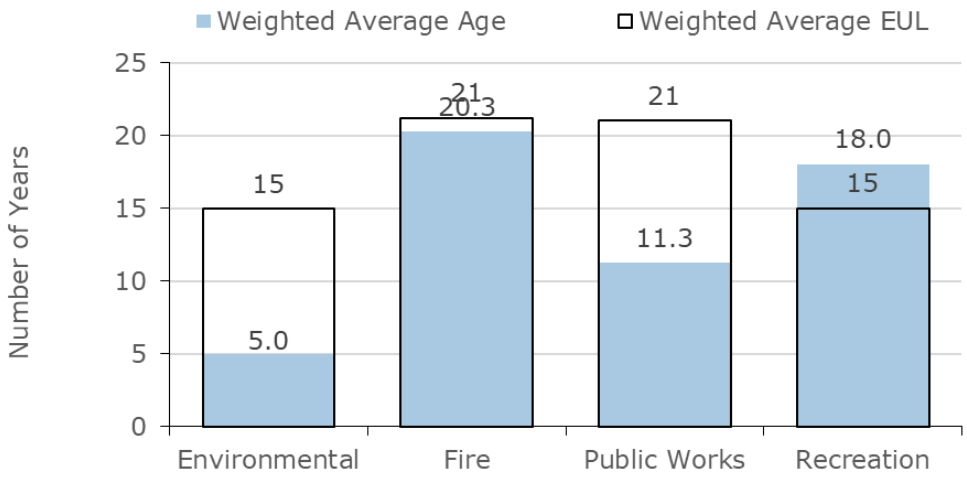


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

Asset Condition & Age

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

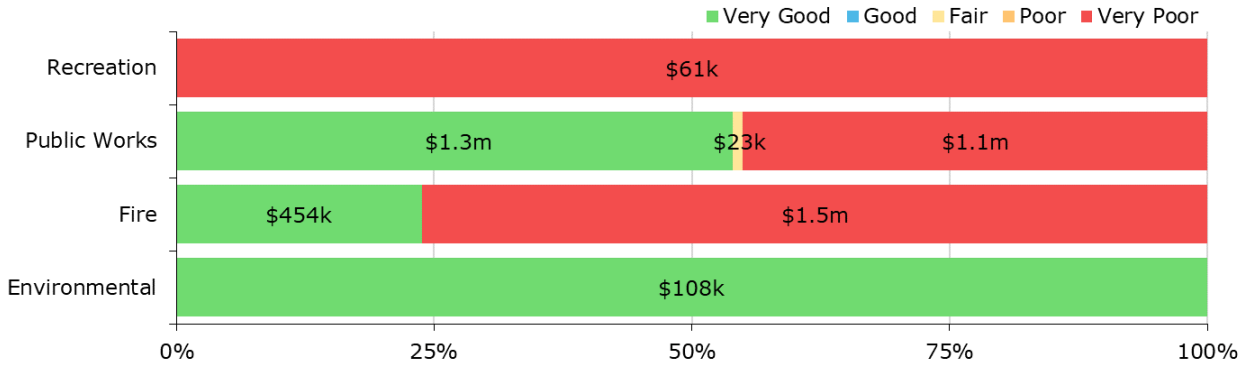
Figure 56: Vehicles Average Age vs Average EUL



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

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

Figure 57: Vehicles Condition Breakdown



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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. An example of the Township's current approach is staff complete regular visual inspections of vehicles to ensure they are in state of adequate repair prior to operation.

Lifecycle Management Strategy

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

Figure 58: Vehicles Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- operations and maintenance is completed by internal staff
- replacements are completed based on useful life estimates and OEM recommendations

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 25 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $226 thousand.

Figure 59: Vehicle Forecasted Capital Replacement Requirements

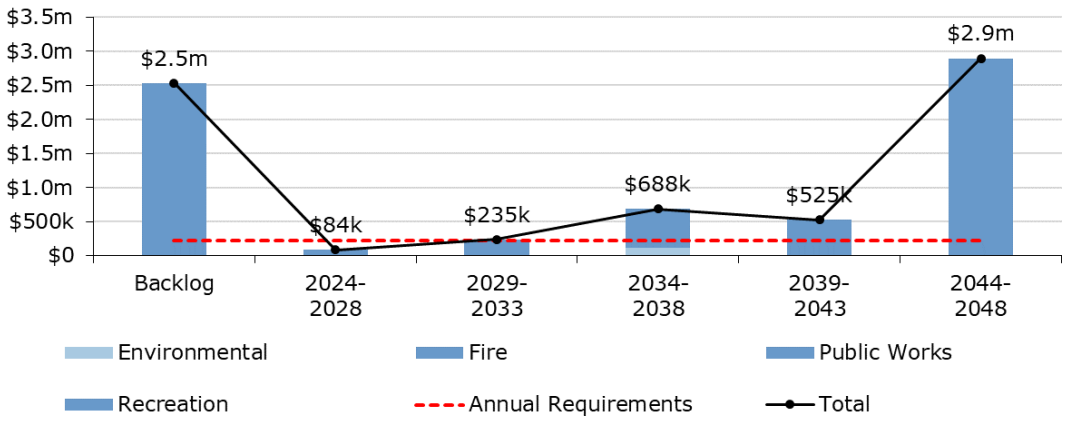


Table 28 below summarizes the projected cost of lifecycle activities (capital replacement only) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

Table 28 Vehicles System-Generated 10-Year Capital Costs

Segment	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Fire	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Environmental	$93k	$0	$0	$0	$0	$0	$0	$0	$42k	$51k	$0
Public Works	$211k	$46k	$0	$0	$23k	$0	$0	$0	$44k	$98k	$0
Recreation	$15k	$15k	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$319k**	**$61k**	**$0**	**$0**	**$23k**	**$0**	**$0**	**$0**	**$85k**	**$149k**	**$0**

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

Risk & Criticality

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

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

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

Figure 60: Vehicles Risk Matrix

Levels of Service

By comparing the cost, performance (average condition) and risk year-over-year, the Township will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025.

Community Levels of Service

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

- Roads vehicles for road maintenance and winter control activities
- Fire vehicles for emergency services
- Environmental services vehicles for equipment transportation
- Recreation services vehicles for equipment transportation

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

Table 29 Vehicles Technical Levels of Service

Values	Technical Metric	Current LOS
Cost Efficient	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0% - 5.0%
Sustainable	Average Condition Rating	Fair (62.26)
Safe	Average Risk Rating	Very High (15.58)

Appendix I: Condition Assessment Guidelines

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

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

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

Role of Asset Condition Data

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

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

Guidelines for Condition Assessment

Whether completed by external consultants or internal staff, condition assessments should be completed in a structured and repeatable fashion, according to consistent and objective assessment criteria. Without proper guidelines for the completion of condition assessments there can be little confidence in the validity of condition data and asset management strategies based on this data.

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating criteria, in a format that can be used for asset management decision-making. As a result, it is important that staff adequately define the condition rating criteria that

should be used and the assets that require a discrete condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project.

There are many options available to the Township to complete condition assessments. In some cases, external consultants may need to be engaged to complete detailed technical assessments of infrastructure. In other cases, internal staff may have sufficient expertise or training to complete condition assessments.

Developing a Condition Assessment Schedule

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

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

Appendix J: Risk Rating Criteria

Risk Definitions

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

Risk Frameworks

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/ Range**	**Score**
Performance (60%)	Condition	0-39	5 - Almost Certain
		40-49	4 - Likely
		50-69	3 - Possible
		70-89	2 - Unlikely
		90-100	1 - Rare
Operational (40%)	Service Life Remaining	<10%	5 - Almost Certain
		10 - <20%	4 - Likely
		20 - <30%	3 - Possible
		30 - <40%	2 - Unlikely
		=>40%	1 - Rare

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 100%	Replacement Cost ($)	>$500,000	5 - Severe
		$250,000 - $500,000	4 - Major
		$75,000 - $250,000	3 - Moderate
		$25,000 - $75,000	2 - Minor
		< $25,000	1 - Insignificant