2024

Township of Cramahe

Asset Management Plan

CRAMAHE
It's In Our Nature

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 Cramahe total $135 million. 51% of all assets analysed are in fair or better condition. The condition data for the majority of road, bridge, and sanitary sewer assets was available. Additionally, condition data was accessible for a portion of the machinery, equipment, and vehicle inventory. 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, Bridges & Culverts, and Sanitary Sewer Network) 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 $3.75 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $1.65 million towards capital projects or reserves per year. As a result, the Township is funding 44% of its annual capital requirements. This creates a total annual funding deficit of $2.1 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 1.1% annual increase in revenues over a 15-year phase-in period.

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 1.9% and 2.4% annual increase respectively in revenues over a 20-year phase-in period.

In addition to annual needs, there is also an infrastructure backlog of $11.7 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.

About this Document

The Cramahe Asset Management Plan was developed in accordance with Ontario Regulation 588/17 ("O. Reg 588/17"). It contains a comprehensive analysis of Cramahe'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.

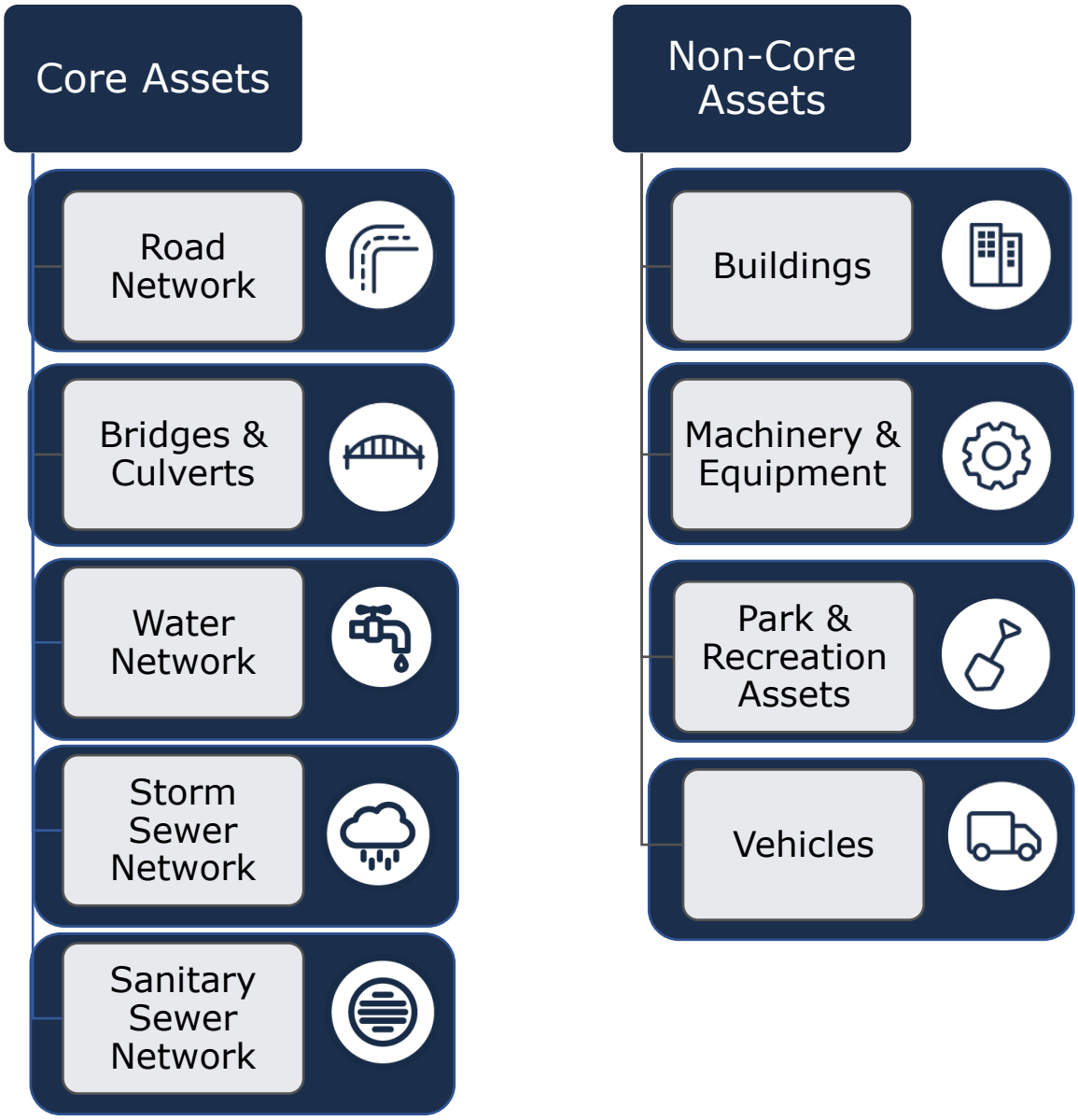
Table 1 Ontario Regulation 588/17 Requirements and Reporting Deadlines

Requirement	2019	2022	2024	2025
Asset Management Policy	●		●	
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, Council holds strategic planning exercises and discussions to identify major initiatives and administrative improvements it wishes to achieve during its tenure. Staff then identify the scope, resources, timing & other logistical matters associated with proposed initiatives.

Asset Management Policy

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

The Township adopted the Asset Management Policy in accordance with Ontario Regulation 588/17 on July 2nd, 2019.

The approval of this policy is important to integrate the Township's strategic mission, vision and goals with its asset management program, and ensuring the critical municipal infrastructure assets and vital services are maintained and provided to the community in a reliable, sustainable manner. The essential services include transportation networks, stormwater management, facilities and parks and other infrastructure.

Asset Management Strategy

An asset management strategy outlines the translation of organizational objectives into asset management objectives and provides a strategic overview of the activities required to meet these objectives. It provides greater detail than the policy on how the Township plans to achieve asset management objectives through planned activities and decision-making criteria. The Township's Asset Management Policy contains many of the key components of an asset management strategy and may be expanded on in future revisions or as part of a separate strategic document.

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. The AMP typically includes the following content:

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

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

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

•Paved Roads •Surface Treated Roads •Gravel Roads •Streetlights •Sidewalks •Cross Walks **Road Network**	•Bridges •Culverts •Non – OSIM Culverts **Bridges & Culverts**	•Hydrants •SCADA System •Water Mains •Water Meters •Water Tower •Well No 1 •Well No 2 •Water Treatment Plant **Water Network**
•Sanitary Maintenance Holes •Sanitary Sewers •SCADA System •Sanitary Treatment Plant **Sanitary Sewer Network**	•Storm Sewer •Storm Structures **Stormwater Network**	•Arena •Buildings Over 1000 Square Feet •Buildings Under 1000 Square Feet **Buildings**
•Athletic Fields •Bike Paths/ Walking Trails •Parking Lots •Park Assets •Playground Equipment •Retention Ponds •Tennis Courts **Parks & Recreation**	•Community Services •Fire •Public Works **Vehicles**	•CCTV •Community Services •Computer Systems/ Software •Fire Department Equipment •LED Sign •Public Works Equipment **Machinery & Equipment**

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.

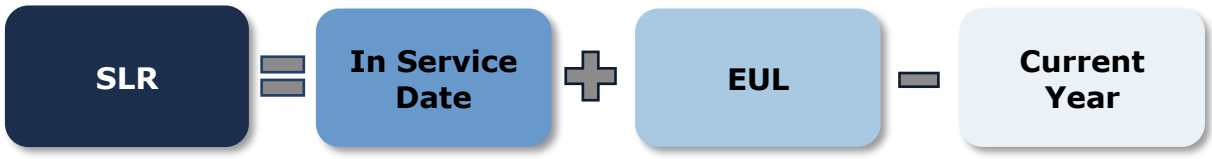
User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost 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

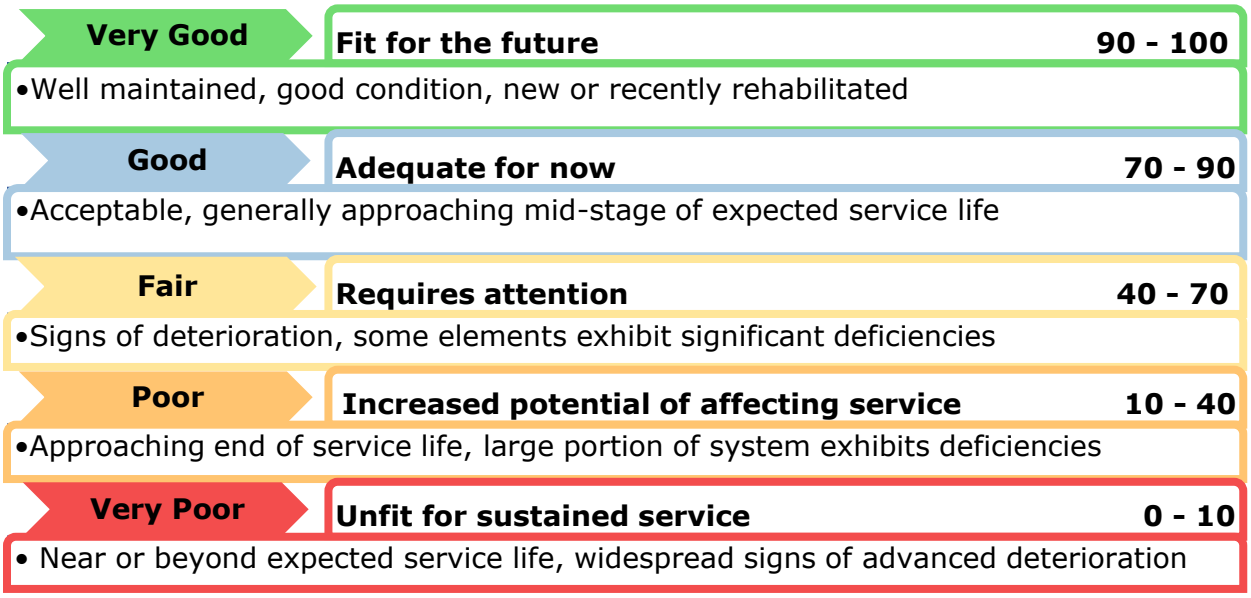


Asset Condition

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 Cramahe.

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 C: Condition Assessment Guidelines includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

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.

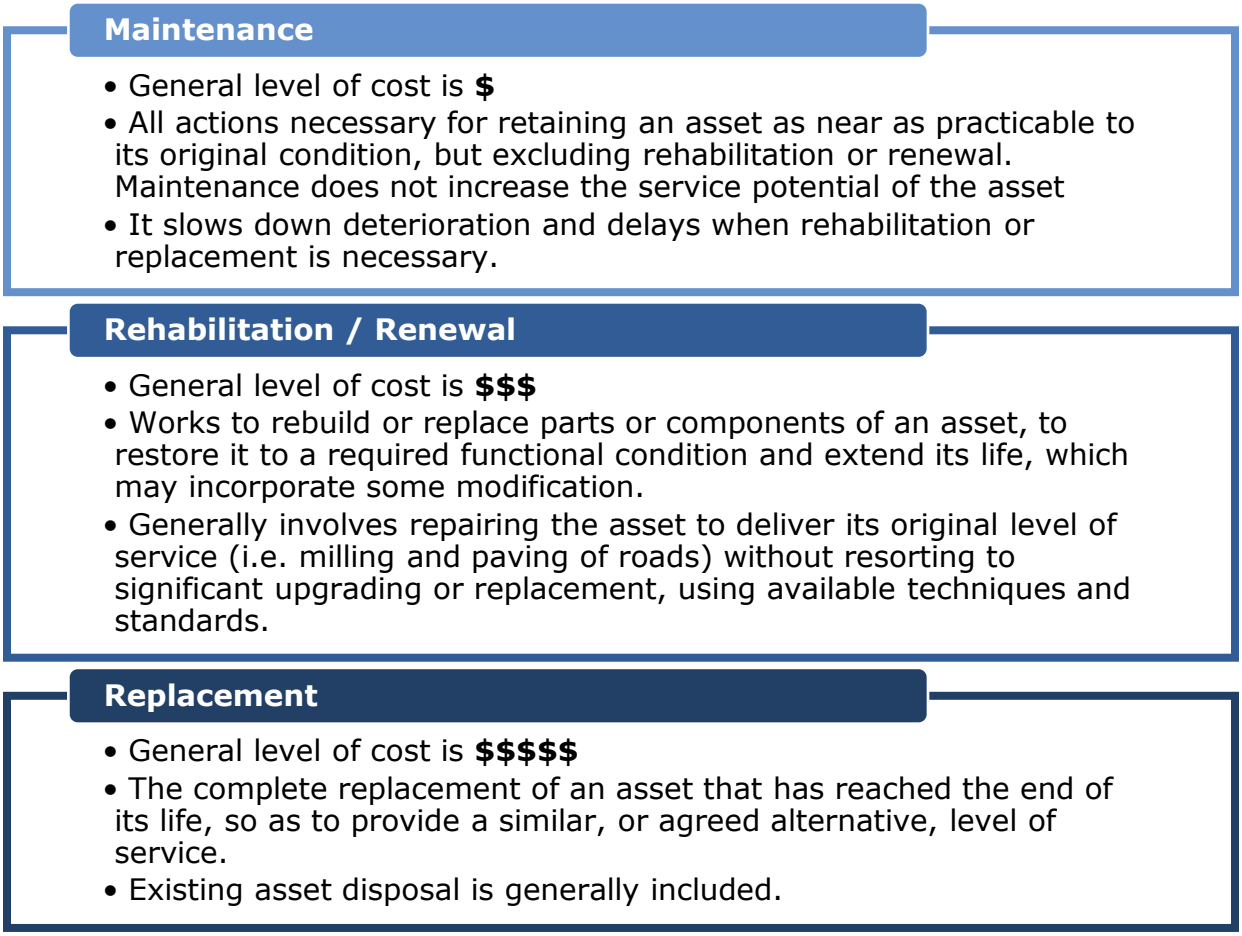
To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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. 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.

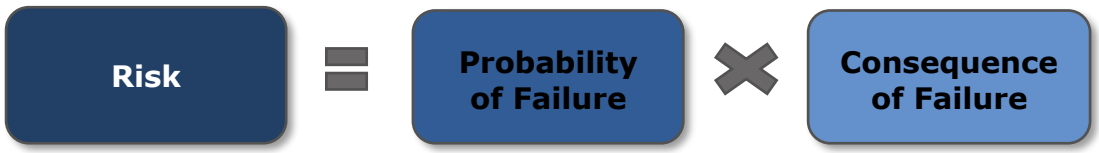
By identifying the various impacts of asset failure and the likelihood that it will fail, risk management strategies can identify critical assets, and determine where maintenance efforts, and spending, should be focused.

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 D: 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 Cramahe 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

Cramahe 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.

Cramahe's Climate Profile

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

Higher Average Annual Temperature:

- Between the years 1971 and 2000 the annual average temperature was 6.9 ºC
- Under a high emissions scenario, the annual average temperatures are projected to increase by 5.6 ºC by the year 2050 and over 6.4 ºC by the end of the century.

Increase in Total Annual Precipitation:

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

Increase in Frequency of Extreme Weather Events:

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

Consideration of Climate Change with Asset Management Strategies

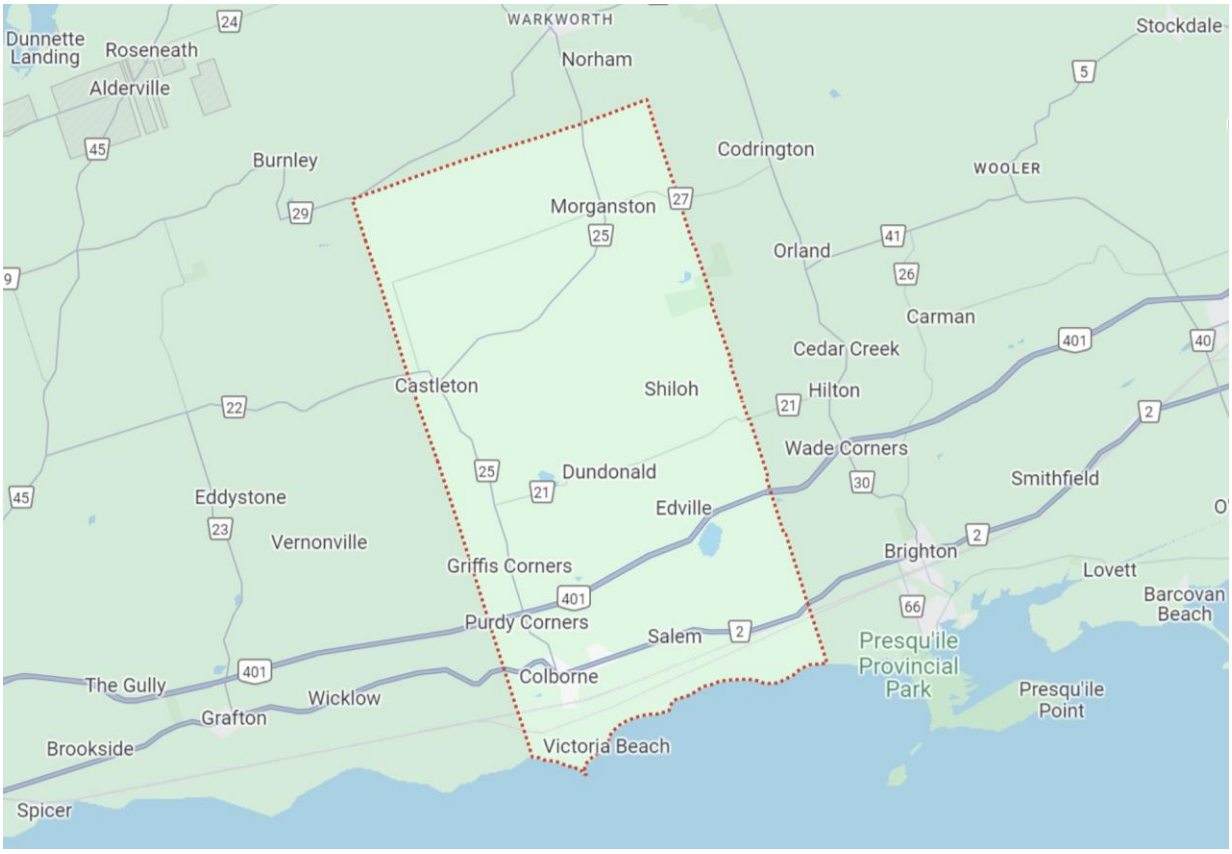
Asset management practices aim to deliver sustainable service delivery - providing services to residents today without compromising the services and well-being of future residents. Climate change threatens sustainable service delivery by reducing the useful life of assets and increasing the risk of asset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

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

Portfolio Overview

Community Profile

The Township of Cramahe is located in Northumberland County of Central Ontario, part of the Greater Golden Horseshoe. The Township is situated in southeastern Ontario, east of Toronto and west of Kingston.The natural landscapes of forests, lakes, and rivers in Cramahe provide plentiful opportunities for outdoor activities



The Township of Cramahe was incorporated in 1850. This incorporation was part of a broader movement during the mid-19th century in Ontario to establish municipal governance structures in rural and urban areas. The incorporation allowed for local administration and governance tailored to the specific needs and interests of the Township's residents. In 2001, the Township of Cramahe and the Village of Colborne was subject to a municipal amalgamation.

The Township includes several small communities, with Colborne being the largest and the administrative center. Other communities include Castleton, Salem, and others. Each of these communities has its own unique history and characteristics. The region is primarily rural, characterized by agricultural lands, small communities, and natural landscapes.

Demand in Cramahe Township is primarily driven by its agricultural base, residential growth due to its appeal as a rural community, and the flourishing

tourism sector attracted by its natural beauty and historical sites. The local economy is also influenced by the needs of a growing population, requiring further development within infrastructure. As a rural municipality, the Township faces the typical challenges of balancing infrastructure development with the preservation of its natural and cultural heritage.

The Township focuses on intensification within the built boundary for growth and of the protection and conservation of environmental sensitive areas and natural heritage. Municipal staff have identified the road network as the primary infrastructure priority. Current design of the Township's transportation network is not capable to serve the heavy traffic coming from Ontario 401 Highway. Staff are aiming to expand the road network and improve the level of service through a series of rehabilitation and replacement projects.

Table 3 Cramahe & Ontario Census Information

Census Characteristic	Cramahe	Ontario
Population 2021	6,509	14,223,942
Population Change 2016-2021	+2.4%	5.8%
Total Private Dwellings	2,772	5,929,250
Population Density	32.2/ km2	15.9/km^2
Land Area	202.22 km2	892,411.76 km^2

State of the Infrastructure

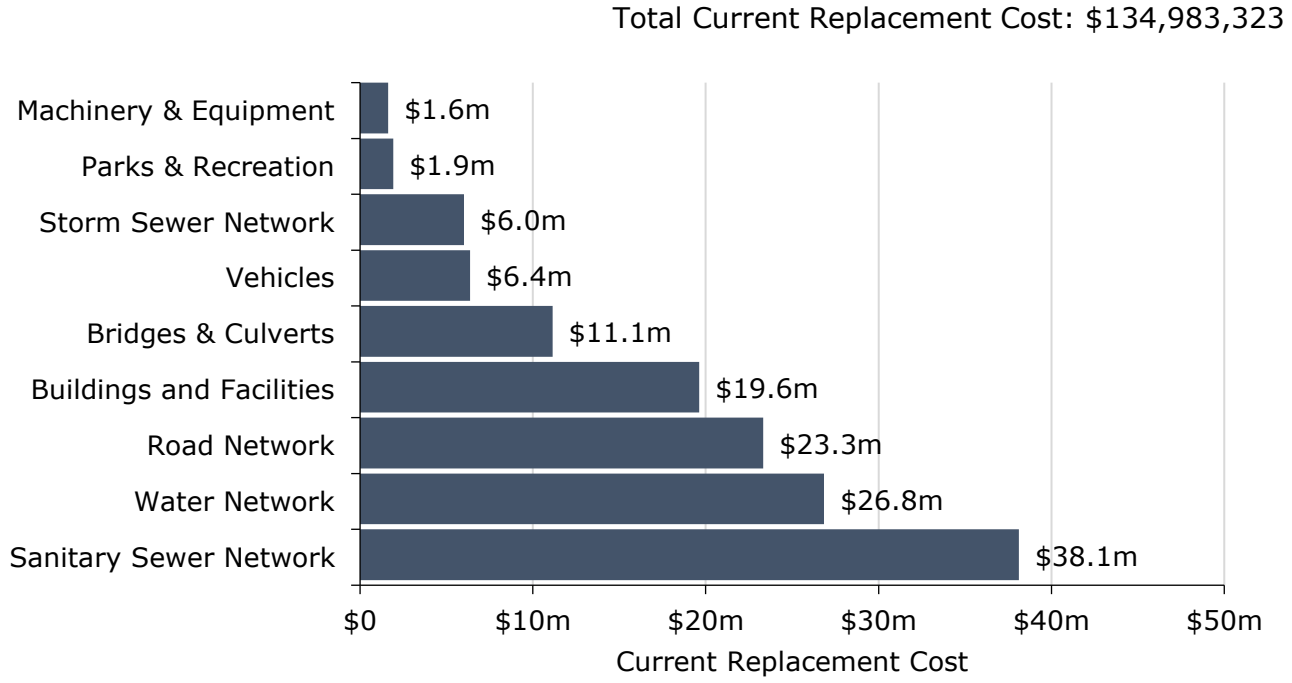
Table 4 Cramahe State of the Infrastructure

Asset Category	Replacement Cost	Asset Condition	Financial Capacity	
Road Network	$23,330,000	38% (Poor)	Annual Requirement:	$1,131,580
			Funding Available:	$855,328
			Annual Deficit:	$276,252
Bridges & Culverts	$11,140,000	67% (Good)	Annual Requirement:	$144,246
			Funding Available:	$140,000
			Annual Deficit:	$4,246
Storm Sewer Network	$6,021,000	77% (Good)	Annual Requirement:	$90,821
			Funding Available:	$30,000
			Annual Deficit:	$60,821
Buildings & Facilities	$19,618,707	34% (Poor)	Annual Requirement:	$599,417
			Funding Available:	$79,915
			Annual Deficit:	$519,502
Vehicles	$6,371,000	39% (Poor)	Annual Requirement:	$524,064
			Funding Available:	$204,781
			Annual Deficit:	$319,283
Parks & Recreation Assets	$1,921,000	23% (Poor)	Annual Requirement:	$69,604
			Funding Available:	$17,788
			Annual Deficit:	$51,817
Machinery & Equipment	$1,630,000	55% (Fair)	Annual Requirement:	$179,927
			Funding Available:	$175,659
			Annual Deficit:	$4,268
Water Network	$26,843,707	40% (Fair)	Annual Requirement:	$406,632
			Funding Available:	$94,410
			Annual Deficit:	$312,222
Sanitary Sewer Network	$38,107,589	48% (Fair)	Annual Requirement:	$603,161
			Funding Available:	$51,300
			Annual Deficit:	$551,861
Overall	**$134,983,323**	**43% (Fair)**	**Annual Requirement:**	**$3,749,453**
			Funding Available:	**$1,649,181**
			Annual Deficit:	**$2,100,272**

Replacement Cost

All Cramahe's asset categories have a total replacement cost of $135 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

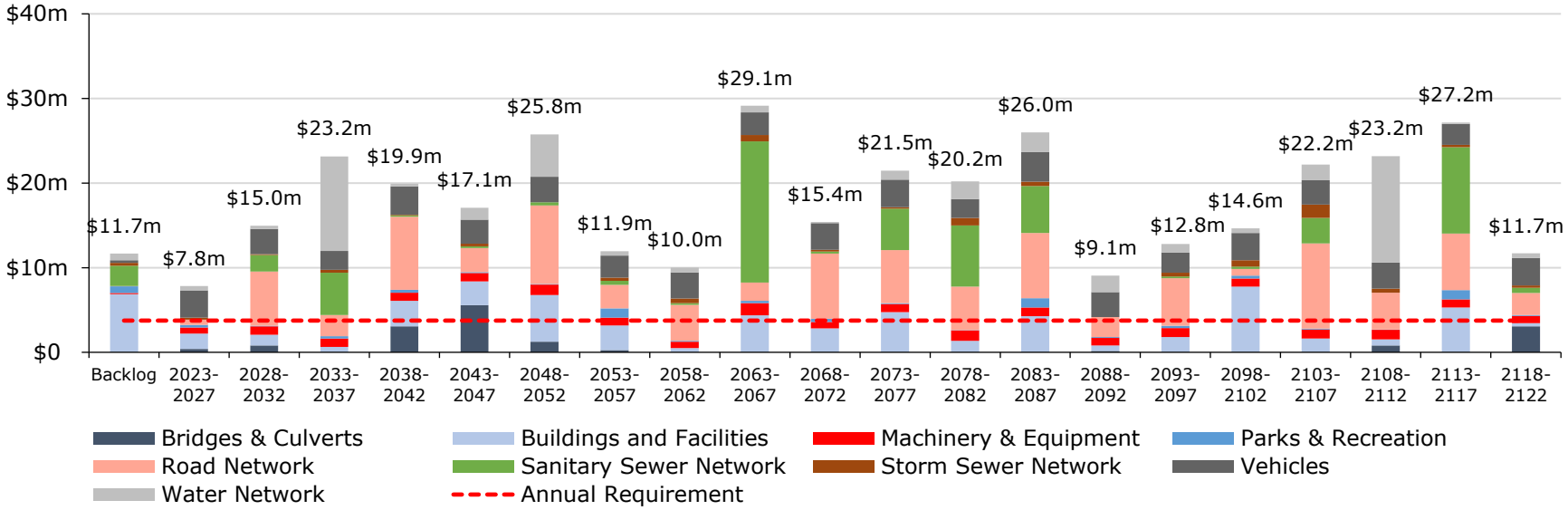


Forecasted Capital Requirements

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, $3.75 million is required each year to remain current with capital replacement needs for Cramahe'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 $135 million, this represents an annual target reinvestment rate of 2.8%.

Figure 6: Forecasted Capital Requirements



The chart also illustrates a backlog of $11.7 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.

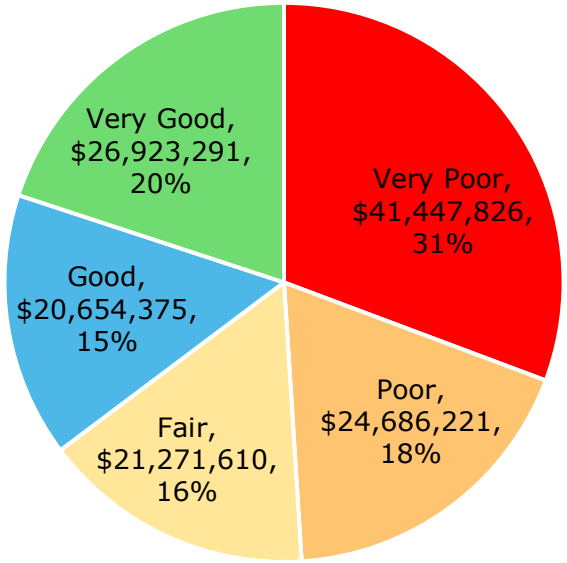
Risk frameworks, proactive lifecycle strategies, and levels of service targets can then be used to prioritize projects, continuously refine estimates for backlogs and ongoing capital needs and help select the right treatment for each asset.

Condition of Asset Portfolio

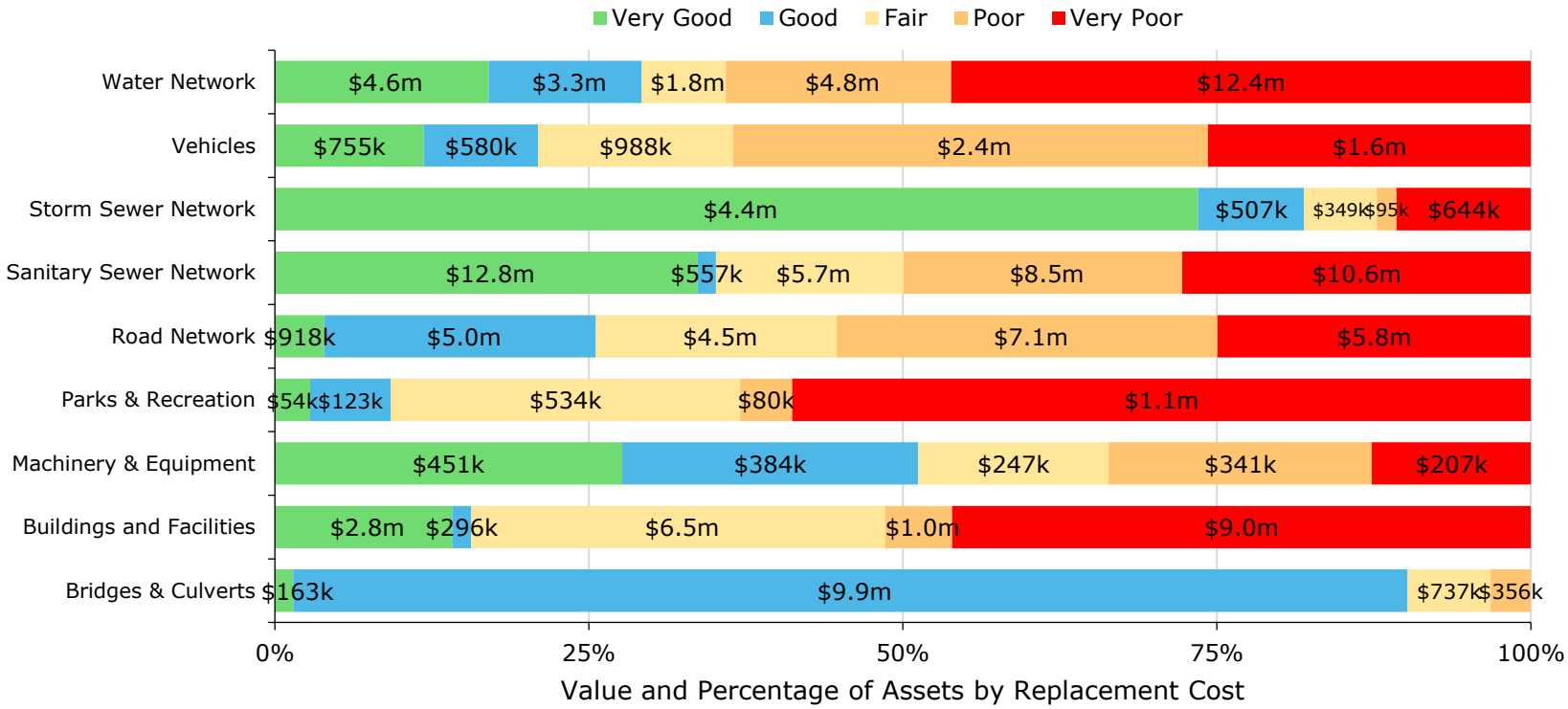
The current condition of the assets is central to all asset management planning. Collectively, 51% of assets in Cramahe are in fair or better condition. This estimate relies on both age-based and field condition data.

Assessed condition data is available for the road network, bridges and culverts, sanitary sewers and some machinery & equipment and vehicles; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions.

The chart below summarizes the replacement cost-weighted condition of the Township's Asset Portfolio:



As illustrated, 51% of the Township's assets are in poor or worse condition, with further details of condition broken down per asset segment:



Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 25% 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

Cramahe has noted key trends, challenges, and risks to service delivery that they are currently facing:

Organizational Capacity and Cognizance

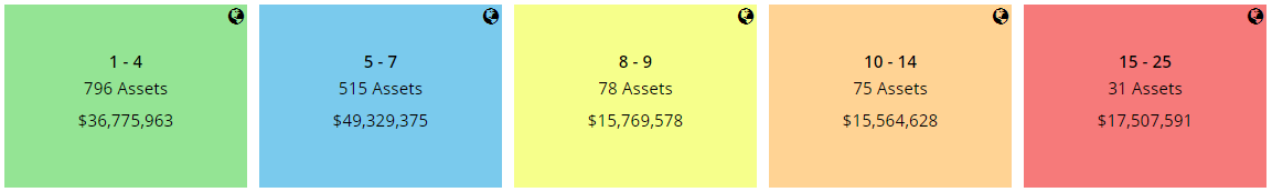
Both short- and long-term planning requires the regular collection of infrastructure data to support asset management decision-making. If organizational stakeholders, including management, staff, and relevant departments, lack a clear understanding of the principles, processes, and importance of asset management, it can lead to inadequate resource allocation and decision-making. Securing commitment and buy-in from organizational leadership to prioritize asset management as a strategic initiative can enable the Township to foster a culture of effective asset management.

Asset Data & Information

There is a lack of confidence in the available inventory data, particularly concerning the in-service dates of certain infrastructure asset categories. Staff plan to prioritize data refinement efforts to increase the accuracy and reliability of asset data and information. Once completed staff can confidently develop data-driven strategies to address infrastructure needs.

The overall asset risk breakdown for Cramahe's asset inventory is portrayed in the figure below.

Figure 7: Overall Asset Risk Breakdown

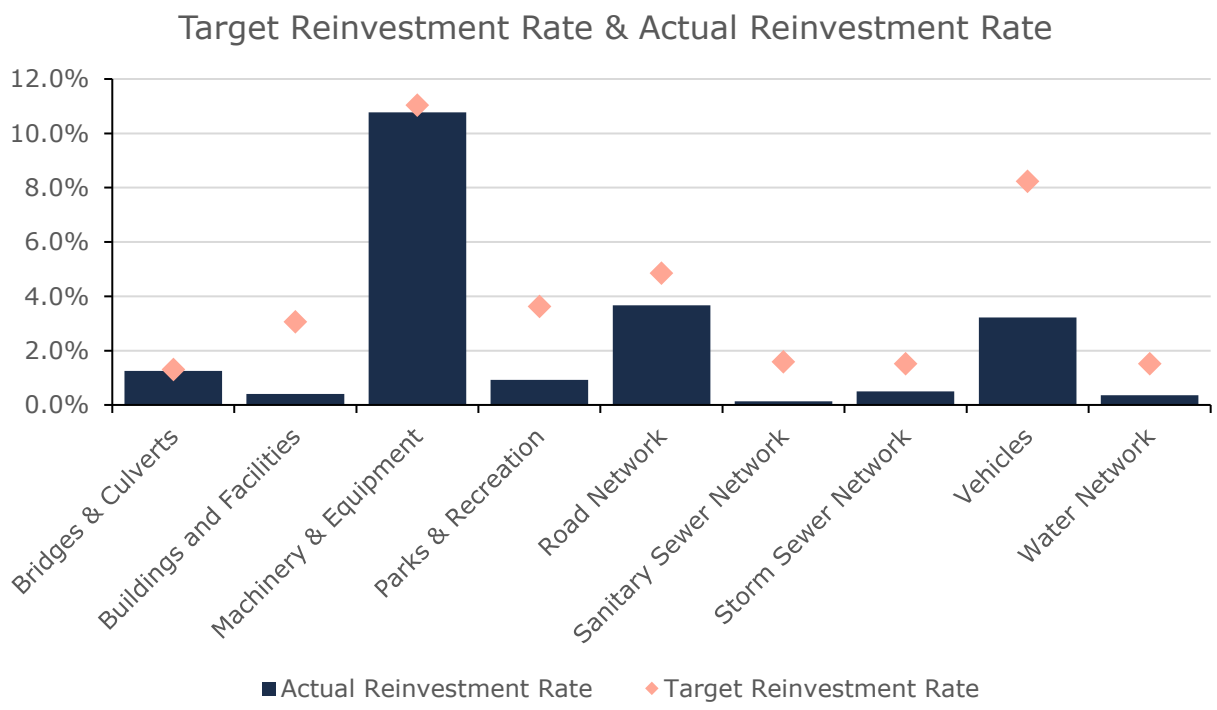


Reviewing the list of very high-risk assets to evaluate how best to mitigate the level of risk the Township is experiencing will help advance Cramahe's asset management program.

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 $3.75 million annually, for a target reinvestment rate of 2.8%. Actual annual spending on infrastructure totals approximately $1.65 million, for an actual reinvestment rate of 1.2%.

Figure 8: Target vs Actual Reinvestment Rates



Financial Strategy

Financial Strategy Overview

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

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

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

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

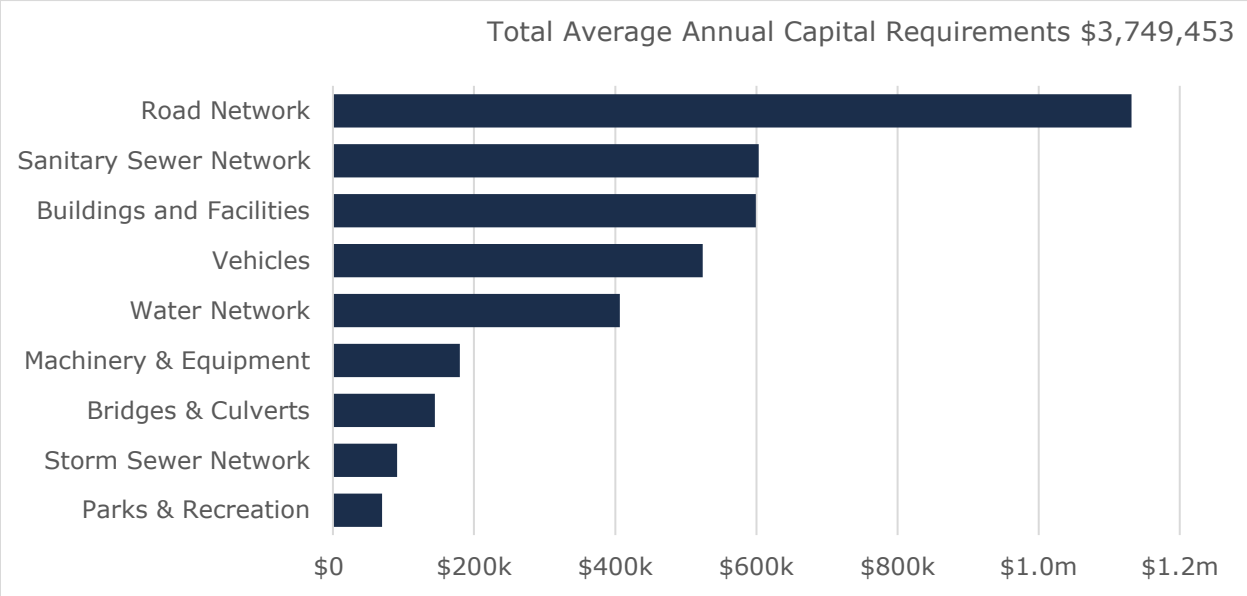
If the financial plan component results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the Province may evaluate a Township's approach to the following:

1. In order to reduce financial requirements, consideration has been given to revising service levels downward.

2. All asset management and financial strategies have been considered. For example:
    a. If a zero-debt policy is in place, is it warranted? If not the use of debt should be considered.
    b. Do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

Annual Requirements & Capital Funding

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. In total, the Township must allocate approximately $3.75 million annually to address capital requirements for the assets included in this AMP.



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

However, for the Road Network, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal of the Township's roads. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares two scenarios for the Road Network:

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

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

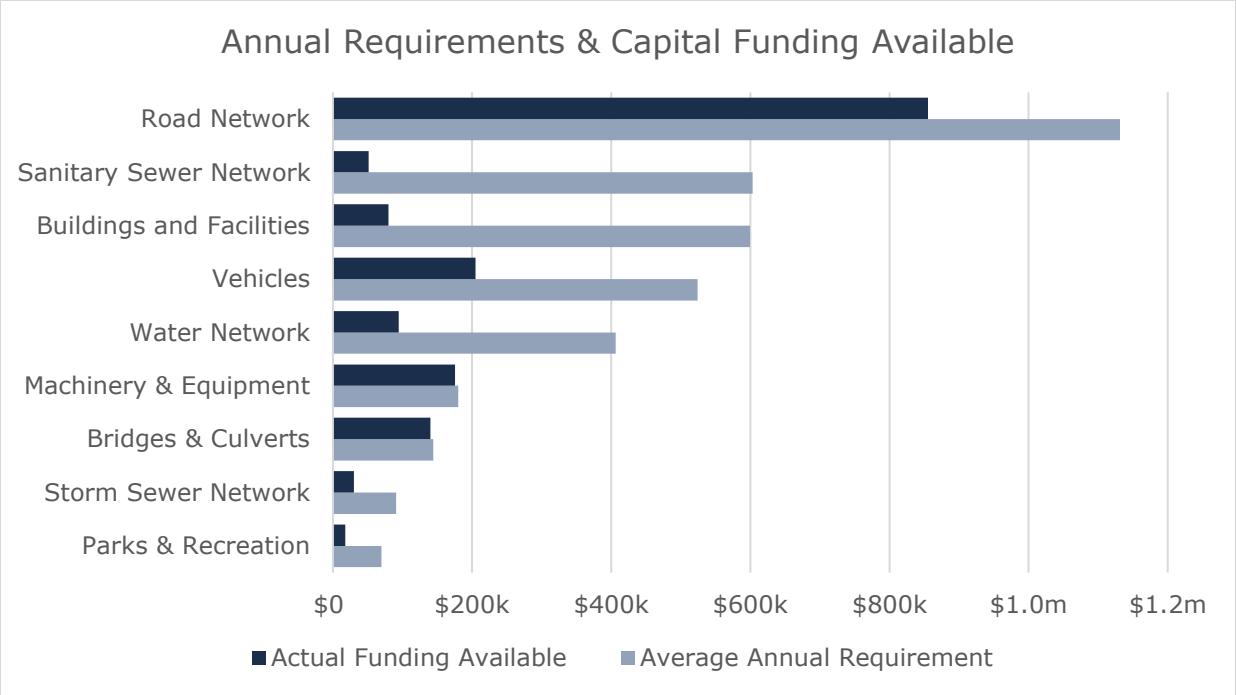
Table 5 Road Network Annual Capital Requirement Comparison

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$1,588,000	$1,132,000	$(456,442)
Bridges & Culverts	$153,000	$144,000	$(8,488)
Sanitary Sewer Network	$633,000	$603,000	$(29,483)

The implementation of proactive lifecycle strategies leads to a potential annual cost avoidance of $456,442 for the Road Network, $8,488 for Bridges & Culverts, and $29,483 for the Sanitary Sewer Network. This represents an overall reduction of the annual requirements for these categories by 12%. As the lifecycle strategy scenario represents the lowest cost option available to the Township, we have used these annual requirements in the development of the financial strategy.

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $1.44 million towards capital projects per year. Given the annual capital requirement of $3.75 million, there is currently a funding gap of $2.31 million annually.



Funding Objective

We have developed a scenario that would enable Cramahe to achieve full funding within 1 to 20 years for the following assets:

- **Tax Funded Assets:** Road Network, Storm Water Network, Bridges & Culverts, Buildings & Facilities, Machinery & Equipment, Vehicles, Parks and Recreation Assets
- **Rate-Funded Assets:** Water Network, Sanitary Sewer Network

Note: For the purposes of this AMP, we have excluded gravel roads since they are a perpetual maintenance asset and end of life replacement calculations do not normally apply. If gravel roads are maintained properly, they can theoretically have a limitless service life.

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

Financial Profile: Tax Funded Assets

Current Funding Position

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

Table 6: Taxes: Required Funding vs Current Funding Position

Asset Category	Avg. Annual Requirement	Annual Funding Available					Annual Deficit
		Taxes	CCBF	OCIF	Capital Reserves[1]	Total Available	
Road Network	1,131,580	268,857	310,000	93,000	183,471	855,328	276,252
Stormwater Network	90,821		30,000			30,000	60,821
Bridges & Culverts	144,246	140,000				140,000	4,246
Buildings & Facilities	599,417	20,000			59,915	79,915	519,502
Machinery & Equipment	179,927	60,336			115,323	175,659	4,268

[1] This represents the amount contributed to reserves dedicated to asset management replacement. These budgeted transfers are funded through property tax collection.

Parks & Recreation	69,604	17,788				17,788	51,817
Vehicles	524,064				204,781	204,781	319,283
	2,739,660	**506,981**	**340,000**	**93,000**	**563,490**	**1,503,471**	**1,236,189**

The average annual investment requirement for the above categories is $2,739,660. Annual revenue currently allocated to these assets for capital purposes is $1,503,471, leaving an annual deficit of $1,236,189. Put differently, these infrastructure categories are currently funded at 55% of their long-term requirements.

Full Funding Requirements

In 2023, the Township of Cramahe has budgeted annual tax revenues of $7,057,671. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Asset Category	Tax Change Required for Full Funding
Road Network	3.9%
Storm Water Network	0.9%
Bridges & Culverts	0.1%
Buildings	7.4%
Machinery & Equipment	0.1%
Parks & Recreation	0.7%
Vehicles	4.5%
	17.6%

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

- Cramahe's debt payments for these asset categories will be decreasing by $106,624 over the next 20 years.

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

Table 7: Phasing in Annual Tax Increases

	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	1,236,189	1,236,189	1,236,189	1,236,189	1,236,189	1,236,189	1,236,189	1,236,189
Change in Debt Costs	N/A	N/A	N/A	N/A	0	0	0	-106,624
Change in OCIF Grants	N/A	N/A	N/A	N/A	0	0	0	0
Resulting Infrastructure Deficit:	1,236,189	1,236,189	1,236,189	1,236,189	1,236,189	1,236,189	1,236,189	1,129,565
Tax Increase Required	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%
Annually:	**3.3%**	1.7%	1.1%	0.9%	3.3%	1.7%	1.1%	0.8%

Financial Strategy Recommendations

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

a) increasing tax revenues by 1.1% each year for the next 15 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
b) allocating the current Canada Community-Building Fund (Formerly known as Gas Tax Fund) and OCIF revenue as outlined previously.
c) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

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

Although this option achieves full funding on an annual basis in 15 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $52k for the Road Network, $367k for the Storm Water Network, $6.9m for Buildings, $128k for Machinery & Equipment, $281k for Vehicles, and 783k for Parks & Recreation assets.

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

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

Financial Profile: Rate Funded Assets

Current Funding Position

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

Table 8: Rates: Required Funding vs Current Funding Position

Asset Category	Avg. Annual Requirement	Annual Funding Available			Annual Deficit
		Rates	Capital Reserves[3]	Total Available	
Water Network	406,632	75,713	18,697	94,410	312,222
Sanitary Sewer Network	603,161	51,300		51,300	551,861
	1,009,793	**127,013**	**18,697**	**145,710**	**864,083**

The average annual investment requirement for the above categories is $1,009,793. Annual revenue currently allocated to these assets for capital purposes is $145,710 leaving an annual deficit of $864,083. Put differently, these infrastructure categories are currently funded at 14.4% of their long-term requirements.

Full Funding Requirements

In 2022, Cramahe has budgeted annual water revenues of $721,800 and budgeted annual sanitary revenues of $726,000. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following changes over time:

Asset Category	Rate Change Required for Full Funding
Water Network	43.3%
Sanitary Sewer Network	76.0%

[3] This represents the amount contributed to reserves dedicated to asset management replacement. These budgeted transfers are funded through utility rate collection.

In the following table, we have expanded the above scenario to present multiple options. Due to the significant increases required, we have provided phase-in options of up to 20 years:

Table 9: Phasing in Annual Rate Increases

	Water Network				Sanitary Sewer Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	312,222	312,222	312,222	312,222	551,861	551,861	551,861	551,861
Decrease in Debt Payments	N/A	N/A	N/A	N/A	-123,590	-123,590	-123,590	-123,590
Resulting Infrastructure Deficit:	312,222	312,222	312,222	312,222	428,271	428,271	428,271	428,271
Rate Increase Required	43.3%	43.3%	43.3%	43.3%	59.0%	59.0%	59.0%	59.0%
Annually:	**7.5%**	**3.7%**	**2.5%**	**1.9%**	**9.8%**	**4.8%**	**3.2%**	**2.4%**

Financial Strategy Recommendations

Considering all the above information, we recommend the 20-year option that includes debt cost reallocations. This involves full funding being achieved over 20 years by:

a) when realized, reallocating the debt cost reductions of $123,590 for sanitary services to the applicable infrastructure deficit.
b) increasing rate revenues by 1.9% for water services and 2.4% for sanitary services each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
c) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

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

3. Any increase in rates required for operations would be in addition to the above recommendations.

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $801k for the Water Network and 2.4m for the Sanitary Sewer Network.

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

Use of Debt

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

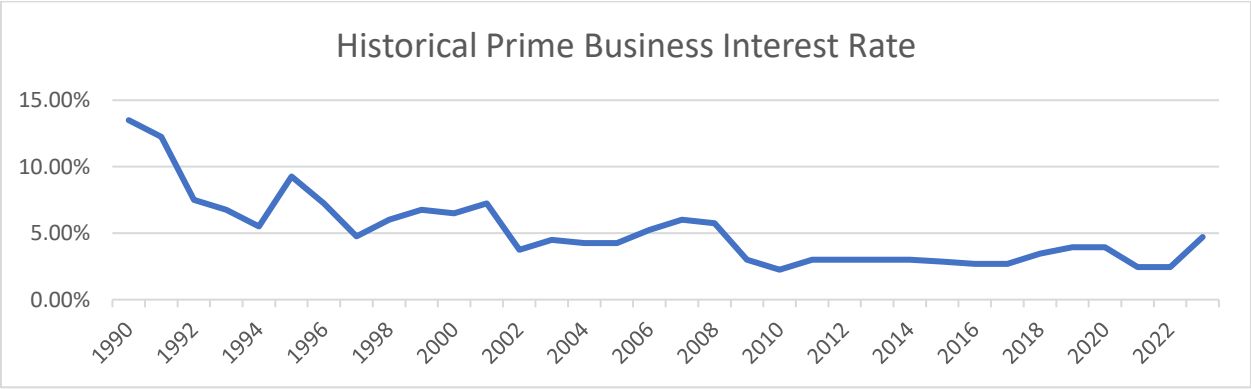
a) the ability to stabilize tax & user rates when dealing with variable and sometimes uncontrollable factors

b) equitable distribution of the cost/benefits of infrastructure over its useful life

c) a secure source of funding

d) flexibility in cash flow management

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



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

For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a $1 million project financed at 3.0%[4] over 15 years would result in a 26% premium or $260 thousand of increased costs due to interest payments. For simplicity, the table does not consider the time value of money or the effect of inflation on delayed projects.

Interest Rate	Number of Years Financed					
	5	10	15	20	25	30
7.0%	22%	42%	65%	89%	115%	142%
6.5%	20%	39%	60%	82%	105%	130%
6.0%	19%	36%	54%	74%	96%	118%
5.5%	17%	33%	49%	67%	86%	106%
5.0%	15%	30%	45%	60%	77%	95%
4.5%	14%	26%	40%	54%	69%	84%
4.0%	12%	23%	35%	47%	60%	73%
3.5%	11%	20%	30%	41%	52%	63%
3.0%	9%	17%	26%	34%	44%	53%
2.5%	8%	14%	21%	28%	36%	43%
2.0%	6%	11%	17%	22%	28%	34%
1.5%	5%	8%	12%	16%	21%	25%
1.0%	3%	6%	8%	11%	14%	16%
0.5%	2%	3%	4%	5%	7%	8%
0.0%	0%	0%	0%	0%	0%	0%

The following tables outline how Cramahe has historically used debt for investing in the asset categories as listed. There is currently $3,324,688 of debt outstanding for

[4] Current municipal Infrastructure Ontario rates for 15-year money is 4.03%.

the assets covered by this AMP with corresponding principal and interest payments of $336,838, well within its provincially prescribed maximum of $1.966 million.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2018	2019	2020	2021	2022
Road Network	1,483,642		1,720,000			
Stormwater Network						
Bridges & Culverts						
Buildings & Facilities	1,722,196					
Machinery & Equipment						
Parks & Recreation						
Vehicles						
Total Tax Funded:	**3,205,838**	**0**	**1,720,000**	**0**	**0**	**0**
Water Network						
Sanitary Sewer Network	118,850					
Total Rate Funded:	**3,324,688**	**0**	**1,720,000**	**0**	**0**	**0**

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2022	2023	2024	2025	2026	2027	2032
Road Network							
Stormwater Network							
Bridges & Culverts							
Buildings & Facilities	106,624	106,624	106,624	106,624	106,624	106,624	106,624
Machinery & Equipment							
Parks & Recreation	106,624	106,624	106,624	106,624	106,624	106,624	106,624
Vehicles							
Total Tax Funded:	**213,248**	**213,248**	**213,248**	**213,248**	**213,248**	**213,248**	**213,248**
Water Network							
Sanitary Sewer Network	123,590	123,590	2				
Total Rate Funded:	**123,590**	**123,590**	**2**	**0**	**0**	**0**	**0**

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

Use of Reserves

Available Reserves

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

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

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

Asset Category	Balance at December 31, 2022
Road Network	1,743,369
Storm Water Network	
Bridges & Culverts	620,265
Buildings	78,583
Machinery & Equipment	544,440
Parks & Recreation	115,465
Vehicles	
Total Tax Funded:	**3,102,122**
Water Network	2,260,933
Sanitary Sewer Network	
Total Rate Funded:	**2,260,933**

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

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

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

Recommendation

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

Recommendations

Asset Data

- Regularly update and validate all inventory data for roads and bridges to reflect their current status.
- Complete Asset Inventory: There are currently missing assets that have not been captured in the existing inventory. To ensure a complete and accurate asset management plan, it is recommended to conduct a thorough inventory audit. This audit should include field inspections and cross-referencing with historical records to identify and document all assets that may have been previously overlooked.

Condition Assessment Strategies

- Continue conducting network-wide assessments to ensure that condition information remains accurate and up to date.
- Establish a routine for reporting and reviewing condition assessment data for all asset categories, including transportation and utilities, to facilitate informed decision-making.
- Provide training for staff on condition assessment methods specific to different asset types to maintain high standards in data accuracy and analysis.

Lifecycle Management Strategies

- Incorporate life cycle management strategies for utility assets (e.g., water and sewer lines) to optimize maintenance and replacement schedules based on asset conditions
- Use inventory data to prioritize maintenance and rehabilitation efforts for critical assets, such as emergency services routes and heavily trafficked roads.
- Evaluate the efficacy of the Township’s lifecycle management strategies at regular intervals to determine the impact cost, condition, and risk. This could be done by updating the condition assessment data whenever new data becomes available and rerunning the capital projections and risk reports.

Risk Management Strategies

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

Levels of Service

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

Analysis of Tax Funded Assets

- Tax-funded assets are valued at $70 million
- 57% of tax-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for tax-funded assets is approximately $2.7 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

Road Network

State of the Infrastructure

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

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

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

Replacement Cost	Condition	Financial Capacity	
$23,330,000	Poor (38%)	Annual Requirement:	$1,131,580
		Funding Available:	$855,328
		Annual Deficit:	$276,252

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

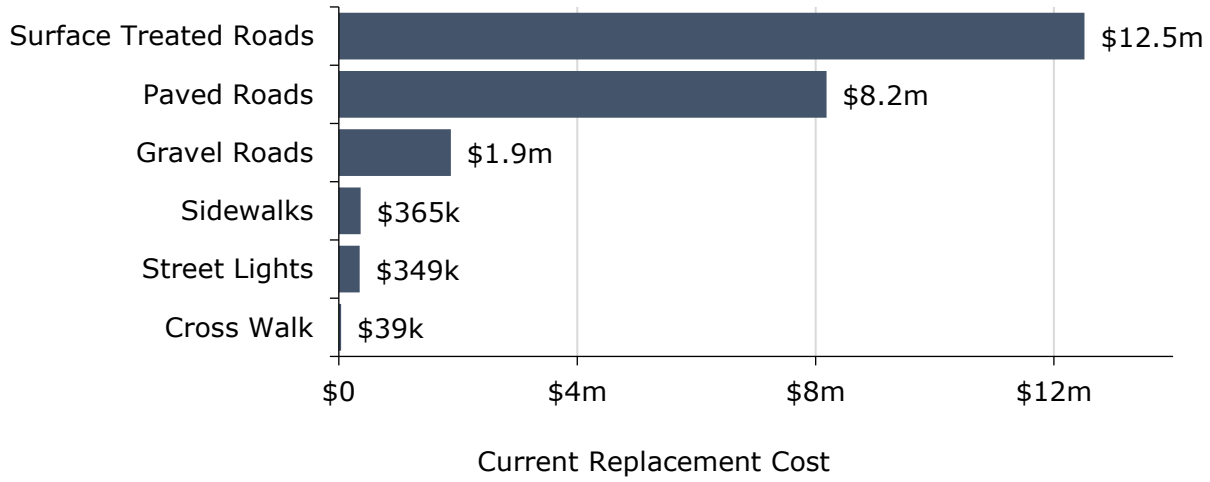
Service Attribute	Level of Service Statement
Scope	The Road Network service is conveniently accessible to the whole community in sufficient capacity (meets traffic demands) and is available under all most conditions.
Safe & Regulatory	The Road Network in poor condition with limited inspection for signage may result in increase probability of hazards and causing road closures.
Affordable	The Annual Capital Reinvestment Rate of the Road Network is 3.7%
Reliability	The Road Network is in poor condition which may result in unplanned service interruptions and road closures.

Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Cross Walk	15	Length (m)	CPI	$39,000
Gravel Roads	76,510	Length (m)	Cost per unit	$1,880,000
Paved Roads	21,505	Length (m)	Cost per unit	$8,183,232
Sidewalks	2,174	Length (m)	CPI	$365,000
Street Lights	489	Quantity	CPI	$349,000
Surface Treated Roads	115,968	Length (m)	Cost per unit	$12,513,000
Total				**$23,330,000**

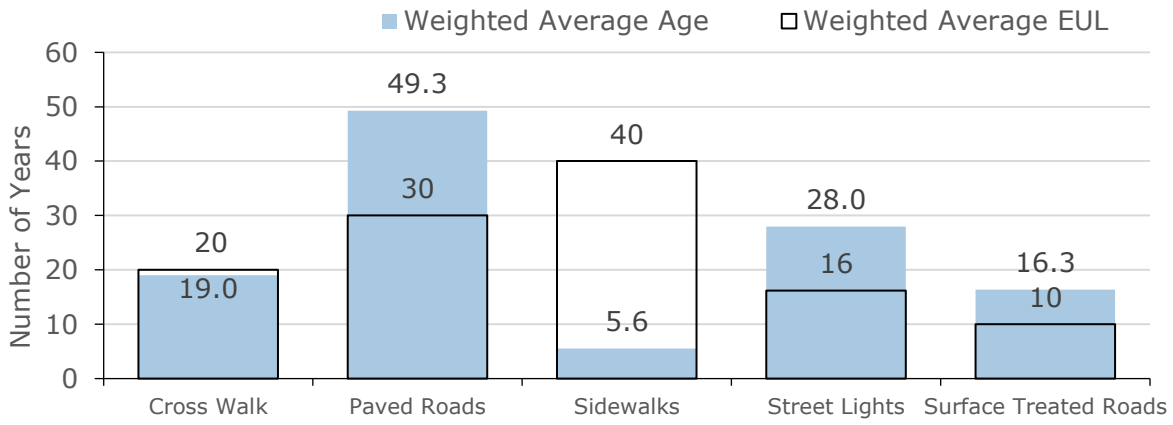
Total Current Replacement Cost: $23,330,135



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

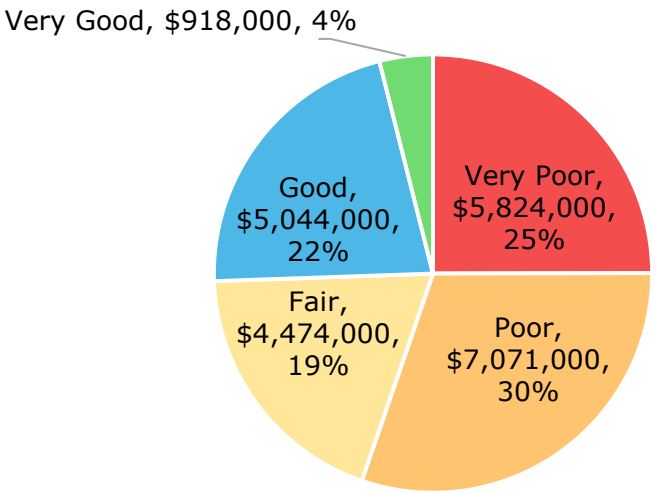
Asset Condition & Age

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

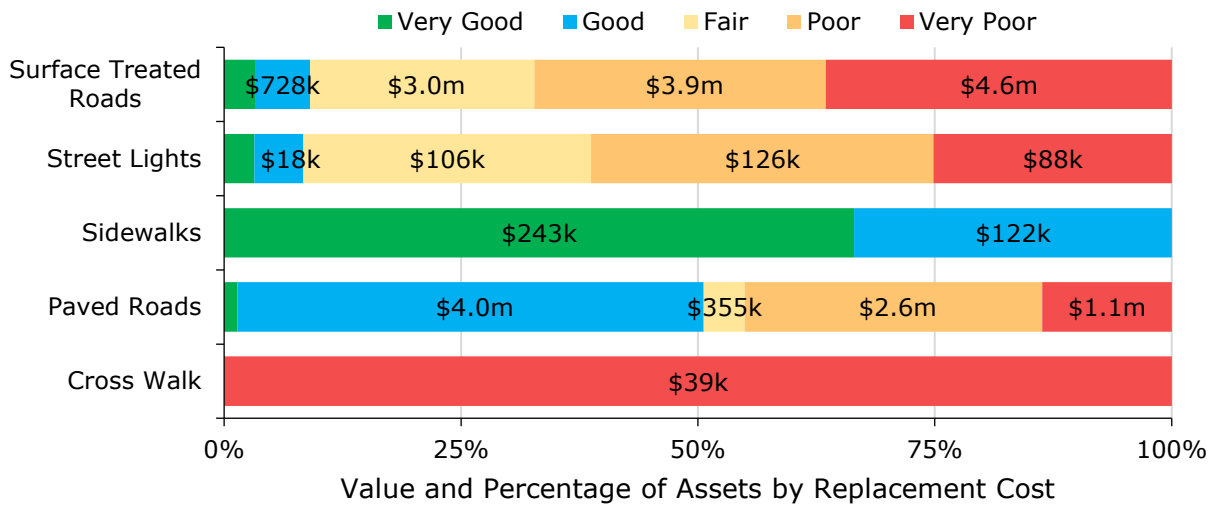


The analysis shows that, based on in-service dates, roads continue to remain in operation beyond their expected useful life. This is due to the life cycle management strategies currently being utilized.

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



As illustrated, 55% the Townships Road network are in poor or worse condition, with further details of condition broken down per asset segment:



To ensure that the Township's Road Network continues 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 more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

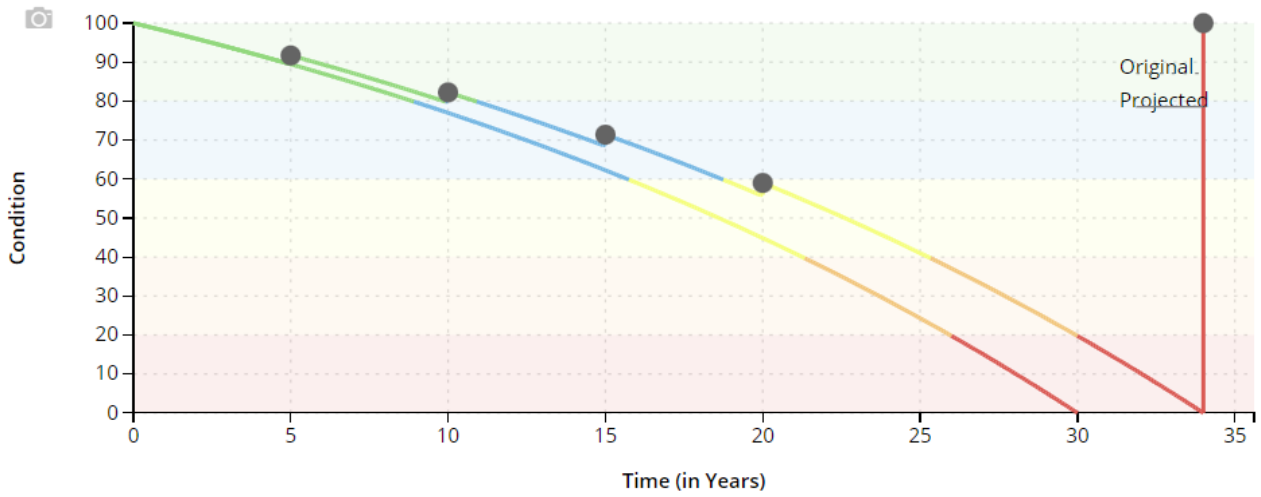
- Inspections are performed on an as needed basis, partially informed by complaints.
- Soil material testing is required in some areas where hazardous material is present.
- A Road Needs Study was completed by external contractors in 2023 that included a detailed assessment of the condition of each road segment
- The Road Needs Study is renewed every five years by external contractors

Lifecycle Management Strategy

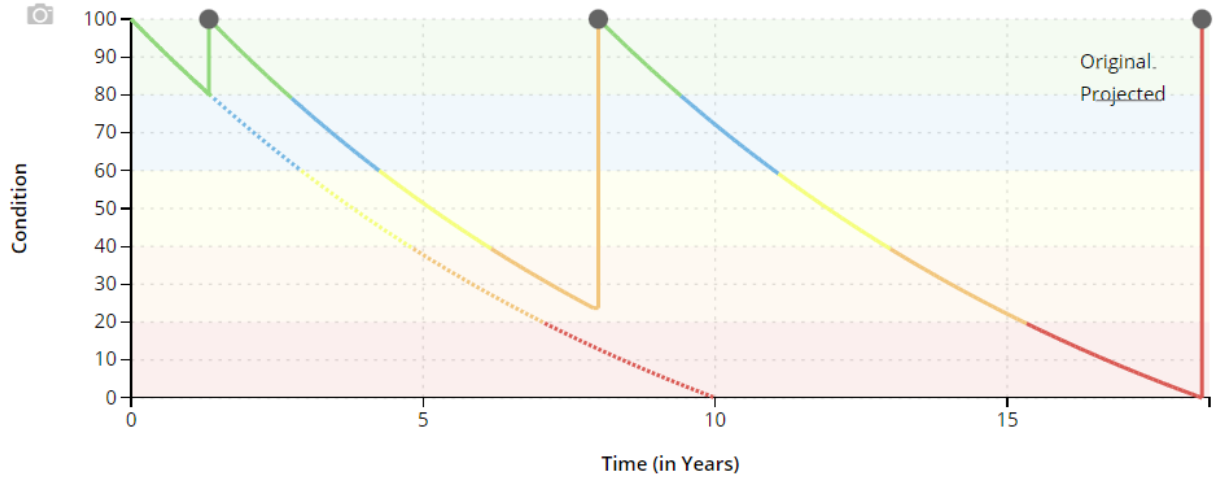
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment.

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of Paved Roads and Surface Treated 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.

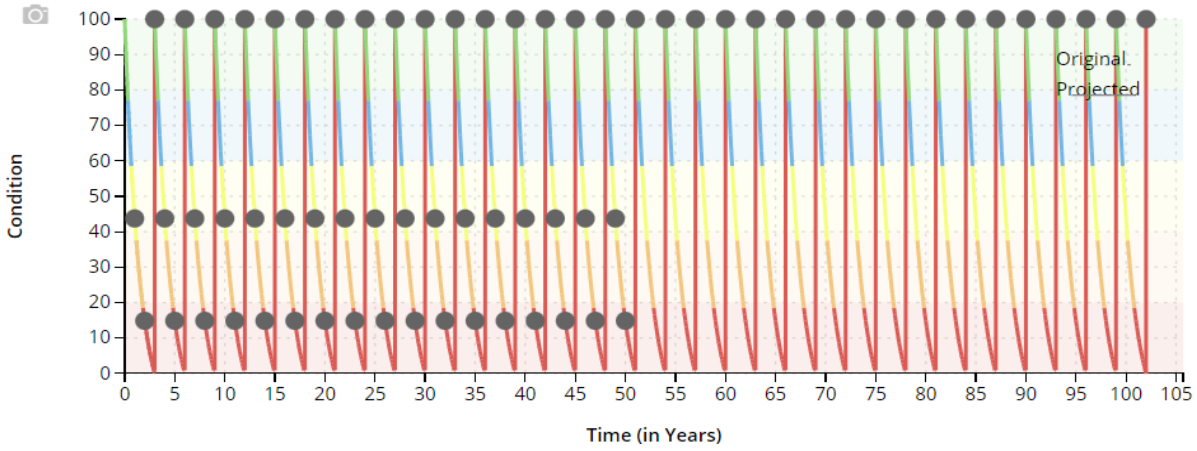
Surface Treated Roads		
Event Name	**Event Class**	**Event Trigger**
Cold Patch / Hot Mix Repairs	Preventative Maintenance	80% Condition
Single Lift Surface Treatment	Rehabilitation	7-8 years
Full Reconstruction	Replacement	0% Condition



Paved Roads (HCB)		
Event Name	**Event Class**	**Event Trigger**
Crack Sealing	Preventative Maintenance	Repeated every 5 years 4 times
Full Reconstruction	Replacement	0% Condition



Gravel Roads		
Event Name	**Event Class**	**Event Trigger**
Dust Suppressant	Maintenance	Repeat annually
Grading	Maintenance	Repeat annually
Gravelling – Adding Material	Rehabilitation	Repeat every 3 years[5]



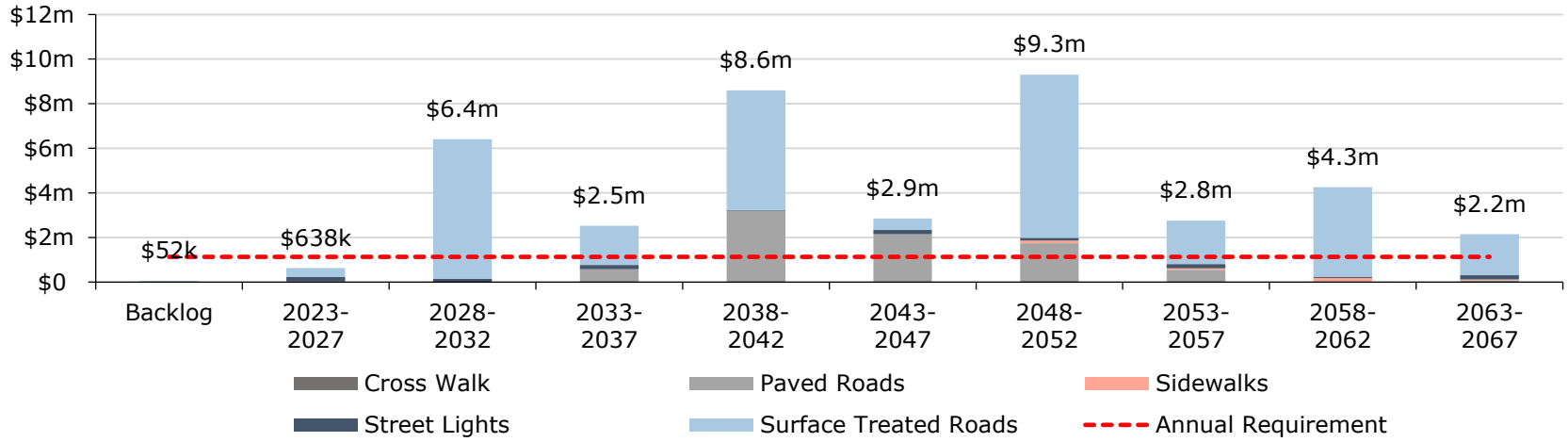
[5] The Unit Cost for re-stoning is $14.93/m. Due to the TCA thresholds set by the Township, gravelling costs are assumed to be operating and excluded from this plan. Future investigation should determine an appropriate portion of gravelling costs to be included as capital.

Forecasted Capital Requirements

chart below 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 2067 to capture at least one iteration of replacement for the longest-lived asset in the asset register.

Cramahe's average annual requirements (red dotted line) total $1.1 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).



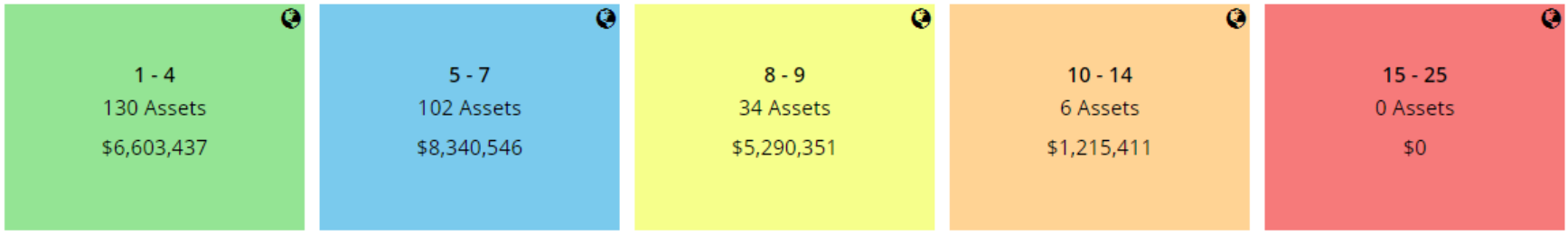
The Table below summarizes the projected cost of lifecycle activities (rehabilitation and replacement) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

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

Segment	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Cross Walk	$39k	$0	$0	$0	$0	$0	$0	$0	$0	$0
Paved Roads	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sidewalks	$88k	$0	$102k	$0	$0	$0	$0	$18k	$130k	$0
Streetlights	$72k	$48k	$0	$114k	$175k	$67k	$297k	$982k	$2.7m	$2.2m
Surface Treated Roads	$39k	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$198k**	**$48k**	**$102k**	**$114k**	**$175k**	**$67k**	**$297k**	**$1.0m**	**$2.8m**	**$2.2m**

Risk & Criticality

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



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

Risks to Current Asset Management Strategies

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

Aging Infrastructure

Rapid expansion of the Road Network occurred in the 1950s, resulting in large cohorts of roads now exceeding 70 years of service life. A higher volume of traffic and heavy vehicles accelerate the deterioration of road surfaces. The large historical investments are now coming due for renewal and replacement, requiring either large expenditures or a decrease in service provision. The Township will need to invest approximately $1.1 million, with the Roads network requiring the most capital. Finding a balance between meeting service demands and maintaining affordability will require the Township to employ strategic lifecycle management and prioritization of critical assets.

Climate Change & Extreme Weather Events

The trend of climate change-induced extreme precipitation events is projected to continue. Severe rainfall and drought, or increased temperature can impact service availability and usage. Flooding can tax the existing drainage system and damage roads. The Township maintains a large Road Network that could be impacted from more rapid freeze-thaw cycles, contributing to pavement deterioration. As a result, higher maintenance and rehabilitation requirements are expected to maintain the same level of service, to avoid complaints, liabilities, and larger capital spending. To improve asset resiliency, staff should identify the critical areas and improve drainage through enhanced lifecycle strategies.

Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include maps, of the Road Network in the municipality and its level of connectivity	See Appendix B
Quality	Description or images that illustrate the different levels of road class pavement and sidewalk condition	The Township completed a Road Needs Study in 2023 in coordination with Tatham Engineering Limited. Every road section received a Pavement Condition Index (PCI) score from 1-100. The PCI rates the condition of the surface of the road section. • 0 being the worst possible condition (eg. an impassable road) • 100 being the best possible condition (eg. a road in perfect condition)

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Accessible & Reliable	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	1.40
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	1.31
	Average duration of planned road closures	5 days
	Number of planned road closures per year	1
Safe & Regulatory	Number of service requests related to road condition	127
	Percentage of signs inspected for reflectivity	0%
	Number of service requests related to sidewalk condition	7
Quality	Average pavement condition index for paved roads in the municipality	79%
	Average surface condition for surface treated roads in the municipality	80%
	Average surface condition for unpaved roads in the municipality	2%[6]

[6] The average condition is not a good indicator for gravel roads because gravel roads are perpetually re-stoned every three years.

Bridges & Culverts

State of the Infrastructure

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

Replacement Cost	Condition	Financial Capacity	
$11,140,000	Good (67%)	Annual Requirement:	$144,246
		Funding Available:	$140,000
		Annual Deficit:	$4,246

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

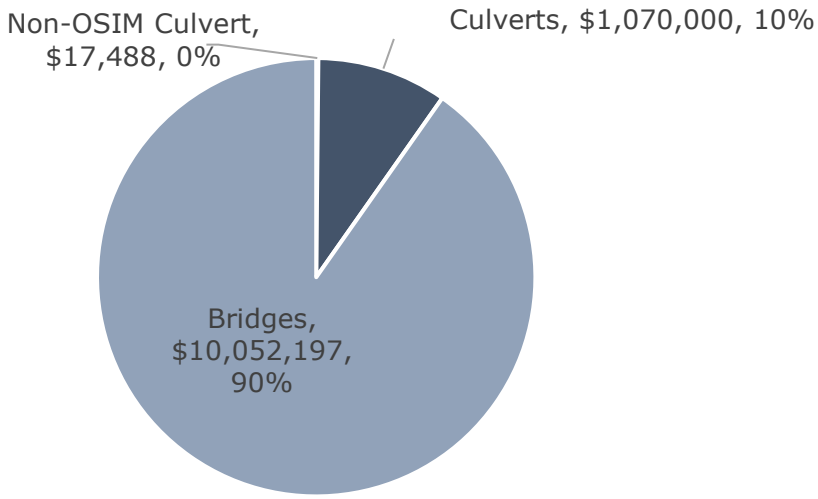
Service Attribute	Level of Service Statement
Scope	Bridges and Culverts are conveniently accessible to the whole community in sufficient capacity (meets traffic demands) and are available under most weather conditions. None of the bridges have dimensional or loading restrictions.
Safe & Regulatory	Thorough inspection of bridges and structural culverts ensures safety and reduces the risk of unplanned closures or potential hazards.
Affordable	The Annual Capital Reinvestment Rate of the Bridges and Culverts is 1.3%.
Reliability	The Bridges and Culverts are in good condition with minimal unplanned service interruptions and bridge closures.

Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Bridges	19	Assets	User-defined	$10,052,000
Culverts	3	Assets	User-defined	$1,070,000
Non-OSIM Culvert	1	Assets	User-defined	$17,000
Total				**$11,140,000**

Error! Reference source not found. chart below displays the replacement cost of e ach asset segment in the Township's bridges and culverts inventory.

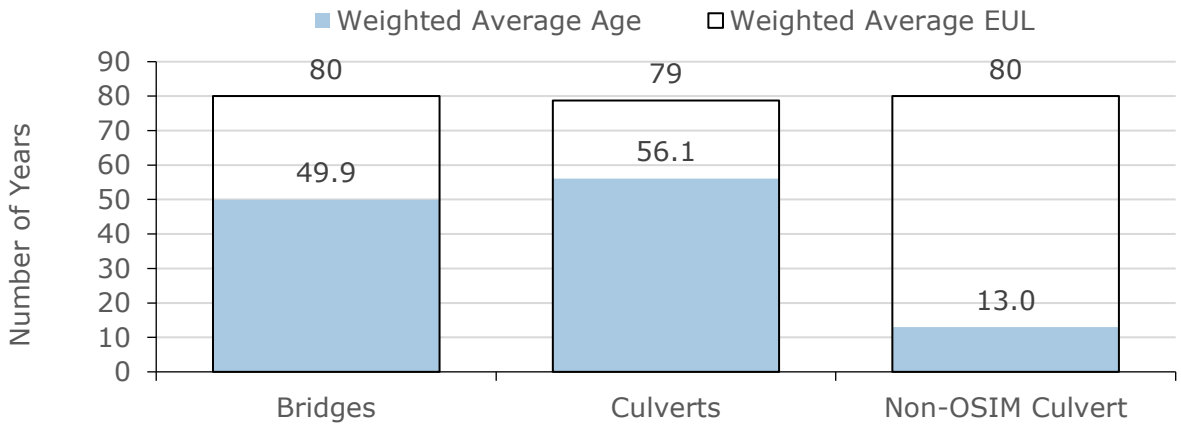


Total Current Replacement Cost: $11,139,685

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).

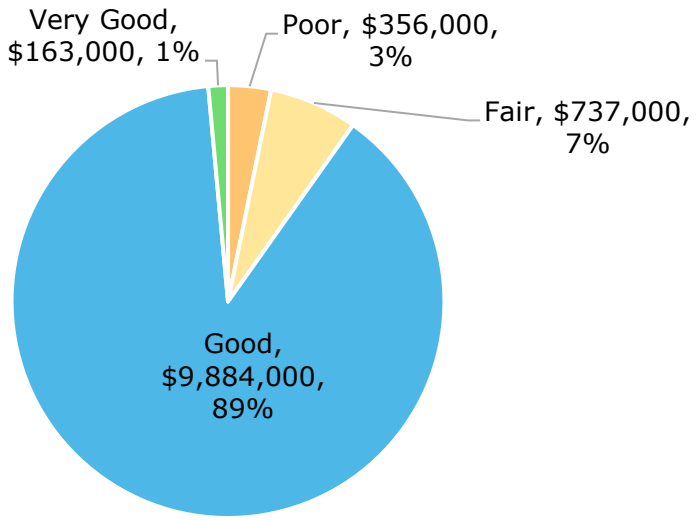
Asset Condition & Age

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

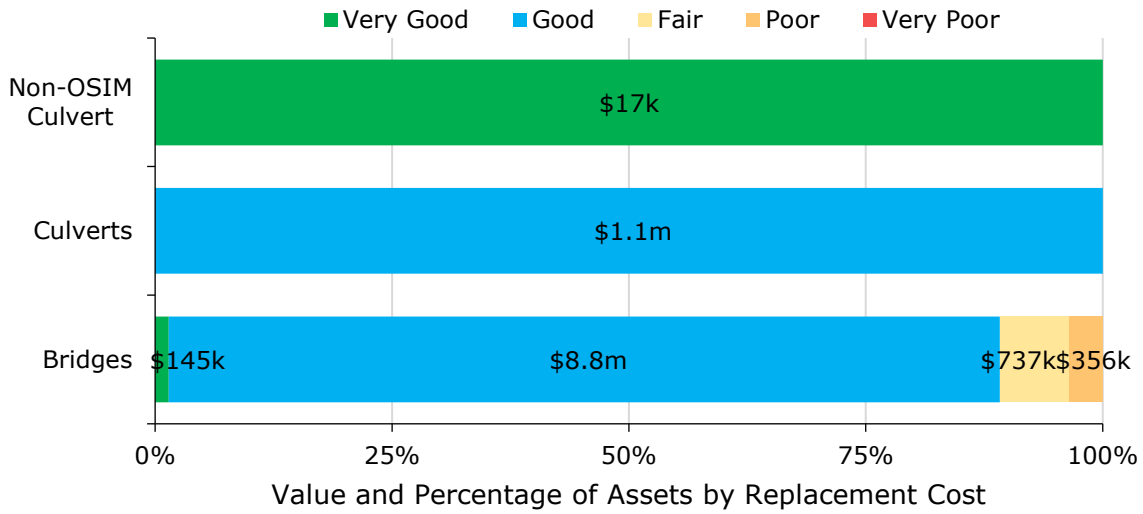


The analysis indicates that, based on in-service dates, bridges are operating below their expected useful life.

The chart below summarizes the replacement cost-weighted condition of the Township's Bridges & Culverts.



As illustrated, 97% of the Township's Bridges & Culverts are in fair or better condition, with further details of condition broken down per asset segment:



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. Cramahe' current approach is to assess the 19 bridges and 3 structural culverts every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM). The most recent assessment was completed in the summer/autumn of 2022 by HP Engineering.

Lifecycle Management Strategy

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

Maintenance

- Annual bridge washing is conducted in the Spring. Other maintenance items include deck sealing, guardrail repair, and expansion joint maintenance as needed
- Snow removal is a significant operating cost. Locations and timing are directed from the Maintenance Standards criteria

Rehabilitation / Renewal / Replacement

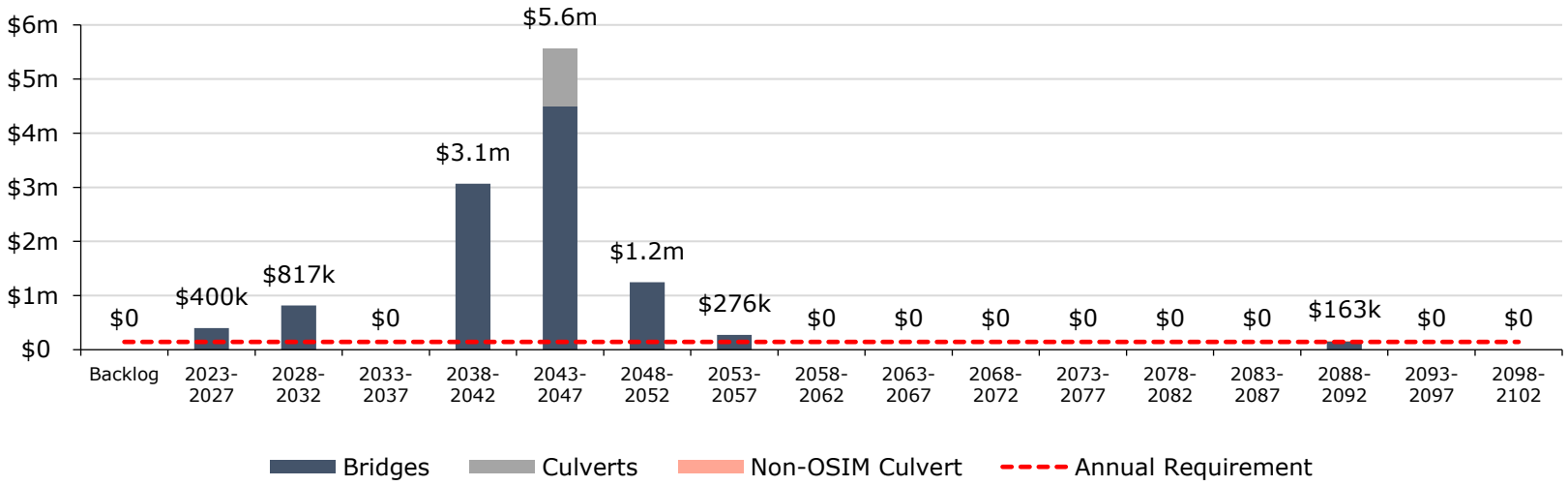
- All lifecycle activities are driven by the results of inspections competed according to the Ontario Structure Inspection Manual (OSIM)

Forecasted Capital Requirements

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

The following analysis was run until 2102, and the resulting graph identifies capital requirements over the next 80 years. Cramahe's average annual requirements (red dotted line) for bridges and culverts total $144 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.

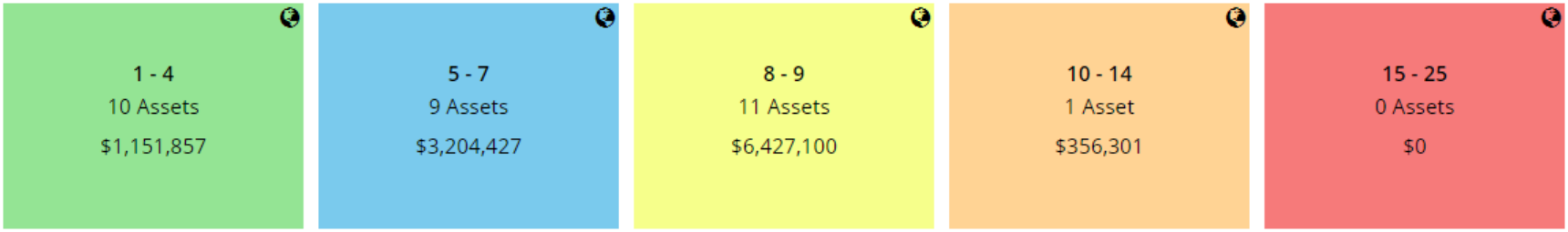


Error! Reference source not found. Table below summarizes the projected cost of lifecycle activities (as p reviously described) that may need to be undertaken over the next 10 years to support current levels of service.

Segment	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Bridges	$0	$0	$400k	$0	$0	$817k	$0	$0	$0	$0
Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Non-OSIM Culvert	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$0**	**$0**	**$400k**	**$0**	**$0**	**$817k**	**$0**	**$0**	**$0**	**$0**

Risk & Criticality

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



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

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

Risks to Current Asset Management Strategies

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

Climate Change & Extreme Weather Events

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

Capital Funding Strategies

Major capital rehabilitation projects for Bridges and Culverts are entirely dependant on the availability of grant funding opportunities. The Township should continue to complete regular inspections according to the Ontario Structural Inspections Manual (OSIMs) and utilize the assessment recommendations for the development of lifecycle strategies and capital planning. The Township should also consider updating asset replacement costs and event costs on a cyclical basis to improve the effectiveness of capital planning.

Levels of Service

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

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

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Accessible & Reliable	% of bridges in the Township with loading or dimensional restrictions	0%
	Number of unplanned structure closures	0[7]
	Average duration of unplanned structure closures	0 days
Safe & Regulatory	% of bridges and structural culverts inspected every two years	100%
Affordable	Annual Capital Reinvestment Rate	1.3%
Quality	Average bridge condition index value for bridges in the Township	66%
	Average bridge condition index value for structural culverts in the Township	69%

[7] The Bailey Road Bridge is currently closed, with no plans for reopening in the foreseeable future. This closure is classified as a planned closure.

Storm Sewer Network

State of the Infrastructure

The Township is responsible for owning and maintaining a storm sewer network of a 6.2 km of storm sewer mains, catch basins and other supporting infrastructure.

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

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

Replacement Cost	Condition	Financial Capacity	
$6,021,000	Good (77%)	Annual Requirement:	$90,821
		Funding Available:	$30,000
		Annual Deficit:	$60,821

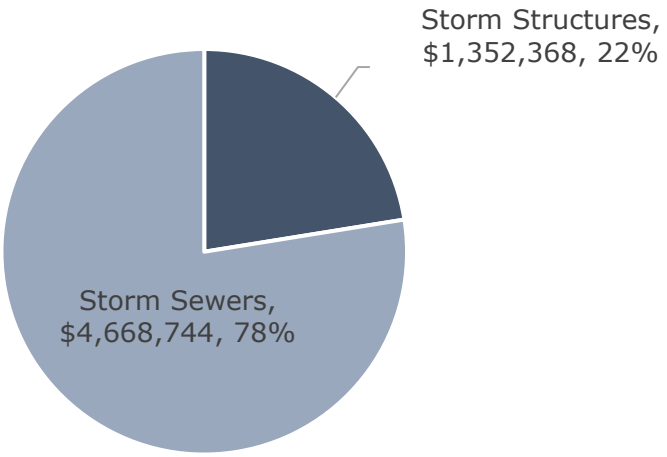
The following core values and level of service statements are a key driving force behind the Township's asset management planning:

Service Attribute	Level of Service Statement
Scope	Some areas of the Township are protected from flooding by the municipal Storm Sewer Network.
Safe & Regulatory	All of Storm Sewer Network within the municipality is resilient to a 5-year storm.
Affordable	The Annual Capital Reinvestment Rate of the Storm Sewer Network is 0.5%.
Performance	The Storm Sewer Network is overall in good condition with average condition rates of 77%, and 88% of the assets are in fair or better condition.

Inventory & Valuation

The table below summarizes the quantity and current replacement cost of the Township's various Storm Sewer Network assets.

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Storm Sewer	6,200	Length (m)	CPI Inflation	$4,669,000
Storm Structures	208	Quantity	CPI Inflation	$1,352,000
Total				**$6,021,000**



Total Current Replacement Cost: $6,021,112

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

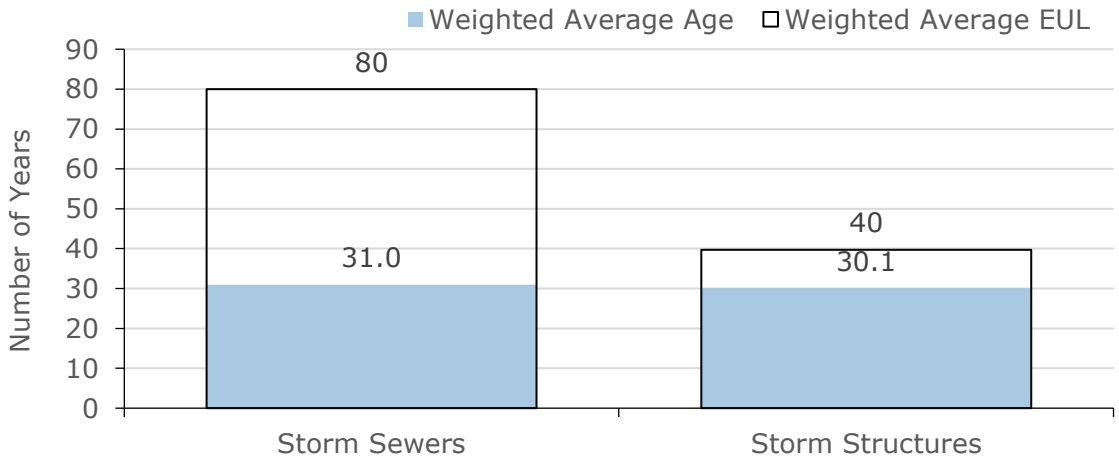
An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age,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

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

The table below summarizes the average age and average EUL of the Township's various Storm Sewer Network assets.

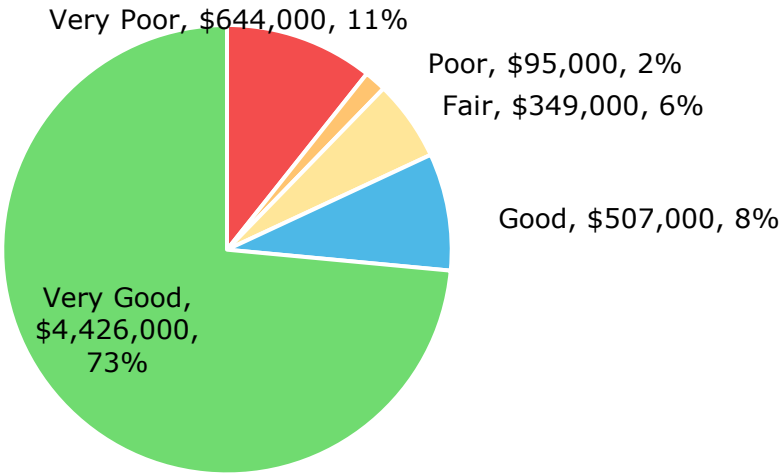
Segment	Weighted Average Age	Weighted Average EUL
Storm Sewer	31.0	80
Storm Structures	30.1	40

The figure below represents the Estimated Useful Life and the Average Age for each segment, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

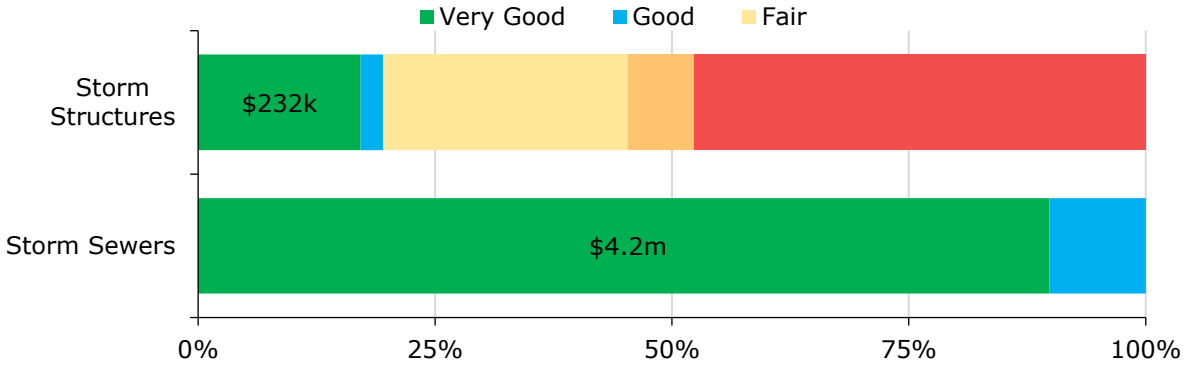


Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

The graph below summarizes the replacement cost-weighted condition of the Township's Storm Sewer Network.



As illustrated, 88% of the Township's Storm Sewer Network assets are in fair or better condition, with further details of condition broken down per asset segment.



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

Current Approach to Condition Assessment

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

- There are no formal condition assessment programs or CCTV Program in place for the Storm Sewer Network
- As the Township refines the available asset inventory for the Storm Sewer Network, a regular assessment cycle should be established

Lifecycle Management Strategy

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

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

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

Maintenance

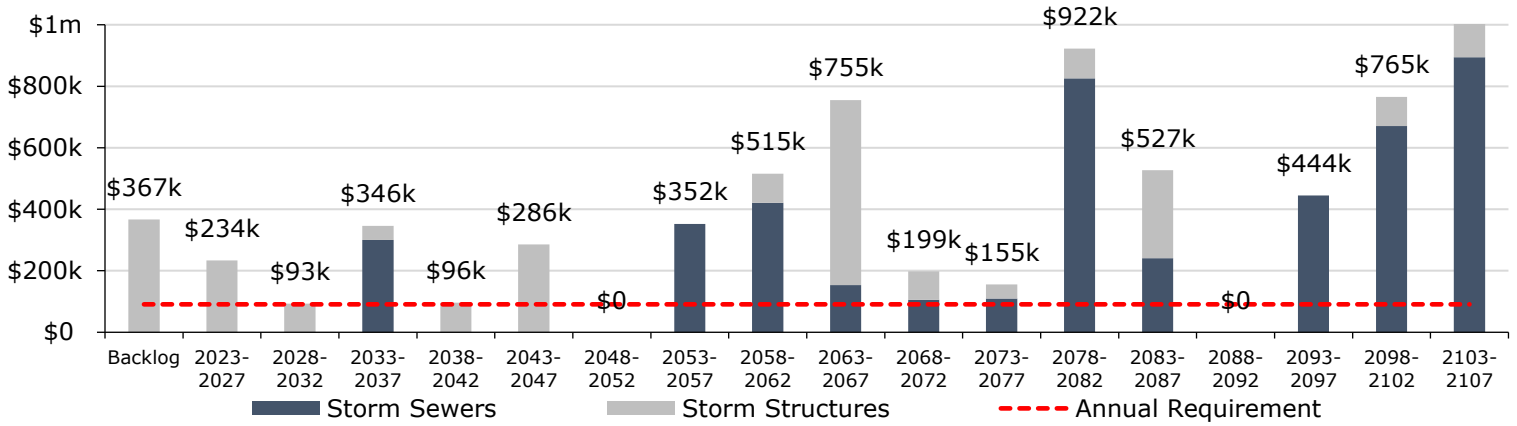
- Driveway culvert maintenance is performed as-needed, generally complaint based. Crushed culverts are replaced, and culverts with significant sedimentation are flushed.
- The road right-of-way is mowed on an annual basis.
- The engineered storm ponds are cleaned on a 10–15-year cycle. Sumps in catch basins are vacuumed out on an annual basis.
- Pipe flushing is performed as needed, removing winter sand buildup.
- Currently, no system-wide flushing or CCTV program in place.

Rehabilitation / Renewal / Replacement

- Trenchless relining is not considered to be an effective strategy for storm pipes, considering they are smaller diameter than sanitary pipes.
- Replacements are failure driven, as this is considered more cost effective than proactive replacements. Since the storm mains are generally lower risk than the road, water, or sanitary network, a reactive strategy is acceptable.

Forecasted Capital Requirements

The graph below illustrates the cyclical short-, medium- and long-term replacement requirements for the Township's Storm Sewer Network. This analysis was run until 2107. The Annual Capital Requirement is $91 thousand, which equals to $455 thousand over a five-year period.



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

The table below summarizes the projected cost of lifecycle activities (maintenance, rehabilitation, and replacements) that will need to be undertaken over the next 10 years to maintain the current level of service. These values are derived from Citywide™. The projections rely on condition data, lifecycle strategies and age data to forecast these values.

Segment	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Storm Sewer	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Storm Structures	$0	$134k	$57k	$43k	$0	$0	$43k	$0	$50k	$0
Total	**$0**	**$134k**	**$57k**	**$43k**	**$0**	**$0**	**$43k**	**$0**	**$50k**	**$0**

Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2022 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.

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

Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies

The current lifecycle management strategy for Storm Sewer Network is considered reactive. There are no formal condition assessment programs in place for the Storm Sewer Network. This poses a risk of service disruption when assets failure occurs. An enhanced proactive strategy can be developed for critical assets to extend the service life of the assets, reduce the risk of service disruption, and reduce grant dependency.

Infrastructure Design & Extreme Weather Events

Past designs of the Storm Sewer Network are currently inadequate since the extreme weather impacts currently are much greater than at the time of design. The design of the Storm Sewer Network is not built to withstand the peak flows and may cause flooding and damage roads. Even though the township has not identified any immediate impacts on service delivery resulting from flooding, it poses a risk when extreme precipitation events is projected to continue. To improve asset resiliency, staff should identify the critical areas and incorporating a monitoring and maintenance program to support infrastructure resiliency and help mitigate the risk.

Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal Storm Sewer Network	A piped drainage system of approximately 6.2 kilometres is present in the Township, mainly located in Colborne. The Storm Sewer Network is consisting of sewer mains, manholes and catch basins. Storm sewer mains are managed in segments from road intersection to road intersection. Refer to Appendix A

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Accessible & Reliable	Number of service requests related to surface flooding	27
Safe & Regulatory	% of properties resilient to a 100-year storm	17.4%[8]
	% of the municipal stormwater system resilient to a 5-year storm	100%
Affordable	Annual Capital Reinvestment Rate	0.5%
Sustainable	% of the Storm Sewer Network that is in good or very good condition	82%
	% of the Storm Sewer Network that is in poor or very poor condition	12%

[8] Of the 1,063 properties in the town, 185 are estimated to be resilient to a 100-year storm in 2022, based on a flood risk study conducted by D.M. Wills Associates Limited in 2024.

Buildings & Facilities

State of the Infrastructure

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

- Keeler Centre
- Art Gallery
- Public Library
- Municipal Offices
- Fire Halls
- Storage Buildings and Garage

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

Replacement Cost	Condition	Financial Capacity	
$19,619,000	Poor (34%)	Annual Requirement:	$599,417
		Funding Available:	$79,915
		Annual Deficit:	$519,502

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

Service Attribute	Level of Service Statement
Performance	The Buildings and Facilities are in poor condition without any reported safety issues, 51% of the Buildings and Facilities are in poor or worse condition.
Accessible & Reliable	The Buildings and Facilities have minimal unplanned facility closures.
Safe & Regulatory	There are minimal user group complaints for municipal Buildings and Facilities

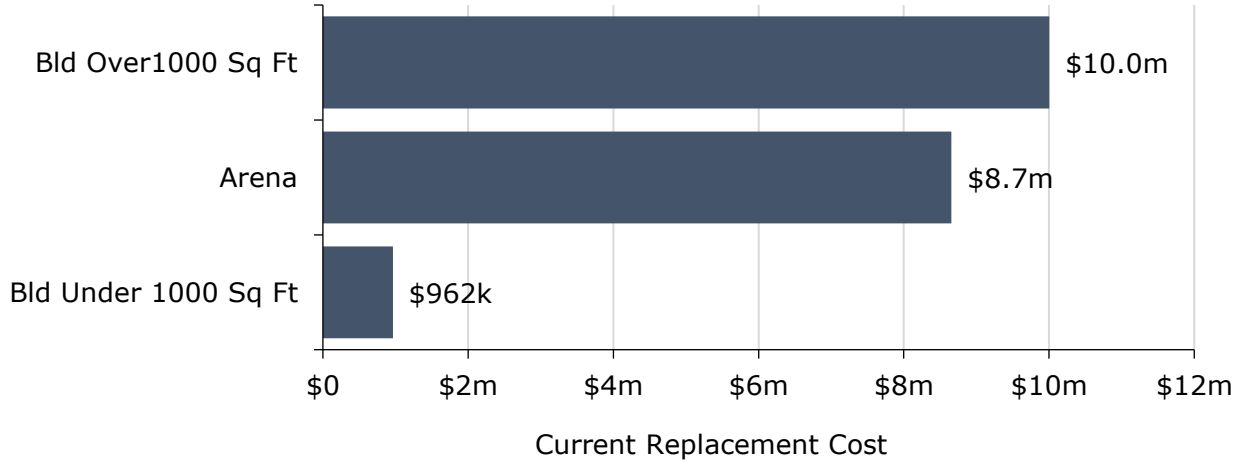
Inventory & Valuation

The Township of Cramahe Buildings & Facilities has a current replacement cost of $19.6 million.

The table below summarizes the quantity and current replacement cost of the Township's various Buildings & Facilities.

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Arena	1 (85)	Assets	CPI	$8,653,000
Bld Over 1000 Sq Ft	9 (31)	Assets	CPI	$10,003,000
Bld Under 1000 Sq Ft	7 (9)	Assets	CPI	$962,000
Total	**17**	**Assets**		**$19,619,000**

Total Current Replacement Cost: $19,618,707



Asset Condition & Age

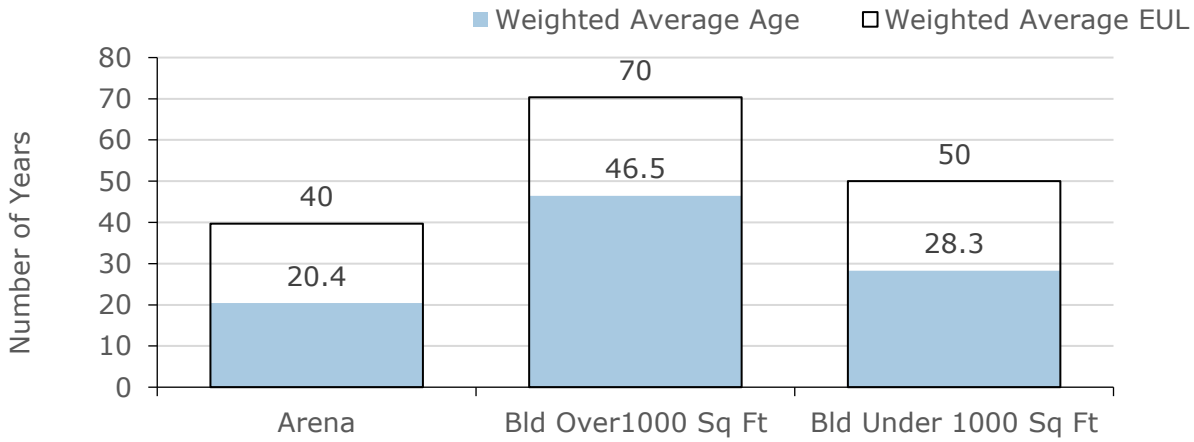
An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age,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

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

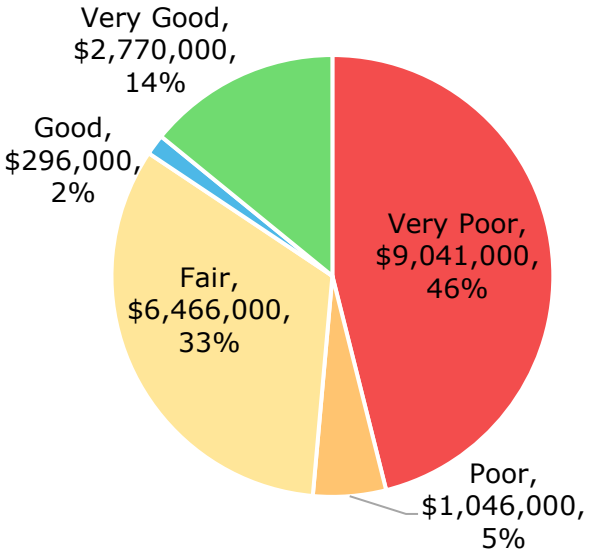
The table below summarizes the average age and average EUL of the Township's various Buildings & Facilities.

Segment	Weighted Average Age	Weighted Average EUL
Arena	20.4	40
Bld Over1000 Sq Ft	46.5	70
Bld Under 1000 Sq Ft	28.3	50

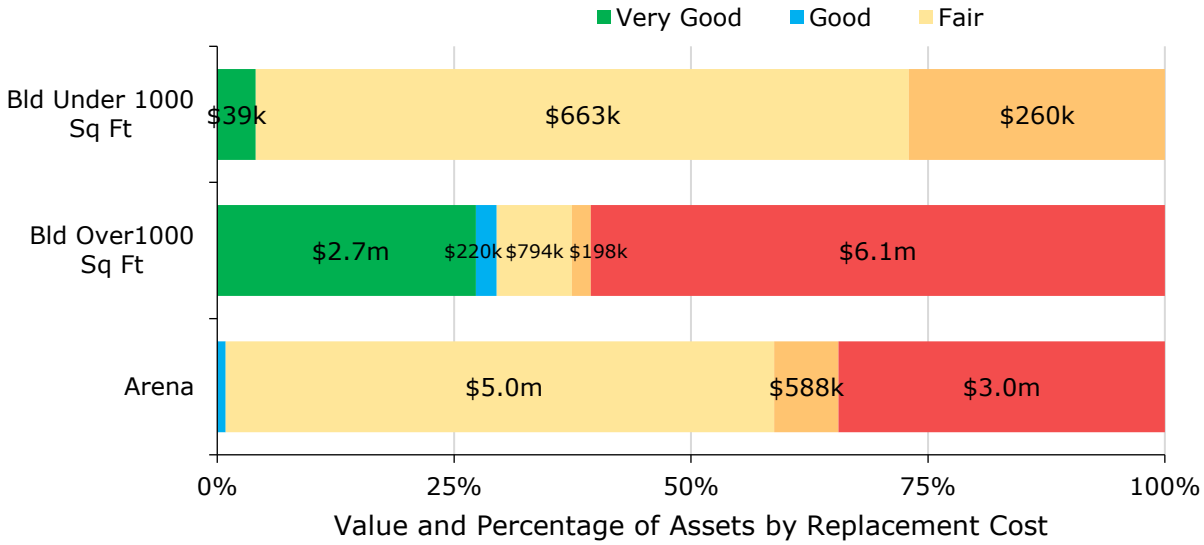
The graph below identifies the average age, and the estimated useful life for each asset segment. The values are weighted based on replacement cost.



The graph below summarizes the replacement cost-weighted condition of the Township's Buildings and Facilities.



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



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

- Health and safety inspection by internal staff is completed monthly
- Municipal buildings are subject to internal inspections on an as-needed basis
- Currently, there are no formal condition structural assessment programs for building assets in place

Lifecycle Management Strategy

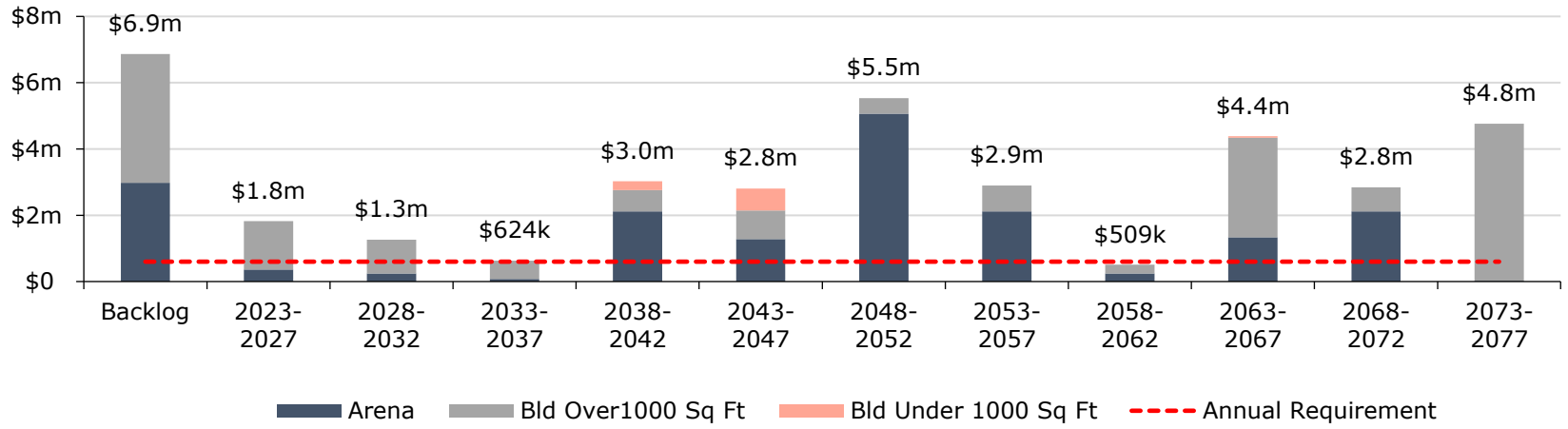
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the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

Maintenance / Rehabilitation / Replacement

- Municipal buildings are subject to regular inspections for health & safety requirements
- Maintenance activities are undertaken as a result of internal inspections, prioritizing activities related to health and safety and regulatory compliance.
- Critical buildings (Fire Stations etc.) have a regular inspection, maintenance and rehabilitation schedule
- Currently no maintenance and rehabilitation schedule for municipal builidngs in place, the maintenance are dealt with on needed basis
- Refurbishments and replacements are projected out for the next 1–2 years. The Township is moving towards a 5–10 year proactive planning horizon.

Forecasted Capital Requirements

The graph below illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's Buildings & Facilities. This analysis was run until 2077. The Annual Capital Requirement is $599 thousand, which equals to $3.0 million over a five-year period.



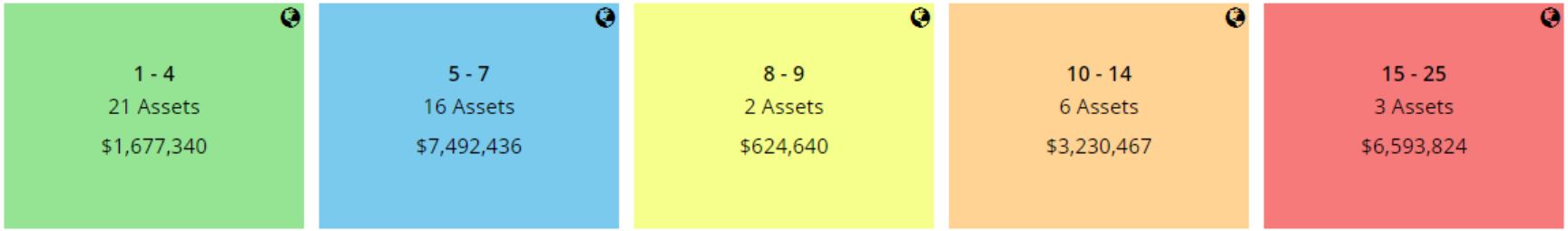
Error! Reference source not found. Table below summarizes the projected cost of lifecycle activities (capital a ctivities only) that may need to be undertaken over the next 10 years to support current levels of service.

Segment	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Arena	$0	$0	$0	$365k	$0	$0	$0	$0	$243k	$0
Bld Over1000 Sq Ft	$247k	$1.1m	$0	$153k	$0	$46k	$0	$863k	$112k	$0
Bld Under 1000 Sq Ft	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$247k**	**$1.1m**	**$0**	**$518k**	**$0**	**$46k**	**$0**	**$863k**	**$355k**	**$0**

These estimates are developed at the asset level and are based on available asset data, including quantities, replacement costs, age, or assessed condition. They can be different from actual capital forecasts. Consistent data updates, particularly condition, and asset acquisitions and disposals 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 D: 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 risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Risks to Current Asset Management Strategies

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

Growth & Demographic Change

The population of the Township is projected to grow to 7,013 by 2034. The Township needs to prioritize expanding its capacity to serve a larger population. Residents that have moved from larger urban centres have a higher expectation on buildings and facilities. On the other hand, a significant portion of the population will be approaching retirement in the next decade. As residents are aging, there will be more demand for accessibility services, and health services in general. The Township is required to increase capital and operating costs for expanding services, enhance accessibility. Setting realistic levels of service targets and developing a comprehensive long-term capital plan with considerations for growth can be helpful to increase the capacity strategically.

Aging Infrastructure & Capital Funding Strategies

Many building assets in the Township are reaching the end of their estimated useful life. There is currently a backlog of approximately $13.2M for all assets, with Buildings & Facilities accounting for $6.7M. Several buildings require replacements of major components in the coming years. Major capital rehabilitation projects for buildings and facilities will be heavily reliant on the availability of grant funding opportunities. The Township should consider performing internal building structure inspections on a regular cycle and document all deficiencies. With the inspection data, a 5-to-10-year proactive facilities replacement /rehabilitation plan can be developed to reduce grant dependency and prevent deferral of capital works.

Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Accessible & Reliable	Number of unplanned facility closures	1
	Square Meter of indoor recreation facilities per 1,000 people	663.54m^2
Safe & Regulatory	Number of user group complaints	0[9]
	Number of health and safety inspections per facility	12
	Number of service requests about unsafe conditions in facilities	0
	Total equivalent kWh energy consumption / m^2 of all buildings and facilities	188.37
	Annual Capital Reinvestment Rate	0.4%
	Percentage of facilities that are in good or very good condition	16%
	Percentage of facilities that are in poor or very poor condition	51%

[9] User complaints are currently tracked via email; however, the municipality plans to transition tracking to AM Software for improved management in the future.

Parks & Recreations

State of the Infrastructure

The Township owns a number of parks and recreation assets, including:

- Athletic Fields, Tennis Courts
- Parking Lots
- Playground
- Bike Paths and Walking Trails

The state of the Parks and Recreation assets are summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$1,921,000	Poor (23%)	Annual Requirement:	$69,604
		Funding Available:	$17,788
		Annual Deficit:	$51,817

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

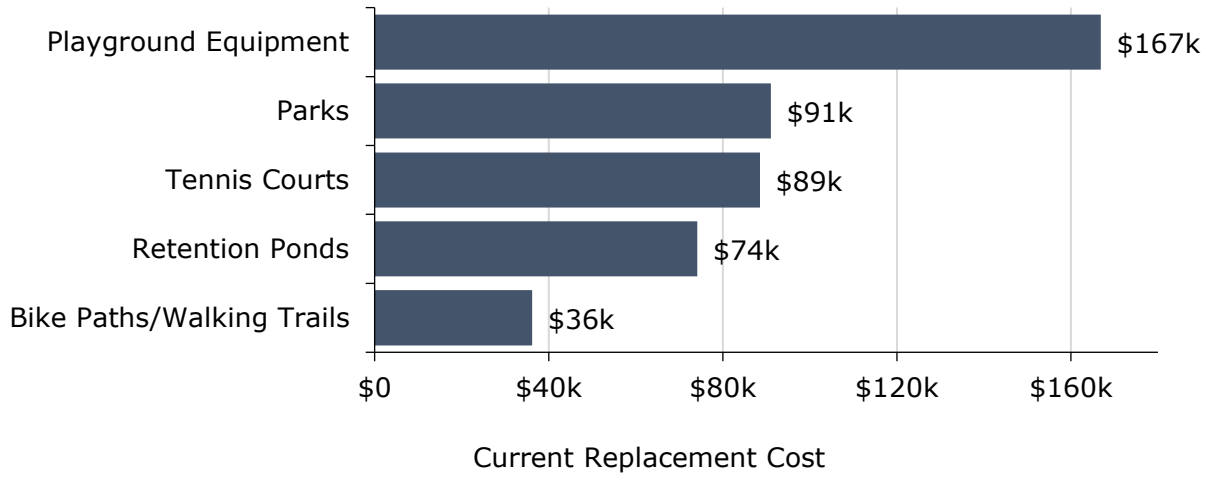
Service Attribute	Level of Service Statement
Performance	The Parks and Recreation assets owned by the Township are in overall poor condition with average condition rate of 23%, and 63% of the Parks and Recreation assets are in poor or very poor condition.
Safe & Regulatory	The playground or park are inspected once a month however there are service requests about unsafe condition.
Affordable	The Annual Capital Reinvestment Rate for Parks and Recreation Assets is 0.9%.

Asset Inventory & Valuation

The Township of Cramahe Parks & Recreation have a current replacement cost of $1.9 million.

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Athletic Fields	5 (18)	Assets, Components	CPI	$1,220,000
Bike Paths/Walking Trails	2	Assets	CPI	$36,000
Parking Lots	7	Assets	CPI	$244,000
Parks	1 (87)	Assets, Components	CPI	$91,000
Playground Equipment	2	Assets	CPI	$167,000
Retention Ponds	1	Assets	CPI	$74,000
Tennis Courts	1 (2)	Assets, Components	CPI	$89,000
Total	**19**	**Assets**		**$1,921,000**

Total Current Replacement Cost: $1,921,283



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

Asset Condition & Age

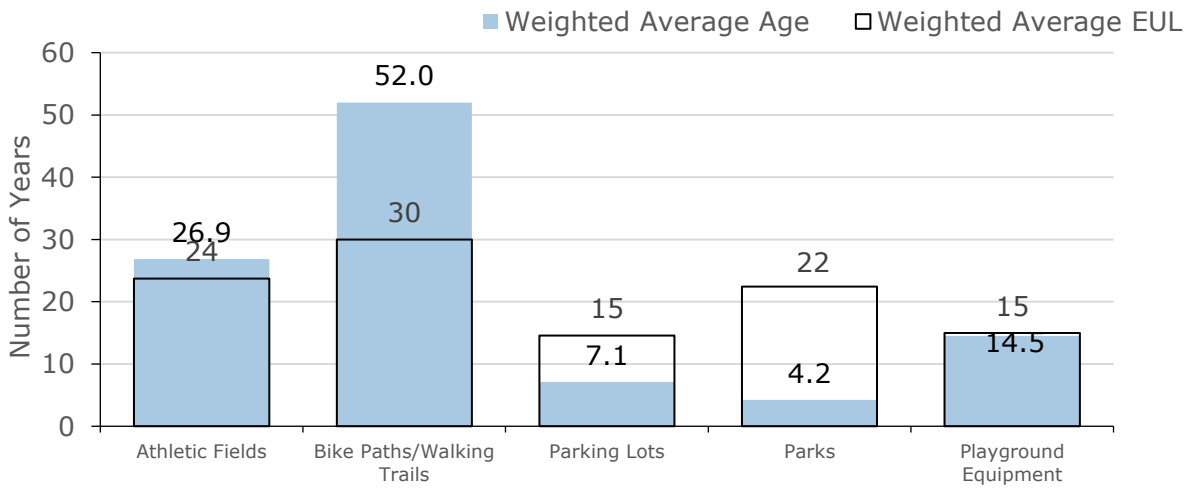
An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age,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

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

The table below summarizes the average age and average EUL of the Township's various Parks & Recreation assets.

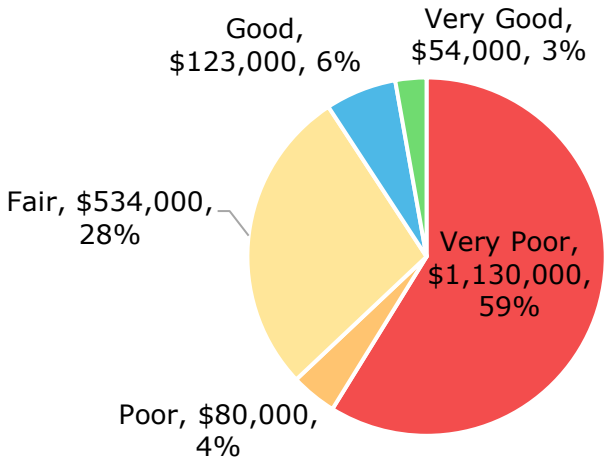
Segment	Weighted Average Age	Weighted Average EUL
Athletic Fields	26.9	24
Bike Paths/Walking Trails	52.0	30
Parking Lots	7.1	15
Parks	4.2	22
Playground Equipment	14.5	15
Retention Ponds	13.0	30
Tennis Courts	2.2	3

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

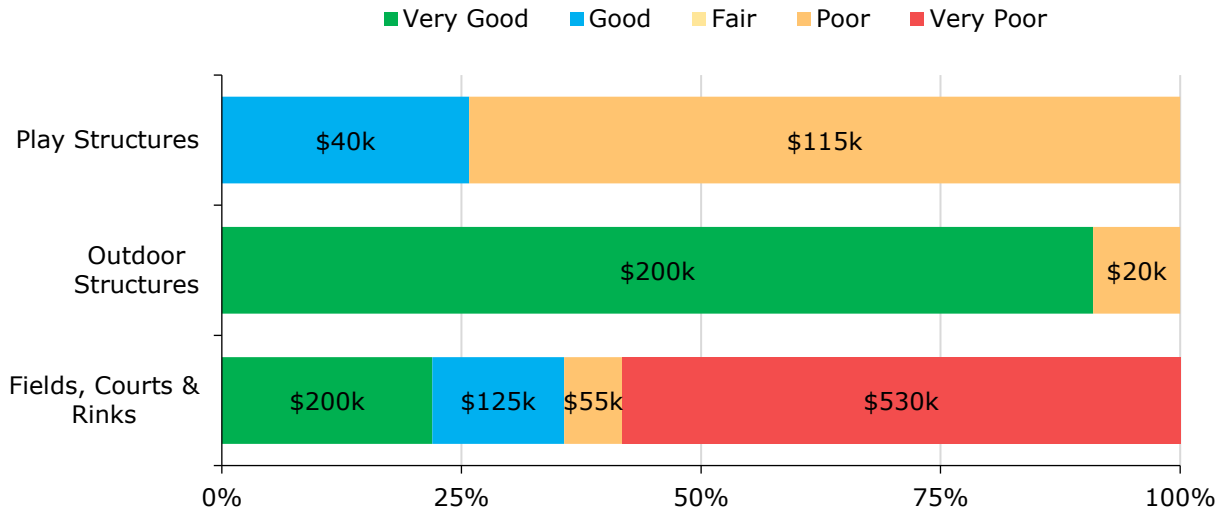


Each asset's estimated useful life should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

The chart below summarizes the replacement cost-weighted condition of the Township's Parks & Recreation.



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



To ensure that the Township's Parks and Recreation 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 Parks and Recreation.

Current Approach to Condition Assessment

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

- Regular visual inspections of parks are completed by in-house staff on a weekly basis
- Play structures are inspected by in-house staff on a monthly basis for CSA compliance
- Sports fields are inspected monthly, or in response to user group planning

Lifecycle Management Strategy

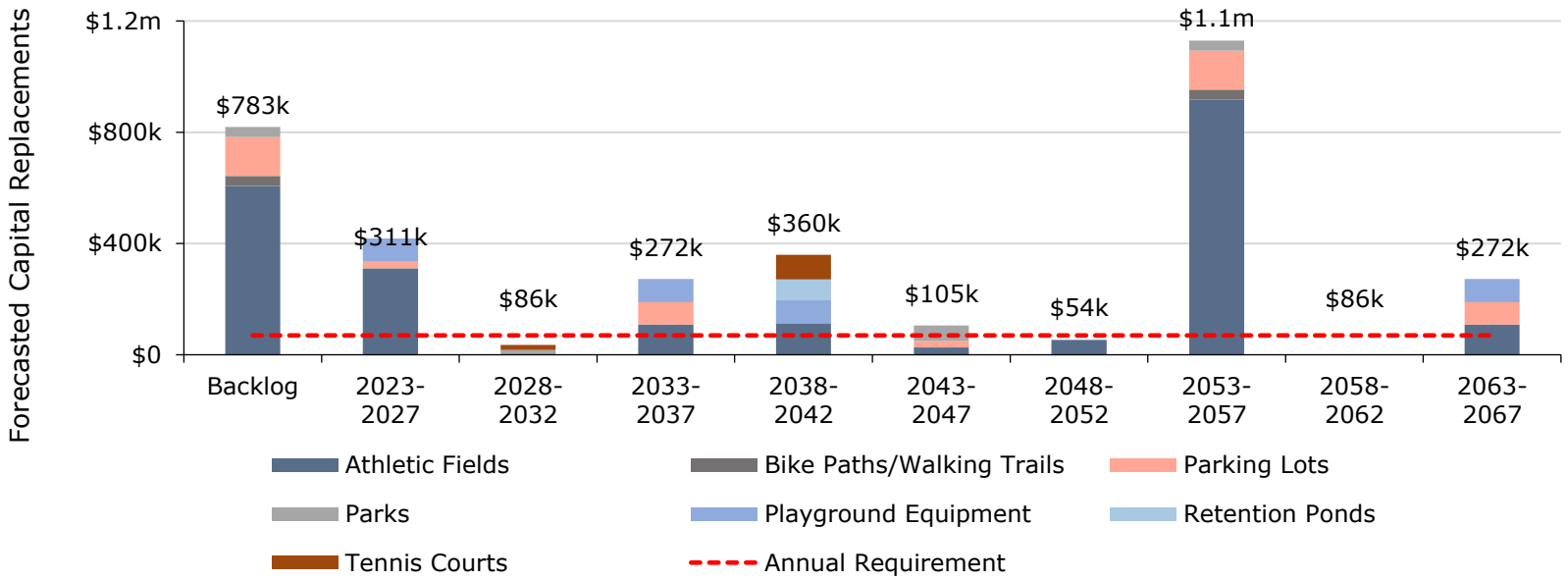
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the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

Maintenance / Rehabilitation / Replacement

- Parks are subjected to scheduled mowing and landscaping, prescribed by asset usage and season
- All trails are seasonal and do not require winter maintenance. In the past trail inspection and maintenance was undertaken by a volunteer group; going forward the Township will maintain trails
- Asset that falls in operating budget are replaced until it reaches its end-of-life

Forecasted Capital Requirements

The graph below illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's Parks & Recreation. This analysis was run until 2067. The Annual Capital Requirement is $70 thousand, which equals to $350 thousand over a five-year period.



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

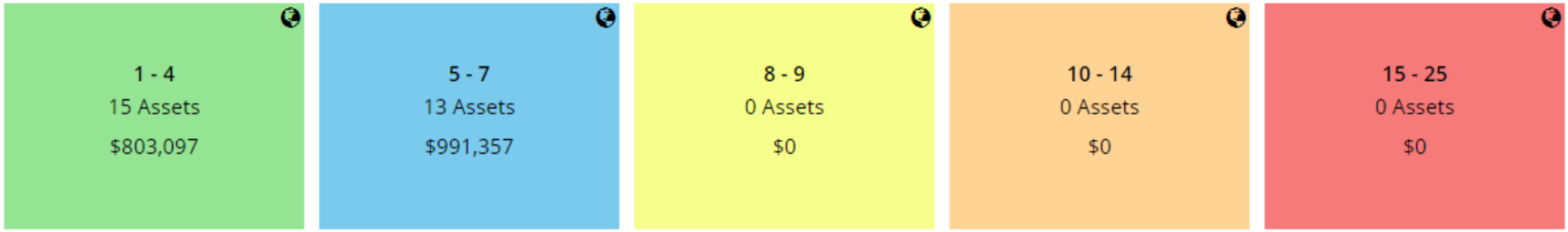
The table below summarizes the projected cost of lifecycle activities (maintenance, rehabilitation, and replacements) that will need to be undertaken over the next 10 years to maintain the current level of service. These values are derived from Citywide™. The projections rely on condition data, lifecycle strategies and age data to forecast these values.

Segment	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Athletic Fields	$0	$311k	$0	$0	$0	$0	$0	$0	$0	$0
Bike Paths/Walking Trails	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Parking Lots	$0	$0	$0	$0	$0	$24k	$0	$0	$0	$0
Parks	$0	$0	$18k	$0	$0	$0	$0	$0	$0	$0
Playground Equipment	$0	$0	$84k	$0	$0	$0	$0	$0	$0	$0
Retention Ponds	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tennis Courts	$0	$0	$0	$18k	$0	$0	$0	$0	$0	$0
Total	**$0**	**$311k**	**$101k**	**$18k**	**$0**	**$24k**	**$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 D: 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 risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Risks to Current Asset Management Strategies

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

Growth & Community Expectations

The Census data indicates that the population of the Township has grown to 6509 in 2021, and it is projected to grow to 7,013 by 2034. The residents in the Township expect to have more Parks and Recreation assets, such as basketball courts, tennis courts and trails. The Township is required to increase capital and operating costs for expanding capacity and maintain current levels of service. Finding a balance between meeting service demands and maintaining affordability will require the Township to employ strategic lifecycle management and prioritization of critical assets.

Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Safe & Regulatory	Number of service requests about unsafe conditions in parks	2
	Number of inspections per playground/park per month	1
Affordable	Annual Capital Reinvestment Rate	0.9%
Sustainable	Percentage of parks and recreation assets that are in good or very good condition	9%
	Percentage of parks and recreation assets that are in poor or very poor condition	54%

Machinery & Equipment

State of the Infrastructure

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

- Fire equipment to support the delivery of emergency services
- Public Work equipment to provide winter control activities and support transportation services
- Other equipment to support administration services and community services

Keeping Machinery & Equipment in an adequate state of repair is important to maintain a high level of service.

The state of the infrastructure for Machinery & Equipment is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$1,630,000	Fair (55%)	Annual Requirement:	$179,927
		Funding Available:	$175,659
		Annual Deficit:	$4,268

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

Service Attribute	Level of Service Statement
Performance	The machinery and equipment owned by the Township are overall in good condition with average condition rate of 55%, and 66% of the Machinery & Equipment is in good or very good condition.
Safe & Regulatory	All regulated maintenance and inspection activities have been completed on Machinery & Equipment.
Affordable	The Annual Capital Reinvestment Rate for Machinery and Equipment is 10.8%.

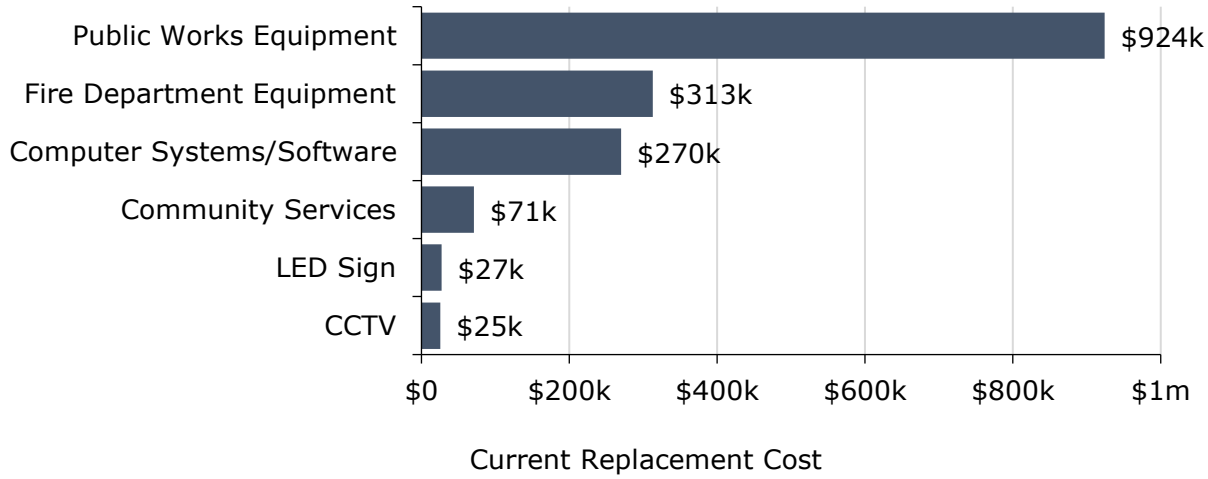
Inventory & Valuation

Machinery & Equipment in Cramahe comprises a current replacement cost of $1.6 million.

The table below summarizes the quantity and current replacement cost of the Township's various Machinery & Equipment.

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
CCTV	1	Assets	CPI Inflation	$25,000
Community Services	4	Assets	CPI Inflation	$71,000
Computer Systems/Software	3	Assets	CPI Inflation	$270,000
Fire Department Equipment	102	Assets	CPI Inflation	$313,000
LED Sign	1	Assets	CPI Inflation	$27,000
Public Works Equipment	36	Assets	CPI Inflation	$924,000
Total	**147**	**Assets**		**$1,630,000**

Total Current Replacement Cost: $1,630,386



Current Replacement Cost

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

Asset Condition & Age

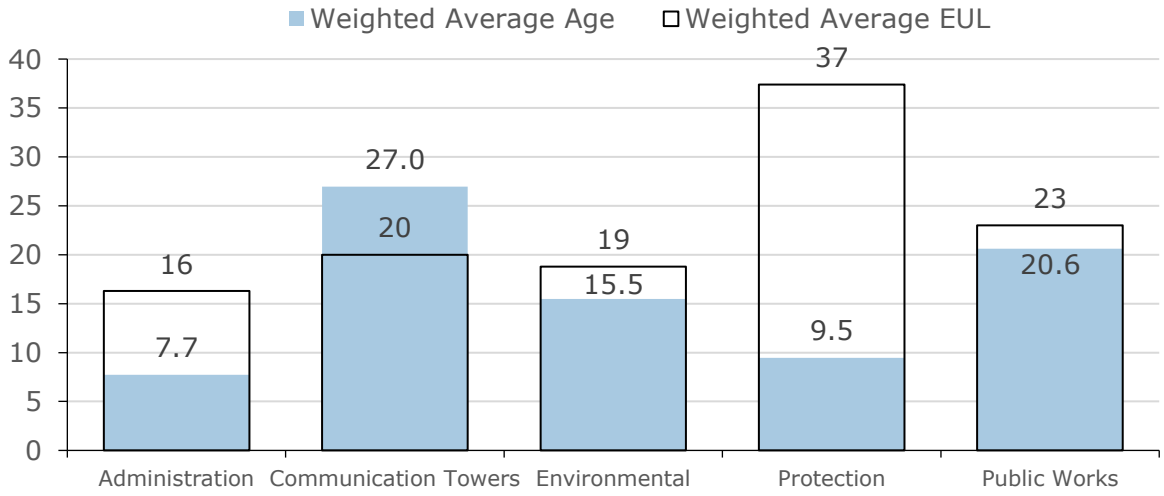
An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age,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

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

The table below summarizes the average age and average EUL of the Township's various machinery & equipment.

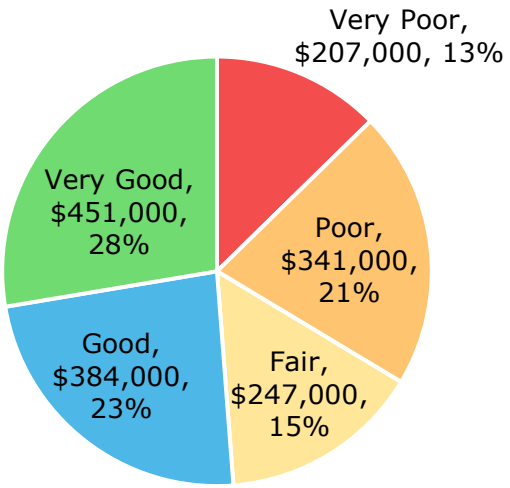
Segment	Weighted Average Age	Weighted Average EUL
CCTV	1.0	5
Community Services	10.2	7
Computer Systems/Software	3.6	5
Fire Department Equipment	5.8	13
LED Sign	17.0	25
Public Works Equipment	3.9	13

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

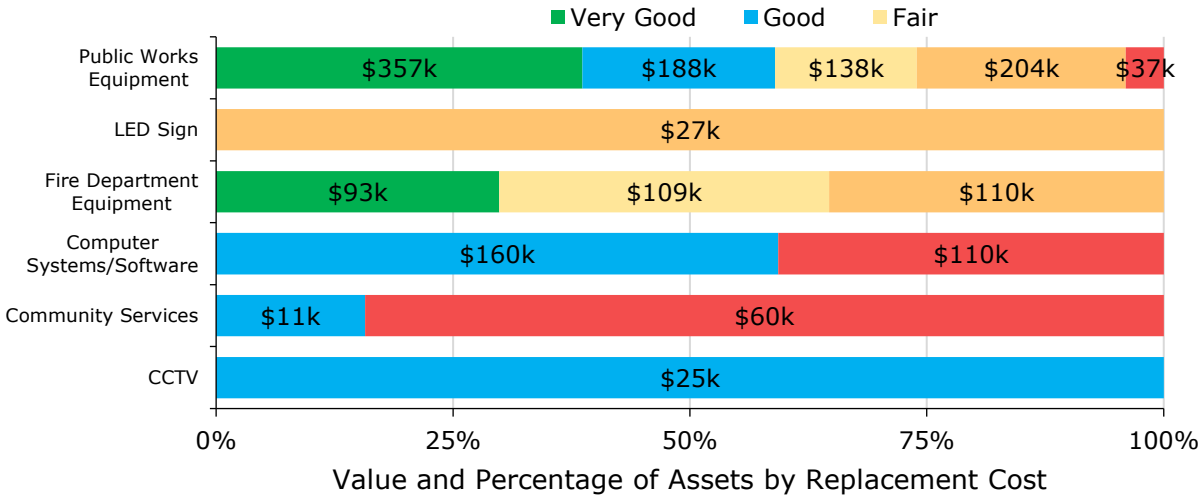


Each asset's estimated useful life should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

The graph below summarizes the replacement cost-weighted condition of the Township's Machinery & Equipment.



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



To ensure that the Township's equipment continues to provide an acceptable level of service, Cramahe 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 more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Personal protective equipment (PPE) is sent to the manufacturer annually for testing. Repairs are made as needed based on the results.
- SCBAs are subject to annual bench testing to ensure functioning as per National Fire Protection Agency (NFPA) requirements.
- Gas detection equipment is bump tested after every use to recalibrate the sensors.
- Other fire equipment, such as the radios, Jaws of Life, and portable pumps, are subject to annual testing. Health and Safety standards govern the functionality of this equipment, and repairs are made to reduce risk of failure.
- Public Works equipment is generally inspected and maintained on a seasonal, or as-needed basis. Significant equipment, such as plow blades, are managed for functionality as per Maintenance Standards. However, there is no formal condition assessment program in place.
- Parks equipment is inspected every Spring. Smaller equipment is inspected on a daily basis as they are used. However, the Zamboni is inspected twice annually and sent to the manufacturer for an overhaul if required.

Lifecycle Management Strategy

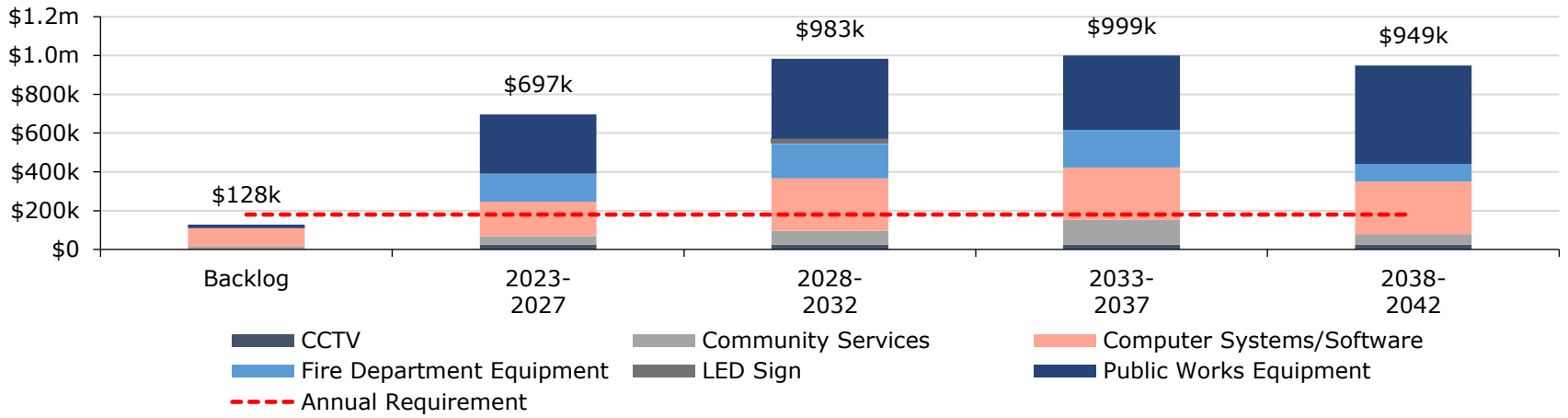
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

Maintenance / Rehabilitation / Replacement

- Maintenance program varies by department
- Annual inspections and cleaning for equipment are completed
- Fire Protection Services equipment is subject to a much more rigorous inspection and maintenance program compared to most other departments
- Machinery and Equipment is maintained according to per Maintenance Standards, manufacturer recommended actions and supplemented by the expertise of municipal staff
- The replacement of Machinery and Equipment depends on its expected useful life, usage and deficiencies identified by operators that may impact their ability to complete required tasks.
- Fire equipment is replaced on schedules defined by the Health and Safety Act, and manufacturer recommendations. Specifically, Helmets and PPE are replaced on a 10-year schedule for compliance.

Forecasted Capital Requirements

The graph below illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's machinery & equipment. This analysis was run until 2042. The Annual Capital Requirement is $180 thousand, which equals $900 thousand over a five-year period.



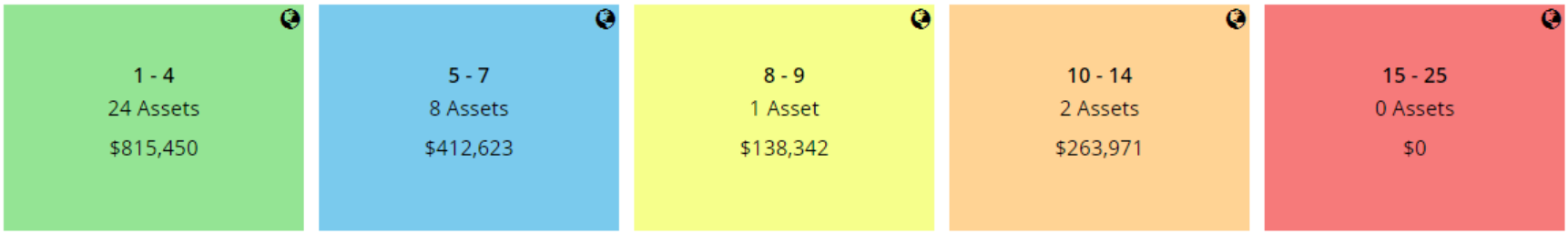
The table below summarizes the projected cost of lifecycle activities (capital replacement only) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

Segment	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
CCTV	$0	$0	$0	$25k	$0	$0	$0	$0	$25k	$0
Community Services	$0	$43k	$0	$0	$0	$11k	$0	$17k	$43k	$0
Computer Systems/Software	$17k	$0	$0	$160k	$0	$110k	$0	$0	$160k	$0
Fire Department Equipment	$0	$0	$102k	$0	$43k	$39k	$0	$48k	$61k	$29k
LED Sign	$0	$0	$0	$0	$0	$0	$27k	$0	$0	$0
Public Works Equipment	$0	$19k	$32k	$0	$255k	$0	$0	$0	$328k	$84k
Total	**$17k**	**$61k**	**$134k**	**$186k**	**$298k**	**$160k**	**$27k**	**$65k**	**$618k**	**$113k**

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 D: 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.

Risks to Current Asset Management Strategies

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

Community Expectations

The Township is primarily a rural township, a significant portion of its population work in neighboring cities. Residents form larger urban centres may bring with them an expectation of higher level of service. Currently, the Township does not have the population density and user base to afford these expectations. An example is that requiring additional equipment and resources for road cleaning and building maintenance. Developing a comprehensive long-term capital plan with considerations for growth and proactive lifecycle strategy can be helpful to minimize dependency on grant funding and improve the efficiency.

Aging Infrastructure and Funding Strategies

As Machinery & Equipment age, they will require increasing O&M costs to function adequately. As capital budgets become more constrained, more maintenance will be postponed, which will further amplify this risk. Replacement and major rehabilitation of the Machinery & Equipment are entirely dependant on the availability of reserve fund. Commit to a dedicated equipment reserve contribution can avoid service disruption when the equipment fails. The Township should also consider updating asset replacement costs and event costs on a cyclical basis to improve the effectiveness of capital planning.

Levels of Service

The following table outlines the Township's current qualitative descriptions that determine the community levels of service provided by the Machinery & Equipment.

Service Attribute	Technical Metric	Current LOS (2022)
Accessible & Reliable	Percentage of equipment with preventative maintenance overdue	0%
Safe & Regulatory	Percentage of safety equipment used beyond its recommended life	0%
	Percentage of Ministry/Safety regulated maintenance and inspection activities completed	100%
Affordable	Annual Capital Reinvestment Rate	10.8%
Sustainable	Percentage of Machinery and Equipment assets that are in good or very good condition	51%
	Percentage of Machinery and Equipment assets that are in poor or very poor condition	34%

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:

- Public Works vehicles for winter control activities and the maintenance of the Transportation Network
- Fire vehicles to provide emergency services
- Community Services vehicles to address service requests in the Community and maintain the Buildings and Facilities

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

Replacement Cost	Condition	Financial Capacity	
$6,371,000	Poor (39%)	Annual Requirement:	$524,064
		Funding Available:	$204,781
		Annual Deficit:	$319,283

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

Service Attribute	Level of Service Statement
Performance	The Vehicles owned by the Township are in overall poor condition with average condition rate of 39%, and 64% of the vehicles are in poor or worse condition.
Accessible & Reliable	Most of the vehicles in service can perform its primary function.
Safe & Regulatory	All the vehicles have completed the regulated MTO maintenance inspections.
Affordable	The Annual Capital Reinvestment Rate for vehicles is 3.2%.

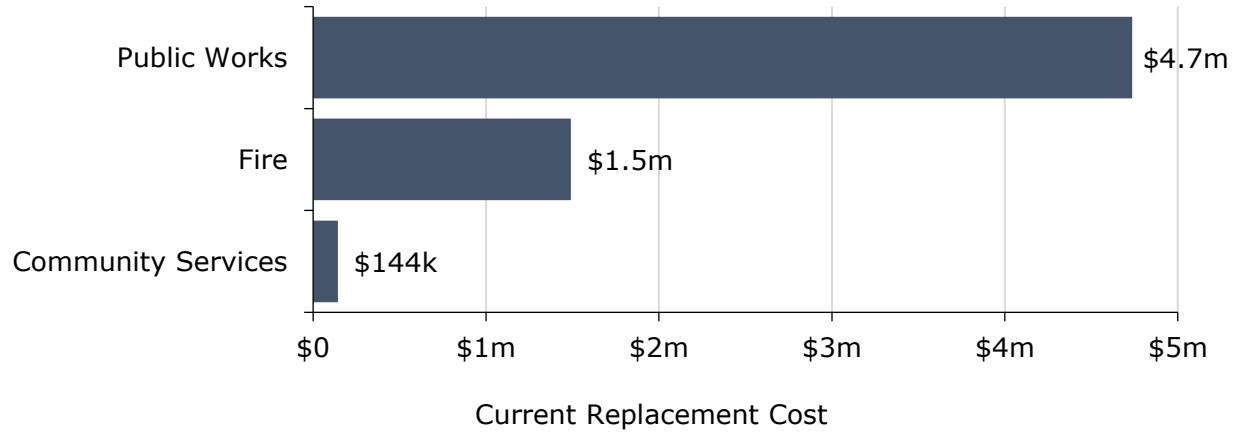
Inventory & Valuation

Cramahe's Vehicles have a current replacement cost of $6.3 million.

The table below summarizes the quantity and current replacement cost of the Township's various vehicles.

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Community Services	3	Assets	CPI Inflation	$144,000
Fire	8	Assets	CPI Inflation	$1,490,000
Public Works	26	Assets	CPI Inflation	$4,736,000
Total	**37**	**Assets**		**$6,371,000**

Total Current Replacement Cost: $6,370,719



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

Asset Condition & Age

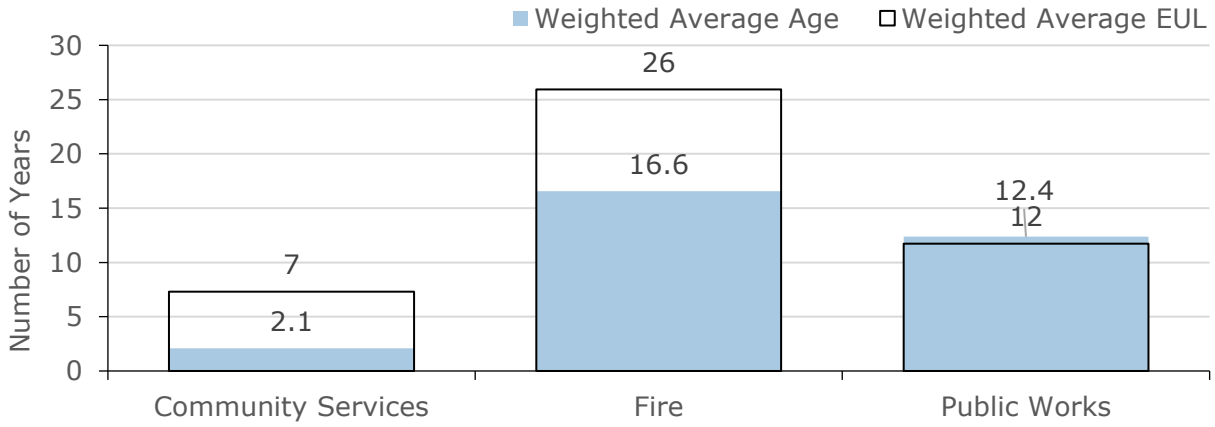
An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age,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

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

The table below summarizes the average age and average EUL of the Township's various vehicle assets.

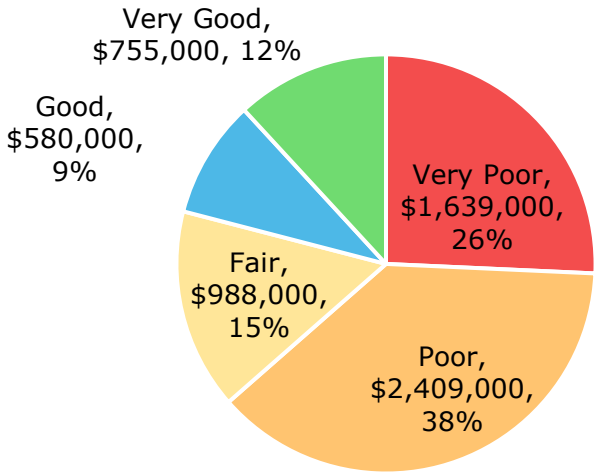
Segment	Weighted Average Age	Weighted Average EUL
Community Services	2.1	7
Fire	16.6	26
Public Works	12.4	12

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

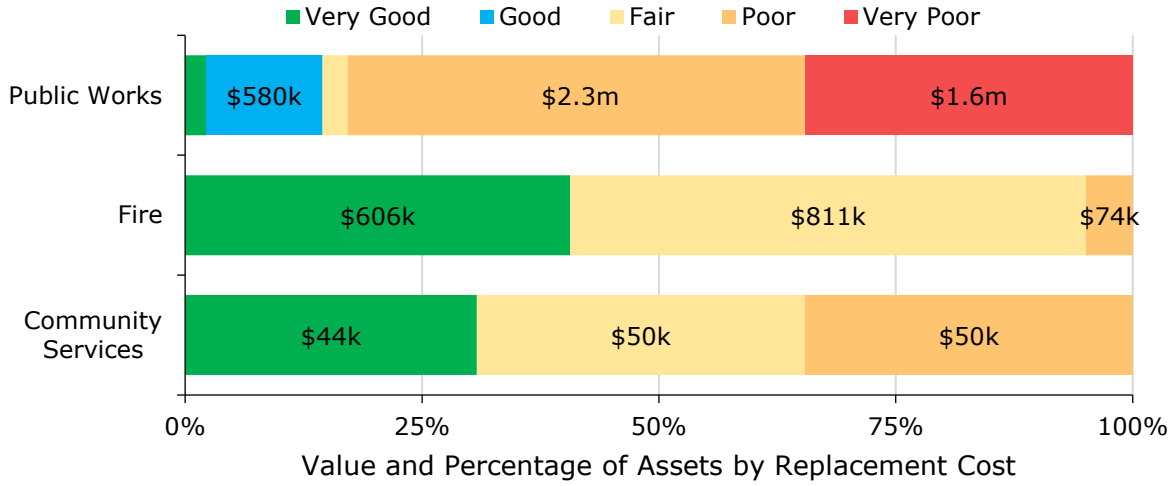


Each asset's estimated useful life should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

The graph below summarizes the replacement cost-weighted condition of the Township's Vehicles.



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



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

Current Approach to Condition Assessment

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

- Visual inspections on vehicles are completed and documented by in-house staff to ensure they are in state of adequate repair prior to operation.
- CVOR vehicles have detailed inspections on an annual basis.
- Non-CVOR vehicle inspections have less formality and are completed mainly for safety on a regular basis.
- Fire apparatus on trucks have annual pump testing from emergency vehicle technicians. Pump functionality is tested on weekly basis in house.

Lifecycle Management Strategy

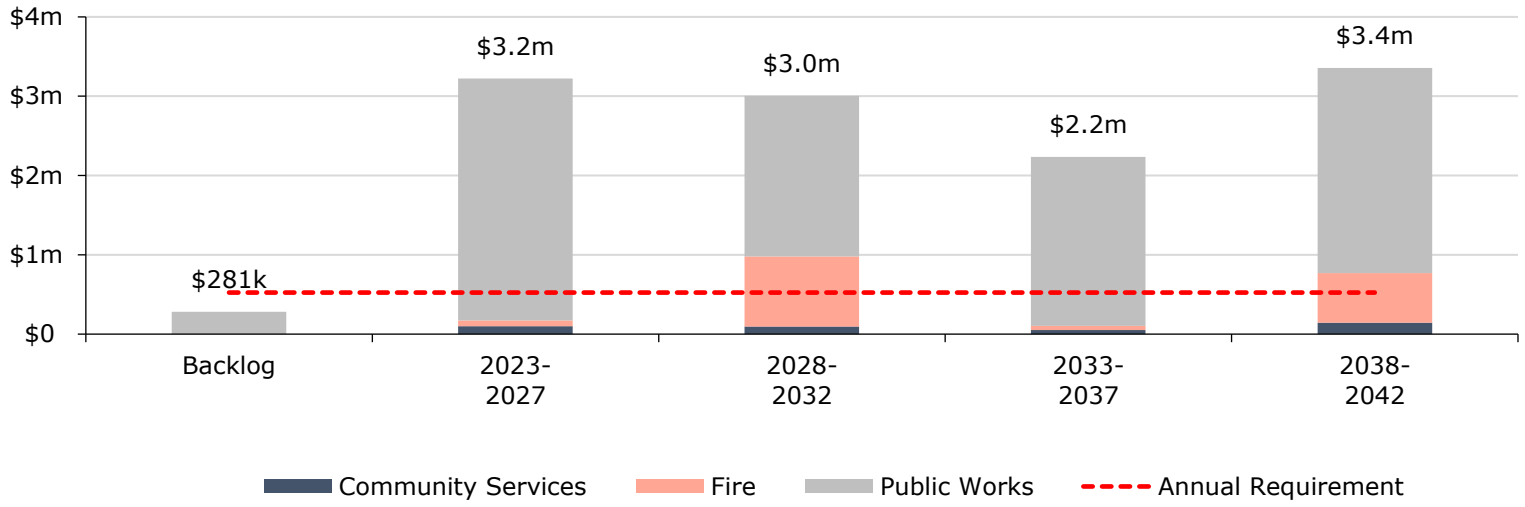
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the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

Maintenance / Rehabilitation / Replacement

- Currently, most maintenance and rehabilitation recommendations are completed by 3rd party mechanics.
- Oil changes are completed based on mileage driven
- License stickers, and registration if needed under CVOR, are competed on an annual basis
- Tire changes, fluid top up, minor component changes, such as wipers, are completed on an as needed basis. Certain specialty parts, such as electronics or sensors, have been cited to be scarce at times
- Fire department pumpers and tankers are replaced at the end of a 20-year lifecycle, fire support vehicles are replaced at the end of year 10
- Public Work vehicles are constrained by budget limitations, resulting in some trucks being replaced 12-16 years into lifecycle
- Generally, vehicles are operated past the industry standard recommendations for replacements

Forecasted Capital Requirements

The graph below illustrates the cyclical short-, medium- and long-term replacement requirements for the Township's Vehicles. This analysis was run until 2042. The Annual Capital Requirement is $524 thousand, which equals to $2.62 million over a five-year period.



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

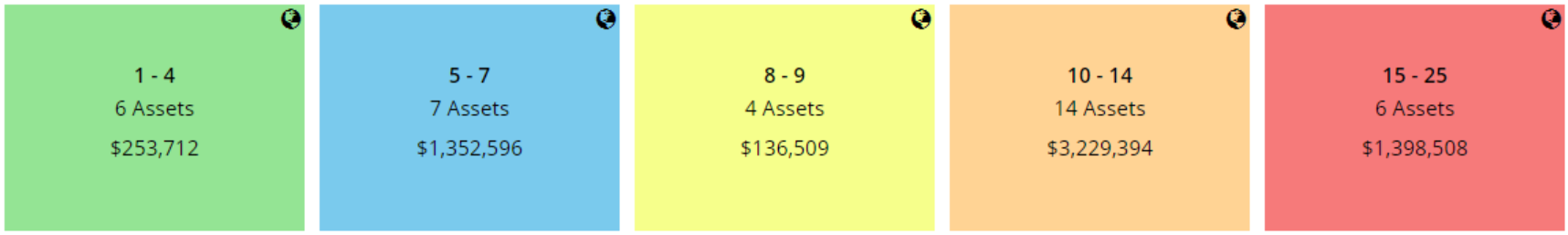
The table below summarizes the projected cost of lifecycle activities (maintenance, rehabilitation, and replacements) that will need to be undertaken over the next 10 years to maintain the current level of service. These values are derived from Citywide™. The projections rely on condition data, lifecycle strategies and age data to forecast these values.

Segment	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Community Services	$0	$50k	$0	$50k	$0	$0	$0	$44k	$0	$50k
Fire	$0	$18k	$56k	$0	$0	$0	$0	$55k	$811k	$18k
Public Works	$788k	$183k	$1.3m	$127k	$609k	$719k	$288k	$397k	$623k	$0
Total	**$788k**	**$251k**	**$1.4m**	**$177k**	**$609k**	**$719k**	**$288k**	**$496k**	**$1.4m**	**$68k**

These estimates are developed at the asset network level and are based on available asset data, including quantities, replacement costs, age, or assessed condition. They can be different from actual capital forecasts. Consistent data updates, particularly condition, and asset acquisitions and disposals 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 D: 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.

Risks to Current Asset Management Strategies

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

Aging Infrastructure and Funding Strategies

Several vehicles within the Township are approaching or have exceeded their estimated useful life. As vehicles age, they will require exponentially increasing O&M costs to ensure compliance with MTO standards and to function adequately. As capital budgets become more constrained, more maintenance will be postponed, which will further amplify this risk. Replacement and major rehabilitation of the Vehicles are entirely dependant on the availability of reserve fund. Committing to a dedicated vehicle reserve contribution can be helpful to prevent deferral of critical vehicle replacement and reduce the risk of service disruption. The Township should consider updating asset replacement costs and event costs on a cyclical basis to improve the effectiveness of capital planning.

Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Accessible & Reliable	Average % of time a vehicle is in service and capable of performing its primary function	95%
Safe & Regulatory	Percentage of regulated MTO maintenance inspections completed	100%
	Number of vehicles safety inspections completed per year per vehicle	1
Affordable	Annual Capital Reinvestment Rate	3.2%
Sustainable	Percentage of vehicles that are in good or very good condition	21%
	Percentage of vehicles that are in poor or very poor condition	64%

Analysis of Rate-funded Assets

- Rate-funded assets are valued at $64.9 million
- 44% of rate-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for rate-funded assets is approximately $1 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

Water Network

State of the Infrastructure

The Colborne Water Supply and Distribution System is maintained and operated by Lakefront Utility Services Inc.

The Water Network in the Township include the following:

- Water Treatment Plant
- Watermains
- Water Towers, Wells
- Hydrants, Water Meters and other Appurtenances

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

Replacement Cost	Condition	Financial Capacity	
$26,844,000	Fair (40%)	Annual Requirement:	$406,632
		Funding Available:	$94,410
		Annual Deficit:	$312,222

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

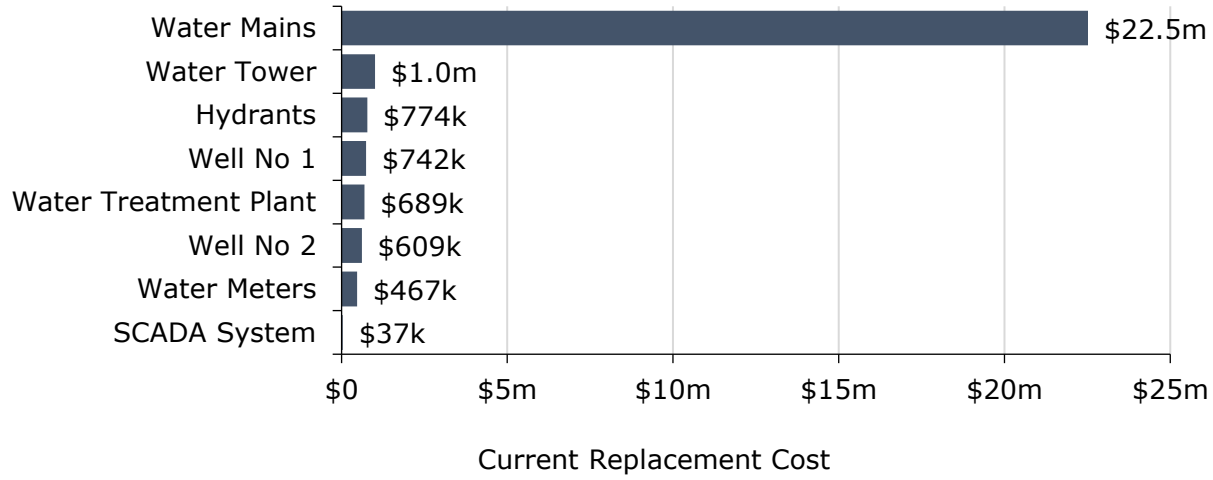
Service Attribute	Level of Service Statement
Scope	Current municipal water is accessible to some areas of the Township, mainly located in Colborne. The Water Network includes water mains, water tower, wells and hydrants.
Reliability	The Water Network is in fair condition with minimal reports of low water quality and pressure. There are no unplanned service interruptions due to boil water advisories.

Inventory & Valuation

The table below summarizes the quantity and current replacement cost of the Township's various Water Network Assets.

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Hydrants	125	Quantity	CPI	$774,000
SCADA System	1	Quantity	CPI	$37,000
Water Mains	25,844	Length (m)	CPI	$22,517,000
Water Meters	1,041	Quantity	CPI	$467,000
Water Tower	2	Quantity	CPI	$1,009,000
Well No 1	4	Quantity	CPI	$742,000
Well No 2	4	Quantity	CPI	$609,000
Water Treatment Plant	1 (3)	Quantity, Components	CPI	$689,000
Total				**$26,844,000**

Total Current Replacement Cost: $26,843,707



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

Asset Condition & Age

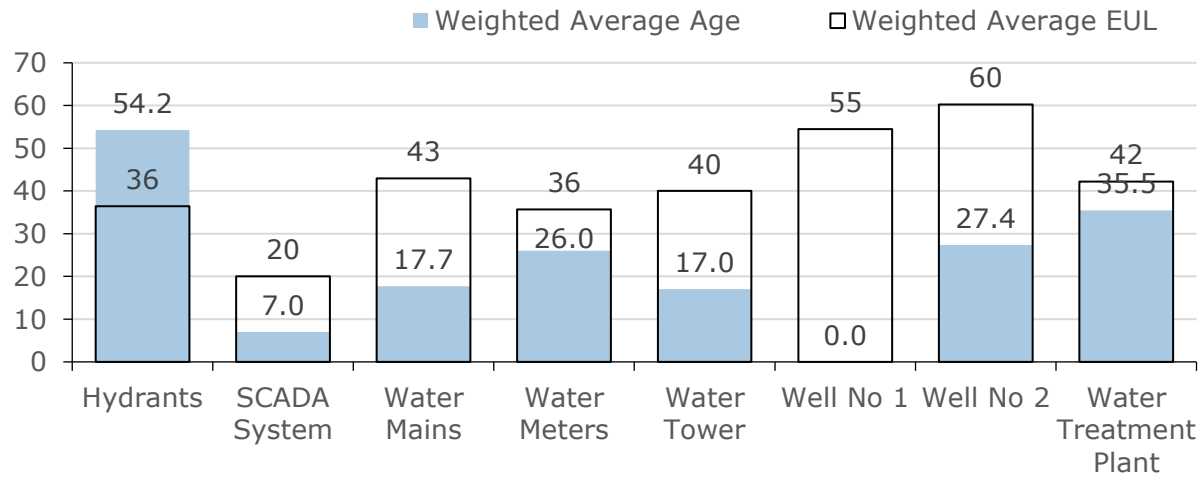
An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age,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

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

The table below summarizes the average age and average EUL of the Township's various Water Network assets.

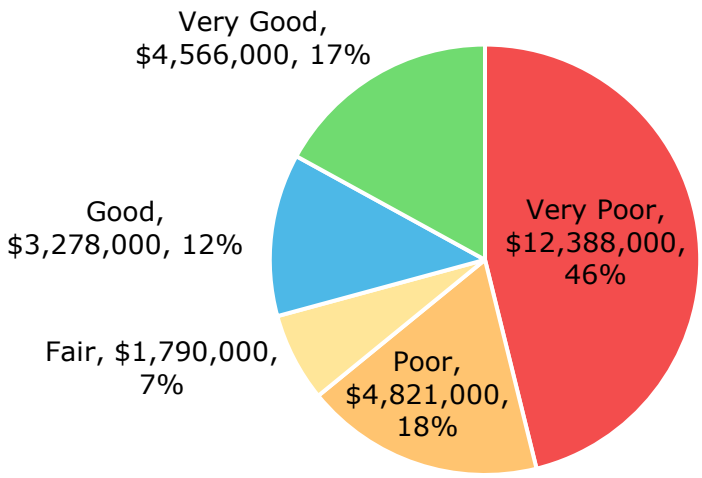
Segment	Weighted Average Age	Weighted Average EUL
Hydrants	54.2	36
SCADA System	7.0	20
Water Mains	17.7	43
Water Meters	12.9	18
Water Tower	17.0	40
Well No 1	0.0	55
Well No 2	27.4	60
Water Treatment Plant	35.5	42

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

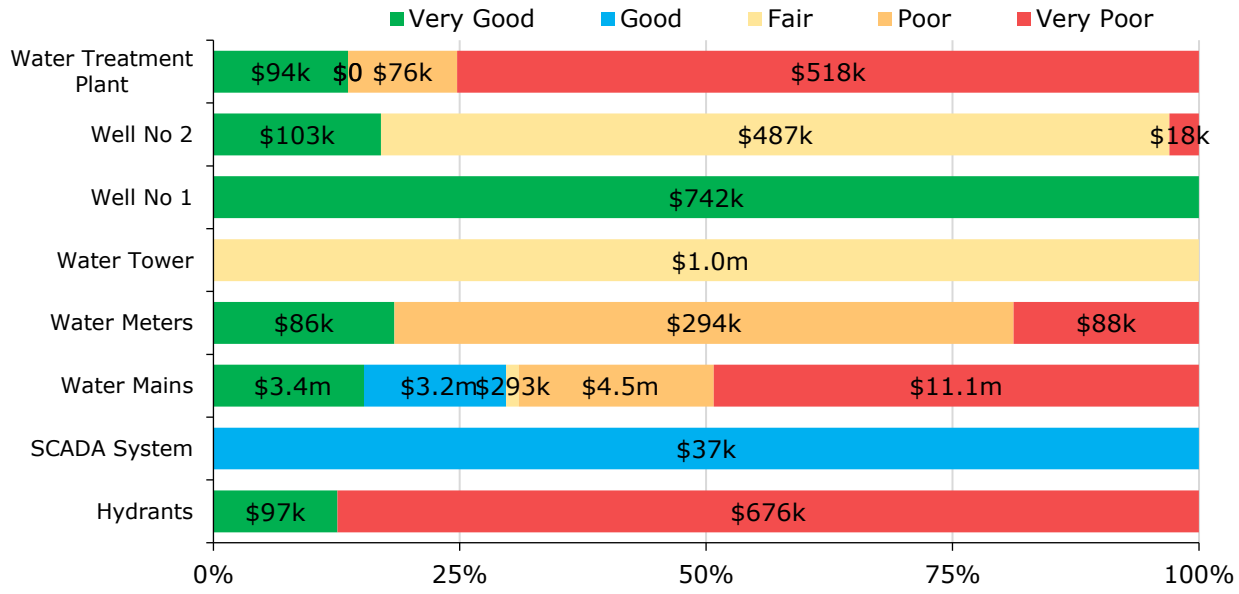


Each asset's estimated useful life should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

The graph below summarizes the replacement cost-weighted condition of the Township's Water Network.



As illustrated, 64% of the Township's Water Network are in poor or worse condition, with further details of condition broken down per asset segment.



Value and Percentage of Assets by Replacement Cost

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

Current Approach to Condition Assessment

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

- Currently, there are no formal condition assessment programs for water assets in place
- Staff primarily rely on the historical break records, pipe diameter, age and material types to determine the projected condition of water mains

Lifecycle Management Strategy

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

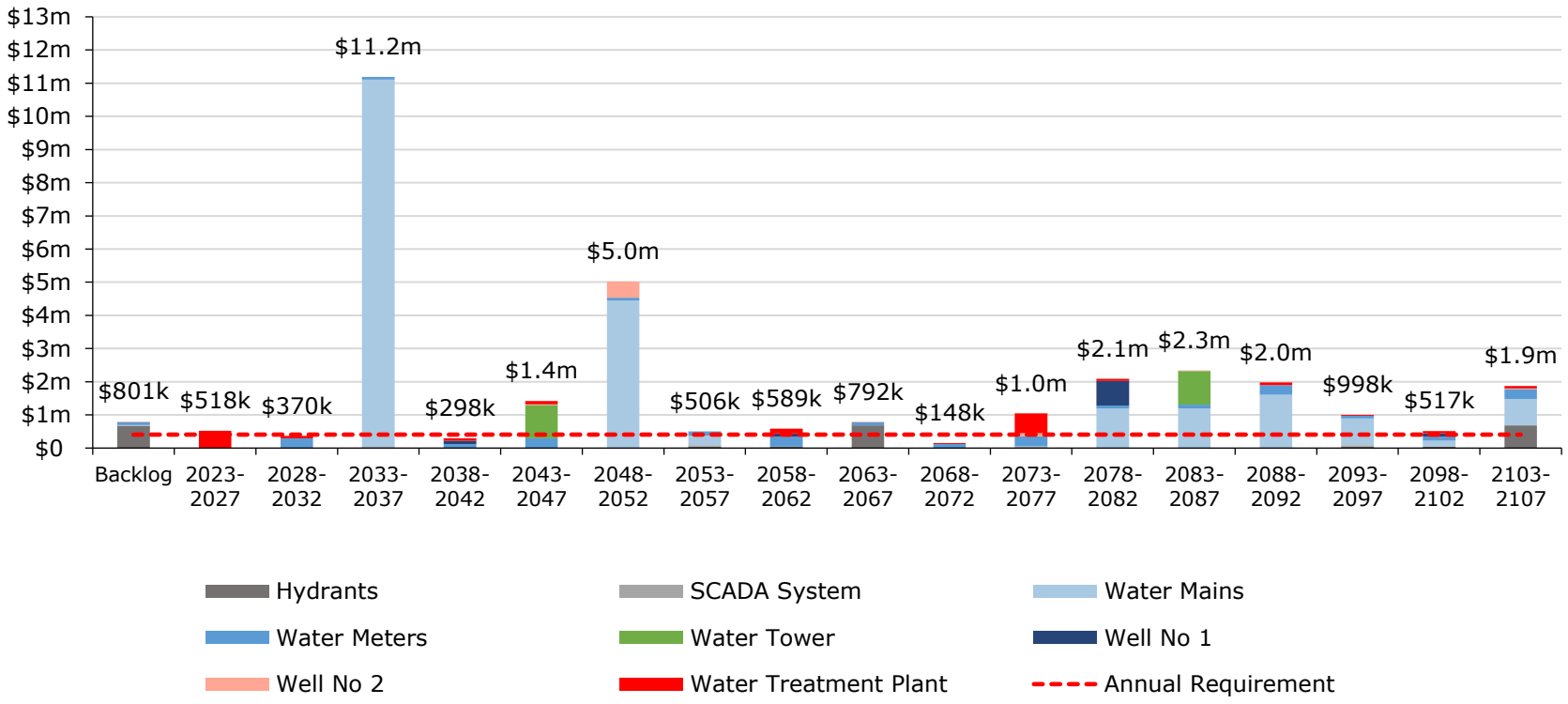
The following table outlines the Township's current lifecycle management strategy.

Maintenance / Rehabilitation / Replacement

- Main flushing and valve turning is completed on the network on an annual basis.
- Maintenance on water meters and hydrants is undertaken annually in batches.
- A water relining program is not considered, as the network is relatively small and relining costs are significant.
- In the absence of mid-lifecycle rehabilitative events, full replacement for most mains is completed once it reaches its end-of-life.
- The prioritized list of watermains is scheduled to align with work on the storm, sanitary, and roads networks.

Forecasted Capital Requirements

The graph below illustrates the cyclical short-, medium- and long-term replacement requirements for the Township's Water Network. This analysis was run until 2107. The Annual Capital Requirement is $407 thousand, which equals to $2.0 million over a five-year period.



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

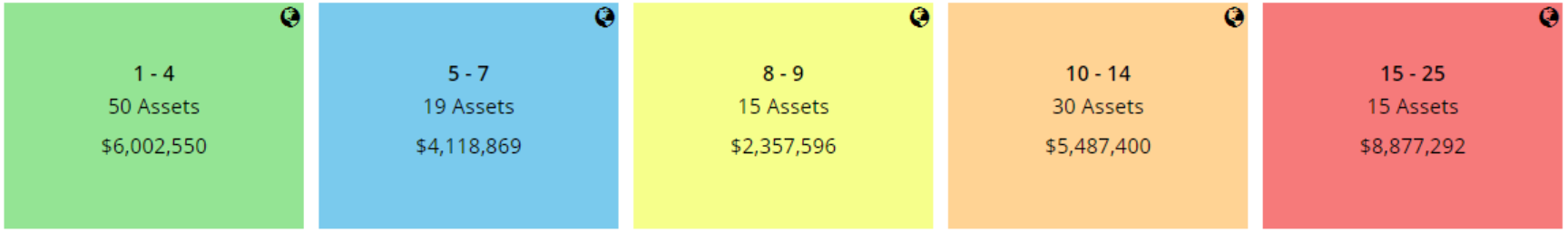
The table below summarizes the projected cost of lifecycle activities (maintenance, rehabilitation, and replacements) that will need to be undertaken over the next 10 years to maintain the current level of service. These values are derived from Citywide™. The projections rely on condition data, lifecycle strategies and age data to forecast these values.

Segment	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Hydrants	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
SCADA System	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Meters	$0	$88k	$0	$0	$0	$294k	$0	$0	$0	$0
Water Tower	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Well No 1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Well No 2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment Plant	$0	$0	$0	$518k	$0	$76k	$0	$0	$0	$0
Total	**$0**	**$0**	**$0**	**$518k**	**$0**	**$370k**	**$0**	**$0**	**$0**	**$0**

These estimates are developed at the asset network level and are based on available asset data, including quantities, replacement costs, age, or assessed condition. They can be different from actual capital forecasts. Consistent data updates, particularly condition, and asset acquisitions and disposals 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 D: 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 risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies

The current lifecycle management strategy for the Water Network is considered reactive. Replacement of watermain is dependent on break records, water quality, age and material type. This poses a risk of service disruption when assets failure occurs. The Township can consider assessing the suitability of corrosion protection for metallic mains, such as cathodic protection systems, zinc galvanization, and plastic coating to extend service life of the assets. The Township can also consider leak detection technologies to reduce costs related to water loss and excavation to find the leak locations.

Growth & Infrastructure Design

The population of the Township is projected to grow to 7,013 by 2034. Past designs of the Water Network have been inadequate for the population growth because some water pipes are undersized. The Township needs to prioritize expanding its capacity to serve a larger population. Developing a comprehensive long-term capital plan with considerations for growth can be helpful to increase the capacity strategically.

Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	See Appendix B
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	See Appendix B
Reliability	Description of boil water advisories and service interruptions	No water quality issue that requires to issue the boil water advisory.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Accessible & Reliable	Percentage of properties connected to the municipal water system	37%
	Number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system	1
	Percentage of properties where fire flow is available	82%
Safe & Regulatory	Number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0
Affordable	Annual Capital Reinvestment Rate	0.4%
Sustainable	Percentage of the Water Network that is in good or very good condition	29%
	Percentage of the Water Network that is in poor or very poor condition	64%

Sanitary Sewer Network

State of the Infrastructure

The Sanitary Sewer Network is owned, maintained and operated by the Township. The network includes the following:

- Sanitary Treatment Plant
- Sewer mains
- Maintenance holes

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

Replacement Cost	Condition	Financial Capacity	
$38,108,000	Fair (48%)	Annual Requirement:	$603,161
		Funding Available:	$51,300
		Annual Deficit:	$551,861

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

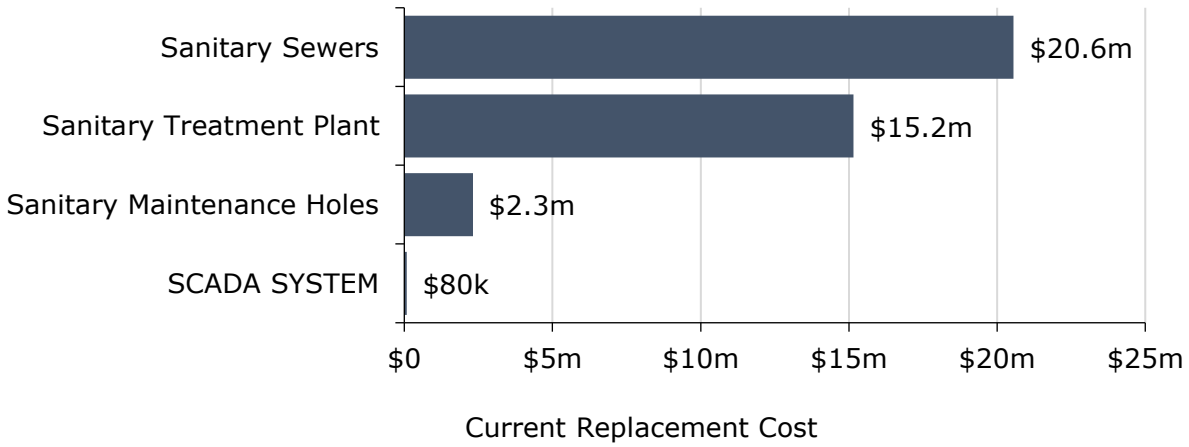
Service Attribute	Level of Service Statement
Scope	The Sanitary Sewer Network is accessible to some area of the Township, mainly located in Colborne.
Reliability	The Sanitary Sewer Network is in fair condition with minimal unplanned service interruptions due to backups and effluent violations.

Inventory & Valuation

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

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost
Sanitary Maintenance Holes	207	Quantity	CPI	$2,314,000
Sanitary Sewers	17,835	Length (m)	CPI	$20,557,000
SCADA SYSTEM	1	Quantity	CPI	$80,000
Sanitary Treatment Plant	1 (16)	Quantity	CPI	$15,157,000
Total				**$38,108,000**

Total Current Replacement Cost: $38,107,589



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

Asset Condition & Age

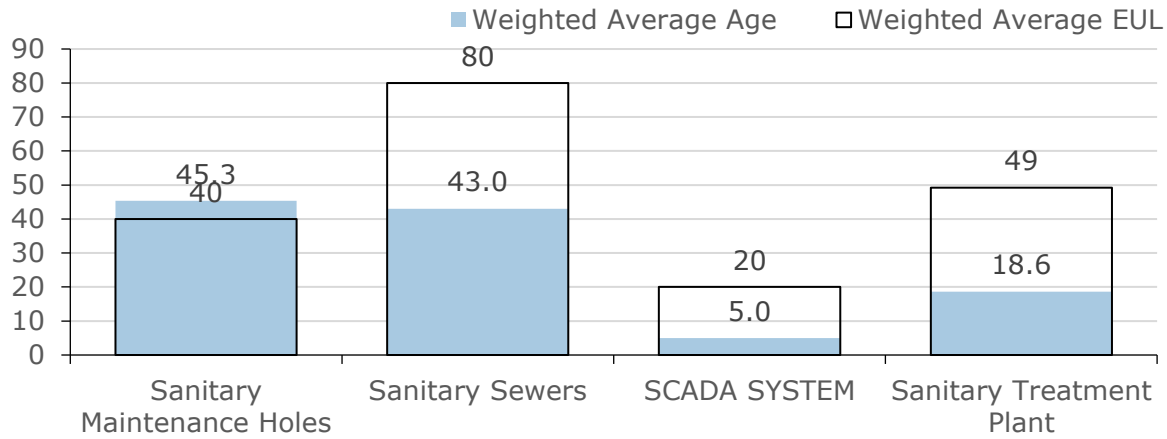
An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age,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

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

The table below summarizes the average age and average EUL of the Township's various Sanitary Sewer Network assets.

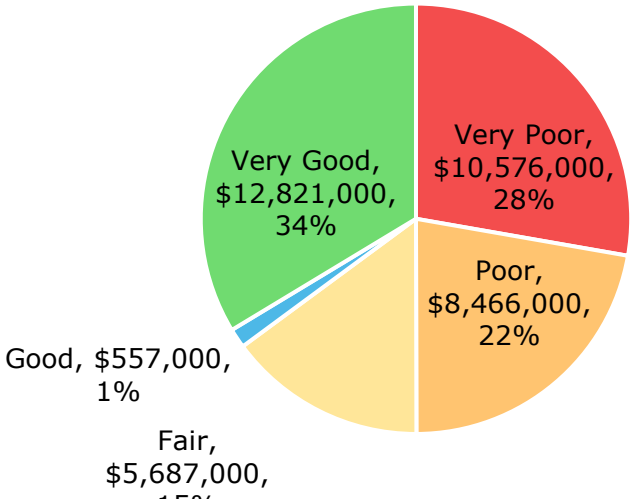
Segment	Weighted Average Age	Weighted Average EUL
Sanitary Maintenance Holes	45.3	40
Sanitary Sewers	43.0	80
SCADA SYSTEM	5.0	20
Sanitary Treatment Plant	18.6	49

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

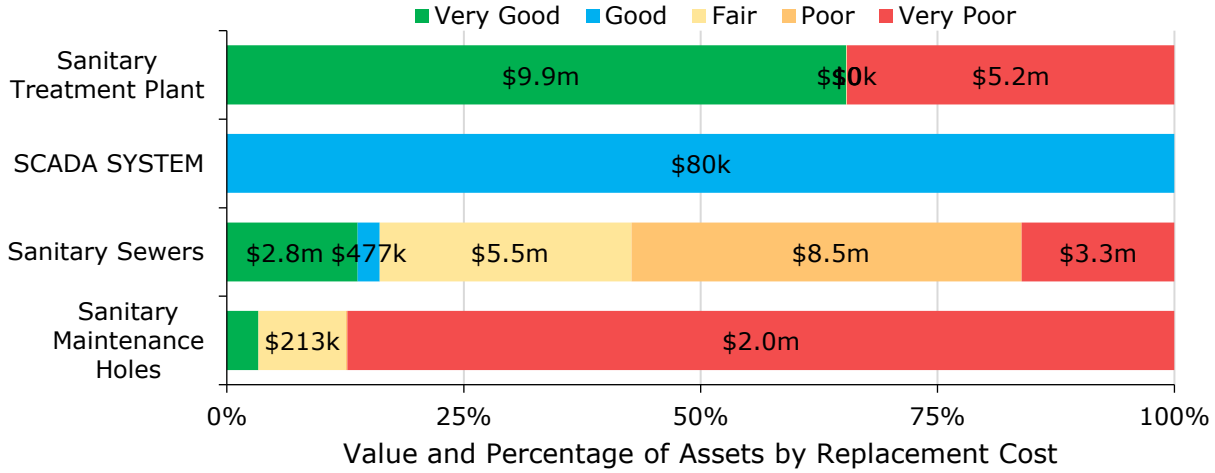


Each asset's estimated useful life should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

The graph below summarizes the replacement cost-weighted condition of the Township's Sanitary Sewer Network.



As illustrated, based on age-based condition, half of the Township's Sanitary Sewer Network assets are in fair or better condition, with further details of condition broken down per asset segment.



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

Current Approach to Condition Assessment

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

- CCTV inspections are completed for sanitary mains by in-house staff on a project basis
- The wastewater treatment plant is inspected daily to compliant with the Ministry of Environment standards

Lifecycle Management Strategy

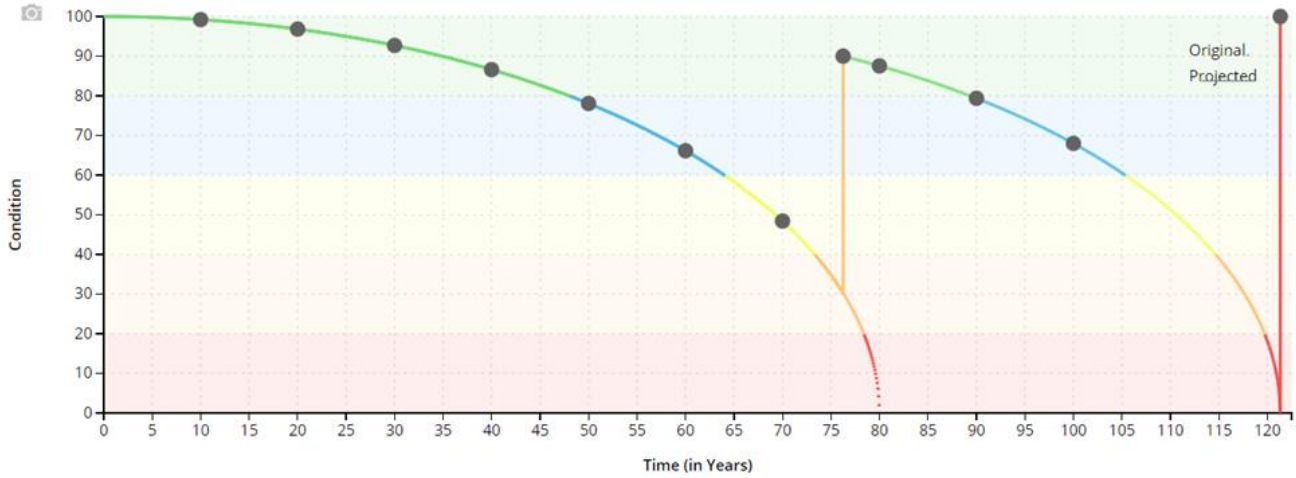
The condition or performance of assets will deteriorate over time. To ensure vehicles are performing as expected, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

Maintenance / Rehabilitation / Replacement

- Rodding, boring, and flushing is performed on an as-needed basis, generally complaint driven
- A structural relining program is being considered for specific locations where road reconstruction is not an option.
- CCTV inspections and flushing are incorporated within the inflow and infiltration (I&I) program, to identify areas with significant stormwater intrusion. Reducing overall I&I will reduce demands on the wastewater conveyance and treatment system, ensuring capacity is more readily available
- Sewer mains are generally replaced as part of the I&I program, or in coordination with road reconstruction
- For purpose of this AMP, the relining program is applied to all the sanitary sewer mains and assumed the entire network is flushed and completed a CCTV inspection every 10 years.

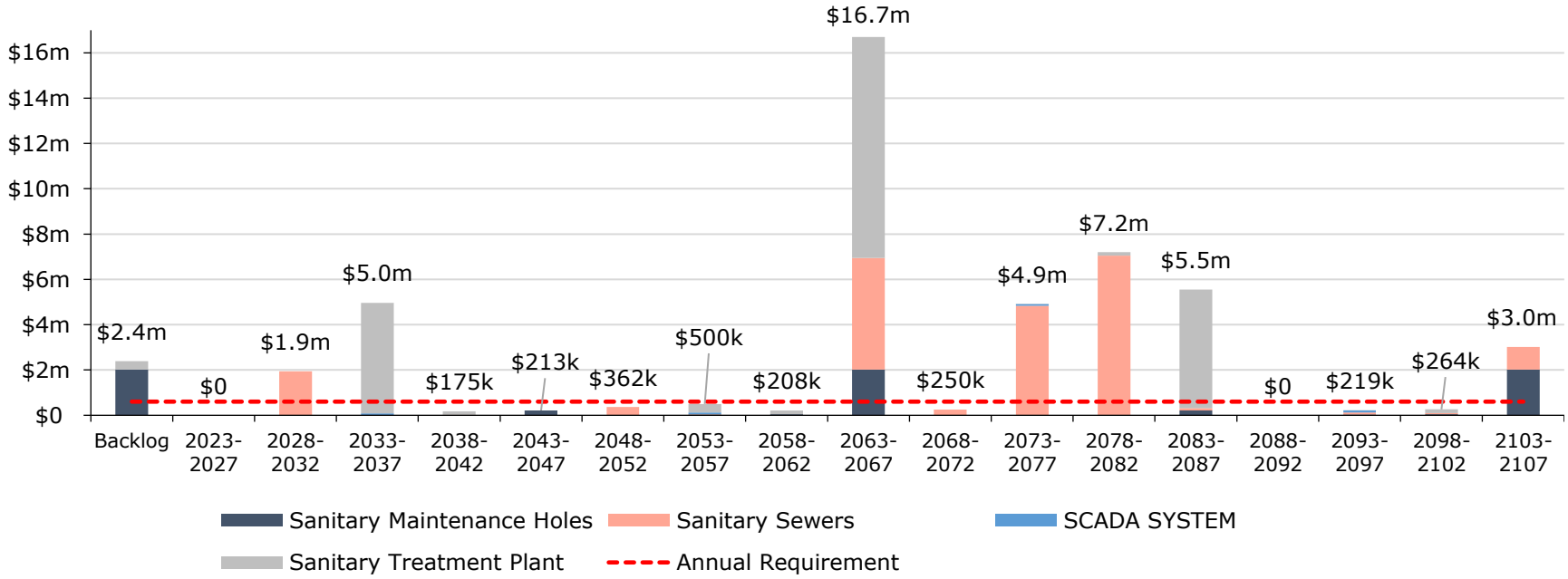
The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of Sanitary Sewer mains. Instead of allowing the mains to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of roads at a lower total cost.

Sanitary Sewer Mains		
Event Name	**Event Class**	**Event Trigger**
O&M Activities (flushing and CCTV inspection)	Maintenance	Repeated every 10 years
Trenchless Relining	Rehabilitation	30% Condition
Full Reconstruction	Replacement	0% Condition



Forecasted Capital Requirements

The graph below illustrates the cyclical short-, medium- and long-term replacement requirements for the Township's Sanitary Sewer Network. This analysis was run until 2107. The Annual Capital Requirement is $603 thousand, which equals to $3.0 million over a five-year period.



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

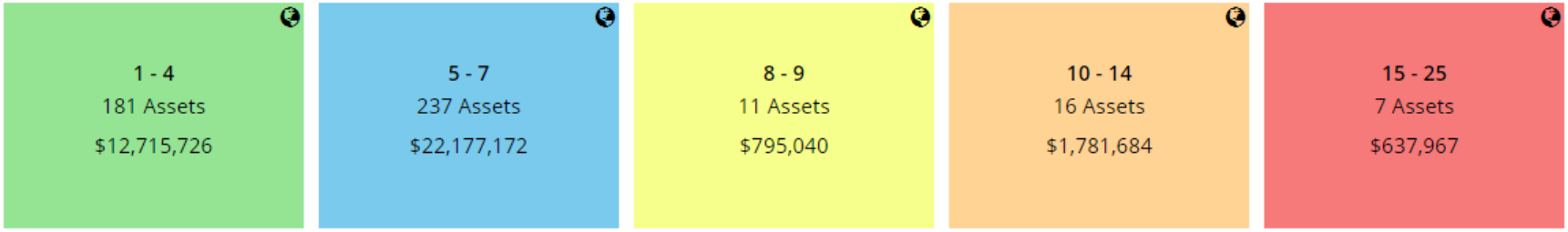
The table below summarizes the projected cost of lifecycle activities (maintenance, rehabilitation, and replacements) that will need to be undertaken over the next 10 years to maintain the current level of service. These values are derived from Citywide™. The projections rely on condition data, lifecycle strategies and age data to forecast these values.

Segment	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Sanitary Maintenance Holes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sanitary Sewers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1.9m
SCADA SYSTEM	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sanitary Treatment Plant	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$1.9m**

These estimates are developed at the asset network level and are based on available asset data, including quantities, replacement costs, age, or assessed condition. They can be different from actual capital forecasts. Consistent data updates, particularly condition, and asset acquisitions and disposals 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 D: 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 risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Risks to Current Asset Management Strategies

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

Growth

The population of the Township is projected to grow to 7,013 by 2034. The Township needs to prioritize expanding its capacity to serve a larger population. Currently, the Township focuses on solving the inflow and infiltration issues to save capacity and reduce costs for water treatment. However, the rapid development requires the Township to increase capital and operating costs to maintain current levels of service and improve efficiency of the sanitary network. Developing a comprehensive long-term capital plan with considerations for growth can be helpful to increase the capacity strategically.

Capital Funding Strategies

2.

A concern for the Township's aging assets, it requires the Township to maintain the assets more frequently to ensure the assets are meeting safety requirements. Current lifecycle strategies for sanitary assets are relatively reactive. The Township should consider developing an annual capital funding strategy to reduce dependency on grant funding and prevent deferral the capital works. The Township should also consider updating asset replacement costs and event costs on a cyclical basis to improve the effectiveness of capital planning.

Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal Sanitary Sewer Network	See Appendix B
Reliability	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Inflow and infiltration issues are identified in the current sanitary system of the Township, the water can infiltrate through cracks in the joints and through manholes.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid stormwater infiltration	The newly installed sewer pipes are designed to be watertight to minimize infiltration.
	Description of the effluent that is discharged from sewage treatment plants in the municipal Sanitary Sewer Network	Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants. The Municipality follows ECA criteria.

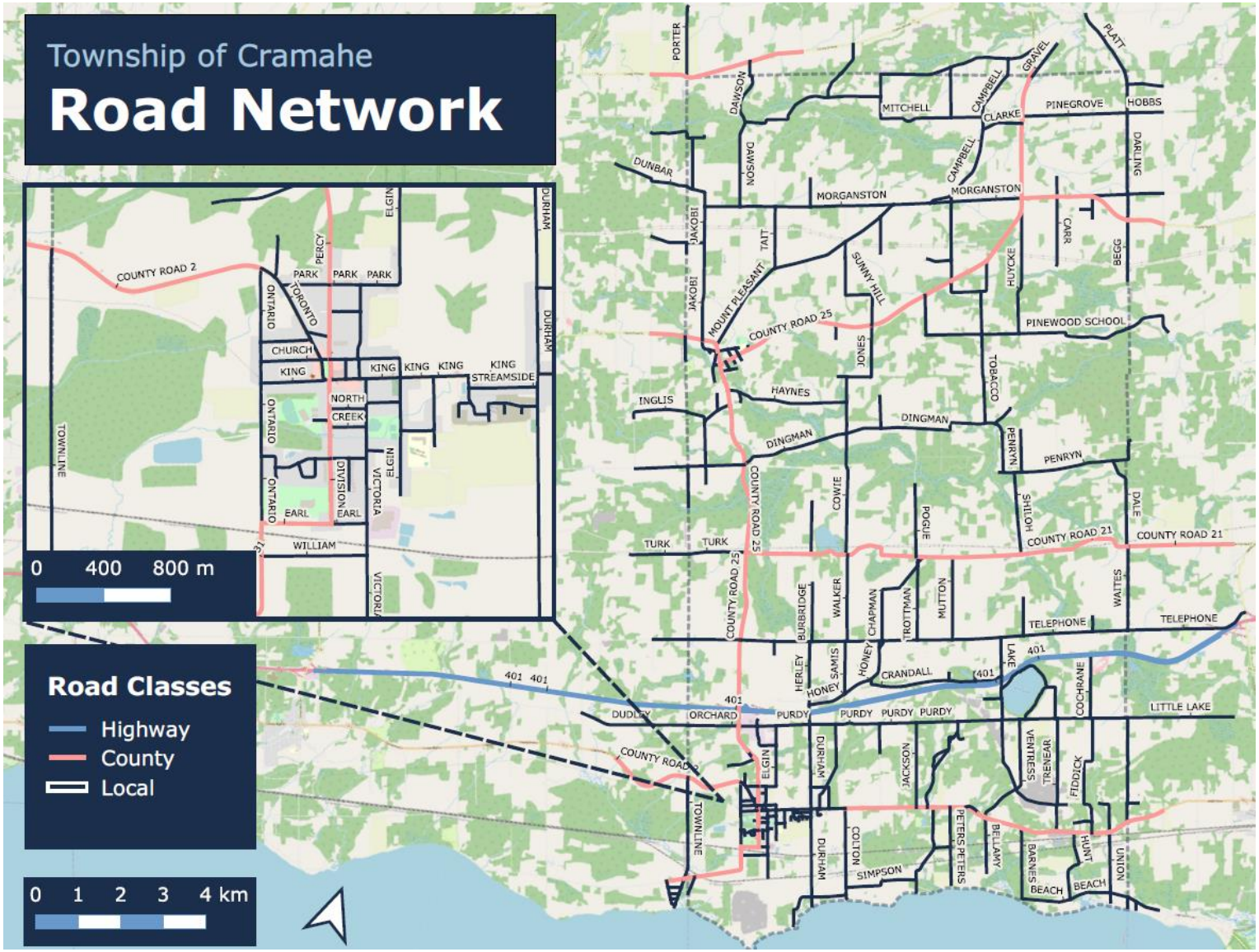
Technical Levels of Service

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

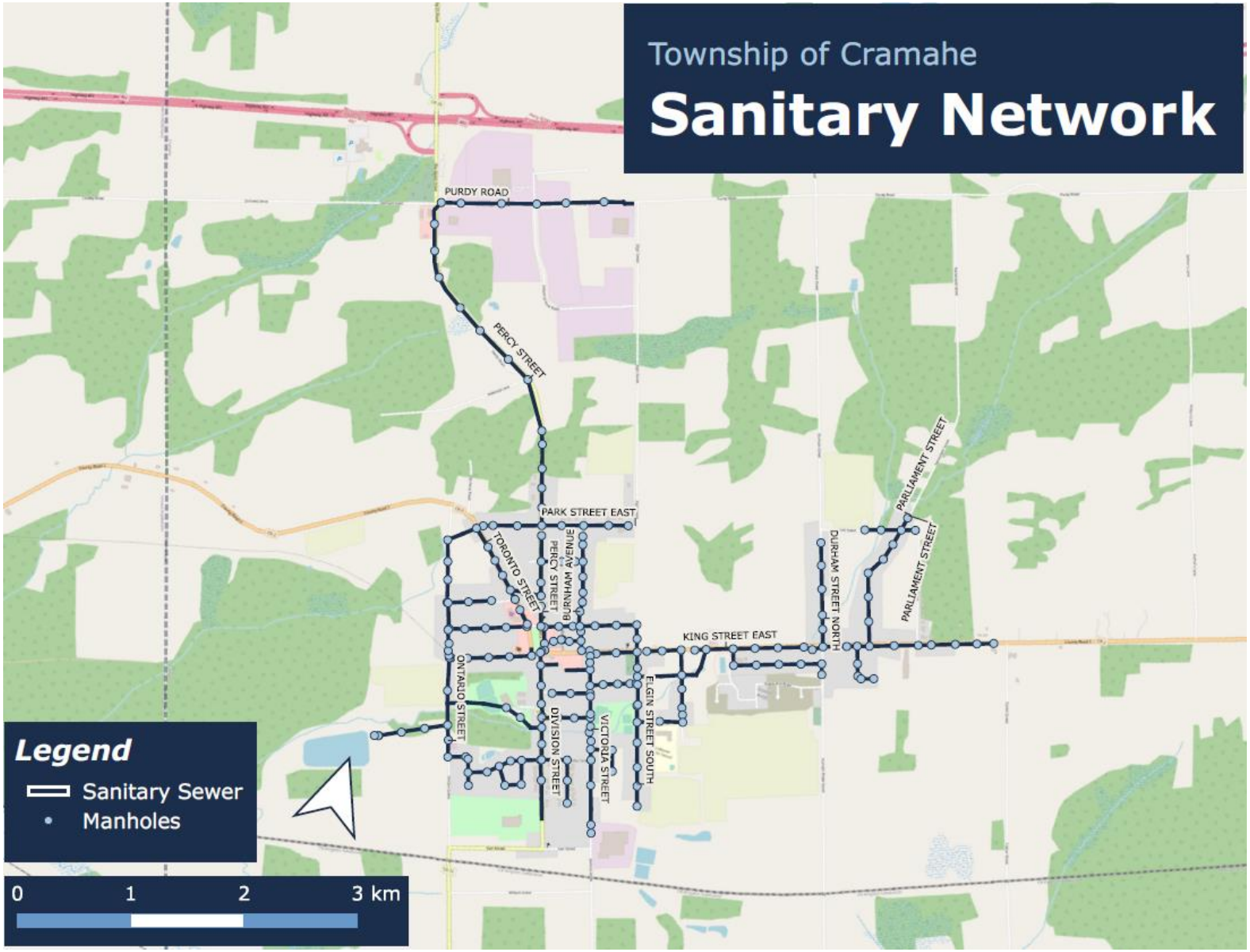
Service Attribute	Technical Metric	Current LOS (2022)
Accessible & Reliable	Percentage of properties connected to the municipal Sanitary Sewer Network	33%
	Number of sanitary sewer main backups	0
Safe & Regulatory	Number of connection-days per year due to sanitary main backups compared to the total number of properties connected to the municipal Sanitary Sewer Network	0
	Number of connection-days per year due to sanitary service backups compared to the total number of properties connected to the municipal Sanitary Sewer Network	0
	Number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal Sanitary Sewer Network	0
Affordable	Annual Capital Reinvestment Rate	0.1%
Performance	Percentage of the Sanitary Sewer Network that is in good or very good condition	35%
	Percentage of the Sanitary Sewer Network that is in poor or very poor condition	50%

Appendix A: Levels of Service Maps

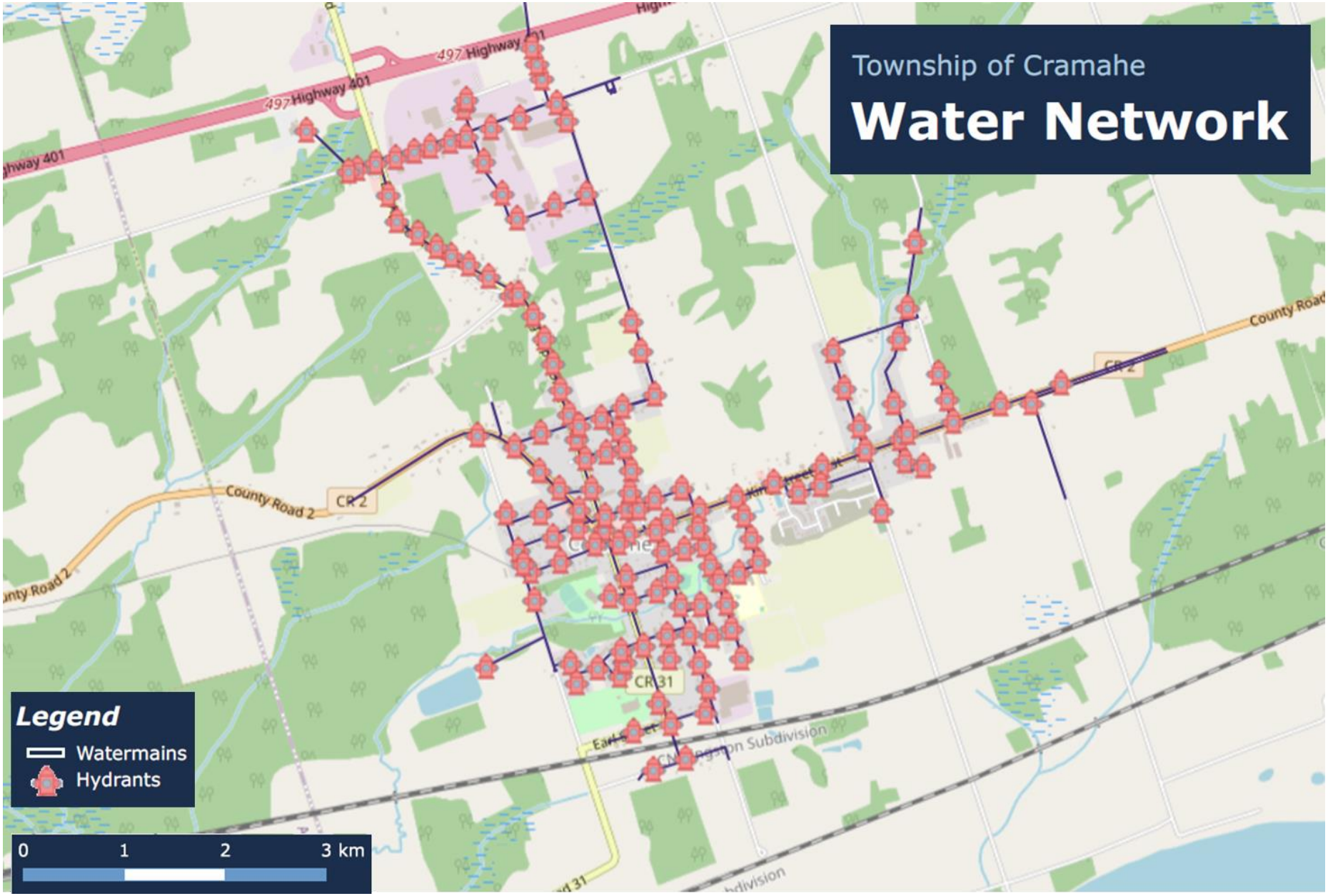
Road Network Maps



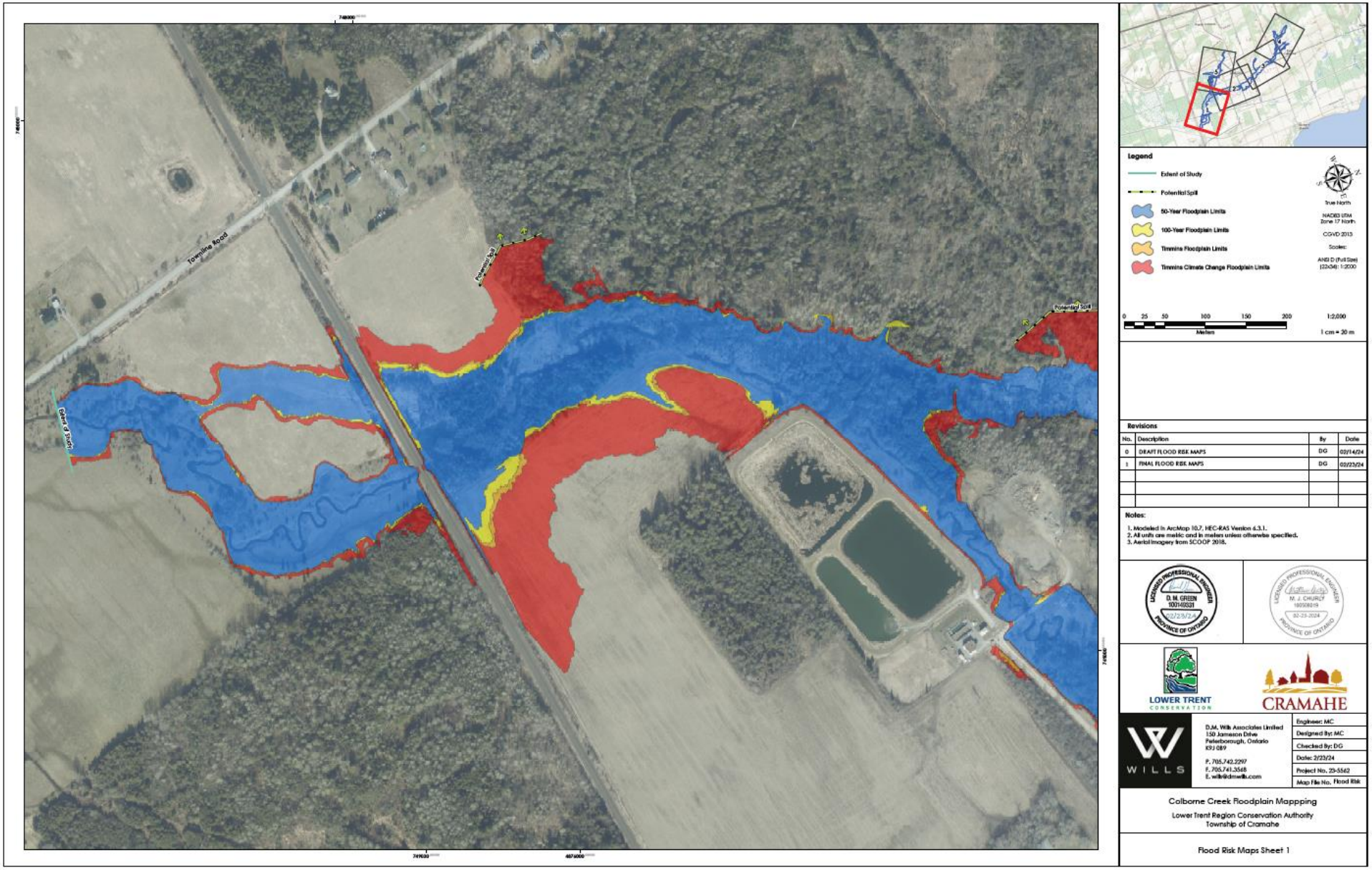
Sanitary Network Maps

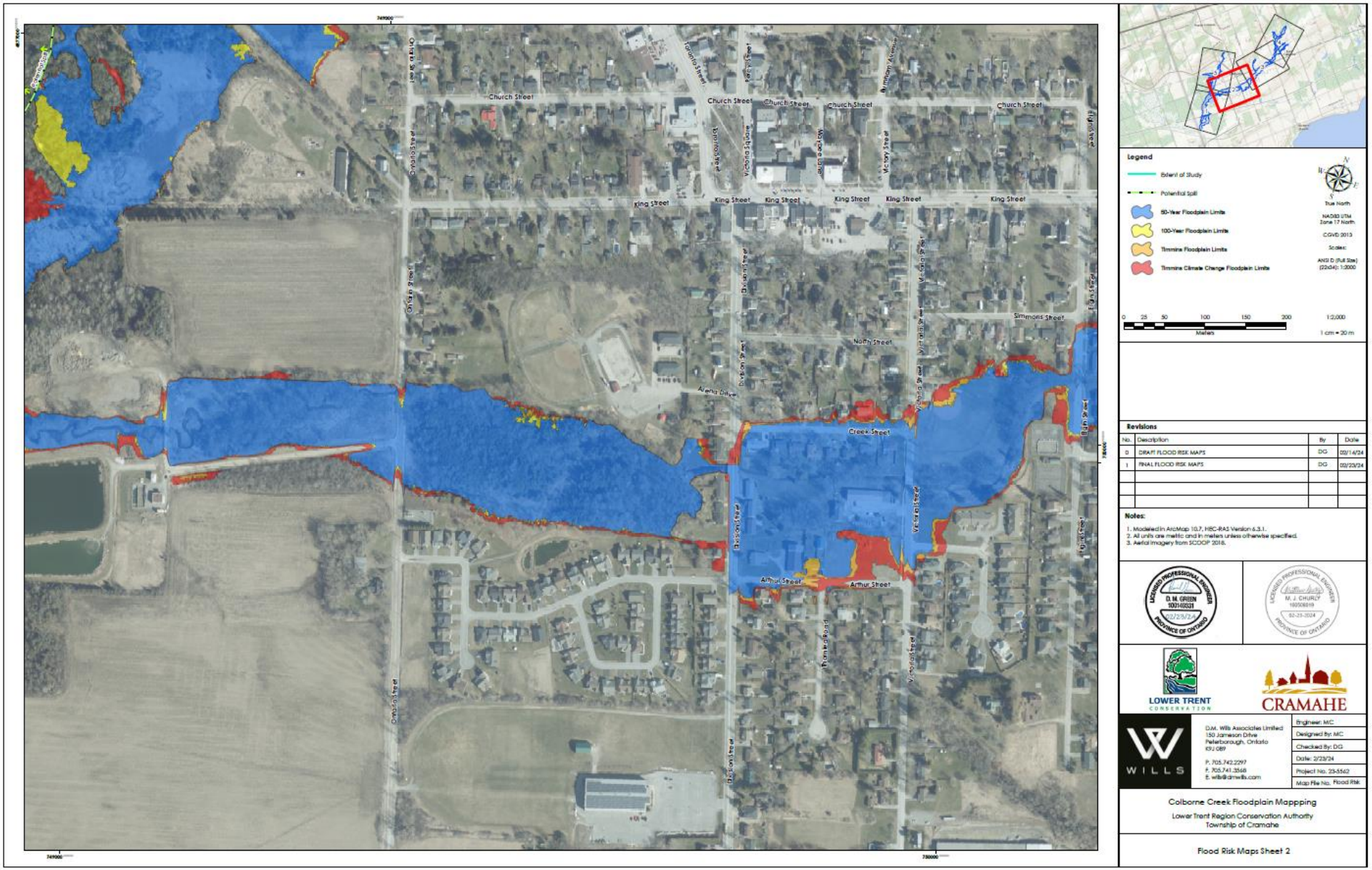


Water Network Maps



Flood Risk Maps




Church Street
King Street
North Street
Simmons Street
Creek Street
Arthur Street
Victoria Street
Division Street
Ontario Street
Legend
Extent of Study
Potential Spill
50-Year Floodplain Limits
100-Year Floodplain Limits
Timmins Floodplain Limits
Timmins Climate Change Floodplain Limits
True North
NAD83 UTM Zone 17 North
CGVD 2013
Scales:
ANSI D (Full Size) (22x34): 1:2000
0 25 50 100 150 200
Meters
1:2,000
1 cm = 20 m
Revisions
No. Description By Date
0 DRAFT FLOOD RISK MAPS DG 02/14/24
1 FINAL FLOOD RISK MAPS DG 02/23/24
Notes:
1. Modelled in ArcMap 10.7, HEC-RAS Version 6.3.1.
2. All units are metric and in meters unless otherwise specified.
3. Aerial Imagery from SCOOP 2018.
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F. 705.741.3568
E. wills@dmwills.com
Engineer: MC
Designed By: MC
Checked By: DG
Date: 2/23/24
Project No. 23-5562
Map File No. Flood Risk
Colborne Creek Floodplain Mappping
Lower Trent Region Conservation Authority
Township of Cramahe
Flood Risk Maps Sheet 2


Church Street
King Street
Simmons Street
Allred Street
Eighth Street
Kensington Avenue
Dunham Street
Scott Street
Shearnside Drive
Legend
Extent of Study
Potential Spill
50-Year Floodplain Limits
100-Year Floodplain Limits
Timmins Floodplain Limits
Timmins Climate Change Floodplain Limits
True North
NAD83 UTM Zone 17 North
CGVD 2013
Scales:
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0 25 50 100 150 200
Meters
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1 cm = 20 m
Revisions
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3. Aerial imagery from SCOOP 2018.
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Designed By: MC
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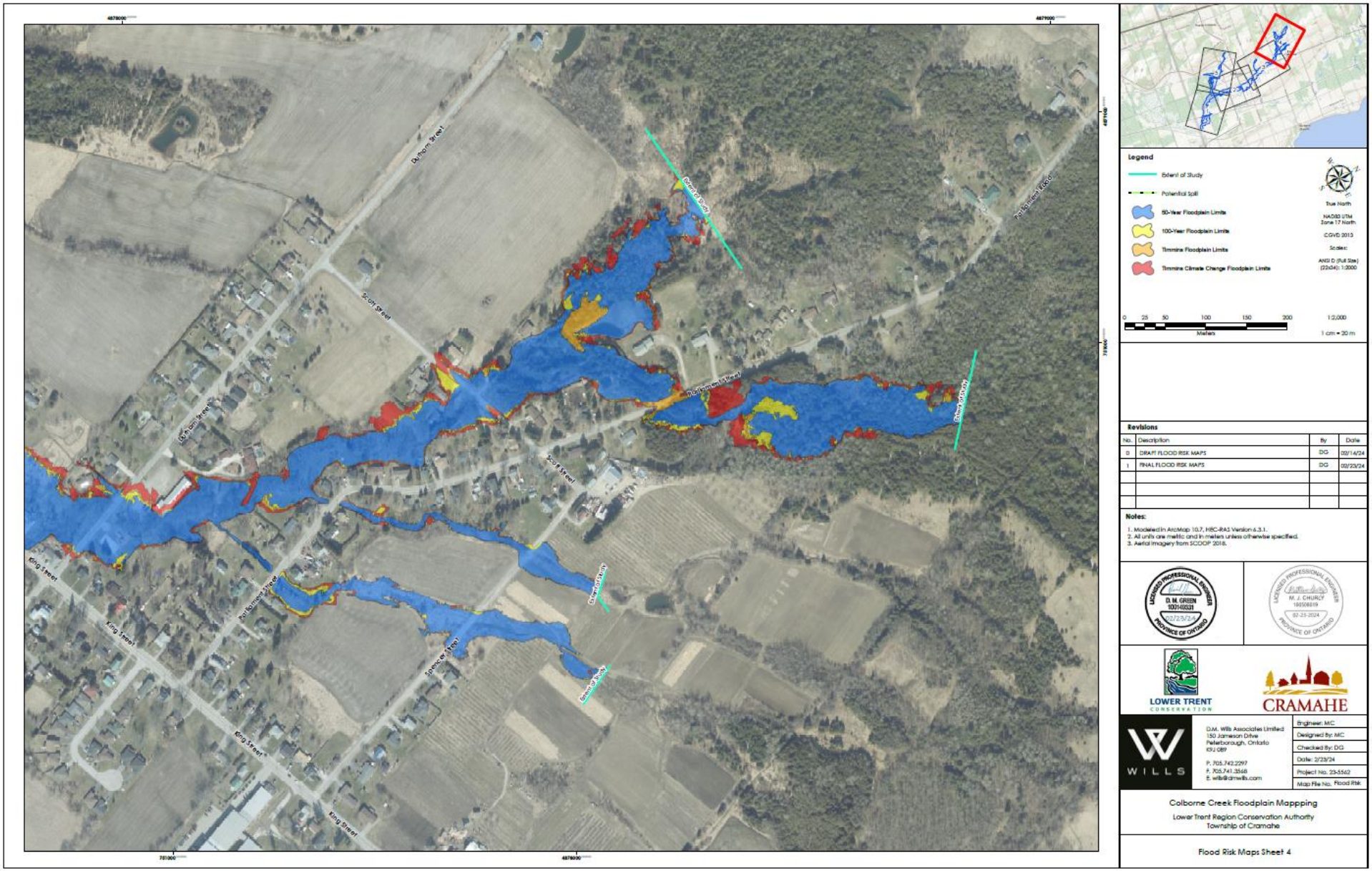
Map File No. Flood Risk
Colborne Creek Floodplain Mappping
Lower Trent Region Conservation Authority
Township of Cramahe
Flood Risk Maps Sheet 3


Dunham Street
Scott Street
Port Stanley Road
Centre of Study
Channel of Study
Spencer Street
King Street
Legend
Extent of Study
Potential Spill
50-Year Floodplain Limits
100-Year Floodplain Limits
Timmins Floodplain Limits
Timmins Climate Change Floodplain Limits
True North
NAD83 UTM Zone 17 North
CGVD 2013
Scales:
ANSI D (Full Size) (22x34): 1:2000
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Meters
1:2,000
1 cm = 20 m
Revisions
No. Description By Date
0 DRAFT FLOOD RISK MAPS DG 02/14/24
1 FINAL FLOOD RISK MAPS DG 02/23/24
Notes:
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2. All units are metric and in meters unless otherwise specified.
3. Aerial Imagery from SCOOP 2018.
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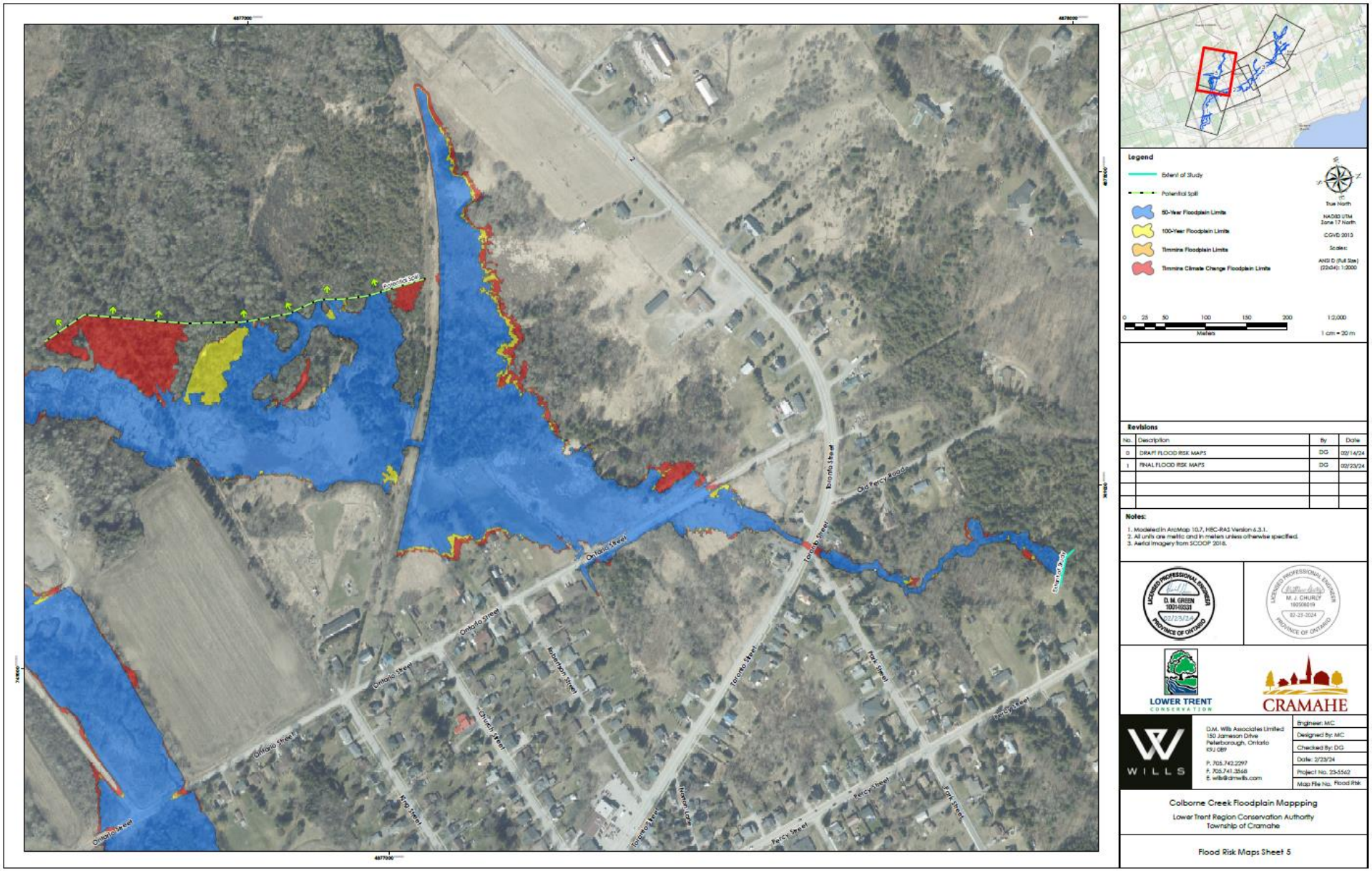
Map File No. Flood Risk
Colborne Creek Floodplain Mappping
Lower Trent Region Conservation Authority
Township of Cramahe
Flood Risk Maps Sheet 4


Legend
Extent of Study
Potential Spill
50-Year Floodplain Limits
100-Year Floodplain Limits
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True North
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CGVD 2013
Scale:
ANSI D (Full Size) (22x34): 1:2000
0 25 50 100 150 200
Meters
1:2,000
1 cm = 20 m
Revisions
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Checked By: DG
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Project No. 23-5562
Map File No. Flood Risk
Colborne Creek Floodplain Mappping
Lower Trent Region Conservation Authority
Township of Cramahe
Flood Risk Maps Sheet 5
Ontario Street
Toronto Street
Old Percy Road
Percy Street
Frank Street
Robertson Street
King Street
Turner Lane

Bridges & Culverts Images

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

Campbell Road Bridge (BCI = 71 Good)

Dingman Road West Bridge (BCI = 48 Fair)

Ontario Street Bridge Culvert (BCI = 75 Good)

King Street Steel Culvert (BCI = 72 Good)

Appendix B: Impacts of Growth

Description of Growth Assumptions

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

Cramahe Official Plan – December 2014

The Township of Cramahe's Official Plan is intended to provide a framework for the future growth, set out the policies to guide the development and use of land with consideration of social, economic and environmental factors. The document planning horizon spans 20 years, covering it to the year 2023.

In 2001, the Township of Cramahe and the Village of Colborne underwent a municipal amalgamation, leading to the creation of a current official plan that builds upon the foundations of the original plans approved in 1998 for Cramahe and in 1993 (updated in 2000) for Colborne.

The Official Plan reflects the priority of promoting commercial and industrial growth in designated areas, and policies pertaining to these land uses have been updated. The Township focuses on directing development to the Colborne urban area and existing hamlet areas of Castleton, Salem Corners and Dundonald. The Official Plan does not encourage expansion of communal sewage and water servicing within the hamlet settlement areas. While intensification, redevelopment and renewal are encouraged, all development within the Township shall have regard for the character and quality of established neighbourhoods.

According to the Plan, the population is projected to reach 6,990 by 2031. The following table outlines population, private dwellings and employment changes to the Township between 2011-2021 from Statistics Canada, for which the Township will be required to provide services.

Year	Population	Private Dwellings	Employment
2021	6,509	2,772	N/A
2016	6,355	2,603	2,985
2011	6,073	2,380	3,090

Growth Plan for the Greater Golden Horseshoe

As part of the Greater Golden Horseshoe, the Township of Cramahe is subject to the policy outlined in the Growth Plan document. The Growth Plan for the Greater Golden Horseshoe (the "Growth Plan") and its Amendment 1 was approved by the Lieutenant Governor in Council to take effect on August 28, 2020. The Plan emphasis on optimizing the use of existing infrastructure and services public service facilities before expanding the urban area. The Growth Plan establishes the population and employment forecasts for the County of Northumberland in the year 2031. The population is projected to grow to 96,000 and employment is projected to grow to 33,000. As per the County's Official Plan, the population of the Township of Cramahe is projected to grow to 6,990 by 2031.

Under the Plan, the Province and the County of Northumberland has determined the population and employment projections, density and intensification targets based on the Northumberland Growth Management Strategy. The Township shall direct 85% growth to the Colborne Urban Area through intensification and the remaining (15%) to the rural areas.

Impact of Growth on Lifecycle Activities

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

The Strategic Plan for Cramahe has indicated the visions as maintaining sustainable infrastructure, thriving business community, providing fiscally responsible practices, supporting balanced and sustainable growth as well as providing gathering places and ensuring effective communications.

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

Appendix C: Condition Assessment Guidelines

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

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

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

Role of Asset Condition Data

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

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

Guidelines for Condition Assessment

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

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

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

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

Developing a Condition Assessment Schedule

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

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

Appendix D: Risk Rating Criteria

Risk Definitions

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

Risk Frameworks

Road Network – Paved (HCB/LCB) Roads

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/ Range**	**Score**
Performance	Asset Condition	0-19	5 - Almost Certain
		20-39	4 - Likely
		40-59	3 - Possible
		60-70	2 - Unlikely
		80-100	1 - Rare

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial (60%)	Replacement Cost	>$5,000,000	5 – Severe
		$1,000,000	4 – Major
		$500,000	3 - Moderate
		$250,000	2 – Minor
		<$50,000	1 – Insignificant
Social (20%)	AADT – 50%	>2000	5 – Severe
		600	4 – Major
		400	3 – Moderate
		200	2 – Minor
		<50	1 – Insignificant
	MTO Class - 50%	4	4 – Major
		5	3 – Moderate
		6	2 – Minor
Health & Safety (20%)	Speed Limit	>80	5 – Severe
		70	4 – Major
		60	3 – Moderate
		50	2 – Minor
		<40	1 – Insignificant

Bridges & Culverts

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

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial (60%)	Replacement Cost	>$1,000,000	5 – Severe
		$1,000,000	4 – Major
		$500,000	3 - Moderate
		$250,000	2 – Minor
		<$100,000	1 – Insignificant
Social (20%)	AADT – 50%	>2000	5 – Severe
		600	4 – Major
		400	3 – Moderate
		200	2 – Minor
		<50	1 – Insignificant
Health & Safety (20%)	Speed Limit	School Route	4 - Major
		80	4 – Major
		60	3 – Moderate
		50	2 – Minor

Buildings

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

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 80%	Replacement Cost	>$1,000,000	5 - Severe
		$1,000,000	4 - Major
		$500,000	3 - Moderate
		$250,000	2 - Minor
		<$100,000	1 - Insignificant
Social 20%	Asset Segment	Fire	5 - Severe
		Public Works	4 – Moderate
		Community Services	2 – Minor

Parks and Recreation

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

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 70%	Replacement Cost	>$1,000,000	5 - Severe
		$1,000,000	4 - Major
		$500,000	3 - Moderate
		$250,000	2 - Minor
		<$100,000	1 - Insignificant
Social 30%	Asset Segment	Fire	5 - Severe
		Public Works	4 – Moderate
		Community Services	2 – Minor

Machinery & Equipment

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

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 70%	Replacement Cost	>$500,000	5 - Severe
		$500,000	4 - Major
		$250,000	3 - Moderate
		$100,000	2 - Minor
		<$50,000	1 - Insignificant
	Fleet Type	Heavy Duty	4 - Major
		Medium Duty	4 – Moderate
		Light Duty	2 - Minor
Social 30%	Asset Segment	Fire	5 - Severe
		Public Works	4 – Moderate
		Community Services	2 – Minor

Vehicles

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

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 70%	Replacement Cost	>$500,000	5 - Severe
		$500,000	4 - Major
		$250,000	3 - Moderate
		$100,000	2 - Minor
		<$50,000	1 - Insignificant
	Fleet Type	Heavy Duty	4 - Major
		Medium Duty	4 – Moderate
		Light Duty	2 - Minor
Social 30%	Asset Segment	Fire	5 - Severe
		Public Works	4 – Moderate
		Community Services	2 – Minor

Water Mains

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

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial	Replacement Cost	>$500,000	5 - Severe
		$500,000	4 - Major
		$250,000	3 - Moderate
		$100,000	2 - Minor
		<$50,000	1 - Insignificant
	Diameter	>500	5 - Severe
		350	4 - Major
		250	3 - Moderate
		150	2 - Minor
		100	1 - Insignificant
	Road Surface Type	Hot Mix	4 - Major
		Surface Treated	3 - Moderate
		Gravel	1 - Insignificant

Sanitary Mains

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Performance 80%	Asset Condition	0	5 - Almost Certain
		20	4 - Likely
		40	3 - Possible
		60	2 - Unlikely
		80	1 - Rare
Structural 20%	Material	C.P	5 – Likely
		PVC, Conc, Asbestos	3 - Possible
		Steel, Ductile Iron, Cast Iron	2 - Unlikely
		HDPE, PVC, Polyurethane	1 - Rare

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 80%	Replacement Cost	>$1,000,000	5 - Severe
		$1,000,000	4 - Major
		$500,000	3 - Moderate
		$250,000	2 - Minor
		<$100,000	1 - Insignificant
	Diameter	>500	5 - Severe
		500	4 - Major
		250	4 – Moderate
		100	2 - Minor
		50	1 - Insignificant
Social 20%	AADT Ranges	0-199	5 - Severe
		200-399	4 - Major
		400-999	4 – Moderate
		1000-1999	2 – Minor
		>2000	1 - Insignificant

Storm Mains

Probability of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Performance 80%	Asset Condition	0	5 - Almost Certain
		20	4 - Likely
		40	3 - Possible
		60	2 - Unlikely
		80	1 - Rare
Structural 20%	Material	C.P	5 – Likely
		PVC, Conc, Asbestos	3 - Possible
		Steel, Ductile Iron, Cast Iron	2 - Unlikely
		HDPE, PVC, Polyurethane	1 - Rare

Consequence of Failure			
Criteria	**Sub-Criteria**	**Value/Range**	**Score**
Financial 80%	Replacement Cost	>$1,000,000	5 - Severe
		$1,000,000	4 - Major
		$500,000	3 - Moderate
		$250,000	2 - Minor
		<$100,000	1 - Insignificant
	Diameter	>750	5 - Severe
		500	4 - Major
		375	4 – Moderate
		250	2 - Minor
		100	1 - Insignificant
Social 20%	AADT Ranges	0-199	5 - Severe
		200-399	4 - Major
		400-999	4 – Moderate
		1000-1999	2 – Minor
		>2000	1 - Insignificant