Asset Management Plan

Township of North Stormont

2024

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 North Stormont total $280 million. 75% of all assets analysed are in fair or better condition. Assessed condition data was available for all road and bridge assets, the majority of sanitary assets, and 60% of water network assets. For the remaining assets, assessed condition data was unavailable, and asset age was used to approximate condition. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation.

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

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent future infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $4.9 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $2.9 million towards capital projects or reserves per year. As a result, the Township is funding 58% of its annual capital requirements. This creates a total annual funding deficit of $2.0 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 1.6% annual increase in revenues over a 20-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 3.1% and 4.3% annual increase respectively in revenues over a 20-year phase-in period.

In addition to annual needs, there is also an infrastructure backlog of $13.8 million, comprising assets that remain in service beyond their estimated useful life. It is highly unlikely that all such assets are in a state of disrepair, requiring immediate replacements or full reconstruction. This makes targeted and consistent condition assessments integral to refining long-term replacement and backlog estimates.

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

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

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

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

About this Document

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

Ontario Regulation 588/17

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

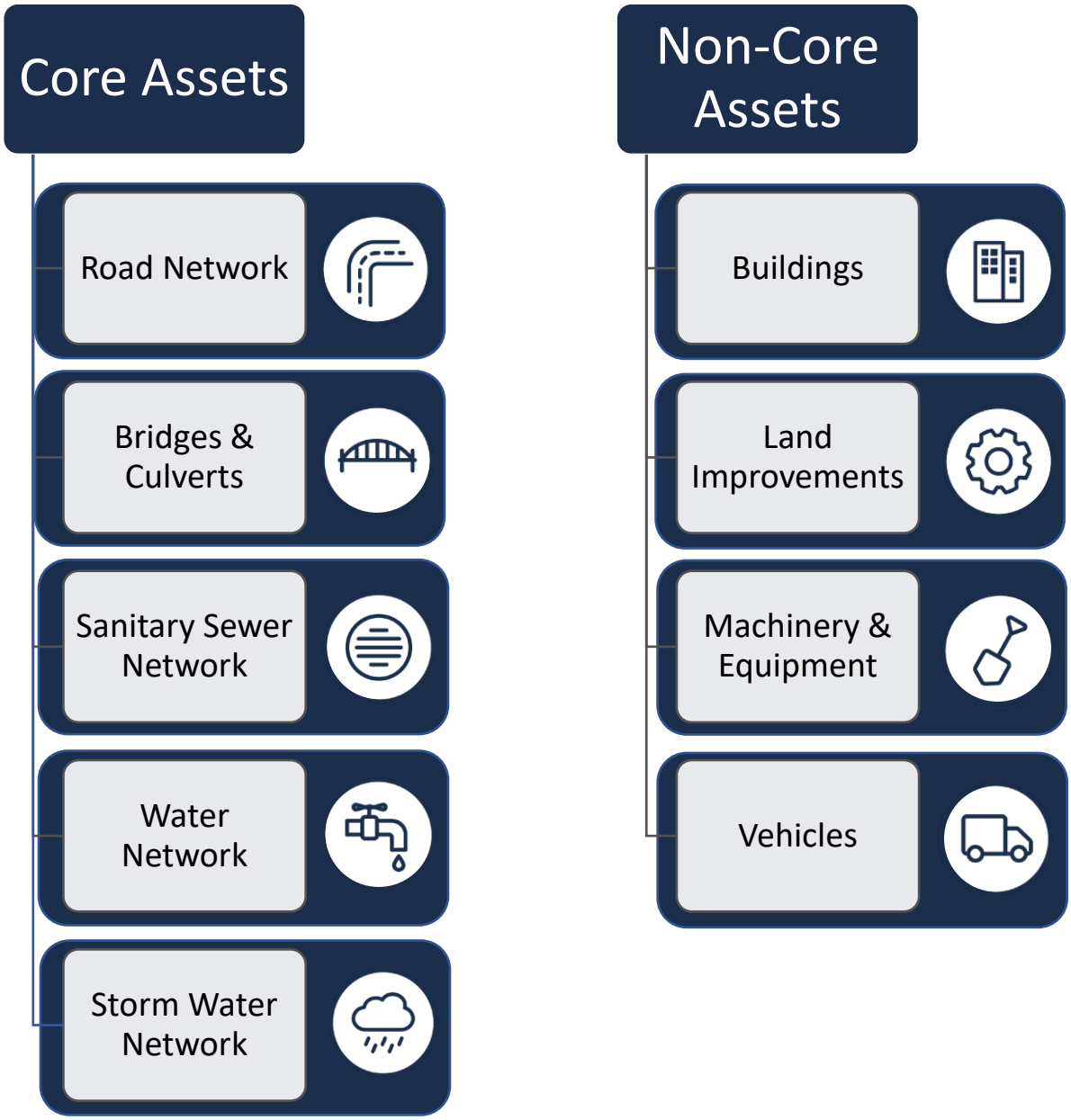
Table 1 Ontario Regulation 588/17 Requirements and Reporting Deadlines

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

Scope

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

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



Limitations and Constraints

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

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

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

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

An Overview of Asset Management

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

Lifecycle costs can span decades, requiring planning and foresight to ensure financial responsibility is spread equitably across generations. An asset management plan is critical to this planning, and an essential element of the broader asset management program. The industry-standard approach and sequence to developing a practical asset management program begins with a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan (AMP).

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

Foundational Documents

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

Strategic Plan

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

Asset Management Policy

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

Asset Management Strategy

An asset management strategy outlines the translation of organizational objectives into asset management objectives and provides a strategic overview of the activities required to meet these objectives. It provides greater detail than the policy on how the Township plans to achieve its asset management objectives through planned activities and decision-making criteria.

Asset Management Plan

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

Key Technical Concepts

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

Asset Hierarchy and Data Classification

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

Table 2 Asset Hierarchy

Asset Class	AM Category	AM Segment
Infrastructure	Road Network	Asphalt Roads Gravel Roads Sidewalks Streetlights Surface Treated Roads
	Bridges & Culverts	Bridges Culverts
	Storm Water Network	Sewer Lines Manholes Ditch Inlets Culverts Catch basins
	Sanitary Sewer Network	Sewer Lines Sewage Treatment
	Water Network	Water Lines Water Valves Fire Hydrants Water Towers
General Capital	Buildings	General Government Protection Transportation Recreation
	Land Improvements	General Government Recreation
	Machinery & Equipment	General Government Protection Transportation Recreation
	Vehicles	Protection Transportation Environmental

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.

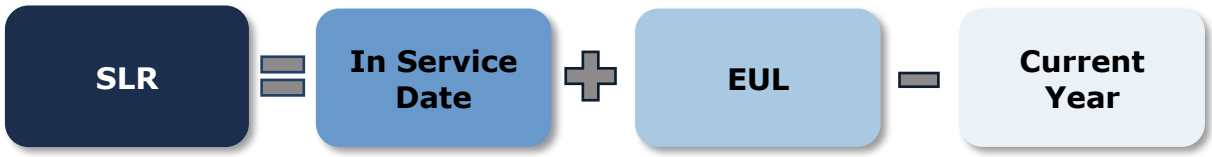
User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost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

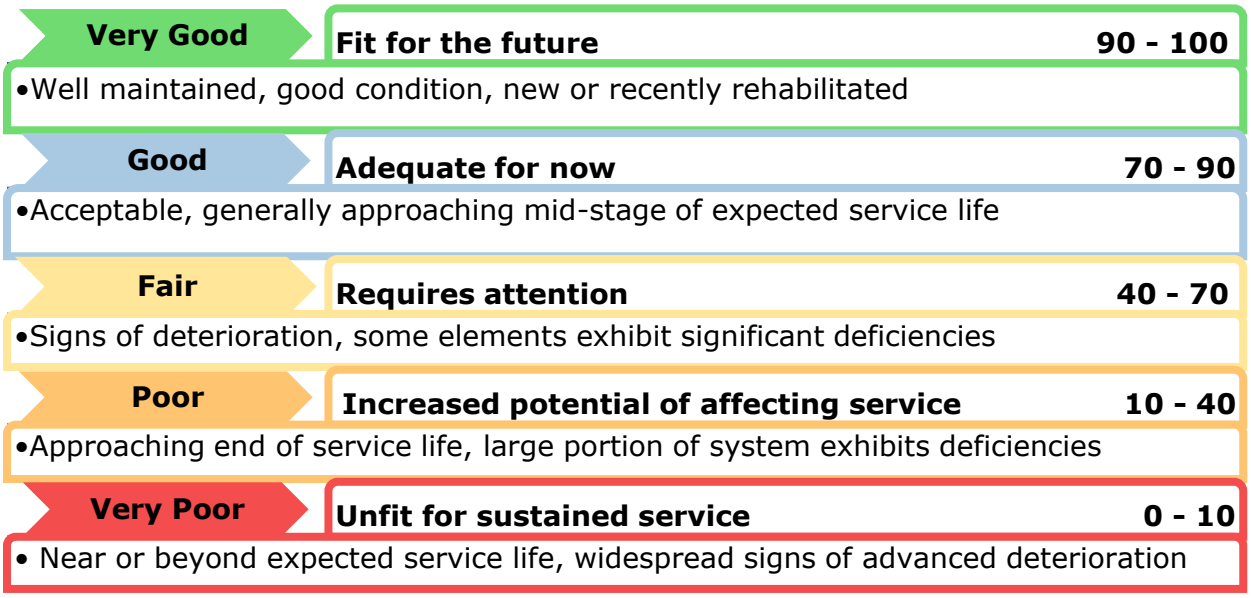


Asset Condition

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 North Stormont.

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 L: 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.

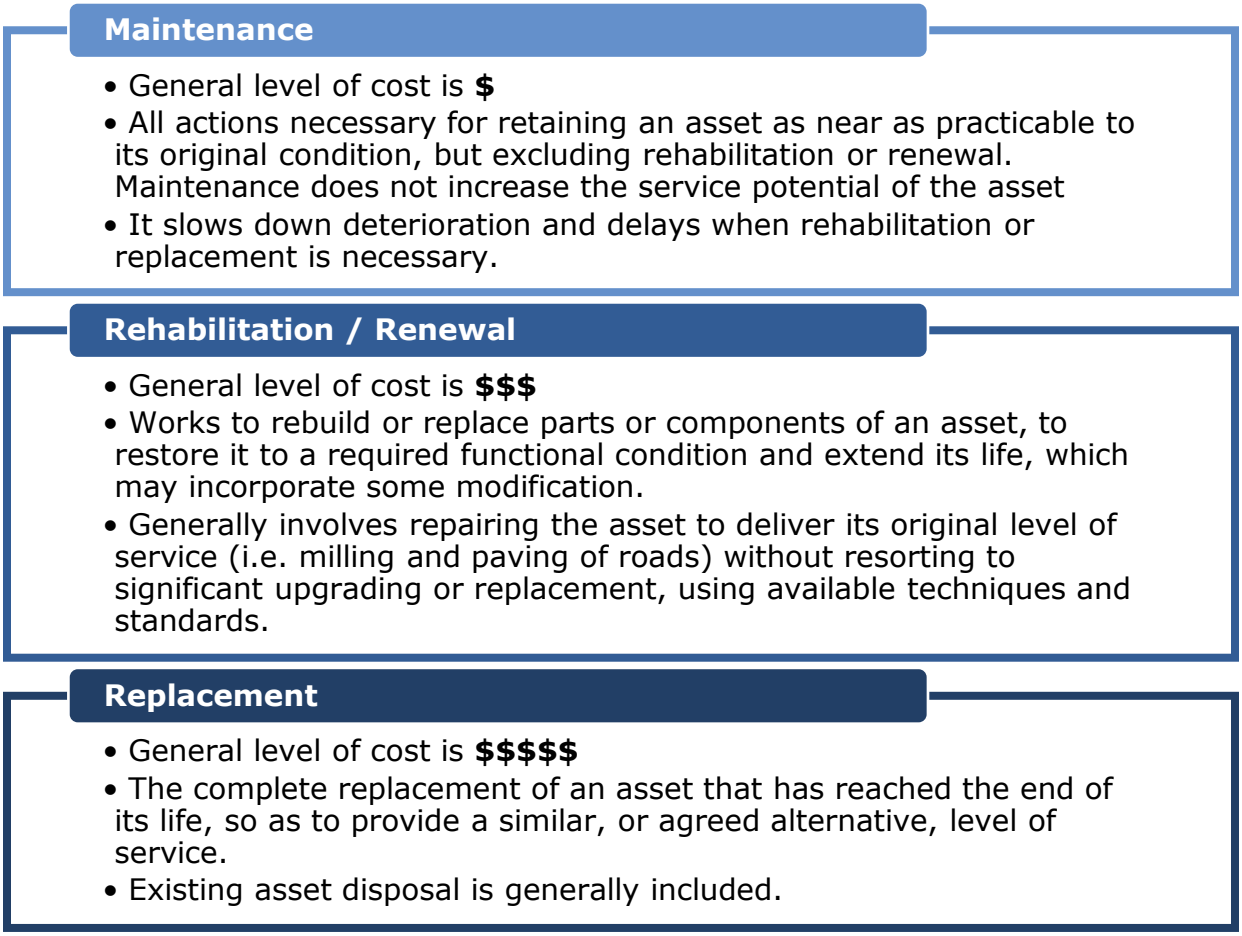
To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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.

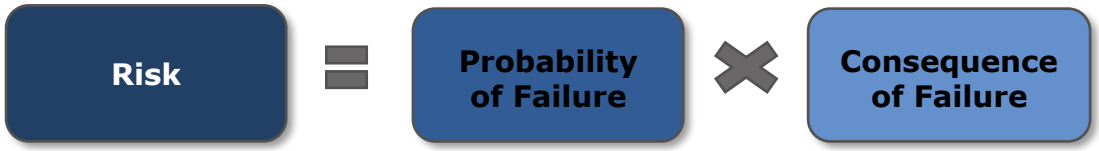
By identifying the various impacts of asset failure and the likelihood that it will fail, risk management strategies can identify critical assets, and determine where maintenance efforts, and spending, should be focused.

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 M: 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 North Stormont 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

North Stormont 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.

North Stormont Climate Profile

The Township of North Stormont is located in Eastern Ontario. 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 North Stormont may experience the following trends:

Higher Average Annual Temperature:

- Between the years 1971 and 2000 the annual average temperature was 5.9 ºC,
- Under a high emissions scenario, the annual average temperatures are projected to increase by 8.7 ºC by the year 2050 and over 12.5 ºC by the end of the century.

Increase in Total Annual Precipitation:

- Under a high emissions scenario, North Stormont is projected to experience a 12% increase in precipitation by the year 2050 and a 16% increase by the end of the century.

Increase in Frequency of Extreme Weather Events:

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

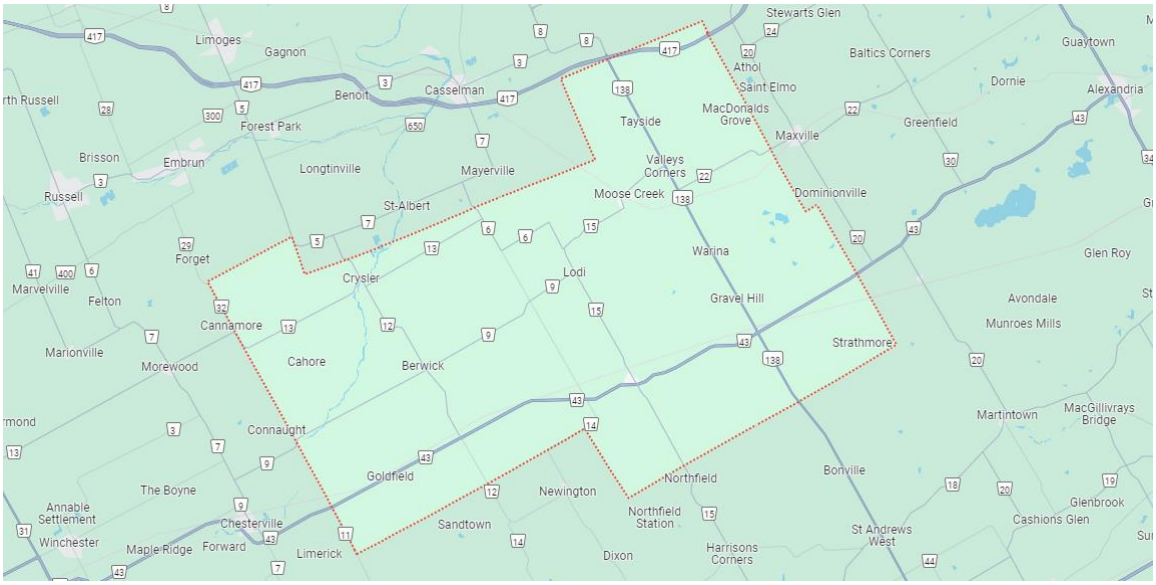
Reinvestment Rate

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

Portfolio Overview

Community Profile

The Township of North Stormont is a Township in the United Counties of Stormont, Dundas, and Glengarry within Eastern Ontario.



The Township is located to the South-East of Ottawa, just above the St. Lawrence River. The Township is comprised of the communities of Avonmore, Crysler, Finch, Monkland, Moose Creek, and Berwick where the Township is administratively based.

The Township's industrial makeup is comprised primarily of construction, agriculture, fishing, forestry, retail, and hunting. The Township has an ideal industrial location, being placed between the major cities of Montreal and Ottawa, which is a key portion of planning the long-term growth of the Township. The Township has made a strong and deliberate commitment to fostering job and industrial growth in the agri-food industry.

The Township of North Stormont has experienced low shifts in population over that last 20 years, with a sharp uptick in 2021. The Township boasts several advantages, such as its strategic positioning between Ottawa and Montreal. Additionally, the Township has made investments in modernizing its broadband infrastructure. However, projected growth remains modest, aligning with trends observed in other municipalities in Eastern Ontario. The Township has a population density just under the Ontario average over its 515 square kilometre area. The Township has a slightly younger than average population by proportion when compared to the rest of Ontario.

The Township's infrastructure priorities include municipal service delivery, facility upkeep, and fire/emergency services.

Table 3 North Stormont & Ontario Census Information

Census Characteristic	North Stormont	Ontario
Population 2021	7,400	14,223,942
Population Change 2016-2021	7.7%	5.8%
Total Private Dwellings	2,949	5,929,250
Population Density	14.4/km^2	15.9/km^2
Land Area	515.46 km^2	892,411.76 km^2

State of the Infrastructure

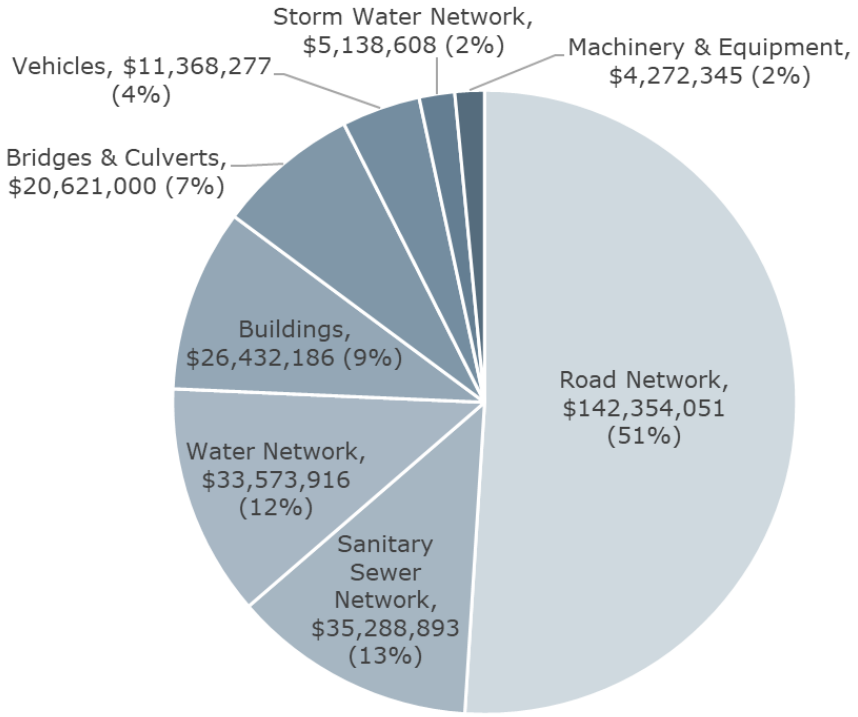
Table 4 North Stormont State of the Infrastructure

Asset Category	Replacement Cost	Asset Condition	Financial Capacity	
Road Network	$142,354,051	Fair (56.05%)	Annual Requirement:	$1,488,433
			Funding Available:	$1,407,896
			Annual Deficit:	$80,537
Bridges & Culverts	$20,621,000	Fair (66.00%)	Annual Requirement:	$257,763
			Funding Available:	$82,371
			Annual Deficit:	$175,392
Storm Water Network	$5,138,608	Fair (58.46%)	Annual Requirement:	$115,072
			Funding Available:	$0
			Annual Deficit:	$115,072
Buildings	$26,432,186	Fair (43.49%)	Annual Requirement:	$652,536
			Funding Available:	$444,500
			Annual Deficit:	$208,036
Land Improvements	$1,346,674	Fair (64.58%)	Annual Requirement:	$82,602
			Funding Available:	$54,457
			Annual Deficit:	$28,146
Vehicles	$11,368,277	Poor (25.64%)	Annual Requirement:	$858,697
			Funding Available:	$329,994
			Annual Deficit:	$528,703
Machinery & Equipment	$4,272,345	Fair (41.28%)	Annual Requirement:	$236,720
			Funding Available:	$330,398
			Annual Deficit:	($93,678)
Water Network	$33,573,916	Fair (58.53%)	Annual Requirement:	$594,735
			Funding Available:	$133,562
			Annual Deficit:	$461,173
Sanitary Sewer Network	$35,288,893	Fair (62.88%)	Annual Requirement:	$654,068
			Funding Available:	$69,821
			Annual Deficit:	$584,247
Overall	**$280,395,950**	**Fair (52.99%)**	**Annual Requirement:**	**$4,940,625**
			Funding Available:	**$2,873,998**
			Annual Deficit:	**$2,066,627**

Replacement Cost

All North Stormont's asset categories have a total replacement cost of $280 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

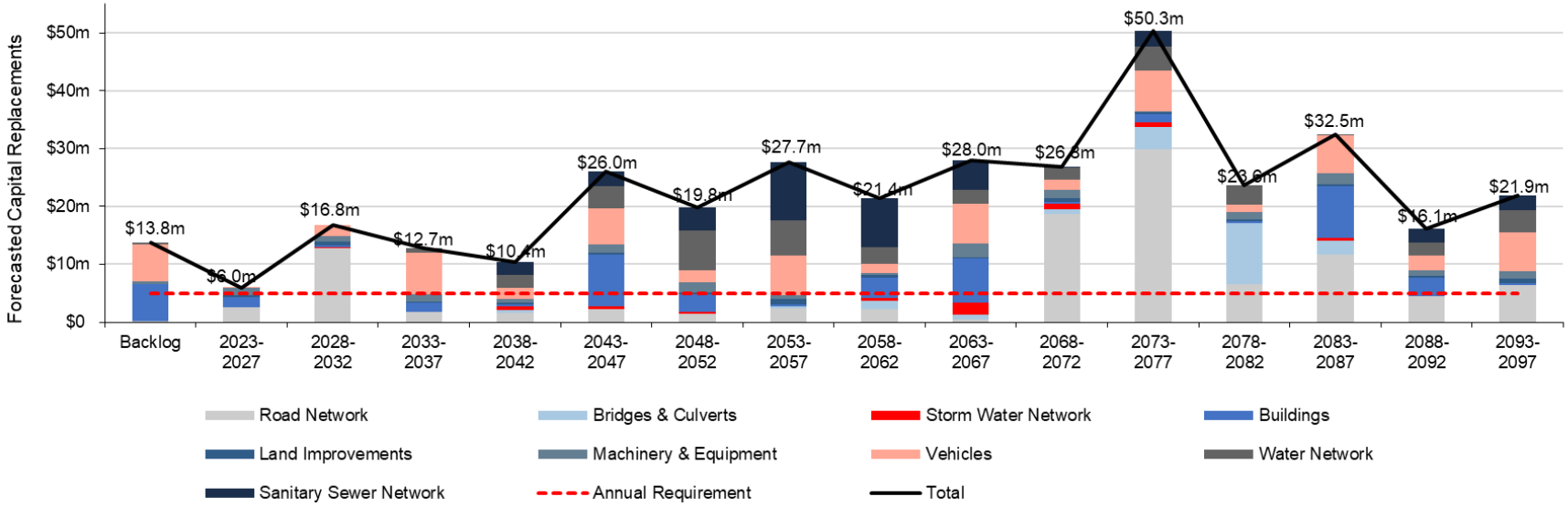


Forecasted Capital Requirements

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, $4.9 million is required each year to remain current with capital replacement needs for North Stormont'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 $280 million, this represents an annual target reinvestment rate of 1.8%.

Figure 6: Forecasted Capital Requirements



The chart also illustrates a backlog of $13.8 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, 75% of assets in North Stormont 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, most of the sanitary sewer network and over half of the water network; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions.

Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 42% 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

North Stormont 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 North Stormont'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 North Stormont's asset management program.

Levels of Service

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

Strategic Plan Line of Site

Strategic Vision

Our Township is known as a thriving and healthy community with a strong municipal government providing cost effective services and infrastructure. Our long-term objectives are:

Staff Engagement: happy, healthy, work/life balance, retention.

Asset Management Plan (AMP): increase in reserve balances to finance upcoming asset renewals/replacements.

Ensure that long-term capital goals are met by the municipality.

Population and housing growth continues to exceed the County and Provincial average, creating availability of a wide range of housing types.

Ensure continued strong customer service with clear procedures and tools.

Create an environment that assures that local businesses are successful and feel supported by the municipality.

Mission Statement (SDG Counties)

Cement a strong road to growth through financially sustainable service delivery that includes all local municipalities.

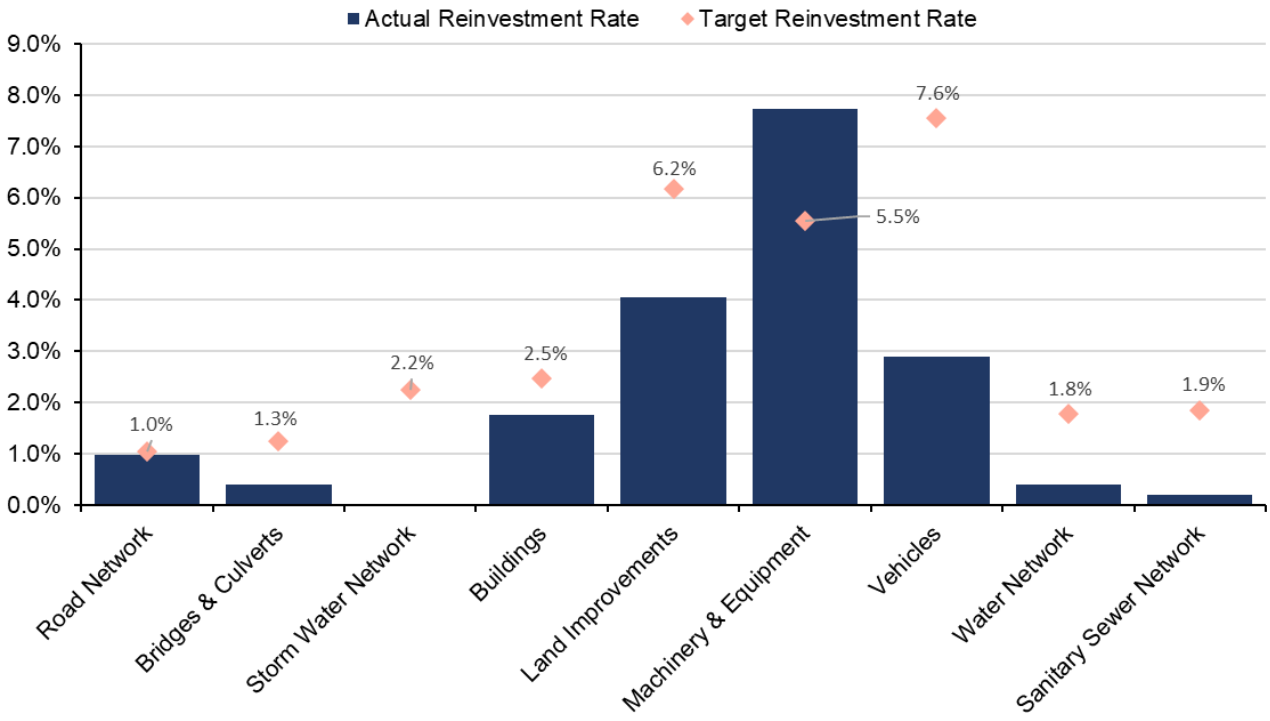
Values (SDG Counties)

- Public accountability
- Collaboration and Partnerships
- Advocacy and Education
- Honesty and Integrity
- Innovation and excellence

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 $4.9 million annually, for a target reinvestment rate of 1.8%. Actual annual spending on infrastructure totals approximately $2.87 million, for an actual reinvestment rate of 1.0%.

Figure 8: Target vs Actual Reinvestment Rates



Impacts of Growth

Understanding the key drivers of growth and demand will allow the Township to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

United Counties of Stormont, Dundas and Glengarry Official Plan (2018)

The Township of North Stormont consolidated their Official Plan in 2018 which bases its projections on the Growth Plan for Northern Ontario and reflects the goals of the Planning Act.

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

The settlement area will be the focus of residential and employment growth. There is a sufficient supply of vacant land available in the Township's designated settlement areas to meet the predicted needs for housing and employment, and even allow for additional supply in case the demand rises in the future. The emphasis of the development will be on settlement areas where there is an

appropriate level of public infrastructure that is presently accessible or can be made available at a reasonable cost. The rural area will maintain its' focus for agricultural activities, as well as mining and mineral exploration.

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 North Stormont 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. Reserves
    d. Debt
    e. 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. Gas tax
    b. Annual grants

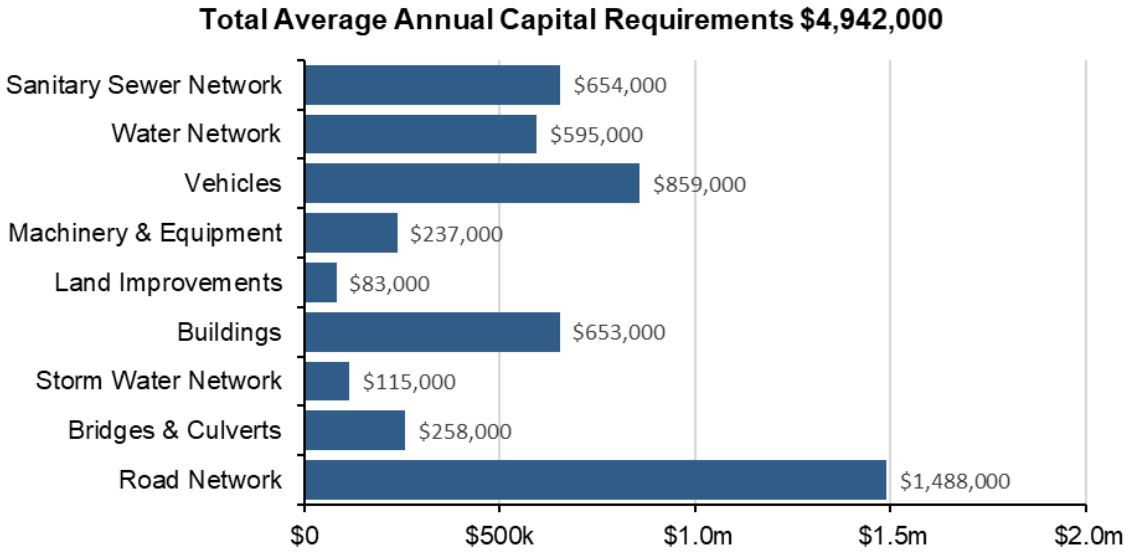
Note: Periodic grants are normally not included due to Provincial requirements for firm commitments. However, if moving a specific project forward is wholly dependent on receiving a one-time grant, the replacement cost included in the financial strategy is the net of such grant being received.

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 $4.9 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.

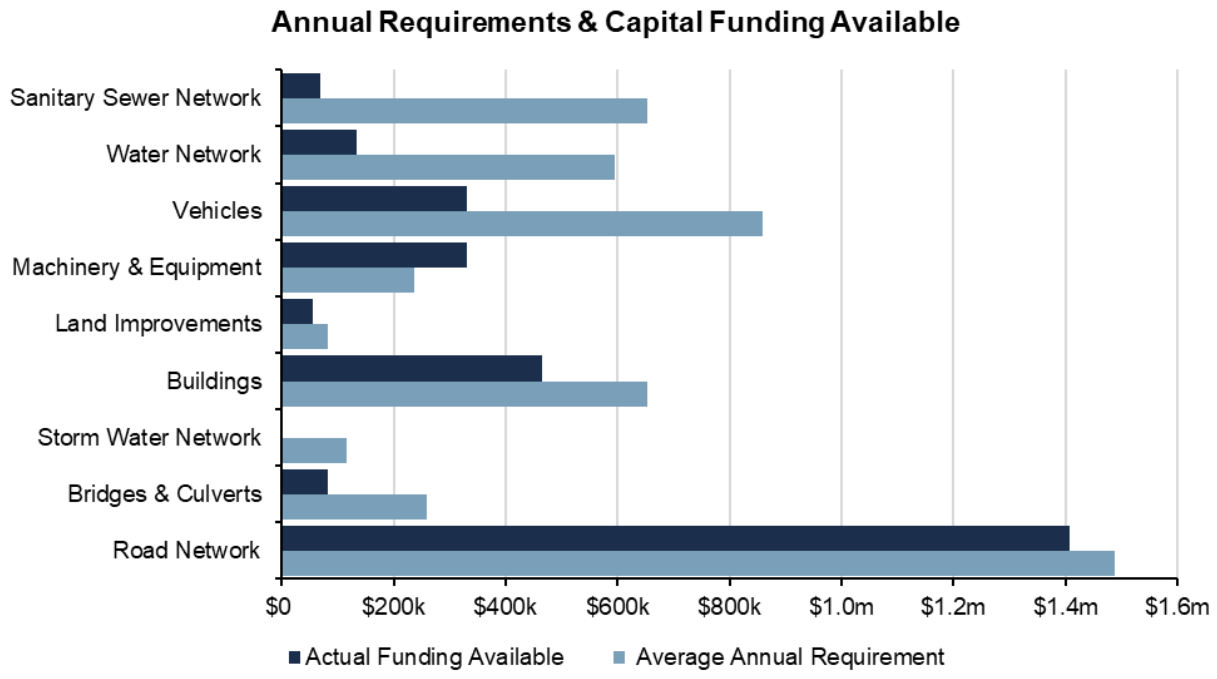
Table 5 Road Network Annual Capital Requirement Comparison

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$5,466,544	$1,488,433	$3,978,111

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $3,978,111 for the Road Network. This represents an overall reduction of the annual requirements for the category by 73%. 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 $2.9 million towards capital projects per year. Given the annual capital requirement of $4.9 million, there is currently a funding gap of $2.0 million annually.



Funding Objective

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

- **Tax Funded Assets:** Road Network, Storm Water Network, Bridges & Culverts, Buildings, Machinery & Equipment, Land Improvements, Vehicles
- **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, North Stormont'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	Gas Tax	OCIF	Capital Reserve Allocation	Total Available	
Road Network	1,488,000	898,582	227,186	282,128		1,407,896	80,104
Storm Water Network	115,072	0				0	115,072
Bridges & Culverts	257,763	82,371				82,371	175,392
Buildings	652,536	444,500			21,000	465,500	187,036
Machinery & Equipment	236,720	330,398				330,398	(93,678)
Land Improvements	82,602	54,457				54,457	28,145
Vehicles	858,697	329,994				329,994	528,703
	3,691,389	**2,140,301**	**227,186**	**282,128**	**21,000**	**2,670,616**	**1,020,773**

The average annual investment requirement for the above categories is $3,691,389. Annual revenue currently allocated to these assets for capital purposes is $2,718,115 leaving an annual deficit of $1,020,773. Put differently, these infrastructure categories are currently funded at 72.3% of their long-term requirements.

Full Funding Requirements

In 2022, Township of North Stormont had annual tax revenues of $3,306,143. 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	2.4%
Storm Water Network	5.4%
Bridges & Culverts	8.2%
Buildings	8.7%
Machinery & Equipment	-4.4%
Land Improvements	1.3%
Vehicles	24.7%
	31.0%

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

- North Stormont's formula based Ontario Community Infrastructure Fund (OCIF) grant is scheduled to grow from $285,090 in 2023 to $323,432 in 2024.
- North Stormont's debt payments for these asset categories will be decreasing by $119,000 over the next 5 to 10 years. Although not shown in the table, debt payment decreases will be $221,000 and $252,000 over the next 15 and 20 years respectively.

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	1,020,773	1,020,773	1,020,773	1,020,773	1,020,773	1,020,773	1,020,773	1,020,773
Change in Debt Costs	N/A	N/A	N/A	N/A	(118,602)	(118,602)	(221,093)	(252,351)
Change in OCIF Grants	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit:	1,020,773	1,020,773	1,020,773	1,020,773	902,171	902,171	799,680	768,422
Tax Increase Required	47.7%	47.7%	47.7%	47.7%	42.2%	42.2%	37.4%	35.9%
Annually:	**8.2%**	**4.0%**	**2.7%**	**2.0%**	**7.3%**	**3.6%**	**2.2%**	**1.6%**

Financial Strategy Recommendations

Considering all the above information, we recommend the 20-year option that includes capturing changes from reallocating debt costs to the infrastructure deficit. This involves full funding being achieved over 20 years by:

a) when realized, reallocating the debt cost reductions of $252,000 to the infrastructure deficit as outlined above.
b) increasing tax revenues by 1.6% 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) allocating the current Canada Community-Building Fund (Formerly known as Gas Tax Fund) and OCIF revenue as outlined previously.
d) allocating the scheduled OCIF grant increases to the infrastructure deficit as they occur.
e) reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
f) 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[1].
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 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 $140,000 for the Road Network, $26,000 for the Storm Water Network, $6,400,000 for Buildings, $557,000 for Machinery & Equipment, and $6,200,000 for Vehicles.

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.

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

Financial Profile: Rate Funded Assets

Current Funding Position

The following tables show, by asset category, North Stormont'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	To Operations	OCIF	Total Available	
Water Network	594,735	557,852	(424,291)		133,562	461,173
Sanitary Sewer Network	654,068	456,425	(386,604)		69,821	584,247
	1,248,803	**1,014,277**	**(810,894)**	**0**	**203,383**	**1,045,420**

The average annual investment requirement for the above categories is $1,248,803. Annual revenue currently allocated to these assets for capital purposes is $203,383 leaving an annual deficit of $1,045,420. Put differently, these infrastructure categories are currently funded at 16.3% of their long-term requirements.

Full Funding Requirements

In 2022, North Stormont had annual water revenues of $456,425 and annual sanitary revenues of $557,852. 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
1. Water Network	82.7%
2. Sanitary Sewer Network	128.0%

In the following tables, 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	461,173	461,173	461,173	461,173	584,247	584,247	584,247	584,247
Change in OCIF Grants	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit:	461,173	461,173	461,173	461,173	584,247	584,247	584,247	584,247
Rate Increase Required	82.7%	82.7%	82.7%	82.7%	128.0%	128.0%	128.0%	128.0%
Annually:	**12.9%**	**6.3%**	**4.1%**	**3.1%**	**18.0%**	**8.6%**	**5.7%**	**4.3%**

Financial Strategy Recommendations

Considering all of 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) increasing rate revenues by 3.1% for water services and 4.3% 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.
b) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

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

Although this option achieves full funding on an annual basis in 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 $409,000 for the Water Network.

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

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:

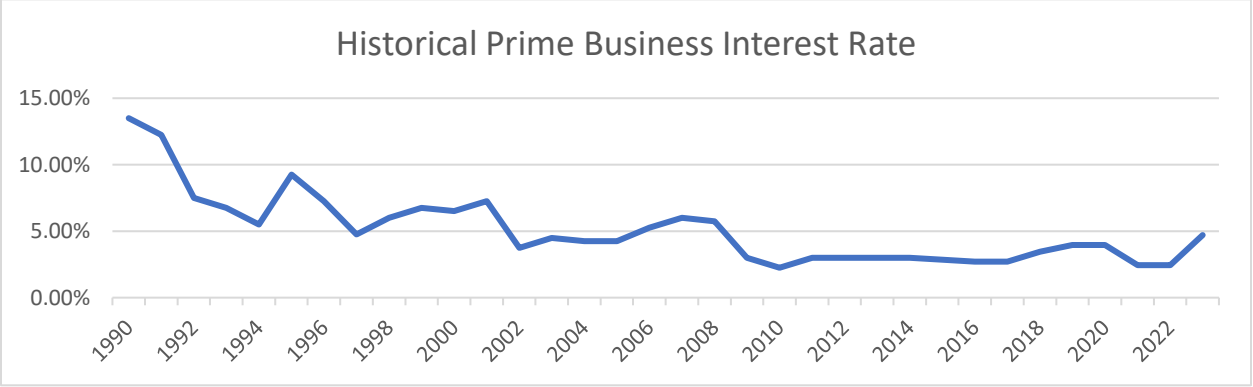
a) the ability to stabilize tax & user rates when dealing with variable and sometimes uncontrollable factors

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%[2] 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%

[2] Current municipal Infrastructure Ontario rates for 15-year money is 3.2%.

The following tables outline how North Stormont has historically used debt for investing in the asset categories as listed. There is currently $2,034,878 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $252,351, well within its provincially prescribed maximum of $5,366,000.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2017	2018	2019	2020	2021
Road Network						
Storm Water Network						
Bridges & Culverts						
Buildings	1,114,800	1,434,126	1,374,299	1,312,518	1,248,718	1,182,835
Machinery & Equipment						
Land Improvements						
Vehicles	920,078	1,015,660	917,866	1,287,608	1,168,146	1,045,662
Total Tax Funded:	**2,034,878**	**2,449,786**	**2,292,165**	**2,600,126**	**2,416,864**	**2,228,497**
Water Network						
Sanitary Sewer Network						
Total Rate Funded:	**0**	**0**	**0**	**0**	**0**	**0**

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2022	2023	2024	2025	2026	2027	2032
Road Network							
Storm Water Network							
Bridges & Culverts							
Buildings	102,491	102,491	102,491	102,491	102,491	102,491	102,491
Machinery & Equipment							
Land Improvements							
Vehicles	149,860	149,860	149,860	149,860	77,878	31,258	31,258
Total Tax Funded:	**252,351**	**252,351**	**252,351**	**252,351**	**180,370**	**133,749**	**133,749**
Water Network							
Sanitary Sewer Network							
Total Rate Funded:	**0**	**0**	**0**	**0**	**0**	**0**	**0**

The revenue options outlined in this plan allow North Stormont 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 North Stormont.

Asset Category	Balance at December 31, 2022
Road Network	2,382,199
Storm Water Network	
Bridges & Culverts	
Buildings	557,390
Machinery & Equipment	
Land Improvements	11,731
Vehicles	329,539
Total Tax Funded:	**3,280,860**
Water Network	767,961
Sanitary Sewer Network	628,337
Total Rate Funded:	**1,396,298**

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 North Stormont'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 North Stormont 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

- Asset management planning is highly sensitive to replacement costs. Periodically update replacement costs based on recent projects, invoices, or estimates, or any other technical reports and studies. Material and labour costs can fluctuate due to local, regional, and broader market trends, and substantially so during major world events. Accurately estimating the replacement cost of like-for-like assets can be challenging. Ideally, several recent projects over multiple years should be used.

Condition Assessment Strategies

- Continue conducting network-wide assessments to ensure condition information remains reliable. Condition assessments are vital to asset management plans as they provide crucial insights into the health and performance of assets over time. By evaluating the condition of assets regularly, the Township can prioritize maintenance and repair efforts, optimize resource allocation, and extend the lifespan of assets. This proactive approach can ensure the efficient and cost-effective operation of infrastructure and equipment.

Lifecycle Management Strategies

- Implement the identified lifecycle management strategies for HCB and LCB roads to realize potential cost avoidance and maintain a high quality of road pavement condition.
- Evaluate the efficacy of the Township's lifecycle management strategies at regular intervals to determine the impact cost, condition, and risk. 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.

Appendix A: Road Network

State of the Infrastructure

North Stormont's Road Network comprises the largest share of its infrastructure portfolio, with a current replacement cost of $142 million, distributed primarily between Asphalt (HCB), Surface-Treated (LCB) and gravel roads.

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

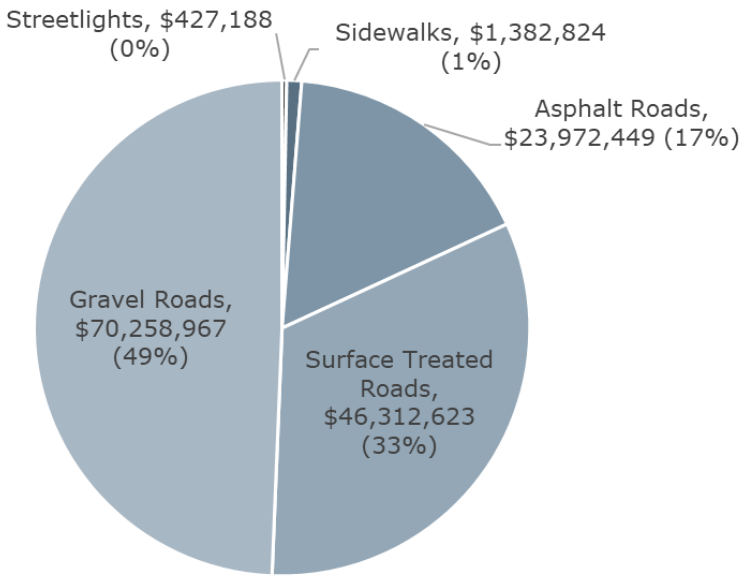
The state of the infrastructure for the road network is summarized below.

Replacement Cost	Condition	Financial Capacity	
		Annual Requirement:	$1,488,000
$142,354,051	Fair (56.05%)	Funding Available:	$1,407,896
		Annual Deficit:	$80,537

Inventory & Valuation

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

Figure 9: Road Network Replacement Value

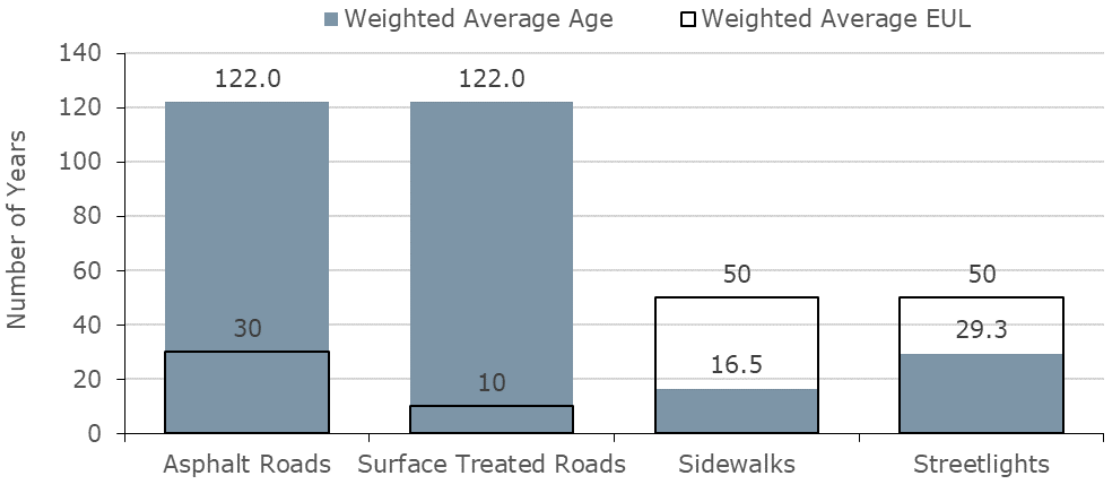


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

Asset Condition & Age

The graph below identifies the average age, and the estimated useful life for each asset segment[3]. It is all weighted by replacement cost.

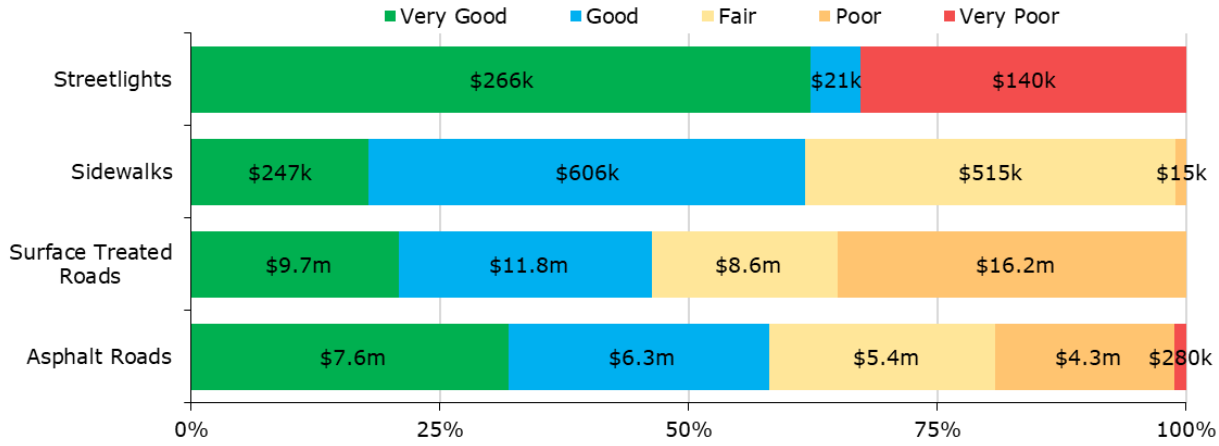
Figure 10: Road Network Average Age vs Average EUL



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

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

Figure 11: Road Network Condition Breakdown



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.

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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The Township conducts comprehensive road needs assessments that serve to evaluate the current condition of road infrastructure, identify areas requiring maintenance or rehabilitation, and inform future investment decisions. Roads needs assessments aid the Township in efficiently allocating resources, optimizing maintenance schedules, and ensuring the continued safety and functionality of the transportation network.

Lifecycle Management Strategy

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

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

Figure 12: Road Network Current Lifecycle Strategy

Maintenance

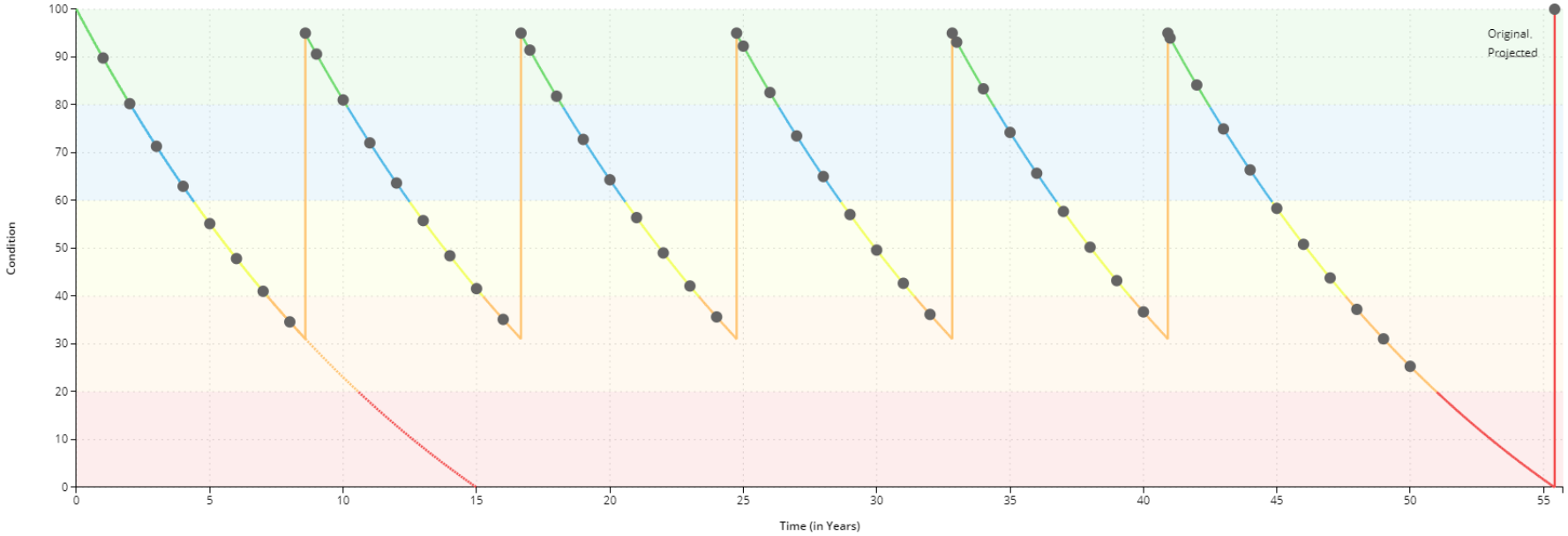
- Deficiency repairs as required from patrols for minimum maintenance standards such as patching, shoulder grading, etc.
- Winter control activities

Rehabilitation / Renewal / Replacement

- Road rehabilitation and replacement projects are planned and executed in alignment with underground utility rehabilitation or replacement initiatives, thereby reducing the overall expenditure
- Activities are conducted in response to immediate needs rather than as part of a proactive strategy, and are dependent on available funding

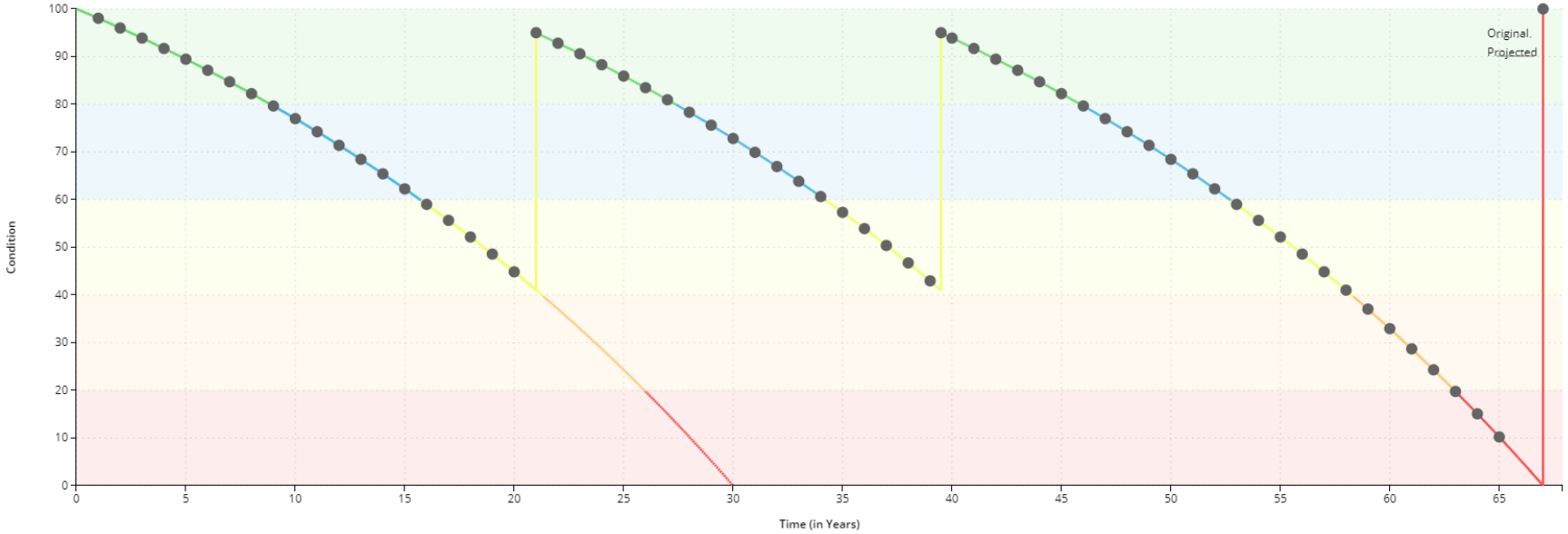
Pavement Condition Index scores, staff judgment, traffic loads, and opportunity to bundle projects help inform the optimal lifecycle intervention, ranging from pothole repairs to overlays and potential replacements. Lifecycle models used to estimate the savings to annual capital requirement are shown below in Figure 13 for Paved (LCB) roads, and Figure 14 for Asphalt (HCB) Roads.

Figure 13: Paved Roads (LCB) Road Lifecycle Model



LCB Roads		
Event Name	**Event Class**	**Event Trigger**
Routine Maintenance	Maintenance	Annual event
Surface Treatment	Rehabilitation	Condition at 31 – 40%
Full Reconstruction	Replacement	Condition at 0 - 30%

Figure 14: Asphalt Roads (HCB) Road Lifecycle Model



HCB Roads		
Event Name	**Event Class**	**Event Trigger**
Routine Maintenance	Maintenance	Annual event
Overlay	Rehabilitation	Condition at 41 – 50%
Full Reconstruction	Replacement	Condition at 0 - 30%

Forecasted Capital Requirements

Figure 15 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's road network. Based on the lifecycle strategies identified previously for HCB and LCB roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the road network. This analysis was run until 2072 to capture at least one iteration of replacement for the longest-lived asset in the asset register.

North Stormont's average annual requirements (red dotted line) total $1.5 million for all assets in the road network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise. The chart illustrates capital needs through the forecast period in 5-year intervals.

The projections are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades. They are based on asset replacement costs, age analysis, and condition data when available, as well as lifecycle modeling (roads only identified above).

Figure 15: Road Network Forecasted Capital Replacement Requirements

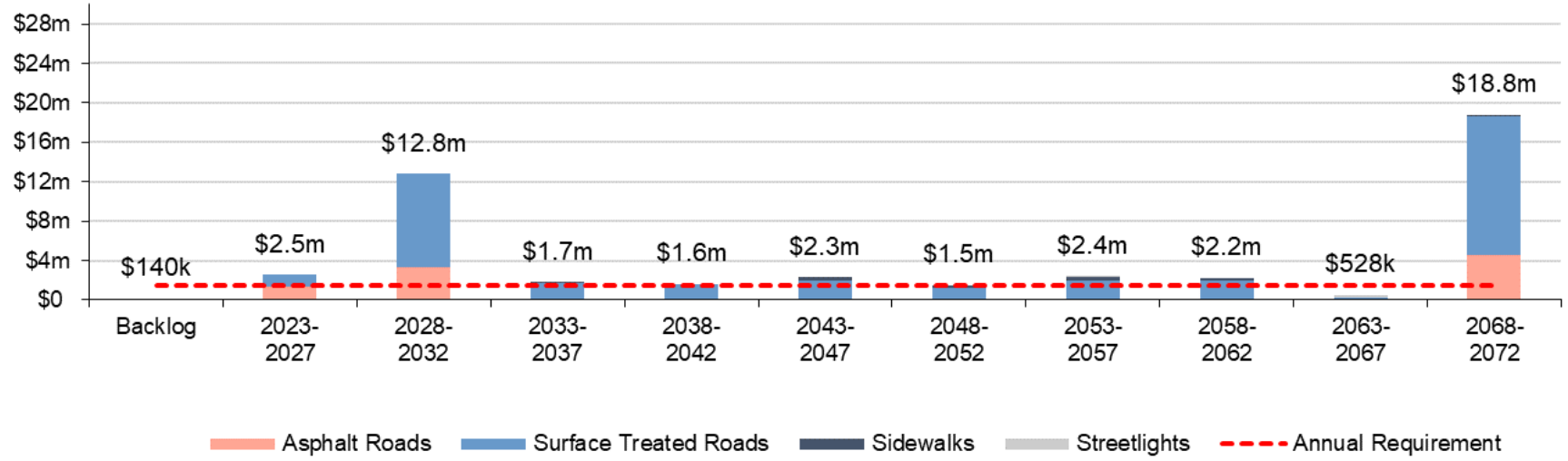


Table 10 below summarizes the projected cost of lifecycle activities (rehabilitation and replacement) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

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

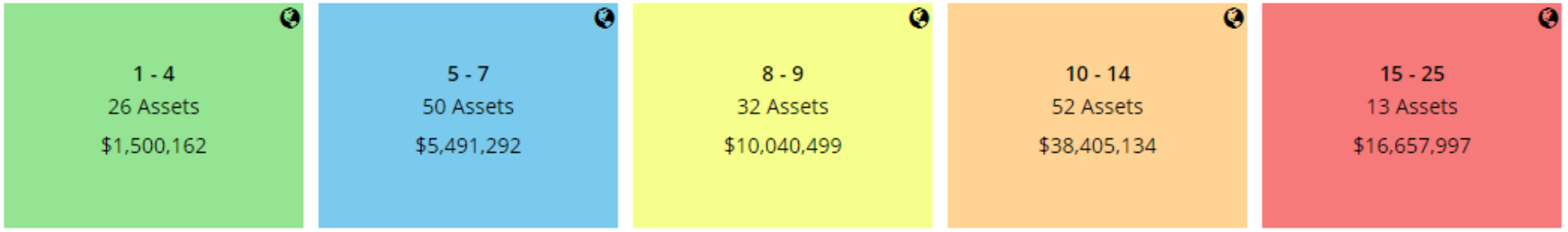
Table 10 Road Network System-generated 10-Year Capital Costs

Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Asphalt Roads	$4.6m	$0	$280k	$0	$0	$1.0m	$1.8m	$1.4m	$82k	$0	$0
Surface Treated Roads	$10.7m	$249k	$379k	$326k	$164k	$99k	$8.1m	$304k	$507k	$249k	$379k
Sidewalks	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Streetlights	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$15.3m**	**$249k**	**$659k**	**$326k**	**$164k**	**$1.1m**	**$9.9m**	**$1.8m**	**$589k**	**$249k**	**$379k**

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 M: Risk Rating Criteria. for the criteria used to determine the risk rating of each asset.

Figure 16: Road Network Risk Matrix



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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining (%)	Average Daily Traffic Counts (Operational)
	Speed Limit (Operational)

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

Risks to Current Asset Management Strategies

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

Climate Change & Extreme Weather Events

Flooding and extreme weather events like increased freeze and thaw cycles can cause damage the Township's roads. Freezing rain followed by rapid freezing can cause ice to expand within cracks and potholes in the pavement, leading to further deterioration of road surfaces. This exacerbates existing pavement issues and accelerates the need for repairs or resurfacing.

Levels of Service

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

Community Levels of Service

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

Table 11 Road Network Community Levels of Service

Values	Qualitative Description	Current LOS (2022)
Cost Efficient	Description, which may include maps, of the road network in the Township and its level of connectivity	See Appendix J.
Sustainable	Description or images that illustrate the different levels of road class pavement condition	See Figure 2 for the description of road condition

Technical Levels of Service

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

Table 12 Road Network Technical Levels of Service

Service Attribute	Technical Metric	Curent LOS (2022)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area in the municipality (km/km^2)	0 lane km/km^2
	Lane-km of collector roads (MMS classes 3 and 4) per land area in the municipality (km/km^2)	1.13 lane km/km^2
	Lane-km of local roads (MMS classes 5 and 6) per land area in the municipality (km/km^2)	0.21 lane km/km^2
Quality	Average pavement condition index for paved roads in the municipality	65%
	Average surface condition for unpaved roads in the municipality	60%
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	1.0% - 1.0%

Appendix B: Bridges & Culverts

State of the Infrastructure

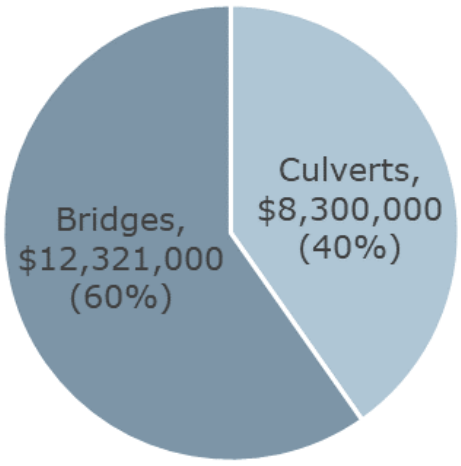
Bridges and culverts (B&C) represent a critical portion of the transportation services provided to the community. The state of the infrastructure for bridges and culverts is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$20,840,987	Fair (66.00%)	Annual Requirement:	$257,763
		Funding Available:	$82,371
		Annual Deficit:	$175,392

Inventory & Valuation

Figure 17 below displays the replacement cost of each asset segment in the Township's bridges and culverts inventory.

Figure 17 Bridges & Culverts Replacement Cost

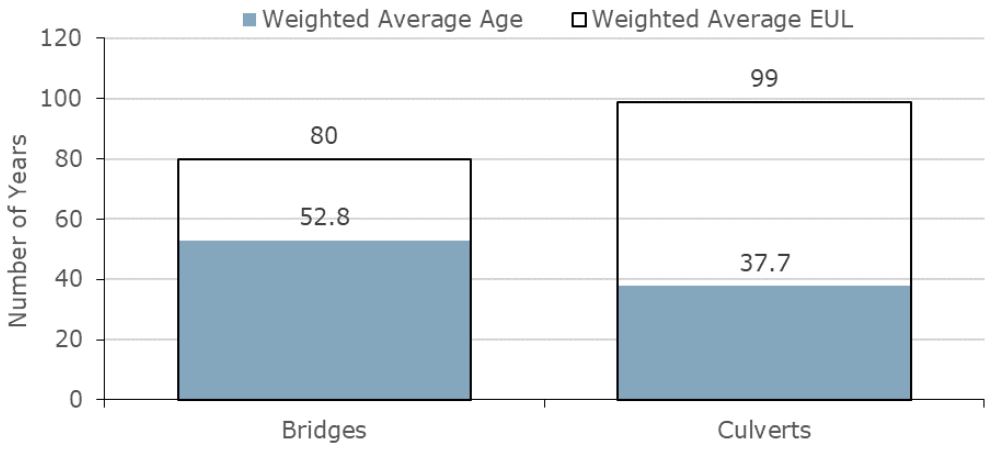


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed. This can be included in the Ontario Structures Inspection Manual (OSIM) inspections as the replacement cost is part of the calculation for the bridge condition index (BCI).

Asset Condition & Age

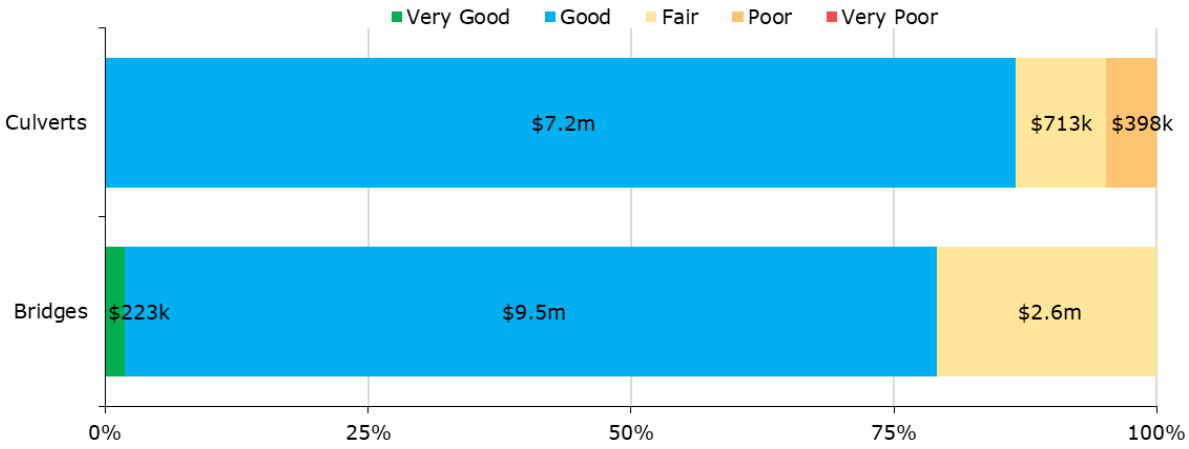
The graph below identifies the average age and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

Figure 18: B&C Average Age vs Average EUL



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

Figure 19: B&C Condition Breakdown



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

Current Approach to Condition Assessment

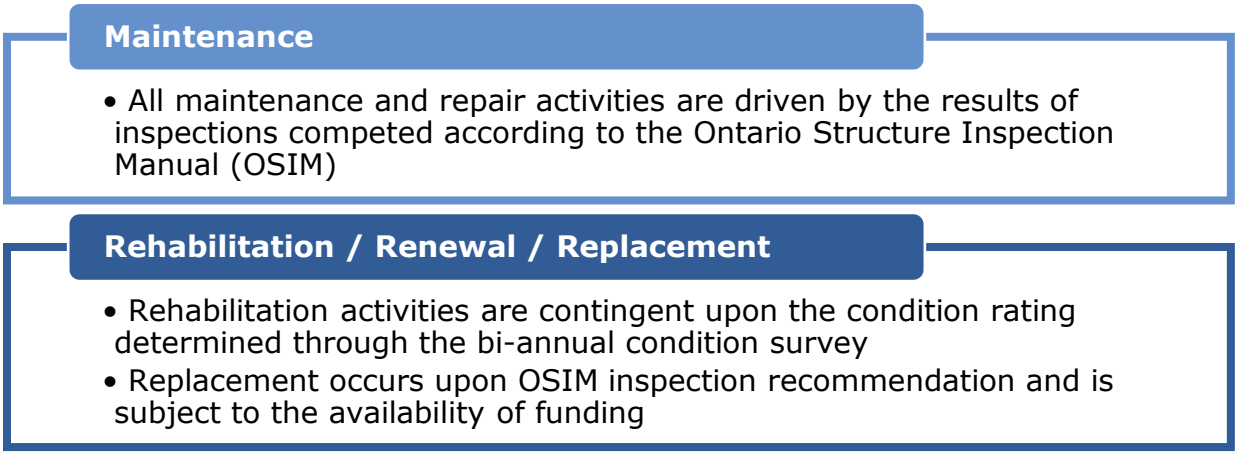
Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets.

North Stormont's current approach is to assess the 20 bridges and 20 culverts every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM). The most recent assessment was completed in 2023 by HP Engineering Inc.

Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. Figure 20 outlines North Stormont's current lifecycle management strategy.

Figure 20: B&C Current Lifecycle Strategy



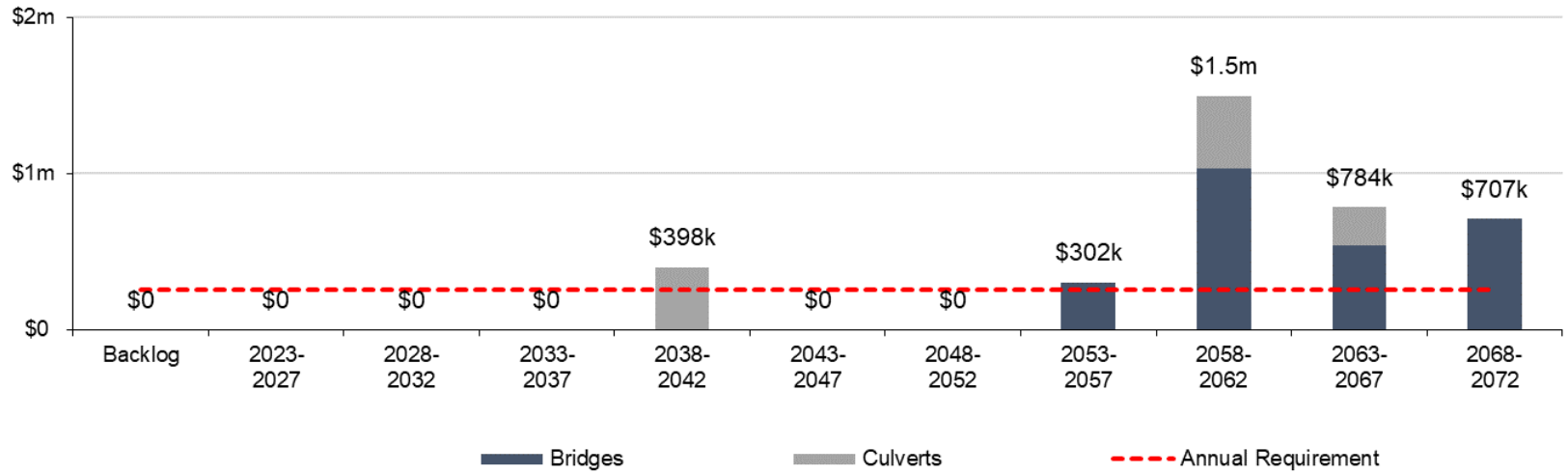
Forecasted Capital Requirements

Figure 21 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 2072 and the resulting graph identifies capital requirements over the next 80 years. North Stormont's average annual requirements (red dotted line) for bridges and culverts total $258 thousand. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

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

Figure 21: B&C Forecasted Capital Replacement Requirements



These are represented at the major asset level.

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

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

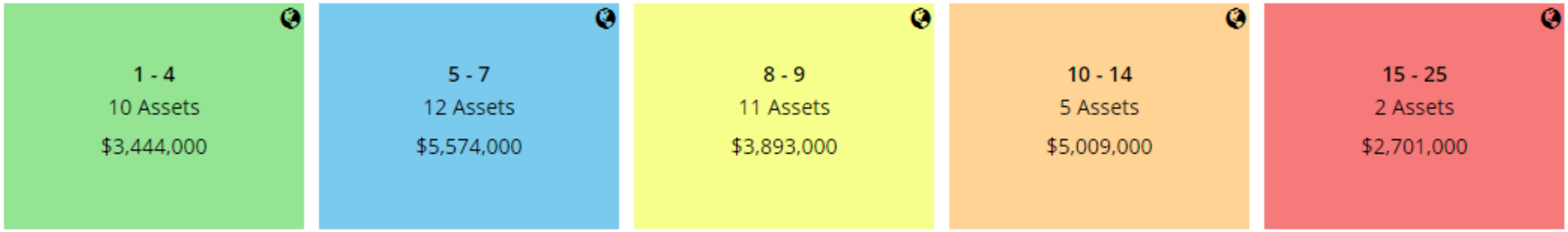
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Bridges	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

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

Risk & Criticality

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

Figure 22: B&C Risk Matrix



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

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

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

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

Risks to Current Asset Management Strategies

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

Climate Change & Extreme Weather Events

The Township of North Stormont is located within a derecho-prone region. High winds from derechos can exert immense forces on bridge structures, potentially causing structural damage. This damage may include bending or twisting of bridge beams, fracture or failure of support columns, or displacement of bridge decks.

Levels of Service

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

Community Levels of Service

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

Table 14 Community Levels of Service

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)	The municipal bridges support a diverse range of traffic, serving as crucial conduits not only within the Township but also for travel between other cities. They accommodate a wide array of vehicles, from large agricultural equipment and heavy transport vehicles to motor and emergency vehicles, as well as cyclists and pedestrians.
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.

Table 15 B&C Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2022)
Scope	% of bridges in the municipality with loading or dimensional restrictions	0%
Quality	Average bridge condition index value for bridges in the municipality	65%
	Average bridge condition index value for structural culverts in the municipality	67%
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.4% - 1.3%

Appendix C: Water Network

State of the Infrastructure

The Urban Settlement Areas of Crysler, Finch, and Moose Creek in the Township of North Stormont receive water services, which are managed and maintained through a partnership with the Ontario Clean Water Agency (OCWA).

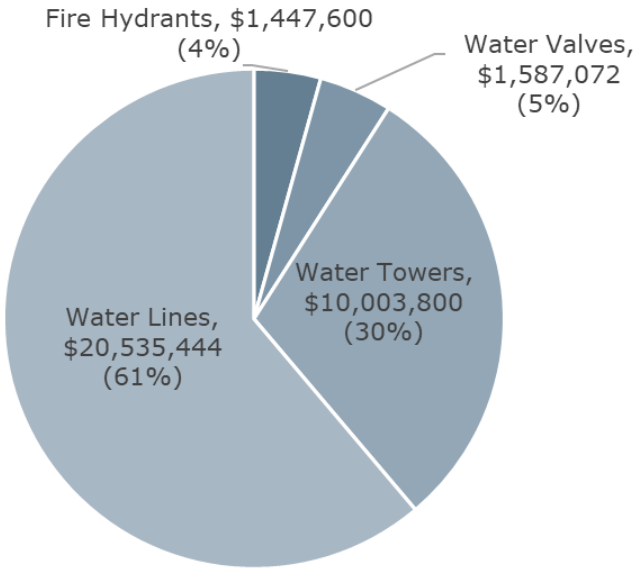
The state of the infrastructure for the water network is summarized in the following table:

Replacement Cost	Condition	Financial Capacity	
$33,573,916	Fair (58.53%)	Annual Requirement:	$594,735
		Funding Available:	$133,562
		Annual Deficit:	$461,173

Inventory & Valuation

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

Figure 23: Water Network Replacement Cost

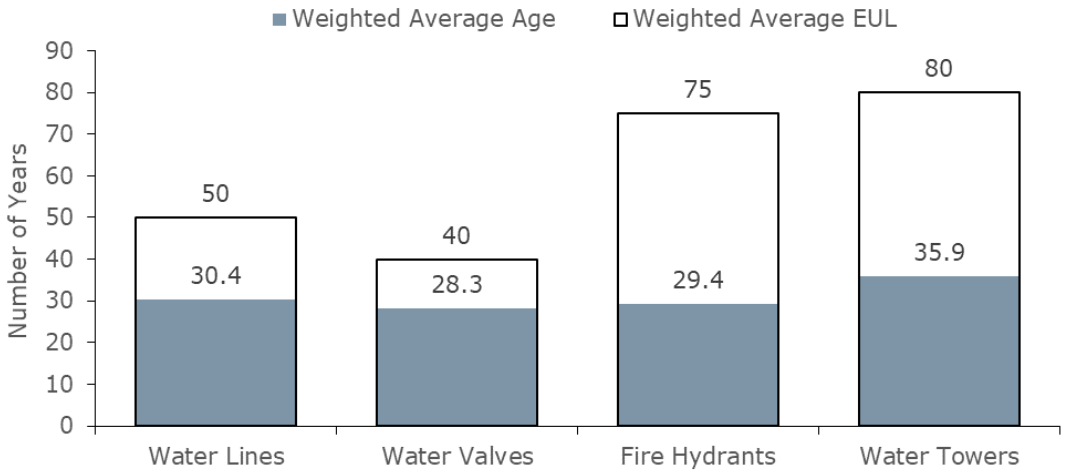


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

Asset Condition & Age

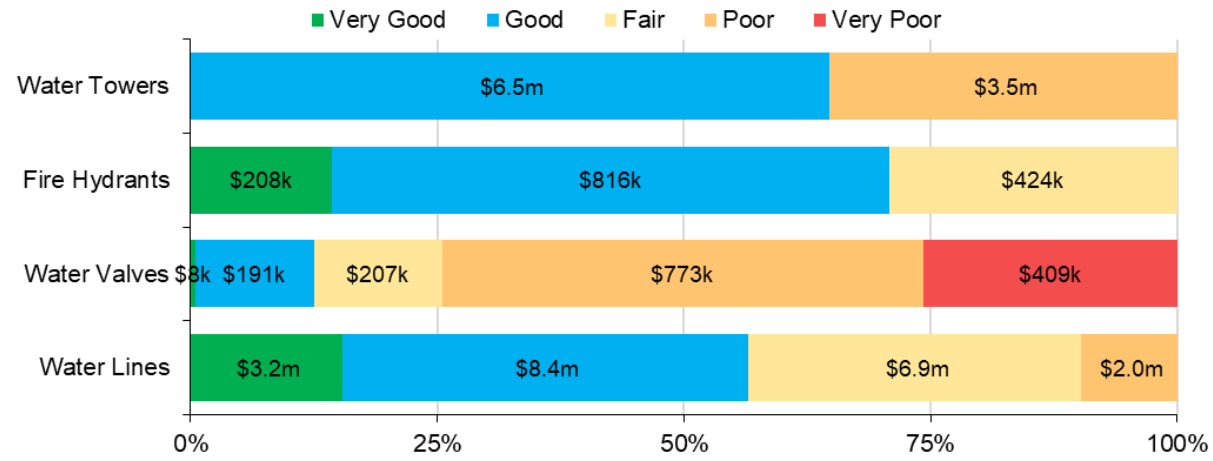
The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Figure 24: Water Network Average Age vs Average EUL



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

Figure 25: Water Network Condition Breakdown



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

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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The Township employs an annual CCTV inspection strategy for its underground infrastructure, rotating inspection locations throughout the township each year. Depending on findings and priorities, the extent of inspection coverage may vary from year to year, with more focus on critical areas or those with known issues. Data collected from CCTV inspections are analyzed to assess pipe condition, identify defects, and prioritize maintenance actions, ultimately optimizing asset performance and maximizing infrastructure lifespan.

Lifecycle Management Strategy

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

Figure 26: Water Network Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Annual inspections of fire hydrants are conducted collaboratively by OCWA and the township, with flow testing occurring twice a year in spring and fall to ensure functionality and identify any potential issues for proactive maintenance.
- Regular inspections of water mains are carried out jointly by OCWA and the Township, with preventative maintenance performed based on manufacturer recommendations.
- Replacement activities are determined through analysis of breakdown rates and issues identified during maintenance, ensuring timely and cost-effective replacements.
- Renewal and replacement activities are guided by lifecycle analysis and align with the asset management plan's recommendations.
- Repairs are promptly addressed reactively in response to complaints, prioritizing service reliability and addressing community concerns.

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that North Stormont should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 80 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirement of $595 thousand.

Figure 27: Water Network Forecasted Capital Replacement Requirements

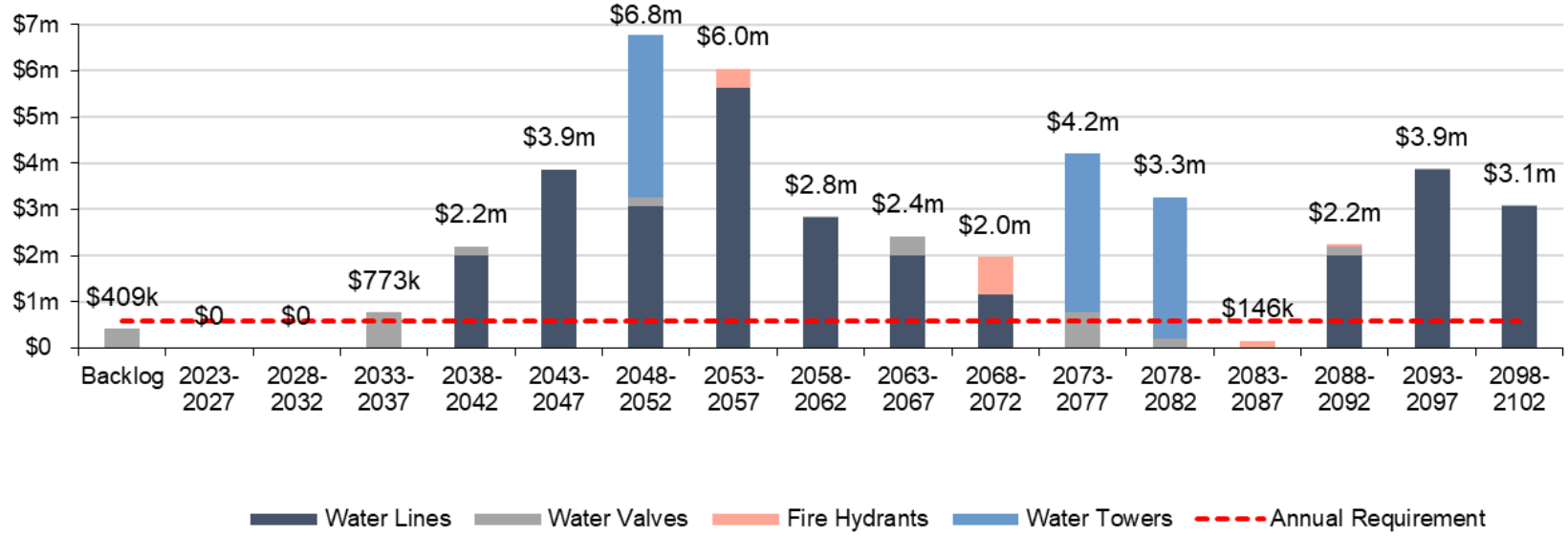


Table 16 Water Network System-Generated 10-Year Capital Costs below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

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

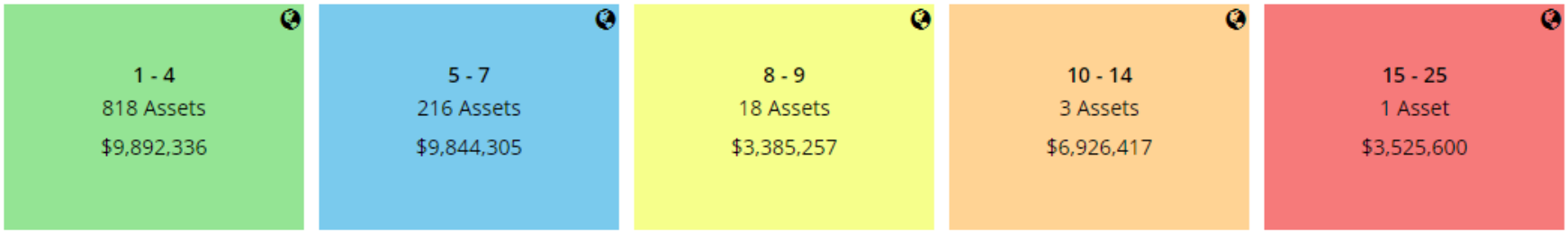
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Water Lines	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Valves	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Fire Hydrants	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Towers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

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

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 M: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 28: Water Network Risk Matrix



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

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

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

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

Levels of Service

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

Community Levels of Service

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

Table 17 Water Network Technical Levels of Service

Values	Qualitative Description	Current LOS (2022)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	In the Township of North Stormont, the Urban Settlement Areas of Crysler, Finch, and Moose Creek are integrated into the municipal water system, encompassing approximately 17% of the population. See Appendix J.
Reliability	Description of boil water advisories and service interruptions	On July 20th, 2022, a single boil water advisory was issued for the Moose Creek area. Immediate measures were undertaken to rectify the situation and restore regular water service within the same day.

Technical Levels of Service

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

Table 18 Water Network Technical Levels of Service

Values	Technical Metric	Current LOS (2022)
Scope	% of properties connected to the municipal water system	17%
	% of properties where fire flow is available	17%
Reliability	# of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system	0 : 501
	# 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	1 : 501
	Average Condition Rating	Fair (58.5%)
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.4% - 1.8%

Appendix D: Sanitary Sewer Network

State of the Infrastructure

The Urban Settlement Areas of Crysler, Finch, and Moose Creek in the Township of North Stormont receive sanitary services, which are managed and maintained through a partnership with the Ontario Clean Water Agency (OCWA). The Township operates two treatment facilities located in Moose Creek and Crysler, both of which are lagoon systems. Wastewater from Finch is transported to the Crysler facility through a forced main pipeline.

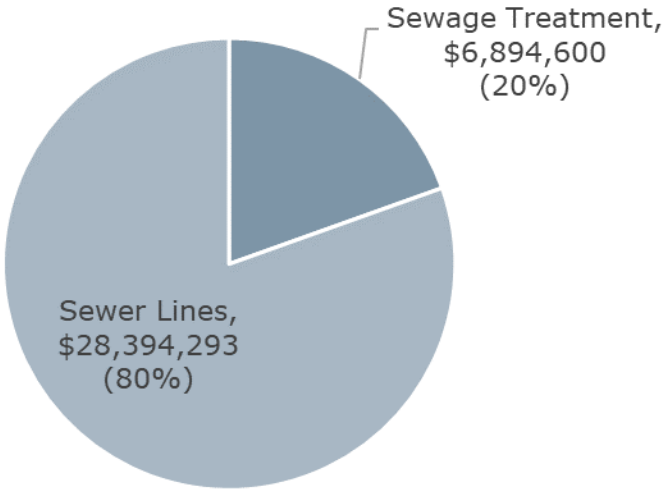
The state of the infrastructure for the Sanitary Sewer Network is summarized in the following table:

Replacement Cost	Condition	Financial Capacity	
$35,288,893	Fair (62.88%)	Annual Requirement:	$654,068
		Funding Available:	$69,821
		Annual Deficit:	$584,247

Inventory & Valuation

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

Figure 27: Sanitary Sewer Network Replacement Cost

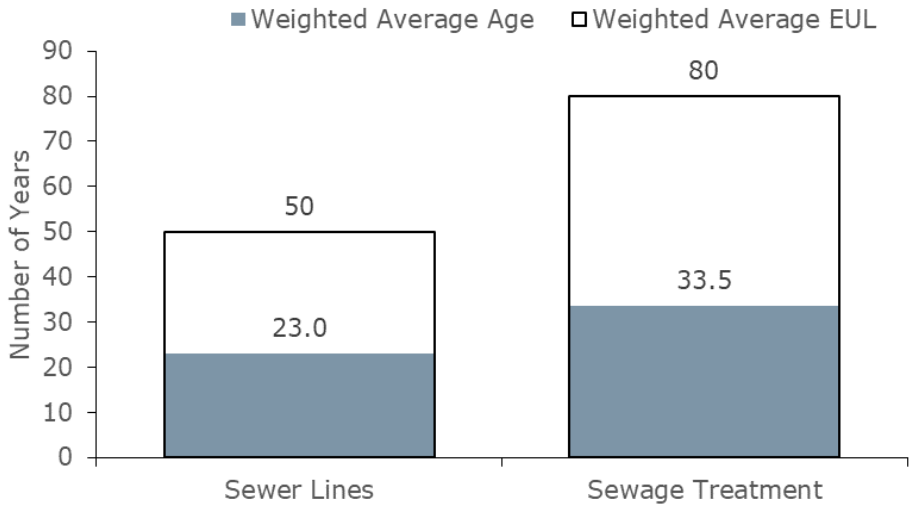


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

Asset Condition & Age

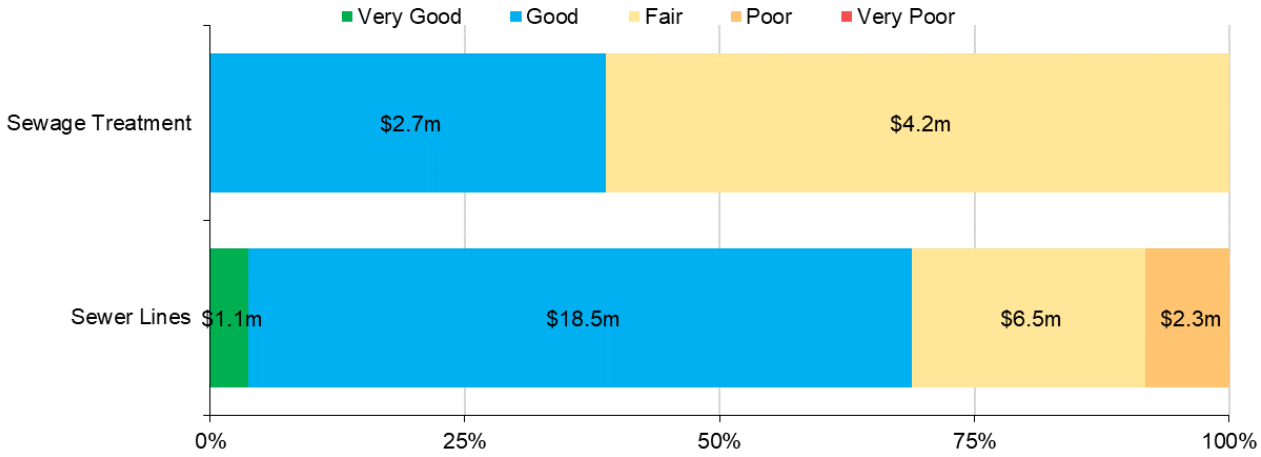
The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Figure 28: Sanitary Sewer Network Average Age vs Average EUL



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

Figure 29: Sanitary Sewer Network Condition Breakdown



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

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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The Township employs an annual CCTV inspection strategy for its underground infrastructure, rotating inspection locations throughout the township each year. Depending on findings and priorities, the extent of inspection coverage may vary from year to year, with more focus on critical areas or those with known issues. Data collected from CCTV inspections are analyzed to assess pipe condition, identify defects, and prioritize maintenance actions, ultimately optimizing asset performance and maximizing infrastructure lifespan.

Lifecycle Management Strategy

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

Figure 30: Sanitary Sewer Network Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Cleaning and flushing of collection systems is performed annually to remove debris, sediment, and other accumulations that can impair flow and lead to blockages or backups. This maintenance activity minimizes the risk of service disruptions.
- Regular inspections of sanitary mains are conducted, involving visual assessments of the condition of the mains, including the detection of structural defects, leaks, or other issues that may compromise system integrity.
- Inspections and cleaning and flushing activities are typically carried out through a partnership between the township and OCWA, leveraging the expertise and resources of both entities.
- Replacement activities are identified based on an analysis of breakdown rates as well as any issues identified during regular maintenance activities

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that North Stormont should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 80 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $654 thousand.

Figure 31: Sanitary Sewer Network Forecasted Capital Replacement Requirements

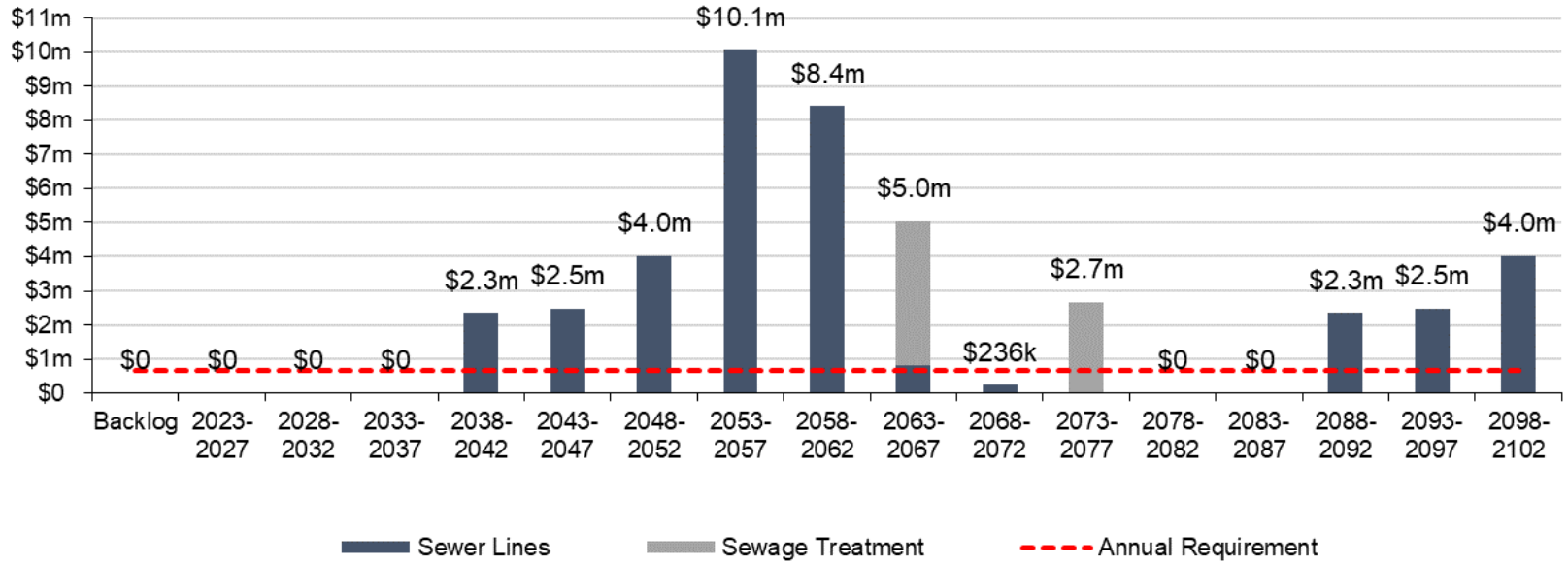


Table 19 Sanitary Sewer Network System-Generated 10-Year Capital Costs below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

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

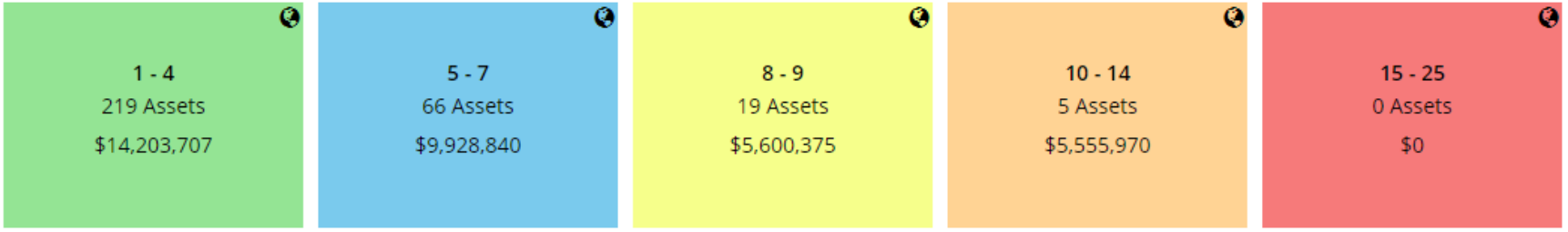
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Sewer Lines	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sewage Treatment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

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

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 M: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 32: Sanitary Sewer Network Risk Matrix



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

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

Risks to Current Asset Management Strategies

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

Aging Infrastructure

The aging of the Moose Creek Lagoon has led to a notable rise in operating and maintenance costs for the Township. Given the critical role of these lagoons in wastewater treatment, the Township recognizes the urgency of addressing this issue. Efforts are underway to secure funding for the replacement of the aging lagoon infrastructure, aiming to improve operational efficiency, ensure regulatory compliance, and mitigate financial risks associated with ongoing maintenance and potential environmental impact.

Growth

The Township is expected to experience low-moderate growth. Expected population growth will increase the demand on sanitary services, specifically the Moose Creek lagoon. As the population continues to grow, the Township must prioritize expanding its capacity to serve a larger population. Staff are working towards developing a comprehensive long-term capital plan with considerations for growth.

Levels of Service

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

Community Levels of Service

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

Table 20 Sanitary Sewer Network Technical Levels of Service

Values	Qualitative Description	Current LOS (2022)
Scope	Description, which may include maps, areas of the municipality that are connected to the municipal wastewater system	The Urban Settlement Areas of Crysler, Finch, and Moose Creek in the Township of North Stormont receive sanitary services. See Appendix J.

	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes.	The Township does not own any combined sewers.
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches.	
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.	Stormwater can enter into sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its designed capacity. In some cases, this can cause water and/or sewage to overflow backup into homes. The disconnection of weeping tiles from sanitary mains and the use of sump pumps and pits directing storm water to the storm drain system can help to reduce the chance of overflow.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid stormwater infiltration	The municipality adheres to specific design standards that incorporate appropriate overflows when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.	Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.

Technical Levels of Service

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

Table 21 Sanitary Sewer Network Technical Levels of Service

Values	Technical Metric	Current LOS (2022)
Scope	% of properties connected to the municipal wastewater systems	17%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	Not Applicable
	# of connection-days per year with sanitary main backups compared to the total number of properties connected to the municipal wastewater system	1 : 501
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	1 : 501
	Average Condition Rating	Fair (63.88%)
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0.2% - 1.9%

Appendix E: Storm Water Network

State of the Infrastructure

The Township is responsible for owning and maintaining a storm water network of 13km of storm sewer lines, storm culverts, catch basins, manholes and ditch inlets. This infrastructure is typically located within the Urban Settlement Areas of Crysler, Finch, Berwick, Avonmore, Monkland and Moose Creek.

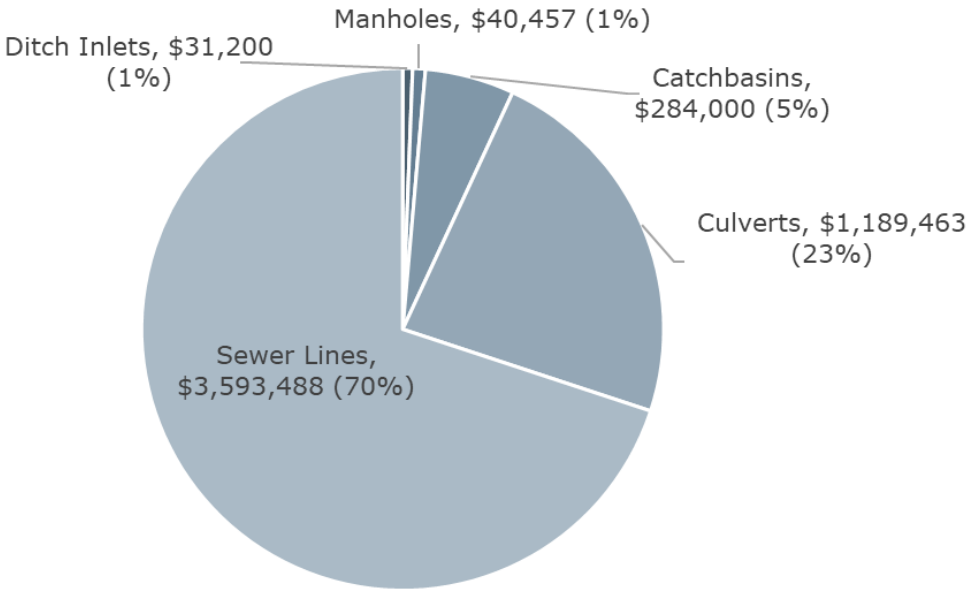
The state of the infrastructure for the Storm Water Network is summarized in the following table:

Replacement Cost	Condition	Financial Capacity	
$5,138,608	Fair (59.46%)	Annual Requirement:	$115,072
		Funding Available:	$0
		Annual Deficit:	$115,072

Inventory & Valuation

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

Figure 33: Storm Water Network Replacement Cost

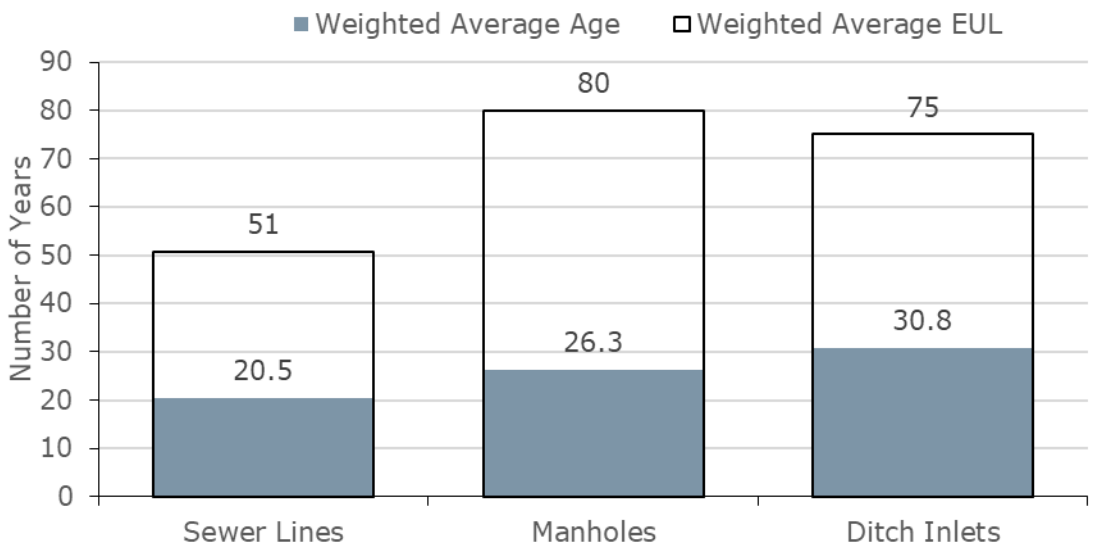


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

Asset Condition & Age

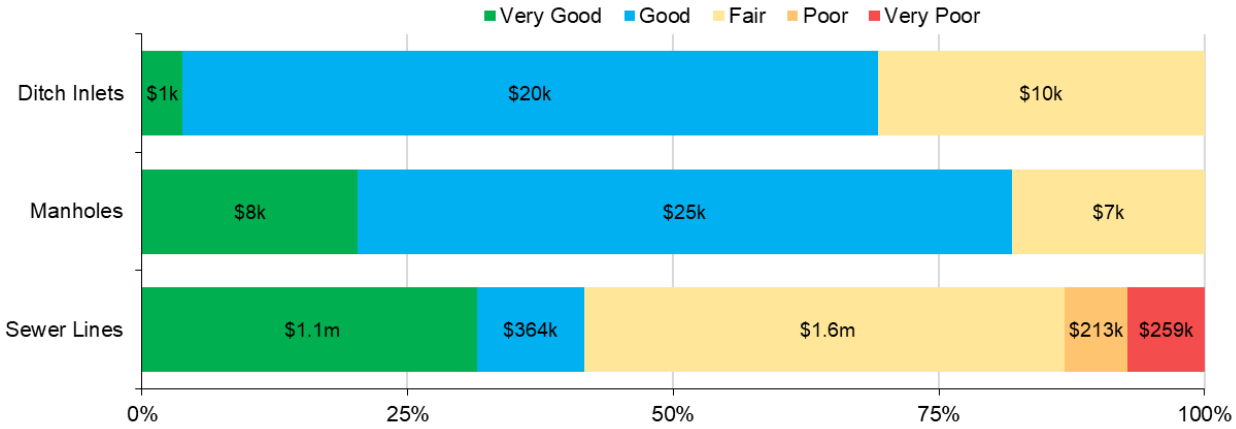
The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Figure 34: Storm Water Network Average Age vs Average EUL



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

Figure 35: Storm Water Network Condition Breakdown



To ensure that the municipal Storm 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 Storm Water network.

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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Storm sewer lines are inspected on an as-needed basis, in coordination with other water and sanitary assets. Regular inspections of storm ponds are conducted consistently at regular intervals.

Lifecycle Management Strategy

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

Figure 36: Storm Water Network Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement
• Routine maintenance within the storm network involves clearing catch basins and ditch inlets, particularly after significant storm events. • The activities involved in managing buried storm sewer lines are initiated either through asset inspections or upon the identification of failures. • Rehabilitation or replacement decisions are made in accordance with the asset's condition, particularly when it falls below a fair rating, or as part of carefully planned reconstruction initiatives.

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that North Stormont should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 80 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $115 thousand.

Figure 37: Storm Water Network Forecasted Capital Replacement Requirements

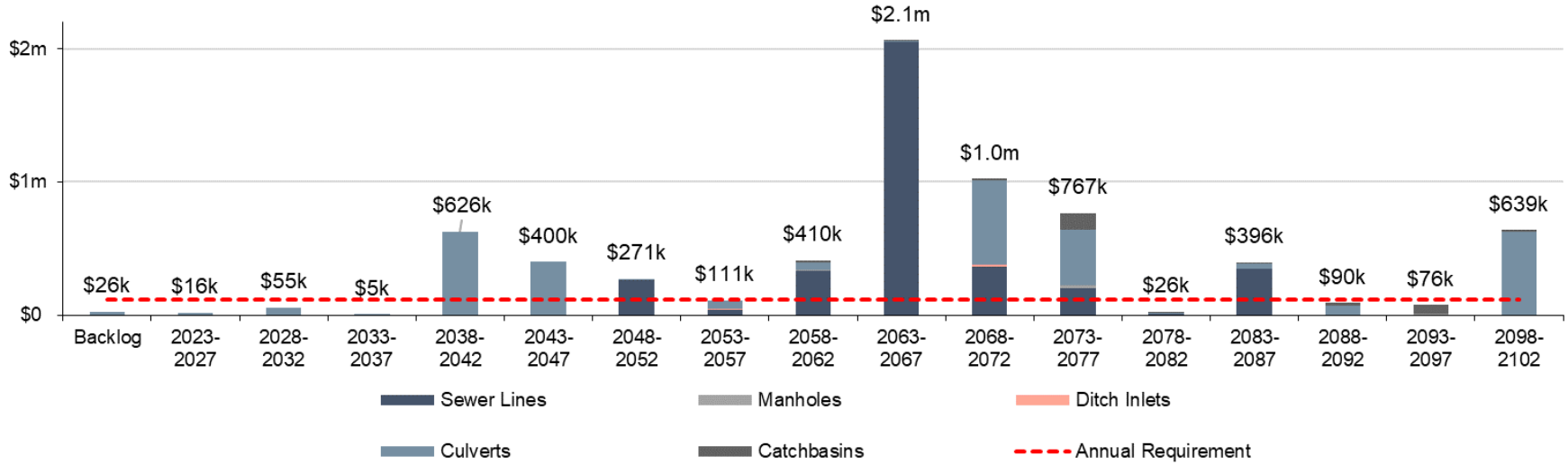


Table 19 Sanitary Sewer Network System-Generated 10-Year Capital Costs below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Table 22 Storm Water Network System-Generated 10-Year Capital Costs

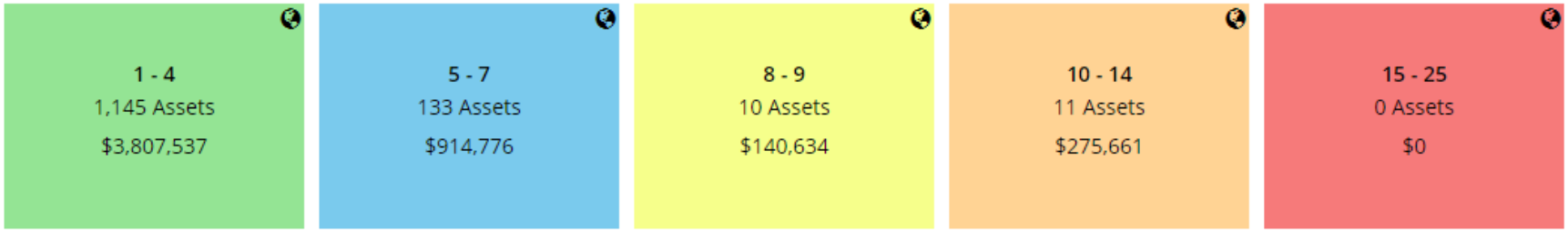
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Sewer Lines	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Manholes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ditch Inlets	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Culverts	$71k	$0	$0	$13k	$0	$3k	$0	$0	$52k	$3k	$0
Catchbasins	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$71k**	**$0**	**$0**	**$13k**	**$0**	**$3k**	**$0**	**$0**	**$52k**	**$3k**	**$0**

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

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 M: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 40: Storm Water Network Risk Matrix



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

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

Levels of Service

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

Community Levels of Service

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

Table 23 Storm Water Network Technical Levels of Service

Values	Qualitative Description	Current LOS (2022)
Sustainable	Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal stormwater system	The Township's protection against flooding extends to various user groups residing in settlement areas, facilitated by the placement of underground linear stormwater assets and associated structures along roadways. Additionally, the inclusion of minor culverts across the township's road network aids in effectively managing stormwater runoff from properties and roadways.

Technical Levels of Service

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

Table 24 Storm Water Network Technical Levels of Service

Values	Technical Metric	Current LOS (2022)
Scope	% of properties in municipality resilient to a 100-year storm.	66%[4]
	% of the municipal stormwater management system resilient to a 5-year storm	100%[5]
Reliability	Average Condition Rating	Fair (58.46%)
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	0% - 2.2%

[4] Data is not presently available to conclusively determine the percent of properties in the municipality resilient to a 100-year storm. Staff are working to identify this metric in future AMP iterations.

[5] The calculations presented in this report are based on the assumption that the infrastructure is fit for purpose and designed to withstand a 5-year storm event. It is important to note that actual resilience may vary depending on factors such as maintenance, construction quality, and environmental changes.

Appendix F: Buildings

State of the Infrastructure

North Stormont owns and maintains several facilities that provide key services to the community. These include:

- General Government buildings such as administration offices
- Protection buildings such as fire stations in Avonmore, Crysler, Finch and Moose Creek
- Transportation buildings such as public works garages and storage sheds
- Recreation facilities such as North Stormont Place, the Crysler arena and other community centres

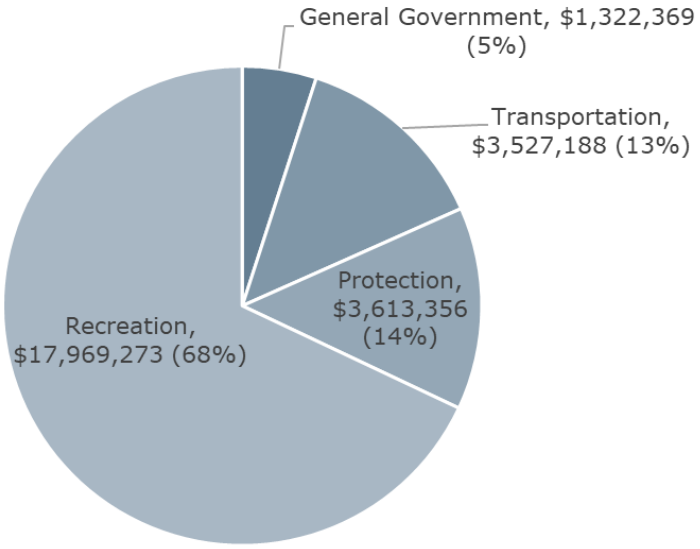
The state of the infrastructure for the buildings and facilities is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$26,432,186	Fair (43.49%)	Annual Requirement:	$652,536
		Funding Available:	$444,500
		Annual Deficit:	$208,036

Inventory & Valuation

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

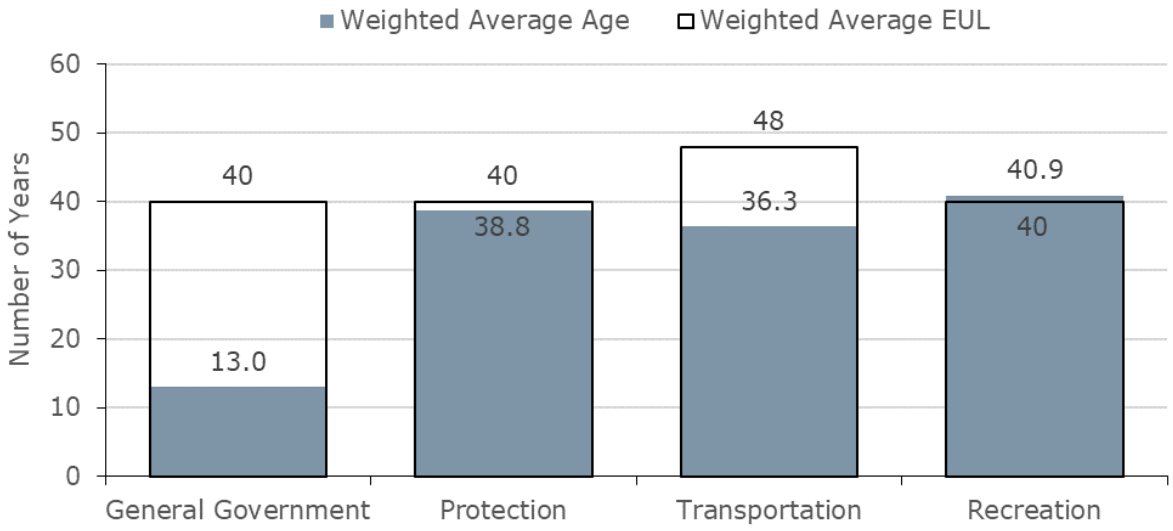
Figure 41: Buildings Replacement Cost



Asset Condition & Age

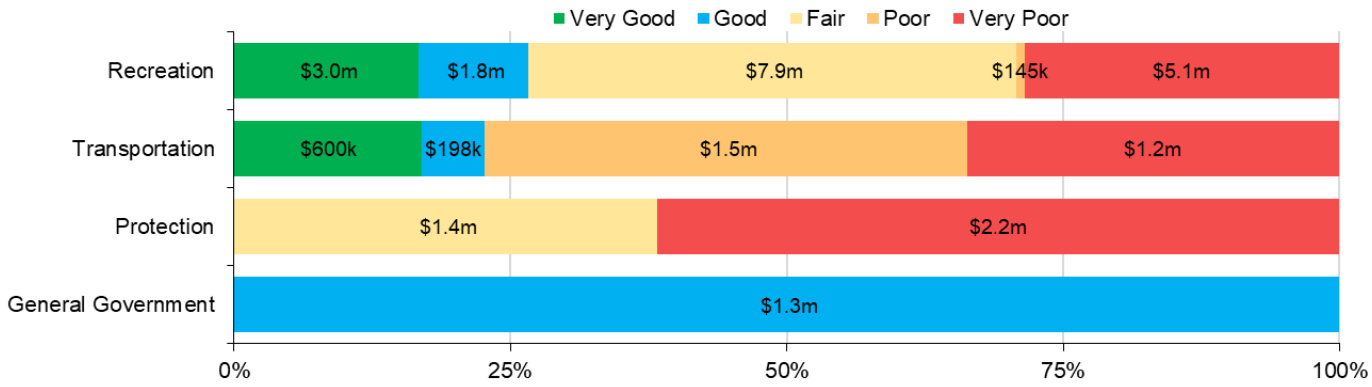
The graph below identifies the average age, and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

Figure 42: Buildings Average Age vs Average EUL



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

Figure 38: Buildings Condition Breakdown



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

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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Regular inspections of Health & Safety building conditions are conducted, with a focus on ensuring compliance with safety regulations and standards, particularly in Fire Halls. These mandated inspections ensure that facilities are adequately equipped to respond to emergencies effectively and maintain a safe environment for occupants.

Lifecycle Management Strategy

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

Figure 39: Buildings Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Heating systems and other component systems undergo annual inspections to maintain efficiency and safety standards, promoting occupant comfort and energy efficiency.
- Buildings are repaired as needed, addressing deficiencies identified by experts, staff, or residents, contingent on available funding. Immediate attention is given to urgent issues, ensuring quick resolution based on the level of urgency.
- Upgrades to buildings are facilitated through funding, allowing the municipality to enhance infrastructure while optimizing resource allocation.

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that North Stormont should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 50 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $653 thousand.

Figure 40: Buildings Forecasted Capital Replacement Requirements

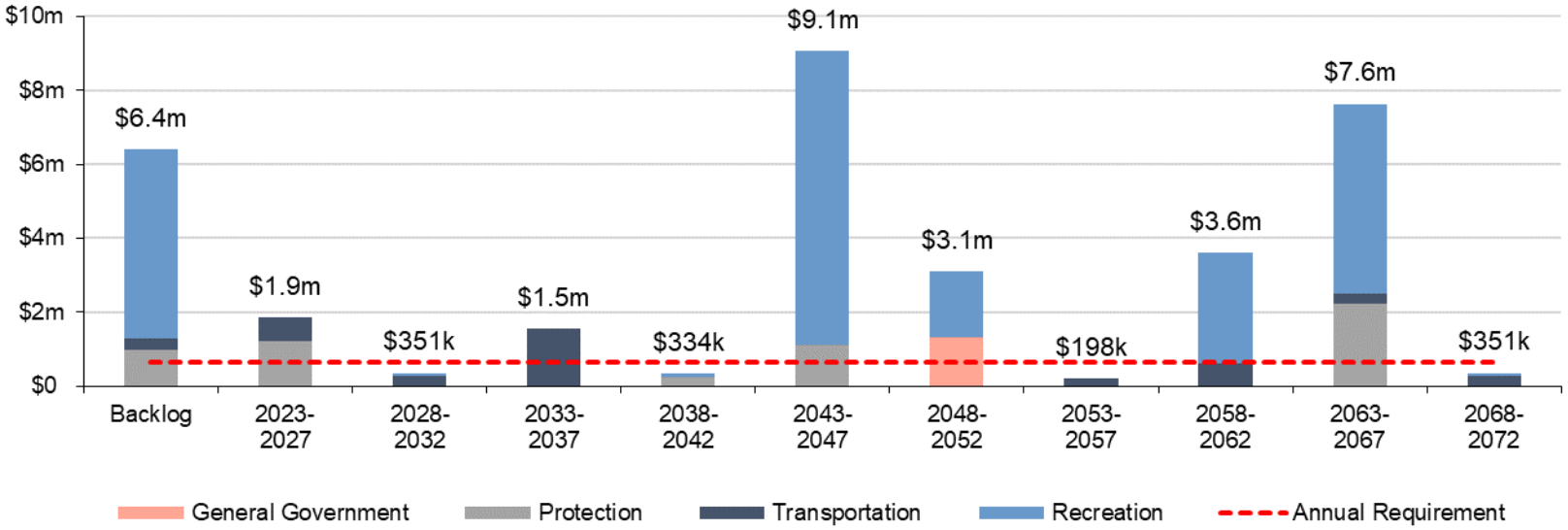


Table 25 below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Table 25 Buildings System-Generated 10-Year Capital Costs

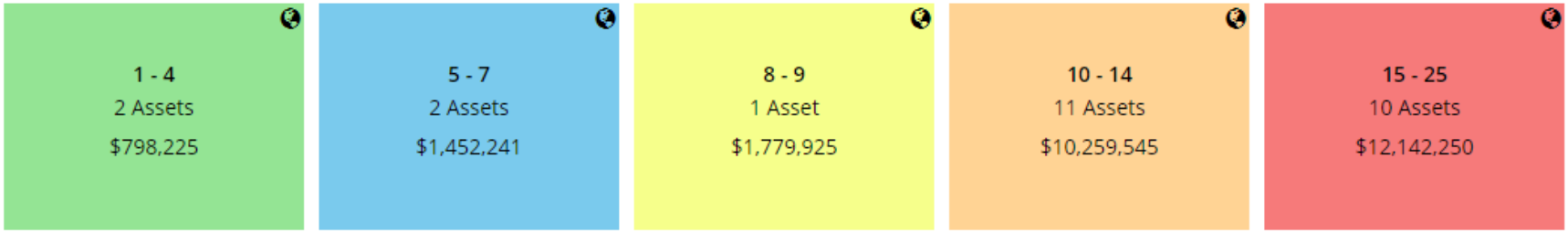
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
General Government	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Protection	$1.2m	$0	$0	$684k	$0	$547k	$0	$0	$0	$0	$0
Transportation	$908k	$625k	$0	$0	$0	$0	$0	$0	$283k	$0	$0
Recreation	$68k	$0	$0	$0	$0	$0	$0	$0	$0	$68k	$0
Total	**$2.2m**	**$625k**	**$0**	**$684k**	**$0**	**$547k**	**$0**	**$0**	**$283k**	**$68k**	**$0**

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

Risk & Criticality

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

Figure 41: Buildings Risk Matrix



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

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

Risks to Current Asset Management Strategies

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

Climate Change & Extreme Weather Events

The Township of North Stormont is located within a derecho-prone region. Strong winds associated with derechos can cause significant damage to buildings and other structures. Roofs may be torn off, windows shattered, and walls damaged, posing risks to occupants and leading to costly repairs.

Levels of Service

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

Community Levels of Service

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

Values	Technical Metric	Current LOS (2022)
Scope	Description of the current condition of municipal buildings and the plans that are in place to maintain or improve the provided level of service	The overall condition of the buildings in the Township are fair. Township staff are currently in the planning stages of implementing formal building condition assessments to identify required maintenance and rehabilitation activities to ensure the state of the buildings remains in adequate condition

Technical Levels of Service

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

Table 26 Buildings Technical Levels of Service

Values	Technical Metric	Current LOS (2022)
Scope	Average Condition Rating	Fair (43.49%)
	Average Risk Rating	Very High (15.56)
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	1.8% - 2.5%

Appendix G: Land Improvements

State of the Infrastructure

North Stormont's land improvement infrastructure is made up of playground equipment, skating rinks, docks and boat launches, as well as general improvements such as fencing and parking lots.

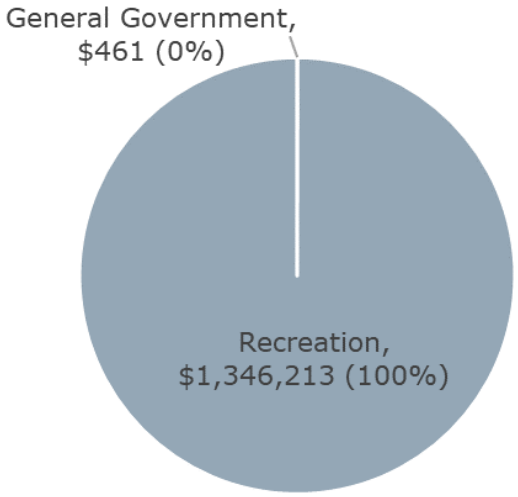
The state of the infrastructure for the land improvements is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$1,346,674	Fair (64.58%)	Annual Requirement:	$82,602
		Funding Available:	$54,457
		Annual Deficit:	$28,146

Asset Inventory & Valuation

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

Figure 42: Land Improvements Replacement Cost

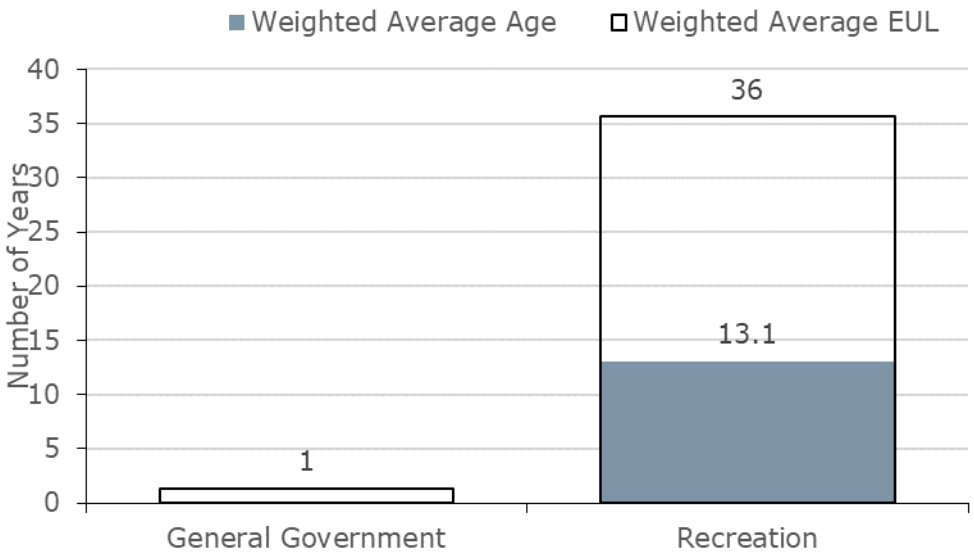


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

Asset Condition & Age

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

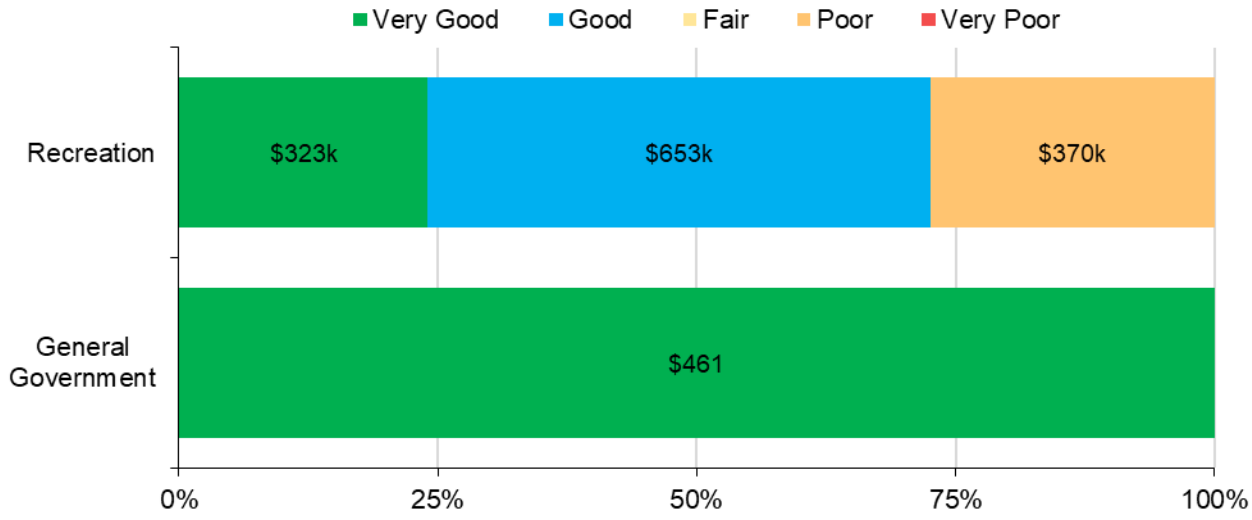
Figure 43: Land Improvements Average Age vs Average EUL



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

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

Figure 44: Land Improvement Condition Breakdown



To ensure that the Township's land improvements continue to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle

management strategy to determine what combination activities is required to increase the overall condition of the land improvements.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Due to the varied nature of the asset category the assets are managed individually. The Township implements a thorough condition assessment strategy for its playgrounds and parks, including daily, weekly, and monthly inspections, along with an annual comprehensive inspection conducted in accordance with CAN/CSA Z614 standards. Internal staff, accredited by CPRA and trained in accessibility standards, perform regular inspections, except for the annual comprehensive assessment which is completed by an external third-party. To ensure accessibility, all surfacing is compliant with AODA standards, with a target of 90% compliance across all facilities. This proactive approach ensures the safety, functionality, and accessibility of township playgrounds and parks, promoting enjoyable recreational experiences for residents and visitors alike.

Lifecycle Management Strategy

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

Figure 45: Land Improvements Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

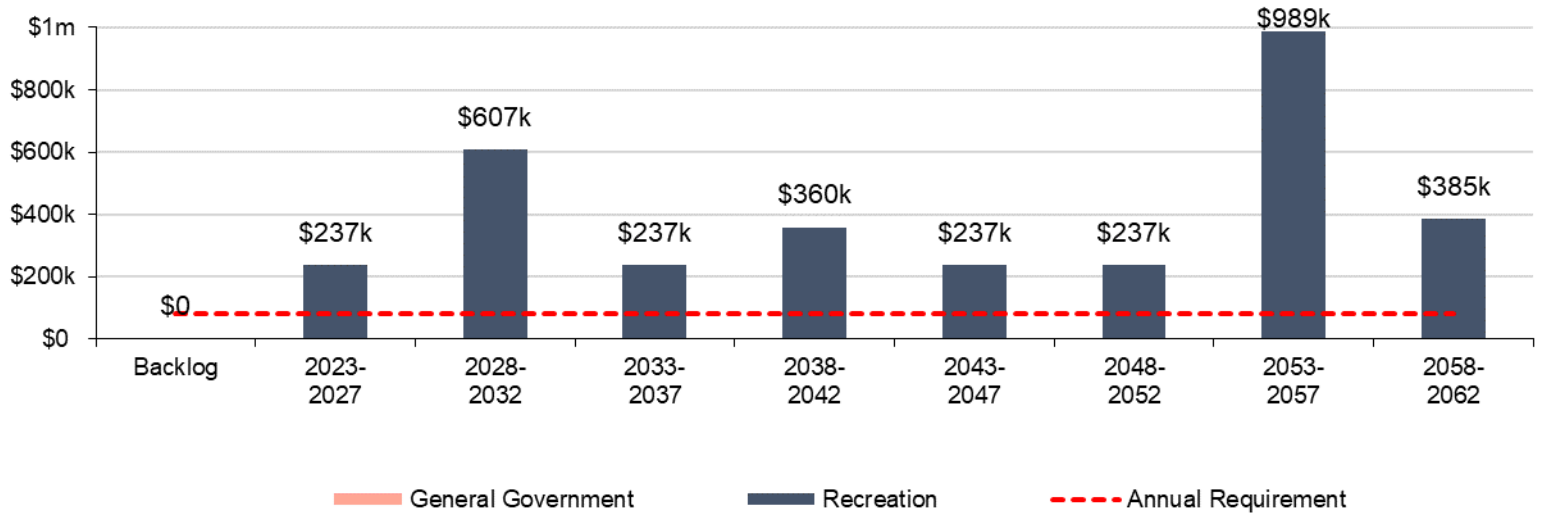
- This asset category's lifecycle requirements are dealt with on a case-by-case basis.

Forecasted Capital Requirements

Figure illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's land improvement infrastructure. This analysis was run until 2062 to capture at least one iteration of replacement for the longest-lived asset in the asset register. North Stormont's average annual requirements (red dotted line) total $83 thousand for all land improvement assets. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

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

Figure 50: Land Improvements Forecasted Capital Replacement Requirements



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

Table 27 below summarizes the projected cost of lifecycle activities (capital replacement only) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register, which was limited to asset age, replacement cost, and useful life.

Table 27 Land Improvements System-Generated 10-Year Capital Costs

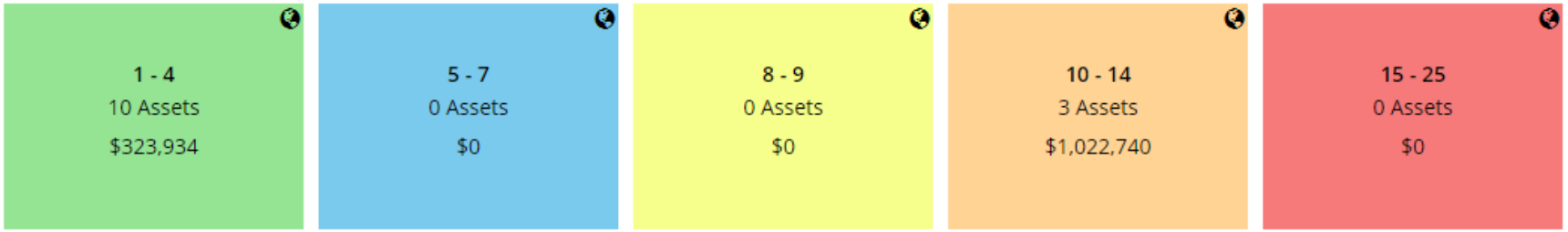
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
General Government	$6k	$0	$461	$461	$461	$461	$0	$461	$461	$461	$461
Recreation	$1.1m	$0	$40k	$77k	$40k	$77k	$0	$40k	$77k	$410k	$77k
Total	**$1.1m**	**$0**	**$41k**	**$78k**	**$41k**	**$78k**	**$0**	**$41k**	**$78k**	**$410k**	**$78k**

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 M: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 51: Land Improvement Risk Matrix



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

Levels of Service

The following tables identify North Stormont's metrics to identify the current level of service for the land improvement assets. By comparing the cost, performance (average condition) and risk year-over-year the Township will be able to evaluate how their services/assets are trending. North Stormont 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 quantitative metrics that determine the community level of service provided by the municipal Land Improvements.

Values	Technical Metric	Current LOS (2022)
Scope	Description of the current condition of land improvement assets and the plans that are in place to maintain or improve the provided level of service	The overall condition of land improvements in the Township are moderate. Consistent inspections performed by the Township ensure that Land Improvement assets remain in an adequate state of repair.

Technical Levels of Service

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

Table 28 Land Improvements Technical Levels of Service

Values	Technical Metric	Current LOS (2022)
Scope	Average Condition Rating	Fair (62.58%)
	Average Risk Rating	Moderate (8.69)
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	4.0% - 6.2%

Appendix H: Machinery & Equipment

State of the Infrastructure

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

- Computers, furniture and phone systems to support municipal services
- Snow plows and landscaping equipment to support roadway maintenance
- Equipment for the fire department to effectively respond to emergencies
- Landfill equipment to support solid waste disposal management
- Zamboni and pool pumps for recreational services

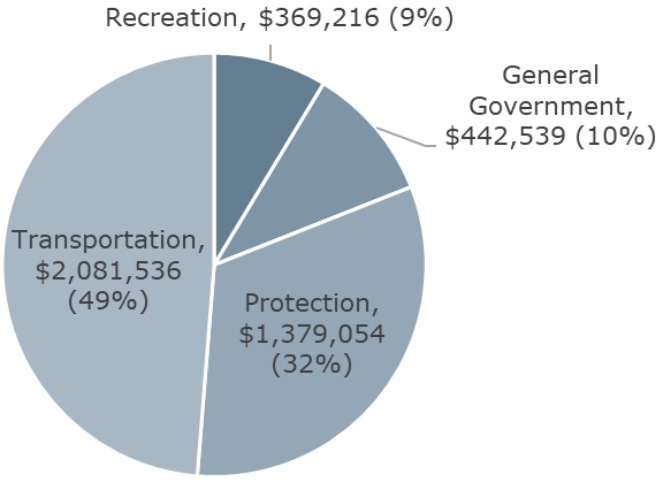
The state of the infrastructure for equipment is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$4,272,345	Fair (41.28%)	Annual Requirement:	$236,720
		Funding Available:	$330,398
		Annual Deficit:	($93,678)

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in the North Stormont's equipment inventory.

Figure 46: Machinery & Equipment Replacement Costs

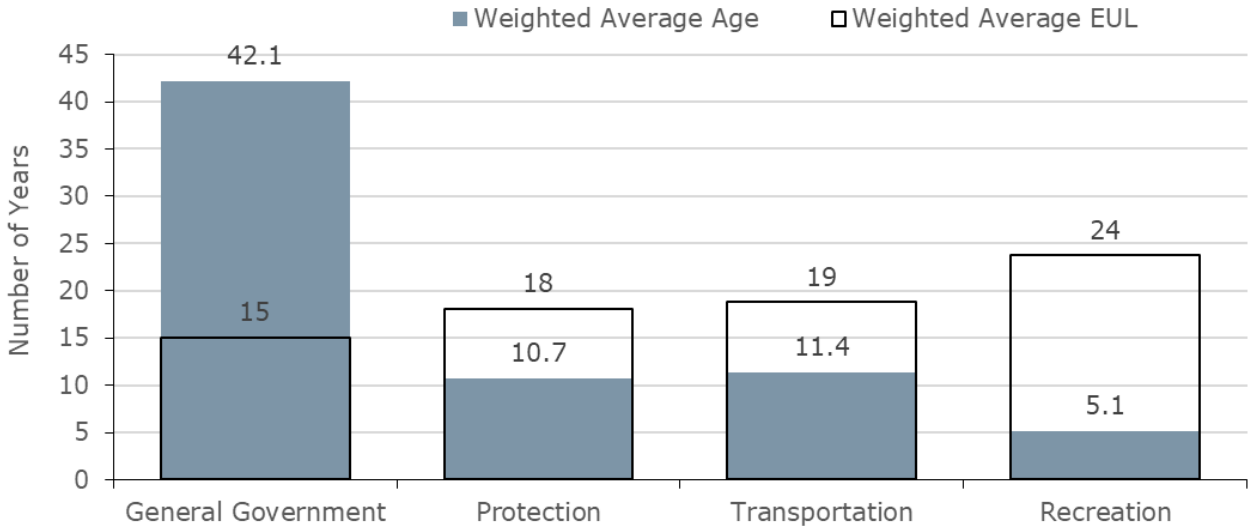


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent capital requirements.

Asset Condition & Age

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

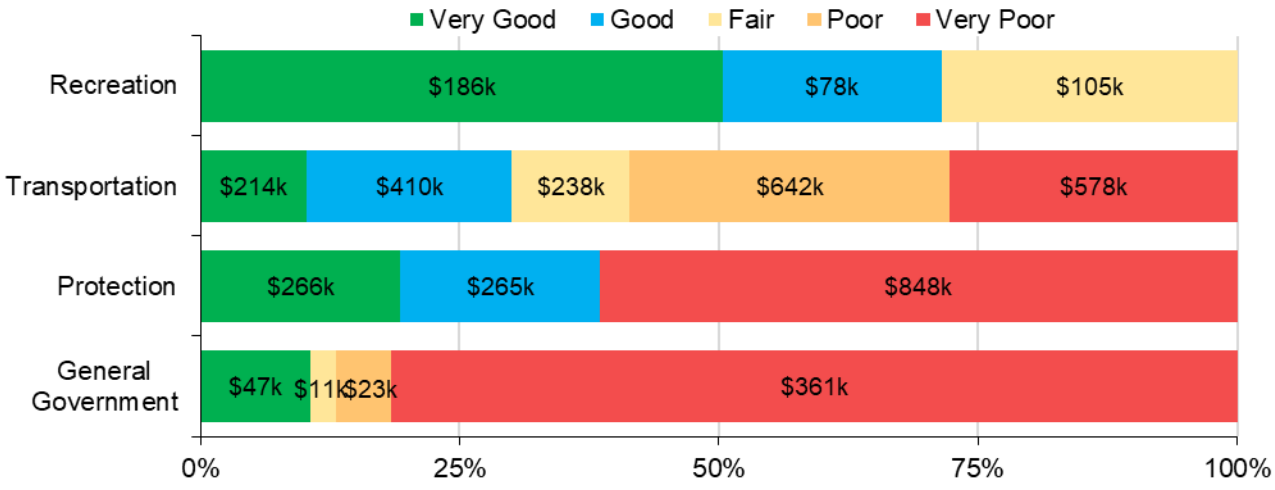
Figure 47: Machinery & Equipment Average Age vs Average EUL



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

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

Figure 48: Machinery & Equipment Condition Breakdown



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

average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The current approach is varied because of the broad range of types of equipment included in this category. Machinery and equipment undergo monthly maintenance and inspections, conducted by third-party technicians, with any necessary repairs promptly addressed. Additionally, pumps undergo regular testing to ensure operational reliability and efficiency.

Lifecycle Management Strategy

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

Figure 49: Machinery & Equipment Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Equipment maintenance adheres to manufacturer recommendations to ensure optimal performance and longevity, and is supplemented by staff expertise when necessary.
- Fire station equipment undergoes regular maintenance as per manufacturer guidelines.
- Self-Contained Breathing Apparatus (SCBA) equipment undergoes monthly testing and replacement based on staff recommendations.

Forecasted Capital Requirements

The following graph identifies capital requirements over the next 35 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $273 thousand.

Figure 50: Machinery & Equipment Forecasted Capital Replacement Requirements

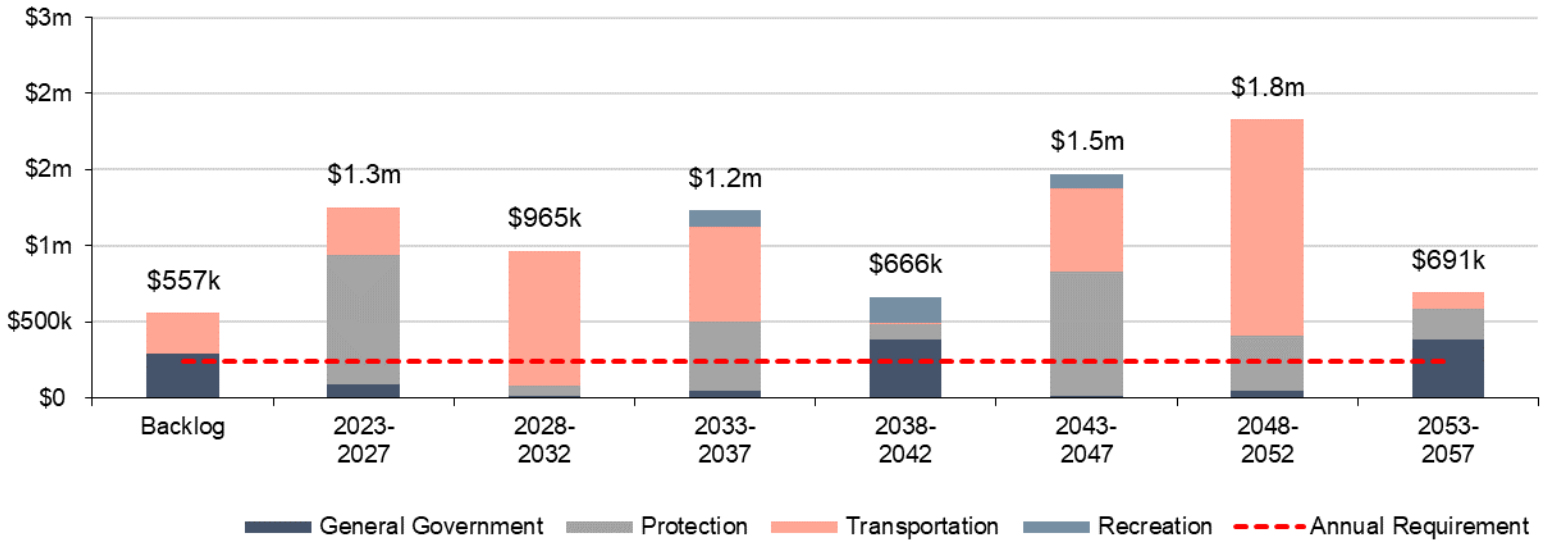


Table 29 below summarizes the projected cost of lifecycle activities (capital replacement only) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

Table 29 Machinery & Equipment System-Generated 10-Year Capital Costs

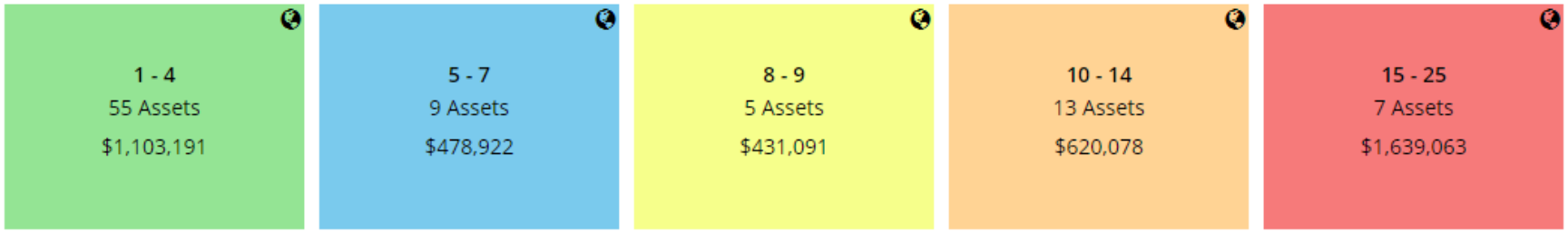
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
General Government	$104k	$25k	$45k	$0	$0	$23k	$0	$0	$0	$11k	$0
Protection	$922k	$25k	$0	$65k	$757k	$0	$0	$12k	$0	$0	$62k
Transportation	$1.2m	$46k	$0	$266k	$0	$0	$544k	$21k	$13k	$78k	$225k
Recreation	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$2.2m**	**$97k**	**$45k**	**$331k**	**$757k**	**$23k**	**$544k**	**$33k**	**$13k**	**$89k**	**$287k**

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

Risk & Criticality

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

Figure 51: Machinery & Equipment Risk Matrix



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

Levels of Service

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

Community Levels of Service

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

Values	Technical Metric	Current LOS (2022)
Scope	Description of the current condition of municipal machinery & equipment and the plans that are in place to maintain or improve the provided level of service	The overall condition of machinery & equipment in the Township is fair. Township staff work to ensure all machinery & equipment assets remain in an adequate state of repair, with particular emphasis on fire safety equipment, which is dictated by safety standards.

Technical Levels of Service

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

Table 30 Machinery & Equipment Technical Levels of Service

Values	Technical Metric	Current LOS (2022)
Scope	Average Condition Rating	Fair (41.28%)
	Average Risk Rating	High (10.47)
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	5.5% - 7.7%

Appendix I: Vehicles

State of the Infrastructure

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

- Roads vehicles for road maintenance and winter control activities
- Protection vehicles for emergency fire services
- Environmental services vehicles for waste management

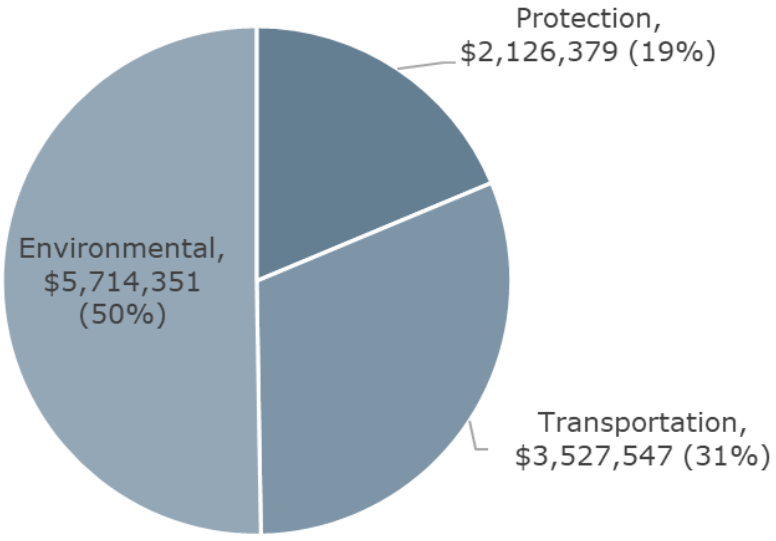
The state of the infrastructure for the vehicles is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$11,368,277	Poor (25.64%)	Annual Requirement:	$858,697
		Funding Available:	$329,994
		Annual Deficit:	$528,703

Inventory & Valuation

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

Figure 52: Vehicle Replacement Costs

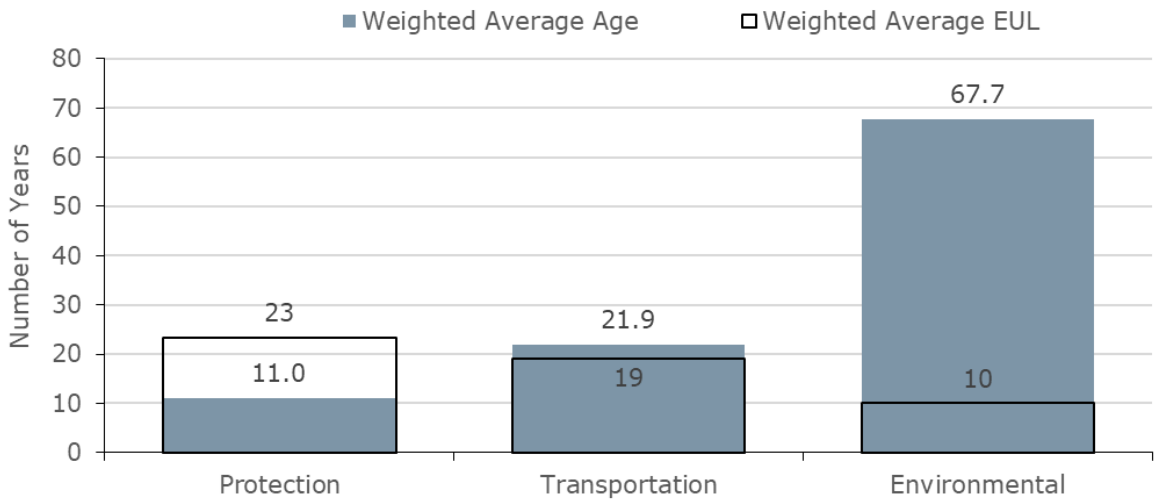


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

Asset Condition & Age

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

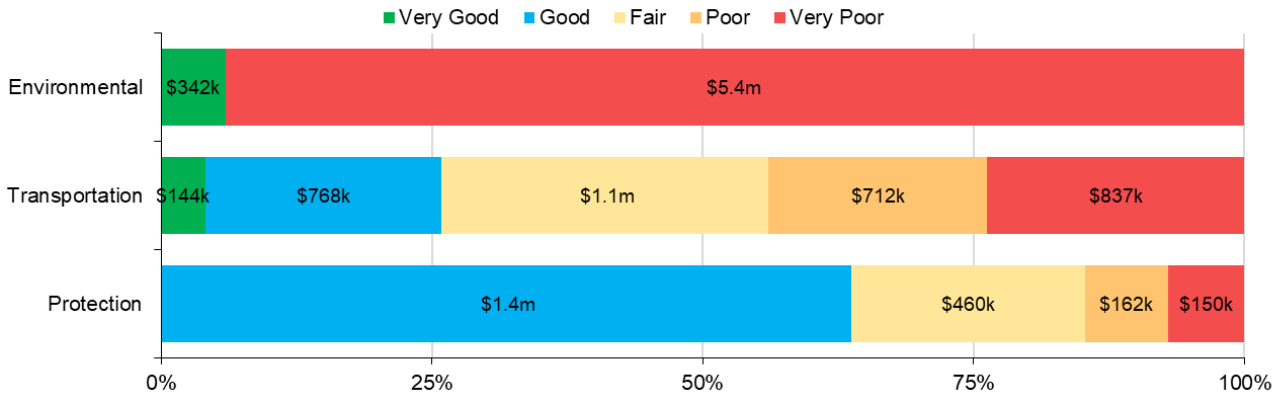
Figure 53: Vehicles Average Age vs Average EUL



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

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

Figure 60: Vehicles Condition Breakdown



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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. An example of the Township's current approach is to conduct daily circle checks and monthly inspections to assess vehicle conditions. The fire department performs monthly inspections of vehicles to ensure they are in state of adequate repair prior to operation. As part of the township's approach to municipal roads vehicles, annual safety inspections are conducted. Mechanics review vehicle conditions and assess maintenance expenses during these inspections.

Lifecycle Management Strategy

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

Figure 61: Vehicles Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Licensed mechanics conduct servicing in-house and repairs are undertaken by an in-house PT310 diesel mechanic or a third-party emergency vehicle technician.
- Essential vehicles like Fire Station pumpers and tankers are maintained in accordance with regulatory requirements and best practices to ensure operational integrity.
- Vehicles are replaced according to staff recommendations and Asset Management Plan lifecycles to uphold reliability and safety standards.

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 35 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $859 thousand.

Figure 54: Vehicle Forecasted Capital Replacement Requirements

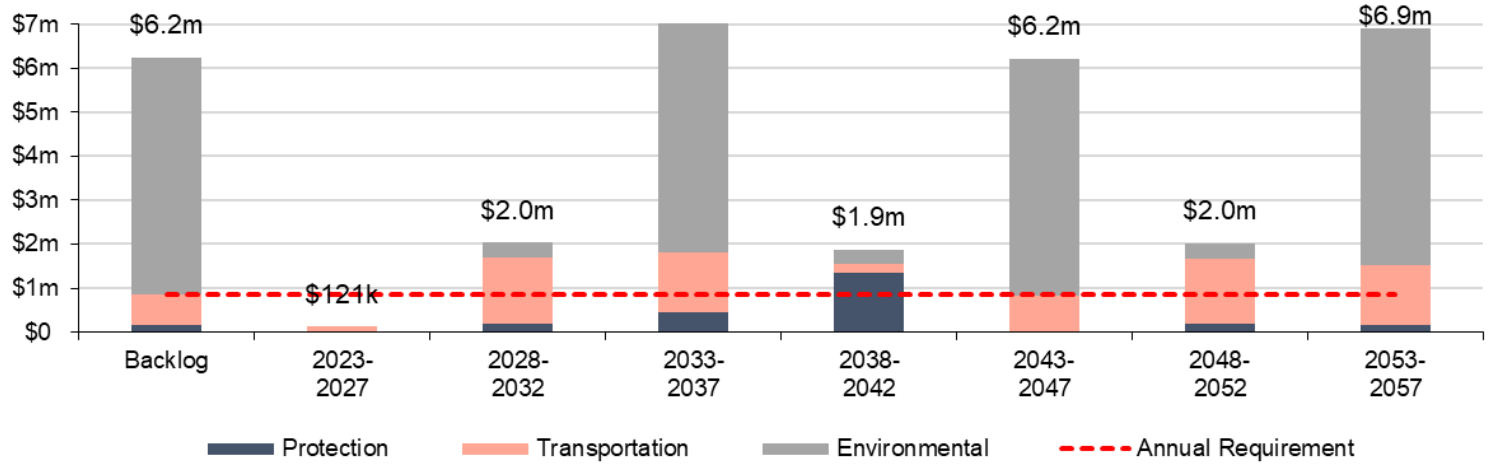


Table 31 below summarizes the projected cost of lifecycle activities (capital replacement only) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

Table 31 Vehicles System-Generated 10-Year Capital Costs

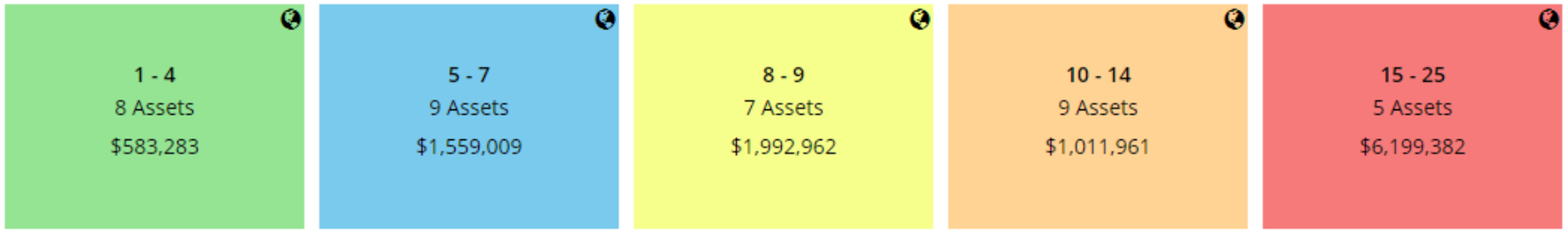
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Protection	$195k	$0	$0	$0	$0	$0	$140k	$0	$55k	$0	$0
Transportation	$1.6m	$0	$121k	$0	$0	$0	$240k	$512k	$0	$521k	$220k
Environmental	$342k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$342k
Total	**$2.2m**	**$0**	**$121k**	**$0**	**$0**	**$0**	**$380k**	**$512k**	**$55k**	**$521k**	**$562k**

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

Risk & Criticality

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

Figure 55: Vehicles Risk Matrix



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

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

Levels of Service

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

Community Levels of Service

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

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

Values	Technical Metric	Current LOS (2022)
Scope	Description of the current condition of municipal vehicles and the plans that are in place to maintain or improve the provided level of service	The overall condition of the vehicles in the Township is fair. The regular inspections conducted by Township staff have been effective in identifying required maintenance and rehabilitation activities to ensure the state of the vehicles remain in adequate condition

Technical Levels of Service

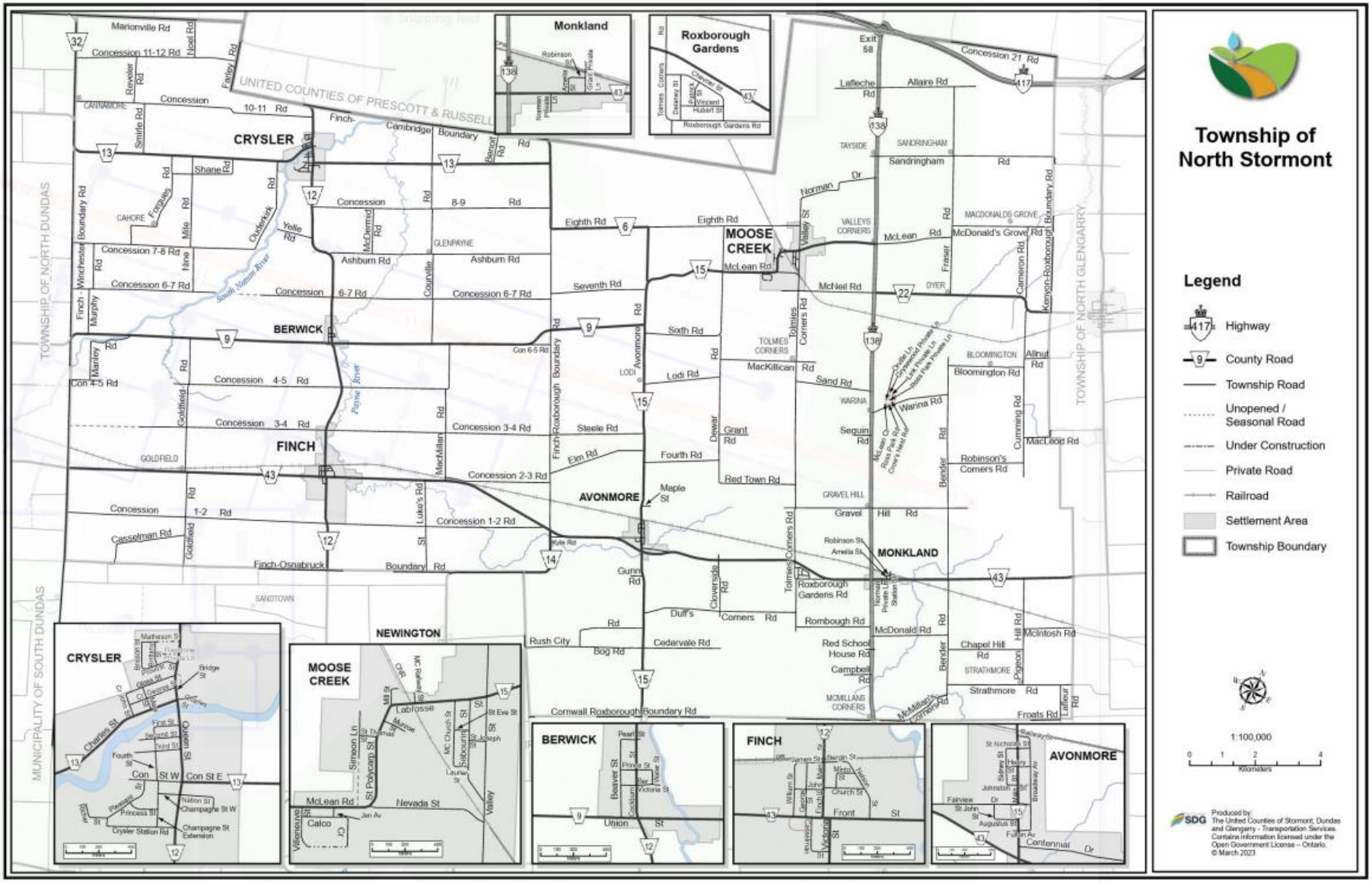
The following table outlines the quantitative metrics that determine the technical level of service provided by vehicles.

Table 32 Vehicles Technical Levels of Service

Values	Technical Metric	Current LOS (2022)
Scope	Average Condition Rating	Poor (25.64%)
	Average Risk Rating	Very High (16.78)
Performance	Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual)	2.9% - 7.6%

Appendix J: Levels of Service Maps

Road Network Maps



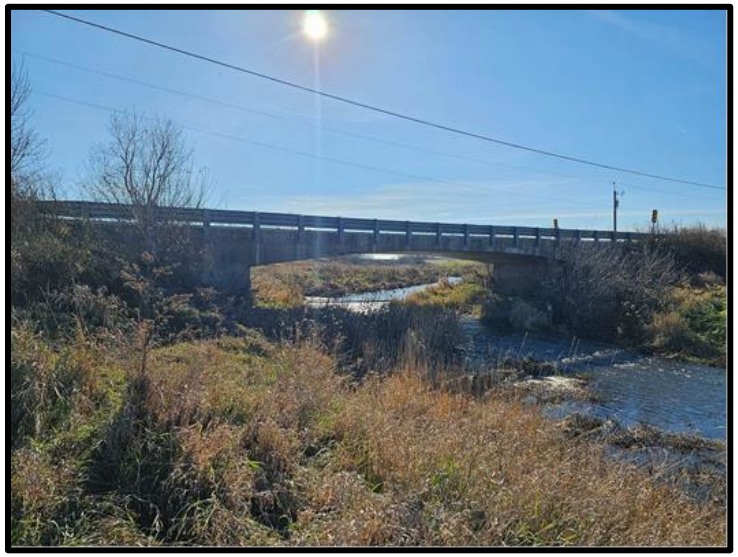
Bridges & Culverts Images

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.

Concession 8-9 Bridge (BCI = 73 Good)

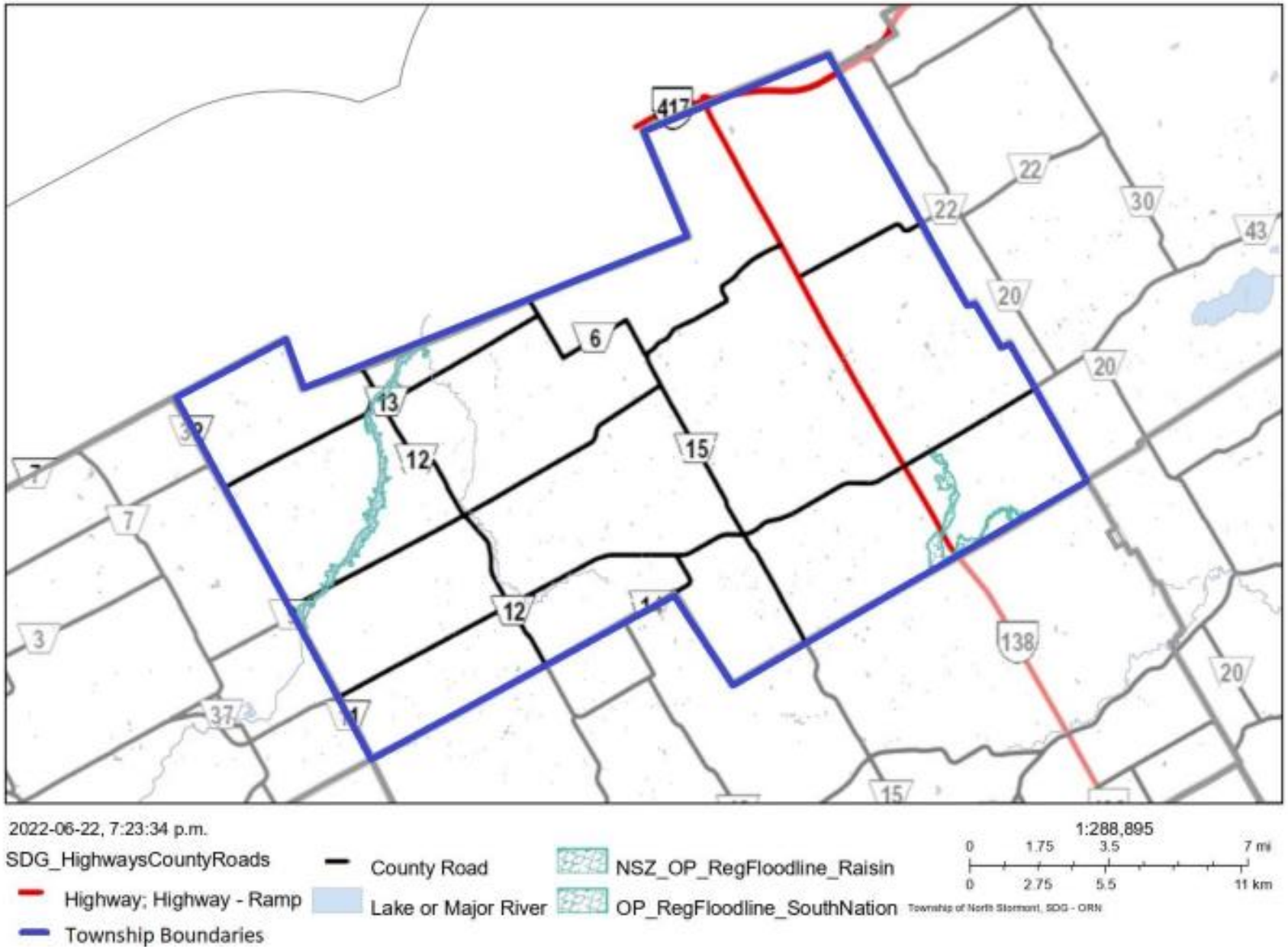
Bender Road Culvert (BCI = 75 Good)

Concession 6-7 Bridge (BCI = 49 Fair)

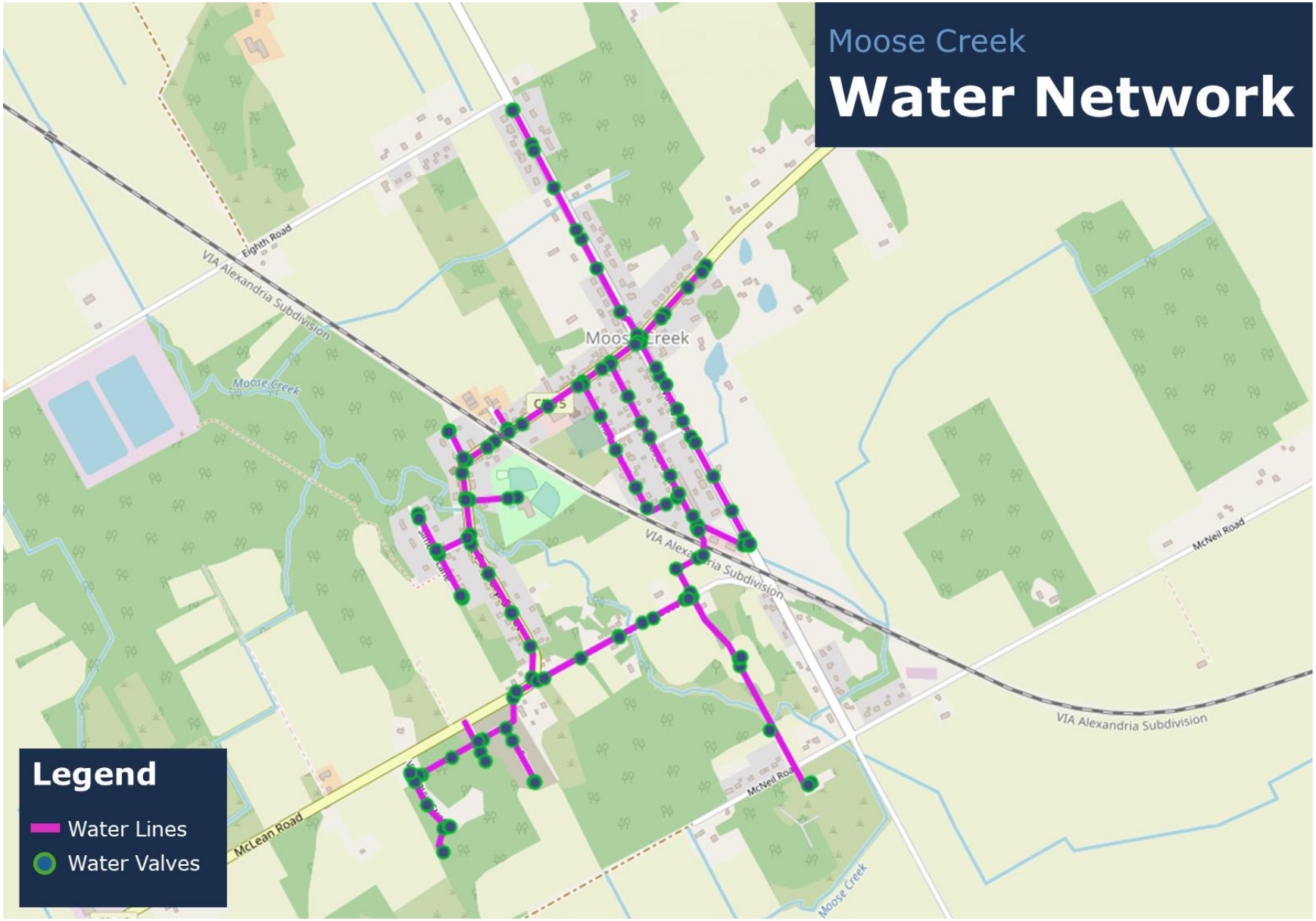


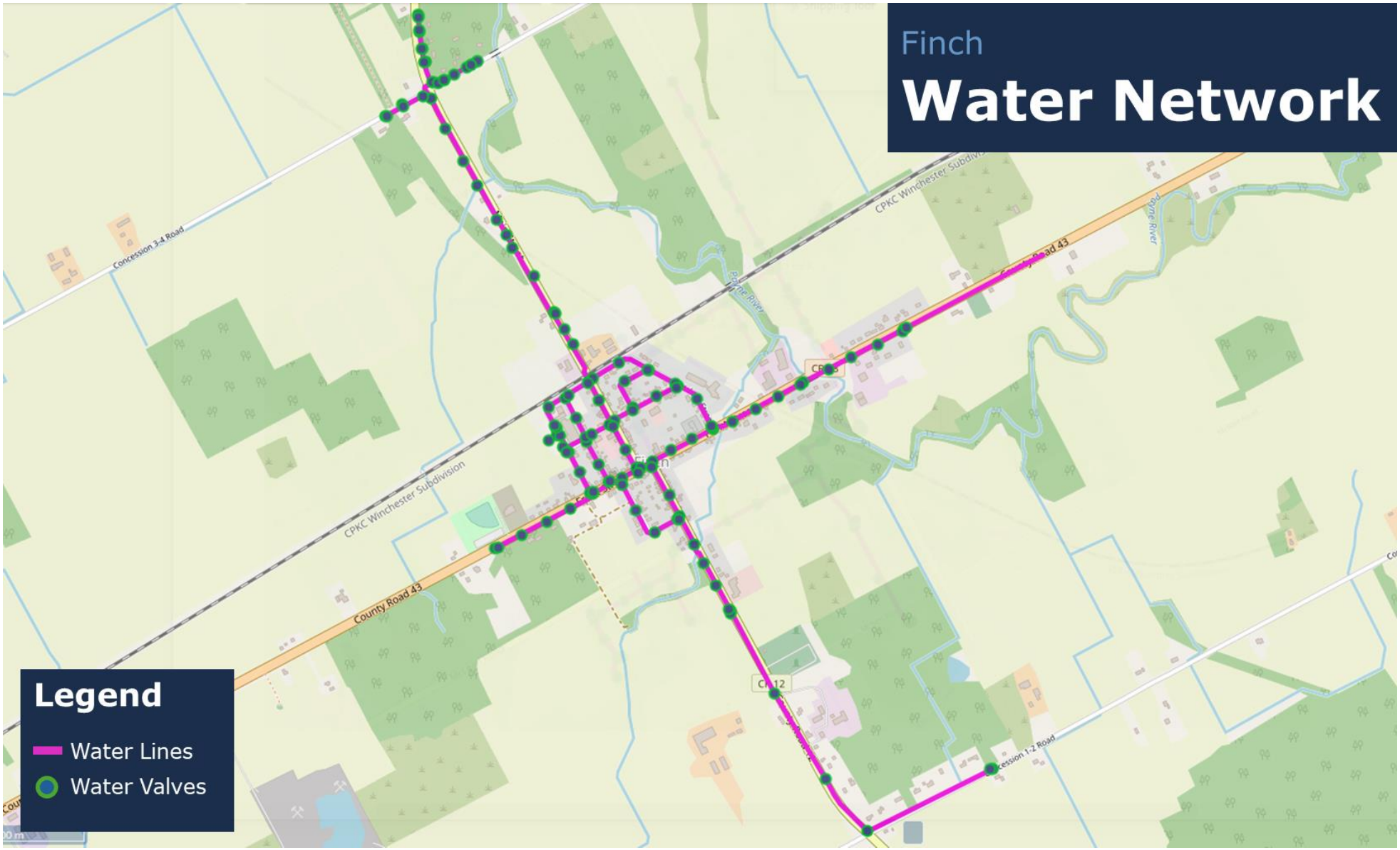
Roxborough - Finch Boundary Culvert (BCI = 50 Fair)

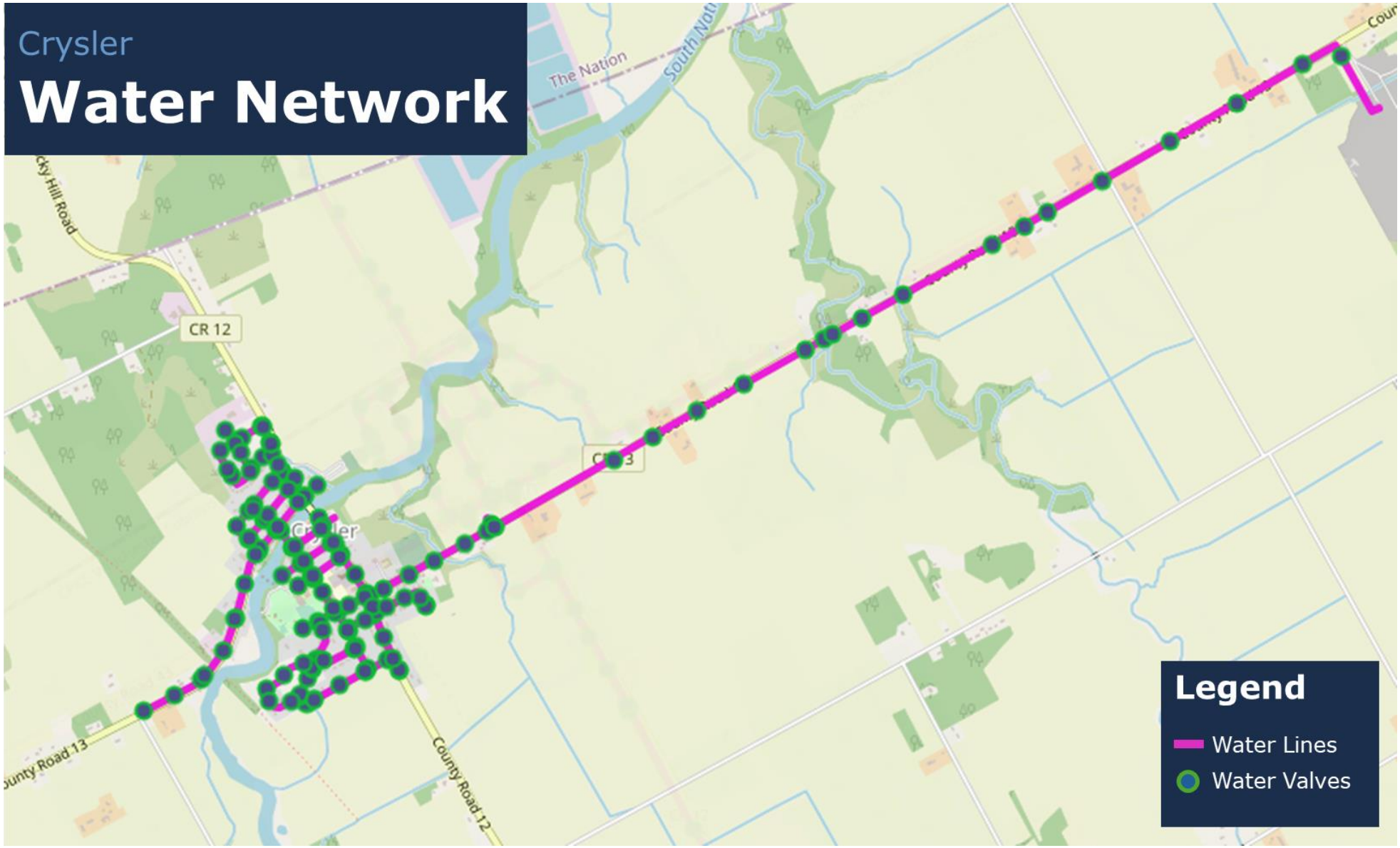
Stormwater Floodplain Map



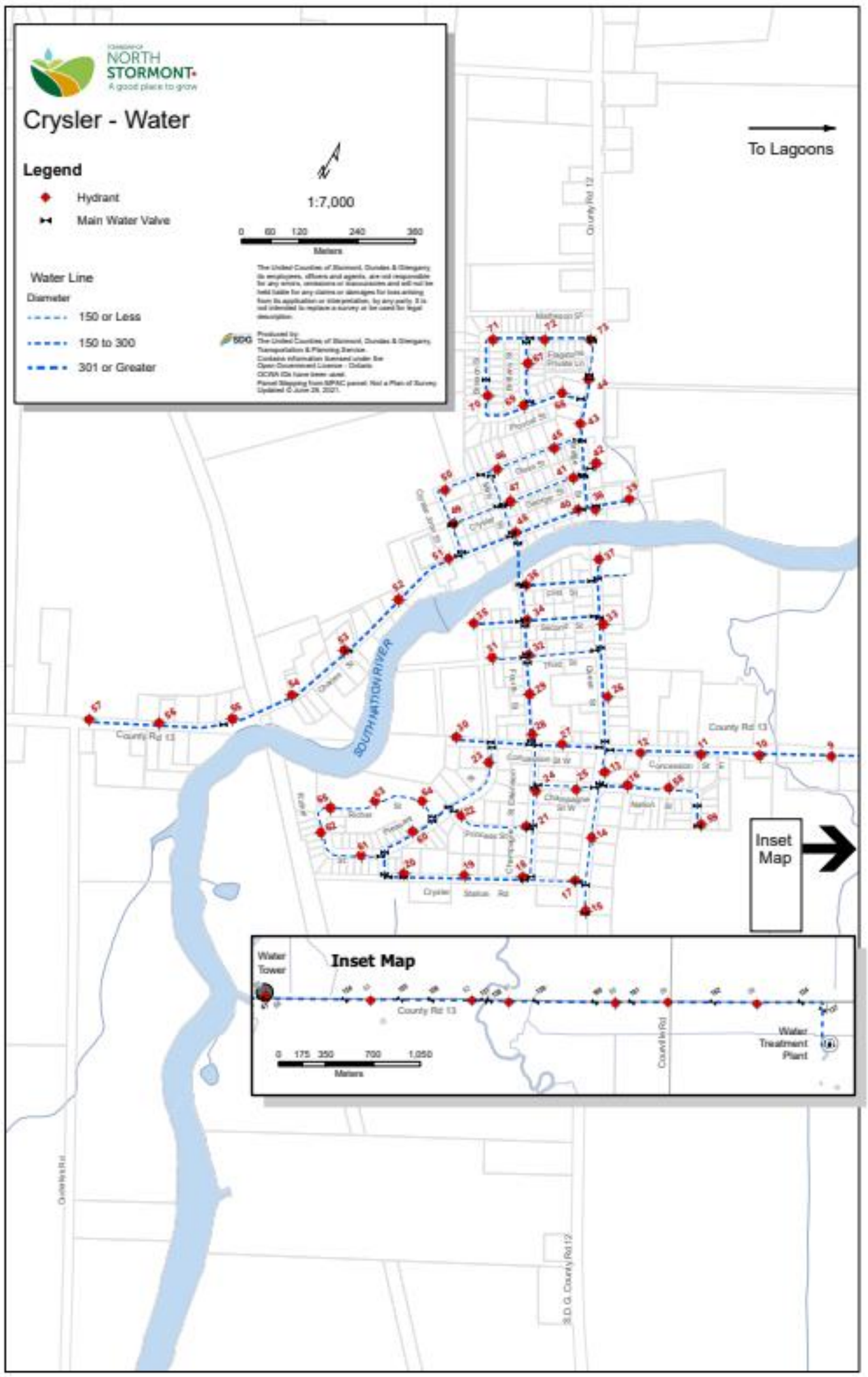
Water Network Maps

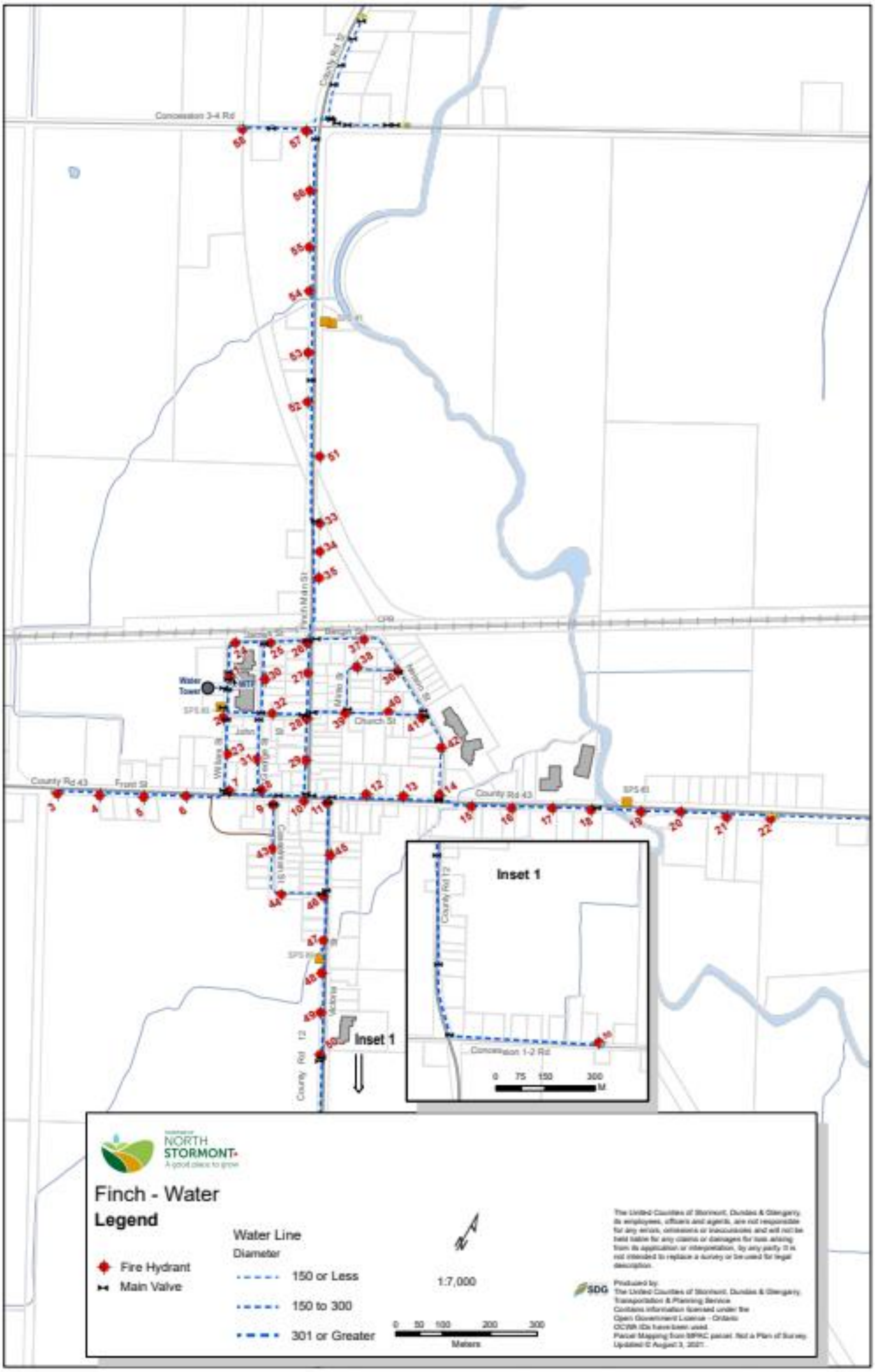


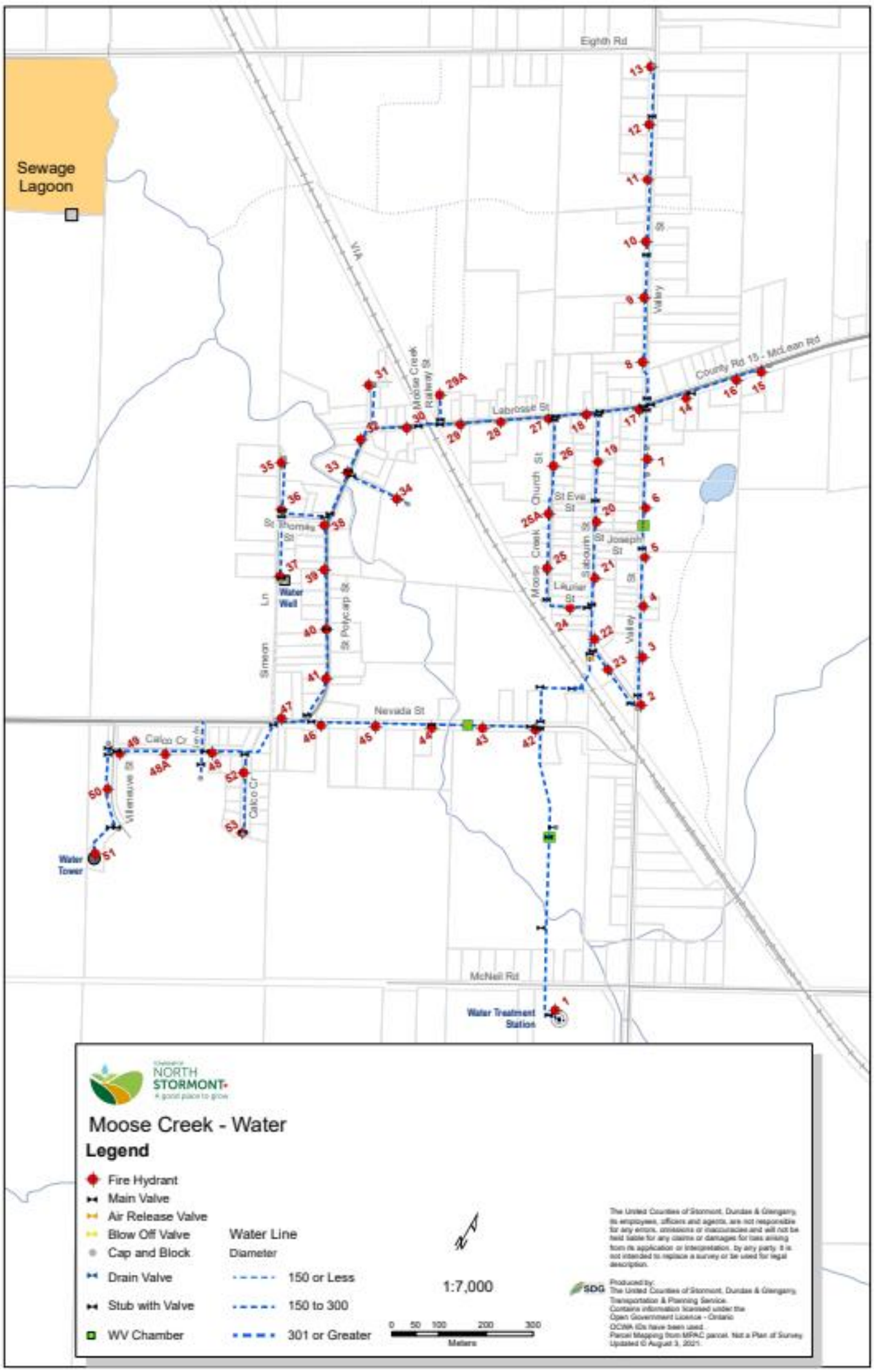

Finch
Water Network
Legend
Water Lines
Water Valves
Concession 3-4 Road
CPKC Winchester Subdivision
County Road 43
Concession 1-2 Road


Crysler
Water Network
The Nation
CR 12
County Road 13
County Road 12
Legend
Water Lines
Water Valves

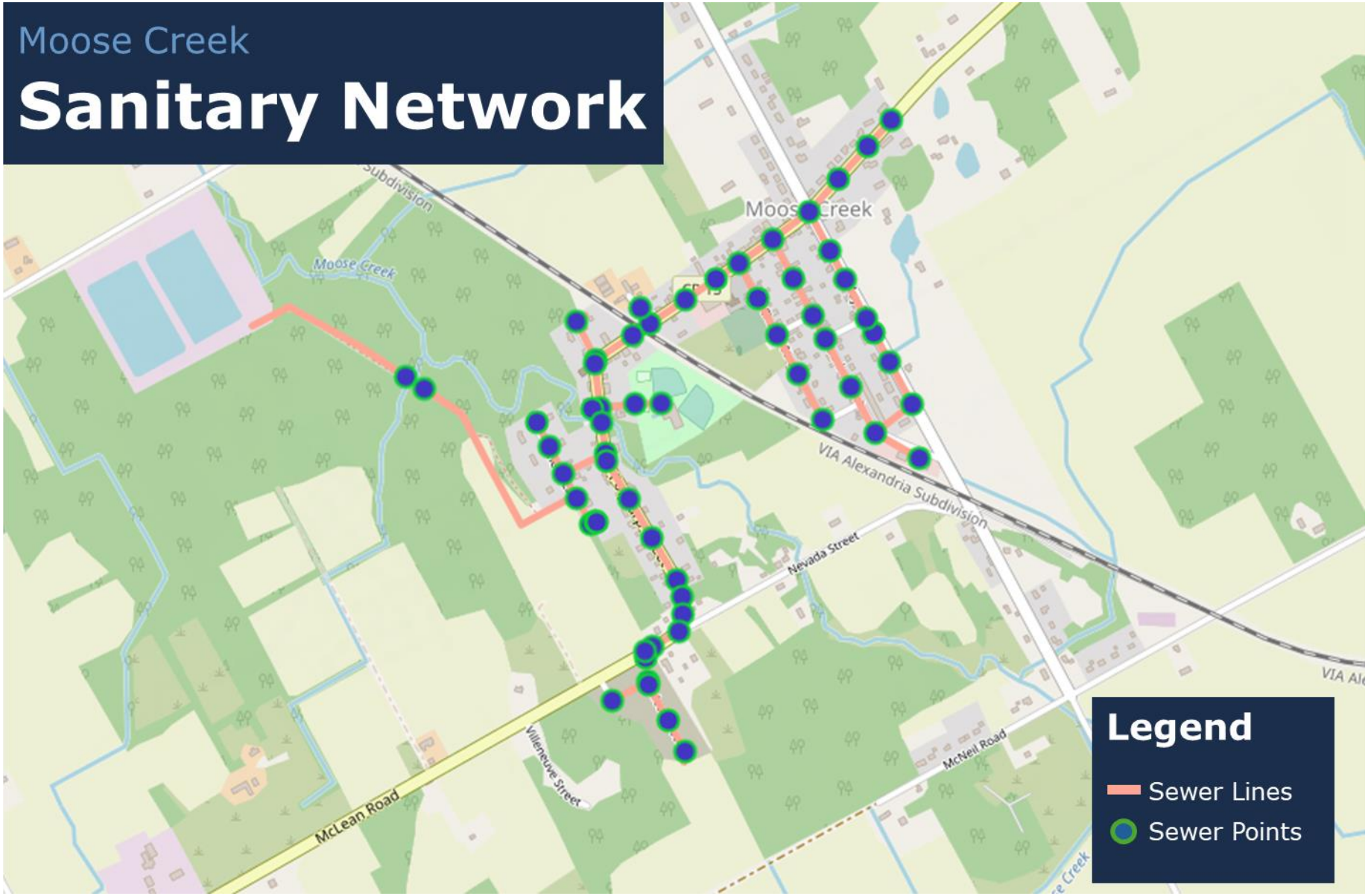
Fire Hydrant Maps

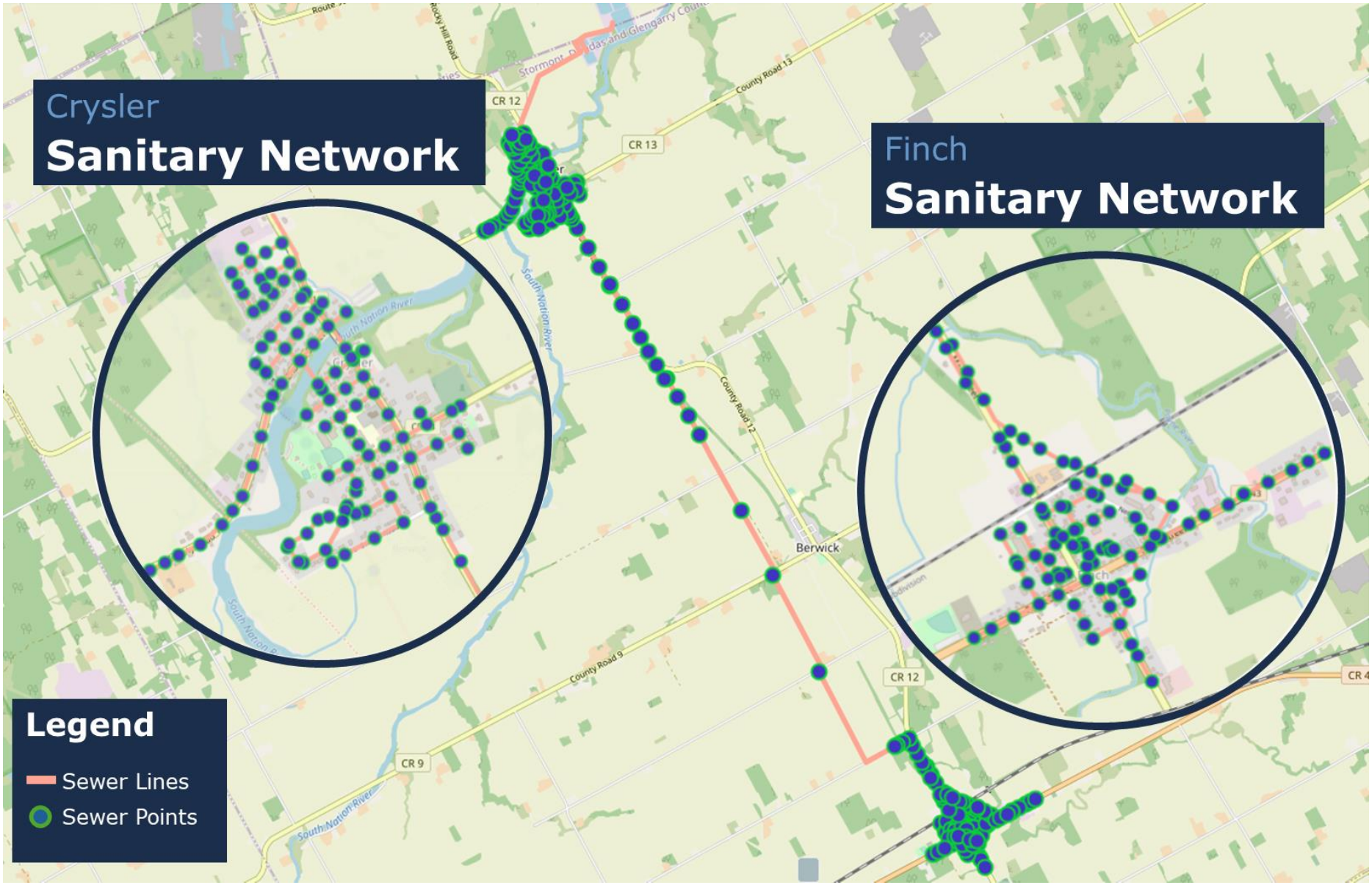



Concession 3-4 Rd
County Rd 43
Front St
CPR
Finch Main St
Church St
Water Tower
Inset 1
Concession 1-2 Rd
County Rd 12
0 75 150 300 M
NORTH STORMONT
A good place to grow
Finch - Water
Legend
Fire Hydrant
Main Valve
Water Line
Diameter
150 or Less
150 to 300
301 or Greater
1:7,000
0 50 100 200 300
Meters
SDG


Sewage Lagoon
Eighth Rd
Moose Creek Railway St
Labrosse St
Church St
St Eve St
St Joseph St
Laurier St
Valley
County Rd 15 - McLean Rd
St Thomas St
Water Well
St Polycarp St
Simon Ln
Nevada St
Calco Cr
Villeneuve St
Water Tower
McNeil Rd
Water Treatment Station
Moose Creek - Water
Legend
Fire Hydrant
Main Valve
Air Release Valve
Blow Off Valve
Cap and Block
Drain Valve
Stub with Valve
WV Chamber
Water Line
Diameter
150 or Less
150 to 300
301 or Greater
1:7,000
0 50 100 200 300
Meters
Produced by:
The United Counties of Stormont, Dundas & Glengarry,
Transportation & Planning Service.
Contains information licensed under the
Open Government Licence - Ontario
OCWA IDs have been used.
Parcel Mapping from MPAC parcel. Not a Plan of Survey
Updated © August 3, 2021.

Sanitary Network Maps




Crysler
Sanitary Network
Finch
Sanitary Network
Legend
Sewer Lines
Sewer Points
CR 12
CR 13
County Road 13
County Road 12
County Road 9
CR 9
Berwick
South Nation River

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

United Counties of Stormont, Dundas, and Glengarry Population and Growth Projections Report (Hemson 2013)

Reasons for Growth

In 2013 the United Counties worked with Hemson to develop a report to understand the growth projections and expected population dynamics for their area. North Stormont was covered in the scope of this report.

The report highlights that the primary catalyst for the County's sustained expansion is the network of relationships and connections it maintains with neighboring areas. This is attributed to the growth stimuli generated by the economic and social activities within the County and its townships, particularly its adjacency to Ottawa.

Table 1

Commuting Behaviour of the UCSDG Resident Employed Labour Force 2006 Census Information

	Portion of County (see note 1)			Total County
	Western	Central	Eastern	
Resident Employed Labour Force with a Usual Place of Work (See Note 2)	9,655	26,385	10,675	46,715
Working within the UCSDG	6,005	23,390	8,935	38,330
Share of Employed Residents	62.2%	88.6%	83.7%	**82.1%**
Share to City of Cornwall	3.1%	**66.0%**	25.2%	43.9%
Working Outside the UCSDG	3,665	3,000	1,745	8,410
Share to Ottawa	**70.5%**	48.5%	28.1%	53.9%
Share to Elsewhere (mainly other parts of Ontario)	29.5%	51.5%	71.9%	46.1%

Source: Hemson Consulting Ltd. based on Statistics Canada 2006 Census data.

Growth Projections

The Hemson Population and Growth Projections Report provided estimates for the County and its townships, projecting growth from 2011 census data to 2031. According to the report, the Township of North Stormont was anticipated to undergo low to moderate population growth, with projections indicating an increase from 7,100 residents in 2011 to 7,300 by 2031. Likewise, the number of households was expected to rise from 2,500 to 2,700 over the same period. Notably, the increase in household numbers aligns closely with the population growth, reflecting an aging demographic that reduces the average population per household over time. It's important to note that the actual population has already surpassed these projections.

Land Supply

As part of predicting the population dynamics, the report also detailed the land supply for the Townships. North Stormont has 185 gross hectares of vacant residential land. This is land that is undeveloped or currently not utilized within residential zoning. The Township does not have any additional land supply in the employment district, or in the Mixed Use/Non-residential zones. This led to the Township of North Stormont having the lowest amount of vacant land supply out of all the townships in the United Counties.

Density

Hemson utilized density to determine the ability of currently utilized land for supporting and encouraging growth. This is done by observing density in "units (housing units) per gross hectare" referred to as upgh. The report indicates that for urban and rural development, a 5-9 upgh is used. Seen below, the capacity for the County's growth well exceeds its current forecasts. For North Stormont in particular, this shows that despite having a low amount of unutilized land in comparison to other Townships, there is still ample capacity and opportunity for growth.

Table 9

Municipal Unit Demand Vs. Capacity
United Counties of Stormont, Dundas and Glengarry

Township	Housing Unit Growth 2011-2031	Unit Capacity at Density Range		
		9 upgh	7 upgh	5 upgh
North Dundas	975	2,500	2,000	1,400
South Dundas	455	1,700	1,300	900
North Stormont	195	1,700	1,300	900
South Stormont	365	4,100	3,200	2,300
North Glengarry	125	1,700	1,300	900
South Glengarry	385	2,900	2,200	1,600
County Total	**2,500**	**14,600**	**11,300**	**8,100**

Source: Hemson Consulting Ltd. 2012 based on information provided by County Planning Staff.

Impact of Growth on Lifecycle Activities

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

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

Appendix L: 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 M: Risk Rating Criteria

Risk Definitions

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

Risk Frameworks

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

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