Asset Management Plan

Township of East Zorra - Tavistock

2024

This Asset Management Program was prepared by:

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

Key Statistics

Replacement cost of asset portfolio
$121.1 million

Replacement cost of infrastructure per household
$40,000 (2021)

Percentage of assets in fair or better condition
90%

Percentage of assets with assessed condition data
77%

Annual capital infrastructure deficit
$1.8 million

Recommended timeframe for eliminating annual infrastructure deficit
15 Years

Target reinvestment rate
3.82%

Actual reinvestment rate
1.77%

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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 critical services. The goal of asset management is to deliver an adequate level of service in the most cost-effective manner. This involves the development and implementation of asset management strategies and long-term financial planning.

Scope

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

This AMP include the following asset categories:

With the development of this AMP the Township has achieved compliance with O. Reg. 588/17 to the extent of the requirements that must be completed by July 1, 2024. There are additional requirements concerning proposed levels of service and growth that must be met by July 1, 2025.

Findings

The overall replacement cost of the asset categories included in this AMP totals $121.1 million. 90% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 77% of assets. For the remaining 23% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

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

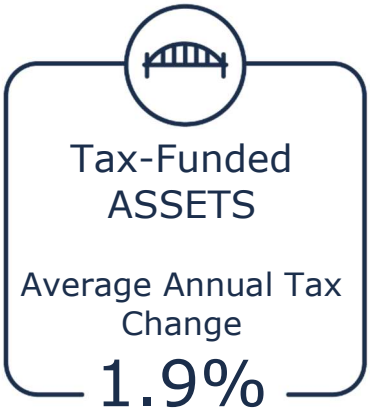
To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $4.6 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $2.1 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $2.5 million.

It is important to note that this AMP represents a snapshot in time and is based on the best available processes, data, and information at the Township. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources.

Annual Tax Increase per Household

Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphic shows the annual tax change required to eliminate the Township's infrastructure deficit based on a 15-year plan:



Recommendations to guide continuous refinement of the Township's asset management program. These include:

- Review data to update and maintain a complete and accurate dataset.
- Develop a condition assessment strategy with a regular schedule.
- Review and update lifecycle management strategies.
- Develop and regularly review short- and long-term plans to meet capital requirements.
- Continue to measure current levels of service and identify sustainable proposed levels of service.

1 Introduction & Context

Key Insights

- The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value ratepayers receive from the asset portfolio.

- The Township's asset management policy provides clear direction to staff on their roles and responsibilities regarding asset management.

- An asset management plan is a living document that should be updated regularly to inform long-term planning.

- Ontario Regulation 588/17 outlines several key milestone and requirements for asset management plans in Ontario between July 1, 2022 and 2025.

1.1 East Zorra-Tavistock Community Profile

Census Characteristic	Township of East Zorra-Tavistock	Ontario
Population 2021	7,841	14,223,942
Population Change 2016-2021	10.2	5.8
Total Private Dwellings	3,055	5,929,250
Population Density	32.4/km^2	15.9/km^2
Land Area	241.96 km^2	892,411.76 km^2

The Township of East Zorra-Tavistock is located in southwestern Ontario. Established in 1975 through the amalgamation of the Township of East Zorra and the Village of Tavistock, it forms part of Oxford County. Geographically, East Zorra-Tavistock is strategically positioned between the cities of London and Kitchener, and is just north of Woodstock.

This Township boasts a rich tapestry of communities, including Braemar, Cassel, East Zorra, Hickson, Huntingford, Innerkip, Perry Mine, Perrys Lake, Strathallan, Tavistock, Tollgate, and Willow Lake. The primary economic driver in East Zorra-Tavistock is agriculture, characterized by a number of innovative farms and farm gate stands that attract visitors from near and far. The local economy is further enriched by a strong community culture, epitomized by events such as the renowned World Crokinole Championship.

Accessibility is a key feature of East Zorra-Tavistock. The township enjoys proximity to major highways, including the 401, 402, and 403, making it an ideal location for travel and transport. Additionally, several airports are located nearby, and the area is serviced by the Canadian Pacific and Canadian National Rail Lines, enhancing its connectivity.

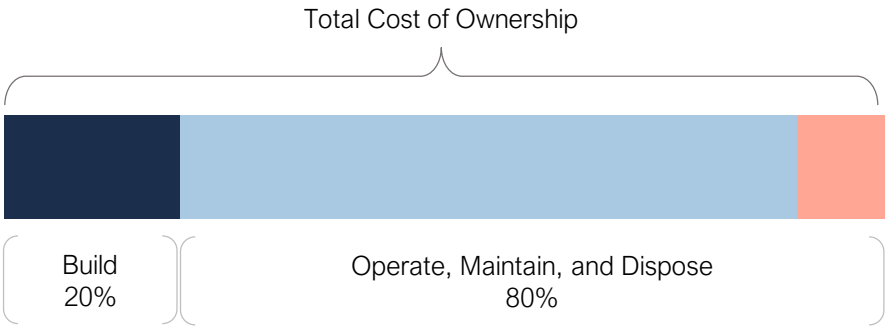
Residents of East Zorra-Tavistock benefit from the Township's blend of small-town charm and convenient access to urban amenities, resulting in a high quality of life. The community's welcoming atmosphere, combined with its robust infrastructure, makes it an appealing place to live, work, and visit.

1.2 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 ratepayers receive from the asset portfolio.

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



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

This industry standard, defined by the Institute of Asset Management (IAM), emphasizes the alignment between the corporate strategic plan and various asset management documents. The strategic plan has a direct, and cascading impact on asset management planning and reporting.

1.2.1 Asset Management Policy

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

The Township and adopted an asset management policy on June 13, 2019 through Report #CAO2019-05. Staff worked collaboratively with PSD and are satisfied that the policy reflects a broad-based approach to Asset Management that East-Zorra Tavistock can embrace and take forward:

1.2.2 Asset Management Strategy

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

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

1.2.3 Asset Management Plan

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

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

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

1.3 Key Concepts in Asset Management

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

1.3.1 Lifecycle Management Strategies

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

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

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

Lifecycle Activity	Description	Example (Roads)	Cost
Maintenance	Activities that prevent defects or deteriorations from occurring	Crack Seal	$
Rehabilitation/ Renewal	Activities that rectify defects or deficiencies that are already present and may be affecting asset performance	Mill & Re-surface	$$
Replacement/ Reconstruction	Asset end-of-life activities that often involve the complete replacement of assets	Full Reconstruction	$$$

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 outlined in this AMP. 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.

1.3.2 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 than that of others. 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.

This AMP includes a high-level evaluation of asset risk and criticality. Each asset has been assigned a probability of failure score and consequence of failure score based on available asset data. These risk scores can be used to prioritize maintenance, rehabilitation and replacement strategies for critical assets.

1.3.3 Levels of Service

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

These measures include a combination of those that have been outlined in O. Reg. 588/17 in addition to performance measures identified by the Township as worth measuring and evaluating. The Township measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service.

Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (roads, bridges and culverts, water, wastewater, stormwater) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. For non-core asset categories, the Township has determined the qualitative descriptions that will be used to determine the community level of service provided. These descriptions can be found in the Levels of Service subsection within each asset category.

Technical Levels of Service

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

For core asset categories (roads, bridges and culverts, water, wastewater, stormwater) the Province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP.

Current and Proposed Levels of Service

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

Proposed levels of service should be realistic and achievable within the timeframe outlined by the 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 levels of service have been established, and prior to July 2025, the Township must identify a lifecycle management and financial strategy which allows these targets to be achieved.

1.4 Climate Change

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

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

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

1.4.1 East Zorra - Tavistock Climate Profile

The Township of East Zorra - Tavistock 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) – East Zorra- Tavistock may experience the following trends:

Higher Average Annual Temperature:

- Between the years 1971 and 2000 the annual average temperature was 7.3 ºC.
- Under a high emissions scenario, the annual average temperatures are projected to increase by 2.5 ºC by the year 2050 and around 3.9 ºC by the end of the century.

Increase in Total Annual Precipitation:

- Under a high emissions scenario, East Zorra - Tavistock is projected to experience an 11% increase in precipitation by the year 2080 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 change.
- In some areas, extreme weather events will occur with greater frequency and severity than others.

1.4.2 Integration of Climate Change and Asset Management

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

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

1.5 Ontario Regulation 588/17

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

The regulation has four reporting requirements for Ontario Municipalities these are as follows:

2019

Strategic Asset Management Policy

2022

Asset Management Plan for Core Assets with the following components:

1. Current levels of service
2. Inventory analysis
3. Lifecycle activities to sustain LOS.
4. Cost of lifecycle activities
5. Population and employment forecasts
6. Discussion of growth impacts

2024

Asset Management Plan for Core and Non-Core Assets

2025

Asset Management Policy Update and an Asset Management Plan for All Assets with the following additional components:

1. Proposed levels of service for next 10 years
2. Updated inventory analysis.
3. Lifecycle management strategy
4. Financial strategy and addressing shortfalls.
5. Discussion of how growth assumptions impacted lifecycle and financial.

This report focuses on the identification of typical lifecycle activities conducted by asset class that are required to sustain the current Level of Service (LOS). The accompanying risk and LOS reports focus on the other components required under O.Reg. 588/17.

O. Reg. 588/17 defines municipal infrastructure asset as directly owned by a municipality or included on the consolidated financial statements of a municipality. Assets must meet the capitalization threshold as defined in the Tangible Capital Asset

(TCA) Policy to be recognized on the financial statements. Therefore, some inventory within the Township may not be included in the asset management inventory because they are not a Tangible Capital Asset. Typically, these are assets funded from operational budgets.

1.5.1 O. Reg. 588/17 Compliance Review

The following table identifies the requirements outlined in Ontario Regulation 588/17 for municipalities to meet by July 1, 2024. Next to each requirement, a page or section reference is included to indicate status and appliable report.

Requirement	O. Reg. Section	Report Reference	Status
Summary of assets in each category	S.5(2), 3(i)	4.1 – 10.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1 – 10.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.2 – 10.2	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.2 – 10.2	Complete
Description of Township's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.2.1 – 10.2.1	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.5 – 10.5	Complete
Current performance measures in each category	S.5(2), 2	4.5 – 10.5	Complete
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.3 – 10.3	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix B	Complete
Risks associated with lifecycle activities to maintain current levels of service	S.5(2), 4(iii)	4.4 – 10.4	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	11.1	Not Included
AMP is publicly available	S.10	N/A	Pending
AMP is approved by Council	S.8 (b)	N/A	Pending
AMP is endorsed by executive lead at the Township	S.8 (a)	N/A	Pending

As noted on page 12, in 2025 there are additional requirements for reporting on proposed LOS and the required lifecycle strategies to support.

2 Scope and Methodology

Key Insights

- This asset management plan includes 7 asset categories with all asset categories being primarily tax funded

- The source and recency of replacement costs impacts the accuracy and reliability of asset portfolio valuation

- 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

2.1 Asset Categories Included in this AMP

This asset management plan for the Township of East Zorra - Tavistock is produced in compliance with Ontario Regulation 588/17. The July 2024 deadline under the regulation—the first of three AMPs—requires analysis of only core assets (roads, bridges and culverts, water, wastewater, and stormwater).

The AMP summarizes the state of the infrastructure for the Township's asset portfolio, establishes current levels of service and the associated technical and customer oriented key performance indicators (KPIs), outlines lifecycle strategies for optimal asset management and performance, and provides financial strategies to reach sustainability for the asset categories listed below.

Asset Category	Sources of Funding
Road Network	Tax Levy & Gas Tax
Bridges & Culverts	Tax Levy & OCIF
Buildings	Tax Levy
Vehicles	
Machinery, Equipment & Furniture	
Land Improvements	
Stormwater Network	

2.2 Deriving Replacement Costs

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

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

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

costs that the Township incurred. As assets age, and new products and technologies become available, cost inflation becomes a less reliable method.

2.3 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 in this AMP was assigned according to the knowledge and expertise of municipal staff and supplemented by existing industry standards when necessary.

By using an asset's in-service data and its EUL, the 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:

$$Service\ Life\ Remaining\ (SLR) = In\ Service\ Date + Estimated\ Useful\ Life(EUL) - Current\ Year$$

2.4 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. The reinvestment rate is calculated as follows:

$$Target\ Reinvestment\ Rate = \frac{Annual\ Capital\ Requirement}{Total\ Replacement\ Cost}$$

$$Actual\ Reinvestment\ Rate = \frac{Annual\ Capital\ Funding}{Total\ Replacement\ Cost}$$

2.5 Deriving Asset Condition

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

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

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

The analysis in this AMP is based on assessed condition data only as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition. Appendix C includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

The following table summarizes the source of assessed condition and the percentage of assets with assessed condition by asset category. Where condition information is as of an earlier date than the data effective date, it is projected to the data effective date based on the reported condition and the assets EUL.

Asset Category	Asset Segment	% of Assets with Assessed Condition[1]	Source of Condition Data
Road Network	All	100%	Tavistock Road Condition Assessment
Bridges & Culverts	All	100%	2021 OSIM Report
Storm Network	All	42%	Staff Assessments
Buildings	All	100%	Staff Assessments
Vehicles	All	0%	N/A
Machinery, Equipment & Furniture	All	100%	Staff Assessments / External party
Land Improvements	All	100%	Staff Assessments

2.6 Deriving Asset Risk

2.6.1 Qualitative Risk

Risk is defined as the effect of uncertainty on objectives. Inherent in the management of infrastructure assets is the assumption of risks. Often, asset risks are specific and measurable. Sometimes, however, risks are impractical to quantify, but are recognized for the threats they pose to assets and their ability to provide their intended service. These are qualitative risks.

Qualitative risks can indicate key trends, challenges, and risks to service delivery that the Township faces. Qualitative risks were identified as applicable to Township of East Zorra-Tavistock's assets. The application of these risks to the Township's assets are further discussed in within each asset category section.

Identifying what qualitative risks are applicable to the Township and which asset categories may be most impacted is a critical first step in the management of risk.

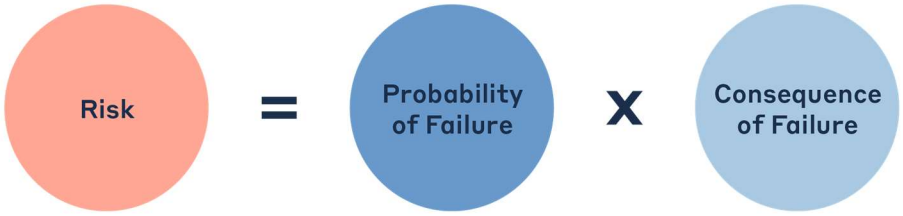
2.6.2 Quantitative Risk

Asset risks may also be specific and measurable against an asset based on attribute features like condition, material, and the cost to replace. When risk can be quantified against an asset it is a quantitative risk.

[1] In absence of physical inspection, staff expertise was used to provide condition assessment, where possible.

Quantitative risk is a product of two variables: the **probability** that an asset will fail, and the resulting **consequences** of that failure event. To calculate risk, the probability and consequence of failure are each scored from 1 to 5, producing a minimum risk rating of one (1) for the lowest risk assets, and a maximum risk rating of 25 for the highest risk assets.

Formula to Assess Risk of Assets



Probability of Failure

Various parameters may be used to estimate the probability or likelihood of an asset's failure. Typically, a model is selected for a group of similar assets (e.g., all roads, water distribution system etc.). Often parameters for estimating probability of failure include asset condition, service life remaining, and/or asset material.

For each risk model, probability of failure (PoF) is determined through the following steps:

1 Identification of *available* attribute data *suitable* for determining the probability of failure for selected assets. In some instances, available asset data may be limited requiring a more simplified PoF model, at least initially.

- This process often identifies opportunities for asset data enhancements and/or data collection. Asset enhancement considerations commonly relate to data quality dimensions which are outlined in **Error! Reference source not found.**.

2 Determination of the type of consequence that applies to the selected attribute.

- Condition, Design Capacity, Economic, Environmental, Health and Safety, Operational, Social, Strategic

3 Where there are multiple parameters included in the PoF model, determine suitable weighting of each parameter.

- Weighting allows the model to recognize that each factor may impact the probability of failure to a different degree. Where the weight is higher, the impact that factor has on the model increases too.

Consequence of Failure

The consequence of failure describes the anticipated effect of an asset's failure to an organization and its stakeholders. There are different types of consequences of failure which can range from insignificant to severe. For example, failure of an infrequently used road may affect only a few residents and/or inconvenience them slightly (i.e., minimal detour distance). Conversely, failure of a more significant road could create significant issues to the transportation networks and affect many residents' ability to access critical community services (i.e., hospitals and schools).

The CoF parameters selected for each risk model aim to measure relevant consequences of an asset's failure. For each risk model, consequence of failure is determined through the following steps:

1 Identification of available attribute data suitable for determining the consequence of failure for selected assets.

- Again, the data available to calculate consequence of failure may be limited, requiring a simplified model at least for a period.

2 Determination of the type of consequence that applies to the selected attribute.

- Condition, Design Capacity, Economic, Environmental, Health and Safety, Operational, Social, Strategic

3 Where there are multiplied parameters included in the CoF model, determine suitable weighting of each parameter.

- Weighting allows the model to recognize that each factor may impact the consequence of failure to a different degree. Where the weight is higher, the impact that factor has on the model increases too.

Risk Scores

Risk Scores are derived from the total PoF multiplied by the total CoF. In this model, risk scores may range from 0-25. The table below provides some examples of respective PoF and CoF scores and the resultant risk rating.

Probability of Failure	Consequence of Failure	Risk Rating
1 – Rare	1 – Insignificant	1 - 4 – Very Low
2 – Unlikely	2 – Minor	5 - 7 – Low
3 – Possible	3 – Moderate	8 - 9 – Moderate
4 – Likely	4 – Major	10 - 14 – High
5 – Almost Certain	5 – Severe	15 - 25 – Very High

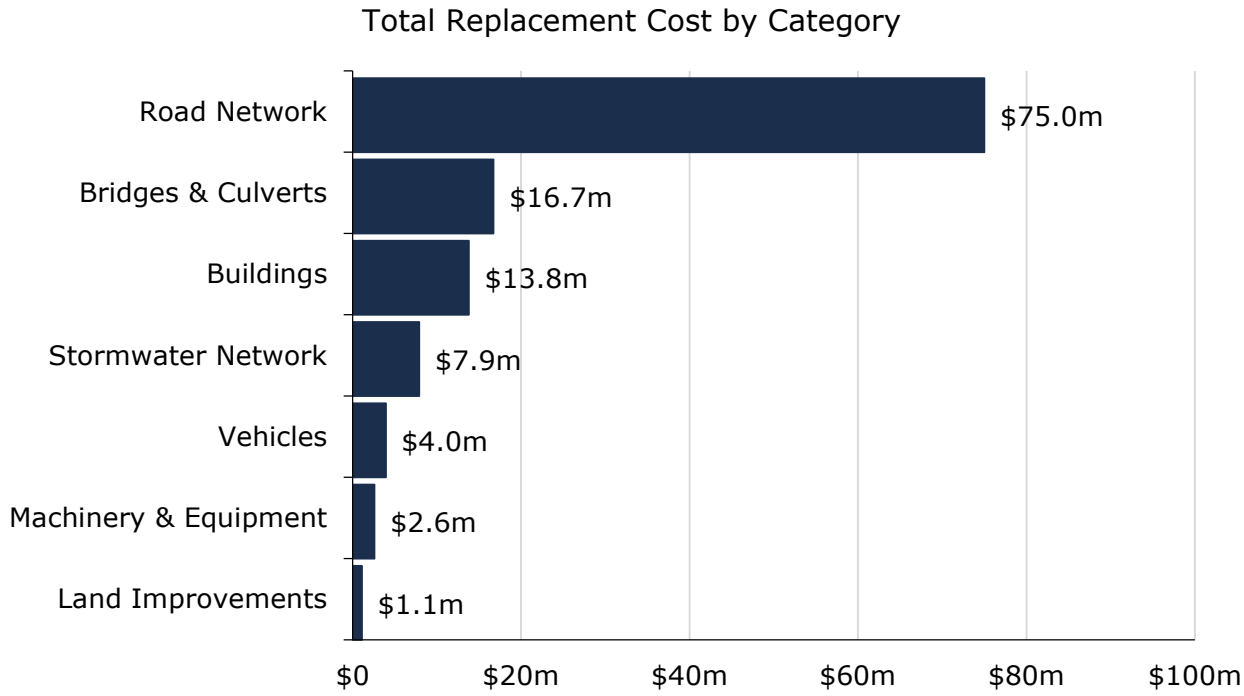
3 Portfolio Overview

Key Insights

- The total replacement cost of the Township's asset portfolio is $121.1 million
- The Township's target re-investment rate is 3.82%, and the actual re-investment rate is 1.77%, contributing to an expanding infrastructure deficit
- The average condition of all assets in the Township is 69% (Good) with an average risk rating of 6.48 / 25 (Low).
- 6% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total $4.6 million per year across all assets

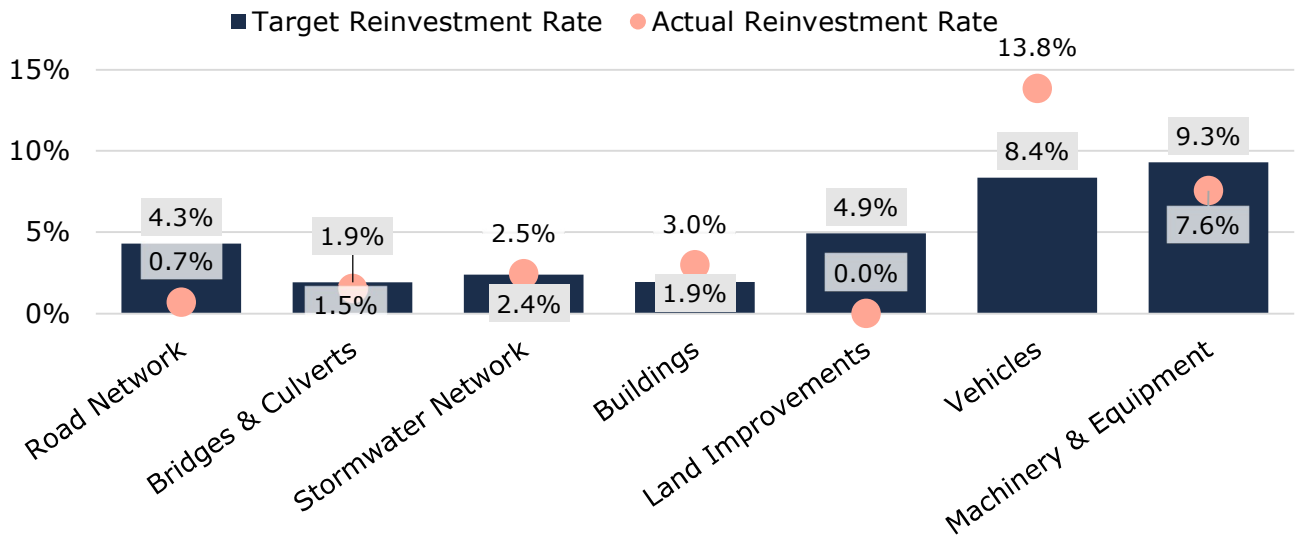
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analysed in this AMP have a total replacement cost of $121.1 million based on inventory data from 2022. 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.



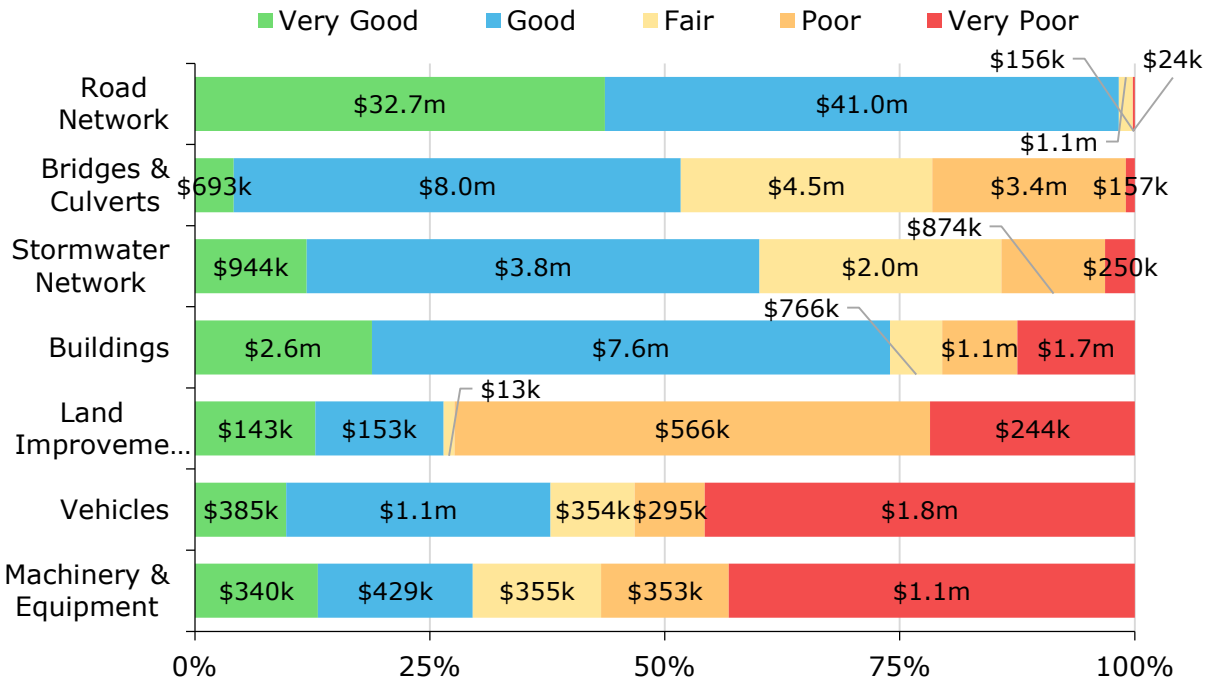
3.2 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township should be allocating approximately $4.6 million annually, for a target reinvestment rate of 3.82%. Actual annual spending on infrastructure totals approximately $2.1 million, for an actual reinvestment rate of 1.77%.



3.3 Condition of Asset Portfolio

The current condition[2] of the assets is central to all asset management planning. Collectively, 90% of assets in East Zorra-Tavistock are in fair or better condition. This estimate relies on both age-based and field condition data.



[2] The condition chart shows percentages of condition weighted by replacement cost, rather than asset count.

Condition results from the 2021 Road Needs Study have been projected to 2022 for this AMP. Overall, nearly 100% of assets (weighted by replacement value) were assessed for condition.

As per Regulation 104/97 Standards for Bridges, every municipal bridge and structural culvert requires inspection for structural integrity, safety, and condition at least bi-annually. Each year, half of the Township's bridge and structural culvert assets are inspected. This report utilizes inspection information from the 2021 OSIM report developed by K. Smart Associates. Like with roads, bridge and structural culvert condition information is projected to December 2022 as required, for the bridges with 2021 assessments.

At this time, only maintenance holes and catch basins have assessed condition scores in the Storm Network; all other assets use age-based condition, which is calculated based on the assets age relative to its expected service life. The Township currently inspects municipal drains but do not inspect stormwater mains or drainage culverts. Discussions regarding drainage inspections are in place, but there are no plans of implementation.

At the time of this report's development, the Township was actively revamping their buildings inventory data in both the assets represented and their respective attribute data. It is expected that this revamp will impact the reported information herein, including the replacement costs, quantities, and condition. These enhancements will be reflected in future asset management reports and demonstrate the Township's commitment to continuous improvement.

The estimated condition of Vehicles varies by department, where Recreation vehicles are generally approaching the end of useful life and other departments have estimated condition ranging from very good to very poor. The condition of Machinery & Equipment assets is mixed, with public works equipment assets having the highest average condition of machinery and equipment segments.

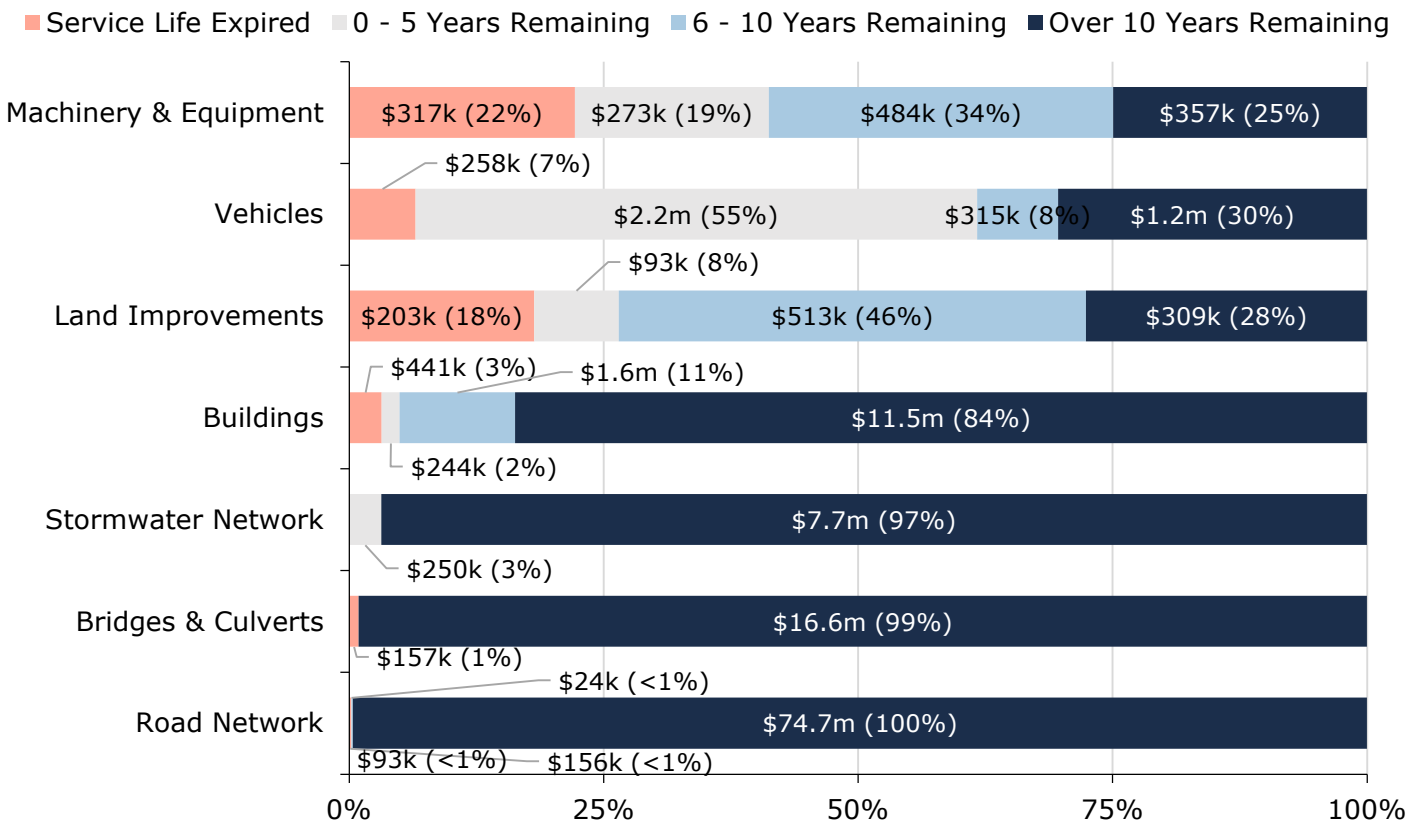
Most land improvement assets are poor condition, except for those at Innerkip Park or related to Public Works. Condition is based on age.

This AMP relies on assessed condition data for an average of 77% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	Asset Segment	% of Assets with Assessed Condition[3]	Source of Condition Data
Road Network	All	100%	Engineering Firm
Bridges & Culverts	All	100%	Engineering Firm
Storm Network	All	42%	Staff Assessments
Buildings	All	100%	Staff Assessments
Vehicles	All	0%	N/A
Machinery, Equipment & Furniture	All	100%	Staff Assessments / External party
Land Improvements	All	100%	Staff Assessments

3.4 Service Life Remaining

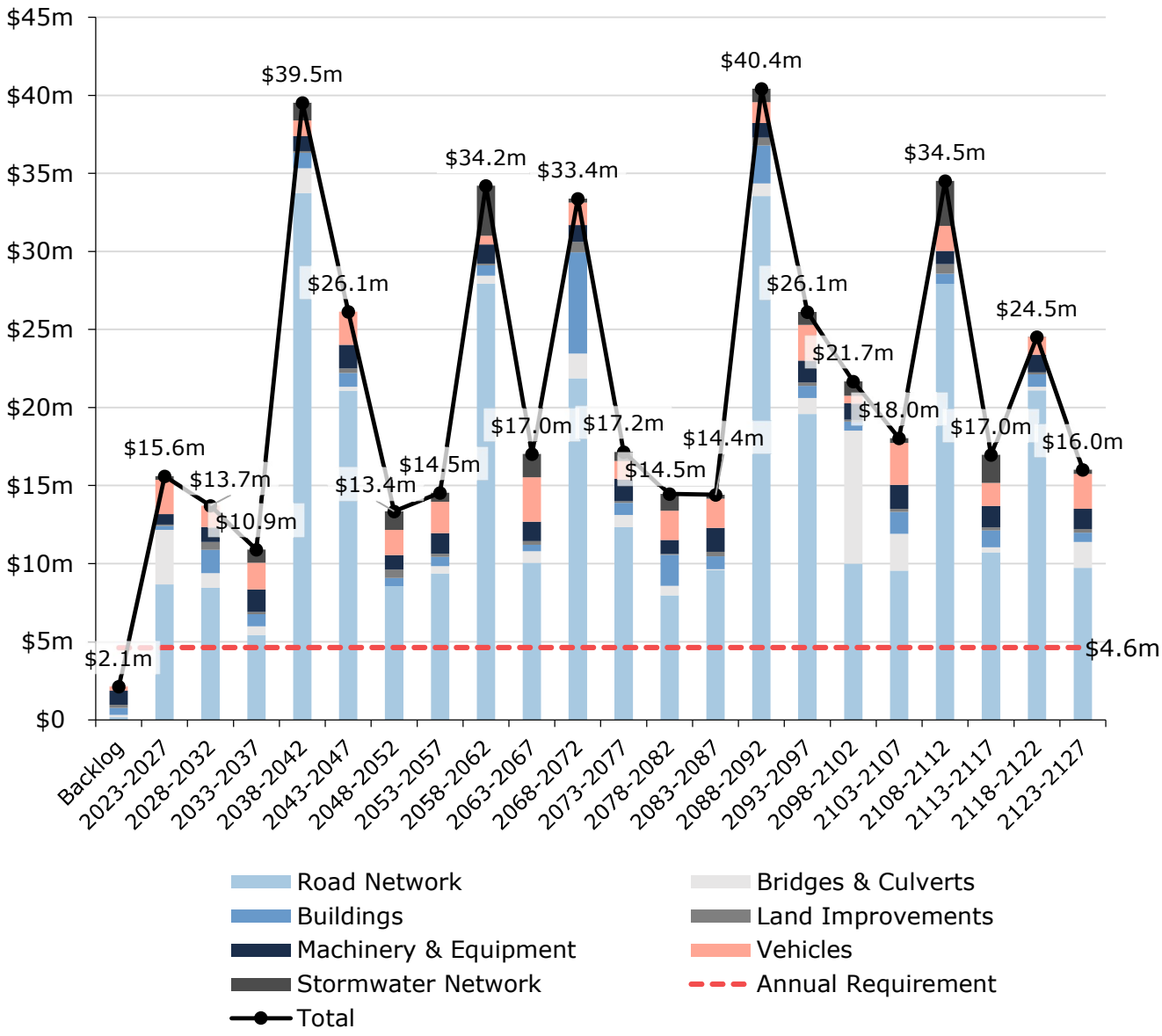
Based on asset age, available assessed condition data and estimated useful life, 6% of the Township's assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B.



[3] In absence of physical inspection, staff expertise was used to provide condition assessment, where possible

3.5 Forecasted Capital Requirements

Based on planned replacement dates and costs provided by the Township and projected replacement dates based on assets in-service date and estimated useful life, the following graph illustrates cumulative capital requirements for the period of 2023-2127. This period has been selected as it allows every asset to go through one-iteration of replacement. The average annual capital requirement for both core and non-core assets is $4.6 million.



4 Road Network

The Road Network is a critical component of the provision of safe and efficient transportation services and represents the second highest value asset category in the Township's asset portfolio. The Township is responsible for the operations and capital upkeep of road network assets. Primarily this consists of paved roads and unpaved roads, but also includes other roadside supportive infrastructure like curbs, sidewalks, and streetlights. The Township's Road Network assets are maintained by the Public Works department.

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

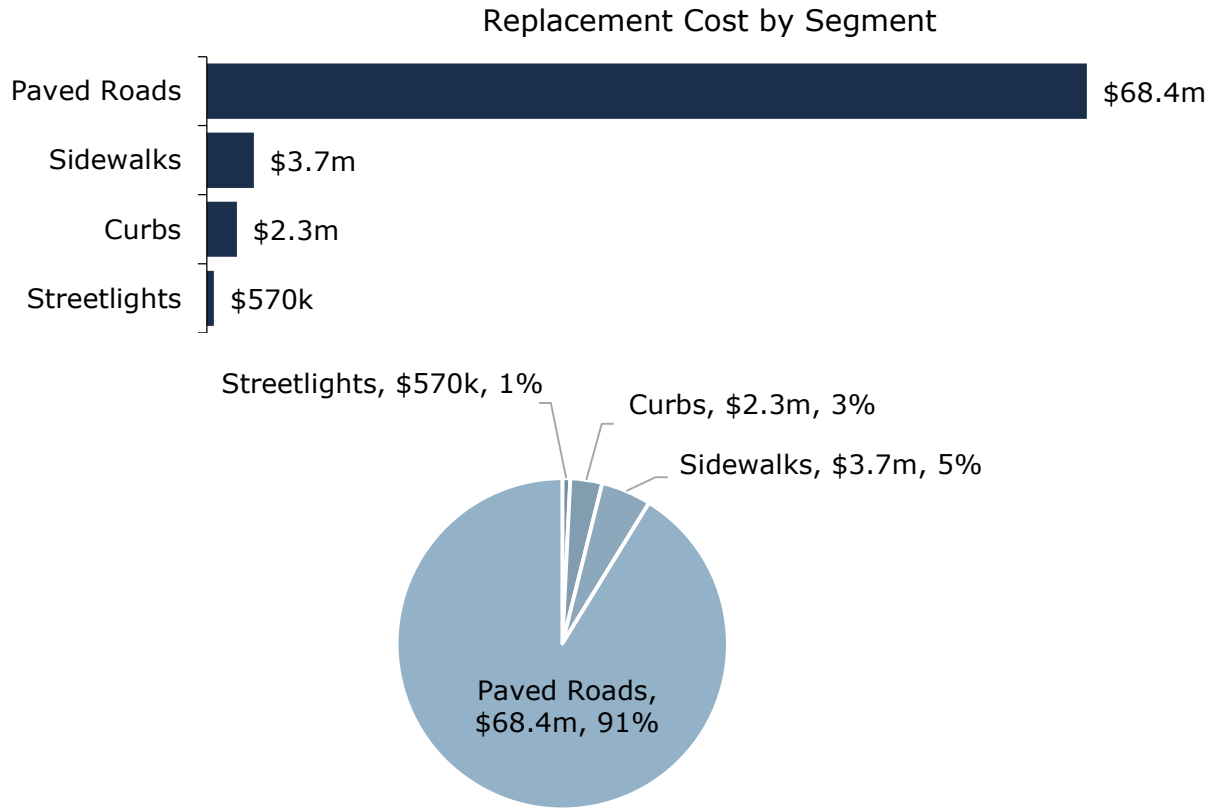
Replacement Cost	Condition	Financial Capacity	
$75,008,000	Good (75%)	Annual Requirement:	$3,228,000
		Funding Available:	$528,000
		Annual Deficit:	$2,700,000

4.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's road network inventory.

Asset Segment	Quantity	Replacement Cost	Average Annual Capital Requirement
Curbs	118,735 m	$2,347,000	$69,000
Paved Roads	70,000 m	$68,426,000	$3,038,000
Sidewalks	45,848 m	$3,665,000	$92,000
Streetlights	655	$570,000	$29,000
Unpaved Roads	Not Planned for Replacement[4]		
Total		**$75,008,000**	**$3,228,000**

[4] Gravel roads undergo perpetual operating and maintenance activities. If maintained properly, they can theoretically have a limitless service life. As this asset is not funded by capital dollars, it is not included.



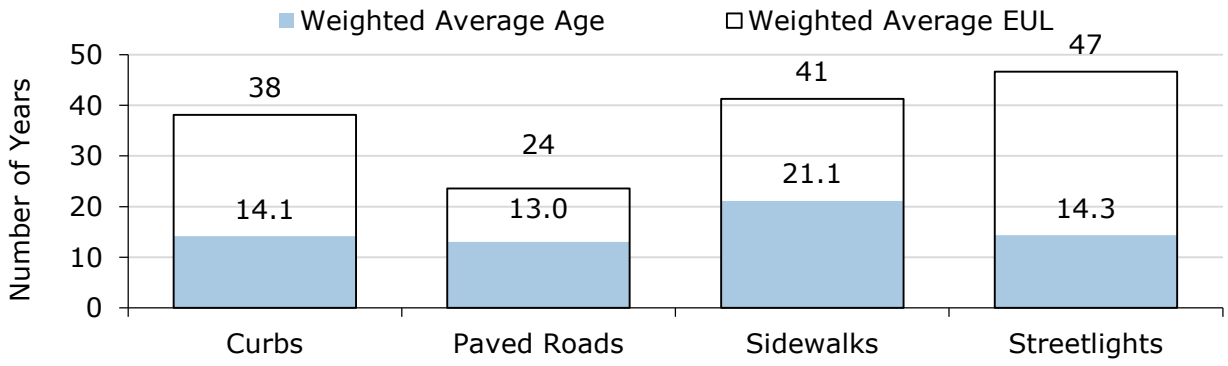
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

4.2 Asset Condition & Age

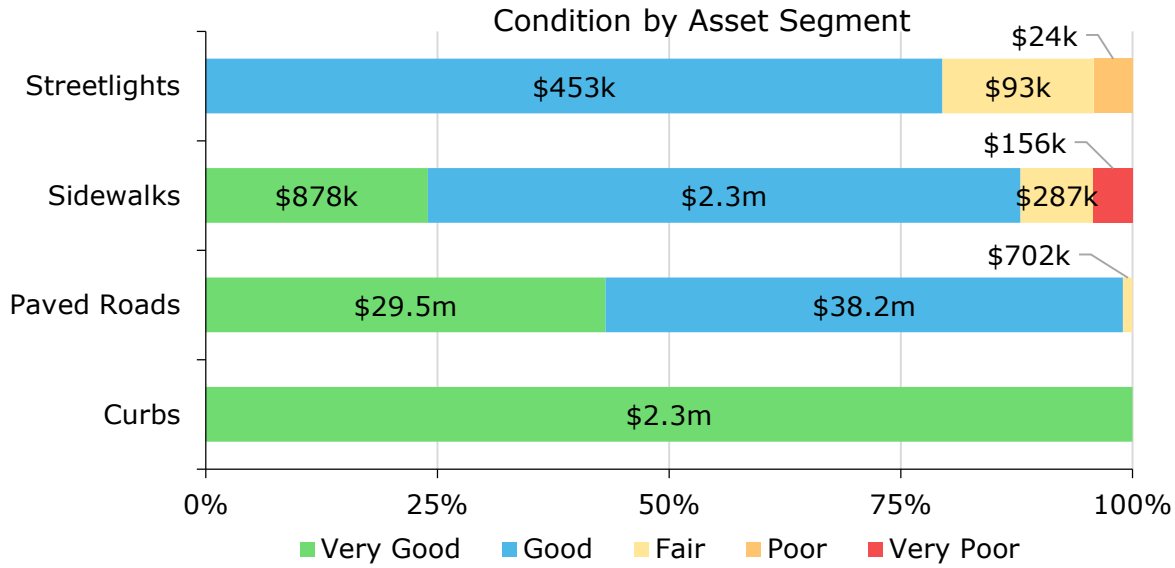
The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost. Condition example images can be found in Appendix F: Pavement Condition Examples.

Asset Segment	Weighted Average EUL (Years)	Weighted Average Age (Years)	Average Condition
Unpaved Roads		N/A[5]	
Streetlights	20	6.2	Good (77%)
Sidewalks	41	21.1	Good (68%)
Paved Roads	24	13.0	Fair (58%)
Curbs	38	14.1	Fair (55%)
Average			**Good (75%)**

[5] Unpaved roads are perpetually maintained rather than replaced, so the asset age is not considered in the same manner as other asset segments.



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

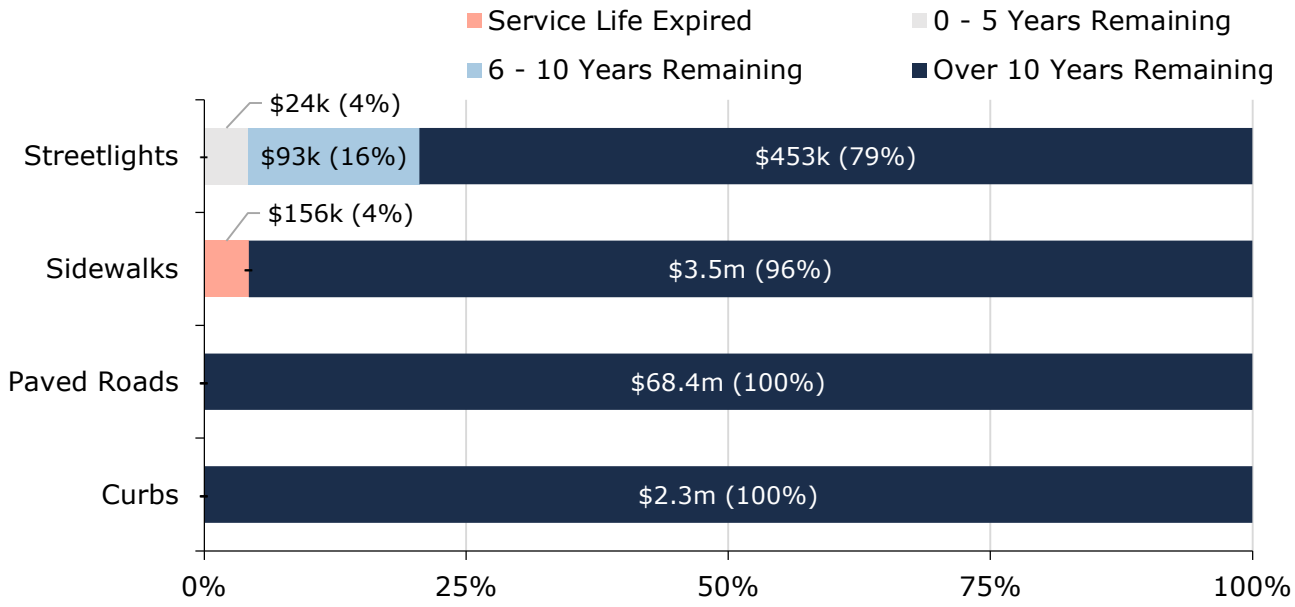


To ensure that the Township's Road Network continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance,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

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.

Based on asset age, available assessed condition data and estimated useful life, 9% of the Township's Road Network assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in **Error! Reference source not found.**. Service life remaining is outlined by replacement value below.

Asset Segment	Service Life Expired	0 - 5 Years Remaining	6 - 10 Years Remaining	Over 10 Years Remaining
Curbs	-	-	-	$2.3m (100%)
Paved Roads	-	-	-	$68.4m (100%)
Sidewalks	$156k (4%)	-	-	$3.5m (96%)
Streetlights	-	$24k (4%)	$93k (16%)	$453k (79%)
Unpaved Roads	-	-	-	-
Total	**$156k (<1%)**	**$24k (<1%)**	**$93k (<1%)**	**$74.7m (100%)**



4.2.1 Current Approach to Condition Assessment

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

- The Township conducts daily visual patrols for road assets, noting any deficiencies on paper, and performs inspections ranging from once per week to once per month, with Class 3 roads inspected weekly, Class 5 roads inspected monthly, and all other roads inspected biweekly.
- Compliance to Minimum Maintenance Standards (MMS) are used to gauge the condition of the paved roads and determine whether mid-life activities or replacement are required.

In this AMP the following rating criteria is used to determine the current condition of road segments and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

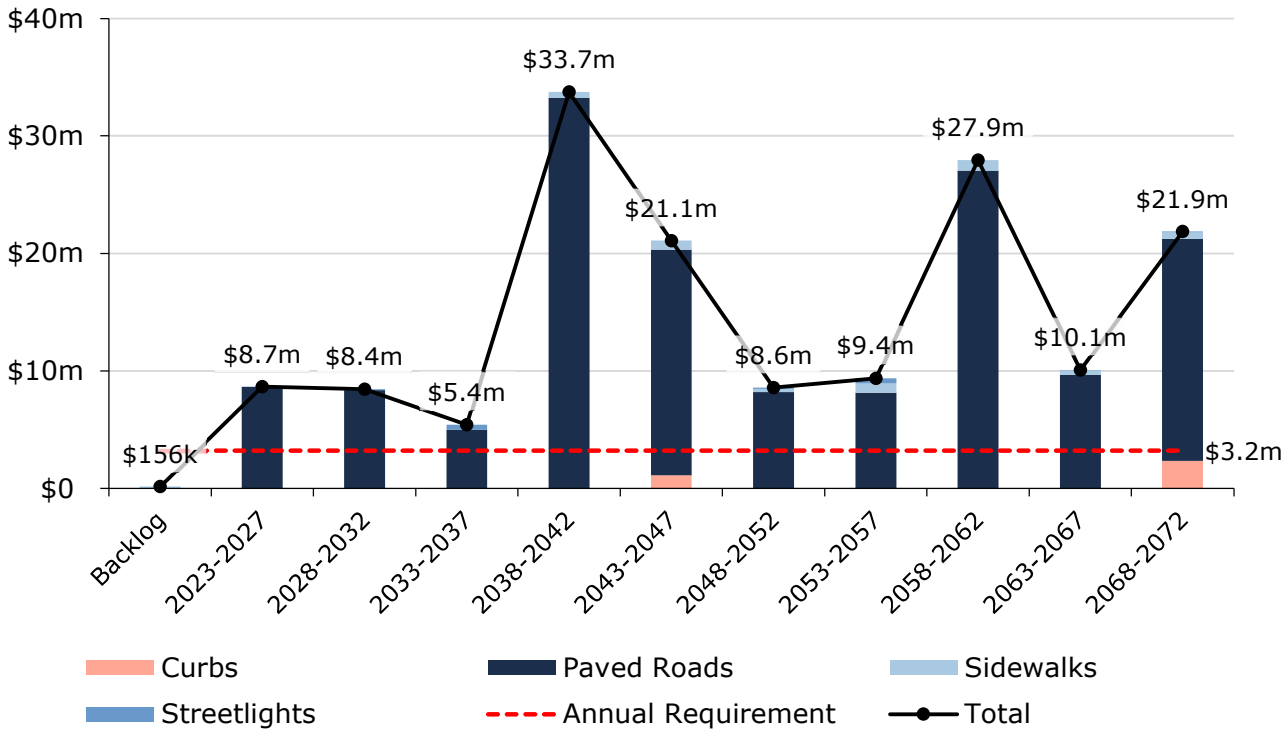
4.3 Lifecycle Management Strategy

The following describes the current lifecycle activities that are typically conducted on road network assets.

Event Class	Description
Maintenance & Testing	• Minimum Maintenance Standards (MMS) Regulations are followed for Road Network assets • Inspections for roads range from once per week to once per month. Class 5 roads are inspected once per month, Class 3 roads are inspected once per week, and the remaining roads are inspected every two weeks • The Township conducts daily visual patrols for road assets. Any deficiencies from observed from patrols are noted on paper • The most recent Roads Needs Study (RNS) was completed in 2021 which was the first one completed within the Township. The Township plans to budget for a RNS to be completed every 5 years • The Township completes crack sealing on paved roads as needed • Gravel roads are re-gravelled on a two-year cycle. Half of the Township's gravel roads are re-gravelled each year, and the remaining gravel roads are completed the following year • Ditching on roads is completed on an as-needed basis • Chloride brine solution is applied to gravel roads once per year to supress dust
Rehabilitation	• Rural paved roads are generally surface treated every 14 years until a full road reconstruction is required • Urban paved roads are generally resurfaced mid-life, followed by a major rehabilitation treatment 5 – 10 years later, such as a mill and pave
Replacement	• Major road repair and reconstruction are prioritized by pavement condition, recommendations from 2021 Road Needs Study, and staff judgement. • Asset replacements are coordinated with other underground assets renewal whenever reasonably possible.

4.3.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The graph identifies capital requirements until the year 2072 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.



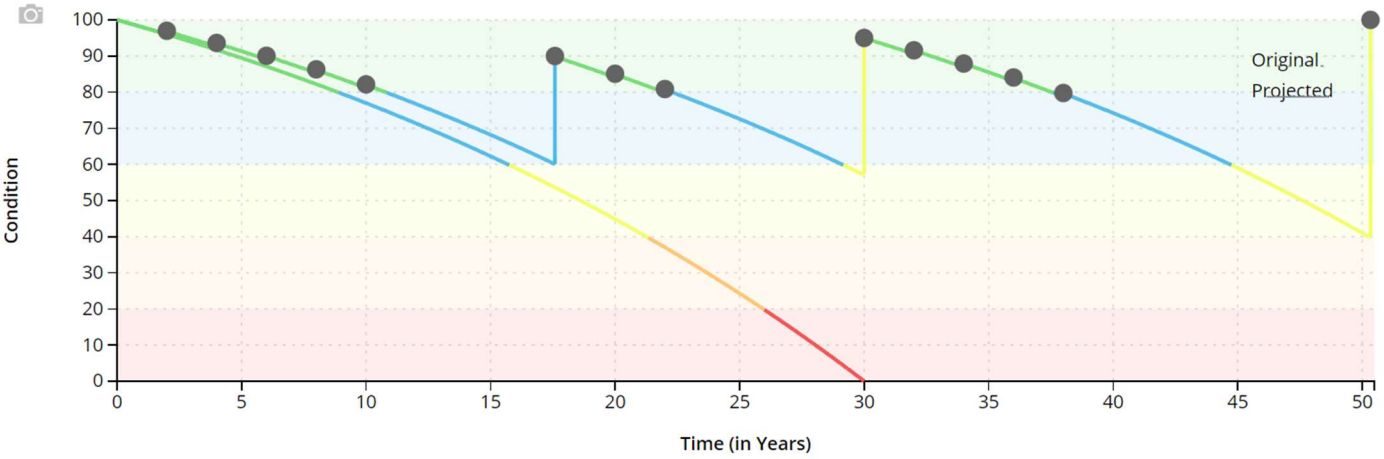
The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B: 10-Year Capital Requirements.

4.3.2 Recommended Capital Rehabilitations

The 2021 Roads Need Study contained several asset rehabilitation recommendations tailored to specific roads, primarily based on their condition and traffic rating. Where Road Need Study recommendations could be attributed to an asset in the asset management software scheduled lifecycle activities were appended to each asset and incorporated into forecasted capital requirements. Costs are based on values provided by the 2021 study with inflationary adjustment to 2022. A general description of the lifecycle activities and their estimated impact are as follows:

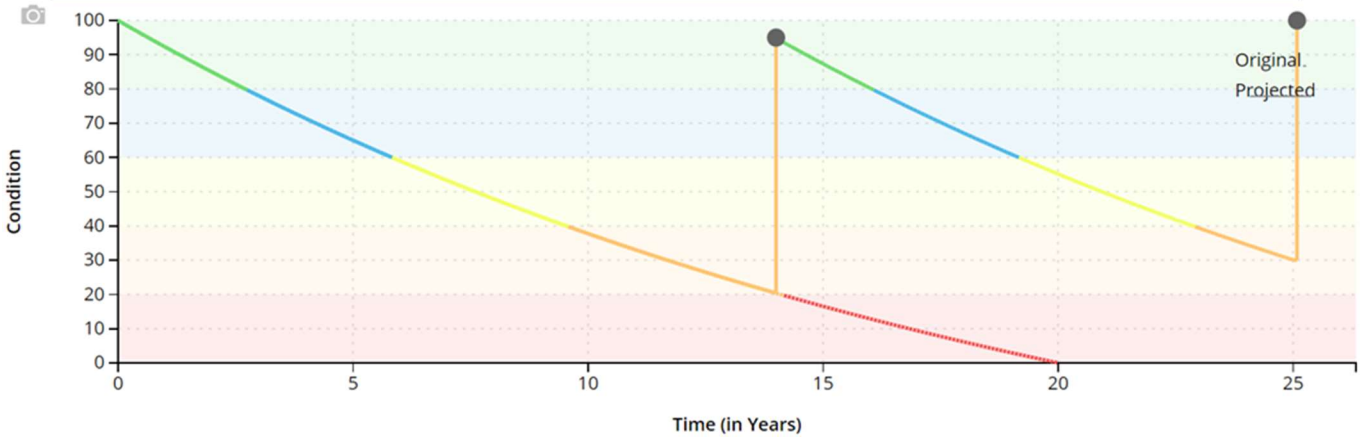
HCB Roads

Activity	Trigger	Cost	Impact
Crack Sealing	Annually while in very good condition	$2.42/m^2	+1% Condition
Resurfacing	18 Years	$21.28/m^2	Restores 90% Condition
Major Rehabilitation	30 Years	$151.04/m^2	Restores 100% Condition
Replacement	End of life	$151.04/m^2	



LCB Roads

Activity	Trigger	Cost	Impact
Surface Treatment	14 Years	$8.09/m^2	Restores 95% Condition
Replacement	End of life	$21.22/m^2	



4.4 Risk & Criticality

4.4.1 Risk Criteria & Scores

The following table outlines the probability of failure and consequence of failure metrics used to calculate each asset's overall risk score.

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

Probability of Failure (POF)	Consequence of Failure (COF)
Asset Condition	Replacement Cost (Economic)
Service Life Remaining	Roadside Environment (Economic)
PCI	MMS Road Class (Operational)
	AADT (Social)
	Segment (Health and Safety)

A more detailed outline of the risk profile metrics and weightings is available in Appendix J: Risk Profiles.

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.

The results of the risk analysis are as follows:

Asset Segment	Average Probability of Failure	Average Consequence of Failure	Average Risk Score
Curbs	1.11 / 5	1.65 / 5	1.83 / 25
Paved Roads	1.74 / 5	3.48 / 5	6.59 / 25
Sidewalks	1.97 / 5	2.08 / 5	4.12 / 25
Streetlights	2.38 / 5	1.40 / 5	3.34 / 25
Unpaved Roads	2.13 / 5	3.41 / 5	7.28 / 25
Average	**1.78 / 5**	**3.33 / 5**	**6.35 / 25**

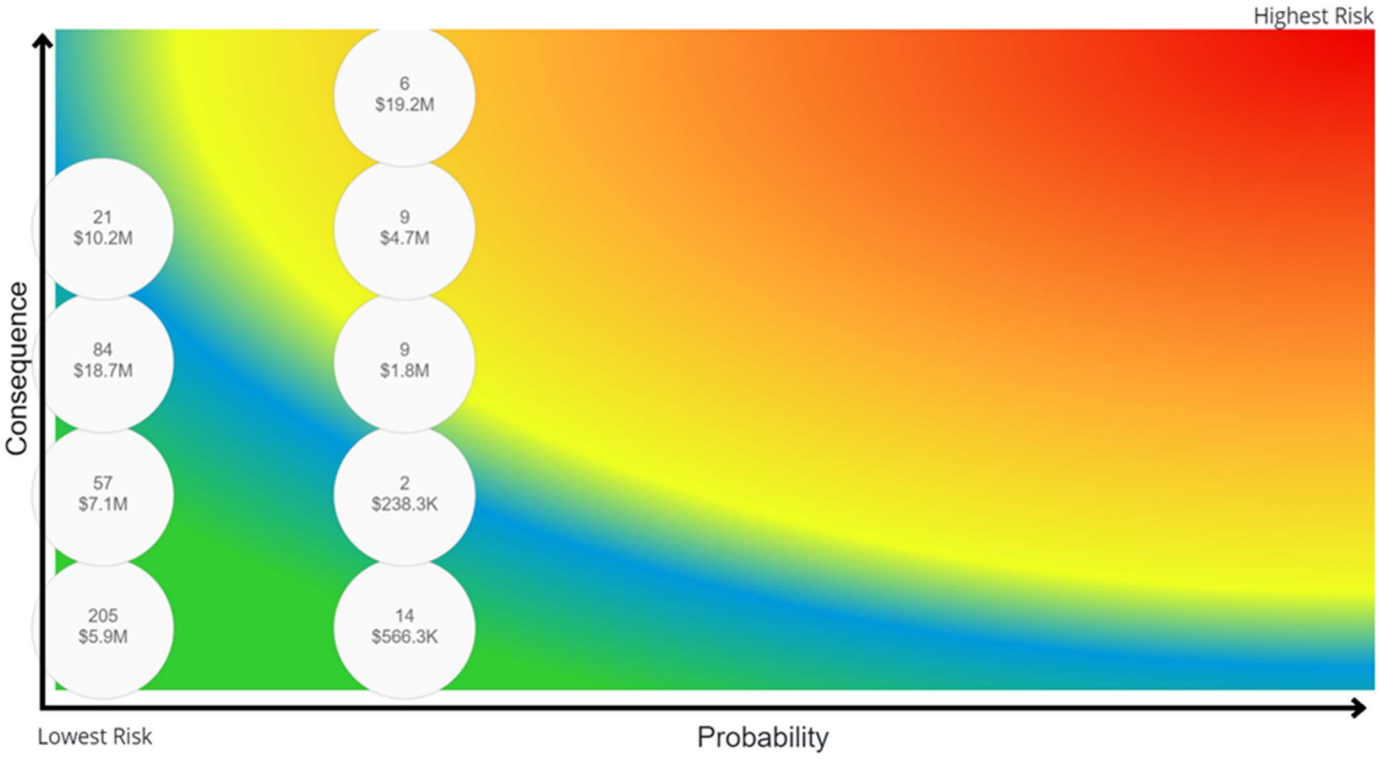
Using the risk model discussed above, the overall risk score for all road network assets is 6.35 which is considered low-to-moderate. However, it is important to note that these are weighted by replacement cost and some assets within each segment may carry significantly more or less risk than the average.

When reviewing risk, it is important to note that all data is reported as of 2022-year end. Risk is a dynamic measure that is affected by changes to asset attribute information, like replacement cost and condition. In most cases, a decline in asset condition will result in an increase in risk. Therefore, it is important to regularly review the data used to calculate risk. In some cases, data inaccuracies may be identified, and their correction could impact risk scores.

4.4.2 Paved Roads: Risk Heatmap

To gain a more detailed overview of risk distribution, we can also review a risk heatmap which plots each asset's probability and consequence of failure and overall risk. This can better illustrate risk distribution and associated replacement costs.

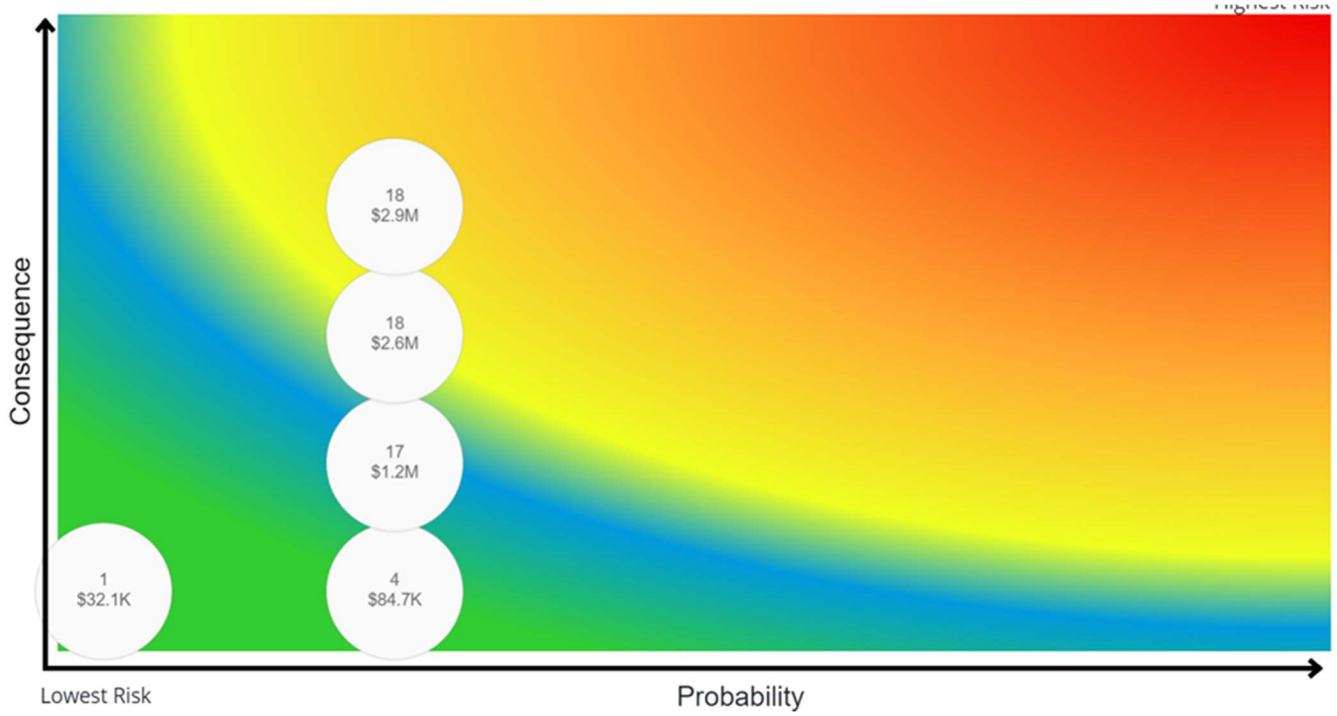
In the following heatmap, risk scores for paved roads are illustrated. Consequence of failure is mapped on the vertical axis with probability of failure along the horizontal axis. Each asset's probability and consequence of failure score determines where it is plotted. Taking a broader look, we can see that the majority of assets are towards the left of the heatmap. While the consequence of failure varies, the assets all have a low probability of failure.



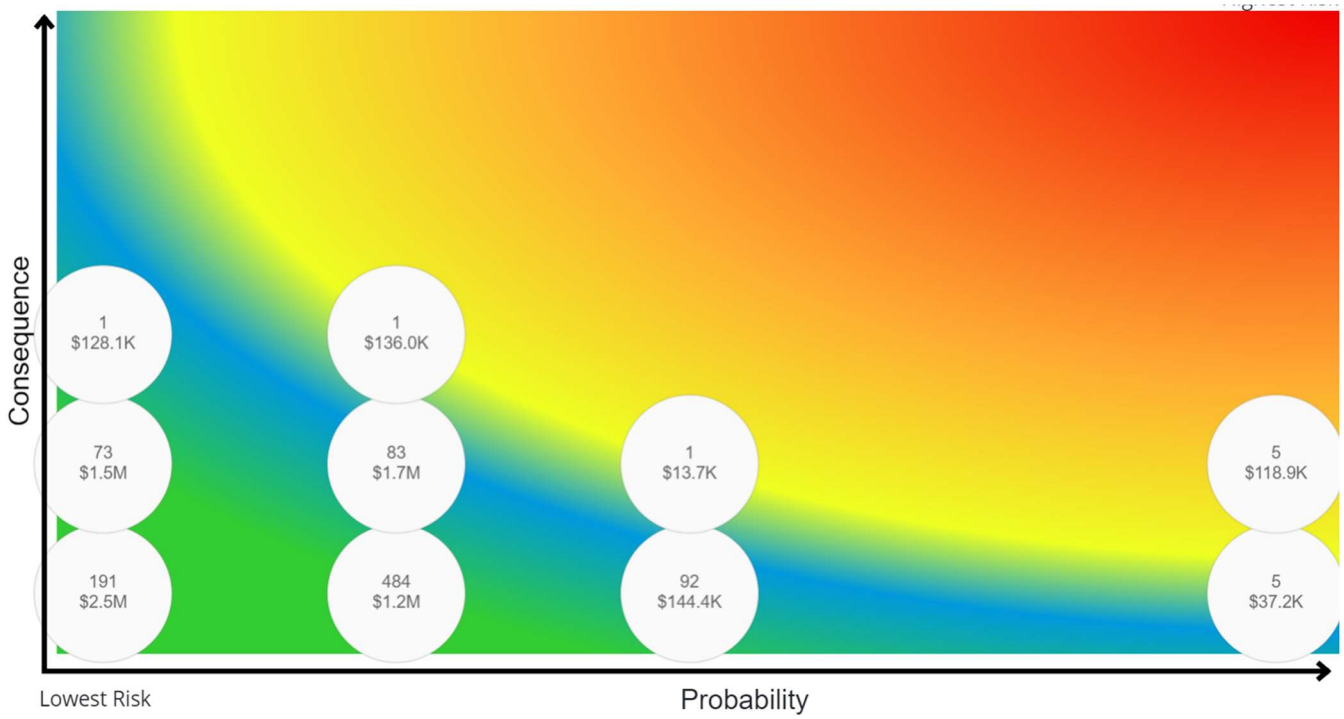
4.4.3 Unpaved Roads: Risk Heatmap

The following heatmap reports on risk for unpaved roads. Similarly, we can see that about half of the assets carry a low risk (green area of the heatmap) since they have

a low probability and/or consequence of failure. A larger portion of assets carry low or moderate risks (blue and yellow), and no asset carries high or very high risk (red).



4.4.4 Road Appurtenances: Risk Heatmap



The heatmap above reports risk for all other road network assets (sidewalks, streetlights, curbs). Unlike the other road network segments, some assets carry a

moderate level of risk due to a very high probability of failure. However, most assets are low risk because both their probability and consequence of failure is moderate or less.

4.4.5 Risks to Current Asset Management Strategies

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

Climate Change & Extreme Weather Events

An increase in the frequency and intensity of precipitation events can result in flooding of sections of the road network. The drainage capacity of the road network is not sufficient to withstand heavy stormwater runoff, particularly on low-lying roads. Further issues can arise as a result of flooding and poor drainage including accelerated deterioration caused by freeze/thaw cycles. To improve asset resiliency, Staff should identify problem areas and improve drainage through enhanced lifecycle strategies.

Capital Funding Strategies

The current level of financial reinvestment does not sufficiently address maintenance and capital rehabilitation requirements to ensure roads remain in an adequate state of repair and achieve their intended service life. The financial strategy in this report addresses the extent of this underfunding.

4.5 Levels of Service

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

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

Value	LOS Statement	Community LOS	Technical LOS (2022)
Accessible & Reliable	Description, which may include maps, of the road network in the Township and its level of connectivity.	Please Refer to Appendix E: Road Network LOS Map	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2): 55.69 Lane Kilometers/ 241.96 land area 0.23 Lane Km per Km^2
			Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2): 358 Lane Kilometers/ 241.96 land area 1.48 Lane Km per Km^2
Sustainability	Description or images that illustrate the different levels of road class pavement condition.	The Township completed a Road Needs Study in the summer of 2021 in coordination with Applied Research Associates Incorporated. The scope of work included assessing the condition of all roads (both paved and unpaved) and all sidewalk assets and collecting additional asset information including length, width, area, surface type and construction quality. Every road asset in scope received a pavement condition index (PCI) score between 0-100 and every sidewalk received a condition score between 0-10. Road appurtenances like curbs, regulatory signs, guide rails and ditches were also assessed for condition based on a 5-point scale of Very good to Very poor.	Average pavement condition index for paved roads in the Township: Good: 77%
			Average surface condition for unpaved roads in the Township (e.g., excellent, good, fair, poor): Fair: 55%

Value	LOS Statement	Community LOS	Technical LOS (2022)
Affordable	The road network is managed cost-effectively for the expected level of service.	The Township conducts a variety of maintenance (e.g., crack sealing, re-gravelling, ditching), testing (e.g., RNS), rehabilitation (e.g., surface treatment, mill and pave), and replacement activities on their road network. These activities work to ensure that the Township's assets are maintained in the best possible condition based on available resources.	Annual capital reinvestment rate: 0.60% All operating programs - paved roads: $154,251 All operating programs - unpaved roads: $694,343 Winter maintenance budget: $47,353
Safe & Regulatory	The road network is managed in accordance with minimum maintenance standards and all other regulatory requirements.	The Township maintains their road network assets in accordance with MMS (O. Reg. 239/02). This includes monitoring the weather, with increased frequency between October and April, and responding to snow and ice accumulation on roadways within the time permitted based on the snow depth.	% of winter event responses that meet or exceeded municipal road maintenance standards: 93%

4.6 Recommendations

Asset Inventory

- The asset inventory should be regularly reviewed to ensure it is up-to-date and an accurate reflection of the assets that are in-service.
- Assets should be regularly updated as condition assessments are completed and available to ensure information is as accurate and relevant as possible.

Condition Assessment Strategies

- Condition assessment strategies are regularly conducted by municipal staff in an informal manor. The Township may consider conducting a formal Road Needs Study on a 5- to 7-year cycle to ensure the assessment information is accurate and to better inform lifecycle strategy decision-making.

Lifecycle Management Strategies

- Continue to update the inventory annually, to reflect the rehabilitation and replacement of assets as scheduled lifecycle activities. The scheduled lifecycle activity should contain the name of activity, impact (e.g. added EUL), time, and cost. Doing so will ensure that the road condition is accurate, and projected capital requirements more closely match the true lifecycle needs.
- When procuring external reports for any assets, particularly roads where there are many assets, require that reports be drafted based on the existing asset management software inventory listing and structure, that data is collected with reference to the Asset ID and that data is provided in an excel format so that data uploads, sync, and other asset data activities can be most effectively conducted.
- To avoid double counting road assets, clearly delineate between the original road asset and road rehabilitation events. This can be achieved by adding the road rehabilitation to the existing asset as a betterment, through naming conventions (i.e., indicating “Rehab” in the asset name), or by selecting "No AMP Category”. For all approaches, ensure that the original road asset condition is updated to reflect any rehabilitation activities that may have occurred to the asset.
- When developing draft capital budgets and engaging in budget deliberations include information about current and future forecasted capital requirements

of road network assets. Ensure there is information about how budget decisions may impact asset condition (performance) and any resultant risks.

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.
- Consider identified risks to the road network and adjust lifecycle management strategies to eliminate potential risks.

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.

5 Bridges & Culverts

Bridges & Culverts represent a critical portion of the transportation services provided to the community. The Township is responsible for the operations and capital upkeep of bridge and culverts. There is a total of 930 of structures in inventory as of December 2022. The Department of Public Works is responsible for the maintenance of all bridges, culverts and guardrails located across municipal roads with the goal of keeping structures in an adequate state of repair and minimizing service disruptions.

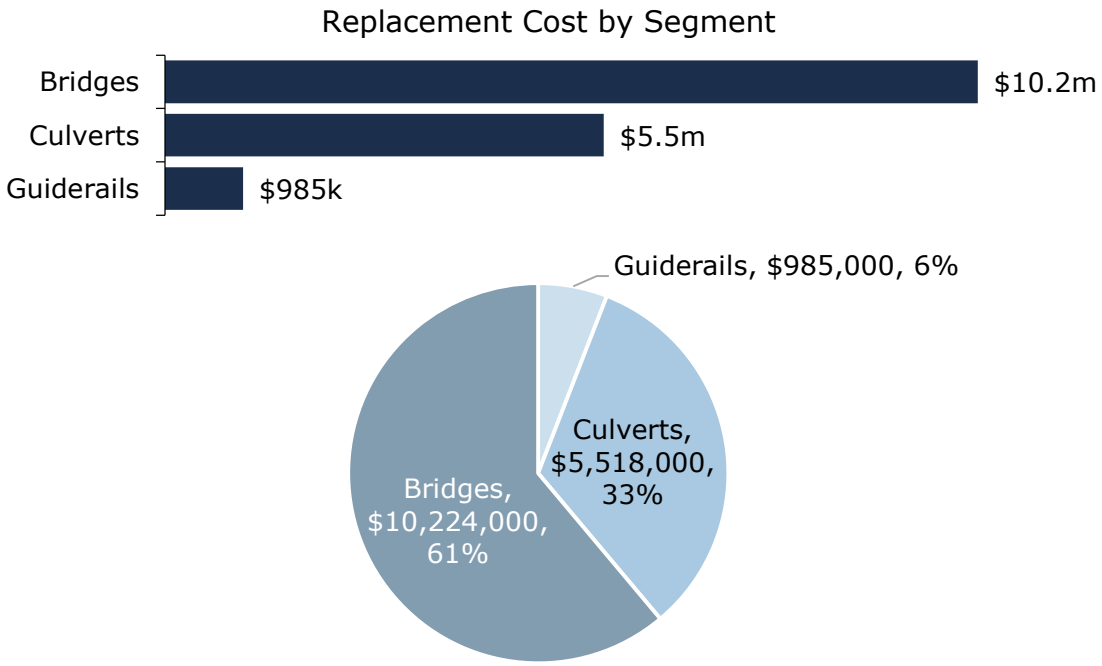
Bridges, structural culverts, and guiderails are recorded in an asset management software system. The following table provides summary information based on a December 2022 effective date:

Replacement Cost	Condition	Financial Capacity	
$16.7 million	Good (64%)	Annual Requirement:	$321,000
		Funding Available:	$258,000
		Annual Deficit:	$63,000

5.1 Asset Inventory & Costs

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

Asset Segment	Quantity	Replacement Cost	Average Annual Capital Requirement
Bridges	3,741 m^2	$10,224,000	$161,000
Culverts	3,975 m^2	$5,518,000	$136,000
Guiderails	2.4 km	$985,000	$25,000
Total		**$16,727,000**	**$321,000**

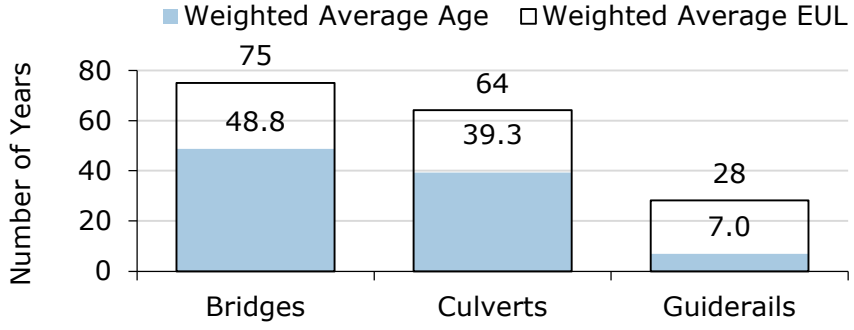


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

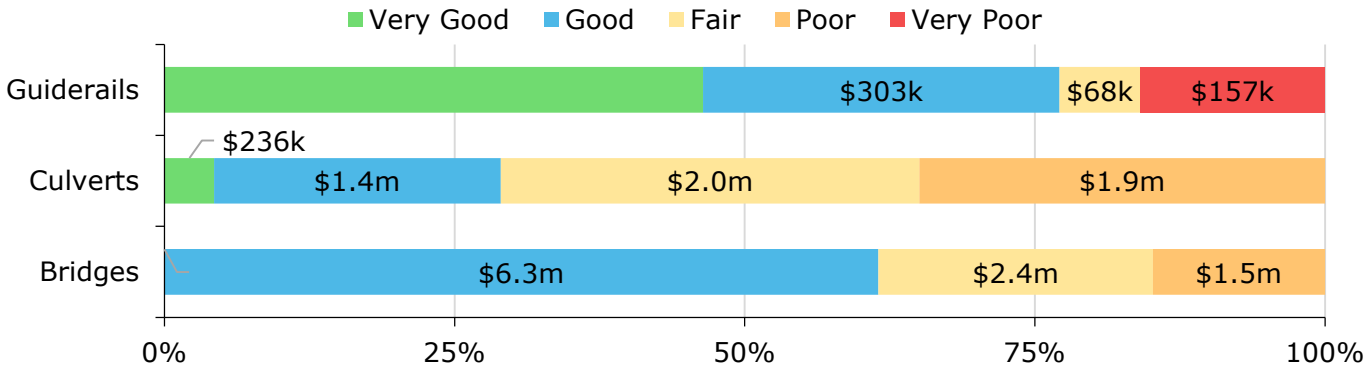
5.2 Asset Condition & Age

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. Bridge condition examples can be found in Appendix H: Bridge Condition Images.

Asset Segment	Weighted Average Estimated Useful Life (Years)	Weighted Average Age (Years)	Average Condition
Bridges	75	48.8	Good (67%)
Culverts	64	39.3	Fair (57%)
Guiderails	28	7.0	Good (70%)
Average			**Good (64%)**



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

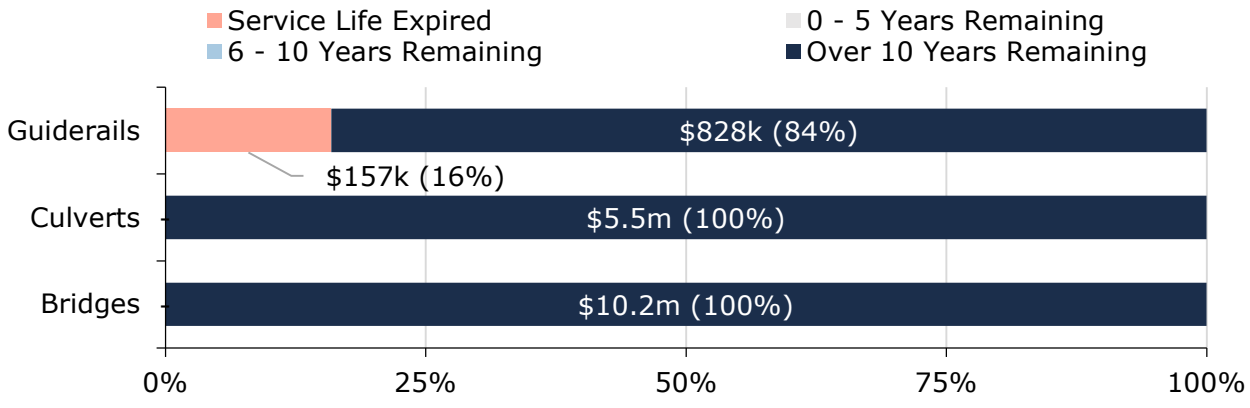


To maintain an acceptable level of service for the Township's bridges and culverts, it is essential to monitor the average condition of all assets. Should the average condition deteriorate, staff must reassess their lifecycle management strategy to determine the optimal mix of maintenance, rehabilitation, and replacement activities needed to improve the overall condition of these structures.

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.

Based on asset age, available assessed condition data and estimated useful life, 1% of the Township's Bridge & Culvert assets will require replacement within the next 10 years. Service life remaining is outlined by replacement value below.

Asset Segment	Service Life Expired	0 - 5 Years Remaining	6 - 10 Years Remaining	Over 10 Years Remaining
Bridges	-	-	-	$10.2m (100%)
Culverts	-	-	-	$5.5m (100%)
Guiderails	$157k (16%)	-	-	$828k (84%)
Total	**$157k (1%)**	-	-	**$16.6m (99%)**



5.2.1 Current Approach to Condition Assessment

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

- Bridges and culverts are inspected during route patrols, with annual internal inspections that include bridge washing and roadside trimming.
- Lifecycle activities are guided by mandated structural inspections per the Ontario Structure Inspection Manual (OSIM), with rehabilitation recommendations prioritized based on risk assessment and integrated into the asset management system, using data from the 2021 OSIM report by K. Smart Associates.

In this AMP the following rating criteria is used to determine the current condition of bridge and culvert assets and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

5.3 Lifecycle Management Strategy

The following describes the current lifecycle activities that are typically conducted on bridge and culvert assets.

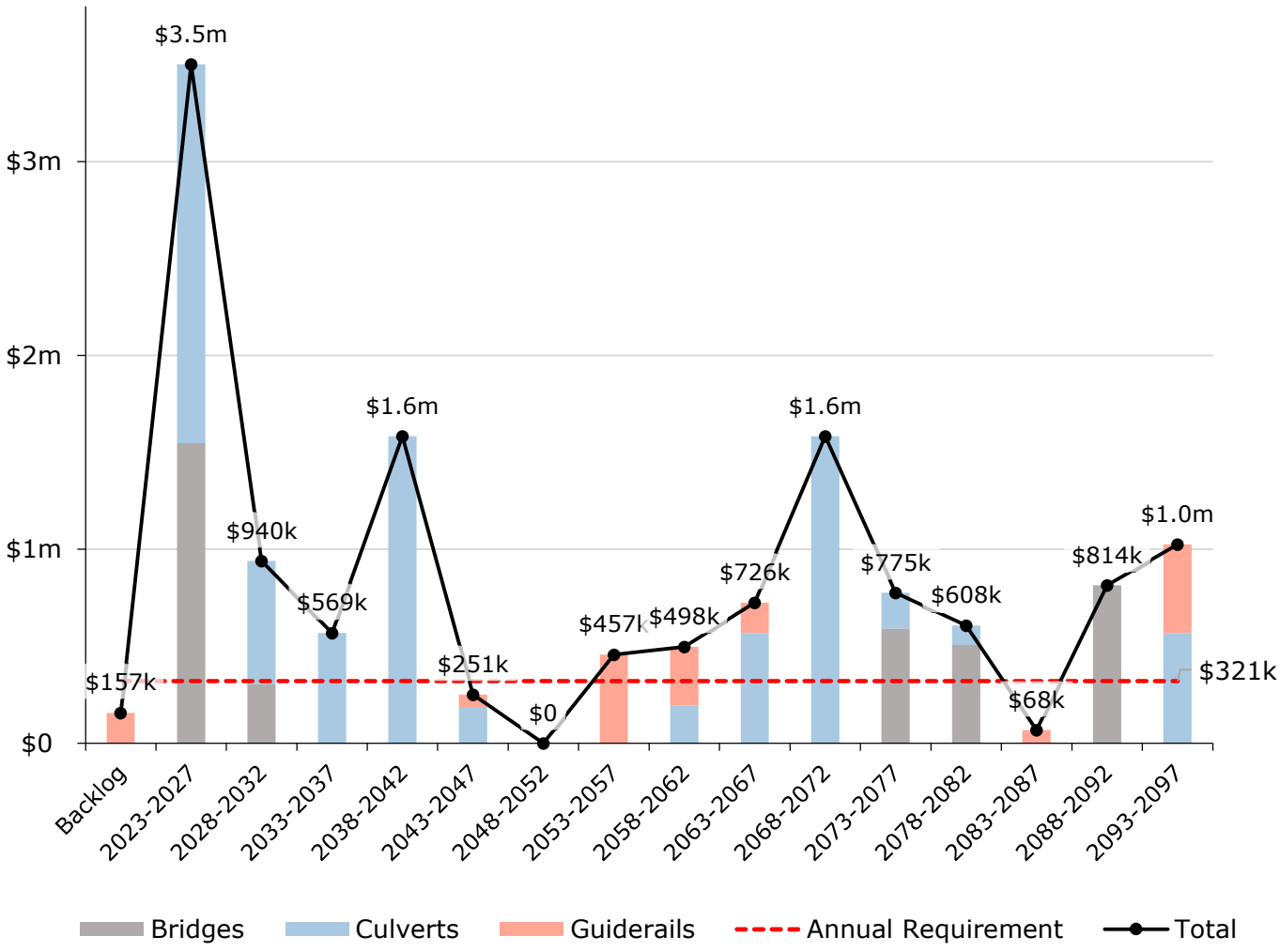
Event Class	Description
Maintenance, Rehabilitation & Replacement	• Bridges & Culverts inspections are completed during route patrols. • Internal inspections are completed once per year which includes bridge washing and roadside trimming. • Lifecycle activities are driven by the results of mandated structural inspections completed according to the Ontario Structure Inspection Manual (OSIM). This includes recommended rehabilitations projects. The Township carefully considers the recommendations from the OSIM but

prioritizes implementation based on risk assessment to determine the most crucial actions to be taken. OSIM Report recommendations are appended to assets in the asset management software system and represented in this report's findings.

- Data, including recommended rehabilitation activities, dates, and estimated costs, in this report is as per the OSIM report completed in 2021 by K. Smart Associates.

5.3.1 Forecasted Capital Requirements

Over the next 53 years (until 2097) every bridge and structural culvert asset will require capital investment, including replacement. Using this period, the average annual capital requirement is $321,000. This is detailed in the graph below and represents the average capital requirement per year, by asset segment and cumulatively.



Capital requirements fluctuate over time, spiking between 2038-2042 and 2068-2072, which is when most bridges and culvert assets are due for replacement. The 2021 OSIM report suggests $3.5m worth of repairs from 2023 to 2027 and another $940,000 from 2028 to 2032. As the Township updates the OSIM reports, more accurate short-term projections of capital requirements will be available.

5.4 Risk & Criticality

5.4.1 Risk Criteria & Scores

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.

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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining	Crossing Type (Operational)
Material	Cumulative Diameter (Operational)
	Culvert Type (Operational)
	AADT (Social)
	Detour Distance (Social)
	Speed Limit (Health and Safety)

A more detailed outline of the risk profile metrics and weightings is available in Appendix J: Risk Profiles.

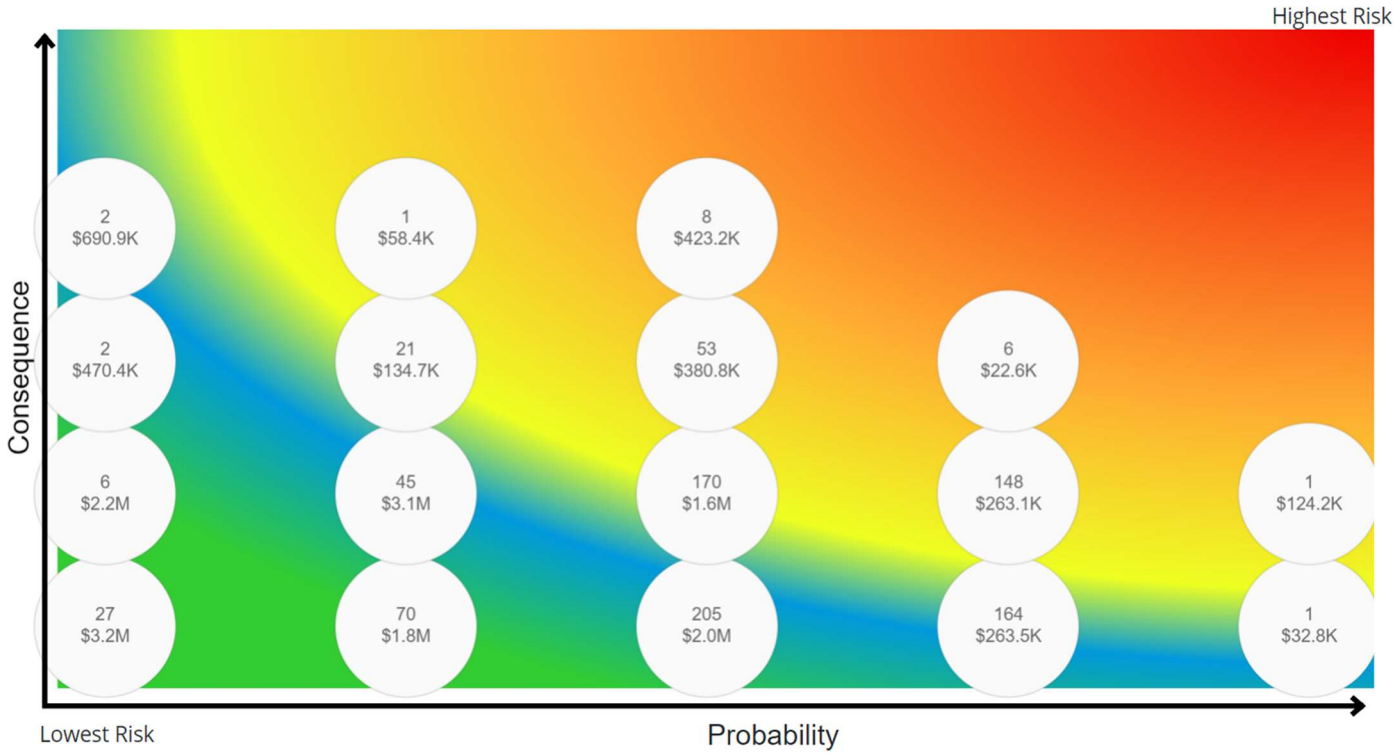
The results of the risk analysis are as follows:

Asset Segment	Average Probability of Failure	Average Consequence of Failure	Average Risk Score
Bridges	2.19 / 5	2.27 / 5	4.90 / 25
Culverts	2.79 / 5	2.31 / 5	6.52 / 25
Guiderails	2.11 / 5	1.34 / 5	2.96 / 25
Average	**2.38 / 5**	**2.23 / 5**	**5.32 / 25**

Overall, the Bridges & Culverts assets have an average risk score of 5.32, which is considered Low.

5.4.2 Bridges & Culverts: Risk Heatmap

The following risk heatmap provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2022 inventory data.



To gain a more detailed overview of risk distribution we can review a risk heatmap which plots each asset's probability and consequence of failure and overall risk. This can better illustrate risk distribution and associated replacement costs.

Risk scores vary across bridge and structural culvert assets. Most assets hold moderate risk (blue and yellow), but some assets are identified as having low risk (green) or high risk (orange and red). For most high-risk assets, there is a high consequence of failure due to the significant replacement cost, but in two instances there is both a high probability of failure due to asset condition and a high replacement cost. Various risk treatments could be explored and would be of value particularly for higher risk assets.

As noted previously, risk is a time specific measure and over time, as asset condition declines, the risks held can be expected to increase. Therefore, it is important to regularly review data used to calculate risk and the resultant outputs, and then to apply appropriate risk treatments.

5.4.3 Risks to Current Asset Management Strategies

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

Climate Change & Extreme Weather Events

Increased freeze and thaw cycles along with increased occurrence of ice jams pose significant risks for bridges within a municipality. More frequent freeze and thaw cycles can weaken the bridge's structural elements, leading to cracking and deterioration of the bridge's surface. Additionally, when ice jams form around the bridge, they obstruct the normal flow of water, causing water levels to rise upstream. The accumulation of water can exert excessive pressure on the bridge, potentially leading to damage and compromising its stability. The combination of freeze and thaw cycles and ice jams increases the likelihood of bridge damage. The Township should implement effective monitoring and maintenance programs to ensure the integrity of bridges during the winter months.

Demographic Change & Community Expectations

The presence of new residents from larger municipalities expecting a higher level of service poses notable risks to the smaller municipality. As these new residents bring with them increased public expectations concerning municipal assets and services, the Township may face challenges in meeting these elevated standards due to limited funding and staffing resources. This mismatch between expectations and available resources can strain the Township's ability to maintain service quality. This may require the Township to increase funding for accommodating resident demands which may not be supported by the residents. The Township must proactively address these discrepancies and engage in effective communication and resource management to accommodate the needs of both new and existing residents.

5.5 Levels of Service

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

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

Value	LOS Statement	Community LOS	Technical LOS (2022)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Bridges and structural culverts are a key component of the municipal transportation network. None of the Township's structures have loading or dimensional restrictions meaning that a variety of vehicle types, including heavy transport, motor vehicles, emergency vehicles and cyclists can cross them without restriction.	% of bridges in the Township with loading or dimensional restrictions: 0%
Safe & Regulatory	Bridges and culverts provide safe vehicular and/or pedestrian passage, and all structures are fully compliant with regulatory requirements.	All bridges and structural culverts are inspected every two years by a third-party engineering firm. The last assessment in 2021 was completed by K. smart Associates. Following on-site inspections, the Township was provided with a report detailing the asset's elements, inspection findings, intervention recommendations, and the opinion of asset condition.	% of bridges and culverts inspected every two years: 100%

Value	LOS Statement	Community LOS	Technical LOS (2022)
Affordable	Bridges and culverts are managed cost-effectively to meet the established level of service	Lifecycle activities are driven by the results of mandated structural inspections completed according to the Ontario Structure Inspection Manual (OSIM). This includes recommended rehabilitations projects. The Township carefully considers the recommendations from the OSIM but prioritizes implementation based on risk assessment to determine the most crucial actions to be taken. OSIM Report recommendations are appended to assets in the asset management software system and represented in this report's findings.	Annual O & M Budget: $32,000 Annual capital reinvestment rate: 2023 Budget[6] 1.5%

[6] Capital investment budgets vary annually to reflect the investment requirements in that year. For this reason, the capital reinvestment rate can be expected to change yearly.

Value	LOS Statement	Community LOS	Technical LOS (2022)
Quality	Description or images of the condition of bridges & culverts and how this would affect use of the bridges & culverts.	Every structure is given a condition rating from 0-100. On average, all Township bridges and culverts are in Good condition. **Very Good (80-100):** considered to be in excellent condition, and repair or rehabilitation work is rarely required within the next 5 years. Routine maintenance is still recommended. **Good (60-79):** considered to be in good condition, and repair or rehabilitation work is not usually required within the next 5 years. Routine maintenance is still recommended. **Fair (40-59):** Generally considered to be in good-fair condition. Repair work is ideally scheduled to be completed within the next 5 years. **Poor (20-39):** Generally considered poor and nearing the end of service life. The rehabilitation of these structures is ideally best scheduled to be	Average bridge condition index value for **bridges** in the Township: Good: 67%

Value	LOS Statement	Community LOS	Technical LOS (2022)
		completed within 1 year. However, if the replacement of the structure is more viable, the structure can be scheduled for replacement within the short-term. **Very Poor (0-19):** Generally considered very poor and at the end of service life. The rehabilitation of these structures is ideally best scheduled immediately. However, if the replacement of the structure is more viable, the structure can be scheduled for replacement within the short-term.	Average condition index value for structural **culverts** in the Township: Fair: 57%

5.6 Recommendations

Asset Inventory

- The asset inventory should be regularly reviewed to ensure it is up-to-date and an accurate reflection of the assets that are in-service.

Condition Assessment Strategies

- As per Regulation 104/97 Standards for Bridges, every municipal bridge and structural culvert requires inspection for structural integrity, safety, and condition at least bi-annually. Every other year, all the Township's bridge and structural culvert assets are inspected.

Lifecycle Management Strategies

- Continue to append the capital cost and recommended date of bridge rehabilitations to assets in the asset management software system so that capital forecasts account for these costs.
- Require that all structural reports detail what is included and excluded in the costing estimates. As necessary, adjust the estimated costs of capital events (i.e., add in overhead if not included). Clarity on costing inclusions and exclusions will improve the accuracy of budget projections and asset management analysis.
- Currently, OSIM reports include recommendations for rehabilitations but do not report on expected impact to asset condition or age. Consider requiring inclusion of the anticipated impact either for all rehabilitations, certain types of rehabilitations (i.e., major rehabs) or for rehabilitations above an estimated cost threshold (i.e., more significant in nature).
- Review the process of actioning OSIM report identified maintenance requirements (i.e., creation of work orders etc.) to ensure that maintenance activities are completed.
- When procuring OSIM reports, require that inspection information be appended to the bridge's asset ID in the asset management software system. Consider providing the successful proponent an extract of asset IDs from the asset management software database. This will improve ease of updates to and reduce risk of incorrect matching of OSIM report information to asset IDs.
- Ensure that capital budgets are developed with clear reference to identified asset capital requirements as driven by OSIM, alongside an understanding of

asset risk and expected asset performance impacts from underfunded or delayed investment.

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.
- Consider identified risks to the bridges and culvers and adjust lifecycle management strategies to eliminate potential risks.

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.

6 Buildings & Facilities

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

- Arena
- Fire Halls
- Library
- Municipal Office
- Public Works Buildings
- Recreation Buildings

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

Replacement Cost	Condition	Financial Capacity	
$13.8 million	Fair (59%)	Annual Requirement:	$266,000
		Funding Available:	$414,000
		Annual Deficit:	-

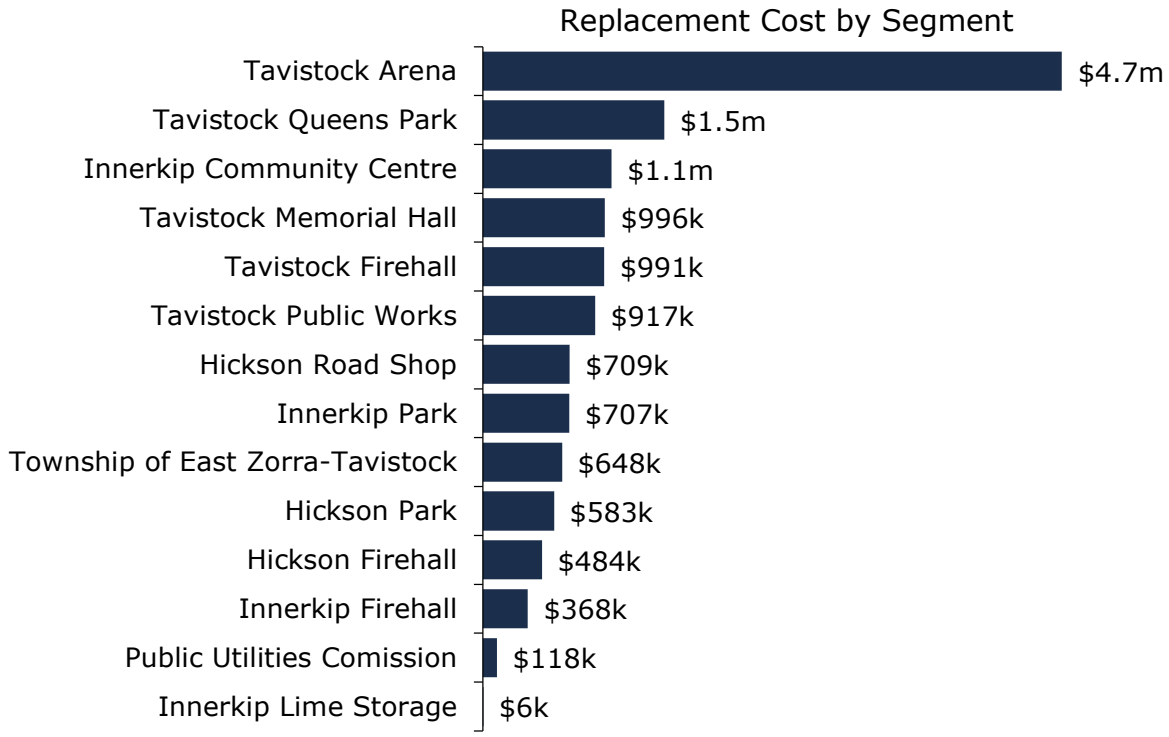
6.1 Asset Inventory & Costs

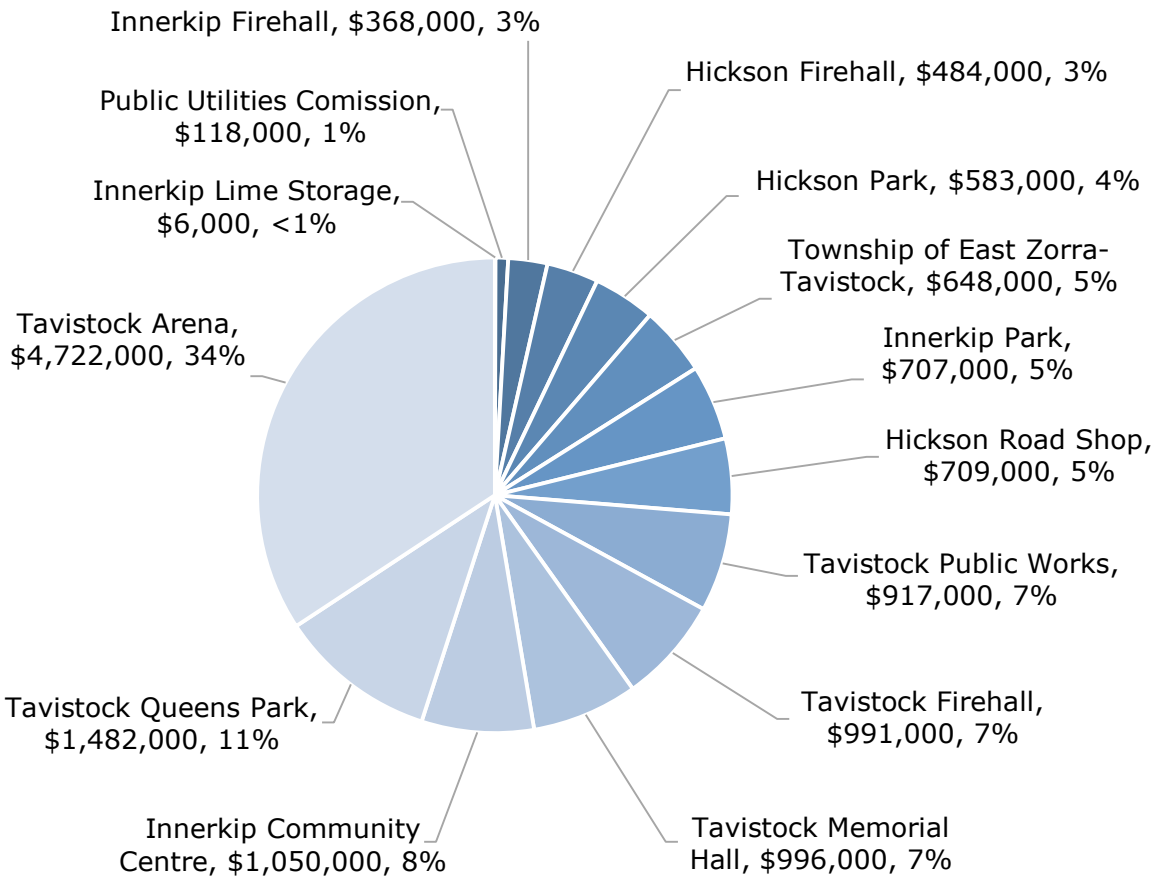
The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's buildings and facilities inventory.

Asset Segment	Quantity	Replacement Cost	Average Annual Capital Requirement
Hickson Firehall	1,507 Quantity, Area (sq ft)	$484,000	$9,000

Hickson Park	15,586 Quantity, Area (sq ft)	$583,000	$12,000
Hickson Road Shop	15,626 Quantity, Area (sq ft)	$709,000	$26,000
Innerkip Community Centre	32,519 Quantity, Area (sq ft)	$1,050,000	$15,000
Innerkip Firehall	119,045 Quantity, Area (sq ft)	$368,000	$6,000
Innerkip Lime Storage	10,408 Quantity, Area (sq ft)	$6,000	-
Innerkip Park	12	$707,000	$23,000
Public Utilities Commission	2	$118,000	$2,000
Tavistock Arena	5	$4,722,000	$72,000
Tavistock Firehall	2	$991,000	$14,000
Tavistock Memorial Hall	3	$996,000	$14,000
Tavistock Public Works	3	$917,000	$30,000
Tavistock Queens Park	5	$1,482,000	$21,000
Township of East Zorra-Tavistock	9	$648,000	$22,000
Total		**$13,781,000[7]**	**$266,000**

[7] At the time of this reports development the Township was actively revamping their buildings inventory data in both the assets represented and their respective attribute data. It is expected that this revamp will impact the reported information herein, including the replacement costs, quantities, and condition. These enhancements will be reflected in future asset management reports and demonstrate the Township's commitment to continuous improvement.


Replacement Cost by Segment
Tavistock Arena
$4.7m
Tavistock Queens Park
$1.5m
Innerkip Community Centre
$1.1m
Tavistock Memorial Hall
$996k
Tavistock Firehall
$991k
Tavistock Public Works
$917k
Hickson Road Shop
$709k
Innerkip Park
$707k
Township of East Zorra-Tavistock
$648k
Hickson Park
$583k
Hickson Firehall
$484k
Innerkip Firehall
$368k
Public Utilities Comission
$118k
Innerkip Lime Storage
$6k

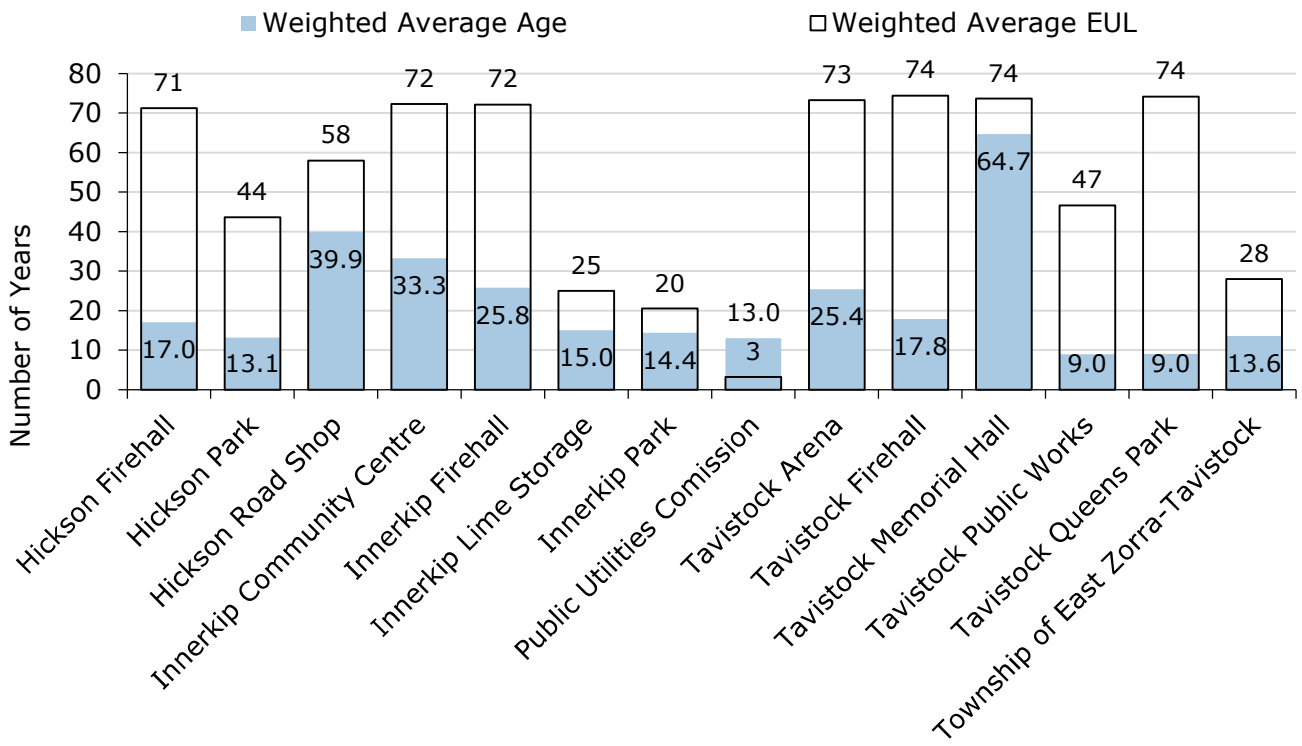

Innerkip Firehall, $368,000, 3%
Hickson Firehall, $484,000, 3%
Public Utilities Comission, $118,000, 1%
Hickson Park, $583,000, 4%
Innerkip Lime Storage, $6,000, <1%
Township of East Zorra-Tavistock, $648,000, 5%
Tavistock Arena, $4,722,000, 34%
Innerkip Park, $707,000, 5%
Hickson Road Shop, $709,000, 5%
Tavistock Public Works, $917,000, 7%
Tavistock Firehall, $991,000, 7%
Tavistock Queens Park, $1,482,000, 11%
Innerkip Community Centre, $1,050,000, 8%
Tavistock Memorial Hall, $996,000, 7%

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

6.2 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.

Asset Segment	Weighted Average Estimated Useful Life (Years)	Weighted Average Age (Years)	Average Condition
Hickson Firehall	71	17.0	Good (75%)
Hickson Park	44	13.1	Good (62%)
Hickson Road Shop	58	39.9	Poor (38%)
Innerkip Community Centre	72	33.3	Good (66%)
Innerkip Firehall	72	25.8	Good (64%)
Innerkip Lime Storage	25	15.0	Very Poor (14%)
Innerkip Park	20	14.4	Poor (37%)
Public Utilities Commission	3	13.0	Very Poor (8%)
Tavistock Arena	73	25.4	Good (64%)
Tavistock Firehall	74	17.8	Good (75%)
Tavistock Memorial Hall	74	64.7	Very Poor (11%)
Tavistock Public Works	47	9.0	Good (68%)
Tavistock Queens Park	74	9.0	Very Good (86%)
Township of East Zorra-Tavistock	28	13.6	Poor (24%)
Average			**Fair (59%)**


Weighted Average Age
Weighted Average EUL
Number of Years
80
70
60
50
40
30
20
10
0
71
44
58
72
72
25
20
13.0
73
74
74
47
74
28
17.0
13.1
39.9
33.3
25.8
15.0
14.4
3
25.4
17.8
64.7
9.0
9.0
13.6
Hickson Firehall
Hickson Park
Hickson Road Shop
Innerkip Community Centre
Innerkip Firehall
Innerkip Lime Storage
Innerkip Park
Public Utilities Comission
Tavistock Arena
Tavistock Firehall
Tavistock Memorial Hall
Tavistock Public Works
Tavistock Queens Park
Township of East Zorra-Tavistock

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

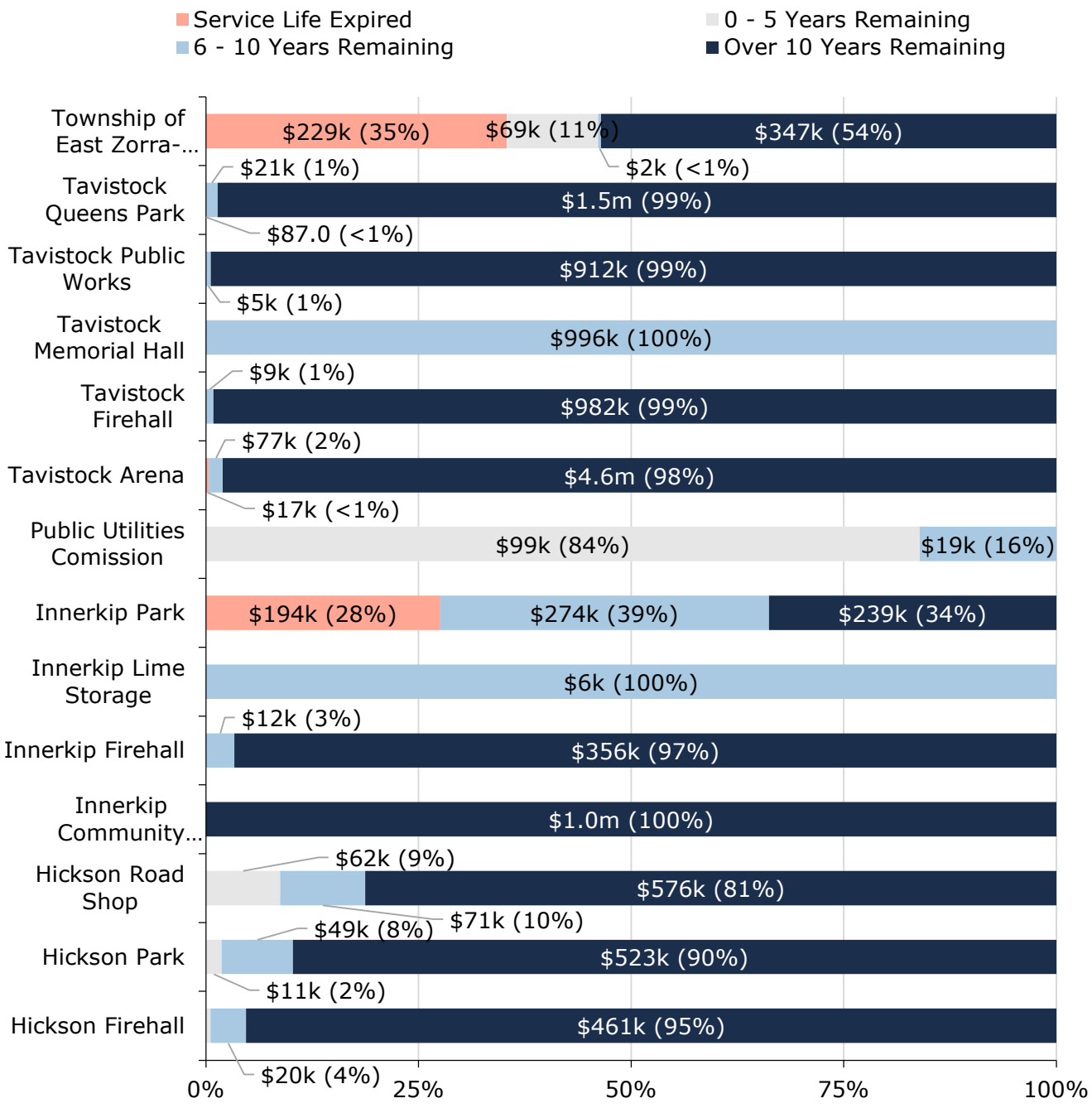
To ensure that the Township's buildings and facilities continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of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

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.

Based on asset age, available assessed condition data and estimated useful life, 16% of the Township's Buildings & Facilities assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B:

10-Year Capital Requirements**Error! Reference source not found.**. Service life remaining is outlined by replacement value below.

Asset Segment	Service Life Expired	0 - 5 Years Remaining	6 - 10 Years Remaining	Over 10 Years Remaining
Hickson Firehall	-	$3k (1%)	$20k (4%)	$461k (95%)
Hickson Park	-	$11k (2%)	$49k (8%)	$523k (90%)
Hickson Road Shop	-	$62k (9%)	$71k (10%)	$576k (81%)
Innerkip Community Centre	-	-	-	$1.0m (100%)
Innerkip Firehall	-	-	$12k (3%)	$356k (97%)
Innerkip Lime Storage	-	-	$6k (100%)	-
Innerkip Park	$194k (28%)	-	$274k (39%)	$239k (34%)
Public Utilities Commission	-	$99k (84%)	$19k (16%)	-
Tavistock Arena	$17k (<1%)	-	$77k (2%)	$4.6m (98%)
Tavistock Firehall	-	-	$9k (1%)	$982k (99%)
Tavistock Memorial Hall	-	-	$996k (100%)	-
Tavistock Public Works	-	-	$5k (1%)	$912k (99%)
Tavistock Queens Park	$87k (<1%)	-	$21k (1%)	$1.5m (99%)
Township of East Zorra - Tavistock	-	-	-	-
Total	**$441k (3%)**	**$244k (2%)**	**$1.6m (11%)**	**$11.5m (84%)**



6.2.1 Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. In this AMP the following rating criteria is used to determine the current condition of buildings and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

6.3 Lifecycle Management Strategy

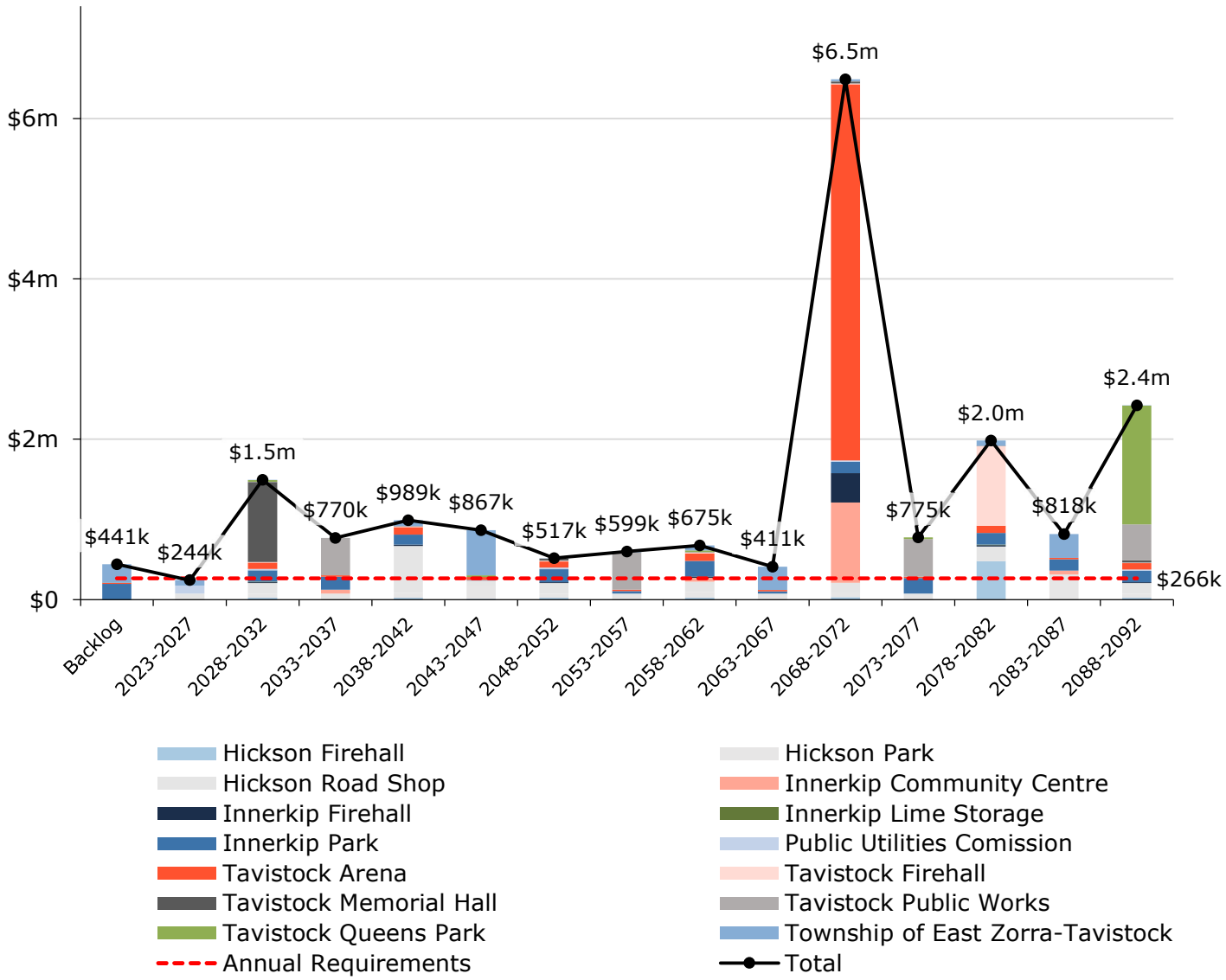
The following describes the current lifecycle activities that are typically conducted on building assets.

Event Class	Description
Maintenance & Inspections	• Health and safety inspections are completed for all buildings on a monthly basis. • External inspections for buildings are not in place, but they are being considered for the future budget year. Factors such as energy consumption will be measured within the assessment. • The Township is currently developing the building condition assessment process but are utilizing the inventory and condition assessments conducted by internal staff in the interim. • In-house staff completes minor maintenance tasks while relying on contractors for more extensive work. Currently, maintenance activities are completed on in as-needed basis and are reactive in nature. The Township aims to transition from a predominantly reactive approach to a proactive lifecycle strategy for building management.
Rehabilitation /Replacement	• The Township is currently facing a backlog of building rehabilitation and replacement projects. Backlog activities are being prioritized and addressed systematically, reducing the list of pending projects over time. • Rehabilitation and replacement activities are completed on in as-needed basis and are reactive in nature. The Township aims to work towards a proactive lifecycle strategy for building management.

6.3.1 Forecasted Capital Requirements

Building assets are forecasted to all require rehabilitation or replacement at some point until 2092. This was determined based on each asset's in-service date, and it's estimated useful life. Over this period, the average annual capital requirement is $266,000. This represents the forecasted capital investment requirement on an average annual basis.

Capital requirements fluctuate over time, spiking significantly between 2068-2072. Most capital requirements are for the Tavistock Arena, followed by Tavistock Queens Park.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

6.4 Risk and Criticality

6.4.1 Risk Criteria & Scores

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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Building Replacement Cost (Economic)
Service Life Remaining	Component Cost (Economic)
	Department (Strategic)

Asset Segment	Average Probability of Failure	Average Consequence of Failure	Average Risk Score
Hickson Firehall	1.64 / 5	4.13 / 5	6.76 / 25
Hickson Park	1.88 / 5	2.09 / 5	3.88 / 25
Hickson Road Shop	2.90 / 5	3.09 / 5	9.00 / 25
Innerkip Community Centre	1.65 / 5	4.14 / 5	6.80 / 25
Innerkip Firehall	1.60 / 5	3.78 / 5	6.07 / 25
Innerkip Lime Storage	4.20 / 5	1.15 / 5	4.83 / 25
Innerkip park	3.36 / 5	2.10 / 5	7.12 / 25
Public Utilities Commission	4.44 / 5	3.13 / 5	13.90 / 25
Tavistock Arena	1.61 / 5	2.99 / 5	4.81 / 25
Tavistock Firehall	1.60 / 5	4.65 / 5	7.44 / 25
Tavistock Memorial Hall	4.18 / 5	2.64 / 5	11.05 / 25
Tavistock Public Works	1.82 / 5	3.15 / 5	5.73 / 25
Tavistock Queens Park	1.04 / 5	2.63 / 5	2.71 / 25
Township of East Zorra-Tavistock	3.64 / 5	3.58 / 5	13.12 / 25
Average	**2.04 / 5**	**3.15 / 5**	**6.30 / 25**

A more detailed outline of the risk profile metrics and weightings is available in Appendix J: Risk Profiles.

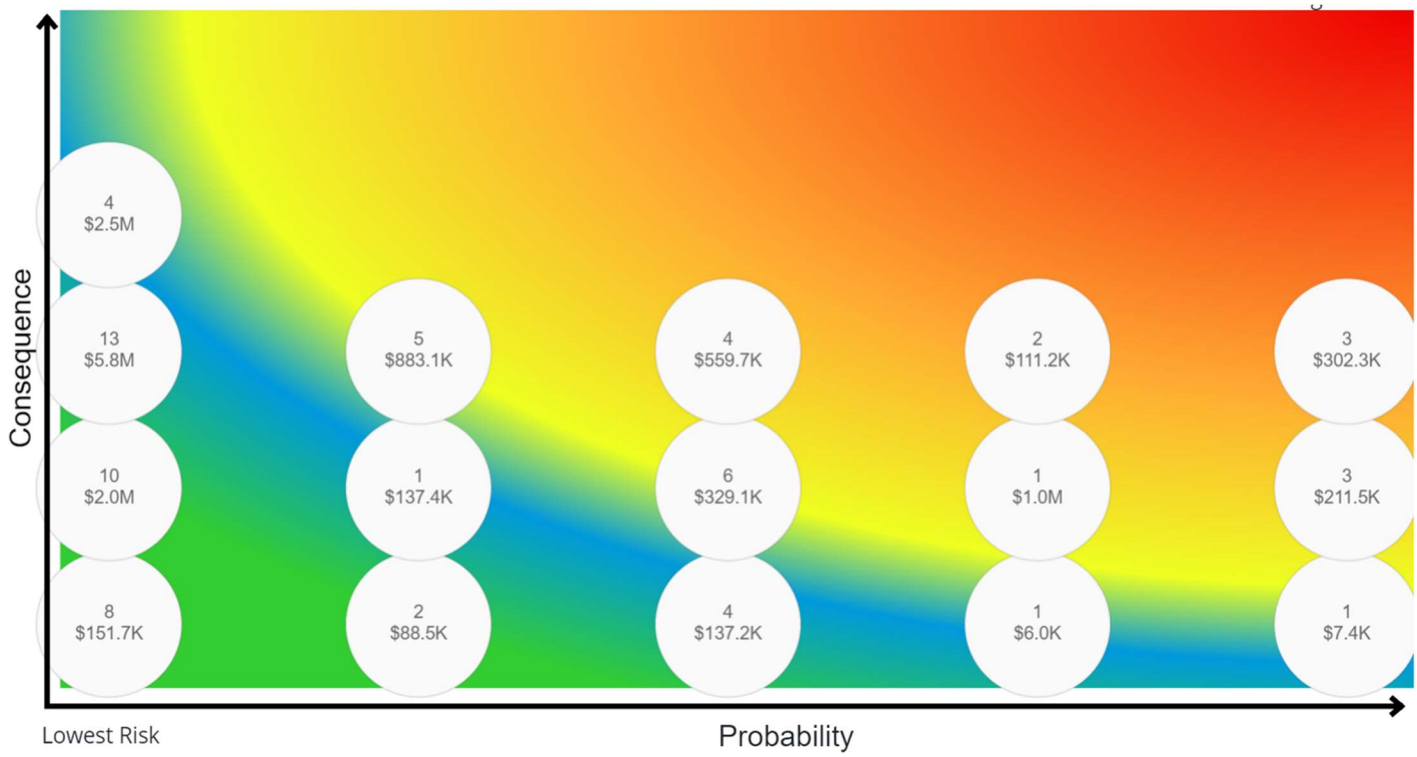
The identification of critical assets allows the Township to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Overall, East Zorra-Tavistock's Buildings assets have an average risk score of 6.30, which is considered Low.

6.4.2 Buildings & Facilities: Risk Heatmap

The following risk heatmap provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2022 inventory data.

To gain a more detailed overview of risk distribution we can also review a risk heatmap which plots each asset's probability and consequence of failure and overall risk. This can better illustrate risk distribution and associated replacement costs. The following risk heatmap represents assets as building components.



As indicated, most assets carry a low probability and a low consequence of failure and therefore are low risk and identified in green. Some assets carry a slightly higher consequence of failure and/or probability of failure and are considered to have moderate risk. These assets are identified in blue and yellow.

As of 2022-year end data there are 3 building component assets identified as very high risk, which are the Township office HVAC and 1998 upgrades, and the Hickson Fire Hall HVAC upgrades. However, risk is a time specific measure and over time as asset condition declines, and assuming there is insufficient investment, risks held by building assets can be expected to increase. As well, asset risks could change following increased evaluation (i.e., Building Condition Assessments discussed in

lifecycle strategies report). Therefore, it is important to regularly review data used to calculate risk and the resultant outputs, and then to treat identified risks appropriately.

6.4.3 Risks to Current Asset Management Strategies

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

Demographic Change & Community Expectations

East Zorra-Tavistock is experiencing growth due to its proximity to London, Hamilton, and Guelph-Kitchener-Waterloo. This growth brings in new residents from larger urban centres with a higher service expectation. The Township is pressured to increase service offering and service availabilities. Proactive maintenance, renewal, and selective upgrades are important to ensure Township facilities can meet these new service demands.

Aging Infrastructure

The aging infrastructure of buildings along with an increased backlog of projects pose significant risks to the Township. As buildings age, they may experience structural deterioration, reduced safety standards, and increased maintenance needs. Over time, this can lead to higher repair and renovation costs, potentially straining the Township's budget and resources. Additionally, with a growing backlog of deferred maintenance and renovation projects, the Township may struggle to address critical issues promptly, further increasing the risks associated with aging infrastructure. To address the risks posed by aging infrastructure, municipalities must adopt proactive approaches, such as regular assessments, strategic and financial planning to ensure efficient rehabilitation of buildings.

Organizational Change and Capacity

Limited organizational capacity, including staff's knowledge gaps in undertaking condition assessments and lifecycle planning and a lack of building expertise, can pose risks to the Township. These factors can lead to inefficient maintenance, delayed repairs, and compromised building safety. To mitigate these risks, investing in staff training and considering outsourcing for specialized tasks are potential actions for

improving the Township's building management and planning capabilities.

6.5 Levels of Service

By 2024 municipalities throughout Ontario are required to report on LOS for all assets. For non-core assets, municipalities must select all metrics. The following table outlines metrics selected and the current LOS, reported with a data effective date of 2022:

Value	LOS Statement	Community LOS	Technical LOS (2022)
Quality	Buildings are managed cost-effectively to meet the established levels of service	Description of cost saving initiatives in place by the Township: TBD	Annual capital reinvestment rate: 3.0%
			O&M cost / # of buildings: $18,463
Safe & Regulatory	Buildings are safe for occupants and do not cause a hazard to the public	On a monthly basis, all facilities are inspected for health and safety. Informally, buildings are inspected by staff during their day-to-day building operation activities.	Frequency of building inspections by facility: 12
Sustainable	There are long-term plans in place for the renewal and replacement of facilities assets.	Rehabilitation and replacement activities are completed on in as-needed basis and are reactive in nature. The Township aims to work towards a proactive lifecycle strategy for building management.	Average condition score by building: See Appendix I: Average Condition by Facility

6.6 Recommendations

Asset Inventory & Replacement Costs

- The Township's asset inventory contains a single record for all buildings and facilities. Buildings consist of several separate capital components that have unique estimated useful lives and require asset-specific lifecycle strategies. Staff should work towards a component-based inventory of all facilities to allow for component-based lifecycle planning.
- Gather accurate replacement costs for building components and update on a regular basis to ensure the accuracy of capital projections.

Condition Assessment Strategies

- The Township should implement regular condition assessments for all building components to better inform short- and long-term capital requirements.

Lifecycle Strategies

- The Township would benefit from capturing more detailed building condition information and documenting it in a consistent manner across all building assets. This process, known as a Building Condition Assessment (BCA), is most often completed to help asset owners better inventory their building assets, more clearly and defensibly understand the near- and long-term requirements, and, as a result, facilitate requisite budgeting and planning.
- Following industry best practice, a BCA could be completed so that building components are categorized based on the standard format of ASTM UNIFORMAT II Standard E1557 classification of building elements. This classification system is based on major building groups and nested within that based on component groups and then specific components. As an example, common substructure building components and their respective Level 2, and 3 groups are shown below:

Uniformat II Level 1 (Major Group)	Uniformat II Level 2 (Component Group)	Uniformat II Level 3 (Component)
A SUBSTRUCTURE	A10 Foundations	A10101 Standard Foundations
		A1020 Special Foundations
		A1030 Slab on Grade
	A20 Basement Construction	A2010 Basement Excavation
		A2020 Basement Walls

- Through the completion of a BCA, the Township will have more accurate information on their buildings near and long-term capital requirements. The identified capital requirements should be strongly considered when setting budgets and determining any required changes (i.e., taxation and user fee rates, reserve contributions) to meet the identified capital needs.
- Alternatively, the Township may consider updating the condition and capital requirements for building components with internal resources. This eliminates the need for a third-party contracted service but is resource intensive. The Township should research the useful life and current replacement cost of buildings components. Additionally, the Township may inspect major components and estimate a condition.
- The capital budget should consider the current and future forecasted capital requirements of building assets; dedicated and consistent capital funding is needed to maintain building assets and prolonged deferral of work is likely to reduce the expected life and/or the performance of building assets.

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

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined 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.

7 Vehicles

The Township owns a variety of vehicle assets that are central to the Townships daily operations. The majority of the Township's vehicles are within the fire and public works departments. These assets have been categorized by department for reporting purposes. Municipal vehicles are used to support several service areas, including:

- Fire
- General
- Public Works
- Recreation

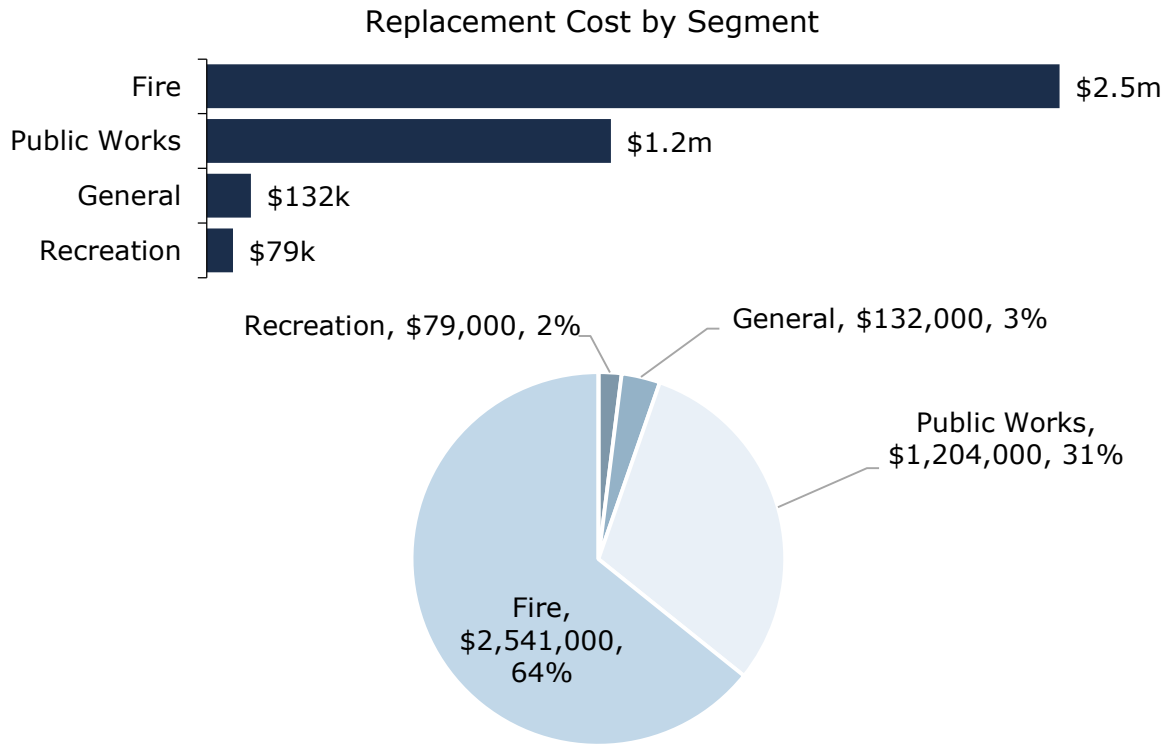
The Township's vehicle assets are recorded in an asset management software system. The following table provides summary information based on a December 2022 effective date:

Replacement Cost	Condition	Financial Capacity	
$4.0 million	Fair (40%)	Annual Requirement:	$330,000
		Funding Available:	$548,000
		Annual Deficit:	-

7.1 Asset Inventory & Costs

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

Asset Segment	Quantity	Replacement Cost	Average Annual Capital Requirements
Fire	9	$2,541,000	$147,000
General	10	$132,000	$24,000
Public Works	8	$1,204,000	$147,000
Recreation	13	$79,000	$12,000
Total	**40**	**$3,956,000**	**$330,000**



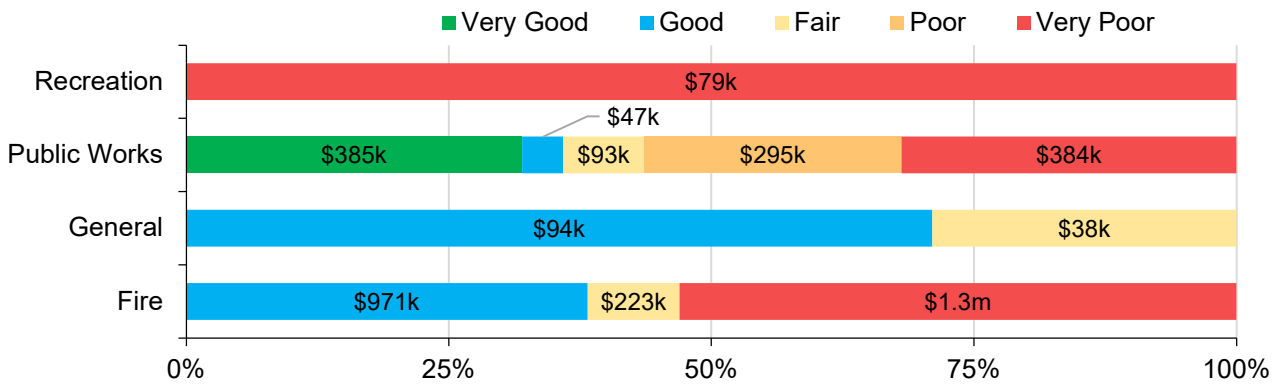
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

7.2 Asset Condition & Age

The table below identifies the current average condition and source of available condition data for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Weighted Average Estimated Useful Life (Years)	Weighted Average Age (Years)	Average Condition
Fire	18	11.1	Poor (38%)
General	6	1.3	Good (71%)
Public Works	9	4.5	Fair (42%)
Recreation	16	25.4	Very Poor (0%)
Average			**Fair (40%)**

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



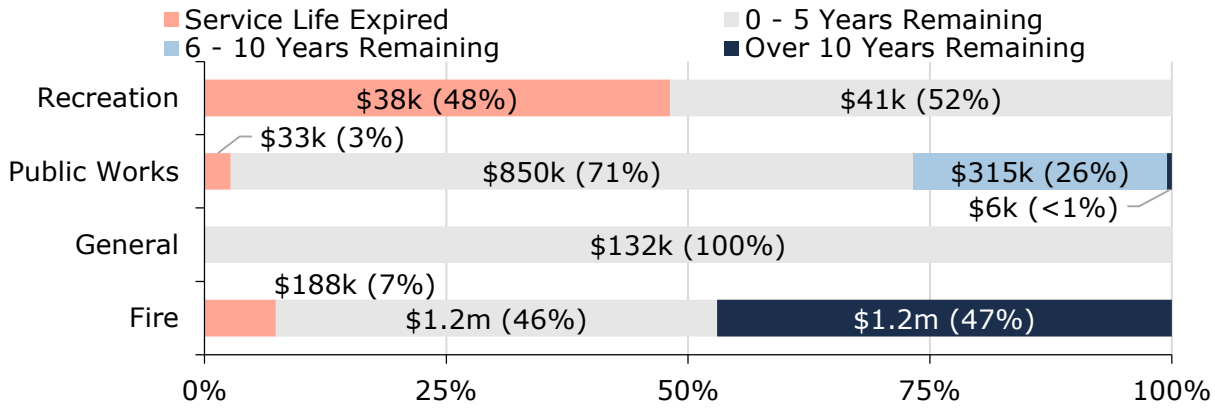
It should be noted that the very poor conditions are due to assets that have exceeded their lifespan. If the assets are performing better than the age-based EUL, condition assessments will increase the accuracy of the inventory.

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.

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.

Based on asset age, available assessed condition data and estimated useful life, 70% of the Township's Vehicle assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B: 10-Year Capital Requirements. Service life remaining is outlined by replacement value below.

Asset Segment	Service Life Expired	0 - 5 Years Remaining	6 - 10 Years Remaining	Over 10 Years Remaining
Fire	$188k (7%)	$1.2m (46%)	-	$1.2m (47%)
General	-	$132k (100%)	-	-
Public Works	$33k (3%)	$850k (71%)	$315k (26%)	$6k (<1%)
Recreation	$38k (48%)	$41k (52%)	-	-
Total	**$258k (7%)**	**$2.2m (55%)**	**$315k (8%)**	**$1.2m (30%)**



7.2.1 Current Approach to Condition Assessment

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

In this AMP the following rating criteria is used to determine the current condition of vehicles and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

7.3 Lifecycle Management Strategy

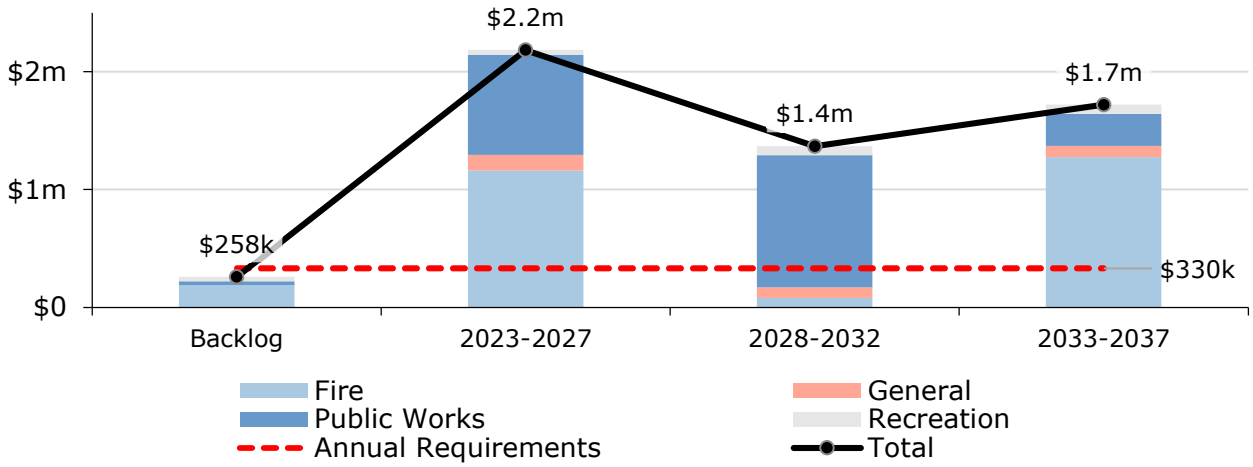
The following describes the current lifecycle activities that are typically conducted on building assets.

Event Class	Description
Maintenance & Inspection	• Internal staff complete regular inspections and circle checks for the Township's vehicle assets. • An external mechanic completes annual safeties as required by the Ministry of Transportation of Ontario (MTO). • External mechanics conduct annual inspections on trucks, driving the maintenance activities for these vehicles. • The timing of repairs is based on a combination of usage and operational performance

Event Class	Description
Rehabilitation	• Rehabilitations are considered on a case by base basis; generally, vehicles assets are infrequently rehabilitated.
Replacement	• Replacement decisions consider the asset's age, condition, mileage hours, maintenance cost and history (i.e., if there is a trend of increasing maintenance). • All vehicles have a replacement plan which range from a 6 to 10-year, however most are replaced in 7 years. Typically, vehicles are sold when they approach the end of their life cycle with proceeds reinvested in new vehicle assets. • Fire vehicles are replaced on a schedule of 20 - 25 years

7.3.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The graph identifies capital requirements over the next 15 years 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.



7.4 Risks & Criticality

7.4.1 Risk Criteria & Scores

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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining	Vehicle Type (Economic)
	Segment (Strategic)
	Truck Type – Fire Vehicles Only (Strategic)

A more detailed outline of the risk profile metrics and weightings is available in Appendix J: Risk Profiles.

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.

The results of the risk analysis are as follows:

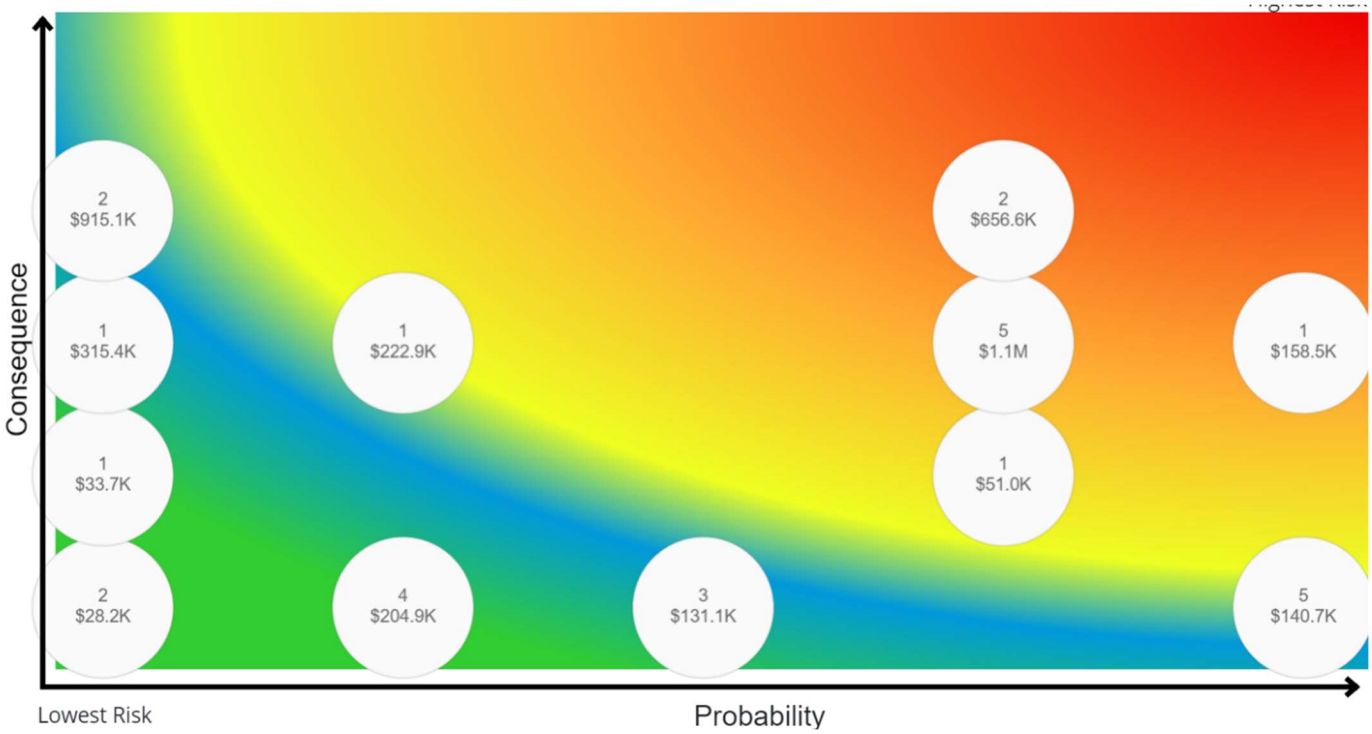
Asset Segment	Average Probability of Failure	Average Consequence of Failure	Average Risk Score
Fire	2.95 / 5	3.97 / 5	11.43 / 25
General	2.64 / 5	1.00 / 5	2.64 / 25
Public Works	3.26 / 5	3.27 / 5	10.76 / 25
Recreation	5.00 / 5	1.25 / 5	6.25 / 25
Average	**3.08 / 5**	**3.60 / 5**	**10.83 / 25**

Overall, the Machinery & Equipment assets have an average risk score of 10.83, which is considered High.

7.4.2 Vehicles: Risk Heatmap

The following risk heatmap provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2022 inventory data.

When viewing all vehicle assets, most assets carry either a low risk of failure (highlighted in green) or high risk (highlighted in red), with some assets having moderate risk (highlighted in blue and yellow). This is illustrated in the heatmap below:



Risk treatments would be valuable to explore at a minimum for assets with moderate-high risk (orange). Further investigation may help the Township identify suitable risk treatments based on their accepted risk tolerance.

Estimating the probability of vehicle asset failure in this model relies on asset condition and remaining service life, while the consequence of failure is determined by economic and strategic impacts, with a 75% weighting on economic consequences and 25% on strategic ones. The model considers direct replacement costs, maintenance needs, and the criticality of vehicle types, especially for Fire service vehicles. The tables below outline the failure probability metrics, vehicle attributes, and associated scoring framework.

7.4.3 Risks to Current Asset Management Strategies

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

Demographic Change & Community Expectations

As growth occurs within the Township, it can pose risks to their vehicles due to increased demands on transportation services. With the expanding population and the addition of a larger service area, the Township may be required to acquire more vehicles in the future to meet

the current levels of service. The extended service area may lead to longer travel distances and more extensive wear and tear on existing vehicles, potentially affecting vehicle maintenance costs and overall fleet efficiency. Effective planning and sustainable strategies are important to balance service expansion and cost-effectiveness

Fiscal Capacity

Legislative requirements and changes in Minimum Maintenance Standards (MMS) can present risks to vehicles within a Township. Recent mandates to electrify the fleet will bring on increased costs to the Township to upgrade gas vehicles to electric. MMS require vehicles and equipment available for road and winter maintenance, pressuring the Township to have a fleet ready to respond. Timely replacement and proactive maintenance will better ensure the Township's vehicles are available for use when needed.

7.5 Levels of Service

By 2024, municipalities throughout Ontario are required to report on LOS for all assets. For non-core assets, municipalities must select all metrics. The following table outlines metrics selected and the current LOS performance.

Value	LOS Statement	Community LOS	Technical LOS (2022)
Affordable	Vehicles are managed at the lowest possible cost for the required level of service	Description of cost savings measures in place to reduce the overall costs of maintaining and replacing vehicles, public works, and parks and recreation departments: TBD	Annual capital reinvestment rate for vehicles: 13.8%
			Annual maintenance costs: $94,000
Safe & Regulatory	Vehicles are safe to use, do not cause a hazard to operators and meet regulatory requirements	Description of strategies in place to mitigate health and safety risks	Frequency of pump tests: Annually
			% of vehicles that exceeds their estimated useful life (PW & General): 7.6%
			% of vehicles that exceeds their estimated useful life (Recreation): 66%

Value	LOS Statement	Community LOS	Technical LOS (2022)
			% of vehicles that exceeds their estimated useful life (Fire): 13%
Sustainability	There are long-term plans in place for the renewal and replacement of all municipal vehicles	Internal staff complete regular inspections and circle checks for the Township's vehicle assets. Annually, an external mechanic completes safeties as required by the Ministry of Transportation of Ontario (MTO). Repairs are scheduled based on a combination of usage and operational performance.	Average Condition of Heavy-Duty Vehicles: Poor (32%)
			Average Condition of Fire Vehicles: Fair (38.2%)
			Average Condition of Light Duty Vehicles: Fair (42%)

7.6 Recommendations

Asset Inventory

- Review estimated useful life values to ensure they match the true service life of vehicles.

Replacement Costs

- All replacement costs used in this AMP were based on the inflation of historical costs. These costs should be evaluated to determine their accuracy and reliability. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

- All condition ratings in this AMP are based on an estimate using the asset age and estimated useful life. Identify condition assessment strategies for high value and high-risk assets. Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Lifecycle Strategies

- To ensure capital projections are as accurate as possible, regularly review and update replacement costs, especially for assets of high value. Wherever possible, obtain estimates based on comparable recent purchases or quotes.
- Review projected capital requirements against current capital funding amounts to determine if funding adjustments may be needed and if so, to enable adjustments to be made more sustainably over time.
- Consider aligning asset management categorization of assets with budgeting structure so that analysis is more streamlined.
- Ensure that the process for assessing asset condition is uniform across vehicle assets so that meaningful comparisons and inferences can be drawn from condition data. A manual detailing the factors reviewed, with supportive information like photographs and scales would be helpful, especially in the event of staff changes.
- Currently, all vehicle condition in the Citywide asset inventory considers age and estimated useful life only. This is inaccurate as the impacts of operating environment, utilization, and performance are not considered. We

recommend that the Township updates the condition scores to reflect these factors. Doing so will provide more accurate capital projections.

- Consider digitizing service records so that review and costing analysis can be streamlined, and more easily documented.

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

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined 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.

8 Machinery & Equipment

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

- Fire equipment to support the delivery of emergency services
- Administrative equipment such as furniture, fixtures, general equipment and phone systems
- Public works equipment to support and maintain parks, playgrounds and other structures
- Recreation equipment to support community buildings and provide maintenance for public areas

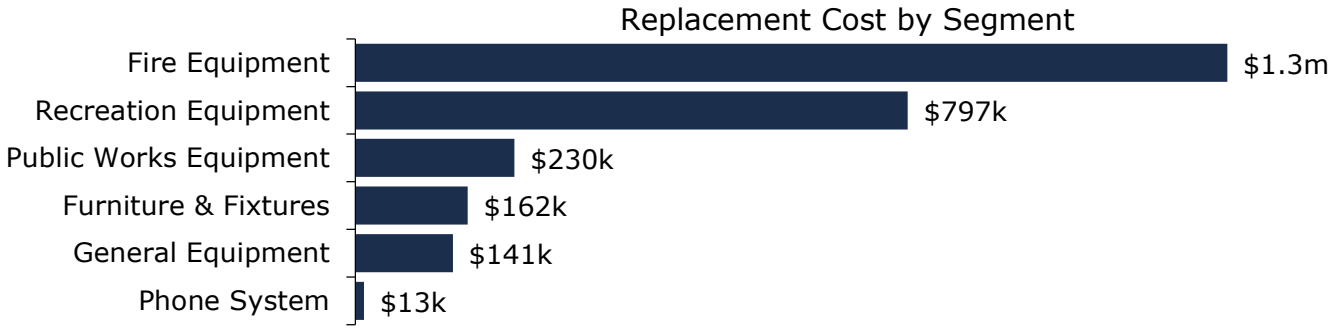
Keeping machinery and equipment in an adequate state of repair is important to maintain a high level of service. The state of the infrastructure for the machinery and equipment is summarized in the following table.

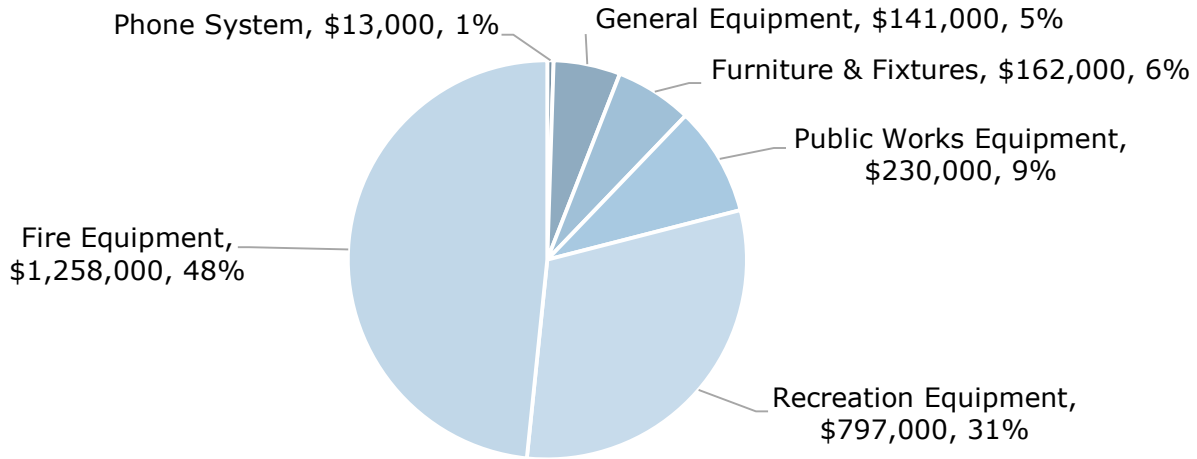
Replacement Cost	Condition	Financial Capacity	
$2.6 million	Poor (36%)	Annual Requirement:	$242,000
		Funding Available:	$197,000
		Annual Deficit:	$45,000

8.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's machinery and equipment inventory.

Asset Segment	Quantity	Replacement Cost	Average Annual Capital Requirement
Fire Equipment	8	$1,258,000	$120,000
Furniture & Fixtures	173	$162,000	$9,000
General Equipment	90	$141,000	$26,000
Phone System	16	$13,000	$1,000
Public Works Equipment		$230,000	$24,000
Recreation Equipment		$797,000	$62,000
Total	**287**	**$2,601,000**	**$242,000**



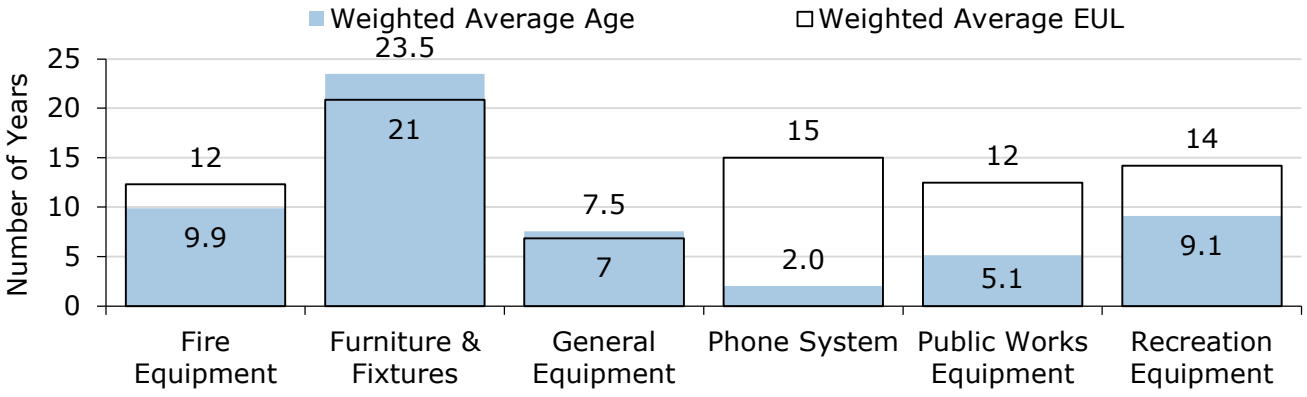


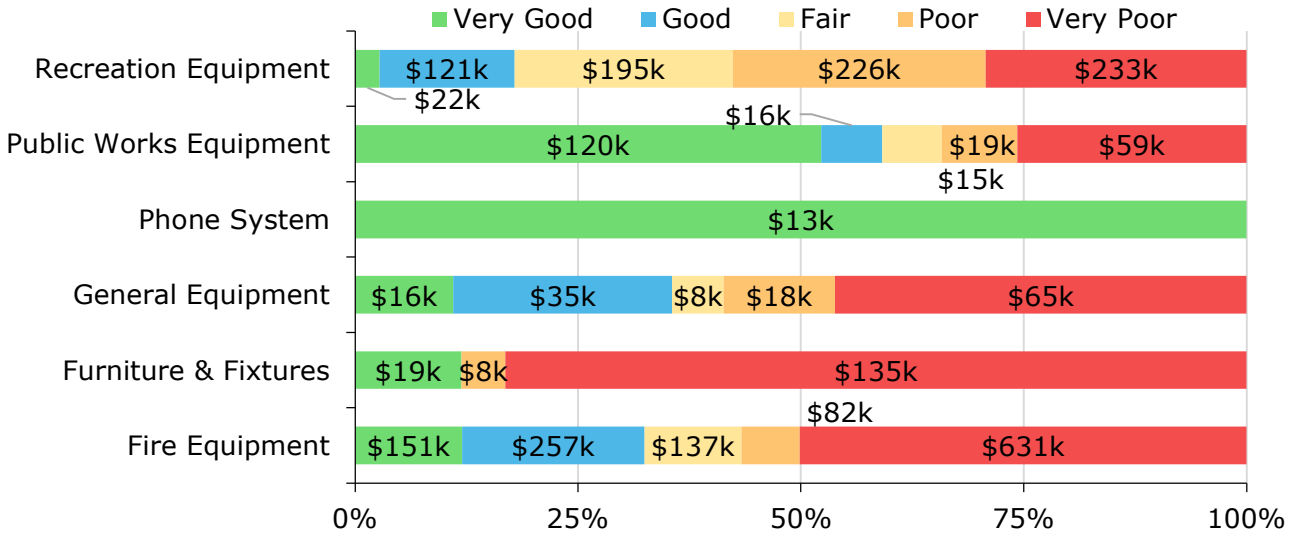
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

8.2 Asset Condition & Age

The table below identifies the current average condition and source of available condition data for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Weighted Average EUL (Years)	Weighted Average Age (Years)	Average Condition
Fire Equipment	12	9.9	Poor (33%)
Furniture & Fixtures	21	23.5	Very Poor (12%)
General Equipment	7	7.5	Poor (33%)
Phone System	15	2.0	Very Good (81%)
Public Works Equipment	12	5.1	Good (61%)
Recreation Equipment	14	9.1	Poor (37%)
Average			**Poor (36%)**





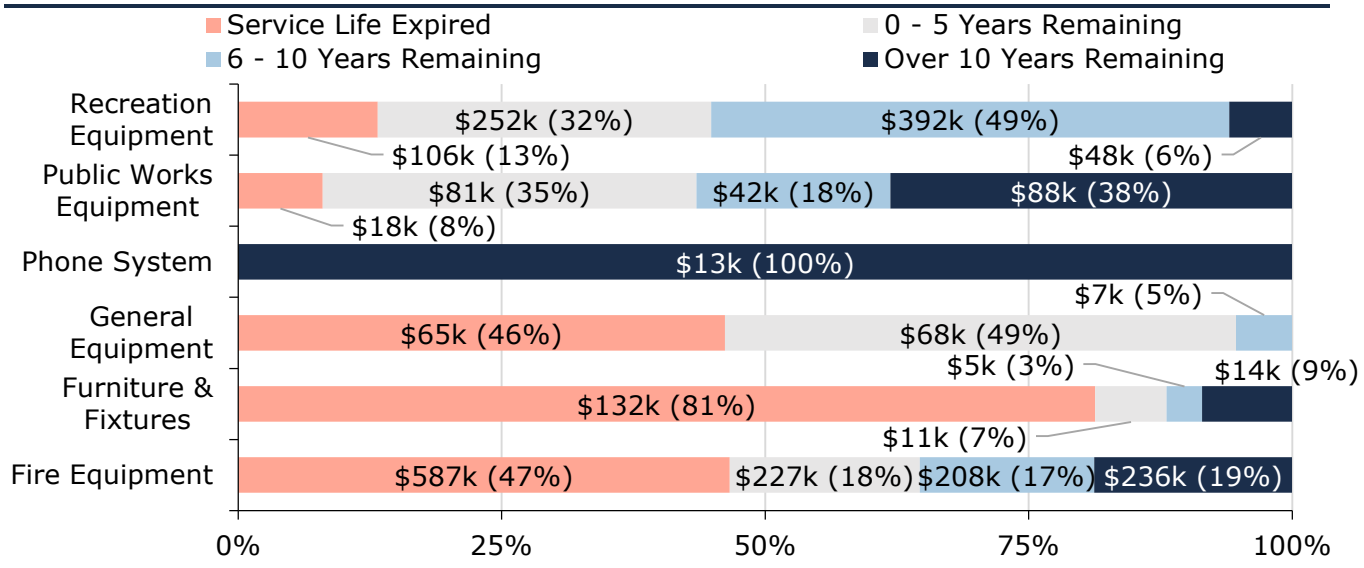
The chart above visually illustrates the average condition for each asset segment on a very good to very poor scale.

.To ensure that the Township's machinery and equipment 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 machinery and equipment.

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.

Based on asset age, available assessed condition data and estimated useful life, 85% of the Township's Machinery & Equipment assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B: 10-Year Capital Requirements. Service life remaining is outlined by replacement value below.

Asset Segment	Service Life Expired	0 - 5 Years Remaining	6 - 10 Years Remaining	Over 10 Years Remaining
Fire Equipment	$587k (47%)	$227k (18%)	$208k (17%)	$236k (19%)
Furniture & Fixtures	$132k (81%)	$11k (7%)	$5k (3%)	$14k (9%)
General Equipment	$65k (46%)	$68k (49%)	$7k (5%)	-
Phone System	-	-	-	$13k (100%)
Public Works Equipment	$18k (8%)	$81k (35%)	$42k (18%)	$88k (38%)
Recreation Equipment	$106k (13%)	$252k (32%)	$392k (49%)	$48k (6%)
Total	**$908k (35%)**	**$640k (25%)**	**$655k (25%)**	**$398k (15%)**



8.2.1 Current Approach to Condition Assessment

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

In this AMP the following rating criteria is used to determine the current condition of machinery and equipment and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

8.3 Lifecycle Management Strategy

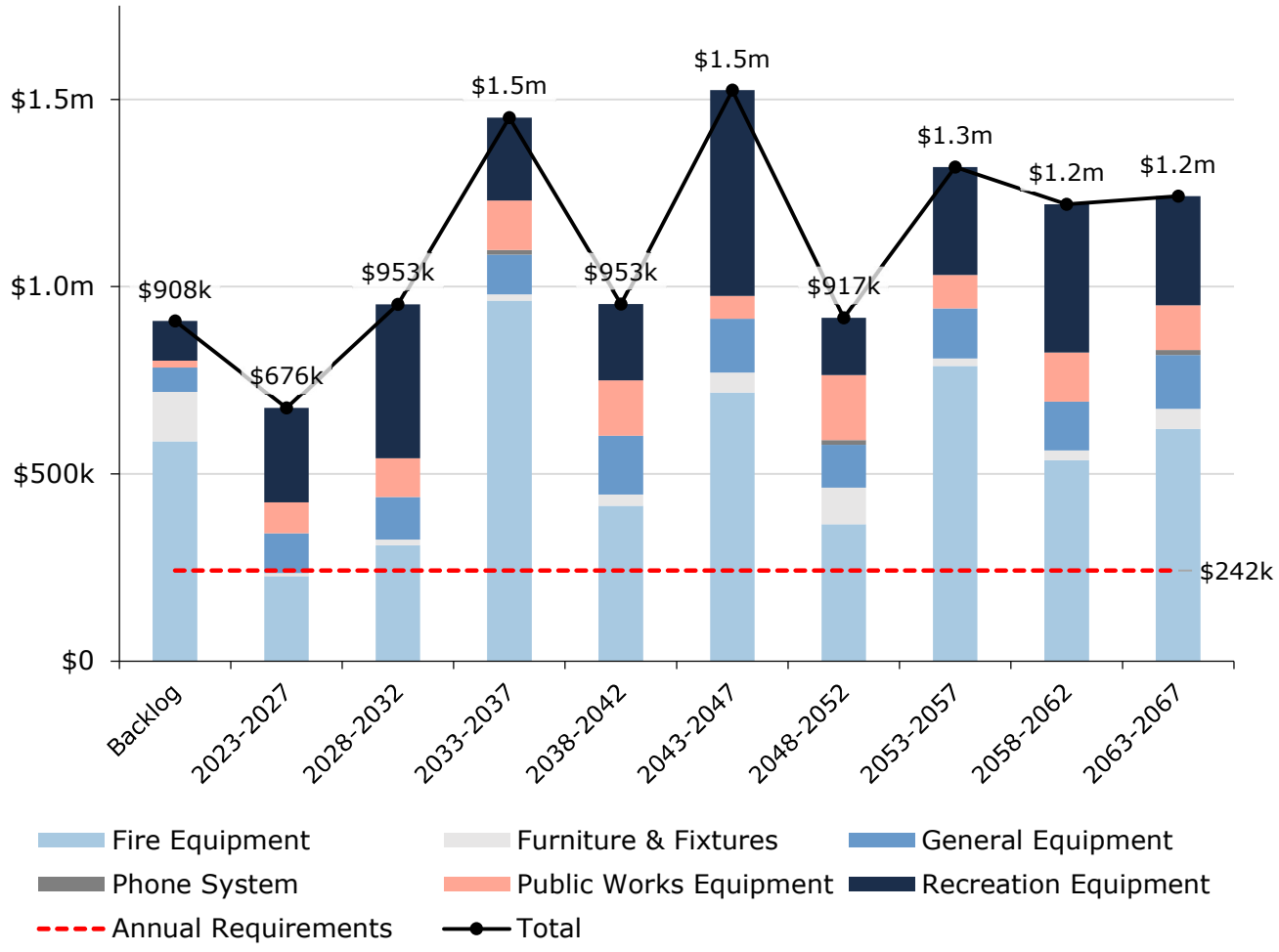
The following describes the current lifecycle activities that are typically conducted on machinery and equipment assets.

Event Class	Description
Maintenance & Inspection	• Internal staff complete basic inspections on machinery and equipment assets such as chainsaws, trucks and other heavy machinery prior to use. • Annual regulatory inspections are completed for trucks and Zambonis. • The Township's approach towards furniture inspections leans towards being reactive. Issues are addressed as they emerge. • Newly acquired furniture and IT equipment are tracked, aiming to establish a consistent replacement schedule. • Maintenance is regularly scheduled for mowers and Zambonis to ensure their optimal performance and longevity.
Rehabilitation	• Rehabilitations are considered on a case by base basis; generally, machinery, equipment and furniture assets are infrequently rehabilitated.

Event Class	Description
Replacement	• With the expertise of senior staff, the Township relies on substantial reserves to guide IT lifecycle planning. • The approach towards public works and smaller equipment involves replacing them reactively, on a case-by-case basis. • The administration department has devised a reserve cycle plan for equipment replacement, with a strategic staggering of replacement years.

8.3.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The graph identifies capital requirements over the next 40 years as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

8.4 Risk & Criticality

8.4.1 Risk Criteria & Scores

The following table outlines the probability of failure and consequence of failure metrics used to calculate each asset's overall risk score.

In this model, estimating the probability of failure for machinery, equipment, and furniture assets relies equally on asset condition (50%) and remaining service life (50%), as outlined in the table below. The consequence of failure is assessed based on economic (50%) and strategic (50%) impacts, with strategic impacts recognizing higher risk for equipment used by critical departments such as Fire services. The tables below detail the attributes and associated scoring framework for these assets.

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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining	Segment (Strategic)

A more detailed outline of the risk profile metrics and weightings is available in Appendix J: Risk Profiles.

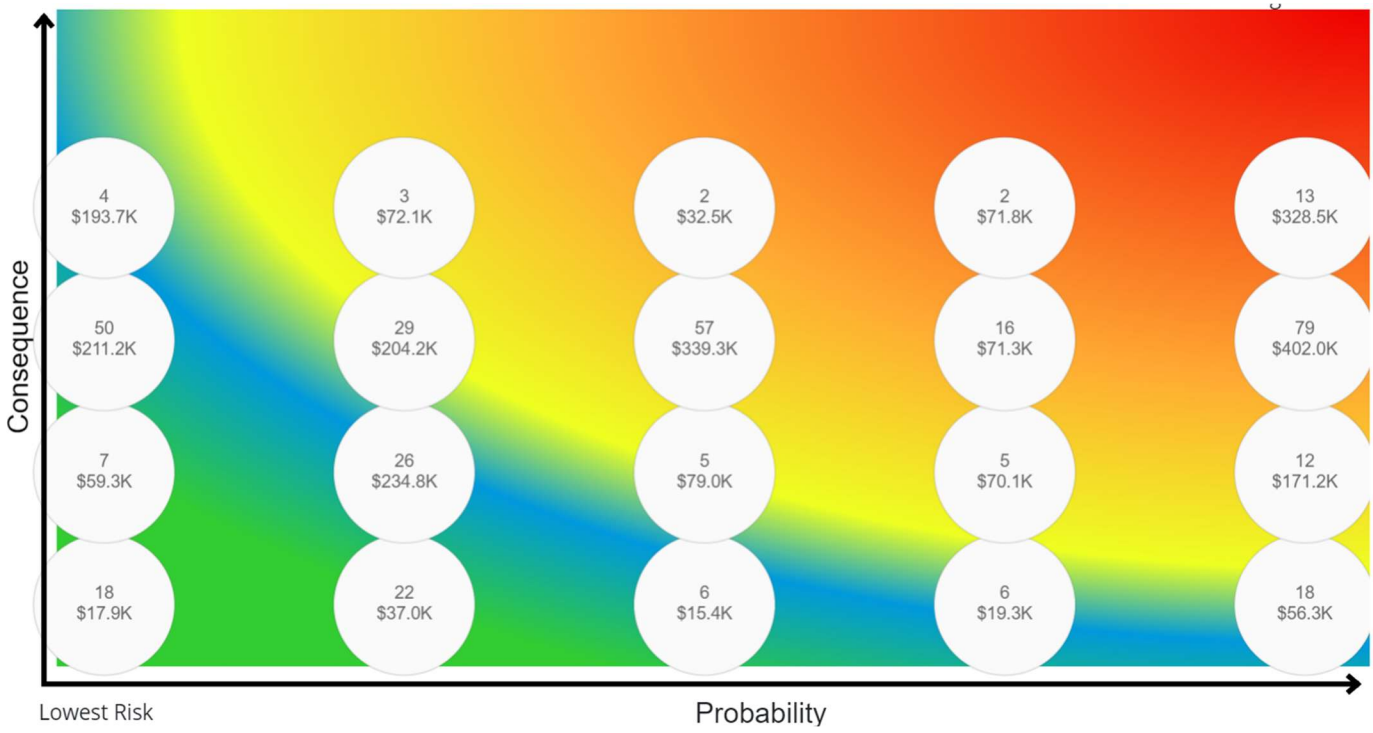
The identification of critical assets allows the Township to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data. The results of the risk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

Asset Segment	Average Probability of Failure	Average Consequence of Failure	Average Risk Score
Fire Equipment	3.51 / 5	3.62 / 5	12.57 / 25
Furniture & Fixtures	4.46 / 5	1.83 / 5	8.47 / 25
General Equipment	3.79 / 5	1.63 / 5	6.39 / 25
Phone System	1.00 / 5	2.00 / 5	2.00 / 25
Public Works Equipment	2.46 / 5	2.75 / 5	6.80 / 25
Recreation Equipment	3.17 / 5	2.99 / 5	9.67 / 25
Average	**3.38 / 5**	**3.12 / 5**	**10.53 / 25**

Overall, the Machinery & Equipment assets have an average risk score of 10.53, which is considered High.

8.4.2 Machinery & Equipment: Risk Heatmap

When viewing all machinery, equipment and furniture, assets are distributed evenly between low, moderate, and high risk of failure. This is illustrated in the heatmap below:



Risk scores vary across machinery and equipment assets. Most assets hold moderate risk (blue and yellow), but some assets are identified as having low risk (green) or high risk (orange and red). For most high-risk assets there is a high consequence of failure due to the significant replacement cost, but in thirteen instances there is both a high probability of failure due to asset condition and a high replacement cost. Various risk treatments could be explored and would be of value particularly for higher risk assets. Like with other asset categories, risk results should be reviewed and investigated, especially where the scores are high. Following this, risk treatment which may include asset investment can be further explored and determined.

8.4.3 Risks to Current Asset Management Strategies

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

Critical Spares (Fire)

Fire equipment is vital to enabling Fire Protection Services; without this equipment the public could be in jeopardy. Due to supply chain interruptions, and high regulatory standards, critical equipment is at risk of being unavailable. Timely replacement and repairs are essential to reduce the risk of equipment unavailability.

Organizational Cognizance

Outdated assets and knowledge gaps within staff can pose a risk to machinery and equipment assets within the Township. As technology advances and new equipment becomes available, existing machinery may become obsolete, making it challenging to find replacement parts finding the required support for maintenance and repairs. The lack of updated knowledge and training among staff can hinder their ability to operate and maintain the machinery effectively, leading to increased downtime, reduced efficiency, and potential safety hazards. To address these risks, the Township must prioritize regular assessments of equipment, invest in staff training and development, and establish proper maintenance and replacement strategies to ensure the longevity and optimal performance of their machinery and equipment assets.

8.5 Levels of Service

By 2024, municipalities throughout Ontario are required to report on LOS for all assets. For non-core assets, municipalities must select all metrics. The following table outlines metrics selected and the current LOS performance:

Value	LOS Statement	Community LOS	Technical LOS (2022)
Accessible and Reliable	Furniture, Equipment, and IT assets function reliably and are available to support the Township's services	Description of critical equipment and the significant repairs to extend service life: TBD	Cost of Critical equipment major repairs (e.g., betterments to extend useful life) - Fire: TBD
			Cost of Critical equipment major repairs (e.g., betterments to extend useful life) – Operations: TBD

Value	LOS Statement	Community LOS	Technical LOS (2022)
Sustainable	There are long-term plans in place for the renewal and replacement of machinery & equipment assets	Prior to use, Township staff complete basic inspections of machinery and equipment assets. Larger assets (i.e., mowers and Zambonis) receive annual regulatory inspections and regularly scheduled maintenance. Smaller assets, like furniture and IT, maintenance activities are primarily reactive in nature. Replacements are primary driven by reserve funds and associated lifecycle planning, or in the case of smaller public works equipment asset failure.	Average Condition of Fire equipment: Poor (33%) Average condition of operations equipment - Heavy Duty: Good (82%)

As part of the project engagement, PSD Citywide worked with East Zorra-Tavistock Township staff to review and as needed update asset data, including assessed condition, replacement costs, and other asset details.

8.6 Recommendations

Asset Inventory

- Review estimated useful life values to ensure they match the true service life of machinery & equipment.

Replacement Costs

- All replacement costs used in this AMP were based on the inflation of historical costs. These costs should be evaluated to determine their accuracy and reliability. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

- All condition ratings in this AMP are based on an estimate using the asset age and estimated useful life. Identify condition assessment strategies for high value and high-risk assets. Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Lifecycle Strategies

- Review projected replacement dates and estimated cost for machinery and equipment assets. If they do not appear reasonable, update the date, and adjust capital requirement projections accordingly.
- When developing capital budgets, consider identified capital requirements and determine if existing revenues are sufficient and, if not, what changes may need to occur (e.g., changes in taxation rates, special funding applications) so that capital budgets meet asset requirements.
- As part of the lifecycle strategy and in particular, replacement considerations, review and consider assets risk when making investment decisions.
- Review inventory to ensure asset information is accurate; adjust data as necessary.
- Ensure that when assets are reviewed for condition, staff apply a consistent set of criteria. Consider the development of supportive guides and documentation.

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

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined 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.

9 Land Improvements

The Township of East Zorra-Tavistock owns a small number of assets that are considered land improvements. This category includes:

- Hickson Park: Drainage, lighting, trails, ballpark and fencing.
- Innerkip Community Centre: Drainage, trails, and trees
- Innerkip Park: Drainage, lighting, Paving, Fencing, Ball Diamonds
- Public Works: stormwater pond fencing and landscaping
- Tavistock Parks & Facilities: Drainage, Lighting, Trails, Trees, Benches and Driveways

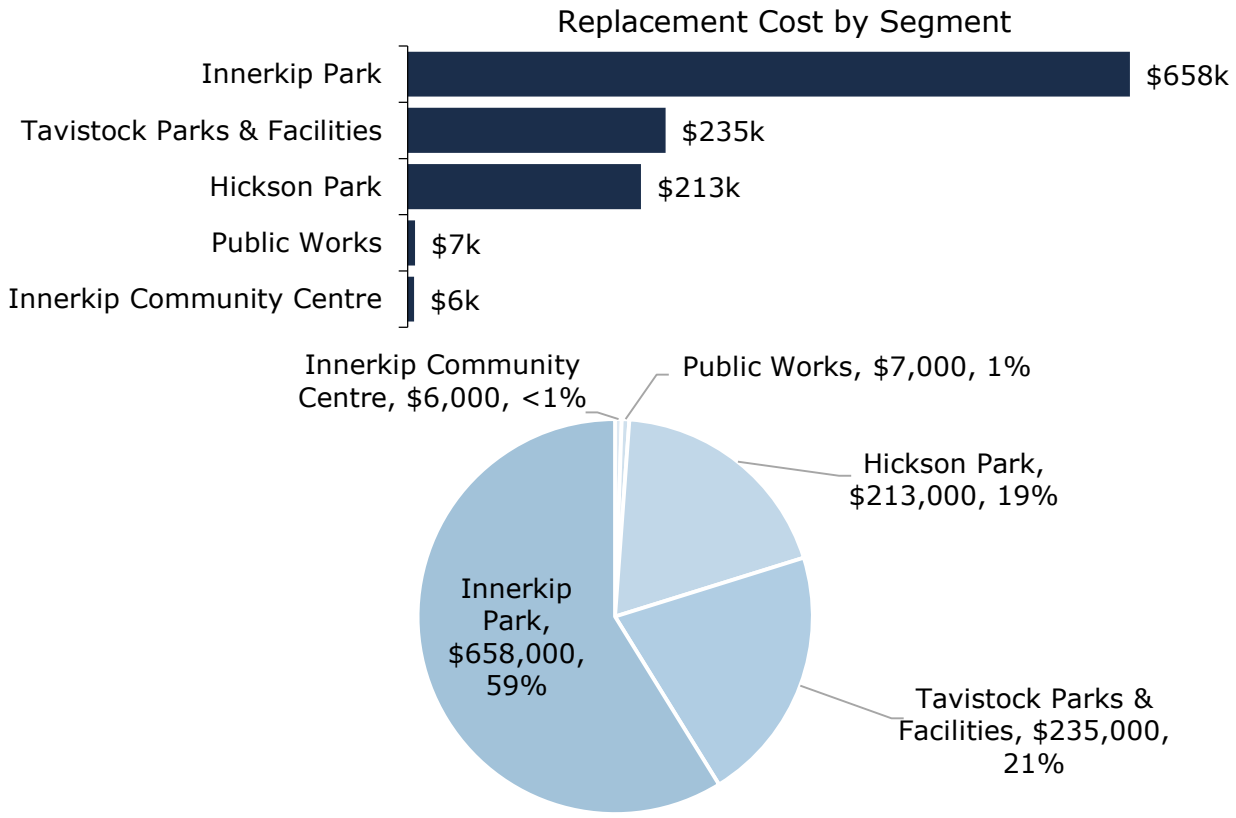
The Township's land improvement assets are recorded in an asset management software system. The following table provides summary information based on a December 2022 effective date:

Replacement Cost	Condition	Financial Capacity	
$1.1 million	Poor (39%)	Annual Requirement:	$55,000
		Funding Available:	-
		Annual Deficit:	$55,000

9.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's Land Improvements inventory.

Asset Segment	Quantity	Replacement Cost	Average Annual Capital Requirement
Hickson Park	16,981 (sqft)	$213,000	$11,000
Innerkip Community Centre	10	$6,000	-
Innerkip Park	17	$658,000	$33,000
Public Works	6	$7,000	-
Tavistock Parks & Facilities	1	$235,000	$11,000
Total		**$1,118,000**	**$55,000**

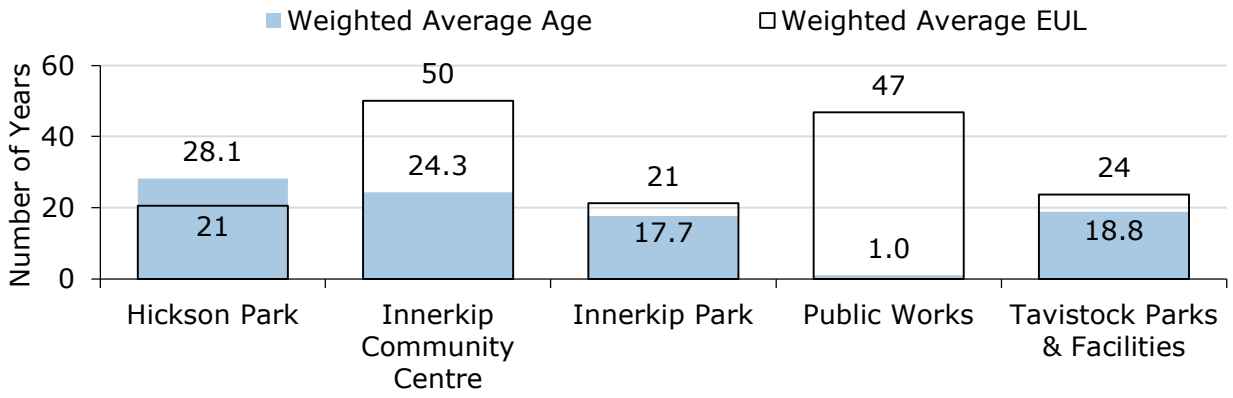


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

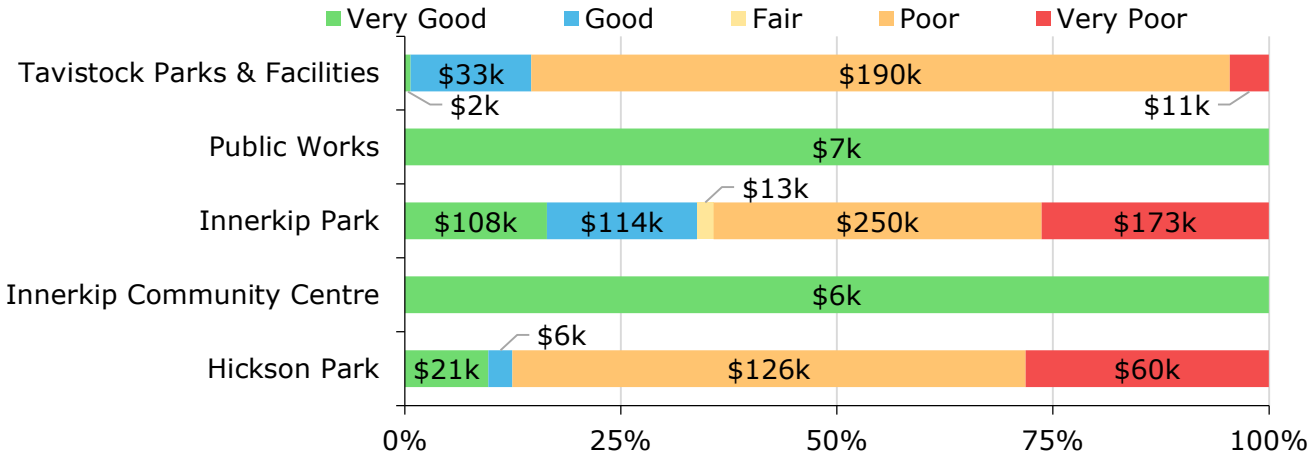
9.2 Asset Condition & Age

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.

Asset Segment	Weighted Average EUL (Years)	Weighted Average Age (Years)	Average Condition
Hickson Park	21	28.1	34 (Poor)
Innerkip Community Centre	50	24.3	84% (Very Good)
Innerkip Park	21	17.7	43% (Fair)
Public Works	47	1.0	100% (Very Good)
Tavistock Parks & Facilities	24	18.8	33% (Poor)
Average			**39% (Poor)**



The chart below visually illustrates the average condition for each asset segment on a very good to very poor scale, reported by category and weighted against asset replacement cost. Most land improvement assets are poor condition, except for those at Innerkip Park or related to Public Works. Condition is based on age.

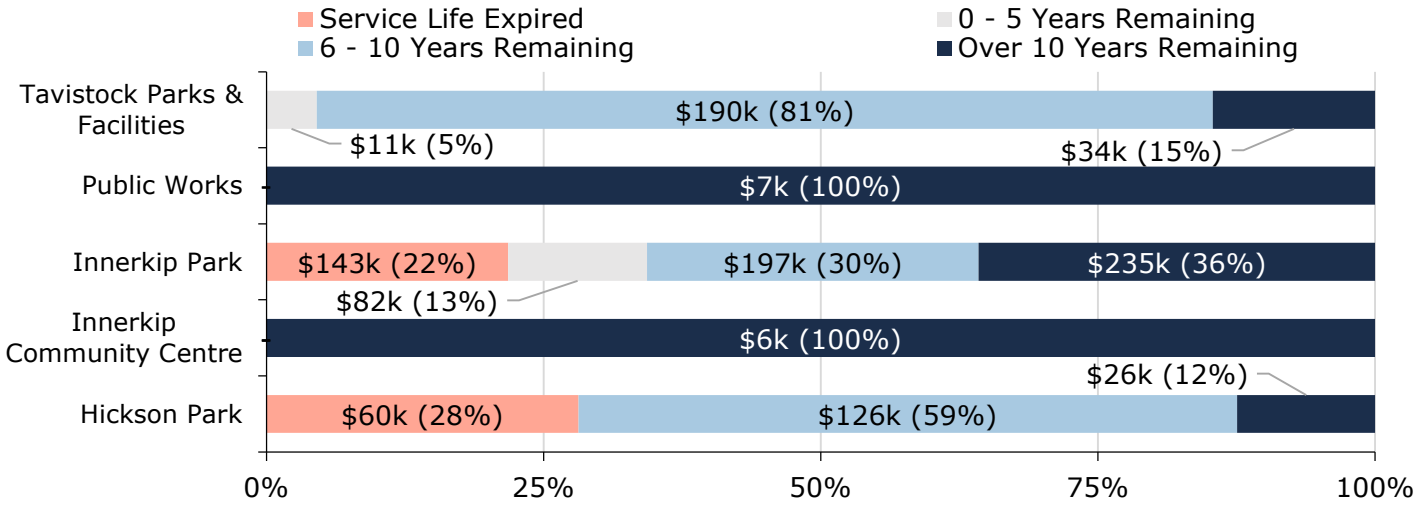


To ensure that the Township's land improvements continue to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance,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

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.

Based on asset age, available assessed condition data and estimated useful life, 72% of the Township's Machinery & Equipment assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B: 10-Year Capital Requirements. Service life remaining is outlined by replacement value below.

Asset Segment	Service Life Expired	0 - 5 Years Remaining	6 - 10 Years Remaining	Over 10 Years Remaining
Hickson Park	$60k (28%)	-	$126k (59%)	$26k (12%)
Innerkip Community Centre	-	-	-	$6K (100%)
Innerkip Park	$143k (22%)	$82k (13%)	$197k (30%)	$235k (36%)
Public Works	-	-	-	$7k (100%)
Tavistock Parks & Facilities	-	$11k (5%)	$190k (81%)	$34k (15%)
Total	**$203k (18%)**	**$93k (8%)**	**$513k (36%)**	**$309k (28%)**



9.2.1 Current Approach to Condition Assessment

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

In this AMP the following rating criteria is used to determine the current condition of land improvements and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

9.3 Lifecycle Management Strategy

Event Class	Description
Maintenance & Inspection	• Internal staff conducts playground inspections biweekly, with a more comprehensive assessment every month, ensuring regular maintenance and safety checks. • External field inspections are completed as-needed, sometimes concurrently with the resolution of other issues. • Monthly inspections are performed on walking trails, monitoring their condition, and addressing any maintenance or safety concerns. • Sidewalks are inspected once a year to evaluate their condition and ensure public safety. • Recreation committees regularly inspect and maintain the interior of sport fields' fencing, ensuring the facilities meet safety and quality standards. • The Township plans to update the parks master plan every five years, which currently identifies needs and aligns with projected enhancements, including additional features and improved accessibility. • Maintenance of trails and pathways is carried out as needed, ensuring they remain safe and accessible.
Rehabilitation / Replacement	• The Township is transitioning towards proactive budgeting for capital replacements, a process that is ongoing as they work to catch up after taking over management responsibilities. • Replacements of assets are prioritized in alignment with recommendations from the master plan, ensuring efficient allocation of resources.

9.3.1 Township Parks and Recreation Master Plan

The Recreation Master Plan considers several land improvement assets, including community and neighbourhood parks, and trails. The report offers several valuable insights in relation to lifecycle management, which include:

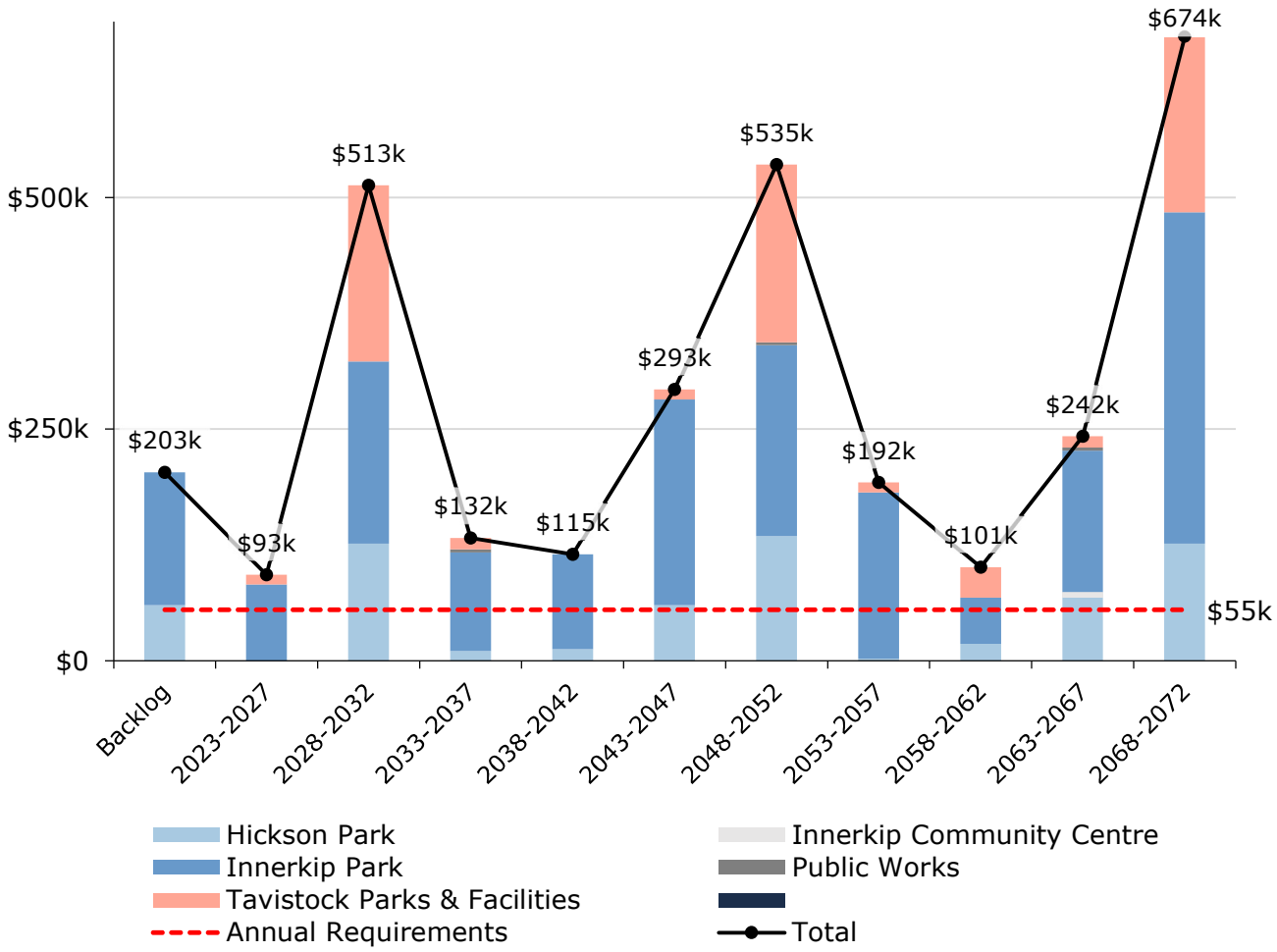
- Consider establishing a unique classification system for parks and open spaces, focusing on proximity, enhancing popular uses, diverse programming, community interests, and connectivity.
- Upgrade trail amenities as per the established classification system, including bridges, canopy coverage, parking, signage, and crossings.

- Maintain coordination with the County to balance between new parklands or amenities and their operations and maintenance costs during the planning and development stages.

9.3.2 Forecasted Capital Requirements

The time over which every land improvement asset would be scheduled for replacement was determined to be 2072 based on planned replacements and/or the assets in-service date and EUL. Using this period, the total average annual capital requirement was determined to be $55,000.

Reporting in 5-year cumulative bins, the chart summarizes the forecasted capital requirements by period and by asset category. Forecasted capital requirements for land improvement assets spike most significantly in 2028 – 2032, 2048 – 2052 and 2068-2072. Most capital costs are associated with Hickson Park and Innerkip Park, as indicated by the light blue and blue bars respectively.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

9.4 Risk & Criticality

9.4.1 Risk Criteria & Scores

In this model, estimating the probability of failure for a land improvements asset relies on asset condition (60%) and remaining service life (40%), as outlined in the table below. The consequence of failure is determined by economic impacts, approximated by the current replacement cost of each asset. As the land improvements inventory becomes more robust, the Township may incorporate additional risk metrics, such as park type or component type.

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining	

A more detailed outline of the risk profile metrics and weightings is available in Appendix J: Risk Profiles.

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. The results of the risk analysis are as follows:

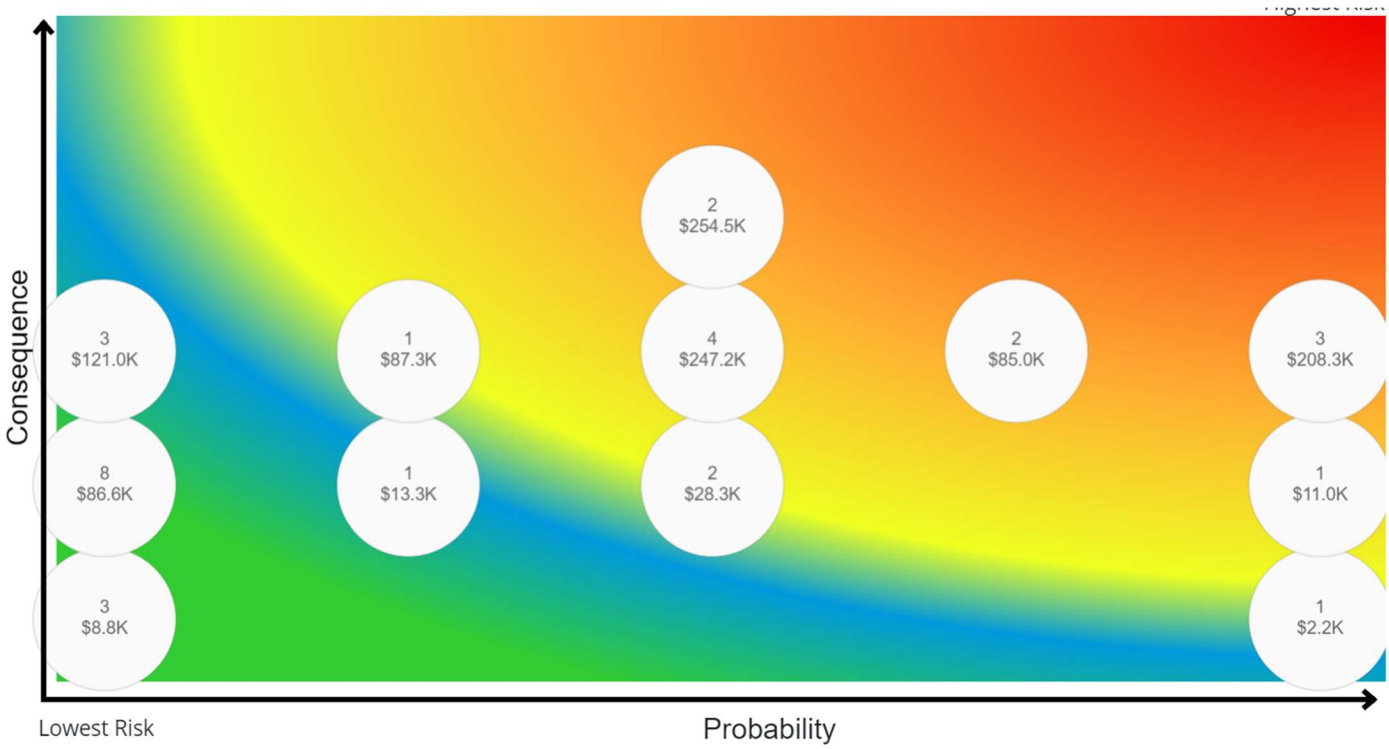
Asset Segment	Average Probability of Failure	Average Consequence of Failure	Average Risk Score
Hickson Park	3.73 / 5	2.86 / 5	10.90 / 25
Innerkip Community Centre	1.00 / 5	2.00 / 5	2.00 / 25
Innerkip Park	3.26 / 5	3.05 / 5	10.18 / 25
Public Works	1.19 / 5	1.00 / 5	1.19 / 25
Tavistock Parks & Facilities	3.37 / 5	3.44 / 5	11.67 / 25
Average	**3.35 / 5**	**3.08 / 5**	**10.53 / 25**

Overall, the Land Improvements assets have an average risk score of 10.53, which is considered High.

9.4.2 Land Improvements: Risk Heatmap

The following risk heatmap provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2022 inventory data.

To gain a detailed overview of risk distribution we can review a risk heatmap which plots each asset's probability and consequence of failure and overall risk. This can better illustrate risk distribution and associated replacement costs.



When viewing all land improvements, most assets carry a low to moderate risk (blue and yellow bubbles). A few assets carry high or very high risk. Currently, there are three assets at very high risks – these are the Innerkip Ball Diamonds #1 and #2, and Hickson Ball Diamonds. These three assts are all past their useful life and carry a significant replacement value. Risk treatments would be valuable to explore at a minimum for assets with moderate-high risk (orange). Further investigation may help the Township identify suitable risk treatments based on their accepted risk tolerance.

9.4.3 Risks to Current Asset Management Strategies

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

Climate Change & Extreme Weather Events

Increased freeze and thaw cycles, along with the heightened occurrence of ice jams, pose significant risks for parks, community centers, and facilities within the Township. More frequent freeze and thaw cycles can weaken structural elements, leading to cracking and surface deterioration. Additionally, ice jams can obstruct normal water flow, causing water levels to rise and exert excessive pressure on these structures, potentially leading to damage and compromised stability. The combination of freeze and thaw cycles and ice jams increases the likelihood of damage. The Township should implement effective monitoring and maintenance programs to ensure the integrity of parks, community centers, and facilities during the winter months.

Fiscal Capacity

Over time, infrastructure costs for land improvements such as parks, community centers, and facilities can spike, posing a significant risk to the Township by straining budgets and affecting services. The unpredictability of these costs can lead to financial constraints, potentially deferring projects and compromising the Township's ability to meet the needs of its residents. Delayed or deferred maintenance due to financial constraints may result in the deterioration of these facilities, leading to higher repair costs in the future. To address this risk, the Township should engage in long-term planning, conduct regular assessments, and prioritize preventive maintenance to ensure the longevity of land improvements.

9.5 Levels of Service

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

Value	LOS Statement	Community LOS	Technical LOS (2022)
Accessible & Reliable	Parks and recreation areas are provided that meet recreational needs and are reasonably accessible to the community	The Township has three primary types of parks and open spaces: parkland and open space, trails, and outdoor recreation. Currently there are 44 hectares of parkland and open spaces. Outdoor recreation assets include six baseball diamonds and six playgrounds, 3 outdoor ice rinks and one basketball court.	Hectares of parking area available for parks, trails, and open spaces: 2.3 hectares parking total
			Hectares of parks and open spaces per 1,000 residents: 4.21 hectares/1000 people
Affordable	Parks and recreation areas are managed cost-effectively to meet the established level of service	Description of cost savings measures in place to ensure parks and land improvements are managed cost-effectively: TBD	Annual capital reinvestment rate (Parks and Rec): 8%
			O&M cost / household (Parks and Rec): $63/household
Safe & Regulatory	Parks and recreation areas are safe for use by the community.	Internal staff conducts playground inspections biweekly, with a more comprehensive assessment every month, ensuring regular maintenance and safety checks.	# of inspections per playground per month: 1 per playground
Sustainable	There are long-term plans in place for the renewal and replacement of land improvement assets	Playgrounds, walking trails, sidewalks are inspected bi-weekly, monthly, and annually respectively. Inspections review the condition of the asset and identify deficiencies.	Average Condition of Parks and Recreation Assets: Poor (39%)
			Average Condition of Land Improvements (other): Very Good (99%)

9.6 Recommendations

Replacement Costs

- All replacement costs used in this AMP were based on the inflation of historical costs. These costs should be evaluated to determine their accuracy and reliability. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

- All condition ratings in this AMP are based on an estimate using the asset age and estimated useful life. Identify condition assessment strategies for high value and high-risk assets.
- Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Lifecycle Strategies

- Review internal processes for assessing asset condition and ensure that the considerations are appropriate for each asset and have a structured process with appropriate reference documentation for evaluation criteria. Such documentation will assist in more objective analysis and, in the event of staff changes, will be valuable to the new incumbent and the sustainability of the asset management program.
- Assess the suitability of rehabilitation for certain assets, especially those that may be more costly to replace and can be cost-effectively rehabilitated (i.e., Tennis courts). If the Township has limited rehabilitation projects to analyze, consider engaging other Municipalities in the region to gather information and insights.
- When developing capital budgets and presenting them to Council for deliberations, incorporate the results of projected capital requirements. Ensure the implications of not investing in assets is understood and, where investment may be obtained, ensure associated project management requirements are also sufficiently resourced.
- Recognizing that capital requirements are forecasted to spike significantly in future years explore opportunities to establish (as needed) and contribute to

capital reserves now so that future capital requirements can be more sustainably funded.

- Incorporate the results of the Parks and Recreation Master Plan into asset investment decisions.

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

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined 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

10 Stormwater Network

The stormwater services provided by the Township and are responsible for the following:

- Catch Basins
- Maintenance Holes
- OGS Units
- Storm Mains
- Stormwater Management Facility

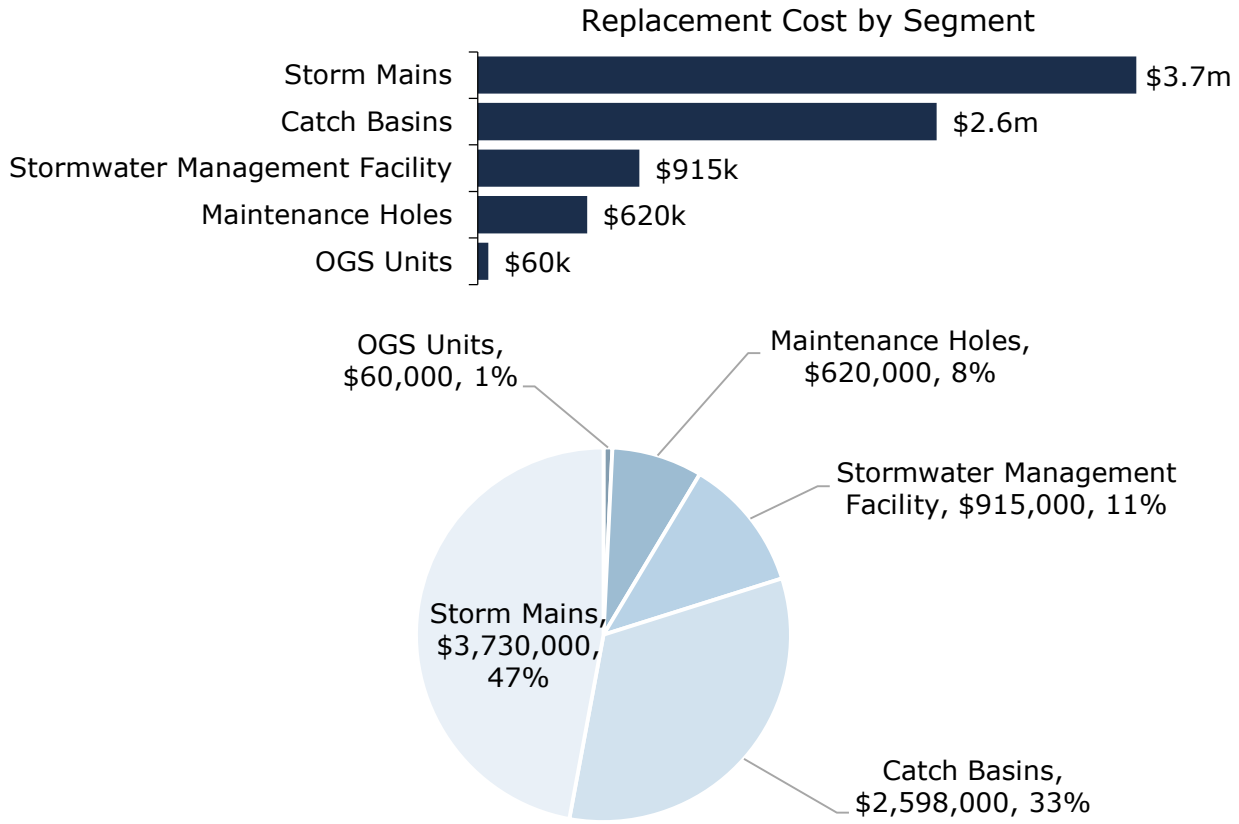
The state of the infrastructure for the stormwater network is summarized in the following table:

Replacement Cost	Condition	Financial Capacity	
$7.9 million	Good (65%)	Annual Requirement:	$190,000
		Funding Available:	$195,000
		Annual Deficit:	-

10.1 Asset Inventory & Costs

The table below includes the quantity, replacement cost method, and annual capital requirements of each asset segment in the stormwater network inventory.

Asset Segment	Replacement Cost	Average Annual Capital Requirement
Catch Basins	$2,598,000	$44,000
Maintenance Holes	$620,000	$11,000
OGS Units	$60,000	$1,000
Storm Mains	$3,730,000	$75,000
Stormwater Management Facility	$915,000	$59,000
Total	**$7,923,000**	**$190,000**

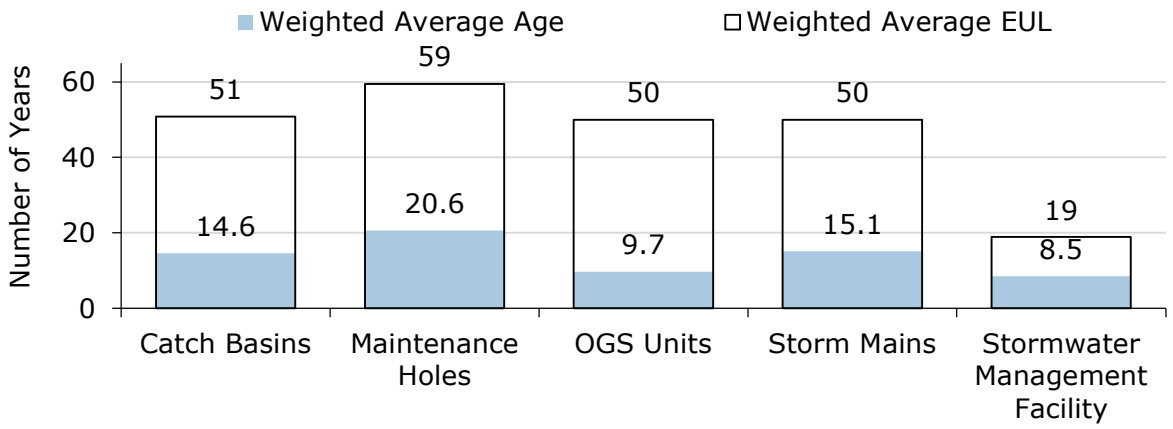


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

10.2 Asset Condition & Age

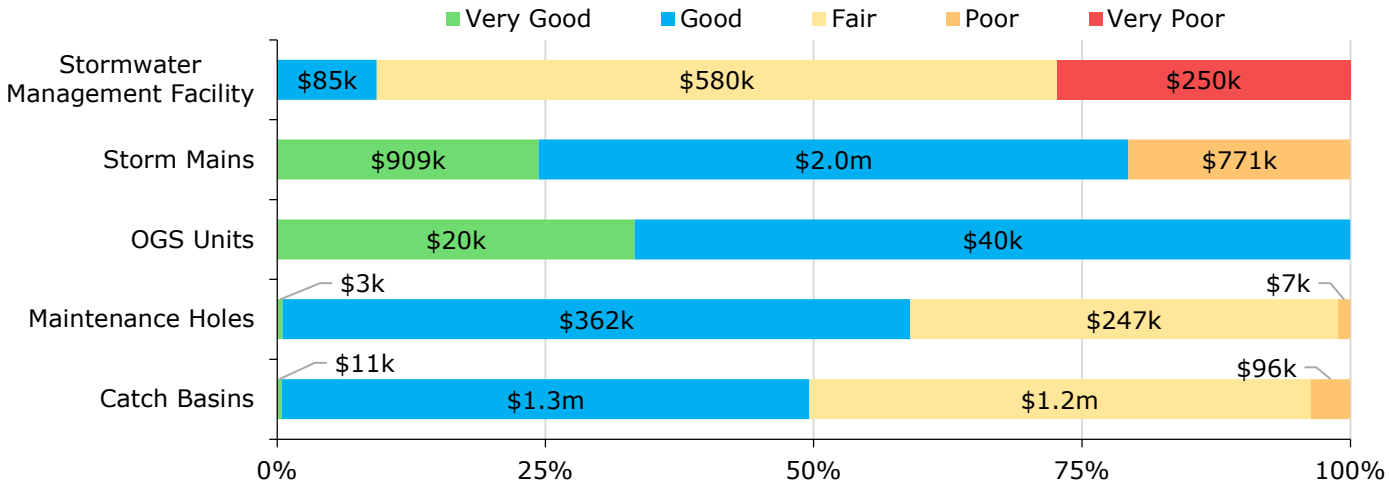
The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Weighted Average EUL (Years)	Weighted Average Age (Years)	Average Condition
Catch Basins	51	14.6	Good (67%)
Maintenace Holes	59	20.6	Good (69%)
OGS Units	50	9.7	Very Good (80%)
Storm Mains	50	15.1	Good (68%)
Stormwater Management Facility	19	8.5	Fair (44%)
Average			**Good (65%)**



At this time, only maintenance holes and catch basins have assessed condition scores, all other asses use age-based condition, which is calculated based on the assets age relative to its expected service life. The Township currently inspects municipal drains but do not inspect stormwater mains or drainage culverts. Discussions regarding drainage inspections are in place, but there are no plans of implementation.

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

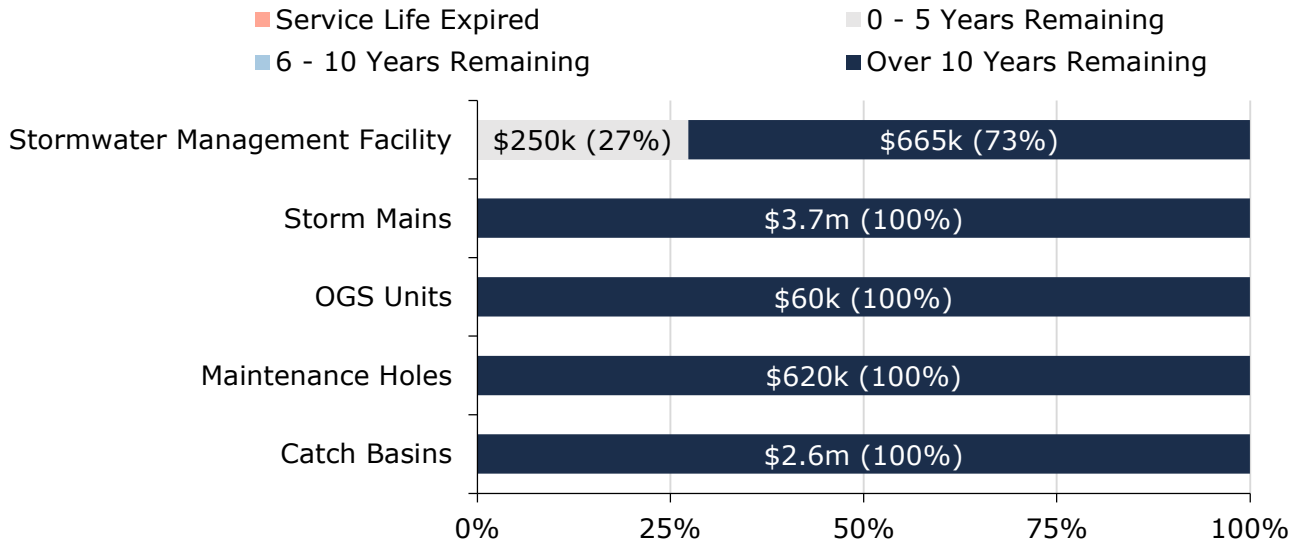


To ensure that the Township's stormwater network continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, 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 periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Based on asset age, available assessed condition data and estimated useful life, 3% of the Township's stormwater network assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B: 10-Year Capital Requirements. Service life remaining is outlined by replacement value below.

Asset Segment	Service Life Expired	0 - 5 Years Remaining	6 - 10 Years Remaining	Over 10 Years Remaining
Catch basins	-	-	-	$2.6m (100%)
Maintenance Holes	-	-	-	$620k (100%)
OGS Unites	-	-	-	$60k (100%)
Storm Mains	-	-	-	$3.7m (100%)
Stormwater Management Facility	-	$250k (27%)	-	$665k (73%)
Total	**-**	**$250k (3%)**	**-**	**$7.7m (97%)**



10.2.1 Current Approach to Condition Assessment

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

- Staff primarily rely on the age and material of storm mains to determine the projected condition of underground assets.
- There are no formal condition assessment programs in place for the water network. Visual assessments are conducted on a regular basis and defects are noted.

In this AMP the following rating criteria is used to determine the current condition of water network assets and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

10.3 Lifecycle Management Strategy

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

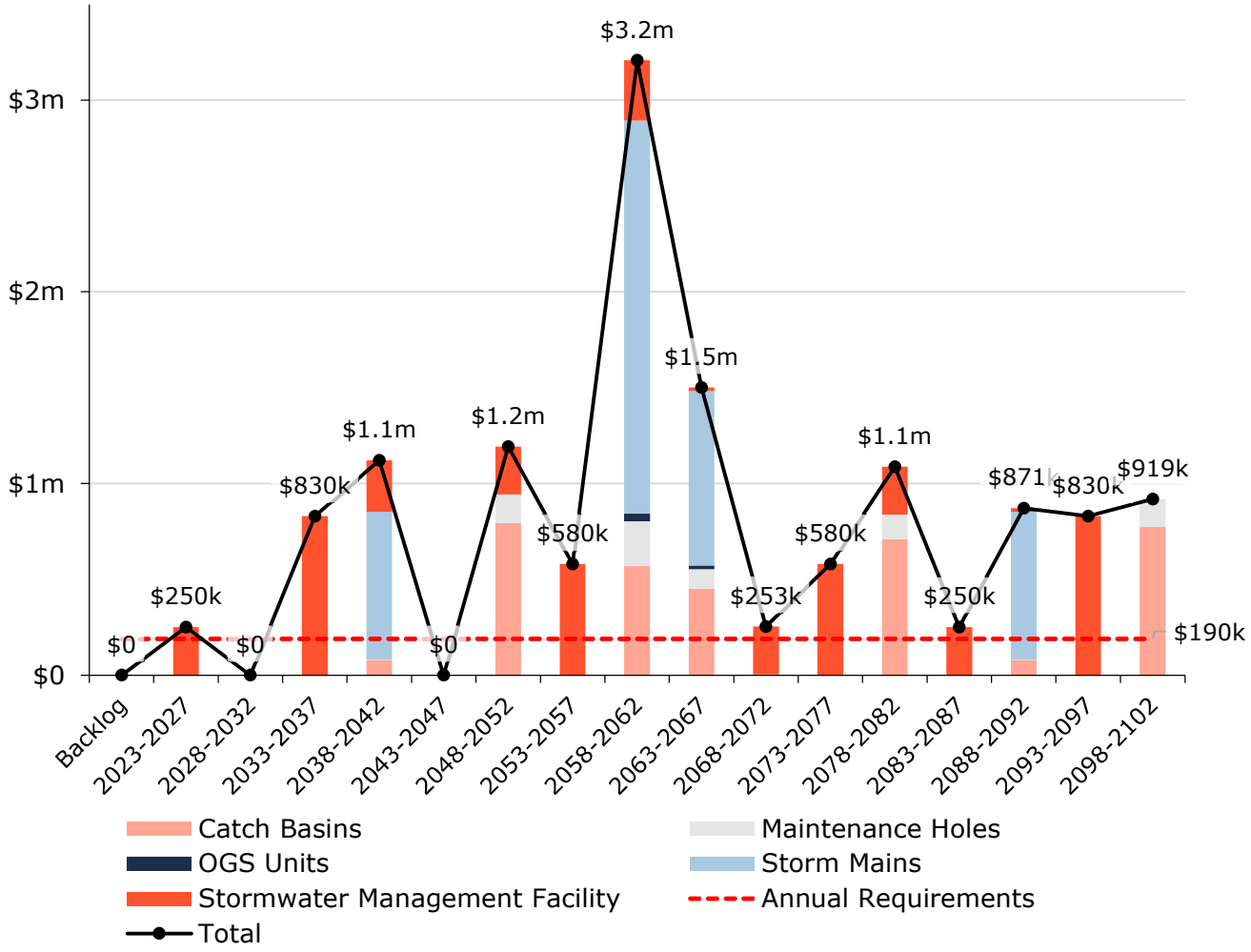
The following describes the current lifecycle activities that are typically conducted on facility assets.

Event Class	Description
Maintenance	• Inspections are performed on municipal drains, but storm mains are not included within this process.
	• During the road patrol process culverts are inspected are to identify any signs of settlement or washout.
	• Catch basins in the roadway are cleaned once per year by a hired contractor. Significant deficiencies are noted but no formal report is completed for each catch basin.
Rehabilitation & Replacement	• Stormwater mains and catch basins are typically replaced/reconstructed at end-of-life and/or in coordination with other asset replacements (roads).

10.3.1 Forecasted Capital Requirements

Stormwater network assets are forecasted to all require rehabilitation or replacement at some point until 2102. This was determined based on each assets in-service date,

and it's estimated useful life. Over this period, the average annual capital requirement is $190,000. This represents the forecasted capital investment requirement on an average annual basis. This is detailed by asset segment as well in the table below.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

10.4 Risk & Criticality

10.4.1 Risk Criteria & Scores

For all stormwater assets excluding stormwater mains, estimating the probability of failure relies on asset condition, determined using an age-based approach, as outlined in the table below. For stormwater mains, the probability of failure also considers material and slope, each with a 25% weighting. The consequence of failure for stormwater assets is based on economic and operational impacts, with economic

consequences weighted at 100% for all stormwater network assets except stormwater mains, which have a 50% weighting and include an additional economic attribute for determining if a main is undersized.

The Table below outlines the metrics used and the associated scoring framework.

Probability of Failure (POF)	Consequence of Failure (COF)
Asset Condition	Replacement Cost
Asset Material	Undersized Pipe
Slope	Pipe Diameter

A more detailed outline of the risk profile metrics and weightings is available in Appendix J: Risk Profiles.

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.

The results of the risk analysis are as follows:

Asset Segment	Average Probability of Failure	Average Consequence of Failure	Average Risk Score
Catch Basins	2.54 / 5	1.50 / 5	3.54 / 25
Maintenance Holes	2.42 / 5	1.03 / 5	2.49 / 25
OGS Units	1.67 / 5	2.67 / 5	4.67 / 25
Storm mains	2.48 / 5	2.72 / 5	6.57 / 25
Stormwater Management Facility	3.45 / 5	4.86 / 5	16.99 / 25
Average	**2.60 / 5**	**2.44 / 5**	**6.45 / 25**

Overall, the Stormwater Network assets have an average risk score of 6.45, which is considered Low.

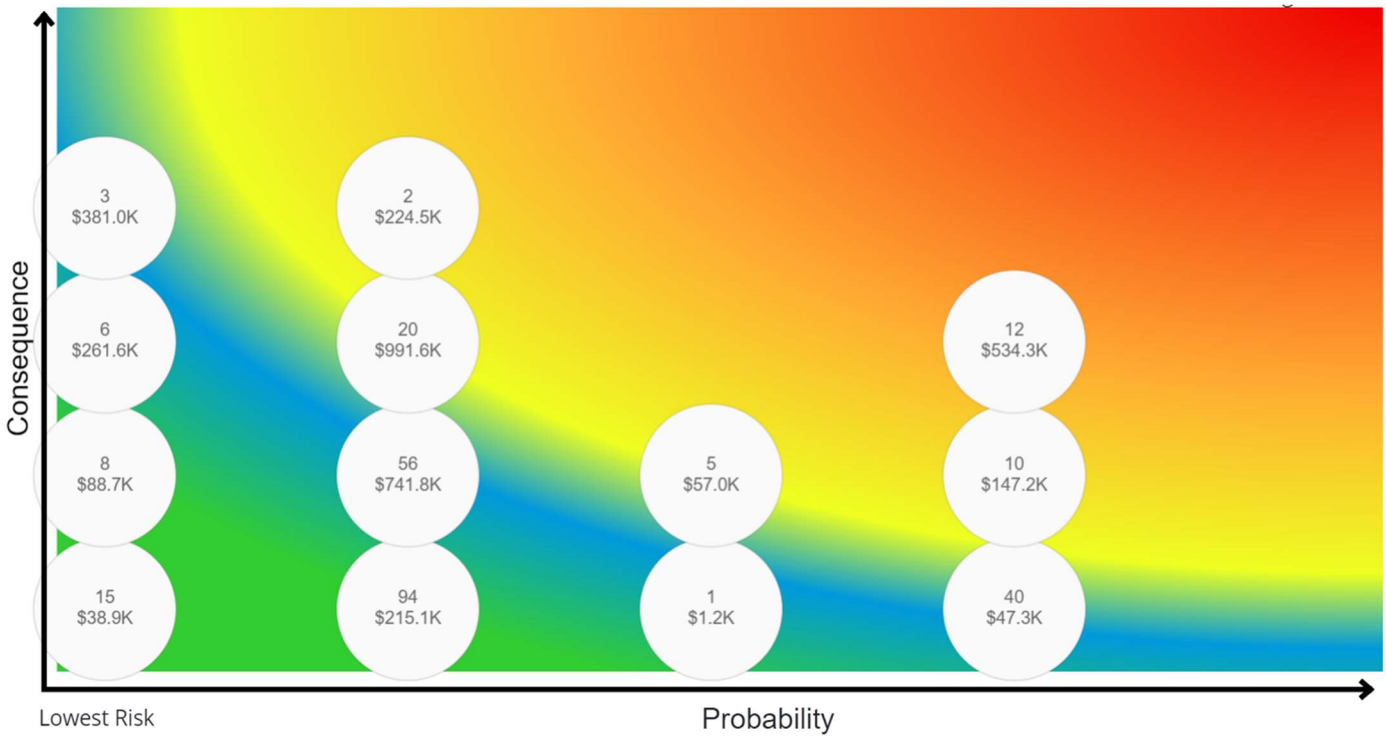
10.4.2 Risk Heatmap: Stormwater Network

The following risk matrices provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2022 inventory data.

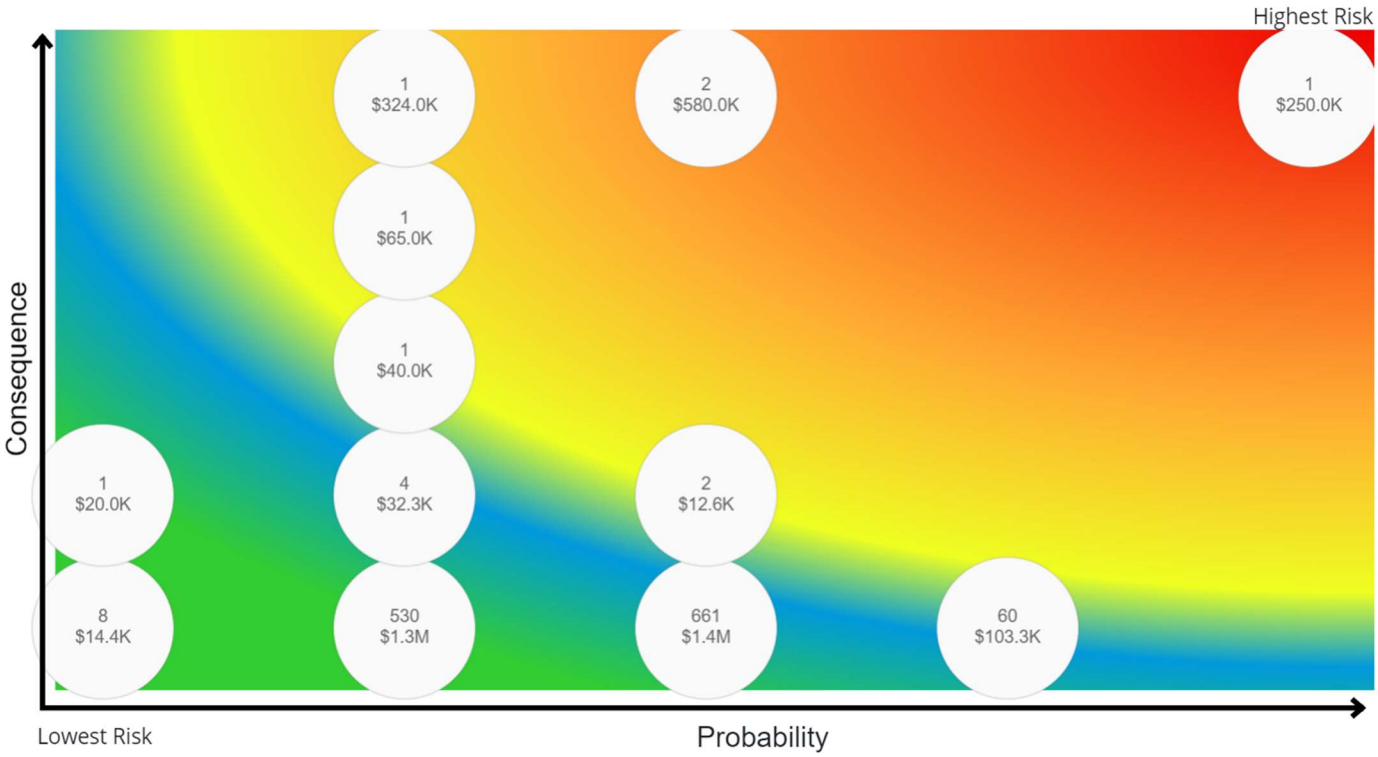
Stormwater Mains: Risk Heatmap

As indicated in the heatmap, most stormwater main assets carry a low probability and a low consequence of failure and therefore are considered low risk and identified

in green. Some stormwater mains carry slightly higher consequence of failure and/or probability of failure and are considered to have moderate risk (highlighted in blue and yellow). The remaining 12 assets carry moderate to high risk (orange), which are in poor condition and generally a lower pipe slope % which contributes to a high probability of failure. Their cost to replace and diameter as a measure of consequence of failure are moderate. Overall, their risk is low to moderate. The Township's risk treatment could include further investigation into asset condition to evaluate criticality of asset replacement or instead they could without further investigation identify these assets as a priority for replacement.



Stormwater Assets (excluding mains): Risk Heatmaps



The heatmap above illustrates risk score for all stormwater network assets excluding stormwater mains. As indicated, risk is low (green bubbles) for these assets. This is largely due to the low replacement cost of these stormwater assets. There is 1 asset with a very high risk, this is Pond #3. This pond is very high risk because it is in very poor condition and the replacement cost is quite significant ($250k). A more detailed investigation may also indicate that select assets have unique conditions like location and function which are not reflected in the risk model due to data limitations but are still crucial to consider when evaluating asset risk.

10.4.3 Risks to Current Asset Management Strategies

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

Climate Change & Extreme Weather Events

Climate change and the increase in rainfall intensity pose significant risks to a stormwater network within the Township. The drainage capacity may be challenged, as future stormwater runoff may increase beyond the previously designed resiliency. If the capacity is exceeded, it can result in culvert failure, road washouts, erosion, and flood damages. Proactive maintenance and replacement of the stormwater system, in addition

upgrades in problem areas, will reduce the risk of damages due to climate change and increased rainfall intensity.

Changing Regulations

Changing regulations, including updates to design standards and assessment certification programs are considered a risk within the stormwater network. These changes may impact personnel qualifications and introduce new requirements that challenge existing infrastructure practices which can lead to potential compliance and adaptation issues for the Township.

10.5 Levels of Service

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

Ontario municipalities were first required to report on LOS for their core assets in July 2022. Stormwater assets must report on LOS related to 5 and 100-year storm resiliency. Municipalities may select additional metrics for LOS reporting. The following table details all LOS metrics mandated and otherwise selected by the Township and their performance as of 2022.

Value	LOS Statement	Community LOS	Technical LOS (2022)
Affordable	Stormwater services are affordable and managed at the lowest possible cost for expected level of service	The Township regularly inspects their municipal drains, and during road patrols culverts are inspected for settlement and washout issues. Annually, roadway catch basins are cleaned by an external contractor.	Annual capital reinvestment rate: 2.5%[8]
			O&M cost per household: $10.64
Sustai	Stormwater assets are used efficiently,	The average current of the stormwater network as of the	Average condition of piped network: 67.81%

[8] Capital Investment to the stormwater network varies each year based on the Township's needs. The 2022 reinvestment rate does not necessarily reflect the typical reinvestment rate or what might be expected from one year to the next.

Value	LOS Statement	Community LOS	Technical LOS (2022)
	and long-term plans are in place for the sustainability of stormwater services infrastructure	data effective date is good (64.8%). The condition of some stormwater segments is better or worse than others; for example, the OGS unit segment has an average condition of very good (80%) whereas most other segments have an average condition of good (60%).	Average condition of storm ponds: 43.78%
Scope	Description, which may include map, of the user groups or areas of the Township that are protected from flooding, including the extent of protection provided by the municipal stormwater system	Please refer to Appendix G: Stormwater LOS Maps for a map of the Stormwater Network.	% of properties in Township resilient to a 100-year storm: TBD
			% of the municipal stormwater management system resilient to a 5-year storm: 89%[9]
			% of urban catch basins and maintenance holes cleaned annually: 90%

[9] This figure assumes that storm mains constructed after 2008 are designed based on 5-year storm for local sewers and 10-year storm event for trunk sewers based on the Tavistock Master Storm System Drainage Plan. It also assumes that 39% of the storm mains constructed prior to 2008 are designed to a 5-year storm. This figure is an estimate based on the best available information available to the Township as of this report. This figure therefore may change as more accurate information becomes available.

10.6 Recommendations

Replacement Costs

- Continue to gather accurate replacement costs and update on a regular basis to ensure the accuracy of capital projections.

Condition Assessment

- Identify condition assessment strategies for high value and high-risk stormwater network assets. To approximate condition of storm mains, optimize other attributes such as age, material, soil type, and history of main breaks.

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 that the Township has established in this AMP. Additional metrics can be established as they are determined 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.

Lifecycle Strategy Recommendations

- Identify stormwater assets that are most critical and prioritize CCTV assessments[10] to these assets first. As condition information is obtained,

[10] CCTV inspections are a no-dig method of analysing the physical condition of mains. Instruments capture video and images which are connected to a computer that feeds real-time information back to the operator and is stored for future reference. Collectable information includes identification of internal corrosion, determination of leak locations, identification of blockages (impacting flow), and general data collection to materially aid in the determination of reliable condition assessment ratings.

ensure it is updated in the asset management software so that it can be incorporated into lifecycle management decision making and planning.

- The Township may consider a phased stormwater main renewal program to proactively replace mains. This will mitigate the risk of large capital expenditure spikes in the long term as cohorts of pipes come up for replacement. Phasing can be accomplished through utilizing CCTV results and established risk models.
- Review the cost of acquiring the identified valuable information for all stormwater assets against the expected benefit to determining if a larger data collection project is viable. To whatever extent data is collected, complete data updates to the asset management software with the collected and/or confirmed asset details.
- Ensure capital budget development considers the current and future forecasted capital requirements of stormwater network assets and how capital budget decisions may impact asset risk and performance.

11 Growth Assumptions

11.1 Description of Growth Assumptions

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

11.1.1 Oxford County Official Plan (2020)

The Oxford County Official Plan is the policy document that establishes the overall land use strategy for both the County and the eight area municipalities that comprise the County.

The policies and land use schedules contained in the Official Plan establish locational and development review requirements for various land uses (residential, commercial, industrial, institutional, parks, etc.), set out how agricultural land and other natural features and cultural heritage resources are to be protected and provide direction on how environmental constraints are to be addressed. The Official Plan also helps to guide municipal decisions with respect to infrastructure, public services and other investments.

The Oxford County Official Plan was adopted by Oxford County Council on December 13, 1995. The Plan has been continuously updated and amended since then, with the latest amendments being adopted in July 2023. The Plan provides a general policy direction and a long-range planning framework for development in East-Zorra Tavistock.

11.1.2 Regional Growth

Oxford County recently undertook a Phase 1 Comprehensive Review Study prepared by Hemson Consulting Ltd. that includes updated municipal growth forecasts and land need analysis. The purpose of the study was to provide up to date growth forecast and land supply information to inform the County's growth management policies and various other County and Area Municipal projects and initiatives.

All eight Area Municipalities in the County are forecast to experience residential and employment growth, and some are expected to require additional land to accommodate that growth. The following tables illustrate the population, household, and employment forecasts for East Zorra-Tavistock between 2016-2046.

Forecast Type	2016	2021	2026	2031	2036	2041	2046	Growth 2016-2046
Total Population	7,330	7,940	8,420	8,930	9,450	9,940	10,400	**3,070**
Total Occupied Households	2,710	2,990	3,210	3,440	3,660	3,840	4,020	**1,310**
Total Employment	2,800	2,950	3,020	3,100	3,200	3,320	3,450	**520**

11.2 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.

Planning for forecasted population growth may require the expansion of existing infrastructure and services. As growth-related assets are constructed or acquired, they should be integrated into the Township's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the Township will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

12 Financial Strategy

Key Insights

- The Township is committing approximately $2.1 million towards capital projects per year from sustainable revenue sources

- Given the annual capital requirement of $4.6 million, there is currently a funding gap of $2.5 million annually

- For tax-funded assets, we recommend increasing tax revenues by 1.9% each year for the next 15 years to achieve a sustainable level of funding

12.1 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 the Township of East Zorra-Tavistock 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
3. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods
4. Use of Senior Government Funds:
    a. Ontario Community Infrastructure Fund (OCIF)
    b. Gas Tax
    c. 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.

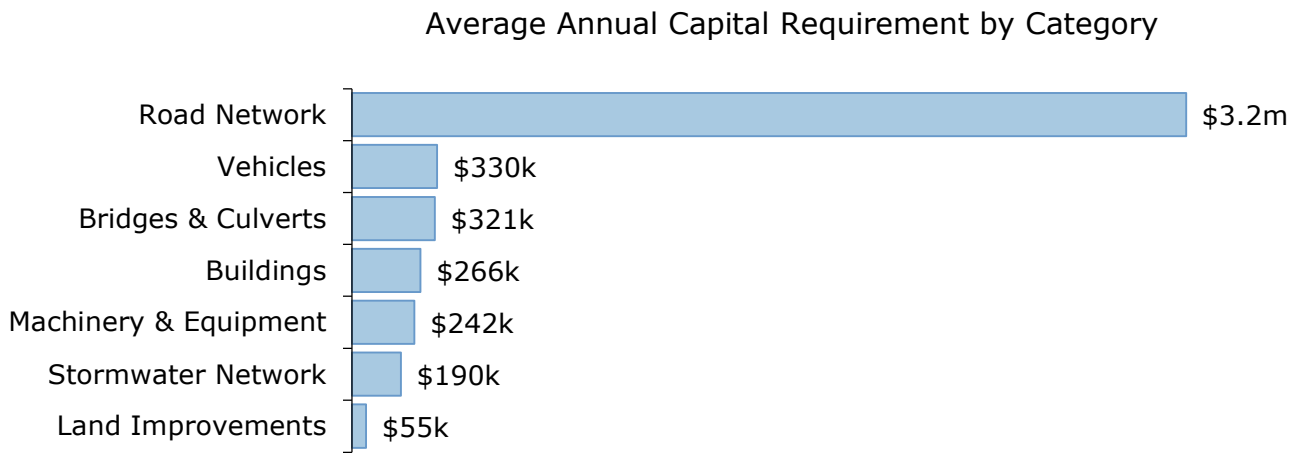
If the financial plan component results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the Province may evaluate a Township's approach to the following:

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.

12.1.1 Annual Requirements & Capital Funding

Annual Requirements

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability. In total, the Township must allocate approximately $4.6 million annually to address capital requirements for the assets included in this AMP.



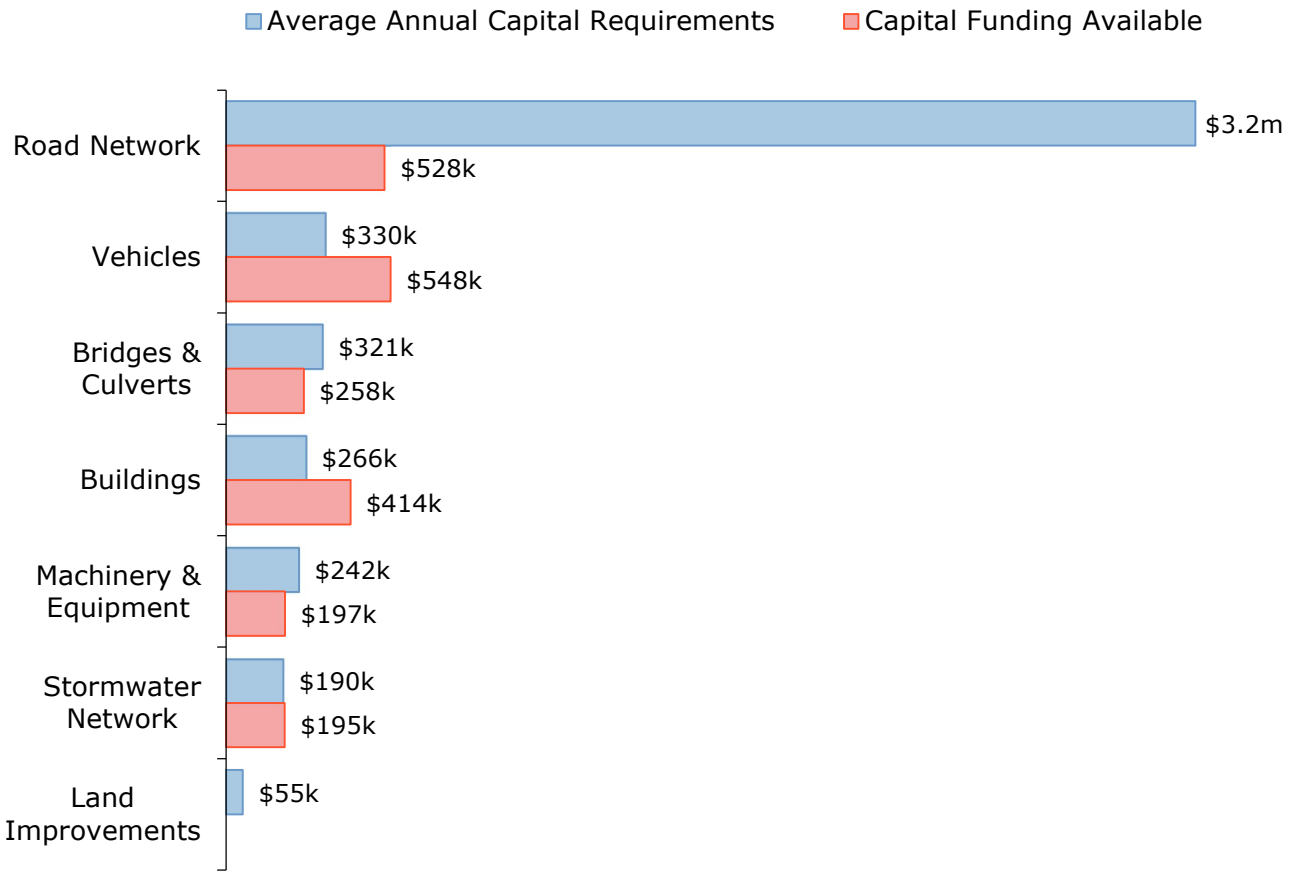
For all asset categories the annual requirement has been calculated based on a "replacement only" scenario, in which capital costs are only incurred at the construction and replacement of each asset.

However, lifecycle management strategies can be developed to identify capital costs that are realized through strategic rehabilitation and renewal of the Township's assets. The development of these strategies could allow for a comparison of potential cost avoidance if the strategies were to be implemented.

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.

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $2.1 million towards capital projects per year from sustainable revenue sources. Given the annual capital requirement of $4.6 million, there is currently a funding gap of $2.5 million annually.



12.2 Funding Objective

We have developed a scenario that would enable East Zorra-Tavistock to achieve full funding within 15 years for the following assets:

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

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

12.3 Financial Profile: Tax Funded Assets

12.3.1 Current Funding Position

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

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Taxes	Gas Tax	OCIF	Total Available	
Road Network	$3,228,000	$306,000	$221,000		$528,000	$2,700,000
Bridges & Culverts	$321,000	$27,000		$231,000	$258,000	$63,000
Buildings	$266,000	$414,000			$414,000	-
Land Improvements	$55,000	-			-	$55,000
Machinery & Equipment	$242,000	$197,000			$197,000	$45,000
Vehicles	$330,000	$548,000			$548,000	-
Stormwater Network	$190,000	$195,000			$195,000	-
Total	**$4,633,000**	**$1,687,000**	**$221,000**	**$231,000**	**$2,139,000**	**2,493,000**

The average annual investment requirement for the above categories is $4.6 million. Annual revenue currently allocated to these assets for capital purposes is $2.1 million leaving an annual deficit of $3.4 million. Put differently, these infrastructure categories are currently funded at 38% of their long-term requirements.

12.3.2 Full Funding Requirements

In 2022, the Township of East Zorra-Tavistock had annual tax revenues of $7.2 million. 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	37.5%
Bridges & Culverts	0.9%
Buildings	-2.1%
Land Improvements	0.8%

Machinery & Equipment	0.6%
Vehicles	-3.0%
Stormwater Network	-0.1%
Total	**34.6%**

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

a) The Township's debt payments for these asset categories will be decreasing by $193,000 over the next 15 years.

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

	Without Capturing Changes				With Capturing Changes			
	5 Years	**10 Years**	**15 Years**	**20 Years**	**5 Years**	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	$2,493,000	$2,493,000	$2,493,000	$2,493,000	$2,493,000	$2,493,000	$2,493,000	$2,493,000
Change in Debt Costs	N/A	N/A	N/A	N/A	($157,000)	($193,000)	($193,000)	($193,000)
Change in OCIF Grants	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit	$2,493,000	$2,493,000	$2,493,000	$2,493,000	$2,336,000	$2,301,000	$2,301,000	$2,301,000
Tax Increase Required	34.6%	34.6%	34.6%	34.6%	32.4%	31.9%	31.9%	31.9%
Annually	**6.2%**	**3.1%**	**2.1%**	**1.5%**	**5.8%**	**2.9%**	**1.9%**	**1.4%**

12.3.3 Financial Strategy Recommendations

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

a) When realized, reallocating the debt cost reductions of $193,000 to the infrastructure deficit as outlined above.
b) Increasing tax revenues by 1.9% each year for the next 15 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
c) Allocating the current gas tax and OCIF revenue as outlined previously.
d) Reallocating appropriate revenue from categories in a surplus position to those in a deficit position.

e) Increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable, since this funding is a multi-year commitment[11].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full capital expenditure funding on an annual basis in 15 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a capital requirement backlog of $2.1 million in total – $908,000 for Machinery & Equipment, $441,000 for Buildings, $258,000 for Vehicles, $203,000 for Land Improvements, $157,000 for Bridges & Culverts, and $156,000 for the Road 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.

12.4 Use of Debt

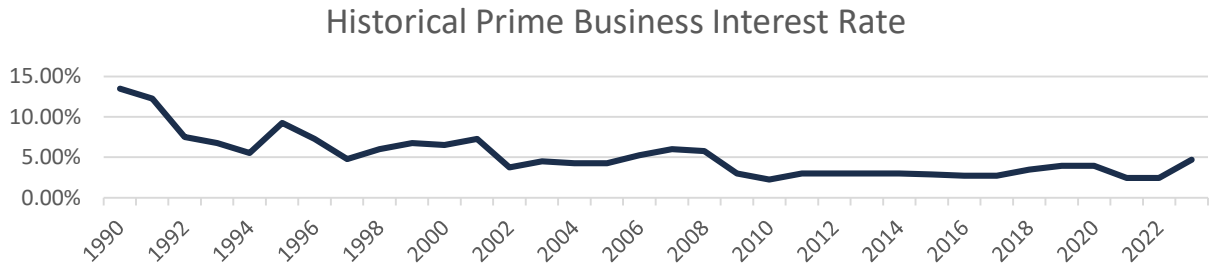
Debt can be strategically utilized as a funding source with in the long-term financial plan. The benefits of leveraging debt for infrastructure planning include:

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

[11] 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.

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%[12] 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%

East Zorra-Tavistock has historically used debt for investing in the asset categories as listed. There is a combined $769,000 of debt outstanding for all tax-funded assets

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

with corresponding principal and interest payments of $193,000 well within its provincially prescribed maximum of $1,845,000.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2018	2019	2020	2021	2022
Road Network	$483,000	$1,081,000	$937,000	$790,000	$639,000	$483,000
Stormwater Network	$168,000	$285,000	$257,000	$229,000	$199,000	$168,000
Buildings	$118,000	$183,000	$168,000	$152,000	$135,000	$118,000
Total Tax Funded:[13]	**$769,000**	**$1,549,000**	**$1,362,000**	**$1,170,000**	**$973,000**	**$769,000**

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2023	2024	2025	2026	2027	2028	2033
Road Network	$132,000	$132,000	$132,000	$132,000	-	-	$132,000
Stormwater Network	$38,000	$38,000	$38,000	$38,000	$22,000	$13,000	$38,000
Buildings	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000
Total Tax Funded:	**$193,000**	**$193,000**	**$193,000**	**$193,000**	**$44,000**	**$35,000**	**$193,000**

The revenue option outlined in this plan will allow East Zorra-Tavistock to fully fund its long-term infrastructure requirements without further use of debt.

12.5 Use of Reserves

12.5.1 Available Reserves

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

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

[13] Due to the diverse nature of non-core asset groups, the assets are indicated to be tax levy-funded but may be funded by user rates dependent on the service they enable.

d) managing the use of debt
e) normalizing infrastructure funding requirement

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 East Zorra-Tavistock'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.

12.5.2 Recommendation

In 2025, Ontario Regulation 588/17 will require East Zorra-Tavistock 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.

13 Appendices

Key Insights

- Appendix A: Infrastructure Report Card
- Appendix B: 10-Year Capital Requirements
- Appendix C: Condition Assessment Guidelines
- Appendix D: Data Quality Dimensions
- Appendix E: Road Network LOS Map
- Appendix F: Pavement Condition Examples
- Appendix G: Stormwater LOS Maps
- Appendix H: Bridge Condition Images
- Appendix I: Average Condition by Facility
- Appendix J: Risk Profiles

Appendix A: Infrastructure Report Card

Asset Category	Replacement Cost (millions)	Asset Condition	Financial Capacity	
Road Network	$75.0	Good (75%)	Annual Requirement:	$3,228,000
			Funding Available:	$528,000
			Annual Deficit:	**$2,700,000**
Bridges & Culverts	$16.7	Good (64%)	Annual Requirement:	$321,000
			Funding Available:	$258,000
			Annual Deficit:	**$63,000**
Buildings	$13.8	Fair (59%)	Annual Requirement:	$266,000
			Funding Available:	$414,000
			Annual Deficit:	**-**
Land Improvements	$1.1	Poor (39%)	Annual Requirement:	$55,000
			Funding Available:	-
			Annual Deficit:	**$55,000**
Machinery & Equipment	$2.6	Poor (36%)	Annual Requirement:	$242,000
			Funding Available:	$197,000
			Annual Deficit:	**$45,000**
Vehicles	$4.0	Fair (40%)	Annual Requirement:	$330,000
			Funding Available:	$548,000
			Annual Deficit:	**-**
Stormwater Network	$7.9	Good (65%)	Annual Requirement:	$190,000
			Funding Available:	$195,000
			Annual Deficit:	**-**
Overall	$121.1	Fair (57%)	Annual Requirement:	$4,633,000
			Funding Available:	$2,139,000
			Annual Deficit:	**$2,493,000**

Appendix B: 10-Year Capital Requirements

The following tables identify the capital cost requirements for each of the next 10 years in order to meet projected capital requirements and maintain the current level of service.

Road Network											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Curbs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Paved Roads	$0	$1.7m	$4.9m	$1.1m	$479k	$426k	$1.4m	$2.3m	$1.7m	$863k	$2.0m
Sidewalks	$156k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Streetlights	$0	$0	$0	$0	$0	$24k	$0	$0	$0	$93k	$0
Total	**$156k**	**$1.7m**	**$4.9m**	**$1.1m**	**$479k**	**$450k**	**$1.4m**	**$2.3m**	**$1.7m**	**$957k**	**$2.0m**

Bridges & Culverts											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Bridges	$0	$429k	$182k	$307k	$186k	$445k	$45k	$20k	$108k	$7k	$124k
Culverts	$0	$244k	$98k	$162k	$47k	$1.4m	$0	$0	$0	$0	$636k
Guiderails	$157k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$157k**	**$673k**	**$280k**	**$469k**	**$233k**	**$1.8m**	**$45k**	**$20k**	**$108k**	**$7k**	**$760k**

Buildings											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Hickson Firehall	$0	$3k	$0	$0	$0	$0	$11k	$0	$0	$0	$12k
Hickson Park	$0	$0	$0	$0	$0	$11k	$0	$0	$49k	$0	$0
Hickson Road Shop	$0	$0	$0	$0	$62k	$0	$0	$59k	$0	$62k	$11k
Innerkip Community Centre	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Innerkip Firehall	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$12k
Innerkip Lime Storage	$0	$0	$0	$0	$0	$0	$0	$0	$6k	$0	$0
Innerkip Park	$194k	$0	$0	$0	$0	$0	$0	$0	$141k	$0	$0
Public Utilities Commission	$0	$0	$0	$99k	$0	$0	$0	$19k	$0	$0	$0
Tavistock Area	$17k	$0	$0	$0	$0	$0	$0	$0	$0	$77k	$0
Tavistock Firehall	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$9k
Tavistock Memorial Hall	$0	$0	$0	$0	$0	$0	$527	$24k	$0	$972k	$0
Tavistock Public Works	$0	$0	$0	$0	$0	$0	$0	$0	$0	$5k	$0
Tavistock Queens Park	$87	$0	$0	$0	$0	$0	$21k	$0	$0	$0	$0
Township of East Zorra-Tavistock	$229k	$61k	$0	$9k	$0	$0	$0	$0	$2k	$0	$0
Total	**$441k**	**$63k**	**$0**	**$107k**	**$62k**	**$11k**	**$32k**	**$103k**	**$198k**	**$1.1m**	**$45k**

Land Improvements											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Hickson Park	$60k	$0	$0	$0	$0	$0	$0	$0	$126k	$0	$0
Innerkip Community Centre	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Innerkip Park	$143k	$0	$0	$30k	$53k	$0	$0	$10k	$187k	$0	$0
Public Works	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tavistock Parks & Facilities	$0	$11k	$0	$0	$0	$0	$190k	$0	$0	$0	$0
Total	**$203k**	**$11k**	**$0**	**$30k**	**$53k**	**$0k**	**$190k**	**$10k**	**$313k**	**$0**	**$0**

Machinery & Equipment											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Fire Equipmemt	$587k	$5k	$43k	$42k	$98k	$40k	$55k	$36k	$107k	$61k	$51k
Furniture & Fixtures	$132k	$3k	$1k	$0	$4k	$0	$9k	$1k	$0	$0	$5k
General Equipment	$65k	$0	$18k	$8k	$43k	$38k	$0	$18k	$24k	$72k	$0
Phone System	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Public Works Equipment	$18k	$745	$48k	$0	$7k	$27k	$33k	$28k	$2k	$12k	$27k
Recreation Equipment	$106k	$11k	$0	$40k	$116k	$84k	$164k	$105k	$57k	$57k	$28k
Total	**$908k**	**$20k**	**$109k**	**$91k**	**$268k**	**$189k**	**$261k**	**$187k**	**$190k**	**$203k**	**$112k**

Vehicles											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Fire	$188k	$0	$51k	$371k	$452k	$285k	$0	$80k	$0	$0	$0
General	$0	$0	$0	$0	$87k	$45k	$0	$0	$0	$49k	$38k
Public Works	$33k	$0	$646k	$93k	$47k	$64k	$0	$33k	$45k	$48k	$996k
Recreation	$38k	$41k	$0	$0	$0	$0	$0	$41k	$36k	$0	$0
Total	**$258k**	**$41k**	**$697k**	**$464k**	**$586k**	**$394k**	**$0**	**$154k**	**$81k**	**$97k**	**$1.0m**

Stormwater Network											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Catch Basins	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance Holes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
OGS Units	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Storm Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Stormwater Management Facility	$0	$0	$250k	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$0**	**$0**	**$250k**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Appendix C: Condition Assessment Guidelines

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

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

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

Role of Asset Condition Data

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

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

Guidelines for Condition Assessment

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

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating criteria, in a format that can be used for asset management decision-making. As a result, it is important that staff adequately define the condition rating criteria that should be used and the assets that require a discrete condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project.

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

Developing a Condition Assessment Schedule

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

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

Appendix D: Data Quality Dimensions

The quality of data affects the reliability of its outputs, and the trust organizations have in those outputs, especially when used to inform decisions. As a best practice, the quality of data can be evaluated based on the six data quality dimensions. These quality dimensions are as follows:

1. **Accuracy:** The information collected reflects reality and can be confirmed with a verifiable source (i.e., VIN information). An example of accuracy not being met is the in-service year on record is 1950 & the Asset model indicates a service year of 1980. Accurate reporting assists in powerful and trusted reporting.

2. **Completeness:** Data is comprehensively collected so that it can deliver meaningful inferences and effectively inform decisions. E.G.: Required fields are populated for all assets

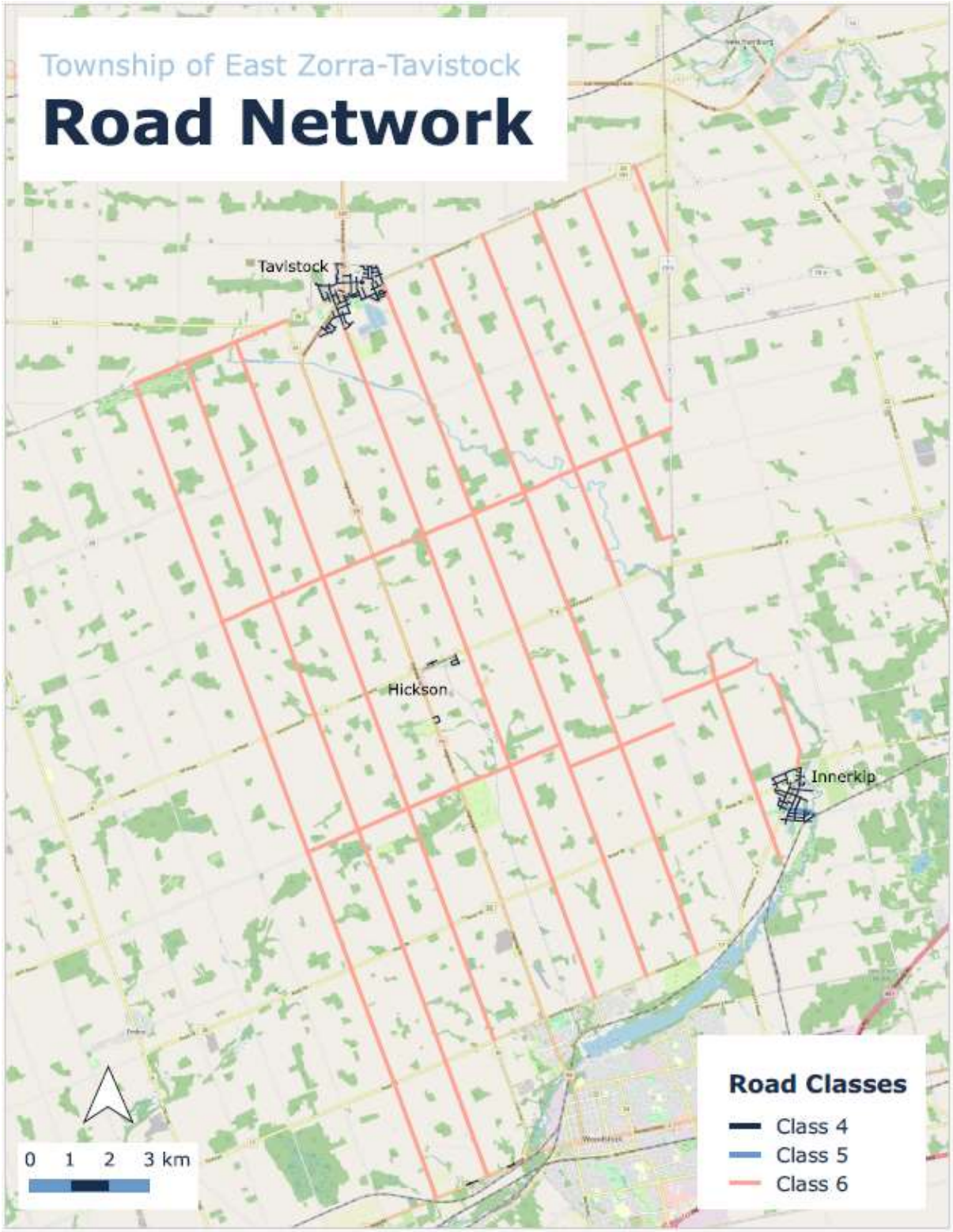
3. **Consistency:** Data on the same asset is consistent across multiple sources if applicable. For example, information in the Asset Management System matches information in finance system.

4. **Timeliness:** Data is available when it is needed. This often requires limited lag time between the event that generates the asset data (i.e., condition assessment) and the updates to the system to reflect the event.

5. **Validity:** Consistent Data Format that is supported by any associated standards or structures. For example, the asset in service date is consistently formatted YYYY-MM-DD and not sometimes YYYY-DD-MM and month value is never greater than 12.

6. **Uniqueness:** Each asset appears only once in the system and there is no data duplication or overlaps. For example, each asset has a unique asset ID, no duplication of asset information.

Appendix E: Road Network LOS Map



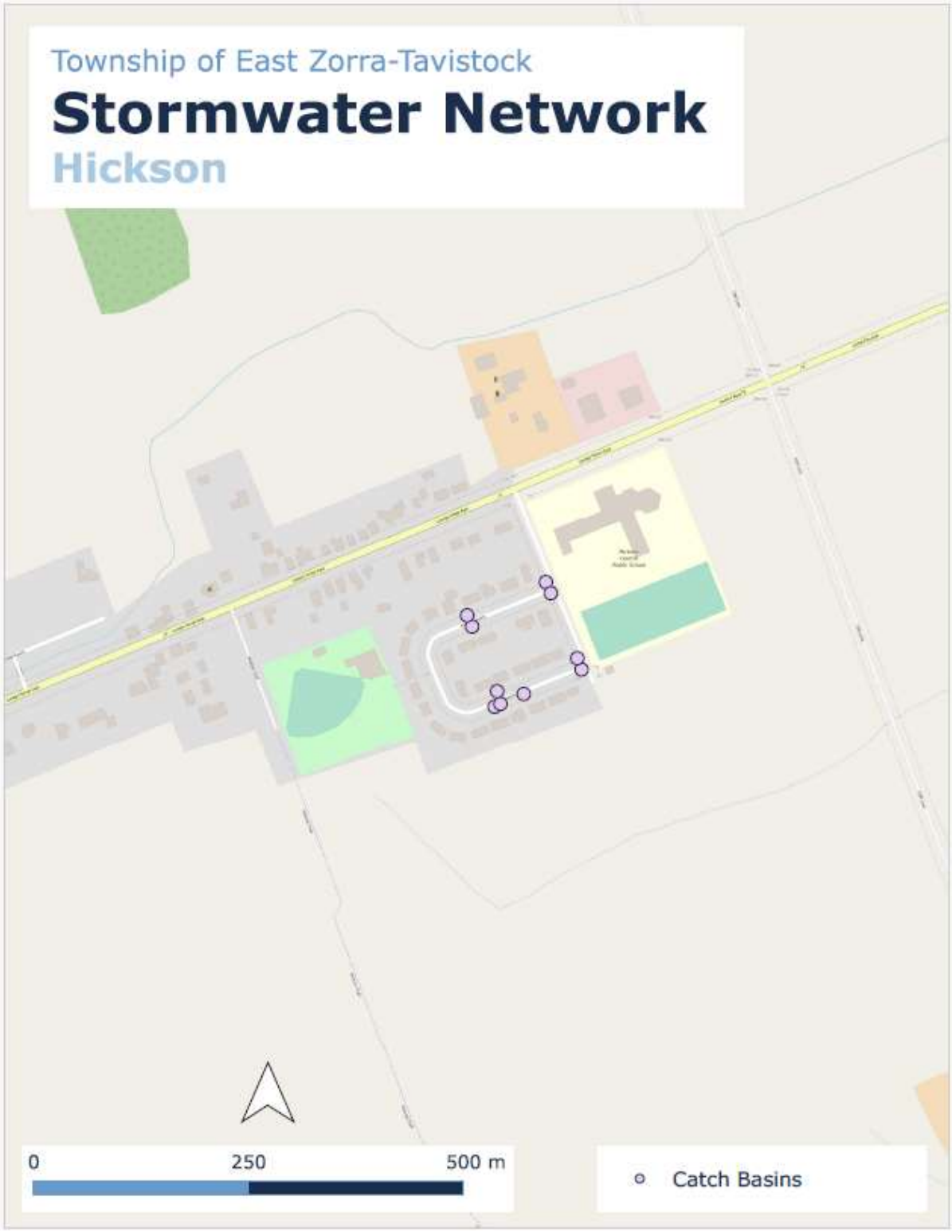
Appendix F: Pavement Condition Examples

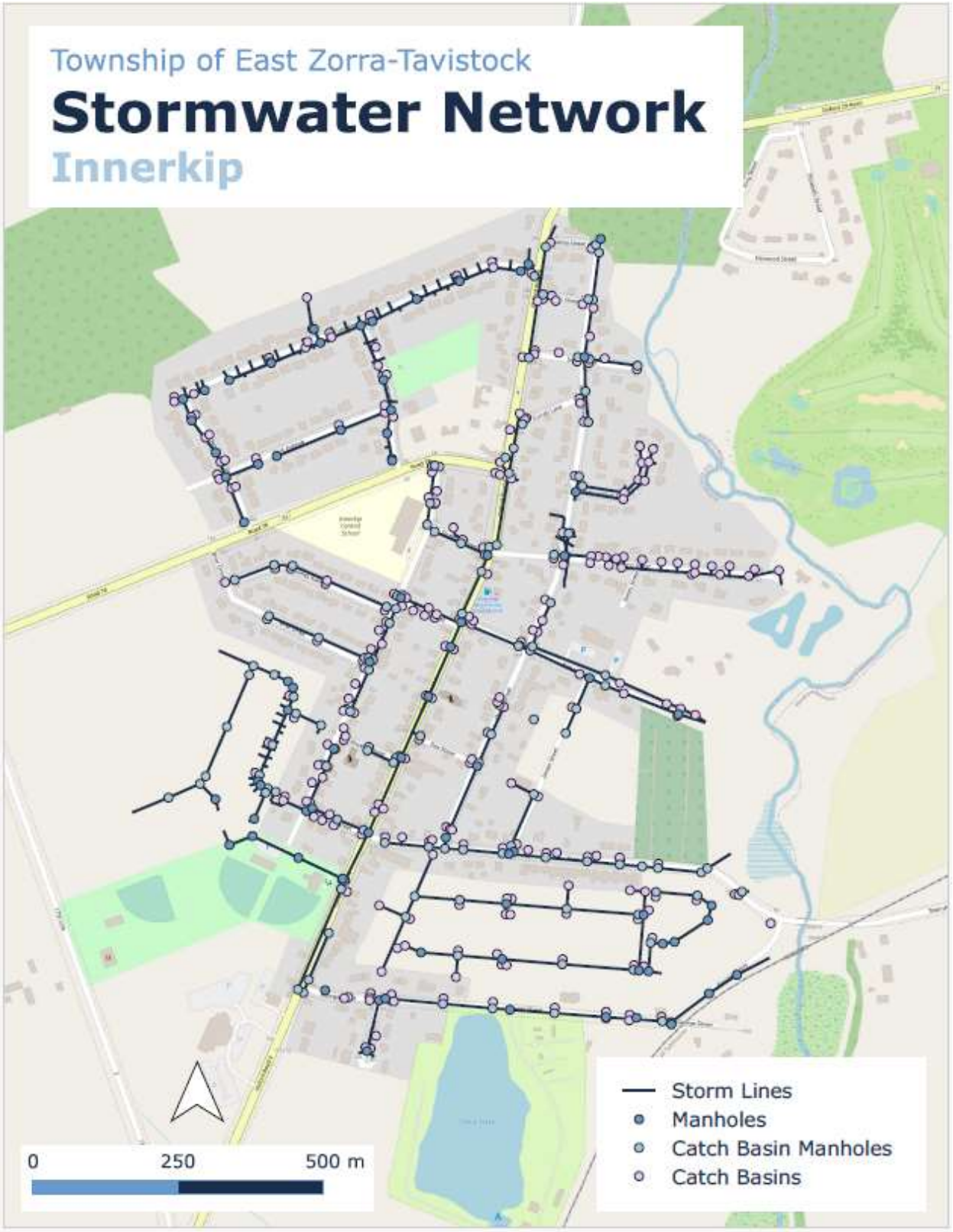
Figure 1: An example of a road (0405-01) in very good condition as of the last assessment date.

Figure 2: An example of a road (0479-00) in good condition as of the last assessment date.

Figure 3: An example of a road (0457-01) in fair condition as of the last assessment date.

Appendix G: Stormwater LOS Maps




Township of East Zorra-Tavistock
Stormwater Network
Innerkip
Storm Lines
Manholes
Catch Basin Manholes
Catch Basins
0
250
500 m


Township of East Zorra-Tavistock
Stormwater Network
Tavistock
Storm Lines
Manholes
Catch Basin Manholes
Catch Basins
0
250
500 m

Appendix H: Bridge Condition Images

Figure 4: Bridge on 10th Line In Fair Condition (40) as of last assessment date

Figure 5: Bridge on 14th line in Good Condition (60) as of last Assessment date

Figure 6: Bridge on 10th Line in Very Good condition as of last Assessment Date

Appendix I: Average Condition by Facility

Asset Segment	Condition (%)
Hickson Firehall	68.6
Hickson Park	74.3
Hickson Shop	71.5
Innerkip Community Centre	63.9
Innerkip Firehall	72
Innerkip Park	73.6
Innerkip Lime Storage	14
Tavistock Memorial Hall	64.7
Public Utilities Commission Building	70.75
Tavistock Arena	67.5
Township of East-Zorra Tavistock	37
Tavistock Queen's Park	61.8
Tavistock Firehall	70.7
Tavistock Public works	61.8

Appendix J: Risk Profiles

Probability of Failure

Asset Category	Asset Segments	Probability Attribute	Factor	Probability of Failure
Road Network	Paved and Unpaved Road Assets	PCI (75%)	80 - 100	1—Rare
			60 - 79	2—Unlikely
			40 - 59	3—Possible
			20 - 39	4—Likely
			0 - 19	5—Almost Certain
		Service Life Remaining (25%)	20 years+	1—Rare
			10 – 19 years	2—Unlikely
			5 – 9 years	3—Possible
			1 – 4 years	4—Likely
			0 years	5—Almost Certain
	Road Appurtenances	Asset Condition (80%)	80 - 100	1—Rare
			60 - 79	2—Unlikely
			40 - 59	3—Possible
			20 - 39	4—Likely
			0 - 19	5—Almost Certain
		Service Life Remaining (20%)	20 years+	1—Rare
			10 – 19 years	2—Unlikely
			5 – 9 years	3—Possible
			1 – 4 years	4—Likely
			0 years	5—Almost Certain

Asset Category	Asset Segments	Probability Attribute	Factor	Probability of Failure
Bridges & Culverts	Bridges & Structural Culverts	Asset Condition (70%)	80 - 100	1—Rare
			60 - 79	2—Unlikely
			40 - 59	3—Possible
			20 - 39	4—Likely
			0 - 19	5—Almost Certain
		Service Life Remaining (30%)	20 years+	1—Rare
			10 – 19 years	2—Unlikely
			5 – 9 years	3—Possible
			1 – 4 years	4—Likely
			0 years	5—Almost Certain
	Small Diameter Culverts	Asset Condition (70%)	80 - 100	1—Rare
			60 - 79	2—Unlikely
			40 - 59	3—Possible
			20 - 39	4—Likely
			0 - 19	5—Almost Certain
		Material (30%)	Concrete	1—Rare
			HDPE, PVC	2—Unlikely
			CSP	4—Likely

Asset Category	Asset Segments	Probability Attribute	Factor	Probability of Failure
Stormwater Network	Stormwater Assets (excluding stormwater mains)	Asset Condition (100%)	80 - 100	1—Rare
			60 - 79	2—Unlikely
			40 - 59	3—Possible
			20 - 39	4—Likely
			0 - 19	5—Almost Certain
	Stormwater Mains	Asset Condition (50%)	80 - 100	1—Rare
			60 - 79	2—Unlikely
			40 - 59	3—Possible
			20 - 39	4—Likely
			0 - 19	5—Almost Certain
		Asset Material (25%)	Concrete	1—Rare
			HDPE, PVC	3—Possible
		Slope (25%)	1-2%	1—Rare
			0.25-0.99%	3—Possible
			Less than 0.25%	5—Almost Certain
Buildings	All Assets	Asset Condition (60%)	80 - 100	1—Rare
			60 - 79	2—Unlikely
			40 - 59	3—Possible
			20 - 39	4—Likely
			0 - 19	5—Almost Certain
		Service Life Remaining (40%)	20 years+	1—Rare
			10 – 19 years	2—Unlikely
			5 – 9 years	3—Possible
			1 – 4 years	4—Likely
			0 years	5—Almost Certain

Asset Category	Asset Segments	Probability Attribute	Factor	Probability of Failure
Vehicles	All Assets	Condition (50%)	80 - 100	1—Rare
			60 - 79	2—Unlikely
			40 - 59	3—Possible
			20 - 39	4—Likely
			0 - 19	5—Almost Certain
		Service Life Remaining (50%)	10 years+	1—Rare
			5 – 9 years	2—Unlikely
			2 – 4 years	3—Possible
			1 year	4—Likely
			0 years	5—Almost Certain
Machinery & Equipment	All Assets	Condition (50%)	80 - 100	1—Rare
			60 - 79	2—Unlikely
			40 - 59	3—Possible
			20 - 39	4—Likely
			0 - 19	5—Almost Certain
		Service Life Remaining (50%)	10 years+	1—Rare
			5 – 9 years	2—Unlikely
			2 – 4 years	3—Possible
			1 year	4—Likely
			0 years	5—Almost Certain

Asset Category	Asset Segments	Probability Attribute	Factor	Probability of Failure
Land Improvements	All Assets	Asset Condition (60%)	80 - 100	1—Rare
			60 - 79	2—Unlikely
			40 - 59	3—Possible
			20 - 39	4—Likely
			0 - 19	5—Almost Certain
		Service Life Remaining (40%)	20 years+	1—Rare
			10 – 19 years	2—Unlikely
			5 – 9 years	3—Possible
			1 – 4 years	4—Likely
			0 years	5—Almost Certain

Consequence of Failure

Asset Category	Asset Segments	Consequence Type	Consequence Attribute	Factor	Consequence of Failure
Road Network	Paved Road Assets	Economic (33%)	Replacement Cost (60%)	$0 - $100,000	1—Insignificant
				$100,001 - $150,000	2—Minor
				$150,001 - $350,000	3—Moderate
				$350,001 - $2,500,000	4—Major
				$2,500,001+	5—Severe
			Roadside Environment (40%)	Rural	1 – Insignificant
				Urban	5 – Severe
		Operational (33%)	MMS Road Class (100%)	6	1—Insignificant
				5	2—Minor
				4	3—Moderate
				3	4—Major
		Social (33%)	AADT (2020) (100%)	0 - 50	1—Insignificant
				51 - 100	2—Minor
				101 - 150	3—Moderate
				151 - 200	4—Major
				201 - 250	5—Severe

Asset Category	Asset Segments	Consequence Type	Consequence Attribute	Factor	Consequence of Failure
Road Network	Unpaved Road Assets	Economic (33%)	Replacement Cost (60%)	$0 - $50,000	1—Insignificant
				$50,001 - $100,000	2—Minor
				$100,001 - $150,000	3—Moderate
				$150,001 - $200,000	4—Major
				$200,001+	5—Severe
			Roadside Environment (40%)	Rural	1 – Insignificant
				Urban	5 – Severe
		Operational (33%)	MMS Road Class (100%)	6	1—Insignificant
				5	2—Minor
				4	3—Moderate
				3	4—Major
		Social (33%)	AADT (2020) (100%)	0 - 50	1—Insignificant
				51 - 100	2—Minor
				101 - 150	3—Moderate
				151 - 200	4—Major
				201 - 250	5—Severe
	Road Appurtenances	Economic (80%)	Replacement Cost (100%)	$0 - $10,000	1—Insignificant
				$10,001 - $50,000	2—Minor
				$50,001 - $100,000	3—Moderate
				$100,001 - $500,000	4—Major
				$500,001+	5—Severe
		Health and Safety (20%)	Segment (100%)	Curbs	1—Insignificant
				Sidewalks	2—Minor
				Streetlights	3—Moderate

Asset Category	Asset Segments	Consequence Type	Consequence Attribute	Factor	Consequence of Failure
Bridges & Culverts	Bridges & Structural Culverts	Economic (30%)	Replacement Cost (100%)	$0 - $100,000	1—Insignificant
				$100,001 - $150,000	2—Minor
				$150,001 - $350,000	3—Moderate
				$350,001 - $2,500,000	4—Major
				$2,500,001+	5—Severe
		Operational (20%)	Crossing Type (100%)	Non-navigable water	1—Insignificant
				Navigable water	5—Severe
		Social (30%)	AADT (60%)	0 - 50	1—Insignificant
				51 - 100	2—Minor
				101 - 150	3—Moderate
				151 - 200	4—Major
				201 - 250	5—Severe
			Detour Distance (km) (40%)	Less than 1	1—Insignificant
				1 - 4	2—Minor
				5 - 9	3—Moderate
				10 - 14	4—Major
				15+	5—Severe
		Health and Safety (20%)	Speed Limit (km/h) (100%)	0 - 40	1—Insignificant
				41 - 50	2—Minor
				51 - 60	3—Moderate
				61 - 80	4—Major
				81+	5—Severe

Asset Category	Asset Segments	Consequence Type	Consequence Attribute	Factor	Consequence of Failure

Bridges & Culverts	Small Diameter Culverts	Economic (30%)	Replacement Cost (100%)	$0 - $5,000	1—Insignificant
				$5,001 - $25,000	2—Minor
				$25,001 - $100,000	3—Moderate
				$100,001 - $500,000	4—Major
				$500,001+	5—Severe
		Operational (40%)	Cumulative Diameter (mm) (100%)	0 - 300	1—Insignificant
				301 - 450	2—Minor
				451 - 525	3—Moderate
				526 - 900	4—Major
				901+	5—Severe
		Social (30%)	Culvert Type (100%)	Driveway	2—Minor
				Roadside	4—Major

Asset Category	Asset Segments	Consequence Type	Consequence Attribute	Factor	Consequence of Failure
Stormwater Network	Stormwater Assets (excluding stormwater mains)	Economic (100%)	Replacement Cost (100%)	$0 - $5,000	1—Insignificant
				$5,001 - $20,000	2—Minor
				$20,001 - $50,000	3—Moderate
				$50,001 - $100,000	4—Major
				$100,001+	5—Severe
	Stormwater Mains	Economic (50%)	Replacement Cost (90%)	$0 - $5,000	1—Insignificant
				$5,001 - $25,000	2—Minor
				$25,001 - $100,000	3—Moderate
				$100,001 - $500,000	4—Major
				$500,001+	5—Severe
			Undersized Pipe (10%)	No	1—Insignificant
				Yes	5—Severe
		Operational (50%)	Pipe Diameter (mm) (100%)	0 - 200	1—Insignificant
				201 - 300	2—Minor
				301 - 450	3—Moderate
				451 - 525	4—Major
				526+	5—Severe

Asset Category	Asset Segments	Consequence Type	Consequence Attribute	Factor	Consequence of Failure
Buildings	All Assets	Economic (50%)	Building Replacement Cost (75%)	$0 - $100,000	1—Insignificant
				$100,001 - $500,000	2—Minor
				$500,001 - $1,000,000	3—Moderate
				$1,000,001 - $3,000,000	4—Major
				$3,000,001+	5—Severe
			Component Replacement Cost (25%)	$0 - $5,000	1—Insignificant
				$5,001 - $25,000	2—Minor
				$25,001 - $100,000	3—Moderate
				$100,001 - $500,000	4—Major
				$500,001+	5—Severe
		Strategic (50%)	Department (100%)	Parks and Recreation, Building	1—Insignificant
				Public Works	3—Moderate
				Administration, Community Centre	4—Major
				Fire	5—Severe

Asset Category	Asset Segments	Consequence Type	Consequence Attribute	Factor	Consequence of Failure
Vehicles	Fire Vehicles	Economic (75%)	Replacement Cost (50%)	$0 - $40,000	1—Insignificant
				$40,001 - $75,000	2—Minor
				$75,001 - $250,000	3—Moderate
				$250,001 - $350,000	4—Major
				$350,000+	5—Severe
			Vehicle Type (50%)	Light Duty	1—Insignificant
				Heavy Duty	4—Major
		Strategic (25%)	Segment (50%)	General	1—Insignificant
				Recreation	2—Minor
				Public Works	3—Moderate
				Fire	4—Major
			Truck Type (50%)	Rescue	3—Moderate
				Tanker, Pumper	5—Severe
	All Other Vehicles	Economic (75%)	Replacement Cost (50%)	$0 - $40,000	1—Insignificant
				$40,001 - $75,000	2—Minor
				$75,001 - $250,000	3—Moderate
				$250,001 - $350,000	4—Major
				$350,000+	5—Severe
			Vehicle Type (50%)	Light Duty	1—Insignificant
				Heavy Duty	4—Major
		Strategic (25%)	Segment (100%)	General	1—Insignificant
				Recreation	2—Minor
				Public Works	3—Moderate
				Fire	4—Major

Asset Category	Asset Segments	Consequence Type	Consequence Attribute	Factor	Consequence of Failure
Machinery & Equipment	All Assets	Economic (50%)	Replacement Cost (100%)	0 - $5,000	1—Insignificant
				$5,001 - $10,000	2—Minor
				$10,001 - $50,000	3—Moderate
				$50,001 - $150,000	4—Major
				$150,001+	5—Severe
		Strategic (50%)	Segment (100%)	General	1—Insignificant
				Recreation	2—Minor
				Public Works	3—Moderate
				Fire & Emergency Services	5—Severe
Land Improvements	All Assets	Economic (100%)	Replacement Cost (100%)	$0 - $5,000	1—Insignificant
				$5,001 - $25,000	2—Minor
				$25,001 - $100,000	3—Moderate
				$100,001 - $150,000	4—Major
				$150,001+	5—Severe