

The 2021 Asset Management Plan for the Municipality of Thames Centre



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Version 3.0

Key Statistics

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|---|--|
| <p>\$323 million</p> <p>Replacement cost of asset portfolio (gravel roads excluded)</p> | <p>\$24,507</p> <p>Replacement cost of infrastructure per capita</p> |
| <p>2.61%</p> <p>Target average annual infrastructure reinvestment rate</p> | <p>1.24%</p> <p>Actual average annual infrastructure reinvestment rate</p> |
| <p>75%</p> <p>Percentage of assets in fair or better condition</p> | <p>51%</p> <p>Percentage of annual infrastructure funding needs currently being met</p> |
| <p>11%</p> <p>Portion of total infrastructure funding that comes from the Federal Gas Tax Fund (GTF)</p> | <p>41%</p> <p>Annual cost savings for roads, water and storm mains through proactive lifecycle management</p> |
| <p>\$323</p> <p>Annual infrastructure deficit per capita</p> | <p>15 years</p> <p>Recommended timeframe for eliminating annual infrastructure deficit for tax-funded and utility rate-funded assets respectively</p> |

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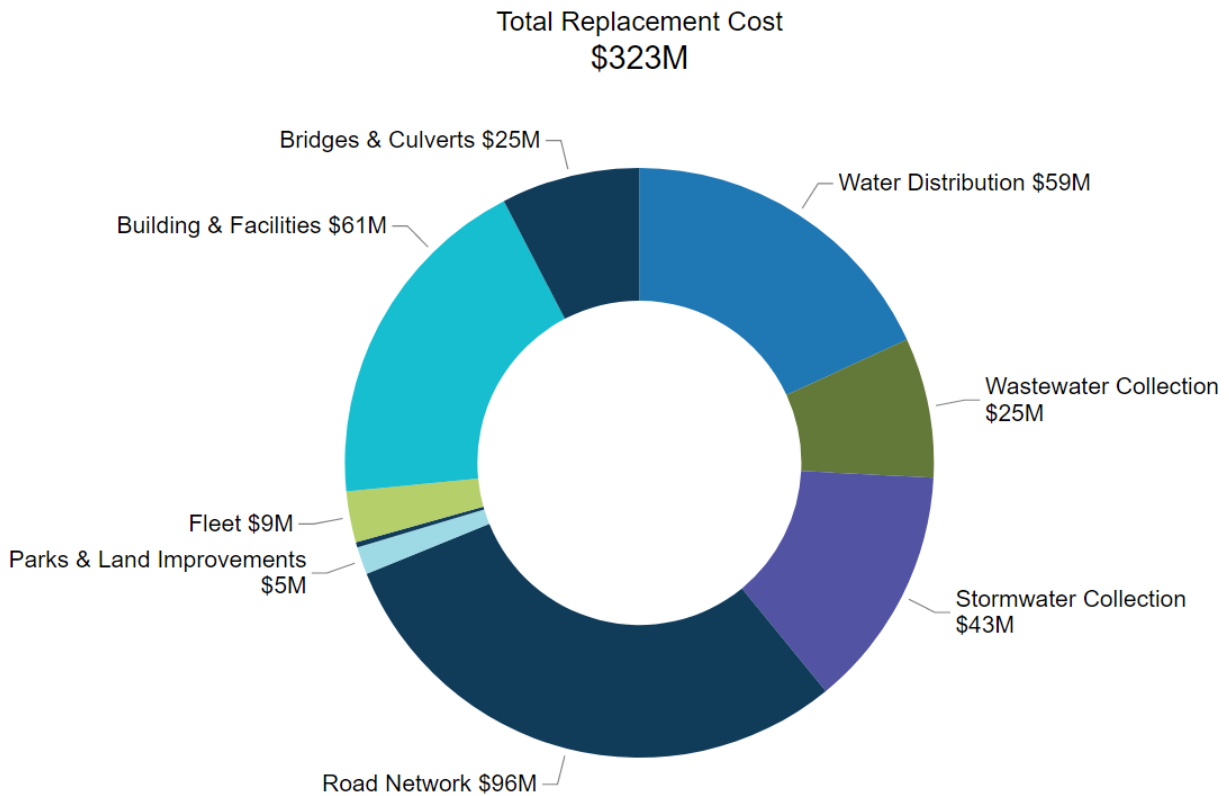
Executive Summary

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.

All municipalities in Ontario are required to complete an asset management plan (AMP) in accordance with Ontario Regulation 588/17 (O. Reg. 588/17). This AMP outlines the current state of asset management planning in the Municipality of Thames Centre. It 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, Thames Centre can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP includes the following asset categories:

| Asset Category | Source of Funding |
|---------------------------|-------------------|
| Road Network | |
| Bridges & Culverts | |
| Buildings & Facilities | |
| Machinery & Equipment | Tax Levy |
| Fleet | |
| Parks & Land Improvements | |
| Water Distribution | |
| Wastewater Collection | User Rates |
| Stormwater Collection | |



The overall replacement cost of the asset categories included in this AMP totals \$323.3 million. 75% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 35% of assets. For the remaining 65% 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 has used a combination of proactive lifecycle strategies (roads, water mains, wastewater mains and stormwater mains) and replacement only strategies (all other assets) to determine the lowest cost option to maintain the current level of service.

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Municipality’s average annual capital requirement totals \$8.4 million. Based on a historical analysis of sustainable capital funding sources, the Municipality is committing approximately \$4.2 million towards capital projects per year. As a result, there is currently an annual funding gap of \$4.3 million.

A financial strategy was developed to address the annual capital funding gap. The following table compares to total and average annual tax/rate change required to eliminate the Municipality’s infrastructure deficit:

| Funding Source | Years Until Full Funding | Total Tax/Rate Change | Average Annual Tax/Rate Change |
|--------------------------|--------------------------|-----------------------|--------------------------------|
| Tax-Funded Assets | 15 Years | 27.2% | 1.7% |
| Rate-Funded (Water) | 15 Years | 24.3% | 1.6% |
| Rate-Funded (Wastewater) | 15 Years | 59.9% | 2.4% |

With the development of this AMP, Thames Centre has achieved compliance with O. Reg. 588/17 to the extent of the requirements that must be completed by July 1, 2022 and 2024. There are additional requirements concerning proposed levels of service and growth that must be met by July 1, 2025.

This AMP represents a snapshot in time and is based on the best available processes, data, and information at the Municipality. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources. Several recommendations have been developed to guide the continuous refinement of the Municipality’s asset management program. These include:

- a) asset inventory data review and validation
- b) the formalization of condition assessment strategies
- c) the implementation of risk-based decision-making as part of asset management planning and budgeting
- d) the continuous review, development and implementation of optimal lifecycle management strategies
- e) the identification of proposed levels of service

The evaluation of the above items and further development of a data-driven, best-practice approach to asset management is recommended to ensure the Municipality is providing optimal value through its management of infrastructure and delivery of services.

1

Introduction and Context

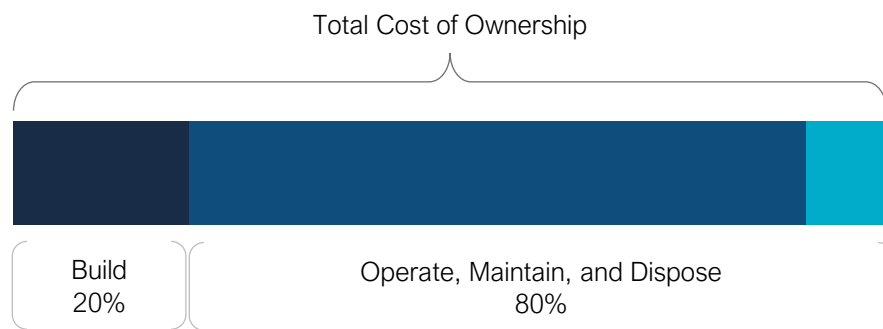
Key Insights

- 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.
- A municipal asset management program is a combination of several disciplines or business functions, including management, financial and economic analyses, engineering and operations and maintenance.
- The Municipality's strategic 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.

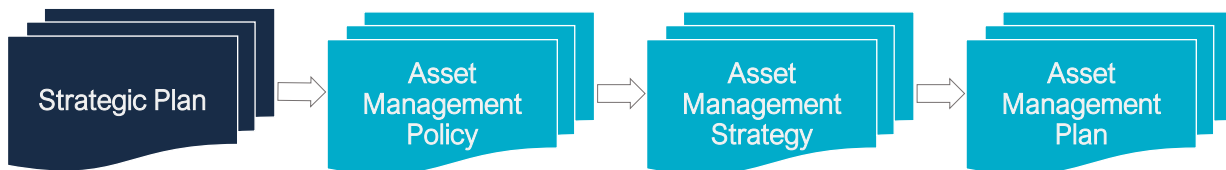
1.1 An Overview of Asset Management

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% comes 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 diagram below depicts an industry-standard approach and sequence to developing a practical asset management program.



The diagram, adopted from the Institute of Asset Management (IAM), illustrates the concept of 'line of sight', or 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.

1.1.1 Asset Management Policy

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

Thames Centre approved policy CP-1-1.3 "Strategic Asset Management Policy for Municipal Infrastructure" on June 24th, 2019, in accordance with Ontario Regulation 588/17. Municipal Council also opted to incorporate the policy into the Corporate Section of the Thames Centre Policy Manual.

The stated goals of the policy are:

- To provide a framework for implementing asset management to enable a consistent approach at all department levels with the Municipality.
- Provide guidance to staff responsible for asset management.
- Communicate asset management principles endorsed by the Municipality.
- Provide transparency, accountability and demonstrate the decision-making process which combines municipal plans and policies, budget, service levels and risk.

The policy provides a foundation for the development of an asset management program within the Municipality. It covers key components that define a comprehensive asset management policy:

- The policy's objectives dictate the use of asset management and data management practices to ensure all assets meet the expected levels and provide the desired levels of service in the most efficient and effective manner;
- The policy commits to, where appropriate, incorporating asset management in the Municipality's other plans;
- There are formally defined roles and responsibilities of internal staff;
- The key principles include the use of a cost/benefit analysis in the management of risk; and
- The policy statements are well defined.

1.1.2 Asset Management Strategy

An asset management strategy outlines the business processes, organizational practices, and key initiatives with associated timelines and resources designed to create and sustain an asset management program. It is intended to convert the asset management policy from a set of formal, institutionalized, but philosophical commitments into specific actions.

The strategy provides a long-term outlook on the overall asset management program development and strengthening key elements of its framework. Unlike the asset management plan, the strategy should not evolve and change frequently.

The Municipality's Strategic 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.

1.1.3 Asset Management Plan

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

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

The focus of the AMP is not simply about identifying the money or resources that are required to meet lifecycle needs of infrastructure and maintain an adequate level of service. It should also identify the processes and strategies that are and can be implemented to improve decision-making outcomes.

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

The Municipality's last iteration of the AMP was completed in 2013. Since then, the asset inventory has undergone revisions for the purposes of asset data consolidation and a restatement of financial statements. This document is an AMP that uses the recently consolidated asset inventory and has been prepared in accordance with O. Reg. 588/17.

1.2 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.

1.2.1 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 |
|-----------------------------|---|------------------------------------|----------|
| Preventive Maintenance | Activities that prevent defects or deteriorations from occurring | Crack Seal | \$ |
| General Maintenance | Activities that repair current defects or inhibit deterioration | Pothole Repairs | \$ |
| 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 the asset | Full Replacement | \$\$\$ |
| Replacement Upgrade | Asset end-of-life activities that involve the replacement of an asset to an upgraded asset | Full Replacement and Asset Upgrade | \$\$\$\$ |

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 Municipality'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.

1.2.2 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. A risk matrix and a list of the five critical assets in each category are included in this AMP. These risk scores can be used to prioritize maintenance, rehabilitation and replacement strategies for critical assets.

1.2.3 Levels of Service

A level of service (LOS) is a measure of what a municipality 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 Thames Centre as worth measuring and evaluating. The Municipality 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 & 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 (Buildings & Facilities, Parks), Thames Centre 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 Municipality'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 & Culverts, Water, Wastewater, Stormwater) the province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP. For some non-core asset categories (Buildings & Facilities, Parks), Thames Centre has determined the technical metrics that will be used to determine the technical level of service provided. These metrics can be found in the Levels of Service subsection within each asset category.

Current and Proposed Levels of Service

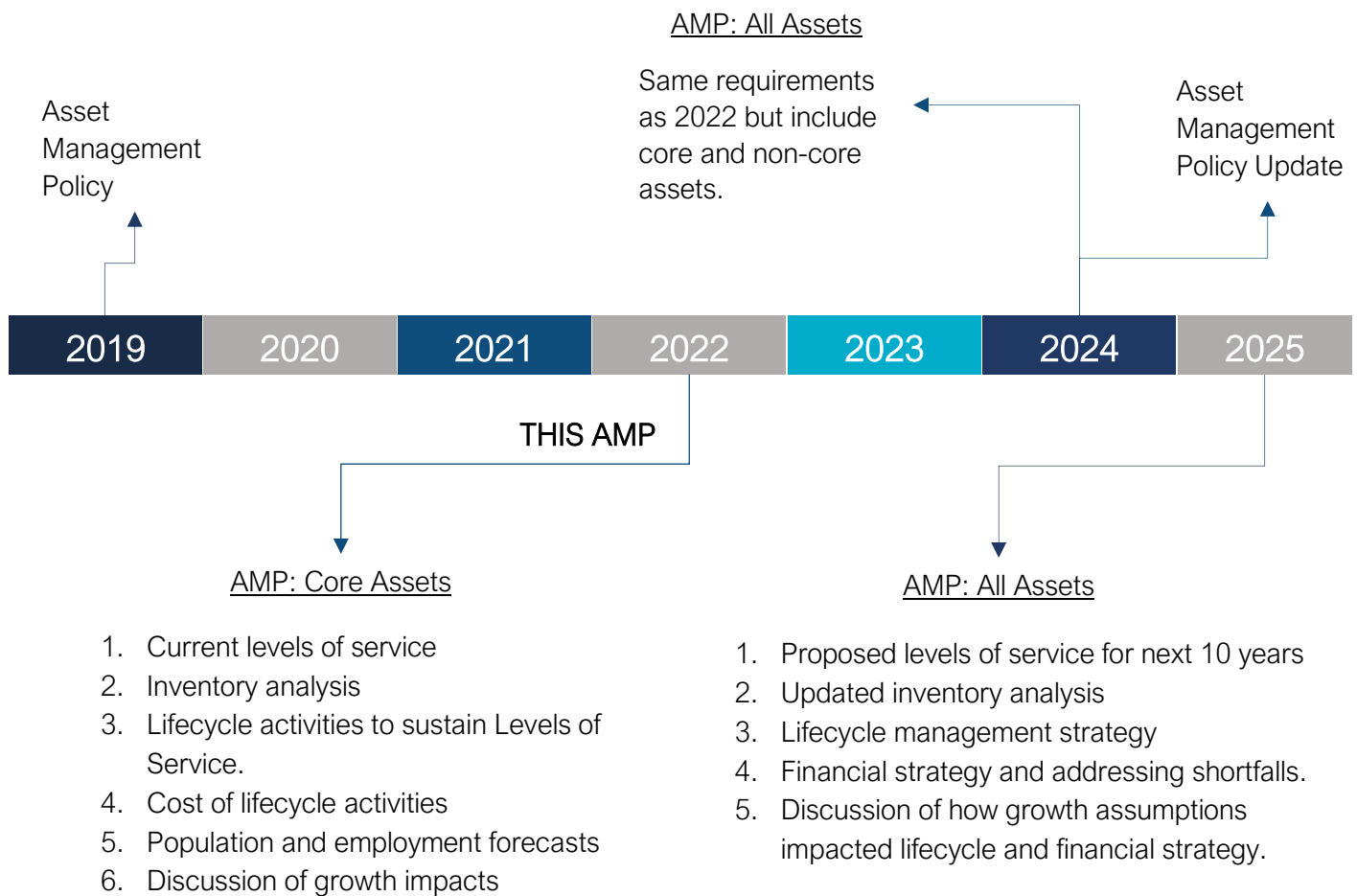
This AMP focuses on measuring the current level of service provided to the community. Once current levels of service have been measured, the Municipality plans to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17.

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

1.3 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 diagram below outlines key reporting requirements under O. Reg 588/17 and the associated timelines.



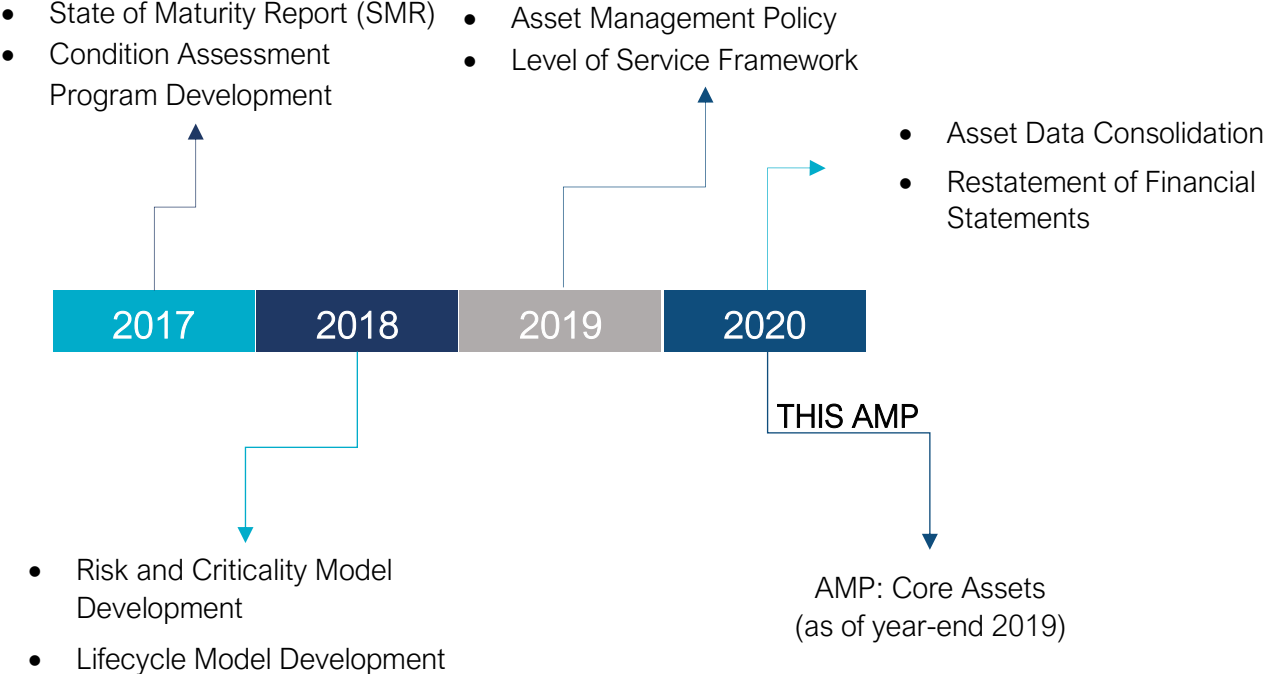
1.3.1 O. Reg. 588/17 Compliance Review

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 in addition to any necessary commentary.

| Requirement | O. Reg. Section | AMP Section Reference | Status |
|--|------------------------------------|-----------------------|---|
| Summary of assets in each category | S.5(2), 3(i) | 4.1.1 - 5.2.1 | Complete |
| Replacement cost of assets in each category | S.5(2), 3(ii) | 4.1.1 - 5.2.1 | Complete |
| Average age of assets in each category | S.5(2), 3(iii) | 4.1.3 - 5.2.3 | Complete |
| Condition of core assets in each category | S.5(2), 3(iv) | 4.1.2 – 5.2.2 | Complete |
| Description of Municipality’s approach to assessing the condition of assets in each category | S.5(2), 3(v) | 4.1.2 – 5.2.2 | Complete |
| Current levels of service in each category | S.5(2), 1(i-ii) | 4.1.6 - 5.2.6 | Complete for Core Assets, Buildings and Facilities, Parks and Land Improvements |
| Current performance measures in each category | S.5(2), 2 | 4.1.6 - 5.2.6 | Complete for Core Assets, Buildings and Facilities, Parks and Land Improvements |
| Lifecycle activities needed to maintain current levels of service for 10 years | S.5(2), 4 | 4.1.4 - 5.2.4 | Complete |
| Costs of providing lifecycle activities for 10 years | S.5(2), 4 | Appendix A | Complete |
| Growth assumptions | S.5(2), 5(i-ii) S.5(2), 6(i-vi) | 6.1-6.2 | Complete |

1.4 Asset Management Roadmap

As part of PSD’s Asset Management Roadmap, the Municipality of Thames Centre committed to taking the necessary steps towards developing a systemic, sustainable and intelligently-structured asset management program. This process involved the collaboration of PSD’s industry-leading asset management team with municipal staff over a multi-year engagement. The following summarizes key milestones/deliverables achieved throughout this project.



Asset Management Maturity Assessment (Completion Date: January 10th, 2017)

The State of Maturity Report provided an audit of the existing asset management capacity and competency. It outlined strategic recommendations to improve the Municipality's asset management program.

Condition Assessment Program Development (Completion Date: December 7th, 2017)

Municipal staff received training on the development of condition assessment strategies for municipal assets. This included condition assessment guidelines as well as data collection templates to ensure asset condition data is collected consistently and updated regularly.

Risk and Criticality Model Development (Completion Date: November 1, 2018)

Risk models were developed to determine the relative criticality of assets based on their probability and consequence of failure. These models assist with the prioritization and ranking of infrastructure needs.

Asset Management Policy (Completion Date: January 31st, 2019)

The Asset Management Policy was developed to provide guidance and leadership in the implementation and development of an asset management program. It was intended to demonstrate an organization-wide commitment to best practices in asset management.

Level of Service Framework Development (Completion Date: August 31st, 2019)

A framework was developed to determine the current level of service provided to the community through municipal infrastructure.

Lifecycle Model Development (Completion Date: March 31st, 2020)

The Municipality's lifecycle management strategies were reviewed and documented to determine current practices and identify opportunities for improvement and potential cost avoidance.

Asset Data Review and Refinement (Completion Date: September 31st, 2020)

Asset data was consolidated from various datasets into the primary tangible capital asset inventory.

AMP & Financial Strategy

This document represents the culminating deliverable of the Asset Management Roadmap.

2 Scope and Methodology

Key Insights

- This asset management plan includes 9 asset categories and is divided between tax-funded and rate-funded categories.
- 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.
- The Municipality's primary tangible capital asset inventory was restated in 2020 and consolidated with asset data from various data sources.

2.1 Asset categories included in this AMP

This asset management plan for the Municipality of Thames Centre is produced in compliance with Ontario Regulation 588/17. The July 2022 deadline under the regulation—the first of three AMPs—requires analysis of only core assets (roads, bridges & culverts, water, wastewater, and stormwater).

The AMP summarizes the state of the infrastructure for the Municipality’s asset portfolio, establishes current levels of service and the associated technical and customer oriented key 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 | Source of Funding |
|--------------------------|-------------------|
| Road Network | Tax Levy |
| Bridges & Culverts | |
| Buildings & Facilities | |
| Machinery & Equipment | |
| Fleet | |
| Park & Land Improvements | User Rates |
| Water Distribution | |
| Wastewater Collection | |
| Stormwater Collection | |

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 per Unit:** Based on costs provided by municipal staff which could include average costs from recent contracts; data from engineering reports and assessments; staff estimates based on knowledge and experience.
- **Historical Cost Inflation:** Inflation of the asset cost recorded at the time it was initially acquired to today’s value using an index (e.g., CPI or NRBCPI)

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

2.3 Estimated Useful Life and Service Life Remaining

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

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

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

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

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

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

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

| Condition | Description | Criteria | Service Life Remaining (%) |
|-----------|---|---|----------------------------|
| Very Good | Fit for the future | Well maintained, good condition, new or recently rehabilitated | 80-100 |
| Good | Adequate for now | Acceptable, generally approaching mid-stage of expected service life | 60-80 |
| Fair | Requires attention | Signs of deterioration, some elements exhibit significant deficiencies | 40-60 |
| Poor | Increasing potential of affecting service | Approaching end of service life, condition 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 D includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

2.6 Asset Inventory Refinement

As part of the collaboration with PSD, the Municipality also refined the primary tangible capital asset inventory to include various types of asset data from additional datasets. This data consolidation was part of the work conducted to audit and produce consolidated Financial Statements, for the period ending December 31, 2019. This was presented to Municipal Council and Resolution 251-200 was approved on September 14, 2020.

2.6.1 Data Sources

The primary asset inventory of the Municipality was refined with the consolidation of asset data from the following sources of asset data and information.

| Asset Information Sources | Asset Category | Description of Asset Data |
|---|--|---|
| GIS Data | Road Network Bridges and Culverts Water Distribution Wastewater Collection Stormwater Collection | spatial and attribute GIS data of asset segments; originating from Thames Centre's geodatabase |
| Sanitary and Storm Sewer Condition Assessment | Wastewater Collection Stormwater Collection | 2019 Sanitary and Storm Sewer Condition Assessment report by Dillon Consulting |
| OSIM Report | Bridge and Culverts | 2018 Bridge and Culvert Inspections report by Spriet Associates |
| Cowan 2018 Insurance Program | Buildings and Facilities | insurance and valuation information for buildings and facilities; 2018 replacement valuation (inflated to 2019) |
| CityWide AM Inventory | All | the primary tangible asset inventory for the Municipality; stored in CityWide™ |

3 Portfolio Overview

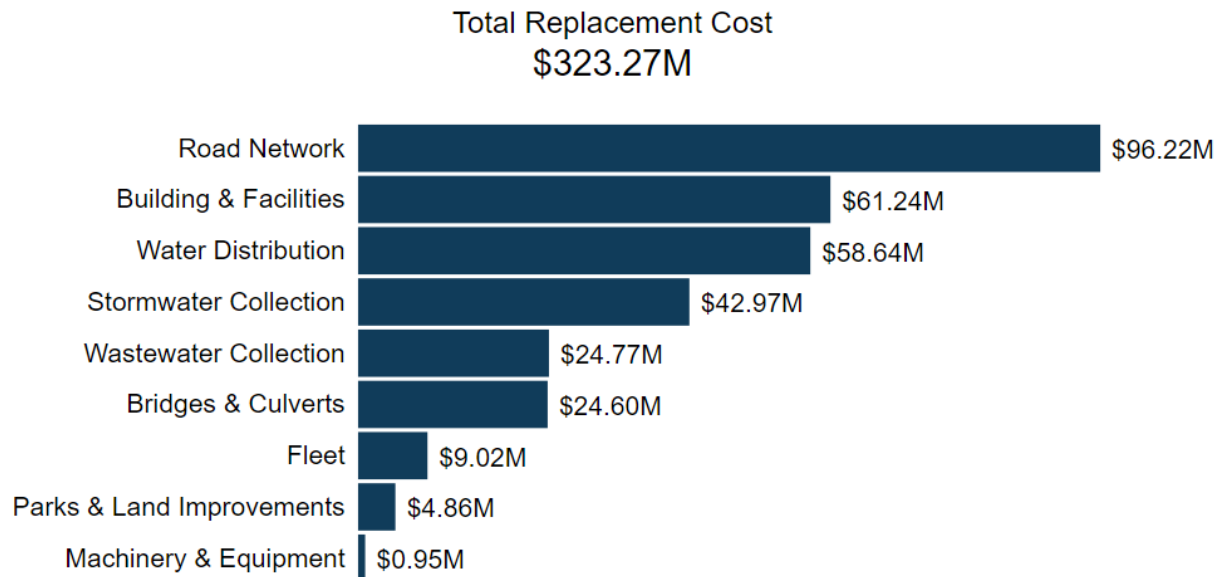
Key Insights

- The total replacement cost of the Municipality's asset portfolio is \$323 million.
- The Municipality's target re-investment rate is 2.61%, and the actual re-investment rate is 1.29%, contributing to an expanding infrastructure deficit.
- 75% of all assets are in fair or better condition.
- 24% of assets are projected to require replacement in the next 10 years.
- Average annual capital requirements total \$8.4 million per year across all asset categories.

3.1 State of the Infrastructure

3.1.1 Total Replacement Cost of Asset Portfolio

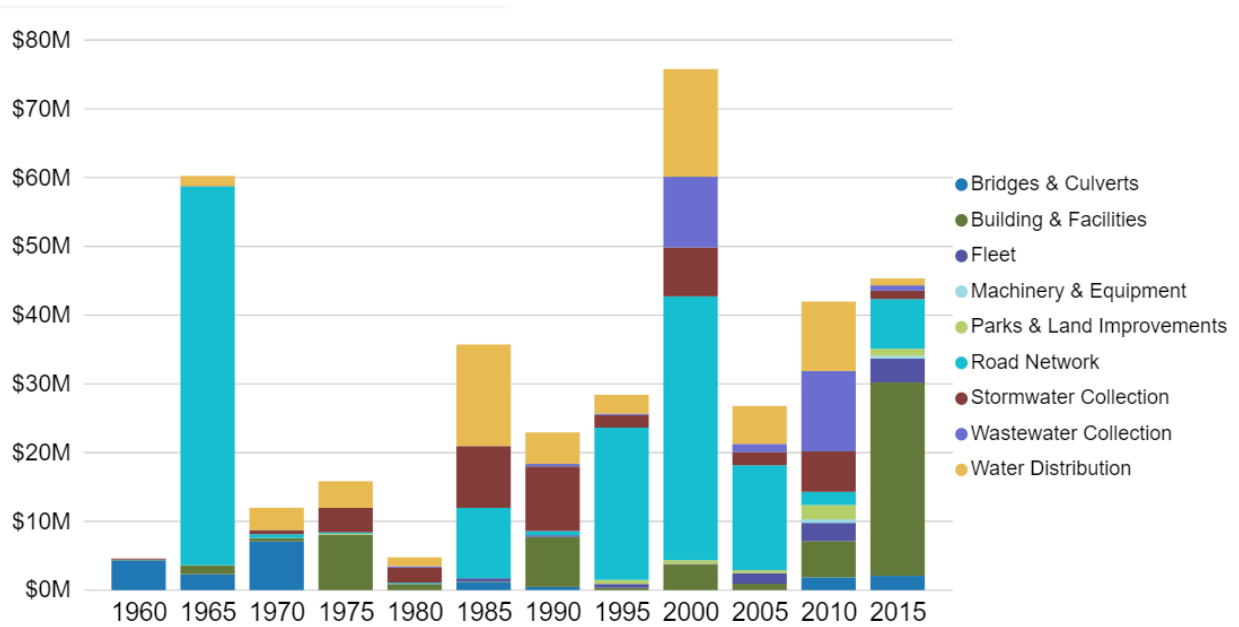
The asset categories analysed in this AMP have a total replacement cost of \$323 million based on inventory data at the end of 2019.



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.

3.1.2 Installation Profile

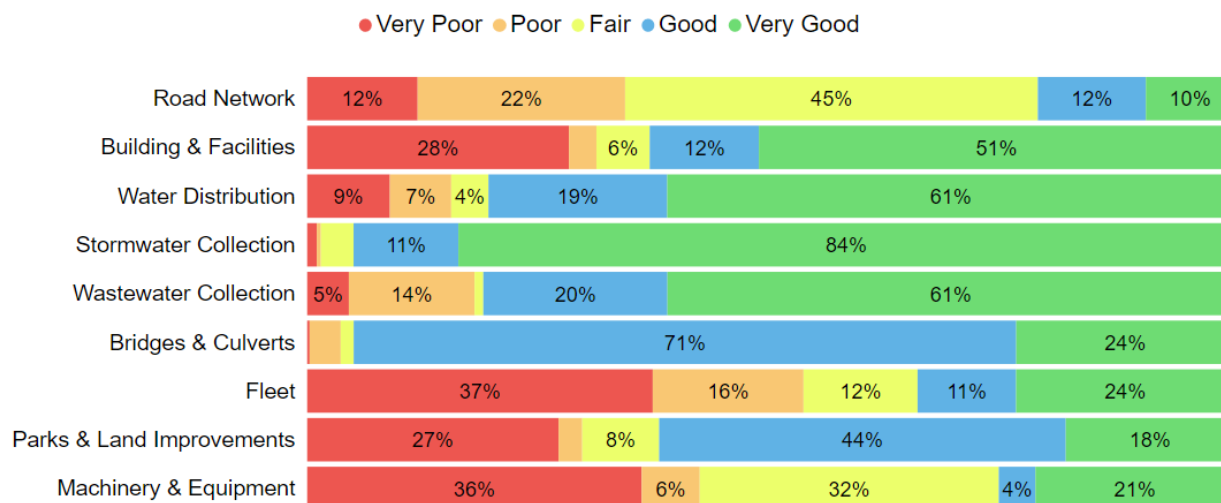
The following graph illustrates the installation profile for the assets analysed in this AMP based on their in-service date and current replacement value.



The decades from 1960 to 1970 and 2000 to 2010 represent periods of substantial investments into the Municipality’s asset portfolio.

3.1.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. The following graph illustrates the projected condition of the asset categories.



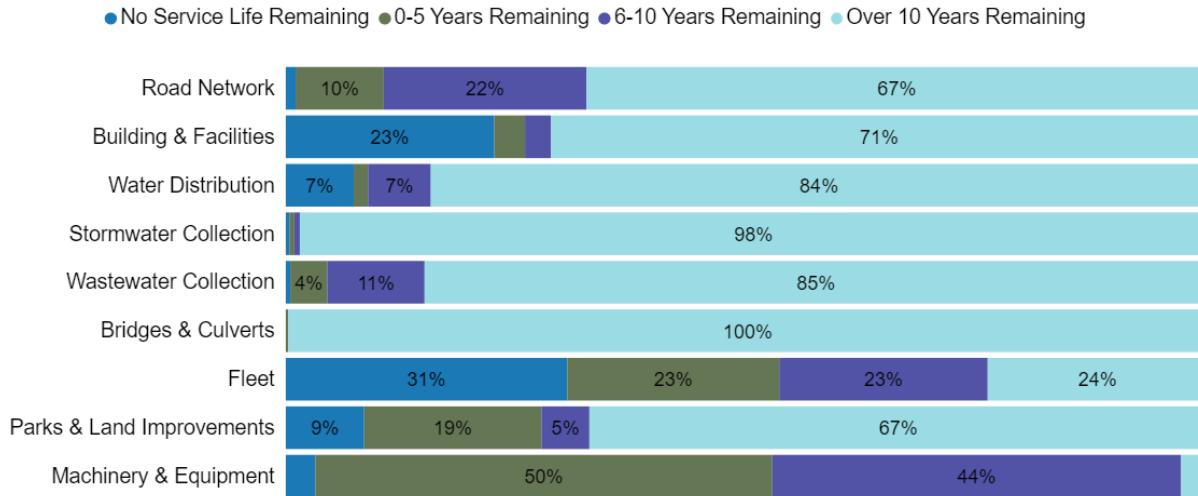
Collectively, 75% of the assets in Thames Centre are in fair or better condition. The calculation of this percentage is replacement cost weighted and uses a combination of age-based and field condition data.

This AMP relies on assessed condition data for 35% 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 | Source of Condition Data |
|--------------------------|----------------------|-------------------------------------|--|
| Bridges & Culverts | Bridges | 89% | 2018 OSIM Report |
| | Culverts | 100% | |
| | Guiderrails | 50% | |
| Parks & Land Improvement | Playground Equipment | 51% | Staff Inspections |
| Stormwater Collection | Mains | 4% | 2019 Sanitary and Storm Assesment Report |
| Wastewater Collection | Mains | 5% | |
| Road Network | HCB Roads | 90% | 2015 RNS |
| | Gravel Roads | 99% | |
| | LCB Roads | 98% | |

3.1.4 Service Life Remaining

The graph below illustrates the service life remaining for each of the asset categories. The calculation of service life remaining is based on asset age, available assessed condition data and estimated useful life. Much like the calculation of asset condition, this value is replacement cost weighted.



Based on the a forementioned variables, around 24% of the Municipality’s assets will require replacement within the next 10 years. Capital requirement costs over the next 10 years are identified in Appendix A.

The following provides a summary of the ranges in useful life, the average age and the average service life remaining of the asset categories within this AMP. The average age is determined by the install year and estimated useful life, while the average service life remaining takes into account the condition of the asset into the calculation.

| Category | Estimated Useful Life Range (Years) | Average Age (Years) | Average Service Life Remaining (Years) |
|--------------------------|-------------------------------------|---------------------|--|
| Bridges & Culverts | 25 - 75 Years | 51.17 | 48.17 |
| Buildings & Facilities | 10 - 100 Years | 31.33 | 15.25 |
| Fleet | 1 - 20 Years | 8.92 | 1.83 |
| Machinery & Equipment | 4 - 20 Years | 4.92 | 4.50 |
| Park & Land Improvements | 5 - 100 Years | 13.58 | 11.08 |
| Road Network | 10 - 75 Years | 27.92 | 21.58 |
| Stormwater Collection | 7 - 86 Years | 25.00 | 58.33 |
| Wastewater Collection | 10 - 100 Years | 12.50 | 68.83 |
| Water Distribution | 10 - 100 Years | 24.83 | 54.83 |
| Total: | | 24.92 | 50.58 |

While capital planning horizons tend to be short (<10 Years), a sustainable lifecycle and financial strategy should consider the full lifecycle of all assets.

Short-term capital costs may be low for asset categories with long useful lives where infrastructure is relatively new. However, planning and saving for long-term capital costs is a key component of asset management planning.

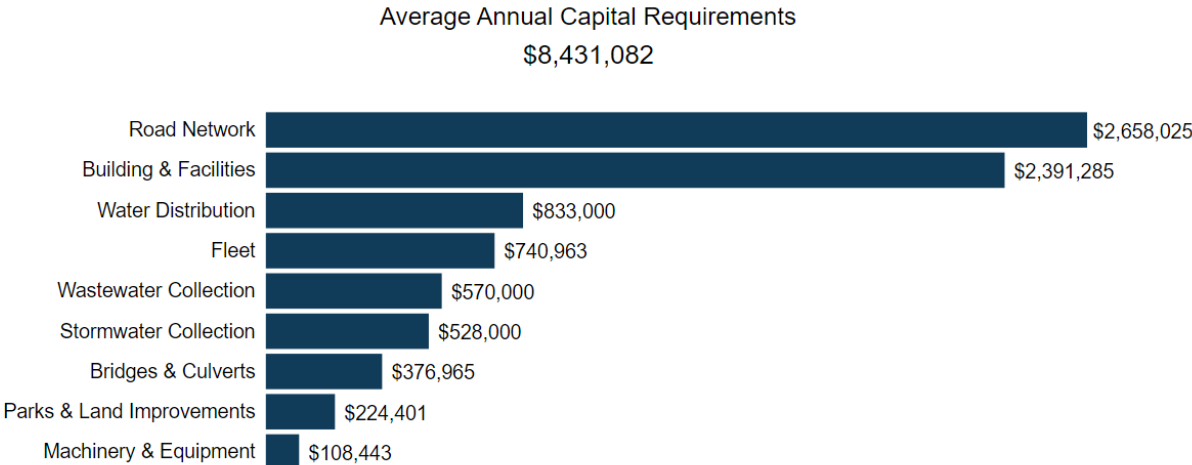
The calculation of an average annual capital requirement considers the estimated useful life and cost of infrastructure to identify the amount that the Municipality should be allocating to meet capital needs regardless of whether the project costs will be incurred in the short- or long-term.

3.2 Projected Capital Requirements

The development of a long-term capital forecast should include both asset rehabilitation and replacement requirements. With the development of asset-specific lifecycle strategies that include the timing and cost of future capital events, the Municipality can produce an accurate long-term capital forecast.

3.2.1 Average Annual Capital Requirements

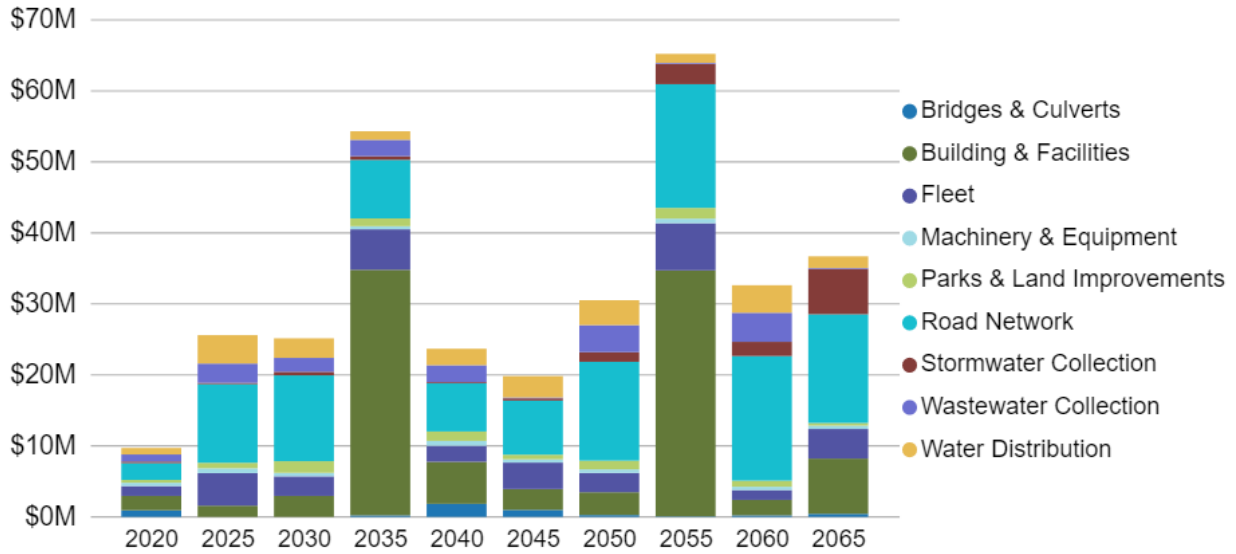
Annual capital requirements represent the amount that the Municipality should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability.



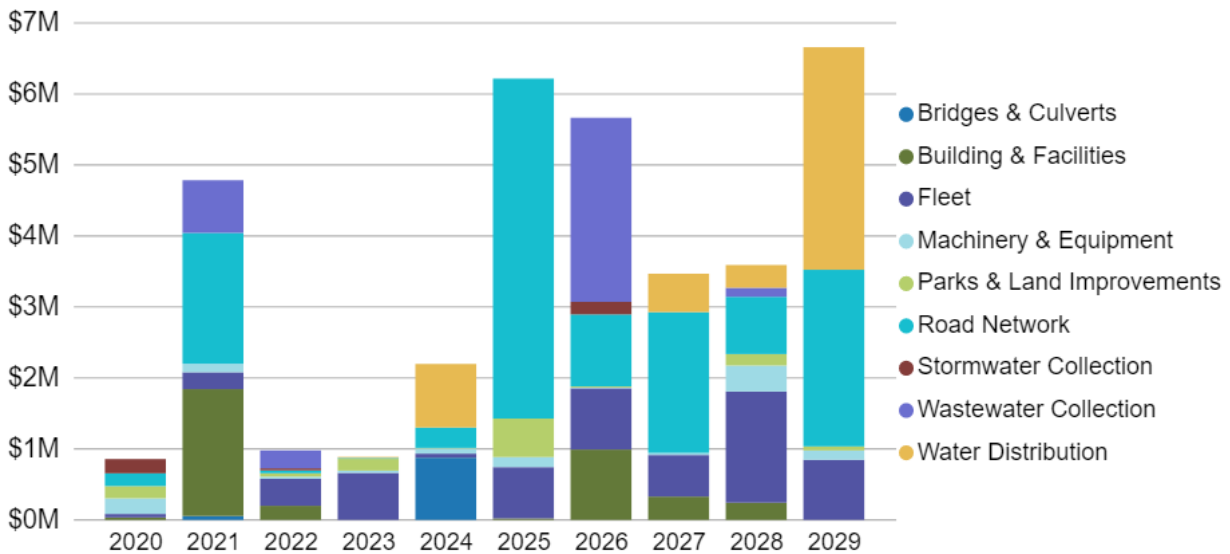
In total, the Municipality must allocate approximately \$8.4 million annually to address capital requirements for the assets included in this AMP.

3.2.2 Projected Capital Requirements

The following graph identifies projected capital requirements over the next 50 years.



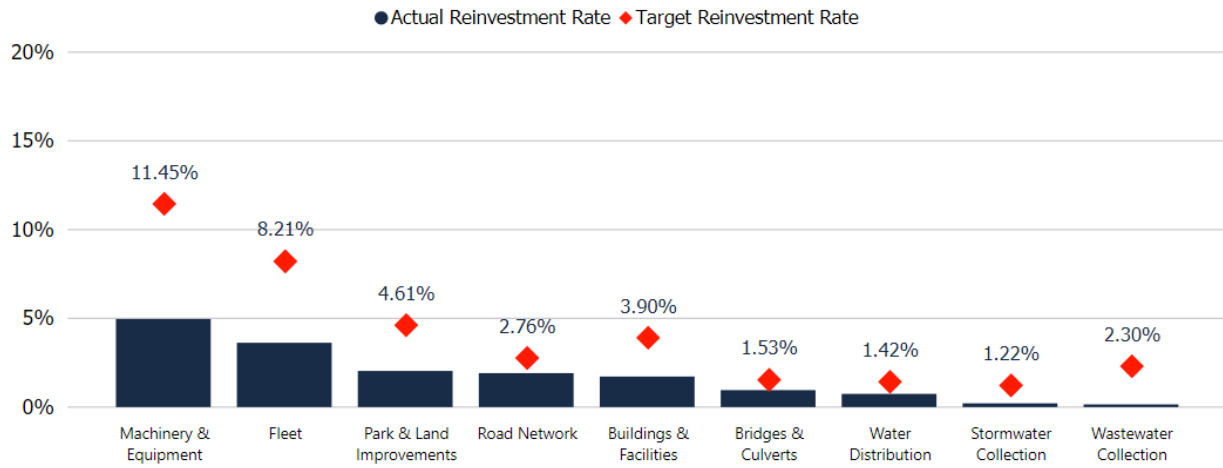
The following graph identifies projected capital requirements over the next 10 years.



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 A.

3.3 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 Municipality should be allocating approximately \$8.4 million annually, for a target reinvestment rate of 2.61%. Actual annual spending on infrastructure totals approximately \$4.2 million, for an actual reinvestment rate of 1.29%.

4 Analysis of Tax-funded Assets

Key Insights

- Tax-funded assets are valued at \$197 million.
- 69% of tax-funded assets are in fair or better condition.
- The average annual capital requirement to sustain the current level of service for tax-funded assets is approximately \$6.5 million.
- To reach sustainability, tax revenues need to be increased by 1.5% annually for the next 20 years to eliminate annual deficits.

4.1 Road Network

The Road Network is a critical component of the provision of safe and efficient transportation services and represents the highest value asset category in the Municipality’s asset portfolio. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure such as sidewalks and streetlights.

Thames Centre’s road network is maintained by the Roads Division in the Public Works department. The division is also responsible for patching and filling holes, cutting grass along roadside ditches, performing roadside tree maintenance, rebuilding roadways and winter maintenance.

4.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the road network inventory.

| Asset Segment | Quantity | Replacement Cost Method | Total Replacement Cost |
|---------------|----------|--|---------------------------|
| Gravel Roads | 196 km | Not Planned for Replacement ¹ | \$55,609,893 ² |
| HCB Roads | 82 km | Cost per Unit | \$44,961,237 |
| LCB Roads | 126 km | Cost per Unit | \$45,861,885 |
| Sidewalks | 25 km | Cost per Unit | \$2,985,926 |
| Streetlights | 573 | CPI Inflation (Historical Cost) | \$2,407,841 |
| | | | \$151,826,782 |

**Total Replacement Cost
\$96.22M**



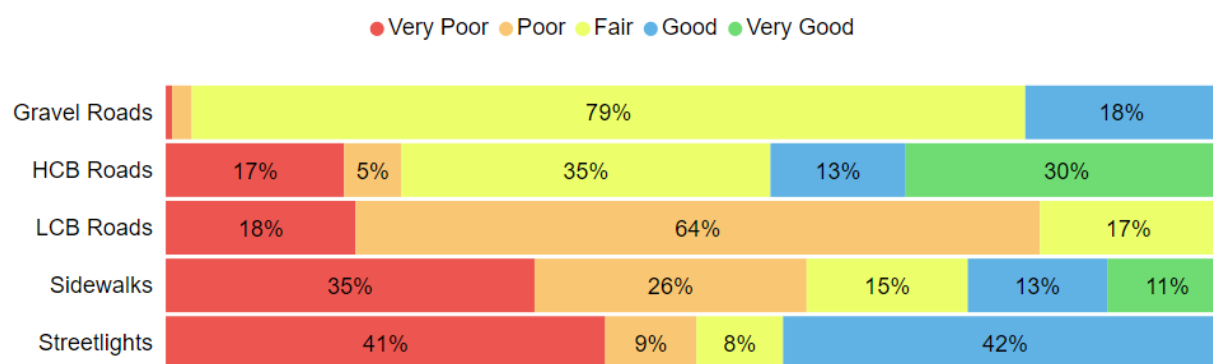
¹ Gravel roads do not undergo asset replacement and are either in a state of perpetual maintenance or upgraded to an asset with a different composition as they approach end of life. As such, gravel roads have been excluded from the calculation of the total replacement cost and annual capital requirements of the Road Network.

² An estimated replacement cost, based on historical cost inflation, was determined and assigned to each gravel road segment. This estimate represents the operational investment required to maintain the gravel roads.

4.1.2 Asset Condition

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 | Average Condition (%) | Average Condition Rating | Condition Source |
|---------------|-----------------------|--------------------------|------------------|
| Gravel Roads | 63% | Good | 99% Assessed |
| HCB Roads | 65% | Good | 90% Assessed |
| LCB Roads | 40% | Fair | 99% Assessed |
| Sidewalks | 35% | Poor | Age-based |
| Streetlights | 37% | Poor | Age-based |
| | 56% | Fair | |



Current Approach to Condition Assessment

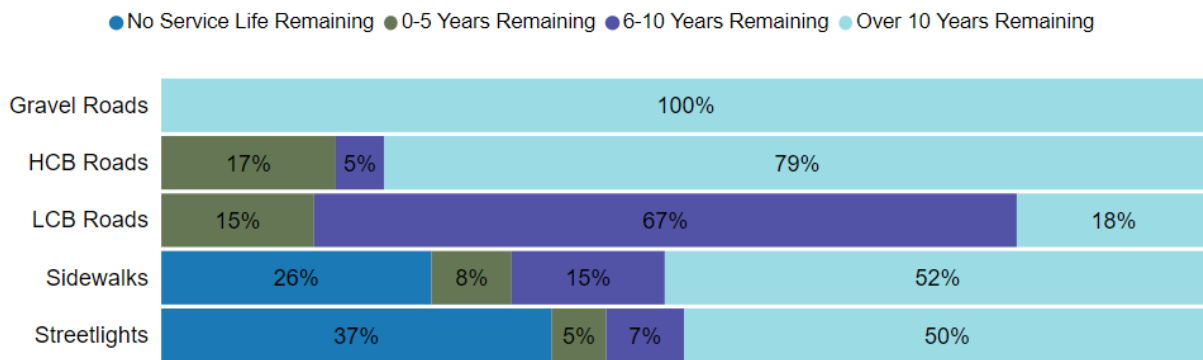
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Municipality's current approach:

- A Road Needs Study was completed in 2015 by 4 Roads Management Services Inc. that included a detailed assessment of the condition of each road segment.
- The Road Needs Study is reviewed every year and additional roads are assessed as needed.
- Road network assets are inspected as per O. Reg. 239/02: Minimum Maintenance Standards for Municipal Highways.

4.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Road Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

| Asset Segment | Estimated Useful Life (Years) | Average Age (Years) | Average Service Life Remaining (Years) |
|---------------|-------------------------------|---------------------|--|
| Gravel Roads | 75 Years | 50.1 | 60.8 |
| HCB Roads | 30 Years | 20.3 | 16.8 |
| LCB Roads | 13 Years | 19.4 | 6.1 |
| Sidewalks | 40 Years | 29.5 | 10.5 |
| Streetlights | 10 - 30 Years | 25.3 | 3.6 |
| | | 27.9 | 21.6 |



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

4.1.4 Lifecycle Management Strategy

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

The table below outlines the Municipality’s current lifecycle management strategy for Gravel roads.

| Activity Type | Description of Current Strategy |
|--------------------------|---|
| Preventative Maintenance | Gravel roads are considered to be in a state of perpetual maintenance |
| | Lifecycle activities are funded through Thames Centre’s operating budget |
| | Maintenance events are applied on an identified and in some cases on a reactive need |
| Replacement | Gravel roads do not require conventional asset replacement events |
| | Roads are reviewed periodically as potential candidates for a surface composition upgrade |

The table below outlines the Municipality’s current lifecycle management strategy for HCB and LCB roads.

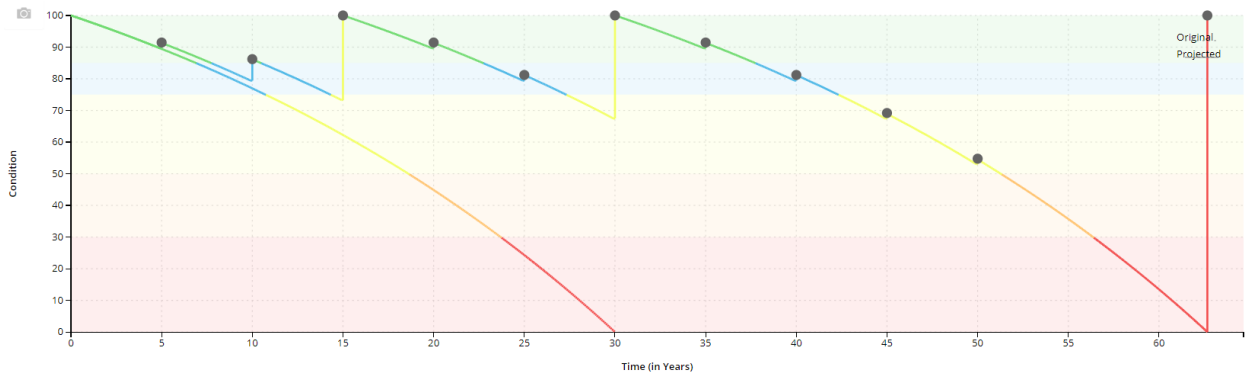
| Activity Type | Description of Current Strategy |
|----------------|--|
| Maintenance | Crack Sealing |
| Rehabilitation | Pavement Resurfacing – Microsurfacing, Single Lift, Double Lift |
| Replacement | Replacement is based on asset condition; risk-based decision making is exercised to the best of staff’s ability |
| | Roads are fully reconstructed and are not part of a formal lifecycle process |
| | The decision-making process that determines whether a road requires rehabilitation or full reconstruction depends on sub-surface infrastructure requirements (e.g. water, sewer, storm). |

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of HCB, LCB and Gravel roads. These strategies have been developed with input from municipal staff and following industry best practices.

Instead of allowing the roads to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of roads at a lower total cost.

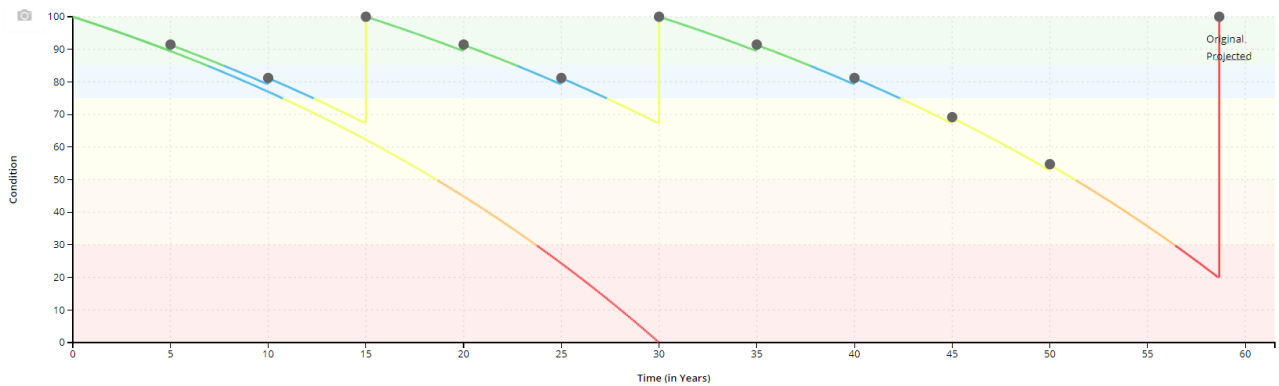
HCB-3 Roads

| Event Name | Event Class | Event Trigger |
|--|----------------|----------------------|
| Crack Sealing | Maintenance | Every 5 Years |
| Microsurfacing – Pavement Preservation | Rehabilitation | 10 Years |
| Basic Resurfacing – Single Lift 50 mm | Rehabilitation | 15 Years |
| Basic Resurfacing – Double Lift 100 mm | Rehabilitation | 30 Years |
| Full Reconstruction | Replacement | Condition at 0 - 30% |



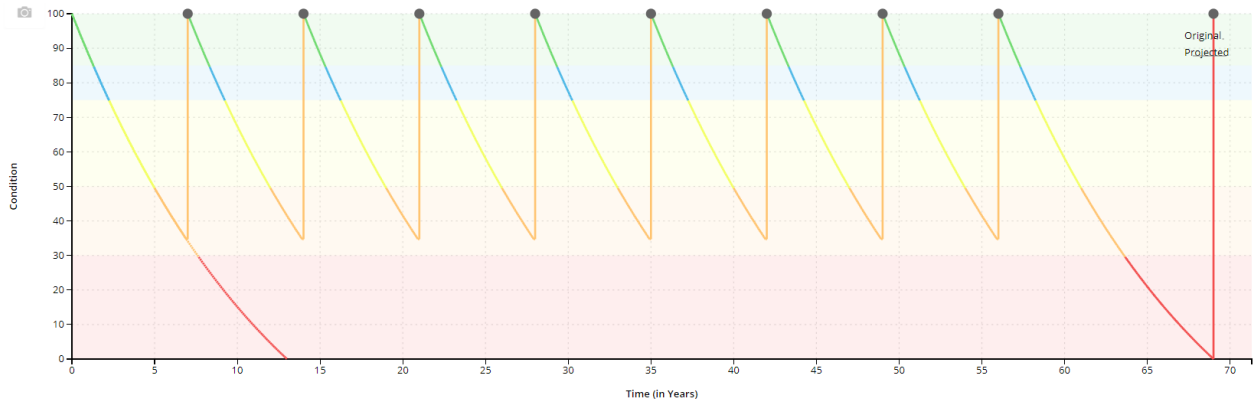
HCB-4 Roads

| Event Name | Event Class | Event Trigger |
|--|----------------|-----------------------|
| Crack Sealing | Maintenance | Every 5 Years |
| Basic Resurfacing – Single Lift 50 mm | Rehabilitation | 15 Years |
| Basic Resurfacing – Double Lift 100 mm | Rehabilitation | 30 Years |
| Full Reconstruction | Replacement | Condition at 20 - 30% |



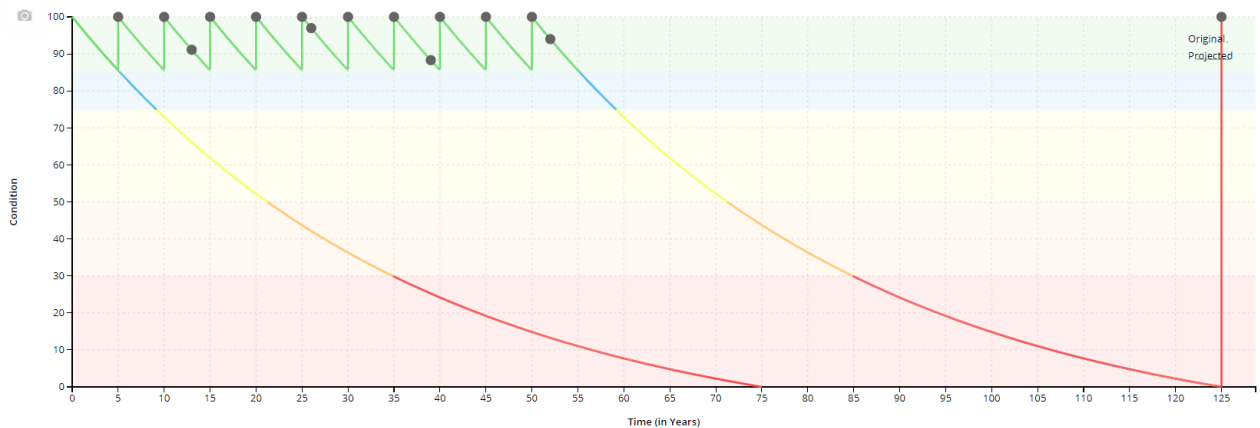
LCB Roads

| Event Name | Event Class | Event Trigger |
|---------------------------------|----------------|----------------------|
| Surface Treatment – Single Lift | Rehabilitation | 7 Years |
| Surface Treatment – Single Lift | Rehabilitation | 21 Years |
| Surface Treatment – Single Lift | Rehabilitation | 35 Years |
| Surface Treatment – Double Lift | Rehabilitation | Every 14 Years |
| Full Reconstruction | Replacement | Condition at 0 - 30% |



Gravel Roads

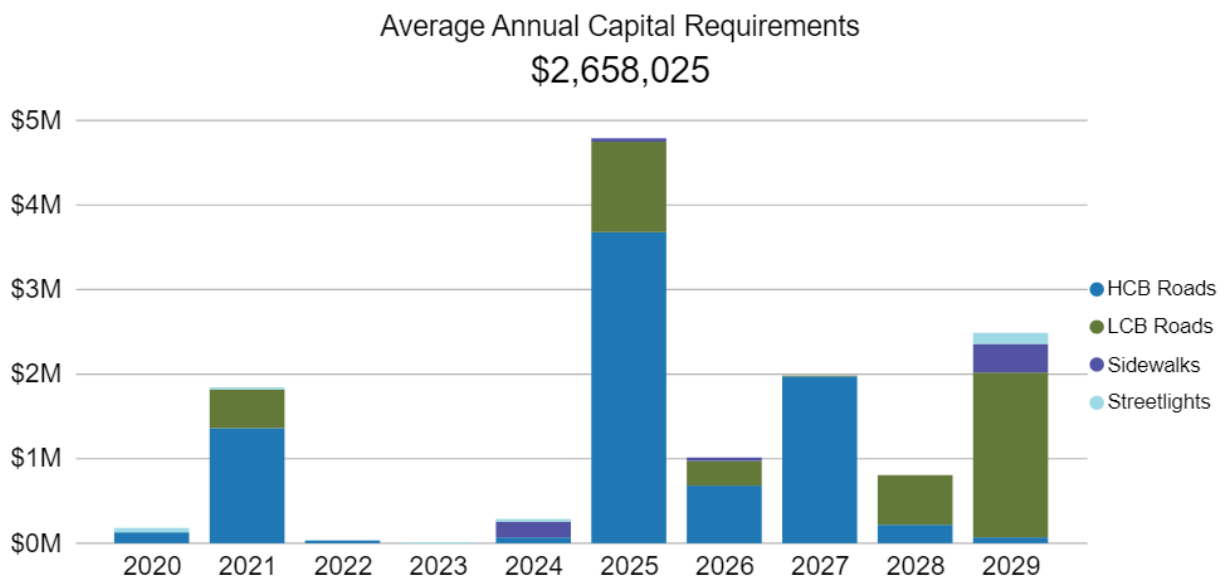
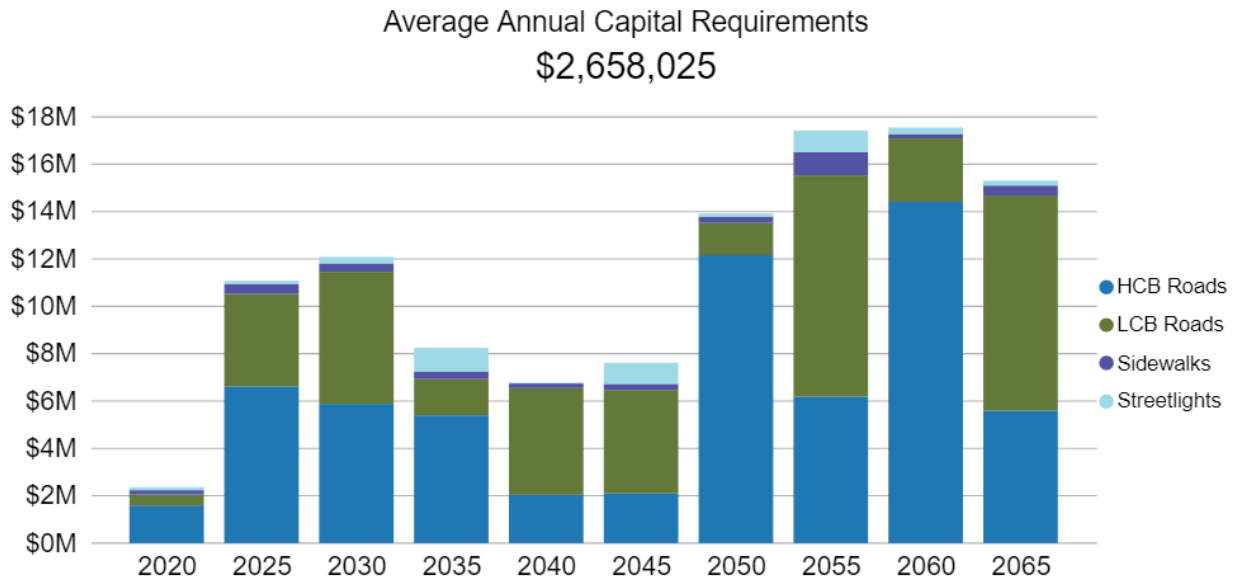
| Event Name | Event Class | Event Trigger |
|-------------------------------------|--------------------------|----------------------|
| Ditching – Reclamation and Drainage | Preventative Maintenance | Every 14 Years |
| Single Lift 75 mm - Granular A | Maintenance | Every 5 Years |
| Asset Composition Upgrade | Replacement | Condition at 0 - 30% |



Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for HCB and LCB Roads, and assuming the end-of-life replacement of all other assets in this category, the following graphs forecasts capital requirements for the Road Network over the next 50-years and 10-years, respectively.

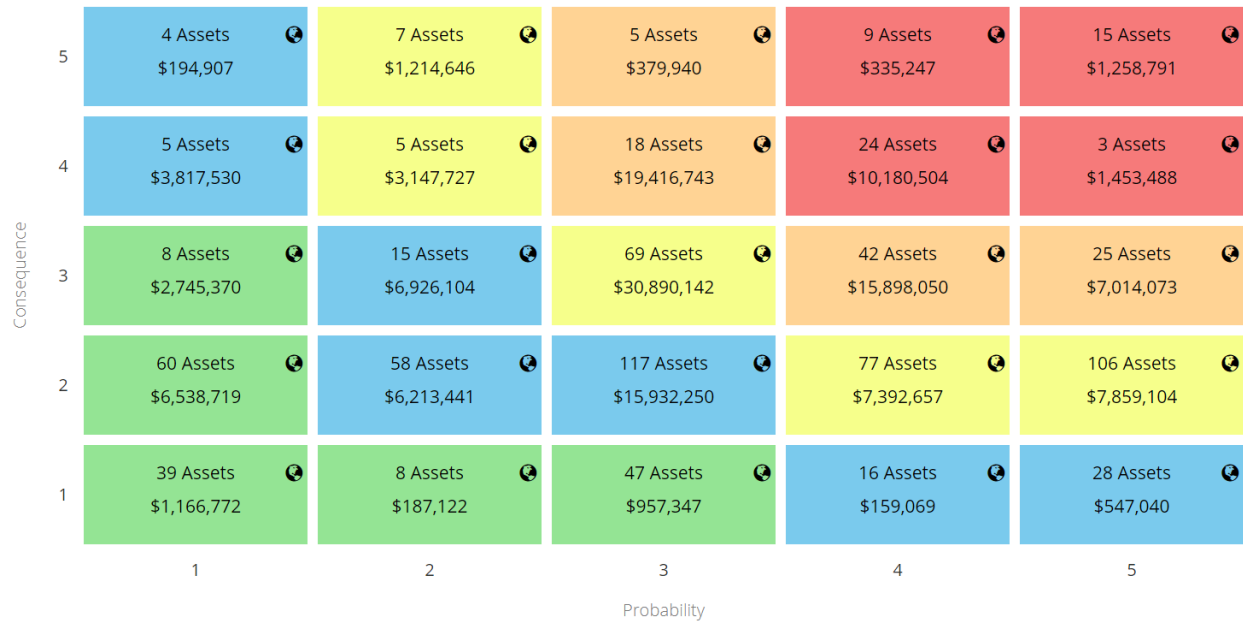
The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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 A.

4.1.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2019 inventory data.



The identification of these critical assets by using the risk framework allows Thames Centre to determine appropriate risk mitigation strategies and treatment options. These may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data. Critical assets do not necessarily require immediate renewal or replacement.

See Appendix C for the criteria used to determine the risk rating of each asset.

4.1.6 Levels of Service

The following tables identify Thames Centre’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 Municipality has selected for this AMP.

Community Levels of Service

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

| Service Attribute | Qualitative Description | Current LOS (2019) |
|-------------------|--|---|
| Scope | Description, which may include maps, of the road network in the Municipality and its level of connectivity | The Municipality’s transportation network comprises of 399 centerline km of road, of which 196 km are gravel roads and 203 km are paved roads. The transport network also includes 25 km of sidewalks and 573 streetlight assets. See Appendix B for maps. |
| Quality | Description or images that illustrate the different levels of road class pavement condition | <p>The Municipality completed a Road Management Study in 2015 in coordination with 4 Roads Management Inc. Every road section received a surface condition rating (1-10).</p> <p>(1-5) identifies road sections where construction is anticipated within the next five years. These roads can be good candidates for resurfacing treatments that would extend the life of the road, deferring the need to reconstruct.</p> <p>(6-10) identifies road sections where reconstruction improvements are anticipated within six to ten years. These roads can be good candidates for resurfacing treatments that would extend the life of the road, thus deferring the need to reconstruct.</p> <p>(ADEQ) identifies road sections that do not have reconstruction or resurfacing needs, although minor maintenance may be required.</p> |

Technical Levels of Service

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

| Service Attribute | Technical Metric | Current LOS (2019) |
|-------------------|---|-------------------------|
| Scope | Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km ²) | 0 km/km ² |
| | Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km ²) | 0.69 km/km ² |
| | Lane-km of local roads (MMS classes 5 and 6) per land area (km/km ²) | 0.12 km/km ² |
| Quality | Average pavement condition index for paved roads in the municipality | HCB: 65% LCB: 40% |
| | Average surface condition for unpaved roads in the municipality (e.g., excellent, good, fair, poor) | Good |
| Performance | Capital reinvestment rate | 2.76% |

4.1.7 Recommendations

Asset Inventory

- Review and confirm that all relevant assets have been accounted for in the central asset inventory.
- Review the road asset inventory to align it with GIS data for an accurate record of road segments.
- Refine the streetlight asset inventory to disaggregate pooled assets and ensure alignment of asset records with GIS data and/or other data sources.

Condition Assessment Strategies

- The last comprehensive assessment of the road network was completed in 2015. Consider completing an updated assessment of all roads within the next 1-2 years.
- Formalize the condition assessment program developed as part of the Roadmap project and expand to other road network assets.

Lifecycle Management Strategies

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

Risk Management Strategies

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

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that Thames Centre 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.

4.2 Bridges & Culverts

Bridges & Culverts represent a critical portion of the transportation network, facilitating a roadway and/or walkway over a physical obstacle. Thames Centre has 66 structures that have a span of 3 meters or more and are therefore categorized as a bridge or a culvert asset.

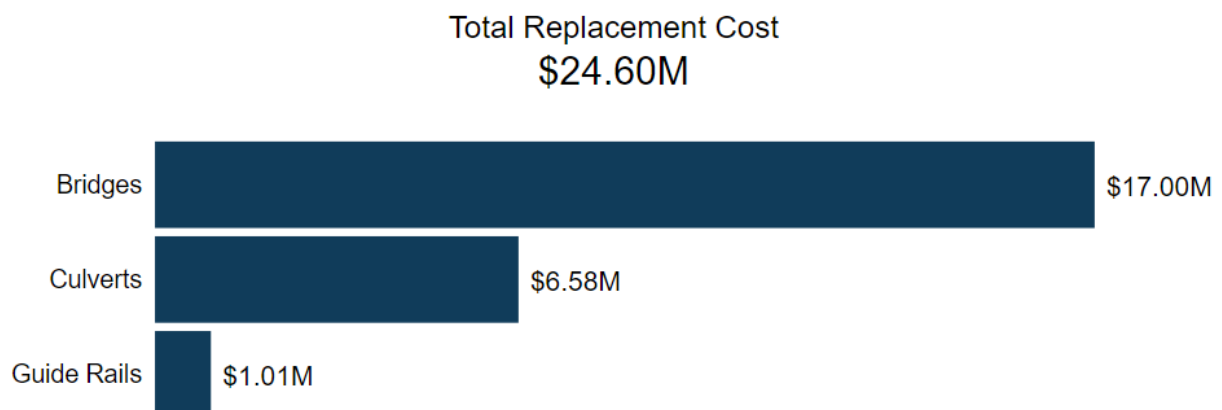
The Transportation Services team in the Public Works Department is responsible for the maintenance of all bridges and culverts located across municipal roads, with the goal of keeping structures in an adequate state of repair and minimizing service disruptions.

Based on the requirements outlined by the Ministry of Transportation, the most recent Bridge and Culvert inspection report was prepared by Spriet Associates and completed in 2018. The next inspection is scheduled to be completed in 2021.

4.2.1 Asset Inventory & Replacement Cost

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

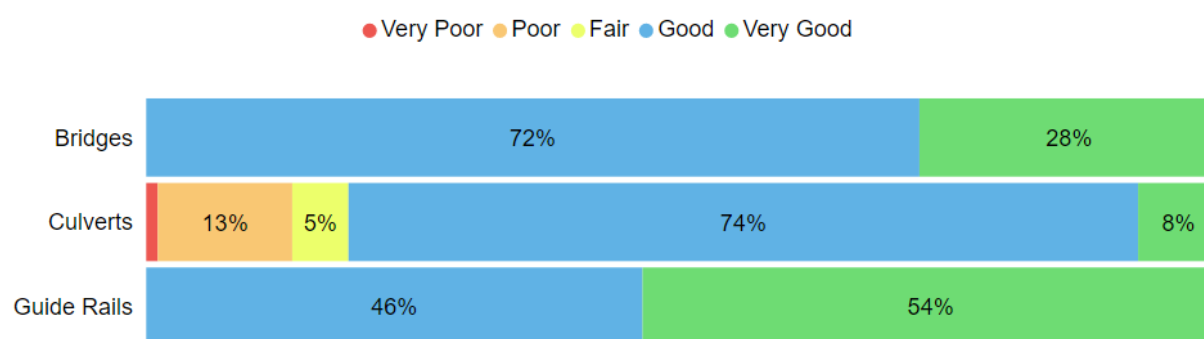
| Asset Segment | Quantity | Replacement Cost Method | Total Replacement Cost |
|---------------|----------|----------------------------------|------------------------|
| Bridges | 30 | CPI Inflation (2018 OSIM report) | \$17,004,352 |
| Culverts | 36 | CPI Inflation (2018 OSIM report) | \$6,579,145 |
| Guiderrails | 11 | CPI Inflation (2018 OSIM report) | \$1,012,797 |
| | | | \$24,596,294 |



4.2.2 Asset Condition

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 | Average Condition (%) | Average Condition Rating | Condition Source |
|---------------|-----------------------|--------------------------|------------------|
| Bridges | 80% | Good | 89% Assessed |
| Culverts | 65% | Good | 100% Assessed |
| Guiderrails | 82% | Very Good | 50% Assessed |
| | 76% | Good | |



To ensure that Bridges & Culverts continue to provide an acceptable level of service, Thames Centre 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 Bridges & Culverts.

Current Approach to Condition Assessment

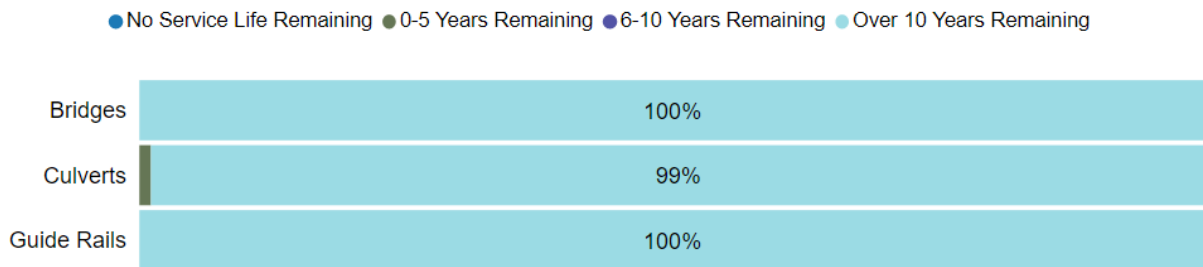
Accurate and reliable condition data allows staff to confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- Condition assessments of all bridges and culverts with a span greater than or equal to 3 meters are completed every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM).

4.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Bridges & Culverts assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

| Asset Segment | Estimated Useful Life (Years) | Average Age (Years) | Average Service Life Remaining (Years) |
|---------------|-------------------------------|---------------------|--|
| Bridges | 25 - 75 Years | 54.8 | 50.0 |
| Culverts | 75 Years | 50.3 | 46.5 |
| Guiderrails | 30 Years | 2.7 | 26.8 |
| | | 51.2 | 48.2 |



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

4.2.4 Lifecycle Management Strategy

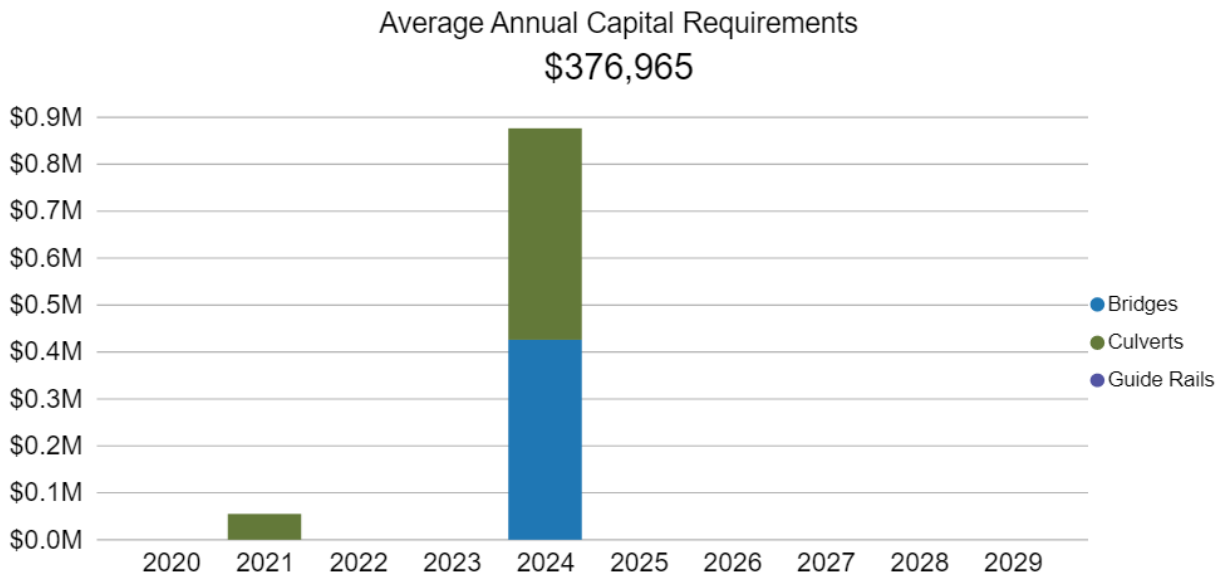
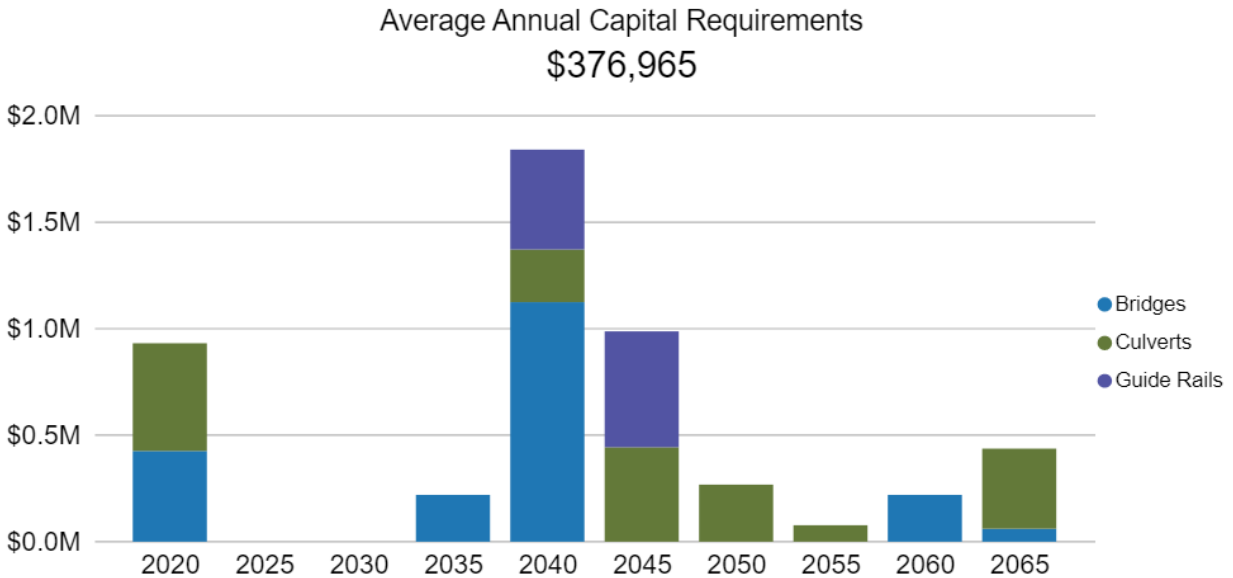
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

| Activity Type | Description of Current Strategy |
|---|--|
| Maintenance, Rehabilitation and Replacement | All lifecycle activities are driven by the results of mandated structural inspections completed according to the Ontario Structure Inspection Manual (OSIM). |
| Inspection | An inspection report was completed in 2018 by Spriet Associates and there is currently another study in progress that will be completed by 2021. |

Forecasted Capital Requirements

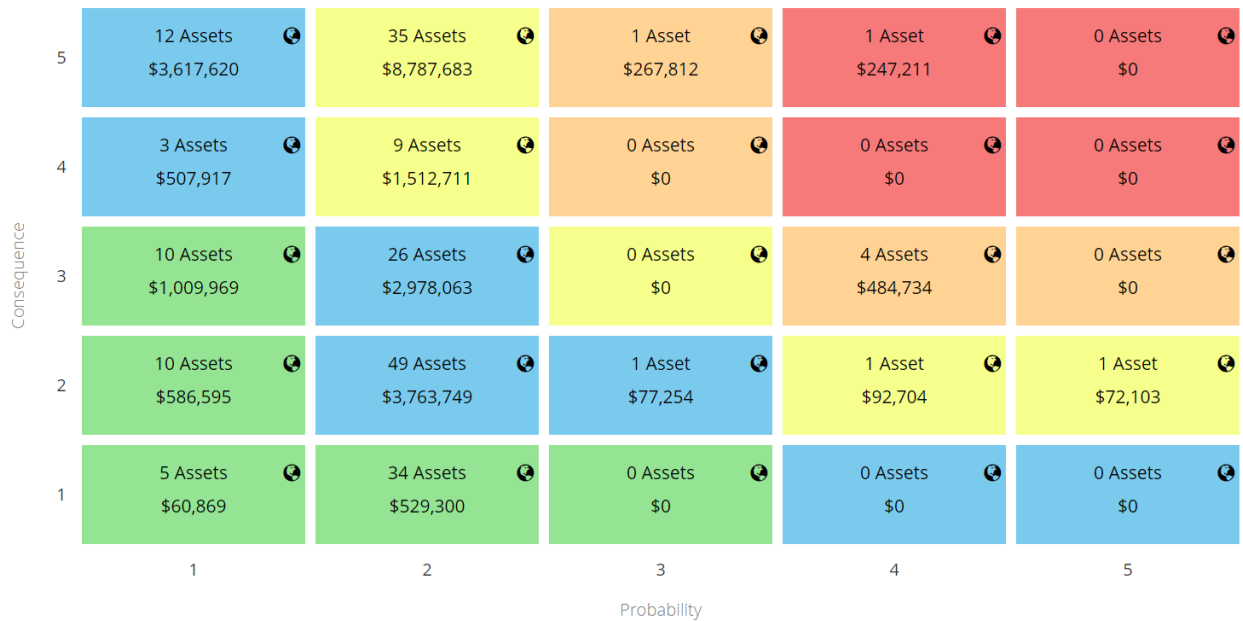
The following graphs forecasts capital requirements for bridge and culvert assets over the next 50-years and 10-years, respectively. The annual capital requirement represents the average amount per year that Thames Centre should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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 A.

4.2.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2019 inventory data.



The identification of these critical assets by using the risk framework allows Thames Centre to determine appropriate risk mitigation strategies and treatment options. These may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data. Critical assets do not necessarily require immediate renewal or replacement.

See Appendix C for the criteria used to determine the risk rating of each asset.

4.2.6 Levels of Service

The following tables identify the Municipality’s current level of service for Bridges & Culverts. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Bridges & Culverts.

| Service Attribute | Qualitative Description | Current LOS (2019) |
|-------------------|---|--|
| Scope | Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists) | <p>All Bridges and Culverts are designed to carry all levels of vehicles. However, not all bridges contain sidewalks so pedestrian walking is not encouraged.</p> <p>There is one bridge in the Municipality that is strictly a pedestrian bridge located on Bridge Street between Catherine Street and Hamilton Road.</p> <p>There is one culvert that is being replaced in 2021 which will support all vehicles after construction. Currently, it is only designed for pedestrians but will have a stronger load bearing after construction.</p> |
| Quality | Description or images of the condition of bridges & culverts and how this would affect use of the bridges & culverts | <p>The 2018 Bridge and Culvert inspections summarized the condition of bridges as being in excellent structural condition. Meanwhile, 22 out of the 36 culverts were found to have no deficiencies. The remaining 14 were found with repair and/or traffic safety issues, except for two pipes which should be replaced. The next inspection is scheduled to take place in 2021.</p> |

Technical Levels of Service

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

| Service Attribute | Technical Metric | Current LOS (2019) |
|-------------------|--|--------------------|
| Scope | % of bridges in the Municipality with loading or dimensional restrictions | 3.23% ³ |
| Quality | Average bridge condition index value for bridges in the Municipality | 80% |
| | Average bridge condition index value for structural culverts in the Municipality | 65% |
| Performance | Capital re-investment rate | 0.96% |

³ 31 bridge structures that also include a pedestrian bridge.

4.2.7 Recommendations

Asset Inventory/Data Refinement

- Continue to review and validate inventory data, assessed condition data and replacement costs for all bridges and structural culverts upon the completion of OSIM inspections every 2-3 years.

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.

Lifecycle Management Strategies

- This AMP includes capital costs associated with the reconstruction of bridges and culverts, as well as projected rehabilitation and renewal costs from the 2018 OSIM report. Thames Centre should continue to work towards identifying projected capital rehabilitation and renewal costs for bridges and culverts and integrating these costs into long-term planning.

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 Municipality believe 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.

4.3 Buildings & Facilities

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

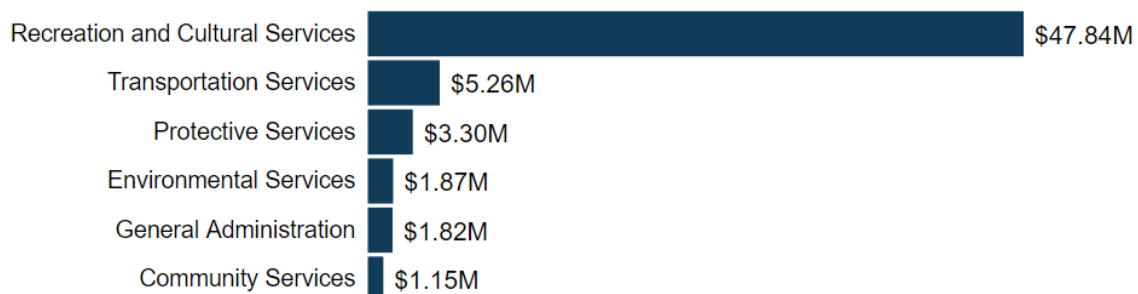
- municipal offices
- operations centre
- public libraries
- cemeteries
- fire halls and associated offices and facilities
- public works garages, equipment depot and storage sheds
- arenas and community centres

4.3.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Buildings & Facilities inventory.

| Asset Segment | Quantity | Replacement Cost Method | Total Replacement Cost |
|----------------------------------|----------|--|------------------------|
| Community Services | 6 | CPI Inflation (2018 Insurance Program) | \$1,151,340 |
| Environmental Services | 25 | CPI Inflation (2018 Insurance Program) | \$1,867,585 |
| General Administration | 14 | CPI Inflation (2018 Insurance Program) | \$1,822,759 |
| Protective Services | 18 | CPI Inflation (2018 Insurance Program) | \$3,301,654 |
| Recreation and Cultural Services | 206 | CPI Inflation (2018 Insurance Program) | \$47,836,613 |
| Transportation Services | 21 | CPI Inflation (2018 Insurance Program) | \$5,264,808 |
| | | | \$61,244,759 |

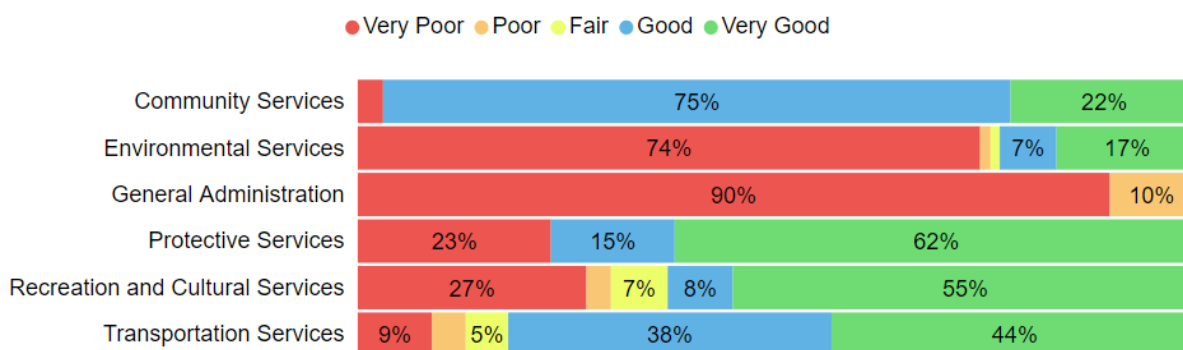
Total Replacement Cost
\$61.24M



4.3.2 Asset Condition

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 | Average Condition (%) | Average Condition Rating | Condition Source |
|----------------------------------|-----------------------|--------------------------|------------------|
| Community Services | 65% | Good | Age-based |
| Environmental Services | 25% | Fair | Age-based |
| General Administration | 9% | Very Poor | Age-based |
| Protective Services | 69% | Good | Age-based |
| Recreation and Cultural Services | 55% | Fair | Age-based |
| Transportation Services | 70% | Good | Age-based |
| | 55% | Fair | |



To ensure that the Municipality's Buildings & Facilities continue to provide an acceptable level of service, Thames Centre 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 & Facilities.

Current Approach to Condition Assessment

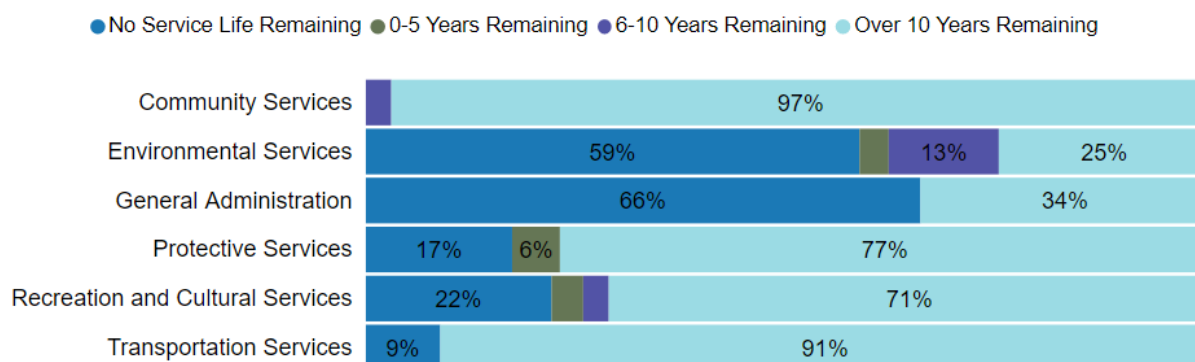
Accurate and reliable condition data allows staff to confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- Formal workplace inspections conducted every year through the Municipality's health and safety program.
- High-level assessments by internal staff are performed annually to determine the condition of facilities.

4.3.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Buildings & Facilities assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

| Asset Segment | Estimated Useful Life (Years) | Average Age (Years) | Average Service Life Remaining (Years) |
|----------------------------------|-------------------------------|---------------------|--|
| Community Services | 20 - 75 Years | 13.2 | 31.8 |
| Environmental Services | 10 - 100 Years | 24.2 | 22.8 |
| General Administration | 20 - 100 Years | 49.8 | -0.9 |
| Protective Services | 20 - 100 Years | 14.0 | 29.6 |
| Recreation and Cultural Services | 20 - 100 Years | 33.1 | 13.3 |
| Transportation Services | 20 - 100 Years | 29.9 | 18.7 |
| | | 31.3 | 15.3 |



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

4.3.4 Lifecycle Management Strategy

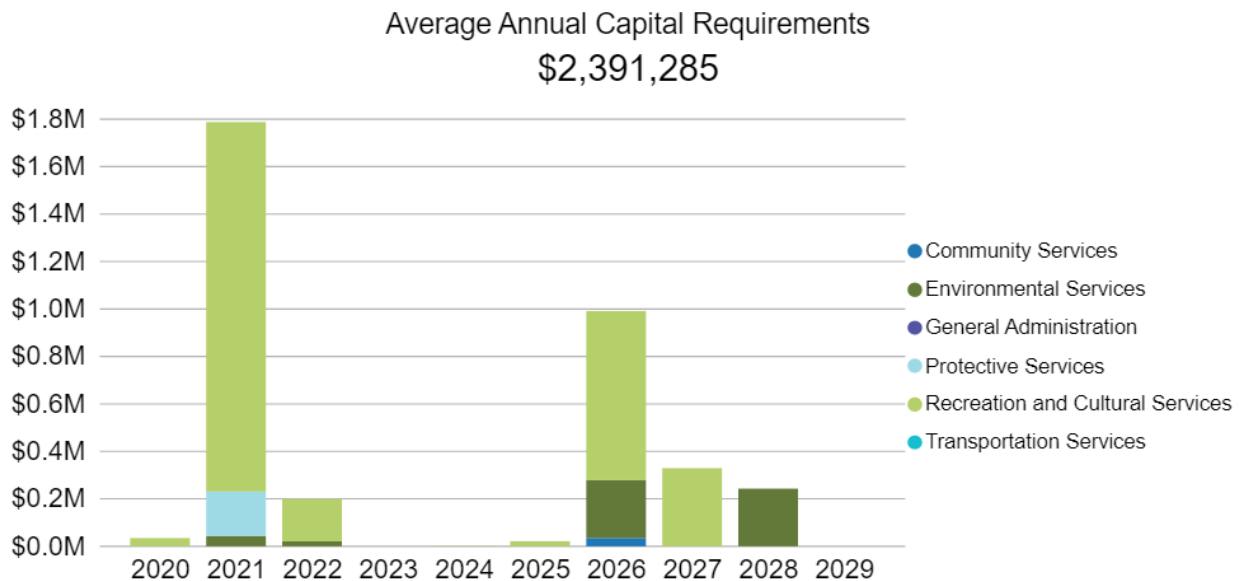
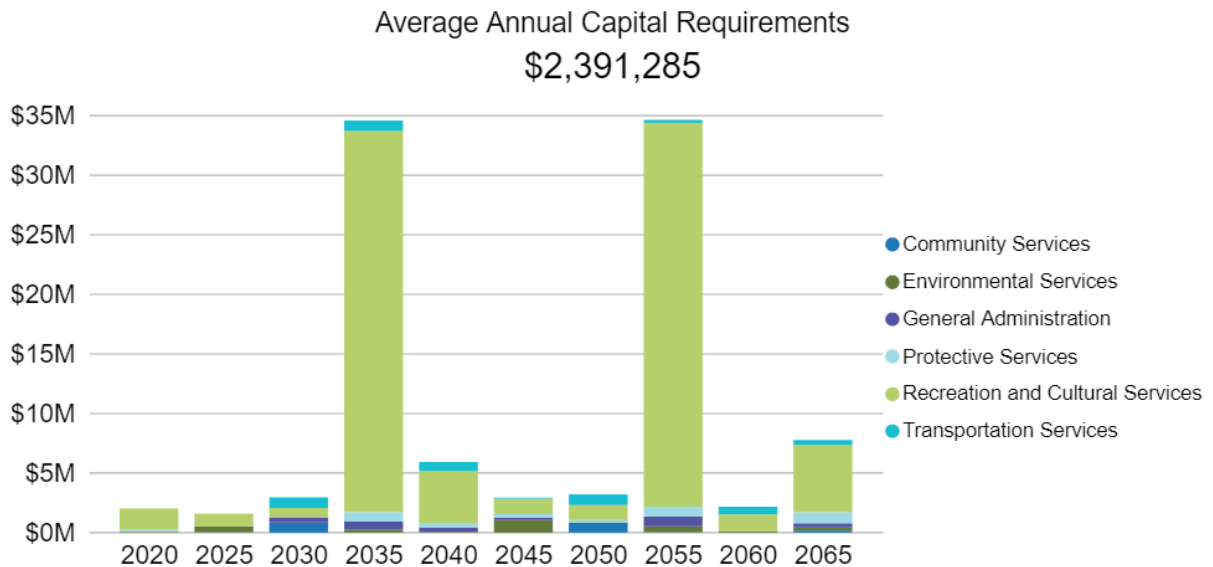
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

| Activity Type | Description of Current Strategy |
|---------------------------------|--|
| Maintenance / Rehabilitation | Municipal buildings are subject to regular inspections to identify health & safety requirements as well as structural deficiencies that require additional attention |
| | Critical buildings (Water Treatment Plant, Wastewater Treatment Plant, Fire Stations etc.) have a detailed maintenance and rehabilitation schedule, while the maintenance of other facilities are dealt with on a case-by-case basis |
| Replacement | As a supplement to the knowledge and expertise of municipal staff, Thames Centre regularly works with contractors to complete Facility Needs Assessment Studies |
| | Assessments are completed strategically as buildings approach their end-of-life to determine whether replacement or rehabilitation is appropriate |

Forecasted Capital Requirements

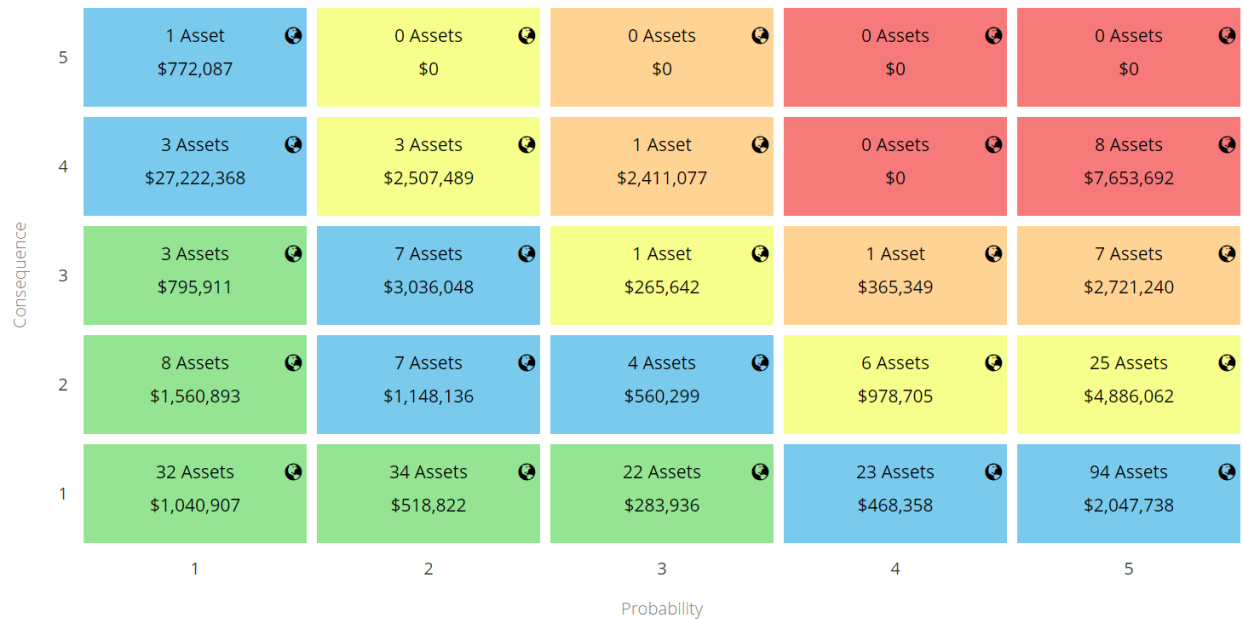
The following graphs forecasts capital requirements for building and facility assets over the next 50-years and 10-years, respectively. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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 A.

4.3.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2019 inventory data.



The identification of these critical assets by using the risk framework allows Thames Centre to determine appropriate risk mitigation strategies and treatment options. These may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data. Critical assets do not necessarily require immediate renewal or replacement.

See Appendix C for the criteria used to determine the risk rating of each asset.

4.3.6 Levels of Service

Buildings & Facilities is considered a non-core asset category. As such, the Municipality has until July 1, 2023 to solidify the qualitative descriptions and technical metrics outlined in the tables below that measure the current level of service provided.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Thames Centre's Buildings & Facilities.

| Service Attribute | Qualitative Description | Current LOS (2019) |
|-------------------|---|--------------------|
| Scope | List of facilities, locational map, an explanation of uses and the service areas supported by these assets. | TBD |

Technical Levels of Service

The following table include quantitative metrics that determine the technical level of service provided by Buildings & Facilities.

| Service Attribute | Technical Metric | Current LOS (2019) |
|-------------------|---|--------------------|
| Scope | % of facilities where annual internal inspections have been completed | TBD |
| | % of facilities that meet AODA standards | TBD |
| Quality | % of facility assets that are in good or very good condition | 63% |
| | % of facility assets that are in poor or very poor condition | 31% |
| Performance | Capital reinvestment rate | 1.72% |

4.3.7 Recommendations

Asset Inventory

- Staff should continue to refine and develop a component-based inventory for all buildings & facilities to allow for component-based lifecycle planning.
- Continue the consolidation of asset attribute data, condition data and updating replacement costs. In particular, the review of datasets such as insurance appraisals, external facility assessments, etc. that provide valuable asset data.

Condition Assessment Strategies

- The Municipality should formalize the internal condition assessment program that has been developed as part of the Roadmap project.
- A comprehensive structural assessment of all buildings & facilities is highly recommended to gain a better understanding of the overall health and condition of each facility to identify accurate short- and long-term capital requirements.

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 Thames Centre 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.

4.4 Machinery & Equipment

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

- custodial equipment to maintain facilities,
- emergency services equipment to support first responders,
- furniture & fixtures for facilities, offices, and buildings,
- IT equipment for communication, entertainment, and data management,
- recreation equipment for parks and sports facilities, and
- tools, shop & garage machinery equipment to ensure proper maintenance of vehicles and machinery.

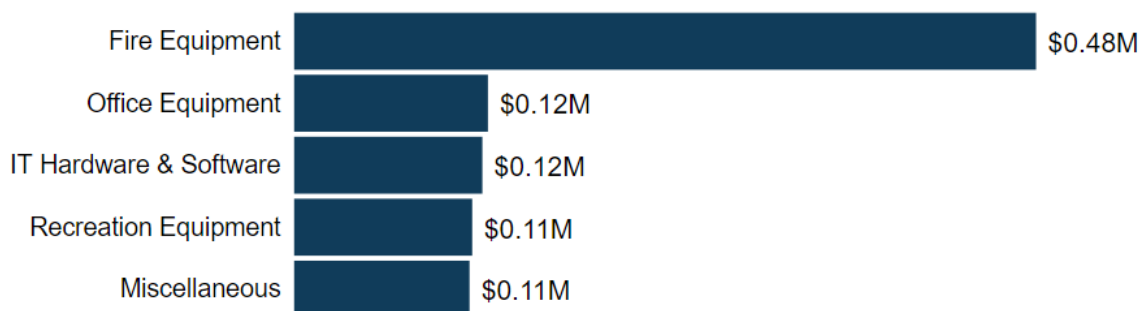
Keeping machinery & equipment assets in an adequate state of repair is important to maintain a high level of service.

4.4.1 Asset Inventory & Replacement Cost

The following table includes the quantity, replacement cost method and total replacement cost of each asset segment in the machinery and equipment inventory.

| Asset Segment | Quantity | Replacement Cost Method | Total Replacement Cost |
|------------------------|----------|---------------------------------|------------------------|
| Fire Equipment | 37 | CPI Inflation (Historical Cost) | \$475,204 |
| IT Hardware & Software | 4 | CPI Inflation (Historical Cost) | \$120,707 |
| Miscellaneous | 6 | CPI Inflation (Historical Cost) | \$112,483 |
| Office Equipment | 3 | CPI Inflation (Historical Cost) | \$124,275 |
| Recreation Equipment | 3 | CPI Inflation (Historical Cost) | \$114,205 |
| | | | \$946,874 |

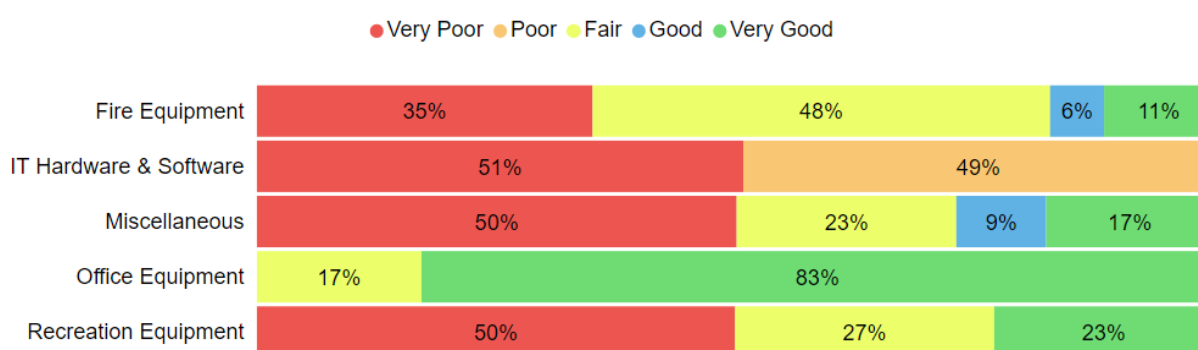
Total Replacement Cost
\$0.95M



4.4.2 Asset Condition

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 | Average Condition (%) | Average Condition Rating | Condition Source |
|------------------------|-----------------------|--------------------------|------------------|
| Fire Equipment | 39% | Poor | Age-based |
| IT Hardware & Software | 12% | Very Poor | Age-based |
| Miscellaneous | 38% | Poor | Age-based |
| Office Equipment | 79% | Good | Age-based |
| Recreation Equipment | 32% | Poor | Age-based |
| | 40% | Fair | |



To ensure that Machinery & Equipment assets continue to provide an acceptable level of service, the Municipality 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 & Equipment assets.

Current Approach to Condition Assessment

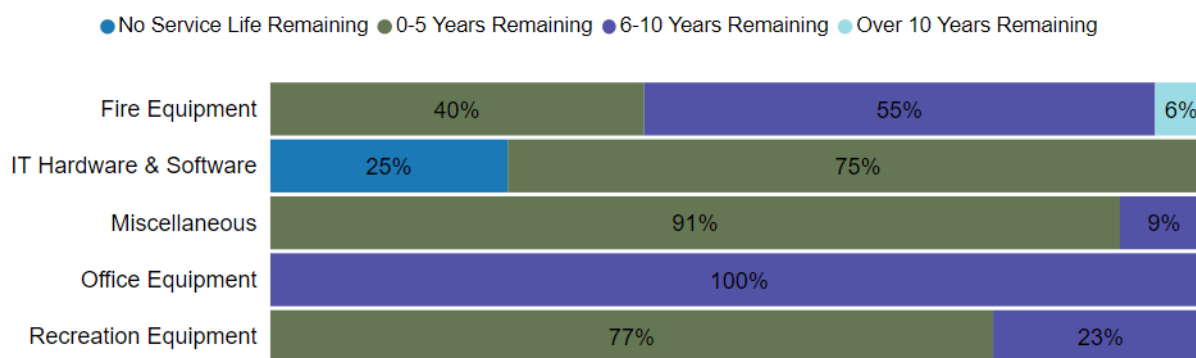
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Municipality's current approach:

- Staff complete regular visual inspections of machinery & equipment to ensure they are in state of adequate repair.
- Aside from a structured reporting and tracking program in place for Fire Equipment assets, there are no formal condition assessment programs in place for the remaining Machinery & Equipment assets

4.4.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Machinery & Equipment assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

| Asset Segment | Estimated Useful Life (Years) | Average Age (Years) | Average Service Life Remaining (Years) |
|------------------------|-------------------------------|---------------------|--|
| Fire Equipment | 10 - 20 Years | 6.1 | 5.6 |
| IT Hardware & Software | 4 Years | 3.8 | 0.3 |
| Miscellaneous | 5 - 20 Years | 3.7 | 3.5 |
| Office Equipment | 10 - 20 Years | 4.3 | 9.0 |
| Recreation Equipment | 10 Years | 5.7 | 4.3 |
| | | 4.9 | 4.5 |



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

4.4.4 Lifecycle Management Strategy

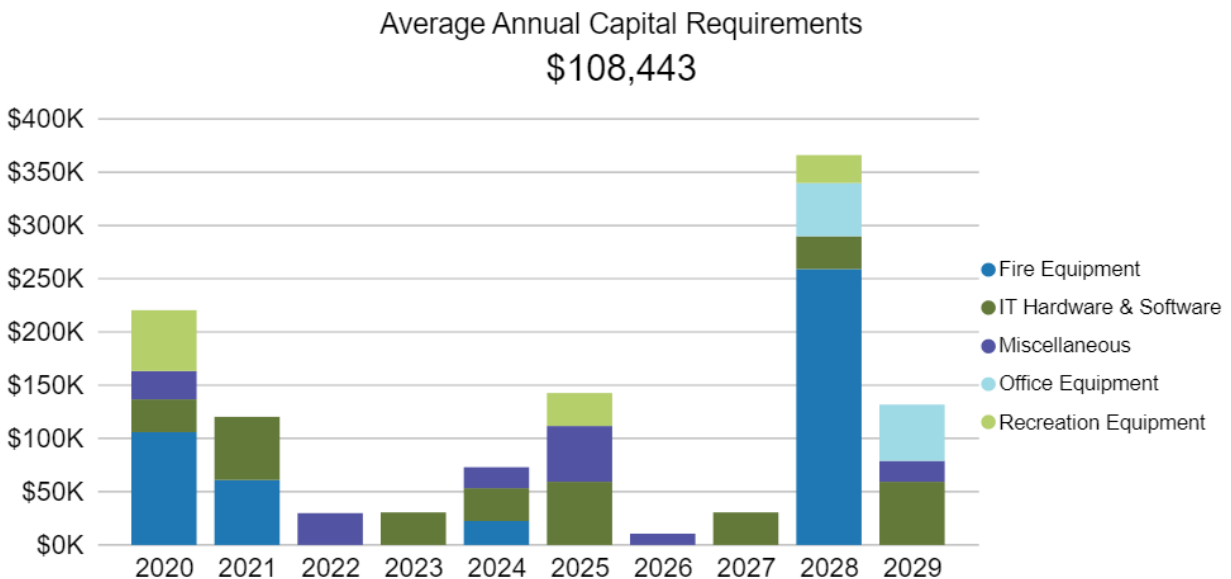
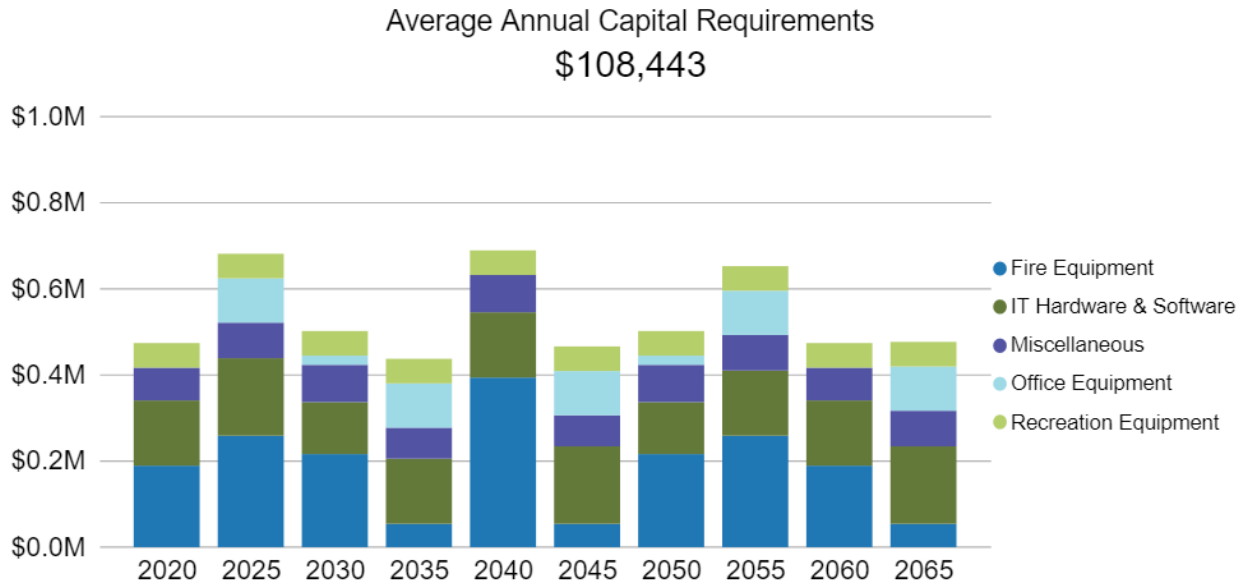
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

| Activity Type | Description of Current Strategy |
|--------------------------------|---|
| Maintenance/ Rehabilitation | Maintenance program varies by department |
| | Fire Protection Services equipment is subject to a much more rigorous inspection and maintenance program compared to most other departments |
| | Machinery & equipment is maintained according to manufacturer recommended actions and supplemented by the expertise of municipal staff |
| Replacement | The replacement of machinery & equipment depends on deficiencies identified by operators that may impact their ability to complete required tasks |

Forecasted Capital Requirements

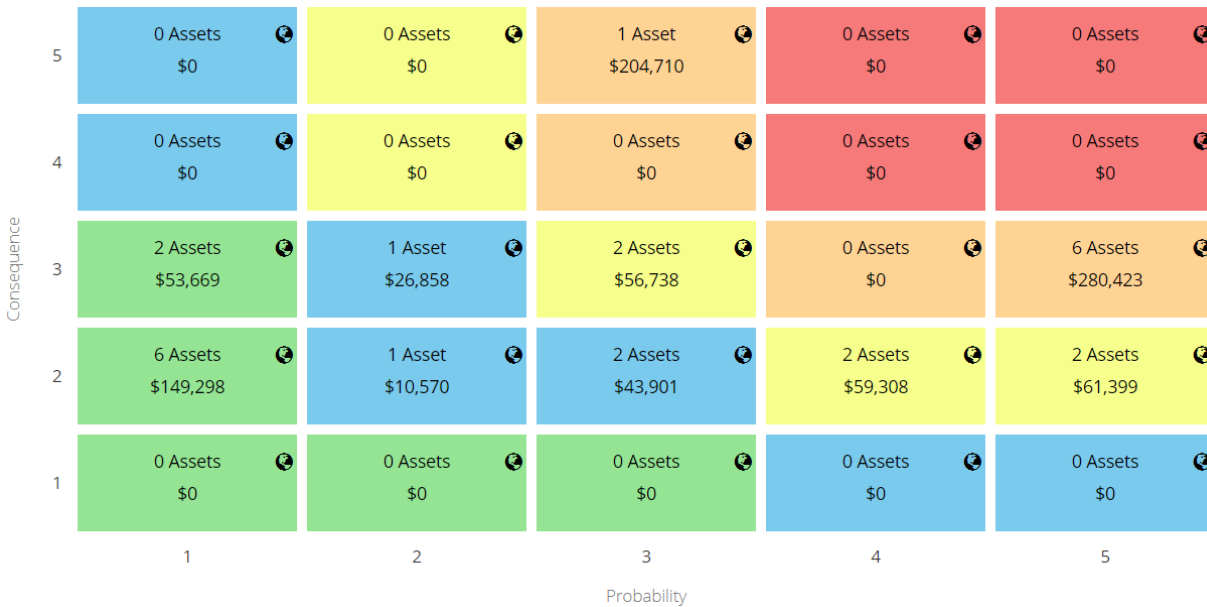
The following graphs forecasts capital requirements for machinery and equipment assets over the next 50-years and 10-years, respectively. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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 A.

4.4.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2019 inventory data.



The identification of these critical assets by using the risk framework allows Thames Centre to determine appropriate risk mitigation strategies and treatment options. These may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data. Critical assets do not necessarily require immediate renewal or replacement.

See Appendix C for the criteria used to determine the risk rating of each asset.

4.4.6 Levels of Service

Machinery & Equipment is considered a non-core asset category. As such, Thames Centre has until July 1, 2024 to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

4.4.7 Recommendations

Asset Inventory

- As part of continuous improvement within the Municipality, staff have indicated working towards a more comprehensive listing of machinery & equipment assets. This is pertinent to all departments and will include critical assets that were previously excluded from the inventory due to the capital thresholds in the TCA policy.

Replacement Costs

- All replacement costs used in this asset category 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

- 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.

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

- Develop metrics and begin measuring current levels of service. 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.

4.5 Fleet

The fleet service is responsible for maintaining and replacing municipally owned vehicles and equipment under the municipal replacement strategy. Municipal vehicles are used to support several service areas, including:

- fire rescue vehicles that support emergency services,
- light-duty, medium-duty, & heavy-duty vehicles to support the maintenance of municipal infrastructure and address service requests,
- heavy-duty machinery to support the construction and rehabilitation of vital infrastructure, the removal of critical infrastructure, and
- attachments to support the operational needs of critical use vehicles and heavy-duty machinery.

4.5.1 Asset Inventory & Replacement Cost

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

| Asset Segment | Quantity | Replacement Cost Method | Total Replacement Cost |
|-------------------|----------|---------------------------------|------------------------|
| Cemetery Vehicles | 1 | CPI Inflation (Historical Cost) | \$64,054 |
| Facility Vehicles | 7 | CPI Inflation (Historical Cost) | \$574,255 |
| Fire Vehicles | 10 | CPI Inflation (Historical Cost) | \$4,062,115 |
| Landfill Vehicles | 1 | CPI Inflation (Historical Cost) | \$25,400 |
| Parks Vehicles | 17 | CPI Inflation (Historical Cost) | \$441,653 |
| Roads Vehicles | 24 | CPI Inflation (Historical Cost) | \$3,818,124 |
| Water Vehicles | 1 | CPI Inflation (Historical Cost) | \$37,677 |
| | | | \$9,023,278 |

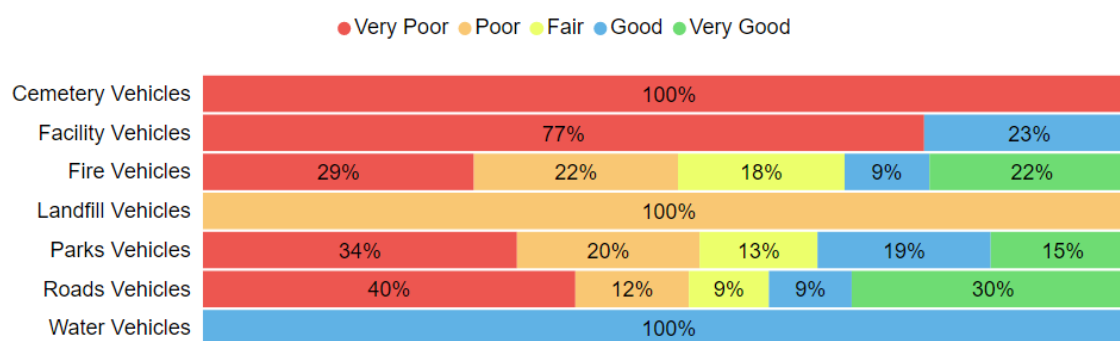
Total Replacement Cost \$9.0M



4.5.2 Asset Condition

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 | Average Condition (%) | Average Condition Rating | Condition Source |
|-------------------|-----------------------|--------------------------|------------------|
| Cemetery Vehicles | 20% | Poor | Age-based |
| Facility Vehicles | 16% | Very Poor | Age-based |
| Fire Vehicles | 43% | Fair | Age-based |
| Landfill Vehicles | 38% | Poor | Age-based |
| Parks Vehicles | 38% | Poor | Age-based |
| Roads Vehicles | 39% | Poor | Age-based |
| Water Vehicles | 75% | Good | Age-based |
| | 40% | Fair | |



To ensure that Thames Centre fleet assets continue to provide an acceptable level of service, the Municipality 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 fleet assets.

Current Approach to Condition Assessment

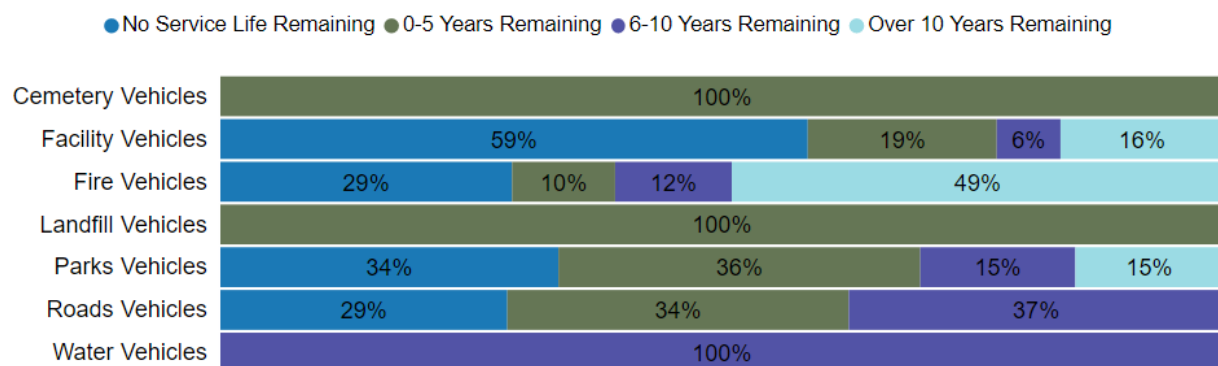
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- Staff complete regular visual inspections of vehicles to ensure they are in a state of adequate repair prior to operation.
- The mileage of vehicles is used as a proxy to determine remaining useful life and relative vehicle condition except for the Fire Department.

4.5.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Vehicles assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

| Asset Segment | Estimated Useful Life (Years) | Average Age (Years) | Average Service Life Remaining (Years) |
|-------------------|-------------------------------|---------------------|--|
| Cemetery Vehicles | 20 Years | 8.0 | 2.0 |
| Facility Vehicles | 1 - 17 Years | 10.3 | 0.3 |
| Fire Vehicles | 15 - 20 Years | 13.4 | 6.1 |
| Landfill Vehicles | 8 Years | 5.0 | 3.0 |
| Parks Vehicles | 1 - 17 Years | 8.9 | -0.1 |
| Roads Vehicles | 5 - 10 Years | 7.1 | 1.6 |
| Water Vehicles | 8 Years | 2.0 | 6.0 |
| | | 8.9 | 1.8 |



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

4.5.4 Lifecycle Management Strategy

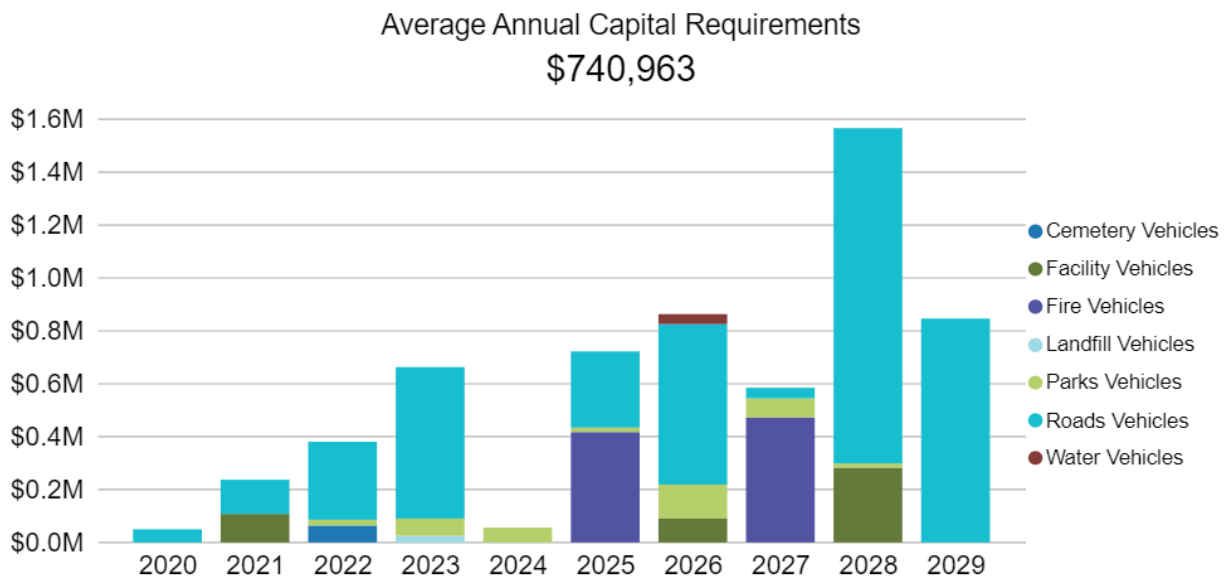
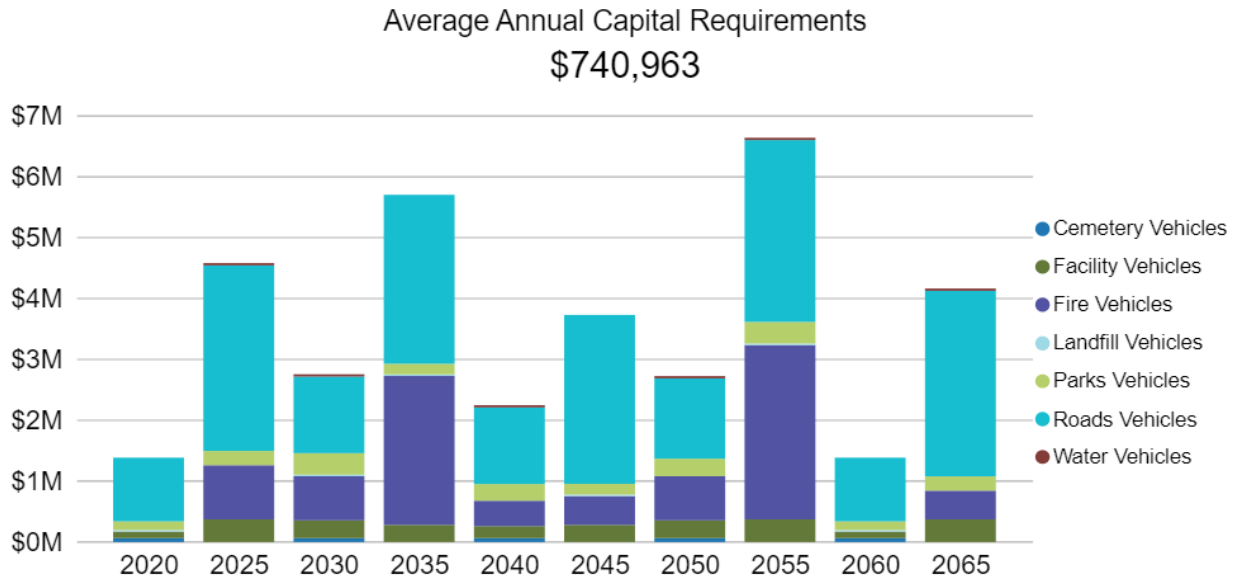
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines Thames Centre's current lifecycle management strategy.

| Activity Type | Description of Current Strategy |
|---------------------------------|---|
| Maintenance / Rehabilitation | Visual inspections completed and documented daily; fluids inspected at every fuel stop; tires inspected monthly |
| | Every 4-7000km includes a detailed inspection; tires are rotated and oil changed |
| | Annual preventative maintenance activities include system components check and additional detailed inspections |
| Replacement | Fleet replacements are based on the Municipality's Tangible Capital Asset Policy. Policy Number: CP-1-1.2 |
| | Vehicle age, kilometres and annual repair costs are taken into consideration when determining appropriate treatment options |

Forecasted Capital Requirements

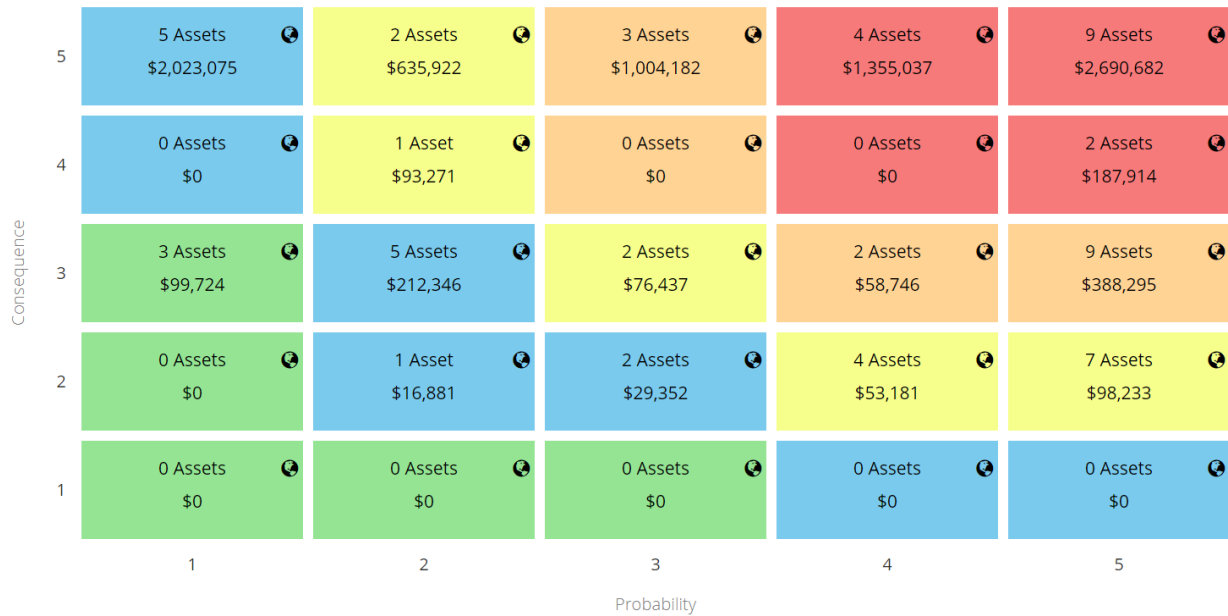
The following graphs forecasts capital requirements for fleet assets over the next 50-years and 10-years, respectively. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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 A.

4.5.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2019 inventory data.



The identification of these critical assets by using the risk framework allows Thames Centre to determine appropriate risk mitigation strategies and treatment options. These may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data. Critical assets do not necessarily require immediate renewal or replacement.

See Appendix C for the criteria used to determine the risk rating of each asset.

4.5.6 Levels of Service

Fleet is considered a non-core asset category. As such, Thames Centre has until July 1, 2024 to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

4.5.7 Recommendations

Replacement Costs

- All replacement costs used in this asset category 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

- Identify condition assessment strategies for high value and high-risk fleet 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.

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

- Develop metrics and begin measuring current levels of service. 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.

4.6 Parks & Land Improvements

Thames Centre owns and operates a number of assets that are categorized under the Parks & Land Improvements category and assist in providing the Municipality with community recreation and natural outdoor space. This category includes:

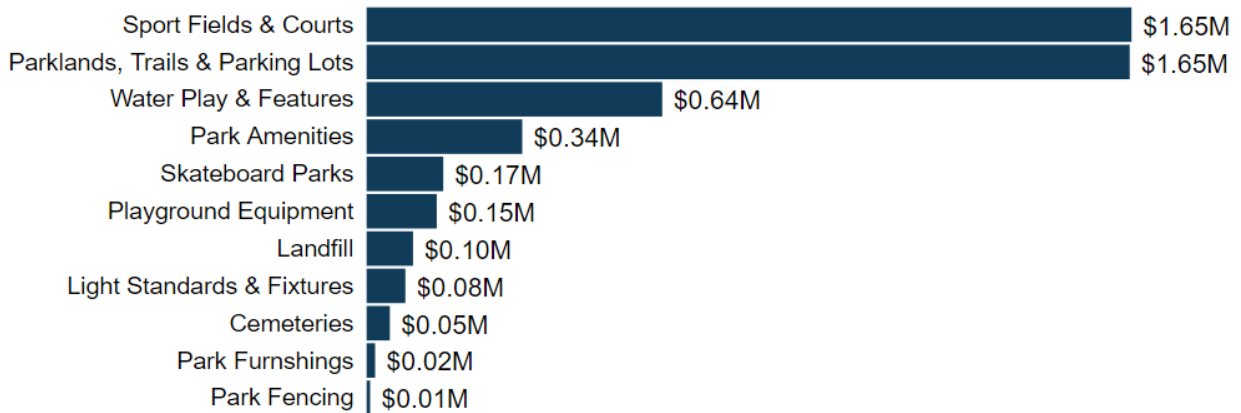
- Fields, courts, and rinks
- Skateboard parks
- Parking lots for municipal facilities and parks
- Parklands and Trails
- Fencing and signage
- Playgrounds
- Miscellaneous landscaping, irrigation and other purposed assets

4.6.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Parks and Land Improvements inventory.

| Asset Segment | Quantity | Replacement Cost Method | Total Replacement Cost |
|----------------------------------|----------|---------------------------------|------------------------|
| Cemeteries | 2 | CPI Inflation (Historical Cost) | \$50,912 |
| Landfill | 1 | CPI Inflation (Historical Cost) | \$100,973 |
| Light Standards & Fixtures | 3 | CPI Inflation (Historical Cost) | \$84,468 |
| Park Amenities | 2 | CPI Inflation (Historical Cost) | \$337,026 |
| Park Fencing | 1 | CPI Inflation (Historical Cost) | \$8,262 |
| Park Furnshings | 2 | CPI Inflation (Historical Cost) | \$19,032 |
| Parklands, Trails & Parking Lots | 21 | CPI Inflation (Historical Cost) | \$1,649,983 |
| Playground Equipment | 4 | CPI Inflation (Historical Cost) | \$152,247 |
| Skateboard Parks | 4 | CPI Inflation (Historical Cost) | \$166,316 |
| Sport Fields & Courts | 12 | CPI Inflation (Historical Cost) | \$1,653,945 |
| Water Play & Features | 9 | CPI Inflation (Historical Cost) | \$639,574 |
| | | | \$4,862,738 |

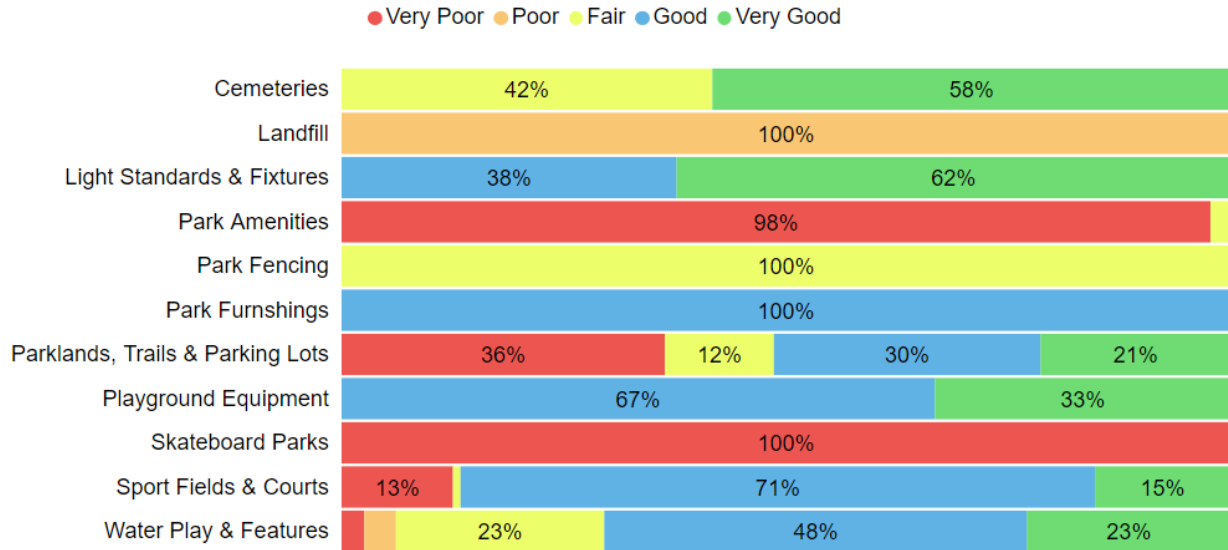
**Total Replacement Cost
\$4.86M**



4.6.2 Asset Condition

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 | Average Condition (%) | Average Condition Rating | Condition Source |
|----------------------------------|-----------------------|--------------------------|------------------|
| Cemeteries | 75% | Good | Age-based |
| Landfill | 37% | Poor | Age-based |
| Light Standards & Fixtures | 83% | Very Good | Age-based |
| Park Amenities | 17% | Very Poor | Age-based |
| Park Fencing | 45% | Fair | Age-based |
| Park Furnshings | 70% | Good | Age-based |
| Parklands, Trails & Parking Lots | 44% | Fair | Age-based |
| Playground Equipment | 73% | Good | 38% Assessed |
| Skateboard Parks | 15% | Very Poor | Age-based |
| Sport Fields & Courts | 68% | Good | Age-based |
| Water Play & Features | 63% | Good | Age-based |
| | 53% | Fair | |



To ensure that the Parks & Land Improvements asset category continues to provide an acceptable level of service, the Municipality 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 assets.

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 municipality’s current approach:

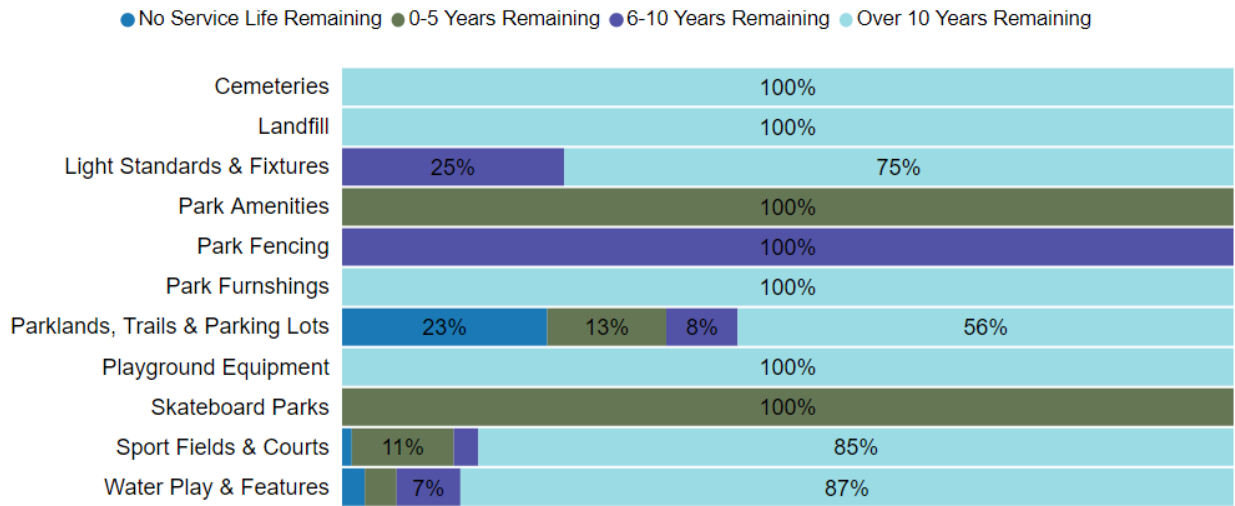
- Staff complete regular visual inspections of parks and land improvements assets to ensure they are in a state of adequate repair.
- Staff conduct formal inspections of the outdoor play space, fixed play structures and surfacing in accordance with CAN/CSA-Z614-14 and required as per O. Reg. 137/15.⁴
- There are no formal condition assessment programs in place for the other parks & land improvement assets.

⁴ Starting in 2021, the Community Services & Facilities department will be engaging a third party to complete formal inspections of playgrounds. A review of this type will be completed for each playground on a three-year rotating schedule.

4.6.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Land Improvements assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

| Asset Segment | Estimated Useful Life (Years) | Average Age (Years) | Average Service Life Remaining (Years) |
|----------------------------------|-------------------------------|---------------------|--|
| Cemeteries | 20 - 100 Years | 10.0 | 50.0 |
| Landfill | 30 Years | 19.0 | 11.0 |
| Light Standards & Fixtures | 15 - 30 Years | 4.7 | 17.0 |
| Park Amenities | 10 - 30 Years | 15.5 | 4.5 |
| Park Fencing | 20 Years | 11.0 | 9.0 |
| Park Furnshings | 20 Years | 6.0 | 13.9 |
| Parklands, Trails & Parking Lots | 5 - 30 Years | 14.6 | 2.3 |
| Playground Equipment | 20 - 30 Years | 9.5 | 16.7 |
| Skateboard Parks | 20 Years | 17.0 | 3.0 |
| Sport Fields & Courts | 10 - 30 Years | 10.8 | 12.9 |
| Water Play & Features | 20 - 100 Years | 20.0 | 20.6 |
| | | 13.6 | 11.1 |



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

4.6.4 Lifecycle Management Strategy

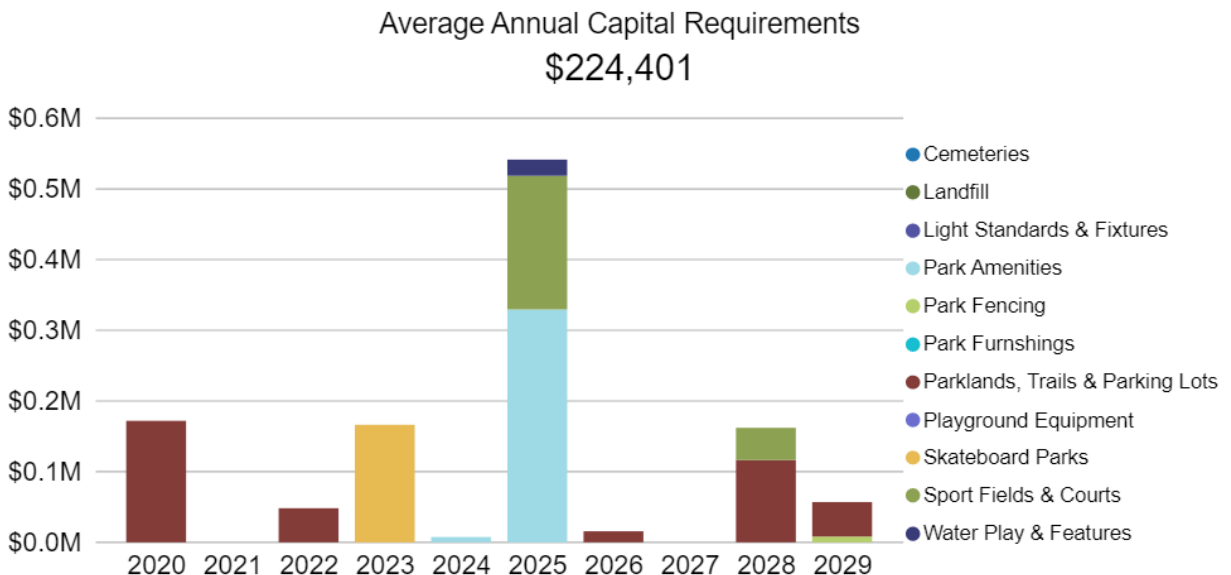
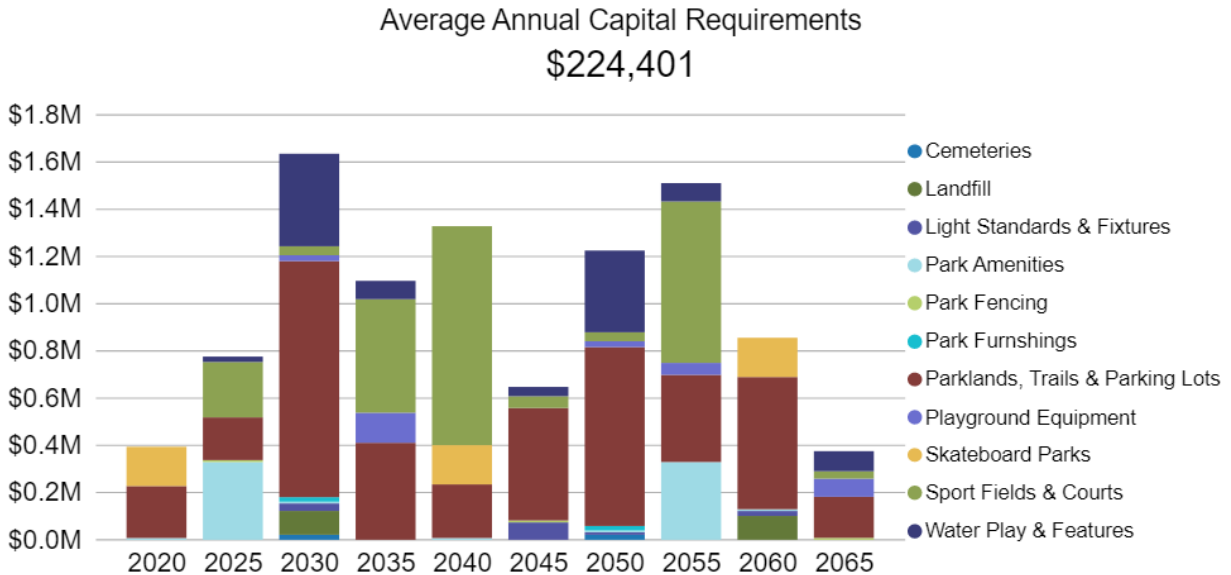
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

| Activity Type | Description of Current Strategy |
|---|--|
| Maintenance, Rehabilitation & Replacement | The Parks & Land Improvements asset category includes several unique asset types and lifecycle requirements are dealt with on a case-by-case basis |

Forecasted Capital Requirements

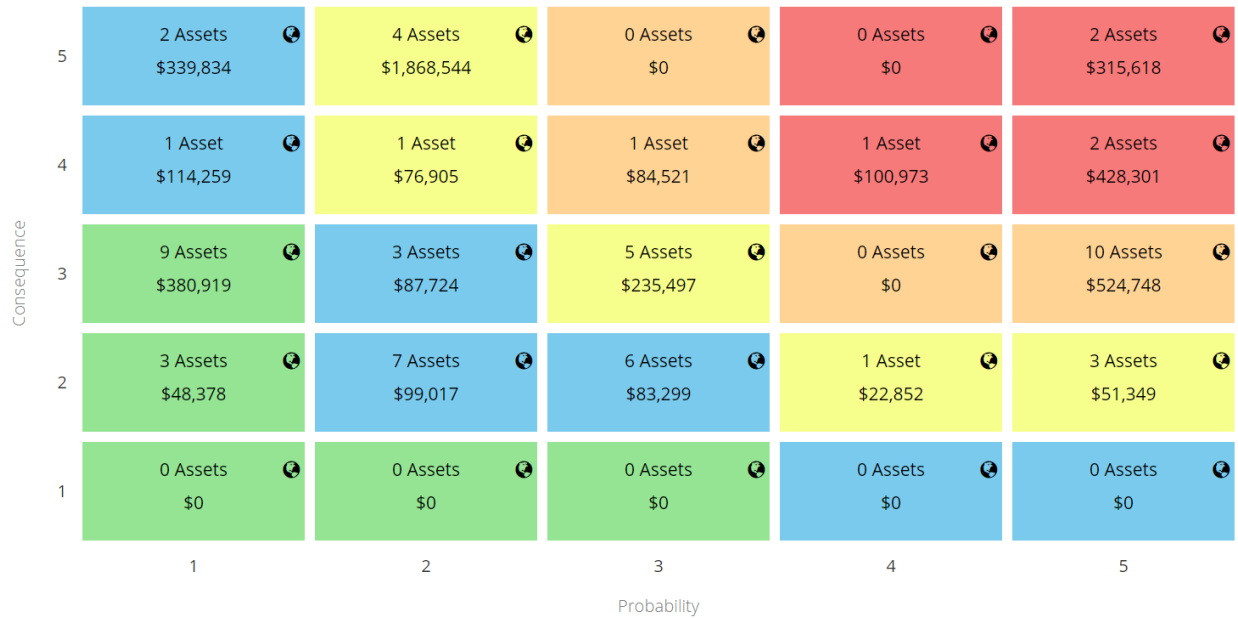
The following graphs forecasts capital requirements for parks and land improvement assets over the next 50-years and 10-years, respectively. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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 A.

4.6.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2019 inventory data.



The identification of these critical assets by using the risk framework allows Thames Centre to determine appropriate risk mitigation strategies and treatment options. These may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data. Critical assets do not necessarily require immediate renewal or replacement.

See Appendix C for the criteria used to determine the risk rating of each asset.

4.6.6 Levels of Service

Parks & Land Improvements is considered a non-core asset category. As such, Thames Centre has until July 1, 2023 to solidify the qualitative descriptions and technical metrics outlined in the tables below that measure the current level of service provided.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by the Parks & Land Improvements category.

| Service Attribute | Qualitative Description | Current LOS (2019) |
|-------------------|---|--------------------|
| Scope | Description, which may include maps, of parks and recreational areas and their proximity to the surrounding community | See Appendix B |

Technical Levels of Service

The following table include quantitative metrics that determine the technical level of service provided by the Parks & Land Improvements category.

| Service Attribute | Technical Metric | Current LOS (2019) |
|-------------------|---|---------------------------|
| Scope | Square metres of outdoor recreation facility space | 682,782.84 m ² |
| Quality | # of maintenance inspections / # of playgrounds (as per CSS) | 11 ⁵ /11 |
| | % of parks and recreation areas that are in good or very good condition | 100% |
| | % of parks and recreation areas that are in poor or very poor condition | 0% ⁶ |
| Performance | Capital reinvestment rate | 2.04% |

⁵ Each playground structure is inspected annually. A new inspection program is to be implemented that will change the inspection frequency from an annual inspection to monthly inspections.

⁶ Two parks that include older play structures, but overall park areas considered to be in good condition.

4.6.7 Recommendations

Replacement Costs

- All replacement costs used in this asset category 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

- 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.
- Formalize the internal condition assessment program that has been developed as a part of Roadmap project.
- Staff have indicated the use of and engagement with third parties to complete formal inspections of all playgrounds.

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 Thames Centre 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.

5 Analysis of Rate-funded Assets

Key Insights

- Rate-funded assets are valued at \$126 million.
- 89% of rate-funded assets are in fair or better condition.
- The average annual capital requirement to sustain the current level of service for rate-funded assets is approximately \$1.9 million.
- Council approved a new permanent stormwater flat rate fee in 2019.

5.1 Water Distribution

The Municipality owns and operates two municipal drinking water systems, which are supplied by groundwater wells. Water distribution and transmission services are overseen by the Public Works department. Thames Centre is responsible for the:

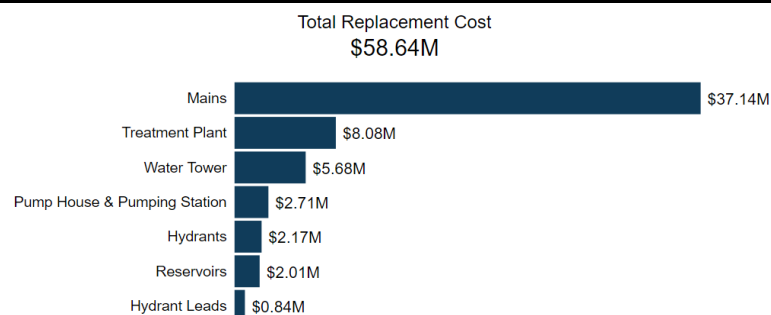
- Water Supply
- Storage Facilities
- Distribution System

A Water and Wastewater Master Plan was approved in 2008, further expanded upon in 2019. The Master Plan provided a review and development of water servicing strategies for servicing the Municipality. Anticipated growth of the urban areas based on population and employment growth forecasts was factored in. Thames Centre also conducted a water and wastewater rate study in 2020 to determine the appropriate rate structure and rate increases, and forecasts over a 10-year period.

5.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Water inventory.

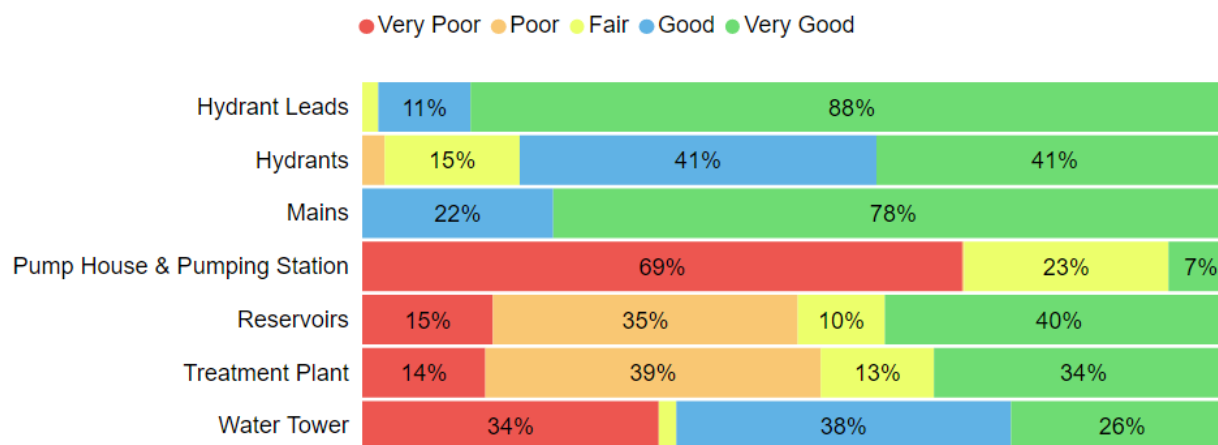
| Asset Segment | Quantity | Replacement Cost Method | Total Replacement Cost |
|------------------------------|----------|---------------------------------|------------------------|
| Hydrant Leads | 1 km | Cost per Unit | \$839,272 |
| Hydrants | 271 | Cost per Unit | \$2,168,000 |
| Mains | 56 km | Cost per Unit | \$37,142,800 |
| Pump House & Pumping Station | 21 | CPI Inflation (Historical Cost) | \$2,711,030 |
| Reservoirs | 10 | CPI Inflation (Historical Cost) | \$2,014,493 |
| Treatment Plant | 12 | CPI Inflation (Historical Cost) | \$8,084,000 |
| Water Tower | 13 | CPI Inflation (Historical Cost) | \$5,680,500 |
| | | | \$58,640,095 |



5.1.2 Asset Condition

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 | Average Condition (%) | Average Condition Rating | Condition Source |
|------------------------------|-----------------------|--------------------------|------------------|
| Hydrant Leads | 94% | Very Good | Age-based |
| Hydrants | 73% | Good | Age-based |
| Mains | 93% | Very Good | Age-based |
| Pump House & Pumping Station | 19% | Very Poor | Age-based |
| Reservoirs | 53% | Fair | Age-based |
| Treatment Plant | 50% | Fair | Age-based |
| Water Tower | 50% | Fair | Age-based |
| | 77% | Good | |



To ensure that the Water Distribution System continues to provide an acceptable level of service, the Municipality 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 are required to increase the overall condition of the Water Distribution System.

Current Approach to Condition Assessment

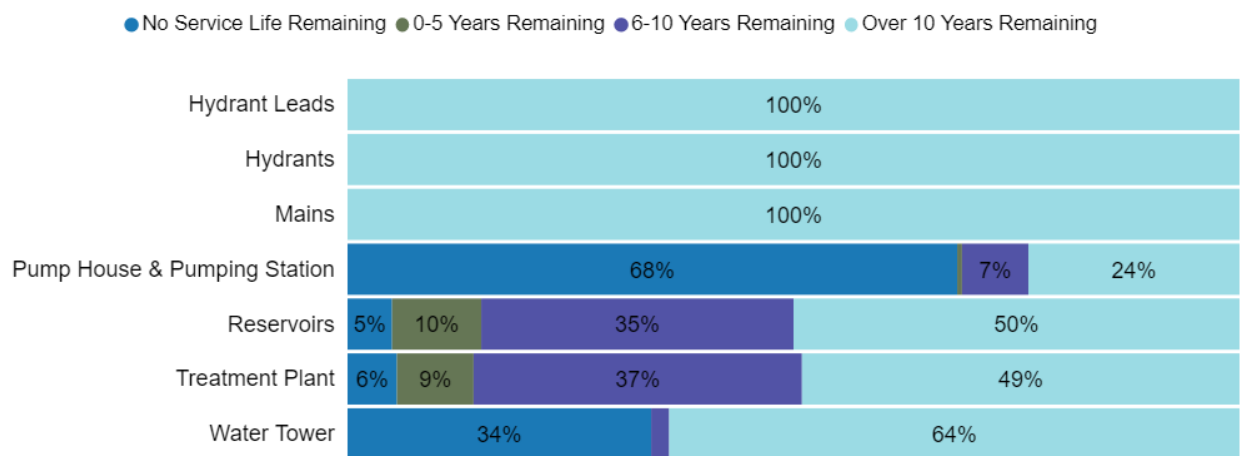
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- Staff primarily rely on the age and material of water assets to determine the projected condition of water mains.
- Aside from the inspections required under O. Reg. 170/3, there are no formal condition assessment programs in place for the Water Distribution System.

5.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Water Distribution System assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

| Asset Segment | Estimated Useful Life (Years) | Average Age (Years) | Average Service Life Remaining (Years) |
|------------------------------|-------------------------------|---------------------|--|
| Hydrant Leads | 75 - 87 Years | 24.4 | 55.5 |
| Hydrants | 87 Years | 23.6 | 63.3 |
| Mains | 75 - 87 Years | 25.1 | 54.8 |
| Pump House & Pumping Station | 10 - 100 Years | 51.9 | -12.4 |
| Reservoirs | 15 - 100 Years | 16.0 | 22.0 |
| Treatment Plant | 15 - 100 Years | 19.1 | 14.3 |
| Water Tower | 15 - 100 Years | 17.3 | 25.1 |
| | | 24.8 | 54.8 |



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

5.1.4 Lifecycle Management Strategy

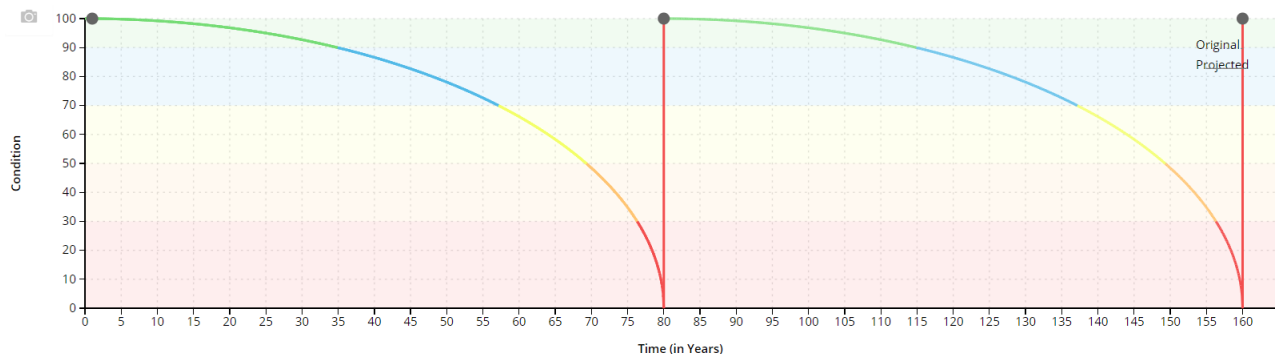
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

| Activity Type | Description of Current Strategy |
|----------------|---|
| Maintenance | Periodic pressure testing to identify deficiencies and potential leaks Main valves are exercised annually and hydrants are flushed biannually |
| Rehabilitation | In the absence of mid-lifecycle rehabilitative events, most mains are simply maintained with the goal of full replacement once it reaches its end-of-life |
| Replacement | Replacement activities are identified based on an analysis of the main break rate as well as any issues identified during regular maintenance activities |

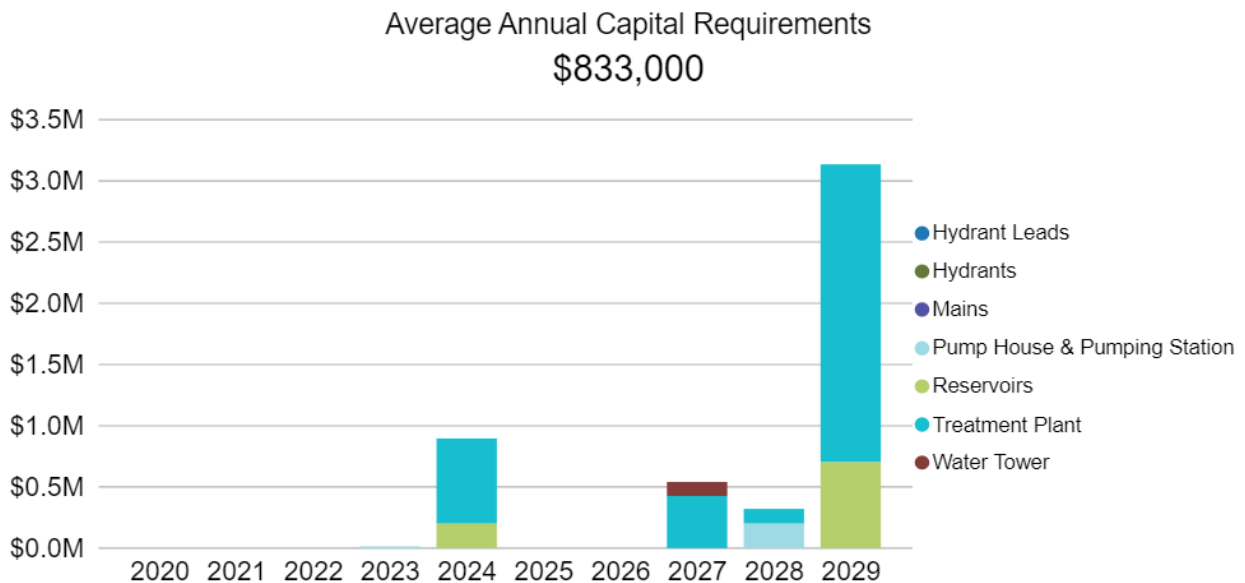
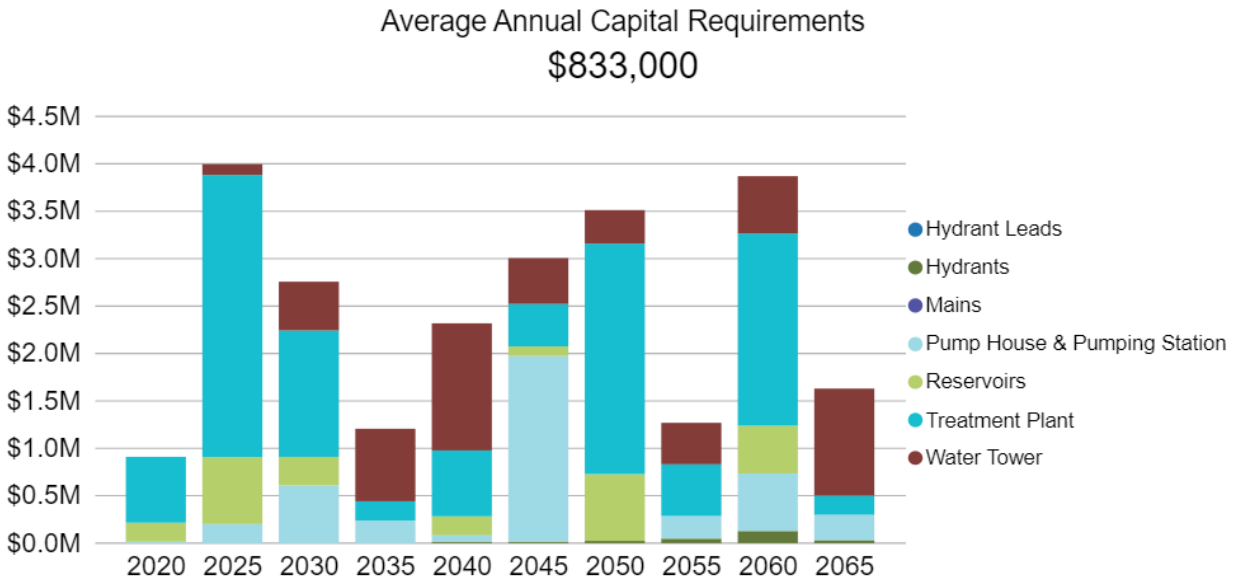
The following lifecycle strategy have been developed as a proactive approach to managing the lifecycle of water mains. A trenchless re-lining strategy is expected to extend the service life of storm mains at a lower total cost of ownership.

| Water Mains | | |
|-------------------------|--------------------------|----------------------|
| Event Name | Event Class | Event Trigger |
| Flushing – Annual Event | Preventative Maintenance | Every Year |
| Trench-less Lining | Rehabilitation | Condition at 0 - 10% |
| Full Reconstruction | Replacement | 160 Years |



Forecasted Capital Requirements

The following graphs forecasts capital requirements for water assets over the next 50-years and 10-years, respectively. The annual capital requirement represents the average amount per year that the Thames Centre should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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 A.

5.1.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2019 inventory data.

| | | | | | | |
|-------------|---|-------------------------|-------------------------|------------------------|------------------------|-------------------------|
| Consequence | 5 | 2 Assets \$4,125,044 | 1 Asset \$1,289,280 | 1 Asset \$574,663 | 1 Asset \$2,430,172 | 3 Assets \$2,280,988 |
| | 4 | 3 Assets \$1,007,333 | 0 Assets \$0 | 1 Asset \$694,335 | 2 Assets \$705,073 | 1 Asset \$694,335 |
| | 3 | 0 Assets \$0 | 1 Asset \$442,315 | 1 Asset \$103,067 | 0 Assets \$0 | 7 Assets \$1,621,771 |
| | 2 | 0 Assets \$0 | 2 Assets \$353,152 | 5 Assets \$631,247 | 5 Assets \$688,403 | 17 Assets \$649,435 |
| | 1 | 113 Assets \$989,540 | 112 Assets \$985,871 | 42 Assets \$336,000 | 7 Assets \$56,000 | 0 Assets \$0 |
| | | 1 | 2 | 3 | 4 | 5 |
| | | Probability | | | | |

The identification of these critical assets by using the risk framework allows Thames Centre to determine appropriate risk mitigation strategies and treatment options. These may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data. Critical assets do not necessarily require immediate renewal or replacement.

See Appendix C for the criteria used to determine the risk rating of each asset.

5.1.6 Levels of Service

The following tables identify Thames Centre’s current level of service for the Water System. These metrics comprise of the community and technical levels of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Municipality has selected for this AMP.

Community Levels of Service

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

| Service Attribute | Qualitative Description | Current LOS (2019) |
|-------------------|---|---|
| Scope | Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system | See Appendix B |
| | Description, which may include maps, of the user groups or areas of the municipality that have fire flow | See Appendix B |
| Reliability | Description of boil water advisories and service interruptions | <ul style="list-style-type: none"> • Service interruption – 125 Ross main break 2020 02 22, service interruption for 53 houses for 4 hrs and 4 min • Service interruption – 188 Ross main break 2020 04 07, service interruption for 12 houses for 1 hr and 15 min • Service interruption – 212 Ross main break 2020 11 18, service interruption for 19 houses for 17 hrs and 30 min |

Technical Levels of Service

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

| Service Attribute | Technical Metric | Current LOS (2019) |
|-------------------|---|--------------------|
| Scope | % of properties connected to the municipal water system | 45% |
| | % of properties where fire flow is available | 47% |
| Reliability | # of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system | TBD |
| | # of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system | 0 |
| Performance | Capital re-investment rate | 0.74% |

5.1.7 Recommendations

Asset Inventory

- Continue to refine the asset inventory to ensure all relevant asset types are included.
- Review and revise replacement costs and critical asset attribute data on a regular basis.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk assets.
- Consider formalizing the internal condition assessment program that has been developed for specific water assets as part of the Roadmap project and expanding it to include other relevant 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

- Continue to measure current levels of service in accordance with the metrics that Thames Centre 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.

5.2 Wastewater Collection

The Municipality owns two wastewater systems, and the Wastewater Services team in the Public Works department is responsible for providing collection and treatment services like:

- Wastewater Treatment
- Pumping Stations
- Sewer Collection System

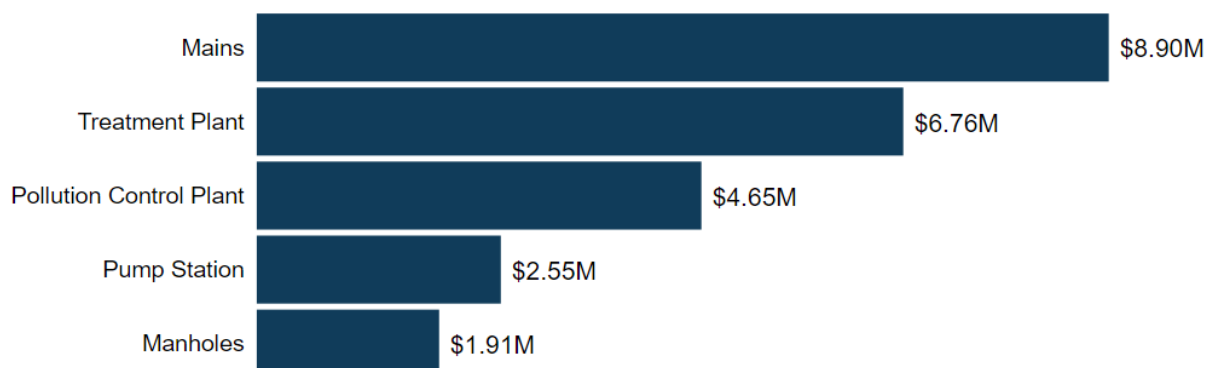
The 2019 Master Plan update provided a review and development of wastewater servicing strategies for servicing the Municipality. A sanitary and storm condition assessment was conducted in 2019, and the subsequent report published found that the overall wastewater system to be in good condition. Thames Centre also developed a water and wastewater rate study in 2020 to determine the appropriate rate structure and rate increases, and capital spending forecasts over a 10-year period.

5.2.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Wastewater inventory.

| Asset Segment | Quantity | Replacement Cost Method | Total Replacement Cost |
|-------------------------|----------|---------------------------------|------------------------|
| Mains | 19 km | Cost per Unit | \$8,903,089 |
| Manholes | 266 | Cost per Unit | \$1,908,000 |
| Pollution Control Plant | 5 | CPI Inflation (Historical Cost) | \$4,647,712 |
| Pump Station | 5 | CPI Inflation (Historical Cost) | \$2,552,362 |
| Treatment Plant | 8 | CPI Inflation (Historical Cost) | \$6,756,776 |
| | | | \$24,767,939 |

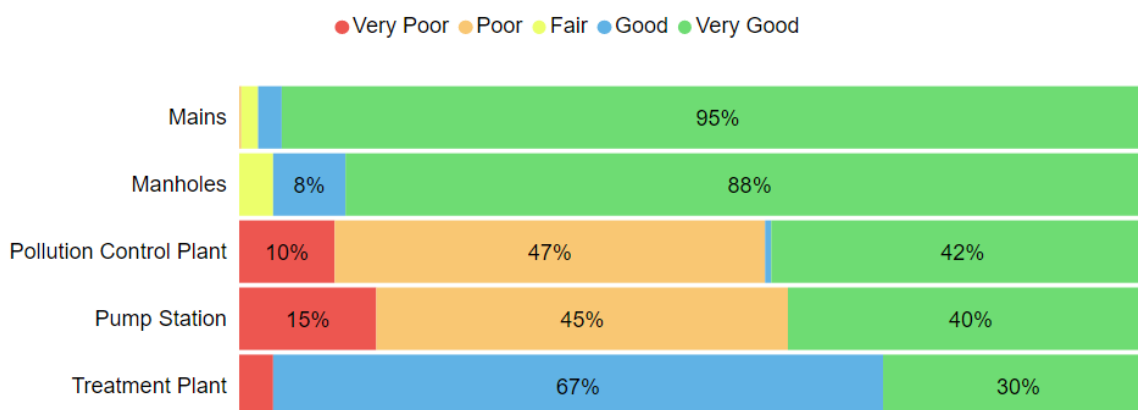
Total Replacement Cost
\$24.77M



5.2.2 Asset Condition

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 | Average Condition (%) | Average Condition Rating | Condition Source |
|-------------------------|-----------------------|--------------------------|------------------|
| Mains | 97% | Very Good | 4% Assessed |
| Manholes | 86% | Very Good | Age-based |
| Pollution Control Plant | 47% | Fair | Age-based |
| Pump Station | 45% | Fair | Age-based |
| Treatment Plant | 73% | Good | Age-based |
| | 75% | Good | |



To ensure that the Wastewater System continues to provide an acceptable level of service, Thames Centre 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 Wastewater System.

Current Approach to Condition Assessment

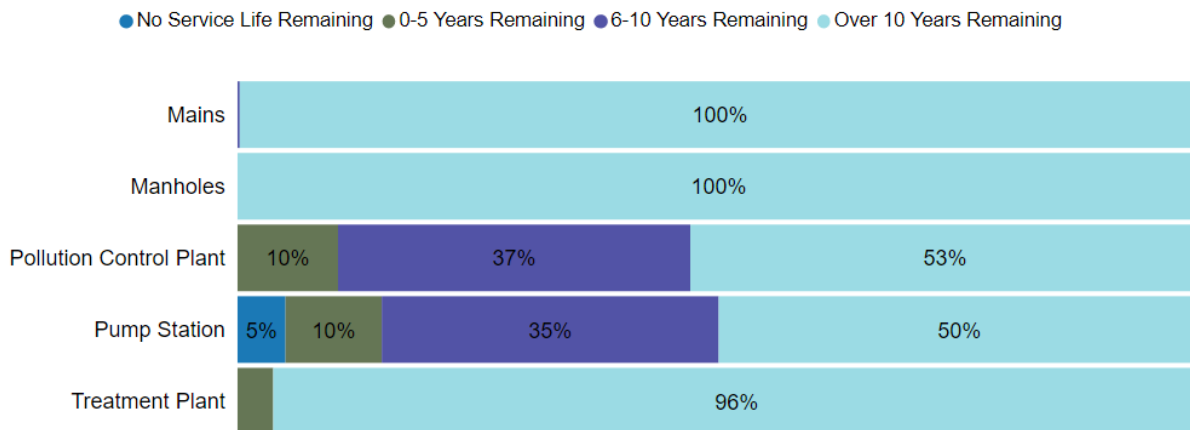
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- In 2019 the Thames Centre contracted Dillon Consulting to perform a wastewater inventory analysis and conduct condition assessments. Due to budgetary constraints, statistically developed deterioration trends were used in conjunction with limited field investigation to develop condition assessment information across the network.
- Thames Centre should consider establishing an industry best practice assessment cycle for wastewater mains.

5.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Wastewater Collection System assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

| Asset Segment | Estimated Useful Life (Years) | Average Age (Years) | Average Service Life Remaining (Years) |
|-------------------------|-------------------------------|---------------------|--|
| Mains | 86 Years | 12.8 | 67.2 |
| Manholes | 95 Years | 12.1 | 73.7 |
| Pollution Control Plant | 10 - 100 Years | 16.8 | 23.2 |
| Pump Station | 10 - 100 Years | 19.0 | 18.0 |
| Treatment Plant | 10 - 100 Years | 8.0 | 33.8 |
| | | 12.5 | 68.8 |



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

5.2.4 Lifecycle Management Strategy

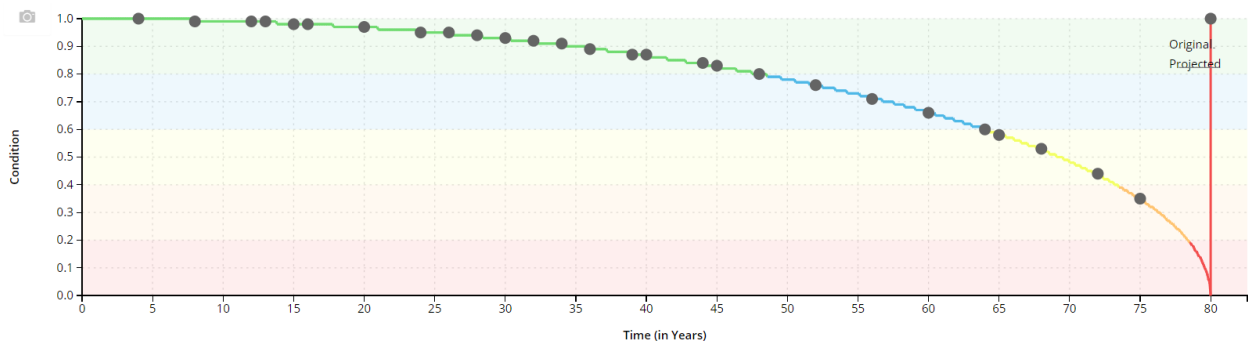
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset’s characteristics, location, utilization, maintenance history and environment.

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

| Activity Type | Description of Current Strategy |
|----------------|--|
| Maintenance | There is currently no regular maintenance schedule used by Thames Centre, but there is interest in establishing an effective system. CCTV and Zoom Camera inspections were conducted in 2019 by Dillon Consulting. |
| Rehabilitation | The 2019 Sanitary and Storm assessment report has provided the Municipality with projected rehabilitation events over the next 5 years. |
| Replacement | The 2019 Sanitary and Storm assessment report has provided the Municipality with projected replacements over the next 5 years as well as a projection of works over a 25-year timeframe. |

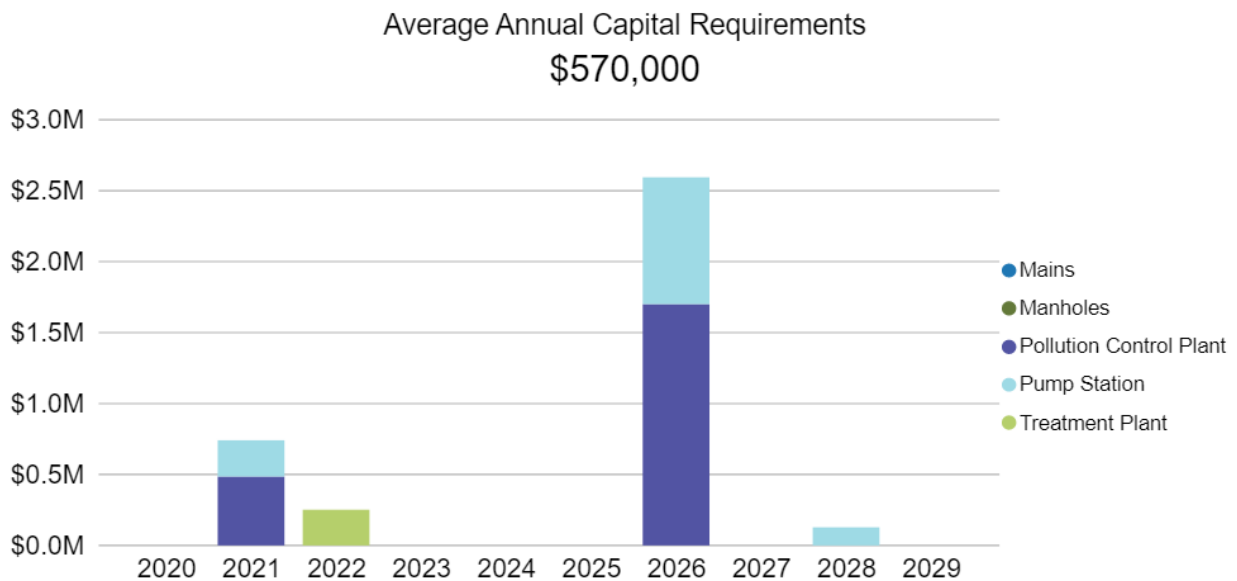
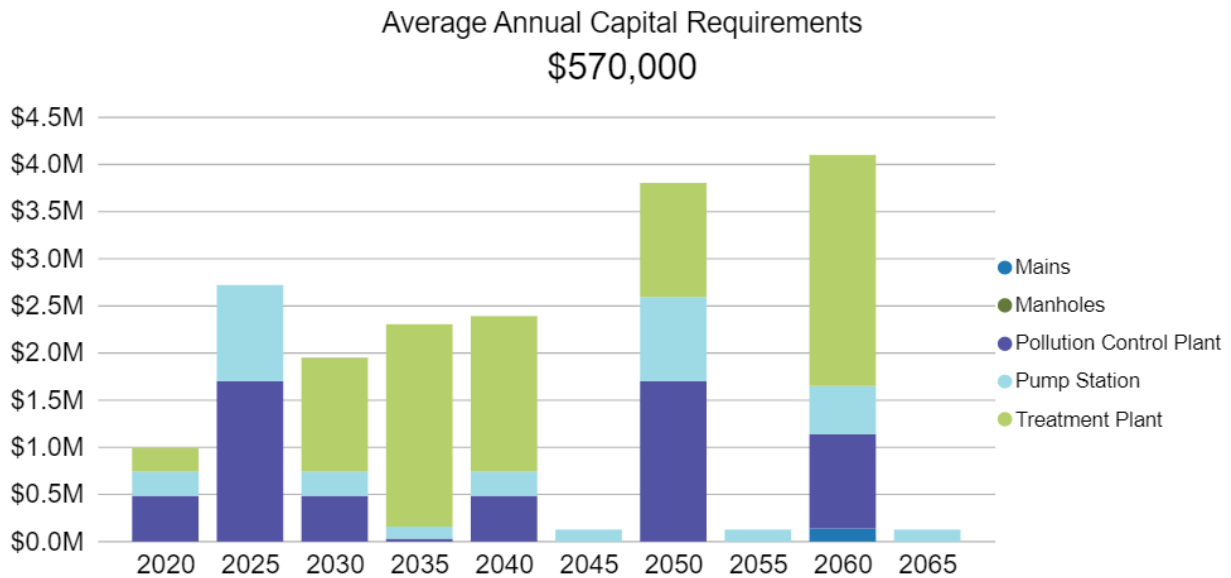
In discussions with municipal staff, the following lifecycle strategy has been developed as formal approach to managing the lifecycle of wastewater mains.

| Wastewater Mains | | | |
|--|--------------------------|----------------|--|
| Event Name | Event Class | Event Trigger | |
| Camera Assessment – 6.5% of total network per year | Preventative Maintenance | Every 15 Years | |
| Rodding | Maintenance | 34 Years | |
| Sewer Flushing – 25% of total network per year | Maintenance | Every 4 Years | |
| Smoke Test – 7.5% of total network per year | Preventative Maintenance | Every 13 Years | |
| Full Reconstruction | Replacement | 80 Years | |



Forecasted Capital Requirements

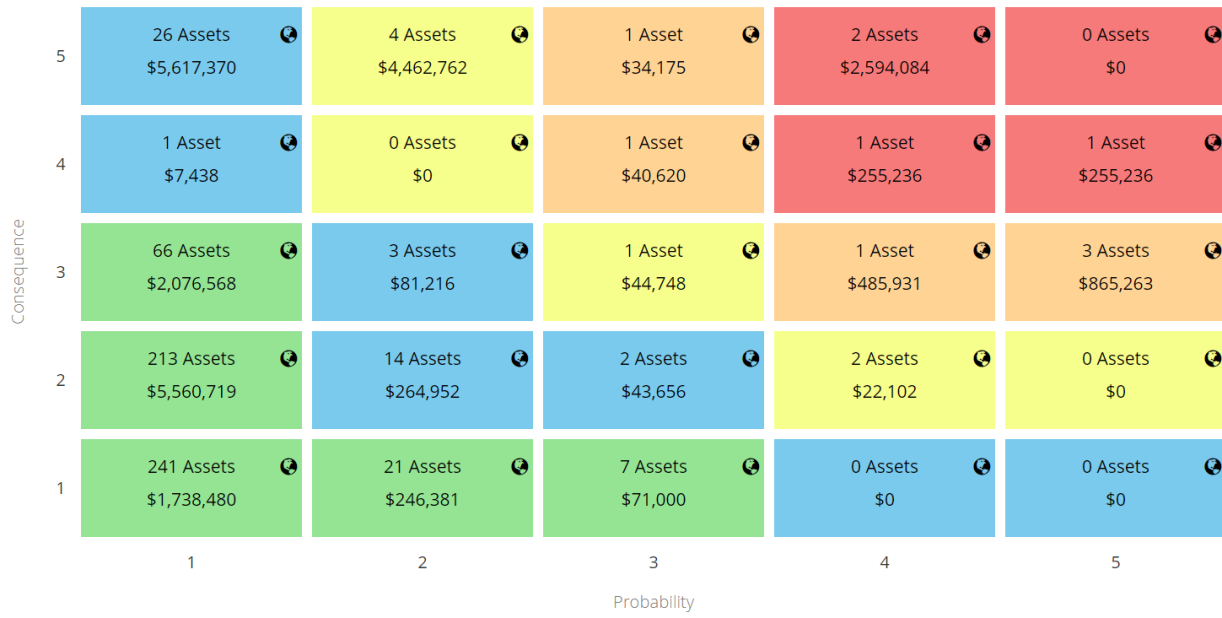
The following graphs forecasts capital requirements for wastewater assets over the next 50-years and 10-years, respectively. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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 A.

5.2.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2019 inventory data.



The identification of these critical assets by using the risk framework allows Thames Centre to determine appropriate risk mitigation strategies and treatment options. These may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data. Critical assets do not necessarily require immediate renewal or replacement.

See Appendix C for the criteria used to determine the risk rating of each asset.

5.2.6 Levels of Service

The following tables identify Thames Centre’s current levels of service for the Wastewater System. 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 Municipality has selected for this AMP.

Community Levels of Service

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

| Service Attribute | Qualitative Description | Current LOS (2019) |
|-------------------|---|--|
| Scope | Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system | See Appendix B |
| Reliability | Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes | The Municipality does not own any combined sewers. |
| | Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches | |
| | Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes | No overflow from wastewater to storm occurs. |
| | Description of how sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration | The municipality follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups. |

| Service Attribute | Qualitative Description | Current LOS (2019) |
|-------------------|--|--|
| | Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system | Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants. |

Technical Levels of Service

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

| Service Attribute | Technical Metric | Current LOS (2019) |
|-------------------|---|--------------------|
| Scope | % of properties connected to the municipal wastewater system | 17% |
| Reliability | # of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system | Not Applicable |
| | # of connection-days per year due to sanitary main backups compared to the total number of properties connected to the municipal wastewater system | 0 |
| | # of connection-days per year due to sanitary service backups compared to the total number of properties connected to the municipal wastewater system | 0 |
| | # of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system | 0 |
| Performance | Capital re-investment rate | 0.15% |

5.2.7 Recommendations

Asset Inventory

- Continue to refine the asset inventory to ensure all relevant asset types are included.
- Review and revise replacement costs and critical attribute data on a regular basis.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk assets.
- Consider formalizing the internal condition assessment program that has been developed for specific wastewater assets as part of the Roadmap project and expanding it to include other relevant 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.

Lifecycle Management Strategies

- Consider a trenchless re-lining strategy for wastewater mains; it is expected to extend the service life of wastewater mains at a lower total cost of ownership and should be implemented to extend the life of infrastructure at the lowest total cost of ownership.
- Evaluate the efficacy of the Municipality's lifecycle management strategies at regular intervals to determine the impact cost, condition and risk.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Municipality 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.

5.3 Stormwater Collection

The Stormwater system is designed to manage the flow of stormwater. In recent years, this asset category has become increasingly relevant due to the increasing intensity and frequency of extreme weather events. The Stormwater and Drainage team in the Public Works department oversee the stormwater system.

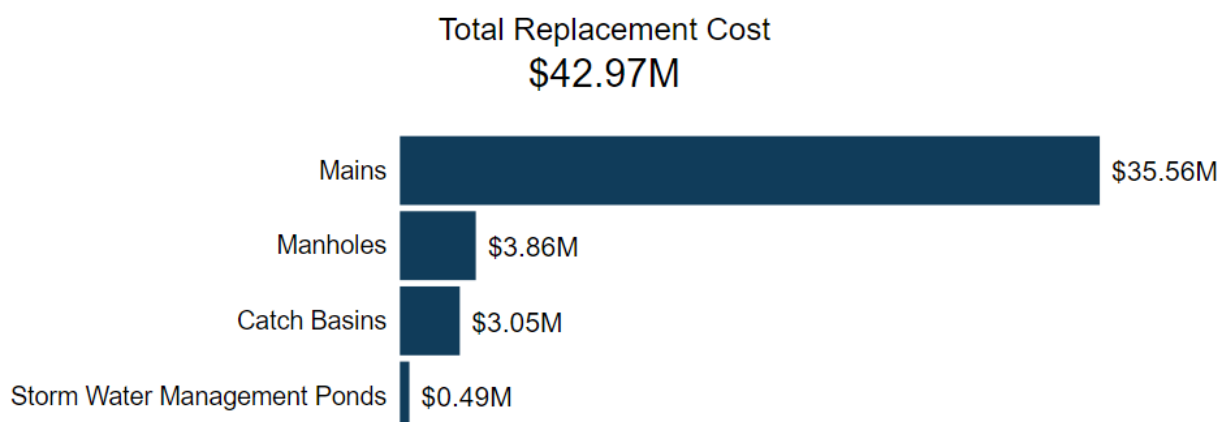
A condition assessment was conducted in 2019 by Dillon Consulting to better understand the condition of the stormwater system, and to effectively prioritize rehabilitation and replacement work in the future.

In 2019, Council also approved a new stormwater flat fee in the bi-monthly amount of \$10.19. The stormwater system was previously tax-funded.

5.3.1 Asset Inventory & Replacement Cost

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

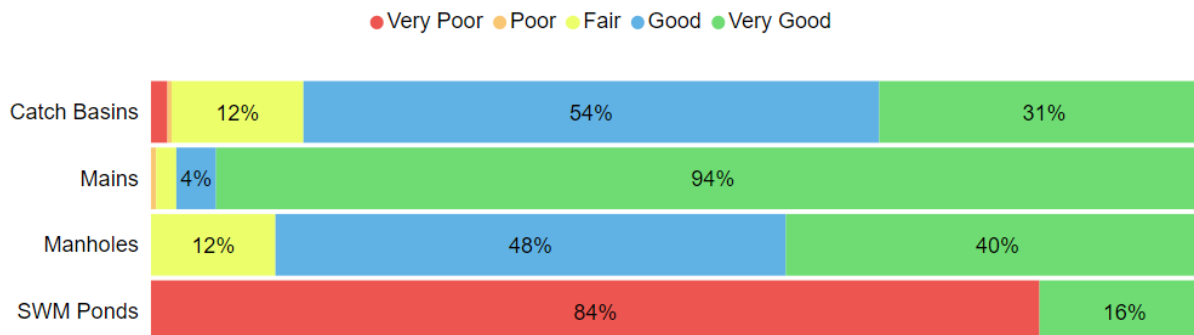
| Asset Segment | Quantity | Replacement Cost Method | Total Replacement Cost |
|---------------|----------|-------------------------|------------------------|
| Catch Basins | 763 | Cost per Unit | \$3,052,000 |
| Mains | 46 km | Cost per Unit | \$35,562,832 |
| Manholes | 531 | Cost per Unit | \$3,864,445 |
| SWM Ponds | 4 | User-Defined | \$488,419 |
| | | | \$42,967,696 |



5.3.2 Asset Condition

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 | Average Condition (%) | Average Condition Rating | Condition Source |
|---------------|-----------------------|--------------------------|------------------|
| Catch Basins | 70% | Good | Age-based |
| Mains | 92% | Very Good | 4% Assessed |
| Manholes | 73% | Good | Age-based |
| SWM Ponds | 15% | Very Poor | Age-based |
| | 88% | Very Good | |



To ensure that the Stormwater system continues to provide an acceptable level of service, the Municipality 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 Stormwater system.

Current Approach to Condition Assessment

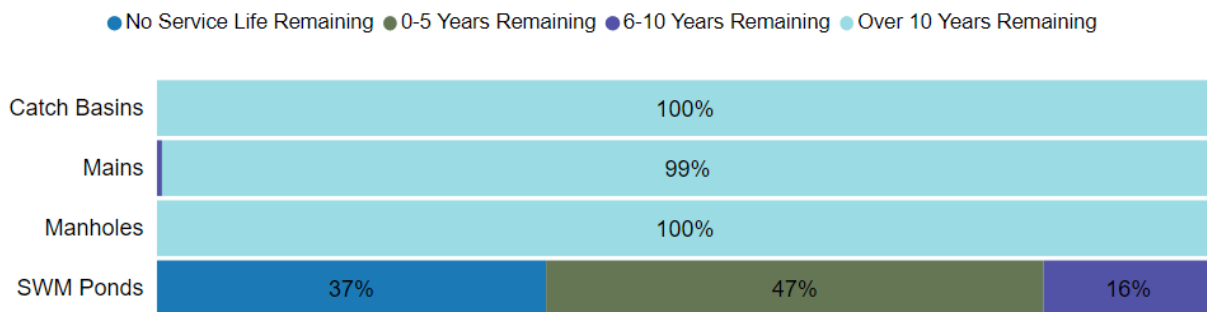
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- In 2019 Thames Centre contracted Dillon Consulting to perform a stormwater network inventory analysis and condition assessments. Due to budgetary constraints, statistically developed deterioration trends were used in conjunction with limited field investigation to develop condition assessment information.
- The Municipality should consider establishing an industry best practice assessment cycle for the stormwater system.

5.3.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Stormwater assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

| Asset Segment | Estimated Useful Life (Years) | Average Age (Years) | Average Service Life Remaining (Years) |
|---------------|-------------------------------|---------------------|--|
| Catch Basins | 86 Years | 25.7 | 60.2 |
| Mains | 75 - 86 Years | 24.3 | 55.7 |
| Manholes | 78 - 86 Years | 22.5 | 63.3 |
| SWM Ponds | 7 - 15 Years | 12.8 | 0.3 |
| | | 24.3 | 58.3 |



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

5.3.4 Lifecycle Management Strategy

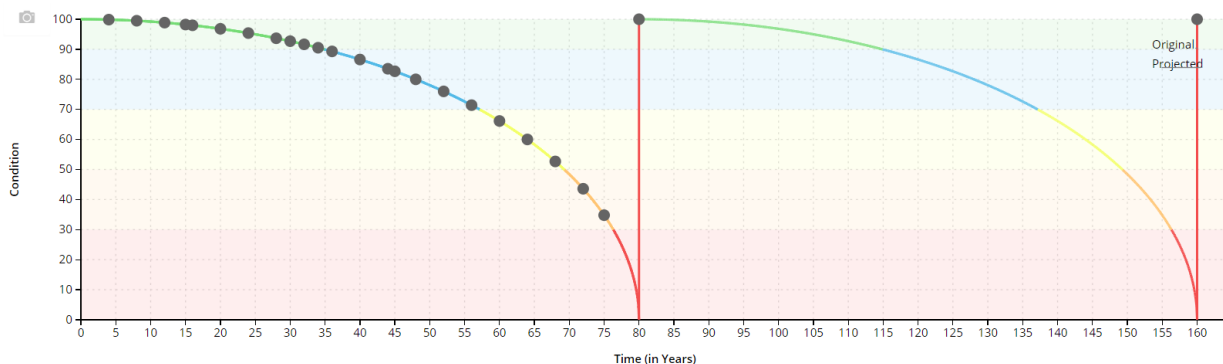
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

| Activity Type | Description of Current Strategy |
|----------------|--|
| Maintenance | There is currently no regular maintenance schedule used by Thames Centre, but there is interest in establishing an effective system. CCTV and Zoom Camera inspections were conducted in 2019 by Dillon Consulting. |
| Rehabilitation | The 2019 Sanitary and Storm assessment report has provided the Municipality with projected rehabilitation events over the next 5 years. |
| Replacement | The 2019 Sanitary and Storm assessment report has provided the Municipality with projected replacements over the next 5 years as well as a projection of works over a 25-year timeframe. |

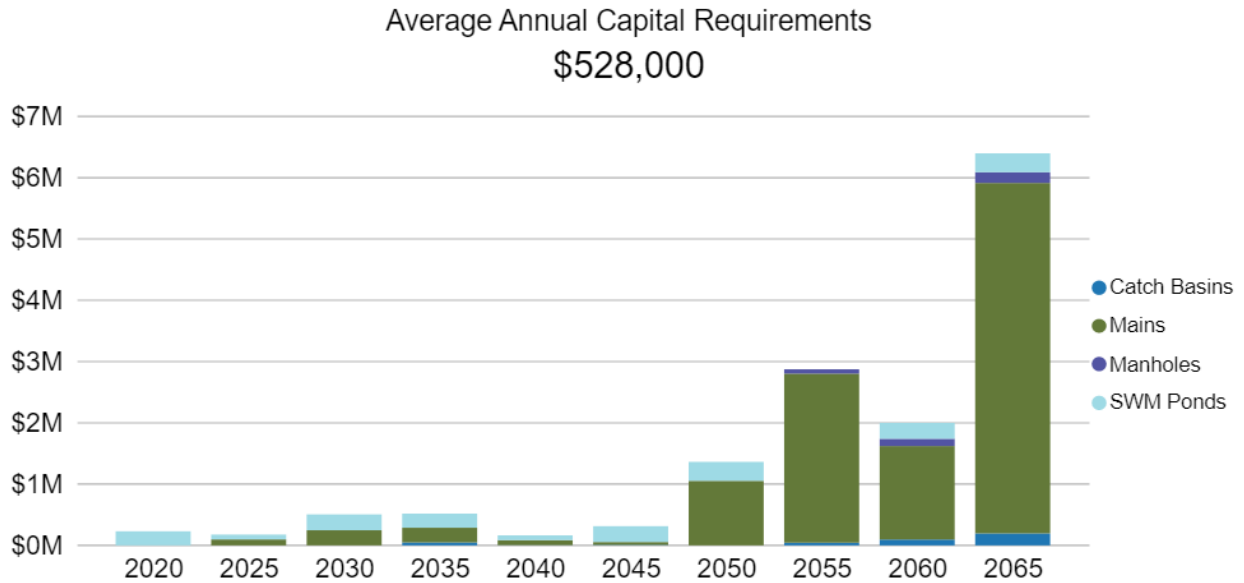
The following lifecycle strategy have been developed as a proactive approach to managing the lifecycle of storm mains. A trenchless re-lining strategy is expected to extend the service life of storm mains at a lower total cost of ownership.

| Storm Mains | | |
|--|--------------------------|----------------------|
| Event Name | Event Class | Event Trigger |
| Camera Inspection – 6.5% of network per year | Preventative Maintenance | Every 15 Years |
| Sewer Flushing – 25% of network per year | Maintenance | Every 4 Years |
| Rodding / Boring | Maintenance | 34 Years |
| Trench-less Lining | Rehabilitation | Condition at 0 - 30% |
| Full Reconstruction | Replacement | 160 Years |



Forecasted Capital Requirements

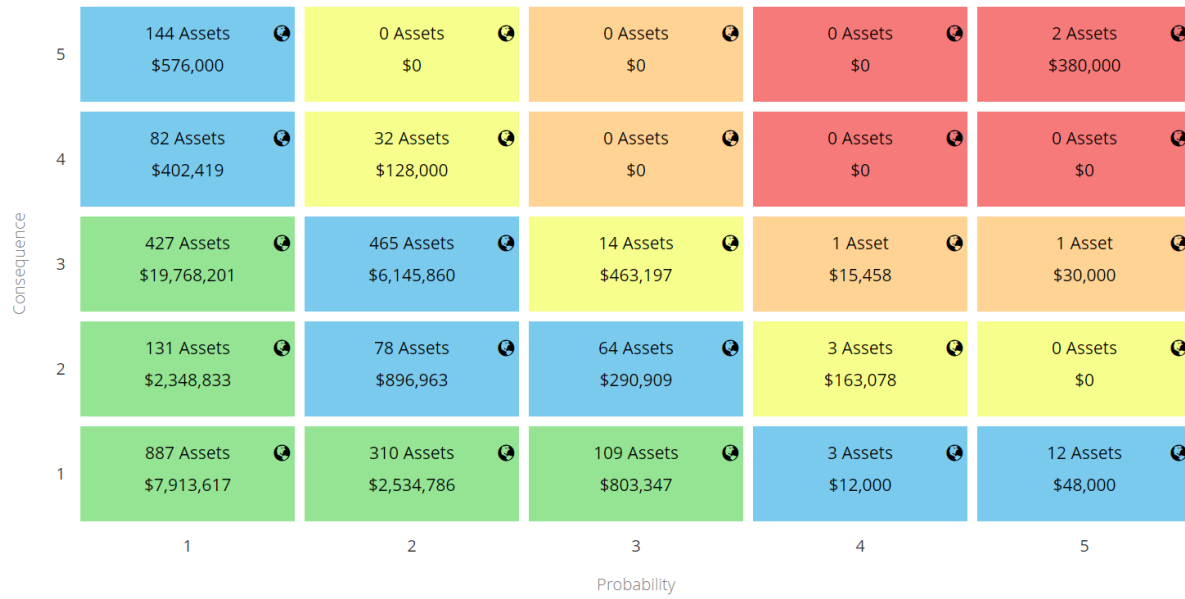
The following graphs forecasts capital requirements for machinery and equipment assets over the next 50-years and 10-years, respectively. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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.

5.3.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2019 inventory data.



The identification of these critical assets by using the risk framework allows Thames Centre to determine appropriate risk mitigation strategies and treatment options. These may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data. Critical assets do not necessarily require immediate renewal or replacement.

See Appendix C for the criteria used to determine the risk rating of each asset.

5.3.6 Levels of Service

The following tables identify Thames Centre’s current levels of service for the Stormwater system. 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 Municipality has selected for this AMP.

Community Levels of Service

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

| Service Attribute | Qualitative Description | Current LOS (2019) |
|-------------------|--|--------------------|
| Scope | Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal stormwater system | See Appendix B |

Technical Levels of Service

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

| Service Attribute | Technical Metric | Current LOS (2019) |
|-------------------|---|--------------------|
| Scope | % of properties in municipality resilient to a 100-year storm | TBD |
| | % of the municipal stormwater management system resilient to a 5-year storm | TBD |
| Performance | Capital reinvestment rate | 0.21% |

5.3.7 Recommendations

Asset Inventory

- Continue to refine the asset inventory to ensure all relevant asset types are included.
- Review and revise replacement costs and critical attribute data on a regular basis.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk assets.
- Consider formalizing the internal condition assessment program that has been developed for specific storm assets as part of the Roadmap project and expanding it to include other relevant 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.

Lifecycle Management Strategies

- Document and review lifecycle management strategies for the Stormwater System on a regular basis to achieve the lowest total cost of ownership while maintaining adequate service levels.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that Thames Centre 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.

6 Impacts of Growth

Key Insights

- Understanding the key drivers of growth and demand will allow Thames Centre to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure.
- Moderate population and employment growth are expected.
- The costs of growth are considered in long-term funding strategies that are designed to maintain the current level of service.

6.1 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 Municipality 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.

6.1.1 Official Plan for the Municipality of Thames Centre (October 2020)

The Official Plan was originally adopted by Municipal Council through By-law No. 100-2003 passed on October 27, 2003, approved by the County of Middlesex on July 20, 2004 and subsequently modified by the Ontario Municipal Board on January 24, 2006, pursuant to Order No. 0232.

The existing Official Plan is up-to-date to include Amendments 1 through 21 (inclusive) which have been consolidated into the current document. As mandated by the Planning Act, the Municipality will be undergoing a review of its Official Plan, considering the last update was conducted in 2015 and approved by the County of Middlesex through Amendment No. 12.

The Settlement Area and Land Use policies apply to the Municipality's Urban Settlement Areas and to areas specifically designed for development to accommodate the anticipated population. The designation is intended to be the areas of the Municipality where growth will be focused in order to optimize the use of public services and infrastructure, and to minimize outward sprawl of development into areas of natural resources and natural heritage.

6.1.2 Middlesex County Official Plan (July 2018)

The Middlesex County Official Plan was adopted in 1997 and approved in 1999. It was then amended by Official Plan Amendment No. 2 in 2006. It sets out the planning framework, general policies and land use policies for the County, with a planning period to 2026. The County updated its projections in 2018 after the release of the 2016 Census population information.

The policy framework provides direction to lower-tier municipalities on matters including managing growth, protecting resources and natural heritage, and coordination between municipalities on cross-boundary (inter-municipal) issues. All lower-tier Official Plans are required to conform to the County Official Plan.

6.1.3 Development Charges Background Study (May 2018)

A Development Charges Background Study for the Municipality was prepared in 2018 by Watson & Associates Economists Ltd., based on the methodology required under the Development Charges Act.

The following tables outline the population and employment forecasts allocated to Thames Centre in the study:

| Population Forecast from 2018 to 2038 | | | |
|---------------------------------------|--------|--------|--------|
| Municipality | 2018 | 2028 | 2038 |
| Thames Centre | 13,449 | 15,148 | 17,211 |

| Employment Forecast from 2018 to 2038 | | | |
|---------------------------------------|-------|-------|-------|
| Municipality | 2018 | 2028 | 2038 |
| Thames Centre | 4,138 | 4,643 | 5,392 |

As a requirement of the Development Charges Act under subsection 10(2)(c), an analysis must be undertaken to assess the long-term capital and operating cost impacts for the capital infrastructure projects identified within the Development Charges.

The background study must also include an asset management plan that deals with all assets proposed to be funded, in whole or in part, by D.C.s. The asset management plan must show that the assets are financially sustainable over their full lifecycle.

6.2 Impact of Growth on Lifecycle Activities

By July 1, 2025, Thames Centre'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 Municipality's AMP.

7 Financial Strategy

Key Insights

- Thames Centre is committing approximately \$4,167,000 towards capital projects per year from sustainable revenue sources.
- Given the annual capital requirement of \$8,431,082, there is currently a funding gap of \$4,264,082 annually.
- For tax-funded assets, we recommend increasing tax revenues by 1.7% each year for the next 15 years to achieve a sustainable level of funding.
- For the water system, we recommend increasing rate revenues by 1.6% annually for the next 15 years to achieve a sustainable level of funding.
- For the wastewater system, we recommend increasing rate revenues by 2.4% annually for the next 15 years to achieve a sustainable level of funding.
- The stormwater system has been excluded from the financial strategy recommendations because of a recent change in the funding source.

7.1 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 Thames Centre 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. Gas tax
 - b. Annual grants

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

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

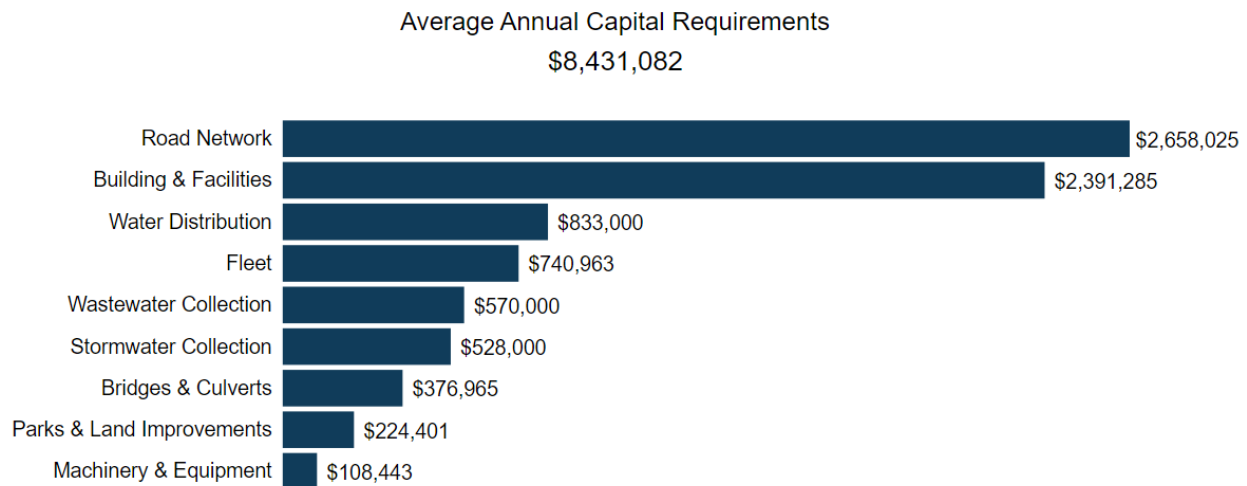
1. In order to reduce financial requirements, consideration has been given to revising service levels downward.
2. All asset management and financial strategies have been considered. For example:

- 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.

7.1.1 Annual Requirements & Capital Funding

Annual Requirements

The annual requirements represent the amount the Municipality should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. In total, the Municipality must allocate approximately \$8.4 million annually to address capital requirements for the assets included in this AMP.



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

However, for the Road Network, Water Distribution and Stormwater Collection Systems; lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal of Thames Centre’s roads, water mains and storm mains, respectively. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares two scenarios for the Road Network, Water Distribution System and the Stormwater Collection System:

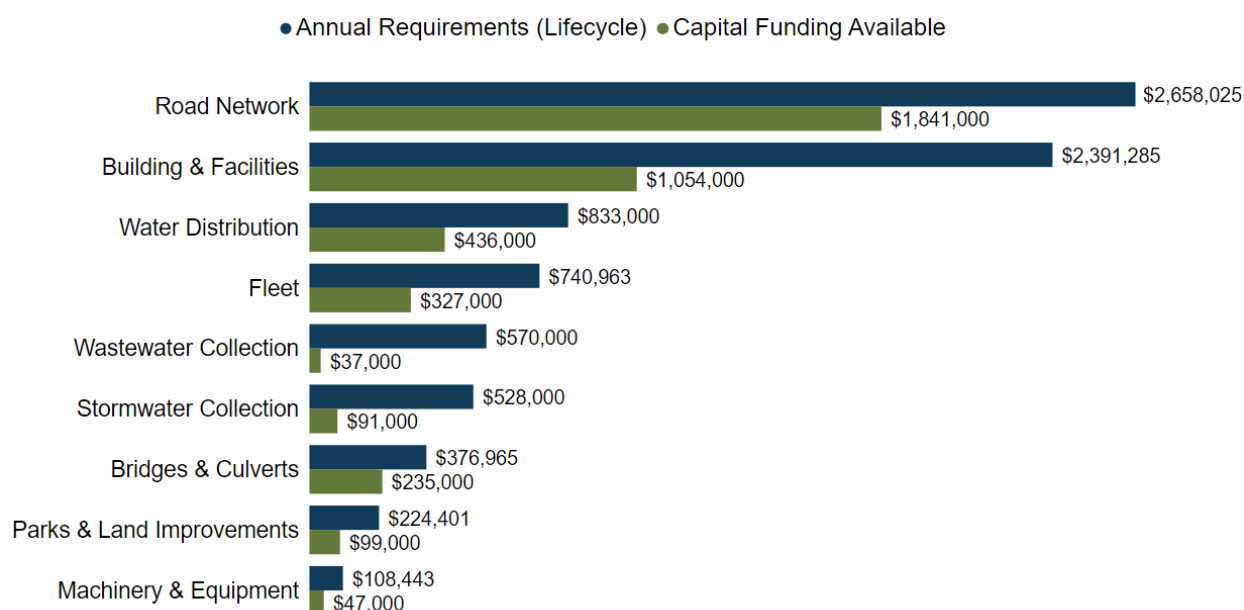
1. **Replacement Only Scenario:** Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life.
2. **Lifecycle Strategy Scenario:** Based on the assumption that lifecycle activities are performed at strategic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

| Asset Category | Annual Requirements (Replacement Only) | Annual Requirements (Lifecycle Strategy) | Difference |
|-----------------------|--|--|-------------|
| Road Network | \$5,196,189 | \$2,658,025 | \$2,538,164 |
| Water Distribution | \$1,070,072 | \$832,684 | \$237,388 |
| Stormwater Collection | \$567,793 | \$531,257 | \$36,535 |

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of \$2,538,164 for the Road Network, \$237,388 for the Water Distribution System and \$36,535 for the Stormwater Collection System. This represents an overall reduction of the annual requirements for each category by 49%, 22% and 6% respectively. As the lifecycle strategy scenario represents the lowest cost option available to The Municipality, we have used these annual requirements in the development of the financial strategy.

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, The Municipality is committing approximately \$4,167,000 towards capital projects per year from sustainable revenue sources.



Given the annual capital requirement of \$8,431,082, there is currently a funding gap of \$4,264,082 annually.

7.2 Funding Objective

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

1. **Tax Funded Assets:** Road Network, Bridges & Culverts, Buildings & Facilities, Machinery & Equipment, Parks & Land Improvements, Fleet
2. **Rate-Funded Assets:** Water Distribution System, Wastewater Collection System, Stormwater Collection

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

We have also included the Stormwater Collection system, although its source of funding has recently changed, from being Tax-Funded to Rate-Funded in 2019.

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

7.3 Financial Profile: Tax Funded Assets

7.3.1 Current Funding Position

The following tables show, by asset category, Thames Centre'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 | 2,658,000 | 1,037,000 | 331,000 | 473,000 | 1,841,000 | 817,000 |
| Bridges & Culverts | 377,000 | 166,000 | 69,000 | 0 | 235,000 | 142,000 |
| Buildings & Facilities | 2,391,000 | 1,054,000 | 0 | 0 | 1,054,000 | 1,337,000 |
| Machinery & Equipment | 108,000 | 47,000 | 0 | 0 | 47,000 | 61,000 |
| Parks & Land Improvements | 224,000 | 99,000 | 0 | 0 | 99,000 | 125,000 |
| Fleet | 741,000 | 327,000 | 0 | 0 | 327,000 | 414,000 |
| | 6,499,000 | 2,730,000 | 400,000 | 473,000 | 3,603,000 | 2,896,000 |

The average annual investment requirement for the above categories is \$6,499,000. Annual revenue currently allocated to these assets for capital purposes is \$3,603,000 leaving an annual deficit of \$2,896,000. Put differently, these infrastructure categories are currently funded at 55% of their long-term requirements.

7.3.2 Full Funding Requirements

In 2020, the Municipality of Thames Centre had annual tax revenues exceeding \$10 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 | 7.7% |
| Bridges & Culverts | 1.3% |
| Buildings & Facilities | 12.5% |
| Machinery & Equipment | 0.6% |
| Parks & Land Improvements | 1.2% |
| Fleet | 3.9% |
| | 27.2% |

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

- a) Thames Centre’s debt payments for these asset categories will be decreasing by \$237,000 and \$256,000 over the next 15 and 20 years respectively, although not shown in the table.

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 | 2,896,000 | 2,896,000 | 2,896,000 | 2,896,000 | 2,896,000 | 2,896,000 | 2,896,000 | 2,896,000 |
| Change in Debt Costs | N/A | N/A | N/A | N/A | 0 | 0 | -237,000 | -256,000 |
| Change in OCIF Grants | N/A | N/A | N/A | N/A | 0 | 0 | 0 | 0 |
| Resulting Infrastructure Deficit: | 5 | 10 | 15 | 20 | 5 | 10 | 15 | 20 |
| Tax Increase Required | 27.2% | 27.2% | 27.2% | 27.2% | 27.2% | 27.2% | 25.0% | 24.8% |
| Annually: | 5.4% | 2.7% | 1.8% | 1.4% | 5.4% | 2.7% | 1.7% | 1.2% |

7.3.3 Financial Strategy Recommendations

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

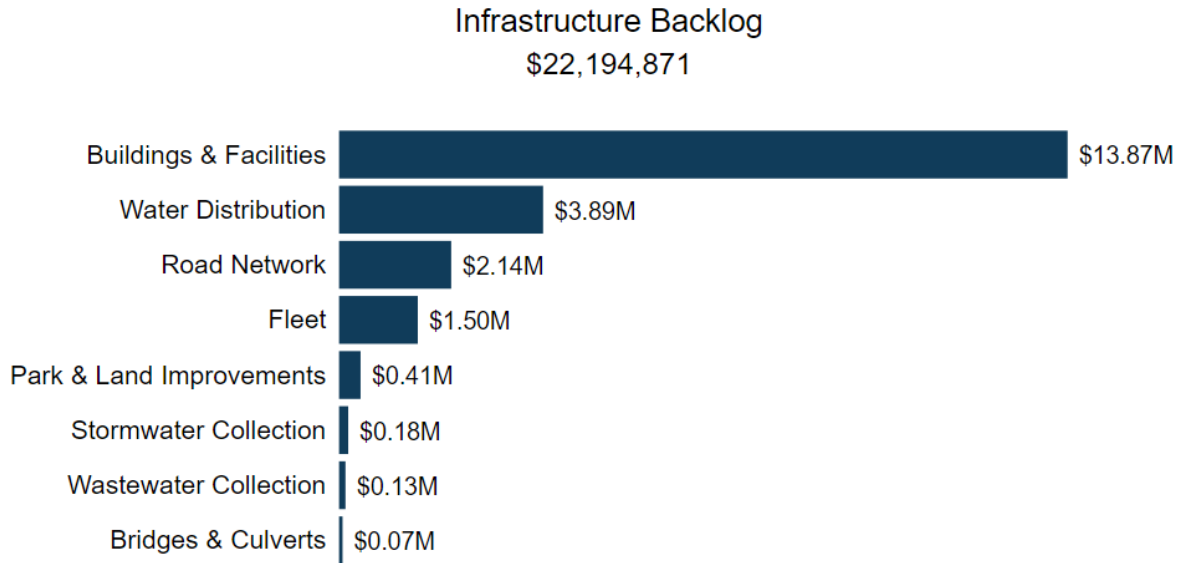
- a) reallocating the debt cost reductions (if and when realized) to the infrastructure deficit as outlined above;
- b) increasing tax revenues dedicated to CapEx by approx. 1.7% each year for the next 15 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP;
- c) continuing to allocate OCIF to the road network, as identified by senior management;
- d) allocating the government transfer revenues for capital assets as outlined previously; and
- 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. Based on best practices, this periodic funding should not be incorporated into an AMP unless there are firm commitments in place. We have included the government transfer funding, as provided by the Finance Department⁷.
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes may be challenging. However, a lack of intentional asset funding planning today may have even greater consequences in terms of infrastructure failure.

⁷ The Municipality should take advantage of all available grant funding programs and transfers from other levels of government. The financial strategy within this AMP has only included the known capital funding as provided by the Municipality's finance department, and there is an expectation the Municipality should be eligible for additional capital funding from senior governments within the next twenty years that could reduce the tax burden. Depending on the outcome of this review, there may be changes that impact its availability.

Although this option achieves full funding on an annual basis in 15 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding envelope available. Current data shows a pent-up investment demand for various service areas including Buildings & Facilities. The most significant areas of capital investment requirements that are primarily tax funded are:



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.

7.4 Financial Profile: Rate Funded Assets

7.4.1 Current Funding Position

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

| Asset Category | Avg. Annual Requirement | Annual Funding Available | | | Annual Deficit | |
|-----------------------|-------------------------|--------------------------|-------------------|----------|----------------|------------------|
| | | Rates | To Oper | OCIF | | Total Available |
| Water Distribution | 833,000 | 1,637,000 | -1,201,000 | 0 | 436,000 | 397,000 |
| Wastewater Collection | 570,000 | 890,000 | -853,000 | 0 | 37,000 | 533,000 |
| Stormwater Collection | 528,000 | 156,000 | -65,000 | 0 | 91,000 | 437,000 |
| | 1,931,000 | 2,683,000 | -2,119,000 | 0 | 564,000 | 1,367,000 |

The average annual investment requirement for the above categories is \$1,931,000. Annual revenue currently allocated to these assets for capital purposes is \$564,000 leaving an annual deficit of \$1,367,000. Put differently, these infrastructure categories are currently funded at 29% of their long-term requirements.

7.4.2 Full Funding Requirements

In 2019, Thames Centre had annual wastewater revenues of \$890,000, annual water revenues of \$1,637,000 and annual stormwater revenues of \$156,000. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following changes over time:

| Asset Category | Rate Change Required for Full Funding ⁸ |
|----------------|--|
| Water | 24.3% |
| Wastewater | 59.9% |
| Stormwater | 280.1% ⁹ |

⁸ In 2020 the Municipality retained Watson & Associates Economists Ltd. to undertake a water and wastewater rate study. The recommendations in the report included a change in the rate structure for water and wastewater to be implemented in 2021. Council approved the rates and fees on May 25, 2020.

⁹ Council approved a Stormwater Flat Fee in 2019. The stormwater system was previously tax funded. The proposed Rate Change percentage is based on solely one year of sustainable revenue.

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

| | Water Distribution ¹⁰ | | | | Wastewater Collection ¹¹ | | | |
|--------------------------------------|----------------------------------|-------------|-------------|-------------|-------------------------------------|-------------|-------------|-------------|
| | 5 Years | 10 Years | 15 Years | 20 Years | 5 Years | 10 Years | 15 Years | 20 Years |
| Infrastructure Deficit | 397,000 | 397,000 | 397,000 | 397,000 | 533,000 | 533,000 | 533,000 | 533,000 |
| Less: decrease in debt payment | 0 | -9,000 | -9,000 | -9,000 | -154,000 | -154,000 | -216,000 | -216,000 |
| Tax Increase Required | 397,000 | 388,000 | 388,000 | 388,000 | 42.6% | 42.6% | 35.6% | 36.6% |
| Annually: | 4.9% | 2.4% | 1.6% | 1.2% | 8.5% | 4.3% | 2.4% | 1.8% |

| | Stormwater Collection | | | |
|--------------------------------------|-----------------------|--------------|--------------|--------------|
| | 5 Years | 10 Years | 15 Years | 20 Years |
| Infrastructure Deficit | 437,000 | 437,000 | 437,000 | 437,000 |
| Less: decrease in debt payment | 0 | 0 | 0 | 0 |
| Tax Increase Required | 280.1% | 280.1% | 280.1% | 280.1% |
| Annually: | 56.0% | 28.0% | 18.7% | 14.0% |

¹⁰ The rate study has recommended increasing the water base charge, volume rate, lifecycle charge, and fire protection charge by 2.5% annually over a 2021-2029 forecast.

¹¹ The rate study has recommended increasing the wastewater base charges and flat rate by 2% annually over a 2022-2029 forecast.

7.4.3 Financial Strategy Recommendations

Considering all of the above information, we recommend the 15-year option for the CapEx required on the utility rate funded assets. This involves full funding being achieved over the next 15 years by:

- a) increasing rates, and revenues dedicated for CapEx purposes, by 1.6% for water services and 2.4% for wastewater services each year for the next fifteen years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
- b) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes and key assumptions:

1. It is reasonable to propose that periodic senior government infrastructure funding should be available during the phase-in period. However, this periodic funding has not been incorporated into an AMP unless there are firm commitments in place.
2. We realize that consistent raising rate revenues consistently for the next fifteen years to invest in infrastructure purposes may be challenging, especially for utilities. However, considering a longer phase-in window may have even greater consequences in terms of reasonably funding the services provided to the rate payers.
3. Any increase in rates required for future operations would be in addition to the above recommendations.
4. The Stormwater system is excluded from the Financial Strategy section. Based on senior management's explanation of the major change in funding sources for the Stormwater system, all related infrastructure backlog has been excluded from the financial strategy.
 - a. The storm water infrastructure was previously funded by property taxation and, during the project, the fund source was switched to rate funded. The historical funding measures are not applicable and the Fund source for the infrastructure backlog has changed. Therefore, this recent and current funding approach change has been excluded from the forecasting and financial strategy recommendations.
 - b. For example, specific to the stormwater utility is the \$300K+ dedicated reserve funds that have been collected through property taxation in the past and set aside for future CapEx of the storm water network. The financial strategy model does NOT account for the available reserves to address current infrastructure back logs or deficits. Therefore, reallocating these reserves to the infrastructure deficit has not been considered as an option in the financial strategy.

Although this option achieves full funding on an annual basis in fifteen years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of \$3,194,000 for the Water and \$3,672,000 for Wastewater. Therefore, within the next 15-years, both utilities may require major maintenance and will also need major investments.

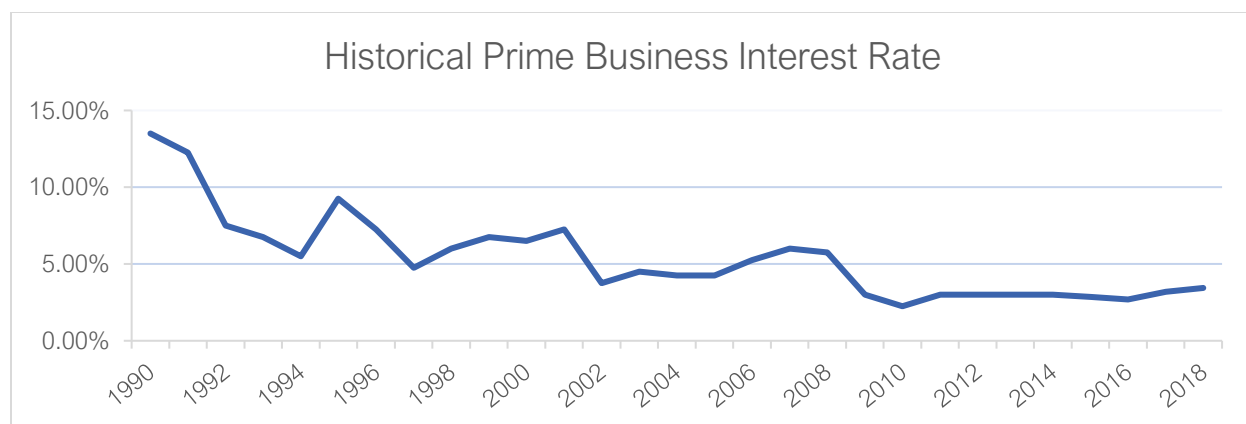
Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

7.5 Use of Debt

For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a \$1M project financed at 3.0%¹² over 15 years would result in a 26% premium or \$260,000 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% |

It should be noted that current interest rates are near all-time lows. Sustainable funding models that include debt need to incorporate the risk of rising interest rates. The following graph shows where historical lending rates have been:



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

A change in 15-year rates from 3% to 6% would change the premium from 26% to 54%. Such a change would have a significant impact on a financial plan.

The following tables outline how Thames Centre has historically used debt for investing in the asset categories as listed. There is currently \$5,045,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of \$536,000, well within its provincially prescribed maximum of \$3,291,000.

| Asset Category | Current Debt Outstanding | Use of Debt in the Last Five Years | | | | |
|---------------------------|--------------------------|------------------------------------|----------|----------------|----------|-----------|
| | | 2015 | 2016 | 2017 | 2018 | 2019 |
| Road Network | 0 | 0 | 0 | 0 | 0 | 0 |
| Bridges & Culverts | 0 | 0 | 0 | 0 | 0 | 0 |
| Buildings & Facilities | 3,878,000 | 0 | 0 | 750,000 | 0 | 1,418,000 |
| Machinery & Equipment | 0 | 0 | 0 | 0 | 0 | 0 |
| Parks & Land Improvements | 0 | 0 | 0 | 0 | 0 | 0 |
| Fleet | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Tax Funded: | 3,878,000 | 0 | 0 | 750,000 | 0 | 0 |
| Water System | 58,000 | 0 | 0 | 0 | 0 | 0 |
| Wastewater System | 1,109,000 | 0 | 0 | 750,000 | 0 | 0 |
| Stormwater System | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Rate Funded: | 1,167,000 | 0 | 0 | 0 | 0 | 0 |

| Asset Category | Principal & Interest Payments in the Next Ten Years | | | | | | |
|---------------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|
| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2030 |
| Road Network | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bridges & Culverts | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Buildings & Facilities | 311,000 | 311,000 | 311,000 | 311,000 | 311,000 | 311,000 | 311,000 |
| Machinery & Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Land Improvements | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicles | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Tax Funded: | 311,000 | 311,000 | 311,000 | 311,000 | 311,000 | 311,000 | 311,000 |
| Water System | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 0 |
| Wastewater System | 216,000 | 216,000 | 216,000 | 62,000 | 62,000 | 62,000 | 62,000 |
| Stormwater System | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Rate Funded: | 225,000 | 225,000 | 225,000 | 71,000 | 71,000 | 71,000 | 62,000 |

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

7.6 Use of Reserves

7.6.1 Available Reserves

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

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

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

| Asset Category | Balance on December 31, 2019 |
|---------------------------|------------------------------|
| Road Network | 6,042,000 |
| Bridges & Culverts | 0 |
| Buildings & Facilities | 758,000 |
| Machinery & Equipment | 840,000 |
| Land Improvements | 520,000 |
| Vehicles | 793,000 |
| Total Tax Funded: | 8,953,000 |
| Water System | 1,175,000 |
| Wastewater System | 107,000 |
| Stormwater System | 308,000 |
| Total Rate Funded: | 1,590,000 |

There is considerable debate in the municipal sector as to the appropriate level of reserves that a Municipality should have on hand. There is no clear guideline that has gained wide acceptance. Factors that municipalities should 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 Thames Centre'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.

7.6.2 Recommendation

In 2025, Ontario Regulation 588/17 will require Thames Centre 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.

8 Appendices

Key Insights

- Appendix A identifies projected 10-year capital requirements for each asset category.
- Appendix B includes maps that have been used to visualize the current level of service.
- Appendix C identifies the criteria used to calculate risk for each asset category.
- Appendix D provides additional guidance on the development of a condition assessment program.
- Appendix E provides glossary of terms.

Appendix A: 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 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
| HCB Roads | \$484,346 | \$129,370 | \$1,361,205 | \$32,610 | \$0 | \$69,054 | \$3,679,700 | \$681,551 | \$1,973,030 | \$217,770 | \$70,122 |
| LCB Roads | \$1,432,965 | \$0 | \$458,078 | \$0 | \$0 | \$0 | \$1,068,615 | \$291,891 | \$9,855 | \$588,017 | \$1,949,889 |
| Sidewalks | \$768,927 | \$0 | \$0 | \$0 | \$0 | \$186,745 | \$41,168 | \$40,360 | \$0 | \$0 | \$337,599 |
| Streetlights | \$895,399 | \$51,192 | \$24,265 | \$6,511 | \$12,875 | \$30,808 | \$0 | \$0 | \$0 | \$0 | \$131,010 |
| | \$3,581,637 | \$180,562 | \$1,843,548 | \$39,121 | \$12,875 | \$286,607 | \$4,789,483 | \$1,013,802 | \$1,982,885 | \$805,787 | \$2,488,620 |

| Bridges & Culverts | | | | | | | | | | | |
|---------------------|------------|------------|-----------------|------------|------------|------------------|------------|------------|------------|------------|------------|
| Asset Segment | Backlog | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
| Bridges | \$0 | \$0 | \$0 | \$0 | \$0 | \$426,000 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Structural Culverts | \$0 | \$0 | \$55,000 | \$0 | \$0 | \$450,603 | \$0 | \$0 | \$0 | \$0 | \$0 |
| | \$0 | \$0 | \$55,000 | \$0 | \$0 | \$876,603 | \$0 | \$0 | \$0 | \$0 | \$0 |

| Stormwater Collection | | | | | | | | | | | |
|-----------------------|------------------|------------------|------------|-----------------|------------|------------|------------|------------------|------------|------------|------------|
| Asset Segment | Backlog | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
| Mains | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$97,948 | \$0 | \$0 | \$0 |
| SWM Ponds | \$180,000 | \$200,000 | \$0 | \$30,000 | \$0 | \$0 | \$0 | \$78,419 | \$0 | \$0 | \$0 |
| | \$180,000 | \$200,000 | \$0 | \$30,000 | \$0 | \$0 | \$0 | \$176,367 | \$0 | \$0 | \$0 |

Buildings & Facilities

| Asset Segment | Backlog | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|----------------------------------|---------------------|-----------------|--------------------|------------------|------------|----------------|-----------------|------------------|------------------|------------|------------------|
| Community Services | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$35,081 | \$0 | \$0 | \$0 |
| Environmental Services | \$1,092,835 | \$0 | \$43,894 | \$20,679 | \$0 | \$0 | \$0 | \$243,534 | \$0 | \$0 | \$242,965 |
| General Administration | \$1,198,065 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Protective Services | \$573,215 | \$0 | \$186,918 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Recreation and Cultural Services | \$10,538,633 | \$34,495 | \$1,557,111 | \$178,401 | \$0 | \$1,818 | \$21,374 | \$713,084 | \$329,326 | \$0 | \$364 |
| Transportation Services | \$465,842 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| | \$13,868,590 | \$34,495 | \$1,787,923 | \$199,080 | \$0 | \$1,818 | \$21,374 | \$991,699 | \$329,326 | \$0 | \$243,329 |

Machinery & Equipment

| Asset Segment | Backlog | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|------------------------|-----------------|------------------|------------------|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|------------------|
| Fire Equipment | \$0 | \$105,903 | \$60,968 | \$0 | \$0 | \$22,488 | \$0 | \$0 | \$0 | \$258,987 | \$0 |
| IT Hardware & Software | \$30,578 | \$30,821 | \$59,308 | \$0 | \$30,578 | \$30,821 | \$59,308 | \$0 | \$30,578 | \$30,821 | \$59,308 |
| Miscellaneous | \$0 | \$26,566 | \$0 | \$29,870 | \$0 | \$19,660 | \$52,383 | \$10,570 | \$0 | \$0 | \$19,660 |
| Office Equipment | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$50,061 | \$52,801 |
| Recreation Equipment | \$0 | \$57,116 | \$0 | \$0 | \$0 | \$0 | \$30,921 | \$0 | \$0 | \$26,168 | \$0 |
| | \$30,578 | \$220,406 | \$120,276 | \$29,870 | \$30,578 | \$72,969 | \$142,612 | \$10,570 | \$30,578 | \$366,037 | \$131,769 |

| Fleet | | | | | | | | | | | |
|-------------------|--------------------|-----------------|------------------|------------------|------------------|-----------------|------------------|------------------|--------------------|--------------------|--------------------|
| Asset Segment | Backlog | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
| Cemetery Vehicles | \$0 | \$0 | \$0 | \$64,054 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Facility Vehicles | \$336,326 | \$0 | \$108,167 | \$0 | \$0 | \$0 | \$0 | \$36,491 | \$53,492 | \$0 | \$282,834 |
| Fire Vehicles | \$1,181,503 | \$0 | \$0 | \$0 | \$0 | \$0 | \$417,410 | \$0 | \$472,314 | \$0 | \$0 |
| Landfill Vehicles | \$0 | \$0 | \$0 | \$0 | \$25,400 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Parks Vehicles | \$148,881 | \$0 | \$0 | \$21,686 | \$64,841 | \$55,898 | \$16,881 | \$0 | \$201,101 | \$0 | \$16,050 |
| Roads Vehicles | \$1,092,580 | \$49,654 | \$128,939 | \$294,911 | \$538,295 | \$34,457 | \$287,923 | \$333,998 | \$312,726 | \$1,232,715 | \$880,775 |
| Water Vehicles | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$37,677 | \$0 | \$0 | \$0 |
| | \$2,759,290 | \$49,654 | \$237,106 | \$380,651 | \$628,536 | \$90,355 | \$722,214 | \$408,166 | \$1,039,633 | \$1,232,715 | \$1,179,659 |

| Parks & Land Improvements | | | | | | | | | | | |
|----------------------------------|------------------|------------|------------------|------------|-----------------|------------------|----------------|------------------|-----------------|------------|------------------|
| Asset Segment | Backlog | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
| Park Amenities | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$7,535 | \$329,491 | \$0 | \$0 | \$0 |
| Park Fencing | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Parklands, Trails & Parking Lots | \$380,008 | \$0 | \$171,924 | \$0 | \$48,286 | \$0 | \$0 | \$0 | \$15,691 | \$0 | \$116,453 |
| Skateboard Parks | \$0 | \$0 | \$0 | \$0 | \$0 | \$166,316 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Sport Fields & Courts | \$18,418 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$189,110 | \$0 | \$0 | \$45,564 |
| Water Play & Features | \$16,463 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$22,852 | \$0 | \$0 | \$0 |
| | \$414,889 | \$0 | \$171,924 | \$0 | \$48,286 | \$166,316 | \$7,535 | \$541,453 | \$15,691 | \$0 | \$162,017 |

| Water Distribution | | | | | | | | | | | |
|------------------------------|--------------------|------------|------------|------------|-----------------|------------------|------------|------------|------------------|------------------|--------------------|
| Asset Segment | Backlog | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
| Pump House & Pumping Station | \$1,852,877 | \$0 | \$0 | \$0 | \$14,615 | \$0 | \$0 | \$0 | \$0 | \$201,536 | \$0 |
| Reservoirs | \$100,725 | \$0 | \$0 | \$0 | \$0 | \$201,449 | \$0 | \$0 | \$0 | \$0 | \$705,073 |
| Treatment Plant | \$448,608 | \$0 | \$0 | \$0 | \$0 | \$694,335 | \$0 | \$0 | \$426,201 | \$119,000 | \$2,430,172 |
| Water Tower | \$1,933,920 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$114,718 | \$0 | \$0 |
| | \$4,336,130 | \$0 | \$0 | \$0 | \$14,615 | \$895,784 | \$0 | \$0 | \$540,919 | \$320,536 | \$3,135,245 |

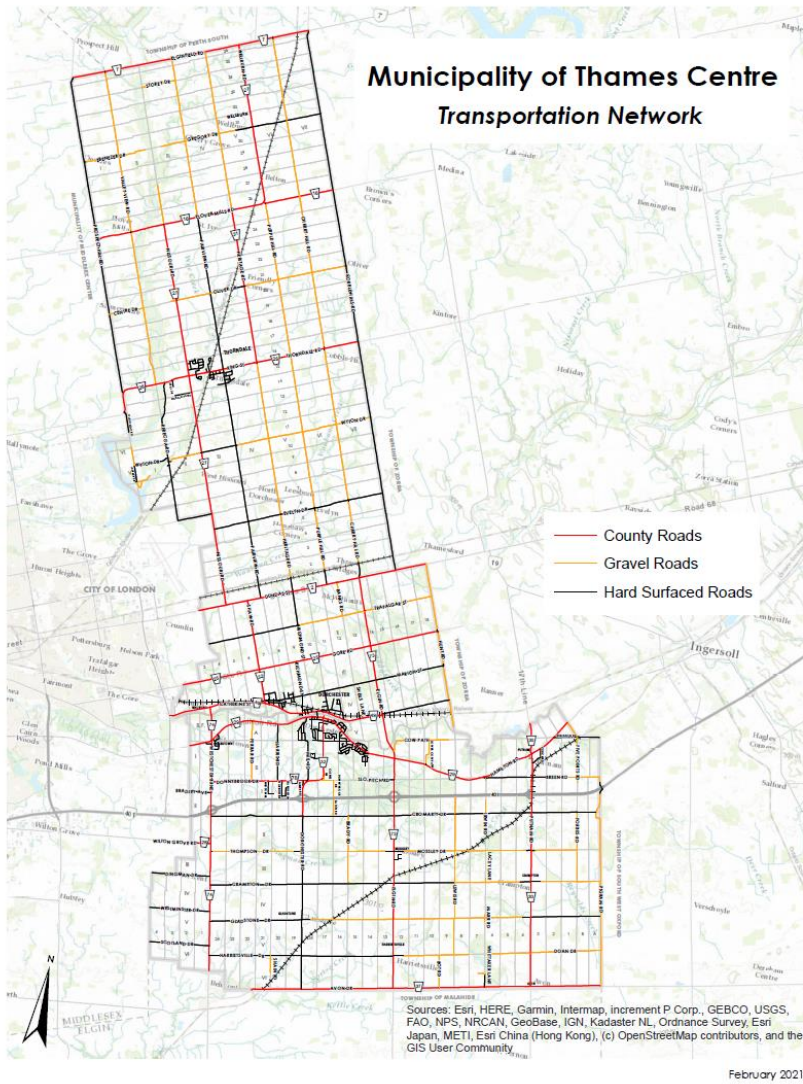
| Wastewater Collection | | | | | | | | | | | |
|-------------------------|------------------|------------|------------|------------------|------------------|------------|------------|------------|--------------------|------------|------------|
| Asset Segment | Backlog | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
| Pollution Control Plant | \$0 | \$0 | \$0 | \$485,931 | \$0 | \$0 | \$0 | \$0 | \$1,700,757 | \$0 | \$0 |
| Pump Station | \$127,618 | \$0 | \$0 | \$255,236 | \$0 | \$0 | \$0 | \$0 | \$893,327 | \$0 | \$0 |
| Treatment Plant | \$0 | \$0 | \$0 | \$0 | \$251,714 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| | \$127,618 | \$0 | \$0 | \$741,167 | \$251,714 | \$0 | \$0 | \$0 | \$2,594,084 | \$0 | \$0 |

Asset Portfolio

| Asset Segment | Backlog | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|---------------------------|---------------------|------------------|--------------------|------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Bridges & Culverts | \$0 | \$0 | \$55,000 | \$0 | \$0 | \$876,603 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Building & Facilities | \$13,868,590 | \$34,495 | \$1,787,923 | \$199,080 | \$0 | \$1,818 | \$21,374 | \$991,699 | \$329,326 | \$0 | \$364 |
| Fleet | \$2,759,290 | \$49,654 | \$237,106 | \$380,651 | \$628,536 | \$55,898 | \$756,671 | \$408,166 | \$580,475 | \$1,691,873 | \$61,030 |
| Machinery & Equipment | \$30,578 | \$220,406 | \$120,276 | \$29,870 | \$0 | \$103,547 | \$142,612 | \$10,570 | \$0 | \$396,615 | \$131,769 |
| Parks & Land Improvements | \$414,889 | \$171,924 | \$0 | \$48,286 | \$166,316 | \$7,535 | \$541,453 | \$15,691 | \$0 | \$162,017 | \$8,262 |
| Road Network | \$1,664,326 | \$180,562 | \$1,843,548 | \$39,121 | \$12,875 | \$286,607 | \$4,789,483 | \$1,013,802 | \$1,982,885 | \$805,787 | \$2,488,620 |
| Water Distribution | \$4,336,130 | \$0 | \$0 | \$0 | \$14,615 | \$895,784 | \$0 | \$0 | \$540,919 | \$320,536 | \$3,135,245 |
| Wastewater Collection | \$127,618 | \$0 | \$741,167 | \$251,714 | \$0 | \$0 | \$0 | \$2,594,084 | \$0 | \$0 | \$0 |
| Stormwater Collection | \$180,000 | \$200,000 | \$0 | \$30,000 | \$0 | \$0 | \$0 | \$176,367 | \$0 | \$0 | \$0 |
| | \$23,381,421 | \$857,041 | \$4,785,020 | \$978,722 | \$822,342 | \$2,227,792 | \$6,251,593 | \$5,210,380 | \$3,433,605 | \$3,376,828 | \$5,825,290 |

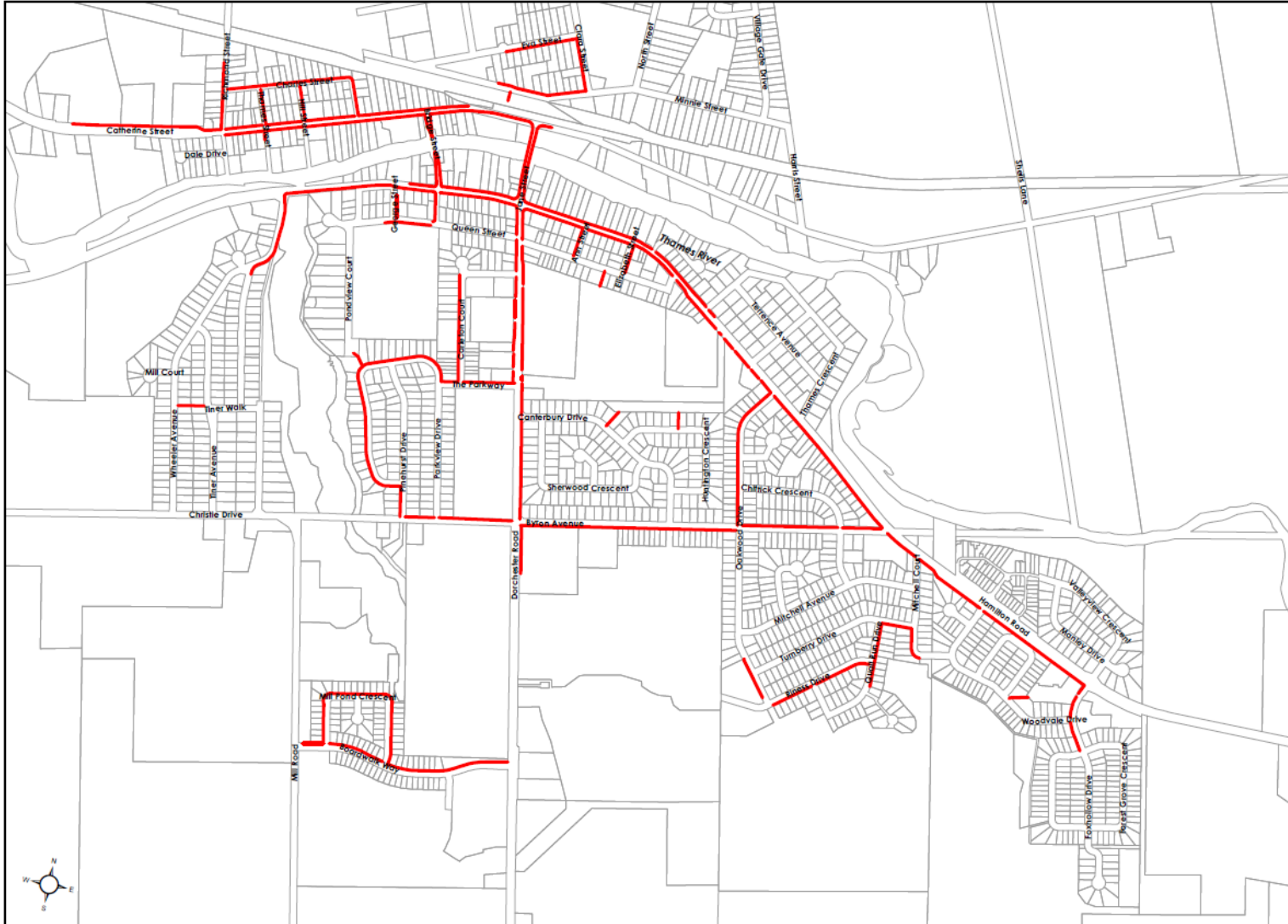
Appendix B: Level of Service Maps

Road Network



Sidewalk Network – Dorchester

Municipality of Thames Centre
Sidewalk Network - Dorchester



December 2020

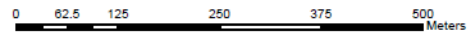
0 125 250 500 750 1,000 Meters

Sidewalk Network – Thorndale

Municipality of Thames Centre
Sidewalk Network - Thorndale

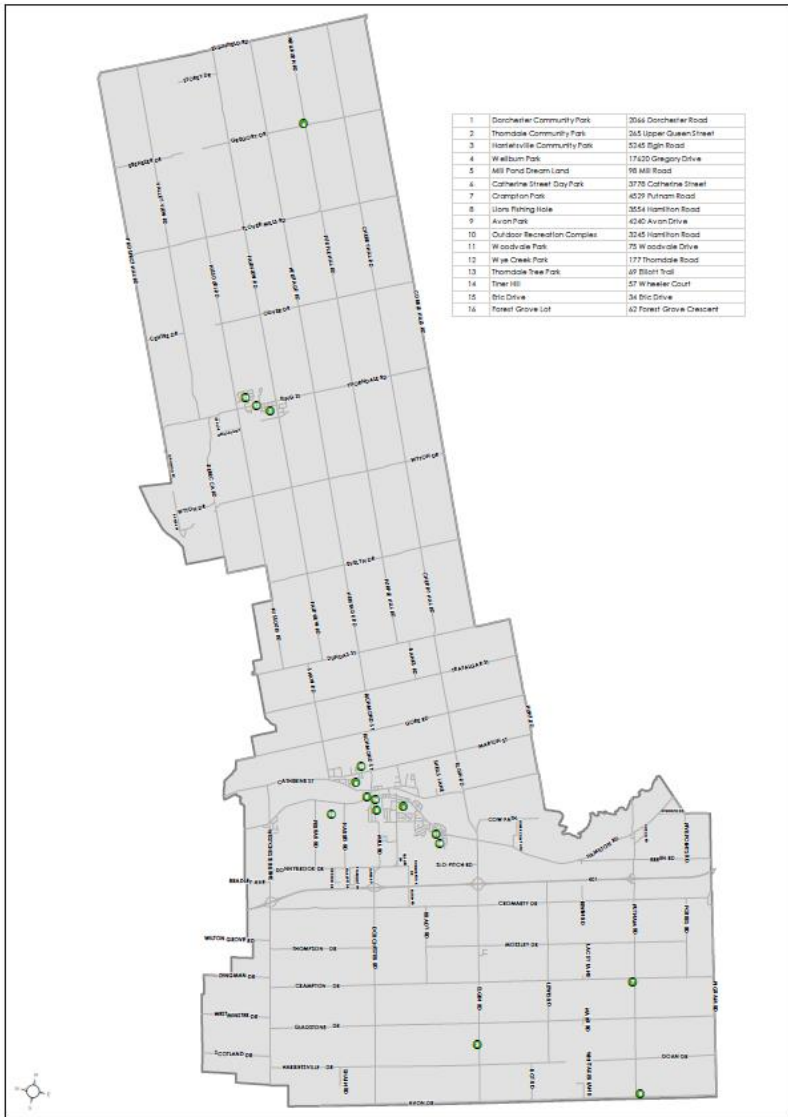


December 2020



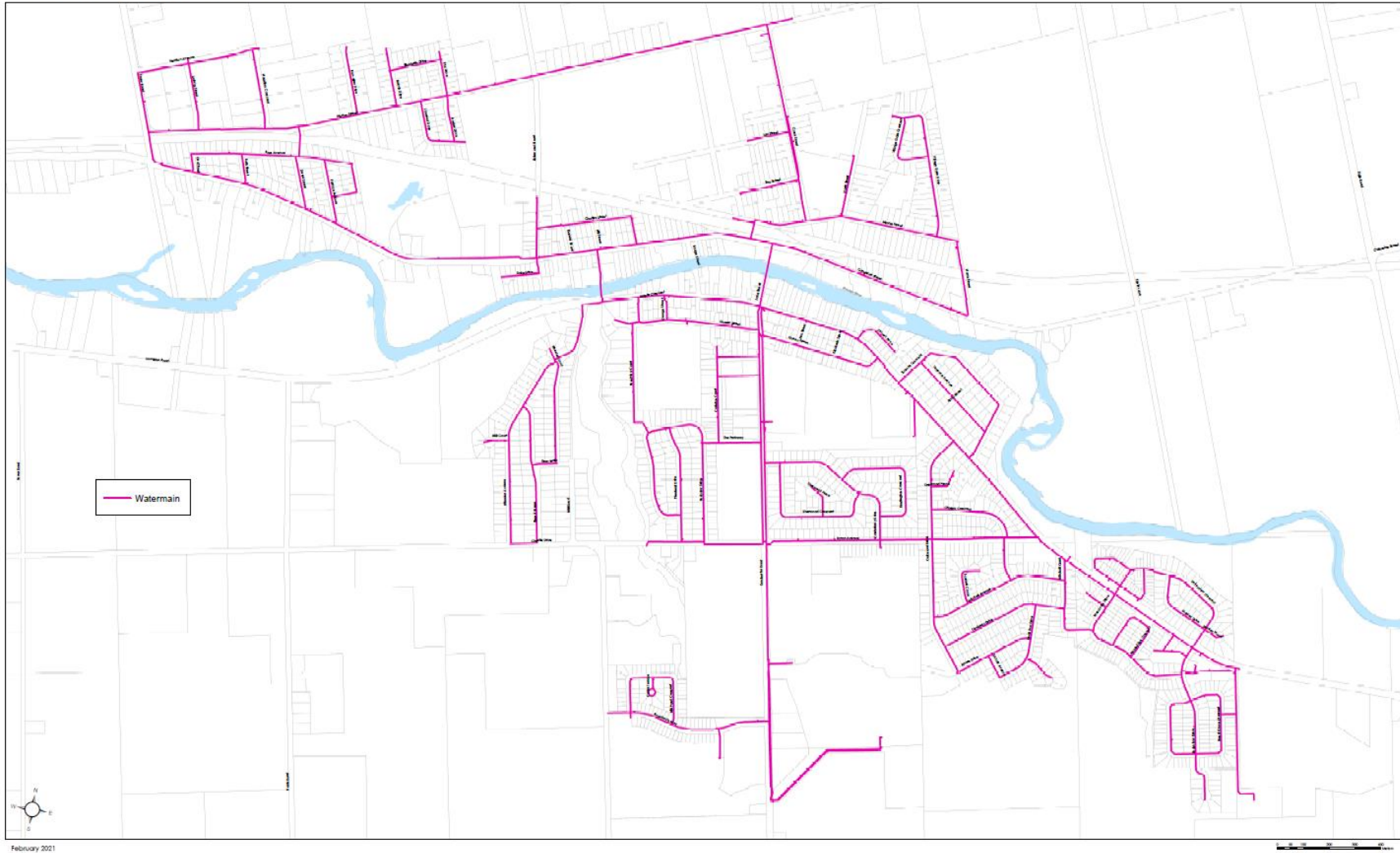
Park & Land Improvements – Parks and Recreation Areas

Municipality of Thames Centre Parks & Recreational Areas



Water Distribution System – Dorchester

Municipality of Thames Centre
Water System - Dorchester

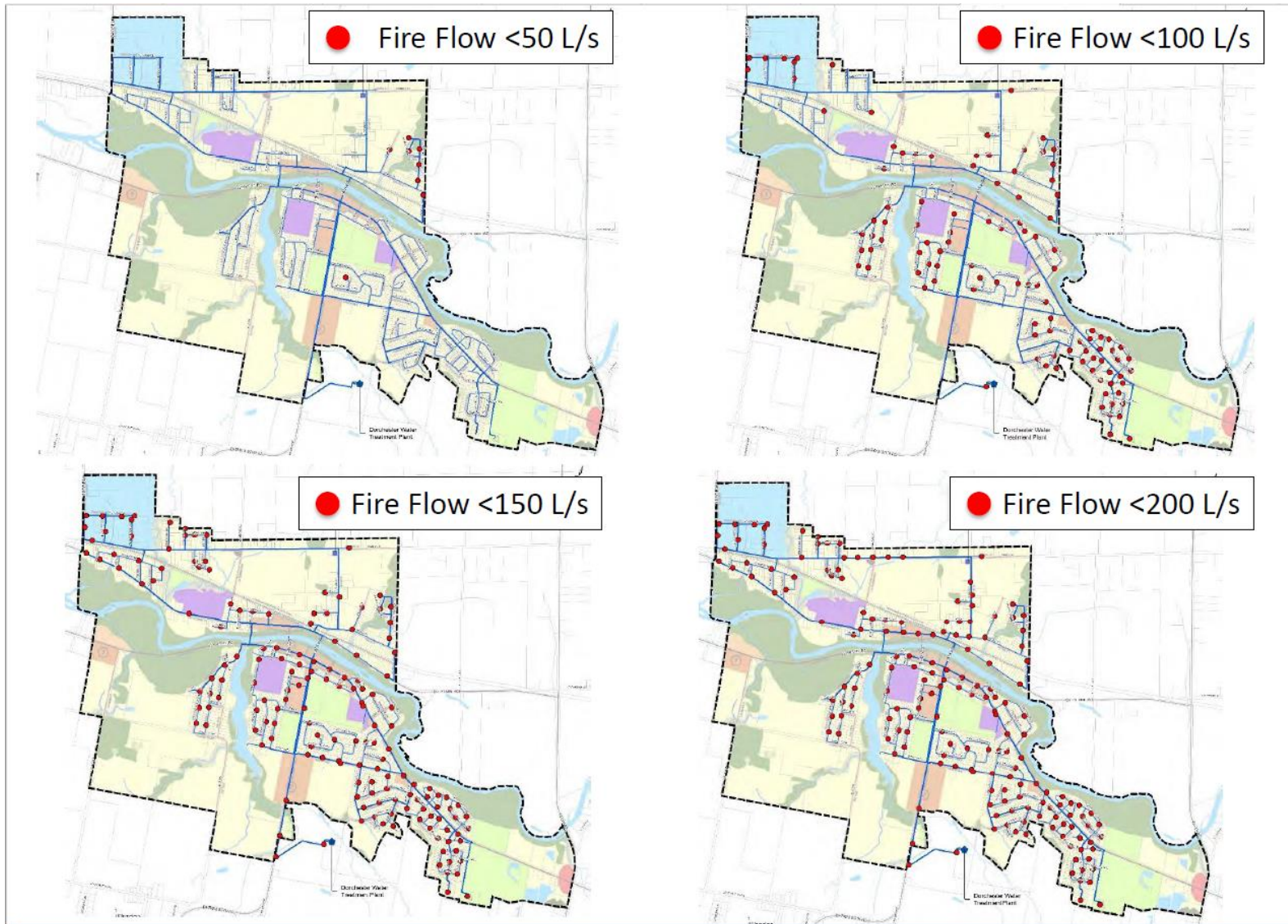


Water Distribution System – Thorndale

Municipality of Thames Centre
Water System - Thorndale

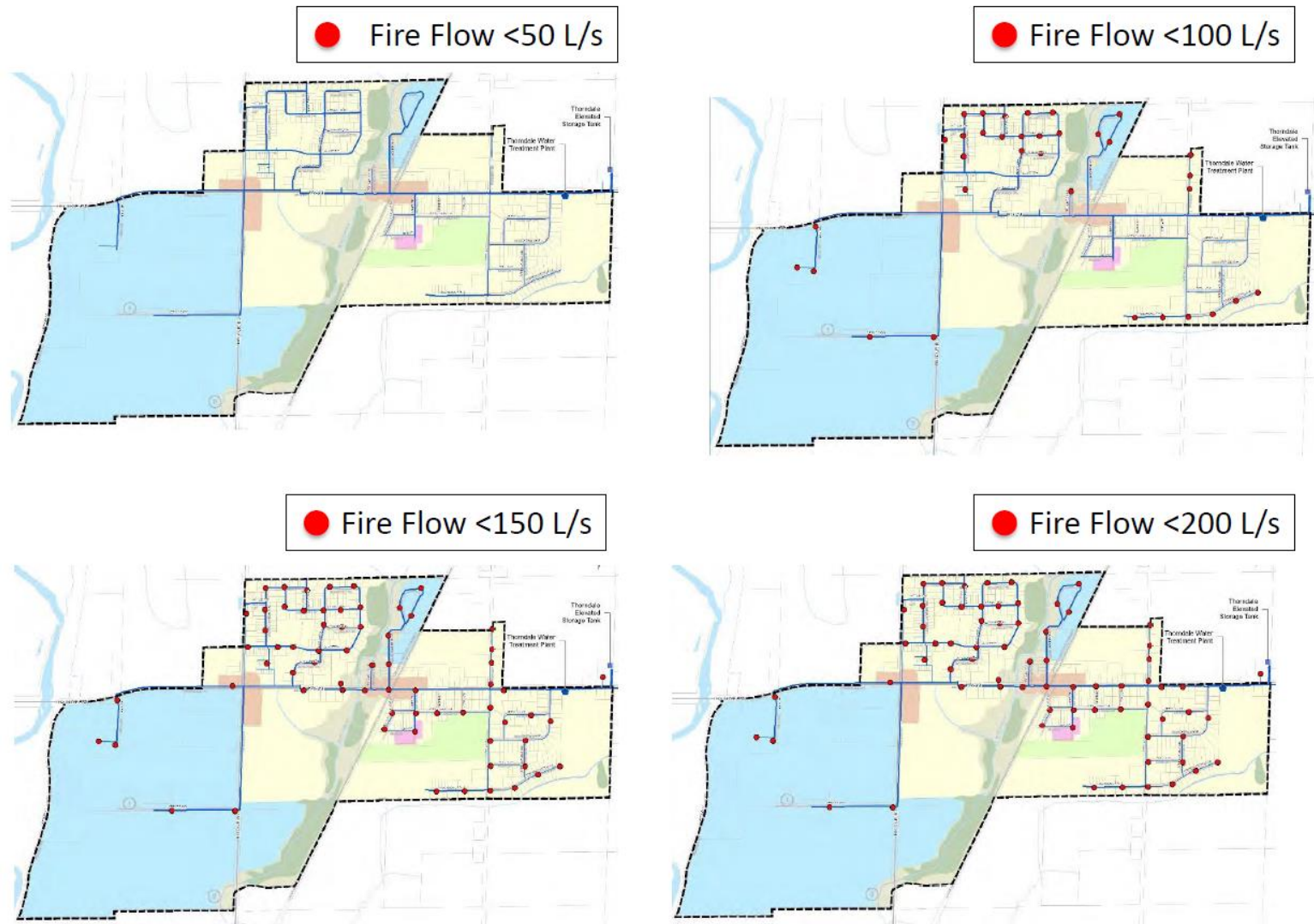


Water Distribution – Fire Flow Areas¹³



¹³ Water and Wastewater Master Plan Update, 2019

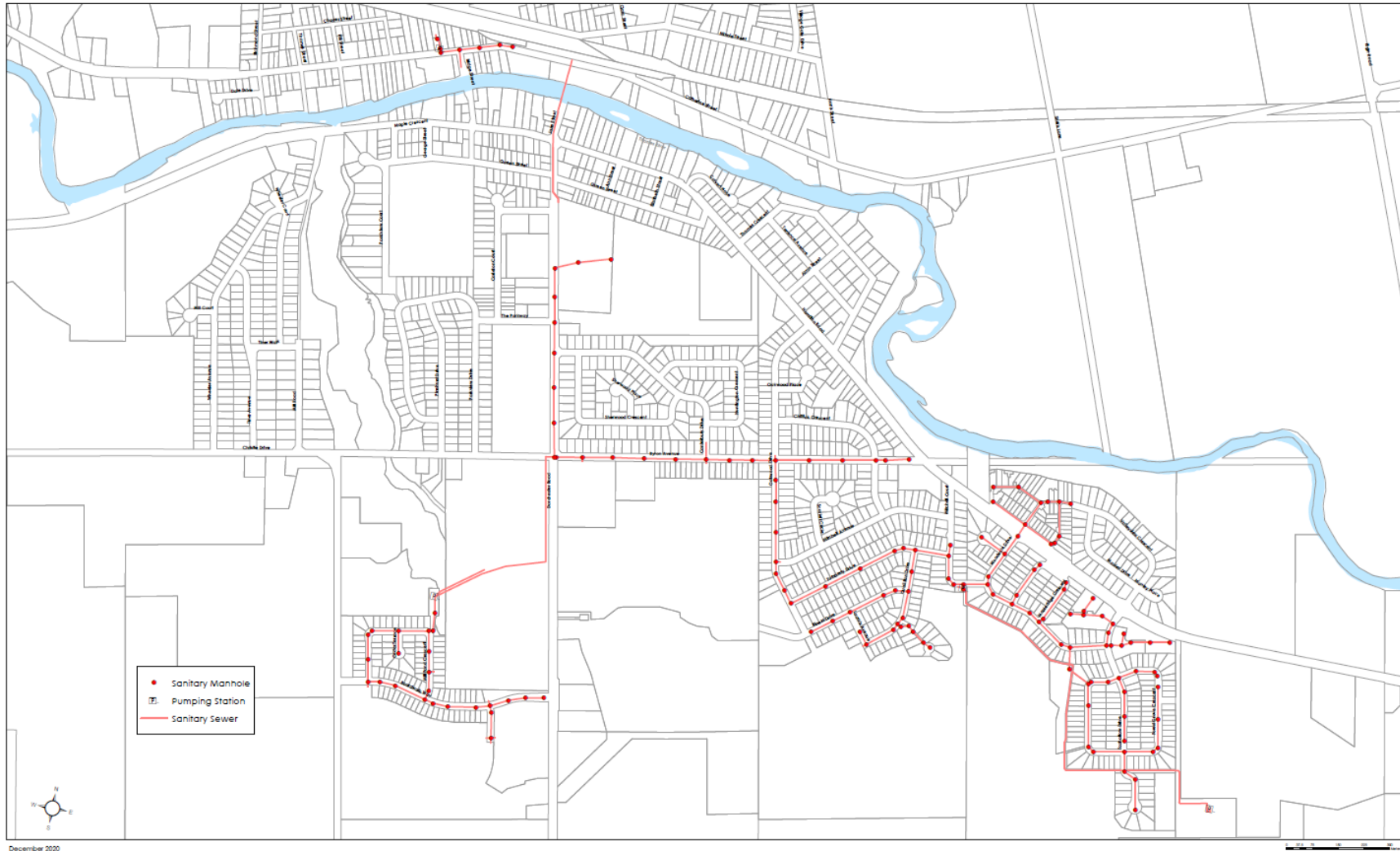
Water Distribution – Fire Flow Areas¹⁴



¹⁴ Water and Wastewater Master Plan Update, 2019

Wastewater System – Dorchester

Municipality of Thames Centre
Sanitary Sewer Network - Dorchester



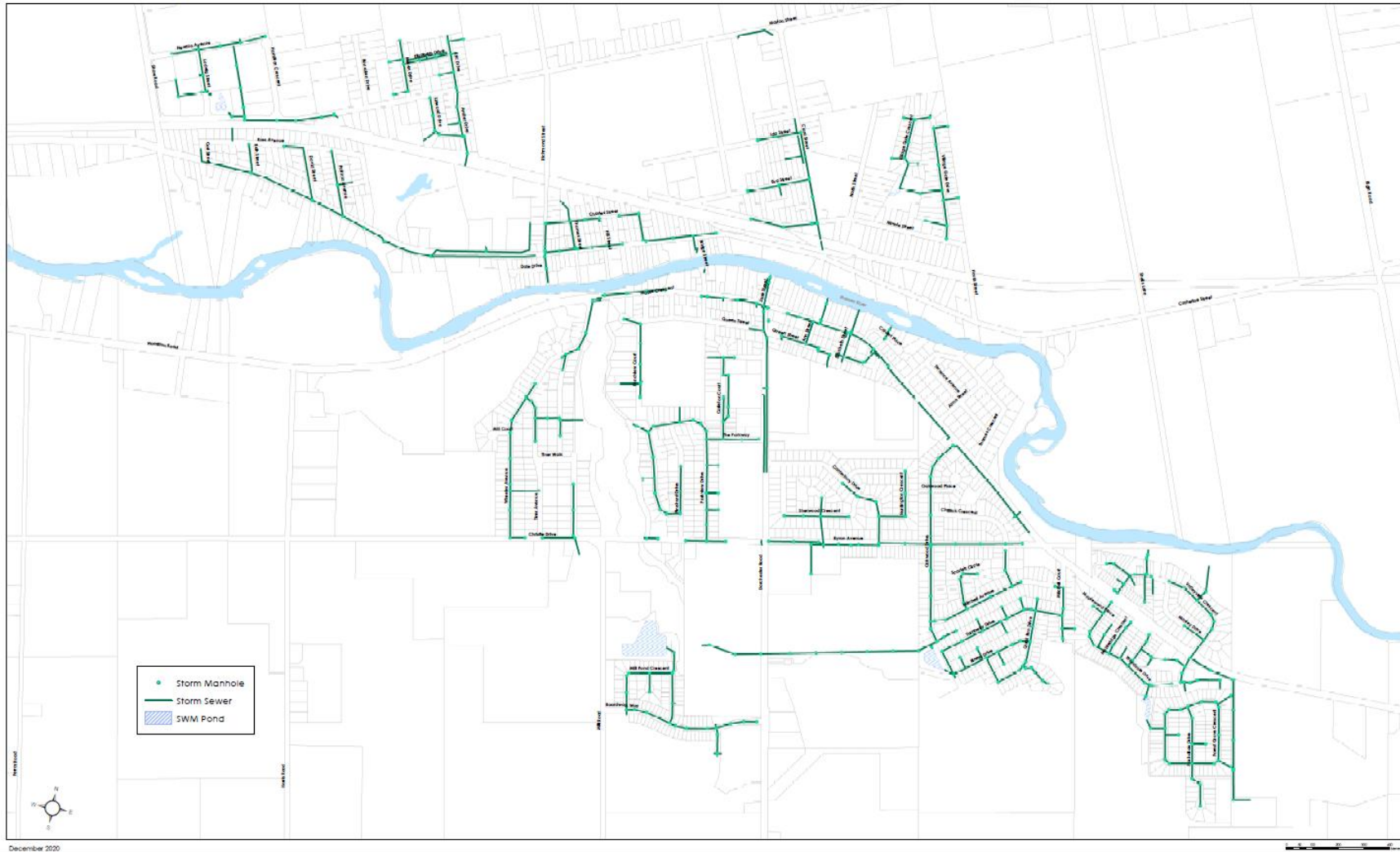
Wastewater System – Thorndale

Municipality of Thames Centre Sanitary Sewer Network - Thorndale



Stormwater System Map – Dorchester

Municipality of Thames Centre Stormwater System - Dorchester



Stormwater System Map – Thorndale

Municipality of Thames Centre
Stormwater System - Thorndale



December 2020

Appendix C: Risk Rating Criteria

Probability of Failure

| Asset Category | Risk Criteria | Criteria Weighting | Value/Range | Probability of Failure Score |
|--|---------------|--------------------|-------------|------------------------------|
| Road Network (Roads) | Condition | 100% | 85-100 | 1 |
| | | | 75-84 | 2 |
| | | | 50-74 | 3 |
| | | | 30-49 | 4 |
| | | | 0-29 | 5 |
| Road Network Bridges & Culverts | Condition | 100% | 80-100 | 1 |
| Stormwater Collection Buildings & Facilities | | | 60-79 | 2 |
| Machinery & Equipment Fleet | | | 40-59 | 3 |
| Parks & Land Improvements | | | 20-39 | 4 |
| Water Distribution Wastewater Distribution | | | 0-19 | 5 |
| Stormwater Collection (Mains) Wastewater Collection (Mains) | Condition | 100% | 0.90-1.0 | 1 |
| | | | 0.70-0.89 | 2 |
| | | | 0.50-0.69 | 3 |
| | | | 0.30-0.49 | 4 |
| | | | 0-0.29 | 5 |
| Water Distribution (Mains) | Condition | 100% | 90-100 | 1 |
| | | | 70-89 | 2 |
| | | | 50-69 | 3 |
| | | | 30-49 | 4 |
| | | | 0-29 | 5 |

Consequence of Failure

| Asset Category | Risk Classification | Risk Criteria | Value/Range | Consequence of Failure Score | | |
|-----------------------|-----------------------|-------------------------|--------------------------|------------------------------|---------------------|---|
| Road Network (Roads) | Economic (60%) | Replacement Cost (100%) | \$0-\$50,000 | 1 | | |
| | | | \$50,000-\$250,000 | 2 | | |
| | | | \$250,000-\$500,000 | 3 | | |
| | | | \$500,000-\$1,000,000 | 4 | | |
| | | | \$1,000,000-\$50,000,000 | 5 | | |
| | Operational (10%) | Service Class (10%) | 3 | 5 | | |
| | | | 4 | 4 | | |
| | | | 5 | 3 | | |
| | | | 6 | 2 | | |
| | Social (15%) | AADT (50%) | 0-50 | 1 | | |
| | | | 51-200 | 2 | | |
| | | | 201-400 | 3 | | |
| | | | 401-600 | 4 | | |
| | | | 601-2000 | 5 | | |
| | | Design Class (50%) | 200 | 1 | | |
| | | | 300 | 2 | | |
| | | | 400 | 2 | | |
| | | | 500 | 4 | | |
| | | | C/R | 4 | | |
| | Health & Safety (15%) | Speed Limit (100%) | L/R | 3 | | |
| LCI | | | 5 | | | |
| 40 | | | 1 | | | |
| 50 | | | 2 | | | |
| 60 | | | 3 | | | |
| | | 70 | 4 | | | |
| | | 80 | 5 | | | |
| | | Bridges & Culverts | Economic (100%) | Replacement Cost (100%) | \$0-\$50,000 | 1 |
| | | | | | \$50,000-\$250,000 | 2 |
| | | | | | \$250,000-\$500,000 | 3 |
| \$500,000-\$1,000,000 | 4 | | | | | |

| Asset Category | Risk Classification | Risk Criteria | Value/Range | Consequence of Failure Score |
|-----------------------|---------------------|----------------------------|---------------------|------------------------------|
| | | | \$1,000,000+ | 5 |
| | | | \$0-\$50,000 | 1 |
| Stormwater Collection | Economic (100%) | Replacement Cost (100%) | \$50,000-\$150,000 | 2 |
| Wastewater Collection | | | \$150,000-\$250,000 | 3 |
| Water Distribution | | | \$250,000-\$500,000 | 4 |
| | | | \$500,000+ | 5 |
| | | | | |

| Asset Category | Risk Classification | Risk Criteria | Value/Range | Consequence of Failure Score |
|------------------------|----------------------|----------------------------|----------------------------------|------------------------------|
| Buildings & Facilities | Economic (80%) | Replacement Cost (100%) | \$0-\$100,000 | 1 |
| | | | \$100,001-\$250,000 | 2 |
| | | | \$250,001-\$500,000 | 3 |
| | | | \$500,001-\$750,000 | 4 |
| | | | \$750,000-\$10,000,000 | 5 |
| | Operational (20%) | Asset Segment (100%) | General Administration | 2 |
| | | | Community Services | 3 |
| | | | Transportation Services | 3 |
| | | | Environmental Services | 4 |
| | | | Recreation and Cultural Services | 4 |
| Fleet | Economic (80%) | Replacement Cost (100%) | \$0-\$25,000 | 1 |
| | | | \$25,001-\$75,000 | 2 |
| | | | \$75,001-\$125,000 | 3 |
| | | | \$125,001-\$200,000 | 4 |
| | | | \$200,000+ | 5 |
| | Social (20%) | Asset Segment (100%) | Administration | 1 |
| | | | Building & Inspection Vehicles | 2 |
| | | | Arena | 3 |
| | | | Landfill | 3 |
| | | | Parks Vehicles | 3 |
| | | | Roads Vehicles | 4 |
| | | | Water Vehicles | 4 |
| | | | Fire Department Vehicles | 5 |

| Asset Category | Risk Classification | Risk Criteria | Value/Range | Consequence of Failure Score | | | |
|-------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------------|---|
| Machinery & Equipment | Economic (80%) | Replacement Cost (100%) | \$0-\$25,000 | 1 | | | |
| | | | \$25,001-\$75,000 | 2 | | | |
| | | | \$75,001-\$125,000 | 3 | | | |
| | | | \$125,001-\$200,000 | 4 | | | |
| | | | \$200,000+ | 5 | | | |
| | Social (20%) | Department (100%) | General Government | 2 | | | |
| | | | Information Technology | 2 | | | |
| | | | Development Services | 2 | | | |
| | | | Community Services | 3 | | | |
| | | | Transportation Services | 4 | | | |
| | | | Health Services | 4 | | | |
| | | | Environmental Services | 4 | | | |
| | | | Protective Services | 5 | | | |
| | | | Parks & Land Improvements | Economic (100%) | Replacement Cost (100%) | \$0-\$25,000 | 1 |
| | | | | | | \$25,001-\$75,000 | 2 |
| \$75,001-\$125,000 | 3 | | | | | | |
| \$125,001-\$200,000 | 4 | | | | | | |
| \$200,000+ | 5 | | | | | | |
| Social (20%) | Asset Segment (100%) | Lighting | | 1 | | | |
| | | Parking Lot | | 1 | | | |
| | | Miscellaneous | | 2 | | | |
| | | Trails | | 2 | | | |
| | | Park Amenities | | 3 | | | |
| Skateboard Park | 4 | | | | | | |
| Splash Pad | 4 | | | | | | |
| Sport Fields and Courts | 4 | | | | | | |
| Playground Equipment | 5 | | | | | | |

| Asset Category | Risk Classification | Risk Criteria | Value/Range | Consequence of Failure Score |
|-------------------------------|---------------------|-----------------------|----------------|------------------------------|
| Stormwater Collection (Mains) | Economic (80%) | Pipe Unit Cost (100%) | \$0-\$250 | 1 |
| | | | \$251-\$500 | 2 |
| | | | \$501-\$700 | 3 |
| | | | \$701-\$1000 | 4 |
| | | | \$1001-\$5,000 | 5 |
| | Operational (20%) | Pipe Material (100%) | CMP | 1 |
| | | | CSP | 1 |
| | | | PVC | 1 |
| | | | HDPE | 2 |
| | | | PPL | 2 |
| | | | PE | 2 |
| | | | PRPC | 3 |
| | | | CONC | 3 |
| | | | RPC | 3 |
| | | | RCONC | 3 |
| | | | CONC PRCST | 4 |

| Asset Category | Risk Classification | Risk Criteria | Value/Range | Consequence of Failure Score | | |
|-------------------------------|----------------------------|-----------------------|----------------------|---------------------------------|-----|---|
| Wastewater Collection (Mains) | Economic (60%) | Pipe Unit Cost (100%) | \$0-\$300 | 1 | | |
| | | | \$301-\$500 | 2 | | |
| | | | \$501-\$700 | 3 | | |
| | | | \$701-\$900 | 4 | | |
| | | | \$901-\$1,000+ | 5 | | |
| | Environmental (20%) | Asset Segment (50%) | Mains | 3 | | |
| | | | Force Mains | 5 | | |
| | Social (20%) | Pipe Diameter (100%) | 0-100mm | 1 | | |
| | | | 100-250mm | 2 | | |
| | | | 250-375mm | 3 | | |
| | | | 375-450mm | 4 | | |
| | | | 450mm+ | 5 | | |
| | Water Distribution (Mains) | Economic (60%) | Pipe Diameter (100%) | 0-25mm | 1 | |
| | | | | 25-100mm | 2 | |
| | | | | 100-150mm | 3 | |
| 150-250mm | | | | 4 | | |
| 250mm+ | | | | 5 | | |
| Operational (20%) | | Pipe Material (100%) | Cast Iron | 2 | | |
| | | | Copper | 1 | | |
| | | | Ductile Iron | 2 | | |
| | | | HDPE | 2 | | |
| | | | Asbestos Cement | 3 | | |
| | | | Riveted Steel | 3 | | |
| | | | Municipex | 4 | | |
| | | | PVC | 5 | | |
| | | | Social (20%) | # of Service Connections (100%) | 0-1 | 1 |
| | | | | | 1-5 | 2 |
| 5-15 | 3 | | | | | |
| 15-50 | 4 | | | | | |
| 50+ | 5 | | | | | |

Appendix D: 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 Municipality'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, and
- 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 Thames Centre'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, Thames Centre 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, Thames Centre 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 Municipality 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 Municipality 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 E: Glossary of Terms

| Term | Term Description |
|------------------------------------|---|
| Asset | An item, thing or entity that has potential or actual value to a Municipality. (Such as plant, machinery, buildings, etc.) |
| Asset Register | A record of asset information, typically held in spreadsheets, databases or software systems, including asset attribute data such as quantity, type and construction cost. |
| Asset Management (AM) | <p>The systematic and coordinated activities and practices of an organization to optimially and sustainably deliver on its objectives through the cost-effective lifecycle management of assets.</p> <p>ISO 55000 definition: coordinated activity of an organization to realize value from assets.</p> |
| Asset Management Plan (AMP) | Long-term plans (usually 10-20 years or more for infrastructure assets) that outline the asset activities and programmes for each asset class to provide a defined level of service in the most cost effective way. |
| Asset Management Policy | A high-level statement of an organization’s principles and approach to asset management. |
| Capital Expenditure (CAPEX) | Expenditure used to create new assets, renew assets or upgrade assets or to increase the capacity of existing assets beyond their original design capacity or service potential. CAPEX increases the value of the asset stock. |
| CCTV | Closed Circuit Television Video |
| Condition | The physical state of the asset. |
| Condition Assessment | The inspection, assessment, measurement and interpretation of the resultant data, to indicate the condition of a specific component so as to determine the need for some preventive or remedial action. |
| Consequence of Failure | The effect of asset failure on organizational objectives. |

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| Critical Assets | Assets that have a higher probability of failure and consequence of failure (in terms of financial, environment, social and any other financial or non-financial impacts). |
| EUL | Estimated Useful Life. The period from the acquisition of the asset to the time when the asset, while physically able to provide a service, ceases to be the lowest cost alternative to satisfy a particular level of service. |
| Facility | A complex structure comprising of many assets (e.g. a hospital, water treatment plant, recreation complex, etc.) that represents a single management unit for financial, operational, maintenance or other purposes. |
| GIS | Geographic Information System |
| Federal Gas Tax Fund (GTF) | A permanent source of funding provided up front, twice-a-year, to provinces and territories, who in turn flow this funding to their municipalities to support local infrastructure priorities. Municipalities can pool, bank and borrow against this funding, providing significant financial flexibility. |
| High-Class Bituminous (HCB) | Hot mix asphalt pavement that is typically placed as a surface for rural, semi-urban and urban roads with higher traffic volumes, and is placed at thicknesses ranging from 50mm (2 inches) to 200mm (8 inches). |
| IAM | Institute of Asset Management |
| Infrastructure Assets | Stationary systems forming a network or a portfolio of assets serving whole communities, where the system as a whole is intended to be maintained indefinitely at a particular level of service potential by continuing replacement and refurbishment of its components. |
| Key Performance Indicator (KPI) | A performance measure that is important to the Municipality. |
| Low-Class Bituminous (LCB) | A thin protective wearing surface applied to existing pavement or gravel surface that acts as a seal from water and fills in cracks and uneven surfaces. LCB is typically placed on rural roads with low traffic volumes and consists of asphalt emulsion and aggregate. |
| Level of Service (LOS) | The parameters or combination of parameters that reflect social, political, economic and environmental outcomes that the Municipality delivers. |

| | |
|-------------------------------|--|
| Maintenance | All actions necessary for retaining an asset as near as practicable to its original condition, but excluding rehabilitation or renewal. Maintenance does not necessarily increase the service potential of the asset or keep it in its original condition, it slows down deterioration and delays when rehabilitation or replacement is necessary. |
| OSIM | Ontario Structure Inspection Manual |
| Probability of Failure | The probability or likelihood of asset failure at a given time. |
| Rehabilitation | Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate modification. Generally, involves repairing the asset to deliver its original level of service without resorting to significant upgrading or renewal, using available techniques and standards. |
| Replacement | The complete replacement of an asset that has reached the end of its life, so as to provide a similar, or agreed alternative, level of service. |
| Replacement Cost | The cost the municipality would incur to acquire the asset on the reporting year. |
| Rural | Refers to predominant characteristics of the adjacent land use; rural being agricultural, light commercial and vacant/undeveloped properties. |
| Semi-Urban | Refers to the predominant characteristics of the adjacent land use; semi-urban being settlement clusters with low-density residential and light commercial/industrial properties. |
| Service Life Remaining | The asset's remaining service life with the most recent condition assessment value taken into consideration. |
| Urban | Refers to the predominant characteristics of the adjacent land use; urban being a mix of dense residential and commercial/industrial/institutional properties. |