Asset Management Plan

Town of Greater Napanee

2022

This Asset Management Program was prepared by:

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The preparation of this project was carried out with assistance from the Government of Canada and the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them."

Key Statistics

Replacement cost of asset portfolio
$488.5 million

Replacement cost of infrastructure per household
$65,478 (2021)

Percentage of assets in fair or better condition
59%

Percentage of assets with assessed condition data
57%

Annual capital infrastructure deficit
$11.1 million

Recommended timeframe for eliminating annual infrastructure deficit
10-20 Years

Target reinvestment rate
3.1%

Actual reinvestment rate
0.8%

Table of Contents

Executive Summary 1
Scope 1
Findings 2
Recommendations 3
1 Introduction & Context 5
1.1 An Overview of Asset Management 6
1.2 Key Concepts in Asset Management 9
1.3 Ontario Regulation 588/17 12
2 Scope and Methodology 14
2.1 Asset Categories Included in this AMP 15
2.2 Deriving Replacement Costs 15
2.3 Estimated Useful Life and Service Life Remaining 16
2.4 Reinvestment Rate 16
2.5 Deriving Asset Condition 17
3 Portfolio Overview 18
3.1 Total Replacement Cost of Asset Portfolio 19
3.2 Target vs. Actual Reinvestment Rate 19
3.3 Condition of Asset Portfolio 20
3.4 Service Life Remaining 21
3.5 Forecasted Capital Requirements 21
4 Analysis of Tax-funded Assets 22
4.1 Road Network 23
4.2 Bridges & Culverts 35
4.3 Storm Water Network 45
4.4 Facilities & Buildings 54
4.5 Fleet 68
4.6 Machinery & Equipment 76
4.7 Parks and Land Improvements 84
5 Analysis of Rate-funded Assets 94
5.1 Water Network 95
5.2 Sanitary Network 103

6 Impacts of Growth 112
6.1 Description of Growth Assumptions 113
6.2 Impact of Growth on Lifecycle Activities 117
7 Financial Strategy 118
7.1 Financial Strategy Overview 119
7.2 Funding Objective 122
7.3 Financial Profile: Tax Funded Assets 123
7.4 Financial Profile: Rate Funded Assets 127
7.5 Use of Debt 129
7.6 Use of Reserves 132
8 Appendices 134
Appendix A: 10-Year Capital Requirements 135
Appendix B: Level of Service Maps 141
Appendix C: Risk Rating Criteria 150
Appendix D: Condition Assessment Guidelines 152

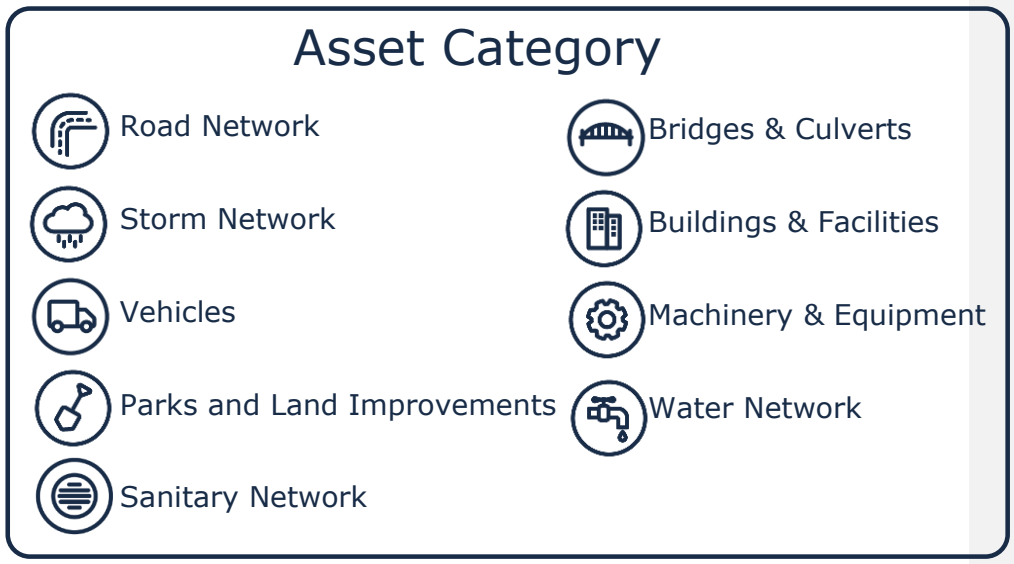
Executive Summary

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

Scope

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

This AMP include the following asset categories:



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

Findings

The overall replacement cost of the asset categories included in this AMP totals $488.5 million. 59% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 57% of assets. For the remaining 43% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.
The development of a long-term, sustainable financial plan requires an analysis of whole lifecycle costs. This AMP uses a combination of proactive lifecycle strategies (roads, bridges, sanitary assets, and buildings) 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 Town's average annual capital requirement totals $15.1 million. Based on a historical analysis of sustainable capital funding sources, the Town is committing approximately $4 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $10.1 million.

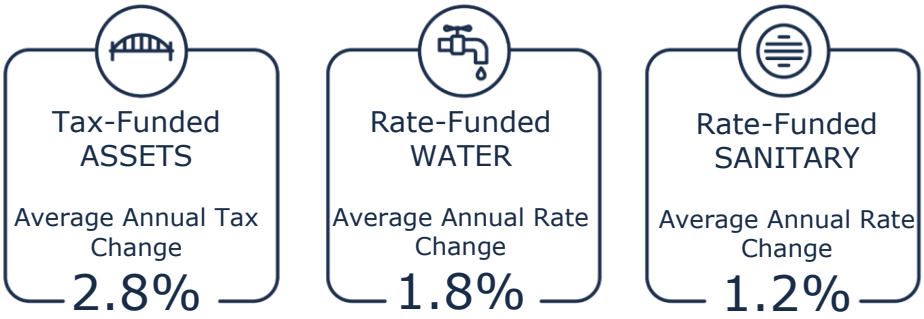
It is important to note that this AMP represents a snapshot in time and is based on the best available processes, data, and information at the Town. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources.

Average Annual Requirements Per Household

Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphics shows annual tax/rate change required to eliminate the Town's infrastructure deficit based on a:

- 20-year plan for tax funded assets
- 15-year plan for water assets
- 10-year plan for sanitary assets



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

- Review data to update and maintain a complete and accurate dataset
- Develop a condition assessment strategy with a regular schedule
- Review and update lifecycle management strategies

- Development and regularly review short- and long-term plans to meet capital requirements
- Measure current levels of service and identify sustainable proposed levels of service

1 Introduction & Context

Key Insights

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

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

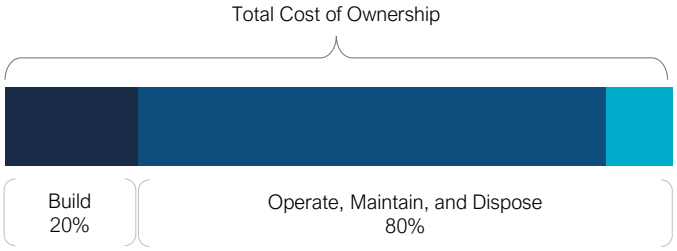
- An asset management plan is a living document that should be updated regularly to inform long-term planning

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

1.1 An Overview of Asset Management

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

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



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

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

1.1.1 Asset Management Policy

An asset management policy represents a statement of the principles guiding the Town'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.

In June of 2019, The Town adopted a Strategic Asset Management Policy in accordance with Ontario Regulation 588/17.

The stated objectives of the policy are to:

- Provide a framework for implementing asset management to enable a consistent and strategic approach to all levels of the organization
- Demonstrate Council's commitment to support the implementation of asset management methods that are consistent with their priorities and objectives
- Provide guidance to staff responsible for asset management
- Provide transparency and accountability and demonstrate the validity of decision-making process which combine strategic plans, budgets, service levels and risks

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 practices to ensure all assets meet the agreed 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 and stakeholders;
- The policy statements are well defined.

1.1.2 Asset Management Strategy

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

1.1.3 Asset Management Plan

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

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

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

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

Depending on initial lifecycle management strategies, asset performance can be sustained through a combination of maintenance and rehabilitation, but at some point, replacement is required. Understanding what effect these activities will have on the lifecycle of an asset, and their cost, will enable staff to make better recommendations.

The Town'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. 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 the Town is providing to the community and the nature and quality of that service. Within each asset category in this AMP, technical metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available.

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

Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (roads, bridges and culverts, water, wastewater, storm sewer) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. For non-core asset categories, the Town 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 Town's asset management strategies on the physical condition of assets or the quality/capacity of the services they provide.

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

2019

Strategic Asset Management Policy

2022

Asset Management Plan for Core Assets with the following components:

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

2024

Asset Management Plan for Core and Non-Core Assets (same components as 2022) and Asset Management Policy Update

2025

Asset Management Plan for All Assets with the following additional components:

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

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 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
Current performance measures in each category	S.5(2), 2	4.1.6 - 5.2.6	Complete
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

2 Scope and Methodology

Key Insights

- This asset management plan includes 9 asset 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

2.1 Asset Categories Included in this AMP

This asset management plan for the Town of Greater Napanee is produced in compliance with Ontario Regulation 588/17. The July 2024 deadline under the regulation requires analysis of both core and non-core assets.

The AMP summarizes the state of the infrastructure for the Town'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	
Storm Network	
Buildings and Facilities	
Vehicles	
Machinery & Equipment	
Parks and Land Improvements	
Water Network	User Rates
Sanitary Network	

2.2 Deriving Replacement Costs

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

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

User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost is reflective of the actual costs that the Town 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 Town 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 Town can determine the service life remaining (SLR) for each asset. Using condition data and the asset's SLR, the Town can more accurately forecast when it will require replacement. The SLR is calculated as follows:

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

2.4 Reinvestment Rate

As assets age and deteriorate they require additional investment to maintain a state of good repair. The reinvestment of capital funds, through asset renewal or replacement, is necessary to sustain an adequate level of service. The reinvestment rate is a measurement of available or required funding relative to the total replacement cost.

By comparing the actual vs. target reinvestment rate the Town can determine the extent of any existing funding gap. The reinvestment rate is calculated as follows:

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

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

2.5 Deriving Asset Condition

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

A condition assessment rating system provides a standardized descriptive framework that allows comparative benchmarking across the Town'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.

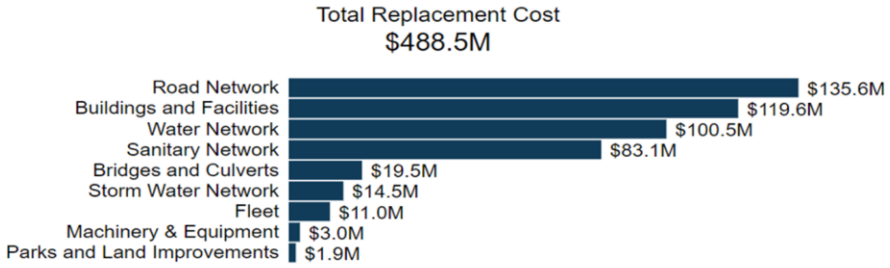
3 Portfolio Overview

Key Insights

- The total replacement cost of the Town's asset portfolio is $488.5 million
- The Town's target re-investment rate is 3.1%, and the actual re-investment rate is 0.8%, contributing to an expanding infrastructure deficit
- 59% of all assets are in fair or better condition
- 37% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total $15.1 million per year across all assets

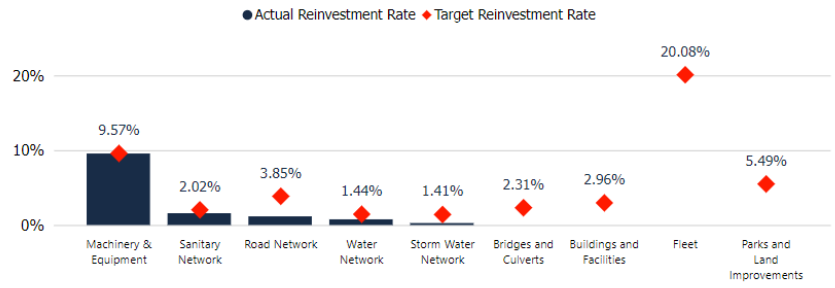
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analyzed in this AMP have a total replacement cost of $488.5 million based on inventory data from 2020. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.



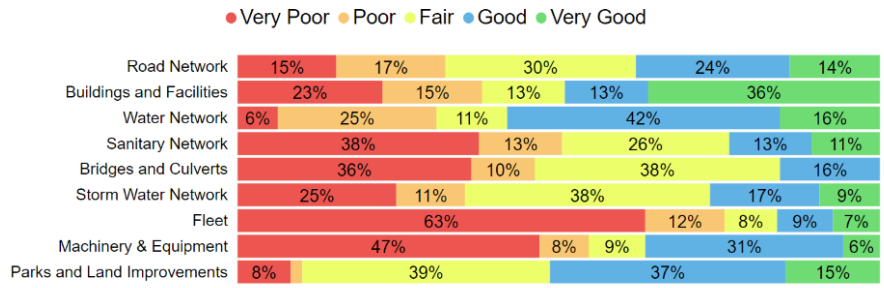
3.2 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Town should be allocating approximately $15.1 million annually, for a target reinvestment rate of 3.1%. Actual annual spending on infrastructure totals approximately $4 million, for an actual reinvestment rate of 0.8%.



3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 59% of assets in Greater Napanee are in fair or better condition. This estimate relies on both age-based and field condition data.

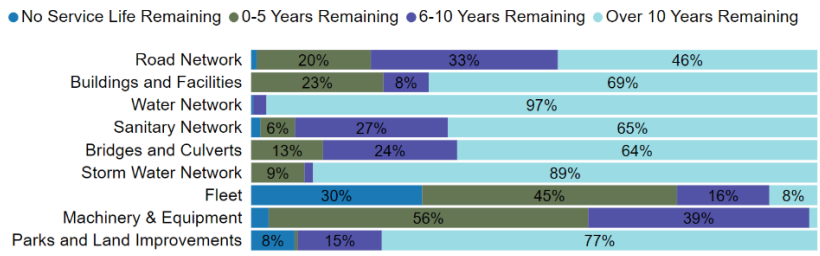


This AMP relies on assessed condition data for 57% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	Asset Segment	% of Assets with Assessed Condition	Source of Condition Data
Road Network	Roads	99%	2019 Assessement
Road Network	Sidewalks	100%	2021 Assessement
Road Network	Streetlights	0%	Age-based
Bridges and Culverts	All	100%	2022 OSIM Reports
Storm Water Network	All	22%	Staff Assessement
Facilities and Buildings	All	21%	2022 Building Condition Assessements
Vehicles	All	0%	Age-based
Machinery & Equipment	All	77%	Staff Assessed
Parks and Land Improvements	All	0%	Age-based
Water Network	All	0%	Age-based
Sanitary Network	All	0%	Age-based

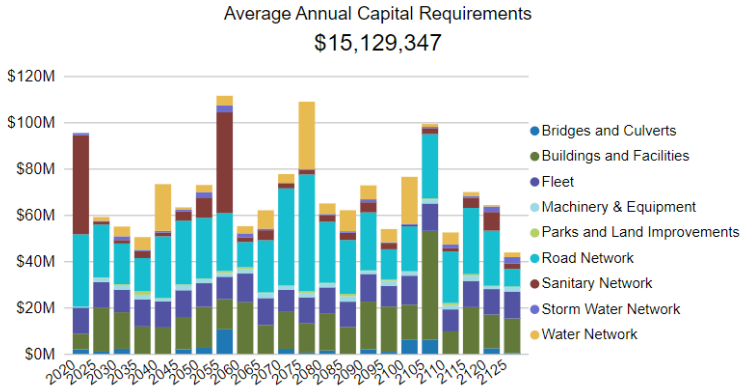
3.4 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 37% of the Town's assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix A.



3.5 Forecasted 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 Town can produce an accurate long-term capital forecast. The following graph identifies capital requirements over the next 105 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins.



4 Analysis of Tax-funded Assets

Key Insights

- Tax-funded assets are valued at $304.9 million
- 63% 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 $12 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

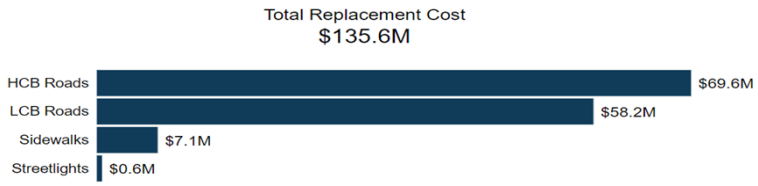
4.1 Road Network

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 Town's asset portfolio. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure including sidewalks and streetlights.

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 Town's Road network inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
HCB Roads	77,371.693 m	User-Defined	$69,634,537
LCB Roads	96,986.941 m	User-Defined	$58,192,165
Sidewalks	52,373.88 m	User-Defined	$7,139,284
Streetlights	681 (count)	User-Defined	$610,200
			$135,576,186



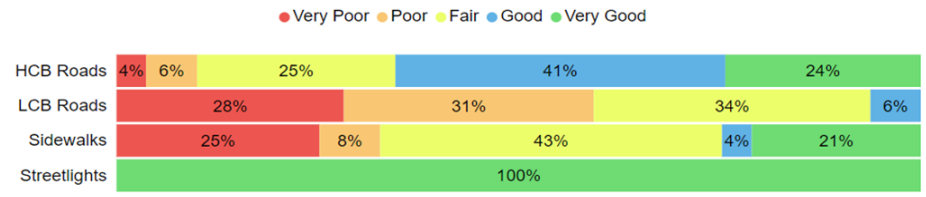
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

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
HCB Roads	63%	Good	99% Assessed
LCB Roads	32%	Poor	100% Assessed
Sidewalks	47%	Fair	100% Assessed
Streetlights	90%	Very Good	Age-Based
	53%	**Fair**	**99% Assessed**

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



To ensure that the Town's continues to provide an acceptable level of service, the Town 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 road network.

Current Approach to Condition Assessment

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

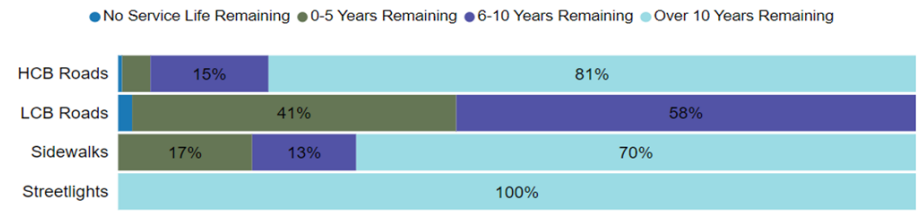
- A Road Needs Study was completed in 2021 that included a detailed assessment of the condition of each road segment
- The Road Needs Study is completed every 5 years by external contractors

- The Town plans to have internal staff complete the roads needs study with PCI index in the future, and increase the frequency to every 2 years
- Road patrols are completed by internal staff based on the minimum maintenance standards (MMS)

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)
HCB Roads	20 Years	32.4	16.2
LCB Roads	10 Years	29.6	5.8
Sidewalks	40 Years	23.1	17.3
Streetlights	50 Years	5.1	44.8
		16.7	**26.2**



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.

4.1.4 Lifecycle Management Strategy

Commented [EI1]: For this section, we have three profile for every road type (based on road class). Please include them all. The lower the condition trigger, the lower is the road class

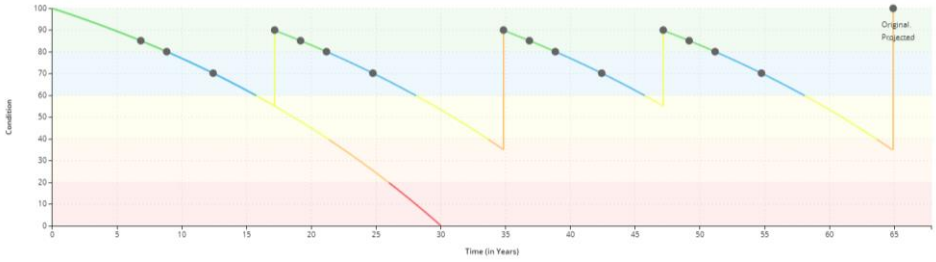
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment.

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

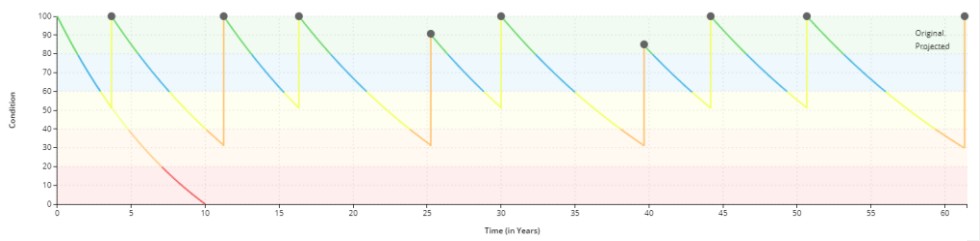
Activity Type	Description of Current Strategy
Maintenance	Creak sealing is completed every five years for HCB roads. This will be triggered based on the road condition in the future.
	Micro surfacing, Rejuvenator and re-profile are conducted as needed according to the the road type and condition.
Rehabilitation	Single surface treatment is completed on a 8-year cycle for roads with less traffic and on a 6-year cycle for roads with medium traffic.
Replacement	Road network replacement is integrated with the replacement of water or sanitary assets when multiple issues exist.

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of LCB and HCB. 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.

Paved Roads (HCB Road)		
Event Name	**Event Class**	**Event Trigger**
Rejuvenator	Maintenance	80 to 90 Condition (Repeating)
Crack Seal	Maintenance	80 to 85 Condition (Repeating)
Micro-Surfacing (Double)	Maintenance	70 to 80 Condition (Repeating)
Resurfacing (#1)	Rehabilitation	55 to 70 Condition
Rehabilitation [1]	Rehabilitation	35 to 55 Condition
Resurfacing (#2)	Rehabilitation	55 to 70 Condition
Full Reconstruction	Replacement	35 to 35 Condition After Rehabilitation



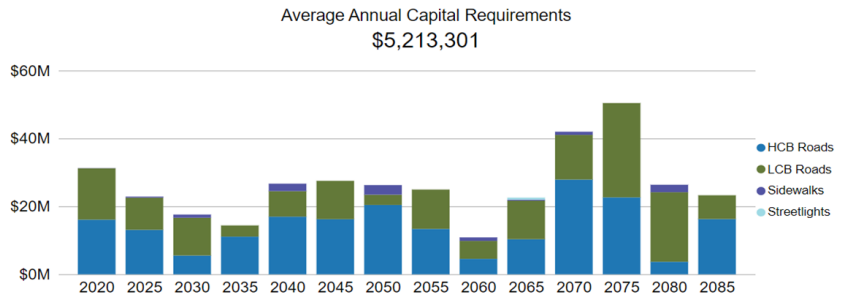
Paved Roads (LCB Roads)		
Event Name	**Event Class**	**Event Trigger**
Padding and Microsurfacing (#1)	Rehabilitation	51 to 80 Condition
Re-Profile (#1)	Rehabilitation	31 to 50 Condition
Padding and Microsurfacing (#2)	Rehabilitation	51 to 80 Condition
Re-Profile (#2)	Rehabilitation	31 to 50 Condition
Padding and Microsurfacing (#3)	Rehabilitation	51 to 80 Condition
Re-Profile (#3)	Rehabilitation	31 to 50 Condition
Padding and Microsurfacing (#4)	Rehabilitation	51 to 80 Condition
Padding and Microsurfacing (#5)	Rehabilitation	51 to 80 Condition
Full Reconstruction	Replacement	30 to 30 Condition



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 graph forecasts capital requirements for the road network.

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 65 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins.

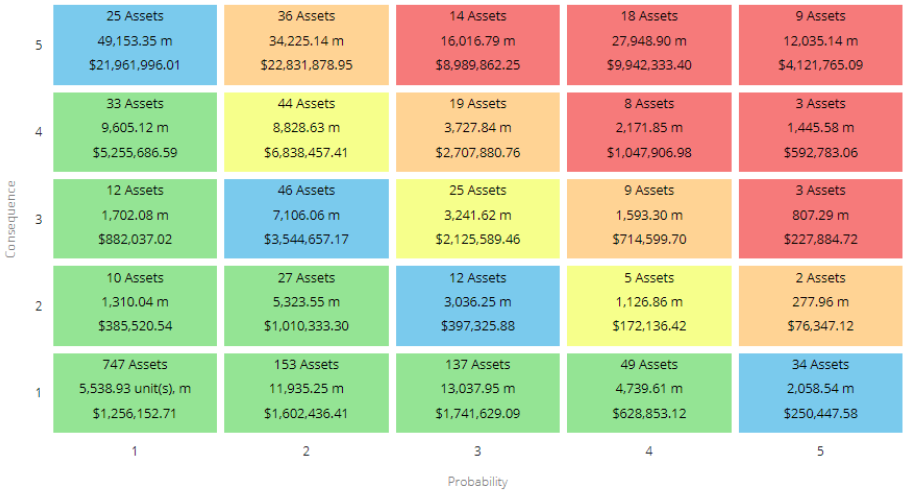


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.1.5 Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.



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

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

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

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

Risks to Current Asset Management Strategies

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

Climate Change & Extreme Events

The trend of climate change-induced extreme precipitation events is projected to continue. High frequency and intensity of precipitation can cause flooding in poor drainage areas. This also results in accelerating the deterioration of road surfaces and weakening the foundation. An increase in cracking, sinkholes and other damages in freeze/thaw cycles are anticipated because of heavy precipitation. As a result, higher maintenance and rehabilitation requirements are expected to maintain the same level of service. To improve asset resiliency, staff should identify the critical areas and improve drainage through enhanced lifecycle strategies.

Capital Funding Strategies

Major capital rehabilitation projects for bridges are dependant on the availability of grant funding opportunities and taxes. Current level of financial investment can neither sufficiently support current lifecycle strategies nor address maintenance and capital rehabilitation requirements proactively. When grants are not available, roadway projects may be deferred. An annual capital funding strategy could reduce dependency on grant funding and help prevent deferral of capital works.

Growth & Bylaws, Policies

As the population continues to grow, the Town must prioritize expanding its capacity to serve a larger population. Population and employment growth will increase the demand on transportation services and potentially decrease the lifecycle of certain assets. On top of that, the town has increased legislated minimum requirement for sidewalks. In this situation, the demand of staff resources and financial requirement will increase and may impose a risk of not able to maintain current levels of service. An enhanced proactive strategy can help to extend the service life of structures with lower funding requirement and minimize the deferral of capital works.

4.1.6 Levels of Service

The following tables identify the Town'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 Town 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 (2021)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	See Appendix B
Quality	Description or images that illustrate the different levels of road class pavement condition	As part of the Road Needs Assessments completed by the Town on regular basis. Every road section received a pavement condition index, rating the condition of the surface of the road on a scale of 0-100. Different condition ranges can indicate the following: • (0-50) Road surface exhibits moderate to significant deterioration and requires reconstruction or rehabilitation immediately • (50-75) Road surface is in fair condition. Resurfacing will be required in the next 1-5 years. • (75-85) Road surface is in good condition. Resurfacing will be required in the next 6-10 years • (85-100) Road surface condition is very good. No road needs have been identified in the next 10 years

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 (2021)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	1.235
Quality	Average pavement condition index for paved roads in the municipality	HCB: 63% LCB: 32%
	% of sidewalks inspected	100%
	% of road network inspected	99%
Performance	Capital reinvestment rate	1.16%

4.1.7 Recommendations

Asset Inventory

- Review roads and supporting infrastructure inventory to determine whether all municipal assets within these asset segments have been accounted for.
- Adopt a review cycle to update the replacement costs with recent market pricing.

Condition Assessment Strategies

- Maintain the current assessment frequency and attributes such as the Pavement Condition Index and consider collecting more attributes such as Riding Comfort, Utilization Rates, and Drainage Adequacy etc.

Lifecycle Management Strategies

- Implement the identified lifecycle management strategies for HCB, and LCB roads to realize potential cost avoidance and maintain a high quality of road pavement condition.
- Evaluate the efficacy of the Town's lifecycle management strategies at regular intervals to determine the impact cost, condition and risk. This could be done by updating the condition assessment data whenever new data becomes available and rerunning the capital projections and risk reports.

Risk Management Strategies

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

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 Town 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

The Municipality's bridges and culverts comprises of 26 structures that have a span of 3 meters or more and are therefore categorized as a bridge or a structural culvert asset.

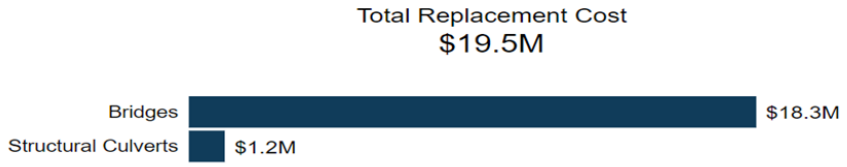
The Department of Public Works is responsible for the maintenance of all bridges and culverts located across municipal roads with the goal of keeping structures in an adequate state of repair and minimizing service disruptions.

McKnight's Sideroad Bridge has been removed and the Oliver's Sideroad Bridge is currently under reconstruction.

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 Town's bridges and culverts inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Bridges	24	User-Defined	$18,330,000
Structural Culverts	2	User-Defined	$1,160,000
			$19,490,000



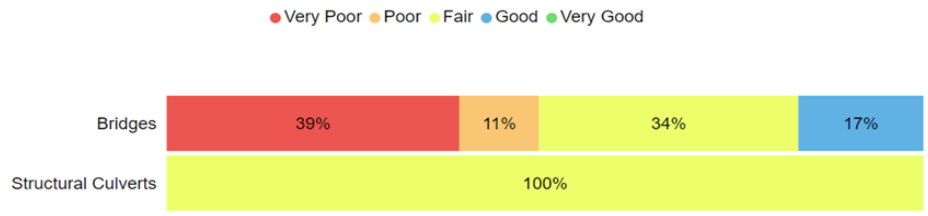
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

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	35%	Poor	100% Assessed
Structural Culverts	53%	Fair	100% Assessed
	36%	**Poor**	**100% Assessed**

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



To ensure that the Town's continues to provide an acceptable level of service, the Town 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 and culverts.

Current Approach to Condition Assessment

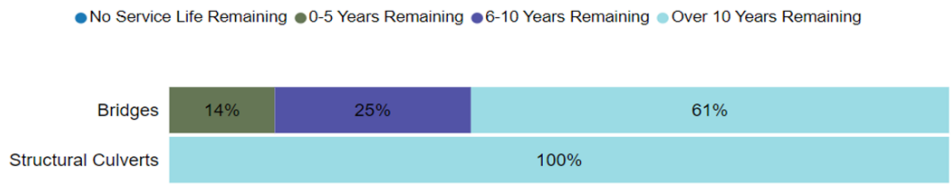
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Town's current approach:

- 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 and 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	45-50 Years	32.5	17.0
Structural Culverts	50 Years	23.5	26.5
		31.8	**17.8**



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.

4.2.4 Lifecycle Management Strategy

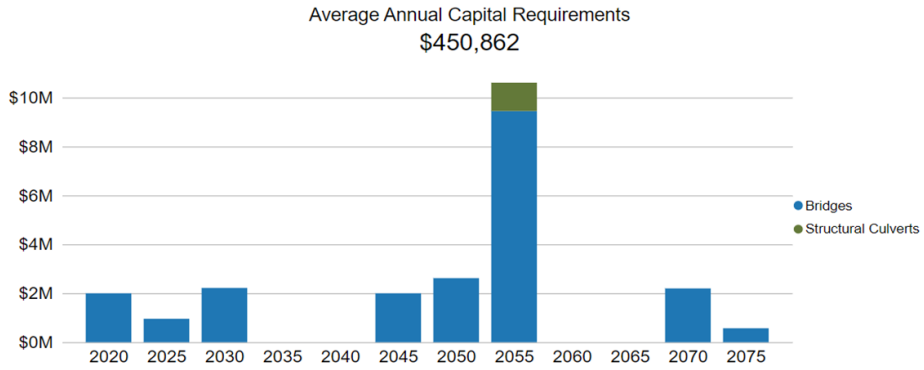
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Operations and Maintenance	Bridge deck cleaning, expansion joint cleaning, pressure flushing and deck washing are planned to be completed annually. However, these activities may be subject to budget constraints.
	Bridge Sealing is planned to be completed for 3 bridges per year.
Rehabilitation and Replacement	All lifecycle activities are driven by the results of mandated structural inspections competed according to the Ontario Structure Inspection Manual (OSIM). However, these activities may be subject to budget constraints.
Inspection	The most recent inspection report was completed in 2020.

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 55 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins.



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

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.

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

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

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

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

Risks to Current Asset Management Strategies

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

Capital Funding Strategies

Major capital rehabilitation projects for bridges and culverts are entirely dependant on the availability of grant funding opportunities. When grants are not available, bridge rehabilitation projects may be deferred. An annual capital funding strategy reduce dependency on grant funding and help prevent deferral or capital works.

Infrastructure Design & Growth

As the population continues to grow, the Town must prioritize expanding its capacity to serve a larger population. Population and employment growth will increase the demand on transportation services and potentially decrease the lifecycle of certain assets. Currently some bridges have load restriction due to the past infrastructure design and not able to provide full capacity. Developing a comprehensive long-term capital plan with considerations for growth and proactive lifecycle strategy can be helpful to minimize dependency on grant funding and increase the capacity.

4.2.6 Levels of Service

The following tables identify the Town's current level of service for bridges and culverts. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Town 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 Bridges and culverts.

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description of the traffic that is supported by municipal bridges (e.g. heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Bridges and structural culverts are a key component of the municipal transportation network. Only three of the Town's structures have loading or dimensional restrictions meaning that most types of vehicles, including heavy transport, motor vehicles, emergency vehicles and cyclists can cross them without restriction.
Safe & Regulatory	Description of the OSIM inspection process	External contractor completes OSIM inspections every 2 years providing detailed condition information for the Town's bridges and structural culverts.
Quality	Description or images of the condition of bridges and culverts and how this would affect use of the bridges and culverts	See Appendix B

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of bridges in the Town with loading or dimensional restrictions	11.5%
Quality	% of bridges inspected every two years	100%
	Average bridge condition index value for bridges in the Town	35%[1]
	Average bridge condition index value for structural culverts in the Town	53%
Performance	Capital re-investment rate	0%

[1] This condition score includes the condition scores for two bridges that are currently under replacement/rehabilitation. Once these activities are completed, this will drive the average condition score up.

4.2.7 Recommendations

Data Review/Validation

- 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 years.

Lifecycle Management Strategies

- This AMP includes capital costs associated with the reconstruction and rehabilitation of bridges and culverts. The Town should continue to identify projected capital rehabilitation and renewal costs for bridges and culverts while integrating the findings of the OSIM inspections into long-term planning.

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 or data availability.

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 Town 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.

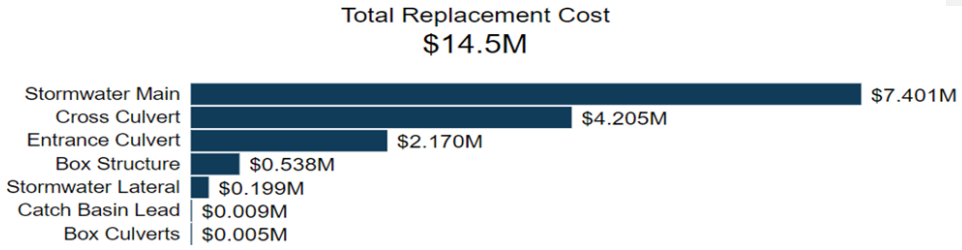
4.3 Storm Water Network

The Town is responsible for owning and maintaining a Storm Water Network composed of culverts, storm mains, catch basins other supporting infrastructure.

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 Town's Storm Water Network inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Box Culverts	8	User-Defined	$4,850
Box Structure	409.802 m	User-Defined	$537,987
Catch Basin Lead	19.570 m	User-Defined	$8,596
Cross Culvert	4,962.916 m	User-Defined	$4,205,351
Entrance Culvert	8240.384 m	User-Defined	$2,169,853
Stormwater Lateral	347.407 m	User-Defined	$198,521
Stormwater Main	12783.611 m	User-Defined	$7,401,256
			$14,526,414



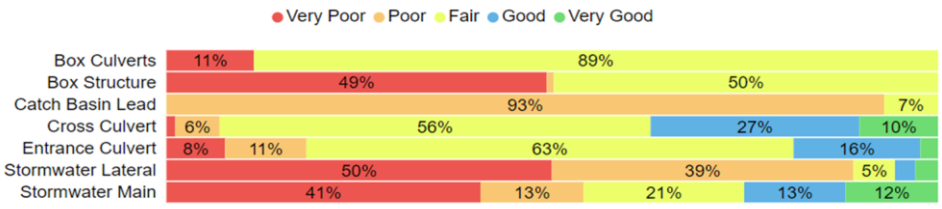
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

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
Box Culverts	37%	Poor	100% Assessed
Box Structure	28%	Poor	Age-Based
Catch Basin Lead	27%	Poor	7% Assessed
Cross Culvert	56%	Fair	35% Assessed
Entrance Culvert	47%	Fair	59% Assessed
Stormwater Lateral	20%	Poor	11% Assessed
Stormwater Main	38%	Poor	6% Assessed
	44%	**Fair**	**22% Assessed**

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



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

Current Approach to Condition Assessment

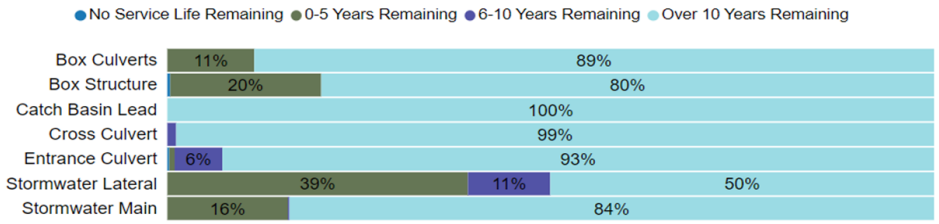
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Town's current approach:

- There are no formal condition assessment programs in place for the storm network
- The town is planning to establish a CCTV assessment program with a regular cycle

4.3.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Storm Water 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)
Box Culverts	70 Years	44.2	25.8
Box Structure	50-70 Years	52.2	11.1
Catch Basin Lead	50 Years	33.5	16.5
Cross Culvert	50-80 Years	33.1	38.8
Entrance Culvert	50-80 Years	37.8	32.5
Stormwater Lateral	50-80 Years	36.1	18.5
Stormwater Main	70-80 Years	45.9	27.2
		39.1	**32.1**



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.

4.3.4 Lifecycle Management Strategy

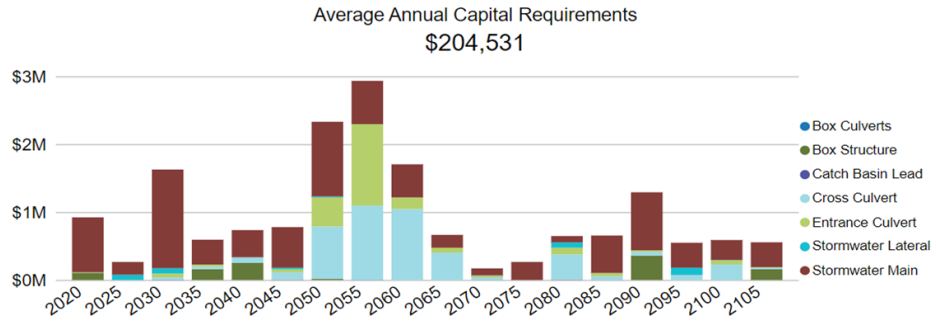
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Catch basin and storm main flushing occur reactively on an as-needed basis.
	The town is planning to estabilish a flushing program with regular cycles for catch basin and storm mains.
Rehabiltion/ Replacement	Currently no rehabilitation program or renewal plan is in place for storm network.
	When reaching their end-of-life, watermain and catch basins are replaced with the roadway projects.

Forecasted Capital Requirements

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

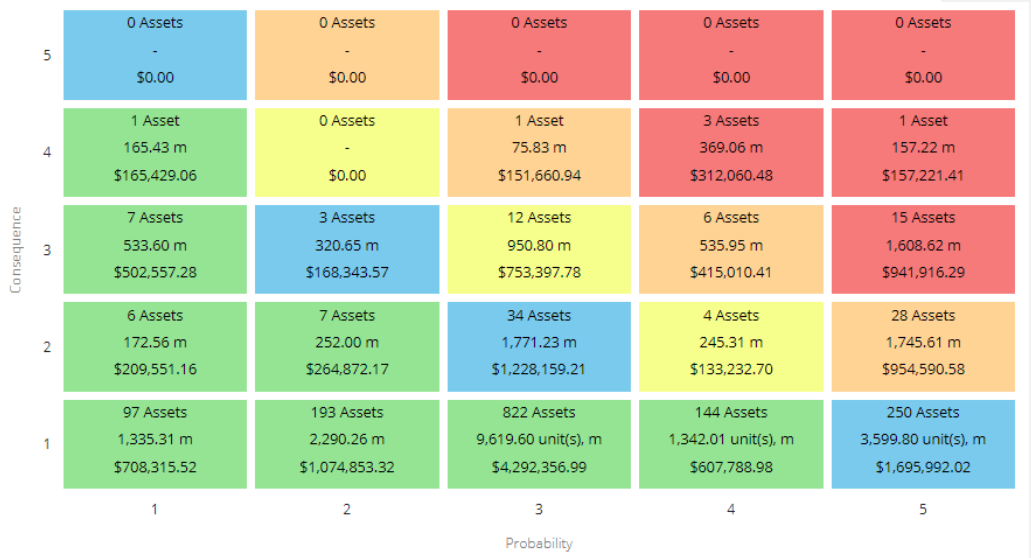


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.3.5 Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.



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

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

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

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

Risks to Current Asset Management Strategies

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

Infrastructure Design & Extreme Weather Events

Across the municipality, a significant number of storm pipes are experiencing surcharging during raining seasons. This network was designed with standards that do not meet the needs of current population. As the trend of climate change-induced extreme precipitation events is projected to continue, the capacity of the storm network is not enough to carry the current precipitation amount. Current condition assessment strategies and lifecycle strategies for the stormwater network are reactive. Incorporating a monitoring and maintenance program for all stormwater infrastructure can further support infrastructure resiliency and help mitigate the risk.

Aging Infrastructure & Capital Funding Strategies

Many storm sewer assets in the town are reaching the end of their useful life or having already exceeded their useful life. In order to provide the desired levels of service, more maintenance and rehabilitation activities are required for these assets before full replacement. Major capital rehabilitation projects for the Storm Water Network will be heavily reliant on the availability of grant funding opportunities. When grants are not available, Storm Water Network rehabilitation projects may be deferred. An enhanced proactive strategy can help to extend the service life of assets with lower funding requirement. An annual capital funding strategy reduces dependency on grant funding and help prevent deferral or capital works.

4.3.6 Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal storm sewer 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 Storm Water Network.

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of properties in municipality resilient to a 100-year storm	TBD[2]
	% of the municipal storm sewer management system resilient to a 5-year storm	TBD[3]
Quality	% of the stormwater system that is in good or very good condition	73%
	% of the stormwater system that is in poor or very poor condition	24%
	% of stormwater mains flushed yearly	20%
Performance	Capital reinvestment rate	0.26%

[2] Staff will be working on collecting this data as it is not currently available.
[3] Staff will be working on collecting this data as it is not currently available.

4.3.7 Recommendations

Asset Inventory

- The Town's Storm Water Network inventory is still at a basic level of maturity. Staff should focus on verifying the accuracy of current data attributes, including type of assets, material, length, and diameter etc. The development of a comprehensive inventory of the Storm Water Network should be priority.

Condition Assessment Strategies

- The development of a comprehensive inventory should be accompanied by a system-wide assessment of the condition of all assets in the Storm Water Network through CCTV inspections.

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 or data availability.

Lifecycle Management Strategies

- Document and review lifecycle management strategies for the Storm Water Network 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 the Town 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 Facilities & Buildings

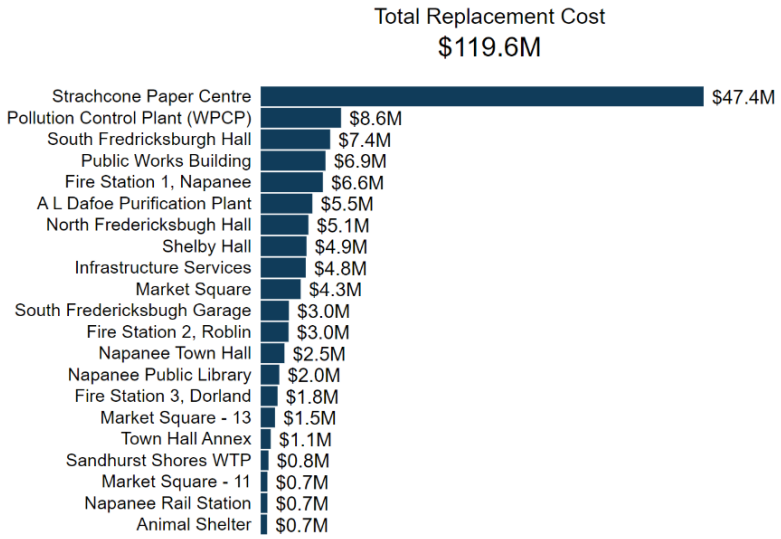
The Town of Greater Napanee owns and maintains several facilities and recreation centres that provide key services to the community. These include:

- municipal offices
- public libraries
- fire halls and associated offices and facilities
- public works garages and storage sheds
- plants

4.4.1 Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
A L Dafoe Purification Plant	1 (121)	User-Defined	$5,534,900
Animal Shelter	1(70)	User-Defined	$688,900
Fire Station 1, Napanee	1(126)	User-Defined	$6,649,500
Fire Station 2, Roblin	1 (85)	User-Defined	$2,980,700
Fire Station 3, Dorland	1 (101)	User-Defined	$1,799,000
Infrastructure Services	1 (107)	User-Defined	$4,824,000
Market Square	1 (115)	User-Defined	$4,276,300
Market Square - 11	1 (62)	User-Defined	$721,600
Market Square - 13	1 (94)	User-Defined	$1,531,300
Napanee Public Library	1 (96)	User-Defined	$1,982,600
Napanee Rail Station	1 (66)	User-Defined	$720,500
Napanee Town Hall	1 (112)	User-Defined	$2,536,600
North Fredericksbugh Hall	1 (183)	User-Defined	$5,099,700
Pollution Control Plant (WPCP)	1 (330)	User-Defined	$8,598,600
Public Works Building	1 (149)	User-Defined	$6,938,500
Sandhurst Shores WTP	1 (48)	User-Defined	$827,100
Shelby Hall	1 (106)	User-Defined	$4,897,800
South Fredericksbugh Garage	1 (87)	User-Defined	$3,026,000
South Fredricksburgh Hall	1 (203)	User-Defined	$7,433,400
Strachcone Paper Centre	1 (166)	User-Defined	$47,408,200
Town Hall Annex	1 (77)	User-Defined	$1,076,000
			$61,179,783



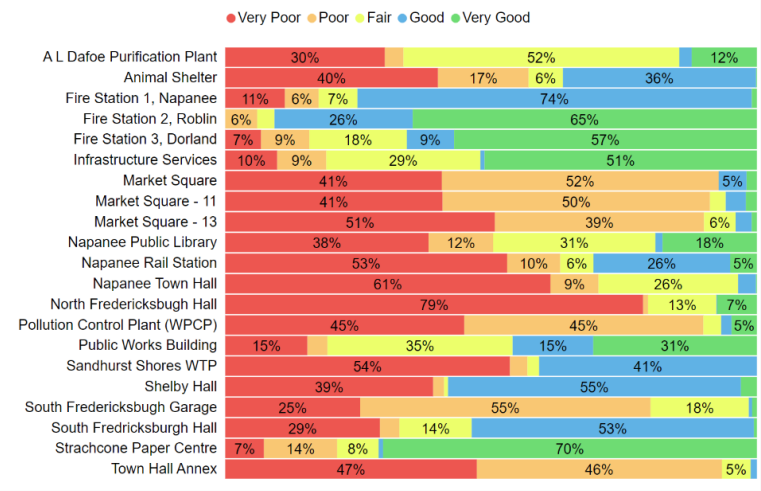
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

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
A L Dafoe Purification Plant	35%	Poor	100% Assessed
Animal Shelter	39%	Poor	100% Assessed
Fire Station 1, Napanee	59%	Fair	100% Assessed
Fire Station 2, Roblin	83%	Very Good	100% Assessed
Fire Station 3, Dorland	68%	Good	100% Assessed
Infrastructure Services	60%	Good	100% Assessed
Market Square	26%	Poor	100% Assessed
Market Square - 11	27%	Poor	100% Assessed
Market Square - 13	22%	Poor	100% Assessed
Napanee Public Library	38%	Poor	100% Assessed
Napanee Rail Station	30%	Poor	100% Assessed
Napanee Town Hall	21%	Poor	100% Assessed
North Fredericksbugh Hall	15%	Very Poor	100% Assessed
Pollution Control Plant (WPCP)	21%	Poor	100% Assessed
Public Works Building	56%	Fair	100% Assessed
Sandhurst Shores WTP	36%	Poor	100% Assessed
Shelby Hall	43%	Fair	100% Assessed
South Fredericksbugh Garage	32%	Poor	100% Assessed
South Fredricksburgh Hall	43%	Fair	100% Assessed
Strachcone Paper Centre	66%	Good	100% Assessed
Town Hall Annex	17%	Very Poor	100% Assessed
	51%	**Fair**	**100% Assessed**

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



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

Current Approach to Condition Assessment

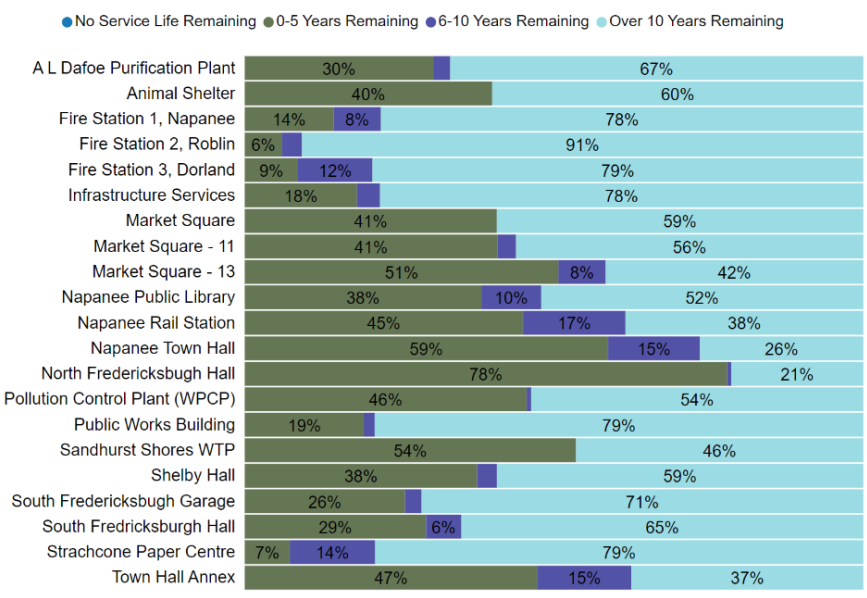
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Town's current approach:

- A building assessment by external contractors was completed in 2022 for all buildings and facilities
- Health and safety inspection by internal staff is conducted on a bi-monthly basis
- The town is planning to complete the building assessment with FCI every 5 years

4.4.3 Estimated Useful Life & Average Age

The Estimated Useful Life for buildings and 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)
A L Dafoe Purification Plant	11-101 Years	29.3	17.9
Animal Shelter	5-101 Years	25.5	8.4
Fire Station 1, Napanee	5-101 Years	167.0	17.8
Fire Station 2, Roblin	11-101 Years	6.8	21.3
Fire Station 3, Dorland	5-101 Years	13.0	19.2
Infrastructure Services	5-101 Years	17.8	12.6
Market Square	5-101 Years	49.9	5.8
Market Square - 11	11-101 Years	26.8	6.3
Market Square - 13	7-101 Years	34.1	6.8
Napanee Public Library	11-101 Years	19.2	13.0
Napanee Rail Station	7-101 Years	29.1	9.8
Napanee Town Hall	11-101 Years	30.8	6.8
North Fredericksbugh Hall	7-101 Years	32.7	8.1
Pollution Control Plant (WPCP)	5-101 Years	46.4	10.2
Public Works Building	7-101 Years	24.3	15.8
Sandhurst Shores WTP	11-101 Years	26.1	9.9
Shelby Hall	5-101 Years	26.9	6.7
South Fredericksbugh Garage	5-101 Years	42.8	8.0
South Fredricksburgh Hall	5-101 Years	25.3	8.3
Strachcone Paper Centre	11-101 Years	16.8	11.7
Town Hall Annex	7-101 Years	25.3	7.6
		28.6	**10.8**



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.

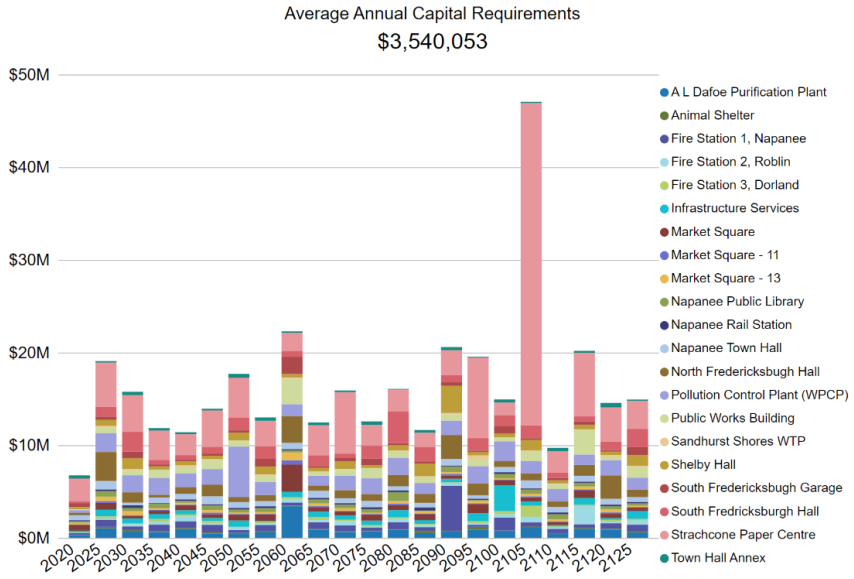
4.4.4 Lifecycle Management Strategy

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 Town's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	General maintenance and cleaning are performed daily.
	Quartly routine maintenance by thrid-party contractor for HVAC in main building, and semi-annually for HVAC in other buildings.
	Maintenance of refrigeration in the Arena is performaed regularly.
Rehabilitation / Replacement	Minor buildings, plubing and electrical deficiencies are repaired by internal staff while major rehabilitation are conducted by external contractors.
	Currently no preventative maintenance and rehabilitation schedule is in place for buildings and facilities.
	The Replacement and major rehabilitation of the buildings and facilities are following the buildings assessment by the external contractors or the expertise of the internal staff.

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 105 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins.

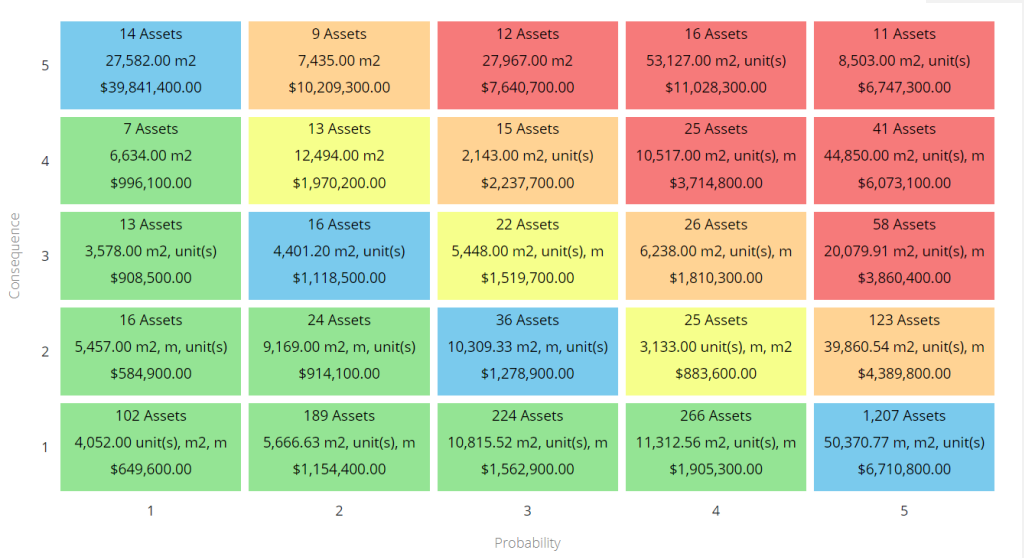


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.4.5 Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.



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

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

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

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

Risks to Current Asset Management Strategies

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

Aging Infrastructure & Capital Funding Strategies

Many building and facility assets in the town are reaching the end of their useful life. Several buildings require replacements of major components in the coming years. Major capital rehabilitation projects for buildings and facilities will be heavily reliant on the availability of grant funding opportunities. Additionally, many heritage buildings require more maintenance because they cannot improve their efficiency due to the material limitation by the heritage requirement. The current level of investment in facilities and buildings is not sufficient to support the recommended activities of current lifecycle strategy. An enhanced proactive strategy can help to extend the service life of assets with lower funding requirement. An annual capital funding strategy reduces dependency on grant funding and help prevent deferral or capital works.

Staff Capacity & Growth

As the population continues to grow, the Town must prioritize expanding its capacity to serve a larger population. Population and employment growth increases the demand, and the community expectation becomes higher on buildings and facilities. Currently, facilities staff are not able to complete all required activities and inspections due to limited staff capacity. Developing a comprehensive long-term capital plan with considerations for growth and proactive lifecycle strategy can be helpful to minimize dependency on grant funding and increase the capacity.

Infrastructure Design & Extreme Weather Events

Past designs of municipal facilities have been inadequate, which has impacted the staff's ability to effectively manage the facilities. This has impacted the staff's ability to effectively manage the facilities. The design of the buildings also did not consider weather impacts, resulting in municipal facilities that are not built to withstand the weather experienced in the area, leading to wind damage and ice build up on roofs. Incorporating a monitoring and maintenance program for all stormwater infrastructure can further support infrastructure resiliency and help mitigate the risk.

4.4.6 Levels of Service

The following tables identify the Town's current level of service for the facilities and buildings. These metrics include the technical and community level of service metrics that the Town 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 facilities and buildings.

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description of the current condition of municipal facilities and the plans that are in place to maintain or improve the provided level of service	A building condition assessment by external contractors was completed in 2022 for all buildings and facilities. This process is planned to take place every 5 years in order to update the condition and Facility Condition Index (FCI) values. Furthermore, health and safety inspection by internal staff is conducted on a bi-monthly basis

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of facilities that are in good or very good condition	49%
	% of facilities that are in poor or very poor condition	38%
	Average Risk Rating associated to buildings	Low
Performance	Capital reinvestment rate	0%

4.4.7 Recommendations

Asset Inventory

- The Town's asset inventory is componentized using Uniformat II. Staff should work towards maintaining the accuracy of this database by capturing the progress of the capital projects recommended by the building condition assessments on a regular basis.

Replacement Costs

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

Condition Assessment Strategies

- The Town should continue to implement and expand the scope of regular condition assessments for all facilities to better inform 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 or data availability.

Levels of Service

- Continue measuring current levels of service in accordance with the metrics that the Town 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.

4.5 Fleet

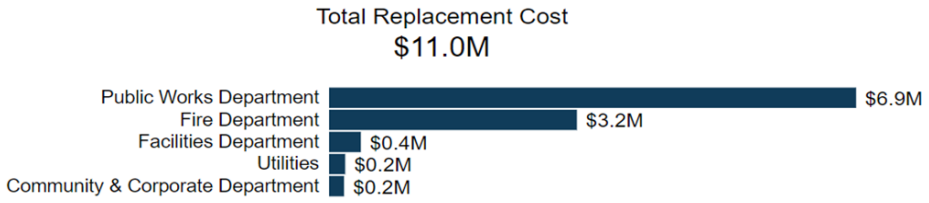
Vehicles allow staff to efficiently deliver municipal services and personnel. Municipal fleet is used to support several service areas, including:

- Community & Corporate services
- Facilities services
- Fire services
- Public Works services
- Utilities services

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 Town's fleet.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Community & Corporate Department	5	User-Defined	$195,796
Facilities Department	7	User-Defined	$415,499
Fire Department	8	User-Defined	$3,240,894
Public Works Department	40	User-Defined	$6,891,782
Utilities	4	User-Defined	$210,802
			$10,954,773



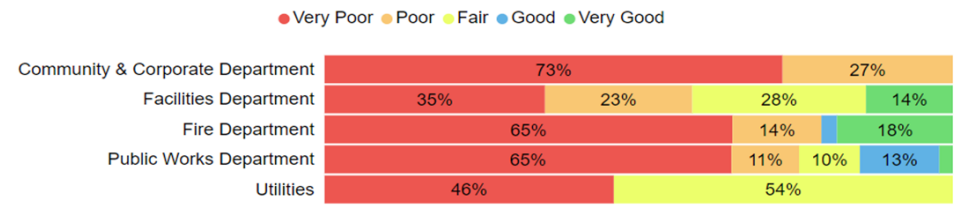
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

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
Community & Corporate Department	6%	Very Poor	Age-Based
Facilities Department	35%	Poor	Age-Based
Fire Department	30%	Poor	Age-Based
Public Works Department	19%	Very Poor	Age-Based
Utilities	32%	Poor	Age-Based
	23%	**Poor**	**Age-Based**

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



To ensure that the Town's Vehicles continue to provide an acceptable level of service, the Town 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

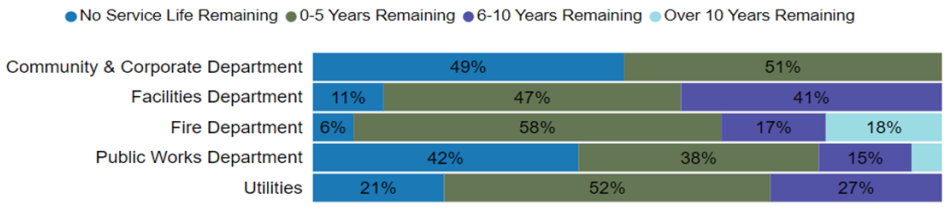
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Town's current approach:

- Staff complete regular visual inspections of vehicles using a template for post and pre trip inspections to ensure they are in state of adequate repair
- Detailed inspections are performed twice a year with tire rotation while the results are not documented

4.5.3 Estimated Useful Life & Average Age

The Estimated Useful Life for fleet 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 & Corporate Department	9 Years	10.1	-1.2
Facilities Department	9-12 Years	7.0	3.6
Fire Department	9-20 Years	10.5	4.0
Public Works Department	0.6-14 Years	9.0	0.5
Utilities	11 Years	8.2	2.8
		9.0	**1.2**



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.

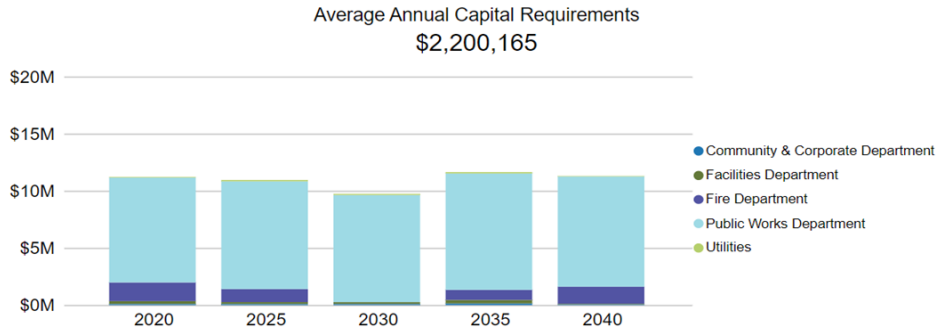
4.5.4 Lifecycle Management Strategy

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 the Town's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance / Rehabilitation	Oil changes and tire rotations are scheduled to perform based on the milage.
Replacement	Vehicle replacements are based on the condition, TCA policy and other regulatory standards.
	The town has estabalished a 10 year plan for vehicle renewal.
	Some vehicles in good condition may be replaced until they reach their end-of-life even if they pass the estimated useful life.

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 20 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins.



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

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.

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

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

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

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

Risks to Current Asset Management Strategies

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

Staff Capacity & Growth
As the population continues to grow, the Town must prioritize expanding its capacity to serve a larger population. Population and employment growth increases the demand on transportation services. Therefore, it requires more fleet to provide the desired levels of service. Currently, municipal staff are not able to complete all required activities and inspections due to limited staff capacity. Developing a comprehensive long-term capital plan with considerations for growth and proactive lifecycle strategy can be helpful to minimize dependency on grant funding and increase the capacity.

Regulatory Requirements & Funding
Changes in legislative and regulatory causes the increase in costs for insurance. This may cause the deferral for vehicles renewal or vehicles purchase. An enhanced proactive strategy can help to extend the service life of assets with lower funding requirement. An annual funding strategy reduces dependency on grant funding.

4.5.6 Levels of Service

The following tables identify the Town's current level of service for the vehicles. These metrics include the technical and community level of service metrics that the Town 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 vehicles.

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description of the Fleet Management and Safety Program	Commercial vehicles meet minimum standards and undergo an inspection regular inspection. Staff have developed a 10-year asset replacement plan for vehicles

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of vehicles where asset age exceeds useful life	29%
	% of vehicles in good or very good condition	16%
	% of vehicles in poor of very poor condition	75%
	Average Risk Rating associated to vehicles	Very High
Performance	Capital reinvestment rate	0%

4.5.7 Recommendations

Replacement Costs

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

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk vehicles.
- 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 or data availability.

Levels of Service

- Continue measuring current levels of service in accordance with the metrics that the Town 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.

4.6 Machinery & Equipment

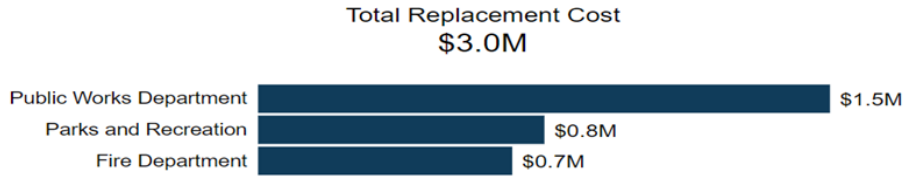
In order to maintain the high quality of public infrastructure and support the delivery of core services, Town staff own and employ various types of machinery and equipment. This includes:

- Parks and recreation related equipment
- Fire equipment to support the delivery of emergency services
- Public works equipment

4.6.1 Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Fire Department	649	User-Defined	$676,255
Parks and Recreation	27	User-Defined	$761,800
Public Works Department	54	User-Defined	$1,521,700
			$2,959,755



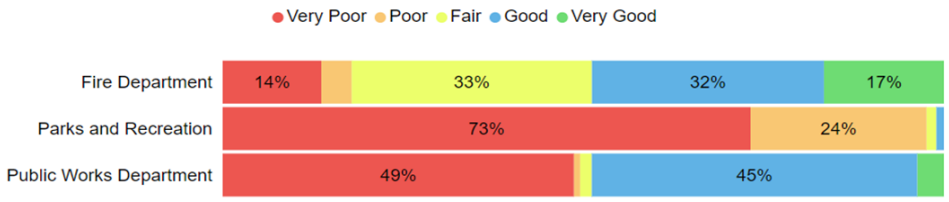
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

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
Fire Department	50%	Fair	Age-Based
Parks and Recreation	11%	Very Poor	100% Assessed
Public Works Department	38%	Poor	100% Assessed
	34%	**Poor**	**77% Assessed**

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



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

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 Town's current approach:

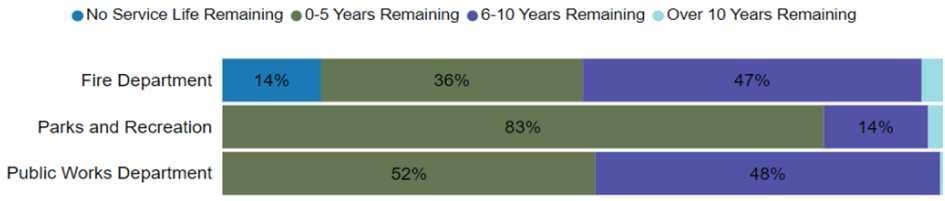
- Visual inspections are preformed by internal staff before using the assets while the results are not documented
- Detailed inspections by licensed mechanicians are completed at least once a year while the results are not documented

- The town is planning to have a more formalized inspection of machinery & equipment in the future

4.6.3 Estimated Useful Life & Average Age

The Estimated Useful Life for machinery and 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 Department	5-20 Years	5.2	5.0
Parks and Recreation	5-25 Years	16.9	2.6
Public Works Department	1-500 Years	6.4	2.8
		8.2	**3.5**



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.

4.6.4 Lifecycle Management Strategy

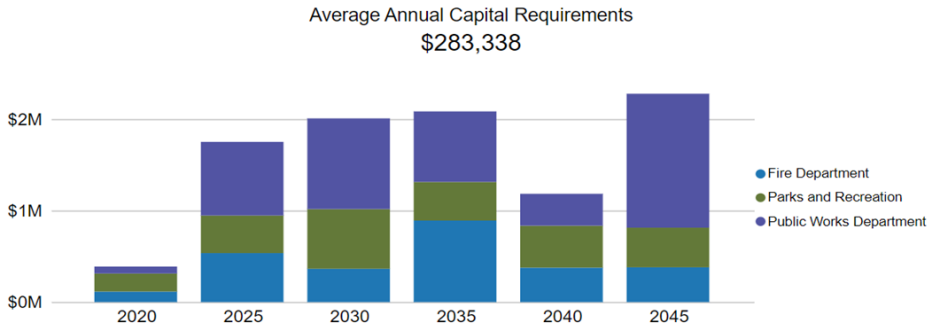
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance/ Rehabilitation	Regular Maintenance or rehabilitation for machinery and equipment are conducted by the in-house mechanicians.
Replacement	The replacement of machinery and equipment depends on its expected useful life, condition and deficiencies identified by mechanicians.
	The town has established a 10-year laptop, cellphone, and service replacement plan.
	Some assets in good condition may not be replaced when they reach their end-of-life even if they pass the estimated useful life.

Forecasted Capital Requirements

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



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

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.

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

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

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

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

Risks to Current Asset Management Strategies

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

Growth & Community Expectations

As the population continues to grow, the Town must prioritize expanding its capacity to serve a larger population. Population and employment growth increases the demand on machinery and equipment. Currently, municipal staff are not able to complete all required activities and inspections due to lack of proper plan for staff utilization. Developing a comprehensive long-term capital plan with considerations for growth and proactive lifecycle strategy can be helpful to minimize dependency on grant funding and improve the efficiency.

Asset Data & Lifecycle Management Strategies

There is a lack of confidence in the available inventory data for the Sanitary Network. Staff plan to prioritize data refinement efforts to increase confidence in the accuracy and reliability of asset data and information. Once completed there will be greater confidence in the development of data-driven strategies to address infrastructure needs.

4.6.6 Levels of Service

The following tables identify the Town's current level of service for the machinery and equipment. These metrics include the technical and community level of service metrics that the Town 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 machinery and equipment.

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description of the lifecycle activities (maintenance, rehabilitation and replacement) performed on machinery and equipment assets	Some assets are run to failure. Furthermore, the service lives of these assets vary. Machinery and equipment are replaced on an as-needed basis.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of machinery and equipment in good or very good condition	37%
	% of machinery and equipment in poor of very poor condition	55%
	Average Risk Rating associated to machinery and equipment	Moderate
Performance	Capital reinvestment rate	9.56%[4]

[4] This is due to high investments put into buying new equipment in recent years.

4.6.7 Recommendations

Replacement Costs

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

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk equipment.
- 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 or data availability.

Levels of Service

- Continue measuring current levels of service in accordance with the metrics that the Town 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.

4.7 Parks and Land Improvements

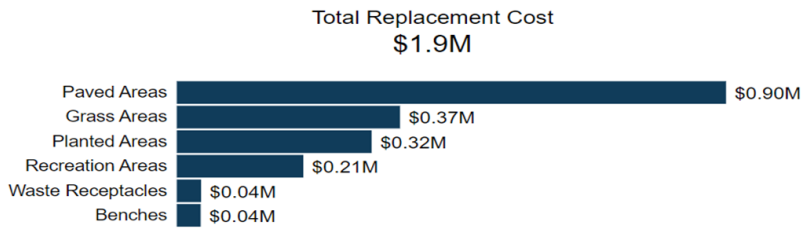
The Town of Greater Napanee owns a small number of assets that are considered Parks and Land Improvements. This category includes:

- Benches
- Grass Areas
- Paved Areas
- Planted Areas
- Recreation Areas
- Waste Receptacles

4.7.1 Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Benches	14	CPI Tables	$39,101
Grass Areas	1	CPI Tables	$365,524
Paved Areas	11	CPI Tables	$899,325
Planted Areas	2	CPI Tables	$319,034
Recreation Areas	5	91% CPI Tables 9% User-Defined	$207,217
Waste Receptacles	25	CPI Tables	$39,767
			$1,869,968



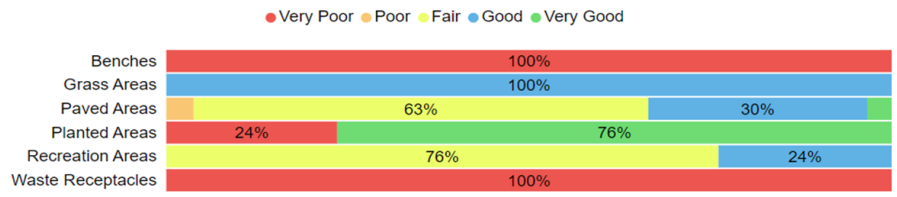
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

4.7.2 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
Benches	0%	Very Poor	Age-Based
Grass Areas	75%	Good	Age-Based
Paved Areas	61%	Good	Age-Based
Planted Areas	68%	Good	Age-Based
Recreation Areas	53%	Fair	Age-Based
Waste Receptacles	4%	Very Poor	Age-Based
	61%	**Good**	**Age-Based**

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



To ensure that the Town's Parks and Land Improvements continue to provide an acceptable level of service, the Town 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 Parks and Land Improvements.

Current Approach to Condition Assessment

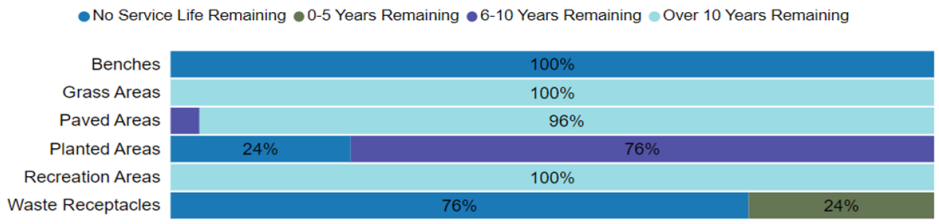
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Town's current approach:

- Regular inspection and maintenance for playground equipment are performed to abide by the regulations
- Detailed inspection of land improvement assets is completed by a third-party contractor yearly during spring season
- Visual inspections of Parks and Land Improvements assets are completed by internal staff monthly to ensure they are in state of adequate repair

4.7.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Parks and 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)
Benches	10 Years	16.1	-6.2
Grass Areas	20 Years	5.1	14.9
Paved Areas	25 Years	10.6	14.4
Planted Areas	10 Years	9.9	0.1
Recreation Areas	20-25 Years	8.8	14.1
Waste Receptacles	10 Years	12.5	-2.5
		10.8	**8.1**



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.

4.7.4 Lifecycle Management Strategy

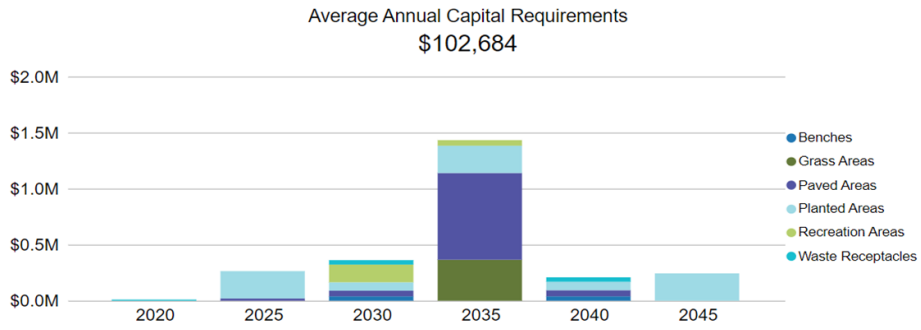
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance/ Rehabilitation	Maintanance for land improvement assets are completed in a weekly basis.
	Maintainance needs are determined based on visual inspections.
Replacement	Asset that fall under an operating budget are not replaced until they reach their end-of-life.
	Condition assessments are completed for capital assets before submitting the replacement request to council for funding.

Forecasted Capital Requirements

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



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.

4.7.5 Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.

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

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

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

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

Risks to Current Asset Management Strategies

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

Asset Data & Staff Capacity

There is a lack of confidence in the available inventory data for Parks and Land Improvements. Currently the data are not formally captured and documented. Due to staff shortages, staff are not able to complete all recommended inspections/maintenance activities or document all the asset data. Data refinement should be prioritized to increase confidence in the accuracy and reliability of asset data and information. Once completed there will be greater confidence in the development of data-driven strategies to address infrastructure needs, prioritize the inspections/maintenance activities and reduce the impacts on staff shortage.

Aging Infrastructure & Capital Funding Strategies

Playground structures require safety compliance, monitored through the CSA inspections. A concern for the Town is aging assets, it requires the town to maintain the assets more frequently to ensure the assets are meeting safety requirements. It may become more and more critical over time if playground assets are not managed proactively. The current level of investment is not sufficient to support the recommended activities of current lifecycle strategy. An enhanced proactive strategy can help to extend the service life of assets with lower funding requirement. An annual capital funding strategy reduces dependency on grant funding and help prevent deferral the capital works.

Growth & Community Expectations

As the population continues to grow, the Town need to expand its capacity to serve a larger population. The new development and new subdivisions are expecting to have more land improvement assets and more functions than currently have. Developing a comprehensive long-term capital plan with considerations for growth and proactive lifecycle strategy can be helpful to minimize dependency on grant funding and increase the capacity.

4.7.6 Levels of Service

The following tables identify the Town's current level of service for the Parks and Land Improvements. These metrics include the technical and community level of service metrics that the Town 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 Parks and Land Improvements.

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description of the lifecycle activities (maintenance, rehabilitation and replacement) performed on land improvement assets	Park operation plan identifies all assets included in parks division, recreational trailer, and parking. Standard operating procedures are developed to maintain these assets. The location of these assets is known and identified in the park's operations documents. A full inventory, including components of assets, is included in the park operations plan. There is also an inventory of cemetery assets. Legislation requirements (CSA) also help determine if asset should be replaced if they do not meet the requirements. Additionally, AODA needs are identified.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of land improvement assets in good or very good condition	51%
	% of land improvement assets in poor or very poor condition	10%
	Average Risk Rating associated to Parks and Land Improvements	High
Performance	Capital reinvestment rate	0%

4.7.7 Recommendations

Replacement Costs

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

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 or data availability.

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Town 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 $183.6 million
- 53% 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 $3.1 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

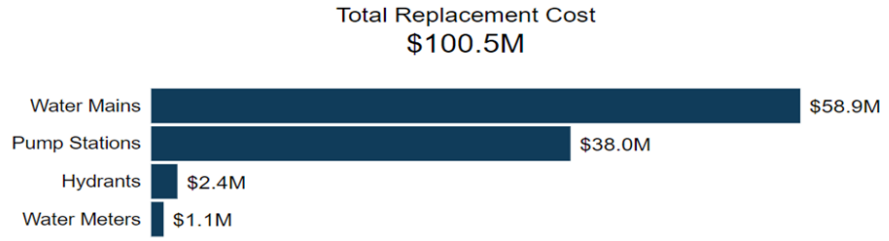
5.1 Water Network

To protect residents' health and life, the Town is responsible to provide an adequate water supply, monitor the water quality and maintain the water system. The water network system includes hydrants, water mains, pump stations, and water meters.

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 Town's Water Network inventory.

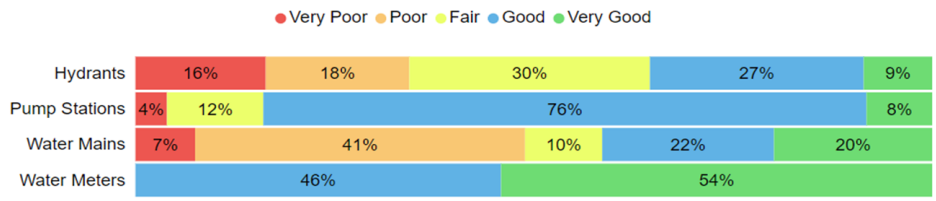
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Hydrants	477	User-Defined	$2,385,000
Pump Stations	8	User-Defined	$38,047,131
Water Mains	94,056.210 m	User-Defined	$58,898,054
Water Meters	2,071	Cost/Unit	$1,132,999
			$100,463,184



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
Hydrants	48%	Fair	100% Assessed
Pump Stations	70%	Good	Age-Based
Water Mains	52%	Fair	Age-Based
Water Meters	81%	Very Good	Age-Based
	59%	**Fair**	**Age-Based**



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

Current Approach to Condition Assessment

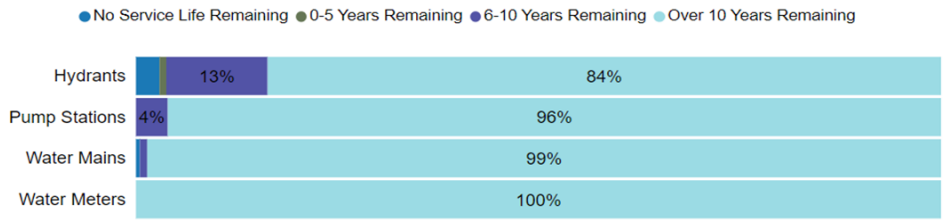
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- Fire flow testing is conducted by internal staff on an annual basis
- Flow test is conducted by internal staff on a 4-year basis
- Valve turn program is currently in place to assess hydrant regularly
- Currently no regular condition assessment in place for watermains. However, the watermain breaks are recorded in operation logbooks by maintenance staff.
- The town has completed the water and wastewater needs study recently. A master plan for water system is planning to be developed.

5.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Water 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)
Hydrants	50 Years	26.9	23.1
Pump Stations	75 Years	34.7	40.3
Water Mains	50-80 Years	31.5	43.0
Water Meters	20 Years	3.8	16.1
		20.3	**30.8**



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

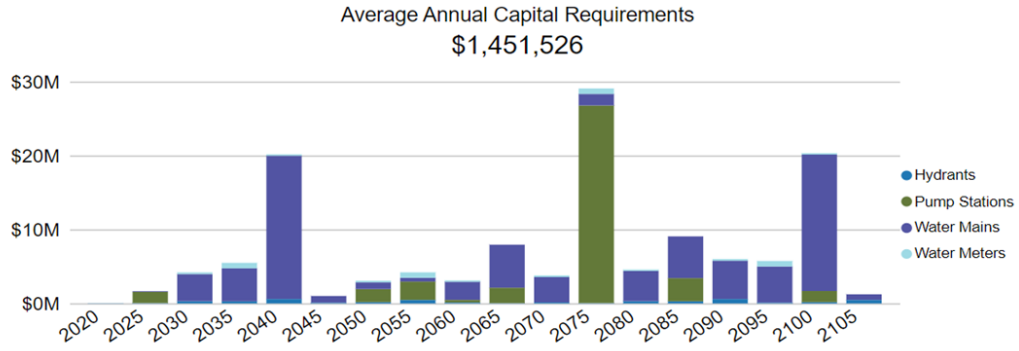
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Hydrant flushing and watermain flushing are performed regularly
Rehabilitation	Currently no rehabilitation program is in place for water network
Replacement	The replacement of watermain is completed before it reaches its end-of-life
	Water network replacement schedule is based on the break records, flow values and usually integrated with the replacement of road network

Forecasted Capital Requirements

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

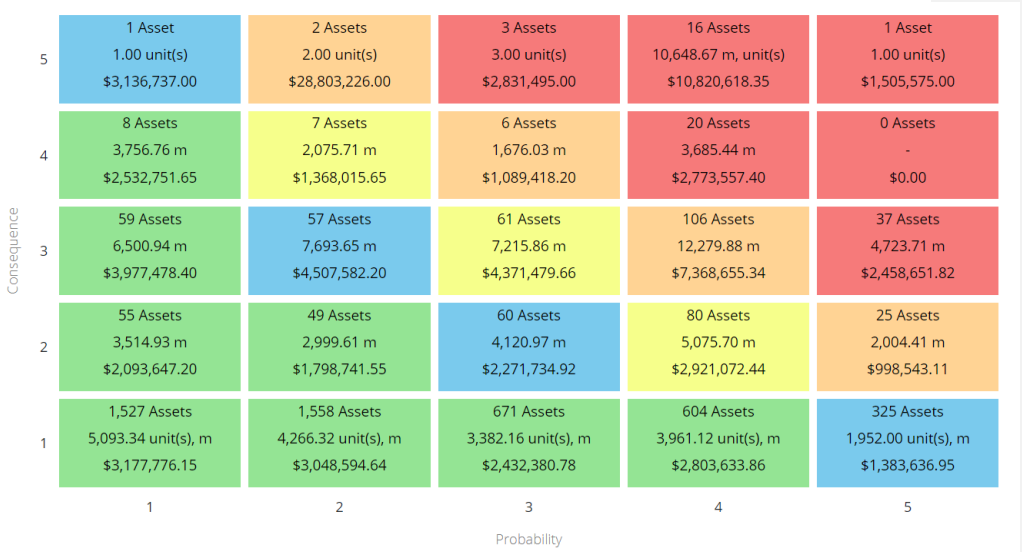


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

5.1.5 Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.



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

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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Economic)	Replacement Cost (Financial)
	Pipe Diameter (Operational)[5]

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

[5] Used for linear assets

Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies

The current lifecycle management strategy for roads is considered reactive. Replacement of watermain is dependent on break records and flow values. Some watermain renewal projects may be deferred to replace with water assets together for saving opportunities. This poses a risk of service disruption when assets failure occurs. An enhanced proactive strategy can help to extend the service life of the assets, reduce dependency on grant funding and minimize the deferral of capital works.

5.1.6 Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
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	Every property within the town service boundary and every property within Sandhurst Shores have access to fire flow. Fire flow is also available from the south limit of the service boundary to Lake Ontario along County Rd 8 (Raw water main).
Reliability	Description of boil water advisories and service interruptions	No boil water advisories have been reported in the last 22 years.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of properties connected to the municipal water system	100%[6]
	% of properties where fire flow is available	100%[7]
Reliability	# 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
	# of connection-days per year where water is not available due to water main breaks compared to the total number of properties connected to the municipal water system	0
Performance	Capital re-investment rate	0.76%

[6] Within service boundary limits, Sandhurst Shores, and along County Road 8
[7] Within service boundary limits, Sandhurst Shores, and along County Road 8

5.1.7 Recommendations

Asset Inventory

- There are a number of asset attributes that were collected by preforming a special join on GIS. Staff should engage in collecting more information, especially regarding in service dates, material types, and diameters of pipes to allow for more accurate asset-specific lifecycle planning and costing.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water network assets and start recording the condition scores in the database.

Risk Management Strategies

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

Levels of Service

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

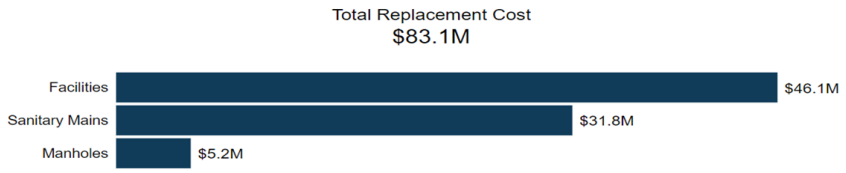
5.2 Sanitary Network

The Sanitary Network is a major infrastructure that the Town maintains to protect residents' health and minimize environmental impacts. The sewer services are overseen by the Utilities Department. The Sanitary Network includes sanitary mains, pump stations, and manholes.

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 Town's Sanitary Network inventory.

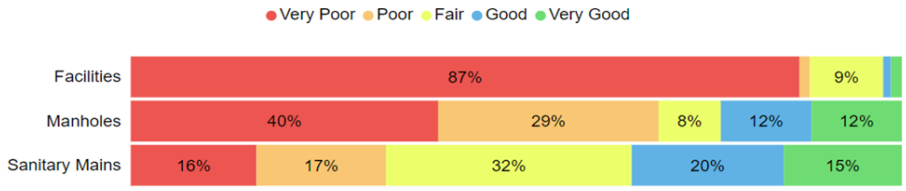
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Manholes	868	User-Defined	$5,206,500
Pump Stations	10	86% CPI Tables 14% User-Defined	$46,118,902
Sanitary Mains	63,510.556 m	User-Defined	$31,816,367
			$83,141,769



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
Manholes	33%	Poor	Age-Based
Pump Stations	14%	Very Poor	Age-Based
Sanitary Mains	48%	Fair	Age-Based
	28%	**Poor**	**Age-Based**



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

Current Approach to Condition Assessment

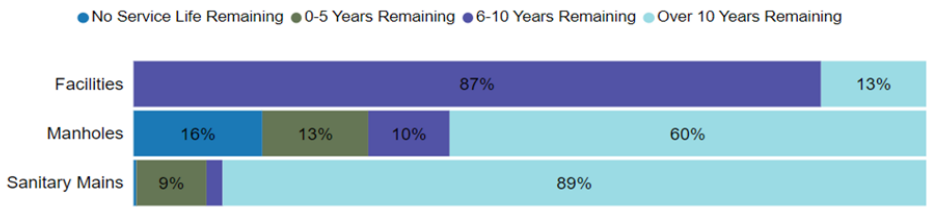
Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets more confidently. The following describes the municipality's current approach:

- CCTV inspections are performed for identifying blockages in certain section of sanitary mains per year
- The sewer treatment system is inspected by third party on a periodic basis
- The assessment videos and reports with rehabilitation/replacement recommendations are documented in the internal system
- The town has completed the water and wastewater needs study recently.

5.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Sanitary 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)
Manholes	50 Years	35.5	14.5
Pump Stations	75 Years	36.9	38.1
Sanitary Mains	50-80 Years	36.3	38.5
		35.9	**27.1**



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.

5.2.4 Lifecycle Management Strategy

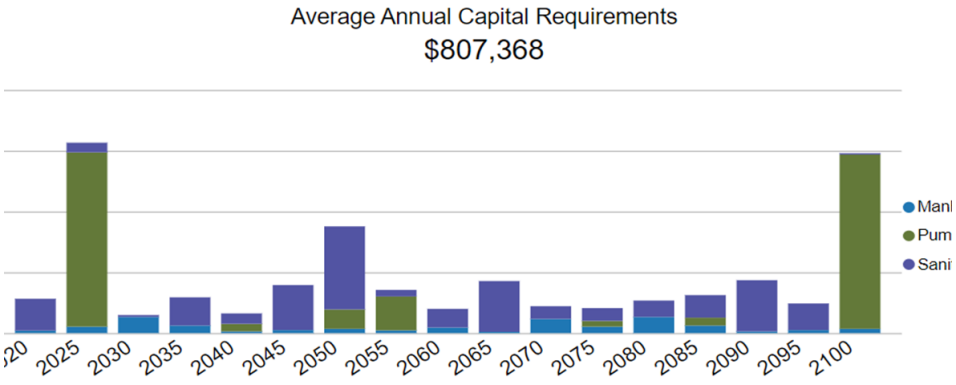
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment.

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

Activity Type	Description of Current Strategy
Maintenance	Main flushing is performed on a 6-year basis.
	CCTV inspection is performed for certain section of the mains each year.
Rehabilitation & Replacement	Currently no rehabilitation program is in place for sanitary network.
	Water network replacement is based on the recommendations in the assessment report, and integrated with the replacement of other networks (such as water and road network).

Forecasted Capital Requirements

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

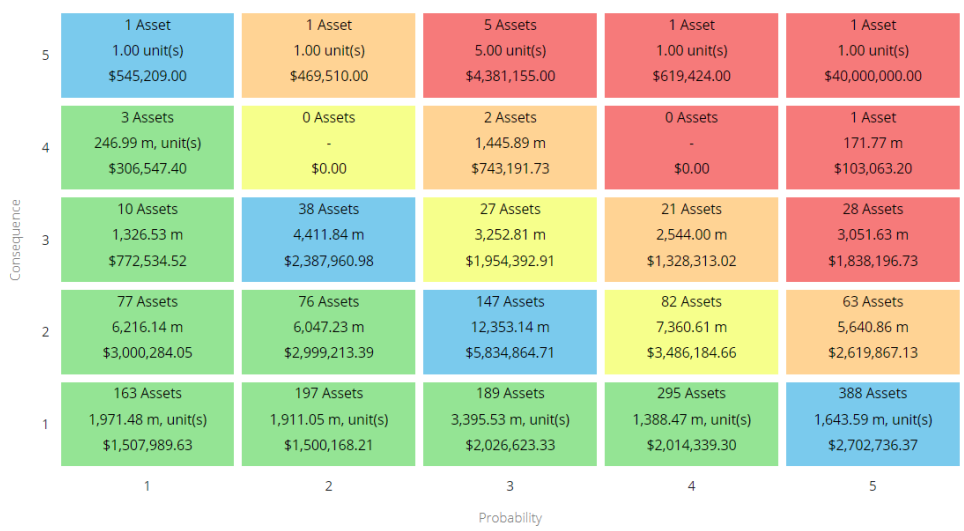


The projected cost of lifecycle activities that will need to be undertaken over the next 60 years to maintain the current level of service can be found in Appendix A.

5.2.5 Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.



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

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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Economic)	Replacement Cost (Financial)
	Pipe Diameter (Operational)[8]

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

[8] Used for linear assets

Risks to Current Asset Management Strategies

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

Aging Infrastructure

As the sanitary network continues to age, there are a handful of structures that are approaching the end of their original useful life. Failure of sanitary network may cause inconvenience and disruption to the expected levels of service to residents. Current lifecycle management strategy for sanitary network is reactive. An enhanced proactive strategy can be helpful to extend the service life of structures with lower funding requirement.

5.2.6 Levels of Service

The following tables identify the Town's current level of service for Sanitary 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 Town has selected for this AMP.

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
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 Town 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	The Town does not own any combined sewers.
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Inflow & Infiltration (I&I) happens between 10-20 times per year.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	A monitoring program is in place. However, no physical upgrades have been employed yet

	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	The discharged effluent meets all regulatory requirements for secondary and tertiary treatment.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of properties connected to the municipal wastewater system	100%[9]
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	0
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	1 event at most
	# 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	0.26%

[9] Within service boundary area. All properties Sandhurst Shores are on a septic tank

5.2.7 Recommendations

Asset Inventory

- There are a number of asset attributes that were collected by preforming a special join on GIS. Staff should engage in collecting more information, especially regarding in service dates, material types, and diameters of pipes to allow for more accurate asset-specific lifecycle planning and costing.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water network 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 the Town 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 Insight

- Understanding the key drivers of growth and demand will allow the Town to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure

- Moderate population and employment growth is expected

- The costs of growth should be 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 Town to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

6.1.1 Greater Napanee Official Plan (2014)

The Town of Greater Napanee adopted an Official Plan to develop a foundation for decisions making, and to establish the pattern which development within the town should follow. The Official Plan provides a framework intended to reduce the element of uncertainty as to the manner and sequence of growth and land use changes so that coordination of public and private investment can occur.

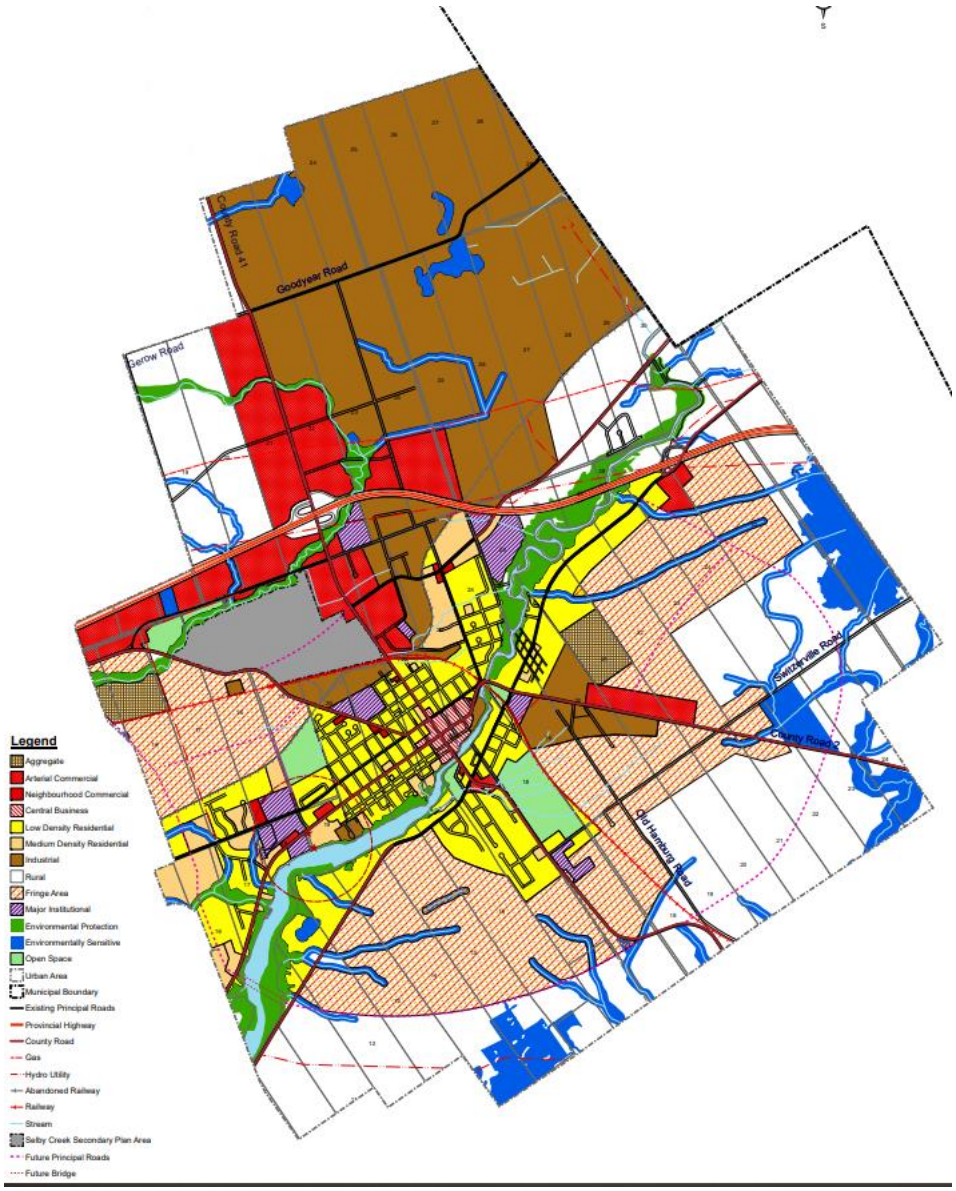
According to the Official Plan, The Town of Greater Napanee is expected to reach a population of 21,600 by the year 2023. This Official Plan accommodates the resulting residential, industrial, institutional, and commercial development. Growth is balanced with protection of the environment and protection of areas with resource potential. Council envisages that:

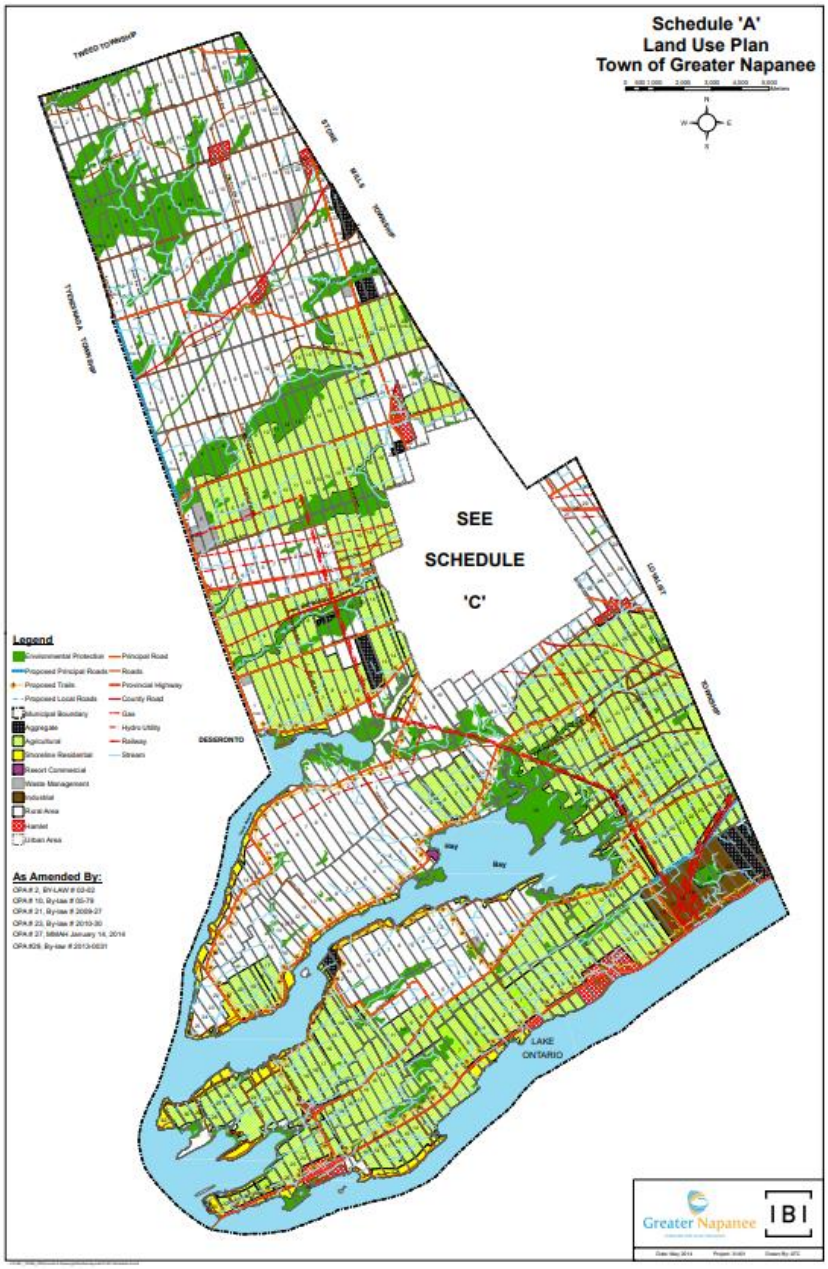
- the majority of residential growth will take place as an expansion to the existing serviced urban area within Greater Napanee, that is, the continued logical serviced extension from the former Town of Napanee into the former Towns of North Fredericksburgh and Richmond;

- areas of secondary and small amounts of growth are:
- the area of Sandhurst which already has a municipal water supply;
- the hamlets of Adolphustown, Conway, Forest Mills, Roblin, Selby, and West Plain;
- minor expansions to areas of residential concentrations such as Sherman's Point and Le Nid Point; and
- limited estate development by plan of subdivision and land severance;
- industrial development is directed to the areas where services are available, that is, Napanee and Richmond industrial areas and to the site of the Lennox Generating Station;
- commercial development is directed primarily to the urban area of Greater Napanee;
- the Town has served as the County seat and as the major commercial centre in Lennox and Addington County. In the post war period, the Town saw a relative decline as shoppers sought opportunities in larger centres. Recent commercial expansion in the Town indicates there is a real opportunity to gain commerce through vigorous and imaginative action.

- areas of environmental sensitivity are protected from incompatible activities while being integrated with the Town and Conservation Authority open space systems;
- opportunities are created to facilitate the development of an integrated pedestrian, vehicular, and bicycle system; and
- resource areas with agricultural and aggregate potential are identified and protected from incompatible uses.

The following maps portray the land use planning within the town:


Goodyear Road
Gerrow Road
Settlyville Road
County Road 2
Old Hamburg Road
Legend
Aggregate
Arterial Commercial
Neighbourhood Commercial
Central Business
Low Density Residential
Medium Density Residential
Industrial
Rural
Fringe Area
Major Institutional
Environmental Protection
Environmentally Sensitive
Open Space
Urban Area
Municipal Boundary
Existing Principal Roads
Provincial Highway
County Road
Gas
Hydro Utility
Abandoned Railway
Railway
Stream
Selby Creek Secondary Plan Area
Future Principal Roads
Future Bridge


Schedule 'A'
Land Use Plan
Town of Greater Napanee
SEE
SCHEDULE
'C'
Legend
As Amended By:
LAKE
ONTARIO
Greater Napanee
IBI

6.1.2 Greater Napanee's Census Profile, Census of Population (2021)

According to the 2021 Census data the population of the Town has increased from 15,892 to 16,879 between 2016 and 2021, which represents a 1.2% yearly increase. Assuming that this trend is constant till 2023, the Town would then miss the population target set in 2014 by about 4300 people.

6.2 Impact of Growth on Lifecycle Activities

By July 1, 2025, the Town'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 Town's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the Town will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

7 Financial Strategy

Key Insights

- The Town is committing approximately $4 million towards capital projects per year from sustainable revenue sources
- Given the annual capital requirement of $15.1 million, there is currently a funding gap of $11.1 million annually
- For tax-funded assets, we recommend increasing tax revenues by 2.8% each year for the next 20 years to achieve a sustainable level of funding
- For rate-funded assets, we recommend increasing tax revenues by 1.8% each year for the next 15 years for the Water Network, and 1.2% for the Sanitary Network each year for the next 10 years to achieve a sustainable level of funding

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 Town of Greater Napanee to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

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

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

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

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

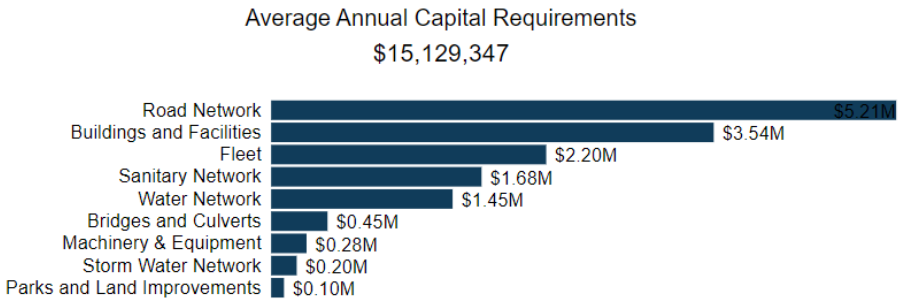
1. In order to reduce financial requirements, consideration has been given to revising service levels downward.

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 Town 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 Town must allocate approximately $15.1 million annually to address capital requirements for the assets included in this AMP.



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

However, for the Road Network and Sanitary Network, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal of the Town's roads and sanitary sewer 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 and Sanitary Network:

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

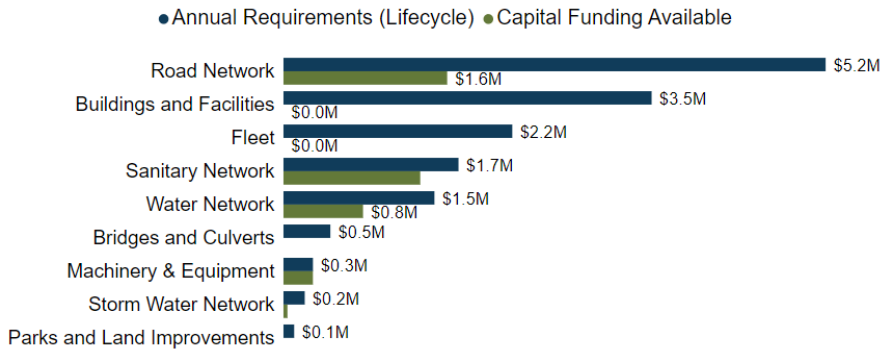
2. **Lifecycle Strategy Scenario**: Based on the assumption that lifecycle activities are performed at strategic intervals to extend the service life of assets until replacement is required.

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Bridges and Culverts	$406,000	$450,000	$(44,000)
Buildings and Facilities	$3,301,000	$3,540,000	$(238,000)
Road Network	$8,331,000	$5,213,000	$3,117,000
Sanitary Network	$1,149,000	$1,682,000	$(533,000)

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $3.1 million for the Road Network and increase of $44,000 for the Bridges and Culverts, $238,000 for Buildings and Facilities, and $533,000 for the Sanitary Network. This represents an overall reduction of the annual requirements for the Road Network category by 37% and an increase by 11%, 7%, and 46% to the other categories respectively as in this case the lifecycle management activities are needed in order for the assets to reach their estimated useful lives. As the lifecycle strategy scenario represents the lowest cost option available to the Town, 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 Town is committing approximately $4 million towards capital projects per year. Given the annual capital requirement of $15.1 million, there is currently a funding gap of $11.1 million annually.



7.2 Funding Objective

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

1. **Tax Funded Assets:** Bridges and Culverts, Buildings and Facilities, Land Improvements, Machinery & Equipment, Road Network, Storm Network and Vehicles
2. **Rate-Funded Assets:** Water Network, Sanitary Network

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

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

7.3 Financial Profile: Tax Funded Assets

7.3.1 Current Funding Position

The following tables show, by asset category, Greater Napanee's average annual asset investment requirements (CapEx), 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	
Bridges and Culverts	$451,000				$0	$451,000
Buildings and Facilities	$3,540,000				$0	$3,540,000
Fleet	$2,200,000				$0	$2,200,000
Machinery & Equipment	$283,000	$283,000			$283,000	$0
Parks and Land Improvements	$103,000				40	$103,000
Road Network	$5,213,000	$373,000	$482,000	$719,000	$1,574,000	$3,639,000
Storm Water Network	$205,000	$38,000			$38,000	$167,000
	$11,995,000	**$694,000**	**$482,000**	**$719,000**	**$1,895,000**	**$10,100,000**

The average annual investment requirement for the above categories is approximately $12 million. Annual revenue currently allocated to these assets for capital purposes is approximately $1.9 million leaving an annual deficit of about $10.1 million. Put differently, these infrastructure categories are currently funded at 15.8% of their long-term requirements.

7.3.2 Full Funding Requirements

In 2020, Town of Greater Napanee has annual tax revenues of $13.3 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
Bridges and Culverts	3.4%
Buildings and Facilities	26.6%
Fleet	16.5%
Machinery & Equipment	0.0%
Parks and Land Improvements	0.8%
Road Network	27.4%
Storm Water Network	1.3%
	76.0%

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

a) Greater Napanee's debt payments for these asset categories will be decreasing by $550,000 over the next 20 years.

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

	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	$10,100,000	$10,100,000	$10,100,000	$10,100,000	$10,100,000	$10,100,000	$10,100,000	$10,100,000
Change in Debt Costs	n/a	n/a	n/a	n/a	$(550,000)	$(550,000)	$(550,000)	$(550,000)
Change in OCIF Grants					$-	$-	$-	$-
Resulting Infrastructure Deficit Closure Time:	**5**	**10**	**15**	**20**	**5**	**10**	**15**	**20**
Tax Increase Required	75.9%	75.9%	75.9%	75.9%	71.8%	71.8%	71.8%	71.8%
Annually:	**12.0%**	**5.9%**	**3.9%**	**2.9%**	**11.5%**	**5.6%**	**3.7%**	**2.8%**

7.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 20-year option. This involves full CapEx funding being achieved over 20 years by:

a) when realized, reallocating the debt cost reductions to the infrastructure deficit as outlined above.
b) increasing tax revenue by 2.8% each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
c) adjusting tax revenue increases in future year(s) when allocations to CapEx exceed or fail to meet budgeted amounts.
d) allocating the current gas tax and OCIF revenue as outlined previously.
e) allocating the scheduled OCIF grant increases to the infrastructure deficit as they occur.
f) reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
g) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included any applicable OCIF formula-based funding since this funding is a multi-year commitment[10].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full CapEx funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $0 for Bridges and Culverts, $0 for Buildings and Facilities, $144,444 for Land Improvements, $0 for Machinery & Equipment, $1,368,069 for Road Network, $7,752 for Storm Network, and $2,456,896for Vehicles.

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

[10] The Town should take advantage of all available grant funding programs and transfers from other levels of government. While OCIF has historically been considered a sustainable source of funding, the program is currently undergoing review by the provincial government. This review may impact its availability.

7.4 Financial Profile: Rate Funded Assets

7.4.1 Current Funding Position

The following tables show, by asset category, Greater Napanee'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
		Rates	Gas Tax	OCIF	Total Available	
Water Network	$1,452,000	$765,000	$0	$0	$765,000	$687,000
Sanitary Network	$1,683,000	$1,315,000	$0	$0	$1,315,000	$368,000
	$3,135,000	**$2,080,000**	**$0**	**$0**	**$2,080,000**	**$1,055,000**

The average annual investment requirement for the above categories is $3.1 million. Annual revenue currently allocated to these assets for capital purposes is $2 million leaving an annual deficit of $1 million. Put differently, these infrastructure categories are currently funded at 66% of their long-term requirements.

7.4.2 Full Funding Requirements

In 2020, Greater Napanee had annual sanitary revenues of $2.9 million and annual water revenues of $2.4 million. 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	Tax Change Required for Full Funding
Water Network	28.9%
Sanitary Network	12.6%

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 Network				Sanitary Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	$687,000	$687,000	$687,000	$687,000	$368,000	$368,000	$368,000	$368,000
Tax Increase Required	28.9%	28.9%	28.9%	28.9%	12.6%	12.6%	12.6%	12.6%
Annually:	**5.3%**	**2.6%**	**1.8%**	**1.3%**	**2.4%**	**1.2%**	**0.8%**	**0.6%**

7.4.3 Financial Strategy Recommendations

Considering the above information, we recommend the 15-year option for the Water Network & the 10-year option for the Sanitary Network. This involves full CapEx funding being achieved over 15 years by:

a) increasing rate revenues by 1.8% for the Water Network each year for the next 15 years & by 1.2% for the Sanitary Network each year for the next 10 years.
b) these rate revenue increases are solely for the purpose of phasing in full funding to the respective asset categories covered in this AMP.
c) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

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

Although this strategy achieves full CapEx funding for rate-funded assets over 10 years, the recommendation does require prioritizing capital projects to fit the annual funding available. Current data shows a pent-up investment demand of $341,511 for the Water Network and $959,416 for the Sanitary Network.

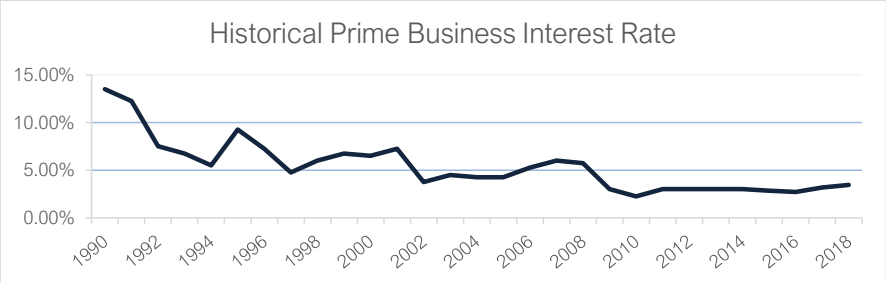
Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

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%[11] 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:



[11] 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 Greater Napanee has historically used debt for investing in the asset categories as listed. There is currently $3,050,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $691,000, well within its provincially prescribed maximum of $2,454,000. The principal and interest payments are expected to drop to $278,000 and $141,000 in 2024 and 2025 respectively.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2016	2017	2018	2019	2020
Bridges and Culverts	$0	$0	$0	$0	$0	$0
Buildings and Facilities	$550,000	$0	$0	$0	$0	$0
Fleet	$0	$0	$0	$0	$0	$0
Machinery & Equipment	40	$0	$0	$0	$0	$0
Parks and Land Improvements	$0	$0	$0	$0	$0	$0
Road Network	$2,500,000	$0	$0	$0	$0	$0
Storm Water Network	$0	$0	$0	$0	$0	$0
Total Tax Funded:	**$3,050,000**	**$0**	**$0**	**$0**	**$0**	**$0**
Water Network	$0	$0	$0	$0	$0	$0
Sanitary Network	$0	$0	$0	$0	$0	$0
Total Rate Funded:	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2020	2021	2022	2023	2024	2025	2030
Bridges and Culverts	$-	$-	$-	$-	$-	$-	$-
Buildings and Facilities	$550,000	$550,000	$550,000	$550,000	$137,000	$-	$-
Fleet	$-	$-	$-	$-	$-	$-	$-
Machinery & Equipment	$-	$-	$-	$-	$-	$-	$-
Parks and Land Improvements	$-	$-	$-	$-	$-	$-	$-
Road Network	$141,000	$141,000	$141,000	$141,000	$141,000	$141,000	$141,000
Storm Water Network	$-	$-	$-	$-	$-	$-	$-
Total Tax Funded	**$691,000**	**$691,000**	**$691,000**	**$691,000**	**$278,000**	**$141,000**	**$141,000**
Water Network	$0	$0	$0	$0	$0	$0	$0
Sanitary Network	$0	$0	$0	$0	$0	$0	$0
Total Rate Funded:	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

The revenue options outlined in this plan allow Greater Napanee 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 Greater Napanee.

Asset Category	Balance on December 31, 2020
Bridges and Culverts	$-
Buildings and Facilities	$1,767,000
Fleet	$1,035,000
Machinery & Equipment	$96,000
Parks and Land Improvements	$-
Road Network	$-
Storm Water Network	$-
Total Tax Funded	**$2,898,000**
Water Network	$7,532,000
Sanitary Network	$0
Total Rate Funded:	**$7,532,000**

There is considerable debate in the municipal sector as to the appropriate level of reserves that a Town 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 Greater Napanee'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 Greater Napanee 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

8 Appendices

Key Insights

- Appendix A identifies projected 10-year capital requirements for each asset category
- Appendix B includes several 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 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	$345,270	$2,467,449	$3,710,034	$3,401,547	$2,890,124	$3,621,099	$3,866,900	$2,031,494	$1,727,203	$2,450,802	$3,010,464
LCB Roads	$1,022,799	$7,140,732	$6,260,630	$534,342	$1,147,934	$42,927	$1,282,461	$781,798	$624,931	$4,099,051	$2,683,148
Sidewalks	$0	$0	$58,458	$0	$0	$0	$305,229	$0	$0	$0	$0
Streetlights	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total:	**$1,368,069**	**$9,608,180**	**$10,029,121**	**$3,935,888**	**$4,038,057**	**$3,664,026**	**$5,454,591**	**$2,813,293**	**$2,352,134**	**$6,549,853**	**$5,693,612**

Bridges & Culverts

Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Bridges	$0	$0	$900,000	$1,100,000	$0	$0	$881,500	$77,500	$0	$0	$0
Structural Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$900,000**	**$1,100,000**	**$0**	**$0**	**$881,500**	**$77,500**	**$0**	**$0**	**$0**

Storm Water Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Box Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Box Structure	$2,075	$0	$0	$105,909	$0	$0	$0	$0	$0	$0	$0
Catch Basin Lead	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cross Culvert	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Entrance Culvert	$5,677	$0	$7,874	$0	$0	$0	$0	$0	$0	$0	$0
Stormwater Lateral	$0	$0	$0	$0	$0	$0	$77,833	$0	$0	$0	$0
Stormwater Main	$0	$0	$0	$808,890	$0	$0	$173,142	$0	$0	$15,073	$0
	$7,752	**$0**	**$7,874**	**$914,799**	**$0**	**$0**	**$250,975**	**$0**	**$0**	**$15,073**	**$0**

Facilities & Buildings

Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
A L Dafoe Purfilication Plant	$0	$0	$0	$12,800	$137,100	$173,200	$133,300	$143,700	$640,800	$108,500	$3,600
Animal Shelter	$0	$0	$0	$6,000	$2,900	$13,000	$22,000	$39,000	$50,700	$23,450	$27,000
Fire Station 1, Napanee	$0	$0	$0	$200	$70,300	$113,810	$252,200	$135,500	$196,500	$62,520	$127,000
Fire Station 2, Roblin	$0	$0	$0	$0	$0	$14,200	$66,000	$12,400	$6,800	$28,500	$45,600
Fire Station 3, Dorland	$0	$0	$0	$35,600	$16,200	$20,900	$79,400	$8,350	$46,100	$26,200	$51,580
Infranstructure Services	$0	$0	$0	$32,500	$26,300	$107,000	$240,700	$97,100	$249,600	$63,600	$45,300
Market Square	$0	$0	$0	$328,200	$84,100	$210,300	$66,850	$94,800	$142,100	$184,400	$283,500
Market Square - 11	$0	$0	$0	$9,700	$7,500	$26,700	$35,200	$39,000	$12,200	$60,400	$36,500
Market Square - 13	$0	$0	$0	$7,500	$129,900	$58,600	$80,400	$82,000	$80,000	$116,000	$119,800
Napanee Public Library	$0	$0	$0	$19,100	$33,100	$107,700	$117,300	$81,700	$92,900	$186,600	$101,500
Napanee Rail Station	$0	$0	$0	$11,950	$14,400	$79,400	$25,400	$28,800	$37,700	$31,600	$58,100
Napanee Town Hall	$0	$0	$0	$88,500	$74,000	$390,500	$90,200	$56,100	$240,900	$94,700	$442,600
North Fredericksbugh Hall	$0	$0	$0	$57,900	$52,500	$146,600	$190,500	$355,380	$399,800	$189,340	$1,996,200
Pollution Control Plant (WPCP)	$0	$0	$0	$19,100	$73,610	$184,600	$303,490	$1,073,800	$310,200	$177,000	$170,050
Public Works Building	$0	$0	$0	$0	$58,700	$47,800	$65,400	$305,080	$82,200	$163,100	$11,200
Sandhurst Shores WTP	$0	$0	$0	$4,900	$0	$10,000	$27,900	$14,000	$58,000	$19,300	$33,600
Shelby Hall	$0	$0	$0	$9,000	$3,700	$203,500	$82,300	$197,800	$100,800	$154,100	$113,200
South Fredericksbugh Garage	$0	$0	$0	$115,040	$115,600	$205,000	$35,200	$66,800	$58,200	$39,600	$127,300
South Fredricksburgh Hall	$0	$0	$0	$11,200	$93,300	$113,600	$108,100	$274,700	$184,100	$367,480	$150,900
Strachcone Paper Centre	$0	$0	$0	$28,500	$513,200	$1,882,100	$424,800	$992,700	$2,564,800	$536,400	$246,700
Town Hall Annex	$0	$0	$0	$174,800	$107,100	$60,000	$27,800	$34,800	$32,500	$3,900	$48,400
	$0	**$0**	**$0**	**$972,490**	**$1,613,510**	**$4,168,510**	**$2,474,440**	**$4,133,510**	**$5,586,900**	**$2,636,690**	**$4,239,630**

`

Fleet

Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Community & Corporate Department	`	$0	$45,900	$0	$53,060	$0	$0	$0	$0	$0	$96,836
Facilities Department	$0	$46,818	$45,900	$0	$53,060	$97,419	$0	$0	$114,868	$0	$46,818
Fire Department	$70,000	$140,000	$0	$0	$1,500,000	$0	$394,157	$0	$539,408	$0	$210,000
Public Works Department	$2,246,060	$664,836	$2,475,688	$2,315,878	$1,403,787	$2,319,912	$2,169,204	$2,055,928	$1,054,040	$2,158,643	$1,998,494
Utilities	$44,000	$0	$0	$0	$53,060	$0	$0	$56,308	$57,434	$0	$0
	$2,456,896	**$851,654**	**$2,567,488**	**$2,315,878**	**$3,062,967**	**$2,417,331**	**$2,563,361**	**$2,112,236**	**$1,765,750**	**$2,158,643**	**$2,352,148**

Machinery & Equipment

Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Fire Department	$0	$92,500	$0	$0	$10,500	$12,000	$122,800	$115,276	$179,715	$24,100	$93,880
Parks and Recreation	$0	$0	$0	$24,500	$100,000	$72,600	$26,000	$124,000	$24,500	$228,900	$7,600
Public Works Department	$0	$0	$0	$2,500	$30,108	$43,608	$35,708	$7,608	$345,608	$348,608	$67,508
	$0	**$92,500**	**$0**	**$27,000**	**$140,608**	**$128,208**	**$184,508**	**$246,884**	**$549,823**	**$601,608**	**$168,988**

Parks and Land Improvements

Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Benches	$39,101	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Grass Areas	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Paved Areas	$0	$0	$0	$0	$0	$0	$0	$0	$19,950	$0	$0
Planted Areas	$75,235	$0	$0	$0	$0	$0	$0	$0	$0	$0	$243,799
Recreation Areas	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Receptacles	$30,108	$0	$0	$9,659	$0	$0	$0	$0	$0	$0	$0
	$144,444	**$0**	**$0**	**$9,659**	**$0**	**$0**	**$0**	**$0**	**$19,950**	**$0**	**$243,799**

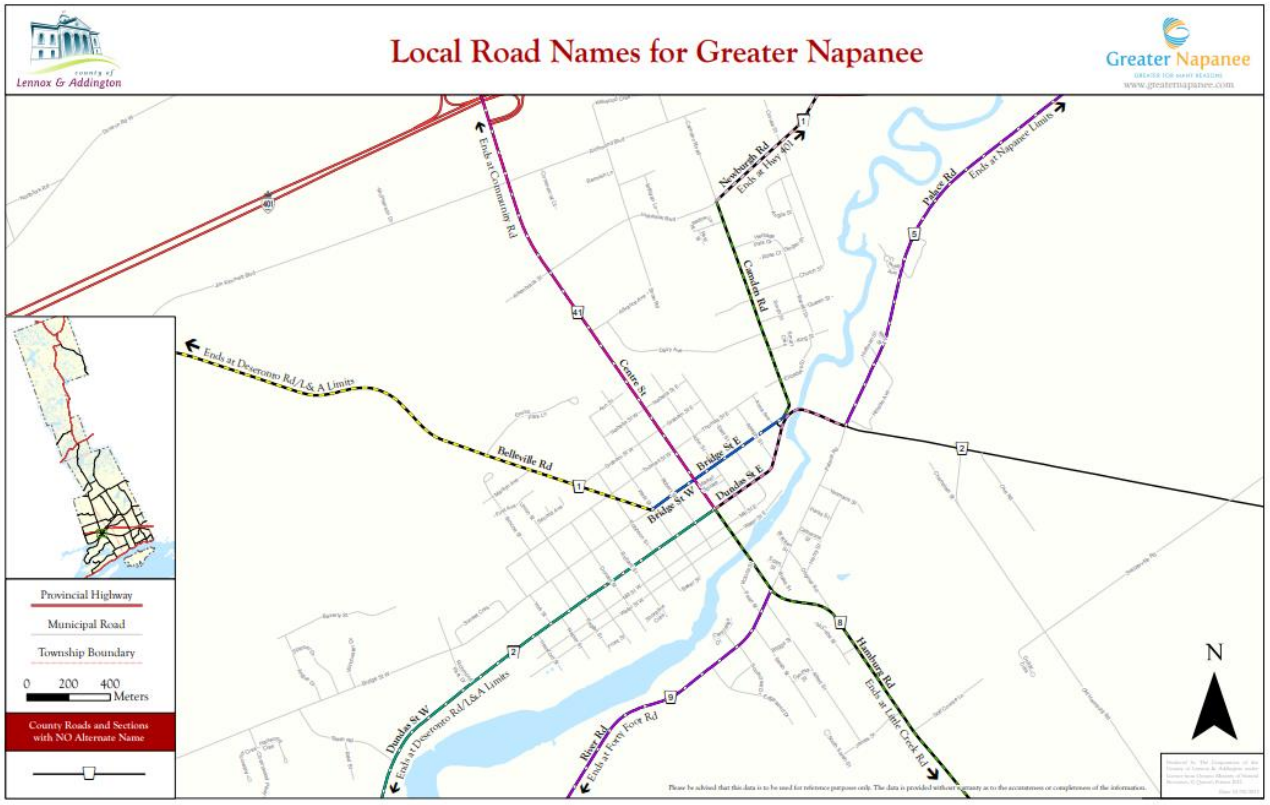
Water Network

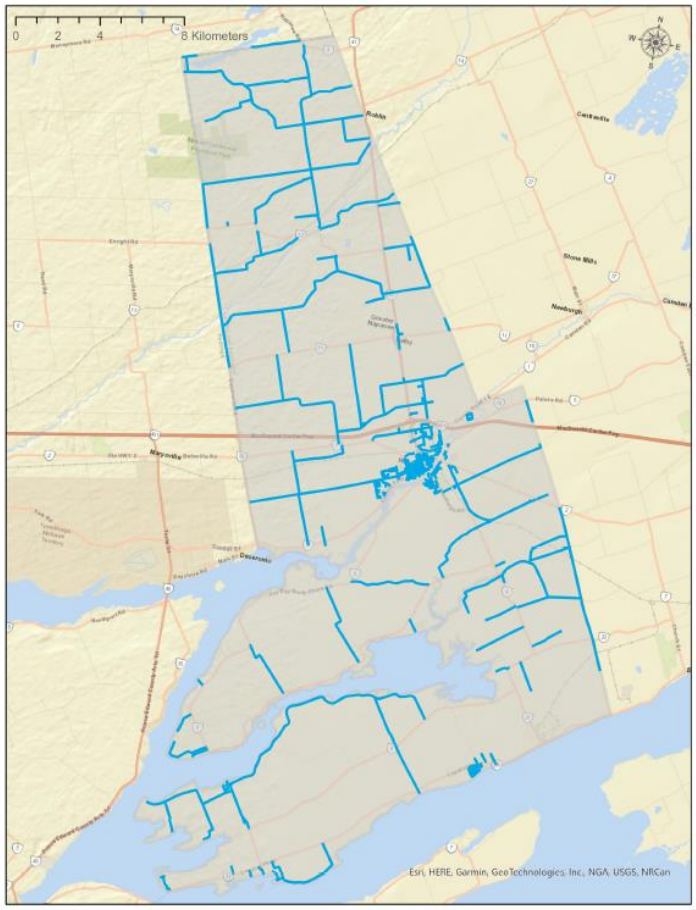
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Hydrants	$50,000	$20,000	$0	$15,000	$0	$0	$0	$5,000	$0	$20,000	$40,000
Pump Stations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,505,575	$0
Water Mains	$291,511	$0	$0	$0	$0	$0	$0	$0	$0	$0	$92,830
Water Meters	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$341,511	**$20,000**	**$0**	**$15,000**	**$0**	**$0**	**$0**	**$5,000**	**$0**	**$1,525,575**	**$132,830**

Sanitary Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Manholes	$846,000	$0	$120,000	$84,000	$0	$0	$150,000	$342,000	$0	$0	$42,000
Pump Stations	$0	$0	$0	$0	$0	$40,000,000	$0	$0	$0	$0	$0
Sanitary Mains	$113,416	$0	$0	$2,623,387	$0	$0	$191,684	$0	$0	$603,852	$0
	$959,416	**$0**	**$120,000**	**$2,707,387**	**$0**	**$40,000,000**	**$341,684**	**$342,000**	**$0**	**$603,852**	**$42,000**

Appendix B: Level of Service Maps

Road Network Map



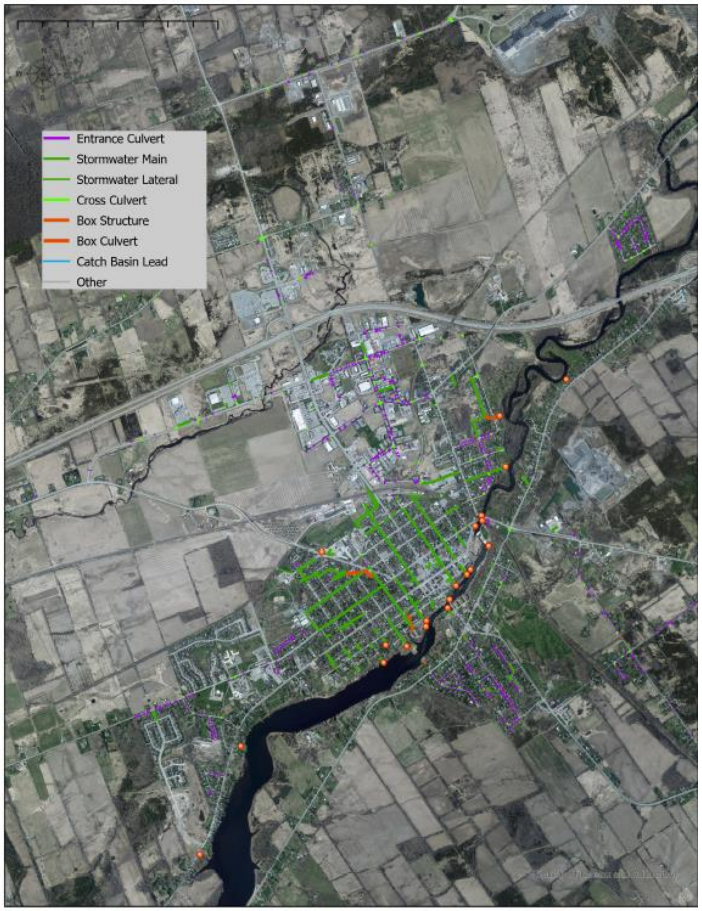


Greater Napanee

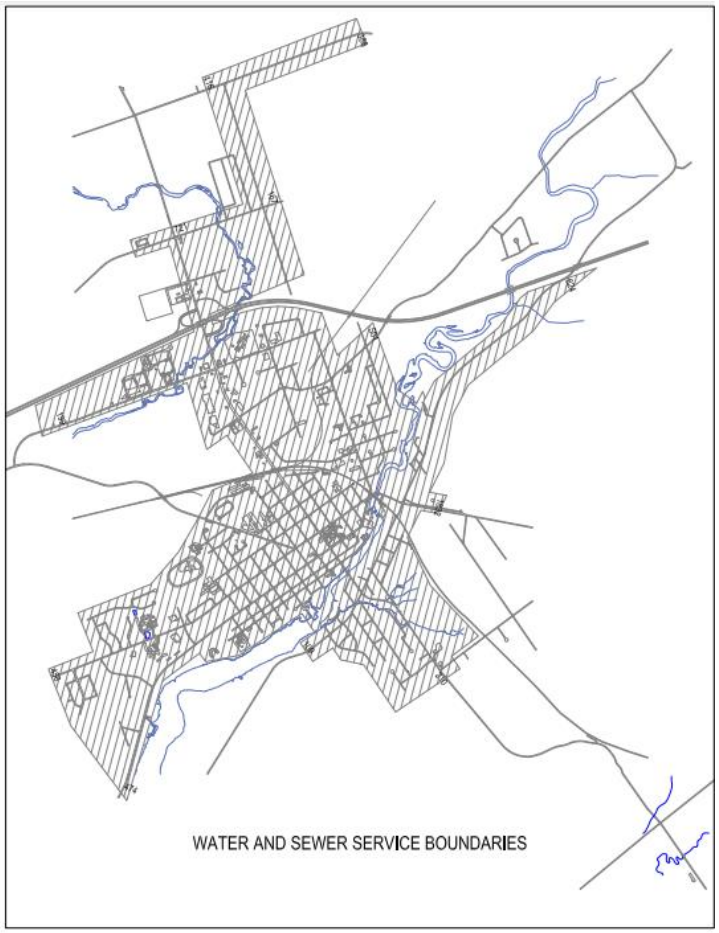
Greater Napanee Roads

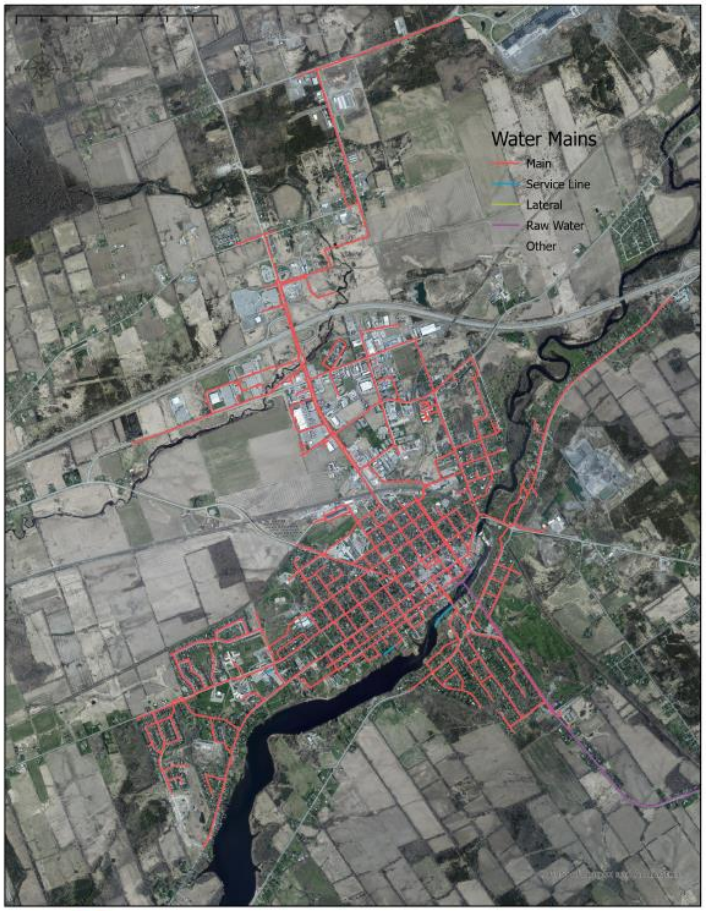
Asset Management Plan, July 2022

Storm Water Network


Entrance Culvert
Stormwater Main
Stormwater Lateral
Cross Culvert
Box Structure
Box Culvert
Catch Basin Lead
Other

Water and Sanitary Networks

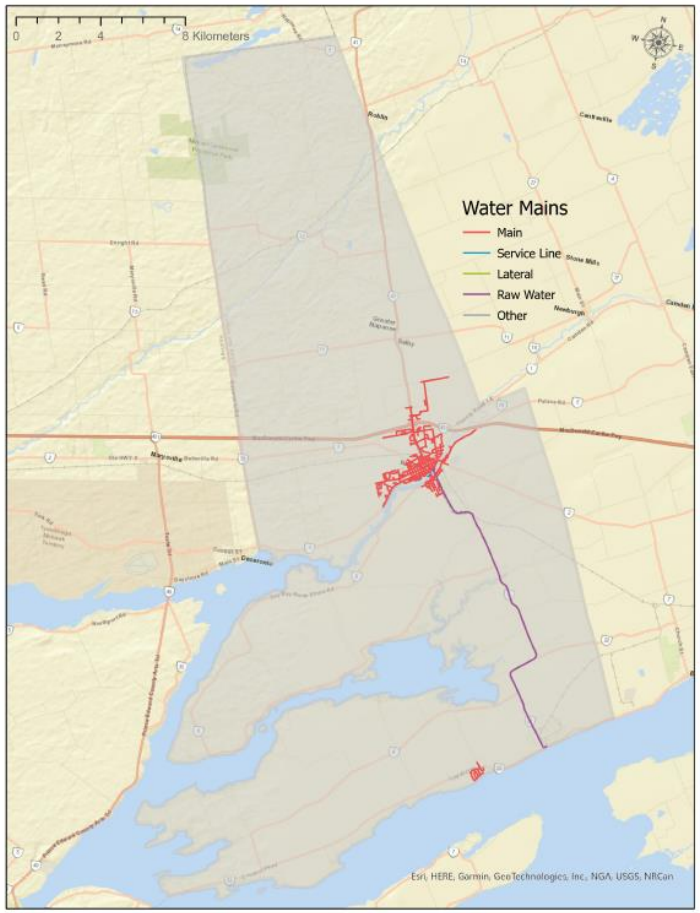




Greater Napanee

Greater Napanee Water Mains

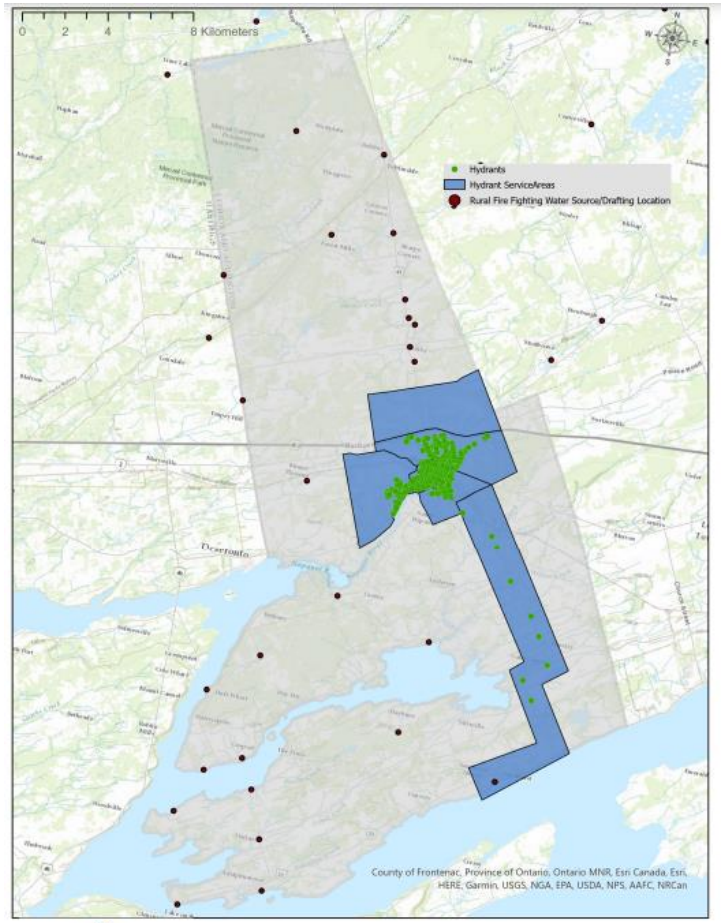
Asset Management Plan, July 2022



Greater Napanee

Greater Napanee Water Mains

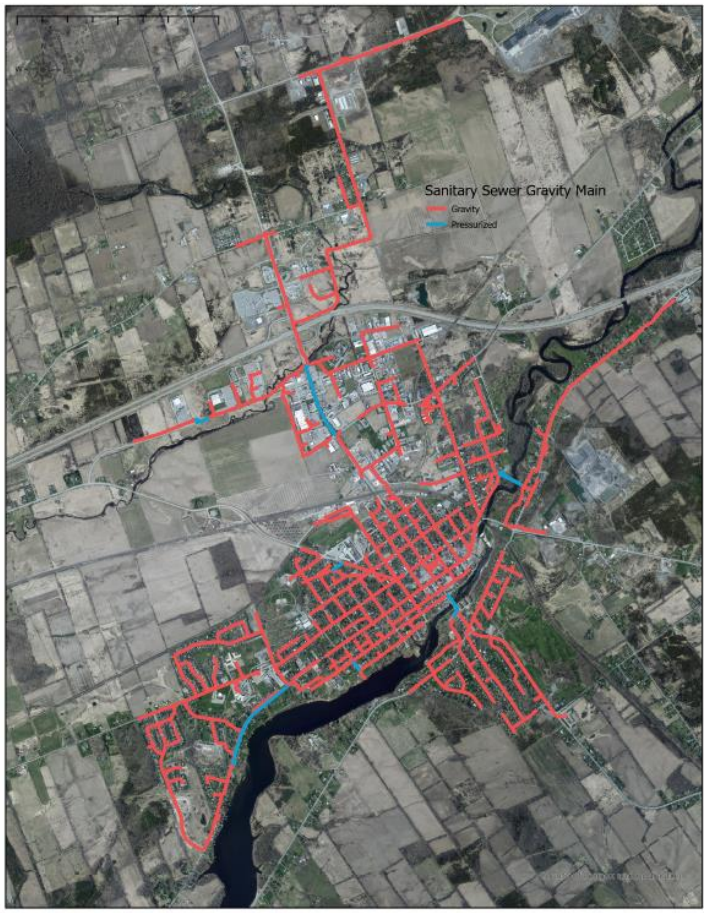
Asset Management Plan, July 2022



Greater Napanee

Greater Napanee Hydrants

Asset Management Plan, July 2022



Greater Napanee

Greater Napanee Sanitary Sewers

Asset Management Plan, July 2022

Appendix C: Risk Rating Criteria

Probability of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Probability of Failure Score
All Assets	Economic (100%)	Condition (100%)	0-19	5
			20-39	4
			40-59	3
			60-79	2
			80-100	1

Consequence of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Water Network (Mains)	Economic (80%)	Replacement Cost (100%)	$0-25,000	1
			$25,001-50,000	2
			$50,001-100,000	3
			$100,001-250,000	4
			$250,001+	5
	Operational (20%)	Pipe Diamter (100%)	0-50	1
			51-100	2
			101-250	3
			250-400	4
			401+	5
Sanitary Network (Mains)	Economic (80%)	Replacement Cost (100%)	$0-25,000	1
			$25,001-50,000	2
			$50,001-100,000	3
			$100,001-250,000	4
			$250,001+	5
	Operational (20%)	Pipe Diamter (100%)	0-150	1
			151-200	2
			201-300	3
			301-375	4
			375+	5
All Other Assets	Economic (100%)	Replacement Cost (100%)	$0-25,000	1
			$25,001-50,000	2
			$50,001-100,000	3
			$100,001-250,000	4
			$250,001+	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 Town's condition assessment strategy should outline several key considerations, including:

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

Role of Asset Condition Data

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

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