Asset Management Plan

Township of Whitewater Region

2022

This Asset Management Program was prepared by:

PSD | CITYWIDE

Empowering your organization through advanced
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Key Statistics

Replacement cost of asset portfolio
$480.7 million

Replacement cost of infrastructure per household
$138,525 (2021)

Percentage of assets in fair or better condition
77%

Percentage of assets with assessed condition data
98%

Annual capital infrastructure deficit
$11.7 million

Recommended timeframe for eliminating annual infrastructure deficit
20 Years

Target reinvestment rate
2.7%

Actual reinvestment rate
0.2%

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Executive Summary

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

Scope

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

This AMP include the following asset categories:

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

Findings

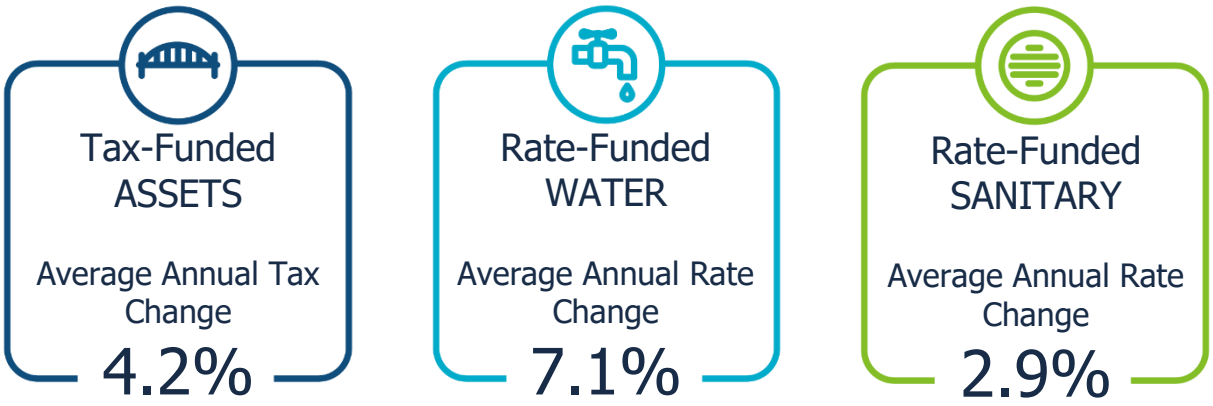
The overall replacement cost of the asset categories included in this AMP totals $480.7 million. 77% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 98% of assets. For the remaining assets, assessed condition data was unavailable, and asset 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 (road network and sanitary sewer network) and replacement only strategies (all other assets) to determine the lowest cost option to maintain the current level of service.

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $12.9 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $1.2 million towards capital projects or reserves per year. As a result, there is currently an annual funding deficit of $11.7 million – translating to approximately $3,400 deficit per household (2021 Census).

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

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 Township's infrastructure deficit based on a 20-year plan:



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

- Develop a data governance framework to ensure accurate and reliable data is being collected and utilized for the asset management program. This should include a condition collection strategy for all critical assets.
- Assess resourcing needs and staff capacity limitations for asset management purposes. Consider hiring an asset management coordinator or financial analyst to champion and coordinate asset management initiatives.
- Update the Township's tangible capital asset (TCA) policy to better align with typical engineering/lifecycle service life estimates.
- Refine risk and lifecycle models to develop more comprehensive short-term and long-term capital forecasts.
- Track and document the current levels of service that have been identified within this AMP to better understand the Township's capabilities and in preparation for O.Reg. 588/17 2025 requirements (setting target levels of service)

1 Introduction & Context

Key Insights

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

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

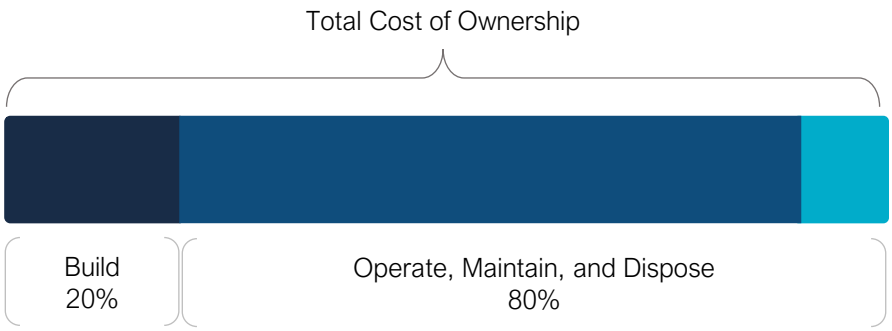
- An asset management plan is a living document that should be updated regularly to inform long-term planning

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

1.1 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 Township's approach to asset management activities. It aligns with the organizational strategic plan and provides clear direction to municipal staff on their roles and responsibilities as part of the asset management program.

The Township adopted the Strategic Asset Management Policy on June 19th, 2019, in accordance with Ontario Regulation 588/17.

The asset management plan satisfies Guiding Principle 1: Strategic Alignment:

> *"Whitewater Region will develop an AMP that aligns with the overarching accountabilities and aspirations of our community by fostering integration of various municipal documents (i.e., strategic plan, master plans – fire & recreation, accessibility plan, and planning documents, etc.)."*

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 Township plans to achieve asset management objectives through planned activities and decision-making criteria. The Township's Asset Management Policy contains many of the key components of an asset management strategy and may be expanded on in future revisions or as part of a separate strategic document.

1.1.3 Asset Management Plan

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

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

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

1.2 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 Township's approach to lifecycle management is described within each asset category outlined in this AMP. Developing and implementing a proactive lifecycle strategy will help staff to determine which activities to perform on an asset and when they should be performed to maximize useful life at the lowest total cost of ownership.

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

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

Community Levels of Service

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

Technical Levels of Service

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

For core asset categories (Roads, Water, Wastewater, Stormwater) 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 Township 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 Township plans to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17.

Proposed levels of service should be realistic and achievable within the timeframe outlined by the Township. They should also be determined with consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals, and long-term sustainability. Once proposed levels of service have been established, and prior to July 2024, the Township 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

2025

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

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

1.3.1 O. Reg. 588/17 Compliance Review

The following table identifies the requirements outlined in Ontario Regulation 588/17 for municipalities to meet by July 1, 2024. Next to each requirement a page or section reference is included in addition to any necessary commentary.

Requirement	O. Reg. Section	AMP Section Reference	Status
Summary of assets in each category	S.5(2), 3(i)	4.1.1 - 5.2.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1.1 - 5.2.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.1.3 - 5.2.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.1.2 – 5.2.2	Complete
Description of Township'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 B	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 8 asset categories and is divided between tax-funded and rate-funded categories

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

- Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life

2.1 Assets categories included in this AMP

This asset management plan for the Township of Whitewater Region is produced in compliance with Ontario Regulation 588/17.

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

Asset Category	Source of Funding
Road Network	Tax Levy
Stormwater Network	
Buildings & Facilities	
Machinery & Equipment	
Vehicles	
Land Improvements	
Water Network	User Rates
Sanitary Sewer Network	

2.2 Deriving Replacement Costs

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

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

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

2.3 Estimated Useful Life and Service Life Remaining

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

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

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

2.4 Reinvestment Rate

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

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

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

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

2.5 Deriving Asset Condition

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

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

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

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

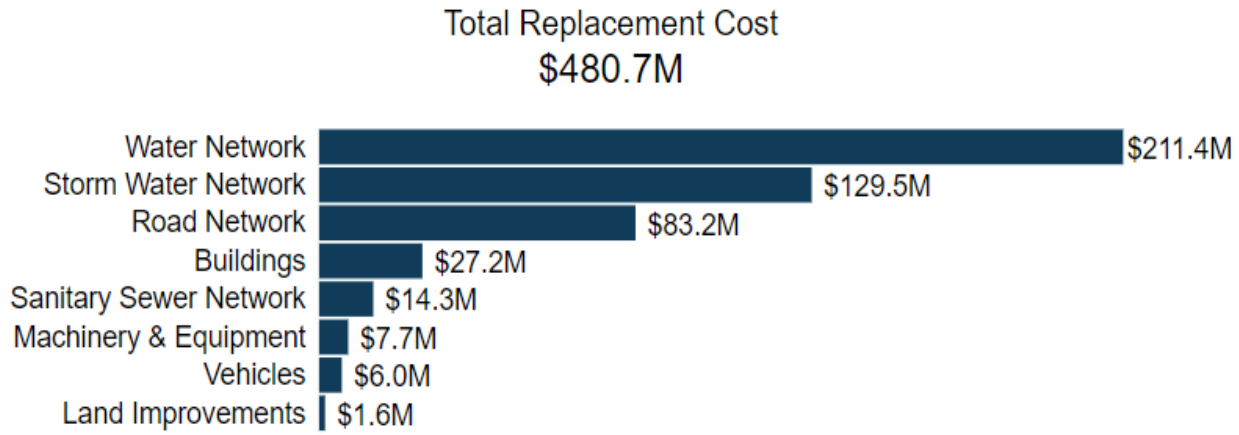
3 Portfolio Overview

Key Insights

- The total replacement cost of the Township's asset portfolio is $480.7 million
- The Township's target re-investment rate is 2.7%, and the actual re-investment rate is 0.2%, contributing to an expanding infrastructure deficit
- 77% of all assets are in fair or better condition
- 26% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total $12.9 million per year across all assets
- All key recommendations within the individual asset category sections are summarized in Appendix E.

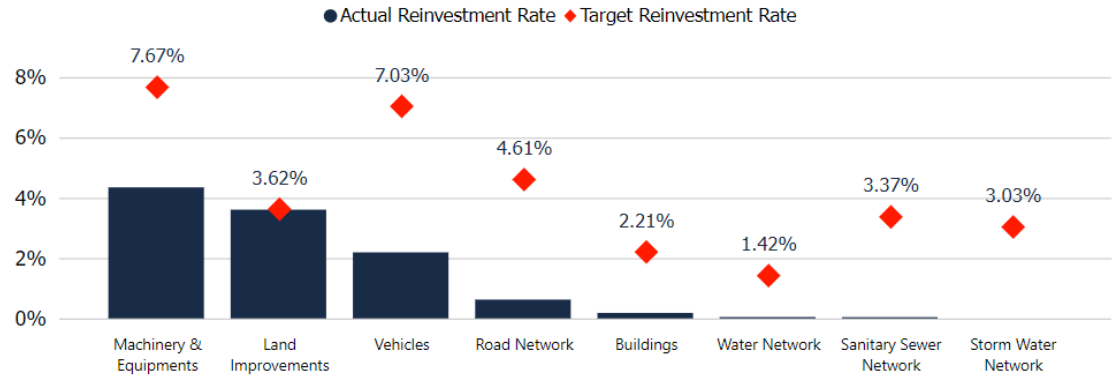
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analysed in this AMP have a total replacement cost of $480.7 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.



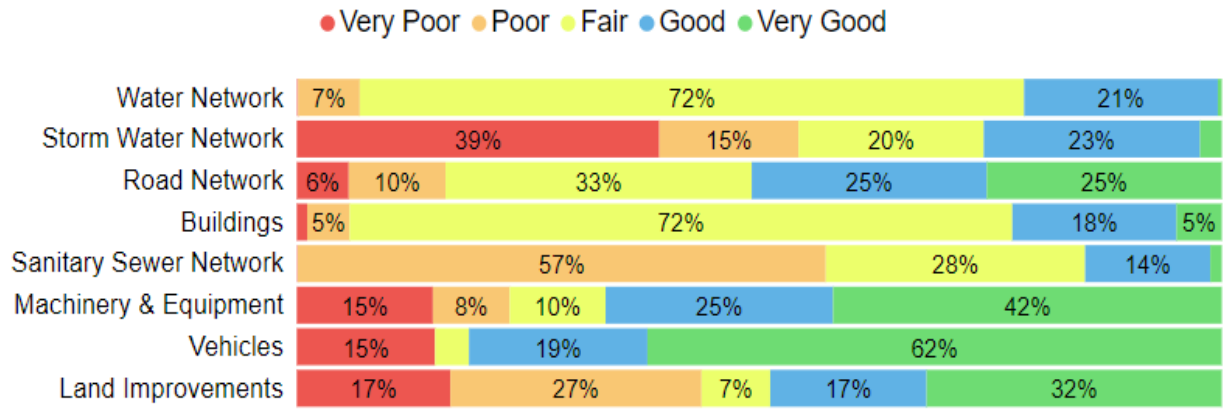
3.2 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township should be allocating approximately $12.9 million annually, for a target reinvestment rate of 2.7%. Actual annual spending on infrastructure totals approximately $1.2 million, for an actual reinvestment rate of 0.2%.



3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 77% of assets in Whitewater Region are in fair or better condition. This estimate relies on both age-based and field condition data.

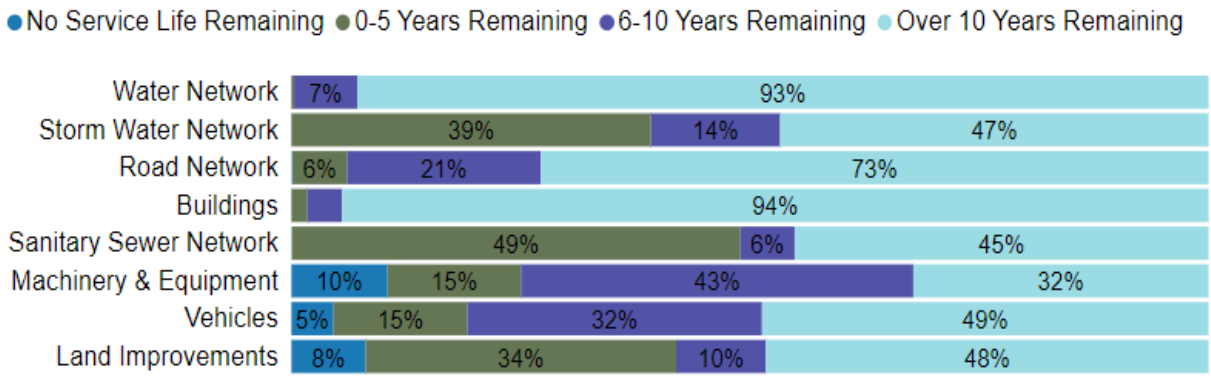


This AMP relies on assessed condition data for 98% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table 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	All	97%	Staff Assessmens
Storm Water Network	All	100%	Staff Assessments
Buildings	All	95%	Building Needs Assessment Report / Staff Assessments
Machinery & Equipment	All	43%	Staff Assessments
Vehicles	All	85%	Staff Assessments
Land Improvements	All	43%	Staff Assessments
Water Network	All	100%	Staff Assessments
Sanitary Sewer Network	All	100%	Staff Assessments

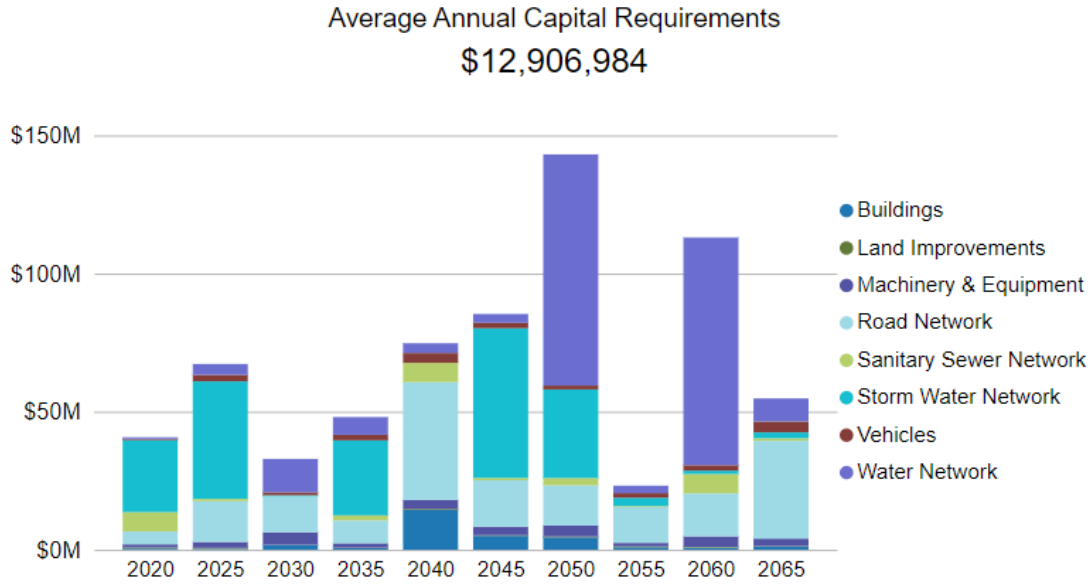
3.4 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 26% of the Township's assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B.



3.5 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 Township can produce an accurate long-term capital forecast. The following graph identifies capital requirements over the next 50 years.



4 Analysis of Tax-funded Assets

Key Insights

- Tax-funded assets are valued at $255 million
- 65% 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 $9.4 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

4.1 Road Network

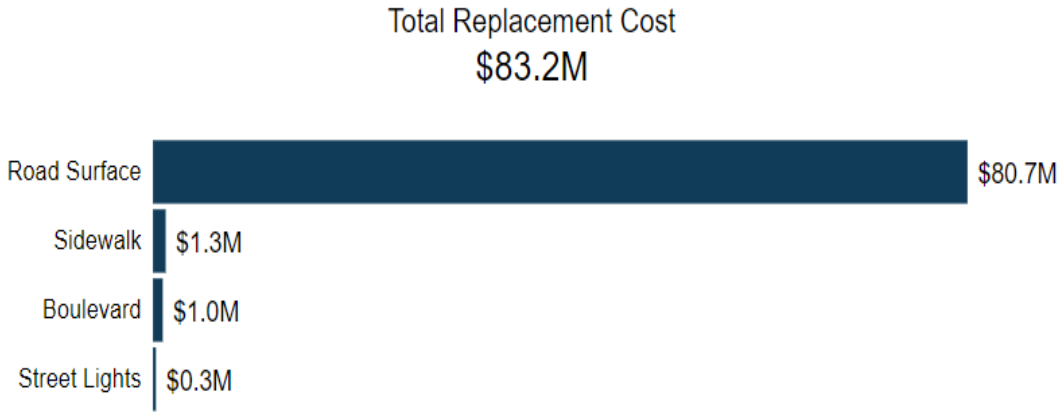
The Road Network is a critical component of the provision of safe and efficient transportation services. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure including sidewalks and streetlights.

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

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 Township's Road Network inventory.

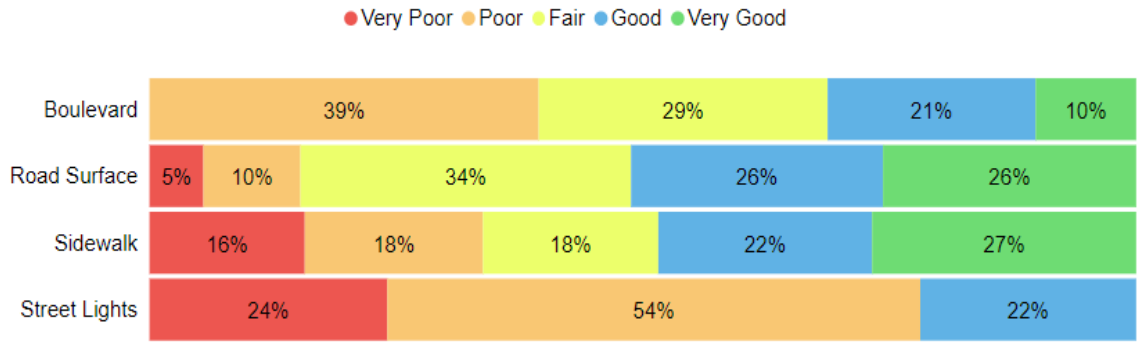
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Boulevard	6,438 m	User-Defined Cost	$965,700
Road Surface	205,873 m	User-Defined Cost	$80,688,800
Sidewalks	8,373 m	User-Defined Cost	$1,255,950
Street Lights	492	User-Defined Cost	$292,500
			$83,202,950



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
Boulevard	40%	Fair	100% Assessed
Road Surface	66%	Good	97% Assessed
Sidewalks	45%	Fair	92% Assessed
Street Lights	44%	Fair	100% Assessed
	65%	**Good**	**97% Assessed**



Current Approach to Condition Assessment

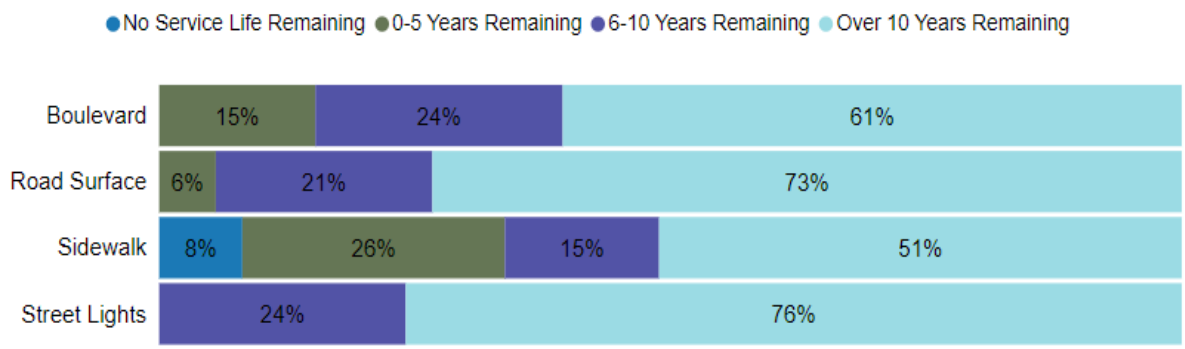
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Road patrols are completed by internal staff to inspect the road segments and sidewalks as required by Minimum Maintenance Standards (MMS).
- Road Needs Studies are completed on an as-needed basis; with the last assessment completed in 2013.
- Streetlights are inspected on an as-needed basis

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)
Boulevard	20-30 Years	46.7
Road Surface	15-25 Years	18.0
Sidewalks	20-37 Years	42.2
Street Lights	30 Years	23.0
		24.3



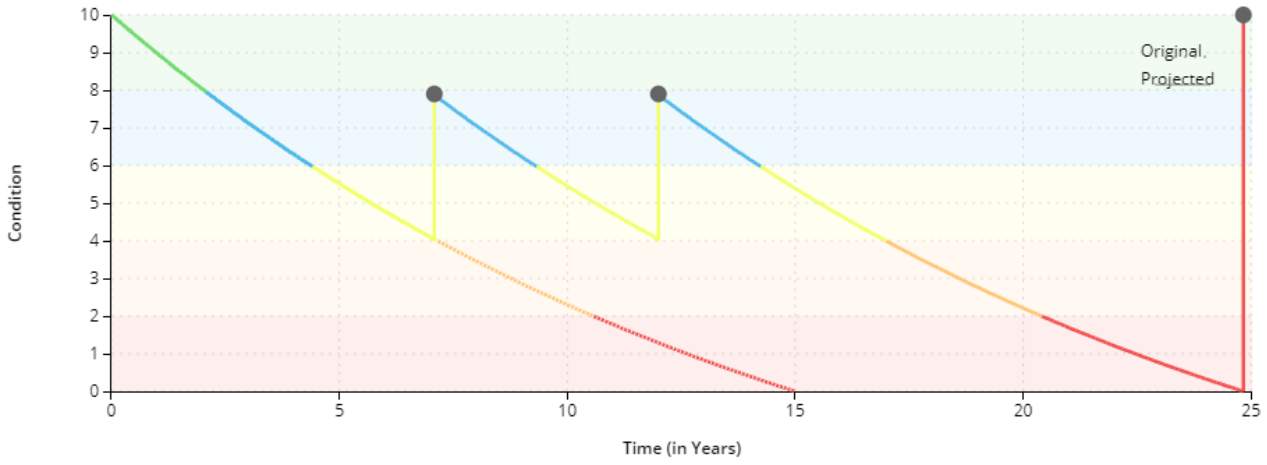
Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.1.4 Lifecycle Management Strategy

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

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

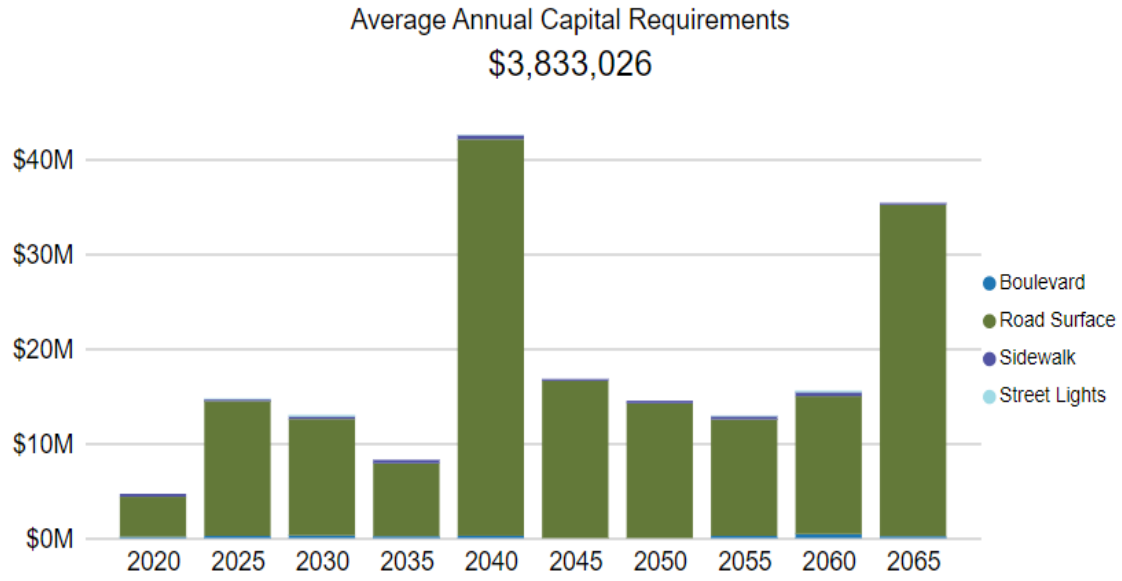
Surface Treated Roads (LCB)		
Event Name	**Event Class**	**Event Trigger**
Single Surface Treatment	Rehabilitation	40% Condition
End of Life Replacement	Replacement	0% Condition



Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for 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 annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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

4.1.5 Risk & Criticality

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

Risks to Current Asset Management Strategies

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

Aging Infrastructure

Several roads in the Township are aging and approaching the end of their useful life. Due to the high number of aging assets, it is difficult to complete all required road reconstructions in the suggested time frame, leading to a backlog of required reinvestment.

Capital Funding Strategies

Major capital rehabilitation projects for the road network are dependant on the availability of grant funding. When grants are not available, road network projects may be deferred. An annual capital funding strategy can reduce dependency on grant funding and help prevent deferral of capital works.

Community Expectations

There is a community expectation that roads in the Township that were surface treated prior to amalgamation will remain as such, however some can be downgraded to gravel roads to assist with strategic planning and levels of service. Additionally, community and levels of service expectations are shifting with the changing demographics and influx of new residents from city centres.

4.1.6 Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include maps, of the road network in the Township and its level of connectivity	See Appendix B
Quality	Description or images that illustrate the different levels of road class pavement condition	The Township completed an internal condition assessment in December 2020. Road sections received a surface condition rating (1-10). (1-5) Road surface exhibits moderate to significant deterioration and requires renewal or full replacement within 1-10 years (6-10) Road surface is in good condition or has been recently re-surfaced. Renewal or reconstruction is not required for 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 (2020)
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)	0.42 km/540 km^2
Performance	Average pavement condition index for paved roads in the Township	66%
	Average surface condition for unpaved roads in the Township (e.g., excellent, good, fair, poor)	Good

4.1.7 Recommendations

Asset Inventory

- Review and update replacement cost information regularly based on latest tender prices (every 1-2 years).
- Apply available condition information as it becomes available to ensure capital forecasts and asset management reporting from Citywide database are reliable.
- Consider expanding the road network inventory to include regulatory signage and small culverts for a more comprehensive database.

Risk & Lifecycle Management Strategies

- Implement the identified lifecycle management strategies for paved roads to realize potential cost avoidance and maintain a high quality of road pavement condition.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

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

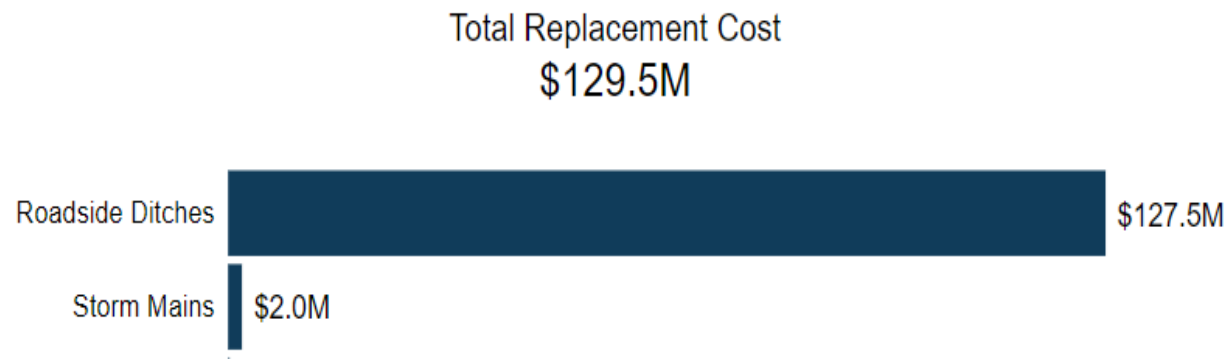
4.2 Stormwater Network

The Township is responsible for owning and maintaining a stormwater network of storm mains, municipal drains, and roadside ditches. Staff are working on improving the accuracy and validity of their stormwater network in order to assist with strategic asset management planning.

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 Township's Stormwater Network inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Municipal Drains	7	CPI Tables	To be determined[1]
Roadside Ditches	364,260 m	User-Defined Cost	$127,491,000
Storm Mains	3,536 m	User-Defined Cost	$2,013,775
			$129,504,789

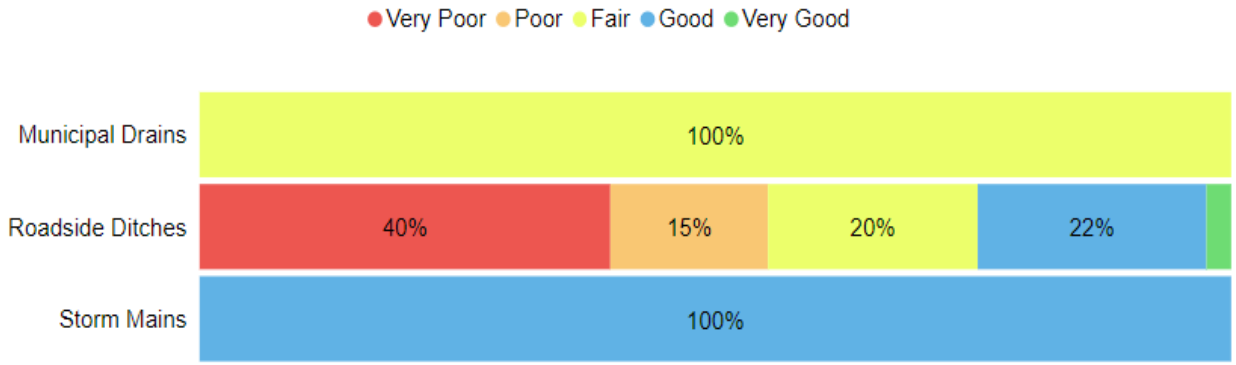


[1] Staff have inventoried some of their stormwater drains and will work to calculate an accurate replacement cost for these assets in future AMP iterations.

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.

	Average Condition (%)	Average Condition Rating	Condition Source
Municipal Drains	40%	Fair	100% Assessed
Roadside Ditches	33%	Poor	100% Assessed
Storm Mains	60%	Good	100% Assessed
	33%	**Poor**	**100% Assessed**



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

Current Approach to Condition Assessment

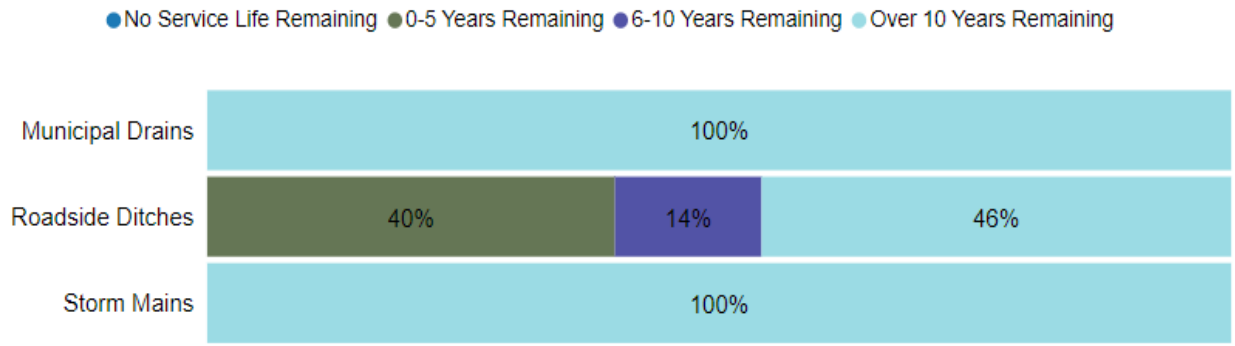
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Staff conduct CCTV inspections on the storm mains as needed, typically ahead of a reconstruction project. Other stormwater assets are visually inspected on a regular basis.
- As the Township refines the available asset inventory for the stormwater network, a regular assessment cycle will be established

4.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Stormwater 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)
Municipal Drains	45 Years	20.0
Roadside Ditches	15-45 Years	40.1
Storm Mains	75 Years	30.2
		38.7



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

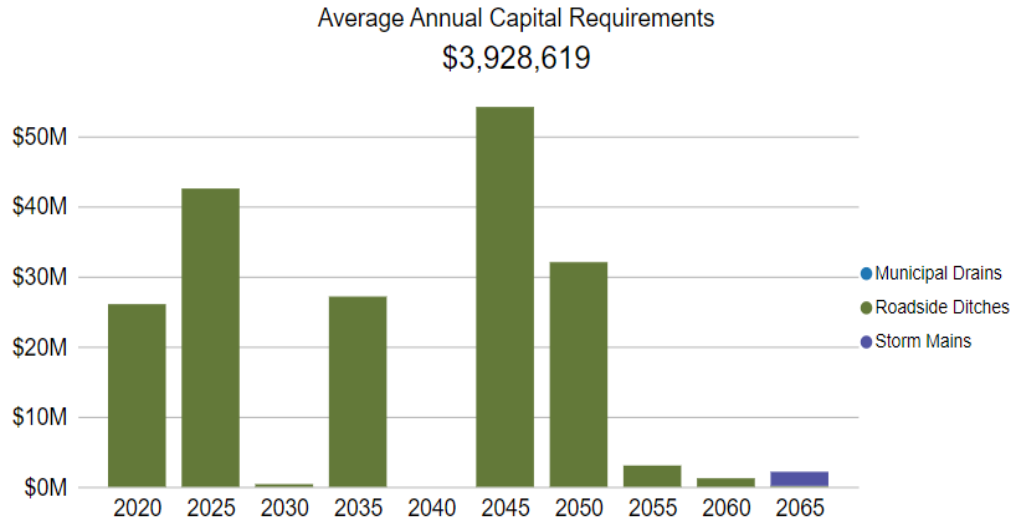
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Although not formally inventoried, catchbasins are cleaned out annually
	CCTV inspections and flushing are completed on an as-needed basis
Rehabilitation /Replacement	Stormwater assets are typically replaced at end-of-life or in coordination with other right-of-way assets (i.e., road reconstruction). Trenchless relining has not historically been a viable option for the storm mains at the Township.

Forecasted Capital Requirements

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



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

4.2.5 Risk & Criticality

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

Risks to Current Asset Management Strategies

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

Asset Data & Information

There is a lack of confidence in the available inventory data for storm assets. Staff do not have a comprehensive inventory of the storm network, including locations, length, or sizes. Due to this, the current approach to asset management for the storm water network is largely reactive.

Climate Change & Extreme Weather Events

The stormwater network comprises of storm mains, drains, and ditches. In recent years, the Township has experience more extreme rainfall events. The risk of surface flooding and road washouts will increase with these events if the system is not maintained adequately.

4.2.6 Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include maps, of the user groups or areas of the Township that are protected from flooding, including the extent of protection provided by the municipal stormwater system	The Township owns and maintains 3.5 kilometres of stormwater mains and 7 municipal drains that span across various settlement areas: Beachburg, Cobden and Haley. The extent of protection provided by the stormwater system is being investigated by staff.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of properties in Township resilient to a 100-year storm	TBD[2]
	% of the municipal stormwater management system resilient to a 5-year storm	TBD

[2] Staff will investigate and determine these stormwater metrics in collaboration with the conversation authorities.

4.2.7 Recommendations

Asset Inventory

- The Township's Stormwater Network inventory remains at a basic level of maturity and staff do not have a high level of confidence in its accuracy or reliability. The development of a comprehensive inventory of the stormwater network should be priority.
- Consider documenting and inventorying stormwater assets such as catchbasins and/or manholes.

Condition Assessment Strategies

- The development of a comprehensive inventory should be accompanied by a system-wide condition assessment of the storm mains through CCTV inspections.

Risk & Lifecycle 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.
- Document and review lifecycle management strategies for the Stormwater 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 identified in O. Reg. 588/17 and those metrics that the Township believes to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.3 Buildings

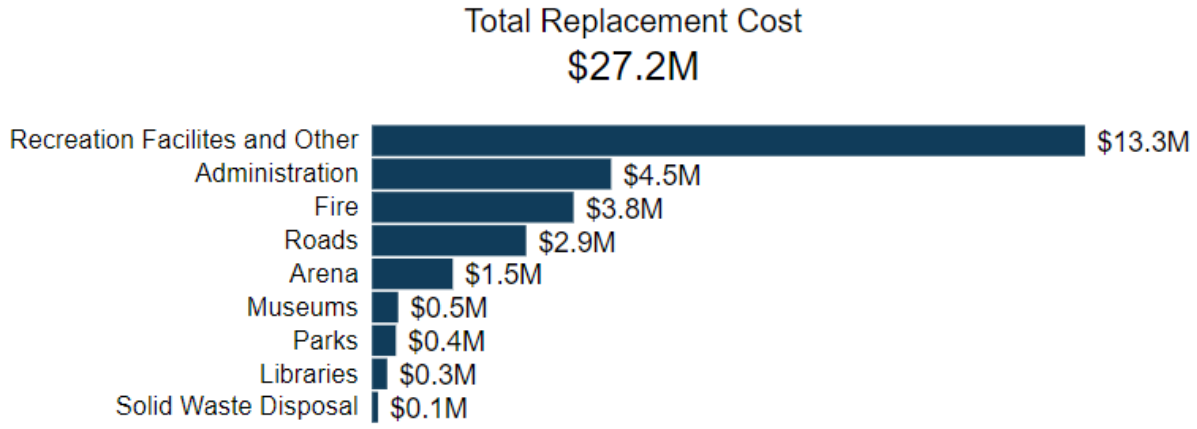
The Township of Whitewater Region owns and maintains several facilities and recreation centres that provide key services to the community. These include:

- Administration Buildings
- Recreation Facilities
- Fire Buildings
- Public Works Buildings

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 Township's Buildings inventory.

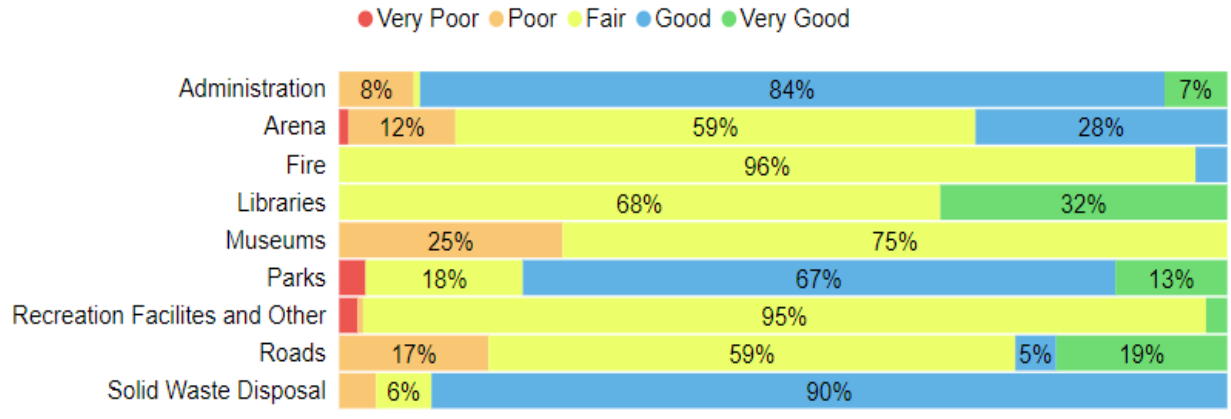
Asset Segment	Quantity (Components)	Replacement Cost Method	Total Replacement Cost
Administration	3 (6)	CPI Tables	$4,450,580
Arena	1 (72)	User-Defined Cost	$1,503,321
Fire	5 (8)	CPI Tables	$3,751,197
Libraries	1 (2)	CPI Tables	$281,791
Museums	2	CPI Tables	$486,369
Parks	6 (1)	CPI Tables	$444,324
Recreation Facilities and Other	3 (18)	CPI Tables	$13,271,238
Roads	3 (17)	CPI Tables	$2,868,800
Solid Waste Disposal	1 (4)	CPI Tables	$112,248
			$27,169,868



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
Administration	59%	Fair	84% Assessed
Arena	43%	Fair	100% Assessed
Fire	42%	Fair	100% Assessed
Libraries	58%	Fair	68% Assessed
Museums	35%	Poor	100% Assessed
Parks	57%	Fair	100% Assessed
Recreation Facilities and Other	46%	Fair	96% Assessed
Roads	47%	Fair	100% Assessed
Solid Waste Disposal	57%	Fair	100% Assessed
	48%	**Fair**	**95% Assessed**



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

Current Approach to Condition Assessment

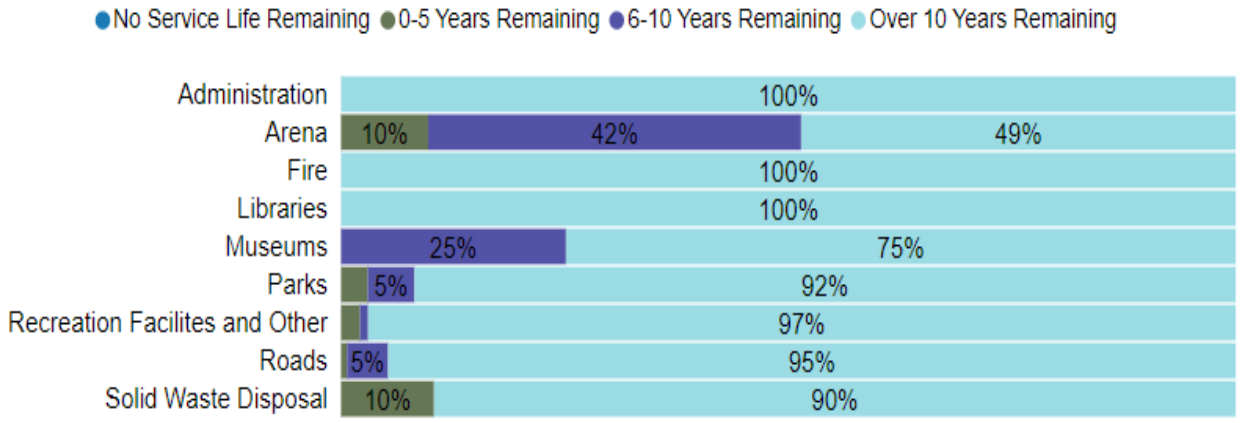
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Visual internal staff inspections are completed regularly on all critical buildings and components.
- Health & safety inspections are completed in accordance with the Technical Standards and Safety Authority (TSSA) and Electrical Safety Authority (ESA) for the applicable components/buildings.
- Third-party condition assessments are conducted as-needed, and provide staff with condition information and deficiency recommendations.

4.3.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Buildings 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)
Administration	25-50 years	21.5
Arena	10-100 years	20.0
Fire	25-50 years	18.8
Libraries	50 years	28.1
Museums	50 years	45.6
Parks	12-50 years	14.2
Recreation Facilities and Other	10-50 years	17.0
Roads	12-50 years	28.0
Solid Waste Disposal	12-50 years	16.6
		20.4



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.

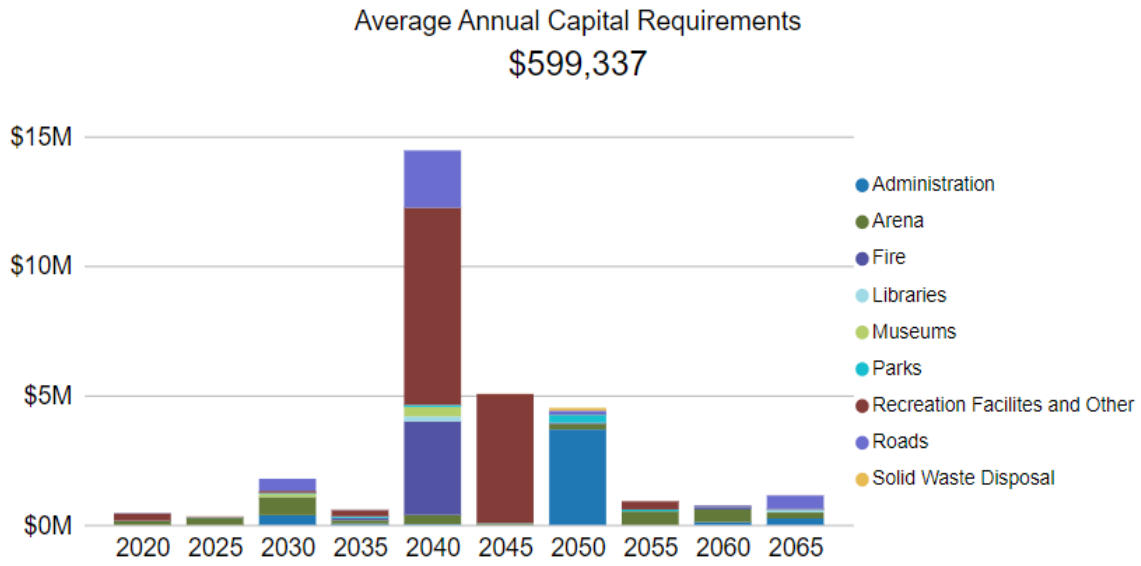
4.3.4 Lifecycle Management Strategy

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 Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance / Rehabilitation	Healthy and safety inspections are conducted as required by regulations
	Energy audits are completed on an as-needed basis; with the last audit conducted in 2020.
Replacement	Renewals and replacements are scheduled based on staff expertise, inspections, and manufacturer recommendations. Staff utilize a long-term capital forecast to plan ahead.

Forecasted Capital Requirements

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



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

4.3.5 Risk & Criticality

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

Risks to Current Asset Management Strategies

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

Aging Infrastructure

A significant number of facilities in the Township are aging and approaching the end of their useful life. In recent years, staff have focused their efforts on replacing deteriorated structures, but many deferred lifecycle activities remain to be completed.

Community Expectations

The level of service provided by the existing facilities infrastructures does not meet the growing community's expectations. Although some recreational facilities no longer meet the capacity and functional needs of the community, Staff are unable to decommission them due to Public interest/demand.

4.3.6 Levels of Service

The following tables identify the Township's current level of service for Buildings. These metrics include the technical and community level of service metrics that the Township has selected for this AMP.

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
Accesible & Reliable	Description of the current condition of municipal buildings and the plans that are in place to maintain or improve the provided level of service	The average condition of municipal buildings is currently 48% (Fair) based on the available data; Staff undertake regular maintenance, rehabilitation, and replacement activities to ensure that municipal buildings provide the necessary level of service to the community.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of facilities meeting AODA Standards	TBD
Performance	Average O&M cost / # of municipal facilities	TBD
	Total equivalent kWh energy consumption / m^2 of buildings	TBD
	% of buildings in good or very good condition	23%
	% of buildings in poor or very poor condition	6%

4.3.7 Recommendations

Asset Inventory

- The Township's asset inventory contains a single record for most facilities. Facilities consist of several separate capital components that have unique estimated useful lives and require asset-specific lifecycle strategies. Staff should work towards a component-based inventory of all facilities to allow for component-based lifecycle planning.

Condition Assessment Strategies

- Staff should implement regular condition assessments for all facilities to better inform short- and long-term capital requirements.

Risk Management Strategies

- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Consider conducting an accessibility study on all critical municipal buildings to better understand the level of service being provided.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.4 Machinery & Equipment

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

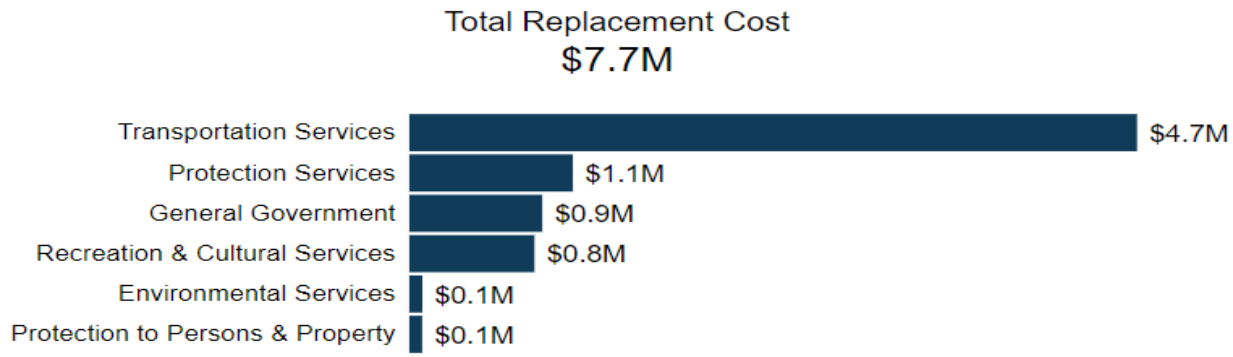
- Public works equipment
- General Government equipment
- Protection Services equipment
- Recreation Equipment

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

4.4.1 Asset Inventory & Replacement Cost

The following table includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township's Machinery & Equipment inventory.

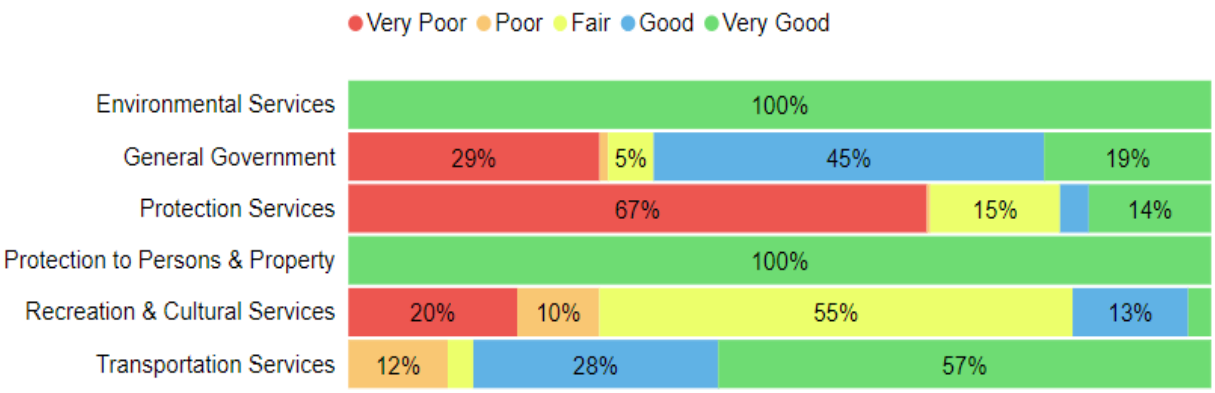
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Environmental Services	2	CPI Tables	$85,279
General Government	22	CPI Tables	$866,548
Protection Services	221	CPI Tables	$1,065,997
Protection to Persons & Property	2	CPI Tables	$83,994
Recreation & Cultural Services	34	CPI Tables	$815,546
Transportation Services	38	CPI Tables	$4,741,511
			$7,658,875



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
Environmental Services	90%	Very Good	Age-based
General Government	49%	Fair	4% Assessed
Protection Services	19%	Very Poor	18% Assessed
Protection to Persons & Property	93%	Very Good	Age-based
Recreation & Cultural Services	33%	Poor	80% Assessed
Transportation Services	65%	Good	54% Assessed
	54%	**Fair**	**43% Assessed**



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

Current Approach to Condition Assessment

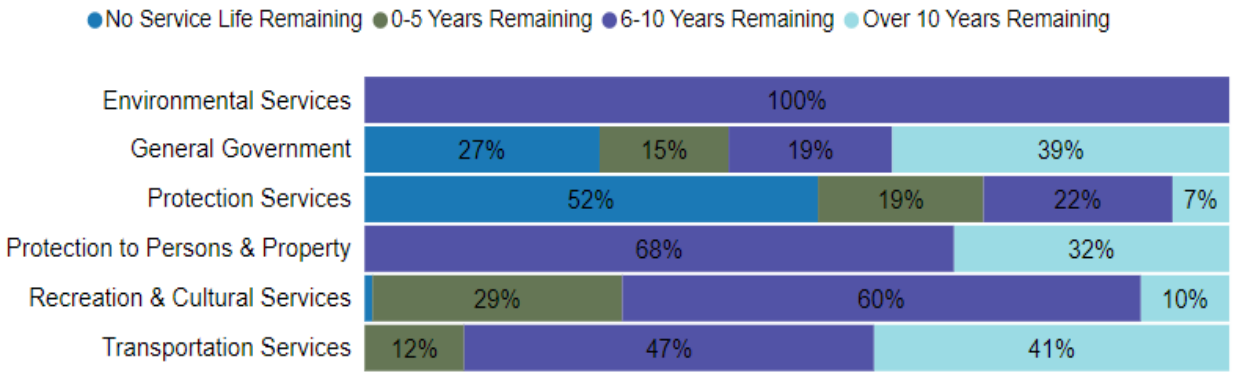
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Staff complete regular visual inspections of machinery & equipment assets to ensure they are in adequate condition and function as required.
- Fire assets are assessed in accordance with the National Fire Protection Association (NFPA) requirements.

4.4.3 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)
Environmental Services	10 years	1.0
General Government	5-20 years	9.3
Protection Services	5-30 years	18.4
Protection to Persons & Property	10-50 years	1.0
Recreation & Cultural Services	30 years	11.4
Transportation Services	10-25 years	7.3
		15.5



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

4.4.4 Lifecycle Management Strategy

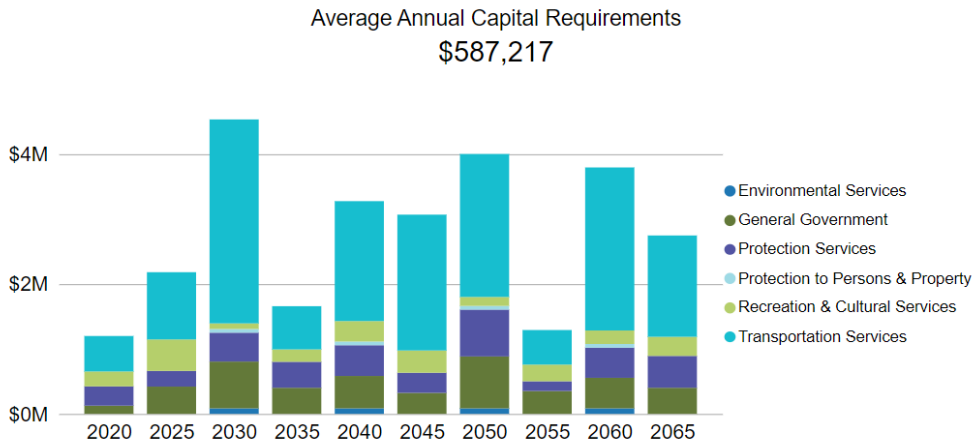
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Machinery & equipment is maintained according to manufacturer recommendations and supplemented by staff expertise. Fire assets are inspected and maintained more proactively due to their critical nature..
Rehabilitation/ Replacement	Machinery & Equipment assets are serviced and maintained on an as-needed basis, depending on their criticality to the Township's operations and regulatory requirements. Renewals and replacements are scheduled after the necessary inspections with the intention of maximizing the assets' service life.

Forecasted Capital Requirements

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



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

4.4.5 Risk & Criticality

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

Risks to Current Asset Management Strategies

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

Regulatory Compliance & Aging Infrastructure

A significant portion of machinery & equipment assets are approaching the end of their useful life. As equipment age, they will not perform as efficiently and may lead to increased operating costs. Legislative requirements determine the length of time machinery can be in service, therefore equipment can sometimes be replaced regardless of its condition/performance to meet regulatory requirements.

Organizational Capacity and Cognizance

The Township owns a significant number of machinery and equipment assets. Maintenance activities can be challenging to complete as needed due to limited staff capacity.

4.4.6 Levels of Service

The following tables identify the Township's current level of service for Machinery & Equipment. These metrics include the technical and community level of service metrics that the Township has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Machinery & Equipment assets.

Service Attribute	Qualitative Description	Current LOS (2020)
Accesible & Reliable	Description of the timelines for equipment inspections and scheduled repairs	Machinery & equipment assets are inspected and repaired proactively based on their criticality, performance, and inspections.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by Machinery & Equipment assets.

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of assets where their age is greater than their useful service life	49%
Performance	Average O&M costs/# of machinery & equipment	TBD
	% of machinery and equipment in good or very good condition	35%
	% of machinery and equipment in poor or very poor condition	23%

4.4.7 Recommendations

Replacement Costs

- All replacement costs used in this AMP are based on the inflation of historical costs. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.
- The Machinery & Equipment inventory is somewhat accurate; however, it can be managed more effectively by pooling/amalgamating smaller assets that are replaced regularly (e.g., computers, pagers, radios, etc.) together.

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.

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.5 Vehicles

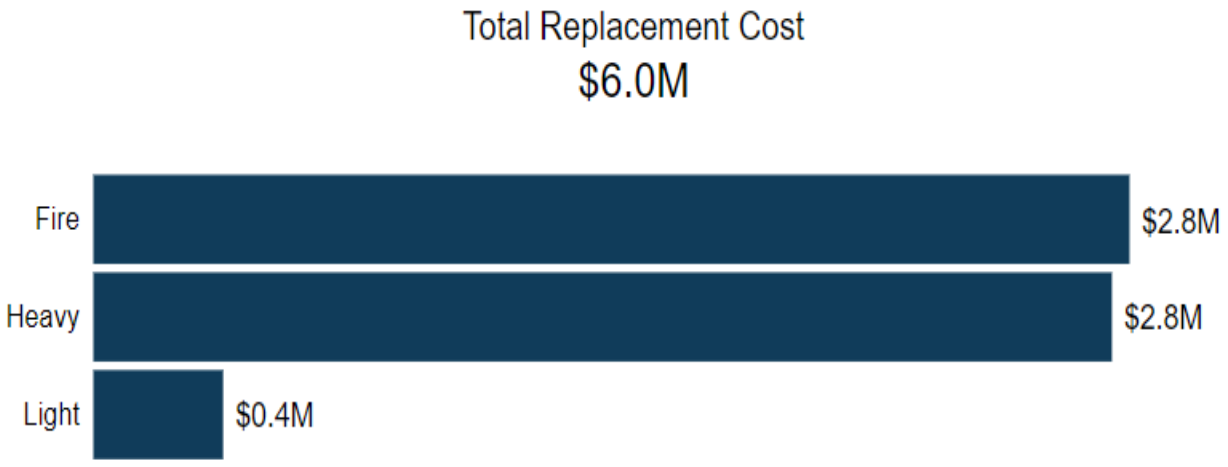
Vehicles allow staff to efficiently deliver municipal services and personnel. Municipal vehicles are used to support several service areas, including:

- Fire rescue vehicles to provide emergency services
- Heavy & Light duty vehicles

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 Township's Vehicles.

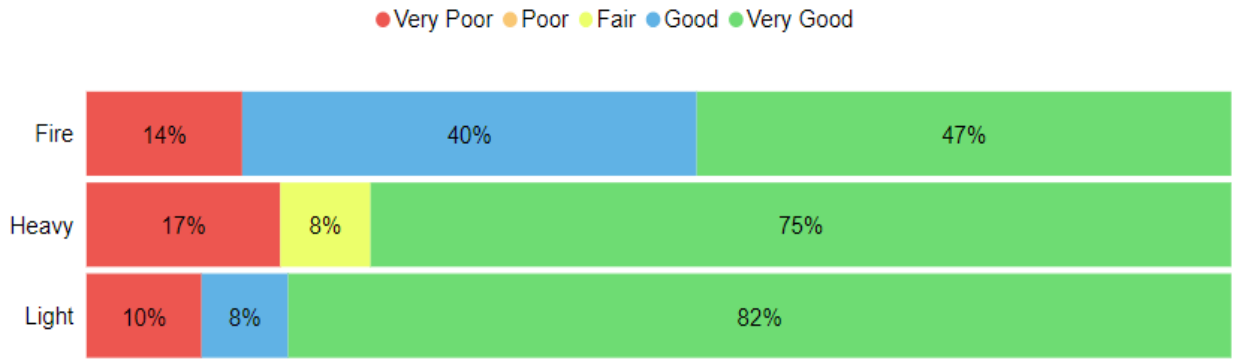
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Fire	12	CPI Tables	$2,835,776
Heavy	13	CPI Tables	$2,787,506
Light	9	40% CPI Tables 60% User-Defined Cost	$355,087
			$5,978,369



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
Fire	69%	Good	100% Assessed
Heavy	66%	Good	70% Assessed
Light	70%	Good	87% Assessed
	68%	**Good**	**85% Assessed**



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

Current Approach to Condition Assessment

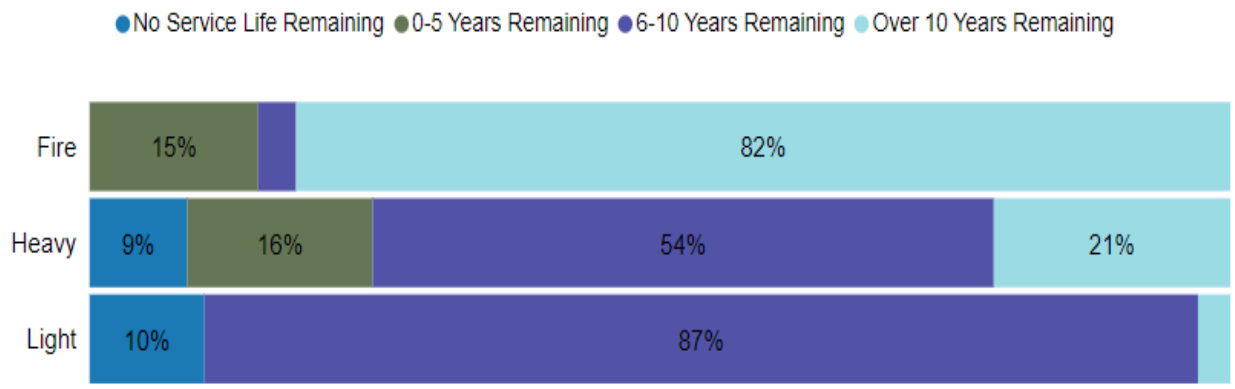
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- An internal mechanic conducts monthly inspections of vehicles to ensure they are in adequate working condition and in compliance with the Commercial Vehicle Operator's Registration (CVOR) requirements.
- Fire vehicles are inspected as required through the national Fire Protection Association (NFPA).

4.5.3 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)
Fire	7-50 Years	6.7
Heavy	10-20 Years	4.8
Light	7-15 Years	6.8
		6.0



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.

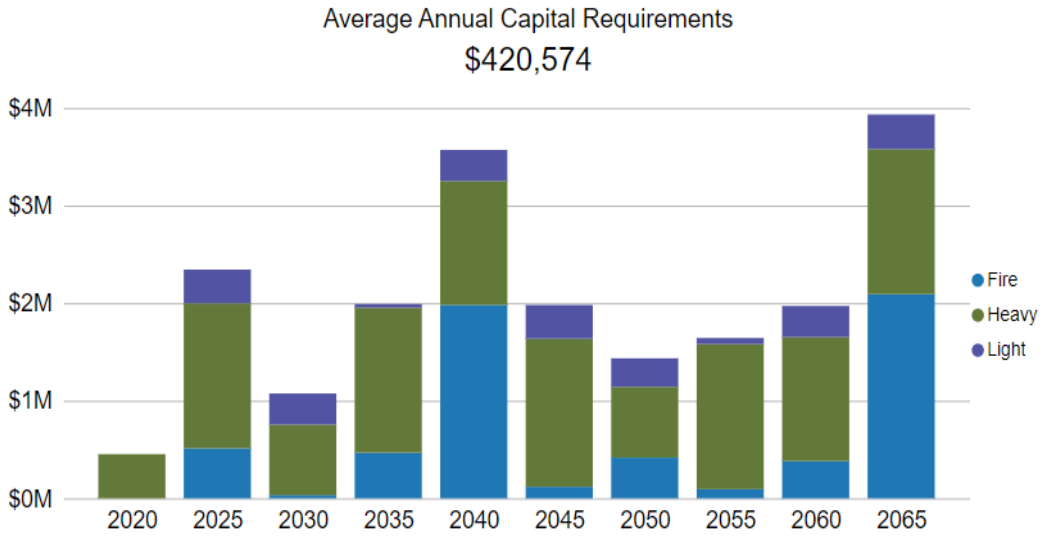
4.5.4 Lifecycle Management Strategy

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 Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Monthly inspections are conducted by an internal mechanic for all critical vehicles.
Rehabilitation/ Replacement	Vehicle renewals and replacements are performed based on mechanic recommendations and in compliance with regulatory requirements. Vehicles that are more critical to the Township's operations are priortized for reinvestment. Staff utilize a short-term capital plan for their vehicles rehabilitations and replacements.

Forecasted Capital Requirements

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



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

4.5.5 Risk & Criticality

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

Risks to Current Asset Management Strategies

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

Regulatory Compliance

Legislative and insurance requirements determine the length of time vehicles can be in service, so vehicles are sometimes replaced even though they are still in good condition in order to comply with requirements.

Staff Capacity

The Township owns a significant number of vehicles but only have one mechanic. Maintenance activities can sometimes be challenging to complete on schedule due to these limitations.

4.5.6 Levels of Service

The following tables identify the Township's current level of service for Vehicles. These metrics include the technical and community level of service metrics that the Township has selected for this AMP.

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
Accesible & Reliable	Description of the MTO and Fire regulated vehicle inspection process	Fire vehicles are inspected/tested annually in accordance with the National Fire Protection Association (NFPA) guidelines. All Commercial Vehicle Operator's Registration (CVOR) vehicles are inspected and maintained by certified mechanic.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of assets where their age is greater than their useful service life	6%
Performance	Average O&M costs / # of vehicles	TBD
	Average fuel consumption / # of vehicles	TBD
	% of vehicles in good or very good condition	81%
	% of vehicles in poor or very poor condition	15%

4.5.7 Recommendations

Asset Inventory

- 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.
- Continue to revise and update user-defined replacement costs. Replacement costs should be updated according to the best available information every 1-2 years.

Risk Management Strategies

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

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.6 Land Improvements

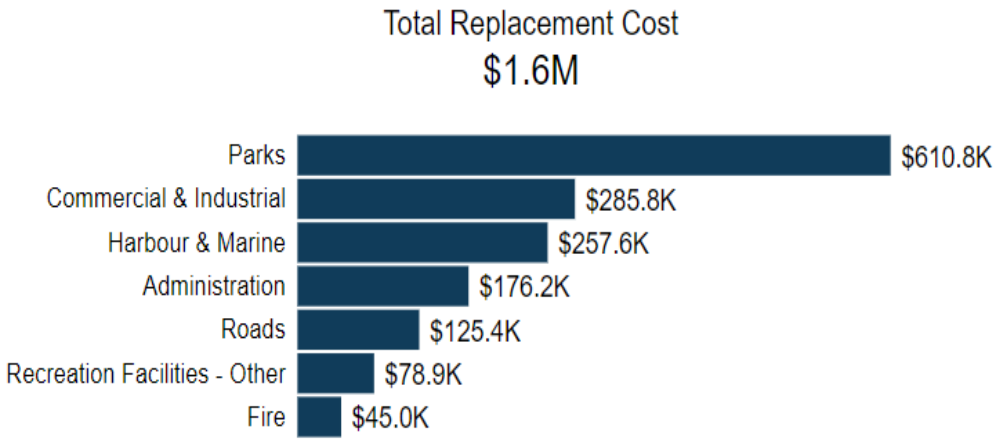
The Township of Whitewater Region owns a number of assets that are considered Land Improvements. This category includes:

- Parking lots for municipal facilities
- Fencing and bleacher
- Docks and wharfs
- Miscellaneous landscaping and other assets

4.6.1 Asset Inventory & Replacement Cost

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

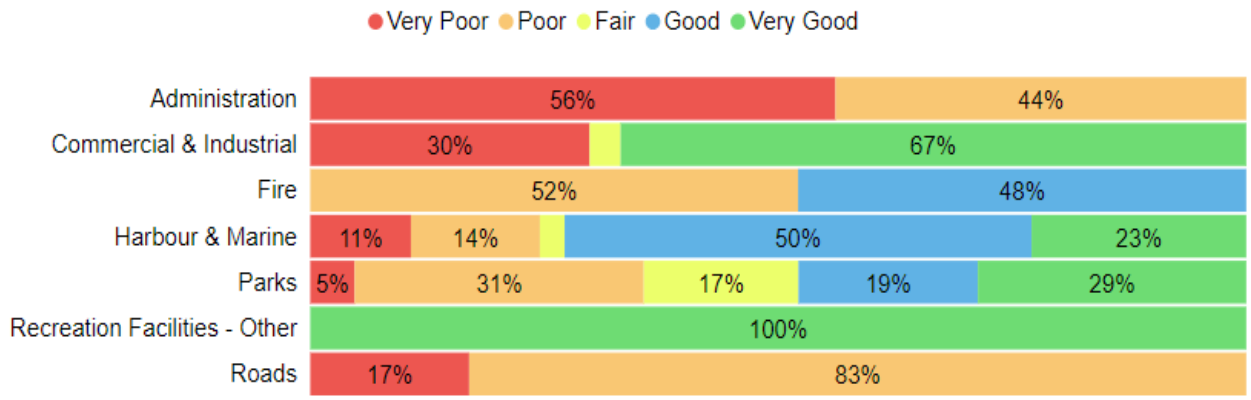
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Adminstration	2	CPI Tables	$176,211
Commerical & Industrial	6	CPI Tables	$285,781
Fire	2	CPI Tables	$45,007
Harbour & Marine	10	CPI Tables	$257,623
Parks	17	CPI Tables	$610,799
Recreation Facilities – Other	1	CPI Tables	$78,920
Roads	3	CPI Tables	$125,427
			$1,579,768



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
Adminstration	9%	Very Poor	Age-Based
Commerical & Industrial	68%	Good	Age-Based
Fire	39%	Poor	Age-Based
Harbour & Marine	54%	Fair	100% Assessed
Parks	50%	Fair	64% Assessed
Recreation Facilities – Other	96%	Very Good	Age-Based
Roads	17%	Very Poor	17% Assessed
	49%	**Fair**	**43% Assessed**



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

Current Approach to Condition Assessment

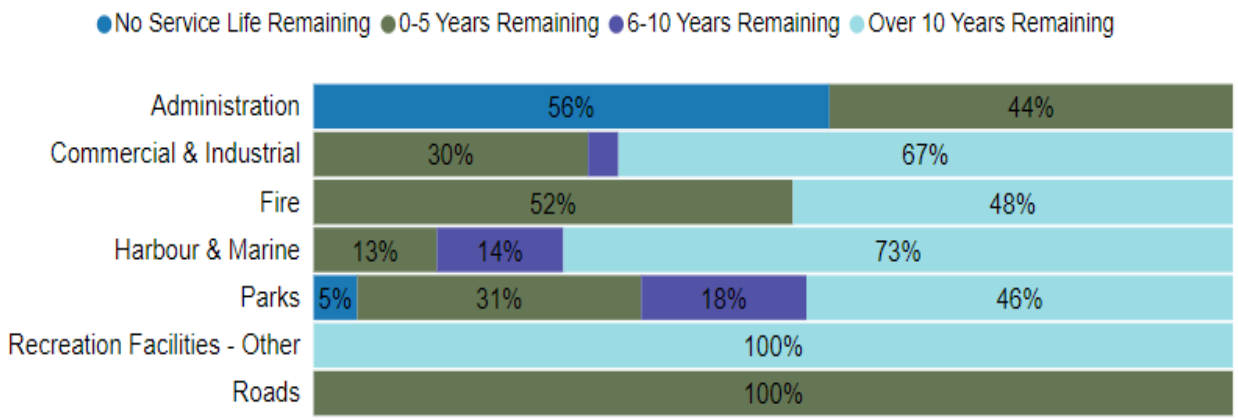
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Staff complete regular visual inspections of land improvements assets to ensure they are in state of adequate repair
- There are no formal condition assessment programs in place for land improvement assets.

4.6.3 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)
Adminstration	25 Years	24.1
Commerical & Industrial	15-20 Years	10.0
Fire	25 Years	15.1
Harbour & Marine	10-40 Years	13.3
Parks	10-60 Years	12.2
Recreation Facilities – Other	25 Years	1.0
Roads	25-40 Years	18.3
		13.0



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

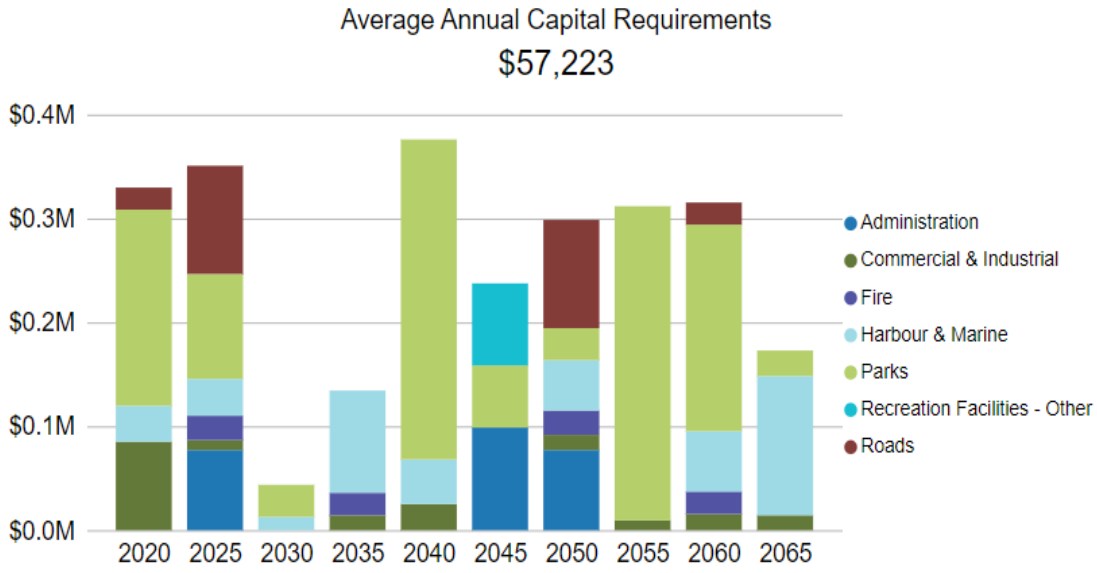
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

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

Forecasted Capital Requirements

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



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

4.6.5 Risk & Criticality

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

Risks to Current Asset Management Strategies

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

Financial Reinvestment

The current level of financial reinvestment does not sufficiently address maintenance and capital rehabilitation requirements to ensure land improvements remain in an adequate state of repair and achieve their intended service life.

Community Expectations

The current infrastructure owned by the Township does not meet the expectations of the changing community demographic. Due to staff capacity restrictions, it is not possible to accommodate all community expectations.

4.6.6 Levels of Service

The following tables identify the Township's current level of service for Land Improvements. These metrics include the technical and community level of service metrics that the Township has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Land Improvement assets.

Service Attribute	Qualitative Description	Current LOS (2020)
Safety	Description of the current condition of land improvement assets and the plans that are in place to maintain or improve the provided level of service	Land improvement assets are maintained and repaired on an as-needed basis with a focus on health & safety issues or regulatory compliance. Land improvement assets are in Fair condition overall.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of assets where their age is greater than their useful service life	5%
Performance	Average O&M costs / # of land improvement assets	TBD
	% of land improvements in good or very good condition	49%
	% of land improvements in poor or very poor condition	44%

4.6.7 Recommendations

Replacement Costs

- All replacement costs used in this AMP were based on the inflation of historical costs. These costs should be evaluated to determine their accuracy and reliability. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.
- Consider streamlining and simplifying the Land Improvements category by re-classifying assets that fit more appropriately under the Buildings or Machinery & Equipment categories. This will allow for even more streamlined levels of service metrics to be tracked.

Condition Assessment Strategies

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

Risk Management Strategies

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

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

5 Analysis of Rate-funded Assets

Key Insights

- Rate-funded assets are valued at $226 million
- 90% 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 $3.5 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

5.1 Water Network

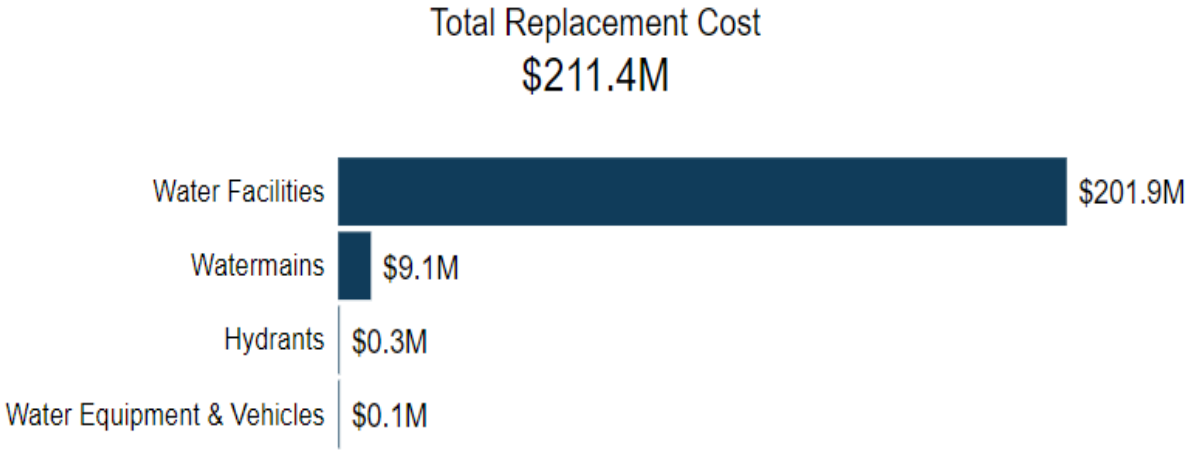
The Ontario Clean Water Agency (OCWA) is responsible for maintaining the operations and renewal of the water system in the Whitewater Region. Water services provided by the Township include the following:

- Reservoirs and wells
- Hydrants
- A system of water mains
- Water Equipment & Vehicles

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 Township's Water Network inventory.

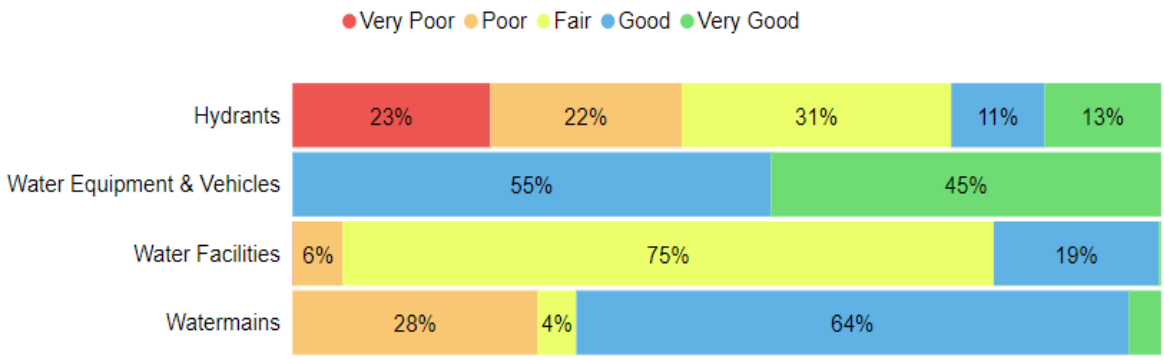
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Hydrants	124	CPI Tables	$338,939
Water Equipment & Vehicles	2	CPI Tables	$97,464
Water Facilities	3 (278)	CPI Tables	$201,867,591
Watermains	23 kms	User-Defined Cost	$9,071,386
			$211,375,380



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	34%	Poor	100% Assessed
Water Equipment & Vehicles	68%	Good	100% Assessed
Water Facilities	43%	Fair	100% Assessed
Watermains	48%	Fair	99% Assessed
	43%	**Fair**	**100% Assessed**



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

Current Approach to Condition Assessment

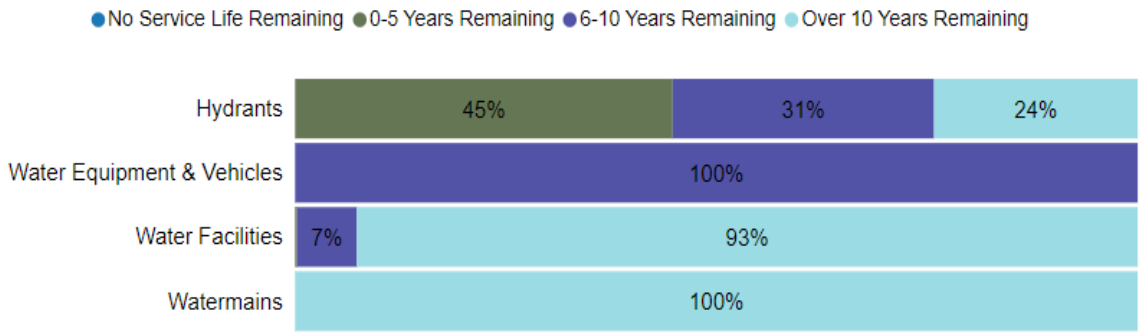
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- Staff primarily rely on the age, pipe material and number of breaks of water mains to determine their projected condition.
- OCWA conducts regular condition inspections on non-linear water assets.

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)
Hydrants	20 Years	27.3
Water Equipment & Vehicles	10 Years	5.6
Water Facilities	5-100 Years	20.9
Watermains	50-100 Years	34.8
		25.1



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.

5.1.4 Lifecycle Management Strategy

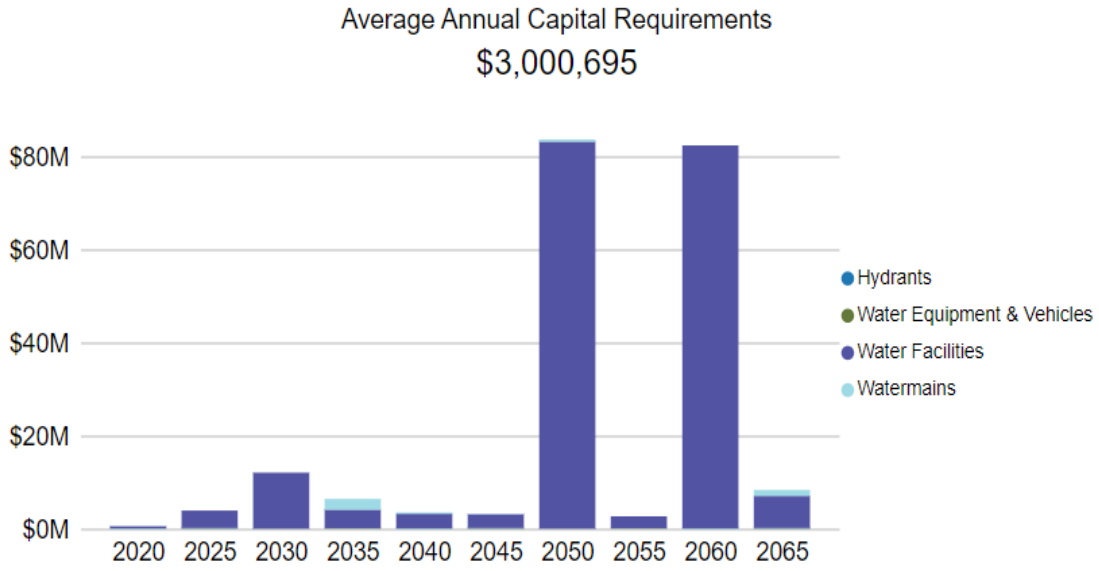
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Main flushing and valve turning is completed on each system, annually
	Periodic pressure testing is conducted as needed to identify deficiencies and potential leaks
Rehabilitation/ Replacement	In the absence of mid-lifecycle rehabilitative events, most mains are simply maintained with the goal of full replacement once it reaches its end-of-life
	Replacement activities are identified based on an analysis of the main break rate as well as any issues identified during regular maintenance activities

Forecasted Capital Requirements

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



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

5.1.5 Risk & Criticality

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

Risks to Current Asset Management Strategies

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

Growth

Population and employment growth will increase the demand on municipal services and potentially decrease the lifecycle of certain assets. As the population continues to grow, the Township must prioritize expanding its capacity to serve a larger population.

Legislative/Regulatory Requirements

Source water protection is the biggest risk that the Township is facing for their water network. There is a high amount of pressure on any changes made to the water network.

5.1.6 Levels of Service

The following tables identify the Township'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 Township has selected for this AMP.

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include maps, of the user groups or areas of the Township that are connected to the municipal water system	The Township services three settlement areas: Beachburg, Cobden and Haley systems. There are 1,532 non-metered water customers and 6 metered water customers connected to the various systems.
	Description, which may include maps, of the user groups or areas of the Township that have fire flow	Staff complete fire flowing on an as-needed basis. Flushing and hydrant repairs/replacements are completed regularly to ensure that adequate flowrate and pressure is available within the Township.

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 (2020)
Scope	% of properties connected to the municipal water system	16.3%
	% of properties where fire flow is available	15.7%
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

5.1.7 Recommendations

Asset Inventory

- There are a number of pooled water main assets that require further segmentation and length measurements to allow for asset-specific lifecycle planning and costing.
- Continue to revise and update user-defined replacement costs; especially for linear mains and high-priority assets (i.e., water buildings, vehicles). Replacement costs should be updated according to the latest tender or project prices, every 1-2 years.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water network assets in collaboration with OCWA.

Risk Management Strategies

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

Levels of Service

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

5.2 Sanitary Sewer Network

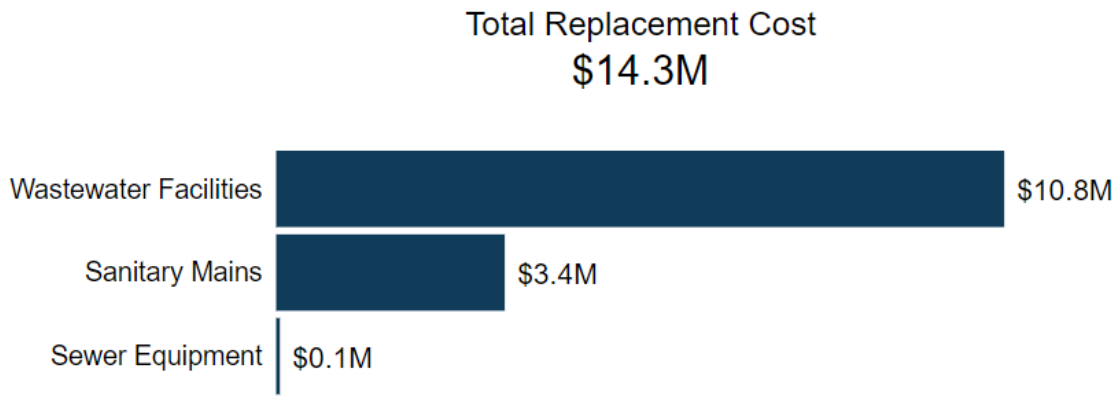
The sewer services provided by the Township are overseen by the Ontario Clean Water Agency (OCWA). They are responsible for the operations and renewal of the following:

- The Cobden Wastewater Treatment Plant
- A lift/pumping station
- A system of sanitary sewer force mains

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 Township's Sanitary Sewer Network inventory.

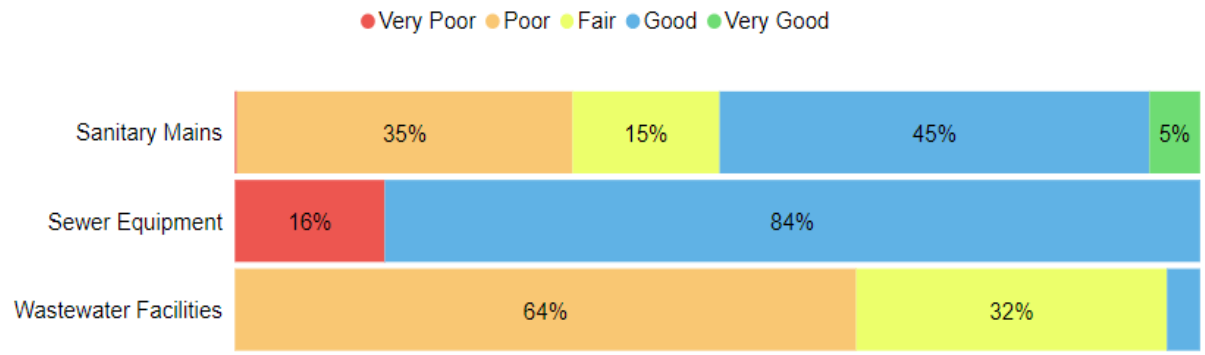
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Sanitary Mains	7.8 kms	User-Defined Cost	$3,393,967
Sewer Equipment	3	CPI Tables	$55,172
Wastewater Facilities	2 (8)	CPI Tables	$10,809,930
			$14,259,069



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
Sanitary Mains	44%	Fair	100% Assessed
Sewer Equipment	51%	Fair	Age-based
Wastewater Facilities	27%	Poor	100% Assessed
	31%	**Poor**	**100% Assessed**



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

Current Approach to Condition Assessment

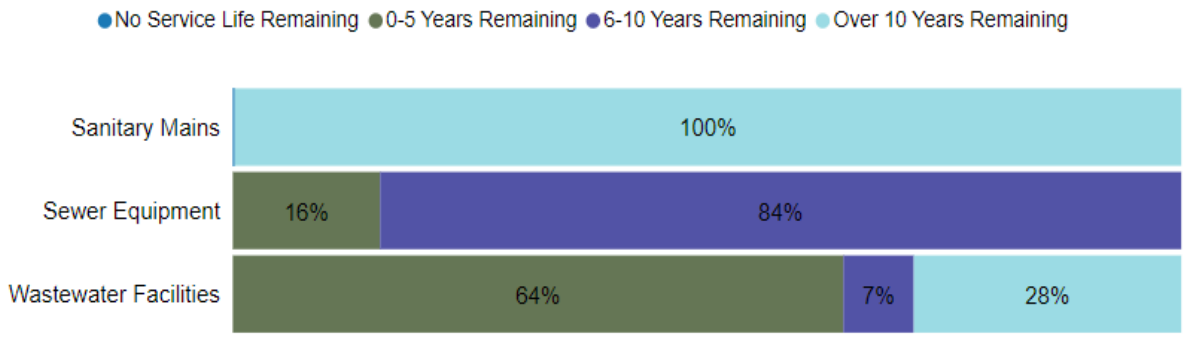
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the Township's current approach:

- CCTV inspections are completed by OCWA on an annual basis to the entire sanitary network. This information guides lifecycle activities.
- Sanitary assets are inspected regularly by staff and in accordance with manufacturer recommendations.

5.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Sanitary Sewer 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)
Sanitary Mains	75-100 Years	40.9
Sewer Equipment	10 Years	6.0
Wastewater Facilities	20-80 Years	35.8
		38.6

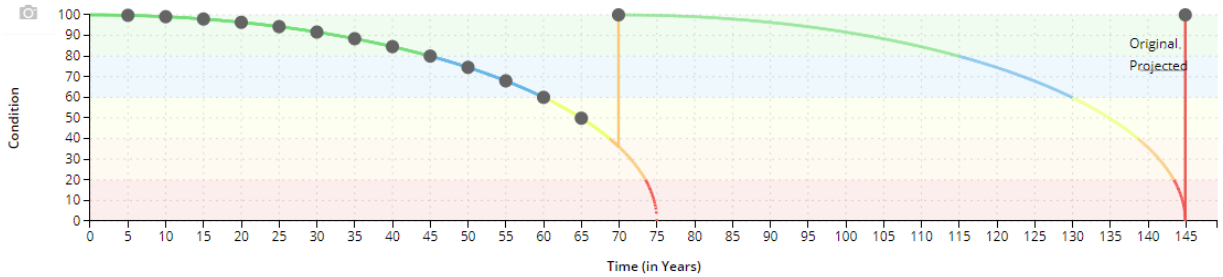


Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

5.2.4 Lifecycle Management Strategy

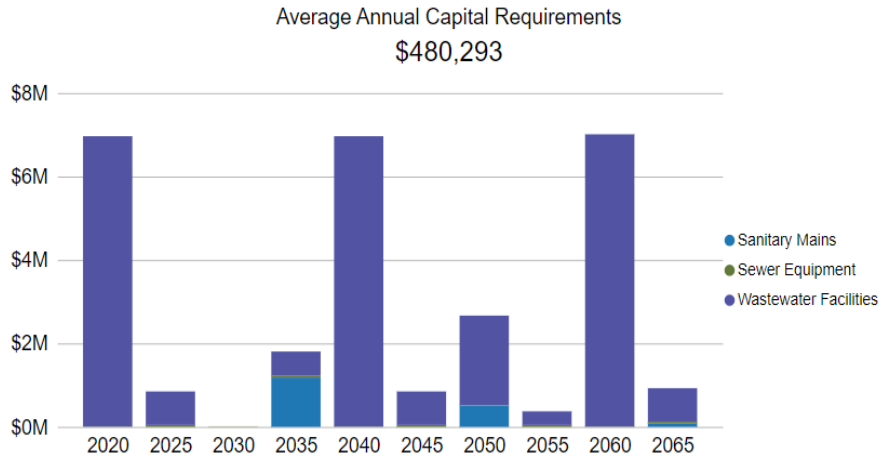
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. The following lifecycle strategy has been developed as a proactive approach to managing the lifecycle of sanitary mains. A trenchless re-lining strategy is expected to extend the service life of sanitary mains at a lower total cost of ownership.

Sanitary Mains		
Event Name	**Event Class**	**Event Trigger**
CCTV Inspection	Maintenance/Inspection	Annual
Flushing	Maintenance	As-needed
Trenchless Re-lining	Rehabilitation	As-needed
Replacement	Replacement	0% Condition



Forecasted Capital Requirements

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



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

5.2.5 Risk & Criticality

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

Risks to Current Asset Management Strategies

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

Capital Funding Strategies

Capital rehabilitation projects for the Sanitary Sewer Network are dependant on the availability of grant funding opportunities. When grants are not available, rehabilitation projects may be deferred.

Climate Change & Extreme Weather Events

Flooding and extreme weather causes damage to multiple components of the sanitary sewer network. Staff should identify and monitor effected sanitary sewer assets.

5.2.6 Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include maps, of the user groups or areas of the Township that are connected to the municipal wastewater system	The Township services three settlement areas: Beachburg, Cobden and Haley systems. There are 434 properties connected to the municipal wastewater system
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 Township does not own any combined sewers
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	The Township 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	Stormwater can enter sanitary sewers due to cracks in mains, manholes, private services or through indirect connections (e.g., weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its designed capacity which can cause water and/or sewage to backup into homes

Service Attribute	Qualitative Description	Current LOS (2020)
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The Township follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants. Staff adhere to the guidelines and the effluent is discharged with established minimum requirements for critical parameters

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of properties connected to the municipal wastewater system	7.6%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	Not Applicable
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	TBD

5.2.7 Recommendations

Asset Inventory

- There are a number of pooled sanitary main assets that require further segmentation and length measurements to allow for asset-specific lifecycle planning and costing.
- Continue to revise and update user-defined replacement costs. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water network assets.
- Document and upload the condition ratings of the sanitary mains from the annual CCTV inspections into the asset management database to inform long-term planning.

Risk & Lifecycle Management Strategies

- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.
- A trenchless re-lining strategy is expected to extend the service life of sanitary mains at a lower total cost of ownership and should be implemented to extend the life of infrastructure at the lowest total cost of ownership.
- Evaluate the efficacy of the Township's lifecycle management strategies at regular intervals to determine the impact cost, condition, and risk.

Levels of Service

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

6 Impacts of Growth

Key Insights

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

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

6.1.1 County of Renfrew Official Plan (March 2019)

The Township of Whitewater Region does not have a local official plan. Much of the information related to growth and development is taken from Renfrew County's official plan. The County's official plan was adopted by council in 2002, with the latest amendment, dated the 22nd of March 2019.

6.1.2 Growth Study Report (December 2020)

Whitewater Region's 2020 growth study report provides the Township with population, dwelling, and employment projections along with recommendations for settlement area boundary expansion.

The table below outlines the population, dwelling, and employment forecasts for the Whitewater Region[3]:

Township of Whitewater Region

Year	Population	Dwelling	Employed by Place-of-Work (EPOW)
2016	7000	2735	2120
2021	7340	2836	2259
2026	7621	2926	2334
2031	7759	2939	2367
2036	7844	2925	2389
2041	7924	2910	2421

Whitewater Region's population is projected to grow by 11.7% by 2041. The number of dwellings, and EPOW are projected to grow by 6% and 12.4%, respectively.

[3] This information can be found in the Township's 2020 Final Growth Study Report

6.2 Impact of Growth on Lifecycle Activities

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

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

7 Financial Strategy

Key Insights

- The Township is committing approximately $1,196,000 towards capital projects per year from sustainable revenue sources

- Given the annual capital requirement of $12,907,000, there is currently a funding gap of $11,711,000 annually

- For tax-funded assets, we recommend increasing tax revenues by 4.2% each year for the next 20 years to achieve a sustainable level of funding

- For the Sanitary Sewer Network, we recommend increasing rate revenues by 2.9% annually for the next 20 years to achieve a sustainable level of funding

- For the Water Network, we recommend increasing rate revenues by 7.1% annually for the next 20 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 Township of Whitewater to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

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

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

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

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

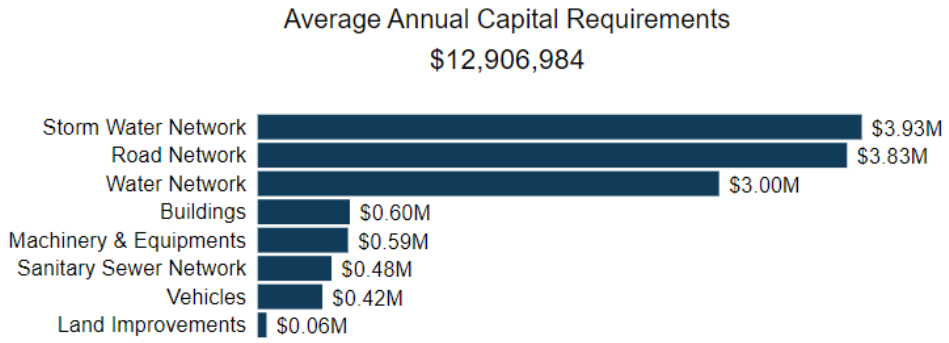
1. In order to reduce financial requirements, consideration has been given to revising service levels downward.
2. All asset management and financial strategies have been considered. For example:
    a. If a zero-debt policy is in place, is it warranted? If not the use of debt should be considered.

b. Do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

7.1.1 Annual Requirements & Capital Funding

Annual Requirements

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability. In total, the Township must allocate approximately $12.9 million annually to address capital requirements for the assets included in this AMP.



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

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

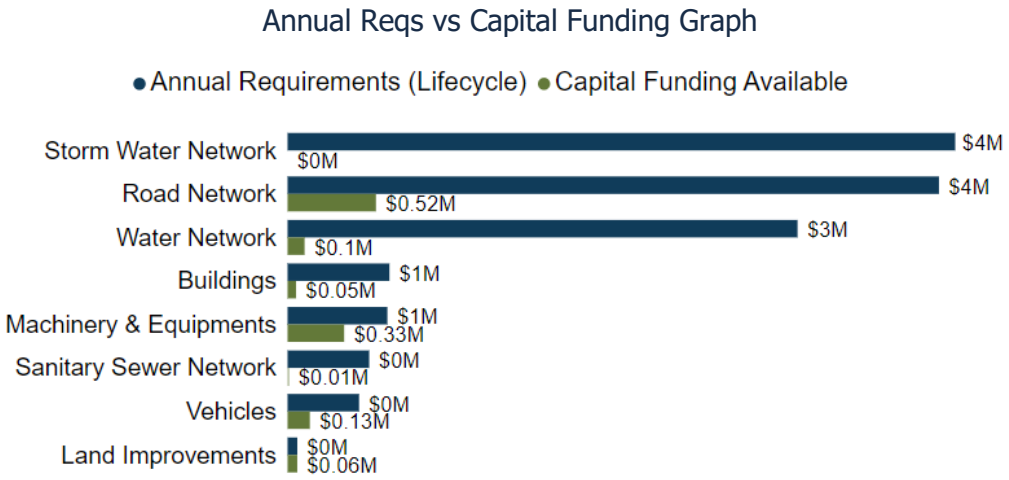
1. **Replacement Only Scenario**: Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life.
2. **Lifecycle Strategy Scenario**: Based on the assumption that lifecycle activities are performed at strategic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

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$4,933,000	$3,833,000	$1,100,000
Storm Water Network	$5,492,000	$3,929,000	$1,563,000

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $1,100,000 for the Road Network and $1,563,000 for the Storm Water Network. This represents an overall reduction of the annual requirements for each category by 22% and 28% respectively. As the lifecycle strategy scenario represents the lowest cost option available to the Township, it has been used in the development of the financial strategy.

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $1,196,000 towards capital projects per year. Given the annual capital requirement of $12,907,000, there is currently a funding gap of $11,711,000 annually.



7.2 Funding Objective

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

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

Note: For the purposes of this AMP, we have excluded gravel roads since they are a perpetual maintenance asset and end of life replacement calculations do not normally apply. If gravel roads are maintained properly, they can theoretically have a limitless service life.
For each scenario developed we have included strategies, where applicable, regarding the use of cost containment and funding opportunities.

7.3 Financial Profile: Tax Funded Assets

7.3.1 Current Funding Position

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

Asset Category	Avg. Annual Requirement	Annual Funding Available					Annual Deficit
		Taxes	Gas Tax	OCIF	Capital Reserve	Total Available	
Buildings	599,000	44,000	0	0	6,000	50,000	549,000
Land Improvements	57,000	15,000	0	0	42,000	57,000	0
Machinery & Equipment	587,000	19,000	0	0	314,000	333,000	254,000
Road Network	3,833,000	14,000	220,000	220,000	66,000	520,000	3,313,000
Storm Water Network	3,929,000	0	0	0	0	0	3,929,000
Vehicles	421,000	59,000	0	0	72,000	131,000	290,000
	9,426,000	**151,000**	**220,000**	**220,000**	**500,000**	**1,091,000**	**8,335,000**

The average annual investment requirement for the above categories is $9,426,000. Annual revenue currently allocated to these assets for capital purposes is $1,091,000 leaving an annual deficit of $8,335,000. Put differently, these infrastructure categories are currently funded at 11.6% of their long-term requirements.

7.3.2 Full Funding Requirements

In 2020, Township of Whitewater has annual tax revenues of $6,396,000. 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
Buildings	8.6%
Land Improvements	0%
Machinery & Equipment	4.0%
Road Network	51.8%
Storm Water Network	61.4%
Vehicles	4.5%
	130.3%

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

a) Whitewater's formula based OCIF grant is not a guaranteed sustainable source of revenue, but the Township has received the grant consistently in the past. The amounts received for future years are not predicted.
b) Whitewater's debt payments for these asset categories will be decreasing by $275,000 over the over the next 10 years. Although not shown in the table, debt payment decreases will be $226,000 and $72,000 over the next 15 and 20 years respectively.

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

	Without Capturing Changes				**With Capturing Changes**			
	5 Years	**10 Years**	**15 Years**	**20 Years**	**5 Years**	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	8,335,000	8,335,000	8,335,000	8,335,000	8,335,000	8,335,000	8,335,000	8,335,000
Change in Debt Costs	N/A	N/A	N/A	N/A	0	-137,000	-166,000	-249,000
Change in OCIF Grants	N/A	N/A	N/A	N/A	0	0	0	0
Resulting Infrastructure Deficit	8,335,000	8,335,000	8,335,000	8,335,000	8,335,000	8,198,000	8,169,000	8,086,000
Tax Increase Required	130.3%	130.3%	130.3%	130.3%	130.3%	128.2%	127.7%	126.4%
Annually	**18.2%**	**8.8%**	**5.8%**	**4.3%**	**18.2%**	**8.6%**	**5.7%**	**4.2%**

7.3.3 Financial Strategy Recommendations

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

a) when realized, reallocating the debt cost reductions of $249,000 to the infrastructure deficit as outlined above.
b) increasing tax revenues by 4.2% each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
c) allocating the current gas tax and OCIF revenue as outlined previously.
d) allocating the scheduled OCIF grant increases to the infrastructure deficit as they occur.
e) reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
f) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable since this funding is a multi-year commitment[4].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $0 for Buildings, $102,000 for the Road Network, $684,000 for Machinery & Equipment, $128,000 for Land Improvements, $0 for the Storm Water Network and $274,000 for Vehicles.

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

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

7.4 Financial Profile: Rate Funded Assets

7.4.1 Current Funding Position

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

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Rates	To Operations	Capital Reserve	Total Available	
Water Network	3,000,000	979,000	-979,000	100,000	100,000	2,900,000
Sanitary Sewer Network	480,000	606,000	-606,000	5,000	5,000	475,000
	3,480,000	**1,585,000**	**-1,585,000**	**105,000**	**105,000**	**3,375,000**

The average annual investment requirement for the above categories is $3,480,000. Annual revenue currently allocated to these assets for capital purposes is $105,000 leaving an annual deficit of $3,375,000. Put differently, these infrastructure categories are currently funded at 3% of their long-term requirements.

7.4.2 Full Funding Requirements

In 2020, Whitewater had annual sanitary revenues of $606,000 and annual water revenues of $979,000. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following changes over time:

Asset Category	Rate Change Required for Full Funding
Water Network	296.2%
Sanitary Sewer Network	78.4%

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 Sewer Network			
	5 Years	**10 Years**	**15 Years**	**20 Years**	**5 Years**	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	2,900,000	2,900,000	2,900,000	2,900,000	475,000	475,000	475,000	475,000
Change in Debt Costs	0	12,000	0	-65,000	0	0	-8,000	-14,000
Resulting Infrastrcture Deficit	2,900,000	2,912,000	2,900,000	2,835,000	475,000	475,000	467,000	461,000
Rate Increase Required	296.2%	297.4%	296.2%	289.6%	78.4%	78.4%	77.1%	76.1%
Annually:	**31.8%**	**14.8%**	**9.7%**	**7.1%**	**12.3%**	**6.0%**	**3.9%**	**2.9%**

7.4.3 Financial Strategy Recommendations

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

a) increasing rate revenues by 7.1% for the Water Network and by 2.9% for the Sanitary Sewer Network each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
b) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

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

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $0 for the Water Network and $7,000 for the Sanitary Sewer Network.

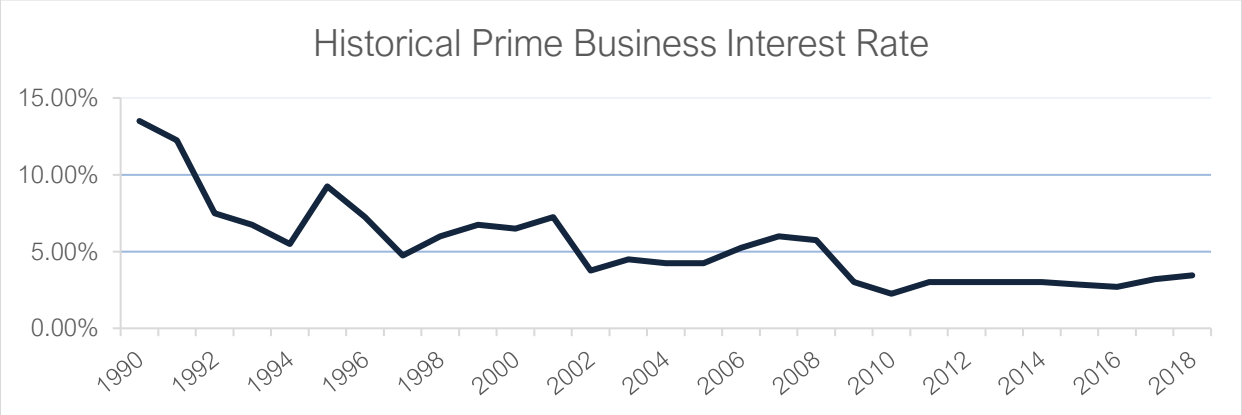
Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

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%[5] 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:



[5] 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 Whitewater has historically used debt for investing in the asset categories as listed. There is currently $1,217,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $400,000, well within its provincially prescribed maximum of $1,770,000.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2016	2017	2018	2019	2020
Buildings	0	0	0	0	0	0
Land Improvements	0	0	0	0	0	0
Machinery & Equipment	0	0	0	0	565,000	0
Road Network	0	0	0	0	1,179,000	0
Storm Water Network	0	0	0	0	0	0
Vehicles	1,217,000	0	0	0	0	0
Total Tax Funded:	**1,217,000**	**0**	**0**	**0**	**1,744,000**	**0**
Water Network	0	0	0	0	314,000	0
Sanitary Sewer Network	0	0	0	0	79,000	0
Total Rate Funded:	**0**	**0**	**0**	**0**	**2,137,000**	**0**

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2020	2021	2022	2023	2024	2025	2030
Buildings	0	0	0	0	0	0	0
Land Improvements	38,000	37,000	36,000	35,000	34,000	0	0
Machinery & Equipment	82,000	163,000	163,000	163,000	122,000	81,000	0
Road Network	110,000	110,000	110,000	110,000	110,000	110,000	83,000
Storm Water Network	0	0	0	0	0	0	0
Vehicles	38,000	77,000	77,000	77,000	77,000	77,000	48,000
Total Tax Funded:	**268,000**	**387,000**	**386,000**	**385,000**	**343,000**	**268,000**	**131,000**
Water Network	118,000	118,000	118,000	119,000	118,000	118,000	130,000
Sanitary Sewer Network	14,000	14,000	14,000	14,000	14,000	14,000	14,000
Total Rate Funded:	**132,000**	**132,000**	**132,000**	**133,000**	**132,000**	**132,000**	**144,000**

The revenue options outlined in this plan allow Whitewater Region 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 Whitewater.

Asset Category	Balance on December 31, 2020
Buildings	290,000
Land Improvements	290,000
Machinery & Equipment	291,000
Road Network	306,000
Storm Water Network	291,000
Vehicles	319,000
Total Tax Funded:	**1,787,000**
Water Network	291,000
Sanitary Sewer Network	291,000
Total Rate Funded:	**582,000**

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

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

These reserves are available for use by applicable asset categories during the phase-in period to full funding. This coupled with Whitewater'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 Whitewater to integrate proposed levels of service for all asset categories in its asset management plan update. We recommend that future planning should reflect adjustments to service levels and their impacts on reserve balances.

8 Appendices

Key Insights

- Appendix A identifies projected 10-year capital requirements for each asset category
- Appendix B includes 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
Boulevard	$0	$0	$0	$0	$0	$147,450	$0	$233,550	$0	$0	$0
Road Surface	$0	$205,450	$0	$806,000	$2,060,100	$1,137,200	$4,027,100	$1,554,000	$4,449,550	$3,324,400	$879,200
Sidewalk	$102,150	$0	$95,550	$0	$0	$226,800	$0	$0	$0	$189,450	$0
Street Lights	$0	$0	$0	$0	$0	$0	$0	$70,500	$0	$0	$0
	$102,150	**$205,450**	**$95,550**	**$806,000**	**$2,060,100**	**$1,511,450**	**$4,027,100**	**$1,858,050**	**$4,449,550**	**$3,513,850**	**$879,200**

Stormwater Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Municipal Drains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Roadside Ditches	$0	$0	$0	$140,000	$25,931,500	$0	$24,692,500	$0	$7,364,000	$0	$10,507,000
Storm Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$140,000**	**$25,931,500**	**$0**	**$24,692,500**	**$0**	**$7,364,000**	**$0**	**$10,507,000**

Buildings & Facilities											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Administration	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Arena	$0	$0	$16,200	$960	$30,000	$97,320	$2,000	$61,390	$0	$101,880	$91,800
Fire	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Libraries	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Museums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Parks	$0	$0	$13,250	$0	$0	$0	$0	$11,794	$0	$11,406	$0
Rereation Facilities and Other	$0	$0	$0	$0	$282,577	$0	$0	$7,000	$0	$28,148	$0
Roads	$0	$0	$0	$0	$19,208	$0	$0	$0	$0	$0	$0
Solid Waste Disposal	$0	$0	$0	$0	$4,672	$0	$7,000	$0	$0	$0	$0
	$0	**$0**	**$29,450**	**$960**	**$336,457**	**$97,320**	**$9,000**	**$80,184**	**$0**	**$141,434**	**$91,800**

Machinery & Equipment											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Environmental Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
General Government	$214,098	$21,474	$16,786	$27,891	$52,109	$8,016	$225,059	$6,189	$27,891	$123,251	$37,991
Protection Services	$462,851	$96,096	$146,875	$8,991	$4,136	$41,390	$24,588	$3,333	$17,375	$131,461	$65,005
Protection to Persons & Property	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Recreation & Cultural Services	$7,366	$0	$152,237	$8,576	$0	$69,104	$5,742	$205,545	$14,160	$184,093	$75,196
Transportation Services	$0	$0	$0	$0	$15,313	$530,772	$0	$133,404	$7,015	$895,450	$0
	$684,315	**$117,570**	**$315,898**	**$45,458**	**$71,558**	**$649,282**	**$255,389**	**$348,471**	**$66,441**	**$1,334,255**	**$178,192**

Vehicles											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Fire	$0	$0	$0	$0	$0	$0	$419,039	$0	$0	$85,744	$8,637
Heavy	$238,498	$0	$233,577	$0	$0	$219,699	$0	$0	$0	$1,485,900	$0
Light	$35,721	$0	$0	$0	$0	$0	$0	$309,306	$35,721	$0	$0
	$274,219	**$0**	**$233,577**	**$0**	**$0**	**$219,699**	**$419,039**	**$309,306**	**$35,721**	**$1,571,644**	**$8,637**

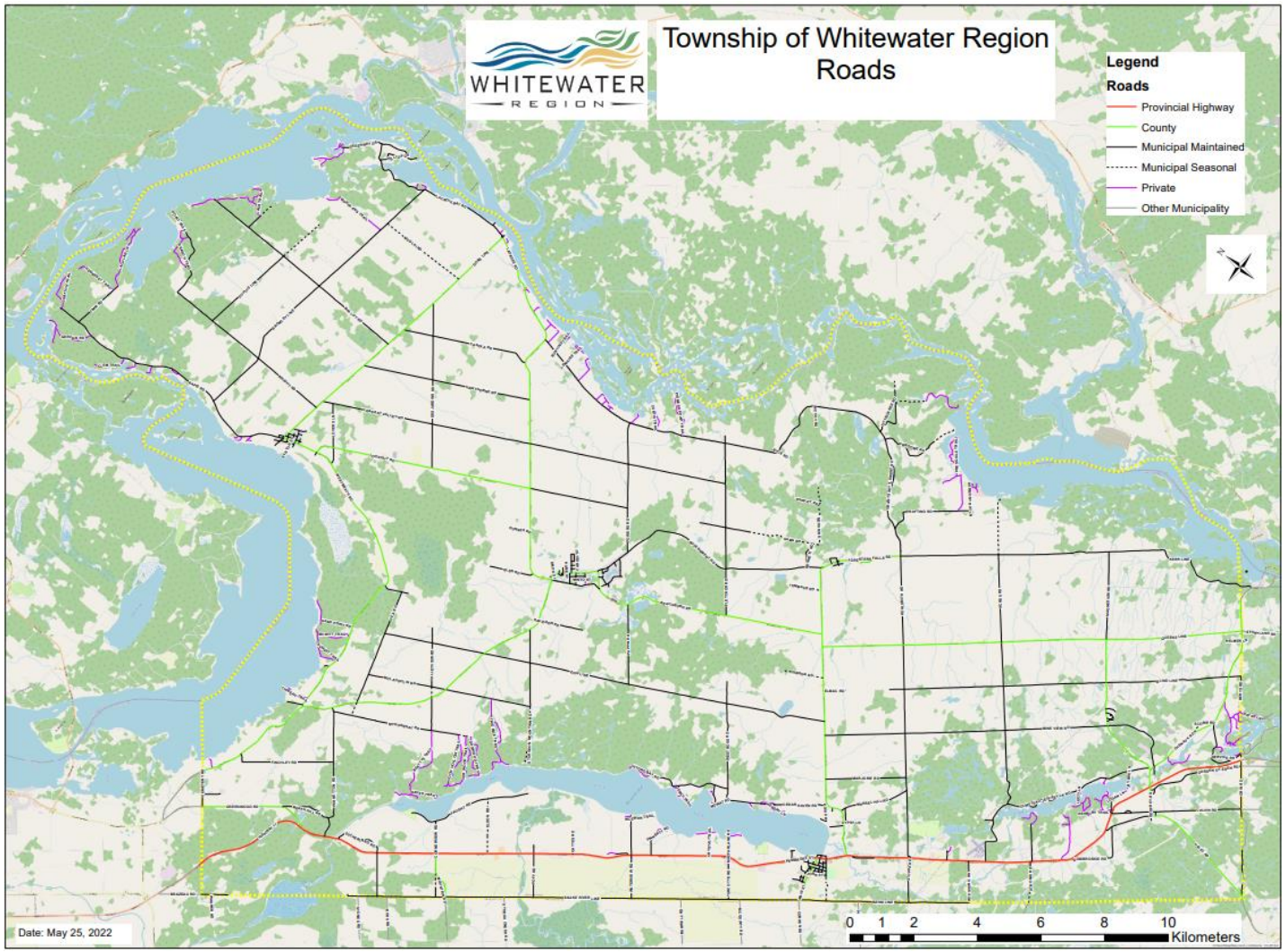
Land Improvements											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Administration	$98,884	$0	$0	$0	$0	$0	$0	$77,327	$0	$0	$0
Commerical & Industrial	$0	$0	$0	$0	$85,301	$0	$0	$0	$0	$9,468	$0
Fire	$0	$0	$0	$0	$0	$0	$23,460	$0	$0	$0	$0
Harbour & Marine	$0	$0	$27,706	$0	$0	$6,817	$0	$0	$0	$35,499	$0
Parks	$28,982	$0	$0	$0	$0	$188,711	$0	$81,414	$0	$19,525	$0
Recreation Faciltities – Other	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Roads	$0	$0	$21,292	$0	$0	$0	$0	$104,135	$0	$0	$0
	$127,866	**$0**	**$48,998**	**$0**	**$85,301**	**$195,528**	**$23,460**	**$262,876**	**$0**	**$64,492**	**$0**

Water Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Hydrants	$0	$0	$77,201	$0	$0	$74,659	$0	$0	$0	$105,172	$0
Water Equipment & Vehicles	$0	$0	$0	$0	$0	$0	$0	$53,707	$0	$43,757	$0
Water Facilities	$0	$0	$0	$0	$240,422	$184,257	$51,811	$109,675	$318,836	$3,213,770	$40,240
Watermains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$77,201**	**$0**	**$240,422**	**$258,916**	**$51,811**	**$163,382**	**$318,836**	**$3,362,699**	**$40,240**

Sanitary Sewer Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Sanitary Mains	$7,119	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sewer Equipment	$0	$0	$8,568	$0	$0	$0	$0	$0	$46,604	$0	$0
Wastewater Facilities	$0	$0	$0	$0	$0	$6,959,221	$0	$0	$0	$802,987	$0
	$7,119	**$0**	**$8,568**	**$0**	**$0**	**$6,959,221**	**$0**	**$0**	**$46,604**	**$802,987**	**$0**

Appendix B: Level of Service Maps

Road Network Map



Appendix C: Risk Rating Criteria

Probability of Failure

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Probability of Failure Score
Road Network Buildings Land Improvements Machinery & Equipment Sanitary Sewer Network Storm Water Network Vehicles Water Network	Condition	100%	8-10	1
			6-8	2
			4-6	3
			2-4	4
			0-2	5

Consequence of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Buildings Land Improvements Machinery & Equipment Sanitary Sewer Network Road Network Storm Water Network Vehicles Water Network	Economic (100%)	Replacement Cost (100%)	$0-$100,000	1
			$100,000-$250,000	2
			$250,000-$500,000	3
			$500,000-$1,000,000	4
			$1,000,000+	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 Township's condition assessment strategy should outline several key considerations, including:

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

Role of Asset Condition Data

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

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

Guidelines for Condition Assessment

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

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

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

Developing a Condition Assessment Schedule

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

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

Appendix E: Key Recommendations

Area of Concern	Recommendations
Asset Management Process	Develop a data governance framework to ensure accurate and reliable data is being collected and utilized for the asset management program. This should include a condition collection strategy for all critical assets.
Asset Management Process	Assess resourcing needs and staff capacity limitations for asset management purposes. Consider hiring an asset management coordinator or financial analyst to champion and coordinate asset management initiatives.
Asset Management Process	Update the Township's tangible capital asset (TCA) policy to better align with typical engineering/lifecycle service life estimates.
All Assets	Refine risk and lifecycle models to develop more comprehensive short-term and long-term capital forecasts.
All Assets	Update condition information, through visual staff inspections or third-party consultants, on a regular basis.
All 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.
All Assets	Track and document the current levels of service that have been identified within this AMP to better understand the Township's capabilities and in preparation for O.Reg. 588/17 2025 requirements (setting target levels of service)
All Assets	Review and update replacement cost information regularly based on latest tender prices (every 1-2 years).
Road Network	Consider expanding the road network inventory to include regulatory signage and small culverts for a more comprehensive database.
Stormwater Network	Stormwater Network inventory remains at a basic level of maturity and staff do not have a high level of confidence in its accuracy or reliability. The development of a comprehensive inventory of the stormwater network should be priority. Consider documenting and inventorying stormwater assets such as catchbasins and/or manholes.

Buildings	Consider conducting building condition assessments for all critical municipal buildings. Staff should work towards a component-based inventory of all facilities to allow for component-based lifecycle planning.
Machinery & Equipment	Manage machinery and equipment assets more effectively by pooling smaller assets that are replaced regularly (e.g., computers, pagers, radios, etc.).
Land Improvements	Consider streamlining and simplifying the Land Improvements category by re-classifying assets that fit more appropriately under the Buildings or Machinery & Equipment categories.
Water Network	There are a number of pooled water main assets that require further segmentation and length measurements to allow for asset-specific lifecycle planning and costing.
Sanitary Network	There are a number of pooled sanitary main assets that require further segmentation and length measurements to allow for asset-specific lifecycle planning and costing. Document and upload the condition ratings of the sanitary mains from the annual CCTV inspections into the asset management database to inform long-term planning.