September 2020

The Asset Management Plan for the Township of White River

PSD RESEARCH CONSULTING SOFTWARE

Key Statistics

$58.9 million Replacement cost of asset portfolio	**$196,500** Replacement cost of infrastructure per household (2016)
2.57% Target average annual infrastructure reinvestment rate	**0.46%** Actual average annual infrastructure reinvestment rate
64% Percentage of assets in fair or better condition	**32%** Percentage of assets with assessed condition data
63% Percentage of sustainable capital funding that comes from the Federal Gas Tax/OCIF	**18%** Percentage of annual infrastructure needs funded from sustainable revenue sources
$1.2 million Annual capital infrastructure deficit	**20 years** Recommended timeframe for eliminating annual infrastructure deficit

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Executive Summary

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

All municipalities in Ontario are required to complete an asset management plan (AMP) in accordance with Ontario Regulation 588/17 (O. Reg. 588/17). This AMP outlines the current state of asset management planning in the Township of White River. It identifies the current practices and strategies that are in place to manage public infrastructure and makes recommendations where they can be further refined. Through the implementation of sound asset management strategies, the Township can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP includes the following asset categories:

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

The overall replacement cost of the asset categories included in this AMP totals $58.9 million. 64% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 32% of assets. For the remaining 68% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

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

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $1.5 million. Based on a historical analysis of sustainable capital funding

sources, the Township is committing approximately $273,000 towards capital projects per year. As a result, there is currently an annual funding gap of $1.2 million.

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

Funding Source	Years Until Full Funding	Total Tax/Rate Change	Average Annual Tax/Rate Change
Tax-Funded Assets	20 Years	39.1%	2.0%
Rate-Funded (Water)	20 Years	108.9%	5.4%
Rate-Funded (Sanitary)	20 Years	117.0%	5.9%

As a rural municipality with a small population and limited commercial/industrial tax base the prospect of increasing taxes and user fees by the recommended amounts is daunting. The goal of asset management is to fund all capital requirements through sustainable revenue sources. However, the Township will continue to rely on one-time grant funding programs and the availability of these grants will have a significant impact on the condition of municipal infrastructure and the level of service that the Township can provide.

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. Several recommendations have been developed to guide the continuous refinement of the Township's asset management program. These include:

a) asset inventory data review to ensure it includes all municipal assets and has enough detail to support short- and long-term planning
b) the development of a condition assessment strategy to increase accuracy of lifecycle and financial planning
c) the continuous review, development and implementation of optimal lifecycle management strategies and the development of long-term capital plan
d) the continued evaluation of current levels of service and the identification of future levels of service

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

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, 2021. There are additional requirements concerning proposed levels of service and growth that must be met by July 1, 2023 and 2024.

AM Program Recommendations

The following table provides a summarized list of recommendations to further the development of the Township's asset management program. A more detailed description of each recommendation can be found within the appropriate Asset Category in **Section 4** of the AMP.

Recommendation Category	Recommendation Details	Applicable Asset Categories
Asset Inventory/Data Refinement	Review Pooled Assets	Road Network
	Develop a Component-Based Inventory	Buildings
	Review Replacement Costs	Buildings Machinery & Equipment Land Improvements Water Network
Condition Assessment Strategies	Develop a Condition Assessment Strategy	All Asset Categories
Lifecycle Management Strategies	Review Lifecycle Management Strategies	Road Network Machinery & Equipment
	Develop a Long-term Capital Plan	Road Network Stormwater Network Buildings Land Improvements Water Network Sanitary Sewer Network
	Develop a Short-Term Capital Plan	Machinery & Equipment
Levels of Service	Measure Current Levels of Service	Road Network Stormwater Network Water Network Sanitary Sewer Network
	Identify Current Levels of Service	Buildings Machinery & Equipment Land Improvements
	Identify Additional LOS Metrics	Road Network Stormwater Network Water Network Sanitary Sewer Network
	Identify Proposed Levels of Service	Road Network Stormwater Network Water Network Sanitary Sewer Network

Asset management is an ongoing practice that requires dedicated time and resources across all departments. Timelines, resources and effort for the above recommendations and all regular asset management activities should be reviewed regularly to determine progress made.

1 Introduction & Context

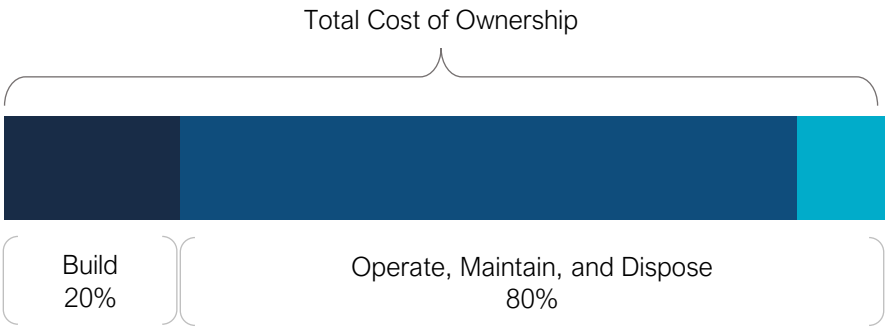
Key Insights

- 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, 2021 and 2024

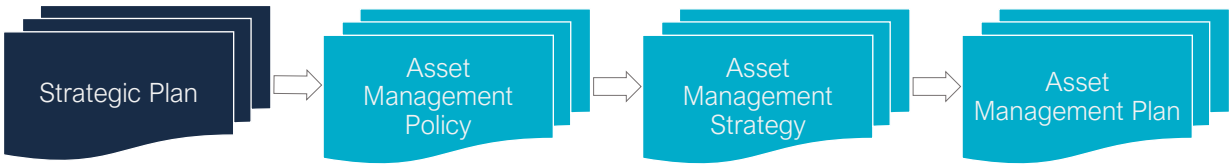
1.1 An Overview of Asset Management

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

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



These costs can span decades, requiring planning and foresight to ensure financial responsibility is spread equitably across generations. An asset management plan is critical to this planning, and an essential element of broader asset management program. The diagram below depicts an industry-standard approach and sequence to developing a practical asset management program.



The diagram, adopted from the Institute of Asset Management (IAM), illustrates the concept of 'line of sight', or alignment between the corporate strategic plan and various asset management documents. The strategic plan has a direct, and cascading impact on asset management planning and reporting.

1.1.1 Asset Management Policy

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

The Township's Asset Management Policy was developed in 2019 (Policy No. P-190612-1) and includes all Key Principles as outlined in the section 3 of the Infrastructure for Jobs and Prosperity Act, 2015.

This Asset Management Plan aligns with the policy's commitment to develop an AMP that incorporates all infrastructure categories.

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 municipality 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) provides a snapshot in time of the current state of municipal infrastructure assets as well as the current strategies in place to assist with planning and decision-making.

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

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

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

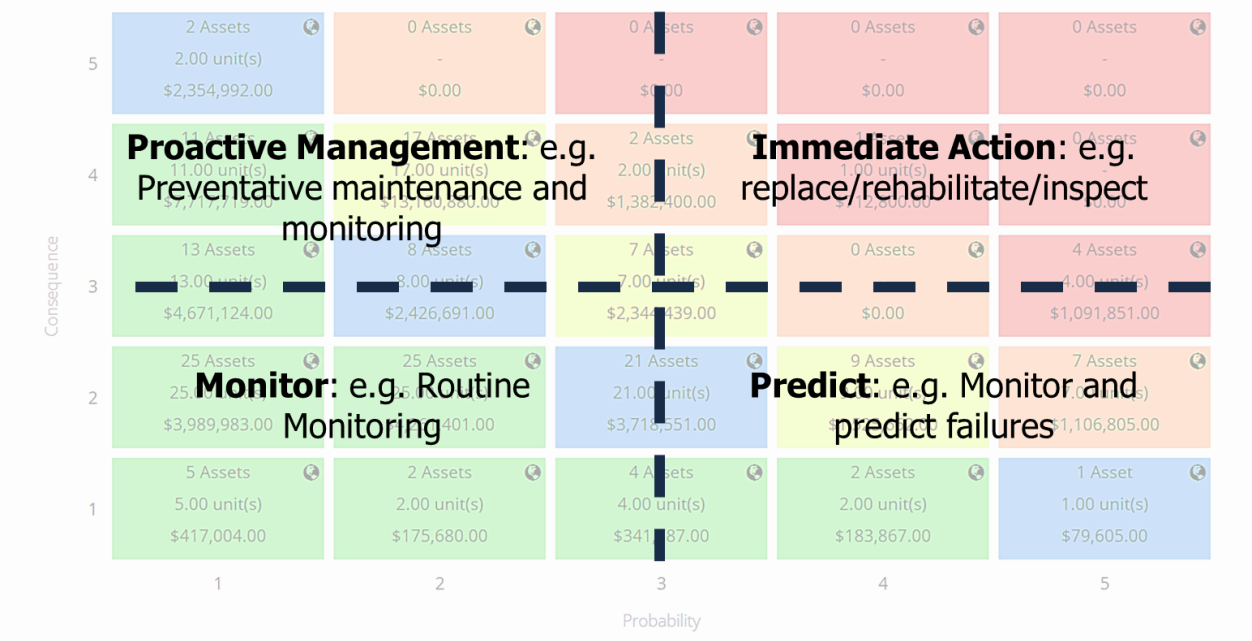
Municipalities generally take a 'worst-first' approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal, and some assets pose a greater risk to service delivery if they were to fail.

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 servicing a handful of properties. Asset risk and criticality is a key component of both short- and long-term planning.

$$\boldsymbol{Risk\ Rating} = Probability\ of\ Failure\ x\ Consequence\ of\ Failure$$

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.

Risk matrices are a useful tool used to visualize risk across a group of assets. The following image provides an example of the actions or strategies that may be considered depending on an asset's risk rating.



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

Definition: a simple, plain language description or measure of the service that the community receives.

Example: Description or images that illustrate the different levels of road class pavement condition

Technical Levels of Service

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

Example: Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)

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 will need to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17.

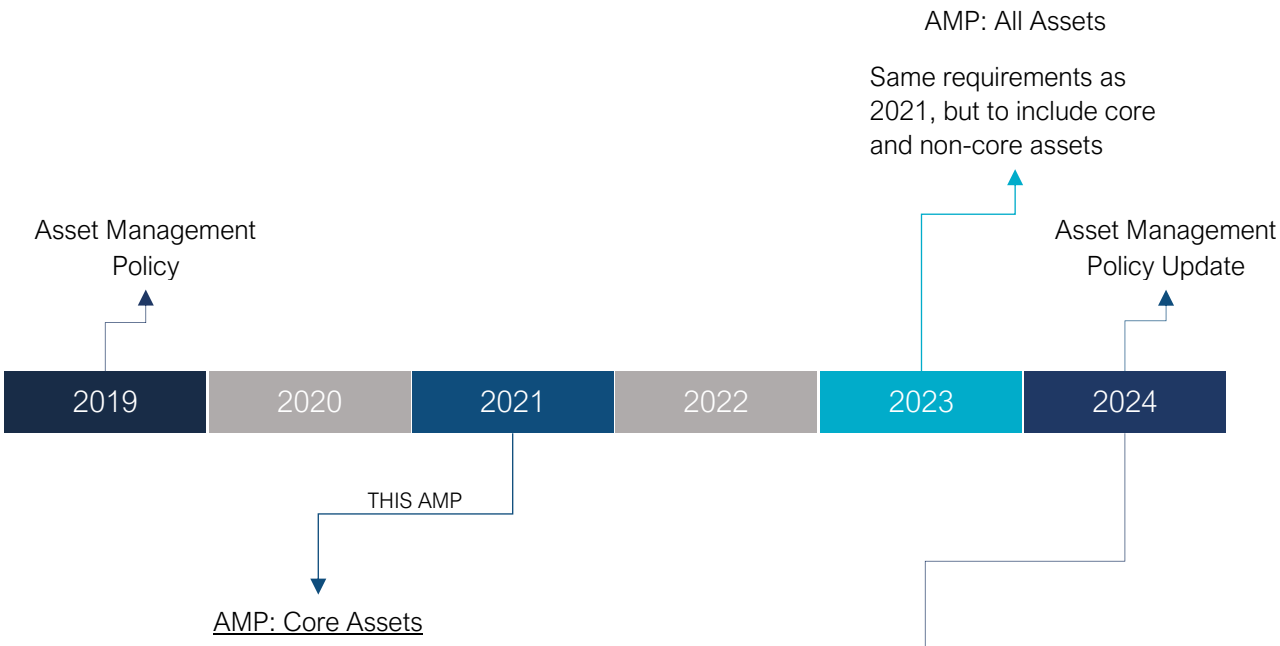
Proposed levels of service should be realistic and achievable within the timeframe outlined by the Township. They should also be determined with consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals and long-term sustainability.

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.



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

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 strategy

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, 2021. Next to each requirement a page or section reference is included in addition to any necessary commentary.

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

2 Scope and Methodology

Key Insights

- This asset management plan includes 7 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 Asset Data Hierarchy

This asset management plan uses a two-tier asset hierarchy to sort assets into both a primary functional category (e.g. Road Network) and a secondary departmental or characteristic-based segment (e.g. Paved Roads or Transportation Services).

2.1.1 Asset Categories

This asset management plan for the Township of White River is produced in compliance with Ontario Regulation 588/17. The July 2021 deadline under the regulation—the first of three AMP updates—requires analysis of only core assets (roads, bridges & culverts, water, wastewater, and stormwater). This AMP includes both core and non-core asset categories.

The AMP summarizes the state of the infrastructure for the Township's asset portfolio, establishes current levels of service and the associated technical and community 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	
Machinery & Equipment	
Land Improvements	
Water Network	User Rates
Sanitary Sewer Network	

2.1.2 Asset Segments

Within each asset category a series of segments have been developed to allow for a more granular level of analysis. This secondary level of the asset data hierarchy aims to group assets together based on either departmental ownership or assets will similar characteristics. Examples of both approaches are found in the tables below

Asset Category	Asset Segment (Departmental)
Buildings	Environmental Buildings
	General Government Buildings
	Health Services Buildings
	Protective Services Buildings
	Recreation Buildings
	General Government Buildings

Asset Category	Asset Segment (Characteristics)
Stormwater Network	Catch Basins
	Culverts
	Manholes
	Sewer Mains

2.2 Deriving Replacement Costs

Replacement costs should reflect the total costs associated with the full replacement or reconstruction of an asset. They should include the combined cost of materials, plant, labour, engineering and administrative costs.

This AMP relies on two methods to determine asset replacement costs:

- Unit Cost: A unit-based cost (e.g. per metre) determined through a review recent contracts, reports and/or staff estimates

- Historical Cost Inflation: Inflation of the asset cost recorded at the time it was initially acquired to today's value using an index (e.g. CPI or NRBCPI)

Historical cost inflation is typically used in the absence of reliable unit cost data. It is a fairly reliable method for recently purchased and/or constructed assets where the cost is reflective of the total capital costs that the Township incurred. As assets age, and new products and technologies impact procurement costs and construction methods, cost inflation becomes a less reliable technique to determine replacement cost.

The following table identifies the methods employed to determine replacement costs across each asset category:

Asset Category	Replacement Cost Method	
	Unit Cost	Cost Inflation
Road Network	96%	4%
Stormwater Network	100%	-
Buildings	-	100%
Machinery & Equipment	-	100%
Land Improvements	-	100%
Water Network	47%	53%
Sanitary Sewer Network	32%	68%
Overall:	**33%**	**67%**

All unit costs were reviewed by Township staff and determined to be the best available cost estimates at the time this AMP was developed.

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 D includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

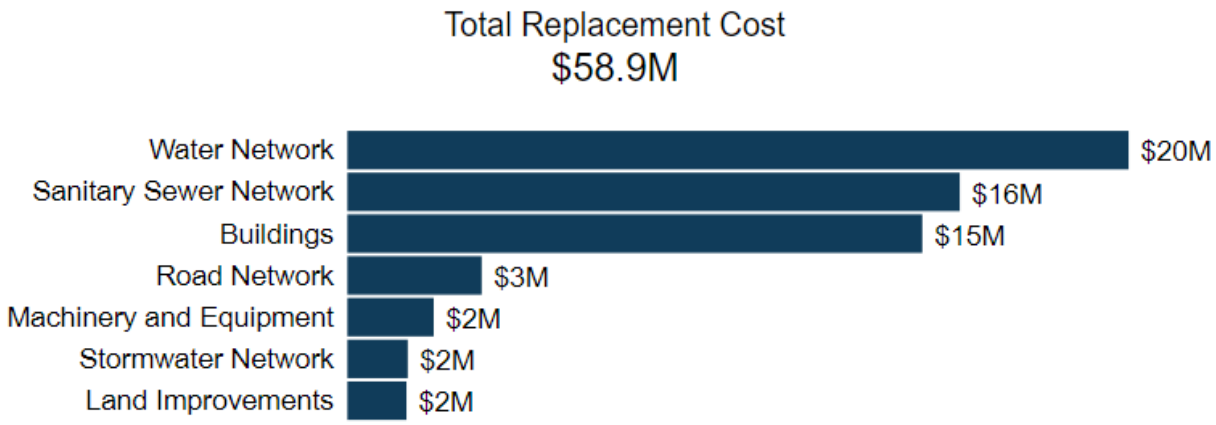
3 Portfolio Overview

Key Insights

- The total replacement cost of the Township's asset portfolio is $58.9 million
- The Township's target re-investment rate is 2.57%, and the actual re-investment rate is 0.46%, contributing to an expanding infrastructure deficit
- 64% of all assets are in fair or better condition
- 23% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total $1.5 million per year across all assets

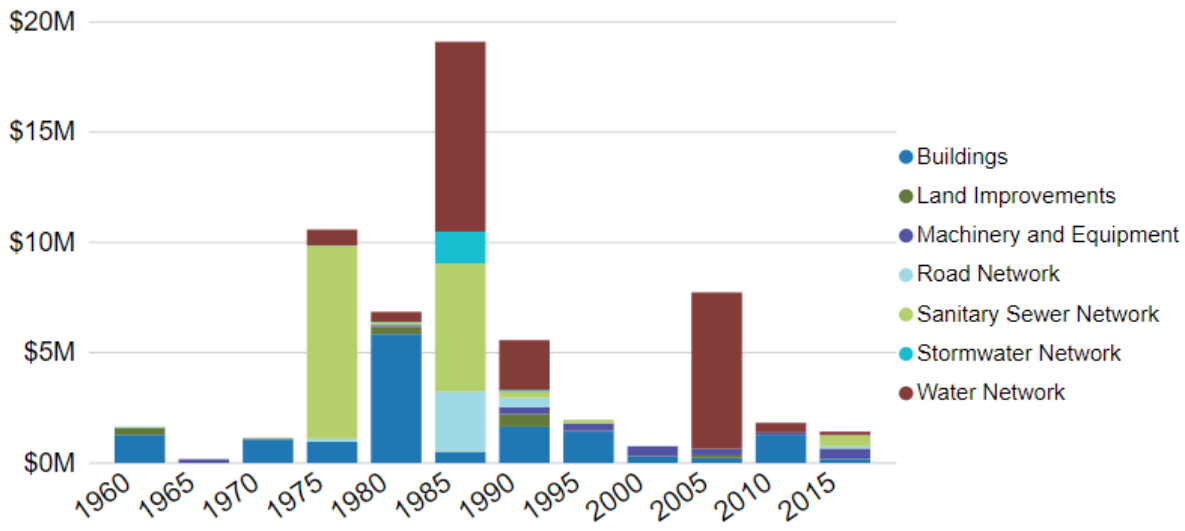
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analyzed in this AMP have a total replacement cost of $58.9 million. This total was determined based on a combination of unit costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.



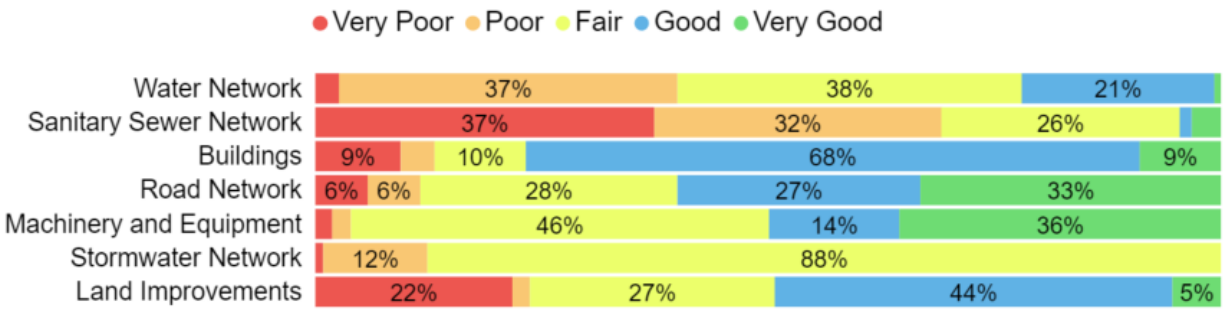
3.2 Installation Profile

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



3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 64% of assets in White River are in fair or better condition. This estimate relies on both age-based and assessed condition data.



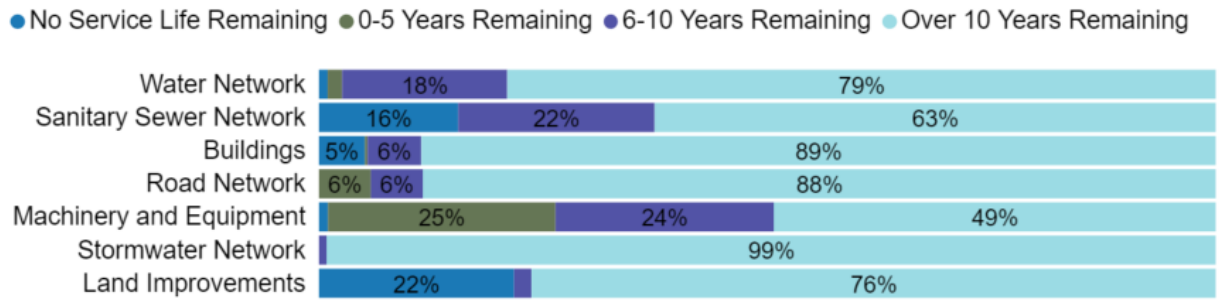
This AMP relies on assessed condition data for 32% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	% of Assets with Assessed Condition	Source of Condition Data
Water Network	0%	-
Sanitary Sewer Network	0%	-
Buildings	82%	Staff Assessments (2019)
Road Network	96%	Staff Assessments (2019)
Machinery & Equipment	79%	Staff Assessments (2019)
Stormwater Network	15%	Staff Assessments (2019)
Land Improvements	77%	Staff Assessments (2019)
Overall:	**32%**	

The development of a condition assessment program across all asset categories is critical to confidence in long-term asset management planning. **Appendix D** provides a high-level overview of the role of asset condition data and key considerations in the development of a condition assessment program.

3.4 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 23% ($13.6 million) of the Township's assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix A.



Category	Estimated Useful Life Range (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Water Network	10-75 Years	40.3	16.8
Sanitary Sewer Network	20-75 Years	34.3	27.8
Buildings	15-50 Years	26.2	23.6
Road Network	30-40 Years	34.8	22.9
Machinery & Equipment	10-20 Years	13.9	6.8
Stormwater Network	50-75 Years	33.5	22.3
Land Improvements	25-40 Years	30.9	8.8
	Average:	**34.0**	**18.7**

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

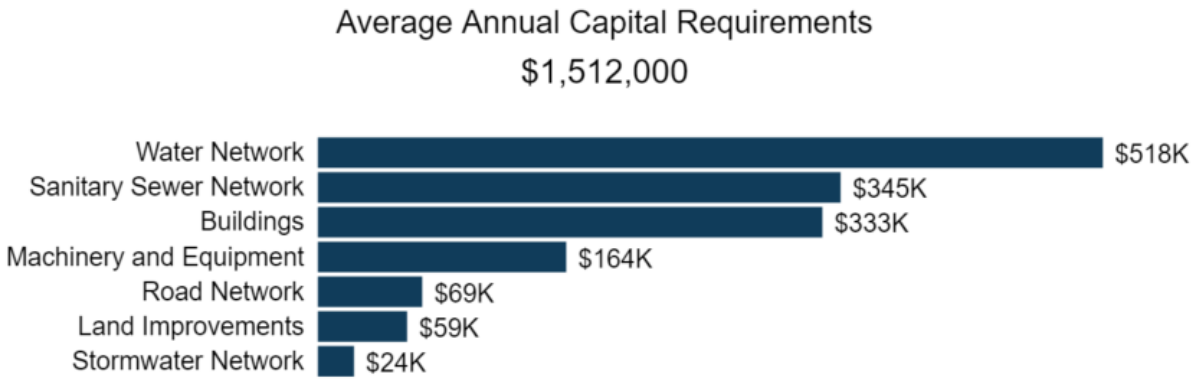
Short-term capital costs may be low for asset categories with long useful lives where infrastructure is relatively new. However, planning and saving for long-term capital costs is a key component of asset management planning.

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

3.5 Forecasted Capital Requirements

3.5.1 Average Annual Capital Requirements

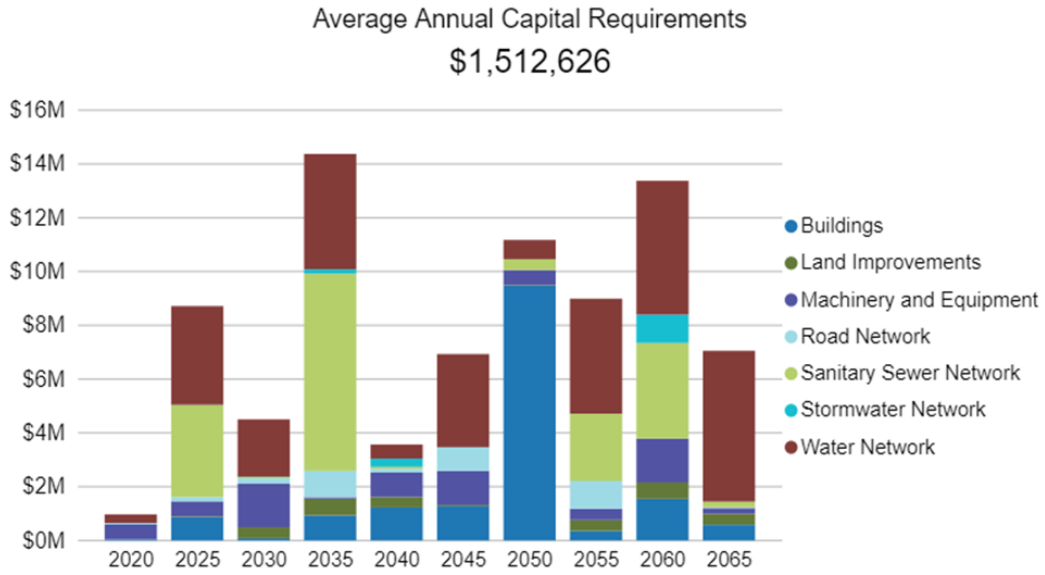
Annual capital requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability.



In total, the Township must allocate approximately $1.5 million annually to address capital requirements for the assets included in this AMP.

3.5.2 Projected Capital Requirements (50 Years)

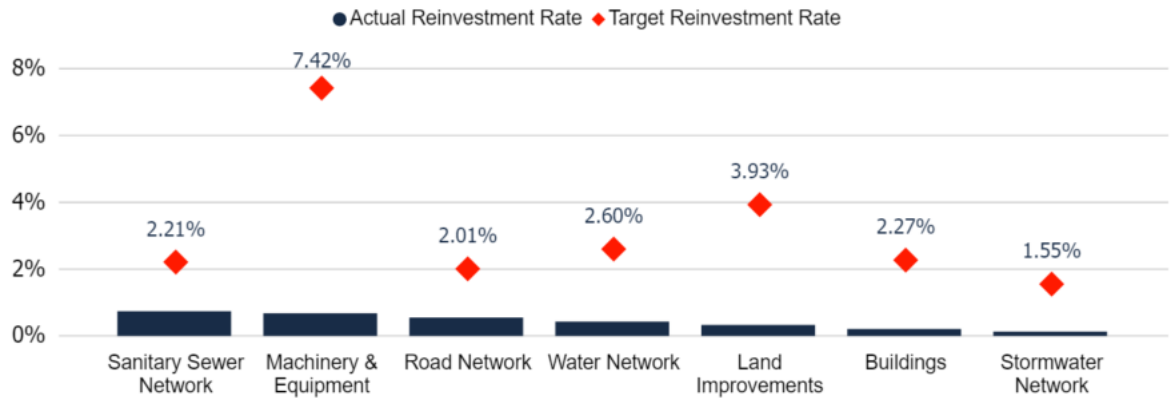
The following graph identifies projected capital requirements over the next 50 years.



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

3.5.3 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township should be allocating approximately $1.5 million annually, for a target reinvestment rate of 2.57%. Actual annual spending from sustainable revenue sources totals approximately $273,000, for an actual reinvestment rate of 0.46%.



4 Analysis of Tax-funded Assets

Key Insights

- Tax-funded assets are valued at $23.3 million
- 87% 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 $667,000

4.1 Road Network

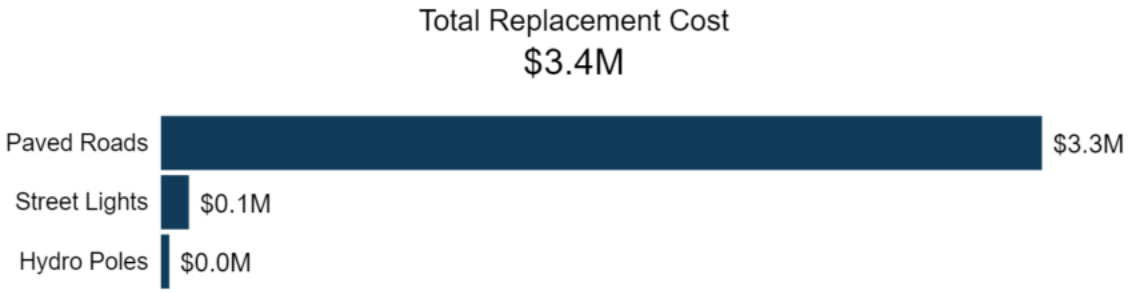
The Road Network is a critical component of the provision of safe and efficient transportation services. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure including hydro poles and streetlights.

The Township's Road Network is maintained by the Public Works Department.

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
Hydro Poles	1 (pooled)	CPI Tables	$32,059
Gravel Roads	8,056 metres	Not Planned for Replacement[1]	
Paved Roads	7,323 metres	Cost/Unit	$3,295,162
Street Lights	5 (pooled)	CPI Tables	$105,455
			$3,432,676

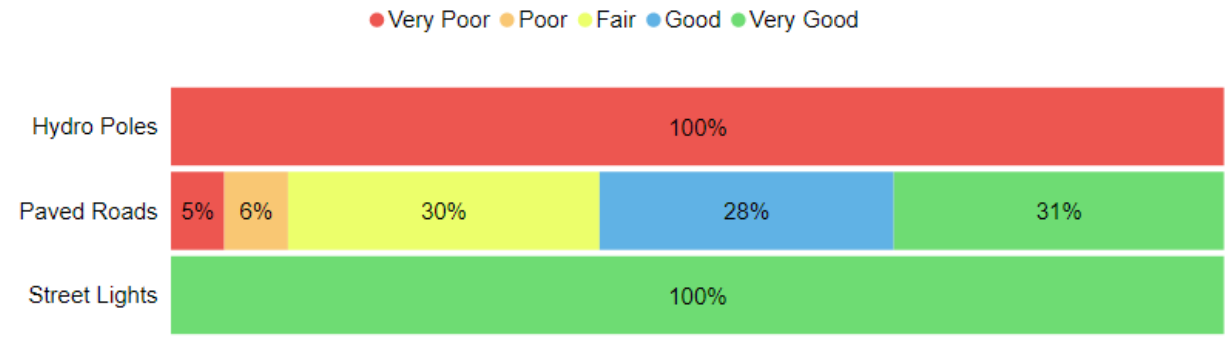


[1] Gravel roads have been included as they comprise a significant portion of the Township's road network. However, the lifecycle management strategies for these assets consist of perpetual maintenance activities and do not require capital costs for rehabilitation or replacement.

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
Hydro Poles	13%	Very Poor	Age-based
Paved Roads	64%	Good	100% Assessed
Street Lights	86%	Very Good	100% Assessed
	65%	**Good**	**99% 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 municipality's current approach:

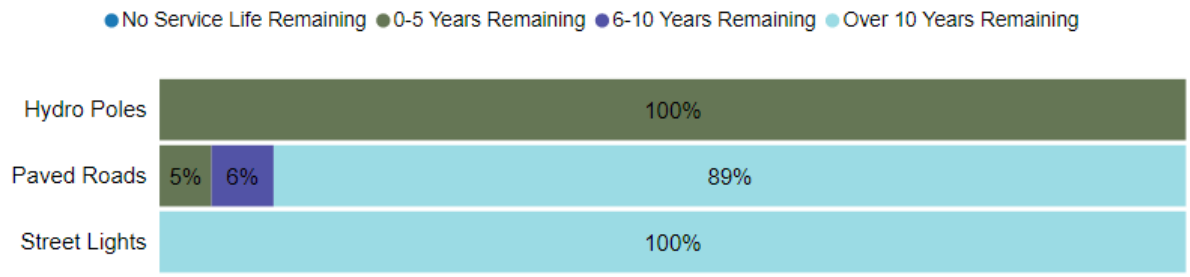
- Township staff regularly drive the road network and scan for pavement distresses that require treatment
- Road condition is not formally assessed according to a condition rating criterion and is usually communicated verbally to necessary staff

4.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Road Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Hydro Poles	40 years	35.3	5.0
Paved Roads	40 years	35.0	23.3
Street Lights	30 years	4.2	25.8
		34.8	**22.9**



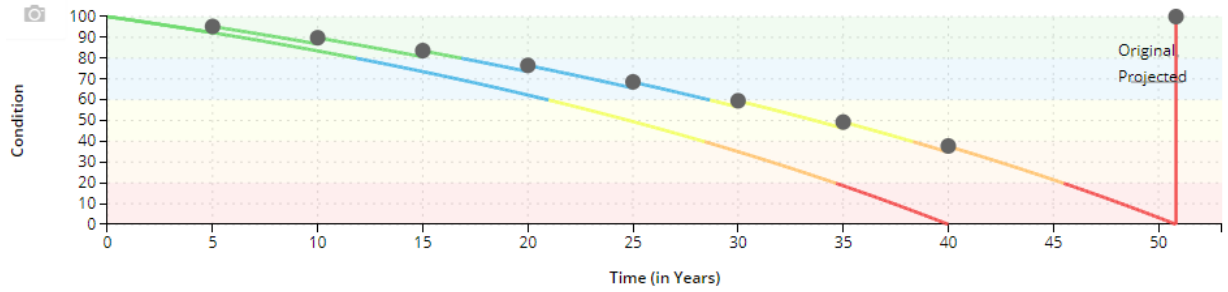
Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

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

Paved Roads		
Event Name	Event Class	Event Trigger
Asphalt Patching	Preventative Maintenance	As-needed



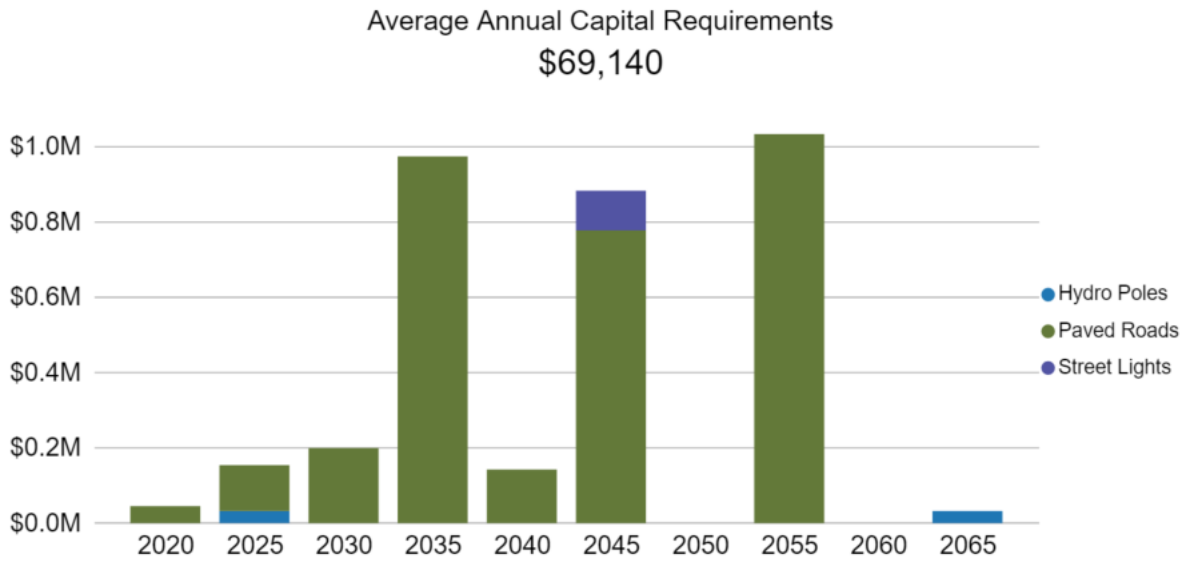
The following table further expands on the Township's current approach to lifecycle management:

Activity Type	Description of Current Strategy
Maintenance	**Paved Roads:** Ongoing pothole filling; not much in terms of crack sealing
	Gravel Roads: No dust control; re-gravelling happens depending on the condition; grading happens internally
	Winter control/maintenance activities are considered a significant operating cost
Rehabilitation	There is no formal lifecycle management strategy in place for the Township's roads
	Pavement re-surfacing has not been completed in the past
	Staff take a more reactive approach to lifecycle management due to limited available resources
Replacement	Full road reconstruction is not common (~2 roads over the past 10 years)
	Capital plan is year-to-year and almost entirely dependant on the availability of grant funding

Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for Paved 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.

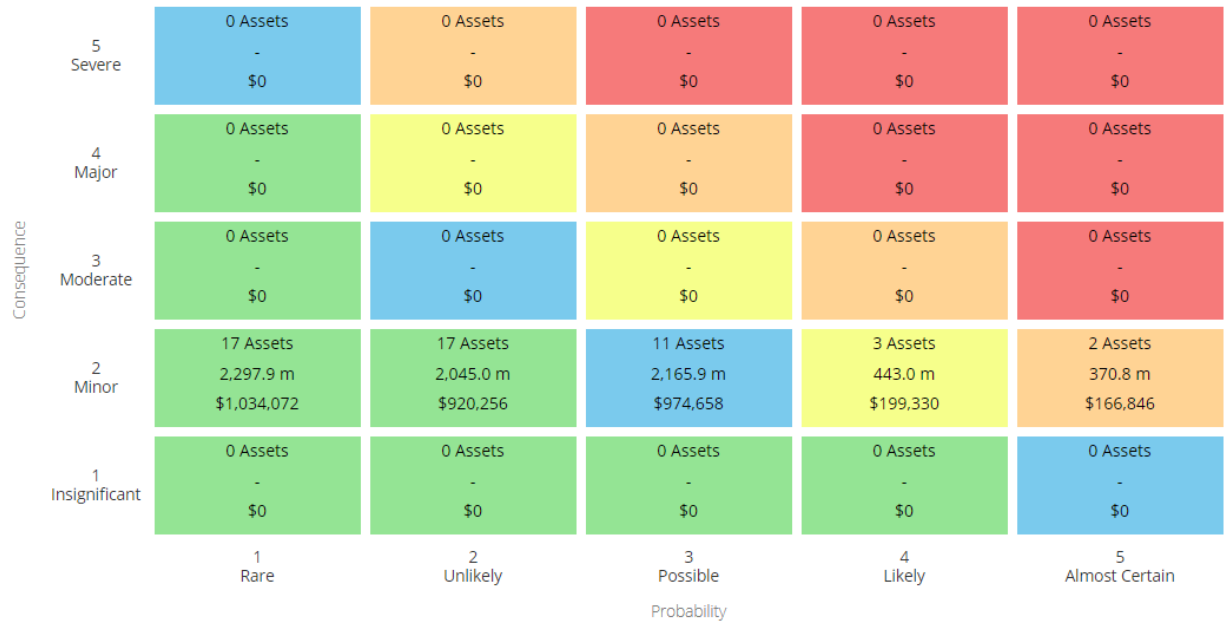
The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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 A.

4.1.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for Paved Roads. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

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

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

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 (2019)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	See Appendix B
Quality	Description or images that illustrate the different levels of road class pavement condition	Very Good - Pavement is in excellent condition with few visible defects. Riding quality is very smooth with not more than a few areas of very slight distortion. Good - Pavement is in good condition with accumulating slight defects and distortions. Riding quality is smooth with intermittent slightly rough and uneven sections. Fair - Pavement is in fair condition with intermittent patterns of slight to moderate defects. Riding quality is comfortable with intermittent bumps or depressions. Poor - Pavement is in poor condition with frequent patterns of moderate defects. Riding quality is uncomfortable, and surface is rough and uneven. Very Poor - Pavement is in very poor condition with extensive severe defects. Riding quality is very uncomfortable, and surface is very rough and uneven.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2019)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0.085
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.2
Quality	Average pavement condition index for paved roads in the municipality	64.5 (Good)
	Average surface condition for unpaved roads in the municipality (e.g. excellent, good, fair, poor)	Fair
Performance	Capital reinvestment rate	0.55%

4.1.7 Recommendations

Asset Inventory/Data Analysis

- Review Pooled Assets - Review asset segments with pooled asset inventories (Hydro Poles & Street Lights) and consider unpooling to assist with more detailed planning and analysis.

Condition Assessment Strategies

- Develop a Condition Assessment Strategy – Identify a consistent condition rating criteria and assessment schedule for paved roads to assist with long-term planning. This may involve both internal staff and external consultants where detailed assessment is required

Lifecycle Management Strategies

- Review Lifecycle Management Strategy – The Township's current lifecycle management strategy consists primarily of preventative maintenance activities. Rehabilitation activities (e.g. road re-surfacing) are considered costly due to the Township's location and the project mobilization costs. Staff should consider a coordinated project approach that aligns with subsurface infrastructure rehab/replacement activities to reduce costs.
- Develop a Long-term Capital Plan – Capital costs associated with road rehabilitation and reconstruction are projected to increase significantly within 15-20 years. Staff should begin to develop a long-term capital plan to ensure sufficient funds are available to meet infrastructure requirements. The requirements in Appendix A provide an overview of projected capital requirements based on the best available data for asset condition and remaining service life. The list of assets with capital needs should be reviewed with departmental stakeholders and adjusted in accordance with feedback received.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Township's current level of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning
- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short- and long-term asset management planning
- Identify Proposed Levels of Service - 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

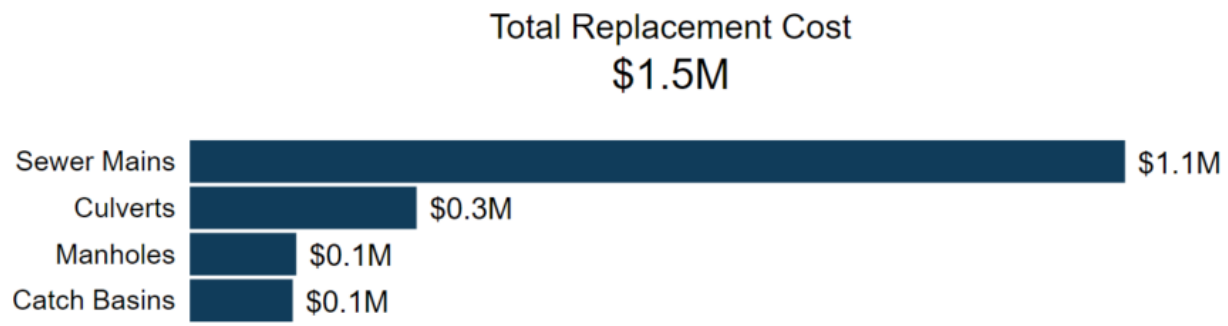
The Township is responsible for maintaining a Stormwater Network consisting of 929 metres of sewer mains, 263 metres of cross-drainage culverts as well as catch basins and manholes.

The Water Department is responsible for managing the municipal stormwater network.

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.

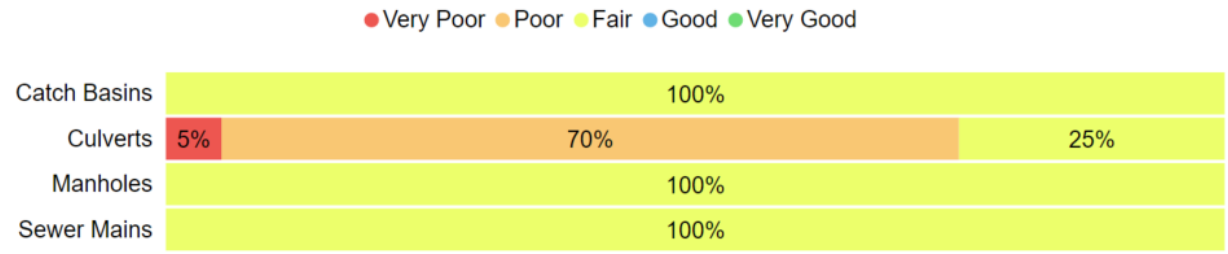
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Catch Basins	29	Cost/Unit	$116,000
Culverts	263 metres	Cost/Unit	$255,729
Manholes	15	Cost/Unit	$120,000
Sewer Mains	929 metres	Cost/Unit	$1,054,672
			$1,546,401



4.2.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Catch Basins	50%	Fair	100% Assessed
Culverts	35%	Poor	Age-based
Manholes	50%	Fair	100% Assessed
Sewer Mains	53%	Fair	Age-based
	50%	**Fair**	**15% 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 municipality's current approach:

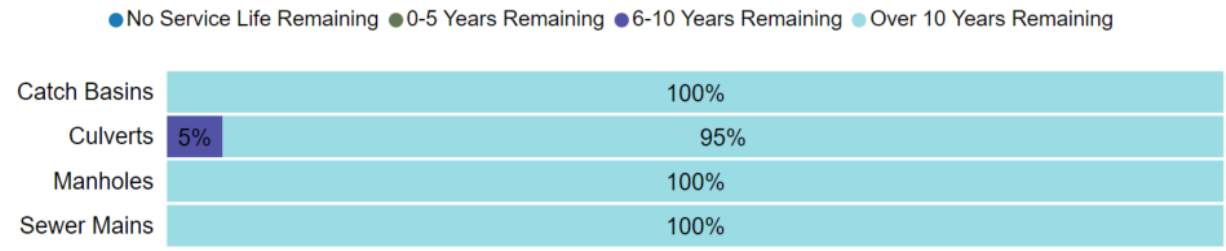
- No regular condition assessments completed for stormwater infrastructure
- Assets are inspected on a case-by-case basis by internal staff; usually more reactive than proactive

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)	Average Service Life Remaining (Years)
Catch Basins	50 years	34.9	24.9
Culverts	50 Years	32.6	17.4
Manholes	50 years	35.0	24.9
Sewer Mains	75 years	35.0	40.0
		33.5	**22.3**



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.

4.2.4 Lifecycle Management Strategy

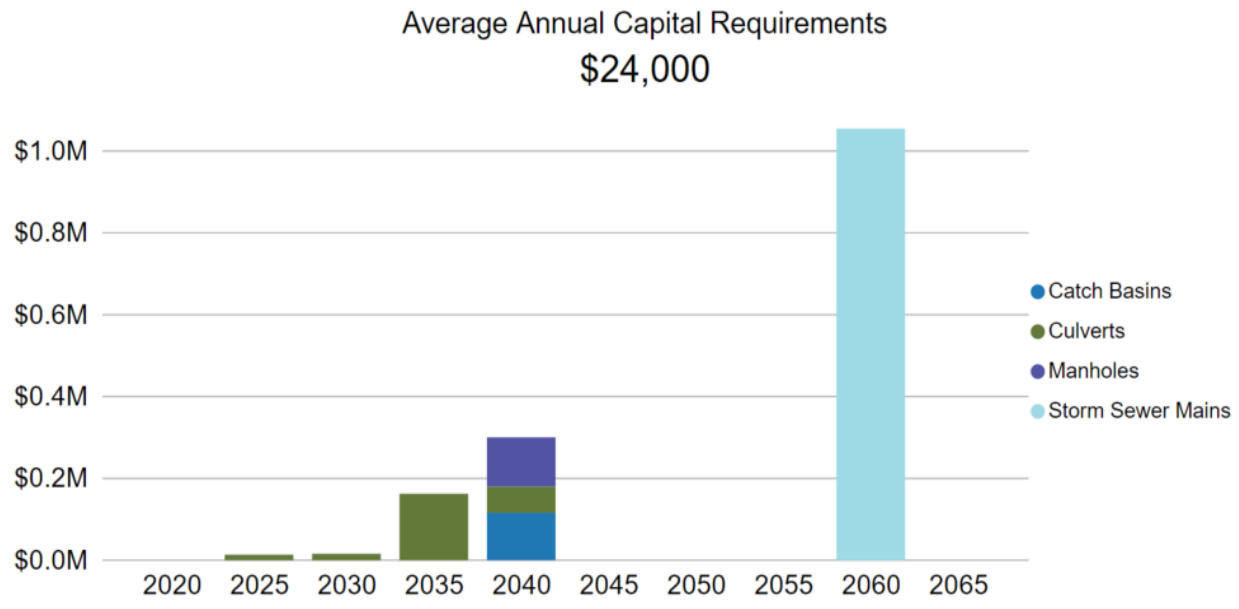
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Maintenance activities are completed purely on a reactive basis as issues arise
Rehabilitation	There haven't been many major issues with stormwater infrastructure and very little asset rehabilitation is required
Replacement	Year-to-year capital plan, although there is typically not much money available for stormwater infrastructure
	Replacement planning focuses more on stormwater facilities than linear infrastructure; one major storm pumping station that needs to be replaced in the near future

Forecasted Capital Requirements

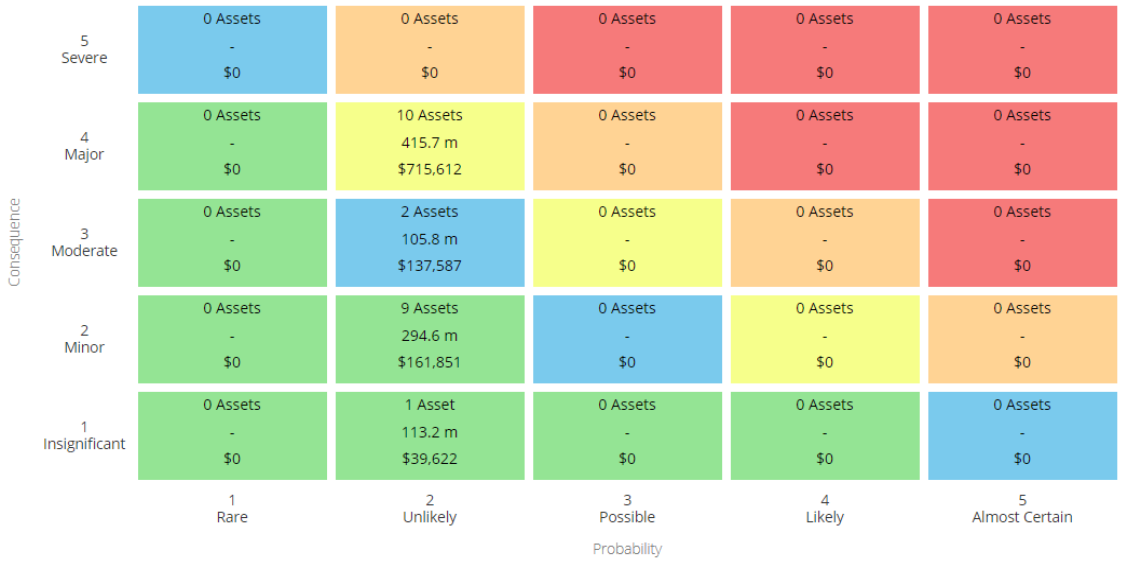
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.



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 A.

4.2.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the Township's Storm Mains. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

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

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

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

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2019)
Scope	% of properties in municipality resilient to a 100-year storm	TBD[2]
	% of the municipal stormwater management system resilient to a 5-year storm	100%[3]
Performance	Capital reinvestment rate	0.13%

[2] The Township does not have sufficient data or modelling available to confidently determine the percentage of properties resilient to a 100-year storm

[3] This is based on the minimum design standards for existing stormwater infrastructure (1:5 year storm)

4.2.7 Recommendations

Condition Assessment Strategies

- Develop a Condition Assessment Strategy – Staff have provided cursory condition ratings for both Manholes and Catch Basins as part of the development process for this AMP. However, there is no formal condition assessment strategy in place for the Stormwater Network. Staff may consider a combination of visual inspections for Catch Basins and Manholes as well as CCTV inspections for Culverts & Sewer Mains to better inform asset management planning

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan – Capital costs are projected to be minimal over the short-term but will increase as infrastructure ages and starts to deteriorate. A long-term capital plan should address when future capital costs are expected to be incurred. The requirements in Appendix A provide an overview of projected capital requirements based on the best available data for asset condition and remaining service life. The list of assets with capital needs should be reviewed with departmental stakeholders and adjusted in accordance with feedback received.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Township's current level of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning
- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short- and long-term asset management planning
- Identify Proposed Levels of Service - 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

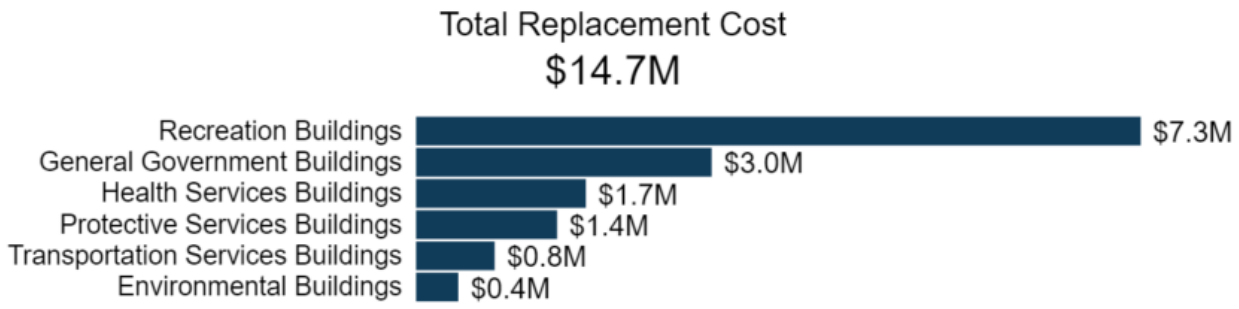
The Township of White River owns and maintains several facilities that provide key services to the community. These include:

- a landfill;
- municipal office/library, tourist information centre and economic development building;
- medical centre, ambulance base and doctor's house;
- fire station;
- baseball field, community centre, arena, playground and museum;
- garage and shop.

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.

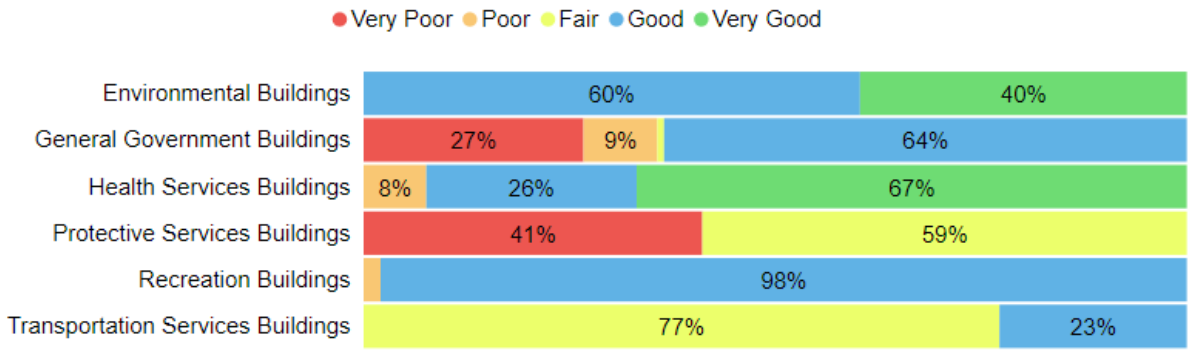
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Environmental Buildings	1	CPI Tables	$428,040
General Government Buildings	3	CPI Tables	$2,987,163
Health Services Buildings	3	CPI Tables	$1,717,073
Protective Services Buildings	1	CPI Tables	$1,426,224
Recreation Buildings	5	CPI Tables	$7,321,177
Transportation Services Buildings	2	CPI Tables	$795,500
			$14,675,177



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
Environmental Buildings	80%	Very Good	Age-based
General Government Buildings	48%	Fair	72% Assessed
Health Services Buildings	80%	Very Good	82% Assessed
Protective Services Buildings	37%	Poor	70% Assessed
Recreation Buildings	69%	Good	98% Assessed
Transportation Services Buildings	54%	Fair	100% Assessed
	62%	**Good**	**82% Assessed**



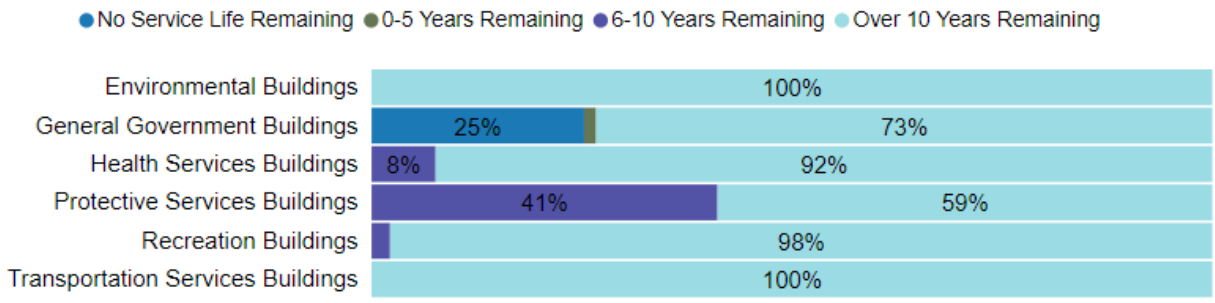
To ensure that the Township's Buildings continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation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

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)	Average Service Life Remaining (Years)
Environmental Buildings	25 years	4.3	20.8
General Government Buildings	10-50 years	33.6	15.8
Health Services Buildings	25-50 years	24.5	36.8
Protective Services Buildings	50 years	23.6	16.9
Recreation Buildings	15-50 years	22.8	24.4
Transportation Services Buildings	50 years	59.6	29.9
		26.2	**23.6**

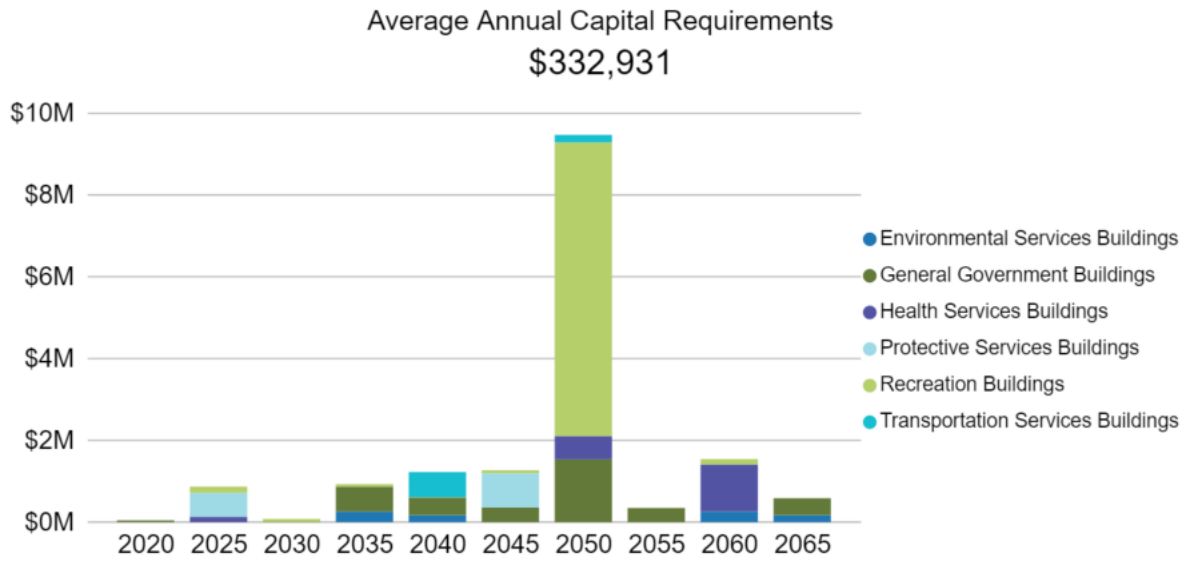


Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.3.4 Lifecycle Management Strategy

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 A.

4.3.5 Risk & Criticality

Buildings are considered a non-core asset catgory. As such, the Township has until July 1, 2023 to identify asset risk and determine asset criticality.

4.3.6 Levels of Service

Buildings are considered a non-core asset category. As such, the Township has until July 1, 2023 to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

4.3.7 Recommendations

Asset Inventory/Data Refinement

- Develop a Component-Based Inventory - The Township's Buildings inventory contains includes a listing of the original structure as well as any betterments/upgrades. However, it does not include of major building components. Facilities consist of several major components that have unique useful lives and require asset-specific lifecycle strategies (e.g. roof, HVAC). Staff should work towards a component-based inventory of all facilities to allow for component-based lifecycle planning.
- Review Replacement Costs – All replacement costs for Buildings are based on historical cost inflation. These costs should be evaluated to determine their accuracy and reliability. Replacement costs should be updated according to the best available information on the current replacement value of each asset.

Condition Assessment Strategies

- Develop a Condition Assessment Strategy - Township staff completed a cursory review of facility condition to inform the development of this AMP. The Township should implement regular condition assessment procedures for all facilities to better inform short- and long-term capital requirements. Detailed component-based facility assessments should be considered for structures that exhibit moderate to severe signs of deterioration.

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan - Without detailed, component-based condition assessments, there is some uncertainty about the true extent and cost of lifecycle requirements for Buildings. Once addressed a long-term capital plan should be developed to plan for future rehabilitation and replacement needs. The requirements in Appendix A provide an overview of projected capital requirements based on the best available data for asset condition and remaining service life. The list of assets with capital needs should be reviewed with departmental stakeholders and adjusted in accordance with feedback received.

Levels of Service

- Identify Current Levels of Service - Township staff need to identify the qualitative descriptions and technical metrics that will measure the current level of service provided by facilities by July 1, 2023 according to O. Reg. 588/17.

4.4 Machinery & Equipment

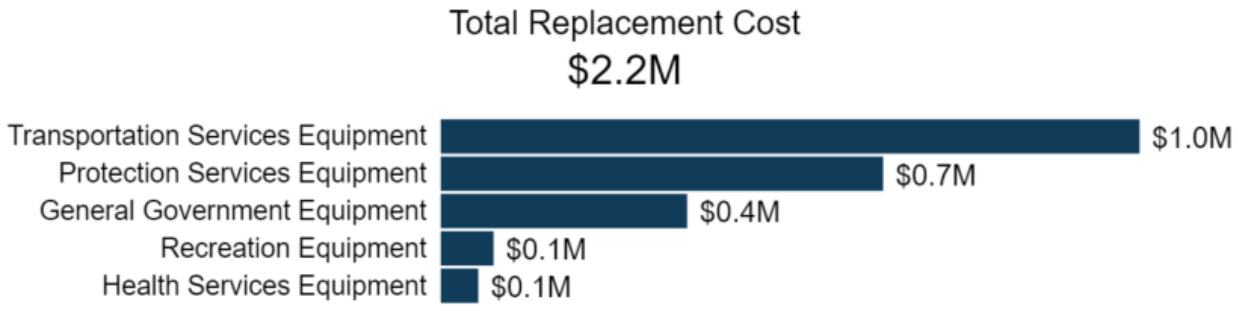
In order to maintain the high quality of public infrastructure and support the delivery of core services, Township staff own and employ various types of machinery and equipment. This includes:

- General government equipment including computers, copiers and servers
- Health services equipment
- Protection services equipment include pump trucks and turnout gears
- A zamboni, grader, loader and trucks

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.

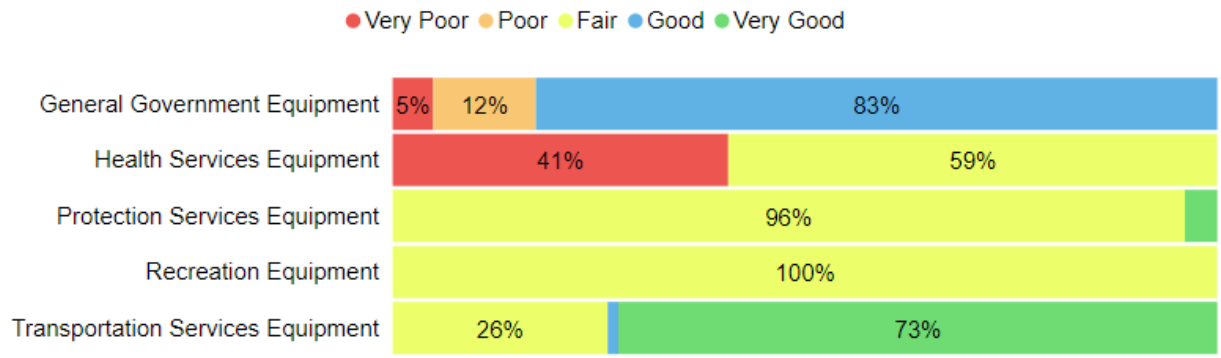
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
General Government Equipment	8	CPI Tables	$368,203
Health Services Equipment	3	CPI Tables	$56,322
Protection Services Equipment	4	CPI Tables	$660,851
Recreation Equipment	1	CPI Tables	$79,168
Transportation Services Equipment	6	CPI Tables	$1,043,700
			$2,208,244



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
General Government Equipment	61%	Good	83% Assessed
Health Services Equipment	33%	Poor	59% Assessed
Protection Services Equipment	51%	Fair	96% Assessed
Recreation Equipment	49%	Fair	100% Assessed
Transportation Services Equipment	79%	Good	67% Assessed
	65%	**Good**	**76% Assessed**



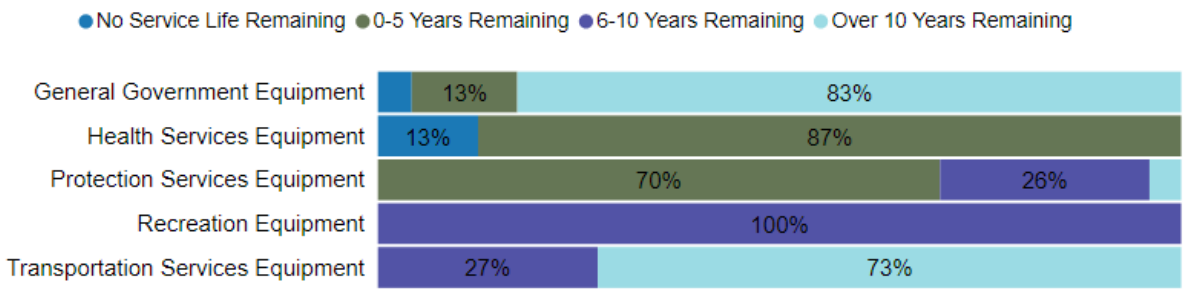
To ensure that the Township's Machinery & Equipment continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance,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

4.4.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Machinery & Equipment assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
General Government Equipment	10-15 years	10.8	2.6
Health Services Equipment	10 years	8.9	1.9
Protection Services Equipment	10-20 years	26.4	9.3
Recreation Equipment	15 years	39.0	7.4
Transportation Services Equipment	15 years	6.9	11.4
		13.9	**6.8**

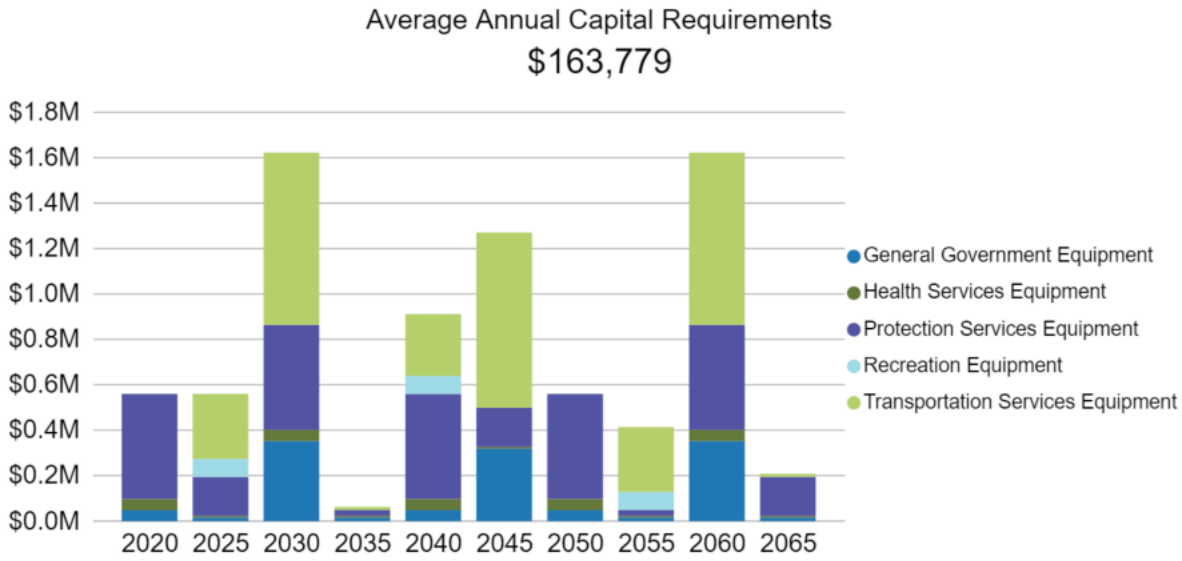


Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.4.4 Lifecycle Management Strategy

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 A.

4.4.5 Risk & Criticality

Machinery & Equipment is considered a non-core asset catgory. As such, the Township has until July 1, 2023 to identify asset risk and determine asset criticality.

4.4.6 Levels of Service

Machinery & Equipment is considered a non-core asset category. As such, the Township has until July 1, 2023 to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

4.4.7 Recommendations

Replacement Costs

- **Review Replacement Costs** - All replacement costs for Machinery & Equipment 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 current replacement value of each asset.

Condition Assessment Strategies

- **Develop a Condition Assessment Strategy** - Staff have provided cursory condition ratings for many assets in support of this AMP. However, there is no formal condition assessment strategy in place. Staff should start with completing condition assessment on high value and high-risk equipment.

Lifecycle Management Strategies

- **Develop a Short-Term Capital Plan –** Given the relatively short useful life of machinery & equipment a short-term capital plan (~5 Years) should be developed to plan for future rehabilitation and replacement needs. The requirements in Appendix A provide an overview of projected capital requirements based on the best available data for asset condition and remaining service life. The list of assets with capital needs should be reviewed with departmental stakeholders and adjusted in accordance with feedback received.

Levels of Service

- **Identify Current Levels of Service** - Township staff need to identify the qualitative descriptions and technical metrics that will measure the current level of service provided by equipment by July 1, 2023 according to O. Reg. 588/17.

4.5 Land Improvements

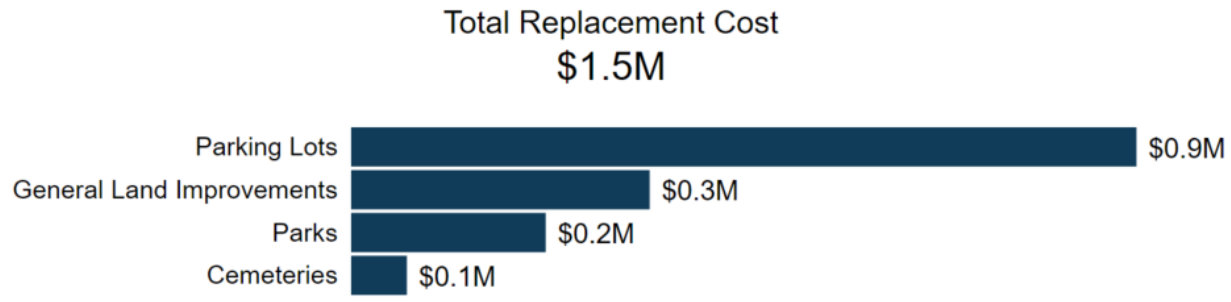
The Township of White River owns a small number of assets that are considered Land Improvements. This category includes:

- parking lots for municipal facilities
- a cemetery and columbarium
- various signs and general land improvements
- Winnie the Pooh Park

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 Land Improvements inventory.

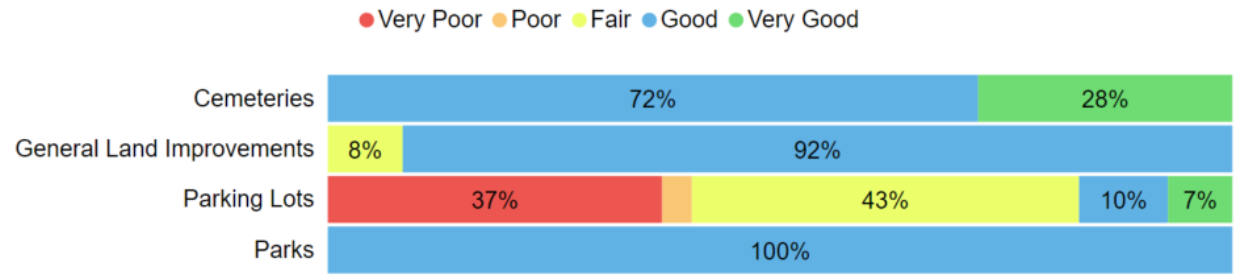
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Cemeteries	2	CPI Tables	$63,309
General Land Improvements	2	CPI Tables	$338,533
Parking Lots	11	CPI Tables	$890,442
Parks	1	CPI Tables	$220,655
			$1,512,939



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
Cemeteries	76%	Good	72% Assessed
General Land Improvements	68%	Good	100% Assessed
Parking Lots	35%	Poor	63% Assessed
Parks	70%	Good	100% Assessed
	49%	**Fair**	**77% Assessed**



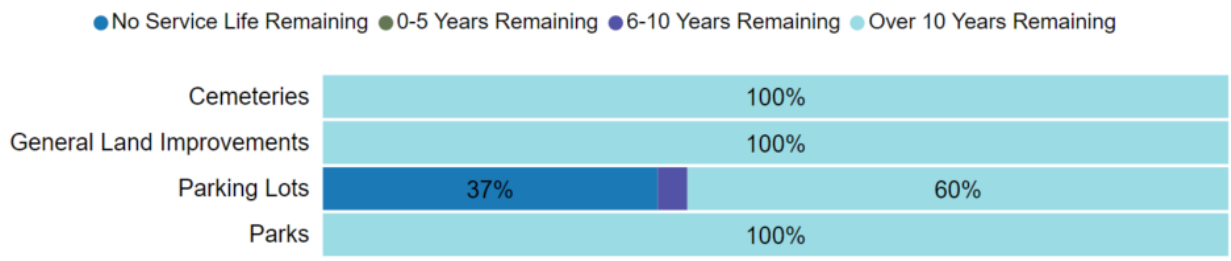
To ensure that the Township's Land Improvements continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance,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

4.5.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Land Improvements assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Cemeteries	40-50 years	14.5	37.2
General Land Improvements	25 years	22.5	14.9
Parking Lots	25 years	36.1	1.2
Parks	25 years	28.0	17.4
		30.9	**8.8**

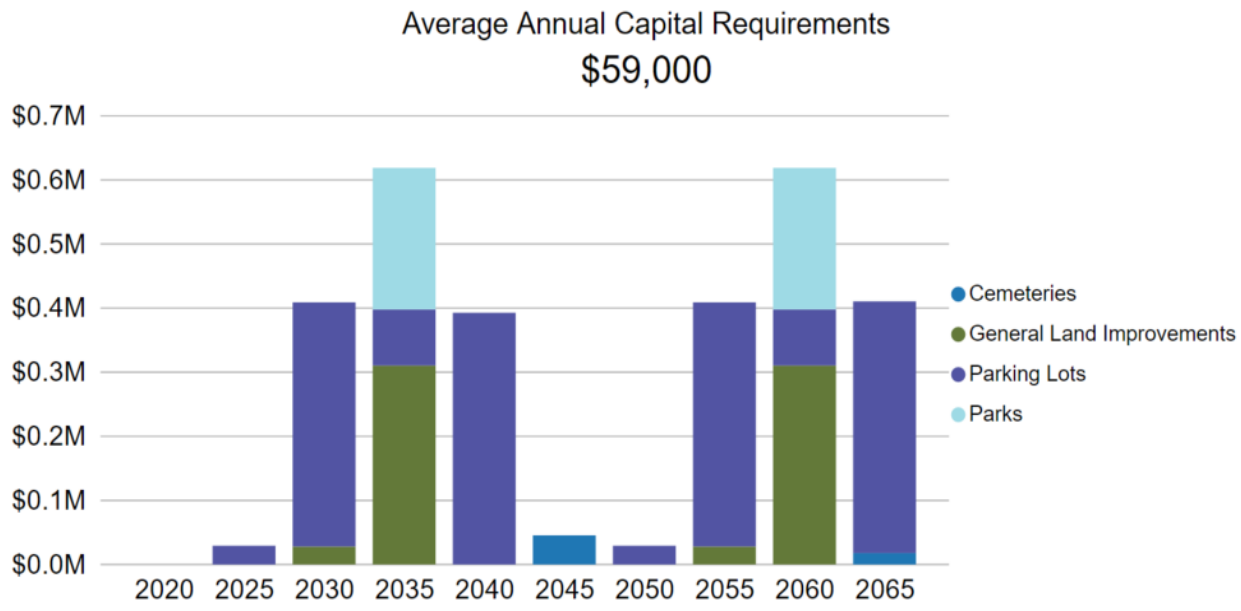


Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.5.4 Lifecycle Management Strategy

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 A.

4.5.5 Risk & Criticality

Land Improvements is considered a non-core asset catgory. As such, the Township has until July 1, 2023 to identify asset risk and determine asset criticality.

4.5.6 Levels of Service

Land Improvements is considered a non-core asset category. As such, the Township has until July 1, 2023 to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

4.5.7 Recommendations

Asset Inventory/Data Refinement

- Review Replacement Costs – All replacement costs for Land Improvements are based on historical cost inflation. These costs should be evaluated to determine their accuracy and reliability. Replacement costs should be updated according to the best available information on the current replacement value of each asset.

Condition Assessment Strategy

- Develop a Condition Assessment Strategy - Staff have provided cursory condition ratings for many assets in support of this AMP. However, there is no formal condition assessment strategy in place. Staff should start with completing condition assessment on high value and high-risk assets.

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan - Capital costs are projected to be minimal over the short-term but will increase in 10-20 years as infrastructure ages. A long-term capital plan should address when future capital costs are expected to be incurred. The requirements in Appendix A provide an overview of projected capital requirements based on the best available data for asset condition and remaining service life. The list of assets with capital needs should be reviewed with departmental stakeholders and adjusted in accordance with feedback received.

Levels of Service

- Identify Current Levels of Service - Township staff need to identify the qualitative descriptions and technical metrics that will measure the current level of service provided by land improvements by July 1, 2023 according to O. Reg. 588/17.

5 Analysis of Rate-funded Assets

Key Insights

- Rate-funded assets are valued at $35.5 million
- 48% 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 $863,000

5.1 Water Network

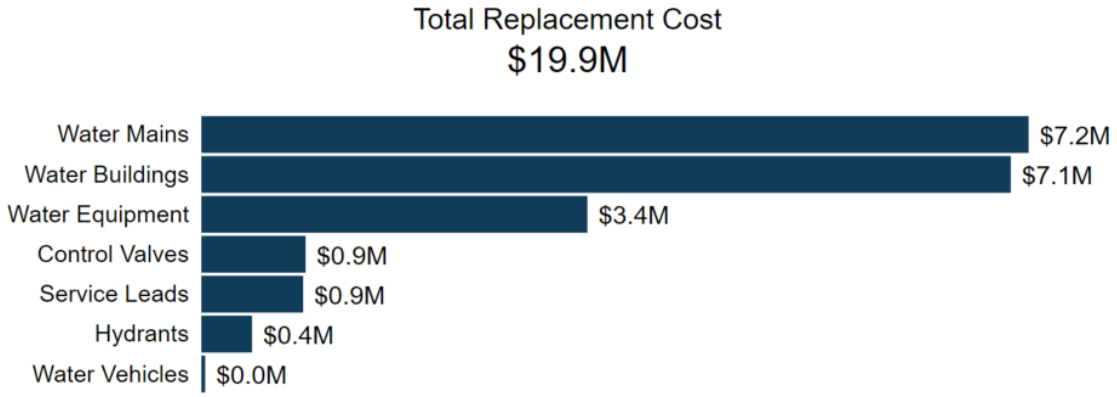
The Township of White River is responsible for a Water Network consisting of 12,439 metres of watermains, a water treatment plant and pumping stations as well as hydrants and additional supporting infrastructure.

The Water Department is responsible for operating and maintaining the Water Network.

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.

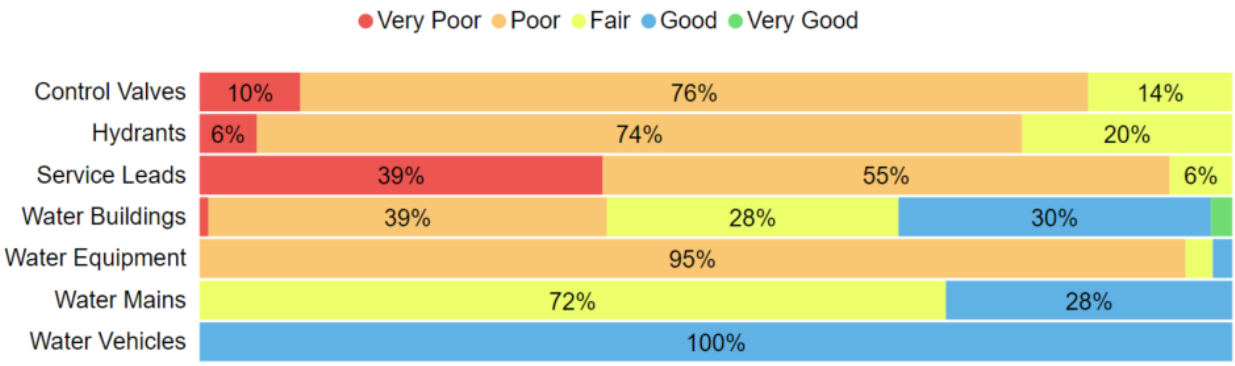
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Control Valves	542	Cost/Unit	$910,600
Hydrants	54	Cost/Unit	$442,800
Service Leads	4,312 metres	Cost/Unit	$889,310
Water Buildings	13	CPI Tables	$7,068,535
Water Equipment	4	CPI Tables	$3,370,817
Water Mains	12,439 metres	Cost/Unit	$7,223,767
Water Vehicles	1	CPI Tables	$33,884
			$19,939,713



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
Control Valves	69%	Good	Age-based
Hydrants	33%	Poor	Age-based
Service Leads	22%	Poor	Age-based
Water Buildings	50%	Fair	Age-based
Water Equipment	34%	Poor	Age-based
Water Mains	55%	Fair	Age-based
Water Vehicles	25%	Poor	100% Assessed
	47%	**Fair**	**0.2% 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 municipality's current approach:

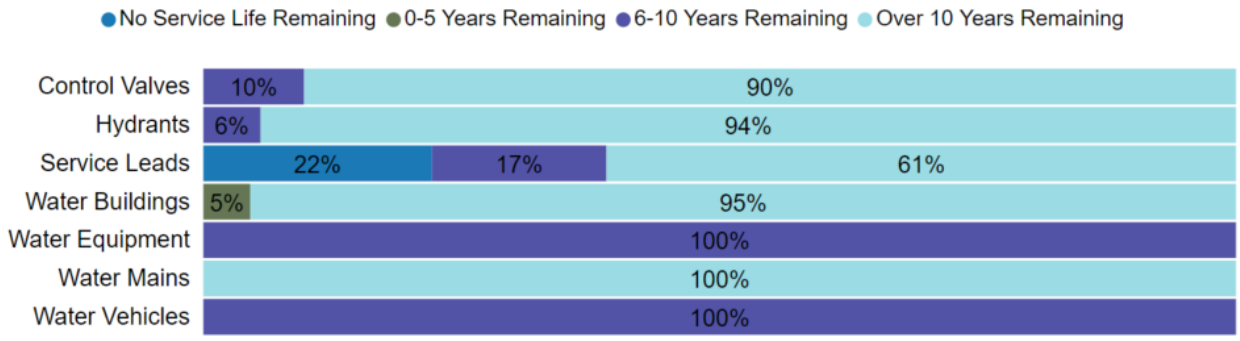
- No formal condition assessment process, but staff ensure water system meets all legislative requirements
- The Township has three trained water operators (one full-time in water, other two are split between water/sewer & roads)

5.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Water Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Control Valves	50 years	35.0	15.0
Hydrants	50 years	33.8	16.3
Service Leads	50 years	54.1	-4.1
Water Buildings	10-50 years	14.7	26.8
Water Equipment	10-20 years	8.8	6.3
Water Mains	75 years	34.2	40.8
Water Vehicles	10 years	7.5	6.9
		40.3	**16.8**



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

5.1.4 Lifecycle Management Strategy

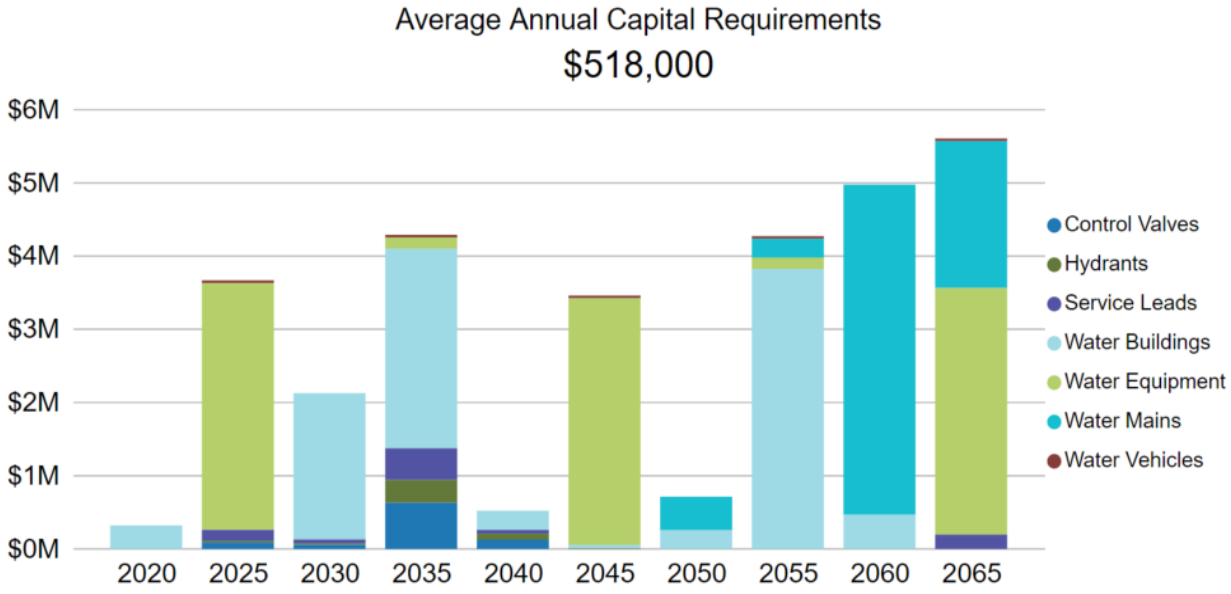
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	100% of the Water Network is flushed twice per year to maintain operating capacity and water quality
	Significant operating costs include: water treatment and labour costs
Rehabilitation	No major capital rehabilitation activities are typically required for the Water Network; very few issues with breaks or leaks and most assets have sufficient useful life remaining
Replacement	Year-to-year capital plan that is heavily dependent on grant funding programs

Forecasted Capital Requirements

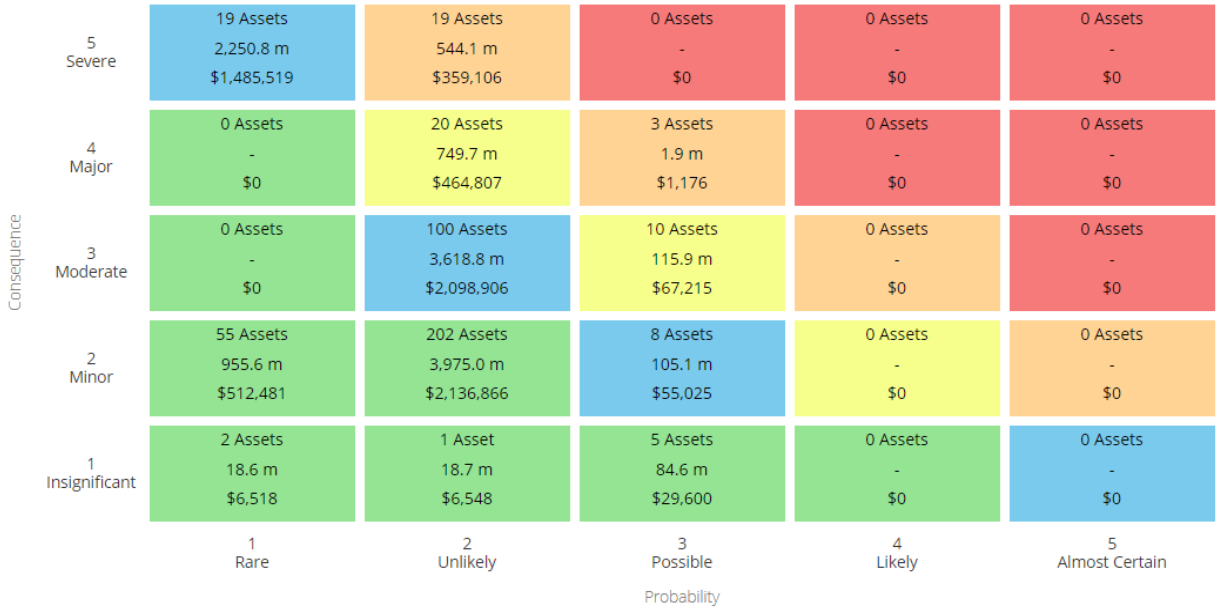
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.



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 A.

5.1.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for Water Mains. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

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

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

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 (2019)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	See Appendix B
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	See Appendix B
Reliability	Description of boil water advisories and service interruptions	The Township did not experience any service interruptions or issue any boil water advisories in 2019. The Township's water treatment and distribution process is monitored through a SCADA system. In the event of a power failure a backup power supply is available to ensure the continuous supply of clean potable water.

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 (2019)
Scope	% of properties connected to the municipal water system	91%
	% of properties where fire flow is available	91%
Reliability	# of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0
	# of connection-days per year where water is not available due to water main breaks compared to the total number of properties connected to the municipal water system	0
Performance	Capital re-investment rate	0.46%

5.1.7 Recommendations

Asset Inventory/Data Refinement

- Review Replacement Costs – All linear water assets have had their replacement costs determined using a unit cost reviewed by Township staff for accuracy. Non-linear assets including water building, equipment and vehicles rely on historical cost inflation. As these assets represent a substantial portion of the overall replacement value of the Water Network, they should be reviewed and updated if necessary.

Condition Assessment Strategies

- Develop Condition Assessment Strategy - This AMP relies on age-based condition data for all water network infrastructure. The development of a network-wide condition assessment program will provide greater reliability in the accuracy of the current condition data.

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan - Capital costs are projected to fluctuate but generally increase over the next 50 years as network infrastructure ages. A long-term capital plan should address when future capital costs are expected to be incurred. The requirements in Appendix A provide an overview of projected capital requirements based on the best available data for asset condition and remaining service life. The list of assets with capital needs should be reviewed with departmental stakeholders and adjusted in accordance with feedback received.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Township's current level of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning
- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short- and long-term asset management planning
- Identify Proposed Levels of Service - 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

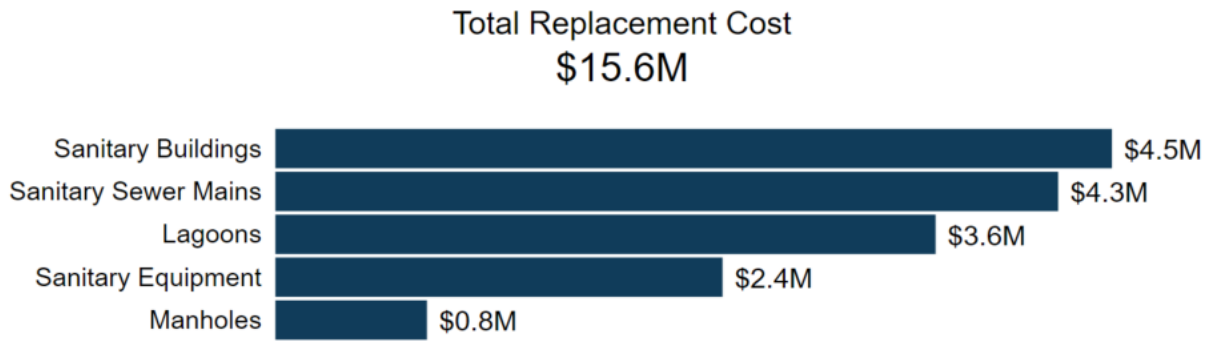
The Township of White River is responsible for a Water Network consisting of 7,996 metres of sanitary sewer mains, lagoons, pumping stations and additional supporting infrastructure.

The Water Department is responsible for operating and maintaining the Sanitary Sewer Network.

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.

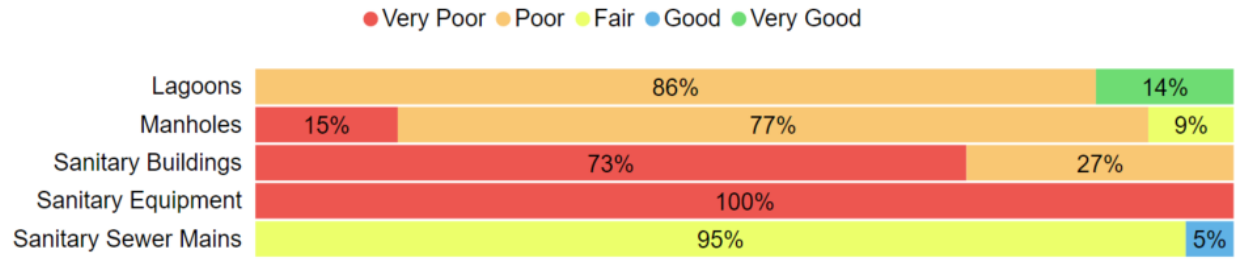
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Lagoons	2	CPI Tables	$3,585,519
Manholes	103	Cost/Unit	$824,000
Sanitary Buildings	7	Cost/Unit	$4,543,026
Sanitary Equipment	6	CPI Tables	$2,428,959
Sanitary Sewer Mains	7,996 metres	87% Cost/Unit & 13% CPI Tables	$4,250,728



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
Lagoons	38%	Poor	Age-based
Manholes	31%	Poor	Age-based
Sanitary Buildings	22%	Poor	Age-based
Sanitary Equipment	0%	Very Poor	Age-based
Sanitary Sewer Mains	54%	Fair	Age-based
	50%	**Fair**	**Age-based**



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 municipality's current approach:

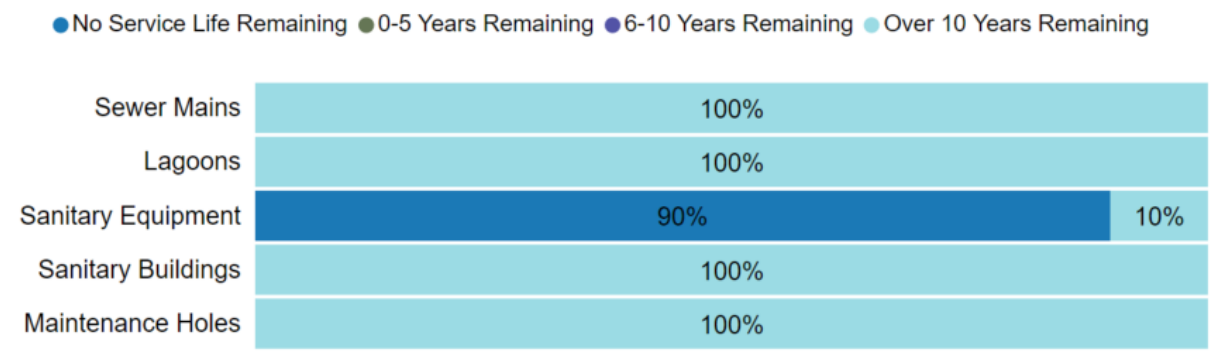
- No formal condition assessment process, but staff ensure wastewater system meets all legislative requirements

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)	Average Service Life Remaining (Years)
Lagoons	60 years	22.3	37.8
Manholes	50 years	34.4	15.6
Sanitary Buildings	50 years	36.6	13.4
Sanitary Equipment	20 years	34.1	-14.1
Sanitary Sewer Mains	75 years	34.3	40.7
		34.3	**27.8**



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

5.2.4 Lifecycle Management Strategy

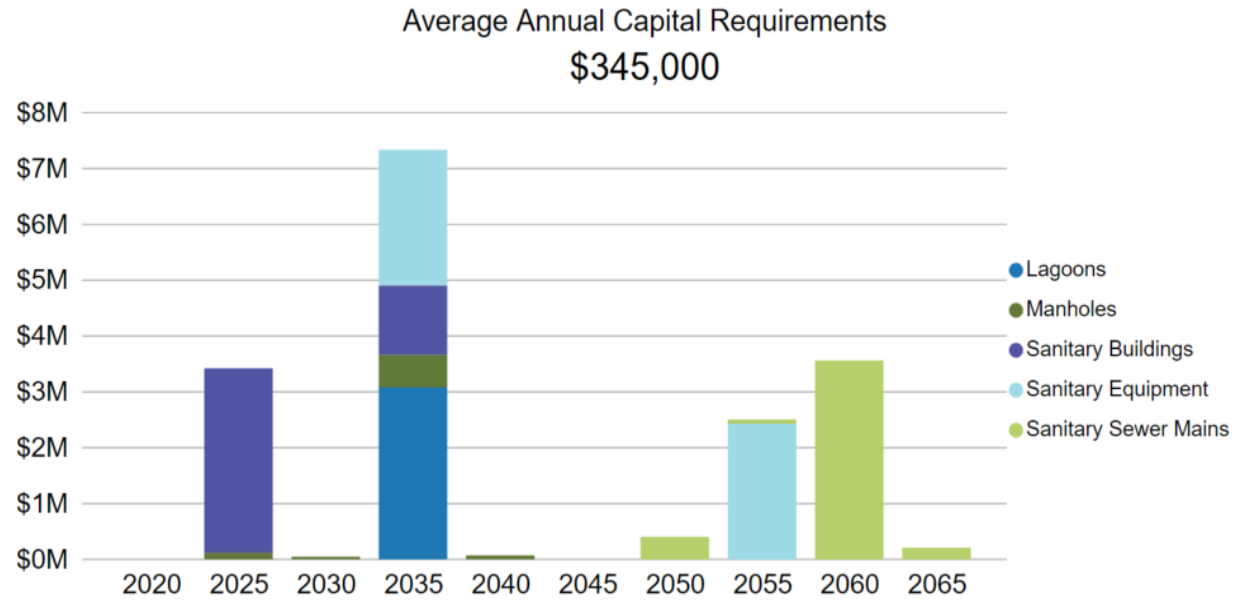
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Significant operating costs include mainly wastewater treatment and labour
	Aerated lagoons are used for wastewater treatment
Rehabilitation /Replacement	Year-to-year budget that is heavily reliant on grant funding programs
	OCIF funding used for lagoons (2 new cells)
	Major forcemain was replaced in 2017 (CWWF funding); solved some operational issues

Forecasted Capital Requirements

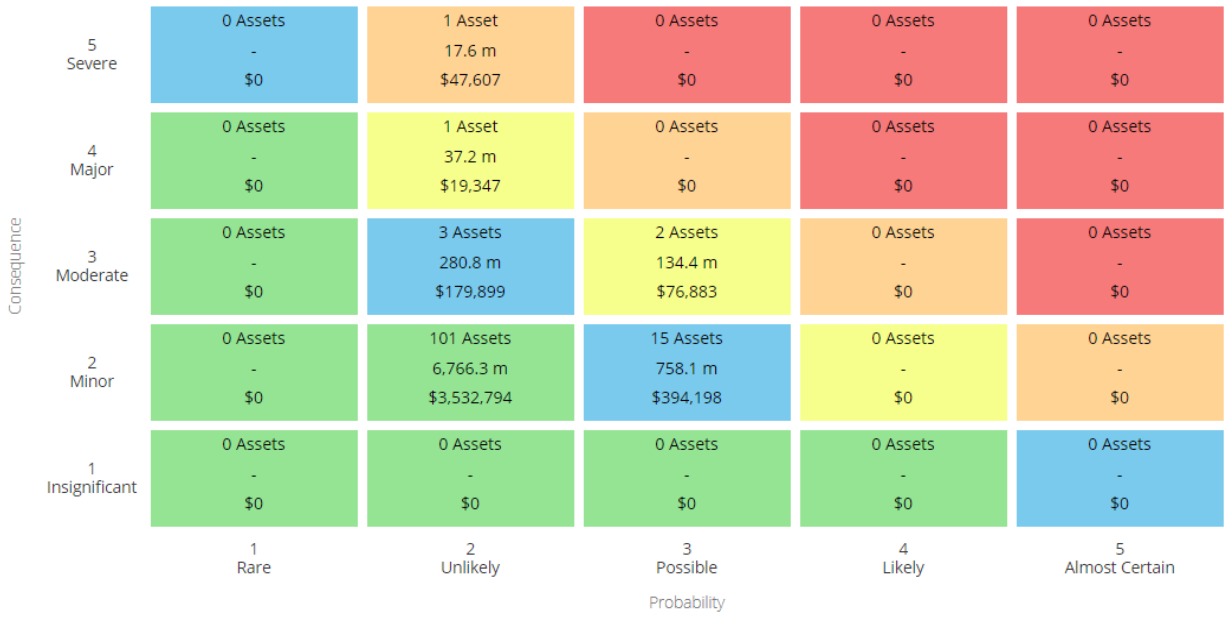
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.



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 A.

5.2.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for Sanitary Sewer Mains. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

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

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

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 (2019)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	See Appendix B
Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes	The 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 sanitary mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its designed capacity. In some cases, this can cause water and/or sewage to overflow backup into homes. The disconnection of weeping tiles from sanitary mains and the use of sump pumps and pits

Service Attribute	Qualitative Description	Current LOS (2019)
		directing storm water to the storm drain system can help to reduce the chance of this occurring.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The municipality follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2019)
Scope	% of properties connected to the municipal wastewater system	87%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	0
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	0
Performance	Capital re-investment rate	0.43%

5.2.7 Recommendations

Condition Assessment Strategies

- Develop Condition Assessment Strategy - This AMP relies on age-based condition data for all sanitary network infrastructure. The development of a network-wide condition assessment program will provide greater reliability in the accuracy of the current condition data.

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan – Capital costs are projected fluctuate annually with significant costs in 15-20 years. A long-term capital plan should address when future capital costs are expected to be incurred. The requirements in Appendix A provide an overview of projected capital requirements based on the best available data for asset condition and remaining service life. The list of assets with capital needs should be reviewed with departmental stakeholders and adjusted in accordance with feedback received.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Township's current level of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning
- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short- and long-term asset management planning
- Identify Proposed Levels of Service - 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

- 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 Housing Need and Demand Study (2017)

In 2017, a Housing Need and Demand Study was completed to identify the current housing situation in the community, forecast the demand for affordable and supportive housing and by user group and recommend an approach to build housing in the community[4].

The Study identified a need for housing as a result of an aging population and the emerging economy. New housing is often accompanied by the need for new municipal infrastructure which may include water, wastewater, stormwater management and transportation services. As growth needs are identified they should be integrated into both short- and long-term lifecycle and financial management strategies.

6.1.2 Population & Labour Force Growth

The following table outlines historical population and labour force growth according to the Statistics Canada's Census Profile of the Township[5].

Growth Category	2001	2006	2011	2016	Net Change (2001-2016)	Net Change (2011-2016)
Population	1,000	830	607	645	-355 (-35%)	+38 (+6.3%)
Employment Rate	63.9%	78.4%	63.2%	59.8%	-4.1%	-3.4%
Participation Rate	70.3%	84.9%	73.6%	62.5%	-7.8%	-11.1%
Unemployment Rate	8.1%	7.6%	15.4%	2.9%	-5.2%	-12.5%

[4] http://www.whiteriver.ca/upload/documents/white-river-housing-study-needs-and-dema.pdf

[5] https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3557091&Geo2=PR&Code2=35&SearchText=White%20River&SearchType=Begins&SearchPR=01&B1=All&GeoLevel=PR&GeoCode=3557091&TABID=1&type=0

6.2 Impact of Growth on Lifecycle Activities

By July 1, 2024 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. The costs associated with growth 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 $273,000 towards capital projects per year from sustainable revenue sources
- Given the annual capital requirement of $1,512,000, there is currently a funding gap of $1,239,000 annually
- For tax-funded assets, we recommend increasing tax revenues by 2.0% each year for the next 20 years to achieve a sustainable level of capital funding
- For the Sanitary Sewer Network, we recommend increasing rate revenues by 9.0% annually for the next 20 years to achieve a sustainable level of funding
- For the Water Network, we recommend increasing rate revenues by 2.5% 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 the Township of White River 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:

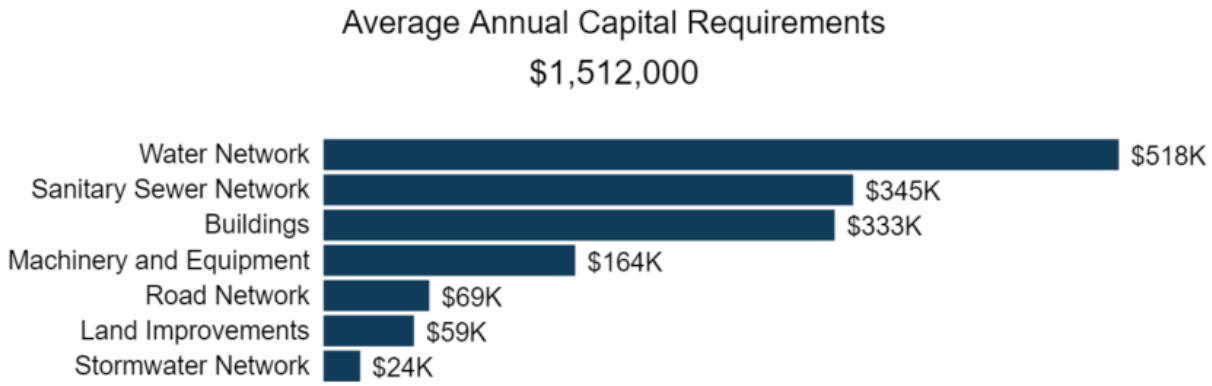
1. In order to reduce financial requirements, consideration has been given to revising service levels downward.

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 $1.5 million annually to address capital requirements for the assets included in this AMP.



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

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

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

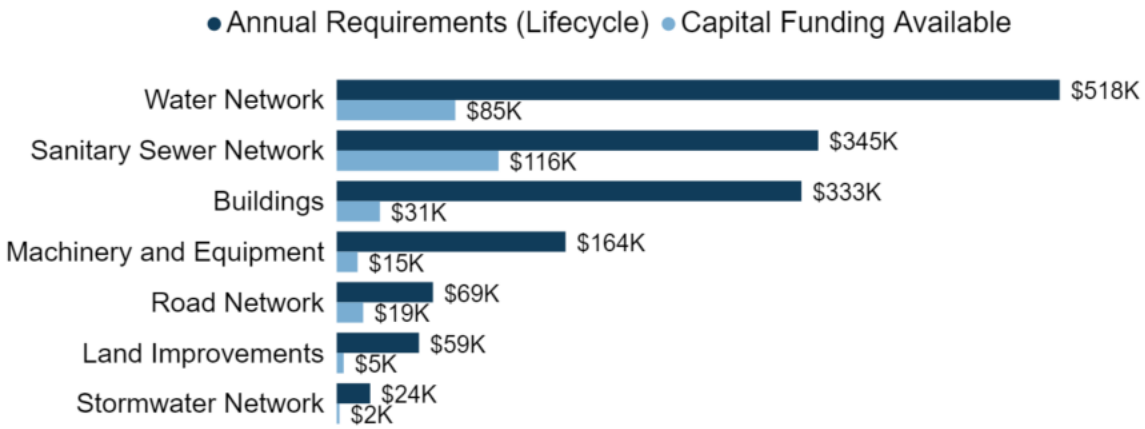
2. Lifecycle Strategy Scenario: Based on the assumption that lifecycle activities are performed at strategic intervals to extend the service life of assets until replacement is required.

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$87,000	$69,000	$18,000

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $18,000 for the Road Network. This represents an overall reduction of the annual requirements for each category by 21%. As the lifecycle strategy scenario represents the lowest cost option available to the Township, we have used these annual requirements in the development of the financial strategy.

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $273,000 towards capital projects per year. Given the annual capital requirement of $1,512,000, there is currently a funding gap of $1,239,000 annually.



The following sections detail the sources of available capital funding, debt payments and reserves for both tax-funded and rate-funded asset categories. A series of recommendations have been developed to address the difference between available funding and capital requirements.

7.2 Funding Objective

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

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

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, White River's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by taxes.

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Taxes	Gas Tax	OCIF	Total Available	
Road Network	69,000	6,000	3,000	10,000	19,000	50,000
Stormwater Network	24,000	2,000	0	0	2,000	22,000
Buildings	333,000	31,000	0	0	31,000	302,000
Machinery & Equipment	164,000	15,000	0	0	15,000	149,000
Land Improvements	59,000	5,000	0	0	5,000	54,000
	649,000	**59,000**	**3,000**	**10,000**	**72,000**	**577,000**

The average annual investment requirement for the above categories is $649,000. Annual revenue currently allocated to these assets for capital purposes is $72,000 leaving an annual deficit of $577,000. Put differently, these infrastructure categories are currently funded at 11% of their long-term requirements.

7.3.2 Full Funding Requirements

In 2019, Township of White River has annual tax revenues of $1,377,000. 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
Road Network	3.6%
Stormwater Network	1.6%
Buildings	21.9%
Machinery & Equipment	10.8%
Land Improvements	3.9%
	41.8%

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

a) White River's debt payments for these asset categories will be decreasing by $0 over the next 5 years and by $38,000 over the next 10 years. Although not shown in the table, debt payment decreases will be $38,000 and $38,000 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	577,000	577,000	577,000	577,000	577,000	577,000	577,000	577,000
Change in Debt Costs	N/A	N/A	N/A	N/A	0	-38,000	-38,000	-38,000
Resulting Infrastructure Deficit:	**577,000**	**577,000**	**577,000**	**577,000**	**577,000**	**539,000**	**539,000**	**539,000**
Tax Increase Required	41.9%	41.9%	41.9%	41.9%	41.9%	39.1%	39.1%	39.1%
Annually:	**8.4%**	**4.2%**	**2.8%**	**2.1%**	**8.4%**	**3.9%**	**2.6%**	**2.0%**

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 $38,000 to the infrastructure deficit as outlined above.

b) increasing tax revenues by 2.0% 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) 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[6].

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 $755,000 for Buildings, $23,000 for Machinery & Equipment, $329,000 for Land Improvements.

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.

[6] 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, White River's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by taxes.

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Rates	To Operations	OCIF & Gas Tax	Total Available	
Water Network	518,000	237,000	-215,000	95,000	117,000	401,000
Sanitary Sewer Network	345,000	223,000	-202,000	63,000	84,000	261,000
	863,000	**460,000**	**-417,000**	**158,000**	**201,000**	**662,000**

The average annual investment requirement for the above categories is $863,000. Annual revenue currently allocated to these assets for capital purposes is $201,000 leaving an annual deficit of $662,000. Put differently, these infrastructure categories are currently funded at 23% of their long-term requirements.

7.4.2 Full Funding Requirements

In 2019, White River had annual sanitary revenues of $223,000 and annual water revenues of $237,000. 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	169.2%
Sanitary Sewer Network	117.0%

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

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

a) White River's debt payments for the Water Network will be decreasing by $143,000 over the next 20 years.

b) For the Sanitary Sewer Network, there are no debt payment changes over the next 20 years.

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined. The following table outlines this concept and presents several options without considering the re-allocation of returning debt costs:

	Water Network				Sanitary Sewer Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	261,000	261,000	261,000	261,000	261,000	261,000	261,000	261,000
Rate Increase Required	169.2%	169.2%	169.2%	169.2%	117.0%	117.0%	117.0%	117.0%
Annually:	**33.8%**	**16.9%**	**11.3%**	**8.5%**	**23.4%**	**11.7%**	**7.8%**	**5.9%**

The following table includes the re-allocation of returning debt costs to capital costs:

	Water Network				Sanitary Sewer Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	401,000	401,000	401,000	401,000	261,000	261,000	261,000	261,000
Change in Debt Costs	-17,000	-33,000	-74,000	-143,000	0	0	0	0
Resulting Deficit	**384,000**	**368,000**	**327,000**	**258,000**	**261,000**	**261,000**	**261,000**	**261,000**
Tax Increase Required	162.0%	155.3%	138.0%	108.9%	117.0%	117.0%	117.0%	117.0%
Annually:	**32.4%**	**15.5%**	**9.2%**	**5.4%**	**23.4%**	**11.7%**	**7.8%**	**5.9%**

7.4.3 Financial Strategy Recommendations

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

a) when realized, reallocating the debt cost reductions of $143,000 for water services to the applicable infrastructure deficit.

b) increasing rate revenues by 5.9% for the Sanitary Sewer Network and 5.4% for the Water 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.

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

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. This periodic funding should not be incorporated into an AMP unless there are firm commitments in place.

2. We realize that raising rate revenues for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

3. Any increase in rates required for operations would be in addition to the above recommendations.

Although this 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 $197,000 for the Water Network and $2,429,000 for the Sanitary Sewer Network.

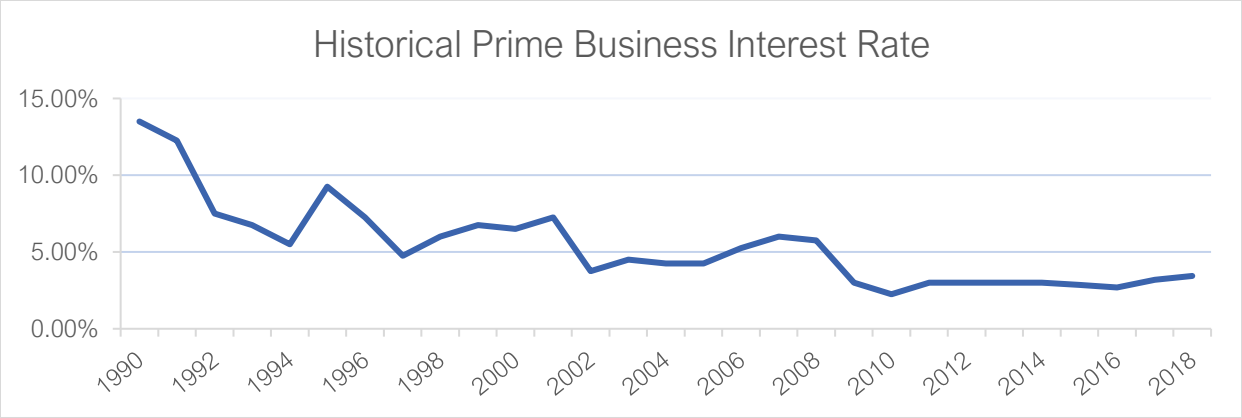
Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

7.6 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%[7] 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:



[7] 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 White River has historically used debt for investing in the asset categories as listed. There is currently $1,800,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $181,000, well within its provincially prescribed maximum of $507,000.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2015	2016	2017	2018	2019
Road Network	0	0	0	0	0	0
Stormwater Network	0	0	0	0	0	0
Buildings	0	0	0	0	0	0
Machinery & Equipment	334,000	0	0	0	0	0
Land Improvements	0	0	0	0	0	0
Total Tax Funded:	**334,000**	**0**	**0**	**0**	**0**	**0**
Water Network	1,466,000	0	0	0	0	0
Sanitary Sewer Network	0	0	0	0	0	0
Total Rate Funded:	**1,466,000**	**0**	**0**	**0**	**0**	**0**

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2020	2021	2022	2023	2024	2025	2030
Road Network	0	0	0	0	0	0	0
Stormwater Network	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0
Machinery & Equipment	38,000	38,000	38,000	38,000	38,000	38,000	0
Land Improvements	0	0	0	0	0	0	0
Total Tax Funded:	**38,000**	**38,000**	**38,000**	**38,000**	**38,000**	**38,000**	**0**
Water Network	143,000	141,000	136,000	133,000	130,000	126,000	110,000
Sanitary Sewer Network	0	0	0	0	0	0	0
Total Rate Funded:	**143,000**	**141,000**	**136,000**	**133,000**	**130,000**	**126,000**	**110,000**

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

7.7 Use of Reserves

7.7.1 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 the Township.

Asset Category	Balance at December 31, 2019
Road Network	0
Stormwater Network	0
Buildings	890,000
Machinery & Equipment	102,000
Land Improvements	54,000
Total Tax Funded:	**1,046,000**
Water Network	1,004,000
Sanitary Sewer Network	0
Total Rate Funded:	**1,004,000**

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 White River'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.

7.7.2 Recommendation

In 2024, Ontario Regulation 588/17 will require White River 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
Hydro Poles	$0	$0	$0	$0	$0	$0	$32,059	$0	$0	$0	$0
Paved Roads	$0	$0	$0	$45,000	$0	$0	$0	$0	$0	$121,846	$0
Street Lights	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$45,000**	**$0**	**$0**	**$32,059**	**$0**	**$0**	**$121,846**	**$0**

Stormwater Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Catch Basins	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$13,465	$0
Manholes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sewer Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$13,465**	**$0**

Buildings											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Environmental Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
General Government Buildings	$754,932	$0	$42,520	$0	$0	$0	$0	$0	$0	$0	$0
Health Services Buildings	$0	$0	$0	$0	$0	$0	$0	$130,799	$0	$0	$0
Protective Services Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$586,594	$0	$0
Recreation Buildings	$0	$0	$0	$0	$0	$0	$150,974	$0	$0	$0	$0
Transportation Services Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$754,932	**$0**	**$42,520**	**$0**	**$0**	**$0**	**$150,974**	**$130,799**	**$586,594**	**$0**	**$0**

Machinery & Equipment											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
General Government Equipment	$15,674	$0	$2,616	$2,113	$43,613	$0	$0	$0	$0	$0	$0
Health Services Equipment	$7,045	$0	$15,877	$0	$0	$33,400	$0	$0	$0	$0	$0
Protection Services Equipment	$0	$0	$0	$0	$0	$462,312	$0	$0	$0	$0	$172,166
Recreation Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$79,168	$0	$0
Transportation Services Equipment	$0	$0	$0	$0	$0	$0	$0	$13,488	$272,329	$0	$0
	$22,719	**$0**	**$18,493**	**$2,113**	**$43,613**	**$495,712**	**$0**	**$13,488**	**$351,497**	**$0**	**$172,166**

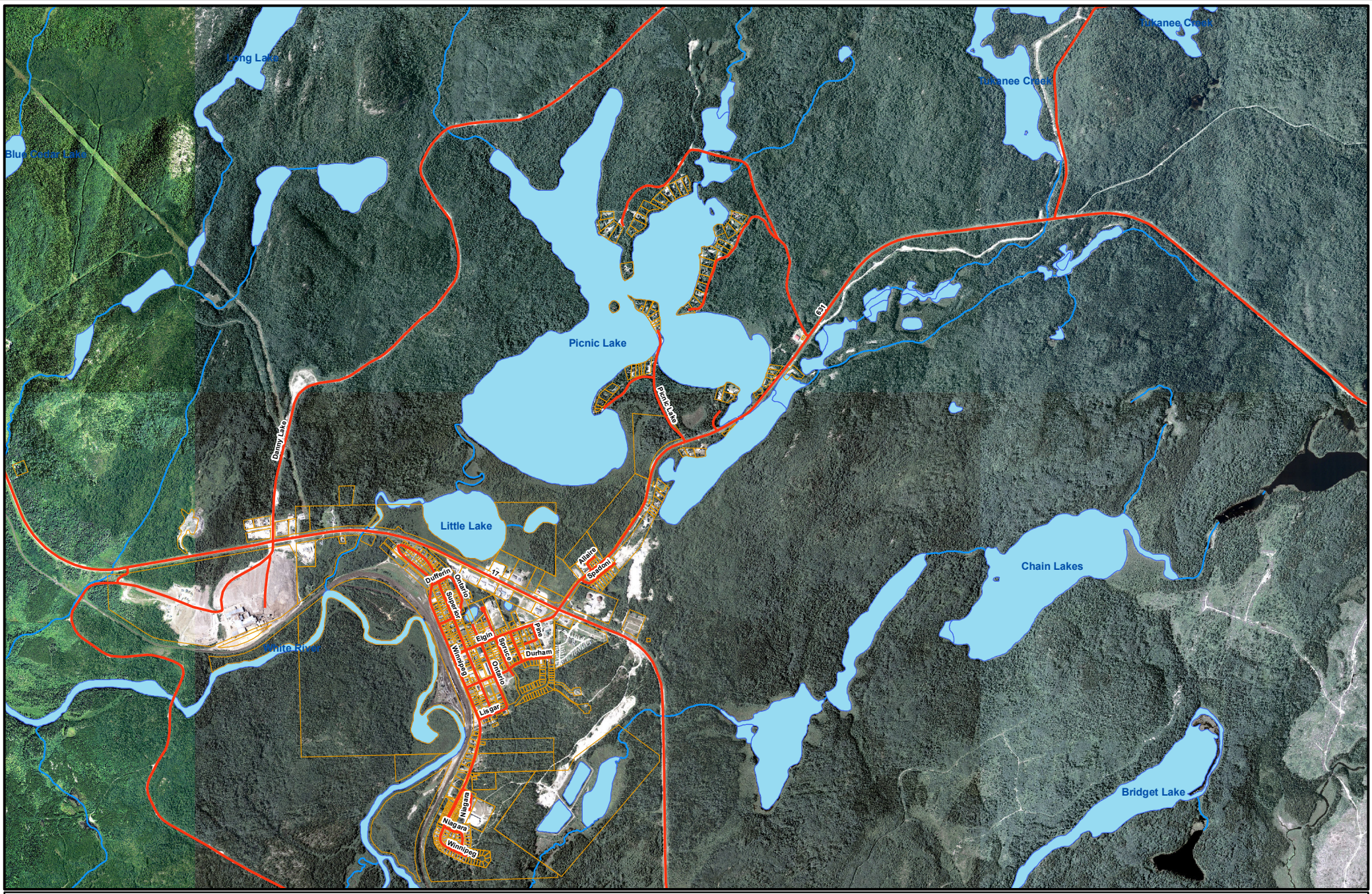
Land Improvements											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Cemeteries	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
General Land Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Parking Lots	$329,240	$0	$0	$0	$0	$0	$0	$0	$29,305	$0	$0
Parks	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$329,240	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$29,305**	**$0**	**$0**

Water Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Control Valves	$0	$0	$0	$0	$0	$0	$0	$0	$0	$89,000	$0
Hydrants	$0	$0	$0	$0	$0	$0	$0	$0	$0	$24,600	$0
Service Leads	$196,926	$0	$0	$0	$0	$0	$0	$0	$0	$150,252	$0
Water Buildings	$0	$62,144	$0	$0	$0	$259,564	$0	$0	$0	$0	$0
Water Equipment	$0	$0	$0	$0	$0	$0	$89,107	$3,281,710	$0	$0	$0
Water Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Vehicles	$0	$0	$0	$0	$0	$0	$0	$33,884	$0	$0	$0
	$196,926	**$62,144**	**$0**	**$0**	**$0**	**$259,564**	**$89,107**	**$3,315,594**	**$0**	**$263,852**	**$0**

Sanitary Sewer Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Lagoons	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Manholes	$0	$0	$0	$0	$0	$0	$0	$0	$120,000	$0	$0
Sanitary Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$517,194	$2,784,313	$0
Sanitary Equipment	$2,428,959	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sanitary Sewer Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$2,428,959	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$637,194**	**$2,784,313**	**$0**

All Asset Categories											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Road Network	$0	$0	$0	$45,000	$0	$0	$32,059	$0	$0	$121,846	$0
Stormwater Network	$0	$0	$0	$0	$0	$0	$0	$0	$0	$13,465	$0
Buildings	$754,932	$0	$42,520	$0	$0	$0	$150,974	$130,799	$586,594	$0	$0
Machinery & Equipment	$22,719	$0	$18,493	$2,113	$43,613	$495,712	$0	$13,488	$351,497	$0	$172,166
Land Improvements	$329,240	$0	$0	$0	$0	$0	$0	$0	$29,305	$0	$0
Water Network	$196,926	$62,144	$0	$0	$0	$259,564	$89,107	$3,315,594	$0	$263,852	$0
Sanitary Sewer Network	$2,428,959	$0	$0	$0	$0	$0	$0	$0	$637,194	$2,784,313	$0
	$3,732,776	**$62,144**	**$61,013**	**$47,113**	**$43,613**	**$755,276**	**$272,140**	**$3,459,881**	**$1,604,590**	**$3,183,476**	**$172,166**

Appendix B: Level of Service Maps



Legend

- White River Roads
- Parcel
- Lakes
- Rivers

11/05/2020

White River Road Network
Township of White River

0 225 450 900 1,350

Meters

NITGC

NORTHERN INFORMATION TECHNOLOGY AND GEOMATICS COOPERATIVE

N W E S

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Legend

- Catch Basin
- Storm, MH
- Cross
- Driveway
- Storm

11/05/2020

White River Storm Network
Township of White River

0 87.5 175 350 525

Meters

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Legend

- Pump Station
- Hydrant
- Bend
- Cap
- Cross
- Inspection Hatch
- Machined Sleeve
- Reducer
- Saddle
- Sleeve
- Tee
- 13 - 300
- 301 - 900
- Service Lead

White River Water Network
Township of White River

0 75 150 300 450
Meters

NITGC
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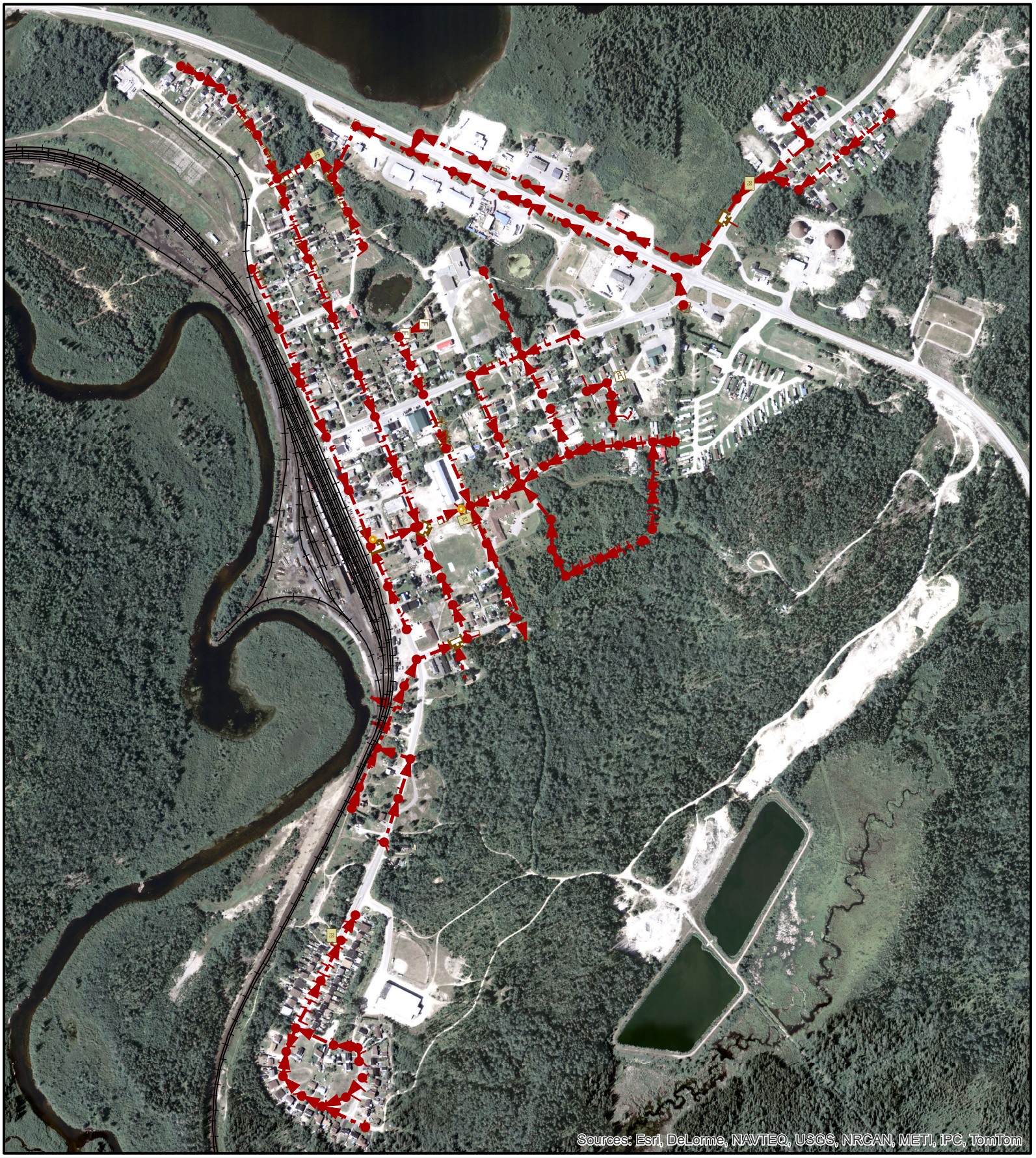
11/05/2020



Legend

- Pumping Station
- Combined, MH
- Sanitary, Chamber
- Sanitary, MH
- Bend
- EndCapw\Blowoff
- Endcap
- Tee
- Wye
- FlushingConnection
- Sanitary
- Sanitary

White River Sewer Network
Township of White River

0 62.5 125 250 375
Meters

NITGC
NORTHERN INFORMATION TECHNOLOGY AND GEOMATICS COOPERATIVE

N W E S

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11/05/2020

Appendix C: Risk Rating Criteria

Probability of Failure

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Probability of Failure Score
Road Network (Roads) Stormwater Network (Mains)	Condition	100%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5
Water Network (Mains)	Condition	80%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5
	Pipe Material	20%	CI	5
			AC	3
			CU	3
			DI	2
			PVC	1
Sanitary Sewer Network (Mains)	Condition	80%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5
	Pipe Material	20%	UNKN	4
			PE	2
			PVC	2

Consequence of Failure

Asset Category	Risk Criteria	Value/Range	Consequence of Failure Score
Road Network (Paved Roads)	Functional Class (50%)	Collector	4
		Local	2
	Num of Lanes (50%)	2	3
		1	2
Stormwater Network (Mains)	Sewer Type (25%)	GRAV	2
	Diameter (75%)	0 (Unknown)	5
		1350	5
		1200	5
		1050	4
		750	3
		530	3
		450	2
		300	2
		250	1
Water Network	Diameter (100%)	300	5
		250	4
		200	3
		150	2
		100	2
		50	1
Sanitary Sewer Network	Diameter (50%)	350	5
		250	3
		200	3
		150	2
		100	1
	Sewer Type (50%)	OVFLW	5
		FM	4
		GRAV	2

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