Asset Management Plan

Township of Baldwin

2021

This Asset Management Plan was prepared by:

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

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

Key Statistics

Replacement cost of asset portfolio
$8.47 million

Replacement cost of infrastructure per household
$26,000 (2021)

Percentage of assets in fair or better condition
26%

Percentage of assets with assessed condition data
94%

Annual capital infrastructure deficit
$27,000

Recommended timeframe for eliminating annual infrastructure deficit
10 Years

Target reinvestment rate
3.57%

Actual reinvestment rate
3.25%

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Executive Summary

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

Scope

This Asset Management Plan (AMP) identifies the current practices and strategies that are in place to manage public infrastructure and makes recommendations where they can be further refined. Through the implementation of sound asset management strategies, the Township and their infrastructure is better positioned to support the sustainable delivery of municipal services.

This AMP include the following asset categories:

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

Findings

The total replacement cost of all assets included in this AMP is $8.47 million as of December 2021. Most assets analysed in this AMP are in fair or better condition and assessed condition data was available for almost all (94%) assets. For the remaining assets, assessed condition data was unavailable, and asset age was used to approximate condition. Generally, age misstates the true condition of assets, making up to date assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

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

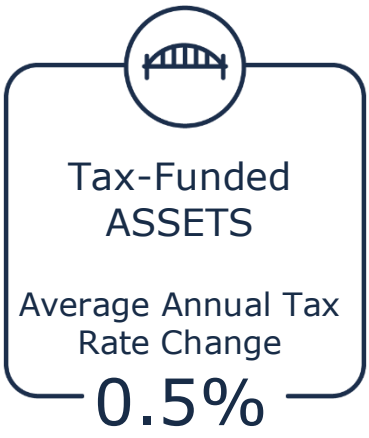
To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $303,000. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $276,000 towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $27,000.

Annual Increase Per Household

It is important to note that this AMP represents a snapshot in time based on asset data as of December 2021. All data, including replacement cost and condition, is reported as of this date, and is based on the best available processes, data, and information at the Township. As noted in the recommendations, review of asset inventory information especially replacement costs are recommended and could result in changes to asset investment requirements and required tax rates to support. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources.

Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphics shows annual tax/rate change required to eliminate the Township's infrastructure deficit based on a 10-year plan:



Recommendations to guide continuous refinement of the Township's asset management program are as follows:

- Thoroughly review asset inventory information for accuracy, completeness, consistency, and validity. Begin with the highest valued asset categories first—road network, buildings— and then move on other asset categories.
- Review and refine asset record collection and retention process; work towards a defined process that ensures asset information, including studies and capital projects are appropriately documented, easily referenceable, and incorporated into the asset management database.
- Develop a condition assessment strategy with a regular schedule, identified responsibility by department, and documented process for assessment procedures, and asset specific considerations. Begin implementation with highest valued and/or most critical assets first. Consider procuring Building Condition Assessments.

- Measure current levels of service and in preparation for the 2025 deadline begin to identify sustainable proposed levels of service.

1 Introduction & Context

Key Insights

- The Township of Baldwin is a small municipality in Northern Ontario about 65 kilometers south-west of Sudbury.

- 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 and the priorities to be advanced through asset management.

- An asset management plan is a living document that requires regular update to best inform long-term planning.

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

Baldwin Township Community Profile

Census Characteristic	Baldwin Township	Ontario
Population 2021	579	14,223,942
Population Change 2016-2021	-4.3%	5.8 %
Total Private Dwellings	326	5,929,250
Population Density	7/km^2	15.9/km^2
Land Area	82.49 km^2	892,411.76 km^2

The Township of Baldwin is in northern Ontario, and 67 kilometres south-west of Sudbury The Township of Baldwin is surrounded by several small lakes and bordered by the Spanish River to the South.

The Township was first surveyed in 1871 and subdivided in 1885. By the early 1900s the Spanish River Pulp and Paper Company began planning a mill Town in the area and in support of this Canadian Specific Railway's development of the Mckerrow Station (originally Stanley Junction) was spurred. Over this period, the population grew and by 1927 the Township of Baldwin was incorporated.

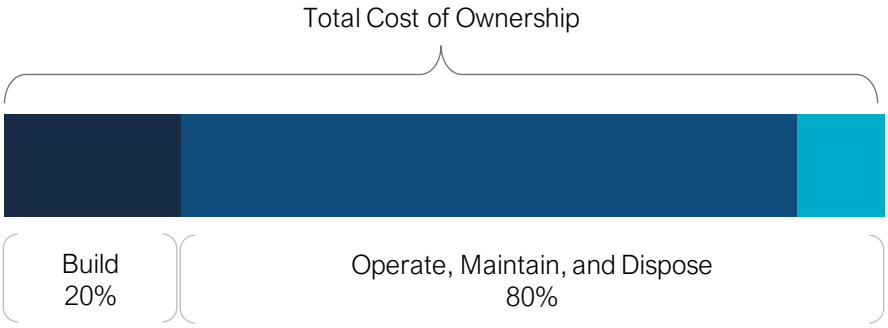
Today, the Township serves as a residential community with many commuting to the neighboring Town of Espanola, home to Domtar Paper Products, for work.

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.

1.2

Typically, the acquisition of capital assets accounts for about 10-20% of an assets total cost of ownership. The remaining 80-90% of an assets total cost of ownership typically is from its operations and maintenance. This AMP focuses its analysis on the capital costs of *existing* municipal infrastructure assets only and is based on assets in inventory as of December 2021.



Assets ownership costs can, and often do, span decades and are often significant in value. To ensure the financial resources are available for assets as needed and costs are spread equitably across generations, planning and foresight is needed. An asset management plan is critical to this planning, and an essential element of broader asset management program. The industry-standard approach and sequence to developing a practical asset management program begins with a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan.

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

1.2.1 Asset Management Policy

The Township's Asset Management Policy was formally adopted in June 2020.

The purpose of the policy is to establish consistent standards and guidelines for the management of the Township's assets. It focuses on managing assets at the lowest total lifecycle cost based on a level of service that meets the needs of the community within a level of risk deemed acceptable. To do so, it advances the following guidelines:

- **Prioritizing** infrastructure priorities
- **Transparency** in decisions which are framed by evidence
- **Consistency** in the provision of core public services
- **Health & Safety** of workers involved in the management of infrastructure to be protected and assets to be serviced to the Provincial Minimum Maintenance Standard.

In addition, the policy outlines persons primarily responsible for the Township's asset management program, including reporting requirements, determination of capital requirements, and how asset management information (including capital requirements) will be considered by council.

1.2.2 Asset Management Strategy

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

Several of the recommendations throughout this report highlight specific actions and practices that are expected to improve the Municipality's Asset management practices, internal capacity and cognizance, and resultant decisions. Thus, these recommendations serve informally as an Asset Management Strategy and provide a framework of activities that operationalize and support the delivery of the asset management objectives as defined in the policy.

1.2.3 Asset Management Plan

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

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

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

Key Concepts in Asset Management

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

1.3.1 Lifecycle Management Strategies

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

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

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

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

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

The Township's current approach to lifecycle management is described for each asset category. For the road network, a proactive lifecycle strategy is outlined. Lifecycle management activities and strategies are developed to operate assets at

the lowest total cost of ownership through strategic interventions and timing of them.

1.3.2 Risk Management Strategies

Municipalities generally take a 'worst-first' approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal. Some are more important than others, and their failure or disrepair poses more risk to the community than that of others. For example, a road with a high volume of traffic that provides access to critical services poses a higher risk than a low volume rural road. These high-value assets should receive funding before others.

By identifying the various impacts of asset failure and the likelihood that it will fail, risk management strategies can identify critical assets, and determine where maintenance efforts, and spending, should be focused.

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

1.3.3 Levels of Service

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

These measures include a combination of O. Reg. 588/17 mandated LOS for road assets and other performance measures identified by the Township. The Township measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service.

Community Levels of Service

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

Technical Levels of Service

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

For core assets the Province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP. For non-core asset categories, the Township has determined the technical metrics that will be used to determine the technical level of service provided. These metrics can be found in the Levels of Service subsection within each asset category.

Current and Proposed Levels of Service

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

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

Ontario Regulation 588/17

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

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

2019

Strategic Asset Management Policy

2022

Asset Management Plan for Core Assets with the following components:

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

2024

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

2025

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

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

1.4.1 O. Reg. 588/17 Compliance Review

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

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

In addition to the above requirements, the AMP must be approved by a resolution passed by municipal council and endorsed by the executive lead of the municipality. The AMP and the Asset Management Policy must also be posted to the Municipality's website where residents can access them. Upon request, a hard copy of the Policy and/or the AMP is to be made available to any person who request it.

Asset Management Roadmap

As part of the development of this AMP, PSD Citywide worked with the Township of Baldwin to review and refine asset data, develop lifecycle, and risk models and select levels of services. The following summarizes key milestones/deliverables achieved throughout this project.

1.5

Asset Data Review and Refinement (Completed on January 19th, 2023)
At the onset of the project asset inventory information was compiled and reviewed and an asset registry was created. This data was further refined over the course of this project through review with staff and asset records.

Lifecycle Model Development (Completed on October 13th, 2022)
The Township's lifecycle management strategies were reviewed and documented to determine current practices. For surface treated roads, a proactive lifecycle strategy with scheduled rehabilitations was modeled and reflected in this AMPs analysis.

Risk and Criticality Model Development (Completed on October 27th, 2022)
Risk models were developed to determine the relative criticality of assets based on their probability and consequence of failure. These models assist with the prioritization and ranking of infrastructure needs.

Level of Service Framework Development (Completed on October 27th, 2022)
A framework was developed to determine the current level of service provided to the community through municipal infrastructure.

AMP & Financial Strategy
This document represents the culminating deliverable of the Asset Management Roadmap.

2 Scope and Methodology

Key Insights

- This asset management plan includes six (6) asset categories all of which are tax-funded.

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

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

2.1 Asset Categories Included in this AMP

This asset management plan for the Township of Baldwin is produced in compliance with Ontario Regulation 588/17. The July 2022 deadline under the regulation—the first of three AMPs—requires analysis of only core assets[1]. The July 2024 deadline under the regulation requires analysis of all assets, which includes assets such as fleet, machinery and equipment, land improvements and buildings.

The AMP summarizes the state of the infrastructure for the Township's asset portfolio, establishes current levels of service statements and metrics, 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
Buildings	
Fleet	
Machinery & Equipment	
Land Improvements	
Waste Water Lagoons	

2.2 Deriving Replacement Costs

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

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

[1] O. Reg. 588/17 defines core assets as roads, bridges and culverts, water, wastewater, and stormwater. Roads and wastewater lagoons are the only core asset owned by the Township of Baldwin.

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

2.3 Estimated Useful Life and Service Life Remaining

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

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

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

2.4 Reinvestment Rate

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

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

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

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

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.

2.5

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	60-79
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies	40-59
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20-39
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-19

Most assets (94%) in this AMP utilize assessed condition data; the remaining assets use age-based condition determine by the assets age relative to its estimate useful life.

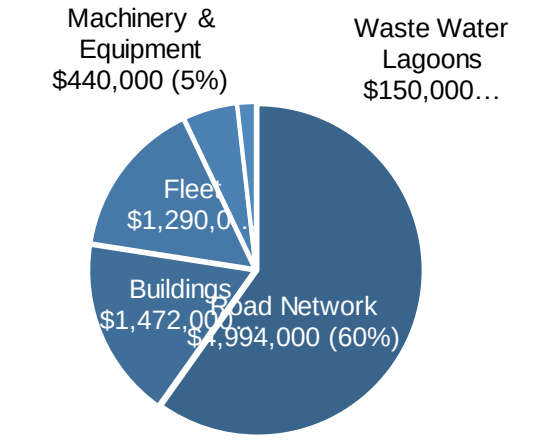
3 Portfolio Overview

Key Insights

- The total replacement cost of the Township's asset portfolio is $8.47 million.
- The Township's target re-investment rate is 3.57%, and the actual re-investment rate is 3.25%, contributing to an expanding infrastructure deficit.
- 85% of all assets are in fair or better condition.
- Average annual capital requirements total $303,000 per year across all assets.

3.1 Total Replacement Cost of Asset Portfolio

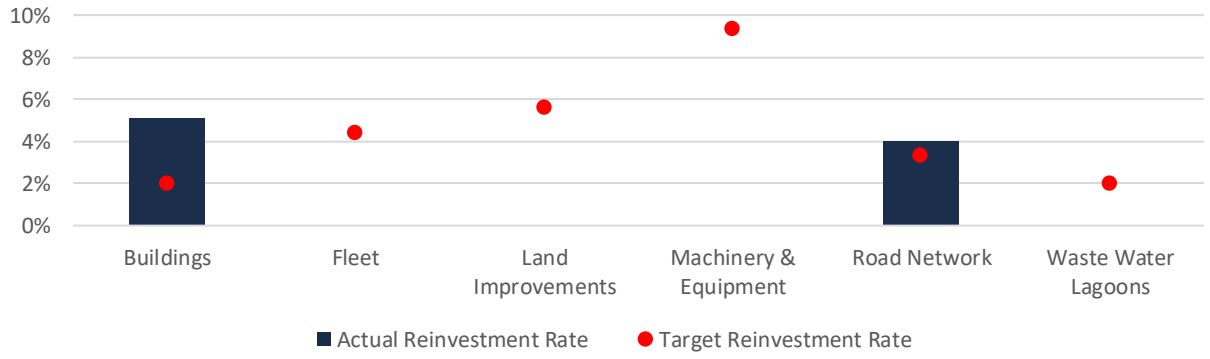
The asset categories analysed in this AMP have a total replacement cost of $8.47 million based on inventory data from December 2021. The total replacement cost was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.



Total Current Replacement Cost: $8,470,000

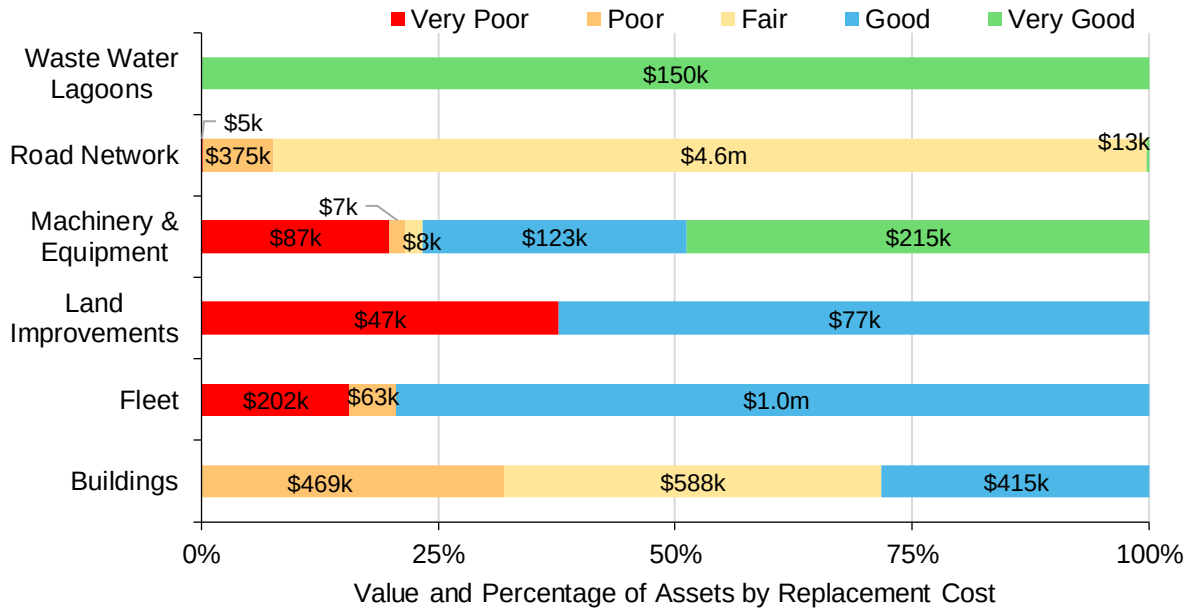
3.2 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township should be allocating approximately $303,000 annually, for an overall target reinvestment rate of 3.57%. Actual annual spending on infrastructure totals approximately $276,000, for an actual reinvestment rate of 3.25%. By asset category the current reinvestment rates compared with the target reinvestment rates are as follows:



Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 24% of assets (weighted be replacement cost) in Baldwin are in good or better condition and 85% of assets are in fair or better condition. This estimate relies on both age-based and field condition data.



This AMP relies on assessed condition data for 94% of assets. Most assessments however were completed in 2017 and have been projected to 2021. As noted in the executive summary, it is recommended that asset condition is regularly reviewed, and asset data updated to reflect any changes. For assets without assessed condition, age is used as an approximation of condition. Assessed condition data is very valuable to asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	Asset Segment	% of Assets with Assessed Condition	Source of Condition Data
Road Network	Paved Roads	100%	Kresin Engineering Corp.
Road Network	Road Culverts & Street Lights	0%	Age- Based
Buildings	All	85%	Kresin Engineering Corp.
Fleet	All	97%	Staff Assessments

Asset Category	Asset Segment	% of Assets with Assessed Condition	Source of Condition Data
Machinery & Equipment	All	100%	Staff Assessments
Land Improvements	All	58%	Age- Based

Service Life Remaining

Service life remaining, which is based on asset age and estimated useful life varies by asset and by asset category. When weighted by replacement value and reported on the category level fleet, machinery and land improvement assets all have less than 10 years of service life remaining. This contrast with roads, buildings, and the wastewater lagoon which all have more than 10 years of service life remaining.

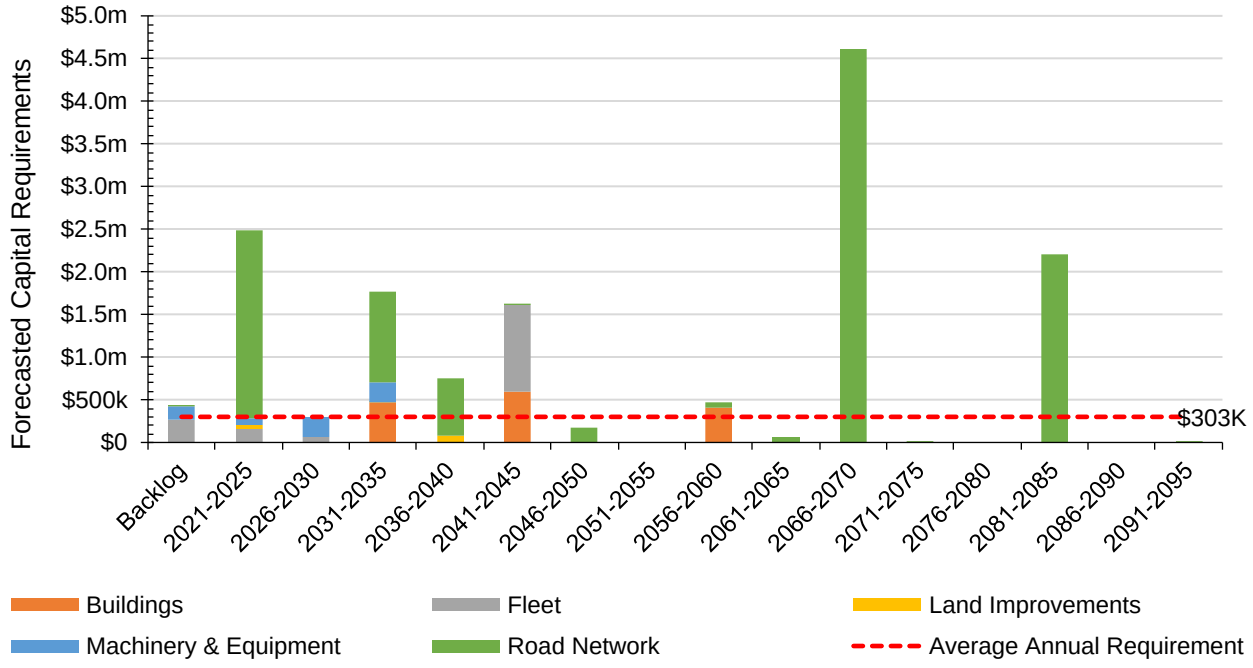
3.4

Asset Category	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Road Network	56.3	23.4	11
Buidlings	50	31.9	18.1
Fleet	14.6	9.4	5.6
Machinery & Equipment	11.6	5.6	6
Land Improvements	18.3	11.8	6.5
WasteWater Lagooon	50	5.6	44.3

Forecasted Capital Requirements

3.5

The development of a long-term capital forecast should include both asset rehabilitation and replacement requirements. With the development of asset-specific lifecycle strategies that include the timing and cost of future capital events, the Township can produce a long-term capital forecast. The following graph identifies forecasted capital requirements over the next 70 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average 5-year capital requirements.



4 Analysis of Assets

Key Insights

- All the Township's existing assets are tax-funded assets; their 2021 replacement value is $8.47 million.

- 85% of assets are in fair or better condition.

- The average annual capital requirement to sustain the current level of service is approximately $303,000.

- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options.

4.1 Road Network

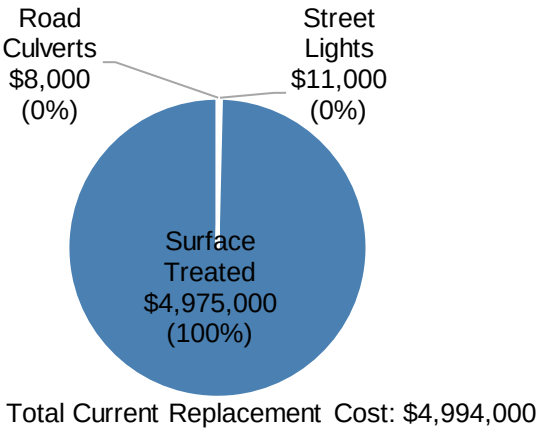
The road network is a critical component of the provision of safe and efficient transportation services and represents the highest value asset category in the Township's asset portfolio. The Township's roads are maintained by the Public Works department.

At the time of the development of the AMP, the Township was unable to locate formal documentation of road construction dates. As a result, the in-Service dates for road network assets are estimated. There is no information on the current length of road culvert assets, so for the purposes of estimating replacement cost their length was assumed to be 8 meters to accommodate the two-way roads they service.

4.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of the Township's road network inventory as of December 2021.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Gravel Roads	7.5 KM	Not Planned for Replacement[2]	
Paved Roads (LCB)	19.9 KM	100% Cost/Unit	$4,975,000
Streetlights	5 units	CPI Tables	$11,000
Road Culverts	6 units	100% Cost/Unit	$8,000
Total			**$4,994,000**



[2] 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. Baldwin township does allocate some capital funding to their gravel roads; this allocation has been reflected in the financial strategy.

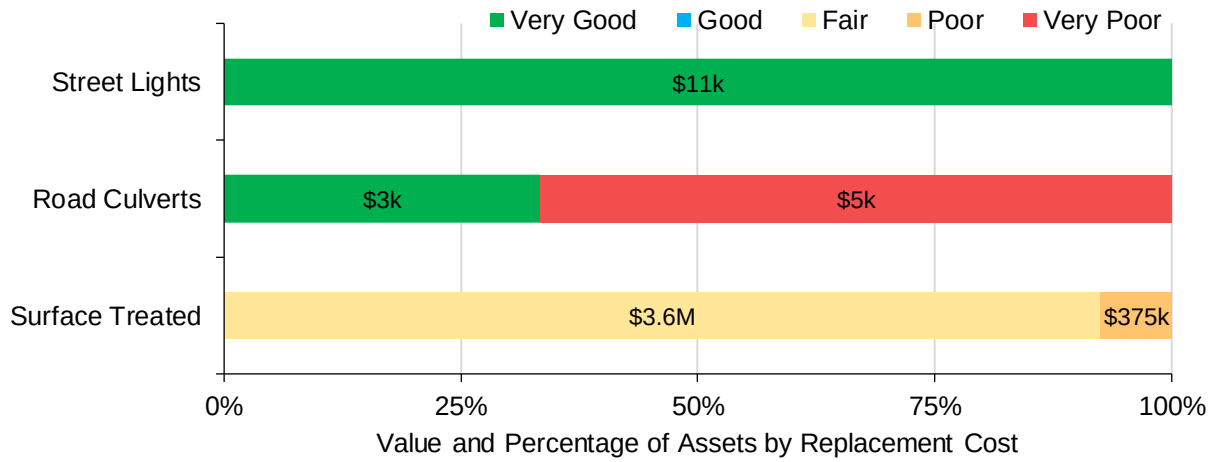
4.1.2 Asset Condition

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
Paved Roads (LCB)	40	Fair	KMPG Assessment
Streetlights	88	Very Good	Age-based
Road Culverts	29	Poor	Age-based
Total	**39**	**Poor**	

The graph below visually illustrates the condition for each asset segment on a very good to very poor scale. As indicated below, condition varies by asset segment with streetlights in very good condition, road culverts having a mix of assets in very good and very poor condition, and surface treated roads in poor or very poor condition.

For road assets condition is based on an assessment completed in 2017 which has been projected to 2021. Updated condition assessments are likely to indicate some differences to projected condition reported below.



To ensure that the Township's 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 road network.

Current Approach to Condition Assessment

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

- The most recent road condition assessment was completed in 2013 by Kresin Engineering Corp (KEC) and then confirmed in 2017 by KPMG. The assessments indicate the overall assessed condition and observations.
- This AMP relies on the projected condition, which uses the 2017 assessments and projects them to 2021.

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)
Paved Roads (LCB)	60	14.9	45.1[3]
Streetlights	25	3	22
Road Culverts	50	53.6	(3.6)

Estimated useful Life is intended to reflect the expected lifespan from an asset. Therefore, it is recommended that it is reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

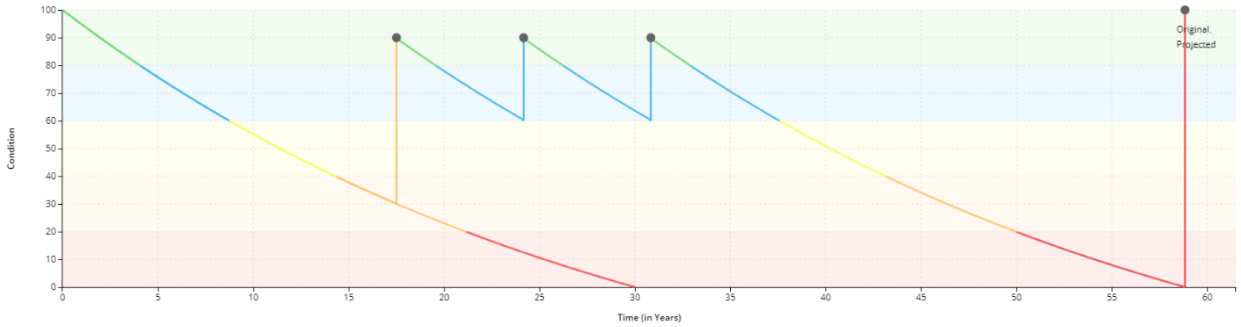
[3] Reported service life remaining is based on the adoption of the road lifecycle strategy detailed in section 4.1.4 below.

4.1.4 Lifecycle Management Strategy

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

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of surface treated roads. Instead of allowing the roads to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of roads at a lower total cost. In the table below proposed rehabilitation activities and their triggers are listed. Following this table is the expected impacts to the condition and expected useful life of surface treated roads over time.

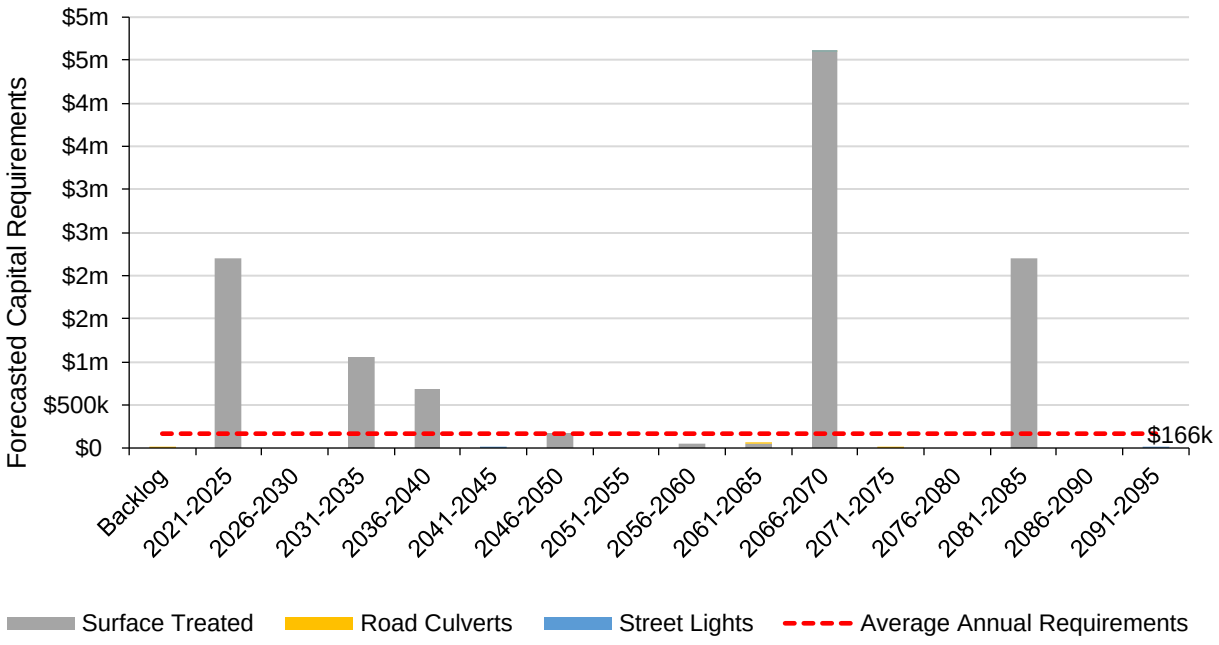
Surface Treated Roads		
Event Name	**Event Class**	**Event Trigger**
Surface Application	Rehabilitation	Condition: 60
Mill & Resurface	Rehabilitation	Age: 17.5 Years



Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for LCB roads, and assuming the end-of-life replacement of streetlights and roadside culverts, the following graph forecasts capital requirements for the road network.

The following graph forecasts long-term capital requirements. The annual capital requirement is $166,000 and represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements until 2095, reported in 5-year cumulative bins. This projection period is used as it ensures that every asset has gone through one full iteration of replacement.



Most capital requirements are for surface treated road assets, however there are some requirements for other road network assets. For a detailed breakdown of capital requirements by year and asset segment please refer to Appendix B.

4.1.5 Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for road network assets based on 2021 inventory data.

The asset-specific attributes that municipal staff utilize to measure risk of surface treated roads is as follows:

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

Further details on the risk model noted above, are provieded in Appendix D.

As indicated below road assets carry various levels of risk, however some assets hold moderate risk (orange) and a few high risk (red) due to their high probability and consequence of failure. The high probably of failure scores are largely due to the fact that most road assets are in poor condition and have little remaining life. Their conseuqence of failure is because of the high replacement value of the road.

The identification of critical assets is an important first step to identifying appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies that seek to improve the assets condition and lifespan, condition assessment strategies that work to collect stronger asset

information to enable better decisions, and/or the identification of other metrics that are important to the measurement of risk but not yet available to the Township.

The risk model presented is high-level developed for the AMP. As a regular practice and Township staff should review and adjust the risk model to reflect changes to the data available to evaluate risk and an evolving understanding of both the probability and consequences of asset failure

Risks to Current Asset Management Strategies

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

Lifecycle Management

The current lifecycle management strategy for road assets is more reactive than proactive; most works are triggered by complaints from the public or findings from weekly patrols. Through this project lifecycle management strategies were identified for surface treated roads with the intent to extend asset lifecycles and reduce total cost of ownership. A formal road rehabilitation strategy will require adoption and implementation from the Public Works department with the results of rehabilitation reviewed over time to better understand actual impact and evaluate total lifecycle cost.

Capital Funding Strategies

Major capital rehabilitation and replacement road projects are often largely dependant on the availability of grant funding opportunities. In recent years road rehabilitation projects have been deferred due to limited municipal capital funding and the unavailability of grant funding. High dependency on grant funds poses risk long-term risks. An annual capital funding strategy could reduce dependency on grant funding and help prevent deferral of capital works.

Data Confidence

Data about roads and road culverts is extremely limited at the Town and in some cases, information has been estimated. A lack of confidence in data severely hinders the Township's ability to manage their assets most effectively throughout their lifecycle. Through this project staff have collected and centralized asset data. As the assets change over time data updates will be critical.

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 (2021)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	The Municipal road network contains about 27 kilometers of local and collector surface treated and gravel roads. The road network primarily services residential and industrial traffic .
Quality	Description or images that illustrate the different levels of road class pavement condition	In 2013 Kresin Engineering Corporation completed assessments of the road assets and collected data on road lengths, road base depths and widths and hard surfacing widths. Additionally, a condition descriptive rating of good, fair, or poor was assigned to each asset. In 2017 KMPG reviewed and confirmed these assessments This AMP use the 2017 confirmed assessments and projects them to 2021.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0.026
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.68

Quality	Average pavement condition index for paved roads in the municipality	42%
	Average surface condition for unpaved roads in the municipality (e.g., excellent, good, fair, poor)	Fair
Performance	Current Capital reinvestment rate vs. Target reinvestment rate	x%

4.1.7 Recommendations

Asset Inventory

- Review road inventory to ensure all municipal assets are accounted for, and asset data like the in-service dates are as accurate as possible.
- The streetlight inventory is currently represented as one pooled asset with one in-service date applied to all assets. Disaggregate the pooled streetlight inventory so that each streetlight is represented as an asset and tailored information can be populated.

Condition Assessment Strategies

- The last condition assessment of the road network was completed in 2013 and reviewed and confirmed in 2017. Consider completing an updated assessment of the road network as soon as possible. In addition to road condition, collect recommended interventions, including estimated cost and recommended dates and append this information to Citywide assets.

Lifecycle Management Strategies

- Implement the identified lifecycle management strategies for surface treated roads to realize potential cost avoidance and maintain the road's condition
- As road rehabilitations are completed monitor their impact to asset condition to enhance and document knowledge of local road deterioration rates.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis, identify where additional data may be needed to improve models, and adjust models as the Township's understanding of the probability and consequences of asset failure evolves.

Levels of Service

- Measure current levels of service in accordance with the metrics identified in O. Reg. 588/17.
- Over time, review current levels of service performance and use this information when working to identify realistic proposed levels of service required by O. Reg. 588/17 in 2025.

4.2 Buildings

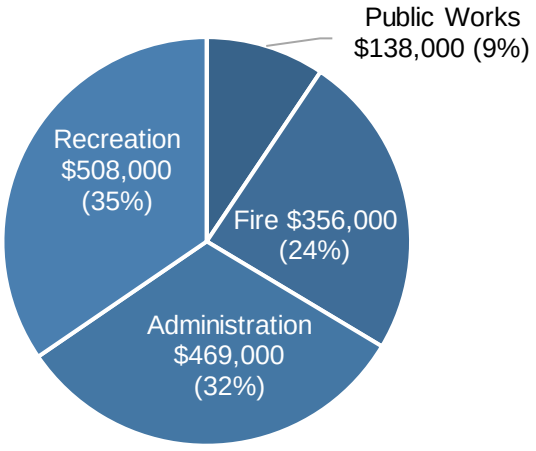
The Township of Baldwin owns and maintains several buildings which are used to support daily and provide service to residents. The buildings owned by the Township include:

- Municipal Office & Hall
- Fire Station
- Public Works Garage
- Snoopy's Recreation Centre

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 buildings inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Administration	4	CPI Tables	$469,000
Fire	2	User-Defined Cost[4]	$356,000
Public Works	1	User-Defined Cost	$138,000
Recreation	2	User-Defined Cost	$508,000
Total			**$1,472,000**



Total Current Replacement Cost: $1,472,000

Each asset's replacement cost should be reviewed periodically and adjusted as necessary.

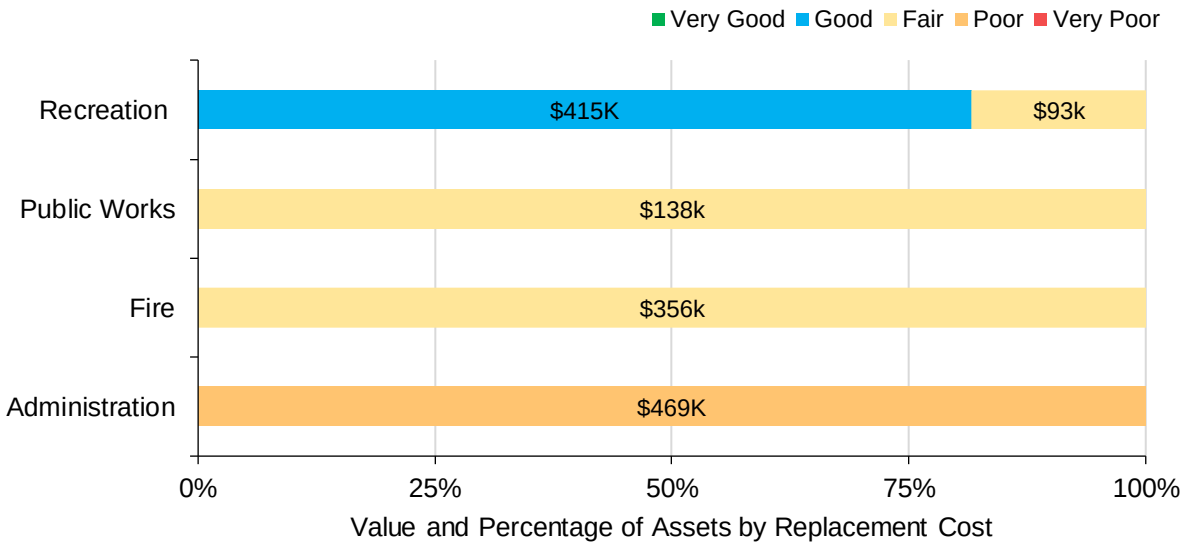
[4] Based on insured values.

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
Administration	22%	Very Poor	Kresin Engineering Corporation
Fire	42%	Poor	Kresin Engineering Corporation
Public Works	42%	Poor	Kresin Engineering Corporation
Recreation	59%	Fair	Kresin Engineering Corporation
	36%	**Poor**	

The graph below visually illustrates the average condition for each asset segment on a very good to very poor scale. As indicated below building assets range in condition from poor to good.



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

replacement activities is required to increase the overall condition of the buildings and facilities.

Current Approach to Condition Assessment

Accurate and reliable condition data is central to estimating the remaining service life of assets and identifying cost-effective approaches to their management. Currently the Town relies on condition assessments completed in 2013 by Kresin Engineering Corp (KEC) and confirmed in 2017 by KMPG. These assessments review the exterior and interior building condition, building system (i.e., electrical, plumbing), and barrier free access for the entire building and an overall condition score. This AMP utilizes the 2017 confirmed assessments and projects them to 2021 based on the asset's estimated useful life.

4.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for building 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)
Administration	50	28.25	21.75
Fire	50	49	1
Public Works	50	18	32
Recreation	50	23	27
		28.25	**21.75**

Except for fire assets all other building assets have over 20 years of remaining service life. The Estimated Useful Life of all assets should be reviewed periodically to determine if it remains suitable. If not, adjustments to the Estimated Useful Life are recommended.

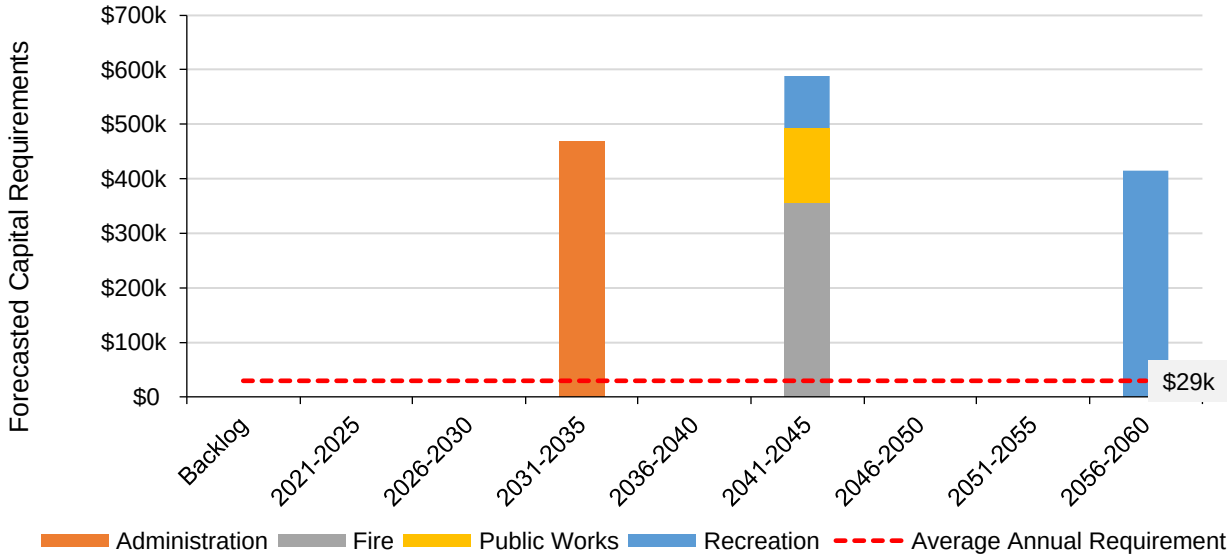
4.2.4 Lifecycle Management Strategy

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
Inspection	Municipal buildings are subject to informal but regular inspections most often completed by the Public Works Department. The intent of inspections is to identify health & safety requirements as well as structural deficiencies that require additional attention.
Replacement	Building component replacements are determined based on informal visual inspections that occur in regular intervals throughout the year.
	Typically, the Public Works department addresses minor replacements and reports them to the clerk. Usually, the operational budget funds minor replacements.
	Where major replacements (i.e., roof replacements) are required, the Public Works Department brings a recommendation to council. If approved the Township tenders the work out to external contractors.

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements, reported in cumulative 5-year bins. Capital requirements are reported until 2060 when every asset has gone through one full iteration of replacement. The average annual capital requirement as indicated by the red dotted line, is $29,000.



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

4.2.5 Risk & Criticality

Risk Matrix

Risk is calculated based on the below noted parameters and is based on 2021 inventory date.

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Department (Operational)

Please refer to Appendix D for a more detailed breakdown of the criteria used to determine the risk rating of each asset. Based on these parameters the following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for building assets based on 2021 inventory data.

As indicated below the amount of risk held by building assets varies, but all building assets have a moderate level of risk because both the probability and consequence of failure is between 2-4.

This is a high-level model developed for the purposes of this AMP. Regular review of the model is recommended so that it can be updated to reflect changes in the Township's understanding of both the probability and consequences of asset failure, and/or the data available to calculate risk.

Calculating risks held by assets is a crucial first steps towards determining appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Risks to Current Asset Management Strategies

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

Limited Asset Data & Small Staff Compliment

Decisions about investments to building assets is primarily based on informal though regular inspections from the Public Works department. There are no long-term plans in place for rehabilitation of building assets nor any detailed assessments to determine long-term capital requirements to aid in the Township's investment decisions. With a small staff compliment and very limited building data or records there is significant risk of lost knowledge about building assets in the event of staff changes. Further, significant building investments may not be identified nor sufficiently planned or budgeted.

4.2.6 Community Level of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Sustainability	Description or images of the condition of the asset and how this could affect use	Building assets range in condition from good to poor and weighted by replacement value are on average in fair condition.
Quality	Description of replacement and rehabilitation considerations and approach	Municipal staff regularly inspect building assets for health and safety compliance. Replacement and rehabilitation decisions are most often based on community and asset needs (i.e., condition necessitates replacement) or by special funding opportunities (i.e., Upper-level government funding for energy efficiency improvements).

4.2.7 Technical Level of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Quality	Weighted Average Condition of Building Assets	Fair (45%)
Sustainability	Current vs. Target Reinvestment rate	

4.2.8 Recommendations

Asset Inventory

- The Township's asset inventory contains a single record for all facilities. Facilities consist of several separate capital components that have unique estimated useful lives and require asset-specific lifecycle strategies. Consider completing a building condition assessment (discussed below) and componentizing buildings based on Uniformat II, Elemental Classification. Review opportunities to complete coordinated projects with neighboring municipalities as a means of obtaining costing efficiencies.

Replacement Costs

- Accurate replacement costs are important for the Township to determine asset needs and intern make well-informed taxation and investment decisions. Regularly review replacement costs and update as appropriate.

Condition Assessment Strategies

- Consider procuring third-party Building Condition Assessments (BCA), at least for their most critical and costly buildings so that detailed, specific, and accurate information about the condition, replacement cost, and recommended interventions for every building component are available.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes.
- In the absence of documented records about building assets, work to gather information from staff about the building assets, especially their performance (i.e., chronic issues), and relevant construction details. In the event of staff changes, and to help inform potential future BCA, this historical knowledge will be very valuable.

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 alongside any strategies required to close gaps between current and proposed levels of service.

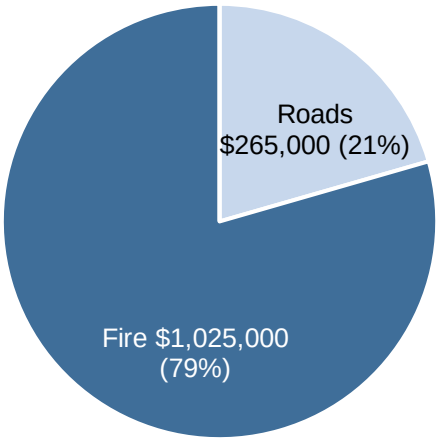
4.3 Fleet

Fleet assets allow staff to efficiently deliver critical municipal services. The Township of Baldwin's fleet assets provide crucial services, such as:

- The maintenance of roadways year round
- The protection of both the Township's and its residents' assets and people from fire and other emergencies

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 vehicles.



Total Current Replacement Cost: $1,290,000

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Fire	2	User-Defined	$1,025,000
Roads	8	CPI	$265,000
Total	**10**		**$1,290,000**

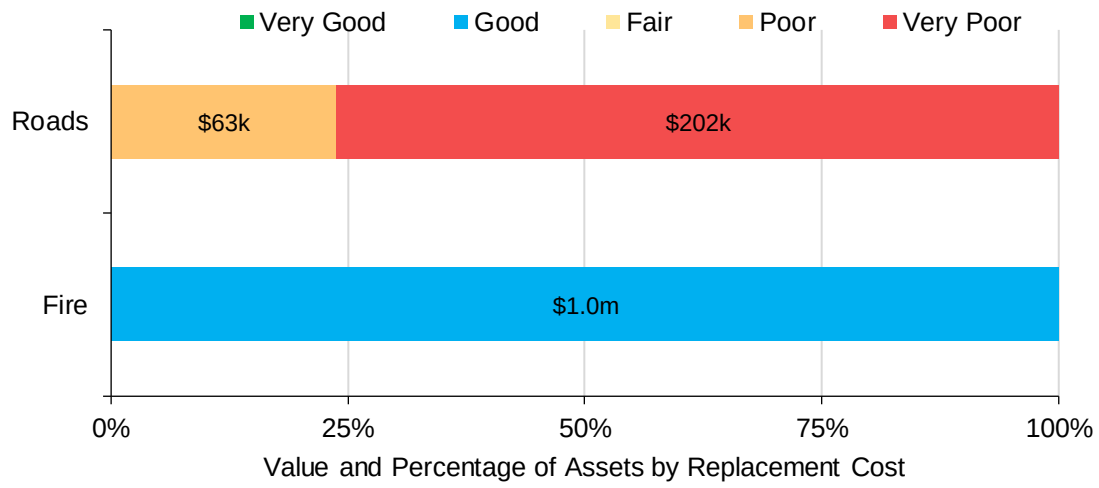
Replacement cost of all assets will change over time. In this AMP all replacement costs are based on a December 2021 effective date. As a regular practice, the Township should review and as needed update replacement costs, so they remain accurate and most effective to asset management planning.

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
Fire	80%	Good	Staff Assessments
Roads	10%	Very Poor	Kresin Engineering Corp Assessments
	24%	**Fair**	

The graph below visually illustrates the condition, weighted by replacement cost, for each asset segment on a very good to very poor scale. As indicated all fleet assets range in condition from very poot to fair; all fire assets are in fair condition as of December 2021 while road fleet assets have more variation.



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

Current Approach to Condition Assessment

Accurate and reliable condition data is a critical input to estimating the remaining service life of assets and identifying the most cost-effective approach to their

management. In 2013 Kresin Engineering Corporation (KEC) completed condition assessments. Assets were reviewed and rating on a 1(poor) to 3 (good) scale. In 2017 KMPG reviewed and confirmed these assessments. In this AMP, the fleet roadway assets use the 2017 confirmed assessments projected to 2021 based on each assets Estimated Useful life. Fire fleet assets have been assessed for condition as of December 2021 based on a review by the Township's fire chief.

4.3.3 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Fire	30 years	5 years 7 months	21 years 11 months
Roads	5-20	10	1.5

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

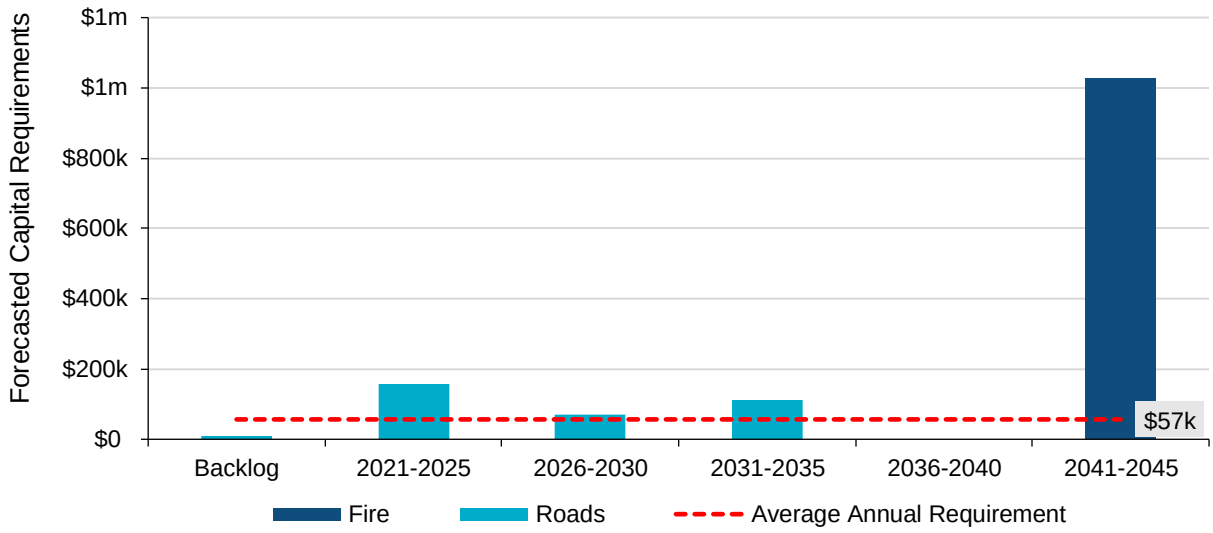
4.3.4 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Township's current lifecycle management strategy for their fleet assets

Activity Type	Description of Current Strategy
Maintenance & Inspection	An external mechanic compeltes all regular maintenance activities like oil changes, based on the manufacturer's recommended schedule
	All fire fleet assets are inspected on a weekly basis by the Fire Crew. Information on fluid levels and any identified repairs is noted and reviewed each week by the Fire Chief. All identified issues are actioned as appropriate.
Replacement	Vehicle age, kilometres, annual repair costs, and mechanic recommendations are the primary consideration for asset replacement.

Forecasted Capital Requirements

The following graph forecasts capital requirements for fleet assets until 2045, when all fleet assets are scheduled to be replaced. Capital requirements are reported in aggregated 5-year bins. The average annual capital requirement is $57,000 and represents the average amount per year that the Township should allocate towards capital funding 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 is detailed by asset segment in Appendix B.

4.3.5 Risk & Criticality

Risk Matrix

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of fleet assets are as follows:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Department (Operational)

Please refer to Appendix D for a more detailed overview of these risk parameters.

Using the parameters above, the following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for fleet assets based on 2021 inventory data.

As indicated above, risks held be fleet assets range from moderate (yellow) to severe (red) as all assets have a high consequence and/or probability of asset failure.

This risk model is high-level developed for the purposes of this AMP and may require adjustments in future years as the data available to calculate risk upon changes and/or as the factors that contribute to asset risk change.

The identification of critical or high-risk assets allows the Township to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies like prioritizing replacement or other

strategies like advancing a more rigorous condition assessment program so that the data inputs to the risk model are more reliable.

Risks to Current Asset Management Strategies

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

Aging Infrastructure & Funding Strategies

Several fleet assets are approaching their useful life. As vehicles age, they often carry increasing O&M. Timely asset replacements may not be financial feasibly, which often further amplifies risk of asset failure. Some fleet assets, like the fire fleet, may be particularly costly but also critically important to replace. A limited capital budget alongside little redundancy and significant anticipated costs carries risk.

4.3.6 Community Level of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Sustainability	Description of replacement and rehabilitation considerations and approach	The condition of fleet assets range from good to very poor and weighted by replacement value are on average in fair condition (66%).
Quality	Description or images of the condition of the asset and how this could affect use	Fleet asset replacement decisions are based on the assets age, kilometers, and annual repair costs alongside recommendations from the mechanic.

4.3.7 Technical Level of Service

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

Service Attribute	Technical Metric	Current LOS (20201)
Quality	Weighted Average Condition of Fleet Assets	Fair (66%)
Sustainability	Current vs. Target Reinvestment rate	

4.3.8 Recommendations

Replacement Costs

- Gather accurate replacement costs and update on a regular basis to ensure the accuracy of capital projections. Recent purchase prices inflated to the replacement cost date are generally the most accurate source of replacement values. Where there is no recent purchase cost, consider connecting with near by Municipalities who may be willing to offer purchase cost information.

Condition Assessment Strategies

- Review process for conducting condition assessments; consider completing assessments on a regular schedule, based on documented and understood criteria, conducted by appropriately trained personnel, and promptly updated to the asset information system.
- Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Risk Management Strategies

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

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP. Review current level of service performance metrics over time to identify trends.
- Begin identifying proposed levels of service as required in 2025 per O. Reg. 588/17. Review reporting requirements and strategies for determining feasible targets.

4.4 Machinery & Equipment

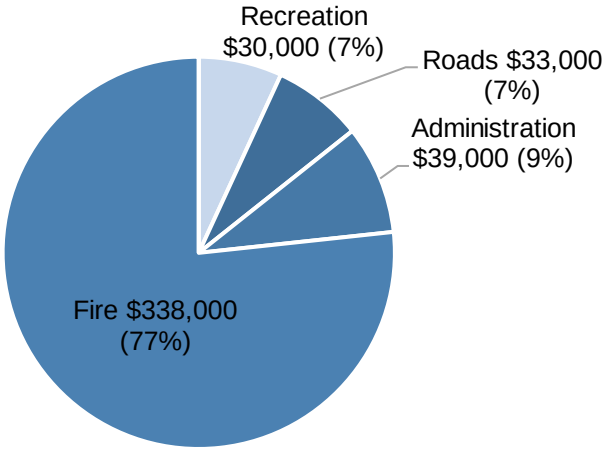
Machinery and equipment assets are important to the Township's ability to maintain their infrastructure and support the delivery of services. Township staff employ various types of machinery and equipment. This includes:

- Landscaping equipment to maintain public parks
- Fire equipment to support the delivery of emergency services
- Plows to provide winter control activities
- Computers, phones, and other office equipment to support operations and administration

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 and equipment inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Administration	4	CPI Tables	$39,000
Fire Department	55	User-Defined/CPI Tables	$338,000
Roads	2	CPI Tables	$33,000
Recreation	1	CPI Tables	$30,000
Total	**62**		**$440,000**



Total Current Replacement Cost: $440,000

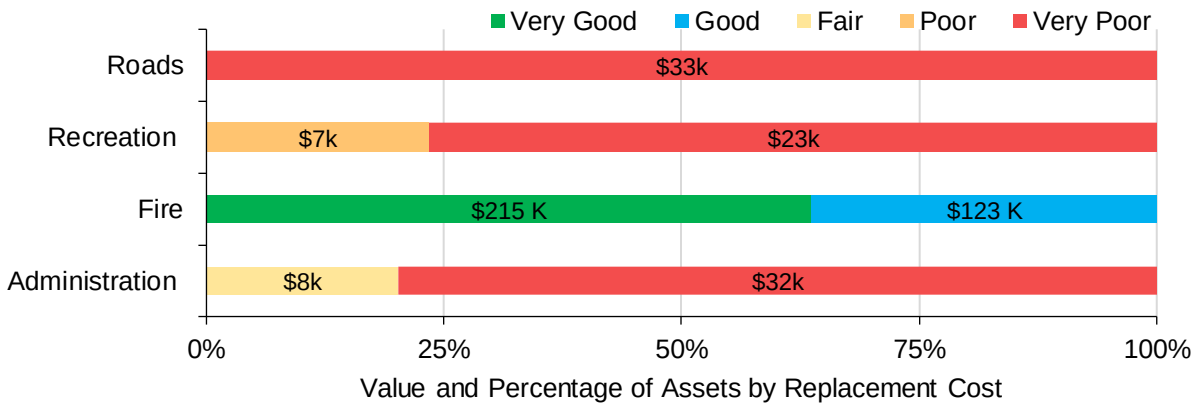
Asset replacement values will change overtime; therefore it is an important practice to regularly review and as necessary update, replacement costs.

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
Administration	9	Very Poor	KMPG 2017 Assessments
Fire Department	84	Very Good	Staff Assessments
Recreation	14	Very Poor	KMPG 2017 Assessments
Roads	15	Very Poor	KMPG 2017 Assessments
Total	**67%**	**Fair**	

The graph below visually illustrates the condition of each machinery and equipment asset segment. As illustrated, machinery and equipment assets vary in condition with fire assets having the highest condition and other asset segments in poorer condition.



To ensure that the Township's machinery and equipment continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. Asset condition is dynamic and will change over time. The more accurate asset condition information is, the greater the quality of asset analysis. With the exception of fire assets, this AMP relies on condition assessments last completed in 2017 which have been projected to 2021.

Current Approach to Condition Assessment

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

- Staff complete regular visual inspections of machinery & equipment to ensure they are in state of adequate repair
- Excluding fire assets, there is no formal condition assessment programs in place, however in 2017 condition ratings were applied to each machinery and equipment assets. These assessments have been projected to 2021.

4.4.3 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Administration	5-30	10.25	1
Fire Department	10.5	1.8	8.6
Recreation	10-15	10	2.5
Roads	20	17	3

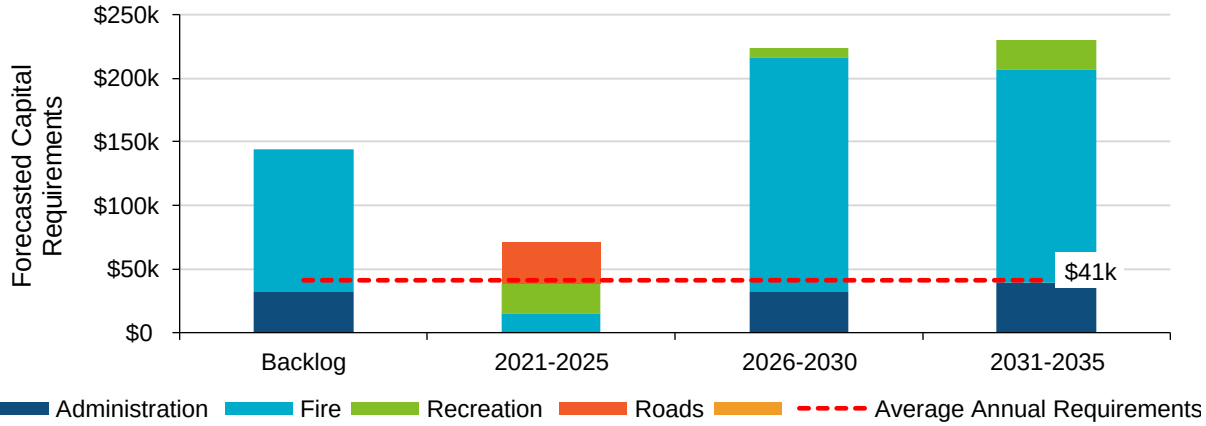
4.4.4 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Township's current lifecycle management strategy for their machinery and equipment assets:

Activity Type	Description of Current Strategy
Maintenance & Inspection	Machinery and equipment is maintained according to manufacturer recommended actions and supplemented by the expertise of an external mechanic
	Fire department assets are inspected on a weekly basis by the Fire crew. For each asset documentation on levels, and missing parts or required repairs is noted. Inspection reports are reviewed by the Fire Chief and actioned as needed (i.e. repairs booked where deemed neccesary)
Replacement	The replacement of machinery and equipment depends on deficiencies identified by operators that may impact their ability to complete required tasks.

Forecasted Capital Requirements

The following graph forecasts capital requirements until 2035, when every asset is scheduled for replacement. Capital requirements are reported in cumulative 5-year bins. For each 5-year period the capital requirements range from about $75,000 (2021-2025) to about $225,000 (2026 and beyond). The average annual capital requirement is $41,000 and represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.



Refer to Appendix B for the projected cost of lifecycle activities over the next 10 years to maintain the current level of service.

4.4.5 Risk & Criticality

Risk Matrix

Risks held by machinery and equipment assets is measured based o the following probability and consequence of failure parameters:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Department (Operational)

For a more detailed breakdown of the risk parameters used, please refer to Appendix D.

Based on these parameters, the following risk matrix was produced. It serves as a tool to visually represent the relationship between the probability of failure and the consequence of failure using 2021 inventory data. As indicated below risks range from low (green) to high (red). Most assets carry low risk (green) due to their low probability and consequence of failure. Some assets carry moderate (orange) risk because of their high probability of failure.

This is a high-level model developed for the purposes of this AMP. The model may benefit from adjustment over time as the Township's understanding of risks and/or the asset attribute data available to calculate risk evolves. The identification of critical assets based on risk is a crucial first step towards the determination of appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township's machinery and equipment assets are currently exposed to:

Aging Infrastructure

A significant portion of machinery and equipment assets are approaching the end of their useful life. Generally, as equipment ages, performance is affected which may lead to increased operating costs.

A related risk for the Town is the obsolescence of equipment, especially for IT assets. IT assets may require updates in advance of reaching their estimated useful life. Therefore, costs may be incurred earlier than expected and/or planned.

4.4.6 Community Level of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Sustainability	Description of replacement and rehabilitation considerations and approach	Machinery and equipment assets replacement is primarily driven by assets age with further consideration given to mechanicals recommendations and general asset performance.
Quality	Description or images of the condition of the asset and how this could affect use	Machinery and equipment assets range in condition from very good to very poor and weighted by replacement value are on average in fair condition.

4.4.7 Technical Level of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Quality	Weighted Average Condition of Assets	Fair (67%)
Sustainability	Current vs. Target Reinvestment rate	

4.4.8. Recommendations

Inventory & Replacement Costs

- Some replacement costs used in this AMP were based on the inflation of historical costs. These costs should be evaluated to determine their accuracy and reliability. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.
- Review inventory for its comprehensiveness; all assets capitalized as per the Township's Tangible Capital Asset (TCA) policy, should be included in asset management decisions and in the AMP inventory.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk equipment. The strategy should detail frequency of assessment, evaluation criteria and scoring guidance and this should be documented for easy reference.
- Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Risk Management Strategies

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

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Township has established in this AMP.
- Work towards identifying proposed levels of service as required in 2025 per O. Reg. 588/17. Develop proposed LOS with a clear understanding of reporting requirements, including the demonstration of feasible targets.

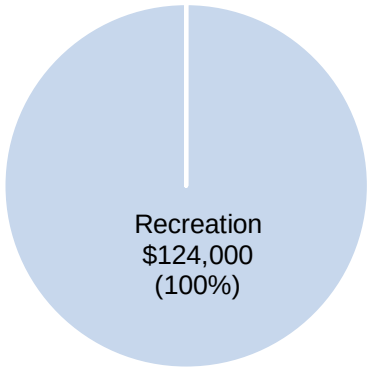
Land Improvements

The Township of Baldwin owns a small number of land improvement assets. This category includes outdoor recreation assets like bating cages, playgrounds, and outdoor rink.

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
Recreation	6	CPI Inflation	$124,000



Total Current Replacement Cost: $124,000

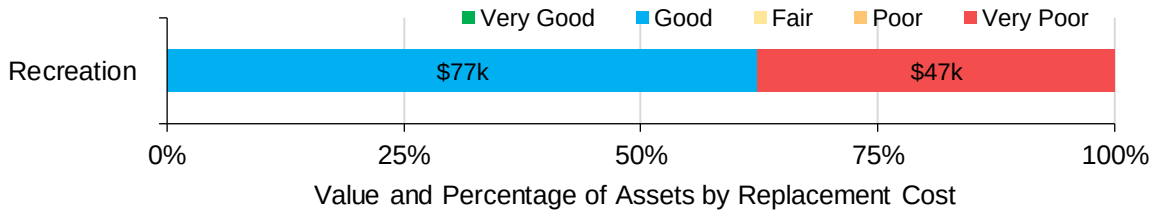
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

4.5.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Recreation	50	Fair	KMPG 2017 Assessments

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



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

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to make better informed asset decisions. The following describes the Township's current approach:

- Staff complete regular visual inspections of land improvements assets to ensure they are in state of adequate repair.
- There are no formal condition assessment programs in place for land 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)
Recreation	18.3	11.8	6.5

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

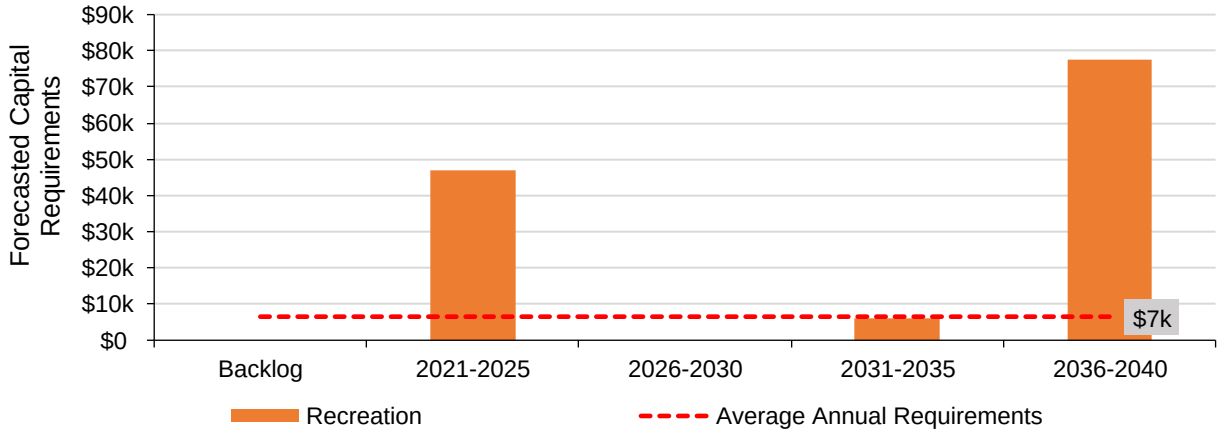
4.5.4 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Township's current lifecycle management strategy for their land improvement assets:

Activity Type	Description of Current Strategy
Maintenanace & Replacement	The land improvements asset category includes several unique asset types and lifecycle requirements are dealt with on a case-by-case basis.
	Playground assets are inspected weekly for saftey issues and where identified these are resolved as soon as possible.
	The soccer field is inspected weekly when the grass is cut.
	The outdoor arena is cleared of snow as needed and inspected a that time.

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement is $7,000 and represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements reported in 5-year cumulative bins until 2040 when every asset has gone through one full iteration of replacement. Capital requirements fluctuate by period, spiking in 2021-2025 then dropping to none in 2026-2030 before slowly increasing in the next period and reaching the peak in the final period (2036-2040).



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

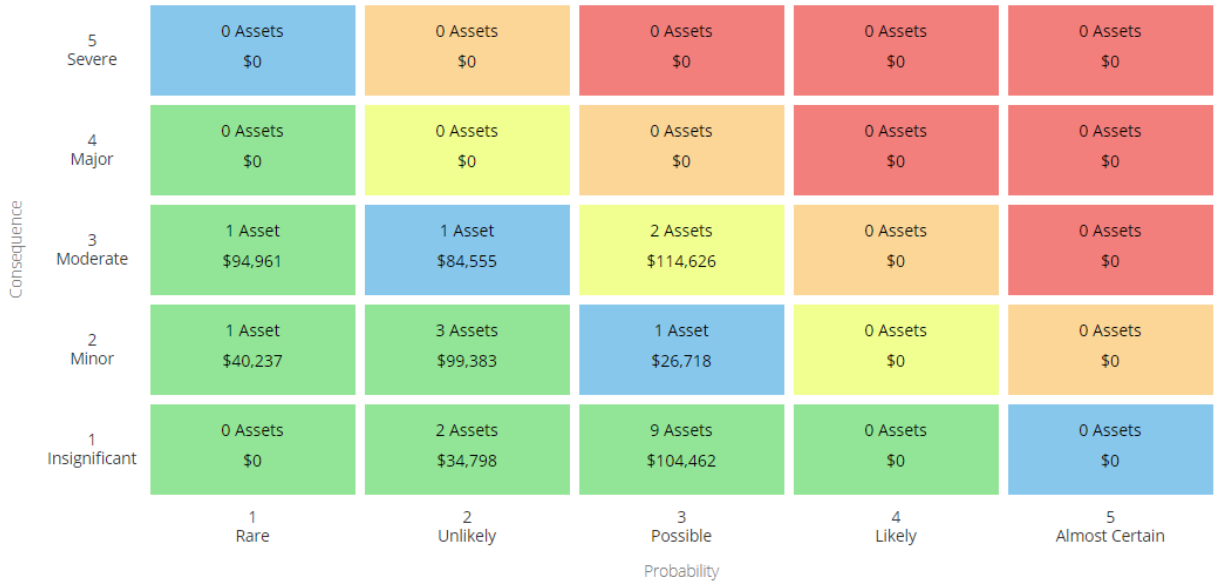
4.5.5 Risk & Criticality

Risk Matrix

Risks held by land improvements assets is based on the following asset-specific attributes that municipal staff utilize to define and prioritize the criticality of land improvements are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Department (Operational)

The following risk matrix provides a visual representation of the relationship between the above noted parameters for land improvement assets only and based on 2021 inventory data. For a more detailed overview of the parameters used, please refer to Appendix D.



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.

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

Risks to Current Asset Management Strategies

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

Regulatory Compliance & Increased Reporting Requirements

Playground structures require safety compliance, monitored through the CSA inspections. This reporting requirement is in addition to several other reporting requirements for other assets. Such reporting takes significant time and resources from the Township. Often, the requirement to report reduces time available to complete other critical activities. This continues to be a challenge for Baldwin where there is a very limited staffing compliment.

4.5.6 Community Level of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Sustainability	Description of replacement and rehabilitation considerations and approach	Using age-based condition land improvement assets range in condition from very poor to good and are on average in fair condition.
Quality	Description or images of the condition of the asset and how this could affect use	Land improvement assets are quite diverse in their type and function; replacement and rehabilitation decisions are based on a range of factors but generally always consider at least the assets age, condition, and performance.

4.5.7 Technical Level of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Quality	Weighted Average Condition of Assets	Fair (50%)
Sustainability	Current vs. Target Reinvestment rate	

4.5.8 Recommendations

Replacement Costs

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

Condition Assessment Strategies

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

Risk Management Strategies

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

Levels of Service

- Begin measuring current levels of service in accordance with the selected metrics. Review the feasibility of collecting current performance metrics to determine if adjustments are needed before the 2024 O. Reg 588/17 deadline. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Using the results of current levels of service, alongside other considerations like budget feasibility and investment priority, begin to identify proposed levels of service. Identify strategies that may be required to close any gaps between current and proposed levels of service.

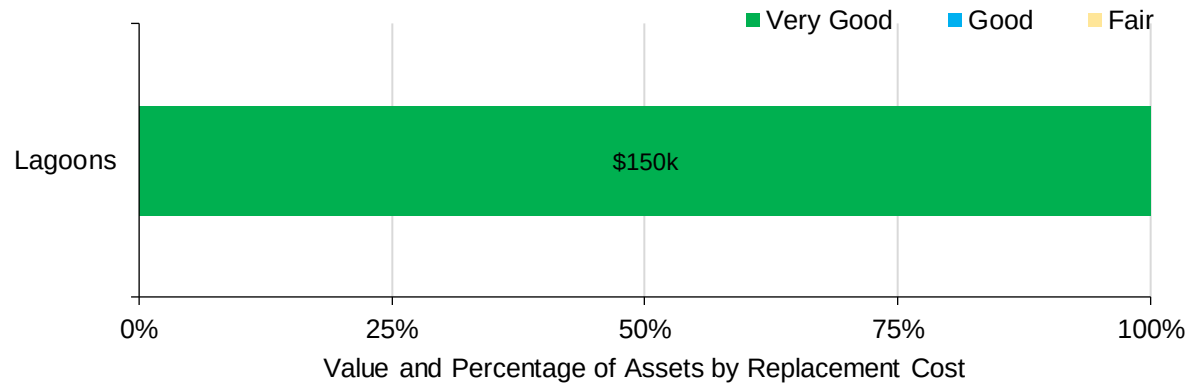
4.6 Wastewater Lagoon

The Township of Baldwin owns a wastewater lagoon referred to as the East and West Exfiltrating Lagoon. Lagoons (sometimes called stabilization ponds) are in-ground earthen basins that treat wastewater through natural processes involving the use of algae and bacteria. Baldwin's Lagoons use an exfiltration system which is based on effluent continuously seeping through gravel, sand, or another material. Lagoon based sewage treatment is one of the earliest methods of wastewater treatment and continues to be viable and cost effective, particularly for smaller communities.

4.6.1 Asset Inventory

Both lagoons were rehabilitated between 2016 and 2017. The project included installation of a clay liner, berm cover and perimeter fencing. Due to this recent rehabilitation the condition of both lagoons is very good.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Lagoons	2	User-Defined	$150,000



The condition of lagoon assets will change over-time, however. Therefore, regular monitoring of asset condition is important for timely identification and resolution of issues to preserve asset life and functionality. The Township should review if they have the internal capacity and appropriate knowledge to effectively complete regular lagoon inspections.

Current Approach to Inspection & Condition Assessment

Accurate and reliable condition data allows staff to make better informed asset decisions. The following describes the Township's current approach:

- The Public Works department monitors the lagoons on a weekly basis during the summer months. The lagoon is closed over the winter and is infrequently inspected during this period.
- Condition assessments are not applied to the lagoon at this time.

4.6.2 Estimated Useful Life & Average Age

The Estimated Useful Life for lagoon assets is assigned based on a Canada-wide review study of average expected useful life of municipal wastewater assets. The Average Age is the AMP effective data date (2021) less the in-service date (2016) of the lagoons. The average service life remaining is the difference between the assets age and the estimated useful life.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Lagoons	50	5.5	44.5

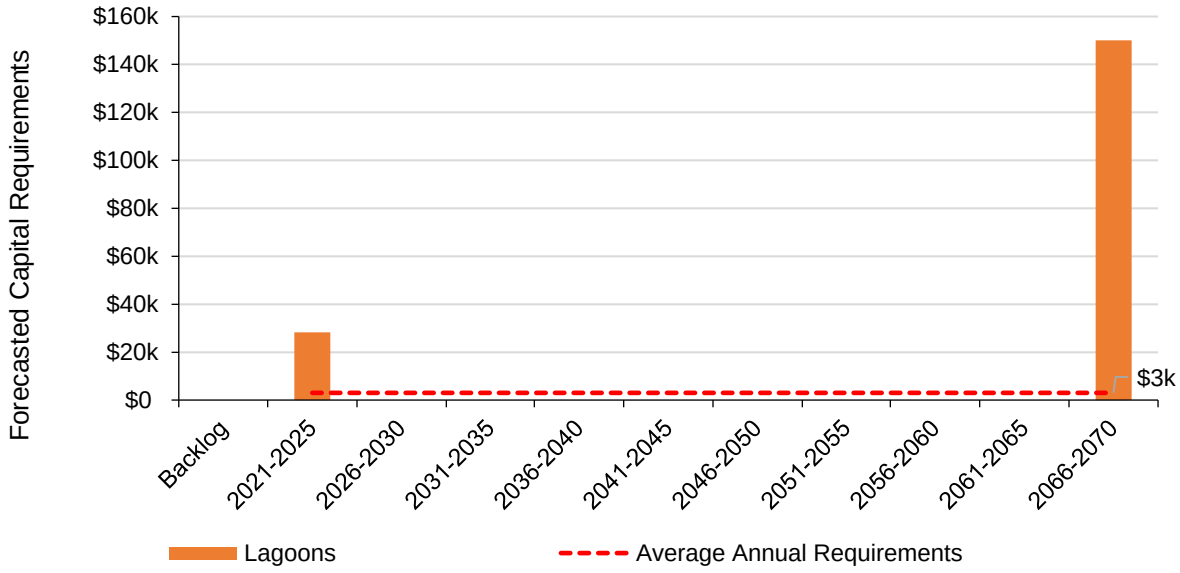
4.6.3 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Township's current lifecycle management strategy for their wastewater lagoons:

Activity Type	Description of Current Strategy
Maintenanace & Rehabilitation	The lagoons are closed in the winter and only accessed as needed for inspections etc.
	Otherwise, lagoons are monitored through operations.
	Rehabilitations are most often driven by Ministry of the Environment requirements and/or recommendations from third-party consultants.

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements for the lagoons. Capital requirements include findings from the 2022 Inspection completed by the Ministry of the Environment. Estimated costs for required work ordered by the Ministry of the Environment is based on quoted costs. Capital forecasts are projected until 2070 when the lagoons are expected to require significant renewal. Over this period (2021-2070) the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs is $3,000.



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

4.6.4 Risk & Criticality

Risk Matrix

Risks held by lagoons is calculated based on the following attributes and weights (noted in brackets).

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (100%)	Replacement Cost (Financial) (80%)
	Department (Operational) (20%)

Both lagoon assets hold the same attributes values and therefore the same level of risk. As noted in the matrix below for lagoon assets the probability of failure is very low (1) while the consequence of failure is higher (4) but overall risk is low as indicated by the green box.

This is a high-level model developed for the purposes of this AMP. The model would benefit for regular review to ensure the attributes used to calculate risk still remain relevant and appropriately weighted or if there are any additional attributes to consider adding to the model.

The identification of critical assets is an important first step to risk mitigation strategies. Risk mitigation may include asset-specific lifecycle strategies like increased maintenance to improve asset function and reliability, and/or data gathering strategies to enhance risk model accuracy.

Risks to Current Asset Management Strategies

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

Data and Information

Information about the wastewater lagoon assets took significant effort to compile and is still somewhat limited. Reliable and comprehensive asset information is a critical resource to asset management planning. For example it can enable effective identification of near and mid-term needs and enable staff to plan for the required capital costs and construction and coordination efforts. Through the development of this AMP the Township has significantly improved their asset information however data gaps remain and could pose future risks to the asset's longevity. Going forward, the Township should work to locate any historical records and update the asset inventory with any relevant details.

4.6.5 Community Level of Service

O. Reg. 588/17 requires that wastewater assets report on mandated community and technical LOS metrics. The provincially mandated metrics (provided for reference in Appendix D), however are tailored to wastewater systems that directly connect to properties and provide conveyance to a wastewater treatment facility. Baldwin Township has a wastewater lagoon that receives and treats hauled sewage. For this reason, none of the provincial Level of Service are applicable to the lagoon assets. Therefore, the Township has selected LOS metrics that are relevant and applicable to the lagoon assets, these metrics are:

Service Attribute	Qualitative Description	Current LOS (2021)
Sustainability	Description of replacement and rehabilitation considerations and approach	The lagoons were rehabilitated recently and this decisions was mostly driven by their condition and effectiveness. A third party was consulted to understand what changes were requried to the lagoons and how to execute.
Quality	Description or images of the condition of the asset and how this could affect use	Using age-based condition wastewater lagoon assets are in very good condition. This is largely attributed to a significant rehabilitation project completed in approximately 2016.

4.6.6 Technical Level of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Sustainability	Current vs. Target Reinvestment rate	X
Quality	Weighted Average Condition of Assets	Very good (88%)

4.6.7 Recommendations

Capital Requirement Costs

- Capital requirements are investments to assets which could include replacement or rehabilitation projects. Having accurate requirement costs both in their amount and recommended date assists with the delivery of effective lifecycle strategies and the ability to procure the necessary funds to complete them. On a regular basis (annually is recommended) review requirement costs for lagoon assets, wherever possible obtain information using expert assessments of asset investment needs and the timing of those interventions.
- Integrate recommended capital interventions into capital financial planning and any necessary funding strategies (e.g., use of reserves etc.).

Condition Assessment & Lifecycle Strategies

- At a minimum compliance monitoring under the operating permit or certificate of approval and reported to the Ministry of the Environment (the regulatory agency) is required. Ensure that monitoring is regularly recorded, actioned as required, and retained for future reference as needed.
- Review the existing staffing resources for capacity and appropriateness of skill set to monitor and manage the lagoon.

Risk Management Strategies

- Consider asset risks when making asset management planning and budgeting decisions. This should include the regular review of all assets, including wastewater assets, to understand their requirements and level of risk.
- Review risk models on a regular basis; if asset data available for risk calculation and/or the attribute selection deemed most suitable changes adjust the risk model accordingly.

Levels of Service

- Begin measuring current levels of service and regularly review the feasibility of their collection.
- Using the results of current levels of service, alongside other considerations like budget feasibility and investment priority, begin to identify proposed levels of service. Identify strategies that may be required to close any gaps between current and proposed levels of service.

5 Impacts of Growth

Key Insights

- Understanding the key drivers of growth and demand will allow the Township to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure.
- The Township experienced population decline between 2016 and 2021. This contrasts with the province which experienced growth in the same period.
- The Township plans to accommodate any new growth through existing infrastructure and self-serviced lots.
- In the event of growth, the cost of it should be considered in long-term funding strategies that are designed to maintain the current level of service.

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

5.1.1 Baldwin Township Official Plan (May 2020)

The Township of Baldwin approved its latest Official Plan in 2020 with a planning time horizon of 25 years (2020-2045). The Official plan is based on a planning area extending from Agnew Lake to the north to the historic corridor of the CPR rail line and Trans- Canada Highway to the south and is centered by McKerrow, the Township's settlement area. The Official Plans serves as a policy framework to guides the Township's growth and is founded on the goal of attaining a healthy economic base that supports sustainable and orderly community development while conserving the natural resources of the rural area. This primary goal is based on a series of specific intentions related to community development, environmental stewardship, community health and safety and resource management.

The Official Plan outlines intentions to maintain low density and a predominantly rural character in the Planning area. New residential development is focused to the Urban Settlement area of McKerrow and specifically to vacant lots that are serviced by existing roads and municipal infrastructure. Water and waste-water services are to be serviced by individual on-site systems rather than through municipal services which are not anticipated over the life of the plan (2020-2045). Commercial development is designated to the Highway Commercial area. The viability of the Official Plan's strategy is heavily leveraged on continue use of public service facilities especially for educational and health care services which are in the nearby areas of Espanola and Greater Sudbury.

5.1.2 Growth Plan for Northern Ontario

The Township's Official Plan identified the importance of coordination in land use planning decisions and identifies a series of related interests and projects that shall be considered and to the extent reasonable and required, be in accordance with. The Growth Plan for Northern Ontario is identified as a related interest. The Northern Ontario Growth Plan's (2010-2035) purpose is to enable growth planning that is integrated across municipal boundaries within a common geographic perspective (i.e., Northern Ontario) and to ensure a long-term and coordination visions of growth policies among all levels of government. The intended result is

coordinated decision making that reflects diverse needs of rural, urban, remote, and Aboriginal communities.

5.1.3 Growth Projections

Baldwin Township's population fluctuated between 2011 and 2021. The most recent 2021 census indicates a 4.3% population decline since 2016 and a 5.2% decrease in the number of private dwellings. This population change is significantly less than both the provincial and national average rates of positive 5.8% and 5.2% growth respectively.

Historical Total Population		
2011	**2016**	**2021**
551	605	579

5.2 Impact of Growth on Lifecycle Activities

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

Based on the existing Official Plan that focuses growth to areas with existing infrastructure and self-serviced lots, and considering the population decline in recent years it is likely that the Township will not require expansion of existing infrastructure and services. However, if growth-related assets are constructed or acquired, they should be integrated into the Township's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the Township will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

6 Financial Strategy

Key Insights

- The Township is committing approximately $276,000 towards capital projects per year from sustainable revenue sources.
- Given the annual capital requirement of $303,000 there is currently a funding gap of $27,000 annually.
- For tax-funded assets, we recommend increasing tax revenues by 0.5% each year for the next 10 years to achieve a sustainable level of funding.

Financial Strategy Overview

6.1

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

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

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

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

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

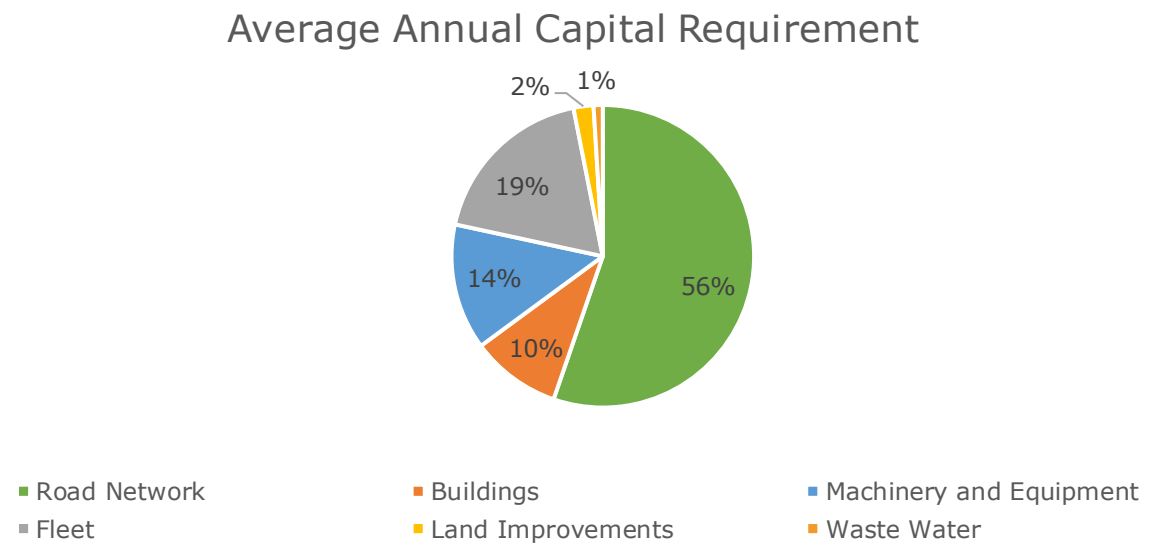
1. To reduce financial requirements, consideration has been given to revising service levels downward.

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.

6.1.1 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 $303,000 annually to address capital requirements for the assets included in this AMP. By asset category, average annual requirements are allocated as follows:



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 costs that are realized through strategic rehabilitation and renewal of the Township's roads and sanitary sewer mains respectively. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares two scenarios for the road network:

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	$165,000	$150,000	$15,000

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $15,000 for the road network. This represents an overall reduction of the annual requirements by 9%. As the lifecycle strategy scenario represents the lowest cost option available to the Township, we have used this annual requirement 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 $276,000 towards capital projects per year from sustainable revenue sources. Given the annual capital requirement of $303,000, there is currently a funding gap of $27,000 annually.

Funding Objective

We have developed a scenario that would enable Baldwin Township to achieve full funding within x years for the following assets:

1. **Tax Funded Assets:** Road Network, Buildings, Machinery & Equipment, Land Improvements, Fleet, wastewater lagoons

6.2

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. Baldwin Township does allocate some capital funding to their gravel road network and the financial strategy calculations have accounted for this.

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

Financial Profile: Tax Funded Assets

6.3.1 Current Funding Position

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

6.3

Asset Category	Avg. Annual Requirement	Annual Funding Available					Annual (Deficit)/ Surplus
		Taxes	Gas Tax	OCIF	Taxes to Reserves	Total Available	
Road Network	166,000	76,000		85,000	40,000	201,000	35,000
Buildings	29,000		75,000			75,000	46,000
Machinery and Equipment	41,000					0	(41,000)
Fleet	57,000					0	(57,000)
Land Improvements	7,000					0	(7,000)
Waste Water Lagoon	3,000					0	(3,000)
	303,000	76,000	75,000	85,000	40,000	276,000	(27,000)

The average annual CapEx requirement for the above categories is $303,000. Annual revenue currently allocated to these assets for capital purposes is $276,000 leaving an annual deficit of $27,000. Put differently, these infrastructure categories are currently funded at 91% of their long-term requirements.

Note: The Road Network consists of 38% gravel roads with a budgeted annual maintenance requirement of $14 thousand. Since gravel maintenance is funded from the Townships capital budget, $15 thousand has been removed from the OCIF funding above to account for this ongoing expense.

6.3.2 Full Funding Requirements

In 2022, Township of Baldwin has annual tax revenues of $675,000 of which a portion was allocated to capital funding. 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	-5.4%
Buildings	-7.1%
Machinery and Equipment	6.4%

Fleet	8.8%
Land Improvements	1.1%
Waste Water Lagoon	0.5%
	4.3%

To fund the annual $27,000 deficit in capital expenditures the tax rate will need to be increased. The below table illustrates the 5-, 10-, 15- and 20-year funding options that are available to The Township of Baldwin to close this funding gap:

	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	27,000	27,000	27,000	27,000
Change in Debt Costs	n/a	n/a	n/a	n/a
Resulting Infrastructure Deficit:	**5**	**10**	**15**	**20**
	27,000	27,000	27,000	27,000
Tax Increase Required	4.2%	4.2%	4.2%	4.2%
Annually:	**0.9%**	**0.5%**	**0.3%**	**0.3%**

6.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 10-year option. This involves full CapEx funding being achieved over 10 years by:

a) Increasing tax revenues by 0.5% each year for the next 10 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
b) Reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
c) Increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.
d) Allocating the current gas tax and OCIF revenue as outlined previously.
e) Allocating the scheduled OCIF grant increases to the infrastructure deficit as they occur.

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[5].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes may be challenging. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

This recommended option achieves full CapEx funding on an annual basis in 10 years and provides financial sustainability over the period modeled. This is noting that additional recommendation to prioritize capital projects to fit the resulting annual funding available. Current data shows a backlog of capital investment requirements of $5 thousand for the Road Network, $144 thousand for Machinery & Equipment, and $274 thousand for Fleet.

Prioritizing future projects may in some cases require the current age-based data to be replaced by condition-based data. Although our recommendations include no

[5] 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.

further use of debt, the results of the condition-based analysis may require otherwise.

Use of Debt

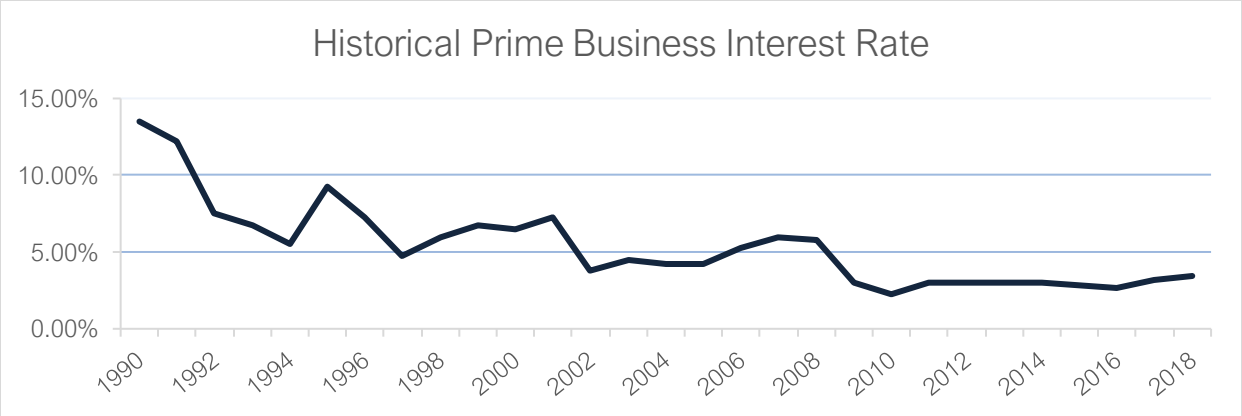
For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a $1M project financed at 3.0%[6] over 15 years would result in a 26% premium or $260,000 of increased costs due to interest payments. For simplicity, the table does not consider the time value of money or the effect of inflation on delayed projects.

6.4

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:

[6] Current municipal Infrastructure Ontario rates for 15-year money is 4.3%.



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.

Use of Reserves

6.5.1 Available Reserves

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

6.5

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 Baldwin.

Asset Category	Balance on December 31, 2021
Road Network	439,000
Buildings	78,000
Machinery and Equipment	109,000
Fleet	149,000
Land Improvements	17,000
Waste Water Lagoon	8,000
Total Tax Funded:	**800,000**

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 consider 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 Baldwin'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.

6.5.2 Recommendation

In 2025, Ontario Regulation 588/17 will require Baldwin 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.

7 Appendices

Key Insights

- Appendix A includes a one-page report card with an overview of key data from each asset category
- Appendix B identifies projected 10-year capital requirements for each asset category.
- Appendix C identifies the criteria used to calculate risk for each asset category.
- Appendix D identifies the O. Reg. 588/17 Level of Service Metrics that would be reported by the Township if the wastewater system included conveyance assets

Appendix A: Infrastructure Report Card

Asset Category	Replacement Cost (millions)	Asset Condition	Financial Capacity	
Road Network	$4,994,000	Poor	Annual Requirement:	$166,000
			Funding Available:	$201,000
Buildings	$1,472,000	Fair	Annual Requirement:	$29,000
			Funding Available:	$75,000
Wastewater Lagoons	$150,000	Good	Annual Requirement:	$3,000
			Funding Available:	$0
			Annual Deficit:	**$3,000**
Machinery & Equipment	$440,000	Good	Annual Requirement:	$41,000
			Funding Available:	$0
			Annual Deficit:	**$41,000**
Land Improvements	$124,000	Fair	Annual Requirement:	$7,000
			Funding Available:	$0
			Annual Deficit:	**$7,000**
Fleet	$1,290,000	Good	Annual Requirement:	$57,000
			Funding Available:	**$0**
			Annual Deficit:	**$57,000**
Overall	$8,470,000	Fair	Annual Requirement:	$303,000
			Funding Available:	$276,000
			Annual Net Deficit:	**$27,000**

Appendix B: 10-Year Capital Requirements

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

Road Network

Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Paved Roads (LCB)	-	-	-	-	-	$2,208,000	-	-	-	-	-
Road Culverts	$5,248	-	-	-	-	-	-	-	-	-	-
Streetlights	-	-	-	-	-	-	-	-	-	-	-
Total	**$5,248**	-	**$195,220**	-	-	**$2,208,000**	-	-	-	-	-

Buildings

Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Administration	-	-	-	-	-	-	-	-	-	-	-
Fire	-	-	-	-	-	-	-	-	-	-	-
Public Works	-	-	-	-	-	-	-	-	-	-	-
Recreation	-	-	-	-	-	-	-	-	-	-	-
Total	**-**	-	-	-	-	-	-	-	-	-	-

Waste Water Lagoons

Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Waste Water Lagoon	-	-	-	$28,000	-	-	-	-	-	-	-

Machinery & Equipment											
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Administration	$31,515	-	-	-	-	-	$31,515	-	-	-	-
Fire	-	-	-	-	-	$15,000	-	-	-	$55,250	$130,000
Recreation	-	0	0	$23,172	-	-	$7,105	-	-	-	-
Roads	-	-	-	-	-	$32,746	-	-	-	-	-
Total	**$31,515**			**$23,172**		**$47,746**	**$38,620**			**$55,250**	**$130,000**

Land Improvements											
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Recreation	-	-	-	$5,904	0	$41,018	-	-	-	-	-

Fleet											
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Fire	-	-	-	-	-	-	-	-	-	-	-
Roads	$43,449	-	-	$158,662	-	-	$8,449	-	-	$63,118	-
Total	**$43,449**	-	-	**$158,662**	-	-	**$8,449**	-	-	**$63,118**	-

Appendix C: Risk Rating Criteria

Probability of Failure

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Probability of Failure Score
All	Condition	80	80-100	1-Insignficant
			60-79	2-Minor
			40-59	3-Moderate
			20-39	4-Major
			0-19	5-Severe
	Service Life Remaining	20	80-100	1-Insignficant
			60-79	2-Minor
			40-59	3-Moderate
			20-39	4-Major
			0-19	5-Severe

Consequence of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Surface Treated Roads	Economic (100%)	Replacement Cost (100%)	$25,000	1-Insignficant
			$75,000	2-Minor
			$150,000	3-Moderate
			$300,000	4-Major
			$800,000	5-Severe
All Others	Economic (80%)	Replacement Cost (100%)	$0-$19,999	1-Insignficant
			$20,000 or more	2-Minor
			$40,000 or more	3-Moderate
			$60,000 or more	4-Major
			$80,000 or more	5-Severe
	Operational (20%)	Department	Administration	2-Minor
			Recreation	2-Minor
			Public Works	3-Moderate
			Fire	4-Major
			Roads	4-Major

Appendix D: Level of Service Wastewater Metrics

The following table details the O. Reg. 588/17 mandated Level of Service metrics that apply to wastewater assets:

Service Attribute	Community LOS (Qualitative Description)	Technical LOS (Technical Metrics)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	Percentage of properties connected to the municipal wastewater system.
Reliability	1. 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. 2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches. 3. Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes. 4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3. 5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.	1. The number 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. 2. The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system. 3. The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.

O. Reg. 588/17 defines wastewater as asset that relates to the collection, transmission, treatment, or disposal of wastewater, including any wastewater asset that from time to time manages stormwater.