Appendix I

Asset Management Plan 2024

Town of Niagara-on-the-Lake

January 2026

psdcitywide

Niagara-on-the-Lake

This Asset Management Plan was prepared by:

psdcitywide

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

Key Statistics

$1.07 b	2024 Replacement Cost of Asset Portfolio
$124.7 k	Replacement Cost of Infrastructure Per Household
79%	Percentage of Assets in Fair or Better Condition
74%	Percentage of Assets with Assessed Condition Data
$13.08 m	Annual Capital Infrastructure Deficit
20 Years	Recommended Timeframe for Eliminating Annual Infrastructure Deficit (Tax funded Assets)
2.08%	Target Investment Rate
0.86%	Actual Investment Rate

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1 Executive Summary

Municipal infrastructure delivers critical services that are foundational to the economic, social, and environmental health and growth of a community. The goal of asset management is to enable infrastructure to deliver an adequate level of service in the most cost-effective manner. This involves the ongoing review and update of infrastructure information and data alongside the development and implementation of asset management strategies and long-term financial planning.

1.1 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 Town of Niagara-on-the-Lake can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP includes the following asset categories:

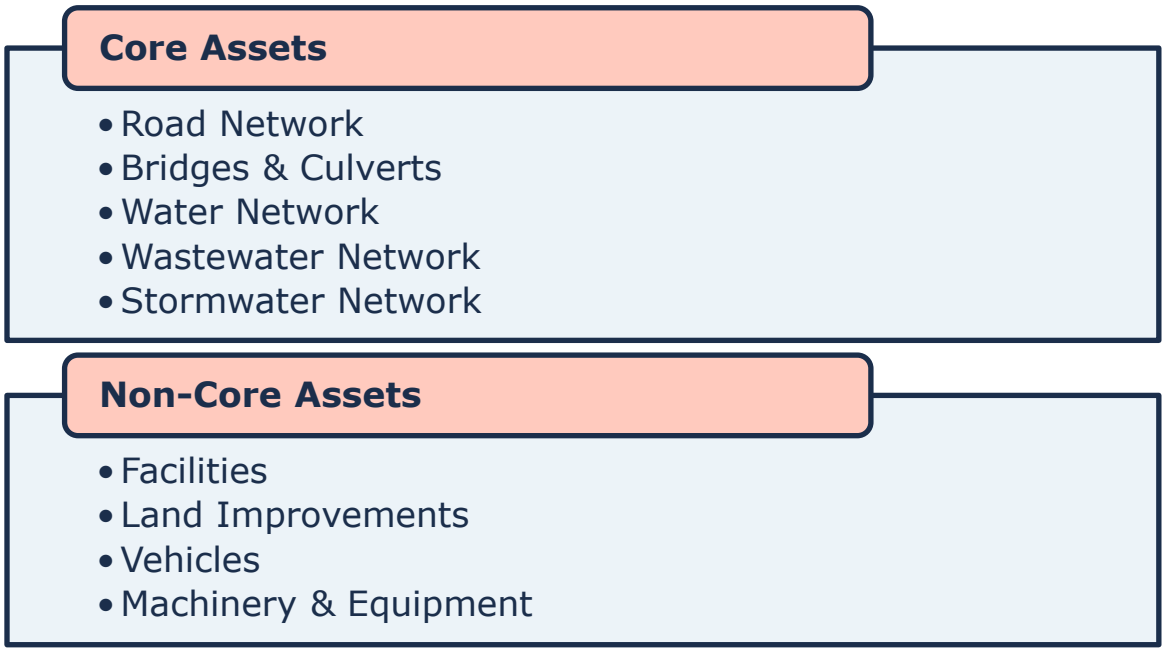


Figure 1 Core and Non-Core Asset Categories

1.2 Compliance

With the development of this AMP the Town of Niagara-on-the-Lake has achieved compliance with July 1, 2024, requirements under O. Reg. 588/17. This includes requirements for levels of service and inventory reporting for all asset categories.

1.3 Findings

The overall replacement cost of the asset categories included in this AMP totals $1.07 billion. 79% of all assets analyzed in this AMP are in fair or better condition and assessed condition data was available for 74% of assets. For the remaining 26% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

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

To fund all capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Town's average annual capital requirement totals $22.3 million. Based on a historical analysis of sustainable capital funding sources, the Town is committing approximately $9.2 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $13.08 million. This funding gap is based on replacing every single asset when it reaches the end of its useful life and completing each recommended rehabilitation activity on schedule. This is an optimal investment level. It is recognized that this level of investment may not be achievable or affordable for the municipality and that further investigation of feasible and appropriate service levels will be required. The forthcoming 2025 AMP will further investigate different investment levels and the service level outcomes projected. This will establish the proposed LOS and the associated annual capital investments required to support it. It is possible that tax and rate changes to support the selected proposed LOS will be different from those noted in the 2024 AMP. The 2024 AMP represents the optimal capital funding levels based on replacing every single asset when it reaches the end of its useful life and completing every recommended rehabilitation to the scope and schedule professionally recommended.

2024 AMP: **Optimal Funding Level** is identified.

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

1.4 Financial Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphics shows annual tax/rate change required to eliminate the Town's infrastructure deficit based on a 20-year plan for tax funded assets, and for rate funded assets a 5-year plan[1] for water and waste water assets, and a 20-year plan for stormwater assets.:

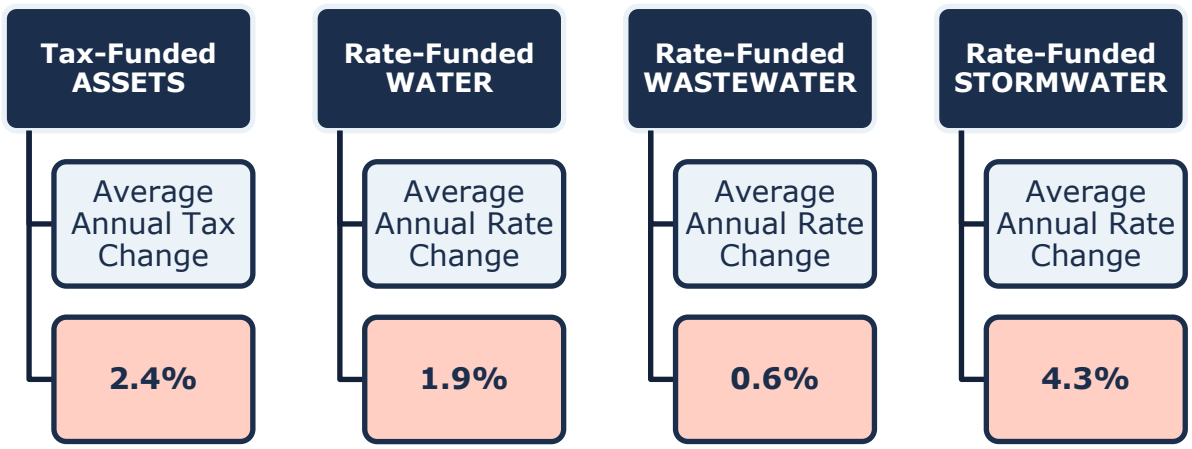


Figure 2 Proposed Tax/Rate Changes

[1] As discussed in the financial strategy, considering the lower degree of increase required a phase-in period of less than 5 years for the Wastewater Network is suggested.

2 Introduction & Context

2.1 Community Profile

The Town of Niagara-on-the-Lake is a lower-tier municipality located in the Regional Municipality of Niagara in Ontario. The town comprises several distinct communities, including the historic Old Town, Virgil, Queenston, St. Davids, and Glendale. Positioned at the northern tip of the Niagara Peninsula, it is bordered by Lake Ontario to the north and the Niagara River to the east, with the United States directly across the river.

Niagara-on-the-Lake is known for its scenic countryside, charming downtown core, and significant historic sites. Residents and visitors enjoy beautifully maintained parks and a variety of recreational facilities, schools, and community events, all contributing to the high quality of life in the town. The town's heritage district, with its 19th-century British Classical architecture and tree-lined streets, offers a unique glimpse into Canada's Loyalist and early colonial past.[2]

Niagara-on-the-Lake offers a blend of small-town charm and access to urban amenities, making it an attractive place to live and visit. Its historic sites, including Fort George and the Old Town, provide an insight into the town's rich past, while the abundance of wineries, cultural festivals, and outdoor recreation opportunities ensure a vibrant community life. These events alongside the presence of several community organizations foster a welcoming, family-friendly environment.[3]

The Town has experienced steady and above-average population growth. Between the 2016 and 2021 Census years, Niagara-on-the-Lake's population increased by 9.0%, reaching 19,088 residents. A significant portion of the population is made up of seniors, with 36.2% aged 65 years or older. Working-aged adults (15 to 64 years) represent 52.8% of the population, while children aged 0 to 14 years make up 11.0%.[4]

Census Characteristic	Town of Niagara-on-the-Lake	Ontario
Population 2021	19,088	14,223,942
Population Change 2016-2021	9%	5.8%
Total Private Dwellings	8,578	5,929,250
Population Density	145.3/km^2	15.9/km^2
Land Area	131.35 km^2	892,411.76 km^2

Table 1 Town of Niagara-on-the-Lake Community Profile

[2] Parks Canada. (n.d.). *Niagara-on-the-Lake National Historic Site of Canada*.
[3] Wikipedia contributors. (n.d.). *Niagara-on-the-Lake*.
[4] Census Profile, 2021 Census of Population: Niagara-on-the-Lake, Town

2.2 Climate Change

Climate change can cause severe impacts on human and natural systems around the world. The effects of climate change include increasing temperatures, higher levels of precipitation, droughts, and extreme weather events. In 2019, Canada's Changing Climate Report (CCCR 2019) was released by Environment and Climate Change Canada (ECCC).

The report revealed that between 1948 and 2016, the average temperature increase across Canada was 1.7°C; moreover, during this time, Northern Canada experienced a 2.3°C increase. The temperature increase in Canada has doubled that of the global average. If emissions are not significantly reduced, the temperature could increase by 6.3°C in Canada by the year 2100. Observed precipitation changes in Canada increases by approximately 20% between 1948 and 2012. By the late 21st century, the projected increase could reach an additional 24%. During the summer months, many regions in Canada are expected to experience periods of extreme weather, including drought, flooding, extreme temperatures, and wildfires, at a higher rate.

The changing climate poses a significant risk to the Canadian economy, society, environment, and infrastructure. The impacts on infrastructure are often a result of climate-related extremes such as droughts, floods, higher frequency of freeze-thaw cycles, extended periods of high temperatures, high winds, and wildfires. Physical infrastructure is vulnerable to damage and increased wear when exposed to these extreme events and climate variabilities. Canadian Municipalities are faced with the responsibility to protect their local economy, citizens, environment, and physical assets.

2.2.1 Town of Niagara-on-the-Lake Climate Profile

Niagara-on-the-Lake is in southern Ontario at the confluence of the Niagara River and Lake Ontario. The town experiences a humid continental climate moderated by the Great Lakes, resulting in milder winters and cooler summers compared to inland areas. The area is expected to experience notable effects of climate change, including rising average annual temperatures, shifting precipitation patterns, and increased frequency and severity of extreme weather events.

2.2.1.1 Higher Average Annual Temperature

Average annual temperatures in Niagara-on-the-Lake are anticipated to increase steadily over the next several decades. Based on the high-emissions scenario[5], models project average annual temperature increases to about 11.5°C by mid-century from historical baseline of approximately 8.9°C (1971–2000). Projections estimate further warming, with averages reaching 13.7°C between 2051 and 2080 and potentially climbing to 15.4°C by the end of the century.

2.2.1.2 Increase in Total Annual Precipitation

Based on a high-emissions scenario, the Town is expected to see a 12% increase (representing an additional 111mm annually) in total yearly precipitation during the 2051–2080 period, with projections indicating a 15% (representing 138mm annually) rise in the final three decades of

[5] The high emissions scenario (based on no reduction of greenhouse gas emissions) is selected for reporting to support asset management planning and decision making that considers the worst outcomes and thereby improves treatment and response efficacy.

the century.[6] In addition to increased total annual precipitation, increased maximum 1-day total precipitation (largest amount of precipitation, rain or snow, that falls within a 24 hour period) are anticipated over the same period.

2.2.1.3 Increase in Frequency of Extreme Weather Events

The Town is likely to face more frequent and severe extreme weather events, including heatwaves, heavy rainfall, and variable freeze-thaw cycles, all of which could impact infrastructure, agriculture, and public safety.[7]

2.2.2 Integration of Climate Change and Asset Management

Asset management practices aim to deliver sustainable service delivery - the delivery of services to residents today without compromising the services and well-being of future residents. Climate change threatens sustainable service delivery by reducing the useful life of an asset and increasing the risk of asset failure. Desired levels of service can be more difficult to achieve because of climate change impacts such as flooding, high heat, drought, and more frequent and intense storms.

To achieve sustainable delivery of services, climate change considerations should be incorporated into asset management practices. The integration of asset management and climate change adaptation observes industry's best practices and enables the development of a holistic approach to risk management. Climate changes can be effectively integrated into asset management decisions throughout an asset's lifecycle. For example, asset acquisition and design decisions (e.g. storm main sizing) that consider climate projections better ensure that assets are appropriate for future weather conditions such as increased total annual and/or maximum 1-day total precipitation.

[6] ClimateData.ca. (n.d.). *Niagara-on-the-Lake, ON*.
[7] Town of Niagara-on-the-Lake. (2022, March 25). *Climate Change Adaptation Plan*

2.3 Asset Management Overview

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.

Typically, the acquisition of capital assets accounts for about 10-20% of their total cost of ownership. The remaining 80-90% comes from operations and maintenance. This AMP focuses its analysis on the *capital* costs to rehabilitate and replace existing municipal infrastructure assets. Operating costs are not included in the analysis herein.

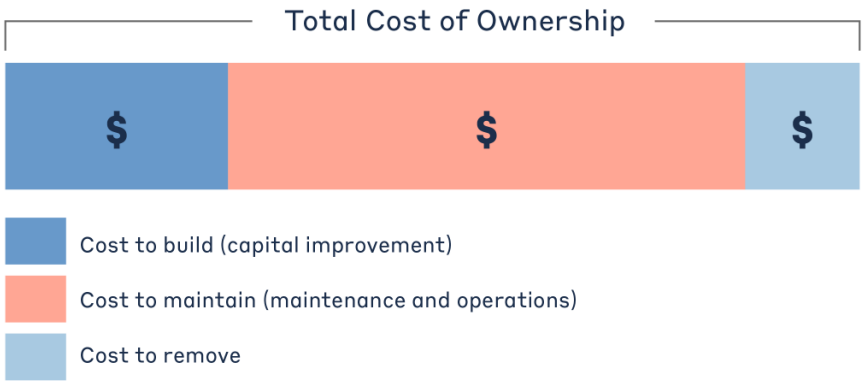


Figure 3 Total Cost of Asset Ownership

These costs can span decades, requiring planning and foresight to ensure financial responsibility is spread equitably across generations. An asset management plan is critical to this planning, and an essential element of broader asset management program.

2.3.1 Foundational Asset Management Documentation

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.

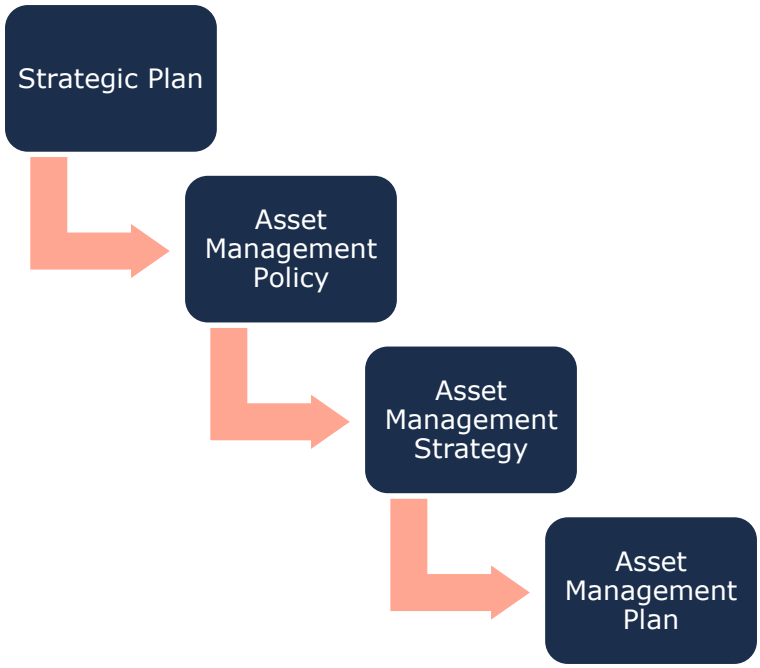


Figure 4 Foundational Asset Management Documents

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.

2.3.1.1 Asset Management Policy

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

The Town of Niagara-on-the-Lake's Asset Management Policy outlines their commitment to asset management and details assets in scope, asset data practices, principles and strategies to adopt and apply, and commitments to updates and innovation. Some key details from the policy include the following strategic considerations:

- Cross asset integration: consideration of assets that may be affected by or may affect other assets (e.g. replacement of mains may affect related roadway assets).
- Programming and Funding Levels Analysis: Understanding the long-term costs of assets over their lifecycle and updating the analysis to reflect the current year's cost estimates.
- Financial Analysis and Planning: lifecycle strategies that are integrated into financial planning analysis; financing strategy that identifies funding shortfalls, funding sources, and explores strategies for addressing the funding gap.

2.3.1.2 Strategic Plan (2022-2027)

The Town of Niagara-on-the-Lake's Strategic Plan, developed for the period of 2022-2027, advances a mission to deliver a high standard of municipal service. This mission is supported by dependable infrastructure and leadership in planning that supports a healthy and financially

sustainable future. Enshrined in this mission are three pillars to support and advance it, these pillars are:

1. Vibrant & Complete Community
2. Good Governance
3. Enrich Community Assets, Environment & Infrastructure

Several associated deliverables and indicators of success are attributed to each pillar. The pillar of Enrich Community Assets, Environment & Infrastructure has several actions and indicators of success of relevance to this asset management plan. These are:

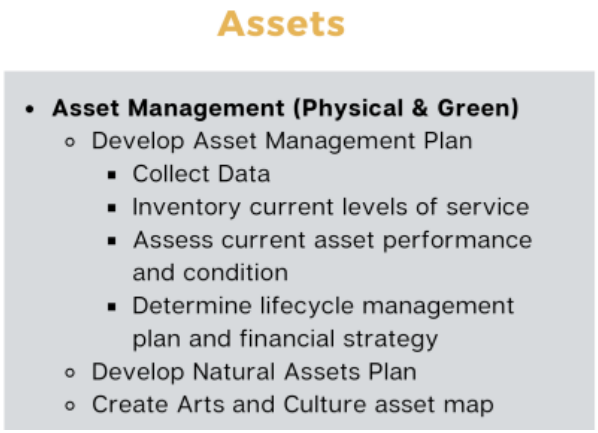


Figure 5: Niagara-on-the-Lake, Strategic Plan: Enrich Community Assets, Environment & Infrastructure

This AMP is a culmination of significant efforts to compile asset inventory information into a central database and to complete analysis to understand asset performance and condition, forecasted capital investment needs, and a financial strategy. This AMP supports and advances many of the objectives of the Strategic Plan.

2.3.1.3 Asset Management Strategy

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

The Town's Asset Management Policy contains many of the key components of an asset management strategy and may be expanded on in future revisions or as part of a separate strategic document.

2.3.1.4 Asset Management Plan

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

- State of Infrastructure
- Asset Management Strategies

- Levels of Service
- Financial Strategies

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

2.3.2 Key Concepts in Asset Management

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

2.3.2.1 Lifecycle Management Strategies

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

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

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

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

Lifecycle Activity	Cost	Typical Associated Risks
Maintenance Activities that prevent defects or deteriorations from occurring	**$**	♦ Balancing limited resources between planned maintenance and reactive, emergency repairs and interventions; ♦ Diminishing returns associated with excessive maintenance activities, despite added costs; ♦ Intervention selected may not be optimal and may not extend the useful life as expected, leading to lower payoff and potential premature asset failure;

Rehabilitation/ Renewal Activities that rectify defects or deficiencies that are already present and may be affecting asset performance	**$$$**	♦ Useful life may not be extended as expected; ♦ May be costlier in the long run when assessed against full reconstruction or replacement; ♦ Loss or disruption of service, particularly for underground assets;
Replacement/ Reconstruction Asset end-of-life activities that often involve the complete replacement of assets	**$$$$$**	♦ Incorrect or unsafe disposal of existing asset; ♦ Costs associated with asset retirement obligations; ♦ Substantial exposure to high inflation and cost overruns; ♦ Replacements may not meet capacity needs for a larger population; ♦ Loss or disruption of service, particularly for underground assets;

Table 2 Lifecycle Management: Typical Lifecycle Interventions

The Town's approach to lifecycle management is described within each asset category outlined in this AMP. Staff will continue to evolve and innovate current practices for developing and implementing proactive lifecycle strategies to determine which activities to perform on an asset and when they should be performed to maximize useful life at the lowest total cost of ownership.

2.3.2.2 Risk & Criticality

Asset risk and criticality are essential facility blocks of asset management, integral in prioritizing projects and distributing funds where they are needed most based on a variety of factors. Assets in disrepair may fail to perform their intended function, pose substantial risk to the community, lead to unplanned expenditures, and create liability for the municipality. In addition, some assets are simply more important to the community than others, based on their financial significance, their role in delivering essential services, the impact of their failure on public health and safety, and the extent to which they support a high quality of life for community stakeholders.

Risk is a product of two variables: the probability that an asset will fail, and the resulting consequences of that failure event. It can be a qualitative measurement, (i.e. low, medium, high) or quantitative measurement (i.e. 1-5), that can be used to rank assets and projects,

identify appropriate lifecycle strategies, optimize short- and long-term budgets, minimize service disruptions, and maintain public health and safety.

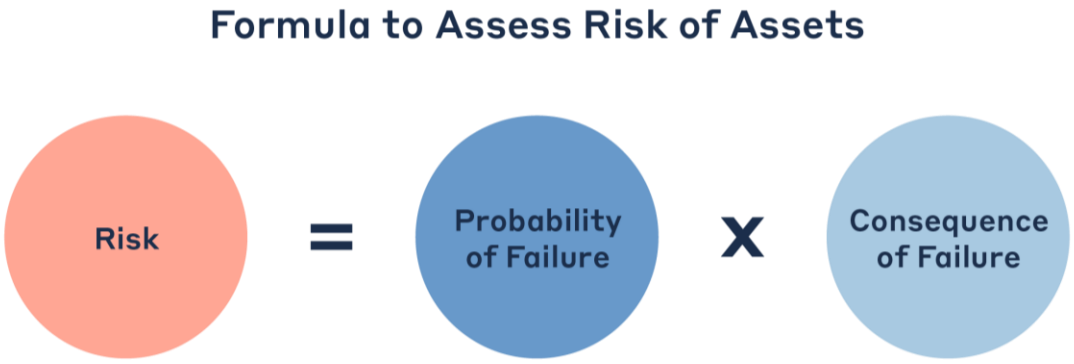


Figure 6 Risk Equations

The approach used in this AMP relies on a quantitative measurement of risk associated with each asset. The probability and consequence of failure are each scored from 1 to 5, producing a minimum risk index of 1 for the lowest risk assets, and a maximum risk index of 25 for the highest risk assets.

2.3.2.2.1 Probability of Failure

Several factors can help decision-makers estimate the probability or likelihood of an asset's failure, including its condition, age, previous performance history, and exposure to extreme weather events, such as flooding and ice jams—both a growing concern for municipalities in Canada.

2.3.2.2.2 Consequence of Failure

Estimating criticality also requires identifying the types of consequences that the organization and community may face from an asset's failure, and the magnitude of those consequences. Consequences of asset failure will vary across the infrastructure portfolio; the failure of some assets may result primarily in high direct financial cost but may pose limited risk to the community. Other assets may have a relatively minor financial value, but any downtime may pose significant health and safety hazards to residents.

Table 3 illustrates the various types of consequences that can be integrated in developing risk and criticality models for each asset category and segments within. We note that these consequences are common, but not exhaustive.

Type of Consequence	Description
Direct Financial	Direct financial consequences are typically measured as the replacement costs of the asset(s) affected by the failure event, including interdependent infrastructure.

Economic	Economic impacts of asset failure may include disruption to local economic activity and commerce, business closures, service disruptions, etc. Whereas direct financial impacts can be seen immediately or estimated within hours or days, economic impacts can take weeks, months and years to emerge, and may persist for even longer.
Socio-political	Socio-political impacts are more difficult to quantify and may include inconvenience to the public and key community stakeholders, adverse media coverage, and reputational damage to the community and the Municipality.
Environmental	Environmental consequences can include pollution, erosion, sedimentation, habitat damage, etc.
Public Health and Safety	Adverse health and safety impacts may include injury or death, or impeded access to critical services.
Strategic	These include the effects of an asset's failure on the community's long-term strategic objectives, including economic development, business attraction, etc.

Table 3 Risk Analysis: Types of Consequences of Failure

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

These models have been built in Citywide for continued review, updates, and refinements.

2.3.2.3 Levels of Service

A level of service (LOS) is a measure of the services that the Town is providing to the community and the nature and quality of those services. 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.

The Town measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service. The Town has reported on all mandated metrics that are required for core assets under O. Reg and has selected additional metrics for their non-core assets.

2.3.2.3.1 Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories as applicable (Roads, Bridges & Culverts, Water, Wastewater, Stormwater) the province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. For non-core assets that Town has selected qualitative metrics.

2.3.2.3.2 Technical Levels of Service

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

For core asset categories as applicable the province, through O. Reg. 588/17, has also provided technical metrics that are required to be included in this AMP. For non-core assets, the town has selected technical metrics.

2.3.2.3.3 Current and Proposed Levels of Service

This AMP focuses on measuring the current level of service provided to the community and determining the *optimal* funding required to replace every single asset at the end of its useful life and complete every single recommended rehabilitation. Once current levels of service have been measured, the Town plans to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17. This will be reported in the 2025 Compliant AMP.

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

2.4 Scope & Methodology

2.4.1 Asset Categories for this AMP

This AMP for the Town of Niagara-on-the-Lake is produced in compliance with O. Reg. 588/17. The July 2024 deadline under the regulation—the second of three AMPs—requires analysis of core and non-core asset categories.

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

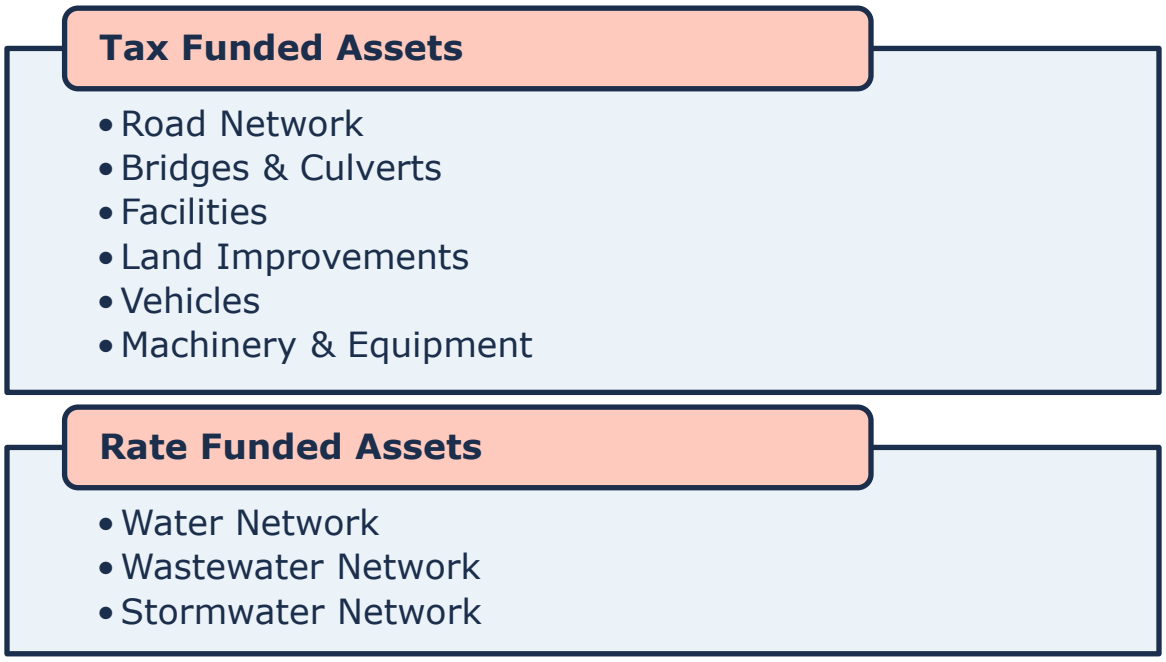


Figure 7 Tax Funded and Rate Funded Asset Categories

2.4.2 Data Effective Date

It is important to note that this plan is based on data as of **December 2024**; therefore, it represents a snapshot in time using the best available processes, data, and information at the Town. Strategic asset management planning is an ongoing and dynamic process that requires continuous data updates and dedicated data management resources.

2.4.3 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:

2.4.3.1 User-Defined Cost and Cost Per Unit

Based on costs provided by municipal staff which could include average costs from recent contracts; data from engineering reports and assessments; staff estimates based on knowledge and experience.

2.4.3.2 Cost Inflation / CPI Tables

Historical costs of the assets are inflated based on Consumer Price Index or Non-Residential Facility Construction Price Index.

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

2.4.4 Estimated Service Life & Service Life Remaining

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

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

Figure 8 Service Life Remaining Calculation

2.4.5 Reinvestment Rate

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

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

Figure 9 Target Reinvestment Rate Calculation

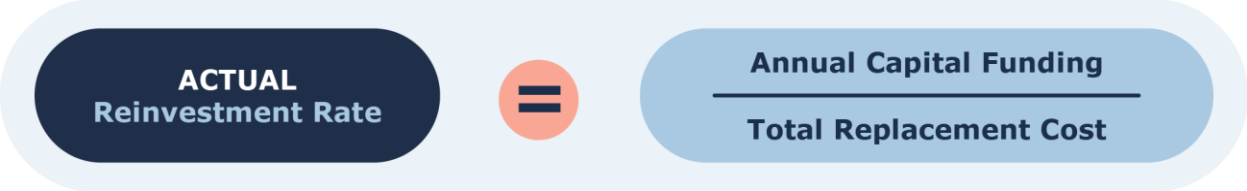


Figure 10 Actual Reinvestment Rate Calculation

2.4.6 Deriving Asset Condition

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

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

Please note: This condition scale does not apply to the road network or the bridges and culverts. The condition scale used for the road network and bridge and culverts is detailed in Sections 4 and 5.

Condition	Description	Criteria	Service Life Remaining (%)
Very Good	Fit for the future	Well maintained, good condition, new or recently rehabilitated	>80
Good	Adequate for now	Acceptable, generally approaching mid-stage of expected service life	60-80
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies	40-59.99
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20-39.99
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	< 20

Table 4 Standard Condition Rating Scale

The analysis in this AMP is based on assessed condition data only as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition.

Age-based condition is calculated based on the age of the asset relative to its useful life. For example, if an asset is anticipated to last 10 years and is one year old, the age-based condition is 90%. Conversely, if the same asset is nine years old, the age-based condition is 10%. This methodology is applied to all land improvements, vehicles, machinery and equipment assets and a portion of assets in the remaining asset categories. Age-based conditions provide a helpful proxy for asset condition and is a good initial step in evaluating asset condition.

2.5 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)[8]. 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.

Figure 11 below outlines key reporting requirements under O. Reg 588/17 and the associated timelines.

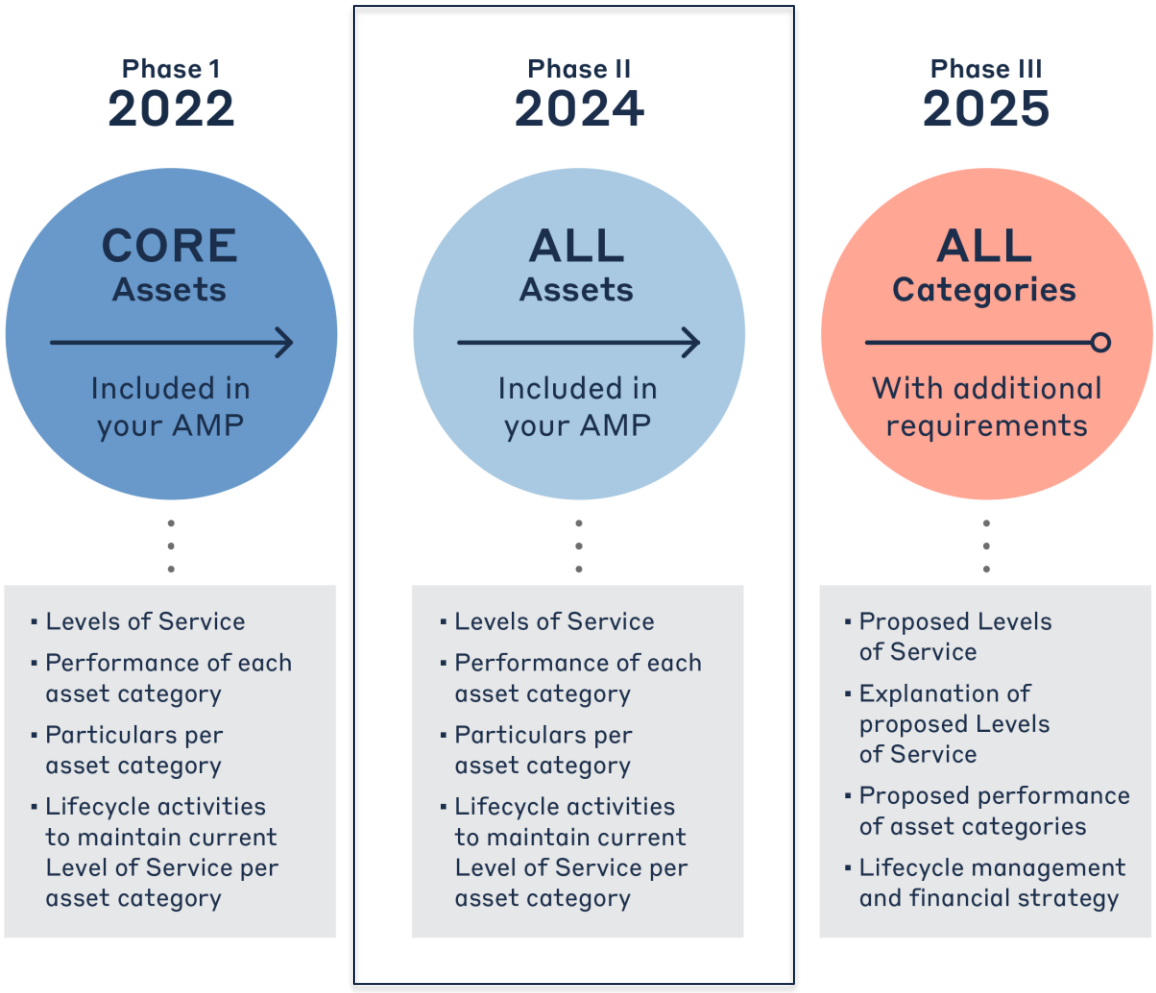


Figure 11 O. Reg. 588/17 Requirements and Reporting Deadlines

[8] O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure https://www.ontario.ca/laws/regulation/170588

2.5.1 O. Reg. 588/17 Compliance Review

Requirement	O. Reg. 588/17 Section	AMP Section Reference	Status
Summary of assets in each category	S.5(2), 3(i)	4.1 – 12.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1 – 12.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.3 – 12.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.2 – 12.2	Complete
Description of municipality's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.4 – 12.4	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.7 – 12.7	Complete
Current performance measures in each category	S.5(2), 2	4.7 – 12.7	Complete
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.4 – 12.4	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)	13.1 – 13.2	Complete

3 Portfolio Overview – State of the Infrastructure

The state of the infrastructure (SOTI) summarizes the inventory, condition, age profiles, and other key performance indicators for the Town's infrastructure portfolio. This information is also presented for each asset category providing more detailed insights and understanding.

3.1 Asset Hierarchy & Data Classification

Asset hierarchy explains the relationship between individual assets and their components, and a wider, more expansive network and system. How assets are grouped in a hierarchy structure can impact how data is interpreted. Assets were structured to support meaningful, efficient reporting and analysis. Key category details are summarized at asset segment level.

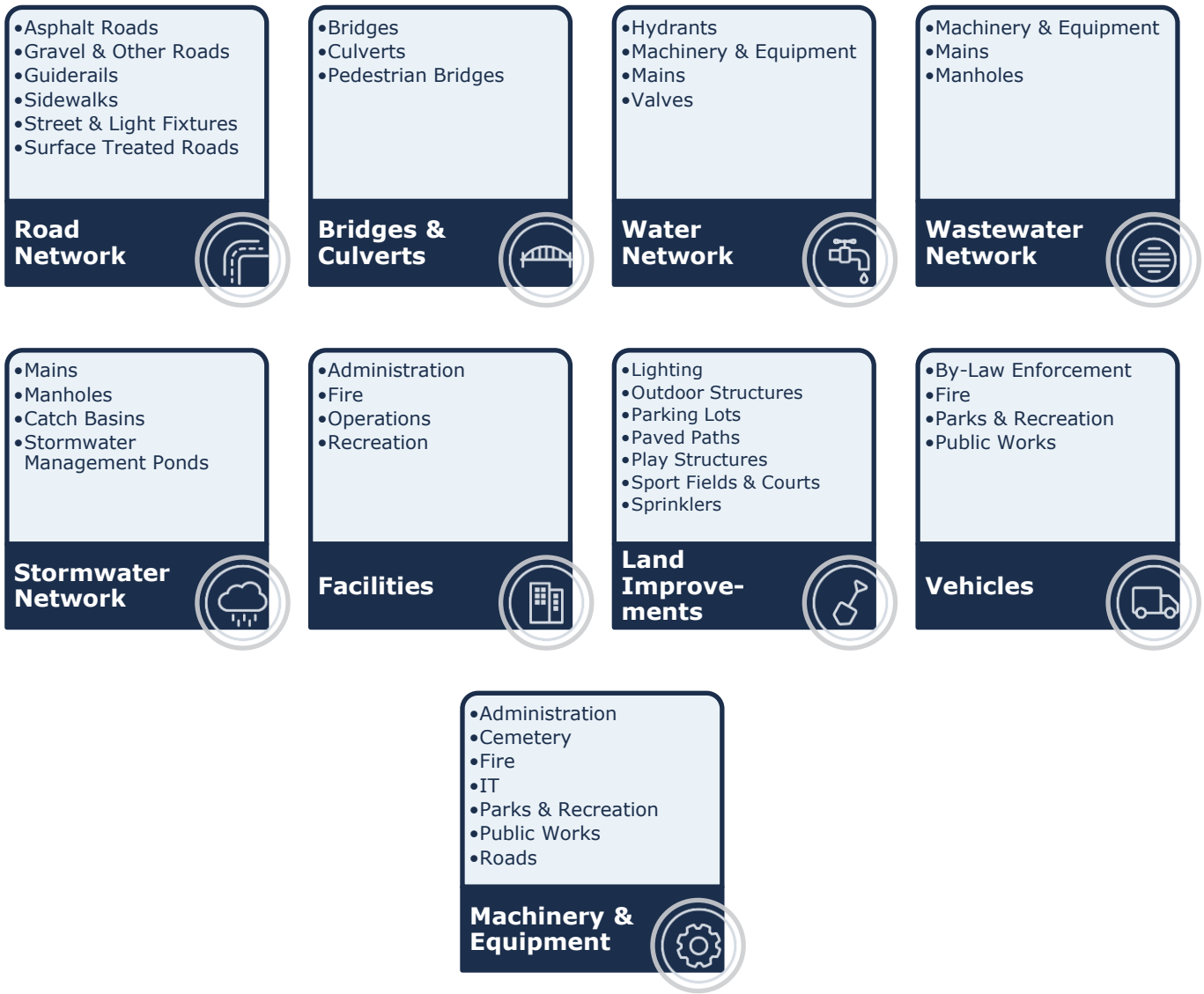


Figure 12 Asset Hierarchy and Data Classification

3.2 Portfolio Overview

3.2.1 Total Replacement Cost of Asset Portfolio

The nine asset categories analyzed in this Asset Management Plan have a total current replacement cost of $1.07 billion. This estimate was calculated using user-defined costing, as well as inflation of historical costs to the data-effective date. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today. Figure 13 illustrates the replacement cost of each asset category; at nearly half (47%) of the total portfolio replacement value, the road network holds the largest share of the Town's asset portfolio, followed by the water network at 15%.

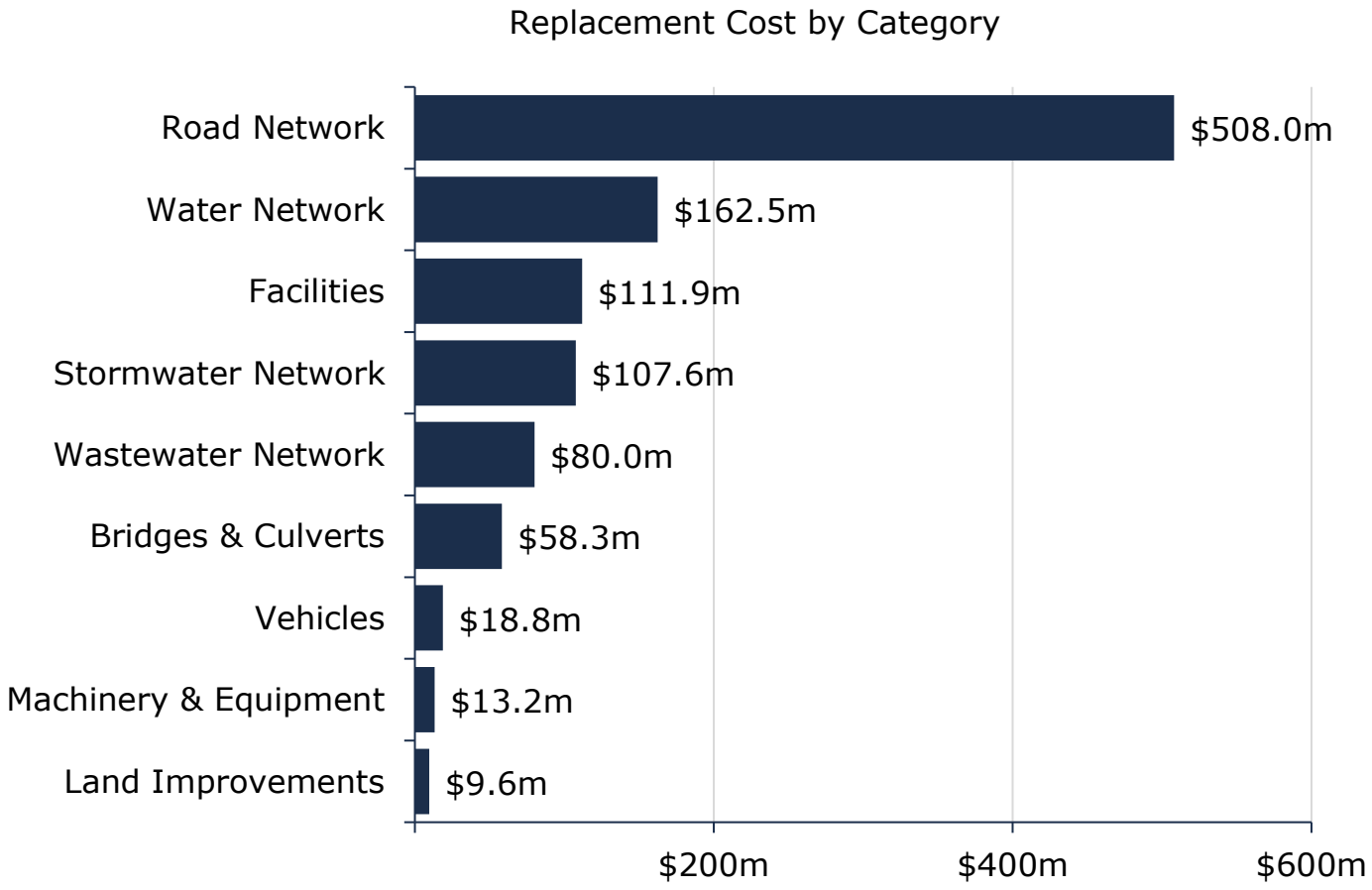


Figure 13 Current Replacement Cost by Asset Category[9]

[9] As reflected in the consolidated financial statements, Niagara-on-the-Lake owns a share of assets operated by the Niagara District Airport Commission. Niagara-on-the-Lake contributes 6% of the total cost of these assets through an operational funding transfer. The long-term Asset Management Plan for these assets was produced by the City of St. Catherines and is included in Appendix E – Niagara District Airport AMP. It can also be found online, here.

3.2.2 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps by comparing the target to the current reinvestment rate. To meet the existing long-term capital requirements, the Town requires an annual capital investment of $22.27 million, for a target portfolio reinvestment rate of 2.08%. Currently, annual investment from sustainable revenue sources is $9.19 million, for a current portfolio reinvestment rate of 0.86%. Target and current re-investment rates by asset category are detailed below.

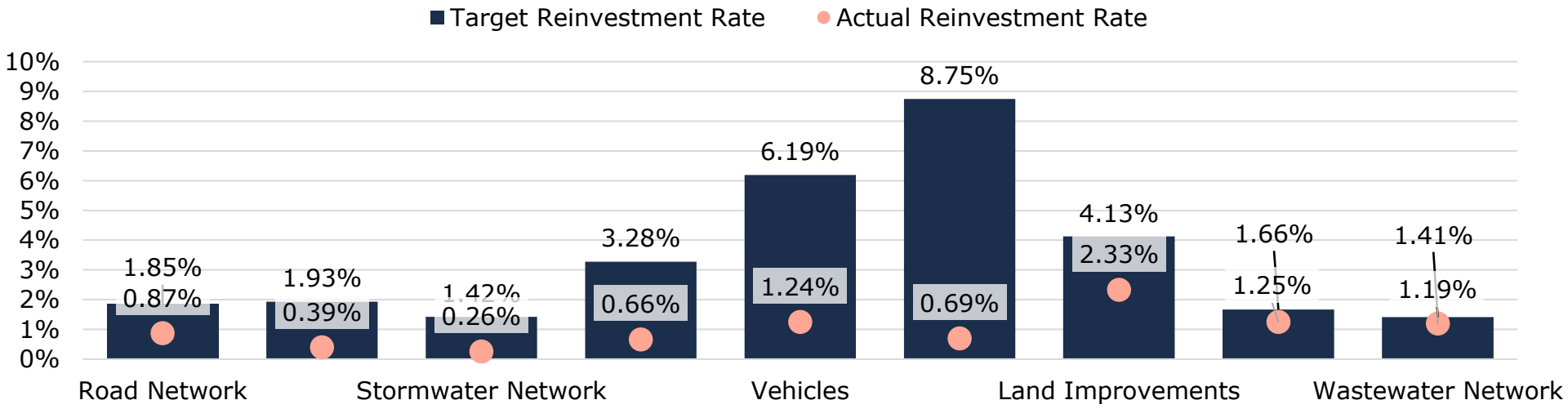


Figure 14 Current Vs. Target Reinvestment Rate

3.2.3 Condition of Asset Portfolio

Figure 15 and Figure 16 summarize asset conditions at the portfolio and category levels, respectively. Based on both assessed condition and age-based analysis, slightly more than three-quarters (79%) of the Town's infrastructure portfolio is in fair or better condition, with the remaining quarter (21%) in poor or worse condition. Typically, assets in poor or worse conditions may require replacement or major rehabilitation in the immediate or short-term. Targeted condition assessments may help further refine the list of assets that may be candidates for immediate intervention, including potential replacement or reconstruction.

Similarly, assets in fair condition should be monitored for disrepair over the medium term. Keeping assets in fair or better condition is typically more cost-effective than addressing asset needs when they enter the latter stages of their lifecycle or decline to a lower condition rating, e.g., poor or worse. Condition data was available for majority of the road network, bridges & culverts, facility, and water network assets while condition data for stormwater and wastewater assets was available for 12% and 20% of assets respectively. For all remaining assets, age was used as an approximation of condition for these assets. Age-based condition estimations can skew data and lead to potential under- or overstatement of asset needs.

Assessed condition data was collected between 2017 and 2024 Where assessed condition data was available, it was projected to current year-end (2024). Figure 15 below summarizes the portfolio condition breakdown. As indicated, most assets are in fair or better condition.

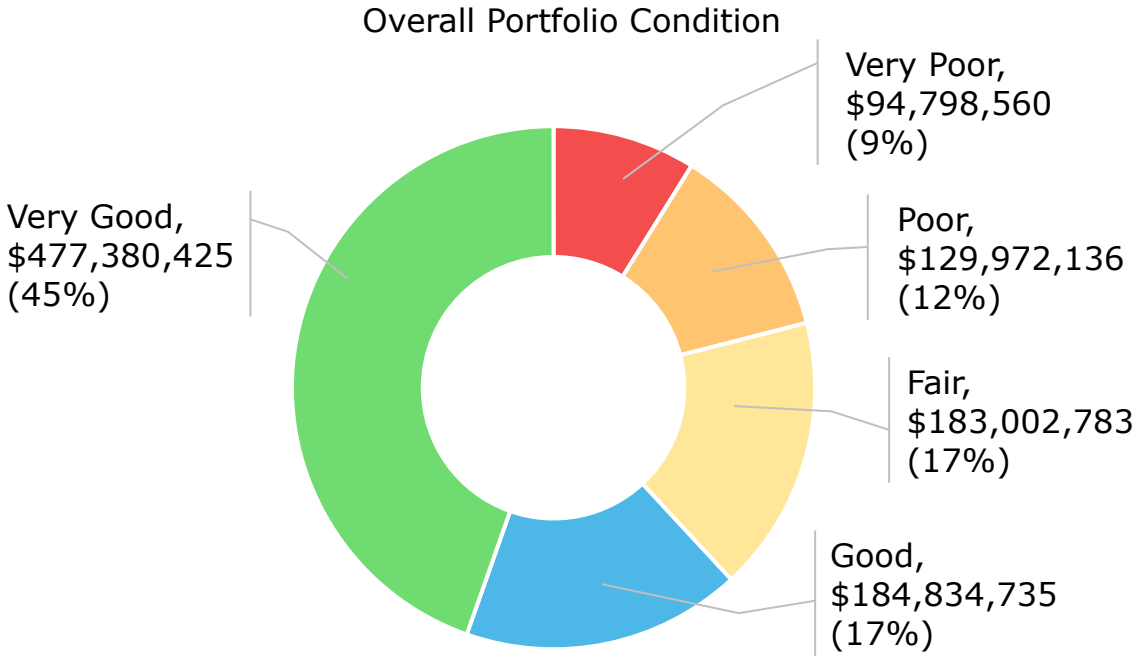


Figure 15 Asset Condition: Portfolio Overview

As further illustrated in Figure 16 at the category level, the majority of all major, core infrastructure including roads, bridges and culverts, water network, stormwater network, and wastewater network are in fair or better condition, based on in-field condition assessment data

and age data. More than half of facilities (57%) are also in poor or worse condition, based on assessments. See Table 5 for details on how condition data was derived for each asset segment.

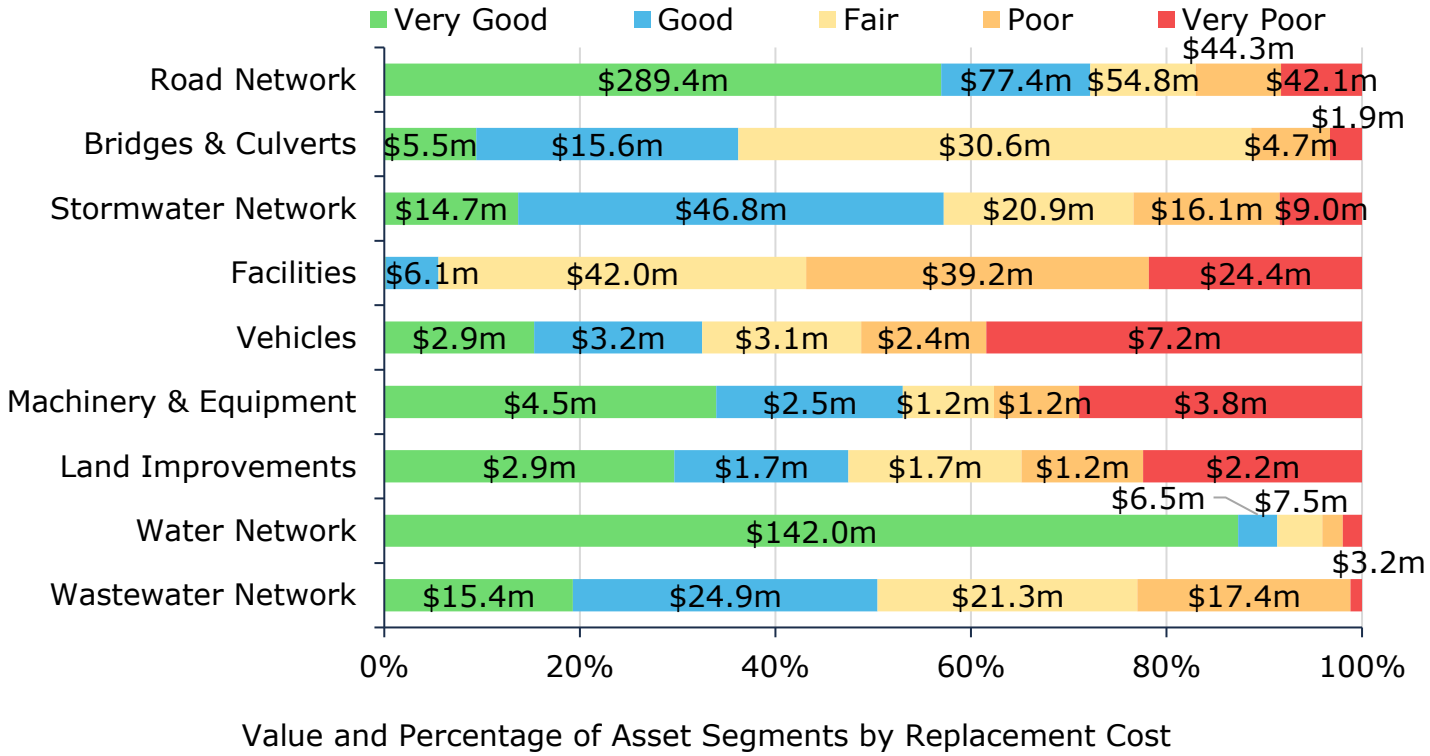


Figure 16 Asset Condition by Asset Category

Facilities are componentized into their major elements and components following the Uniformat II classification standard, allowing condition estimates to be made at both the 'parent' asset level and the individual component level, improving the accuracy and validity of condition assessments.

3.2.3.1 Source of Condition Data

This AMP relies on assessed conditions for 74% of assets, based on and weighted by replacement cost. For the remaining assets, age is used as an approximation of condition. Assessed condition data tends to significantly improve the accuracy of condition estimates which in turn improves the accuracy of all other analyses (i.e. capital investment requirements, risk calculations). Table 5 below identifies the source of condition data used throughout this AMP. All assessed conditions are projected to the data effective date based on the assets estimated useful life.

Asset Category	Asset Segment(s)	% of Assets with Assessed Conditions	Source of Condition Data
Road Network	Asphalt Roads Surface Treated Roads Gravel & Other Roads	100%	2023 Roads Needs Study
	Guiderails		2021 Engineering Firm Assessment
Bridges & Culverts	Bridges	100%	2023 OSIM Report
	Culverts	97%	2023 & 2024 OSIM Report
	Pedestrian Bridges	100%	2023 OSIM Report
Water Network Assets	Mains	91%	2024 Condition Assessments: Third Party Engineering Firm
Wastewater Network Assets	Mains	22%	CCTV Assessments completed in 2024.
Stormwater Network	Mains	15%	CCTV Assessments completed in 2024
	SWMP	85%	Staff Assessments
Facilities	Administration	100%	2017 Facilities Master Plan Assessments
	Fire	99%	
	Operations	100%	
	Recreation	98%	
Land Improvements	All	0%	N/A
Vehicles	All	0%	N/A
Machinery & Equipment	All	0%	N/A

Table 5 Source of Condition Data

3.2.4 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 14% of the Town's assets will require replacement within the next 10 years. Service life remaining by category is summarized in Figure 17 below. Please refer to Appendix B – 10-Year Capital Requirements for an annual summary of the forecasted expenditures by asset category and segment.

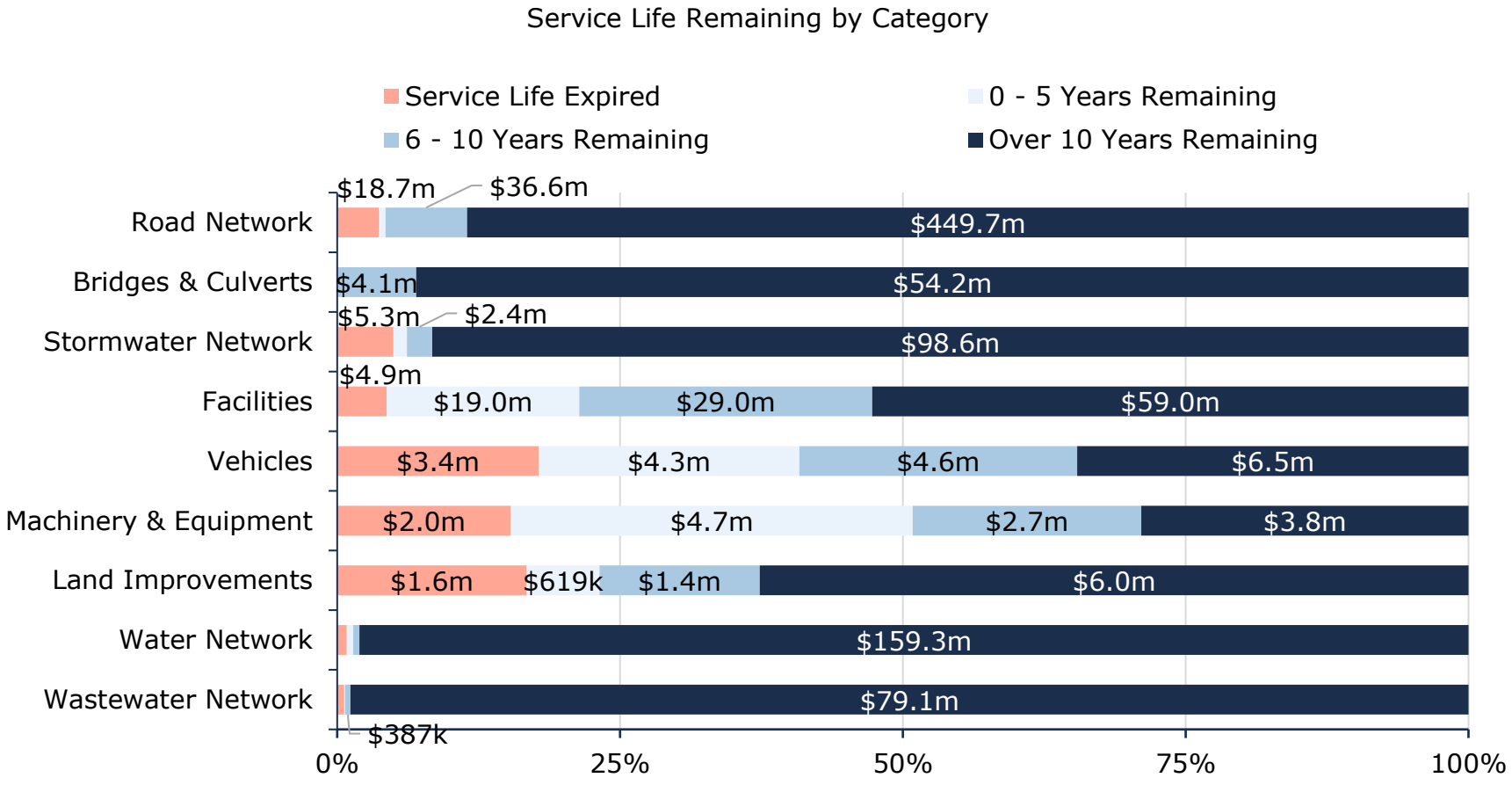


Figure 17 Service Life Remaining by Asset Category

3.2.5 Risk Matrix

Using the risk equation and preliminary risk models outlined in Appendix D – Risk Rating Criteria, Figure 18 shows how assets across the different asset categories are stratified within a risk matrix.

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$536,095,357 (50%)	$125,917,768 (12%)	$111,931,417 (10%)	$164,694,845 (15%)	$131,349,253 (12%)

Figure 18 Risk Matrix: All Assets

The analysis shows that based on current risk models, approximately 12% of the Town's assets, with a current replacement cost of approximately $131.35 million, carry a very high risk rating (15 or higher (red) out of 25). However, the largest proportion of assets (50%) hold a very low risk score; in many cases this is due to the assets' good condition and modest replacement cost should it fail.

As new asset attribute information and condition assessment data are integrated with the asset register, asset risk ratings will evolve, resulting in a redistribution of assets within the risk matrix. Staff should also continue to calibrate risk models.

We caution that since risk ratings rely on many factors beyond an asset's physical condition or age, assets in a state of disrepair can sometimes be classified as low-risk, despite their poor condition rating. In such cases, although the probability of failure for these assets may be high, their consequence of failure ratings was determined to be low based on the attributes used and the data available.

Similarly, assets with very high condition ratings can receive a moderate to high-risk rating despite a low probability of failure. These assets may be deemed as highly critical to the Town based on their costs, economic importance, social significance, and other factors. Continued calibration of an asset's criticality and regular data updates are needed to ensure these models more accurately reflect an asset's actual risk profile.

3.2.6 Forecasted Capital Requirements

Aging assets require maintenance, rehabilitation, and replacement. Figure 19 below illustrates the forecasted infrastructure capital investment requirements for all asset categories analyzed in this AMP over a 100-year time horizon. On average, $22.27 million is required each year to remain current with capital replacement and rehabilitation needs for the Town's asset portfolio (red dotted line). Although capital forecasts (reported here in 5-year cumulative amounts) do fluctuate substantially from year to another, this figure is a useful benchmark for annual capital expenditure targets (or allocations to reserves) to support capital investment needs as they arise. This figure relies on capital costs as of 2024-year end alongside age and available condition data.

The chart also illustrates a backlog of more than $37.8 million, comprising assets that remain in service beyond their estimated useful life. It is unlikely that all such assets are in a state of disrepair, requiring immediate replacements. This makes continued and expanded targeted and consistent condition assessments integral. Risk frameworks, proactive lifecycle strategies, and

levels of service targets can then be used to prioritize projects, continuously refine estimates for both backlogs and ongoing capital needs, and help select the right treatment for each asset.

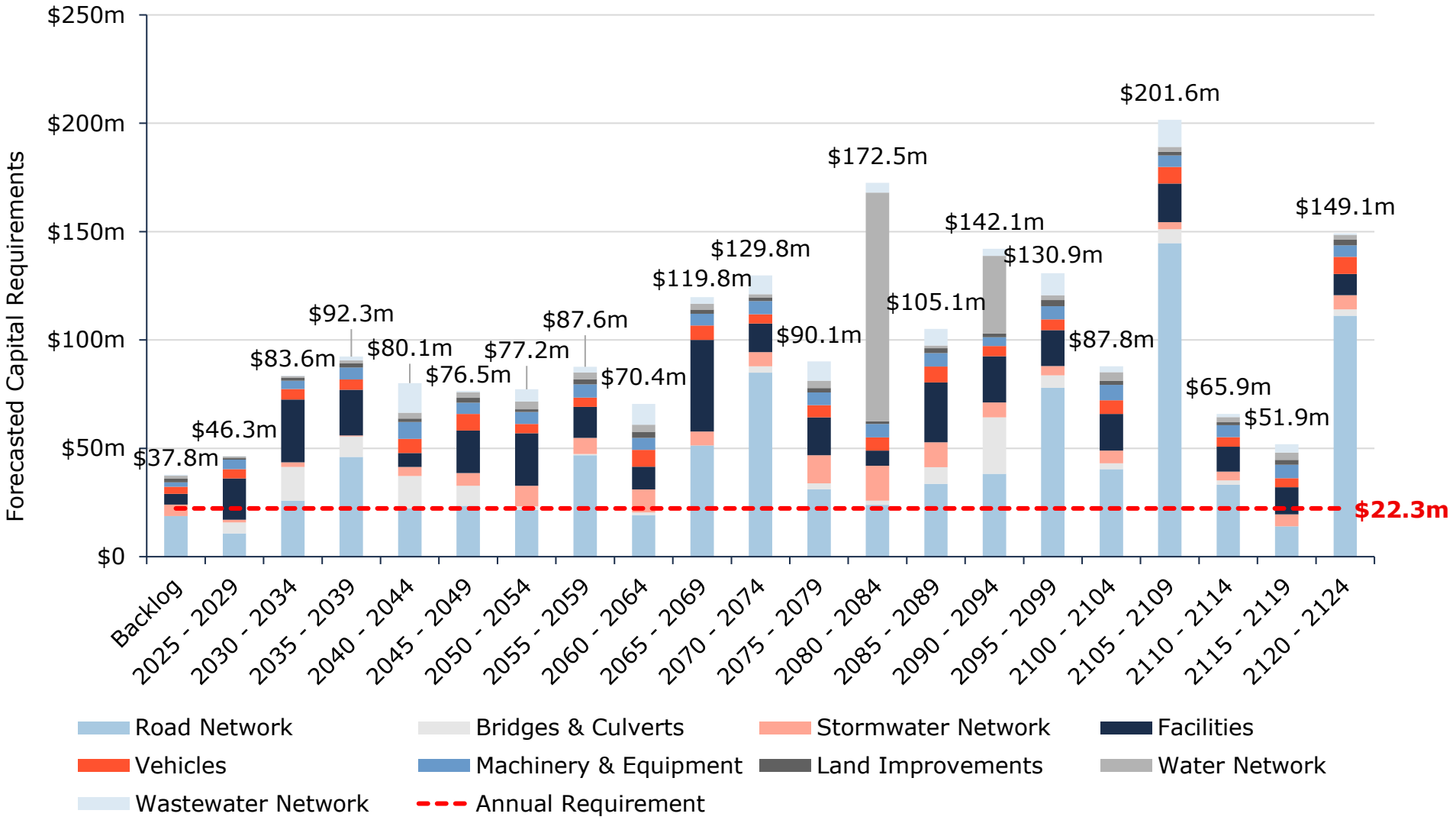


Figure 19 Capital Replacement Needs: Portfolio Overview 2025-2124

Core Assets

4 Road Network

The Town's Road Network comprises the largest share of its infrastructure portfolio, with a current replacement cost of more than $508 million, distributed primarily between asphalt roads and surface treated roads. The Town also owns and manages other supporting infrastructure and capital assets, including sidewalks, guiderails, and street and light fixtures.

4.1 Inventory & Valuation

Table 6 and Figure 20 below summarizes the quantity and current replacement cost of the Town's various Road Network assets as managed in its primary asset management register, Citywide. Most of the replacement costs are associated with asphalt roads.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Asphalt Roads	123,289	Meters	$291,432,000	CPI
Gravel & Other Roads	31,615	Meters	$31,568,000	CPI
Guiderails	7,657	Meters	$3,905,000	User-Defined
Sidewalks	80,190	Meters	$26,628,000	Cost per Unit
Street & Light Fixtures	2,336	Assets	$17,520,000	User-Defined
Surface Treated Roads	106,199	Meters	$136,953,000	CPI
TOTAL			**$508,006,000**	

Table 6 Detailed Asset Inventory: Road Network

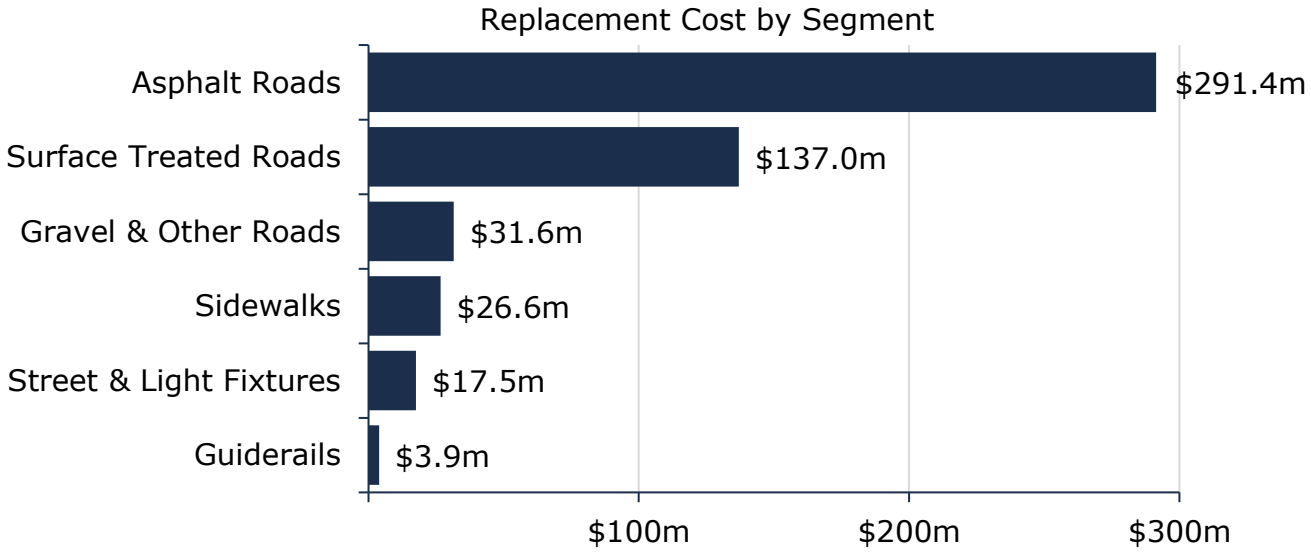


Figure 20 Portfolio Valuation: Road Network

4.2 Asset Condition

Figure 21 summarizes the replacement cost-weighted condition of the Town's Road Network. Based on a combination of field inspection data and age, 83% of assets are in fair or better condition; the remaining 17% of assets are in poor to very poor condition. Condition assessments were available for 100% of asphalt roads, surface treated roads, gravel and other roads, and guiderails, based on replacement cost. This condition data was projected from inspection date to current year to estimate their condition today. No condition data was available for the remaining asset segments (i.e. Street & Light Fixtures, sidewalks).

Assets in poor or worse conditions may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. As illustrated in Figure 21, the majority of the Town's Road Network assets are in fair or better condition.

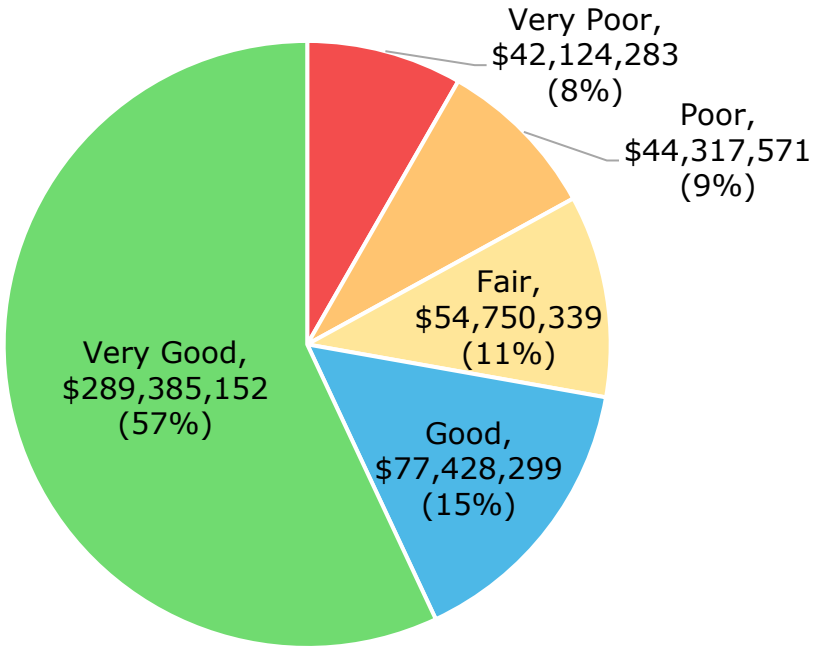


Figure 21 Asset Condition: Road Network Overall

As illustrated in Figure 22, based on condition assessments, the majority of the Town's asphalt roads and surface treated roads are in fair or better condition; however, 66% of gravel and other roads are in poor or worse condition.

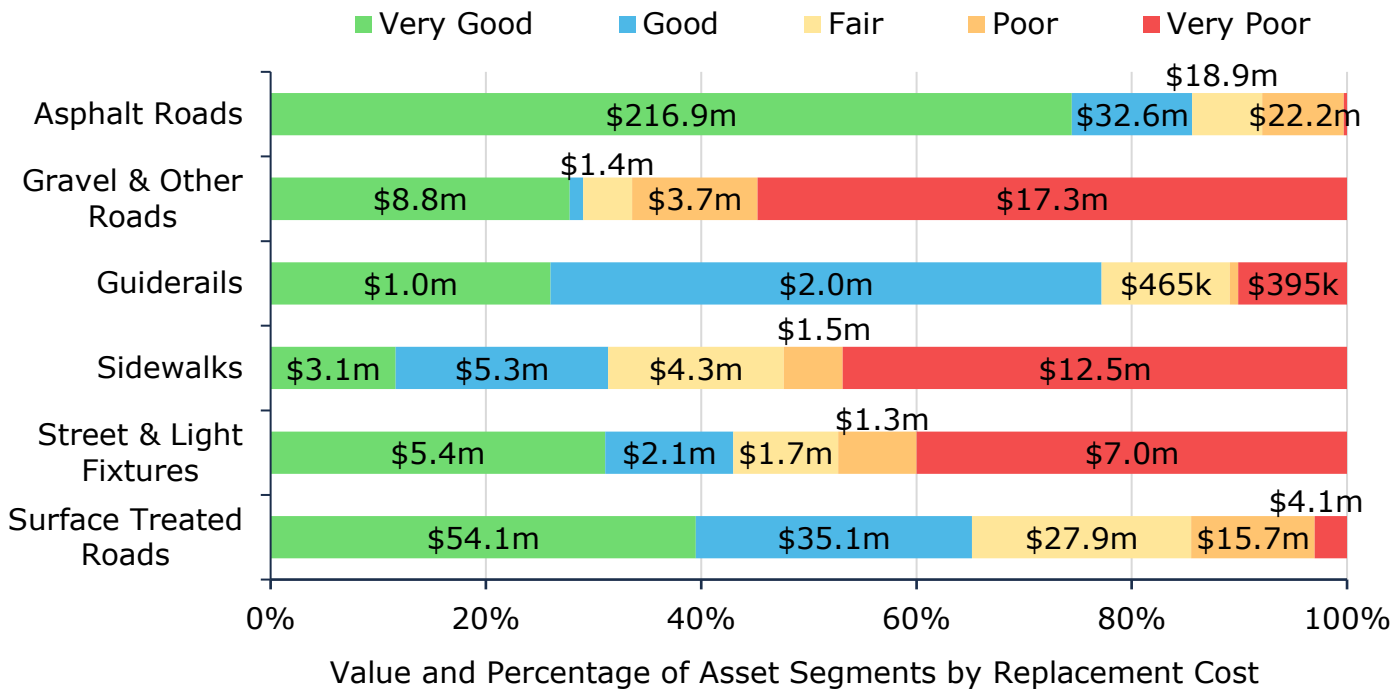


Figure 22 Asset Condition: Road Network by Segment

This condition data is sourced from the 2023 Roads Inspection and is projected to 2024, the data effective date. Based on in-field condition assessments most guiderails (89%), asphalt roads (92%) and surface treated roads (86%) are in fair or better condition, a much smaller percentage of gravel roads (34%) are in fair or better condition. No condition data was available for the street and light fixtures and sidewalks.

Where assessed conditions are reported for road network assets, it is based on the following condition scale:

Condition	Description	Criteria	Condition Range (%)
Very Good	Fit for the future	Well maintained, good condition, new or recently rehabilitated and expected to have at least 10 years of remaining service life	70-100
Good	Adequate for now	Acceptable, generally approaching mid-stage of expected service life with close to 10 years of service life remaining	55-69
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies with 1 to 10 years of expected service life remaining	35-54

Condition	Description	Criteria	Condition Range (%)
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration. Limited-service life remaining.	20-34
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-19

Table 7: Road Network Condition Scale

4.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential long-term replacement spikes.

Figure 23 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

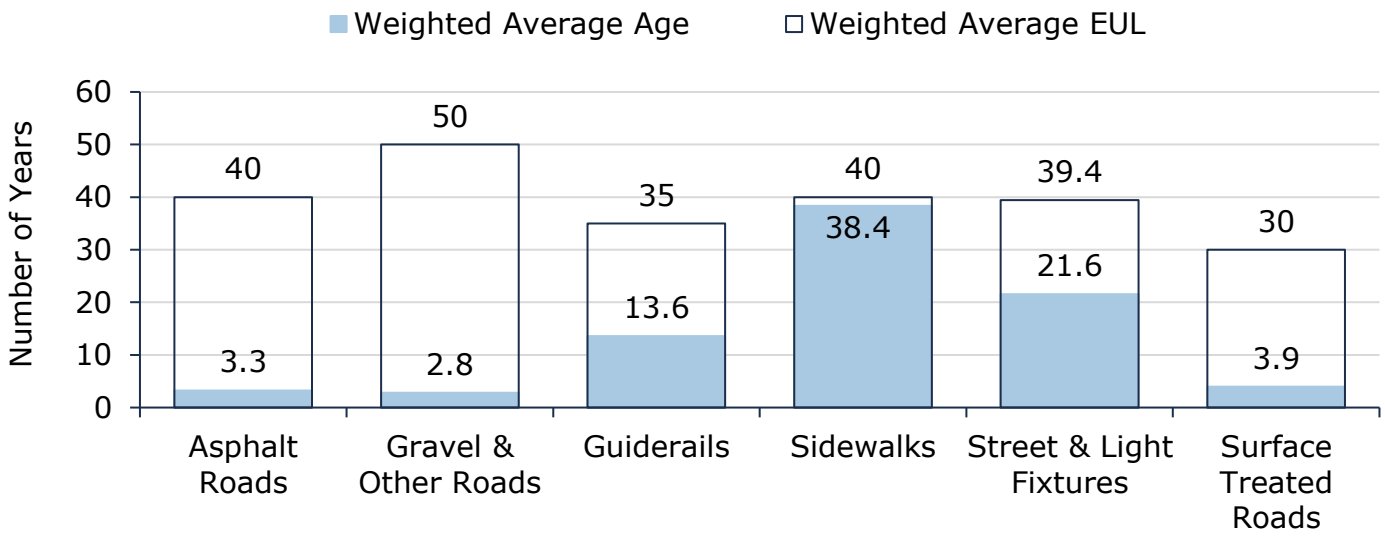


Figure 23 Estimated Useful Life vs. Asset Age: Road Network

Age analysis shows that most road assets except for sidewalks are in the early stages of their expected useful life.

4.4 Current Approach to Lifecycle Management

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 asphalt and 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.

Asphalt Roads		
Event Name	**Event Class**	**Event Trigger**
Crack Sealing	Preventative Maintenance	5 Years (Repeated 2 times)
Basic resurfacing- Single Lift	Rehabilitation	Condition of 60% to 65%
Pulverizing and Resurfacing- Double Lift	Rehabilitation	Condition of 40% to 45%
Full Reconstruction	Replacement	Condition of 0%

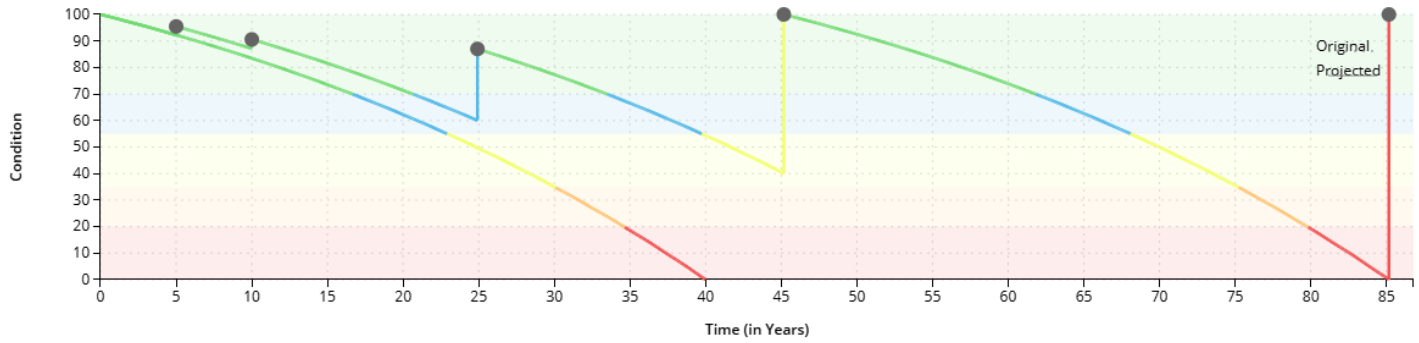


Table 8 Lifecycle Management Strategy: Road Network (Asphalt Roads)

Surface Treated Roads		
Event Name	**Event Class**	**Event Trigger**
Single Surface Treatment	Rehabilitation	Condition of 60% to 65%
Double Surface Treatment	Rehabilitation	Condition of 35% to 40%
Full Reconstruction	Replacement	Condition of 0%

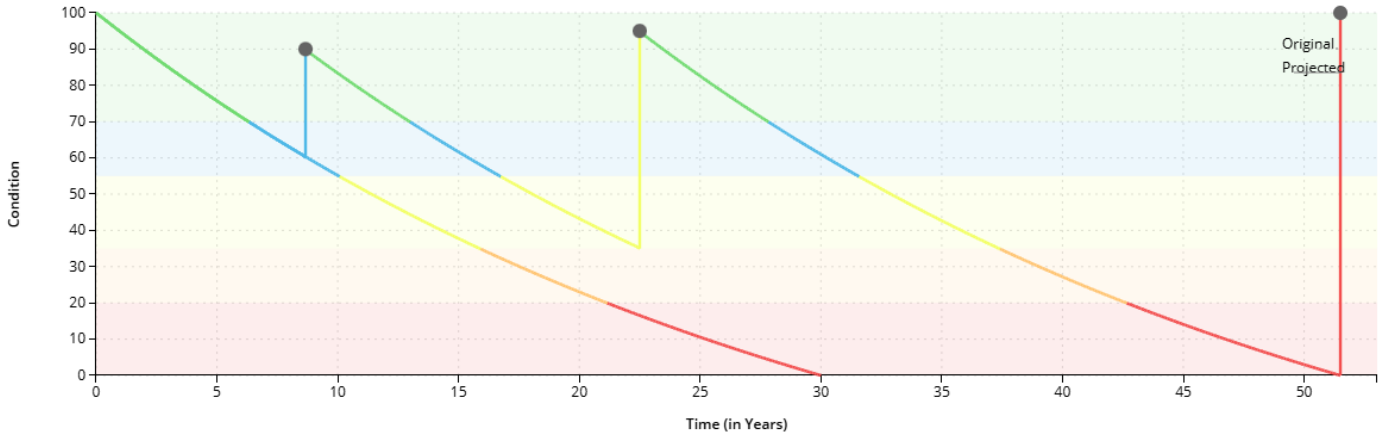


Table 9 Lifecycle Management Strategy: Road Network (Surface Treated Roads)

The following table outlines the Town's current lifecycle management strategy for their road network assets.

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance includes inspections, cleaning, vegetation management, and minor repairs. Work is conducted monthly or as triggered by visual inspections or service requests identifying cracks, potholes, or safety issues.
Rehabilitation	Rehabilitation includes resurfacing and structural repairs. A subset of the road network receives rehabilitation investment annually and activities are typically triggered by PCI results or visible deterioration.
Replacement	Replacement is considered when an asset is beyond rehabilitation or when lifecycle cost analysis shows that continued maintenance is not cost-effective. Assets nearing the end of life or requiring frequent costly repairs are prioritized.
Inspection	Road assets are assessed every five (5) years, with the last assessment completed in 2023. Assessments are conducted by external contractors using the Pavement Condition Index (PCI). Supporting infrastructure like sidewalks and streetlights is assessed annually by internal staff using a standardized checklist method that assesses structural integrity, lighting quality, and trip hazards. The Town plans to explore outsourcing assessments to an external contractor.

Table 10 Lifecycle Management Strategy: Road Network

4.5 Forecasted Long-Term Replacement Needs

Figure 24 illustrates the forecasted capital investment needs for the Town's Road Network. This analysis was run until 2109 to capture at least one iteration of replacement for the longest-lived asset in inventory. The Town's average annual requirements (red dotted line) total $9.4 million for all assets in the road network. This figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure capital investments are not deferred.

The chart illustrates substantial capital needs throughout the forecast period. It also shows a backlog of $18.7 million, dominated by sidewalks followed by street and light fixtures. However, as no condition data was available for these assets, this estimate may not be accurate. These projections are based on asset replacement costs, age analysis, and condition data when available, as well as lifecycle modeling (asphalt roads and surface treated roads only). They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

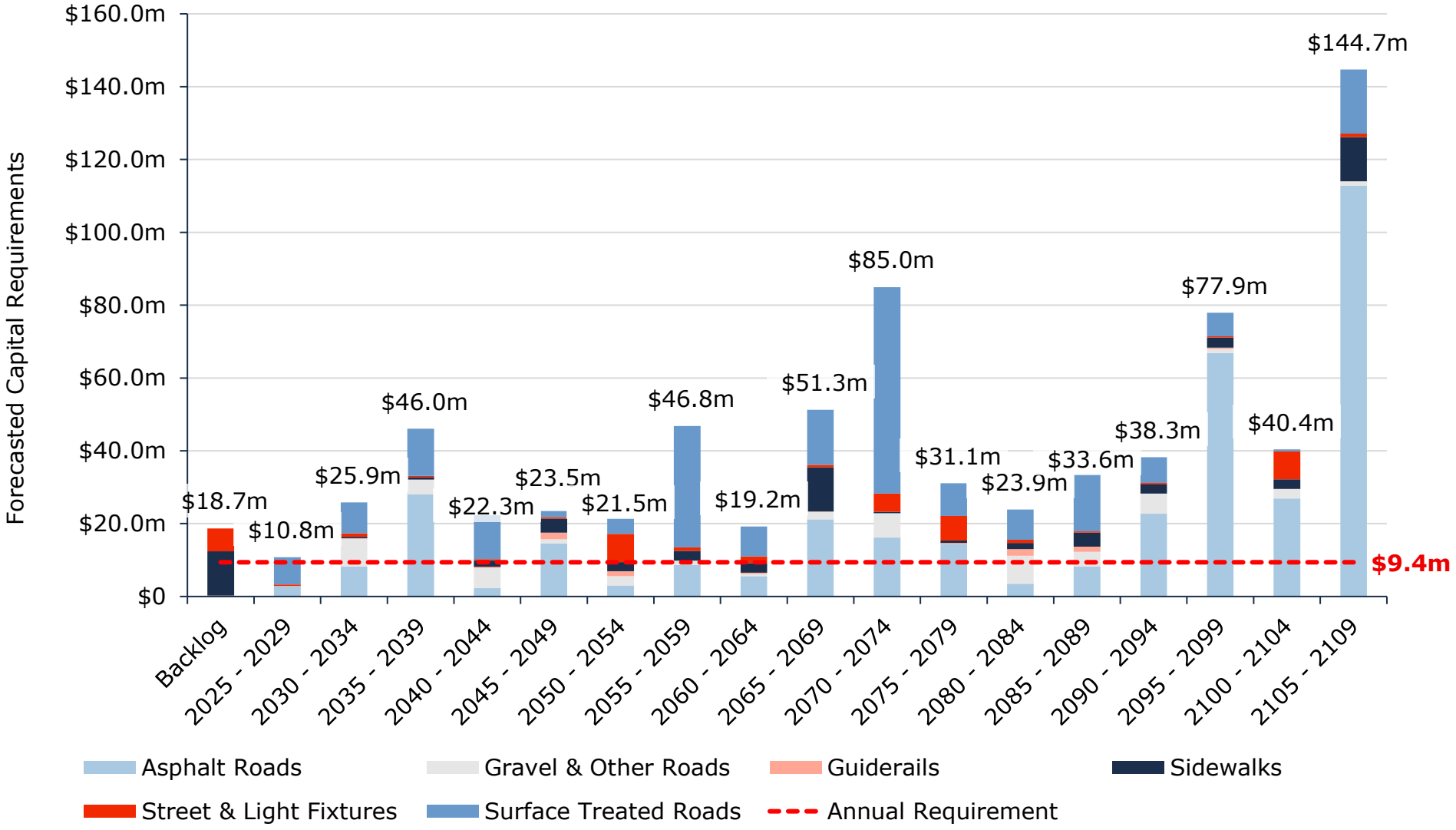


Figure 24 Forecasted Capital Replacement Needs: Road Network 2025-2109

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, assessed conditions may indicate that assets forecasted for replacement based on age may not require investment within the time estimated, supporting the recommendation to complete condition assessments. Nonetheless, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. Regular condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A summary of the 10-year replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

4.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service type, replacement costs, traffic data, and roadside environment. The risk ratings for assets without useful attribute data were calculated using only condition, service type, and their replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Town may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Town's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications. As highlighted in Figure 25 the majority (59%) of road network assets have very low risk scores.

1 - 4 **Very Low**	5 - 7 **Low**	8 - 9 **Moderate**	10 - 14 **High**	15 - 25 **Very High**
$301,802,641 (59%)	$44,628,568 (9%)	$51,759,462 (10%)	$56,747,378 (11%)	$53,067,594 (10%)

Figure 25 Risk Matrix: Road Network

4.6.1 Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies
Current lifecycle strategies are described as proactive and effective. However, the Municipality acknowledges that deferred maintenance may result in higher long-term costs, emergency repairs, and safety risks. While trigger points for interventions are reviewed regularly, reliance on

visual inspections and annual scheduling can still leave room for reactive responses.

Aging Infrastructure
There is acknowledgement that a significant portion of the road network may be reaching or exceeding its useful life. This heightens the need for prioritization in capital works planning, especially where cost-effective rehabilitation may no longer be viable.

4.7 Levels of Service

The tables that follow summarize the Town's current levels of service with respect to prescribed Metrics under Ontario Regulation 588/17, as well as any additional performance measures that the Town selected for this AMP.

4.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Scope	Description, which may include maps of the road network in the municipality and its level of connectivity	The Town of Niagara-on-the-Lake boasts a network of approximately 523 lane kilometers of roadway, most of which are surface treatment and asphalt. The system mostly consists of collector and local roads. Please refer to Appendix C for a map of the road network.
Quality	Description or images that illustrate the different levels of road class pavement condition	The condition of the road network ranges from very poor to very good, with most (83%) of the roadway assets being in fair or better condition. Condition details by asset segment are provided in the Asset Condition section above.

Table 11 O. Reg. 588/17 Community Levels of Service: Road Network

4.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0 km/km^2

Service Attribute	Technical Metric	Current LOS (2024)
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	1.95 km/km^2
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	2.04 km/km^2
Quality	Average pavement condition index for paved roads in the Town	Asphalt roads: 79%
		Surface Treated Roads: 62%
	Average surface condition for gravel and other roads in the Town (e.g. excellent, good, fair, poor)	Poor
Performance	Current vs. Target Capital Reinvestment Rate	0.87% vs. 1.85%
	Average Risk of road network	6.76

Table 12 O. Reg. 588/17 Technical Levels of Service: Road Network

5 Bridges & Culverts

The Town's transportation network also includes a total of 38 bridges, two (2) pedestrian bridges and 33 structural culverts, with a current replacement cost of $58.3 million.

5.1 Inventory & Valuation

Table 13 and Figure 26 summarizes the quantity and current replacement cost of assets within the bridges and culverts category. Replacement costs are determined based on the 2023 user-defined replacement cost sourced from the 2023 OSIM study; this value is inflated to December 2024 using the Non-residential CPI indices.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Bridges	38	Assets	$22,715,000	CPI
Culverts	33	Assets	$34,667,000	CPI
Pedestrian Bridges	2	Assets	$902,000	CPI
TOTAL			**$58,284,000**	

Table 13 Detailed Asset Inventory: Bridges & Culverts

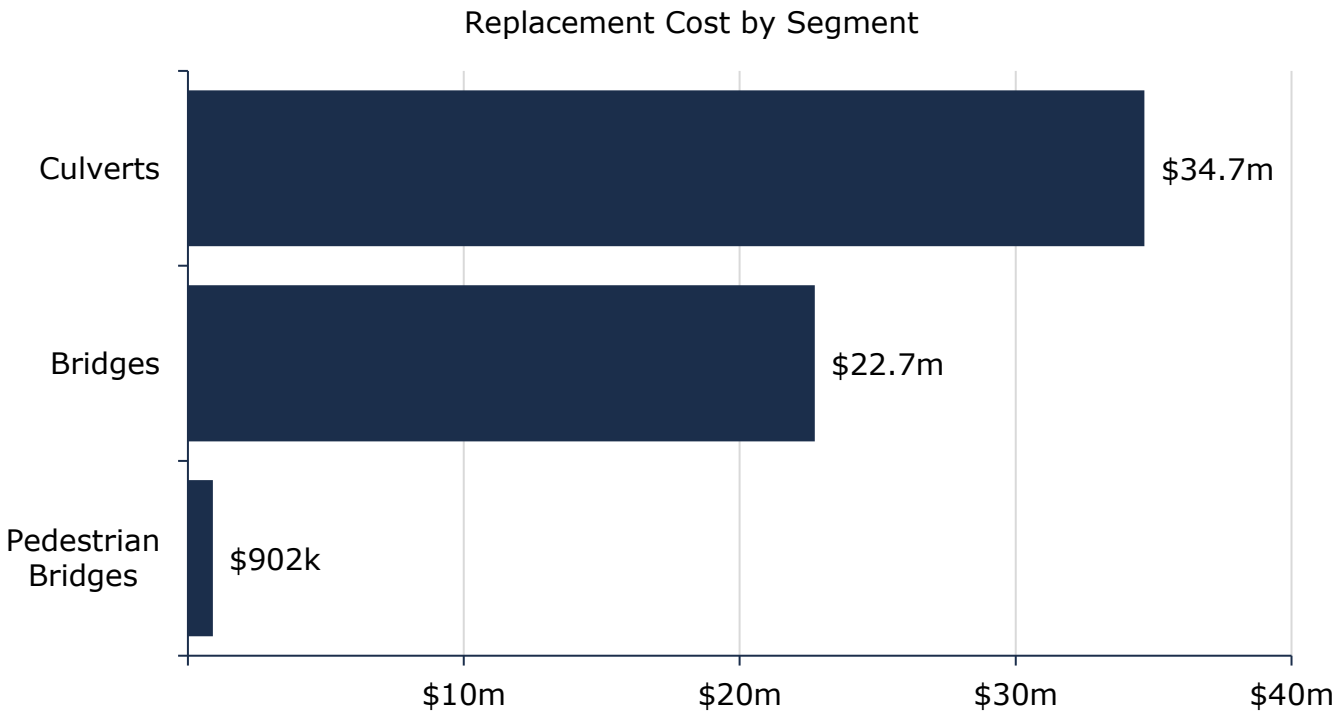


Figure 26 Portfolio Valuation: Bridges & Culverts

5.2 Asset Condition

Figure 27 summarizes the replacement cost-weighted condition of the Town's bridges and culverts. Based on the Town's recent Ontario Structures Inspection Manual (OSIM) assessments, 89% of bridges and culverts are in fair or better condition. Some elements or components of these structures may be candidates for replacement or rehabilitation in the medium term and should be monitored for further degradation in condition. A small proportion (11%) of the bridges and culverts portfolio is in poor or worse condition and may require replacement in the immediate or short term.

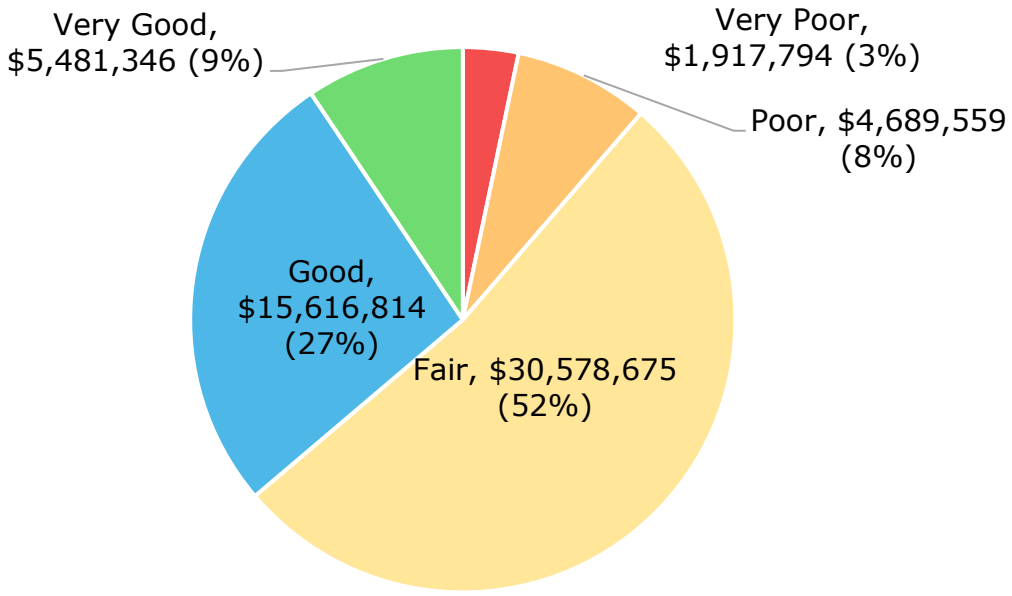


Figure 27 Asset Condition: Bridges & Culverts Overall

As further detailed in Figure 28, condition values are presented by asset segment. Over 80% ($19.6 million) of the bridges are in fair or better condition. Similarly, 90% of culverts, with a current replacement cost of $31.2 million and 100% of pedestrian bridges are in fair or better condition. Bridges and culverts with a poor or worse rating (i.e., a bridge condition index of less than 20) are not necessarily unsafe for regular use. The OSIM ratings are designed to identify repairs needed to elevate condition ratings to a fair or higher.

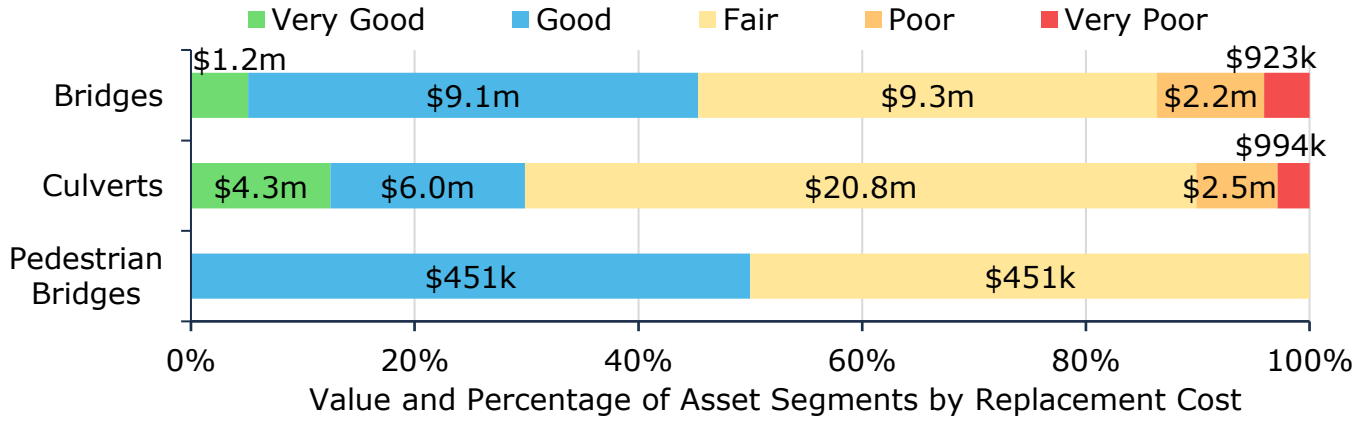


Figure 28 Asset Condition: Bridges & Culverts by Segment

Bridge conditions are defined by the OSIM's study and are described as follows:

Table 14: Bridge Condition Scale

Condition	Criteria	Condition Range (%)
Very Good	Overall, the components of the structure are in very good condition. Generally, the structure has been constructed within the last 10 years and does not require any work within the next 10 years.	80-100
Good	Overall, the components of the structure are in good condition. Generally, the structure is adequate or requires only minor maintenance within the next 10 years.	70-79
Fair	Overall, the components of the structure are in fair condition. Generally, the structure requires major rehabilitation or replacement within the next 10 years or requires Condition Survey (C/S) Load Capacity Evaluation (LCE) or Rehabilitation/Replacement Analysis (RRA).	60-69
Poor	Overall, the components of the structure are in poor condition. Generally, the structure requires replacement within the next 5 years.	20-59
Very Poor	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-19

5.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 29 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

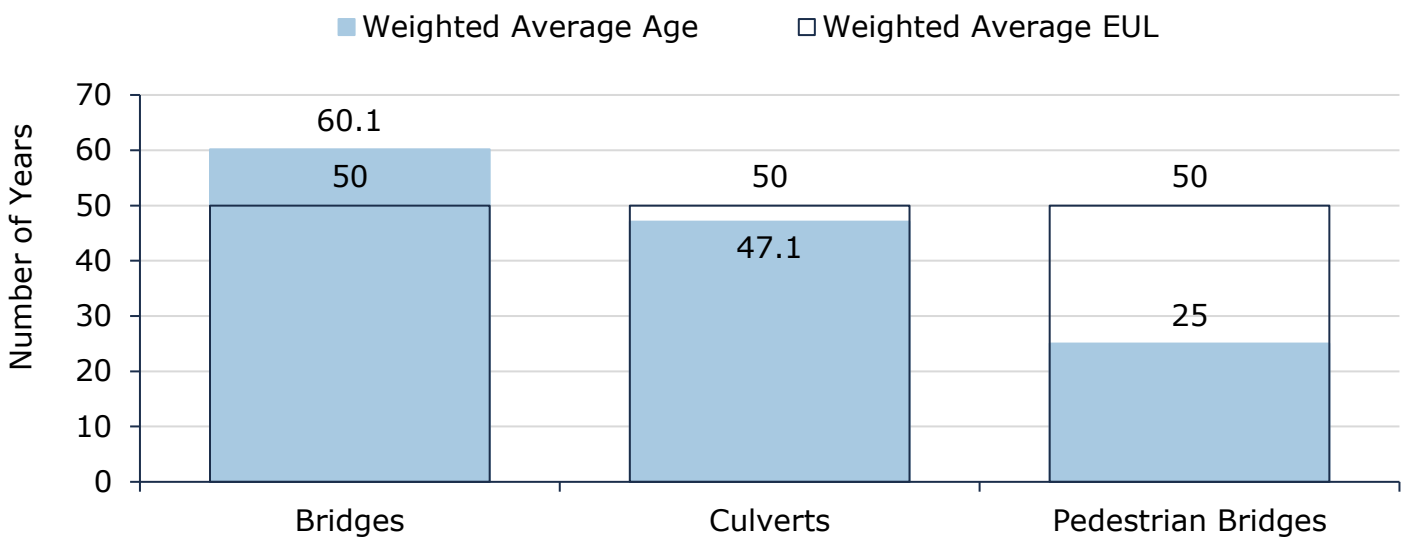


Figure 29 Estimated Useful Life vs. Asset Age: Bridges & Culverts

Age analysis reveals that on average, bridges have consumed their estimated useful life, with an average age of 60.1 years against an average EUL of 50 years. On average, culverts are also in the latter stages of their lifecycle, with an average age of 47.1 years, against an average EUL of 50 years while pedestrian bridges are in the middle stages of their lifespan. However, it is important to note that based on assessed conditions most assets are in fair or better condition. In this case, age-based information has limited utility.

5.4 Current Approach to Lifecycle Management

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.

Table 15 outlines the Town's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance activities include inspections, cleaning, minor repairs, and vegetation management. These are carried out annually and are triggered by inspection findings or service requests.
Rehabilitation	Rehabilitation activities include structural repairs or replacements as required. These are generally initiated based on recommendations from inspection reports.
Replacement	Replacement is considered when the condition of an asset has deteriorated significantly and rehabilitation is no longer cost-effective. Assets nearing the end of their service life or those with frequent costly repairs are prioritized

Activity Type	Description of Current Strategy
Inspection	As legislatively required, all structures with a span greater than 3 metres are inspected at least once every two years. The most recent inspection was completed in 2023, with the next scheduled for 2025, in accordance with provincial guidelines. These inspections are conducted by qualified external contractors, and reported data includes key indicators such as the Bridge Condition Index (BCI), which inform maintenance and capital planning decisions. Smaller structures, such as the culverts at One Mile Creek that do not meet the 3-metre span, are assessed on a five-year cycle and are documented in a separate report.

Table 15 Lifecycle Management Strategy: Bridges & Culverts

5.5 Forecasted Long-Term Replacement Needs

Figure 30 illustrates the forecasted capital investment requirements for the Town's bridges and culverts. This analysis was run until 2074 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Town's primary asset management system and asset register. The Town's average annual requirements (red dotted line) for bridges and culverts total $1.1 million. Although actual investment requirements may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to support capital planning.

The chart illustrates substantial capital needs through the forecast period with major investment spikes estimated at $15.6 million between 2030 and 2034, and $14.9 million between 2040 and 2044 as assets reach the end of their useful life. These projections consider asset condition, and the associated costs are based on asset replacement costs coupled with OSIM report recommendations for rehabilitations. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support long-term financial planning.

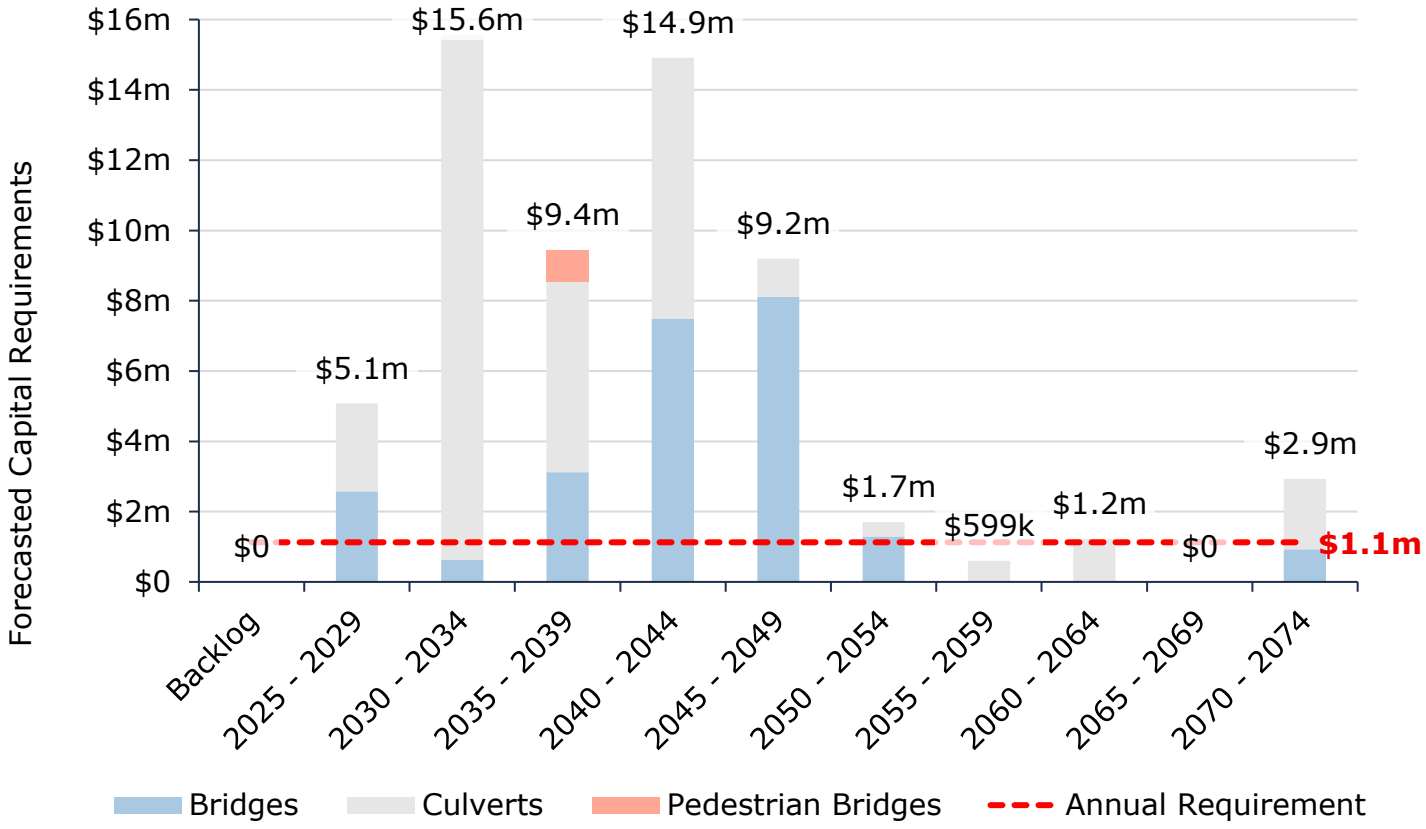


Figure 30 Forecasted Capital Replacement Needs: Bridges & Culverts 2025-2074

A summary of the 10-year replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

5.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition and replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1 (lowest) to 25 (highest). A high-risk rating is due to a high probability and/or consequence of failure increase.

These risk models have been built into the Town's Asset Management Database and are outlined in Appendix D. As indicated in Figure 31 below, about half of bridge and culvert assets have a high or very high-risk rating. This is most often due to the assets' condition and the significant replacement cost of these assets.

1 - 4 **Very Low** $6,507,321 (11%)	5 - 7 **Low** $10,250,159 (18%)	8 - 9 **Moderate** $7,185,147 (12%)	10 - 14 **High** $14,818,031 (25%)	15 - 25 **Very High** $19,523,530 (33%)

Figure 31 Risk Matrix: Bridges & Culverts

An asset's criticality rating, determined by the nature and magnitude of the consequences of its potential failure should be used to prioritize projects, particularly lifecycle management strategies. Using risk in conjunction with levels of service, and the recommended workplans in OSIM inspections, can assist in optimizing limited funds.

5.6.1 Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies
While inspection cycles and maintenance programs are in place, the municipality indicated that lifecycle trigger points are only "somewhat" reviewed. This suggests a partially reactive approach, where repairs or replacements may be initiated based on need rather than proactive forecasting. Deferred maintenance was acknowledged as a contributor to higher long-term costs and emergency repair risk.

Organizational Capacity
While staff are familiar with assets and their condition, historically limited time and resources have made it difficult to maintain accurate, up-to-date data. This affects the ability to plan replacements proactively and reduces confidence in lifecycle forecasting. This risk is expected to be substantially reduced through the development of this asset management plan and the associated asset inventory information.

5.7 Levels of Service

The tables that follow summarize the Town's current levels of service with respect to prescribed metrics under Ontario Regulation 588/17 as well as any additional performance measures that the Town has selected for this AMP.

5.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Bridges and culverts are a key component of the municipal transportation network. All structures besides bridges B4 and B16, do not have loading restrictions, meaning that most types of vehicles, including heavy transport, motor vehicles, and emergency vehicles can cross them without restriction.
Quality	Description or images of the condition of bridges & culverts and how this would affect use of the bridges & culverts	The condition of bridges and structural culverts varies but as noted in Figure 28 most assets are in fair or better condition. Photographs of bridges and structural culverts is provided in Appendix C – Level of Service Maps & Photos

Table 16 O. Reg. 588/17 Community Levels of Service: Bridges & Culverts

5.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Scope	% of bridges in the Town with loading or dimensional restrictions	5%[10]
Quality	Average bridge condition index value for bridges in the Town	66%
	Average bridge condition index value for pedestrian bridges in the Town	70%
	Average bridge condition index value for structural culverts in the Town	67%
Performance	Current vs. Target Capital Reinvestment Rate	0.39% vs. 1.93%
	Average Risk	10.39

Table 17 O. Reg. 588/17 Technical Levels of Service: Bridges & Culverts

[10] The 2023 OSIM report indicated a total of two bridges (Soth Shore Lane and Queenston Street) with loading or dimensional restrictions.

6 Water Network Assets

The Town of Niagara-on-the-Lake owns and operates the water distribution system. Niagara Region owns and manages Decew and Niagara Falls water treatment plants which provide water to the Town of Niagara-on-the-Lake. The Town is responsible for water distribution which is enabled by over 207 km of water mains and other infrastructures such as hydrants, valves, and machinery and equipment.

6.1 Inventory & Valuation

Table 18 and Figure 32summarizes the quantity and current replacement cost of the Town's various water linear assets as managed in its primary asset management register, Citywide Assets.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Hydrants	1,428	Assets	$8,568,000	User-Defined
Machinery & Equipment	15	Assets	$707,000	CPI
Mains	207,247	Meters	$145,430,000	Cost per Unit
Valves	2,612	Assets	$7,836,000	User-Defined
TOTAL			**$162,541,000**	

Table 18 Detailed Asset Inventory: Water Network Assets

Figure 32 Portfolio Valuation: Water Network Assets

6.2 Asset Condition

Figure 33 summarizes the replacement cost-weighted condition of the Town's water network. Based on mostly in-field condition assessment and limited age data, a vast majority (96%) of assets are in fair or better condition; the remaining 4% of assets are in poor to very poor condition.

Assets in poor or worse conditions may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

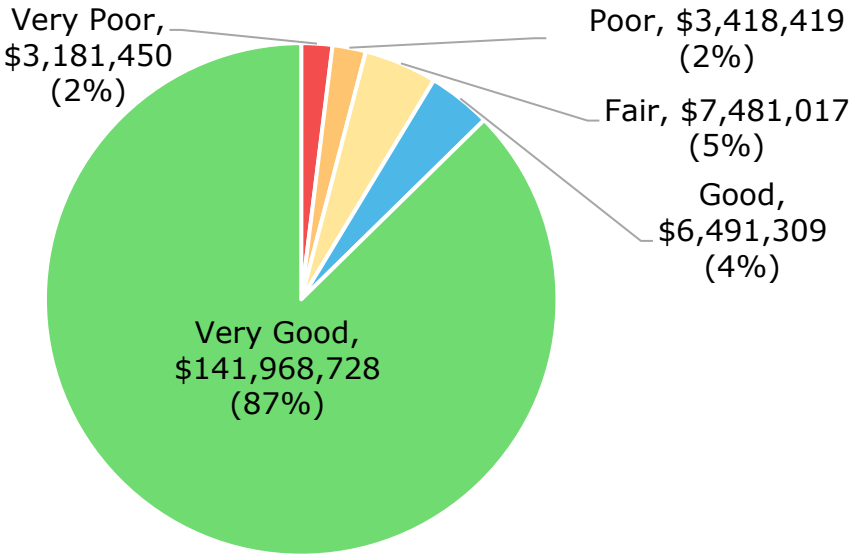


Figure 33 Asset Condition: Water Network Assets Overall

As illustrated in Figure 34, based on mostly in-field condition assessment, the majority of the Town's water mains are in very good condition. Based on age data, hydrants, machinery and equipment, and valves are mostly in fair or better condition.

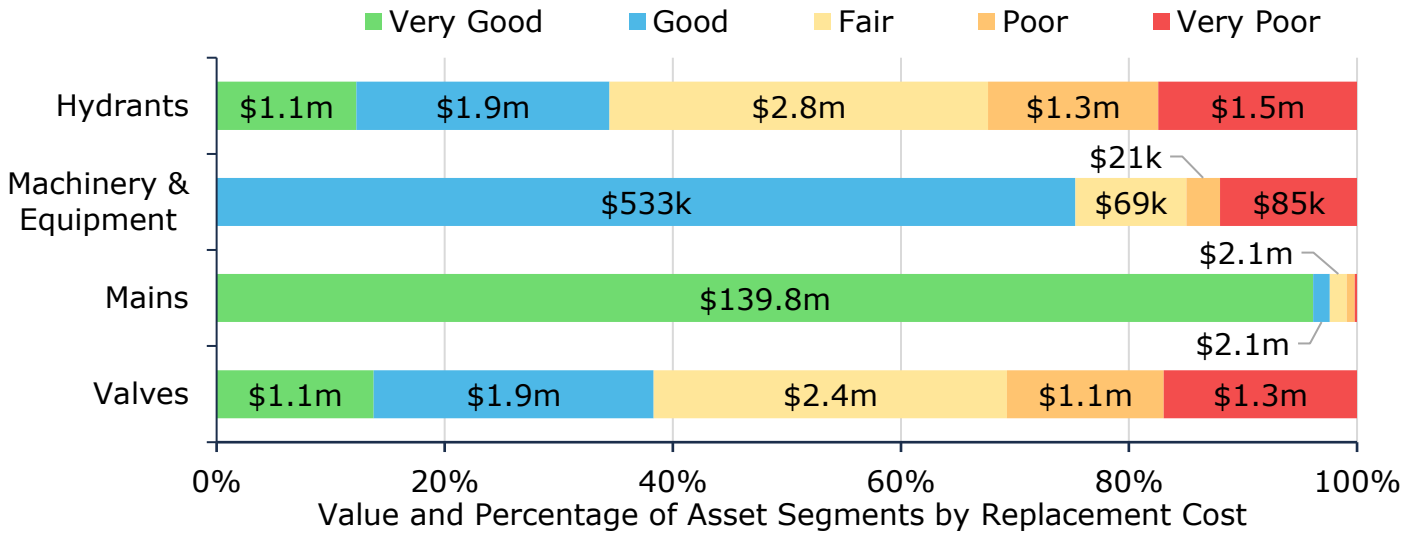


Figure 34 Asset Condition: Water Network Assets by Segment

Assessed conditions are reported for water main assets, based on condition assessments conducted by a third-party in August 2024. These assessments are projected to the data effective data (December 2024) for consistent reporting. For water main assets, condition scores are derived based on an assessment of the following key deficiency factors:

1. Sub-Standard Size (10% weight)
2. High Break Rate (20% weight)
3. Hydraulic Capacity (50% weight)
4. Potential Water Quality Problem (20% weight)

A score for each factor is determined and then multiplied by its respective weight (as noted above) to determine an overall score. The overall score may range from 1 (best rating) to 10 (worst rating) and is defined and described as follows:

Condition	Description	Criteria	Condition Range
Very Good	Fit for the future	Appropriately sized, low break rate, adequate hydraulic capacity, no water quality concerns.	0-2.49
Good	Adequate for now	Most factors (size, break rate, hydraulic capacity, water quality problems) are generally performing well, but typically one factor is performing at a moderate level.	2.5-4.49
Fair	Requires attention	There is mixed performance amongst the performance factors (size, break rate, hydraulic capacity, water quality problems).	4.5-6.49
Poor	Increasing potential of affecting service	More factors (size, break rate, hydraulic capacity, water quality problems) are performing poorly than well.	6.5-8.49
Very Poor	Unfit for sustained service	Not appropriately sized, significant break rates, inadequate hydraulic capacity, water quality concerns due to pipe material.	8.5-10

Table 19: Water Network Condition Scale

6.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential long-term replacement spikes.

Figure 35 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets. For all segments, the weighted average age is less than the weighted average EUL.

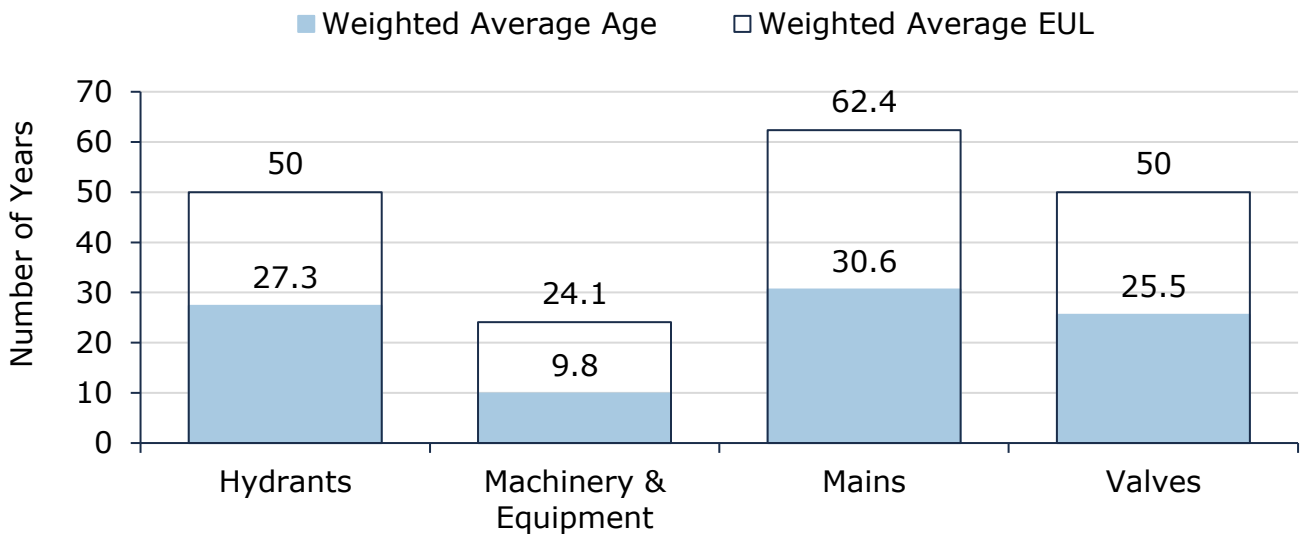


Figure 35 Estimated Useful Life vs. Asset Age: Water Network Assets

6.4 Current Approach to Lifecycle Management

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

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

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance includes inspections, flushing, valve turning, and minor repairs. Valve turning and flushing are done annually, with other

Activity Type	Description of Current Strategy
	maintenance as needed. Maintenance is triggered by leaks or inspections. Estimated annual cost: $200,000.
Rehabilitation	Rehabilitation includes replacement of aging infrastructure components, generally initiated on an annual basis based on age and deterioration. Structural repair strategies are limited; most assets considered for rehabilitation are fully replaced.
Replacement	Asset replacement is typically triggered when infrastructure reaches the end of its useful life or when it begins to experience frequent failures and high repair costs. Replacement priorities are informed by the Water Needs Study, the most recent of which was completed in draft form in 2024, with the final report pending. The study includes condition assessments, flow testing results, and material recommendations, and is used to guide both short- and long-term investment planning. Based on the available funding envelope, consultants develop a five-year capital plan that prioritizes projects accordingly.
Inspection	Watermains are assessed every five (5) years, with the last completed in 2024. Assessments are carried out by consultants in conjunction with internal staff. Standard age-based criteria are used. Supporting infrastructure like hydrants and valves are assessed annually using maintenance inspection checklists.

Table 20 Lifecycle Management Strategy: Water Network Assets

6.5 Forecasted Long-Term Replacement Needs

Figure 36 illustrates the cyclical short, medium and long-term infrastructure replacement requirements for the Town's water linear assets. This analysis was run until 2089 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Town's primary asset management system and asset register. The Town's average annual requirements (red dotted line) total $2.7 million for all assets in water network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates moderate capital needs throughout the forecast period with a replacement spike of $105.5 million between 2080 and 2084. These projections are based on asset replacement costs and assessed conditions when available. As noted in section 6.2, water main assets received condition assessments in 2024. These assessments are based on asset attributes such as pipe material and break history. The condition scores have small ranges, and almost all water mains received a score within the very good range. For this reason, the forecasted replacement date of mains is almost all within the same few years. This is the cause of the significant capital spike between 2080 and 2084. Camera inspection of pipes may reveal more variability in condition, and consequently also in the projected timing of forecasted replacements. As a next step to advancing asset information, it is recommended that the Town consider a CCTV assessment of their water mains.

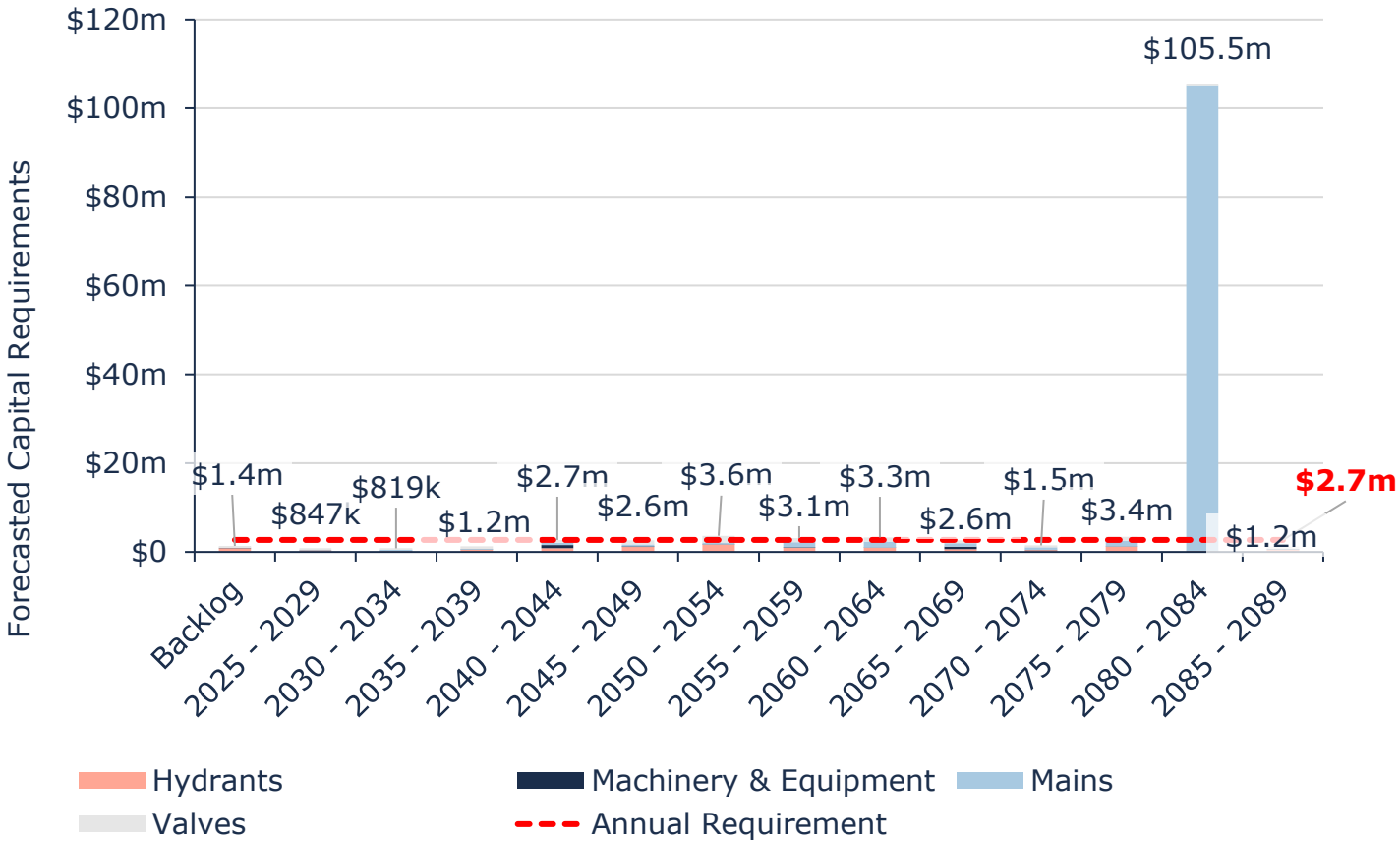


Figure 36 Forecasted Capital Replacement Needs: Water Network Assets 2025-2089

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, further investigation (i.e. condition assessments) may reveal that not all assets in fact require replacement as forecasted. Age-based conditions provide a valuable initial assessment to enable quantification of capital forecasts and support long-term financial planning, including establishing dedicated reserves. Regular condition assessments and a robust risk framework can advance the accuracy of estimates and support timely lifecycle interventions, including replacements.

A summary of the 10-year replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

6.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service type, diameter (for mains only), and replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1 (lowest) to 25 (highest). A high-risk rating is due to a high probability and/or consequence of failure increase.

These risk models have been built into the Town's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset

risk ratings and classifications. As indicated in Figure 37 below, almost all assets have a very low risk rating.

1 - 4 Very Low $147,108,845 (91%)	5 - 7 Low $7,766,310 (5%)	8 - 9 Moderate $4,330,265 (3%)	10 - 14 High $2,791,528 (2%)	15 - 25 Very High $543,975 (<1%)

Figure 37 Risk Matrix: Water Network Assets

6.6.1 Risks to Current Asset Management Strategies

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

Aging Infrastructure
A portion of the water infrastructure is identified as being between 50 to 60 years old, approaching or exceeding its expected useful life. Older systems are more prone to leakage and repair needs. These aging assets present an increasing capital pressure, particularly if replacement continues to be driven by reactive intervention.

6.7 Levels of Service

The tables that follow summarize the Town's current levels of service with respect to prescribed metrics under Ontario Regulation 588/17 as well as any additional performance measures that the Town has selected for this AMP.

6.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	The Town receives treated water from the Decew Falls Water Treatment Plant and the Niagara Falls Water Treatment Plant, both owned and operated by Niagara Region. The Town distributes this treated water through approximately 207 kilometers of Town-owned watermains. The service area is bounded by Lake Ontario, the Niagara River, the City of Niagara Falls and the City of St. Catharines.
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	Fire flow is available to properties with municipal water services. This predominantly covers properties within

Service Attribute	Qualitative Description	Current LOS (2024)
		the urban areas of the historic old town, Glendale, Queenston, St. Davids and Virgil.
Reliability	Description of boil water advisories and service interruptions	There was one water main break in 2024 that occurred on an old section of pipe near a dead-end. Only three properties were impacted, with water unavailable to them for approximately 5 hours in total.

Table 21 O. Reg. 588/17 Community Levels of Service: Water Network Assets

6.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Scope	% of properties connected to the municipal water system	78%
	% of properties where fire flow is available	77%[11]
Reliability	# of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0 (No boil water advisories in 2024)
	# of connection-days[12] per year where water is not available due to water main breaks compared to the total number of properties connected to the municipal water system	3 vs.9678
Performance	Current vs. Target Capital Reinvestment Rate	1.25% vs. 1.66%
	Average Risk	4.51

Table 22 O. Reg. 588/17 Technical Levels of Service: Water Network Assets

[11] This is an estimated figure based on a Water Needs Study in draft at the time this AMP was completed.
[12] "Connection-days" means the number of properties connected to a municipal system that are affected by a service issue, multiplied by the number of days on which those properties are affected by the service issue.

7 Wastewater Network Assets

The Town owns and operates the essential wastewater collection system that services the community. Once collected, the wastewater is transmitted to the Wastewater Treatment Plant which is owned and managed by Niagara Region.

7.1 Inventory & Valuation

Table 23 and Figure 38 summarizes the quantity and current replacement cost of the Town's various wastewater linear assets as managed in asset inventory. The largest proportion of replacement cost is associated with water mains.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Machinery & Equipment	5	Assets	$66,000	CPI
Mains	99,059	Meters	$71,107,000	Cost per Unit
Manholes	1,473	Assets	$8,838,000	User-Defined
TOTAL			**$80,011,000**	

Table 23 Detailed Asset Inventory: Wastewater Network Assets

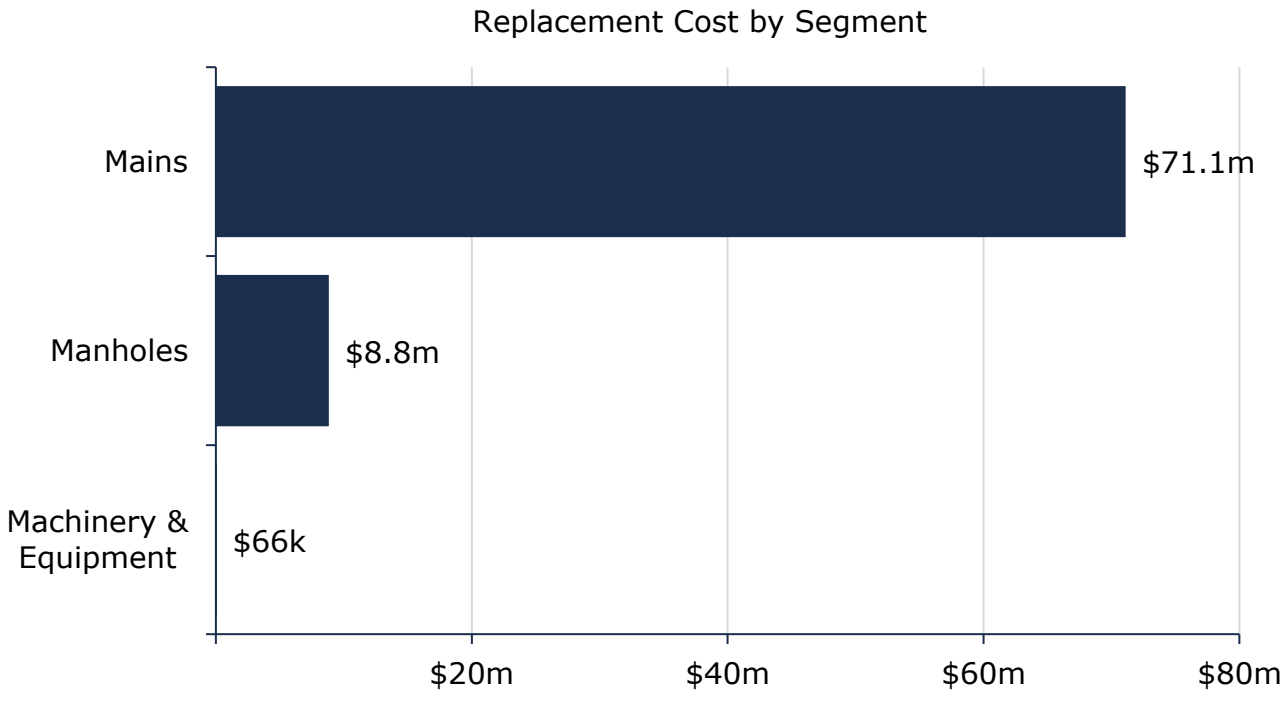


Figure 38 Portfolio Valuation: Wastewater Network Assets

7.2 Asset Condition

Figure 39 summarizes the condition (weighted by replacement cost) of the Town's wastewater linear assets. Based on mostly age and limited in-field condition assessment data, slightly more than three-quarters (77%) of assets are in fair or better condition; the remaining 23% of assets are in poor to very poor condition.

Assets in poor or worse conditions may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

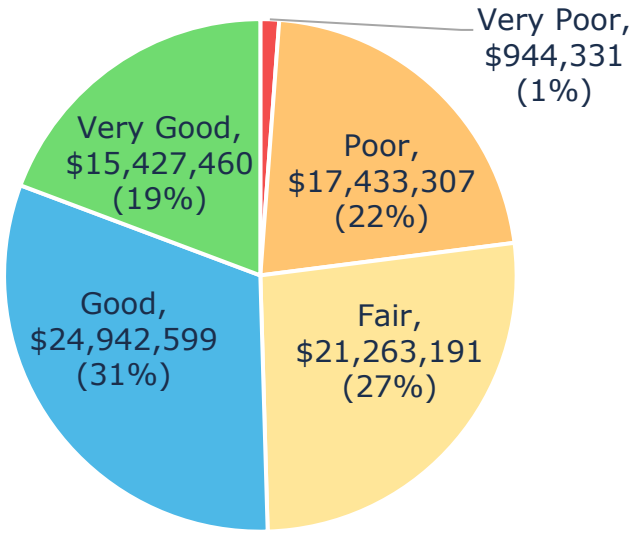


Figure 39 Asset Condition: Wastewater Network Assets Overall

As illustrated in Figure 40, the majority of the Town's sanitary sewer mains and manholes are in fair or better condition, however, all machinery and equipment are in poor or worse condition. This is due to the average age relative to the average EUL as discussed in section 7.3 to follow. Condition assessments for these assets may indicate more variability in their condition.

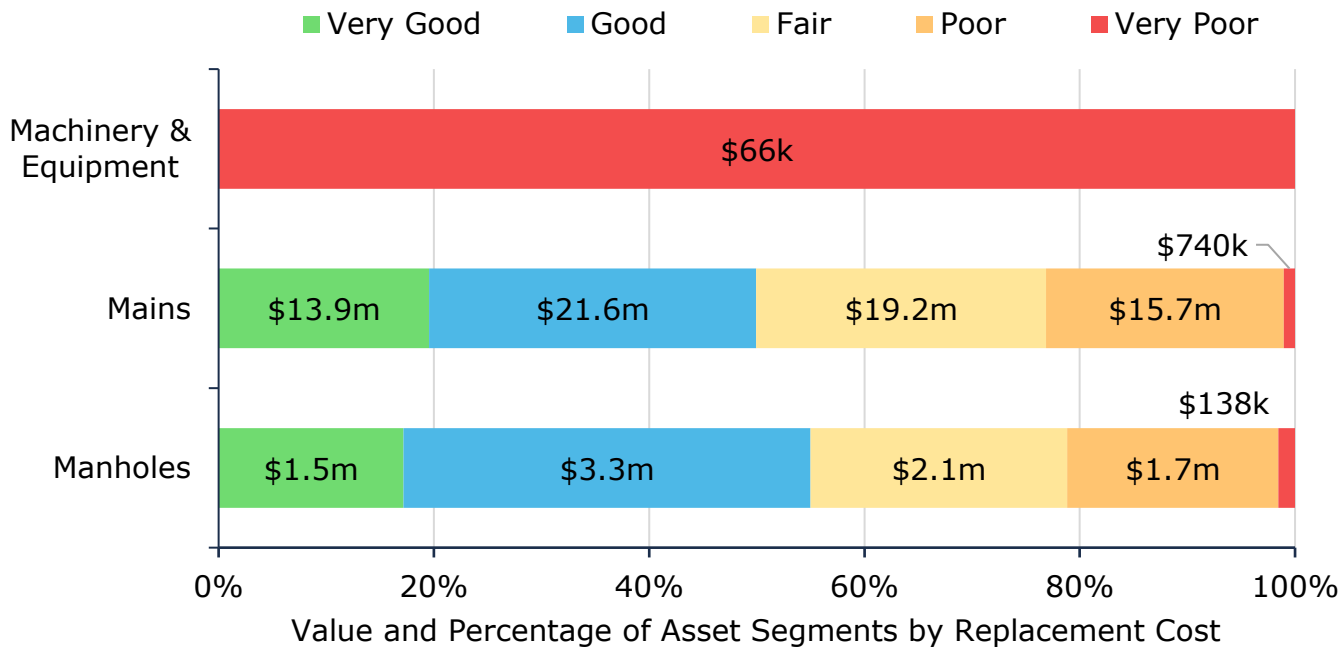


Figure 40 Asset Condition: Wastewater Network Assets by Segment

Assessed conditions are reported for a selection of wastewater main assets, based on condition assessments conducted by a third-party in 2024. These assessments applied the Pipeline Assessment Certification Program (PACP) rating methodology[13]. For wastewater main assets, condition scores are defined as follows:

Condition	Description	Criteria	Condition Range
Very Good	Fit for the future	No or only minor defect grade	<1.50
Good	Adequate for now	Minor to moderate defect grade	1.51-2.50
Fair	Requires attention	Moderate defect grade	2.51-3.49
Poor	Increasing potential of affecting service	Significant defect grade	3.5-4.49
Very Poor	Unfit for sustained service	Most significant defect grade	4.5-5

Table 24: Wastewater Network Condition Scale

[13] The overall quick rating value was used as the assessed condition and is the metric reported herein. The overall quick rating reports the worst structural and worst operations and maintenance rating which provides a single high-level indicator of the pipes overall condition. Additional details on the frequency of defects within each section of pipe is retained in the asset management database.

7.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential long-term replacement spikes.

Figure 41 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

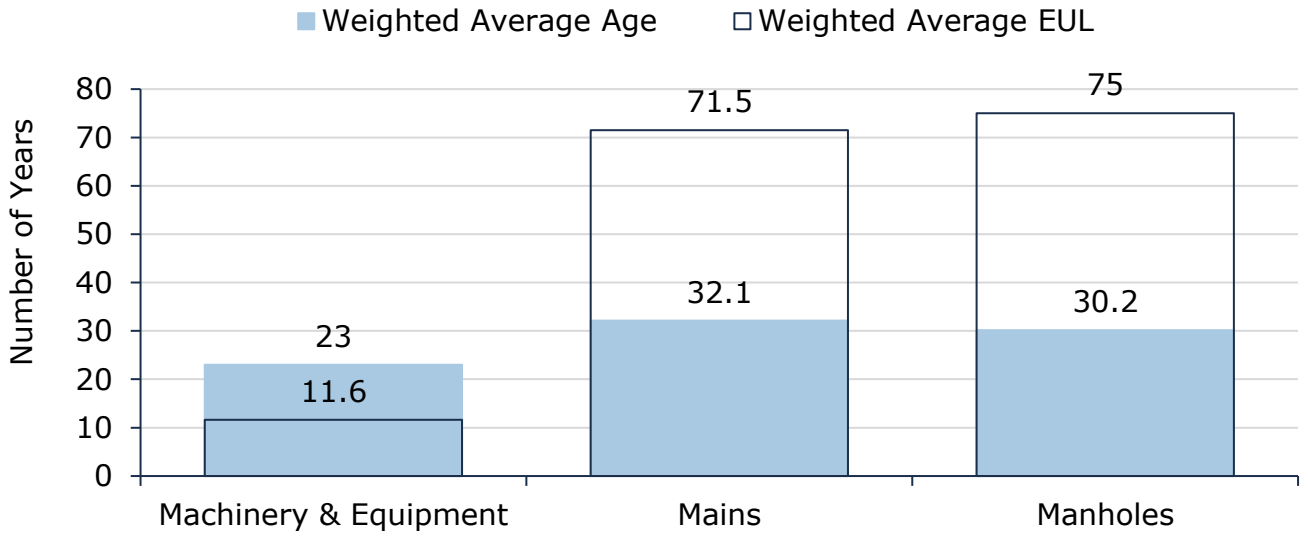


Figure 41 Estimated Useful Life vs. Asset Age: Wastewater Network Assets

7.4 Current Approach to Lifecycle Management

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

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

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance includes CCTV inspections, cleaning, minor repairs, and a flushing program in which approximately 20% of the network is flushed each year to ensure full system coverage over a five-year cycle. Maintenance activities are typically triggered by inspections, blockages,

Activity Type	Description of Current Strategy
	breaks, leaks, and service complaints. The estimated annual maintenance cost is approximately $200,000.
Rehabilitation	Rehabilitation includes trenchless relining, grouting, and structural repairs. Rehabilitation is typically initiated when defects are identified during inspections or when condition scores indicate deterioration.
Replacement	Replacement is considered when assets have significantly deteriorated or when rehabilitation is no longer cost-effective. Assets nearing the end of life or with frequent and costly repairs are prioritized. Budgeting is informed by condition assessments and critical need.
Inspection	The Town performs CCTV inspections on the sanitary system annually, with the goal of inspecting and flushing approximately 20% of the network each year to achieve full system coverage over a five-year cycle. This phased approach is outlined in the Town's Sanitary Needs Study, which is updated every five years to guide system-wide inspection planning. Inspections are conducted by a combination of internal staff and external contractors using standardized methods for mains, manholes, and pump stations. While formal condition ratings may not be consistently produced, inspections are primarily used to identify and document deficiencies in specific sections of the system. These findings support ongoing maintenance activities and inform future repair and capital planning efforts

Table 25 Lifecycle Management Strategy: Wastewater Network Assets

7.5 Forecasted Long-Term Replacement Needs

Figure 42 illustrates the forecasted capital investment requirements for the Town's wastewater linear assets. This analysis was run until 2099 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Town's primary asset management system and asset register. The Town's average annual requirements (red dotted line) total $1.1 million for all assets in the wastewater network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

Figure 42 below illustrates substantial capital needs throughout the forecast period with the largest replacement spike of $13.7 million occurring between 2040 and 2044. It also shows a small backlog of $500,000, dominated by mains. These projections are based on asset replacement costs and assessed conditions when available. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved long-term financial planning.

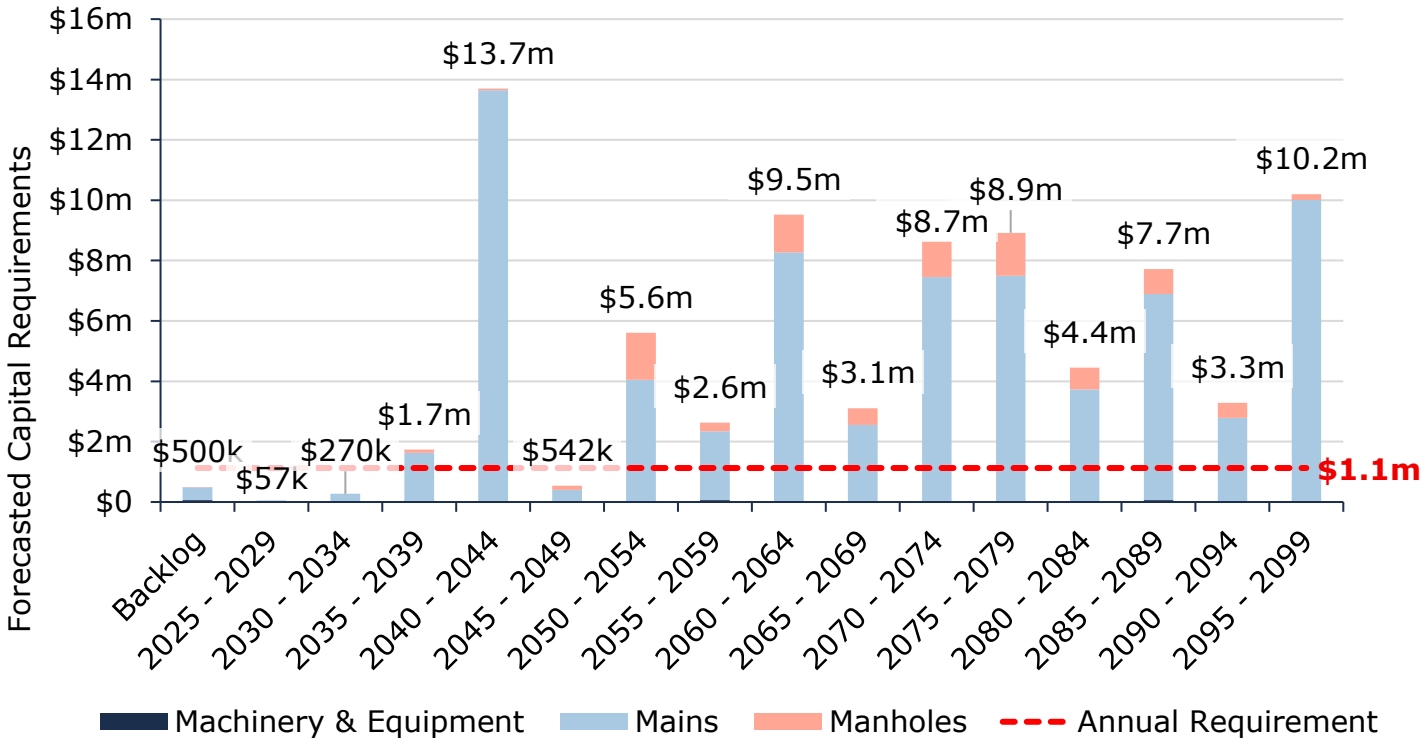


Figure 42 Forecasted Capital Replacement Needs: Wastewater Network Assets 2025-2099

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. Regular condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements. A summary of the 10-year replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

7.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service type, diameter (for mains only), and replacement costs. The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. The existing risk models are summarized in Appendix D.

As indicated below, the largest proportion (30%) of assets are very low risk, however there are a notable portion in high and very high-risk ranges (19% and 13% respectively).

1 - 4 **Very Low** $24,177,666 (30%)	5 - 7 **Low** $20,176,470 (25%)	8 - 9 **Moderate** $10,513,231 (13%)	10 - 14 **High** $14,825,899 (19%)	15 - 25 **Very High** $10,317,622 (13%)

Figure 43 Risk Matrix: Wastewater Network Assets

These risk models have been built into the Town's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

7.6.1 Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies
The current lifecycle management strategy is considered more reactive than proactive. A more clearly defined strategy would reduce the risk of increased O&M costs, deferred maintenance, and service disruption

Asset Data
While assessments are conducted on a structured five-year cycle, some actions remain reactive, and trigger points are not regularly reviewed. This limits the ability to implement fully proactive lifecycle planning

7.7 Levels of Service

The tables that follow summarize the Town's current levels of service with respect to prescribed metrics under Ontario Regulation 588/17 as well as any additional performance measures that the Town has selected for this AMP.

7.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	The Town owns and operates the essential wastewater collection systems that services the community, managing the conveyance of wastewater from residences, businesses, and institutions. Once collected, the wastewater is transmitted to the Wastewater Treatment Plant owned and operated by the Niagara Region.
Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes	There are no combined sewers in the Town of Niagara-on-the-Lake.
	Description of the frequency and volume of overflows in combined	There are no combined sewers in the Town of Niagara-on-the-Lake.

Service Attribute	Qualitative Description	Current LOS (2024)
	sewers in the municipal wastewater system that occur in habitable areas or beaches	
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Stormwater can enter sanitary sewers due to cracks in sanitary mains. In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its designed capacity. In some cases, this can cause water and/or sewage to overflow backup into homes. The use of sump pumps and pits directing storm water to the storm drain system can help to reduce the chance of this occurring.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The municipality follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups. Inflow and infiltration issues are more commonly an issue in areas with older infrastructure and rarely an issue in areas with more recently constructed infrastructure.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	N/A: The Town of Niagara-on-the-Lake does not own water treatment facilities.

Table 26 O. Reg. 588/17 Community Levels of Service: Wastewater Network Assets

7.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Scope	% of properties connected to the municipal wastewater system	65.7%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	N/A

Service Attribute	Technical Metric	Current LOS (2024)
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	12 vs. 6364
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	N/A: Niagara Region[14]
Performance	Current vs. Target Capital Reinvestment Rate	1.19% vs.: 1.41%
	Average Risk	8.16

Table 27 O. Reg. 588/17 Technical Levels of Service: Wastewater Network Assets

[14] Wastewater treatment assets are owned and managed by the Region of Niagara. The 2024 Annual Wastewater Annual report can be found here.

8 Stormwater Network

The Town's stormwater network is comprised of nearly 100 km of mains and other critical supporting capital assets with a total current replacement cost of approximately $107.6 million.

8.1 Inventory & Valuation

Table 28 and Figure 44 summarizes the quantity and current replacement cost of all stormwater network assets available in the Town's asset register. As indicated below, the largest share of replacement costs is associated with stormwater mains.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Catch Basins	2,500	Assets	$13,931,000	User-Defined
Mains	99,495	Meters	$82,090,000	Cost per Unit
Manholes	1,931	Assets	$11,586,000	User-Defined
Stormwater Management Ponds (SWMP)	20	Assets	Not Planned for Replacement	
TOTAL			**$107,607,000**	

Table 28 Detailed Asset Inventory: Stormwater Network

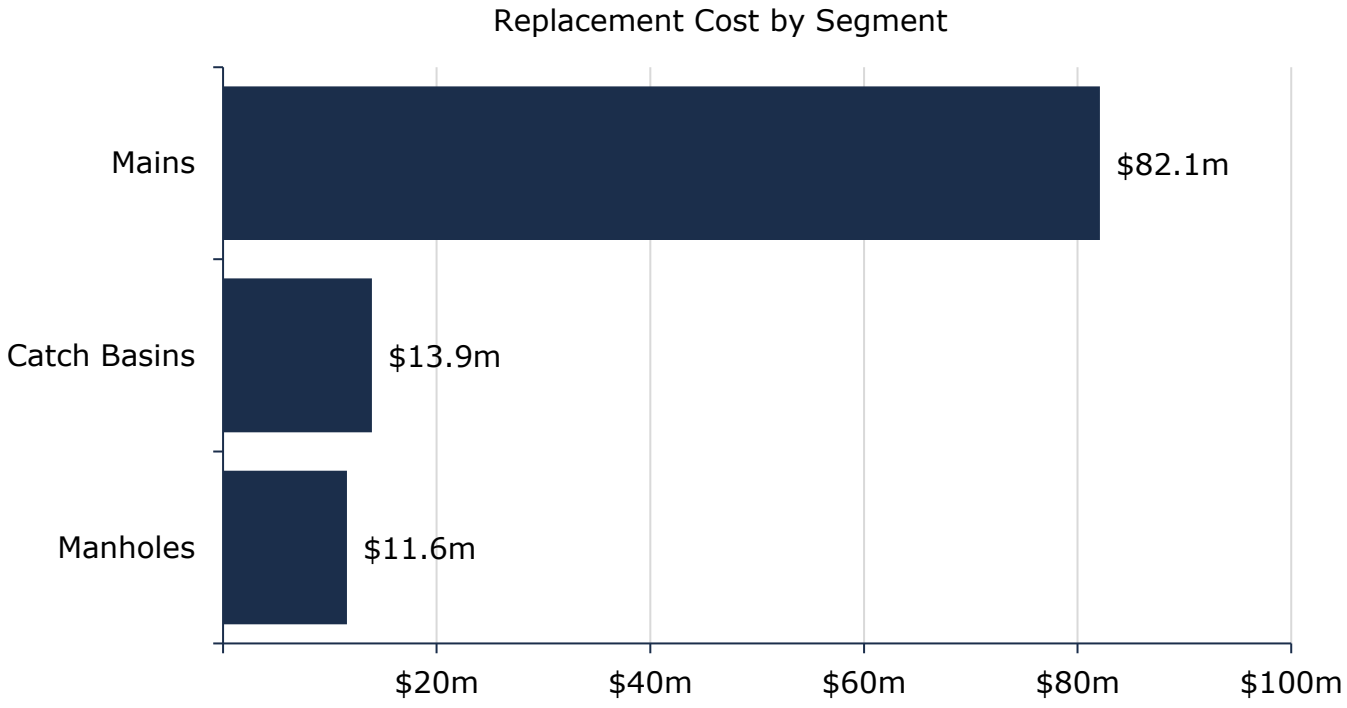


Figure 44 Portfolio Valuation: Stormwater Network

8.2 Asset Condition

Figure 45 summarizes the replacement cost-weighted condition of the Town's stormwater network assets. Based on age data and in-field condition assessments, approximately 77% of assets are in fair or better condition and 23% of assets are in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. The graph below does not reflect the condition of stormwater management ponds as these assets are not planned for replacement and therefore have no cost associated. However, staff complete regular inspections and assessments of stormwater management ponds, and the most recent assessments indicated the assets to be in good condition on average.

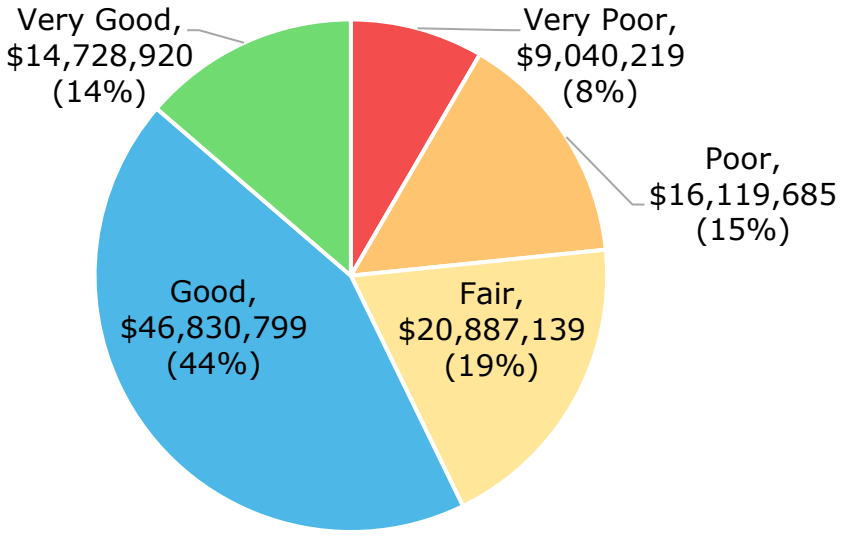


Figure 45 Asset Condition: Stormwater Network Overall

As illustrated in Figure 46, based on in-field condition assessments for 15% of storm mains and age-based condition for the remaining stormwater network assets, catch basins have the largest proportion of assets in poor or very poor condition. On a replacement costs basis, mains have the most cost ($19.0 million) associated with very poor and poor condition assets. As additional mains are assessed for condition, this figure may change.

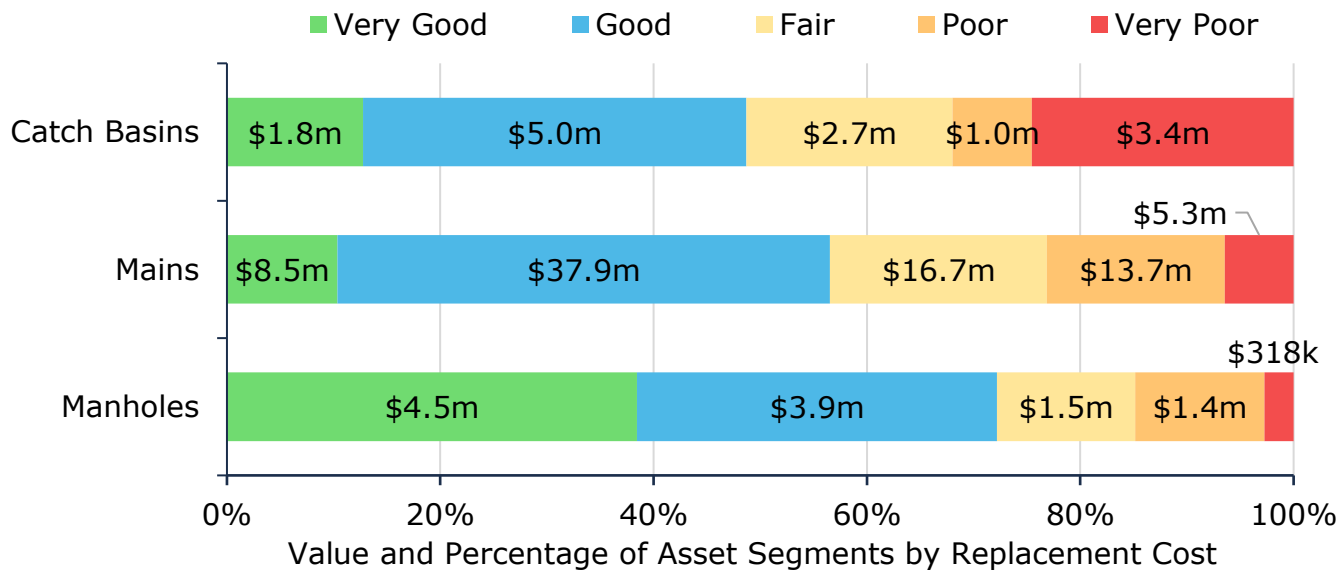


Figure 46 Asset Condition: Stormwater Network by Segment

Assessed conditions are reported for stormwater main assets, based on condition assessments conducted by a third-party in 2024. These assessments apply the Pipeline Assessment Certification Program (PACP) rating methodology[15]. For stormwater main assets, condition scores are as follows:

Condition	Description	Criteria	Condition Range
Very Good	Fit for the future	No or only minor defect grade	<1.50
Good	Adequate for now	Minor to moderate defect grade	1.51-2.50
Fair	Requires attention	Moderate defect grade	2.51-3.49
Poor	Increasing potential of affecting service	Significant defect grade	3.5-4.49
Very Poor	Unfit for sustained service	Most significant defect grade	4.5-5

Table 29: Stormwater Network Mains Condition Scale

[15] The overall quick rating value was used as the assessed condition and is the metric reported herein. The overall quick rating reports the worst structural and worst operations and maintenance rating which provides a single high-level indicator of the pipes overall condition. Additional details on the frequency of defects within each section of pipe is retained in the asset management database.

8.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 47 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

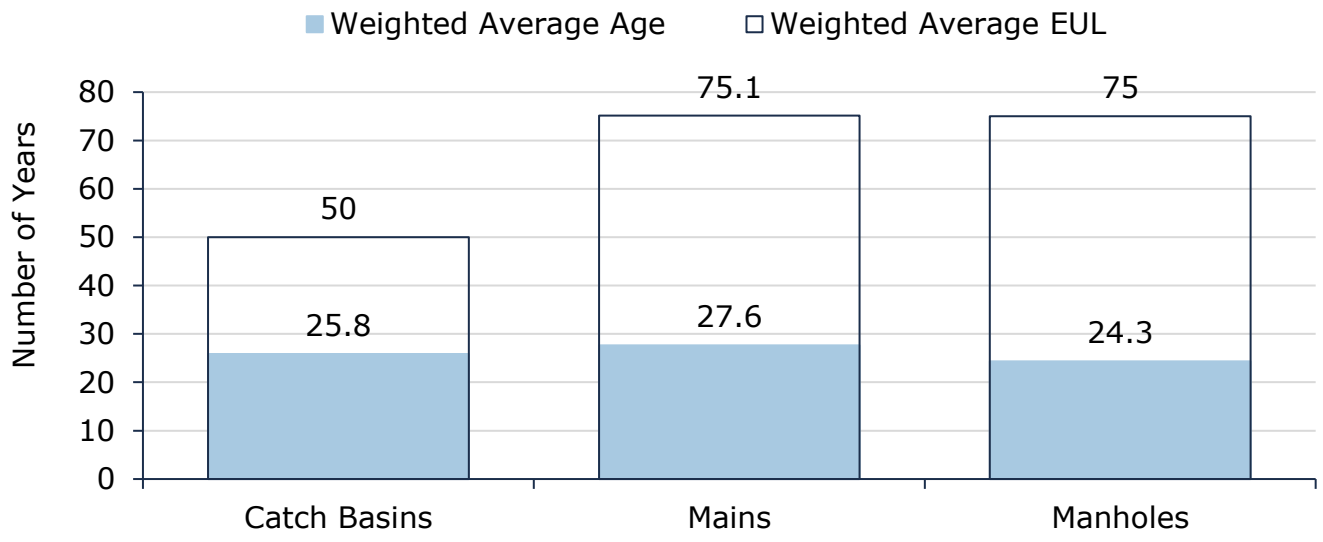


Figure 47 Estimated Useful Life vs. Asset Age: Stormwater Network

Age analysis reveals that on average, all the assets are in the mid stages of their lifespan.

8.4 Current Approach to Lifecycle Management

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

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

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance includes annually cleaning 20% of catch basin and flushing of storm mains, performed annually or as needed. Blockages and

Activity Type	Description of Current Strategy
	complaints also trigger service. SWMP maintenance also includes vegetation control, erosion control, and general site work such as replacing lights or repairing fencing. The annual maintenance cost is estimated at $100,000.
Rehabilitation	Rehabilitation activities for mains include trenchless relining and spot repairs, triggered by condition scores and asset deterioration.
	For Stormwater Management Ponds (SWMPs), rehabilitation typically occurs on a 15-year cycle and may include repairing or replacing inlets and outlet structures and dredging to remove accumulated sediment. These are undertaken on an as-needed basis when inspections identify issues.
Replacement	Replacement is considered when assets reach the end of life or fail, and rehabilitation is no longer viable. Assets with high failure risk or nearing the end of their service life are prioritized.
	SWMPs, however, are rarely fully replaced due to their size, function, and the substantial cost. Replacement only occurs if a pond's capacity is insufficient to manage increased volumes from new development or when significant functionality issues such as persistent aeration problems, cannot be resolved through rehabilitation.
Inspection	The Town initiated its stormwater inspection program two years ago in response to emerging provincial requirements for system-wide assessment. The program aims to inspect the entire storm system within a 3-to-5-year period, targeting approximately 20% of assets annually. Condition assessments are carried out by both internal staff and external contractors using standardized methods. Manholes and pump stations are visually inspected by staff on an as-needed basis.

Table 30 Lifecycle Management Strategy: Stormwater Network

8.5 Forecasted Long-Term Replacement Needs

Figure 48 illustrates the forecasted capital investment requirements for the Town's stormwater network assets. This analysis was run until 2124 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Town's primary asset management system and asset register. The Town's average annual requirements (red dotted line) total $1.5 million for all assets in the stormwater network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates a backlog of $5.3 million, dominated by mains and catch basins. The largest replacement spikes are forecasted during 2075 to 2089 as most mains reach the end of their expected design life. These projections and estimates are based on asset replacement costs and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

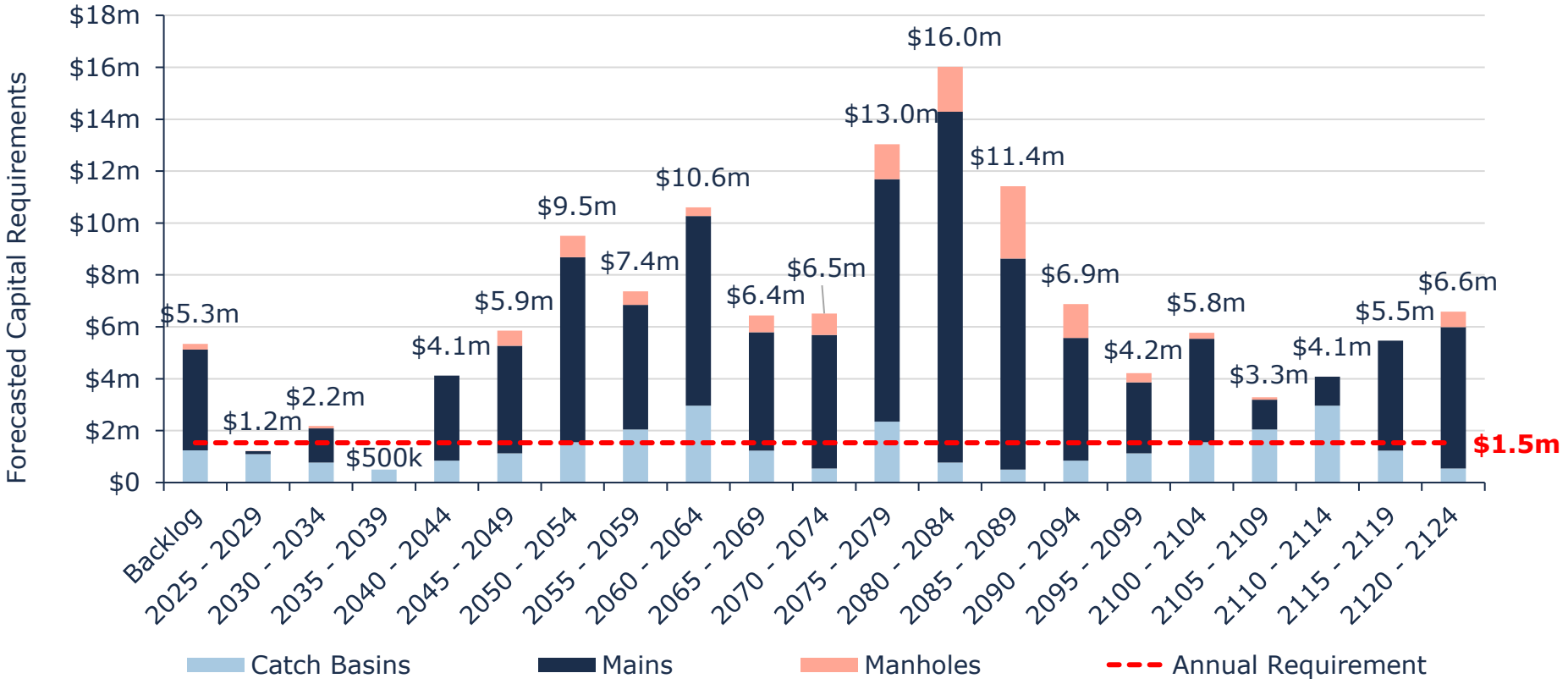


Figure 48 Forecasted Capital Replacement Needs Stormwater Network 2025-2124[16]

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, assessed condition information may reveal differences in conditions as reported herein, this would result in shifts to capital forecasts. Nonetheless, the use of age-based projections is an impactful first step to forecasting investment requirements and supporting long-term financial planning. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A summary of the 10-year replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

[16] Due to capacity issues, a rehabilitation project is required for one of the stormwater management ponds. The estimated projected costs and anticipated timing is reflected in this graph. Based on current information, no other capital costs are anticipated for stormwater management ponds.

8.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service type, diameter (for mains only), and replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Town may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Town's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications. As indicated below, most (42%) stormwater assets are identified as very-low risk, however there are a portion of assets that are very high risk, and these should be reviewed and considered in the near-term.

1 - 4 **Very Low** $45,651,265 (42%)	5 - 7 **Low** $25,530,265 (24%)	8 - 9 **Moderate** $12,012,563 (11%)	10 - 14 **High** $17,813,150 (17%)	15 - 25 **Very High** $6,599,520 (6%)

Figure 49 Risk Matrix: Stormwater Network

8.6.1 Risks to Current Asset Management Strategies

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

Asset Data Confidence
The stormwater asset management program is still in the early stages of implementation. Although condition assessments have begun with approximately 15 km of storm mains being assessed in 2024, condition and inventory data for some infrastructure, especially supporting elements like manholes and ditches, are not yet comprehensive. Staff have indicated that confidence in data remains limited, and further work is needed to improve asset tracking and prioritization.

8.7 Levels of Service

The tables that follow summarize the Town's current levels of service with respect to prescribed metrics under Ontario Regulation 588/17 as well as any additional performance measures that the Town has selected for this AMP.

8.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Scope	Description, which may include map, of the user groups or areas of the Town that are protected from flooding, including the extent of protection provided by the municipal storm water network	The Town's stormwater management system protects key user groups and areas within the municipality from flooding by effectively capturing, conveying, and controlling stormwater runoff. This system includes a network of storm mains, catch basins, manholes, and stormwater management ponds.

Table 31 O. Reg. 588/17 Community Levels of Service: Stormwater Network

8.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Scope	% of properties in municipality designed to be resilient to a 100-year storm	~90%[17]
	% of the municipal stormwater management system designed to be resilient to a 5-year storm	~90%
Performance	Current vs. Target Capital Reinvestment Rate	0.26% Vs. 1.42%
	Average Risk	6.88

Table 32 O. Reg. 588/17 Technical Levels of Service: Stormwater Network

[17] As per the Town's Municipal Engineering Standards report, all storm systems must be designed to a 5-year storm and all major systems to a 100-year storm system. Based on this standard, the Town estimates that most of its network is resilient to a 5-year storm and most of its major systems are resilient to a 100-year storm. Considering this, most properties are inferred to be resilient. There may be however legacy assets constructed before the standard was developed that do not meet the updated standard. It is anticipated that the proportion of the network not meeting the standards will diminish over time as non-conforming assets age and are replaced.

Non-Core Assets

9 Facilities

The Town owns and operates several facilities that support daily operations and provide municipal services to the community. The facility asset segments can be described as follows:

- Administration: Admin facility
- Fire: Fire stations
- Operations: Operations center and operations yard
- Recreation: Washrooms, arenas, community center, courthouse, info center, library, cemetery, pool, hospital, art center, gazebo, pavilion, and splashpad.

9.1 Inventory & Valuation

Table 33 and Figure 50 summarizes the quantity and current replacement cost of all facility assets available in the Town's asset register. The quantity listed represents the number of asset records currently available for each segment.

Segment	Quantity (components)	Unit of Measure	Replacement Cost	Primary RC Method
Administration	1 (34)	Facilities (components)	$6,332,000	CPI
Fire	5 (154)		$16,965,000	CPI
Operations	2 (95)		$6,238,000	CPI
Recreation	24 (564)		$82,340,000	CPI
TOTAL			**$111,875,000**	

Table 33 Detailed Asset Inventory: Facilities

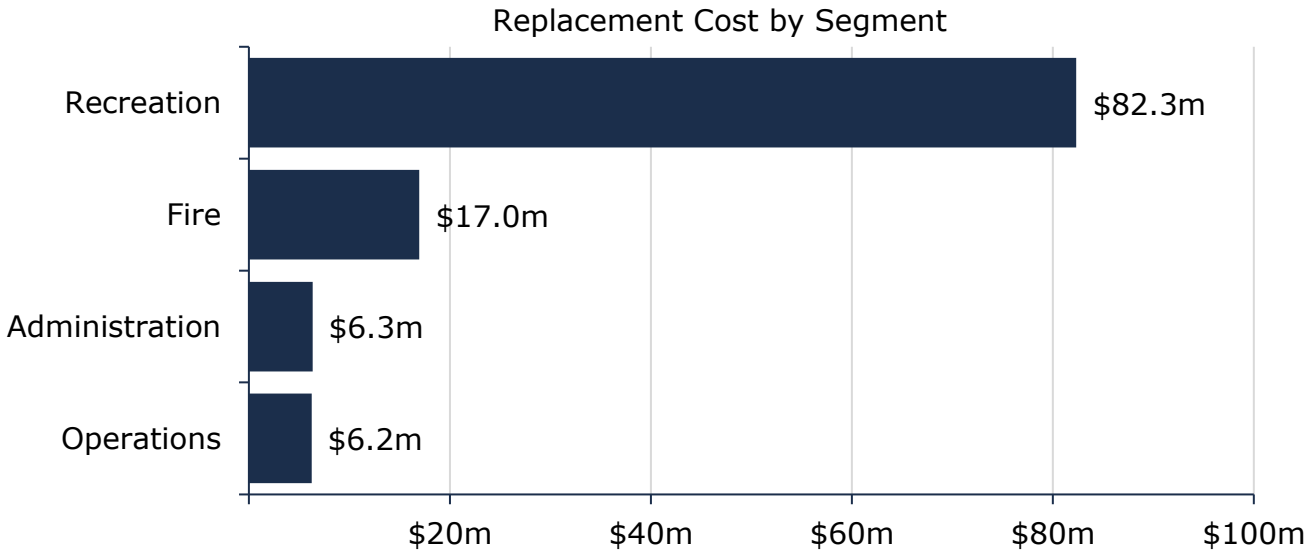


Figure 50 Portfolio Valuation: Facilities

9.2 Asset Condition

Figure 51 summarizes the replacement cost-weighted condition of the Town's facilities portfolio. Based mostly on in-field assessed condition data, 43% of facilities assets are in fair or better condition; however, 57%, with a current replacement cost of more than $63.6 million are in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. The facilities are componentized according to Uniformat II standards[18], and condition data is available at the component level based on comprehensive assessments, allowing for detailed evaluation.

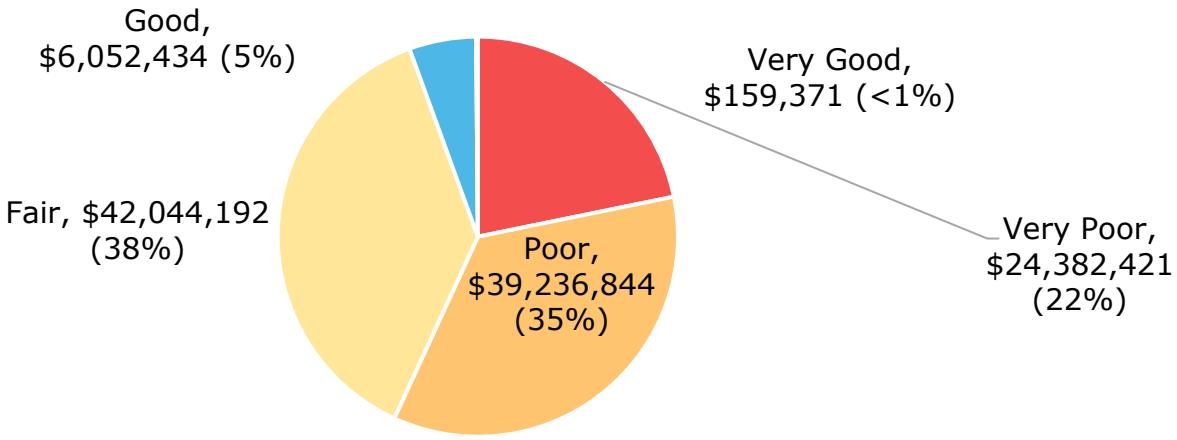


Figure 51 Asset Condition: Facilities Overall

Figure 52 summarizes the assessed condition of facilities by each segment. A substantial portion of recreation assets and about half of operations assets are in poor to worse condition.

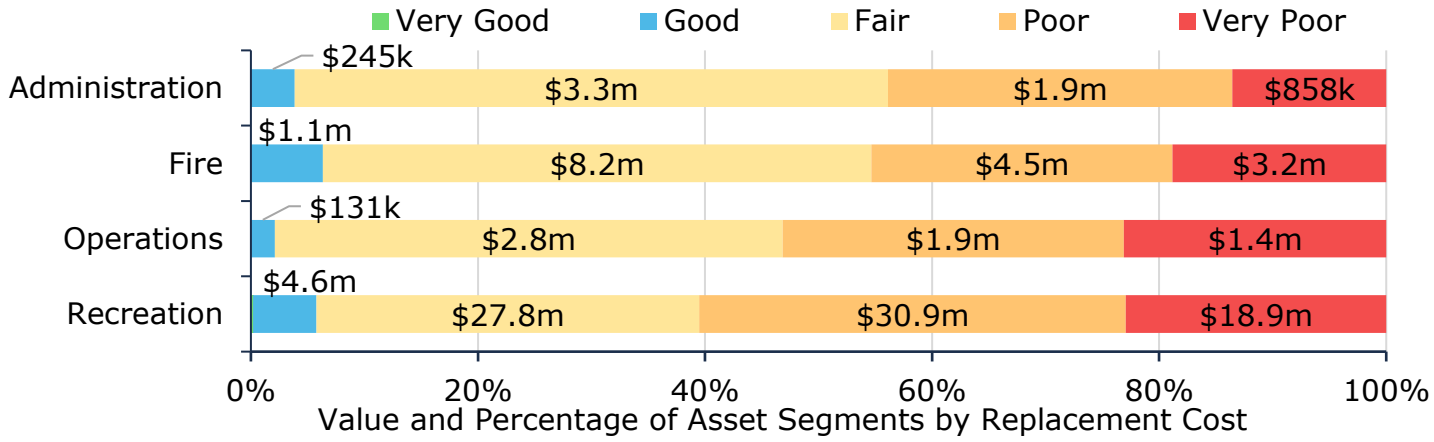


Figure 52 Asset Condition: Facilities by Segment

[18] This classification system is based on major building groups and nested within that based on component groups and then specific components. An example, Level 1 is A: Substructure, level 2 is: A10 Foundations and level 3 is A1030: Slab on Grade. This data structure allows EUL, condition, and replacement cost values to be customized to the component level which ultimately leads to more detailed and accurate information, including condition and cost projections.

9.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 53 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

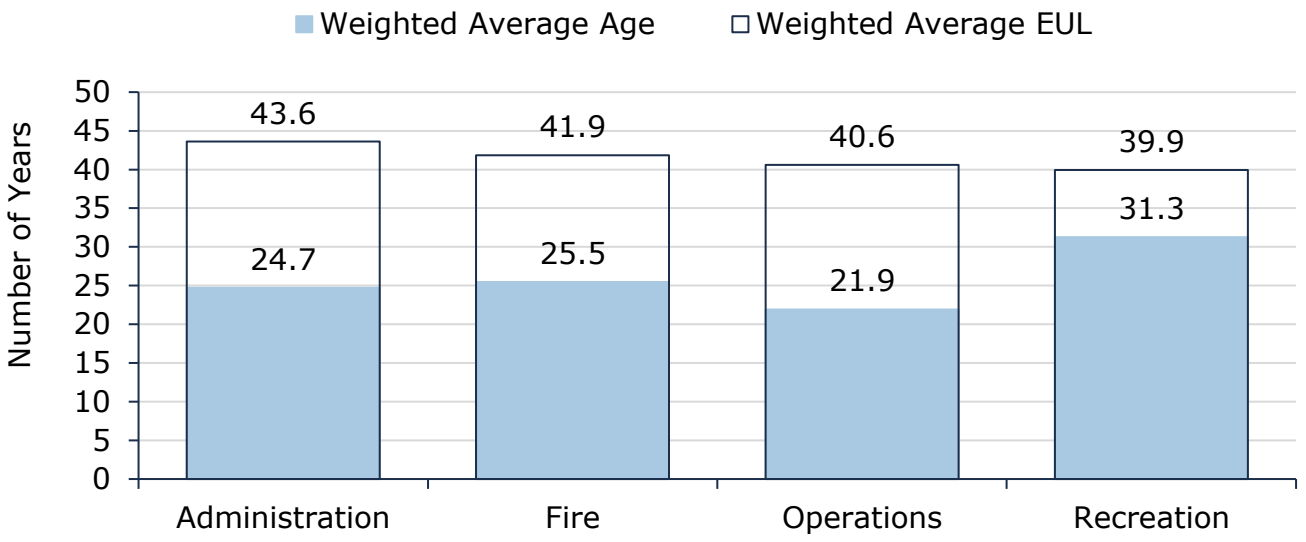


Figure 53 Estimated Useful Life vs. Asset Age: Facilities

Age analysis reveals that, on average, facility assets are in the mid to late stages of their serviceable life.

9.4 Current Approach to Lifecycle Management

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.

Table 34 outlines the Town's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance includes HVAC, roofing, mechanical, generator, and life safety system service contracts. Internal staff complete plumbing, drywall, and minor electrical work. Maintenance is triggered by legislation, visual inspections, service requests, and health and safety checks. Estimated annual cost is approximately $400,000.
Rehabilitation	Rehabilitation activities include roof replacements, HVAC upgrades, brick repointing, foundation drainage, arena mechanical systems, dasher board replacements, and window retrofits. These are triggered by BCA/FMP recommendations, consultant input, stakeholder feedback, and major weather events.
Replacement	Replacement is considered when rehabilitation is no longer cost-effective or when critical issues such as safety, accessibility, or heritage designation are involved. Condition, cost comparisons, revenue impact, and end-of-life status inform prioritization. There is no formal contingency budget; Council approval is required for material unexpected needs.
Inspections	All facilities were assessed through a Facility Condition Assessment (BCA) in 2017, which informed the 2018 Facilities Master Plan. Inspections are conducted by external contractors, with internal facility teams performing frequent walkthroughs. A Facility Condition Index (FCI) is used. The target reassessment cycle is every 5 years but historically occurs every 6–7 years due to budget constraints.

Table 34 Lifecycle Management Strategy: Facilities

9.5 Forecasted Long-Term Replacement Needs

Figure 54 illustrates the forecasted capital requirements for the Town's facilities portfolio. This analysis was run until 2089 to capture at least one iteration of replacement for the longest-lived asset in inventory. The Town's average annual requirements (red dotted line) total $3.7 million for all facilities. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates substantial capital needs throughout the forecast period with the largest replacement spike of $42.3 million occurring between 2065 and 2069. The chart also illustrates a backlog of more than $4.9 million, dominated by recreation facilities, and comprising assets

that have reached the end of their useful life but remain in operation. These projections and estimates are based on current asset records, their replacement costs, and assessed conditions. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

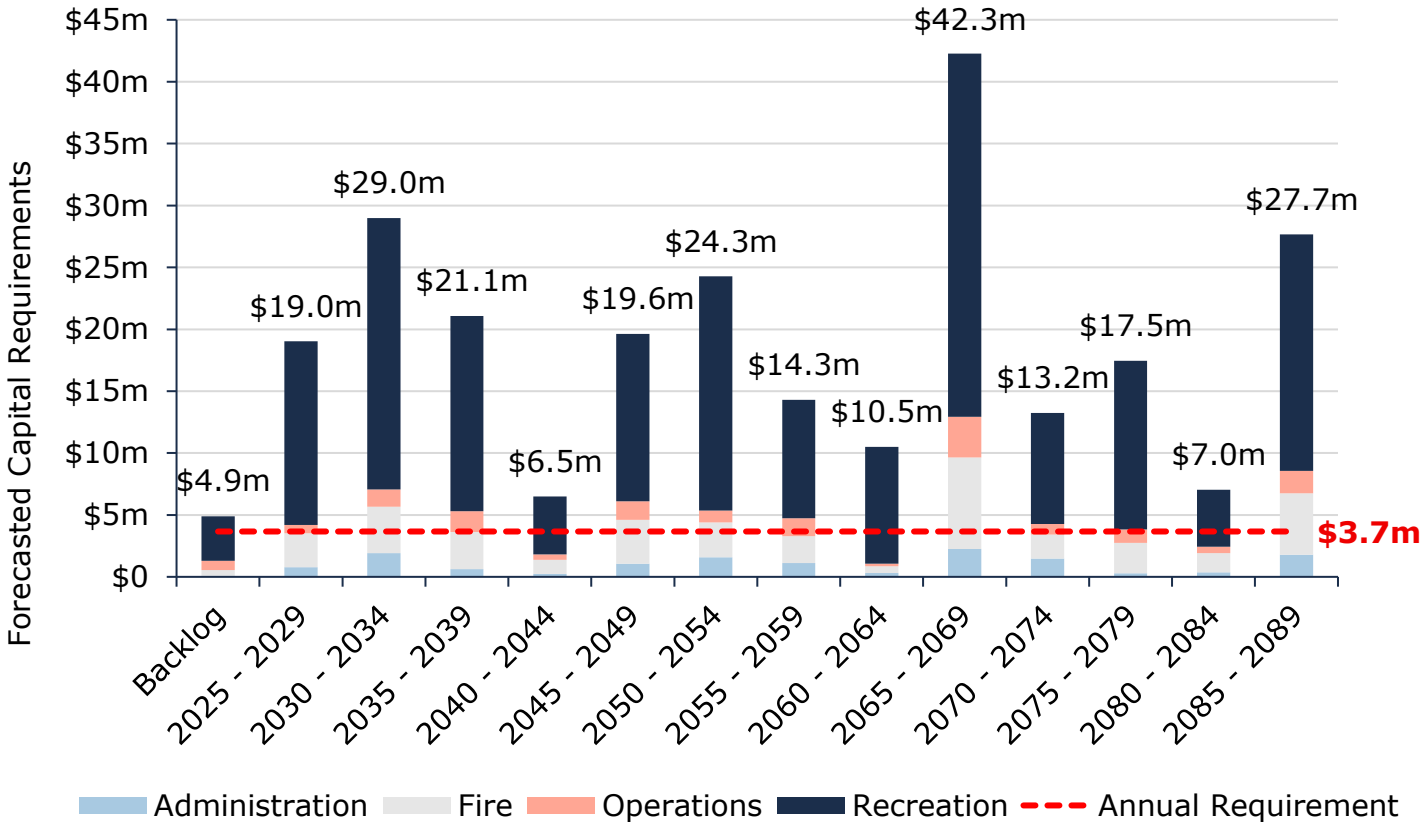


Figure 54 Forecasted Capital Replacement Needs Facilities 2025-2089

A summary of the 10-year replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

9.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, replacement costs, and component group.

The matrix classifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. Figure 55 below indicates the risk scores for facility assets with the largest proportion of facility assets sitting at a high and very high-risk rating.

These risk models have been built into the Town's Asset Management Database and are outlined in Appendix D.

1 - 4 **Very Low** $2,855,869 (3%)	5 - 7 **Low** $12,333,049 (11%)	8 - 9 **Moderate** $20,774,472 (19%)	10 - 14 **High** $50,899,649 (45%)	15 - 25 **Very High** $25,012,223 (22%)

Figure 55 Risk Matrix: Facilities

9.6.1 Risks to Current Asset Management Strategies

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

Aging Infrastructure
Several municipal facilities are approaching or have reached the end of their useful life. While major facility systems such as HVAC, roofing, and arena equipment are regularly maintained, aging structures and legacy facility envelopes continue to pose capital planning challenges. Replacement needs are prioritized using assessment data; however, delays in implementation due to funding constraints may increase lifecycle costs, particularly where facility performance, accessibility, or life safety is affected.

Organizational Capacity

While staff are familiar with assets and their condition, limited time and resources have made it difficult to maintain accurate, up-to-date data. This affects the ability to plan replacements proactively and reduces confidence in lifecycle forecasting.

9.7 Levels of Service

The tables that follow summarize the Town's current levels of service. There are no specifically prescribed metrics under Ontario Regulation 588/17 for non-core assets, therefore the metrics below represent performance measures that the Town has selected for this AMP.

9.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Quality	Description of the types of facilities that the municipality operates and maintains	The Town owns and operates several facilities that support daily municipal operations and provide a variety of services to the community which include the following: Administration is supported through the main administration facility. Fire services are provided via multiple fire stations throughout the Town. Operations are centered around the operations center and the operations yard. Recreation services are offered through numerous facilities including washrooms, arenas, the community center, courthouse, information center, library, cemetery, pool, art center, gazebo, pavilion, and splashpad.
Sustainability	Summary of key considerations for capital investment decisions.	The Town completed comprehensive facility Condition Assessments in 2017, and this information is an important consideration to capital investment decisions. Other notable considerations include stakeholder feedback, major unexpected events (e.g. weather events), criticality of need considering asset conditions, cost comparisons of approaches (i.e. replacement vs. rehabilitation), and revenue impacts as applicable.

Table 35 Community Levels of Service: Facilities

9.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Quality	Average facility condition index value for facilities in the Town	37%
	Average Risk	11.98
Sustainability	Current vs. Target Capital Reinvestment Rate	0.66% vs. 3.28%

Table 36 Technical Levels of Service: Facilities

10 Land Improvements

The Town's land improvements portfolio includes a variety of assets, many of which support recreation and leisure activities. Examples of common assets within each asset segment are:

- Lighting: Outdoor lighting most often adjacent to paved paths
- Outdoor Structures: bandshells, park washrooms, pergolas, benches, bike racks, sculptural structures
- Parking Lots: only includes parking lots not otherwise associated with facilities
- Paved Paths: all park pathways, pedestrian pathway, interlocking brick/pavers
- Play Structure: playing structures, toddler play pads, rock climbing wall and swing sets
- Sports Fields & Courts: fencing associated with playing fields, sports fields and courts, and artificial bowling green
- Sprinklers: irrigation systems

10.1 Inventory & Valuation

Table 37 and Figure 56 summarizes the quantity and current replacement cost of all land improvements assets available in the Town's asset register.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Lighting	130	Assets	$1,298,470	CPI
Outdoor Structures	23		$1,203,100	CPI
Parking Lots	31		$1,065,589	CPI
Paved Paths	32		$1,310,710	CPI
Play Structures	38		$2,231,752	CPI
Sport Fields & Courts	54		$2,243,369	CPI
Sprinklers	10		$275,839	CPI
TOTAL			**$9,628,829**	

Table 37 Detailed Asset Inventory: Land Improvements

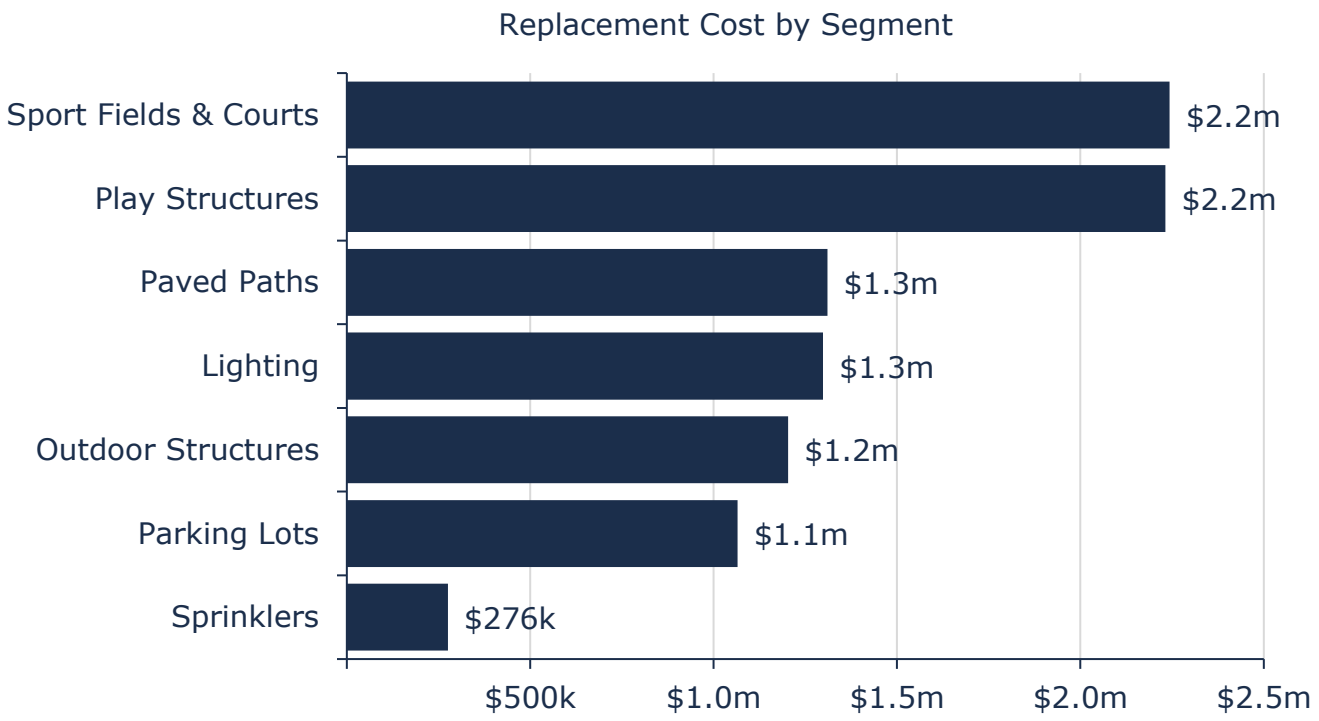


Figure 56 Portfolio Valuation: Land Improvements

10.2 Asset Condition

Figure 57 summarizes the replacement cost-weighted condition of the Town's land improvements portfolio. Land improvement assets utilize age-based condition which is calculated based on the age of the asset relative to its useful life.

Based on age data only, 65% of assets are in fair or better condition, the remaining 35% are in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

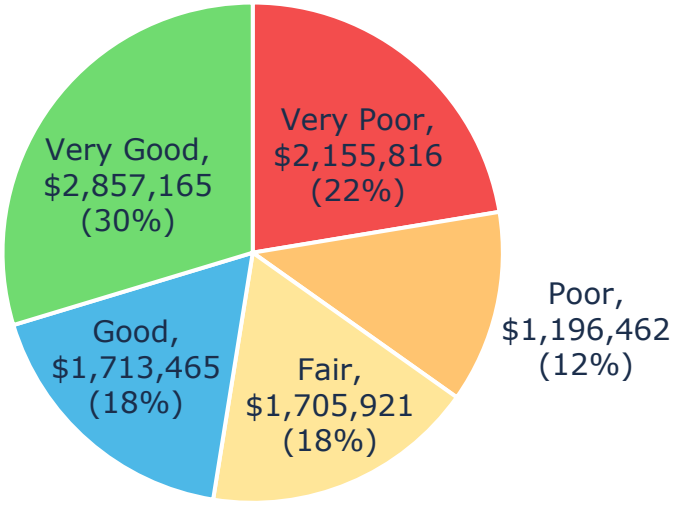


Figure 57 Asset Condition: Land Improvements Overall

Figure 58 summarizes the age-based condition of land improvements by each service type. Assets in poor or worse condition are concentrated primarily in parking lots and play structures.

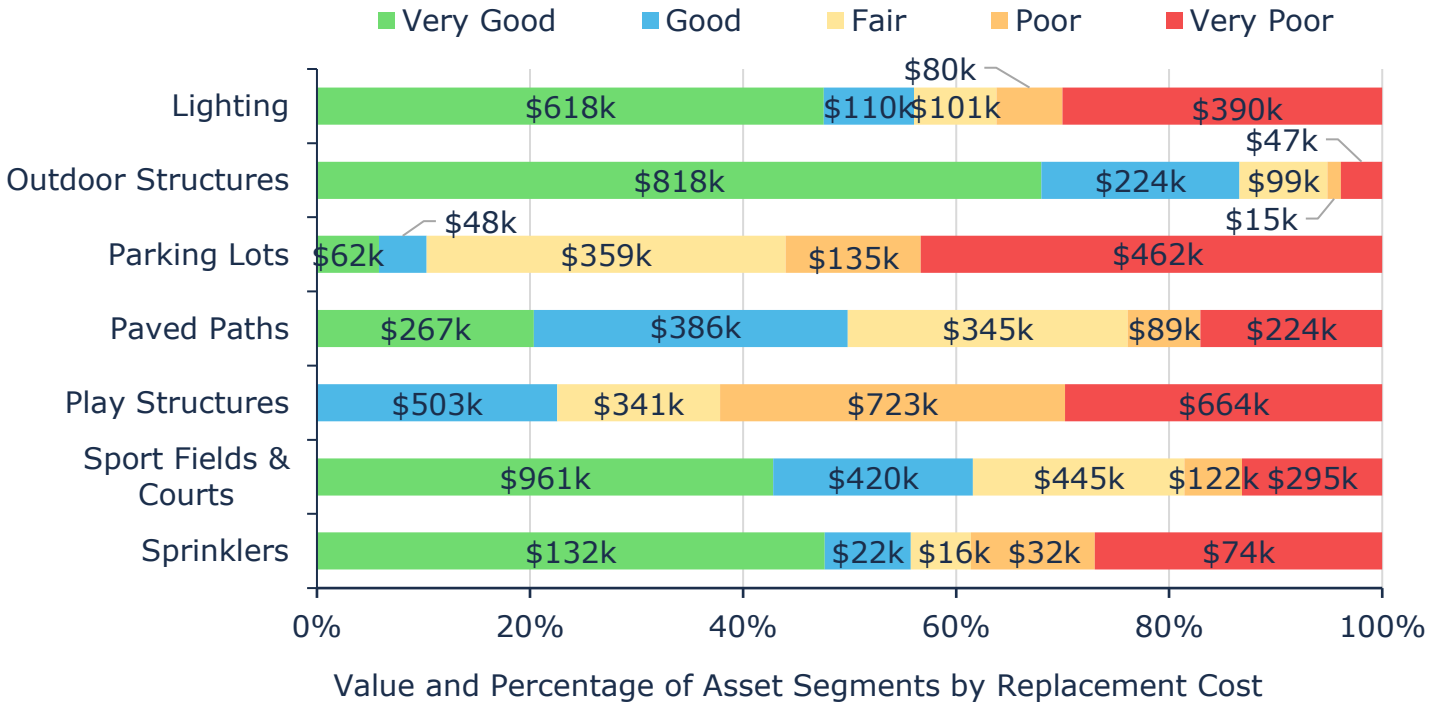


Figure 58 Asset Condition: Land Improvements by Segment

10.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As

assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 59 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets. Age analysis reveals that, on average, most assets are in their early to late stages of their expected life.

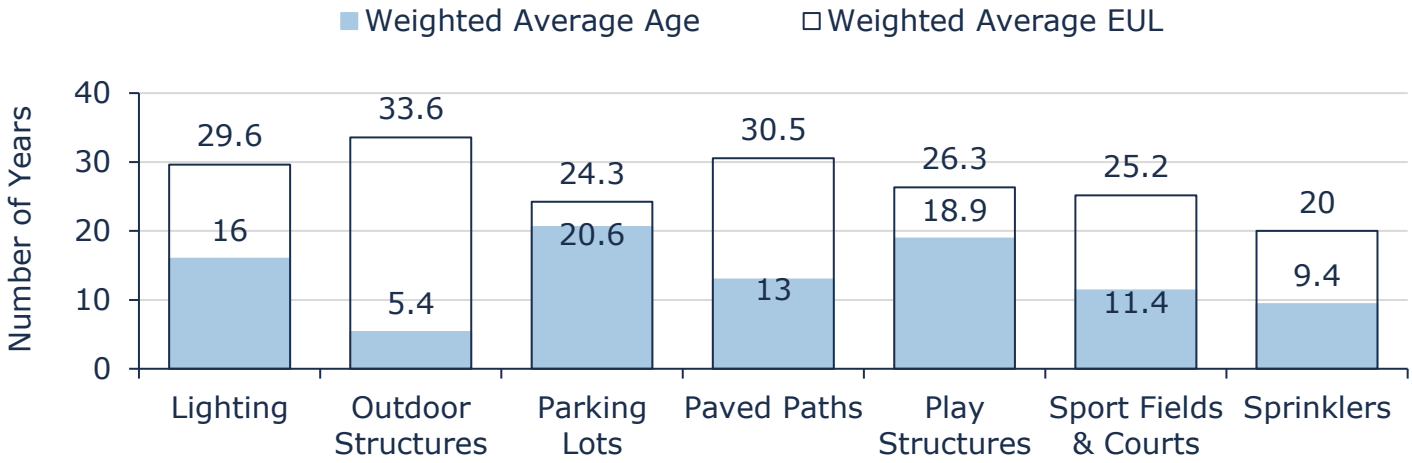


Figure 59 Estimated Useful Life vs. Asset Age: Land Improvements

10.4 Current Approach to Lifecycle Management

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.

Table 38 outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance includes inspections, cleaning, minor repairs, and vegetation management. Activities are carried out by parks staff and are triggered by safety or structural issues identified during inspections. Efforts are made to extend asset life despite limited resources.
Rehabilitation / Replacement	There is no formal rehabilitation program. Work on aging assets is done on an as-needed basis. Replacement is considered when assets are in poor condition or when maintenance is no longer cost-effective. Capital budget

	inclusion is based on asset age and maintenance cost trends; safety related investments are prioritized.
Inspections	Full inspections are conducted on parks and assets within on a weekly basis. Inspections are conducted by internal staff using a three-point condition scale (Good / Fair / Poor). No formal inspection policy exists, and inspections do not increase during the off-season due to resource limitations.

Table 38 Lifecycle Management Strategy: Land Improvements

10.5 Forecasted Long-Term Replacement Needs

Figure 60 illustrates the forecasted capital requirements for the Town's land improvements portfolio. This analysis was run until 2084 to capture at least one iteration of replacement for the longest-lived asset in inventory. The Town's average annual requirements (red dotted line) total $397,000 for all land improvements. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates substantial capital needs throughout the forecast period. These projections are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

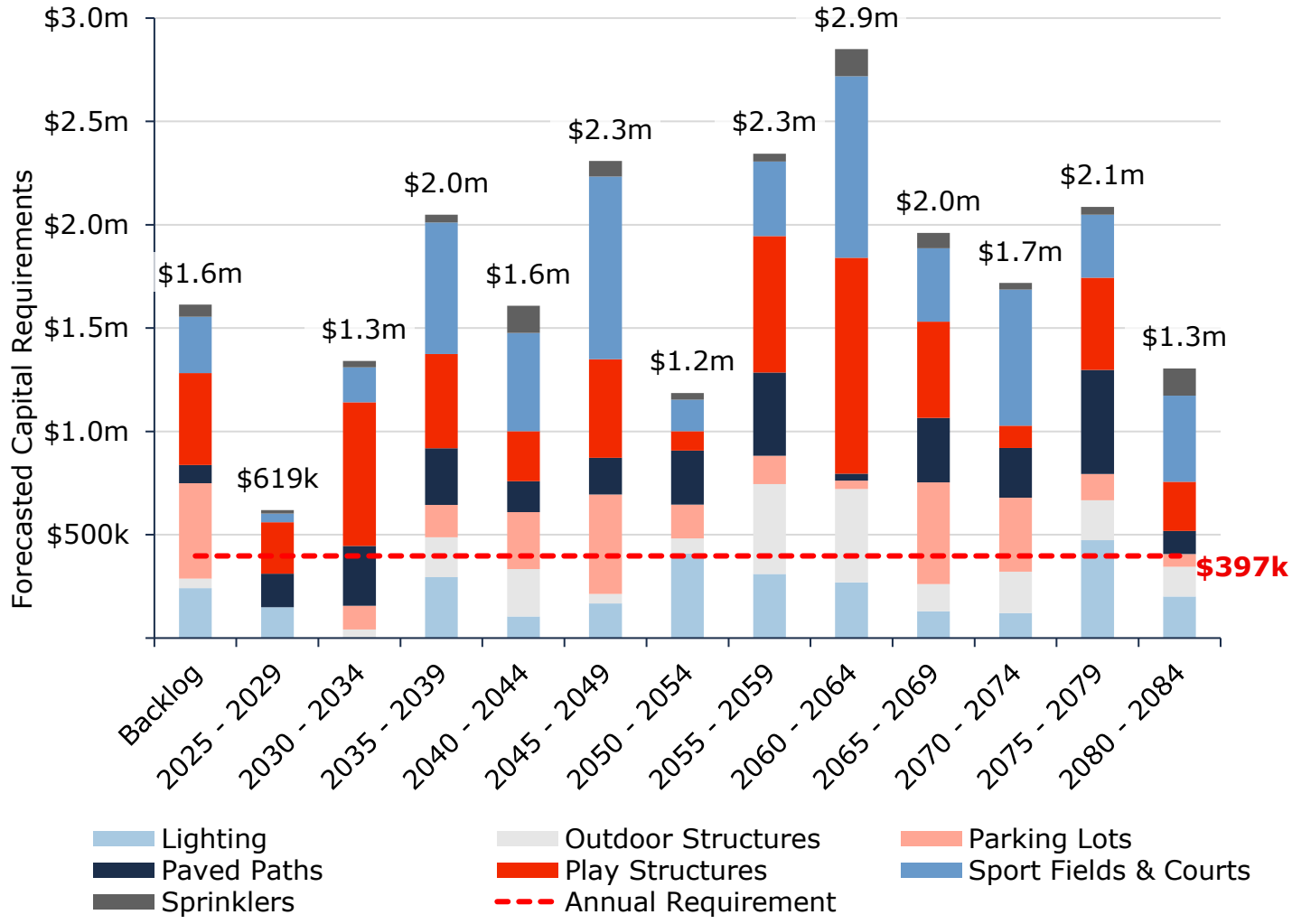


Figure 60 Forecasted Capital Replacement Needs: Land Improvements 2025-2084

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. More refined asset data, particularly assessed condition, may indicate that asset replacement needs are less immediate than as represented. However, the present age-based conditions allow for the estimation of investment requirements, which is essential for long-term

financial planning. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A summary of the 10-year replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

10.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service type, and replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Town may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Town's Asset Management Database and they are detailed in Appendix D of this report. See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications. As indicated below, about one third of land improvement assets have a very high-risk rating; and about a third have a low-risk rating.

1 - 4 **Very Low**	5 - 7 **Low**	8 - 9 **Moderate**	10 - 14 **High**	15 - 25 **Very High**
$1,096,201 (11%)	$2,841,445 (30%)	$632,956 (7%)	$1,454,989 (15%)	$3,603,238 (37%)

Figure 61 Risk Matrix: Land Improvements

10.6.1 Risks to Current Asset Management Strategies

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

Capital Funding Strategies
In most cases, major capital projects rely on entirely the availability of funding from grants and/or other levels of governments. When these fundings sources are not available, projects may be deferred. This limits the ability to complete projects and creates further challenges in meeting public expectations. An annual capital funding strategy can reduce dependency on grant funding and help prevent deferral of capital works.

Climate Change & Extreme Weather Events
Extreme rain events have impacted park assets such as playgrounds and trails. These events trigger unplanned repairs and highlight the vulnerability of outdoor infrastructure to severe weather.

10.7 Levels of Service

The tables that follow summarize the Town's current levels of service. There are no specifically prescribed Metrics under Ontario Regulation 588/17 for non-core assets, therefore the Metrics below represent performance measures that the Town has selected for this AMP.

10.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Quality	Description, which may include maps, of the outdoor recreational facilities that the municipality operates and maintains	The Town offers a wide range of outdoor amenities that provide and support recreational activities. These include lighting, outdoor structures, parking lots, paved paths, play structures, sport fields, courts support, and sprinkler systems. These elements collectively enhance the quality of life and encourage outdoor activity throughout the Town. A map of parks is provided in Appendix C.
Sustainability	Summary of key considerations for capital investment decisions.	Staff work to maintain land improvements in safe operable condition. Regular inspection of assets is completed, in many cases, on a weekly basis. Considerations for asset replacement are primary condition, and the cost to maintain compared to replace. Where safety risks are present, replacement is prioritized.

Table 39 Community Levels of Service: Land Improvements

10.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Quality	Average condition of outdoor recreation facilities and land improvements in the municipality	Fair
	Average Risk	10.71
Sustainability	Current vs. Target Capital Reinvestment Rate	2.33% vs. 4.13%

Table 40 Technical Levels of Service: Land Improvements

11 Vehicles

The Town's vehicles portfolio includes 96 assets that support a variety of general and essential services, including by-law enforcement, fire services, parks and recreation, and public works. Most vehicle assets are owned; however, a portion is leased. Leased vehicles are funded by operational dollars therefore, no capital costs are forecasted for these assets. The total current replacement of all owned vehicles is estimated at approximately $18.8 million. A range of fleet assets exist, common examples by asset segment include:

- By-Law Enforcement: SUVs
- Fire: Various Fire trucks, SUVs
- Parks & Recreation: Trailers, Ice Resurfacers
- Public Works: Trailers, Dump Trucks, Plow Trucks, tractor

11.1 Inventory & Valuation

Table 41 and Figure 62 summarizes the quantity and current replacement cost of all vehicles assets available in the Town's asset register. The Fire segment accounts for the largest share of the vehicles portfolio's replacement cost.[19]

Segment	Quantity		Unit of Measure	Replacement Cost	Primary RC Method
	Total	Leased			
Facility	3	3	Assets	N/A	CPI
By-Law Enforcement	5	4		$57,000	
Fire	20	0		$13,296,000	
Parks & Recreation	32	17		$911,000	
Public Works	36	15		$4,555,000	
TOTAL	96	39		**$18,818,000**	

Table 41 Detailed Asset Inventory: Vehicles

[19] All inventory information only reflects assets owned by the Town and excludes all assets under a lease agreement.

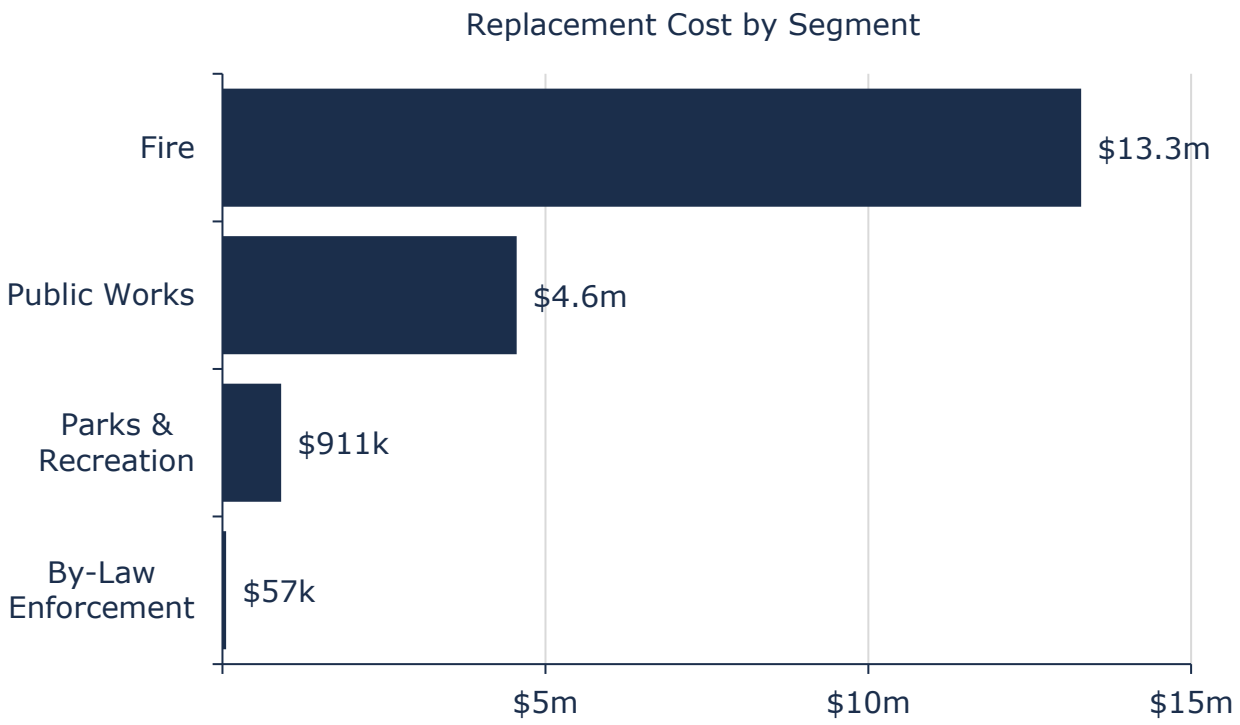


Figure 62 Portfolio Valuation: Vehicles

11.2 Asset Condition

Figure 63 summarizes the replacement cost-weighted condition of the Town's vehicles portfolio. Based primarily on age data, slightly more than half (49%) of vehicles are in fair or better condition, with the remaining 51% in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. No assessed condition data was available for fleet assets and instead condition was approximated based on asset age.

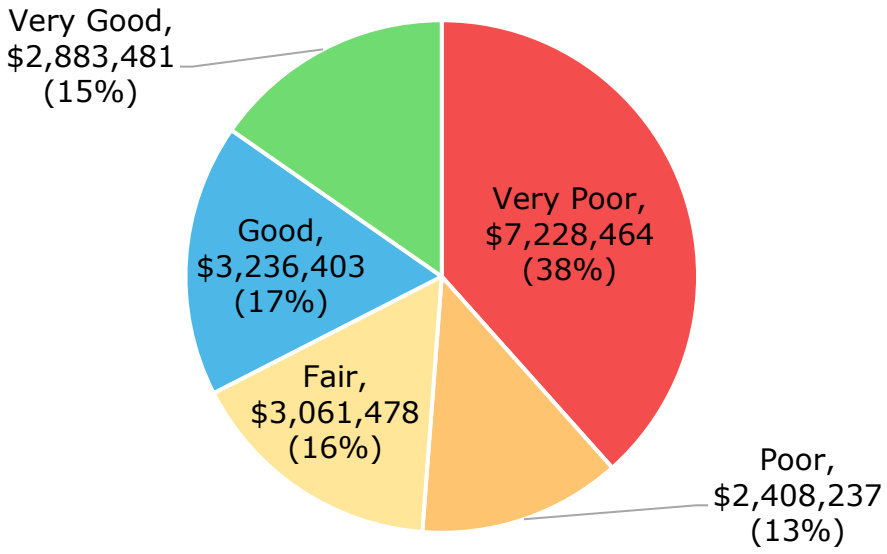


Figure 63 Asset Condition: Vehicles Overall

Figure 64 summarizes the condition of vehicles by segment. Based on age data, all the by-law enforcement assets are in very poor condition. Over half (53%) of assets in the Fire segment with a replacement cost of $7.1 million are in fair or better condition. However, a significant portion of other segments are in poor or very poor condition.

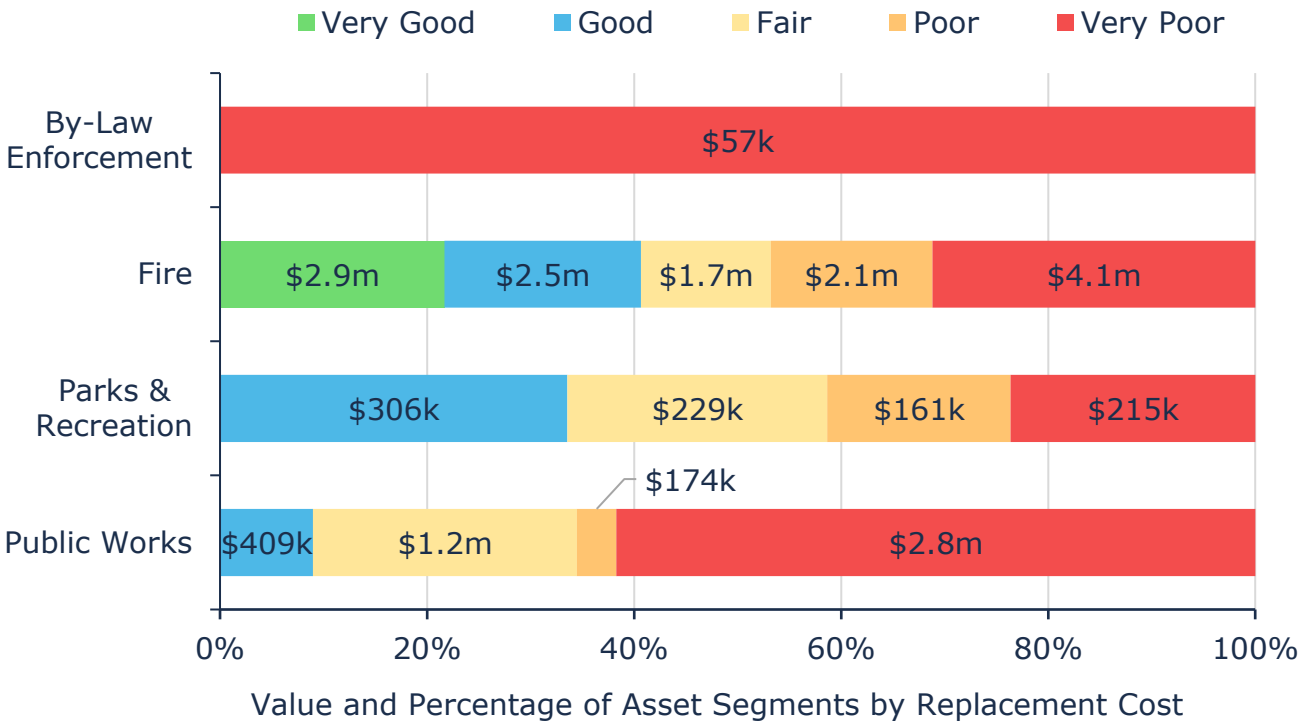


Figure 64 Asset Condition: Vehicles by Segment

11.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 65 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets. Age analysis reveals that on average assets in the by-law enforcement segment remain in service slightly beyond their established useful life. Otherwise, the average age of assets is less than the average EUL.

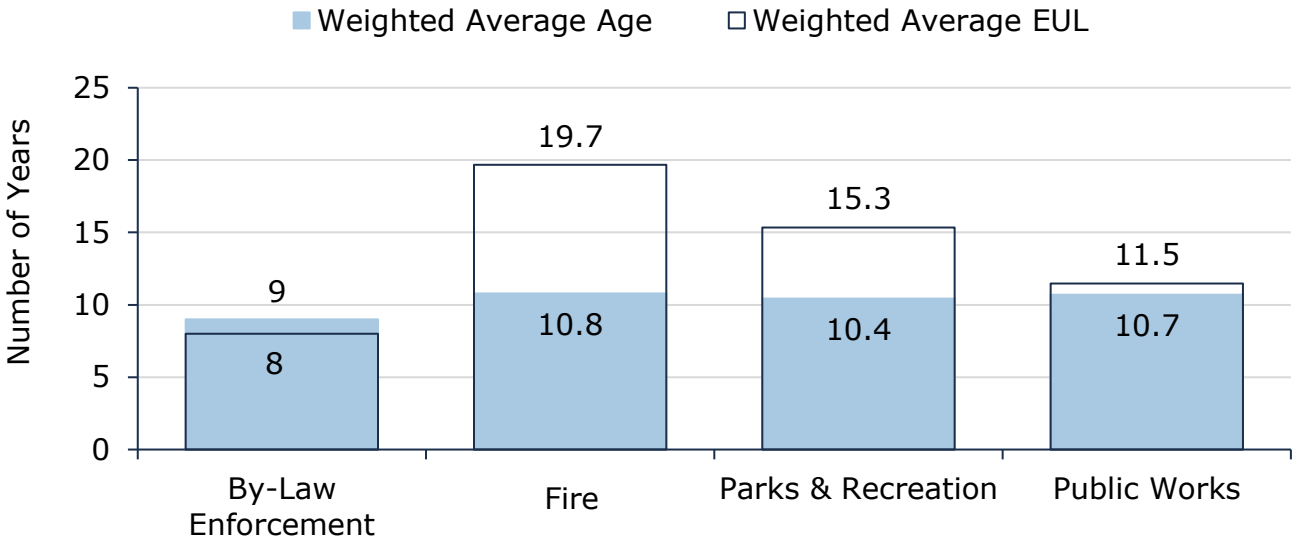


Figure 65 Estimated Useful Life vs. Asset Age: Vehicles

11.4 Current Approach to Lifecycle Management

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

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

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance includes weekly servicing, along with annual maintenance and repair of issues identified through inspections. Maintenance ensures that apparatus remain in operational condition with no significant downtime. Estimated annual maintenance cost for fire fleet: $90,000–$100,000.
Replacement	Apparatus is replaced based on a 20-year lifecycle schedule approved by Council. Replacement is also triggered by increased repair frequency, insurance considerations, or cost-effectiveness. Apparatus is sold at the end of their service life. Contingency funding is built into account, but future delays are possible due to rising costs.
Inspections	Apparatus is inspected weekly by internal staff and undergo annual inspections by external contractors. Staff vehicles are inspected on an as-needed basis. Assessments follow National Fire Protection Standards, and a Good–Fair–Poor scale is used.

Table 42 Lifecycle Management Strategy: Vehicles

11.5 Forecasted Long-Term Replacement Needs

Figure 66 illustrates the forecasted capital requirements for the Town's vehicles portfolio. This analysis was run until 2044 to capture at least one iteration of replacement for the longest-lived asset in inventory. The Town's average annual requirements (red dotted line) total $1.2 million for all vehicles. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

Replacement needs are forecasted to rise considerably throughout the forecast period, peaking at $6.5 million between 2040 and 2044 as vehicles reach the end of their useful life. The chart also illustrates a backlog of more than $3.4 million, dominated by public works and fire segments, and comprising assets that have reached the end of their useful life but still remain in operation These projections and estimates are based on asset replacement costs and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

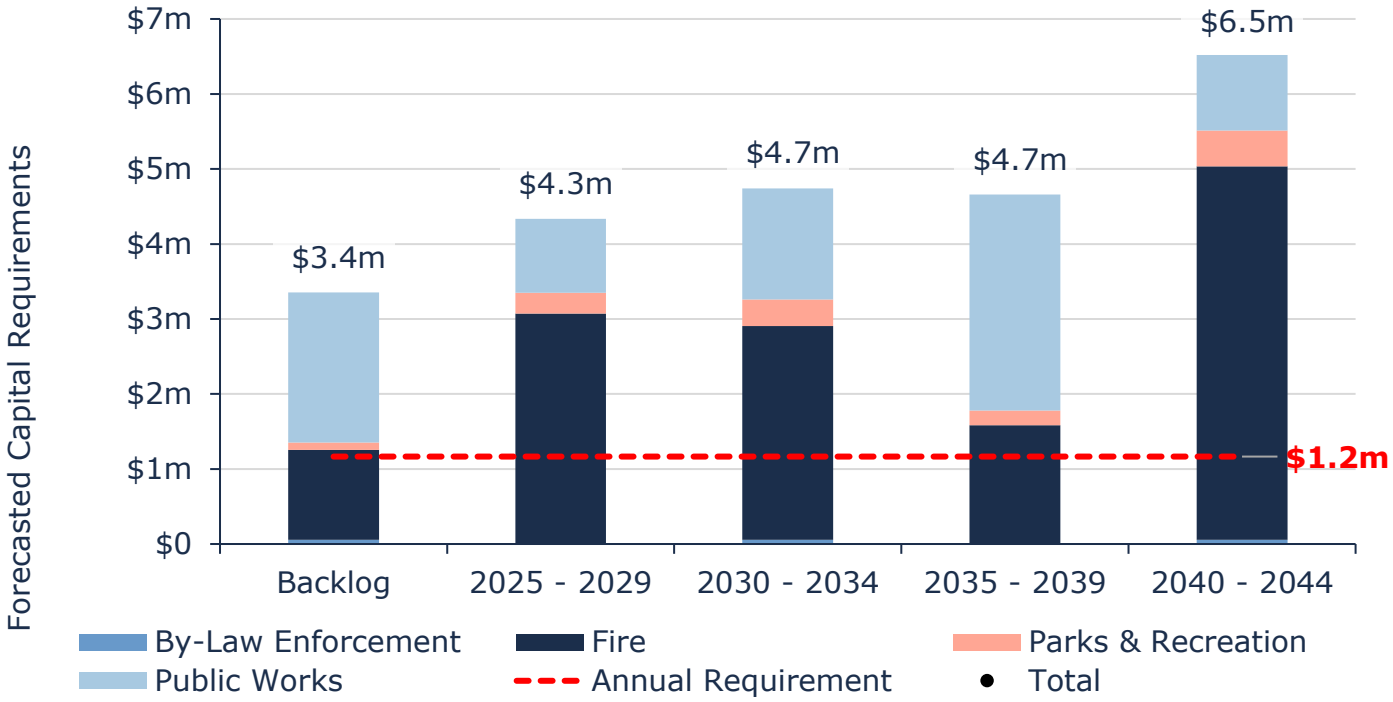


Figure 66 Forecasted Capital Replacement Needs: Vehicles 2025-2044

A summary of the 10-year replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

11.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, replacement costs, and department.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Town may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Town's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications. As presented below, about half of fleet assets are considered very-high risk. This is largely due to their condition (refer to Figure 63).

1 - 4 **Very Low**	5 - 7 **Low**	8 - 9 **Moderate**	10 - 14 **High**	15 - 25 **Very High**
$2,909,516 (15%)	$320,105 (2%)	$2,942,716 (16%)	$3,085,490 (16%)	$9,560,236 (51%)

Figure 67 Risk Matrix: Vehicles

11.6.1 Risks to Current Asset Management Strategies

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

Aging Infrastructure
While the Town currently operates with a well-defined 20-year replacement schedule, rising apparatus costs pose a risk to implementation. The council may elect to delay replacements for cost savings, which could impact lifecycle expectations and operational readiness. Although current investment is sufficient, delaying capital replacements could result in higher maintenance needs and compromise the readiness of critical response vehicles.

Climate Change & Extreme Weather Events
Fleet assets are designed to operate in extreme conditions; however, prolonged exposure to heat, snow, salt, and freeze-thaw cycles increases deterioration. Even with hardened design standards, climate impacts still contribute to long-term wear on vehicle bodies and systems, increasing lifecycle costs.

11.7 Levels of Service

The tables that follow summarize the Town's current levels of service. There are no specifically prescribed metrics under Ontario Regulation 588/17 for non-core assets, therefore the metrics below represent performance measures that the Town has selected for this AMP.

11.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Quality	Description of the types of vehicles that the municipality operates and the services that they help to provide to the community	Facility vehicles include pick-up trucks to ensure efficient transportation for staff. By-Law Enforcement vehicles include pick-up trucks, SUVs, and passenger vans. Fire vehicles include ladder trucks, pumpers, rescue squads, SUVs and tankers, ensuring readiness for emergency response. Parks and Recreation vehicles include cargo vans, ice resurfacers, pick-up trucks, tractors and a utility truck for

Service Attribute	Qualitative Description	Current LOS (2024)
		services such as park maintenance and arena servicing. Public Works vehicles, such as backhoes, cargo vans, plow trucks, pick-up trucks, are vital for ensuring safe road conditions and managing infrastructure during inclement weather and construction projects.
Sustainability	Summary of key considerations for capital investment decisions.	The most common considerations applied to investment decisions for fleet assets are the assets age and performance (condition), if repair costs and frequency are increasing, and insurance considerations.

Table 43 Community Levels of Service: Vehicles

11.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Quality	Average condition of vehicles	Fair
	Average Risk	15.10
Sustainability	Current vs. Target Capital Reinvestment Rate	1.24% vs. 6.19%

Table 44 Technical Levels of Service: Vehicles

12 Machinery & Equipment

The Town's machinery and equipment portfolio includes 316 assets that support a variety of general and essential services, including administration, cemetery, fire, IT, parks and recreation, public works, and roads. The total current replacement of machinery and equipment assets is estimated at approximately $13.2 million. Common examples of assets within each machinery and equipment segment are:

- Administration: mail machine
- Cemetery: loader, mower
- Fire: Generator
- IT: Computers, servers, security systems, ipads
- Parks & Recreation: ticket printers, mowers, leaf collection systems
- Public Works: various saws, mowers, tractors, and plow attachments
- Roads: fuel dispenser, traffic data collector, pressure washer, surveying equipment

12.1 Inventory & Valuation

Table 45 and Figure 68 summarizes the quantity and current replacement cost of all machinery and equipment assets available in the Town's asset register.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Administration	1	Assets	$12,000	CPI
Cemetery	3		$28,000	CPI
Fire	64		$5,383,000	User-Defined
IT	19		$1,117,000	User-Defined
Parks & Recreation	129		$4,889,000	CPI
Public Works	62		$1,120,000	CPI
Roads	38		$670,000	CPI
TOTAL			**$13,218,000**	

Table 45 Detailed Asset Inventory: Machinery & Equipment

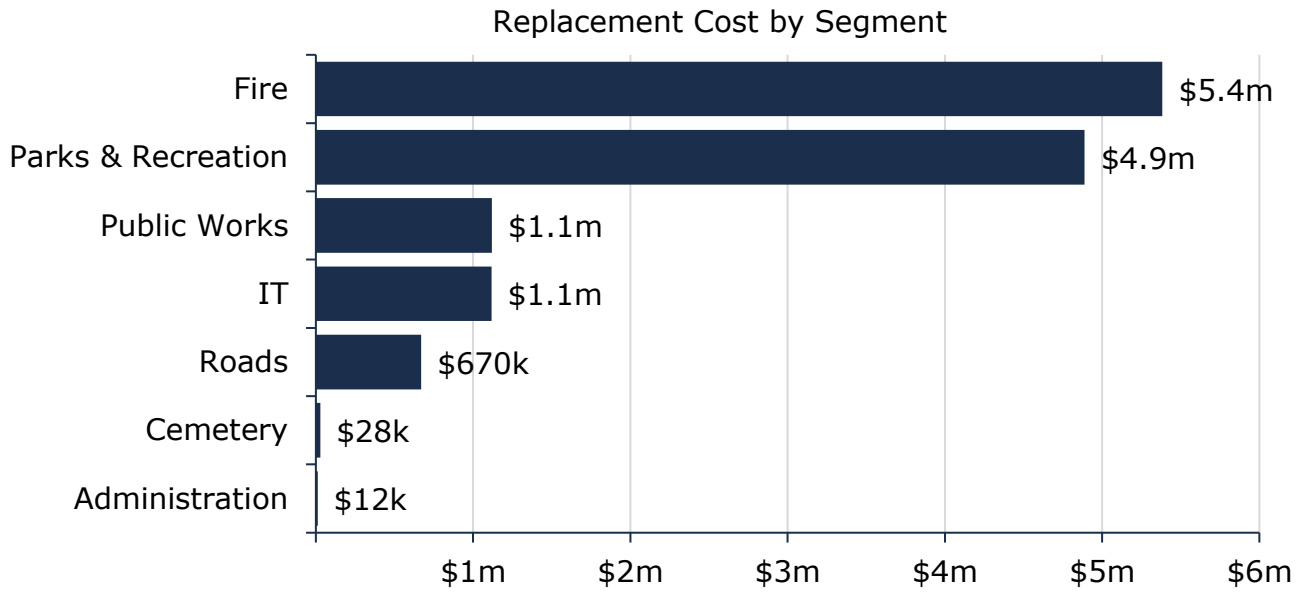


Figure 68 Portfolio Valuation: Machinery & Equipment

12.2 Asset Condition

Figure 69 summarizes the replacement cost-weighted condition of the Town's machinery and equipment portfolio. Based only on age data, 62% of assets are in fair or better condition; the remaining 38% are in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

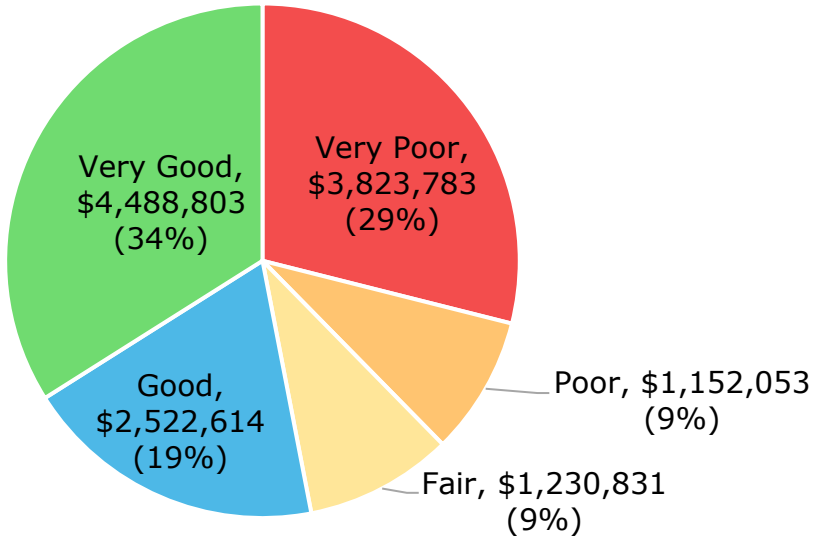


Figure 69 Asset Condition: Machinery & Equipment Overall

Figure 70 summarizes the age-based condition of machinery and equipment by each department. Most assets that support administration, IT and fire services are in fair or better

condition. Assets in poor or worse condition are concentrated primarily in public works, cemetery, and roads.

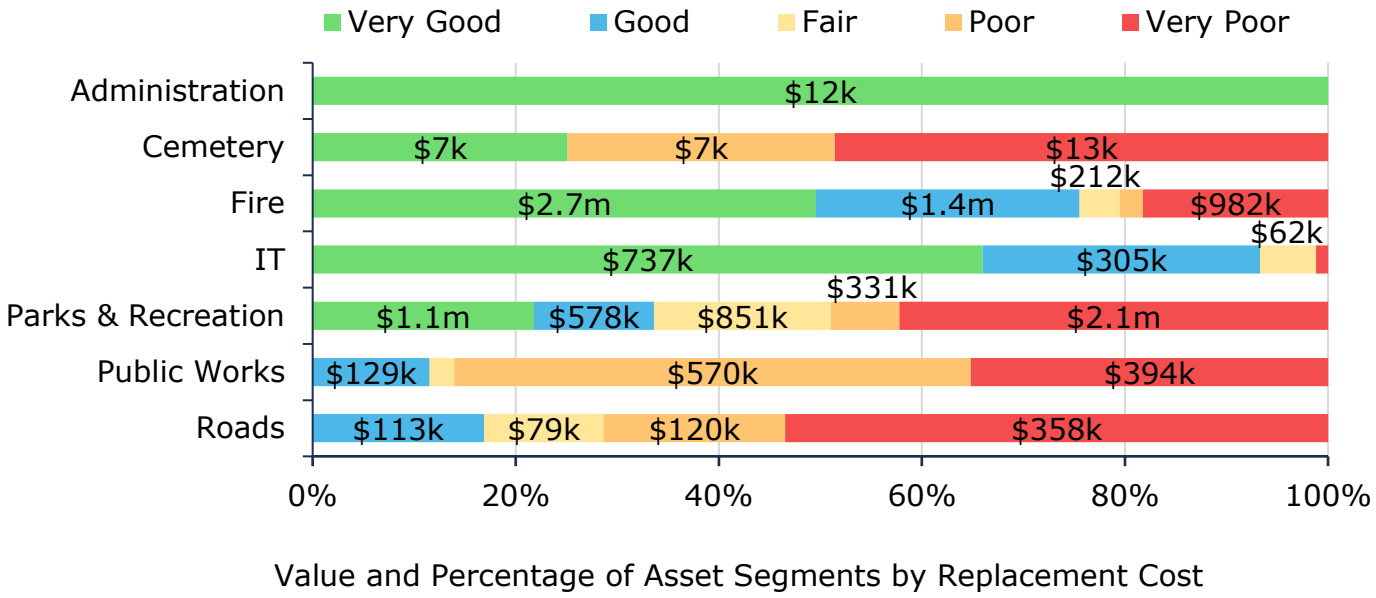


Figure 70 Asset Condition: Machinery & Equipment by Segment

12.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 71 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets. Age analysis reveals that, on average, public works and roads assets are in the latter stages of their expected life.

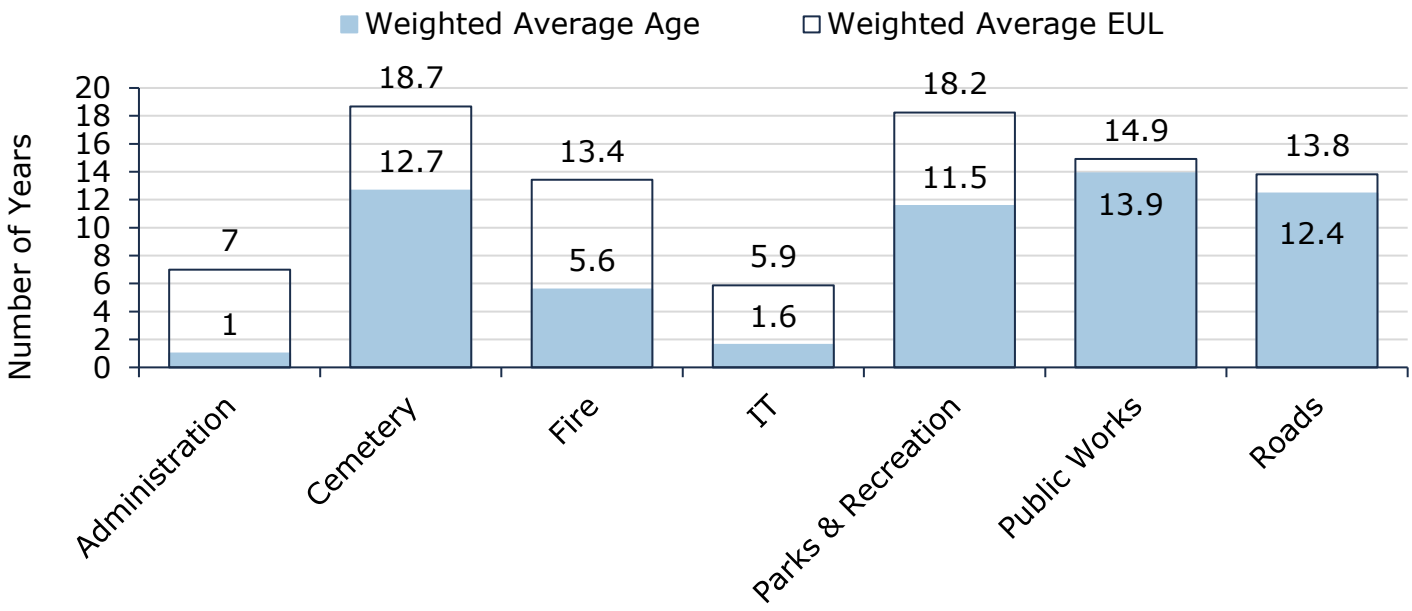


Figure 71 Estimated Useful Life vs. Asset Age: Machinery & Equipment

12.4 Current Approach to Lifecycle Management

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

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

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance includes weekly inspections, repairs, and oil changes. Any identified defect is addressed immediately. Maintenance is triggered by inspection findings and performance issues.
Replacement	Replacement is considered when maintenance is no longer effective or when equipment reaches the end of its useful life. Age, technology, and cost of ongoing repairs are key considerations. Budgets are set based on historical needs and anticipated repairs.
Inspections	Equipment is inspected daily before use to ensure it is safe to operate. In addition, weekly inspections are conducted by internal staff to ensure operational readiness, particularly for fire services. Condition assessments follow National Fire Protection Association (NFPA) guidelines.

Table 46 Lifecycle Management Strategy: Machinery & Equipment

12.5 Forecasted Long-Term Replacement Needs

Figure 72 illustrates the projected capital requirements for the Town's machinery and equipment portfolio. This analysis was run until 2059 to capture at least one iteration of replacement for the longest-lived asset in inventory. The Town's average annual requirements (red dotted line) total $1.2 million for all machinery and equipment. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

5-year replacement needs are forecasted to rise considerably over the 35-year projection period, peaking at $7.7 million between 2040 and 2044. These projections and estimates are based on asset replacement costs and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support long-term financial planning.

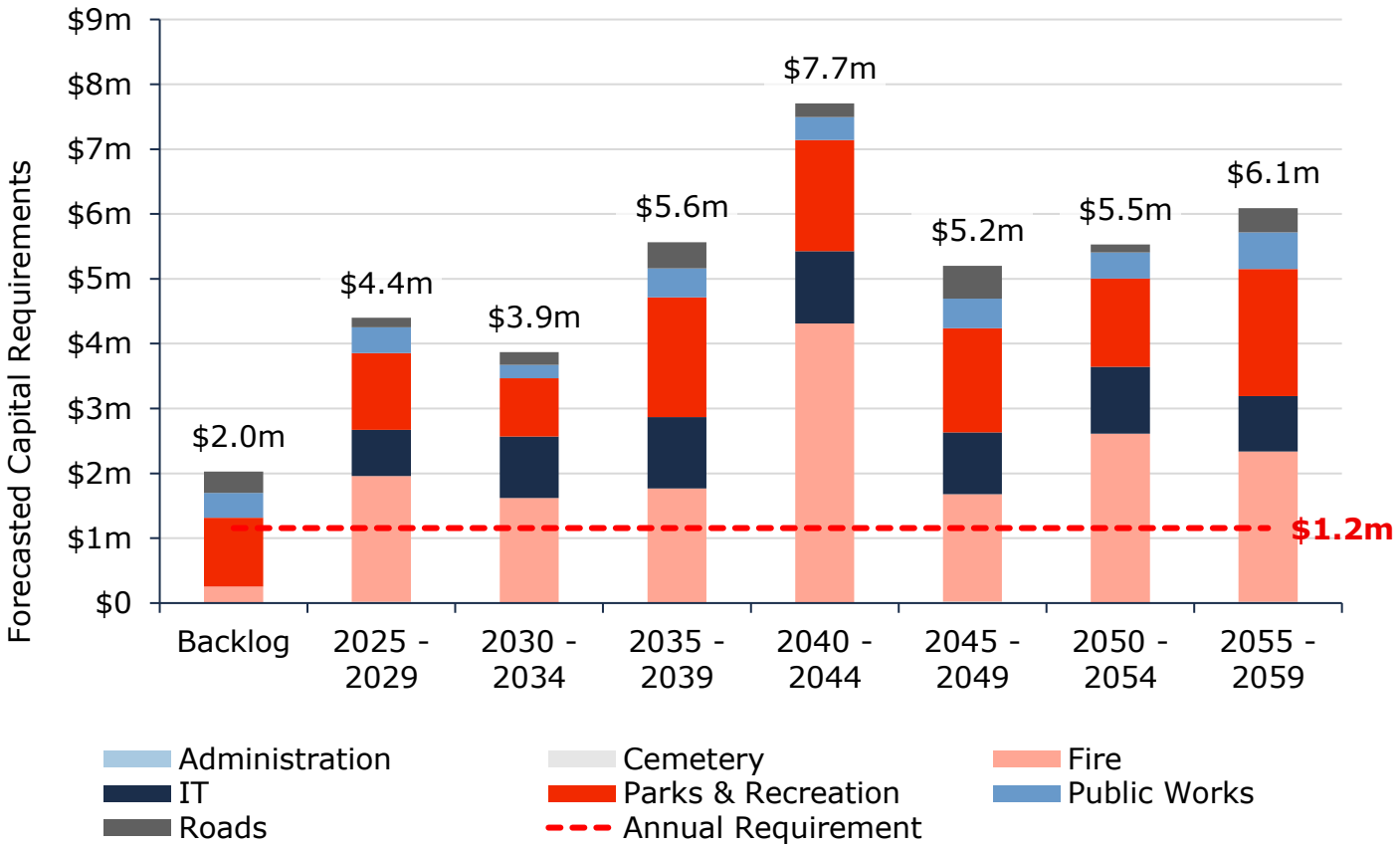


Figure 72 Forecasted Capital Replacement Needs: Machinery & Equipment 2025-2059

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. More refined asset data, particularly assessed condition, may indicate that asset replacement needs are less immediate than as represented. However, the present age-based conditions allow for the estimation of investment requirements, which is essential for long-term financial planning. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A summary of the 10-year replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

12.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, replacement costs, and department.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Town may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Town's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

1 - 4 **Very Low** $3,986,034 (30%)	5 - 7 **Low** $2,071,398 (16%)	8 - 9 **Moderate** $1,780,606 (13%)	10 - 14 **High** $2,258,731 (17%)	15 - 25 **Very High** $3,121,315 (24%)

Figure 73 Risk Matrix: Machinery & Equipment

12.6.1 Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies
The current strategy for managing fire-related machinery and equipment is operationally proactive but lacks a formalized rehabilitation framework. Equipment is inspected and repaired promptly, but there is no intermediate stage between maintenance and replacement. Assets are replaced when no longer repairable, which may shorten lifecycle potential and limit cost optimization opportunities.

Asset Data & Information
Staff have strong knowledge of equipment condition and operational needs, and NFPA guidelines are followed. However, asset data and replacement schedules are not centrally consolidated, limiting integration into broader planning efforts. While budgeting and operational response are well-managed, there is room to improve the documentation and systematization of lifecycle decisions.

12.7 Levels of Service

The tables that follow summarize the Town's current levels of service. There are no specifically prescribed Metrics under Ontario Regulation 588/17 for non-core assets, therefore the Metrics below represent performance measures that the Town has selected for this AMP.

12.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2024)
Quality	Description of the types of equipment that the municipality operates and the services that they help to provide to the community	Administration is supported by equipment such as mail folder/ inserter machine. Cemetery is supported by a loader with a bucket, shoring equipment and a mower lift. Fire is supported by equipment such as generators, thermal imaging cameras, and bunker gear. IT supports multiple departments and functions across the Town. Common assets are personal computers and peripherals, security cameras, microphones, routers and ipads. Parks and recreation services are supported by mowers, trailers, a lift, snowblowers, a pump and storage tanks. Public Works is supported by equipment such as pumps, generators, saws and wing plows. Roads include air compressor system, fuel dispensers, fuel tanks, and traffic data collectors
Sustainability	Summary of key considerations for capital investment decisions.	Replacement is considered when maintenance is no longer effective or when equipment reaches the end of its useful life. Age, technology, and cost of ongoing repairs are key considerations.

Table 47 Community Levels of Service: Machinery & Equipment

12.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2024)
Quality	Average condition of machinery and equipment	Fair
	Average Risk	9.91
Sustainability	Current vs. Target Capital Reinvestment Rate	0.69% vs. 8.75%

Table 48 Technical Levels of Service: Machinery & Equipment

Growth, Financial Analysis & Key Recommendations

13 Growth

The demand for infrastructure and services will change over time based on a combination of internal and external factors. Understanding the key drivers of growth and demand will allow the Town to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

13.1 Town of Niagara-on-the-Lake Official Plan

The Town of Niagara-on-the-Lake, guided by the Niagara Official Plan, is planning for responsible growth while protecting its historic charm, rural landscape, and agricultural vitality. The plan supports strategic, sustainable development that enhances the Town's unique character, emphasizing a balance between intensification in appropriate locations and preservation of natural and cultural assets.

Niagara-on-the-Lake is forecasted to grow to a population of 28,900 and 17,610 jobs by 2051. Growth will be directed primarily within the Town's urban area, supported by municipal water and wastewater services, with a strong emphasis on maintaining the distinct heritage and village atmosphere that defines the community. Limited growth will occur in rural settlements, with a focus on residential infill that complements the surrounding rural character.

Housing policies promote the creation of a diverse and attainable housing stock to meet the needs of all residents. Niagara-on-the-Lake is targeting a 25% residential intensification rate within its built-up area, focusing on gentle infill, strategic redevelopment, and maintaining compatibility with established neighborhoods. The Official Plan encourages a mix of housing types and densities to support young families, seniors, and a growing workforce tied to the tourism, agriculture, and service sectors.

Growth in Niagara-on-the-Lake will be influenced by several factors, including its proximity to major urban centers like St. Catharine's and the Greater Toronto and Hamilton Area (GTHA), its thriving wine and tourism industries, and its high quality of life. Migration of retirees, second-home owners transitioning to full-time residents, and tourism-driven employment growth are expected to be significant drivers.

To accommodate this growth, the Town will focus on maintaining and enhancing public infrastructure and services, including transportation networks, parks, cultural and heritage facilities, and community hubs. Strategic infrastructure investments will ensure that growth remains sustainable and supports healthy, complete communities. The Official Plan stresses the importance of transit-supportive development where feasible, alongside improvements to active transportation options.

Throughout all growth and development, Niagara-on-the-Lake is committed to preserving its agricultural lands, cultural heritage, and environmental features. The Plan ensures that growth management strategies align with climate change mitigation goals, biodiversity protection, and the maintenance of Niagara-on-the-Lake's renowned rural and historic identity.

13.2 Impact of Growth on Lifecycle Activities

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

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

14 Financial Strategy

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 Town of Niagara-on-the-Lake 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, will be reflected in 2025 AMP)
    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. Debt
    d. Development charges
3. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods
4. Use of Senior Government Funds:
    a. Canada Community-Facility Fund (CCBF)
    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.

14.1 Annual Requirements & Capital Funding

14.1.1 Annual Requirements

The annual requirements represent the amount the Town should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. In total, the Town must allocate approximately $22.27 million annually to address capital requirements for the assets included in this AMP.

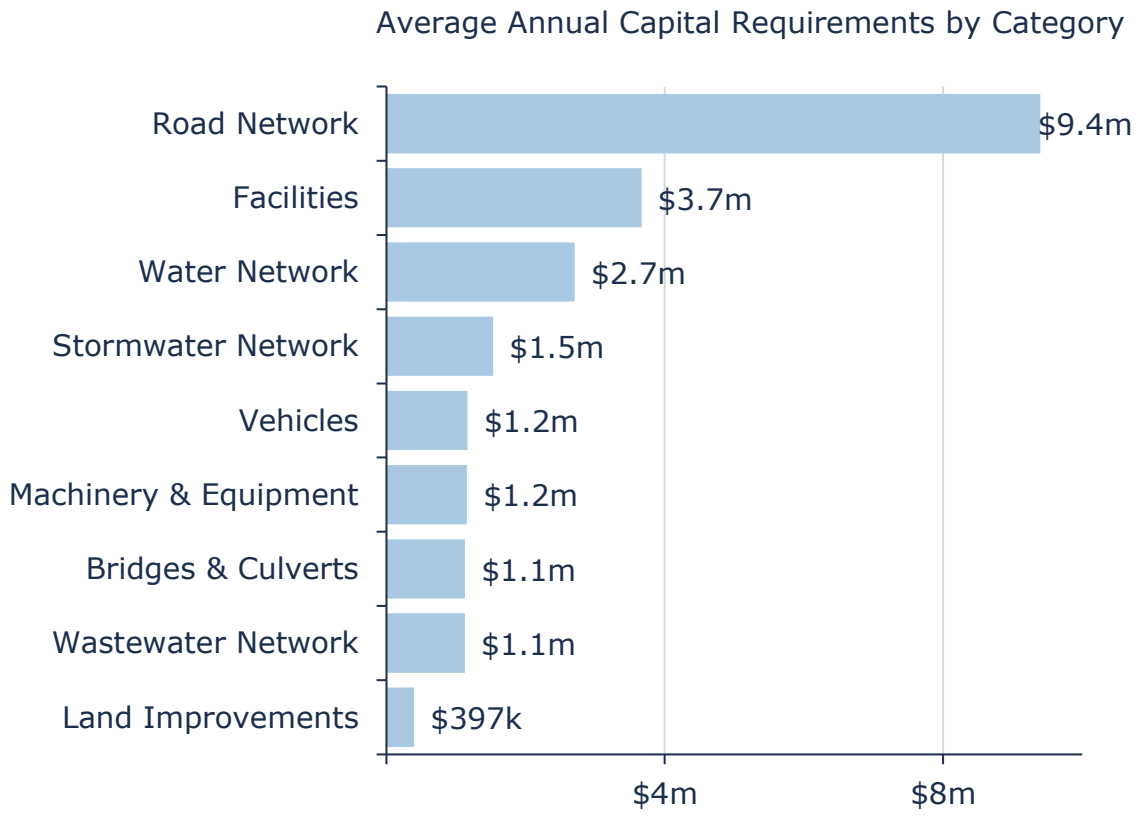


Figure 74 Annual Capital Funding Requirements by Asset Category

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 (surface treated and asphalt road segments) and bridges and structural culverts, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares two scenarios for the Road Network and bridges and culverts:

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 (surface treated, and asphalt roads only)	$13,756,438	$9,396,000	$4,360,438
Bridges & Culverts	$1,166,000	$1,127,000	$39,000

Table 49 Lifecycle Strategies Annual Savings

The implementation of a proactive lifecycle strategy leads to potential annual cost avoidance of $4.36 million for the Road Network and $39,000 for bridges and structural culverts. This represents an overall reduction of the annual requirements for each category by 32% and 3% respectively. As the lifecycle strategy scenario represents the lowest cost option available to the Town, we have used these annual requirements in the development of the financial strategy.

14.1.2 Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Town is committing approximately $9.19 million towards capital projects per year. Given the annual capital requirement of $22.27 million, there is currently a funding gap of $13.08 million annually.

For tax funded assets, the average annual investment from taxes and the Municipal Accommodation Tax (MAT) is estimated based on each asset categories total average annual requirement (AAR) and its share of the portfolios AAR. For example, the AAR of roads is $9,395,521 which is 56% of the portfolios total AAR ($16,907,533)[20]. Therefore, 56% of the total capital investment from taxes and the MAT respectively is allocated to roads. The same methodology is applied to all other tax funded assets except for the stormwater network. The stormwater network tax allocation is based on historic capital allocations from a special levy used for the stormwater network exclusively. As capital allocations by asset category vary from year to year based on asset requirements, allocation based on AAR is the most representative method of forecasting future capital allocations.

[20] This excludes the storm networks AAR.

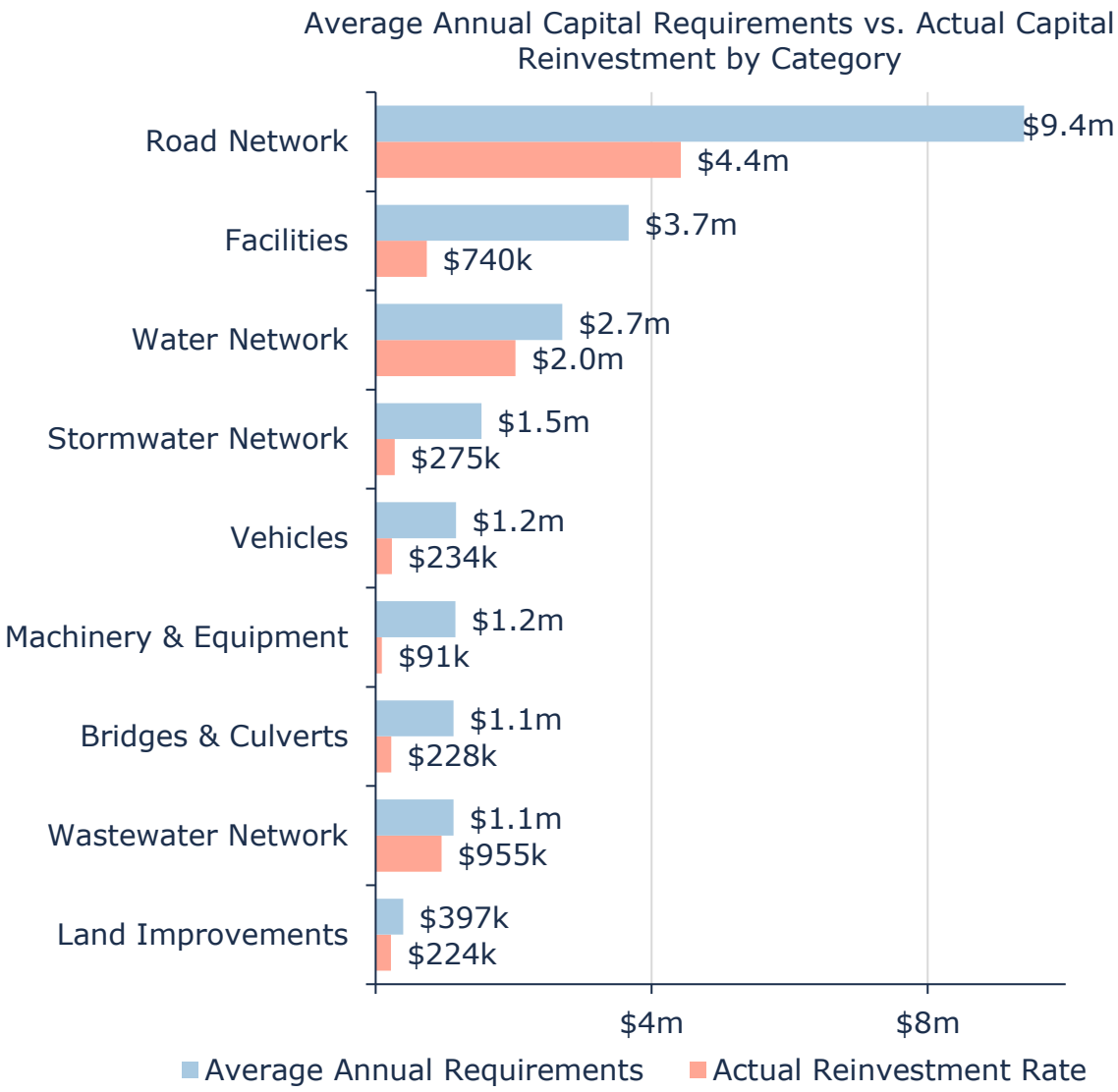


Figure 75 Annual Requirements vs. Capital Funding Available

14.2 Funding Objective

We have developed a scenario that would enable Town of Niagara-on-the-Lake to achieve full funding within 20 years for the following assets:

1. **Tax Funded Assets:** Road Network, Bridges & Culverts, Facilities, Machinery & Equipment, Land Improvements, Vehicles
2. **Storm Water Network:** This asset category is reported separately due to a special capital levy structure.

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

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

14.3 Financial Profile: Tax Funded Assets

14.3.1 Current Funding Position

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

Asset Category	Avg. Annual Requirement (AAR)	Annual Funding Available					Annual Deficit
		Taxes	CCBF	OCIF	MAT[21]	Total Funding	
Road Network	9,395,521	1,757,566	625,134	1,900,000	138,925	4,421,625	4,973,896
Bridges & Culverts	1,127,357	210,888			16,669	227,558	899,799
Facilities	3,665,250	685,637			54,196	739,833	2,925,417
Machinery & Equipment	1,156,528	216,345			17,101	233,446	923,082
Land Improvements	397,359	74,332			5,875	80,207	317,151
Vehicles	1,165,519	218,027			17,234	235,261	930,258
Total	16,907,533	3,162,795	625,134	1,900,000	250,000	5,937,929	10,969,604

Table 50 Annual Available Funding for Tax Funded Assets

The average annual investment requirement for the above categories is $16,907,000. Annual revenue currently allocated to these assets for capital purposes is $5,938,000 leaving an annual deficit of $10,967,000. Put differently, these infrastructure categories are currently funded at 35.1% of their long-term requirements.

[21] Municipal Accommodation Tax came into effective July 1, 2022. It is a tax revenue provided to Tourism Niagara-on-the-Lake for purposes of promoting and growing the tourism industry in Niagara-on-the-Lake. A portion of these revenues are reallocated to several municipalities within the Niagara Region. Of the revenues available to the Town of Niagara-on-the-Lake, approximately $250,000 annually is allocated to capital projects.

14.3.2 Full Funding Requirements

For 2026, the budgeted annual tax revenues for the Town of Niagara-on-the-Lake are approximately $18,163,077. 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	27.4%
Bridges & Culverts	5.0%
Facilities	16.1%
Machinery & Equipment	5.1%
Land Improvements	1.7%
Vehicles	5.1%
Total	60.4%

Table 51 Tax Increase Requirements for Full Funding

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

a) Niagara-on-the-Lake's debt payments for these asset categories will be increasing by $308,219 by 2030.
b) By 2035 debt payments will increase by $13,856 from 2025 levels
c) By 2040 debt payments will increase $10,460 from 2025 levels
d) By 2045 debt payments will reduce by $257,724 from 2025 levels

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

	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	10,969,604	10,969,604	10,969,604	10,969,604
Change in Debt Costs	308,219	13,856	10,460	-257,724
Resulting Infrastructure Deficit:	11,277,823	10,983,459	10,980,063	10,711,880
Total Tax Increase Required	62.1%	60.5%	60.5%	59.0%
Annually:	10.2%	4.9%	3.3%	2.4%

Table 52 Tax Increase Options 5-20 Years

14.3.3 Financial Strategy Recommendations

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

a) When realized, reallocating the debt cost reductions of $257,724 to the infrastructure deficit as outlined above.
b) increasing tax revenues by 2.4% each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
c) allocating the current CCBF, OCIF, and MAT revenue as outlined previously.
d) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable, since this funding is a multi-year commitment[22].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of increased infrastructure failure.

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $18.7 million for the road network, $4.9 million for facilities, $4 million for vehicles, $2 million for machinery and equipment and $1.6 million for land improvements.

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

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

14.4 Financial Profile: Rate Funded Assets

14.4.1 Current Funding Position

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

Asset Category	Avg. Annual Require-ment	Annual Funding Available		Annual Deficit
		Rates	Total Available	
Water Network	2,705,695	2,025,757	2,025,757	679,939
Wastewater Network	1,126,677	954,878	954,878	171,799
Stormwater Network	1,532,091	275,000	275,000	1,257,091
Total	5,364,463	3,255,634	3,255,634	2,108,829

Table 53 Annual Available Funding for Rate Funded Assets

The average annual investment requirement for the above categories is $5,364,000. Annual revenue currently allocated to these assets for capital purposes is $3,256,000, leaving an annual deficit of $2,109,000. Put differently, these infrastructure categories are currently funded at 60.7% of their long-term requirements.

14.4.2 Full Funding Requirements

Using the 2025 budgeted revenues, Niagara-on-the-Lake has annual budgeted water revenues of $7,036,000, annual budgeted wastewater revenues of $6,137,000 and annual budgeted stormwater revenues of $961,600. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following changes over time:

Asset Category	Rate Change Required for Full Funding
Water Network	9.7%
Wastewater Network	2.8%
Stormwater Network	130.7%

Table 54 Rate Increase Requirements for Full Funding

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

Water Network				
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	679,939	679,939	679,939	679,939
Rate Increase Required	9.7%	9.7%	9.7%	9.7%
Annually:	1.9%	1.0%	0.7%	0.5%

Table 55 Water Rate Increase Options 5-20 Years

Wastewater Network				
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	171,799	171,799	171,799	171,799
Rate Increase Required	2.8%	2.8%	2.8%	2.8%
Annually:	0.6%	0.3%	0.2%	0.2%

Table 56 Sanitary Rate Increase Options 5-20 Years

Stormwater Network				
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	1,257,091	1,257,091	1,257,091	1,257,091
Rate Increase Required	130.7%	130.7%	130.7%	130.7%
Annually:	18.3%	8.8%	5.8%	4.3%

Table 57 Stormwater Rate Increase Options 5-20 Years

14.4.3 Financial Strategy Recommendations

Considering all of the above information, we recommend the 5-year option for both the water and wastewater networks and the 20-year option for the stormwater network. This involves full funding being achieved over the specified time periods by:

a) increasing rate revenues by 1.9% for water services and 0.6% for wastewater services each year for the next 5 years solely for the purpose of phasing in full funding to the respective asset categories.
b) increasing rate revenues by 4.3% for stormwater services each year for the next 20 years
c) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. This periodic funding should not be incorporated into an AMP unless there are firm commitments in place.
2. We realize that raising revenues for infrastructure purposes may be challenging. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure. Further, considering the lower degree of increase required we feel it is palatable to consider a phase-in period of less than 5 years for the Wastewater Network. Given the total rate increase required is 2.8% it is foreseeable that a phase-in period as short as 1 or 2 years could be considered.
3. Any increase in rates required for operations would be in addition to the above recommendations.

Although this option achieves full funding on an annual basis within 5 years or less and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $1.5 million for the Water Network, $301 thousand for the Wastewater Network and $3.6 million for the Stormwater Network.

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

14.5 Use of Debt

Debt can be strategically utilized as a funding source within the long-term financial plan. The benefits of leveraging debt for infrastructure planning include:

a) the ability to stabilize tax & user rates when dealing with variable and sometimes uncontrollable factors
b) equitable distribution of the cost/benefits of infrastructure over its useful life
c) a secure source of funding
d) flexibility in cash flow management

The following tables outline how Niagara-on-the-Lake has historically used debt for investing in the asset categories as listed. As of year-end 2024, there is currently $2,776,770 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $868,424 as of 2026 well within its provincially prescribed maximum of $10.2 million.

Asset Category	Current Debt Outstanding	Total Debt Outstanding in the Last Five Years				
		2020	2021	2022	2023	2024
Road Network	25,780	162,513	135,155	103,586	67,311	25,780
Bridges & Culverts	0	0	0	0	0	0
Facilities	563,000	891,000	812,000	731,000	648,000	563,000
Machinery & Equipment	394,785	0	0	496,037	446,012	394,785
Land Improvements	0	0	0	0	0	0
Vehicles	1,793,205	0	1,056,116	1,284,994	962,713	1,793,205
Total Tax Funded	2,776,770	1,053,513	2,003,271	2,615,616	2,124,036	2,776,770
Water Network	0	0	0	0	0	0
Wastewater Network	0	0	0	0	0	0
Stormwater Network	0	0	0	0	0	0
Total Rate Funded	**0**	**0**	**0**	**0**	**0**	**0**

Table 58 Niagara-on-the-Lake Outstanding Debt 2020-2024

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2025	2026	2027	2028	2029	2030	2035
Road Network	226,004	403,859	404,765	407,244	408,947	410,530	286,472
Bridges & Culverts	0	29,087	29,087	29,087	29,087	29,087	29,087
Facilities	134,750	134,577	134,186	132,673	131,914	130,992	22,253
Machinery & Equipment	61,583	61,583	61,583	61,583	61,583	61,583	0
Land Improvements	0	0	0	0	0	0	0
Vehicles	138,954	237,318	237,313	237,343	237,332	237,319	237,334
Total Tax Funded	561,291	866,424	866,932	867,930	868,862	869,510	575,146
Water Network	0	0	0	0	0	0	0
Wastewater Network	0	0	0	0	0	0	0
Stormwater Network	0	0	0	0	0	0	0
Total Rate Funded	0	0	0	0	0	0	0

Table 59 Niagara-on-the-Lake Principal and Interest Payments

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

14.6 Use of Reserves

14.6.1 Available Reserves

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

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

By asset category, the table below outlines the details of the reserves currently available to Niagara-on-the-Lake.

Asset Category	Balance at December 31, 2024
Road Network	2,943,988
Bridges & Culverts	372,221
Facilities	2,792,079
Machinery & Equipment	881,009
Land Improvements	2,468,316
Vehicles	1,722,851
Total Tax Funded:	**11,180,851**
Water Network	6,518,648
Wastewater Network	5,398,665
Stormwater Network	1,767,616
Total Rate Funded:	**11,917,313**

Table 60 Niagara-on-the-Lake Reserve Balances

There is considerable debate in the municipal sector as to the appropriate level of reserves that a Town should have on hand. There is no clear guideline that has gained wide acceptance. Factors that municipalities should 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 in applicable asset categories during the phase-in period to full funding. This coupled with Niagara-on-the-Lake'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.

15 Recommendations & Key Considerations

15.1 Financial Strategies

1. Review the feasibility of adopting a full-funding scenario to achieve 100% of average annual funding requirement for the asset categories analyzed. This includes:
    a. Increasing taxes by 2.4% per year over a period of 20 years.
    b. Increasing water rates by 1.9% per year over a period of 5 years.
    c. Increasing sanitary rates by 0.6% per year over a period of 5 years. Consideration to increase rates over a shorter period (i.e. 1 to 2 years).; and
    d. Increasing stormwater rates by 4.3% per year over a period of 20 years[23]

2. Reallocating debt cost reductions in future years for tax funded assets to the infrastructure deficit when realized.

3. Continued allocation of OCIF, CCBF and MAT funding as previously outlined.

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

5. Continue to apply for project specific grant funding to supplement sustainable funding sources.

15.2 Asset Data

1. Continuously review, refine, and calibrate asset data, especially assessed condition information. Identified opportunities include:
    a. Water Condition: Current condition information is based on a review of key attribute data such as break history and pipe material (refer to 6.2). Based on this methodology, almost all water mains are reflected as in very good condition. Further inspection, especially through CCTV assessment methodologies, may reveal more variability in condition within the network. It is recommended that this be considered for future inspection to further increase the accuracy of the assessment information and the resultant analysis (i.e. forecasted capital requirements).
    b. Sanitary Need Study: As additional assets are assessed incorporate asset details, particularly asset condition information and rehabilitation needs. Where additional attribute information is available (e.g. Inflow and infiltration) and can be applied to assets, update the asset registry to reflect. Currently some assets still rely on age-based estimates, however approximately one-fifth of the network is planned for inspection annually.
    c. Storm CCTV Assessments: As additional assets are assessed update assessment details into the asset registry. Currently some assets still rely on age-based

[23] These recommended changes are based on the optimal funding level—the investment required to replace every single asset when it reaches the end of its useful life and complete recommended rehabilitations. These recommended rates are subject to change based on the outcomes of the 2025 Asset Management Plan which is centered around an established proposed level of service.

estimates, however approximately one-fifth of the network is planned for inspection annually.

d. Facility Condition Assessment Updates: The last assessment was completed in 2017; an assessment review and update tentatively planned for 2027 is expected to provide value. Whenever assessments are completed, update the asset inventory. Where possible and beneficial leverage the existing asset inventory to complete the assessment update.
e. OSIM Updates: Bridges and structural culverts are required to be inspected every two (2) years. As assessments are updated, ensure revised assessed condition, replacement costs, and rehabilitation recommendations are reflected in the database.
f. Road Needs Study: Ensure any updates to the road needs study (i.e. new condition assessments and associated recommendations) are reflected in the asset inventory.
g. Water Network: Within the valve inventory, identify valve types (i.e. butterfly valves, ball valves)

2. Work towards an assessment program for non-core assets. Ensure that the program identifies and documents a standard condition scale, associated definitions and reference examples, frequency of assessments and persons responsible for assessment completion, review, and update to the asset inventory. Review capital forecasts, risks, and priorities for replacement based on any updates to asset condition.
3. Asset management planning is highly sensitive to replacement costs. Periodically update replacement costs based on recent projects, invoices, or estimates, as well as condition assessments, or any other technical reports and studies. Material and labor costs can fluctuate due to local, regional, and broader market trends, and substantially so during major world events. Accurately estimating the replacement cost of like-for-like assets can be challenging. Ideally, several recent projects over multiple years should be used.

15.3 Risk & Levels of Service

1. Risk models and matrices can play an important role in identifying critical assets. As a result, project selection and the development of multi-year capital plans can become more strategic and objective. This may be particularly impactful for the water, wastewater, and stormwater main assets which received condition assessments in 2024 and have standardized, reliable, and consistent data that can be a powerful aid in prioritizing capital projects. Initial models have been built into Citywide for all asset groups. These models reflect current data. As the data evolves and new attribute information is obtained, these models should also be refined and updated. There may be opportunities to use additional asset attributes and/or reasons to adjust the weighting or ranges of already incorporated attributes. Explore opportunities to leverage study or assessment projects as a means of gathering asset data that may not yet exist but is deemed valuable and cost-effective to collect and maintain.

2. Regularly review and measure current level of service to understand asset performance. Once Proposed LOS is collected, compare current LOS to proposed LOS and where there are significant differences, investigate causes and as appropriate mitigation measures.

3. Staff should monitor evolving local, regional, and environmental trends to identify factors that may shape the demand and delivery of infrastructure programs. These can include population growth, and the nature of population growth; climate change and extreme weather events; and economic conditions and the local tax base. This data can also be used to review service level targets.

Appendices

16 Appendix A – Infrastructure Report Card

Asset Category	Replacement Cost	Average Condition	Financial Capacity	
Road Network	**$508.0 m**	**Good**	Annual Requirement:	$9,396,000
			Funding Available:	$4,410,000
			Annual Deficit:	**$4,985,000**
Bridges & Culverts	**$58.3 m**	**Good**	Annual Requirement:	$1,127,000
			Funding Available:	$226,000
			Annual Deficit:	**$901,000**
Water Network Assets	**$162.5 m**	**Very Good**	Annual Requirement:	$2,706,000
			Funding Available:	$2,026,000
			Annual Deficit:	**$680,000**
Wastewater Network Assets	**$80.0 m**	**Good**	Annual Requirement:	$1,127,000
			Funding Available:	$955,000
			Annual Deficit:	**$172,000**
Stormwater Network	**$107.6 m**	**Fair**	Annual Requirement:	$1,532,000
			Funding Available:	$296,000
			Annual Deficit:	**$1,236,000**
Facilities	**$111.9 m**	**Poor**	Annual Requirement:	$3,665,000
			Funding Available:	$735,000
			Annual Deficit:	**$2,930,000**
Land Improvements	**$9.6 m**	**Fair**	Annual Requirement:	$397,000
			Funding Available:	$234,000
			Annual Deficit:	**$164,000**
Vehicles	**$18.8 m**	**Fair**	Annual Requirement:	$1,166,000
			Funding Available:	$232,000
			Annual Deficit:	**$933,000**
Machinery & Equipment	**$13.2 m**	**Fair**	Annual Requirement:	$1,157,000
			Funding Available:	$80,000
			Annual Deficit:	**$1,077,000**

17 Appendix B – 10-Year Capital Requirements

Road Network	Backlog	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Asphalt Roads	-	$1.7m	$8k	$636k	$452k	-	$787k	$1.5m	$1.7m	$1.3m	$2.9m
Gravel & Other Roads	-	-	-	-	-	-	$7.7m	-	-	-	-
Guiderails	$280k	$35k	-	-	$35k	-	$45k	-	-	-	$30k
Sidewalks	$12.1m	-	-	-	-	-	-	$212k	$112k	-	$70k
Street & Light Fixtures	$6.3m	$210k	$143k	$8k	-	$45k	$15k	$270k	$120k	$375k	$173k
Surface Treated Roads	-	$694k	$2.7m	$175k	$1.6m	$2.3m	$2.6m	$87k	$2.9m	-	$2.9m

Bridges and Culverts	Backlog	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Bridges	-	$740k	$486k	$714k	-	$639k	$639k	-	-	-	-
Culverts	-	$211k	$1.1m	$115k	$1.1m	-	$14.0m	-	-	-	$920k
Pedestrian Bridges	-	-	-	-	-	-	-	-	-	-	-

Water Network	Backlog	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Hydrants	$834k	$18k	$60k	$174k	$18k	$90k	$18k	$24k	$78k	$78k	$6k
Machinery & Equipment	$74k	-	-	$32k	$6k	-	$17k	$6k	-	-	$6k
Mains	$5k	$1k	$1k	-	-	-	$32k	$65k	$9k	$10k	$137k
Valves	$447k	$9k	$27k	$204k	$18k	$189k	$51k	$51k	$102k	$99k	$30k

Wastewater Network	Backlog	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Machinery & Equipment	$66k	-	-	-	-	-	$9k	-	-	-	-
Mains	$422k	-	-	-	-	$57k	-	-	$185k	$76k	-
Manholes	$12k	-	-	-	-	-	-	-	-	-	-

Stormwater Network	Backlog	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Catch Basins	$1.2m	$87k	$202k	$413k	$221k	$178k	$71k	$83k	$451k	$105k	$61k
Mains	$2.2m	-	-	$106k	-	-	-	$274k	-	$933k	-
Manholes	$222k	-	-	$6k	-	-	-	-	-	$90k	-

Facilities	Backlog	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Administration	$82k	-	$245k	$327k	-	$204k	-	$1.2m	$327k	-	$368k
Fire	$454k	-	-	$1.4m	-	$1.3m	-	$1.5m	$517k	-	$1.7m
Operations	$770k	-	-	$488k	-	$183k	-	$628k	$208k	-	$581k
Recreation	$3.6m	-	$433k	$6.9m	-	$7.6m	-	$6.4m	$8.6m	-	$6.9m

Land Improvements	Backlog	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Lighting	$241k	$37k	$96k	$16k	-	-	-	-	-	-	-
Outdoor Structures	$47k	-	-	-	-	-	-	$15k	-	$15k	$11k
Parking Lots	$462k	-	-	-	-	-	$60k	$15k	$41k	-	-
Paved Paths	$88k	-	-	$136k	-	$28k	-	$27k	$34k	$201k	$28k
Play Structures	$443k	$59k	$24k	$162k	$4k	-	$10k	$601k	$84k	-	-
Sport Fields & Courts	$274k	-	$5k	-	-$16K	$22k	$26k	$92k	-	-	$50k
Sprinklers	$58k	$17k	-	-	-	-	-	$32k	-	-	-

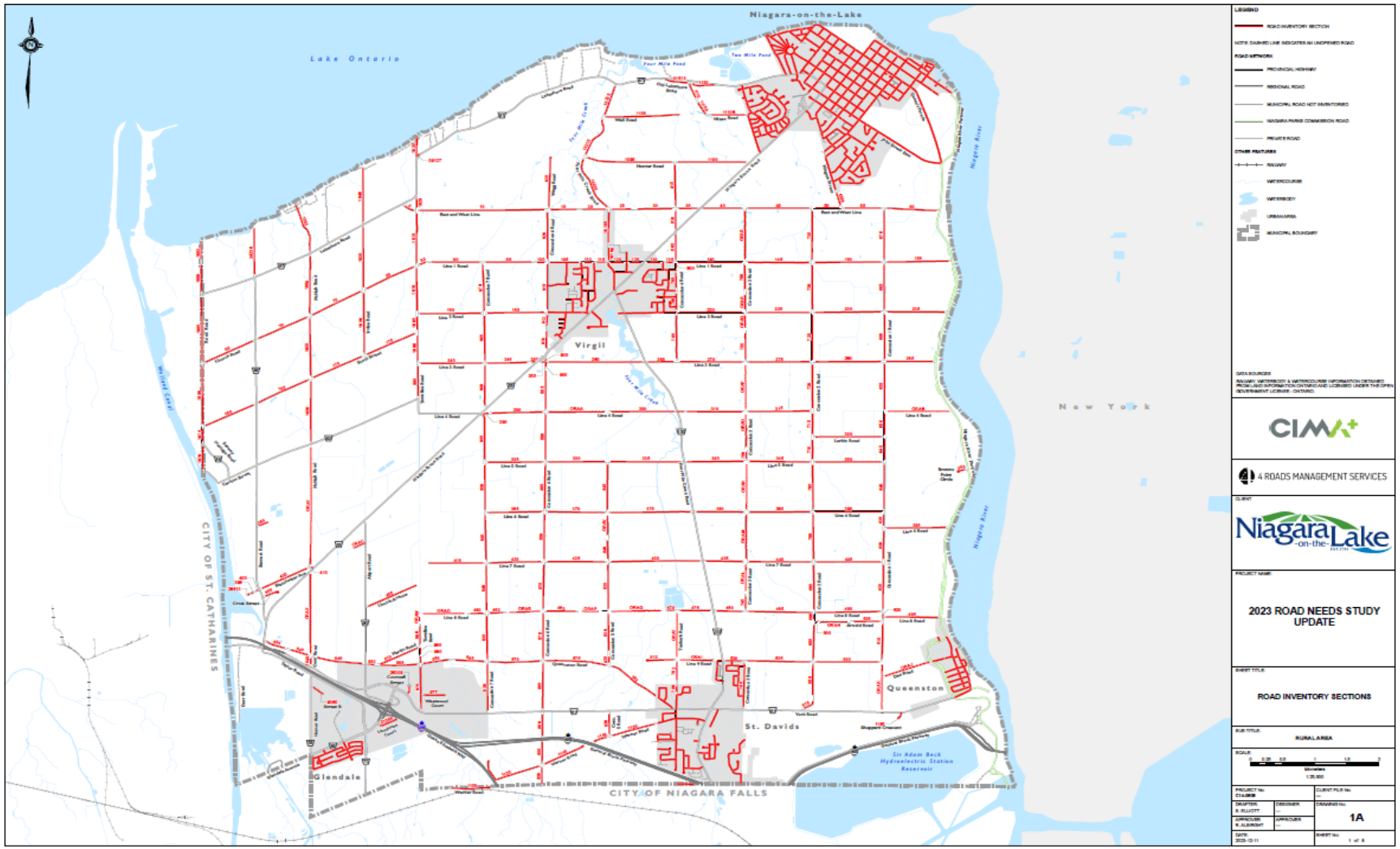
Vehicles	Backlog	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
By-Law Enforcement	$57k	-	-	-	-	-	-	-	-	$57k	-
Fire	$1.2m	-	$63k	$2.0m	$975k	-	$975k	$975k	-	$223k	$676k
Parks & Recreation	$96k	$20k	-	$99k	$161k	-	$209k	-	-	$19k	$127k
Public Works	$2.0m	-	$160k	$648k	$174k	-	$302k	$510k	$668k	-	-

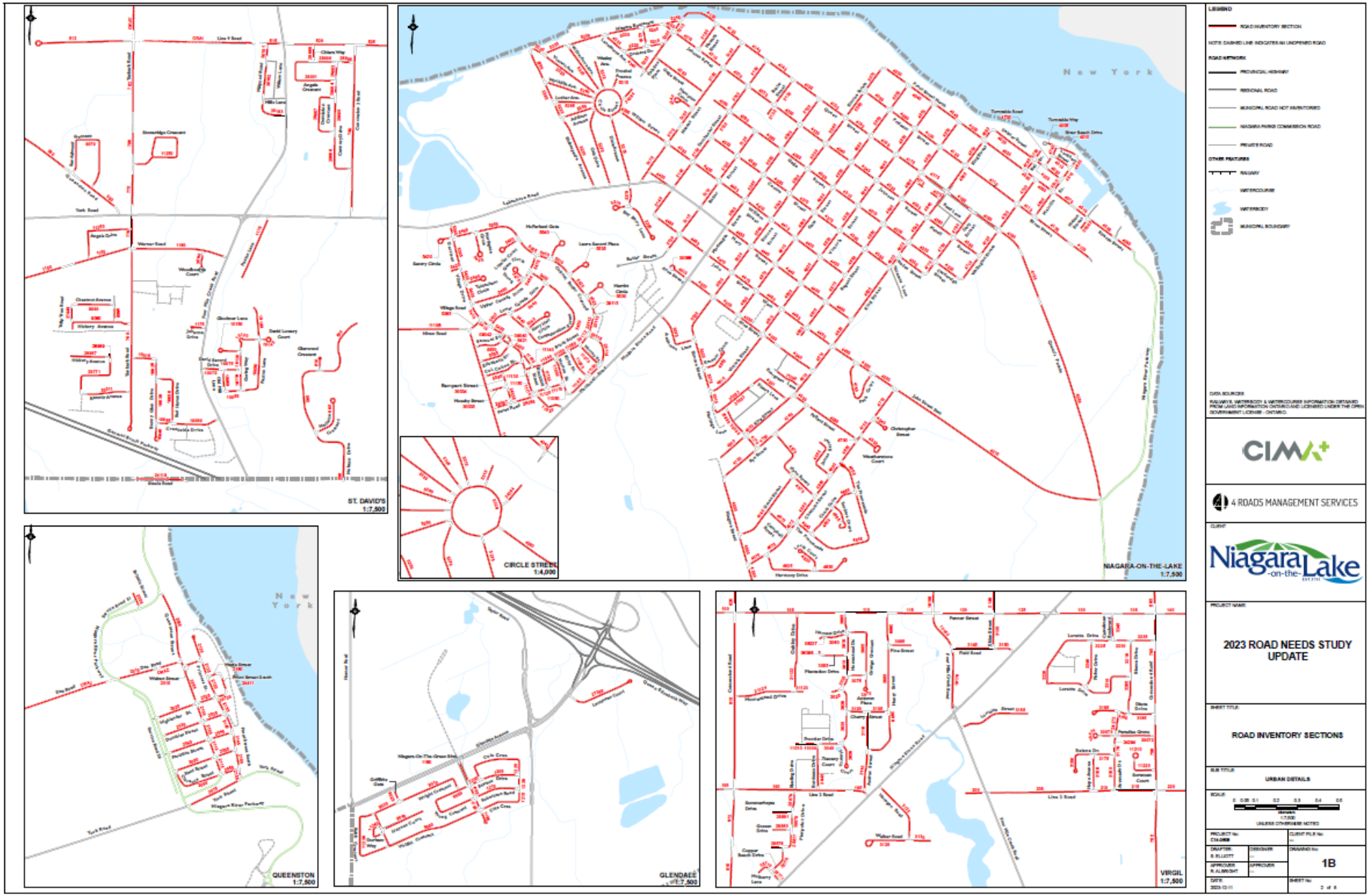
Machinery and Equipment	Backlog	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Administration	-	-	-	-	-	-	-	$12k	-	-	-
Cemetery	-	-	-	$13k	$7k	-	-	-	-	-	-
Fire	$253k	$715k	$29k	$36k	$19k	$1.1m	$22k	$42k	$212k	$16k	$1.3m
IT	-	-	$13k	$50k	$82k	$564k	$375k	$17k	$129k	$54k	$375k
Parks & Recreation	$1.1m	$703k	$166k	$83k	$212k	$22k	$114k	$168k	$40k	$452k	$126k
Public Works	$386k	-	-	$86k	$210k	$105k	-	$169k	$20k	$6k	$9k
Roads	$327k	$31k	$24k	$11k	$13k	$63k	$69k	-	$37k	$66k	$26k

18 Appendix C – Level of Service Maps & Photos

18.1.1.1 Road Network

18.1.1.1.1 Maps of Roads

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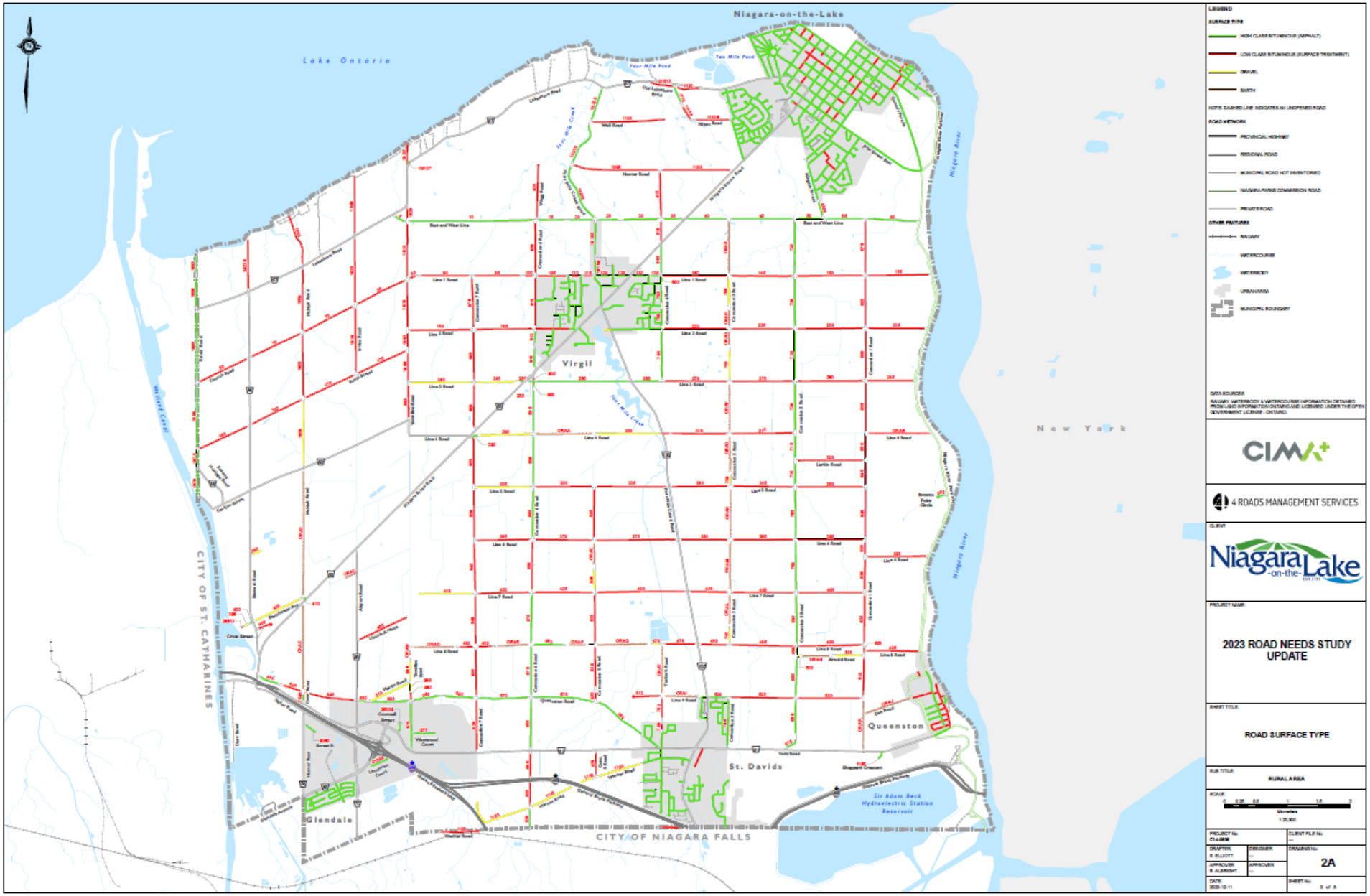
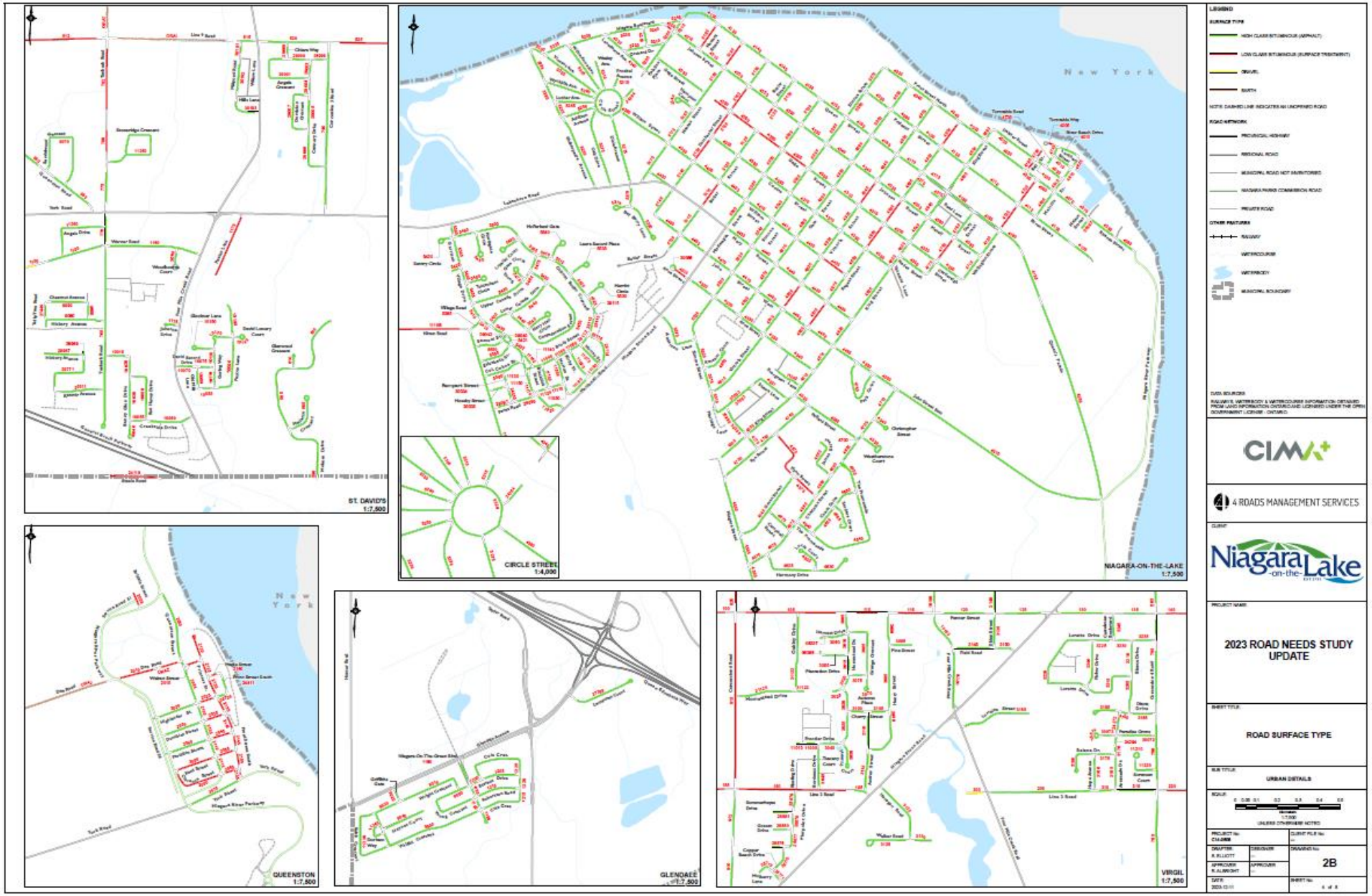
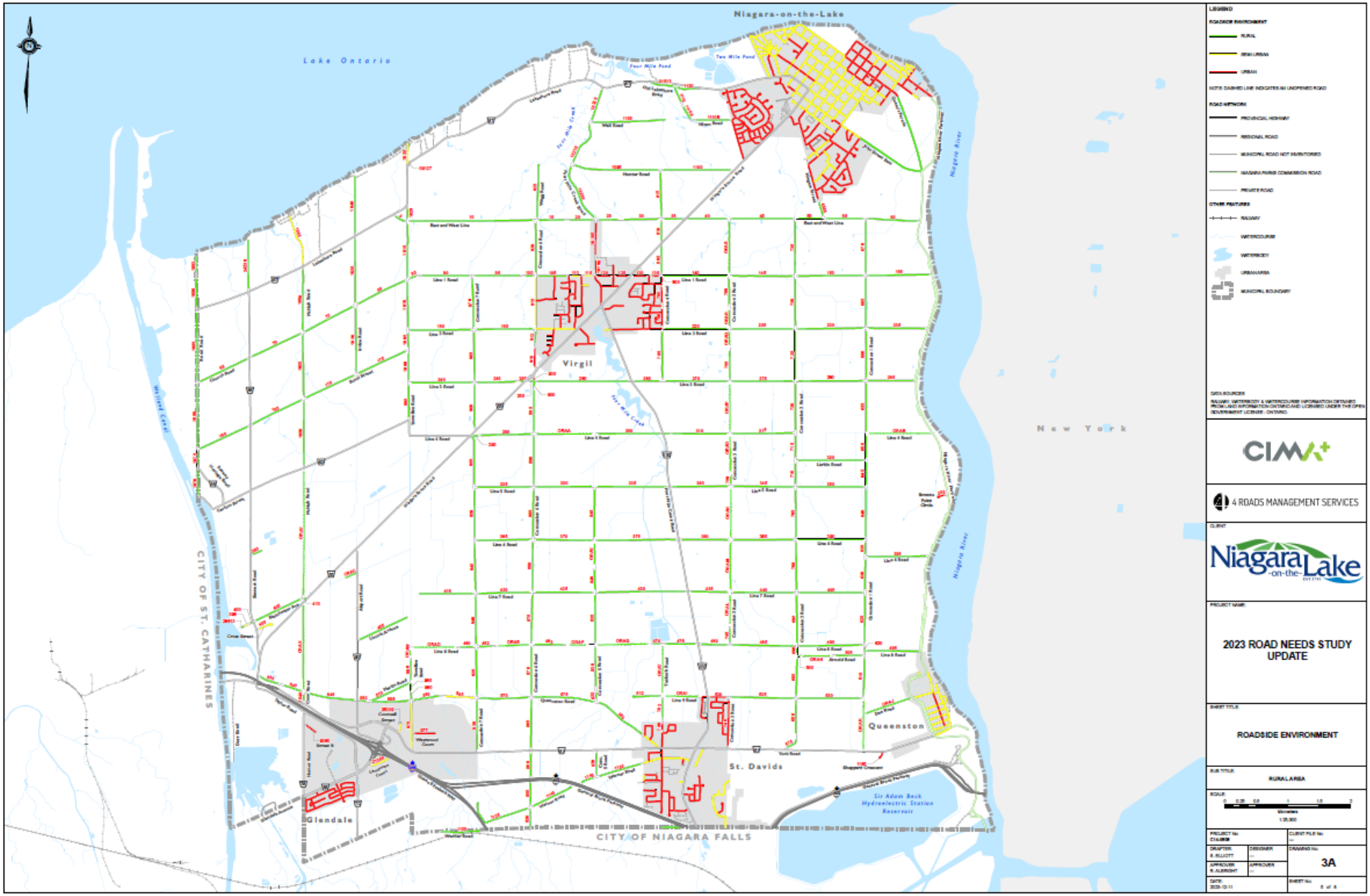
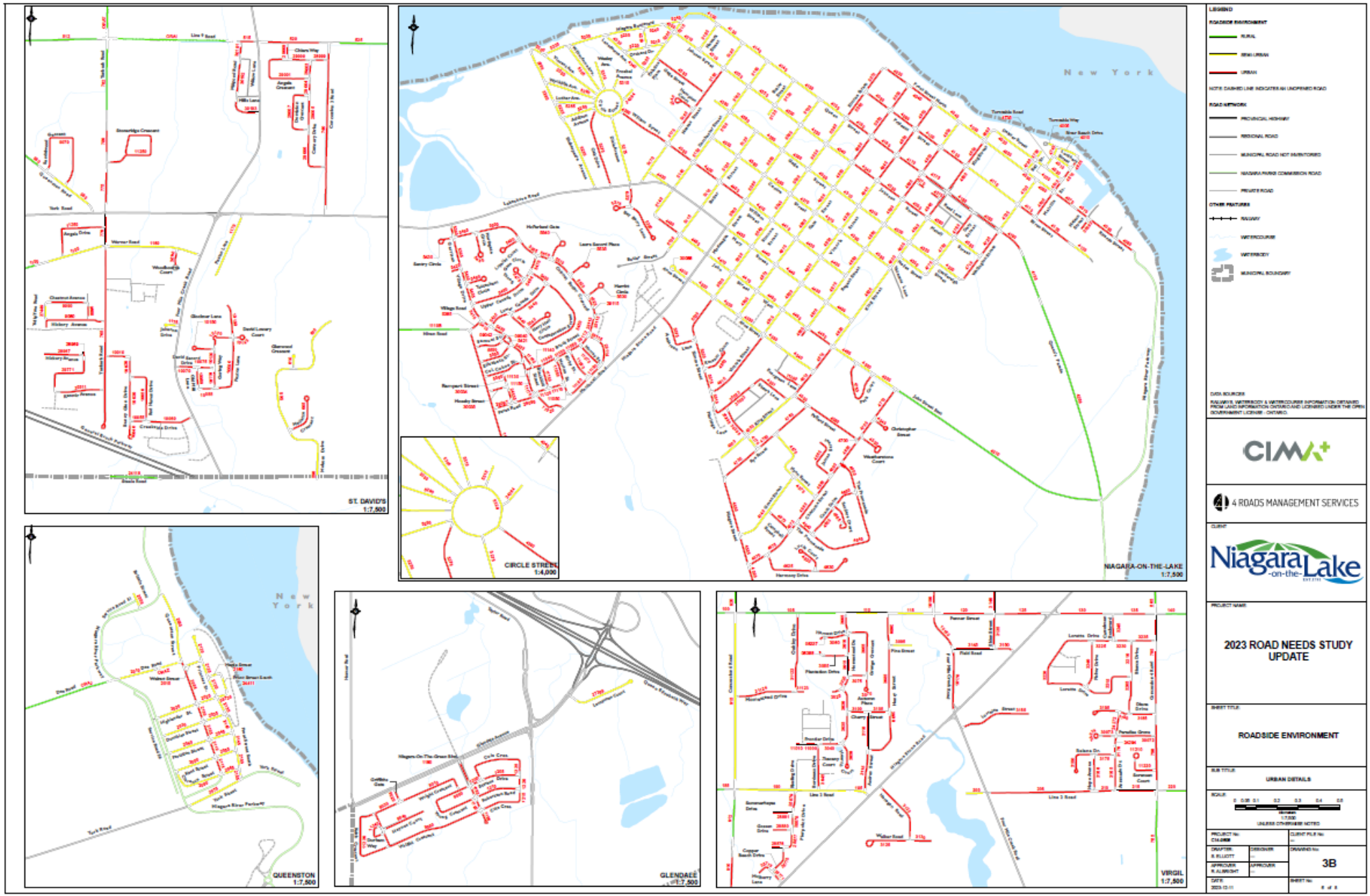
CIRCLE STREET
1:4,000
NIAGARA-ON-THE-LAKE
1:7,500
QUEENSTON
1:7,500
GLENDALE
1:7,500
VIRGIL
1:7,500
LEGEND
ROAD INVENTORY SECTION
NOTE: DASHED LINE INDICATES AN UNOPENED ROAD
ROAD NETWORK
PROVINCIAL HIGHWAY
REGIONAL ROAD
MUNICIPAL ROAD NOT INVENTORIED
NIAGARA PARKS COMMISSION ROAD
PRIVATE ROAD
OTHER FEATURES
RAILWAY
WATERCOURSE
WATERBODY
MUNICIPAL BOUNDARY
DATA SOURCES
CIMA+
4 ROADS MANAGEMENT SERVICES
Niagara-on-the-Lake
2023 ROAD NEEDS STUDY UPDATE
ROAD INVENTORY SECTIONS
URBAN DETAILS
1B


Niagara-on-the-Lake
Lake Ontario
Virgil
St. Davids
Queenston
Glendale
CITY OF ST. CATHARINES
CITY OF NIAGARA FALLS
New York
Niagara River
Welland Canal
Sir Adam Beck Hydroelectric Station Reservoir
LEGEND
SURFACE TYPE
ROAD NETWORK
OTHER FEATURES
RAILWAY
WATERCOURSE
WATERBODY
URBAN AREA
MUNICIPAL BOUNDARY
CIMA+
4 ROADS MANAGEMENT SERVICES
Niagara-on-the-Lake
2023 ROAD NEEDS STUDY UPDATE
ROAD SURFACE TYPE
RURAL AREA
2A

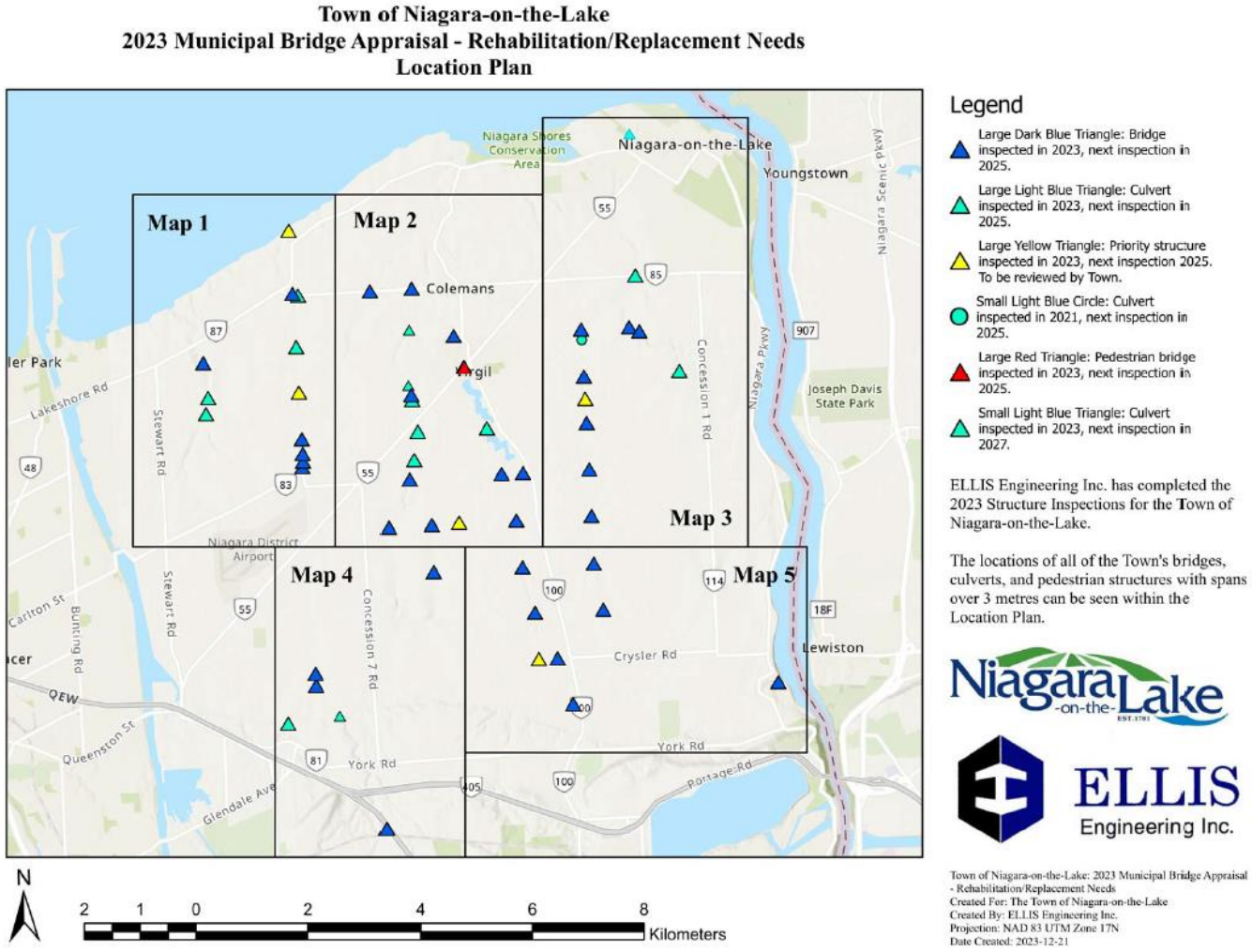

ST. DAVIDS
1:7,500
CIRCLE STREET
1:4,000
NIAGARA-ON-THE-LAKE
1:7,500
QUEENSTON
1:7,500
GLENDALE
1:7,500
VIRGIL
1:7,500
LEGEND
SURFACE TYPE
HIGH CLASS BITUMINOUS (ASPHALT)
LOW CLASS BITUMINOUS (SURFACE TREATMENT)
GRAVEL
EARTH
NOTE: DASHED LINE INDICATES AN UNOPENED ROAD
ROAD NETWORK
PROVINCIAL HIGHWAY
REGIONAL ROAD
MUNICIPAL ROAD NOT MAINTAINED
NIAGARA PARKS COMMISSION ROAD
PRIVATE ROAD
OTHER FEATURES
RAILWAY
WATERCOURSE
WATERBODY
MUNICIPAL BOUNDARY
DATA SOURCES
RAILWAYS, WATERBODY & WATERCOURSE INFORMATION OBTAINED FROM LAND INFORMATION ONTARIO AND LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO.
CIMA+
4 ROADS MANAGEMENT SERVICES
CLIENT
Niagara-on-the-Lake
PROJECT NAME
2023 ROAD NEEDS STUDY UPDATE
SHEET TITLE
ROAD SURFACE TYPE
SUB TITLE
URBAN DETAILS
SCALE
1:7,500
UNLESS OTHERWISE NOTED
PROJECT No.
CIM-0008
CLIENT FILE No.
DRAFTER
R. ELLIOTT
DESIGNER
CHECKED
R. ALBRIGHT
APPROVER
DRAWING No.
2B
DATE
SHEET No.


Niagara-on-the-Lake
Lake Ontario
Virgil
Queenston
St. Davids
Glendale
CITY OF ST. CATHARINES
CITY OF NIAGARA FALLS
New York
Niagara River
2023 ROAD NEEDS STUDY UPDATE
ROADSIDE ENVIRONMENT
RURAL AREA
3A

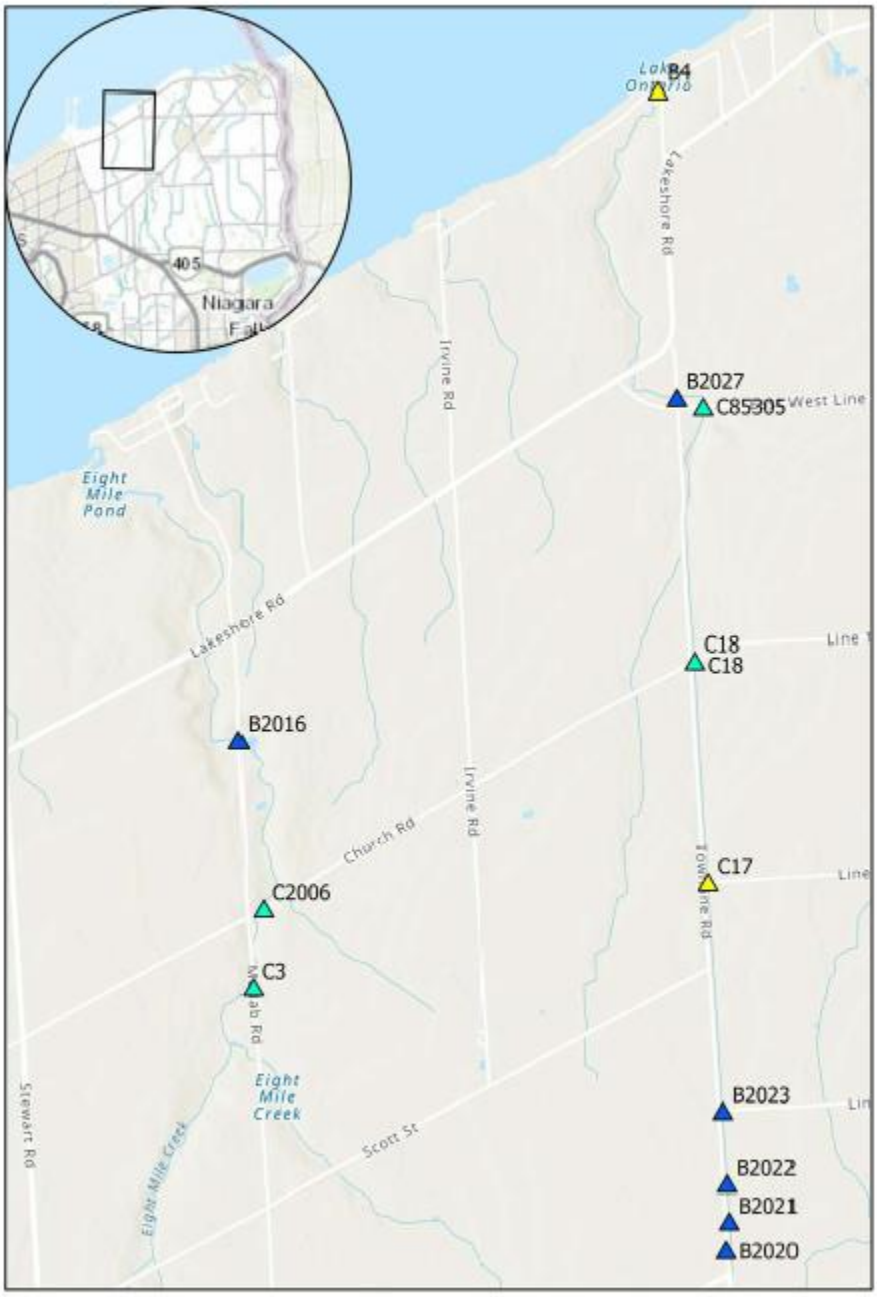

ST. DAVIDS
1:7,500
CIRCLE STREET
1:4,000
NIAGARA-ON-THE-LAKE
1:7,500
QUEENSTON
1:7,500
GLENDALE
1:7,500
VIRGIL
1:7,500
LEGEND
ROADSIDE ENVIRONMENT
RURAL
SEMI-URBAN
URBAN
ROAD NETWORK
PROVINCIAL HIGHWAY
REGIONAL ROAD
MUNICIPAL ROAD NOT MAINTAINED
NIAGARA PARKS COMMISSION ROAD
PRIVATE ROAD
OTHER FEATURES
RAILWAY
WATERCOURSE
WATERBODY
MUNICIPAL BOUNDARY
CIMA+
4 ROADS MANAGEMENT SERVICES
Niagara-on-the-Lake
2023 ROAD NEEDS STUDY UPDATE
ROADSIDE ENVIRONMENT
URBAN DETAILS
3B

18.1.1.2 Bridges and Culverts

18.1.1.2.1 Map of Bridges and Culverts



Town of Niagara-on-the-Lake: 2023 Municipal Bridge Appraisal - Rehabilitation/Replacement Needs Location Plan - Map 1



Legend

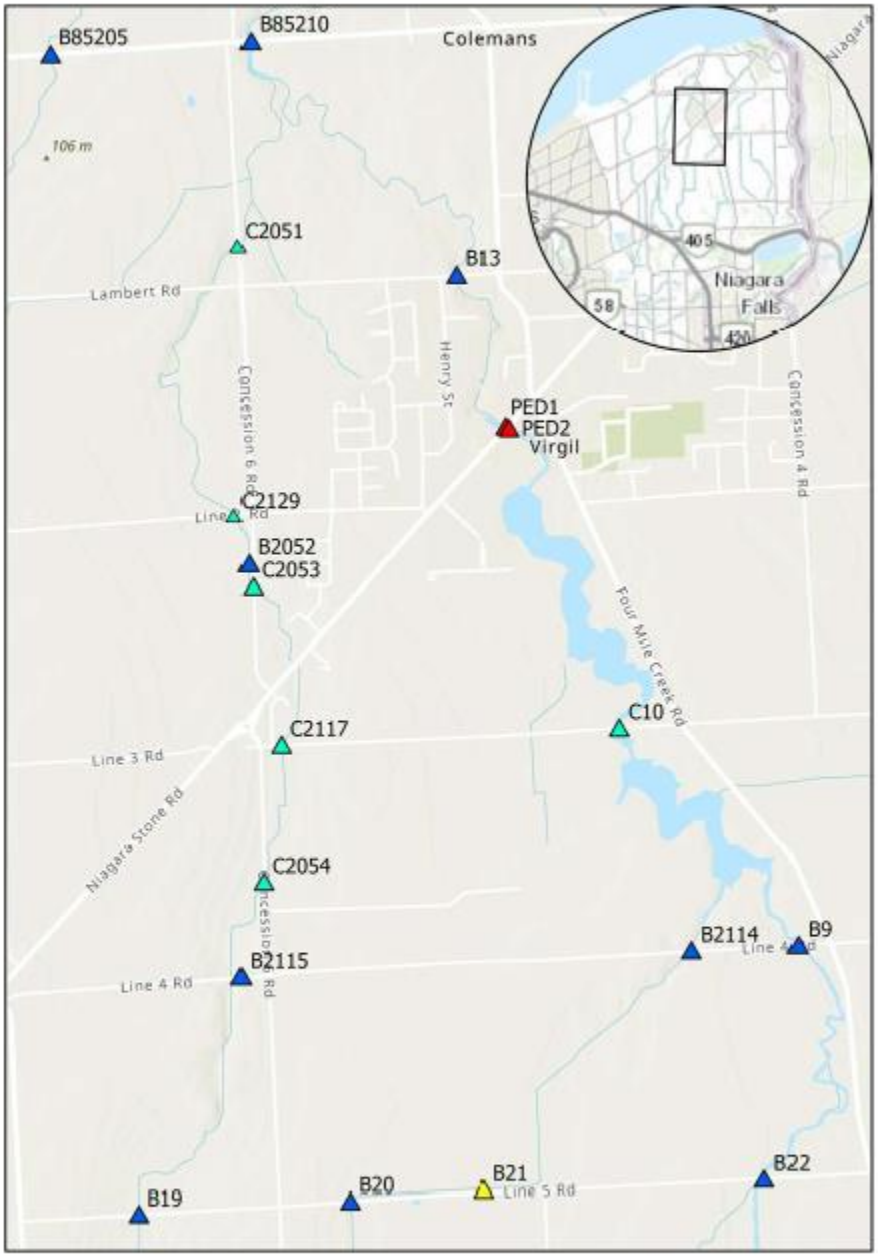
- Large Dark Blue Triangle: Bridge inspected in 2023, next inspection in 2025.
- Large Light Blue Triangle: Culvert inspected in 2023, next inspection in 2025.
- Large Yellow Triangle: Priority structure inspected in 2023, next inspection 2025. To be reviewed by Town.
- Small Light Blue Circle: Culvert inspected in 2021, next inspection in 2025.
- Large Red Triangle: Pedestrian bridge inspected in 2023, next inspection in 2025.
- Small Light Blue Triangle: Culvert inspected in 2023, next inspection in 2027.

N

0 0 0 0 0 0 0 1 Kilometers

Town of Niagara-on-the-Lake: 2023 Municipal Bridge Appraisal Rehabilitation/Replacement Needs - Location Plan - Map 1
Created For: The Town of Niagara-on-the-Lake
Created By: ELLIS Engineering Inc.
Projection: NAD 83 UTM Zone 17N
Date Created: 2023-12-21

Town of Niagara-on-the-Lake: 2023 Municipal Bridge Appraisal - Rehabilitation/Replacement Needs Location Plan - Map 2



Legend

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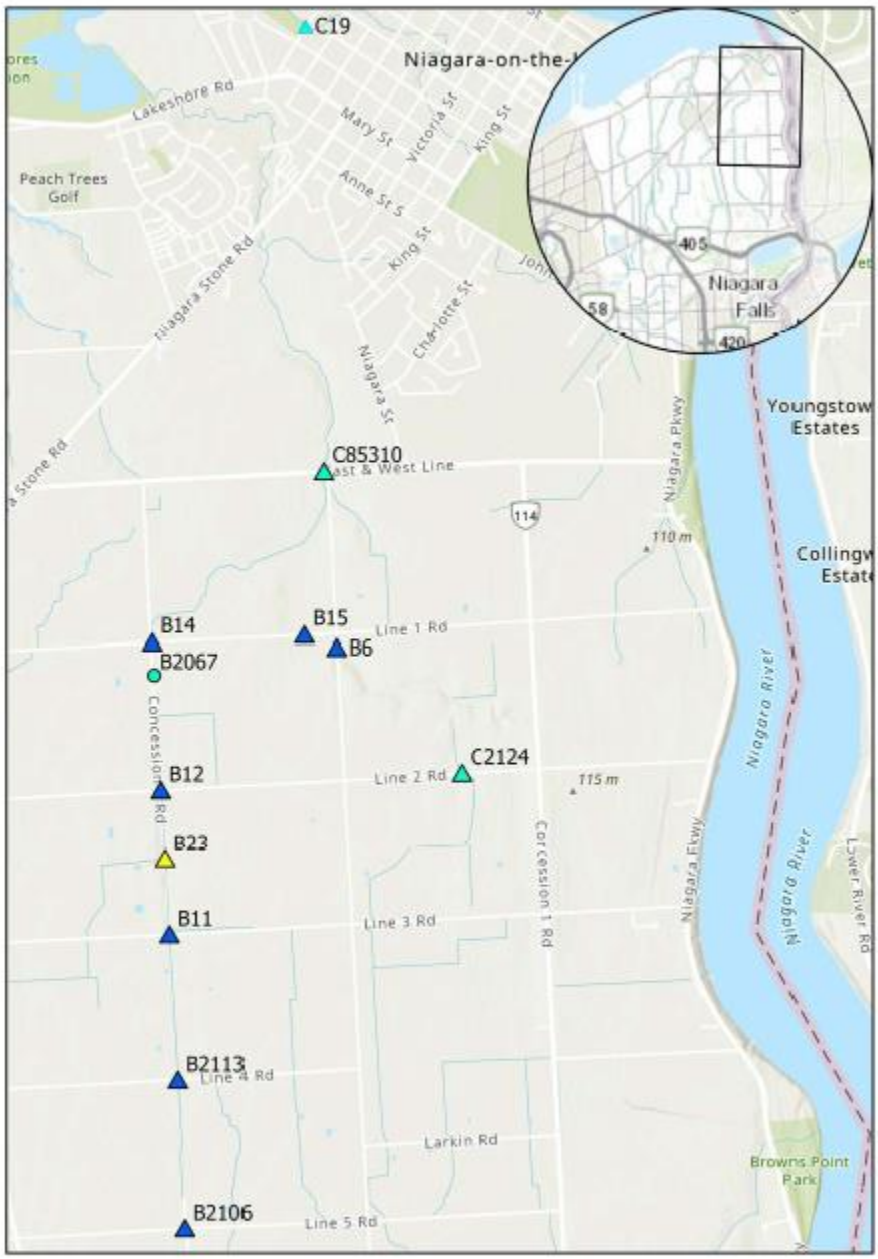
- Small Light Blue Circle: Culvert inspected in 2021, next inspection in 2025
- Large Red Triangle: Pedestrian bridge inspected in 2023, next inspection in 2025.
- Small Light Blue Triangle: Culvert inspected in 2023, next inspection in 2027.

N

0 0 0 0 0 0 1 Kilometers

Town of Niagara-on-the-Lake: 2023 Municipal Bridge Appraisal Rehabilitation/Replacement Needs - Location Plan - Map 2
Created For: The Town of Niagara-on-the-Lake
Created By: ELLIS Engineering Inc.
Projection: NAD 83 UTM Zone 17N
Date Created: 2023-12-21

Town of Niagara-on-the-Lake: 2023 Municipal Bridge Appraisal - Rehabilitation/Replacement Needs Location Plan - Map 3



Legend

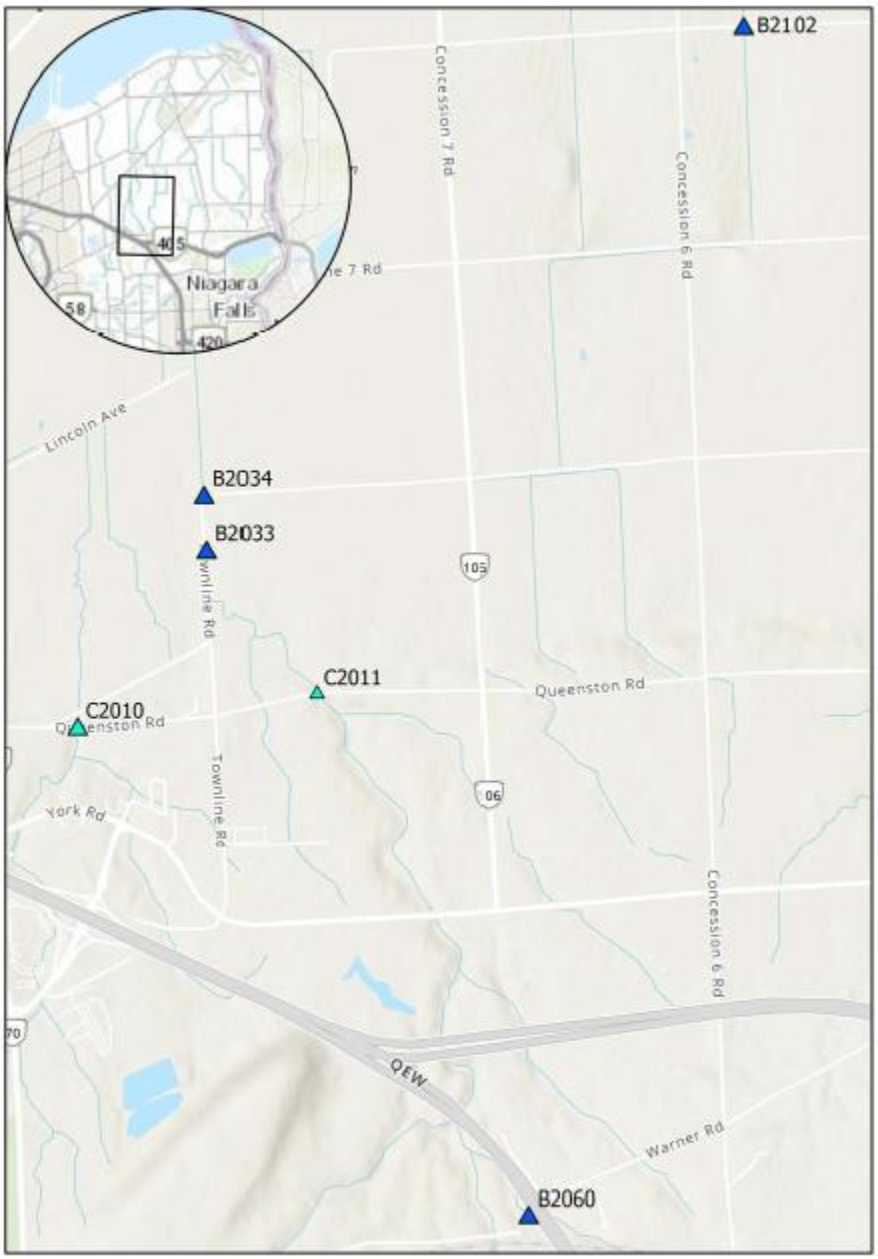
- Large Dark Blue Triangle: Bridge inspected in 2023, next inspection in 2025.
- Large Light Blue Triangle: Culvert inspected in 2023, next inspection in 2025.
- Large Yellow Triangle: Priority structure inspected in 2023, next inspection 2025. To be reviewed by Town.
- Small Light Blue Circle: Culvert inspected in 2021, next inspection in 2025
- Large Red Triangle: Pedestrian bridge inspected in 2023, next inspection in 2025.
- Small Light Blue Triangle: Culvert inspected in 2023, next inspection in 2027.

N

0 0 0 0 1 1 1 Kilometers

Town of Niagara-on-the-Lake: 2021 Municipal Bridge Appraisal Rehabilitation/Replacement Needs - Location Plan - Map 3
Created For: The Town of Niagara-on-the-Lake
Created By: ELLIS Engineering Inc.
Projection: NAD 83 UTM Zone 17N
Date Created: 2021-11-11

Town of Niagara-on-the-Lake: 2023 Municipal Bridge Appraisal - Rehabilitation/Replacement Needs Location Plan - Map 4



Legend

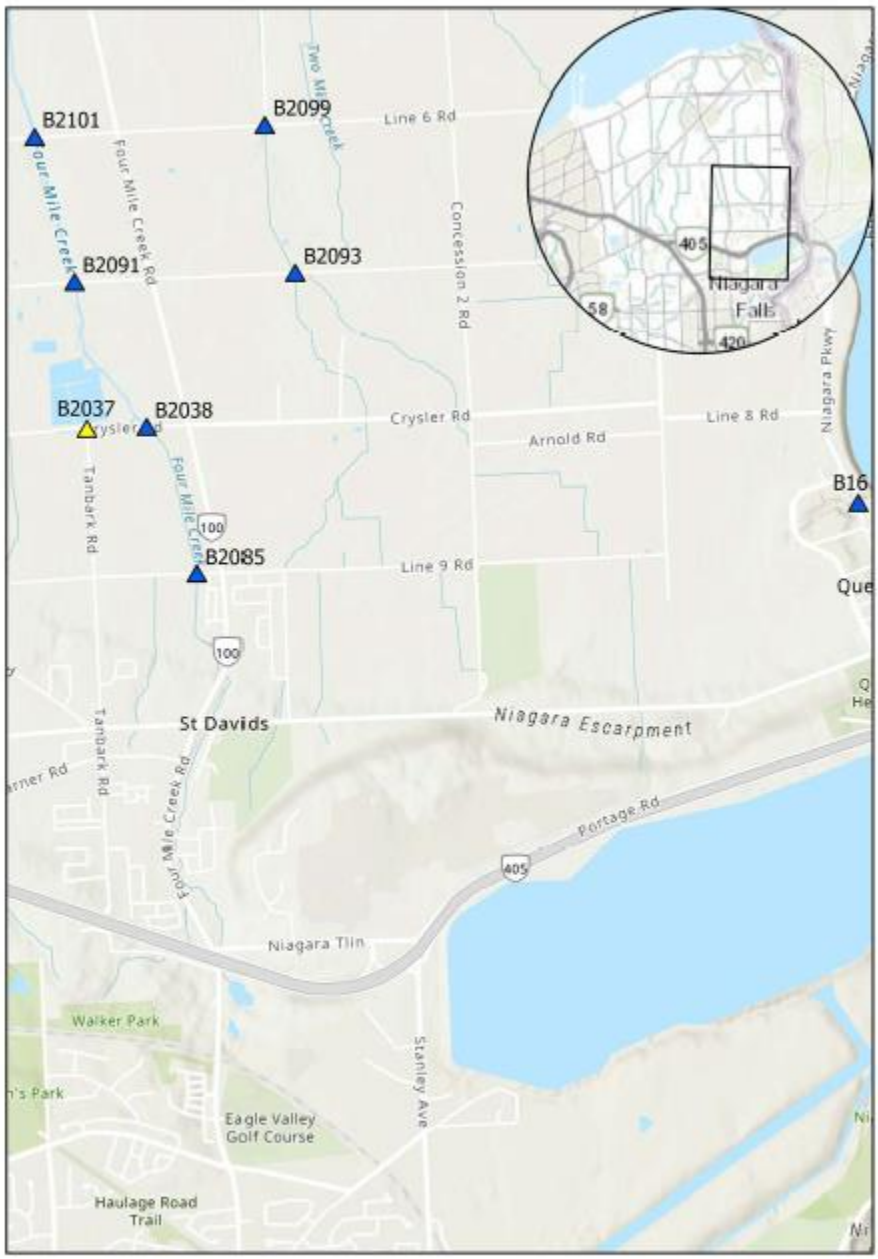
- Large Dark Blue Triangle: Bridge inspected in 2023, next inspection in 2025.
- Large Light Blue Triangle: Culvert inspected in 2023, next inspection in 2025.
- Large Yellow Triangle: Priority structure inspected in 2023, next inspection 2025. To be reviewed by Town.
- Small Light Blue Circle: Culvert inspected in 2021, next inspection in 2025.
- Large Red Triangle: Pedestrian bridge inspected in 2023, next inspection in 2025.
- Small Light Blue Triangle: Culvert inspected in 2023, next inspection in 2027.

N

0 0 0 0 0 0 1 Kilometers

Town of Niagara-on-the-Lake: 2023 Municipal Bridge Appraisal Rehabilitation/Replacement Needs - Location Plan - Map 4
Created For: The Town of Niagara-on-the-Lake
Created By: ELLIS Engineering Inc.
Projection: NAD 83 UTM Zone 17N
Date Created: 2023-12-21

Town of Niagara-on-the-Lake: 2023 Municipal Bridge Appraisal - Rehabilitation/Replacement Needs Location Plan - Map 5



Legend

- Large Dark Blue Triangle: Bridge inspected in 2023, next inspection in 2025.
- Large Light Blue Triangle: Culvert inspected in 2023, next inspection in 2025.
- Large Yellow Triangle: Priority structure inspected in 2023, next inspection 2025. To be reviewed by Town.
- Small Light Blue Circle: Culvert inspected in 2021, next inspection in 2025
- Large Red Triangle: Pedestrian bridge inspected in 2023, next inspection in 2025.
- Small Light Blue Triangle: Culvert inspected in 2023, next inspection in 2027.

N

0 0 0 0 1 1 1 Kilometers

Town of Niagara-on-the-Lake: 2023 Municipal Bridge Appraisal Rehabilitation/Replacement Needs - Location Plan - Map 5
Created For: The Town of Niagara-on-the-Lake
Created By: ELLIS Engineering Inc.
Projection: NAD 83 UTM Zone 17N
Date Created: 2021-12-21

TOWN OF NIAGARA-ON-THE-LAKE

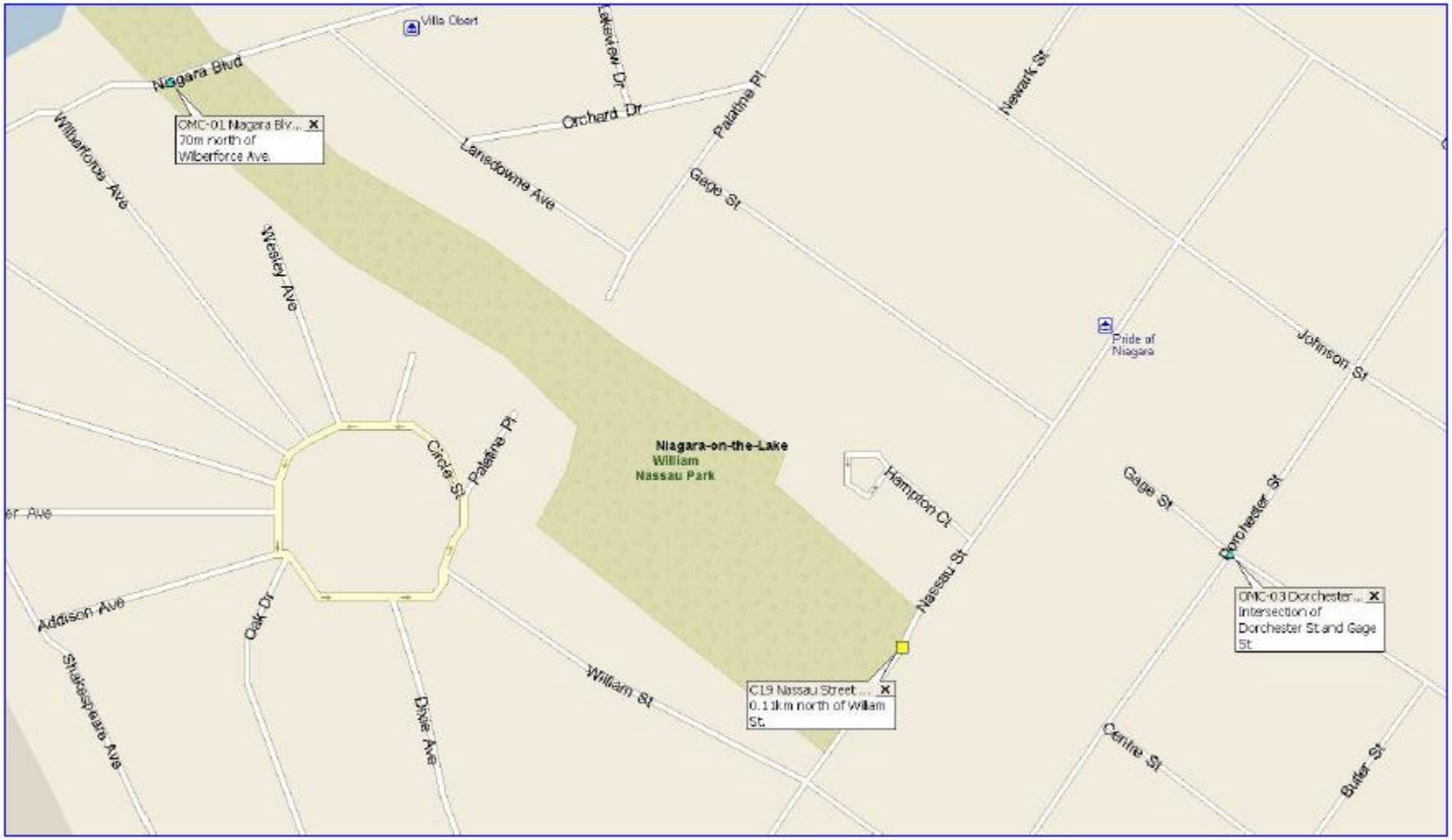
2024 ONE MILE CREEK STRUCTURE INSPECTIONS
REHABILITATION/REPLACEMENT NEEDS

LOCATION PLAN

TOWN OF NIAGARA-ON-THE-LAKE

2024 ONE MILE CREEK STRUCTURE INSPECTIONS
REHABILITATION/REPLACEMENT NEEDS

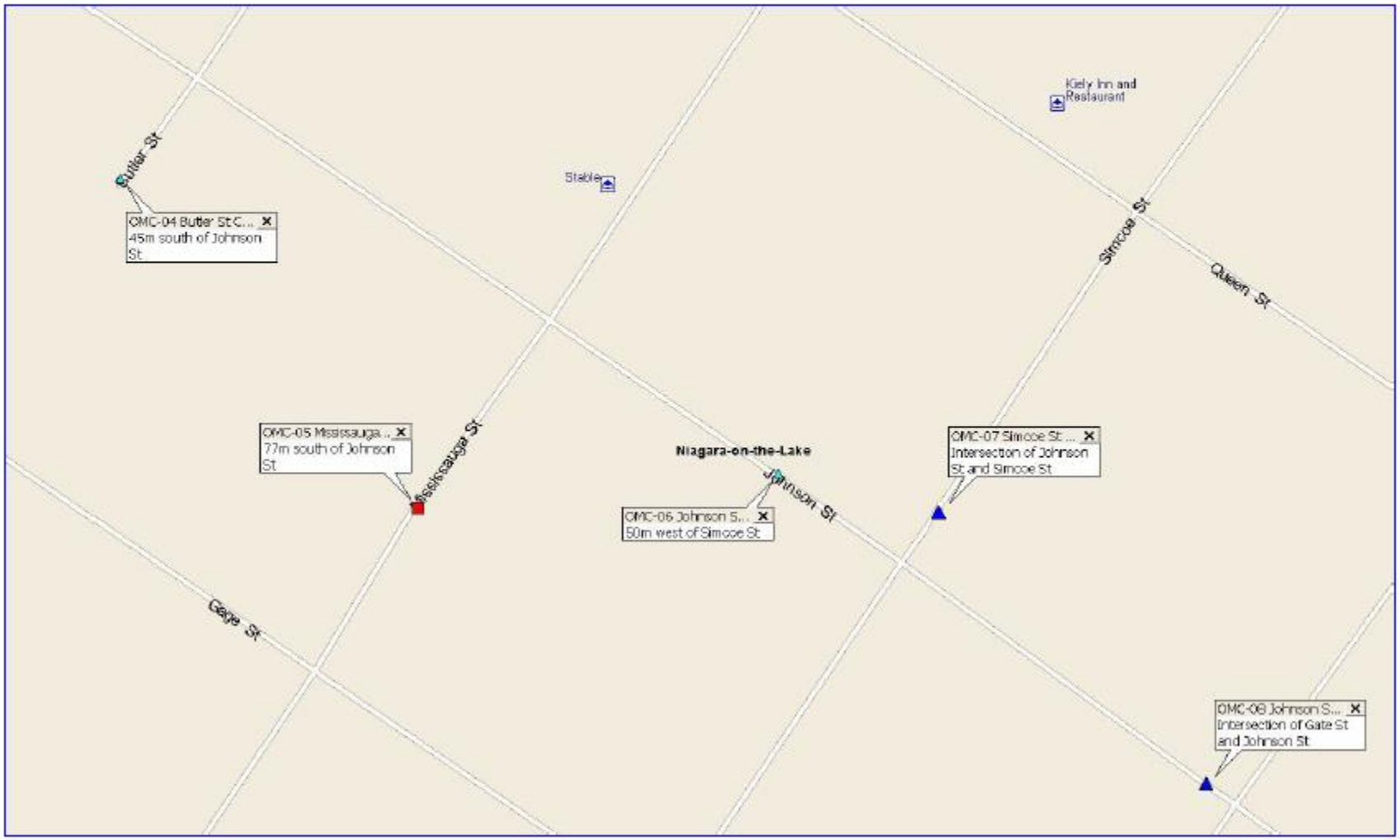
LOCATION PLAN – MAP 1



TOWN OF NIAGARA-ON-THE-LAKE

2024 ONE MILE CREEK STRUCTURE INSPECTIONS
REHABILITATION/REPLACEMENT NEEDS

LOCATION PLAN – MAP 2



TOWN OF NIAGARA-ON-THE-LAKE

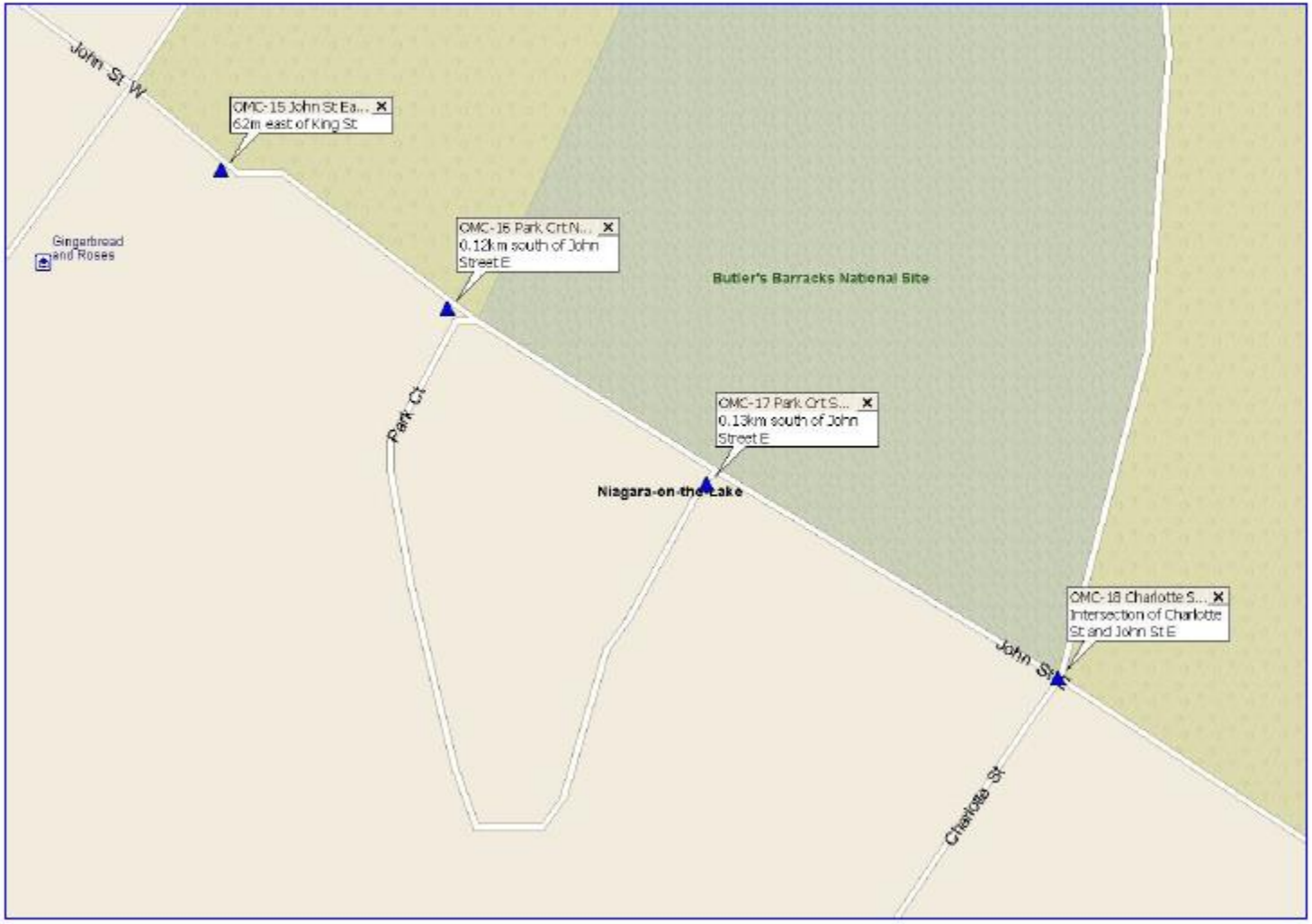
2024 ONE MILE CREEK STRUCTURE INSPECTIONS
REHABILITATION/REPLACEMENT NEEDS

LOCATION PLAN – MAP 3

TOWN OF NIAGARA-ON-THE-LAKE

2024 ONE MILE CREEK STRUCTURE INSPECTIONS
REHABILITATION/REPLACEMENT NEEDS

LOCATION PLAN – MAP 4



18.1.1.2.2 Photos of Bridges and Culverts

Bridge Name: Concession 2 Road (B6), Captured 11th July 2023, Condition: 88/100 (Very Good)

Photograph No. 1: 0227: Roadway over the structure looking north.

Photograph No. 2: 0248: East elevation.

Photograph No. 3: 0285: West elevation.

Photograph No. 4: 0258: Underside of the structure looking west.

Bridge Name: Shore Lane (B4), Captured 20th June 2023, Condition: 63/100 (Fair)

Photograph No. 1: 0766: Roadway over the structure looking east.


Photograph No. 2: 0771: South elevation.

Photograph No. 3: 0788: Underside of the structure and east abutment looking east.

Photograph No. 4: 0778: Area of severe corrosion on west exterior girder.

Bridge Name: Concession 3 Road (B23), Captured July 2023, Condition: 10/100 (Very Poor)

Photograph No. 1: 0718: Driveway over the structure looking east.

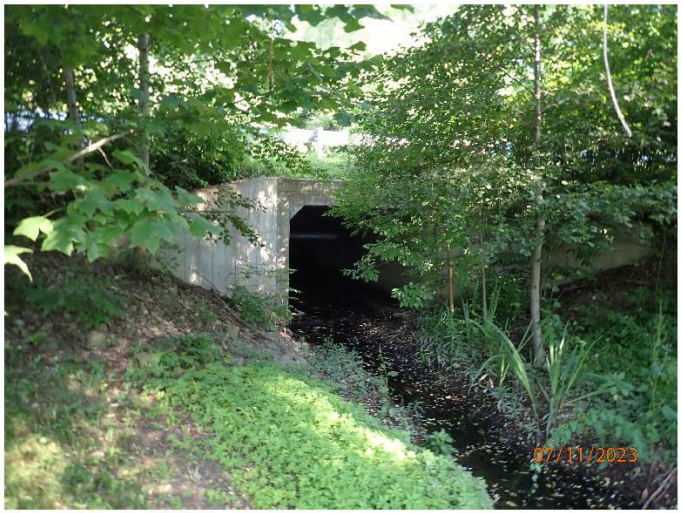

Photograph No. 2: 0724: North elevation.

Photograph No. 3: 0725: South elevation.

Photograph No. 4: 0722: Concrete barrier at west end.

Culvert Name: Nassau Street Culvert (C19), Captured July 2023, Condition: 85/100 (Very Good)

Photograph No. 1: 0012: Roadway over the structure looking south.



Photograph No. 2: 0039: East elevation.

Photograph No. 3: 0050: Underside of the structure looking west.

Photograph No. 4: 0020: Detached post at southeast corner.

Culvert Name: Regent Street Culvert (OMC-13), Captured June 2024, Condition: 55/100 (Poor)

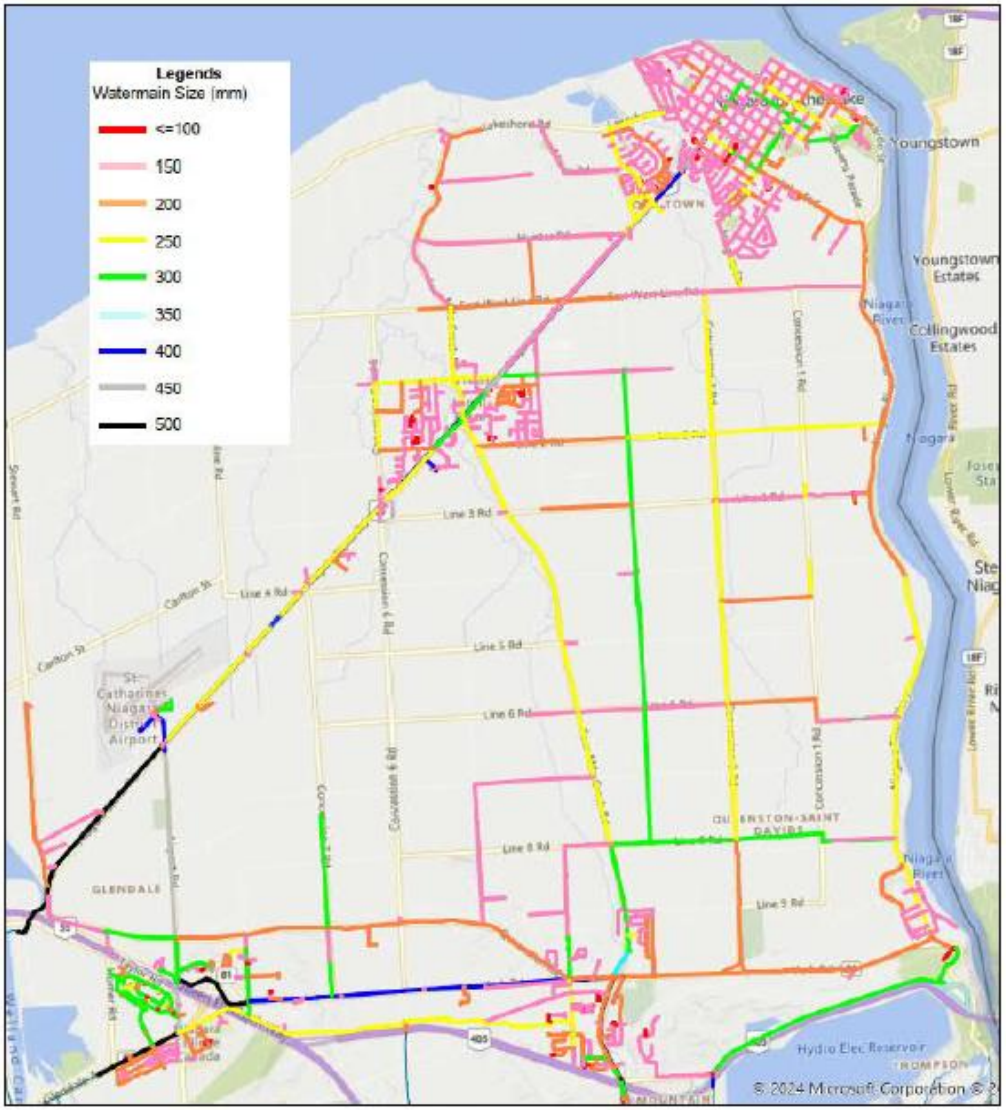
Photograph No. 1: 0419: Roadway over the structure looking south.

Photograph No. 2: 0437: West elevation.

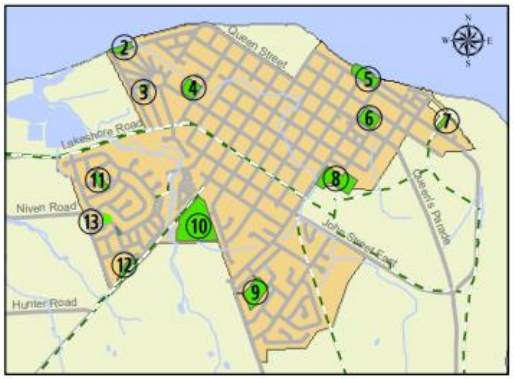
Photograph No. 3: 0442: Interior of west half of structure looking east.

Photograph No. 4: 0449: Area of failure in concrete arch at west end of structure.

18.1.2 Map of the Water Network



18.1.3 Map of Parks



2017 Prepared by the Town of Niagara-on-the-Lake GIS

19 Appendix D – Risk Rating Criteria

19.1 Probability of Failure

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Probability of Failure Score
Road Network (Asphalt / Gravel Roads/ Surface Treated)	Condition	100%	70-100	1-Rare
			55-69	2- Unlikely
			35-54	3- Possible
			20-34	4- Likely
			0-19	5- Almost Certain
Bridges & Culverts	Condition	100%	80-100	1-Rare
			70-79	2- Unlikely
			60-69	3- Possible
			20-59	4- Likely
			0-19	5- Almost Certain
All Others	Condition	100%	80-100	1-Rare
			60-79	2- Unlikely
			40-59	3- Possible
			20-39	4- Likely
			0-19	5- Almost Certain

19.2 Consequence of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Road Network (Asphalt)	Economic (60%)	Replacement Cost (100%)	<$100,000	1-Insignifcant
			$100,000 - $400,000	2- Minor
			$400,000 - $650,000	3- Moderate
			$650,000 - $1,500,000	4- Major
			$1,500,000-$4,000,000	5- Severe
	Operational (40%)	AADT (70%)	0-200	1-Insignifcant
			201-500	2- Minor
			501-1000	3- Moderate
			1001-3000	4- Major
			3001-6500	5- Severe
		Roadside Environment (30%)	R -> 2 - Minor	1-Insignifcant
			S -> 3 - Moderate	2- Minor
			U -> 4 - Major	3- Moderate
Road Network (Surface Treated)	Economic (60%)	Replacement Cost (100%)	$0-$100,000	1-Insignifcant
			$100,000-$350,000	2- Minor
			$350,000-$500,000	3- Moderate
			$500,000-$1,000,000	4- Major
			$1,000,000-$4,000,000	5- Severe
	Operational (40%)	AADT (80%)	0-100	1-Insignifcant
			101-300	2- Minor

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
			301-700	3- Moderate
			701-1000	4- Major
			1001-2500	5- Severe
		Roadside Environment (20%)	Rural -> 2 - Minor	1-Insignifcant
			Suburban -> 3 - Moderate	2- Minor
			Urban -> 4 - Major	3- Moderate
Road Network (Gravel)	Economic (60%)	Replacement Cost (100%)	0-$75,000	1-Insignifcant
			$75,000-$250,000	2- Minor
			$250,000-$400,000	3- Moderate
			$400,000-$600,000	4- Major
			$600,000-$800,000	5- Severe
	Operational (40%)	AADT (80%)	0-100	1-Insignifcant
			101-300	2- Minor
			301-700	3- Moderate
			701-1000	4- Major
			1001-2500	5- Severe
		Roadside Environment (20%)	Rural -> 2 - Minor	1-Insignifcant
			Suburban -> 3 - Moderate	2- Minor
			Urban -> 4 - Major	3- Moderate
Bridges & Culverts	Economic (100%)	Replacement Cost (100%)	<$100,000	1-Insignifcant
			$100,000 - $400,000	2- Minor
			$400,000 - $650,000	3- Moderate
			$650,000 - $850,000	4- Major
			$850,000-$1,000,000	5- Severe

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Facilities	Economic (65%)	Replacement Cost (100%)	<$50,000	1-Insignifcant
			$50,000 - $100,000	2- Minor
			$100,000 - $250,000	3- Moderate
			$250,000 - $350,000	4- Major
			$350,000-$500,000	5- Severe
	Operational (35%)	Uniformat Level 2 (100%)	C30 - Interior Finishes -> 1 - Insignificant , E10 - Equipment -> 1 - Insignificant , E20 - Furnishings -> 1 - Insignificant , G20 - Site Improvements -> 1 - Insignificant	1-Insignifcant
			C10 - Interior Construction -> 2 - Minor , F10 - Special Construction -> 2 - Minor	2- Minor
			A10 - Foundations -> 3 - Moderate , A20 - Basement Construction -> 3 - Moderate , B10 - Superstructure -> 3 - Moderate , B20 - Exterior Enclosures -> 3 - Moderate , G40 - Site Electrical Utilities -> 3 - Moderate	3- Moderate
			B30 - Roofing -> 4 - Major , C20 - Stairs -> 4 - Major , D20 - Plumbing -> 4 - Major , D30 - HVAC -> 4 - Major	4- Major

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
			, D50 - Electrical -> 4 - Major	
			D10 - Conveying -> 5 - Severe , D40 - Fire Protection -> 5 - Severe	5- Severe
Mains	Economic (60%)	Replacement Cost (100%)	<$20,000	1-Insignifcant
			$20,000 - $40,000	2- Minor
			$40,000 - $60,000	3- Moderate
			$60,000 - $80,000	4- Major
			$80,000-$100,000	5- Severe
	Operational (10%)	Diameter (mm) (100%)	<150	1-Insignifcant
			150-400	2- Minor
			400-700	3- Moderate
			700-1200	4- Major
			1200-1800	5- Severe
	Social (30%)	Category (100%)	Stormwater Network -> 3 - Moderate	1-Insignifcant
			Wastewater Network -> 4 - Major	2- Minor
			Water Network -> 5 - Severe	3- Moderate
All Others	Economic (60%)	Replacement Cost	<$10,000	1-Insignifcant
			$10,001-$20,000	2- Minor
			$20,000-$30,000	3- Moderate
			$30,001-$60,000	4- Major
			>$60,000	5- Severe

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
	Social (40%)	Segment	Administration, By-Law Enforecment, Cemetery, Gravel & Other Roads, Parks & Recreation	2- Minor
			Facility, Machinery &Equipent, Public Works, Valves	3- Moderate
			Fire, Fire, Hydrants	4- Major

20 Appendix E – Niagara District Airport AMP

NIAGARA | DISTRICT AIRPORT
gateway to the peninsula

Asset Management Plan

Current Levels of Service

May 6, 2024
Rev 2

Prepared by SLBC Inc.

EXECUTIVE SUMMARY

The Purpose of the Plan

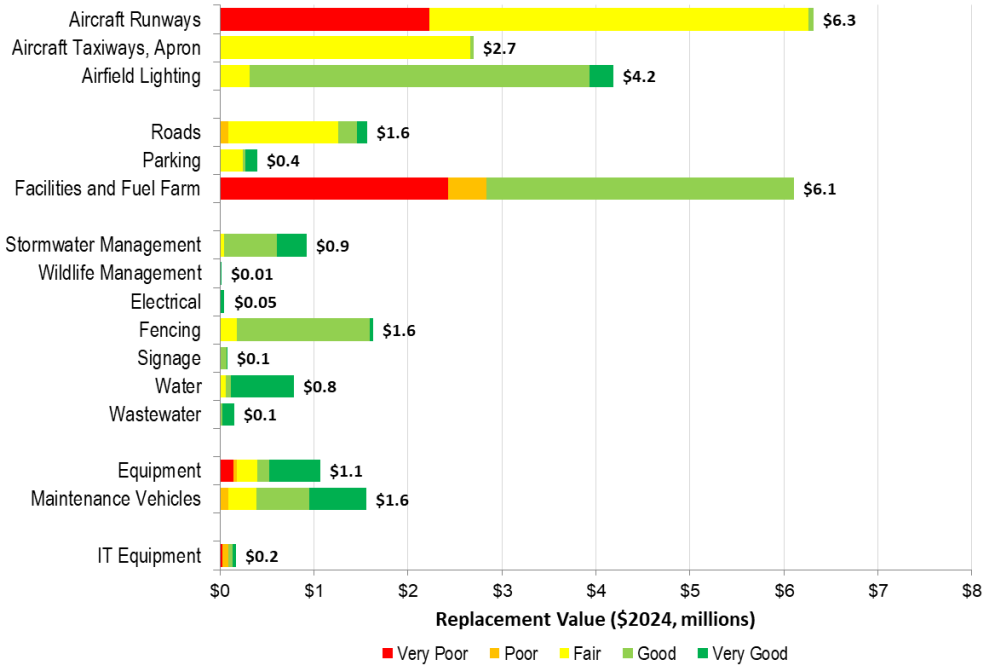
Asset management planning is a comprehensive process that ensures the delivery of infrastructure services in a financially sustainable manner. This Niagara District Airport (the Airport) Asset Management Plan (AM Plan) Current Levels of Service (LOS) provides information about infrastructure assets with actions required to provide an agreed level of service in a cost-effective manner while outlining associated risks. The AM Plan defines the services to be provided, how the services are provided and what funds are required to provide the services over the 10-year planning period. The AM Plan will link to a Long-Term Financial Plan which typically considers a 10-year planning period.

This AM Plan meets the July 2024 requirements of Ontario Regulation (O.Reg.) 588/17 "Asset Management Planning for Municipal Infrastructure" under the Infrastructure for Jobs and Prosperity Act, 2015. Specifically, by July 2024, O.Reg. 588/17 requires municipalities to adopt an AM Plan reporting current LOS for all assets, as well as lifecycle needs to maintain those LOS.

Asset Descriptions

This AM Plan covers the infrastructure assets that provide airside and groundside services, specifically runways, taxiways, aprons and lighting, groundside roads, parking, facilities and fuel farm, site servicing, vehicles and equipment and information technology equipment. The overall condition and replacement value of assets that support the service delivery included in this AM Plan are shown in Figure ES-1. The total estimated replacement value of the assets is **$27.7 million** expressed in current (2024) dollars.

Figure ES-1: Condition Distribution of Airport Assets



Eighty percent (80.1% or $22.2 million) of the Airport's assets are in Fair condition or better. Two and a half percent (2.5% or $0.7 million) are in Poor condition, which indicates that they are nearing the end of their service life. Seventeen and a half percent (17.5% or $4.8 million) are in Very Poor condition, which means they are due or overdue for replacement. Assets in Very Poor condition consist of Runway 11-29, Hangar 11, a front-end loader, a snowblower, handheld radios and various IT devices. Runway 11-29 has an estimated replacement value of $2.2 million and is currently closed. Hangar 11 has an estimated replacement value of $2.4 million and is nearing the end of its lease period to Genaire Limited.

Levels of Service

Service levels are categorized by the following service attributes:

- **Capacity:** Services have enough capacity and are accessible enough to everyone
- **Function:** Services meet customer needs while limiting health, safety, security, natural, and heritage impacts
- **Reliability and Quality:** Services are continuous, predictable, and responsive to customers
- **Affordability:** Services are affordable and provided at the lowest cost for both current and future customers

O.Reg. 588/17 Asset Management Planning for Municipal Infrastructure requires reporting of current levels of service.

The current performance related to capacity and function are not provided in this AM Plan as an 2024 Airside Redevelopment Study is currently under development that will define the demand for expanded services, as well as the required capacity and assets to support those services.

The reliability service attribute indicates whether assets are fit for service. The Technical LOS measures the percent of assets in renewal backlog, i.e. due or overdue for replacement. As shown in Table ES-1, 17% of the Airport's assets are in renewal backlog. These assets correspond to the assets identified as being in Very Poor condition, including Runway 11-29, Hangar 11, a front-end loader, a snowblower and some IT equipment.

Table ES-1: Current Performance – Reliability

Customer LOS Statement	Technical LOS Indicator	Current Performance	Comment
Assets are fit for service	% assets in renewal backlog, i.e. due or overdue for replacement	**17.5%**	Less is better

The O.Reg. requires the organization to forecast the cost of maintaining the current performance over the next 10 years, in othder words, to prevent the renewal backlog from growing.

The affordability service attribute will be addressed in the Financial Summary of the AM Plan.

Lifecycle Management Plan

The projected outlays necessary to maintain the current renewal LOS is $10 million over the next 10 years or approximately $1.0 million/year. The approximate timing of those needs is shown in Figure ES-2. The spike in needs in 2029 represents the need to renew Hangar 11. The spike in

2033 consists primarily of Runway 06-24, a plow truck and a loader, while the spike in 2034 consists primarily of Taxiway A, the terminal apron and the flying club apron.

Figure ES-2 Renewal Needs and Funding – Maintain Current LOS Scenario

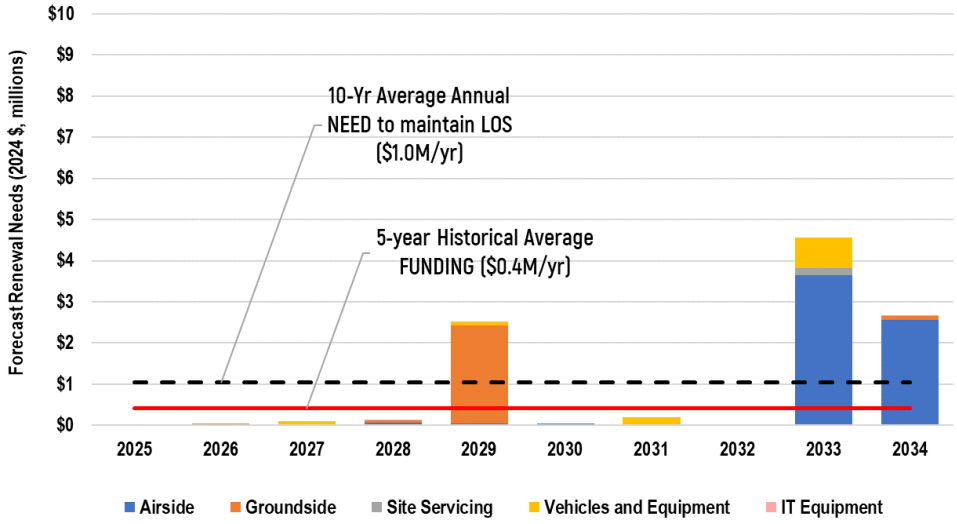
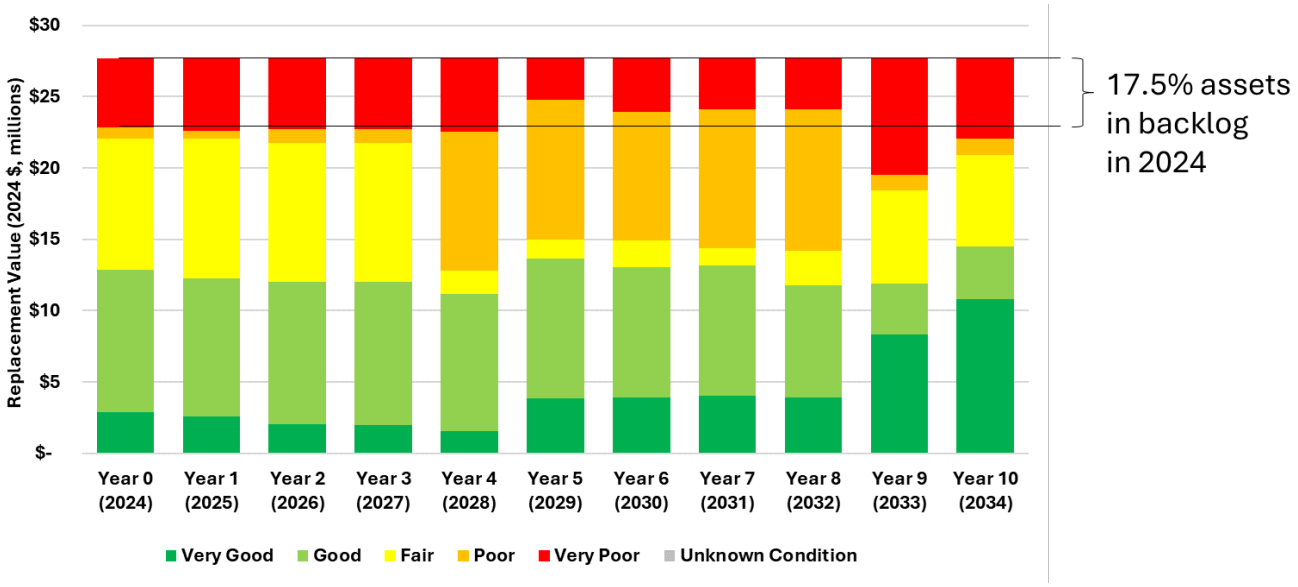


Figure ES-3 shows the forecast condition distribution associated with the funding scenario depicted in Figure ES-2. This scenario was designed to maintain the current LOS, i.e. the renewal backlog. In 2024 the renewal backlog was 17.5%. The backlog grows to 20.3% by 2034; however, through the period 2025-2034; the annual renewal backlog averages 17.3%.

Figure ES-3 Condition Forecast – Maintain Current LOS Scenario



For reference, Figure ES-2 shows that the average capital renewal funding over the past 5 years (2020-2024) was $0.4 million/year, which is $0.6 million/year less than the amount required to maintain the current LOS. As such, continuing to fund at an average of $0.4 million/year would

result growth of the renewal backlog, meaning that more and more assets would fall into Very Poor condition.

To eliminate the renewal backlog over the next 10 years, an estimated $1.6 million/year would be needed, which is $1.2 million/year more than the historical average renewal funding provided.

For operations and maintenance of the current asset portfolio, an estimated $0.6 million/year is needed. This amount focuses on costs associated with operations and maintenance of assets, and does not include the costs of other airport programs and services.

The Airport is currently exploring growth options in its 2024 Airside Redevelopment Study. The cost of the growth needs will be incorporated into the 2025 AM Plan

Financial Summary

Table ES-2 compares the historical funding with forecast needs for each lifecycle stage. The table shows that to maintain the current LOS there is a renewal gap of $0.6 million/year and historical funding levels would cover only 40% of the needs.

The Table also shows that average annual costs for operating and maintaining the airport assets is estimated at $697k/year, based on average annual expenditures over the past three years (2021-2023) inflated to 2024 $. The anticipated annual funding for operations and maintenance is $600k/year based on 2024 budget amounts, including only costs related to operations and maintenance of assets (not full operating budget). This represents funding that covers 86% of estimated needs, leaving a gap of about $97k/year.

Table ES-2 Comparison of Historical Funding and Forecast Needs

Lifecycle Stage	Anticipated Funding Amount (2024 $/year, millions)	Forecast Need 2025-2034 (2024 $/year, millions)	Gap (2024 $/year, millions)	% Funding / Needs
Growth & Upgrade	N/A	To be defined in 2024 Airside Redevelopment Study	N/A	N/A
Renewal (to maintain current LOS)	$0.4*	$1.0	$0.6	40%
Operations & Maintenance	$0.6**	$0.7***	$0.1	86%

* Average annual renewal funding 2020-2024

** Based on 2024 budget, including only costs related to operations and maintenance of assets, not full operating budget.

*** Based on average expenditures for asset operations and maintenance over years 2021-2023.

To close the funding gap, the Airport may either increase revenues or lower expenditures. Revenues may be increased through increases in user fees, contributions from municipalities or grants. Expenditures may be lowered by reducing service levels, eliminating assets or deferring

renewals, beginning with the lowest criticality assets. The Airport is not permitted to fund using debt or to hold reserves.

There are risks associated with providing the service and not being able to complete all identified asset lifecycle activities needed. We have identified major risks as:

- Deferral of renewal activities which results in reduced whole of life of the infrastrure, higher annual cost over the life of the asset, assets in worse overall condition and associated risk of sub-par performance, and less effective use of resources.

It is recommended that the Airport will endeavour to manage these risks within available funding by:

- Prioritizing needed activities by risk impact rating and lower cost renewal methods
- Continuing to identify and request funding and staffing incrementally over time to maintain the current levels of service.

Asset Management Practices

The data confidence is assessed as medium confidence level for data used in the preparation of this AM Plan.

To improve asset management practices, we will undertake the following next steps:

- Determine proposed (i.e., target) levels of service for reporting in the Proposed LOS AM Plan required by O.Reg. 588/17 for approval by July 1, 2025.
- Complete the 2024 Airside Redevelopment Study and associated business case and determine Growth and Upgrade Needs Forecasts, including the future use and lifecycle activities for Hangar 11.
- Improve the asset State of Infrastructure database by conducting cyclical industry standard condition assessments, giving priority to high consequence of failure (CoF) assets. In particular, conduct condition assessments on the Terminal and Maintenance Garage. Develop inventories of building systems and components as part of the condition assessment.
- Establish a master asset inventory to support AM activities. Align the TCA register with AM asset register, or consolidate the two inventories. Establish processes to update the asset register(s) when assets are acquired, replaced or eliminated.
- Explore options for implementing technologies for work order management and asset investment planning. Consider the possibility of using applications in place at one of the three owner municipalities.

Monitoring and Improvement Program

O.Reg. 588/17 requires that AM Plans be updated by July 1, 2025 to report proposed LOS for the subsequent 10 years, along with the cost of sustaining the proposed LOS. Thereafter, the O.Reg. requires that progress implementing the AM Plan be reported to municipal Councils annually by July 1. In addition, the O.Reg. requires AM Plans to be updated at least every 5 years.

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List of Abbreviations

Abbreviation	Definition
AM	Asset Management
BCA	Building Condition Assessments
CEO	Chief Executive Officer
CoF	Consequence of Failure
CPI	Consumer Price Index
CRV	Current Replacement Value
ISO 31000	International Organization for Standardization Risk Management Process
LOS	Levels of Service
NRBCPI	Non-Residential Building Construction Price Indices
O.Reg.	Ontario Regulation
TCA	Tangible Capital Asset

1 INTRODUCTION

1.1 Background

The Niagara District Airport (the Airport) is a municipal airport located within the Niagara-on-the-Lake boundaries and financially supported by its three surrounding municipalities – the cities of Niagara Falls and St. Catharines, and the town of Niagara-on-the-Lake.

The Niagara District Airport Commission manages the Airport on behalf of the three municipalities. The Commission is comprised of nine individuals – three elected councilors representing each of the three municipalities and six individuals nominated by the municipalities – all serving as commissioners for a four-year term.

The Airport encompasses an area of 130 hectares (321 acres) in which several areas have been designated for airside and groundside development. The Airport has a 5,000-foot runway, 24-hour Customs clearance, NAV CANADA on site, and Avgas and Jet Fuel refueling available. Approximately 75 aircraft are based on the Airport. On-site services include executive and personal charter, helicopter and fixed wing sightseeing, expert airport maintenance operations, and an active flight training school, and several interesting vintage aircraft.

This Asset Management Plan (AM Plan) communicates the requirements for the sustainable delivery of services through management of assets, compliance with regulatory requirements, and the required funding to maintain current levels of service over a planning period of 10 years.

1.2 Alignment with Regulatory Requirements

This 2024 Current Levels of Service (LOS) AM Plan meets the requirements of Ontario Regulation (O.Reg.) 588/17 “Asset Management Planning for Municipal Infrastructure” under the Infrastructure for Jobs and Prosperity Act, 2015. Specifically, by July 2024, O.Reg. 588/17 requires municipalities to adopt an AM Plan reporting current LOS for all assets, as well as lifecycle needs to maintain those LOS.

In accordance with the requirements of O.Reg. 588/17, this AM Plan is posted on the Airport’s website, along with related background documents, such as condition assessments.

1.3 Relationship with Other Documents

Asset management planning is a medium- to long-term planning activity that relies on input from strategic planning activities and informs shorter-term decision making. The AM Plan provides a framework to validate the Airport’s budgeting processes and assist in prioritizing work activities, including capital projects, based on risk. It also discusses LOS that support goals in the Airport’s strategic plan and lifecycle management strategies intended to reduce the overall cost of asset ownership.

The AM Plan is intended to be read with other Airport and supporting municipalities’ policies and planning documents, including the following:

- Corporate Asset Management Policies of the City of Niagara Falls, the City of St. Catharines and the Town of Niagara-on-the-Lake
- Tangible Capital Asset (TCA) Annual Financial Statements

- Feasibility Study and Business Case (2020): Examines potential business opportunities to position the Airport as a stronger economic asset to the region, and the necessary investments and developments to achieve those future business goals.
- Niagara District Airport Master Plan – Draft (2021): Developed by Niagara Region. It outlines the strategic goals related to future business objectives and short-term infrastructure improvements at the airport. It is still in draft form, and has not yet been formally adopted by the Airport's governing Commission.
- Niagara District Airport – 2023 Budget Presentation
- Niagara District Airport – 2023 Capital Budget
- Niagara District Airport – 2023 Operating Budget.

1.4 Key Stakeholders

Key stakeholders in the preparation and implementation of this AM Plan are shown in Table 1-1 below.

Table 1-1 Key Stakeholders in the AM Plan

Key Stakeholder	Role in Asset Management Plan
Niagara District Airport Commission	The Commission is comprised of 9 members, 3 of which are elected Councillors from each of the 3 owner municipalities, and the other 6 being appointed members representing the municipalities. The Commission provides executive leadership and strategic direction for the Airport's operation, management, and future business development goals. It is responsible for communication and liaison between the Councils of the three owner municipalities and the Airport's administration staff. Overall owners of the Airport's assets. Approves asset management policies and asset funding allocation through the annual budget process. An overarching expectation of a standard of care is required by the Commisison to ensure commitment to effective asset management practices.
Elected Councils for the Cities of Niagara Falls and St. Catherines, and the Town of Niagara-on-the-Lake	These municipalities are joint owners of the Airport's assets. Councils approve funding allocation to be used by the Airport Governing Commission, proportional to their share of ownership of the Airport, through the annual corporate budget process.
Airport Chief Executive Officer (CEO)	Under the leadership of the Niagara District Airport Commission, the CEO Provides leadership, strategic direction and corporate oversight to ensure that the goals and directions of the asset management program remain consistent with the overall strategic plan. Provides information needed by the Commission for strategic business decisions, such as long-range forecasts of asset investment needs, services levels, risks, costs, and performance measures.
Airport Manager of Airside and Groundside Services	The Manager of Airside and Groundside Services supports the CEO in implementing the asset management decisions, inluding capital improvements, and operations and maintenance activities, as well as improvements to asset management pratices. The Manager also oversees the safe, compliant, and efficient operation of the airport.
Airport Manager of Finance and Administration	Provides historic Tangible Capital Asset (TCA) amounts, and historic and current capital and operating budgets. Further, provides coordination on input data and development of the AM Plan.

1.5 Goals and Objectives of Asset Ownership

The Airport exists to provide services. Some of these services are provided by infrastructure assets. The Airport has acquired infrastructure assets by purchase, by contract, construction by staff, and by donation of assets constructed by others to meet increased levels of service.

The Airport's goal in managing infrastructure assets is to meet the defined level of service (as amended from time to time) in the most cost effective manner for present and future customers.

The key elements of infrastructure asset management are:

- Providing a defined level of service and monitoring performance
- Managing the impact of growth through demand management and infrastructure investment
- Taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet the defined level of service
- Identifying, assessing and appropriately controlling risks
- Linking to a long-term financial plan which identifies required, affordable expenditure and how it will be financed.

Key elements of the planning framework are:

- **Levels of service:** specifies the services and levels of service to be provided
- **Future demand:** how this will impact on future service delivery and how this is to be met
- **Lifecycle management:** how to manage existing and future assets to provide defined levels of service
- **Financial management:** what funds are required to provide the defined services
- **Asset management practices:** how to manage provision of the services
- **Monitoring and improvement plan:** how the AM Plan will be monitored to ensure objectives are met, including how to increase asset management practice maturity.

1.6 Organization of Document

The contents of this AM Plan follow the recommended elements of a detailed AM Plan:

- **Introduction:** Outlines scope, background information, relationship to other documents and plans, and applicable legislation
- **State of Infrastructure:** Summarizes the inventory, valuation, age and remaining life, and condition of the assets in the inventory by asset class
- **Levels of Service:** Defines levels of service through performance indicators and targets, and outlines current performance
- **Lifecycle Management Strategy:** Defines the framework for identifying critical assets and quantifying risk to enable prioritization of lifecycle activities, and summarizes the asset management strategies (i.e., planned actions) that will enable the assets to maintain the current levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost
- **Financial Management Strategy:** Summarizes the infrastructure gap based on the determined infrastructure needs and associated budget
- **AM Plan Improvement and Monitoring:** Summarizes the next steps including improving future iterations of the AM Plan and monitoring of AM Plan implementation progress.

2 STATE OF INFRASTRUCTURE

The State of Infrastructure section of the AM Plan describes the Airport's asset inventory, and provides a snapshot in time of the valuation, age and condition of the assets. Recommendations for the sustainment of data collection and reporting are provided in the AM Plan Improvement and Monitoring section.

2.1 Asset Hierarchy and Inventory

Understanding the assets owned by the Airport that are used to support each major service area is important to enable their effective and efficient management. In this AM Plan, the Airport's asset inventory has been organized around the major service groups and asset classes shown in Table 2-1 in the following sub-section.

Most infrastructure assets owned by the Airport are included. Land is not included in the current replacement costs of the asset inventory. As inputs into decision-making, data and information are important assets, but are not currently included in this AM Plan.

2.2 Asset Valuation

Financial accounting valuation uses historical costs and depreciation assumptions to determine the book value of capital assets in accordance with the Public Sector Accounting Board (PSAB). Policies and procedures relating to the development of net book values for accounting purposes have been developed by the Airport to comply with PSAB 3150 Tangible Capital Assets (TCA) reporting.

While financial accounting valuations are based on historical costs, managerial valuations are based on replacement costs. For most asset types, the replacement values were calculated using historical purchase costs indexed to December 31, 2023 using the Non-Residential Building Construction Price Indices (NRBCPI) or Consumer Price Index (CPI), as appropriate for the asset type. For some asset types, replacement values are based on current unit costs. The replacement cost valuation represents the estimated cost to replace assets today and is presented in current (2024) dollars and does not account for future technology improvements but does account for increased regulatory requirements and technology improvements to date.

The estimated current replacement value of Airport assets is **$27.7** million presented in current (2024) dollars, as outlined in the following table.

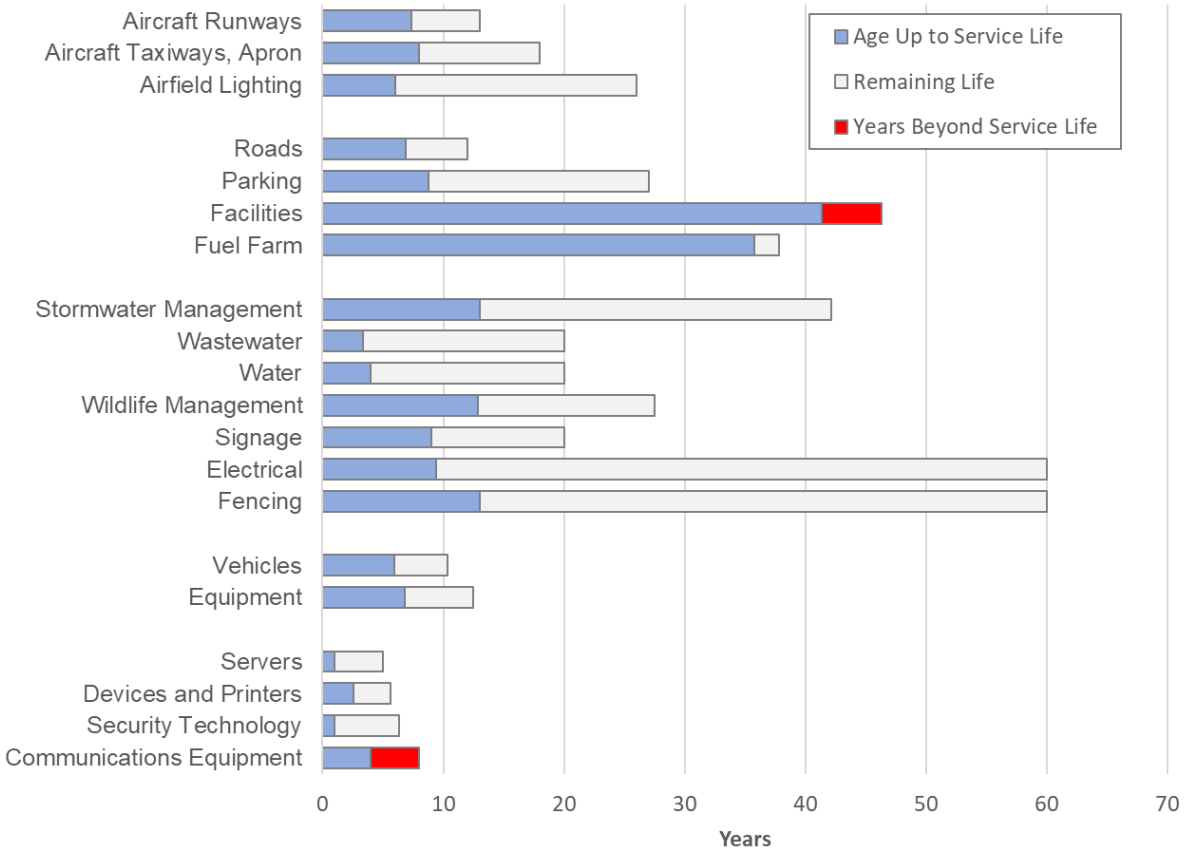
Table 2-1 Assets covered by this AM Plan

Asset Class	Asset Sub-Class	Replacement Value	
		2024$M	%
Airside	Aircraft Runways	$6.32	22.8%
	Aircraft Taxiways, Apron	$2.70	9.8%
	Airfield Lighting	$4.18	15.1%
Groundside	Roads	$1.56	5.6%
	Parking	$0.40	1.4%
	Facilities	$6.06	21.9%
	Fuel Farm	$0.04	0.2%
Site Servicing	Stormwater Management	$0.92	3.3%
	Water	$0.79	2.8%
	Wastewater	$0.15	0.5%
	Wildlife Management	$0.01	0.0%
	Signage	$0.08	0.3%
	Electrical	$0.05	0.2%
	Fencing	$1.63	5.9%
Vehicles and Equipment	Vehicles	$1.56	5.6%
	Equipment	$1.07	3.9%
IT Equipment	Servers	$0.03	0.1%
	Devices and Printers	$0.04	0.2%
	Security Technology	$0.03	0.1%
	Communication Equipment	$0.06	0.2%
TOTALS		**$27.69**	**100.0%**

2.3 Asset Age and Remaining Life

Understanding the estimated life of an asset and the proportion of life that remains provides an insight into potential risk of asset failure and potential renewal need. The following graph shows, for each asset sub-class, the average age of the assets against the average estimated useful life, in years. Averages are “weighted” by replacement cost to give more importance to asset types with more value. Although many of the Airport’s assets are relatively new, many others are reaching the middle to latter stages of their useful lives and will require rehabilitation or replacement in the upcoming years. The assets that are beyond service life are the Hangar 11 facility and some IT equipment assets (security software and handheld radios).

Figure 2-1 Asset Life Consumed Profile



2.4 Asset Condition

In this AM Plan, the term “condition” refers to the degree of physical deterioration of an asset. “Performance” is a more general term that typically describes an asset’s ability to achieve levels of service through measures such as capacity, function and operational quality.

Condition assessment programs evaluate current physical condition, determine rate of deterioration over time, enable forecasts of future condition, and inform the most beneficial type and timing of treatment. Condition assessment methods and rating systems have become relatively standard for some assets but vary depending on the type of asset. The Airport conducts inspections more frequently on more critical assets such as airside pavement and facilities, while condition assessments are undertaken for less critical assets such as groundside parking lots, signage and vehicles at an appropriate frequency for the asset group. Some Airport assets have no reported physical condition. These include assets which the Airport is in the process of collecting the data, assets where the renewal decision is not based on condition (e.g. age or mileage), and assets that are run-to-failure.

For those assets with no condition data, age-based condition is estimated as the percentage of age to useful life. Using age data as a surrogate for condition data is common but it can be misleading as age does not always directly reflect condition or remaining life. The Airport is working to increase the percentage of assets with industry standard condition assessment data

for facilities through building condition assessments (BCAs) and pavement condition assessments.

The Airport undertook a Airfield Pavement Structural Assessment in 2024 which included determination of whether the structural capacity of the airside pavement can accommodate the traffic anticipated over the next 20-year period. The assessment will provide an overall condition grade for the airside pavement, and types, severity and density of distresses, pavement structure layer thicknesses and material types, and asphalt moduli. The overall condition grade from the draft results of the Airfield Pavement Structural Assessment were used in this AM Plan.

To enable comparison of condition and condition trends over time between different asset types, a generic condition grading scale is often used to translate detailed engineering data about assets into information that can be compared across asset groups. For this purpose, the Airport uses a five-point condition grading system, summarized in the table below, which is consistent with the general condition grading system included in the International Infrastructure Management Manual (IIMM).

Table 2-2 Five-Point Condition Grading System

Grade	Description	Condition Criteria	Criteria Description
VG	Very Good	Fit for the future	Well maintained, good condition, new or recently rehabilitated
G	Good	Adequate for now	Acceptable, generally approaching mid-stage of expected service life
F	Fair	Requires attentions	Signs of deterioration, some elements exhibit deficiencies
P	Poor	Increasing potential of affecting service	Approaching end of service life, below standard, significant deterioration
VP	Very Poor	Unfit for sustained service	Near or past service life, advanced deterioration, assets may be unusable

Details relating to the condition of each asset are currently maintained in various databases and spreadsheets. The Airport converts industry standard condition rating systems and age-based assets to the above condition grading system as provided in the table below.

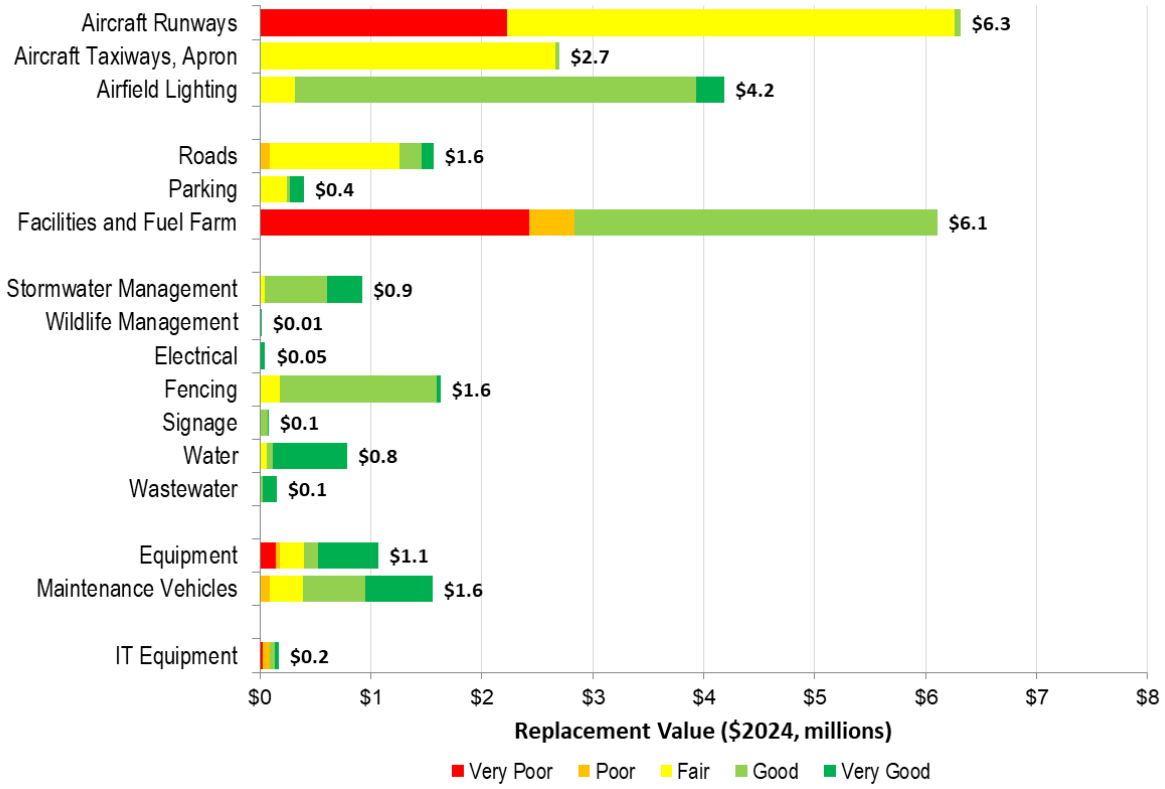
Table 2-3 Conversion of Industry Condition to Five-Point Condition Grade

Condition Grade	% Life Remaining for Age-Based "Condition"	Airside Pavement Condition Grade
Very Good (New)	75 to 100%	Very Good
Good	50 to 75%	Good
Fair	25 to 50%	Fair
Poor	0 to 25%	Poor
Very Poor (End-Of-Life)	<= 0%	Very Poor

The following graph depicts, by colour, the value of assets that fall within each of the condition grades (very good or new, good, fair, poor, very poor), organized by asset sub-class. The total

replacement value of assets within each asset sub-class is shown to the right of the condition grade bar.

Figure 2-2 Asset Condition Grade Profile



To adequately meet service levels and manage risk while minimizing lifecycle costs, most assets should generally be preserved in fair or better condition. The above figure shows that the majority of the Airport's assets – in fact **80.1%** – are in fair or better condition. A total of **2.5%** of assets are in poor condition and **17.5%** of assets are in very poor condition. Assets in poor or very poor condition require increased attention and renewal investment (i.e., funding and staff resources) to avoid increased maintenance costs and/or unexpected failure. The majority of assets that are currently in very poor condition are aircraft runway 11-29 which is closed to traffic and the Hangar 11 facility which is under review as it is in very poor condition and not functional as a hanger as it does not have airside access. Assets in poor and very poor condition would typically be included in 10-year capital renewal program and budget forecast.

2.5 Confidence of Data

The Airport has well-developed policies, procedures and guidelines for sustainability of Tangible Capital Asset (TCA) information. The information that supports this AM Plan is also continuously updated. The Airport intends to update this AM Plan every five years, as required by O.Reg. 588/17, Asset Management Planning for Municipal Infrastructure, or more frequently as needed.

The Airport's asset management program is always developing and implementing standards to improve the quality and consistency of information captured. Section 6 of this AM Plan provides a summary of the confidence in the data used to develop this AM Plan and an improvement and monitoring plan.

3 LEVELS OF SERVICE

3.1 Overview

One of the basic principles of sound asset management practice is to describe the levels of service the current and future community want and are prepared to pay for, and the associated lowest cost to deliver those levels of service. Performance management is the systematic and cyclical process of identifying objectives, collating information regarding the achievement of those objectives, reporting the information in a meaningful way, and using the information to improve delivery of services to the community.

Monitoring the Airport's performance against defined levels of service helps to improve the Airport's service delivery by focusing program activities and assets on priorities, and identifying under-performance so that it can be addressed. Performance measures or indicators are used for this purpose.

GOOD PERFORMANCE MANAGEMENT

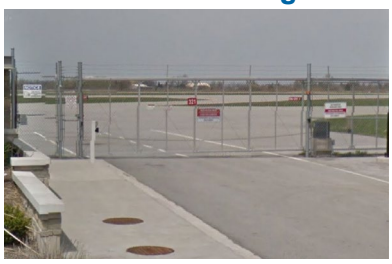
Helps the Airport to

- improve service delivery
- demonstrate affordability
- provide accountability to the community

3.2 Current Services and Programs

The Airport provides the following scope of services to the community that are included in the AM Plan:

Asset Class	Asset Types
Airside 	• **Airside assets** include the main runways, taxiways, aprons, and airfield lighting which are necessary for aircraft to complete safe departures and arrivals from the Airport.
Groundside 	• **Groundside assets** include the supporting infrastructure which ensure the airport remains easily accessible for staff and visitors, such as roads and parking lots. Groundside also includes the fuel farm and buildings/facilities such as the hangar and maintenance garage, which enable the safe and efficient operation and maintenance of aircraft.

Asset Class	Asset Types
Site Servicing 	• **Site servicing assets** provide essential services such as stormwater management, wildlife management, electrical service, fencing, signage, water service, and wastewater service. The objective of site servicing is to prevent flooding, provide security of the airfield, and provide other services.
Vehicles and Equipment 	• **Vehicles and equipment** owned by the Airport allow operations staff to perform necessary maintenance tasks to airside, groundside, and site servicing assets, and include: – **Vehicles** such as tractors, pick-up trucks, runway sweepers, and other vehicles – **Field equipment** such as snowblowers, line painters, decelerometers, and de-icing spreaders.
IT Equipment 	• IT equipment includes the Airport's servers, communications devices and equipment, security system such as cameras and security software, as well as laptops and printers.

3.3 Legislative Requirements

There are many legislative requirements relating to the management of assets. Legislative requirements that impact the delivery of Airport services are outlined in **Table 3-1**.

Table 3-1 Legislative Requirements

Legislation	Requirement
Municipal Act, 2001	The main statute governing the creation, administration and government of municipalities in Ontario, other than the City of Toronto.
Ontario Regulation 588/17 The Infrastructure for Jobs and Prosperity Act, 2015	Sets out the principles for the provincial government to regulate asset management planning for municipalities.
Accessibility for Ontarians with Disabilities Act (AODA)	Develops, implements, and enforces accessibility standards to achieve accessibility for Ontarians with disabilities with respect to goods, services, facilities, accommodation, employment, buildings, structures, and premises on or before January 1, 2025.
Public Section Accounting Board Standard 3150	Standards on how to account for and report on tangible capital assets in government financial statements.
Canadian Aviation Regulations (CARs)	A compilation of regulatory requirements designed to enhance the safety and competitiveness of the Canadian aviation industry. They correspond to areas of aviation which Transport Canada, Civil Aviation is mandated to regulate (personnel licensing, airworthiness, commercial air services, etc.).
TP312 Aerodrome Standards and Recommended Practices	These standards complement subpart 302 of the Canadian Aviation Regulations (CARs). They set out requirements such as: physical characteristics; obstacle limitation surfaces; visual aids; and some technical services the aerodrome operator at a certified land aerodrome (airport) provides to support aircraft operations.
TP1247 Aviation - Land Use in the Vicinity of Aerodromes	Describes the operational characteristics of aerodromes and the different types of land uses outside the aerodrome property boundary and recommends, where applicable, guidelines for those land uses in the vicinity of aerodromes. Includes links to source documents to further explain the technical aeronautical requirements.
Airport Wildlife Management Bulletin - TP 8240 - No. 38	The airport bird-hazard risk analysis process complements the provisions of TP 1247 with Transport Canada's airport bird-hazard risk analysis process (ABRAP)
ICAO Annex 14 Aerodromes Design and Operations	Provides a series of design criteria for efficiently proportioned aerodromes. Prescribe the physical characteristics and obstacle limitation surfaces to be provided for at aerodromes, and certain facilities and technical services normally provided at an aerodrome.
Highway Traffic Act R.R.O. 1990 Reg. 615: Signs	Sets out the standard for the erection and maintenance of signs.
Highway Traffic Act R.R.O. 1990	Sets out fleet and equipment inspection requirements Reg. 174/22: Classes of Vehicles Requiring Annual and Semi-Annual Inspections Reg. 611: Safety Inspections Reg. 199/07: Commercial Motor Vehicle Inspections Reg. 587: Equipment
Technical Standards and Safety Act, 2000	Sets out the technical standards and safety regulations to enhance public safety by providing for the efficient and flexible administration of various industries or equipment.

Legislation	Requirement
Ontario Building Code Act, 1992	The legislative framework governing the construction, renovation and change-of-use of a building in Ontario. The Ontario Building Code, a regulation under the Act, establishes detailed technical and administrative requirements and minimum standards for building construction in public health and safety, fire protection, structual sufficienty, construction materials, plumbing and mechanical systems.

Legislated Community Levels of Service

Legislated requirements define the standards according to which the Airport is legally obligated to provide services to the community. The Airport delivers services in adherence to applicable legislative requirements, including required compliance monitoring and reporting. Many legislated levels of services relate to service and asset safety and reliability. Information on regulatory inspections is contained within various databases and maintained by Airport staff at the operational level to ensure legislative compliance. It is typical that details of compliance be held at the operational level, but that reporting that confirms that the Airport complies is reported at a higher level.

3.4 Corporate Vision, Mission and Values

The Niagara District Airport Commission's 2023-2026 Strategic Plan defines the organization's vision, mission and values as follows:

Vision

To become an indispensable aviation gateway.

Mission

To provide an elevated airport experience for customers and community.

Values

Safety. Efficiency. Integrity. Customer-Focused. Teamwork.

The Strategic Plan identifies the following Planning Goals for 2024 – 2026:

Secure Partners for Growth

- Obtain funding to engage in airside development
- Attract scheduled & charter passenger services

The Strategic Plan priorities are as follows:

Advocacy

- Secure Funding
- Develop Advocacy Strategy and Advance Business Case for Growth

Alignment

- Alignment with Municipal Partners
- Secure Stakeholder Support for the Business case
- Community Engagement

Analytics

- Capture Enhanced Demographic Data
- Publish a Comprehensive and Compelling Business Case

The Asset

- Create Conditions for Growth
- Explore Growth Opportunities within Current Capacity
- Evaluate Current Infrastructure Capabilities vs. Future Needs

3.5 Customer and Technical Levels of Service

Customer LOS measure how the customer receives the service and whether value to the customer is provided. Figure 3-1 shows that Corporate LOS commitments and the legislated LOS referenced by them drive the definition of more specific Customer (also known as Community) LOS, which can be categorized as relating to one of the following service attributes:

- **Capacity:** Statements that reflect whether the service and supporting assets are of sufficient capacity to meet user demand.
  - Does the Airport need more or less of these services and assets?
- **Function:** Statements that reflect the suitability of the services, operations and assets for the user or other stakeholder.
  - Do they meet the needs of the community?
  - Do they meet regulatory requirements including those for health and safety, environmental protection and barrier free access?
  - Do they support the Airport's strategic priorities?
- **Reliability & Quality:** Statements that reflect whether services and supporting assets are reliable, available when needed, and responsive to customers.
  - Are assets maintained and renewed to ensure a state of good repair (i.e., condition)?
  - Are services continuous?
  - Is the community involved in planning, treated respectfully and responded to promptly?
- **Affordable:** Statements that reflect whether services and supporting assets are adquately funded in both the short and long term.

Technical LOS measures support the customer LOS statements. They relate to the allocation of resources to service activities to best achieve the desired customer outcomes and demonstrate effective performance.

Customer LOS are translated into Technical LOS, where:

- **Capacity LOS** drive assessment of expansion needs
- **Function LOS** drive assessment of upgrade needs

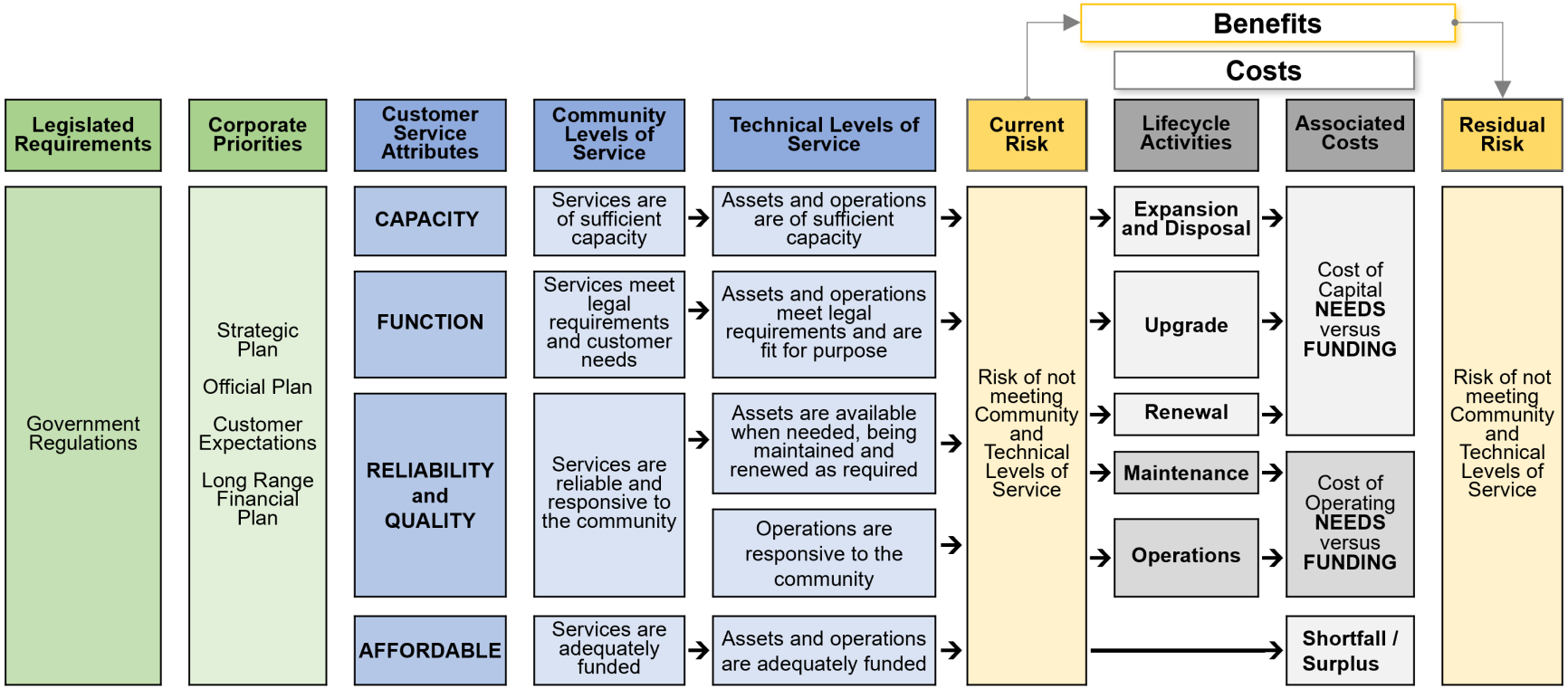
- **Reliability & Quality LOS** drive assessment of renewal, maintenance and operations (and programming) needs
- **Affordability LOS** drive assessment of financial sustainability needs.

The risks of failing to achieve Customer and Technical LOS commitments are assessed, and lifecycle activities are prioritized to address those risks. Lifecycle activities may include expansion, upgrade, renewal, maintenance or operational activities, depending on the category of LOS to be addressed. In some cases, lifecycle activities address several Customer and Technical LOS. For example, a project on a runway may simultaniously increase capacity, make upgrades to meet regulatory requirements, and renew existing pavement. The nature of the lifecycle activity determines whether it should be funded as capital or operating, as well as eligible funding sources. As shown in Figure 3-1, even after the lifecycle intervention, some residual risk may remain.

3.6 Customer Research and Expectations

Customer input will be sought as part of the Alignment and Analytics priorities identified in the 2023-2026 Strategic Plan. This includes public opinion, stakeholder group surveys and municipal partner input to collect information about user service patterns, behaviours and preferences today and potentially in the future. This customer research, along with demographic analysis, will provide insight into customer needs and perceptions related to demand and areas of improvement. This information will be used to inform the 2025 AM Plan's proposed LOS.

Figure 3-1 Levels of Service Framework



3.7 Current Performance

The current performance related to capacity and function are not provided in this AM Plan as an 2024 Airside Redevelopment Study is currently under development that will define the demand for expanded services, as well as the required capacity and assets to support those services.

The reliability service attribute indicates whether assets are fit for service. The Technical LOS measures the percent of assets in renewal backlog, i.e. due or overdue for replacement. As shown in Table ES-1, 17.5% of the Airport's assets are in renewal backlog. These assets correspond to the assets identified as being in Very Poor condition, including Runway 11-29, Hangar 11, a front-end loader, a snowblower and some IT equipment.

Table 3-2 Current Performance – Reliability

Customer LOS Statement	Technical LOS Indicator	Current Performance	Comment
Assets are fit for service	% assets in renewal backlog, i.e. due or overdue for replacement	**17.5%**	Less is better

The O.Reg. requires the organization to forecast the cost of maintaining the current performance over the next 10 years, in othder words, to prevent the renewal backlog from growing.

The affordability service attribute will be addressed in the Financial Summary of the AM Plan.

3.8 Factors Impacting Levels of Service Performance

External trends and issues affecting expected levels of services or the Airport's ability to meet the defined levels of services include the following.

- Population and employment changes (e.g., growth, demographics), which will impact infrastructure use.
- Changes in expectations for patterns of use from the public, which will impact infrastructure use and revenue for services.
- Potential changes in technology or methods, which may replace obsolete equipment, provide longer asset life, and/or achieve higher quality and greater efficiencies.
- Potential changes to the cost of input variables (e.g., cost of power, fuel), which will impact costs to deliver the services.
- Infrastructure failing prematurely due to environmental factors and/or construction practices requiring renewal much earlier than the expected life of the asset.
- Availability of external funding (e.g. federal and provincial infrastructure programs), which may affect the infrastructure improvement activities that can be undertaken.
- Unexpected downloading of services by more senior levels of government.
- Popularity of sustainability initiatives and "greening" trends (e.g. LEEDs).
- Climate change, including changing storm events and patterns (e.g., higher frequency storms occurring more regularly), which will impact the infrastructure.
- Potential changes in Federal or Provincial legislation.

4 ASSET MANAGEMENT STRATEGY

The Asset Management Strategy section of the AM Plan describes the framework that the Airport uses to identify critical assets and quantify risk to enable prioritization of lifecycle activities, and summarizes the asset management strategies (i.e., planned actions) that will enable the assets to maintain the current levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost.

4.1 Overview of AM Strategy Development

Monitoring the Airport's performance against defined levels of service helps to improve the Airport's service delivery by identifying under-performance so that it can be addressed. Assessing the risks associated with failing to achieve the defined Costomer and Technical LOS helps to priotize lifecycle activities and minimize residual risks.

To achieve its program objectives, the Airport builds new infrastructure assets to meet growth needs and manages existing assets to meet reliability needs – all with limited funds. Asset lifecycle management strategies are planned actions that enable assets to provide the defined levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost.

Asset lifecycle management strategies are typically organized into the following categories:

- **Non-asset solutions** – actions or policies that can lower costs or extend asset life (e.g., better integrated infrastructure planning and master planning, demand management, insurance, process optimization, managed failures).
- **Growth or expansion** – activities to provide a new asset that did not exist previously (e.g. a parking lot) or an expansion to an existing (e.g., widening a road, lengthening a runway).
- **Upgrade or enhancement** – activities to provide a higher level of service capability from an existing asset to achieve better fit for purpose (e.g., increasing the structural capacity of current airside pavement) or to meet regulatory or corporate requirements.
- **Renewal** – activities that return the original service capability of an asset (e.g. replacing the roof of a building or replacing an existing snow plow with a new one).
- **Maintenance** – activities to retain asset condition to enable it to provide service for its planned life (e.g. pavement patching, building and structure repairs), including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.
- **Operations** – regular activities to provide services (e.g., using / running a piece of equipment, cleaning, provision of energy)
- **Disposal** – activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.

The Airport assesses the costs of potential lifecycle activities to determine the lowest lifecycle cost strategy to manage each asset type. The sum of all asset lifecycle management strategies informs the minimum cost to sustain each asset type, for each service area. Failing to take care of assets can impact the total cost of ownership for that asset and can also have other impacts such as causing damage to other infrastructure or causing interruption to service delivery.

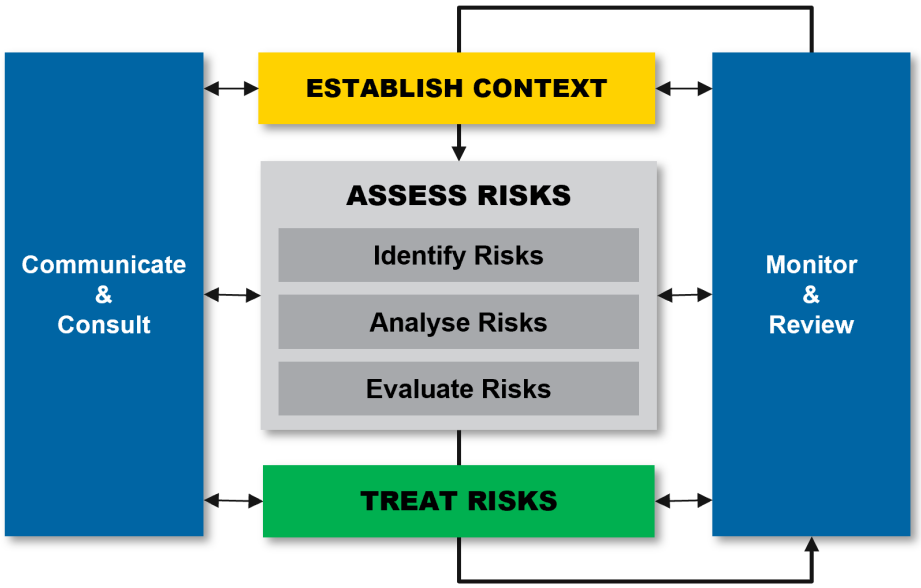
4.2 Risk Assessment

4.2.1 Risk Management Framework

Risk management refers to the management of uncertainty on business objectives. For this AM Plan, risk management was guided by the ISO 31000 Standard for Risk Management, which provides globally accepted principles and guidelines for risk assessment.

The ISO 31000 Risk Management Standard outlines the steps involved in Risk Management as shown in Figure 4-1.

Figure 4-1 ISO 31000 Risk Management Process



- **Establish Context** – the environment in which the Airport seeks to define and achieve its objectives
- **Identify Risks** – that could affect achievement of Airport's LOS
- **Analyze Risks** – estimate the level of a risk by approximating likelihood and consequence of occurrence
- **Evaluate Risks** – determine whether or not a specified level of risk is acceptable or tolerable
- **Treat Risks** – select and implement one or more treatment options
- **Monitor and Review** – determine the current status and whether or not required LOS are being achieved
- **Communicate and Consult** – an iterative two-way dialogue between the Airport and its stakeholders throughout the risk management process.

4.2.2 Risk Context

For this AM Plan, the Airport defines the risk as the failure to maintain current LOS.

4.2.3 Risk Assessment

Table 4-1, shown below, presents the **Risk Evaluation Matrix Framework** that depicts the risk exposure, based on the likelihood of occurrence and overall consequence rating for each risk.

Table 4-1 Risk Evaluation Matrix Framework

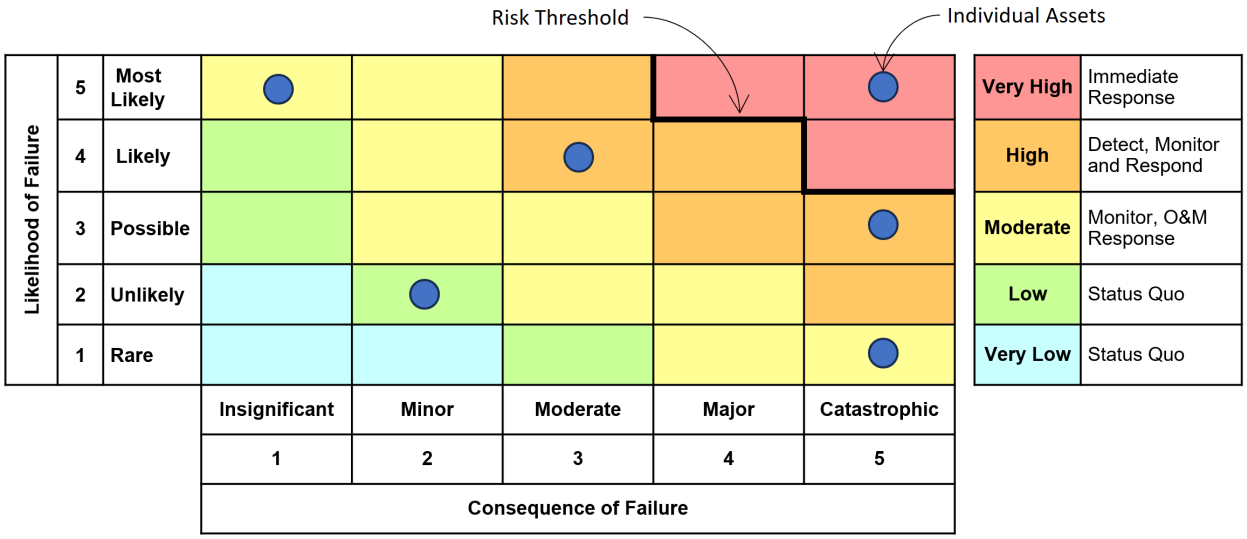


Table 4-2, on the following page, presents the **Consequence Rating Criteria** used to determine consequence ratings, which details the ratings for the severity of consequences of risks. For each risk, consequences for the following five consequence categories are considered: service delivery, economic, environmental, health and safety, and social. An overall consequence rating is calculated by taking the highest consequence rating from across the five consequence categories.

Table 4-3, two pages ahead, presents the **Probability (Likelihood) Rating Criteria** used to determine the likelihood of occurrence (i.e., the chance of a significant single event or ongoing/cumulative occurrence). The likelihood of occurrence can be defined for each of the three service attributes: capacity, function, reliability but is considered for reliability only in this AM Plan as a master plan is currently under development that will define the demand for and capacity of the services and supporting assets and the suitability of the services, operations and assets for stakeholders.

Table 4-2 Consequence Rating Criteria

CoF Score	Consequence (Impacts) of Failure				
	Service Delivery	Economic	Health and Safety	Environmental	Social
1	No impact to services or small number of customers experience disruption or impact to non-essential service.	Damages, losses, or fines of under $10,000	No obvious potential for injury or affects to health.	Asset degradation/failure has negligible impact on environment, emissions, and pollution. Impact fully reversible within 1 week.	Event only of interest to individuals. No community concern.
2	Localized service disruption or impact to non-essential services.	Damages, losses, or fines of $10,000-$200,000	Potential for minor injury or affects to health of an individual.	Asset degradation/failure has minor impact to the environment including potential for increased emissions or pollution. Prosecution possible. Impact fully reversible within 3 months.	Minor community interest. Local media report.
3	Significant localized disruption or impact to non-essential services and/or localized disruption to essential services.	Damages, losses, or fines of $200,000-$2,000,000	Potential for serious injury or affects to health of one or more individuals with a possibility of short term disability or hospitalization.	Asset degradation/failure has significant short-term impact to the environment including a likely increase of emissions or pollution. Prosecution probably. Impact fully reversible within 1 year.	There will likely be moderate local media exposure which may last several days. Public Community Discussion. Broad adverse media coverage.
4	Widespread short-term disruption or localized long-term disruption of essential services.	Damages, losses, or fines of $2,000,000-$10,000,000	Potential for serious injury or affects to health of one or more individuals with a possibility of loss of a life.	Asset degradation/failure poses risk of environmental contamination and/or has significant long-term impact. Likely a substantial increase to emissions or pollution. Prosecution expected. Impact fully reversible within 5 years.	There will likely be significant, negative, local or provincial media exposure which may last several days. Loss of confidence in the Commission. National publicity. Public agitation for action.
5	Airport-wide or long-term disruption of essential services.	Damages, losses, or fines of over $10,000,000	Potential for death or multiple deaths with probable permanent damage.	Asset degradation/failure poses significant risk to environment including a major long-term impact. Likely to result in contamination. May become of Provincial or Federal importance. Prosecution. Long term study. Impact not fully reversible.	There will likely be significant, negative, national or international media exposure lasting several days or weeks. Public investigation. International coverage. Management changes demanded.

Table 4-3 Probability (Likelihood) Rating Criteria

PoF Score	Probability (Likelihood) of Failure				
	Frequency	Probability	Capacity	Function	Reliability
1	Within 10 to 20 years	0% to 10%	Demand corresponds well with actual capacity and no operational problems experienced. Meets current and future capacity needs within planning horizon.	The infrastructure in the system or network meets all service delivery needs (i.e., health, safety, security, legislative, etc.) in a fully efficient and effective manner.	Asset is physically sound and is performing its function as originally intended. Asset is new or at the beginning of its service life. (< 25% Life Consumed)
2	Within 6 to 10 years	11% to 30%	Demand is within actual capacity and occasional operational problems experienced.	The infrastructure in the system or network meets service delivery needs (i.e., health, safety, security, legislative, etc.) in an acceptable manner.	Asset is physically sound and is performing its function as originally intended. Typically, asset has been used for some time but is within mid-stage of its expected life. (25% < Life Consumed <=50%)
3	Within 3 to 5 years	31% to 60%	Demand is approaching actual capacity and/or operational problems occur frequently. Meets current capacity needs but not future without modifications.	The infrastructure in the system or network meets service delivery needs (i.e., health, safety, security, legislative, etc.) with some inefficiencies and ineffectiveness present	Asset is showing signs of deterioration and is performing at a lower level than originally intended. (50% < Life Consumed <=75%)
4	Within 2 years	61% to 80%	Demand exceeds actual capacity and/or significant operational problems are evident.	The infrastructure in the system or network has a limited ability to meet service delivery needs (i.e., health, safety, security, legislative, etc.).	Asset is showing significant signs of deterioration and is performing to a much lower level than originally intended. (75% < Life Consumed <=100%)
5	Within 1 year	81% to 100%	Demand exceeds actual capacity and/or operational problems are serious and ongoing. Does not meet current capacity requirements.	The infrastructure in the system or network is seriously deficient and does not meet service delivery needs (i.e., health, safety, security, legislative, etc.) and is neither efficient nor effective.	Asset is physically unsound and/or not performing as originally intended. Asset has reached end of life and failure is imminent. (> 100% Life Consumed)

Table 4-4 shows the Consequence of Failure (CoF) rating and service life used to evaluate risks and subsequently determine asset renewal activity needs.

Table 4-4 Consequence Rating (CoF) and Service Life

Asset Class	Asset Sub-Class	Asset Type	Asset Sub-Type	CoF
Airside	Aircraft Runways	Pavement	RW Pavement	5
			Rarely Used Pavement	4
			Closed Pavement	1
		Signage	TA Pavement	5
		Pavement Paint	TA Tie-Down	5
	Aircraft Taxiways, Apron	Pavement	AS Signage	5
			Rarely Used Pavement	4
			Closed Pavement	1
		Aircraft Tie-Down Pad	AS Pavement Paint	5
		Pavement Paint	AFL-8	5
	Airfield Lighting	Field Electric Centre Structure	AFL-10	5
		Field Electric Centre & Controls	AFL-15	5
		Underground Cables & Conduits	AFL-20	5
		Lighting		5
Groundside	Roads	Pavement	GS Pavement	3
		Lighting	Road Lighting	3
		Pavement Paint	GS Pavement Paint	3
	Parking	Curb & Gutter	GS C&G	3
		Lighting	Parking Lot Lighting	3
	Facilities	Terminal	Building	5
			Furniture	3
			Flagpoles	3
			Monuments	3
			Flower Pots	2
			Outdoor Furniture	2
		Hangar 11	Building	2
		Maintenance Garage	Building	3
		Fuel Farm	Concrete Pads	4
			Fuel System	4
Site Servicing	Electrical	Underground Service Cable		5
	Fencing	Gate and Control System		5
		Barbed Wire Fencing		5
		Fencing		5
	Stormwater Mgmt	Storm sewers		4
		CBMH - catchbasins		4
		DIMH		4
		Culverts		4
		Ditches		4
		Inlets & Headwalls		4
		Oil-Grit Separator		4
	Signage	Rules and Regulation		4
		Bylaw Sign		3

Asset Class	Asset Sub-Class	Asset Type	Asset Sub-Type	CoF
Site Servicing		Information Sign		2
		Other		2
	Wildlife Mgmt	Culverts		4
	Wastewater	Sanitary mains		4
		MH		3
	Water	Watermains		4
		Hydrants		4
		Meter Chamber		3
Vehicles & Equip	Equipment	Loader Plow		4
		Mower		4
		De-icing Spreader		4
		Mower		4
		Plow Blade		4
		Decelerometer		3
		Line painter		3
		Loader		3
		Power Washer		3
		Range Finder		3
		Snowblower		3
	Maintenance Vehicles	Loader		4
		Plow Truck		4
		Tractor		4
		Pick-up Truck		3
		Sweeper		3
		Utility Vehicle		3
IT Equipment	Servers	Servers		4
	Devices and Printers	AP		3
		Lenovo Thinkpad Computers		3
		Miscellaneous Computer Equip		2
		Printer		2
	Security Technology	Access Keypad		5
		Security Software		5
		Cameras		4
	Communications Equip	AV System		4
		Radios		3
		Handheld Radios		3

Table 4-5 summarizes the Airport's Risk Evaluation Matrix, based on the likelihood of occurrence and overall consequence rating for each risk, for all Airport assets. Note that, although 17% of the Airport's assets are in Very Poor condition, only 0.3% are in the Very High risk exposure category. The Very High risk exposure assets consists of the ARCAL controller for the aircraft runway.

Table 4-5 Risk Evaluation Matrix ($M)

Likelihood of Failure						
	5	$2.2	$2.4	$0.2	--	**$0.006**
	4	--	$0.0	$0.6	$0.0	--
	3	--	$0.0	$1.5	$1.2	$6.6
	2	--	$0.1	$0.3	$1.3	$8.3
	1	--	$0.0	$2.1	$0.4	$0.3
		1	2	3	4	5
		Consequence of Failure				

Risk Exposure	CRV* ($M)	CRV* (%)
Very High	$0.006	0.02%
High	$8.6	31.2%
Moderate	$16.4	59.3%
Low	$2.6	9.4%
Very Low	$0.0	0.0%
Total	**$27.7**	**100.0%**

* CRV = Current Replacement Value

4.3 Asset Management Strategies

The Airport uses its understanding of current service delivery gaps and potential future gaps to inform the timing, location and amount of needed investments in infrastructure assets. The Airport aims to provide sufficient service capacity to meet demand and manages the condition and renewal of assets to sustain defined service levels, including meeting legislated and other corporate requirements.

4.3.1 Growth and Expansion Strategies

The Airport's approaches to accommodate growth and expansion needs will be identified in the 2024 Airside Redevelopment Study, which will define the demand for and capacity of the services and supporting assets.

4.3.2 Upgrade and Enhancement Strategies

Upgrade and enhancement activities provide a higher level of service capability from an existing asset to achieve a better fit for purpose (e.g., increasing the structural capacity of current airside pavement) or to meet regulatory or corporate requirements such as for health, safety, and environmental protection.

The 2024 Airside Redevelopment Study includes upgrade and enhancement strategies needed to support the proposed redevelopment. In addition, the Airport may produce functional needs plans that apply across the organization such as accessibility and energy conservation plans, which will provide upgrade and enhancement needs forecasts. As it is common for growth and upgrade strategies to be undertaken simultaneously, these lifecycle strategies are often reported together.

4.3.3 Renewal Strategies

All assets physically deteriorate at different rates to eventual failure and loss of ability to deliver the required levels of service. The Airport invests in condition assessments to gain the critical knowledge needed to understand where the assets are in their lifecycles and identify performance gaps.

For each identified renewal performance gap, technically feasible lifecycle options are assessed to determine the lowest cost solution to adequately address the gap. For each asset type, the Airport develops an asset renewal strategy that identifies the frequency and cost of activities that provide the defined level of service, at the lowest lifecycle cost. The renewal strategies are applied to the asset portfolio over time to determine the program of renewal activities and the amount that must be invested in the Airport's asset portfolio to sustain current service levels.

For some asset types, such as most fleet and information technology assets, the renewal strategy is very simple – replace the asset at the end of its useful life. For other asset types, such as a facility or pavement, the renewal strategy is much more complicated. For a facility, there are many thousands of components, some of which may be rehabilitated or replaced numerous times throughout the life of the facility. For pavement, there are numerous treatment types and they may each only be applied a limited number of times throughout the life of the pavement, and only under certain conditions.

Over time, as the Airport refines the asset management strategies through optimization analyses, the tracking of condition against targets and the application of renewal activities to meet defined levels of service becomes more routine.

4.3.4 Operations and Maintenance Strategies

The distinction between renewals (which are capital works) and maintenance (which is an operational expense) is set by accounting policies and standard operating procedures. Maintenance ensures the asset continues to deliver defined levels of services, while renewals can extend the asset's useful life. Renewals and maintenance are strongly linked; maintenance strategies can hasten or delay the need for renewals, and, if renewals are deferred, maintenance needs will often increase.

Asset operations and maintenance requirements and required resources are assessed and prioritized based on:

- Carrying out legislated operations and maintenance activities to ensure safety and environmental sustainability in accordance with appropriate regulations.
- Conducting routine and preventative maintenance activities to ensure preservation of existing assets.
- Analysis of current operations and maintenance contracts and known historical costs of delivering defined levels of services to forecast future operations and maintenance costs. For example, in some cases operations and maintenance costs increase at the rate of inflation, and in other cases such as energy and oil for pavement, costs have increased significantly more over time than the overall rate of inflation.
- Assessing consequential operations and maintenance requirements of significant new or upgraded infrastructure planned for the asset portfolio.

Any asset portfolio growth will place significant pressure on the capacity of existing operations and maintenance. Consequential operational expenditure is the operations and maintenance cost

associated with new and upgraded assets. For example, for a new facility, the costs of electricity, natural gas and routine maintenance all contribute to the consequential operational expenditure associated with that new asset. These costs will be incurred by the Airport into the future for as long as the facility is in use. For most assets, a good estimate of the consequential operational expenditure required to operate and maintain the new assets is simply the existing operations and maintenance cost multiplied by the growth factor.

5 FINANCING STRATEGY

5.1 Introduction

The purpose of a financial strategy is to provide a path to financial sustainability.

Financial sustainability involves managing service levels, infrastructure and financial assets in both the short and the long term. An organization is considered financially sustainable if:

- Its revenues are commensurate with its level of service aspirations
- It can adjust its capital plan, operating programs and service levels in response to changes in economic conditions or revenues
- It can keep its infrastructure in a state of good repair and replace it at the right time
- It can accommodate growth without unacceptable rate or debt increases.

Potential risks to achieving municipal financial sustainability include:

- A mismatch between level of service aspirations and fiscal capacity
- Uncertainty in the future cost of needed infrastructure investments
- Unforeseen shocks to revenue, such as an economic downturn or a reduction in revenue
- Demand that does not materialize as expected.

5.2 Capital Needs Forecast

Capital Needs Forecast to Service Growth and Upgrade

To meet the demand for expanded services, the Airport constructs new and expands the capacity of the asset portfolio, in addition to implementing non-asset strategies. To meet demand for functional improvements to services, the Airport upgrades the functionality of the asset portfolio. The needs to accommodate growth and upgrade are not known at this time but will be identified in the 2024 Airside Redevelopment Study.

Capital Needs Forecast to Service Renewal

To manage asset condition and address potential asset and associated service reliability gaps, the Airport continuously renews the asset portfolio. In accordance with O.Reg. 588/17 requirements, Figure 5-1 shows the capital renewal needs forecast to **maintain current LOS** (i.e., current % of assets in very poor condition), for each of the next 10 years (coloured bars) and on average for the next 10 years (dashed black line). These forecasts are based on a range of methods including industry standard physical condition assessments and needs forecasts, staff-report condition assessments and needs forecasts, install date and estimated useful life, and annuities (replacement cost divided by the estimated useful life). For reference, the solid red line shows the average funding available for the past 5 years (2020 to 2024) as $0.4 million/year.

Figure 5-1 Renewal Needs and Funding – Maintain Current LOS

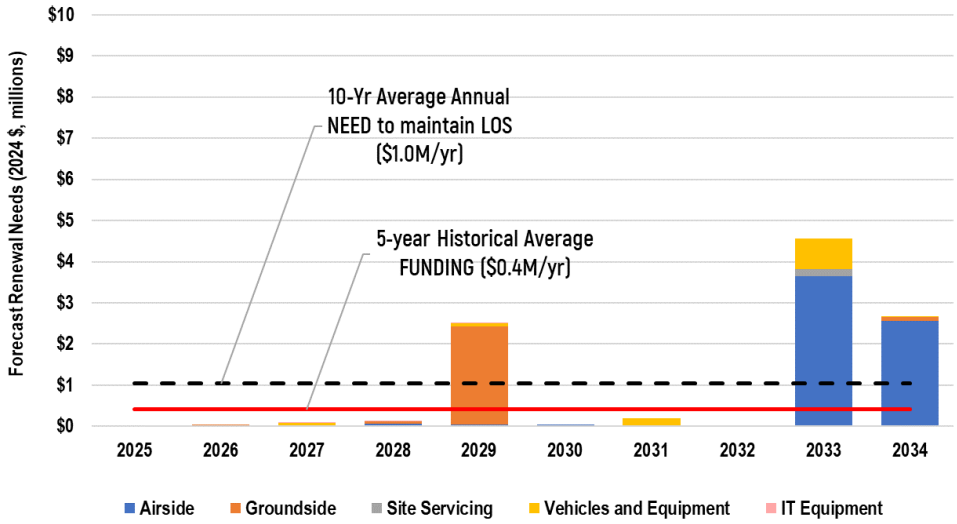


Figure 5-2 shows the forecast condition distribution associated with the funding scenario depicted in Figure 5-1. This scenario was designed to maintain the current LOS, i.e. the renewal backlog. In 2024 the renewal backlog was 17.5%. The backlog grows to 20.3% by 2034; however, through the period 2025-2034; the annual renewal backlog averages 17.3%.

Figure 5-2 Condition Forecast – Maintain Current LOS Scenario

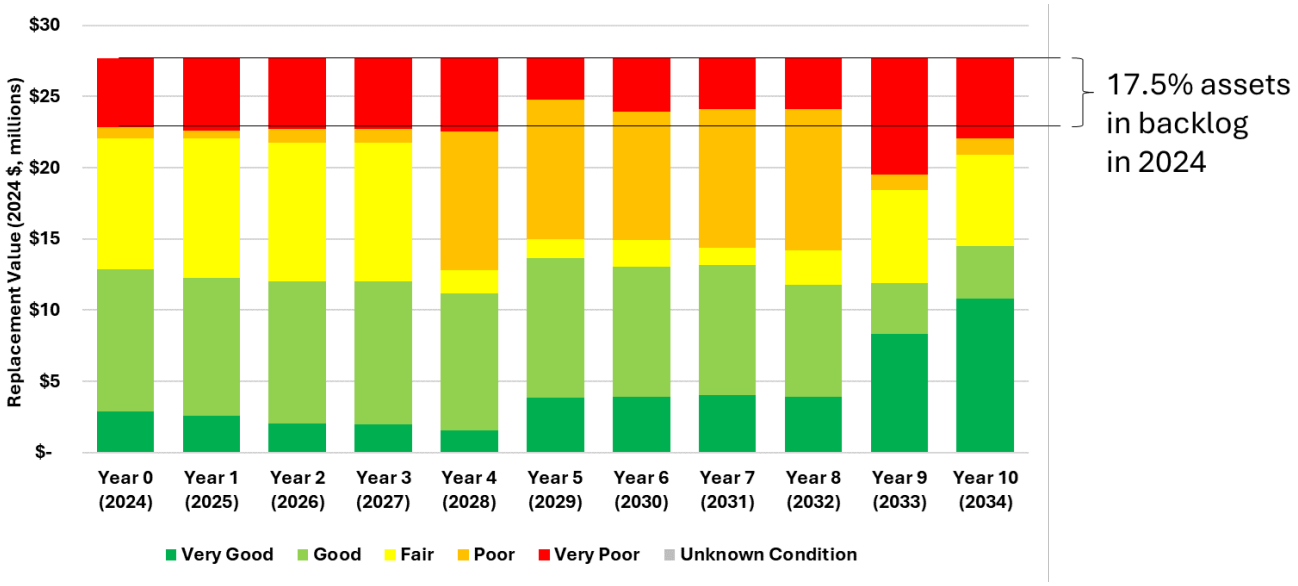


Figure 5-3 shows the capital renewal needs forecast to address all outstanding needs for each of the next 10 years (coloured bars), the average for the next 10 years (dashed black line), and the average historical renewal funding of $0.4 million/year (solid red line). The Figure shows that $1.6

million/year would be needed to address all outstanding needs. In figure 5-4, the condition forecast shows that this level of funding would eliminate the renewal backlog.

Figure 5-3 Renewal Needs and Funding – Eliminate Backlog

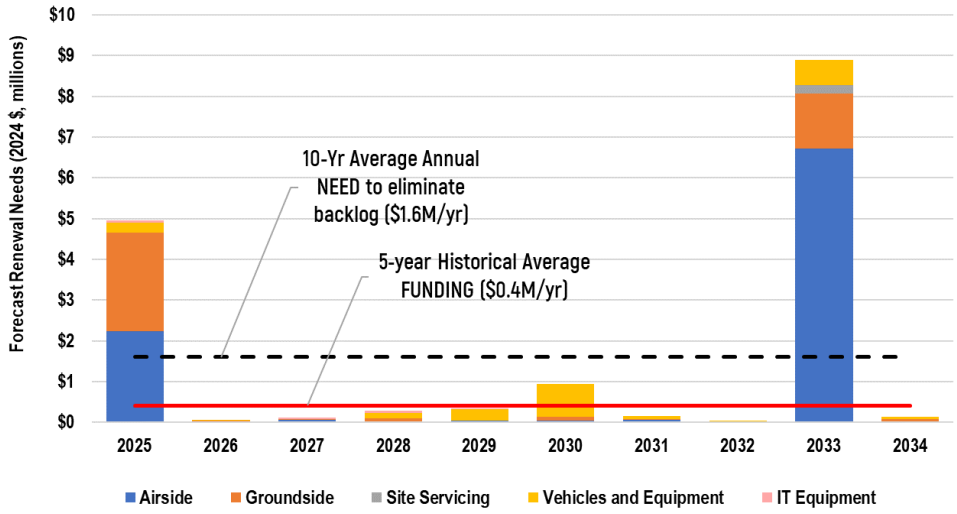
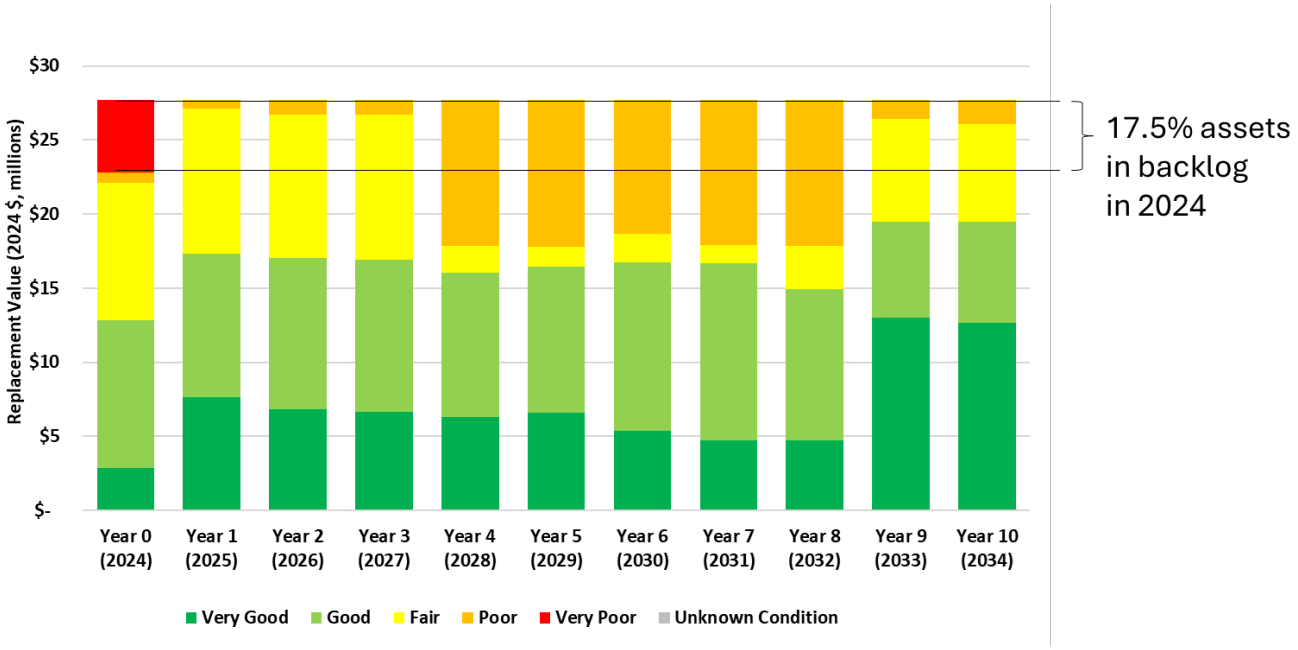


Figure 5-4 Condition Forecast – Eliminate Backlog Scenario

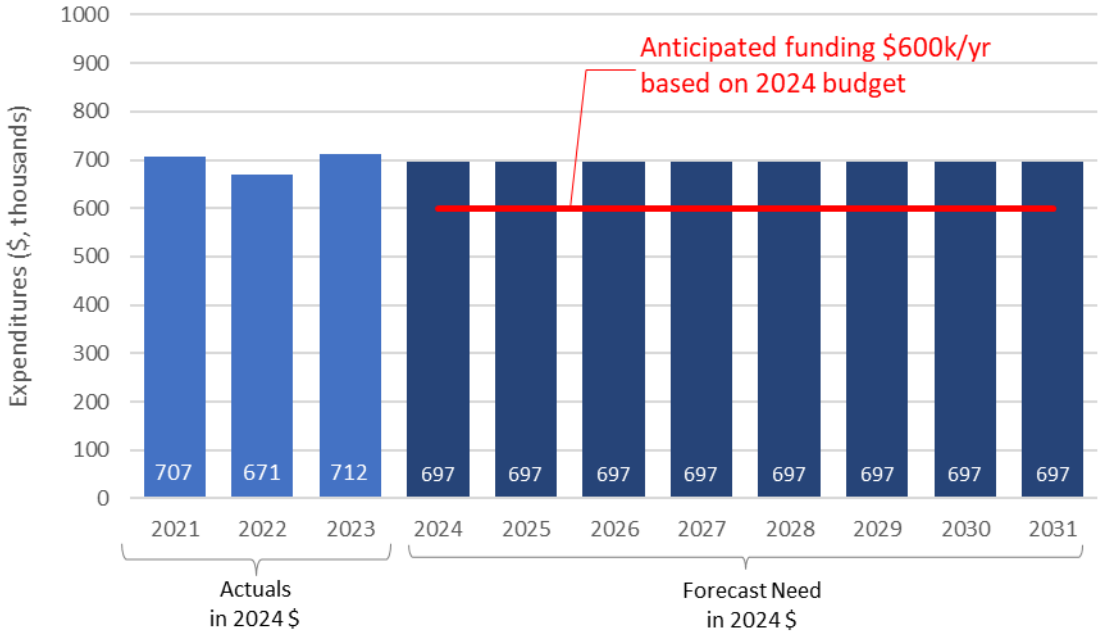


5.3 Operating Needs Forecast

To deliver the current LOS, the Airport undertakes regularly programmed activities, including operating and maintaining the assets and providing services. Any asset portfolio growth will place pressure on the capacity of existing operations and maintenance needs; however, growth and upgrade needs for the next 10 years are not defined at this time.

Figure 5-3 shows the actual expenditures for the years 2021-2023, inflated to 2024 $. The forecast needs for future years (2024-2025) is estimated at $697k/year, which is the average annual expenditure for the years 2021-2023. For comparison, the figure shows the 2024 budget of $600k/year. This

Figure 5-5 Annual Operating Needs Forecast*



** Amounts include only costs related to operations and maintenance of assets, not full operating budget.*

5.4 Funding Sources for Asset Lifecycle Strategies

The above sections provide a summary of the forecasted needs to renew, operate and maintain Airport service levels and assets. The Airport's ability to deliver on its AM Plan depends on its financial strategy. Financial sustainability requires long-term planning so that the necessary steps can be taken in the near-term to manage long-term financial risks.

A number of revenue sources are available to fund the capital and operating needs:

- User fees
- Financial support from the cities of Niagara Falls and St. Catharines, and the town of Niagara-on-the-Lake based on population
- Grants from the Federal Government (only with scheduled service).

Note that the Airport is not permitted to fund using debt or hold reserves.

The Airport is currently developing a strategy to determine how best to fund each of the asset lifecycle needs, across each of the asset classes. Alternative procurement and funding models are also being considered.

6 PLAN IMPROVEMENT AND MONITORING

6.1 Data Confidence

Data for asset management is created and collected through documented data specifications and protocols in phases that correspond to the general lifecycle of the assets:

- **Inventory Data** is collected during the asset acquisition / creation phase and provides identification, location and description data. Examples include asset ID, description, purchase year, installation year, in-service date, purchase cost, make, model, serial number, physical attributes (e.g. length, material, power rating), class, and parent asset.
- **AM Planning Data** is collected throughout the lifecycle of the assets and provides the base data for analysis of asset condition / maintenance, utilization / operations, and performance. Examples include updated demand / utilization / access restrictions data, updated condition data, updated criticality, risk and resilience data, physical works plans / achievements and related estimated / actual costs.
- **AM Analysis Data** is developed to report AM performance and make decisions to minimize impacts of failure to meet performance targets. For example to determine customer service performance, technical assets performance, and costs of asset ownership (lifecycle needs).

The quality of AM data can include its completeness and accuracy, and can be dictated by what it is based upon. The grades for evaluating data confidence are shown below.

Table 6-1 Data Confidence Grading

Grade	Quantity, Size, Install Year, Service Life	Condition	Replacement Value	Growth / Upgrade Needs Forecast	Renewal Needs Forecast
	% complete & accurate	Based upon	Based upon	Based upon	Based upon
Very High (VH)	90% to 100%	current industry standard condition assessment	current tender documents, quotes	historic budget actuals and current master plan forecast, with costs	current industry standard condition assessments & needs forecast, with costs
High (H)	80% to 90%	2+ year old industry standard condition assessment	2+ year old tender documents, quotes	historic budget actuals and 2+ year old master plan forecast, with costs	2+ year old industry standard condition assessments & needs forecast, with costs
Moderate (M)	70% to 80%	staff-reported condition	staff-reported costs	historic budget actuals and master plan forecast, with staff forecast costs	staff-reported condition assessment and needs forcast, with costs
Low (L)	50% to 70%	install date and useful life	inflated historical costs	population growth forecast	Needs forecast from install date & useful life
Very Low (VL)	0% to 50%	Unknown	Unknown	Unknown	Unknown

In compiling this AM Plan, a review of the asset registries is was performed. The review looked at the completeness and accuracy of the asset registries. The following table provides the assessment of the data used for meaningful asset management planning.

Table 6-2 AM Plan Data Confidence Grades

Asset Class	Asset Sub-Class	State of Infrastructure					Needs Forecast	
		Quantity & Size	Install Year	Service Life	Condition	Replacement Costs	Growth & Upgrade	Renewal
Airside	Aircraft Runways	VH	M	H	H	M	N/A	H
	Aircraft Taxiways, Apron	VH	M	H	H	M	N/A	H
	Airfield Lighting	H	H	H	M	M	N/A	M
Groundside	Roads	H	M	H	M	M	N/A	M
	Parking	H	M	H	M	M	N/A	M
	Facilities*	M	M	M	M	M	N/A	L
	Fuel Farm	H	H	H	M	M	N/A	M
Site Servicing	Stormwater Management	M	M	H	M	M	N/A	M
	Water	M	M	H	L	M	N/A	M
	Wastewater	M	M	H	L	M	N/A	M
	Wildlife Management	H	H	H	H	M	N/A	M
	Signage	H	M	H	L	H	N/A	M
	Electrical	M	M	H	L	M	N/A	M
	Fencing	M	M	H	L	M	N/A	M
Vehicles and Equipment	Vehicles	VH	H	H	H	H	N/A	H
	Equipment	VH	H	H	H	M	N/A	H
IT Equipment	Servers	VH	H	H	M	M	N/A	M
	Devices and Printers	VH	H	H	M	M	N/A	M
	Security Technology	VH	H	H	M	M	N/A	M
	Communication Equip	H	H	H	M	M	N/A	M

* Facility inventories were generally available only at the building level. Information on building systems and components would enable better needs forecasting.

6.2 Improvement Plan

The next steps resulting from this AM Plan to improve asset management practices are:

- Determine proposed levels of service for reporting in the Proposed LOS AM Plan required by O.Reg. 588/17 for approval by July 1, 2025.
- Complete the 2024 Airside Redevelopment Study and associated business case and determine Growth and Upgrade Needs Forecasts. This is an important step as it may influence the criticality of assets within the asset portfolio and the timing of renewal activities.
- Establish the future use and lifecycle activities for Hangar 11.

- Improve the asset State of Infrastructure database by conducting cyclical industry standard condition assessments, giving priority to high consequence of failure (CoF) assets. In particular, conduct condition assessments on the Terminal and Maintenance Garage. Develop inventories of building systems and components as part of the condition assessment.
- Improve the Renewal Needs Forecast in conjunction with the condition assessments.
- Establish a master asset inventory to support AM activities. Align the TCA register with AM asset register, or consolidate the two inventories. Establish processes to update the asset register(s) when assets are acquired, replaced or eliminated.
- Explore options for implementing technologies for work order management and asset investment planning. Consider the possibility of using applications in place at one of the three owner municipalities.

6.3 AM Plan Monitoring and Update

O.Reg. 588/17 requires that AM Plans be updated by July 1, 2025 to report proposed LOS for the subsequent 10 years, along with the cost of sustaining the proposed LOS. Thereafter, the O.Reg. requires that progress implementing the AM Plan be reported to municipal Councils annually by July 1. In addition, the O.Reg. requires AM Plans to be updated at least every 5 years.