THE CITY OF WINDSOR
ONTARIO, CANADA

ASSET MANAGEMENT PLAN

2024

Acknowledgements

We would like to acknowledge the efforts of all City staff, our partnering consultant GEI Consultants, and our agencies, boards and committees who were involved in the development of this Plan and were invaluable in providing both the quantitative and qualitative data required to inform this comprehensive corporate plan.

The collaboration achieved in the development of this document is noteworthy and has continued to highlight the importance of Asset Management to enhance the integration of best practices into the regular business processes of the Corporation.

Without the strategic guidance provided by Council, the oversight of the Asset Management Steering Committee, the dedication of the Asset Planning team, and the support of all staff responsible for managing the City's extensive network of assets, this document would not have been possible.

City of Windsor Asset Planning Department

Executive Summary

The City of Windsor (City) is a vibrant community located in southwestern Ontario, with many amenities including access to the United States border, world-class entertainment, historical and cultural landmarks, and beautiful waterfront gardens and parks. Asset Management in the City directly supports the City's Strategic Goals, through the continued maintenance of both existing and new infrastructure throughout the City. City Council is committed to ensuring that infrastructure is provided in a sustainable, orderly, and coordinated fashion.

The objective of Asset Management is to outline and establish a set of planned actions, based on best practice that will enable assets to provide a sustainable Level of Service (LOS), while managing risk at the lowest Lifecycle Cost (LCC).

Making Asset Management 'business as usual' is sometimes called operationalizing or implementing asset management. As Asset Management strategies and practices are further developed and incorporated into everyday operations, the City can become more strategic about how it manages its assets and spending.

An effective Asset Management program helps to better manage assets:

- By minimizing total costs of acquiring, operating, maintaining, and renewing assets;
- While operating within an environment of limited resources;
- And continuously delivering the service levels customers need and regulators require;
- At an acceptable level of risk to the organization.

This Asset Management Plan (AMP) supports these goals, providing a plan for effective and efficient management of City-owned assets. The AMP will help to ensure the management of City-owned infrastructure follows asset management practices while complying with Ontario Regulation 588/17 (O. Reg. 588/17) and the AMP will allow the City to optimize available resources and continue to meet acceptable levels of service (LOS) for all infrastructure. This AMP is an update to the previous plan completed in 2018-2019.

Asset Management Plan Overview

The City has a robust Asset Management Program in place to ensure that the City is able to continue with sustainable asset management practices. The Asset Management Policy (last updated in 2022), along with other corporate documents and plans informs this AMP. Upon endorsement by Council, the 2024 AMP will meet the requirements of the O. Reg. 588/17 2024 requirements. This AMP will be updated following this plan to meeting the 2025 requirements of the regulation.

The City owns a variety of assets which support services that are provided to the community. Within the scope of this AMP are the following asset categories in Figure 01, which includes an overview of the category, the replacement cost, and average condition.

Figure 0-1. 2024 AMP Asset Category Overview

The City owns approximately $14.7B in infrastructure assets that are identified in this plan, spanning across eight different asset categories. Figure 0-2 shows the valuation breakdown by asset category for the City of Windsor assets (excluding Agencies, Boards and Committee's) in relation to their replacement value. Environmental Services represents the largest asset category with assets totalling a replacement value of $6.4B. Transportation is the second biggest category with close to $5.8B in assets. While the replacement values and assets are widely different across the asset categories, all are critical for the City's ability to provide services to the community.

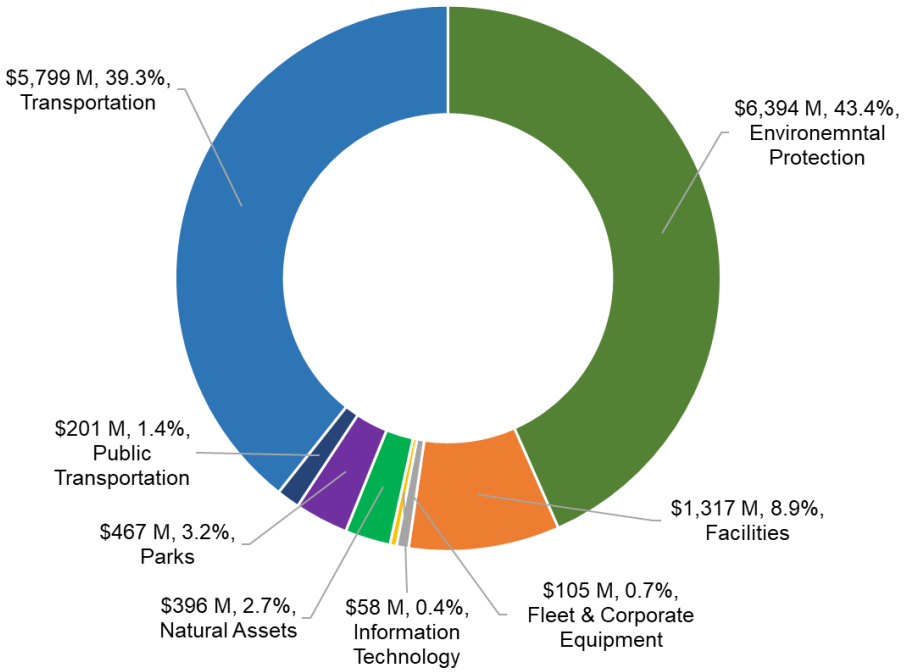

Figure 0-2. Asset Category Valuation as a Percentage of Replacement Value (Excluding ABCs)

The City has a number of additional asset categories that have their own governing boards. These asset categories make up the City of Windsor ABCs, totalling approximately $1.6 billion of assets. Figure 0-3 shows the valuation breakdown of each City of Windsor ABC asset category.

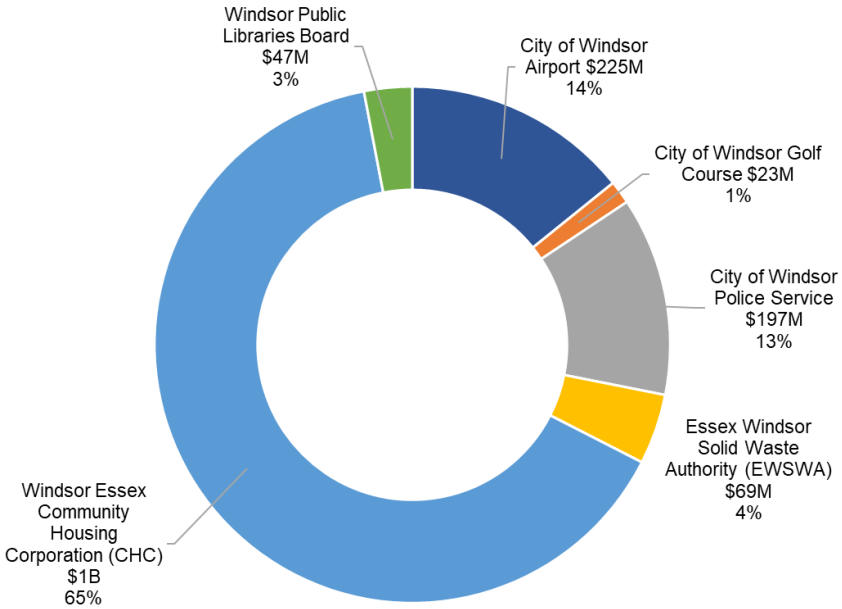

Figure 0-3. Asset Category Valuation as a Percentage of Replacement Value – Windsor ABCs

State of the Infrastructure

The AMP is divided into chapters for each asset category, detailing the asset inventory and valuation, asset condition, asset age, levels of service, lifecycle management strategy, and data confidence and improvement plan. Asset condition is an important metric used throughout this AMP, allowing the City to track progress in achieving levels of service, and continuing to provide safe, effective and efficient services to the community.

The information provided in this AMP provides a snapshot of the condition of the City's assets, based on the best available information at the time of the development of this plan. The City has undertaken extensive efforts to update the information within this plan, including replacement values and condition. This ensures replacement values are reflective of the current market conditions, resulting in forecasts which are more accurate for the needs of the infrastructure.

Figure 0-4 shows the overall asset condition by replacement value for City of Windsor assets (excluding the ABCs).

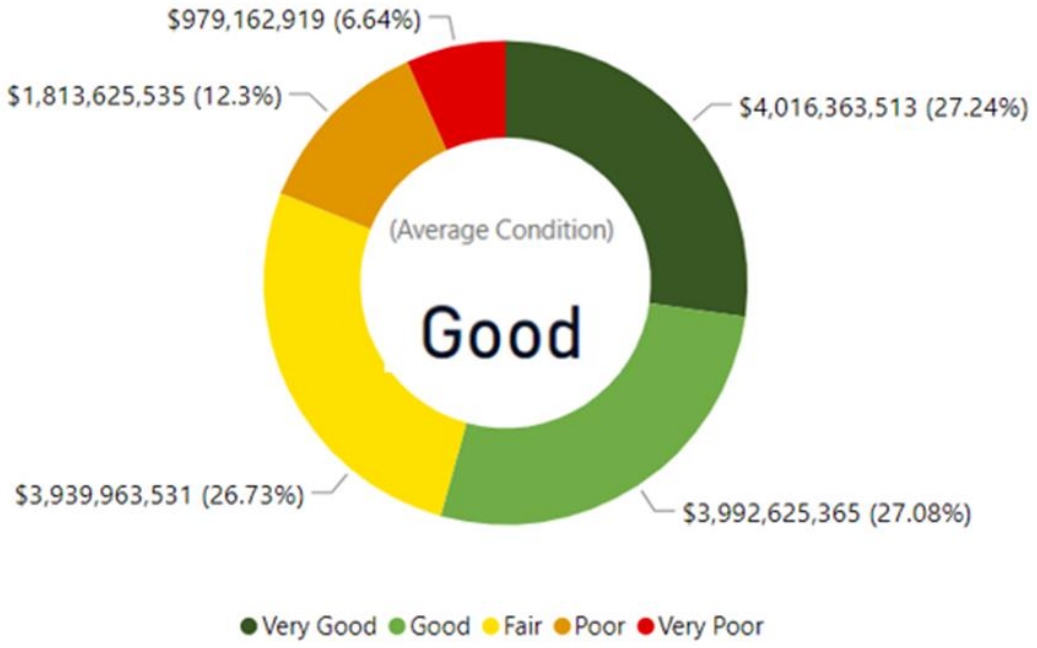

Figure 0-4. Overall Asset Condition as a Percentage of Replacement Value (Excluding ABCs)

On average, the City's assets, excluding those of its ABCs, are in Good condition, with 54.32% of assets in Good or Very Good condition. Detailed breakdowns of asset condition can be found in each chapter by asset category, asset segment, and asset sub-segment. Average condition of the assets are weighted by replacement value.

Figure 0-5 shows the overall asset condition by replacement value for assets managed by the City of Windsor ABCs.

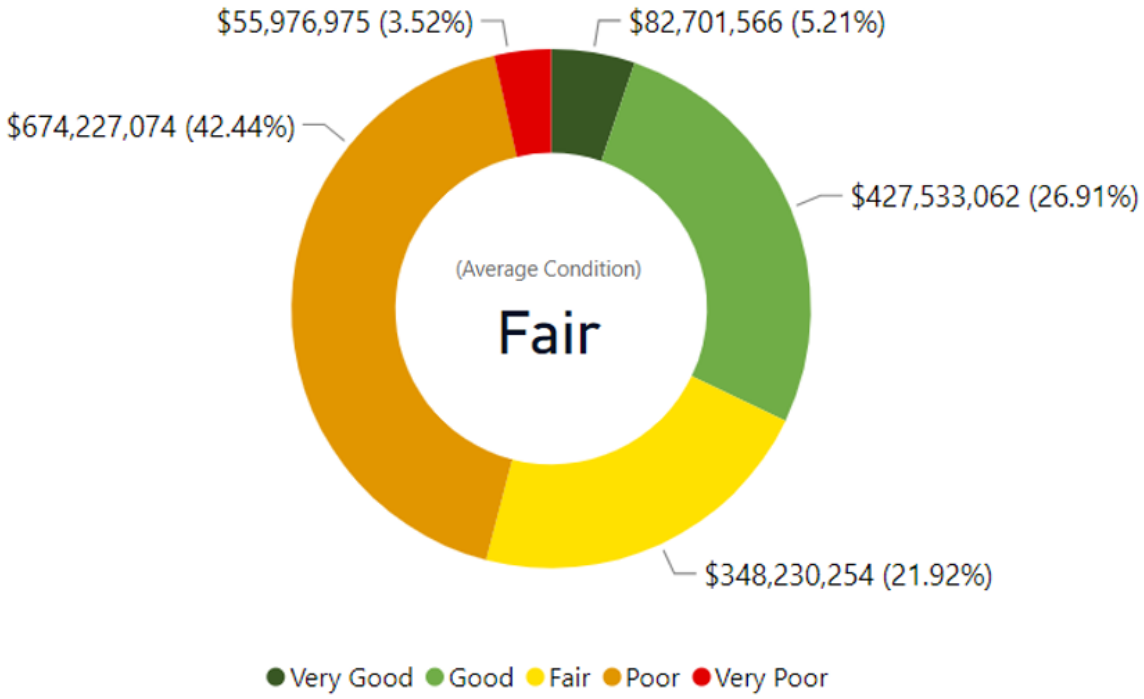

Figure 0-5. Asset Condition as a Percentage of Replacement Value – Windsor ABCs

On average, City of Windsor ABCs assets are in Fair condition with approximately 54% of assets in Fair, or better, condition. Detailed information on asset condition for the City of Windsor ABCs can be found in Appendix A.

Levels of Service

Levels of Service (LOS) metrics provide key performance information that supports the provision of the respective services for the asset categories and segments. They support the organization's strategic goals and are derived from customer needs, Council objectives, City Policies, legislative and regulatory requirements, and the financial capacity of the municipality to deliver those LOS.

LOS are crucial for the City to establish the standards and expectations for the delivery of services to the community. By tying assets to these service levels, the City can effectively assess and benchmark performance in meeting community needs and expectations. This is achieved by:

Defining Service Standards: LOS establish clear performance standards for the various services provided by the City. These standards outline parameters key to the delivery of service for each asset category.

Linking Assets to Services: City assets play a crucial role in delivering services. For example, roads and transportation infrastructure contribute to the level of service by providing smooth and safe travel routes. By linking assets to specific services, the City

can assess how well their infrastructure supports the desired service outcomes, which will be further assessed in the 2025 AMP.

Performance Measurement and Benchmarking: LOS provides a framework for measuring the performance of assets in meeting service standards. Metrics are used to quantify performance such as asset condition, availability, reliability, and cost-effectiveness.

Resource Allocation and Prioritization: LOS helps the City allocate resources effectively by prioritizing investments based on service priorities and performance targets.

Community Engagement and Accountability: LOS provide a transparent framework for communicating with residents about the quality and reliability of City services. By establishing clear service standards, the City can engage with the community to gather feedback, address concerns, and demonstrate accountability for services.

O. Reg. 588/17 has prescribed LOS metrics for core assets (including Bridges and Structures, Roads, Wastewater, and Storm). All other LOS, including those for non-core assets, were developed by City staff to be in line with strategic goals. These metrics can be found within the asset category chapters. The 2025 AMP will provide targets for these LOS metrics.

Lifecycle Management

The objective of the Lifecycle Management Strategy is to outline and establish a set of planned actions, based on best practices, that will enable the City's assets to provide a sustainable LOS to the residents of Windsor, while managing risk at the lowest LCC. The City has documented all lifecycle activities and strategies to maintain the City's assets, in the support of services to the community. The costs of these strategies have been assessed through different scenarios to determine the cost of these strategies.

Lifecycle management strategies are vital part of Asset Management for several reasons:

Asset Maintenance and Longevity: The City has a multitude of assets ranging from roads, bridges, sewers, facilities, fleet, etc. Implementing lifecycle management strategies ensures that these assets are properly maintained throughout their lifespan, maximizing their life, and minimizing needs for costly repairs or premature replacement.

Cost Efficiency: By planning for the entire lifecycle of an asset, the City can make informed decisions about budget allocations.

Risk Management: The City faces various risks associated with their assets, including safety hazards, regulatory compliance issues, and disruptions to services. By taking a proactive approach to lifecycle management, the City can identify and mitigate these risks by ensuring that assets are monitored, maintained, and upgraded as needed to meet changing standards and requirements.

Sustainability and Resilience: Sustainable development and resilience are increasingly important considerations for municipalities facing environmental challenges and climate change. Lifecycle strategies assist the City to incorporate principles of sustainability by promoting efficiencies, reducing waste, and prioritizing the integration of renewable technologies into infrastructure planning and design.

Service Delivery and Quality of Life: The City assets directly impact the quality of life for residents by providing essential services such as transportation, public transportation, and public facilities. Effective lifecycle management ensures that these services remain reliable and efficient, enhancing the well-being of the community.

This AMP communicates the City's commitment to providing and sustaining services to the community now, and in the future, through the responsible management of its infrastructure. This plan provides a detailed view of how the City effectively manages its assets, optimizes resources, mitigates risks, and enhances the quality of life for residents in a sustainable and resilient manner. They City will continue to enhance and improve upon the lifecycle and asset management strategies documented within this plan.

Financial Overview

The financial overview provided within this AMP is a critical component that outlines the infrastructure needs of the City over a 20-year planning period. It serves several important purposes, including:

Budget Overview: A comprehensive overview of the anticipated expenditures associated with maintaining, renewing, and replacing the City's Infrastructure assets.

Projected Expenditures: The AMP, through the development of Lifecycle Management activities, evaluates different options for meeting service levels and addressing infrastructure needs. By comparing these options, the City can identify the most cost-effective and sustainable solutions.

Funding Strategies and Recommendations: The financial overview outlines potential options available to the City to bridge the infrastructure gap. Addressing the identified infrastructure needs will require careful consideration and a combination of strategies, including financial and non-financial.

Risks Associated with Lifecycle Management: The financial overview highlights the potential risks associated with not addressing infrastructure needs. These risks include increased costs, safety hazards, regulatory non-compliance, and negative impacts to quality of life for the community. By assessing expenditure requirements and addressing funding gaps, the City can mitigate risks, and ensure effective management and stewardship of its infrastructure to meet the needs of current and future generations.

Projected Expenditures and Infrastructure Needs

The compiled investment needs for the City (excluding its ABCs) are presented in Figure 0-6 and Table 0-11. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies. The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

The 2024 AMP has identified an average annual overall funding gap of $78 million to maintain current LOS for all asset categories, and an annual gap of $118 million for infrastructure needs as per the identified lifecycle strategies for each asset Segment. These figures do not include the infrastructure needs of the City's ABCs. By taking a proactive and multifaceted approach to addressing infrastructure needs, the City can work towards ensuring the continued functionality, safety, and resiliency of its essential assets for the benefit of residents and businesses.

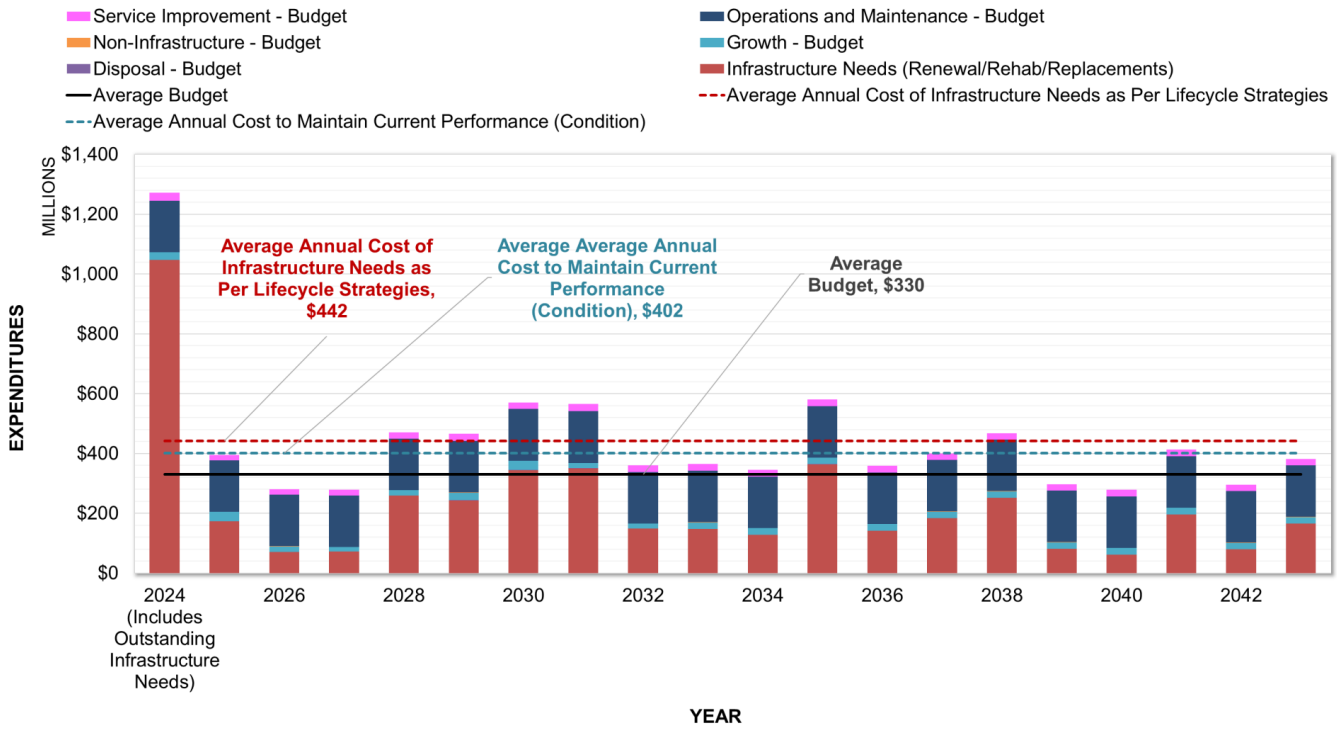

Figure 0-6. Overall Scenario Comparison (Excluding ABCs)

Following lifecycle strategies and activities outlined in this AMP are the City's most effective way to avoid risk. Ignoring the infrastructure gap, and not completing lifecycle activities and strategies as outlined in this AMP can lead to a range of negative consequences, both immediate and long-term.

Table 0-11. Combined Average Annual Budget and Lifecycle Investment Scenarios (Excluding ABCs)

Lifecycle Activity	Average Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Identified Infrastructure Spending Requirements
Non-Infrastructure	$599,080	$599,080	$599,080
Operations & Maintenance	$178,607,755	$178,607,755	$178,607,755
Service Improvement	$21,957,669	$21,957,669	$21,957,669
Disposal	$452,500	$452,500	$452,500
Growth	$21,455,942	$21,455,942	$21,455,942
Renewal, Rehabilitation & Replacement	$107,078,828	$184,998,265	$225,320,136
Total	**$330,151,774**	**$408,071,211**	**$448,393,082**
Funding Gap		**$77,919,437**	**$118,241,308**

Figure 0-7 highlights the cumulative effect of this gap over the 20-year forecast period, emphasizing the impact of inflation on the required funding. The inflation rate used in this analysis is 2.5%. The cumulative results of these scenarios demonstrate that significant investment, along with the adoption of strategic asset management practices and policies, will be required to meet expected spending requirements to keep assets in their current condition.

If left unaddressed, the cumulative infrastructure gap, factoring in inflation, is projected to amount to $4.5 B by the end of the 20-year period. It is crucial for the City to consider ways in which to address this gap through strategic investments and planning to ensure sustainable and resilient infrastructure for the future.

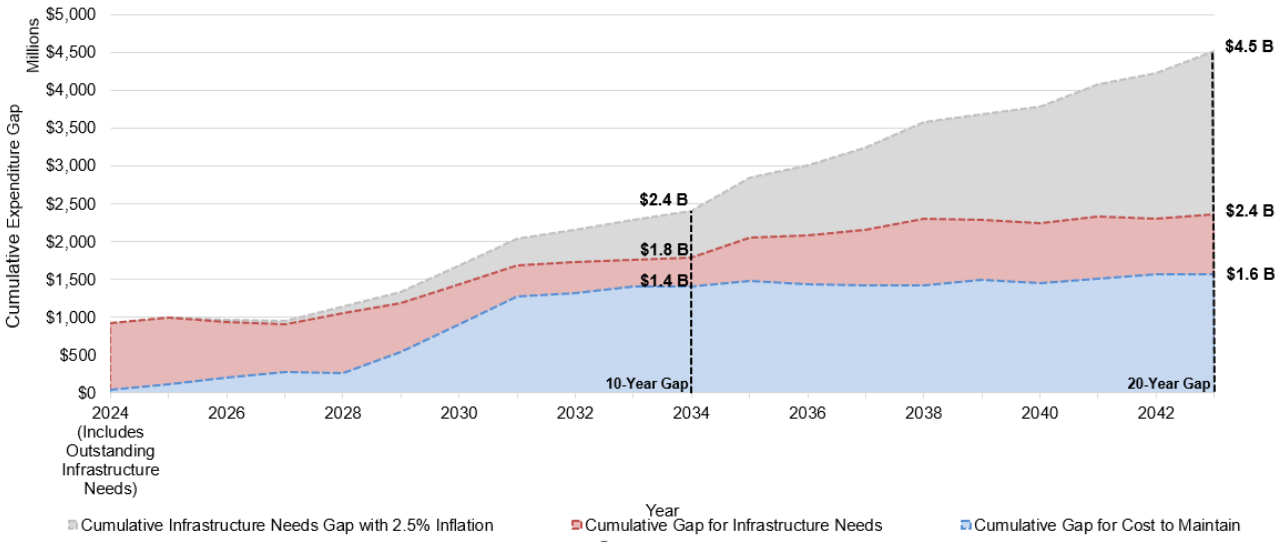

Figure 0-7. Cumulative Infrastructure Gap with 2.5% Inflation

Further to the infrastructure needs identified above, the City's ABCs are also facing pressures when it comes to infrastructure needs, as outlined in Table 0-2. Detailed information regarding the assets managed by each of the City's ABCs can be found in APPENDIX A.

Table 0-2. ABCs Infrastructure Gap

Lifecycle Activity	Annual Average Infrastructure Gap to Maintain Current Performance (Condition)	Annual Average Infrastructure Gap to Meet Infrastructure Needs as Per Lifecycle Strategies
City of Windsor Airport	$6,100,802	$9,124,996
City of Windsor Golf Course	$770,509	$884,506
City of Windsor Police Service	$3,216,944	$6,532,147
City of Windsor Public Libraries Board	$2,177,537	$33,027
Windsor Essex Community Housing Corporation (CHC)	$7,300,000	$11,700,000
Essex Windsor Solid Waste Authority (EWSWA)	$5,700	-

Improvement & Monitoring Plan

Continual improvement in asset management is essential for the City to enhance efficiency, effectiveness, and sustainability of the infrastructure management practices over time. The 2024 AMP provides an overview of the work that has been completed since the previous AMP, as well as opportunities for improvements and the current work plan that has been developed throughout the compilation of this plan. As data, systems, and strategies are enhanced, so will future forecasts and iterations of this plan.

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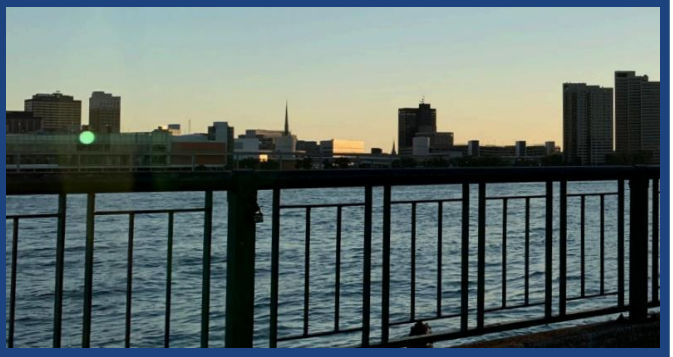
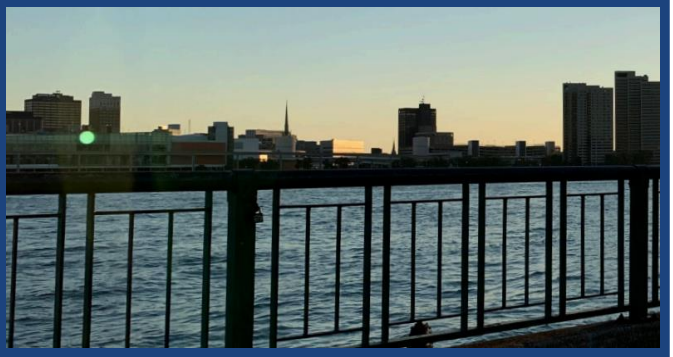
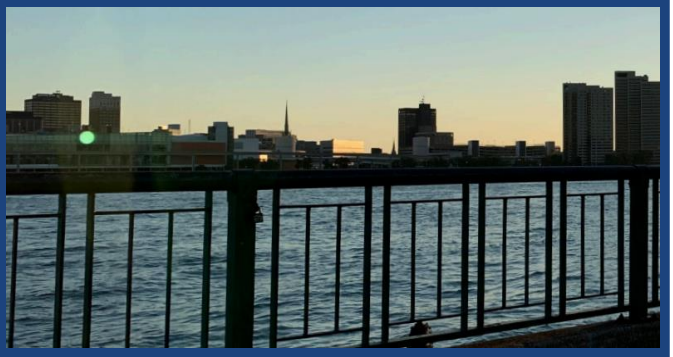
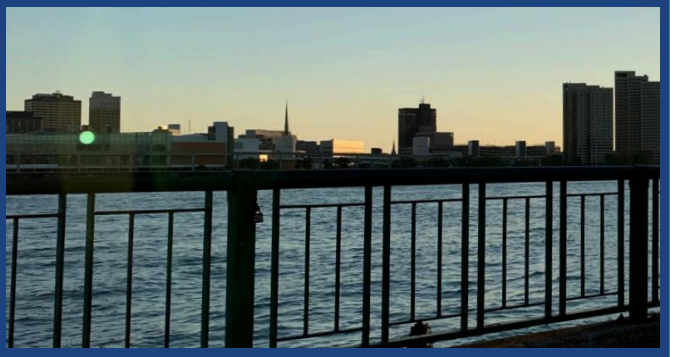








Introduction

1 Introduction

The City of Windsor's (the City)'s infrastructure supports a variety of municipal services that residents and businesses rely on everyday. The City's Corporate Asset Management Plan (AMP) supports the municipality's strategic goals, as outlined in the Official Plan and other corporate strategic plans and documents. By maintaining both existing and new infrastructure in a sustainable, orderly, and coordinated manner, the City continues to prioritize the provision of safe, efficient, and effective infrastructure systems. Furthermore, the AMP ensures compliance with Ontario Regulation 588/17 (O. Reg. 588/17) while optimizing available resources and meeting levels of service at an acceptable level of risk. This Corporate Asset Management Plan (2024 AMP) supersedes the 2018-2019 Corporate Asset Management Plan (2018-2019 AMP) and will remain current until its scheduled update in 2025. The 2024 AMP, along with additional information on the various plans informing the AMP, is available on the City's website. Any further information not found online, may be requested through the Asset Planning Department.

1.1 Purpose and Regulation

1.1.1 Asset Management Plan Purpose

Municipal organizations exist to provide a wide range of services that are essential to a communities' quality of life, like transportation systems, waste management, drainage and flood protection, public art, parks, and recreation services. The services they deliver depend on physical infrastructure assets such as wastewater treatment plants, stormwater retention ponds, roads, buses, buildings, vehicles, and equipment. Natural assets, such as trees and shorewalls also play an important role in supporting these services. Municipal staff interact with these assets daily as part of their job to provide services to the community.

A community's prosperity, economic development, competitiveness, image, and overall quality of life are inherently and explicitly tied to the reliable performance of its infrastructure assets. These assets are the foundation that enables communities to thrive. However, municipalities face some significant social, economic, and environmental challenges that may affect their ability to manage their assets and deliver services sustainably over the long term.

The objective of Asset Management is to outline and establish a set of planned actions, based on best practice that will enable the City's assets to provide a sustainable Level of Service (LOS), while managing risk at the lowest Lifecycle Cost (LCC).

Making Asset Management 'business as usual' is sometimes called operationalizing or implementing asset management. As Asset Management strategies and practices are further developed and incorporated into everyday operations, the City can become more strategic about how it manages its assets and spending by:

- Minimizing total costs of acquiring, operating, maintaining, and renewing assets;
- While operating within an environment of limited resources;

- And continuously delivering the service levels customers need and regulators require;
- At an acceptable level of risk to the organization.

Figure 1-1. Relationship between Service, Cost, and Risk informing asset management strategies (Climate Risk Institute)

An organization's AMP serves as a strategic document ensuring that the management of municipal infrastructure follows sound Asset Management practices and principles, while optimizing available resources and maintaining levels of service. The objective of this AMP is to provide an overview of how City assets are performing, estimate the funding levels required to sustain the assets at current levels of service, and to start discussing LOS and lifecycle activities to be undertaken in managing the City's infrastructure assets.

This AMP will provide information and analysis on the infrastructure needs for existing assets. The infrastructure needs associated with Proposed Levels of Service (PLOS), growth, service enhancement or economic development will be forthcoming under the 2025 requirements of O. Reg. 588/17. The July 2025 update will also need to consider a financial strategy as it relates to the City's infrastructure needs.

1.1.2 Ontario Regulation 588/17 Overview

New statutory and regulatory requirements have been an important driver of moving asset management forward. O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure, requires municipalities to develop an Asset Management Policy outlining how asset management practices will be incorporated into the municipal framework. This policy must also consider actions that may be required to address vulnerabilities caused by climate change. A copy of the City's current Asset Management Policy (2022) (AM Policy) can be found on the City's website.

In addition to development of an AM Policy, O. Reg. 588/17 requires municipalities to develop and implement an AMP. After 2025, an annual review of the municipality's progress in implementing its AMP, as well as a 5-year AMP update, is required to remain in compliance. A summary of O. Reg. 588/17 timelines and requirements is shown in Figure 1-2.

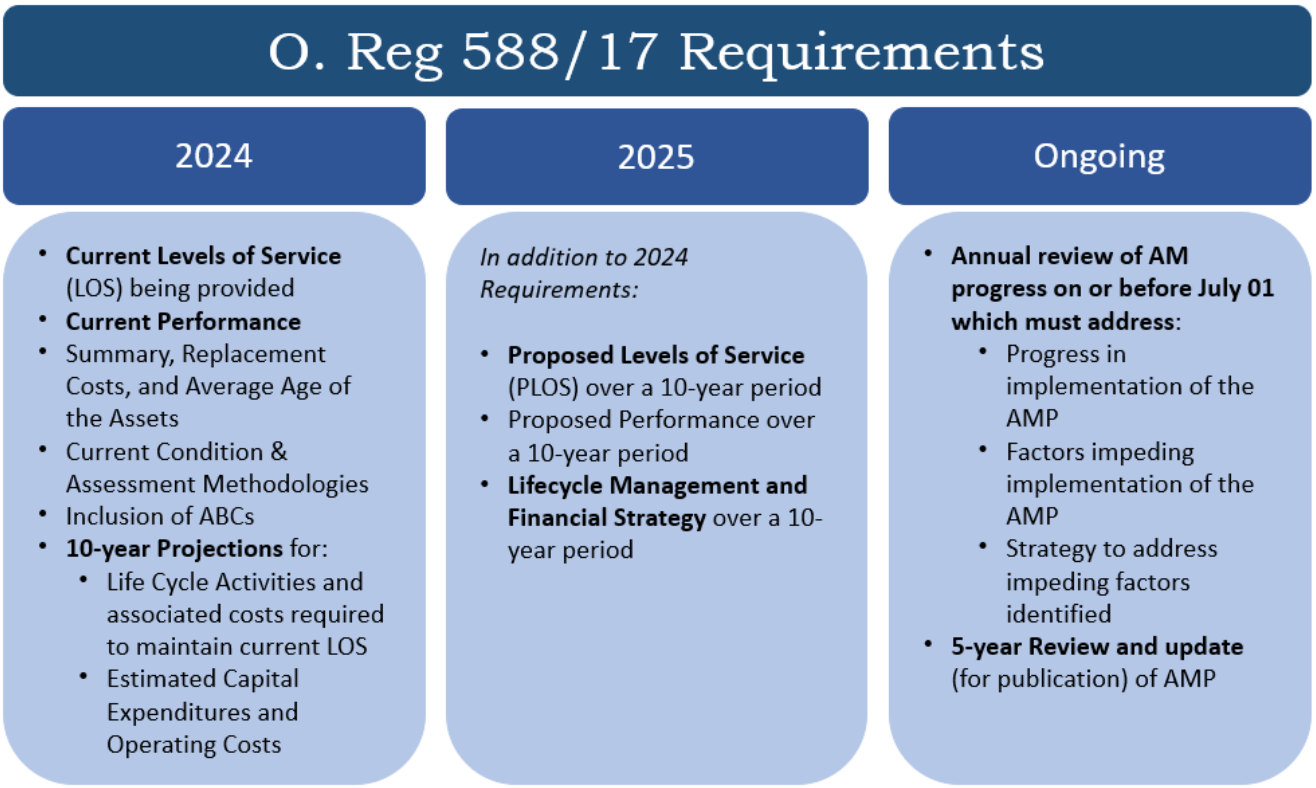


Figure 1-2. Ontario Regulation 588/17 Timelines and Requirements

This AMP satisfies the requirements for July 1, 2024. This version of the AMP does not provide recommendations on desired levels of service, nor the funding levels required to achieve them. This analysis will be included in the next AMP for compliance to year 2025 requirements.

1.2 Asset Management Program in Windsor

1.2.1 Corporate Asset Management Overview

The City has been working to adopt and implement asset management strategies and principles for several years. In 2011, Administration identified the need to establish an Asset Management Program to facilitate sustainable asset management practices, formally establishing the City's Asset Planning division.

Between 2011 to 2013, a comprehensive and robust Asset Management Strategy was developed as a foundation for developing the City's first AMP in alignment with the Ontario Ministry of Infrastructure requirements set out by their guidance document, Building Together: Guide for Municipal AMPs. This culminated in the development of the City's 2013 AMP, which reported on assets valued at $5.2 billion.

Windsor's 2018-2019 AMP was approved by Council in 2019 and was compliant with O. Reg. 588/17 requirements for 2022. The assets covered in the 2018-2019 AMP were valued at a replacement cost of $6.12 billion and included core assets of roads, wastewater and storm

assets, bridges and culverts and some non-core assets such as facilities, corporate fleet and fuel sites, various parks assets, Transit Windsor fleet and equipment, IT and other corporate equipment. Overall, the condition of the City's assets at that time was assessed as Good.

In addition, the 2018-2019 AMP considered a financial strategy to address the identified infrastructure gap, which is still being implemented. The 2018-2019 AMP identified a total annual funding deficit of over $33 million dollars per year and identified services provided by the following assets that were at risk of decline: Transportation, Parks, Environmental Protection, Facilities, Equipment and IT Infrastructure. This resulted in an annual infrastructure levy increase of 1.16% from 2020 to 2025 to be spent on the identified asset types. In 2023 this levy was further extended to 2026 to address level of service needs related to homeless and housing initiatives. That same year, an additional levy of 0.25% per year for the years 2023 - 2026 was approved to specifically address deficiencies in Local Residential Roads.

As required under O. Reg. 588/17, the 2024 AMP considers all corporate infrastructure assets. This includes those owned by the City and managed through various City Agencies, Boards and Committees (ABCs). In defining the threshold for the inclusion of specific infrastructure asset types in the AMP, factors such as asset type, Estimated Useful Life (EUL), purchase price, and tangible capital asset (TCA) thresholds were considered.

Given the inclusion of these additional assets, the 2024 AMP has been reformatted to allow for grouping of asset segments and sub-segments with similar asset characteristics and lifecycle activities. Future AMP updates will continue to follow the current asset hierarchy established in this document to allow for comparison and trend analysis.

1.2.2 Asset Management Governance

The City of Windsor's AM Policy was first approved in 2017, with an update approved in 2022. The AM Policy outlines how municipal assets should be managed by striving to meet defined levels of service at the lowest asset LCC while maximizing services to the community and managing associated risks. The AM Policy also identifies the roles and responsibilities of administrative staff who make infrastructure-related decisions and provides a clear governance structure to begin embedding asset management into corporate culture. As outlined in the AM Policy, the organizational structure for asset management governance is as follows, in Figure 1-3.

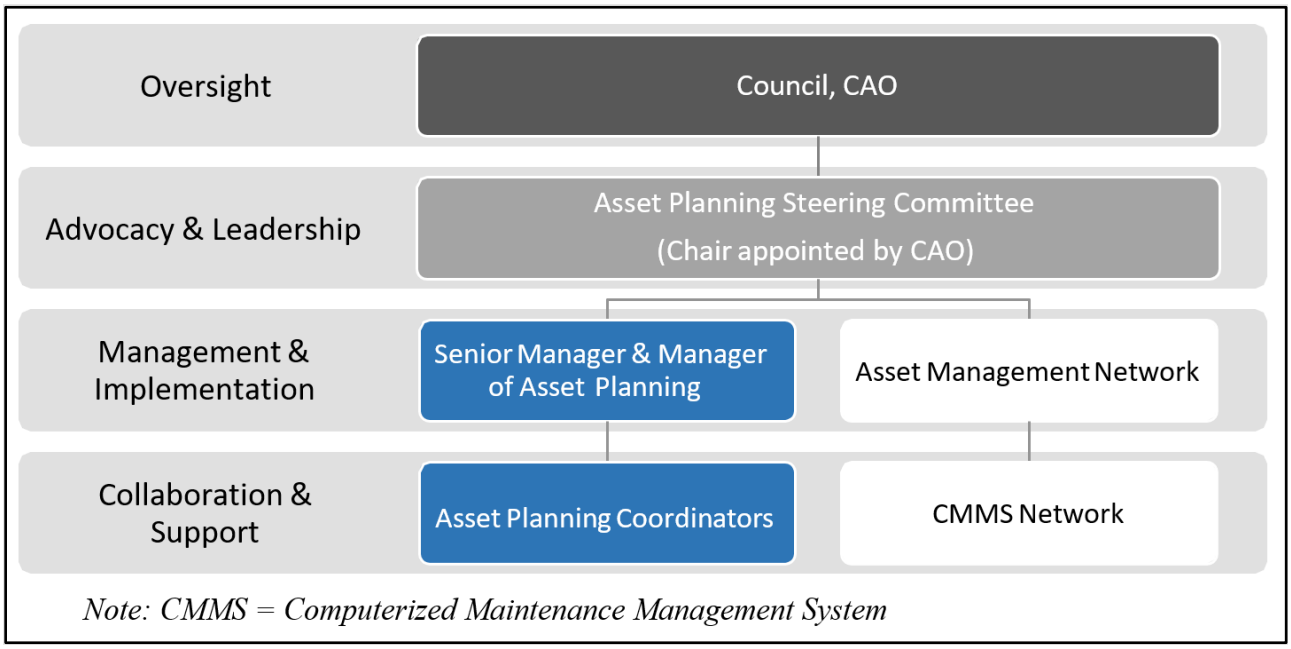


Figure 1-3. City of Windsor Asset Management Governance Structure

1.2.3 Asset Management Stakeholders' Roles & Responsibilities

The City's Corporate Asset Planning division has led the development of this 2024 AMP, in collaboration with GEI Consultants and with support from staff across various departments who are part of the Asset Management Network and the Computerized Maintenance Management System (CMMS) Network. Reviews were also undertaken by the Asset Planning Steering Committee for endorsement and approvals with a final review of the AMP by the City's Chief Administrative Officer (CAO). The roles and responsibilities of the various groups involved in the Asset Management process are provided in Table 1-1.

Table 1-1. Asset Management Program Roles and Responsibilities

Role	Responsibilities
Council	• Set priorities for Asset Management and articulate community values • Maintain corporate capacity to support all elements and practices of Asset Management • Approve asset funding through the capital budget process

Role	Responsibilities
CAO	• Implement the organization's AM Policy and supporting Asset Management system • Establish an Asset Planning Steering Committee and appoint cross-functional representatives from relevant business areas to serve on the Steering Committee • Ensure the review of the AM Policy at a minimum of every 5 years
Asset Planning Steering Committee	• Provide overall guidance and direction for City-wide Asset Management development • Ensure that adequate resources are available for Asset Management roadmap implementation and overall Asset Management development • Monitor and manage the communication and change management plans for Asset Management development
Asset Management Network	• Provide departmental sponsorship for Asset Management practices and concepts • Provide adequate resources to support Asset Management goals at the departmental level • Provide leadership and support to Departmental Asset Planning Coordinators
Senior Manager & Manager of Asset Planning and Asset Planning Coordinators (Asset Planning Division)	• Track, analyze and report on Asset Management program benefits to the Senior Management team and other stakeholders • Work with operational departments and the CMMS Networks to obtain asset data to inform the AMP • Develop the AMP with input from departments • Work to integrate Asset Management strategies into all service areas
CMMS Network (includes Departmental Asset Management SMEs)	• Provide asset registry, condition and age data to Asset Planning for the AMP • Keep asset registries up-to-date and work to improve reliability and accuracy of asset data • Assist with the interpretation and validation of all asset data to inform the AMP • Provide subject area expertise for their associated assets to inform the AMP • Work with Asset Planning to communicate Asset Management strategy needs and opportunities

1.2.4 General Asset Management Strategies

This section includes an overview of the City's approach to managing assets including condition assessment techniques, the identification of the optimal life cycle interventions required based on the lowest LCC, and various prioritization techniques, including the consideration of risk.

1.2.4.1 Condition Assessment Programs

A key building block of good Asset Management practice is to have comprehensive and reliable information on the current condition of the infrastructure. Municipalities need to have a clear understanding of the performance and condition of their assets, as management decisions for future expenditures and field activities should be based on this knowledge. An incomplete understanding about an asset may lead to its premature failure or premature replacement.

Benefits of objective condition assessment programs within the overall Asset Management process are as follows:

- It allows for the establishment of rehabilitation programs;
- When utilized in risk frameworks, it assists in the identification and avoidance of future failures and provides liability protection;
- It can be utilized to inform proactive repair schedules and preventative maintenance programs;
- It improves the understanding of asset service life therefore contributing towards improving LOS;
- It enables accurate asset reporting which, in turn, enables better decision making.

Condition assessment can involve different forms of analysis such as subjective opinion, legislated methods, mathematical models, or variations thereof, and can be completed through a very detailed or very cursory approach. Various objective condition assessment programs are in place to assess the City's assets. Condition methodology for assets included in this AMP is explained in each chapter.

1.2.4.2 Lifecycle Costing

The goal of Asset Management is to minimize the LCC of an asset, while maximizing services to the community and managing associated risk. This involves a comprehensive approach to Asset Management, illustrated in Figure 1-4. Proper management of assets throughout their lifecycle enables the City to make better decisions at the right time in order to manage assets at their lowest LCC.

Figure 1-4. The Asset Lifecycle (Climate Risk Institute)

It is important to note that the construction of new capital assets, in general, only accounts for 10-20% of their total cost of ownership. As shown in Figure 1-5, 80% of asset ownership costs are spent on the asset's operation, maintenance, renewal, and eventual disposal.

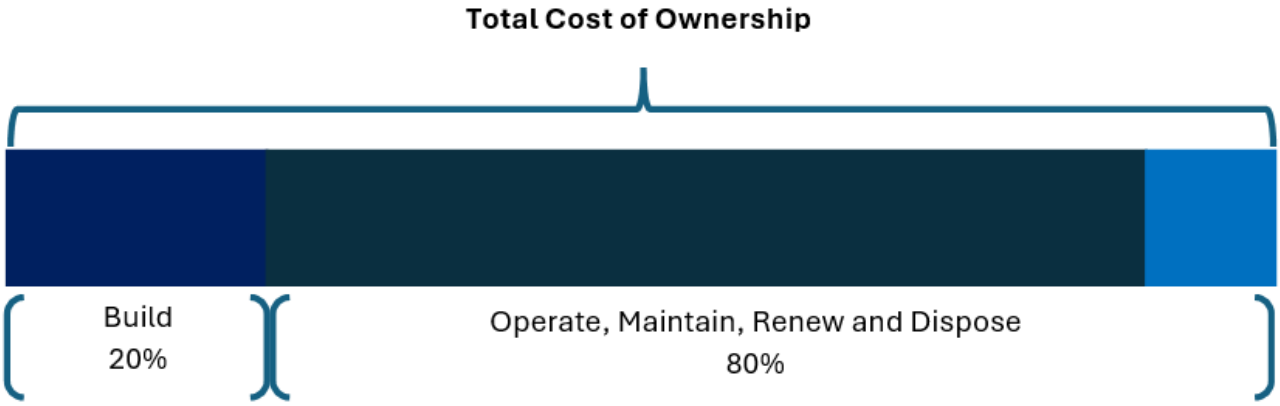


Figure 1-5. Cost of Ownership (City of Windsor, Asset Planning)

Determining all costs associated with an assets lifecycle is called Whole Lifecycle Costing (WLC). Administration is working to integrate this type of analysis into its decision-making and analysis when rehabilitating or replacing aging infrastructure, or when developing costs for new or acquired assets.

1.2.4.3 Optimized Decision Making

Integrating Asset Management strategies into the way assets are managed has the ability to better inform decision makers when making asset related decisions. This informed approach contributes to balanced service levels, decreased risks to the community, and sustainable asset cost. Asset Management decisions occur at a number of different stages including, project selection, project prioritization both across and within service areas and at operational and maintenance levels.

Optimized decision making, either within or across service areas, is currently based on a range of approaches. These approaches utilize the available asset data, such as condition assessment information, and is supplemented with expert knowledge from City staff and outside agencies. For high-value or complex projects, the decision-making process includes assessing a broad range of capital solutions, such as renewal, rehabilitation, and replacement options in addition to the investigation of operational solutions such as enhanced maintenance regimes. A similar approach has been taken for the selection of rehabilitation work for assets such as roads, sewers, and structures, where staff have assessed various alternative solutions and developed a range of intervention options that are most appropriate to the City's needs.

As a part of the Corporate Asset Management program, the strategies outlined below are considered and continue to be strengthened to better facilitate decision making:

- **Risk Based Analysis:** This approach focuses on maximizing risk reduction for minimum cost. The Corporation quantifies the risk, identifies mitigation measures and risk tolerance, and then sets out to reduce the risks in the most cost-effective manner.
- **Cost-Benefit Analysis:** Involves identifying the financial impacts of various alternatives within a business case. This includes both benefits and costs over the entire analysis period with the goal of assessing which alternative presents the greatest value of benefits compared to costs.
- **Business Case Evaluation:** The development of business cases to evaluate alternatives and select a preferred solution that provides the best value when evaluated against specific weighted criteria.

1.2.4.4 Integrated Solutions

Asset Management is a change management process that involves a holistic approach across municipal departments. It is not something that occurs at a fixed time in an annual cycle but rather, it should be regarded as a key part of the City's culture.

Integrating Asset Management and social and environmental goals is becoming critical for municipalities. When infrastructure is due for renewal or rehabilitation, updating the infrastructure to meet accessibility, equity and environmental goals can contribute to multiple corporate objectives, as well as to enhance services to the community. This is becoming increasingly important as most Federal and Provincial funding opportunities are requiring social and environmental objectives be met to receive infrastructure renewal funding.

In addition, many municipalities are incorporating public input on services levels in their community. How residents rate the services provided, and whether or not they are willing to pay more to sustain service levels, can be valuable information to include into an AMP.

1.3 Alignment to the City's Strategic Goals

The AMP is a key component of the City's planning process linking with multiple other corporate plans and documents, for example:

- **The Official Plan** – The AMP will both utilize and influence the land use policy directions for long-term growth and development as provided through the Official Plan.
- **Capital Budget** – The decision framework and infrastructure needs identified in the AMP form the basis on which future capital budgets are prepared.
- **Operating Budget** – Ensures funding is available for day-to-day asset management activities which allow assets to continue operating at their original or current performance levels.
- **Infrastructure Master Plans** – The AMP aims to align with the goals and projections from infrastructure master plans and in turn will influence future master plan recommendations. All City Master Plans can be found on the City Website at *https://www.citywindsor.ca*. Such plans include, but are not limited to:
    - Active Transportation Master Plan
    - Sewer and Coastal Flood Protection Plan
    - Rediscover Our Parks – Parks and Outdoor Recreation Master Plan
    - Recreation Master Plan
    - More than Transit Master Plan
    - Corporate Climate Action Plan
    - Energy Management Plan
    - Corporate Technology and Strategic Plan
- **By-Laws, standards, and policies** – The AMP will influence and utilize policies and by-laws related to infrastructure management practices and standards.
- **Regulations** – The AMP must recognize and abide by industry and senior government regulations, where applicable.
- **Business Plans** – The service levels, policies, processes, and budgets defined in the AMP are incorporated into business plans as activity budgets, management strategies, and performance measures.

Further, Asset Management directly supports a number of the City's Strategic Goals as laid out in the Official Plan. Specifically in the Infrastructure section, with regard to accommodating the transportation and physical service needs in the City, Council is committed to ensuring that infrastructure is provided in a sustainable, orderly and coordinated fashion. Council's infrastructure goals are to achieve:

- **Sustainable Infrastructure:** Safe, sustainable, effective and efficient infrastructure.
- **Optimal Use:** Optimal use of existing infrastructure.

- **Community Transportation:** An accessible, affordable and available transportation system.
- **Balanced System:** An environment in which all modes of transportation can play a balanced role.
- **Coordinated, Efficient and Cost Effective:** The provision of infrastructure in a coordinated, efficient and cost-effective manner.
- **Integrated Planning:** Integration of planning for infrastructure with the planning for growth.
- **Protect Natural Features:** For development and site alteration on lands located within or adjacent to the significant habitat of endangered species or threatened species; Provincially Significant Wetlands; natural heritage features; the policies contained within the Natural Assets chapter of this Plan will also apply.

1.4 Development & Methodology of the Asset Management Plan

1.4.1 Asset Management Plan Scope

This AMP includes the following categories:

Table 1-2 below outlines the types of assets included within each chapter of the Plan.

Table 1-2. Asset Management Plan Asset Scope

Asset Category	Assets Included
Environmental Protection	Combined Sewers, Municipal Drains, Sanitary Sewers, Storm Management Ponds & Underground Storage Facilities, Storm Pumping Stations & Interceptors, Storm Sewers, Wastewater Pumping Stations & Interceptors, Wastewater Treatment Plants & Biosolids Facility.
Transportation	Bridges & Subways, Class Arterial (A1 and A2) and Collector (C1 and C2), Expressway, Major Culverts(>3m), Noise Barrier Walls, On-Road Bike Facilities, Parking Garages, Pay & Display Parking Lots, Pedestrian Bridges (ROW), Paved Alleys, Scenic Parkway, Sidewalks, Street Lighting (ROW) Luminaries, Street Lighting (ROW) Poles, Traffic Signals and Pedestrian Crossings (PXO).
Facilities	City-owned Facilities including Administrative and Operational, Community Centres, Fire, Heritage & Culture, Huron Lodge, Multi-Use Recreation & Other Long-Term Facilities, Outdoor Ice Rinks, Parks, Recreation, Transitional.
Fleet & Corporate Equipment	Fleet and Corporate Equipment assets, including Corporate Fleet, Energy Systems, EV Charging Stations, Fire Equipment, Fire Fleet and Support Vehicles, Fuel Sites, Huron Lodge Equipment, Off-Road Fleet, Parks Equipment, Public Works and Recreation Equipment, and the Corporate Radio System.
Information Technology	Applications & software including Communications Equipment, Computers, Enterprise Applications & Software, Firewalls, Infrastructure Software, Other Applications & Software, Other Corporate IT Equipment, Servers, Switches & Wireless Access Points, Virtual Servers.
Natural Assets	Natural Shorewall, City-owned Park and Street Trees.
Parks	Parks amenities including Baseball Diamonds, Basketball Courts, Benches, Bike Facilities, Community Gardens, Dog Parks, Lights, Maintained Recreation Trails, Non-Pay & Display Parking Lots, Off-Road Equipment, Ornamental & Drinking Fountains, Other Equipment, Pedestrian Bridges and Boardwalks, Picnic Shelters, Playgrounds, Riverfront Parks Shorewall, Skateboard Parks, Soccer Fields, Splash Pads, Tennis & Pickleball Courts.
Public Transportation	Transit Windsor assets including Bus Shelters, Equipment, Facilities, Fuel Sites, Transit Fleet, Transit Support Vehicles.

Asset Category	Assets Included
ABCs	Assets pertaining to the City of Windsor Airport, City of Windsor Golf Courses, Essex-Windsor Solid Waste Authority, City of Windsor Police Service, Windsor-Essex Community Housing Corporation, and the Windsor Public Library Board.

Asset data used to inform the analysis in the 2024 AMP is a presented as of year-end 2022, except where significant changes necessitated updates to 2023 information. All current replacement values are stated in 2023 dollars.

1.4.2 Asset Management Plan Structure & Methodology

The 2024 AMP is divided into chapters (as outlined in Table 1-2), also referred to as AMP Category (Category). Each chapter will provide details on the following:

1.4.2.1 State of the Infrastructure

The State of the Infrastructure section provides an assessment of the of the infrastructure owned by the City. The primary objective is to provide a high-level inventory and insights on the overall age, condition, replacement value, and key metrics of the assets, as required by O. Reg. 588/17. The information is based on datasets and documents that were assessed for data confidence and discussed with Subject Matter Experts (SMEs). This section summarizes the inventory of assets and their replacement values and provides the age and condition for each asset Category and asset Segment.

Asset Register

The asset register was developed by City staff, pulling information from multiple sources. Required information includes:

- Number of Units
- Installation Data
- Current Replacement Value
- Estimated Useful Life
- Condition

The resulting register, or inventory, provided the basis for the analysis that was used in the 2024 AMP, including State of the Infrastructure, LOS, and Lifecycle Management Strategies.

Current Replacement Value

Current Replacement Value (CRV) of an asset refers to the cost of replacing the asset with a similar one in today's dollars. Determining the current replacement value is important for Asset Management purposes, as it helps in assessing the financial implications of asset replacement, and plan for future capital expenditures. It is best practice to include all costs

associated with a replacement in order to fully assess replacement value. These costs may include engineering and design, project management, materials, and labour.

City staff have undergone a lengthy process to review, assess and update CRVs across all asset categories presented in this AMP. To update these values, several strategies have been leveraged, including market assessment, analyzing recent contracts of similar assets, staff expertise, engineering estimates and professional appraisals, among others. Updating of CRVs is an ongoing effort, which will be continually improved upon for asset management purposes.

In interpreting the information presented in this AMP, the following should be noted:

- CRVs used in this AMP represent the best available information for the development of this document and will continue to be evaluated and updated as required for future iterations of the AMP;
- Current market conditions have been reflected in this AMP, and in some cases are significantly different than those provided in the previous AMP due to recent and ongoing economic conditions;
- Except where noted, all replacement costs are based on the cost to replace the asset with a similar asset (i.e. 'like-for-like') and;
- There is no growth, technology change, or enhancement assumptions included in the reported CRVs, unless identified specifically within an individual chapter.

Estimated Useful Life

Estimated Useful Life (EUL) in Asset Management planning refers to the anticipated duration over which an asset is expected to remain operational and provide its intended function. This estimate may be based on various factors such as design specifications, historical performance data, maintenance practices, environmental condition, and technological advancements. The purpose of estimating useful life for Asset Management planning is to enable organizations to allocate resources for maintenance, repairs, replacements, and new acquisitions over the asset's lifecycle. It allows for budgeting long-term capital expenditures through replacement planning, risk management, optimizing maintenance and performance evaluation.

For the purposes of this AMP, staff reviewed and assessed estimated useful lives to ensure appropriate values were used for accurate forecasting of infrastructure spending needs.

Asset Condition

Assigning condition ratings to assets across each asset Category using a consistent rating scale is a crucial step in asset management. By using standardized scales, the City of Windsor can track year-over-year asset performance and gain insights into overcall asset condition, regardless of asset Category.

Within this AMP, condition ratings were assigned based on numerous methods, and then standardized into condition rating scale categories of Very Good to Very Poor. The condition

ratings scale consists of a numerical or categorical value that represents the condition of the assets. This methodology applies to several asset Segments including Roads & Paved Alleys which are assessed using Structural Condition Index (SCI) scores; Bridges which are assessed using Bridge Condition Index (BCI) scores; Sidewalks which use definitions and guidelines to determine condition; and Sewers which are assessed either through objective assessment methods like CCTV or Zoom or based on condition definitions. Where condition assessment data was available, these condition values were used and input into the condition rating scale. Where assessed condition was not available, condition of an asset was assessed based on its remaining life compared to its age and EUL. The condition categories and rating scale is outlined in Table 1-3.

Table 1-3. Condition Rating Scale

Condition	Definition	Description
Very Good	Fit for the Future	The asset is fit for the future. It is well maintained, in good condition, new or recently rehabilitated.
Good	Adequate for Now	The asset is adequate. It is acceptable and generally within the mid-stage of its expected service life.
Fair	Requires Attention	The asset requires attention. The asset shows signs of deterioration, and some elements exhibit deficiencies.
Poor	At Risk	There is an increasing potential for the asset condition to affect the service it provides. The asset is approaching the end of its service life, the condition is below the standard and a large portion of the system exhibits significant deterioration.
Very Poor	Unfit for Sustained Service	The asset is unfit for sustained service. It is near or beyond its expected service life and shows widespread signs of advanced deterioration. Some assets may be unusable.
Unknown	Unknown	Not enough data exists to determine condition.

1.4.2.2 Levels of Service

The LOS metrics provide key performance information that support the provision of the respective service for each City asset Segment. They support the organization's strategic goals and are derived from customer needs, Council objectives, City Policies, legislative and regulatory requirements, and the financial capacity of the municipality to deliver those LOS. O. Reg. 588/17 has prescribed LOS for core assets. All other LOS were developed by City staff.

In general, LOS provide the following information:

- **Level of Service Statement:** A brief description presented in plain language for public understanding of the service provided by each asset Category to residents based upon the City's core values and mission.
- **Levels of Service Metric:** A statement that describes the LOS metrics being reported.
- **Current Performance:** The current results of the LOS metric described as a value or statements supporting the service delivery outcomes.

The LOS metrics can be used for internal reporting purposes within City departments or the broader city administration. These indicators provide a way to track and monitor the performance of the infrastructure and services. They may include metrics such as infrastructure condition performance, efficiency, compliance with regulatory standards, and operational costs.

The LOS metrics in this AMP represent a combination of those required by O. Reg. 588/17 and those developed by asset managers throughout the organization. For the purposes of this AMP, the current performance of the City's assets is assessed using these LOS metrics. The 2025 AMP will provide proposed (target) performance of these same metrics and evaluate the City's ability to fund the proposed LOS (PLOS).

Figure 1-6 shows the City's Community Strategic Plan Pillars (2007) and select objectives that relate to the AMP and how the LOS attributes featured in the 2024 AMP align with these Council approved strategic pillars.

Windsor Strategic Plan *Pillars and Objectives*	**Our Society**	**Our Environment**					**Our Economy**	**Our Government**			
	Diverse and Caring	**Clean and Efficient**					**Cultivated and Competitive**	**Responsive and Responsible**			
	Stay Safe	Maintain Infrastructure	Improve Our Environment	Develop Responsibly	Conserve Energy	Make Transportation Convenient and Efficient	Grow Business	Improve Financial Success	Make Services Responsive	Form Beneficial Partnerships	Encourage Public Engagement
AMP 2024 *Service Attributes*	**Reliability**		**Environmental Stewardship**			**Availability**		**Fiscal Sustainability**	**Responsiveness**		
	Services are predictable and continuous and are delivered such that they minimize health, safety and security risks.		Services preserve and protect the natural heritage environment and promote climate change initiatives.			Services of sufficient capacity are convenient and accessible to the entire community and are suitable for the intended function (fit for purpose).		Assets are maintained in a serviceable position over the long term.	Customers are treated fairly and consistently, within acceptable timeframes, demonstrating respect, empathy and integrity.		

Figure 1-6. City of Windsor Strategic Plan Pillars & Objectives and how these relate to the City's 2024 AMP Service Attributes

1.4.2.3 Lifecycle Management Strategy

Lifecycle management strategies aim to establish planned actions, based on best practices, to ensure the City's assets can sustainably serve its citizens at the lowest possible LCC, while managing risk. Lifecycle activities are important as they work together to extend the asset life, reduce overall LCC, and achieve other objectives such as environmental goals. The goal of defining these lifecycle strategies is to capture the activities that are required to sustain the assets within each asset Category. The City is continuously improving its Asset Management approach by reviewing processes and procedures and implementing best practices in asset management.

Lifecycle Management Activity Categories

Lifecycle Management Activity Categories summarize the various lifecycle activities that asset owners complete during the lifecycle of an assets. For the purposes of this plan, the lifecycle activity categories are as follows:

- **Non-Infrastructure Solutions:** Actions or policies that can lower costs and contribute to the management of assets. These would include activities such as studies and inspections to assess asset condition, or the implementation of policies as they relate to asset management.
- **Operations & Maintenance Activities:** Regulatory scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events. Typically, these activities are undertaken to ensure an asset meets its expected useful life.
- **Renewal/Rehabilitation/Replacement Activities:** Significant repairs designed to extend the life of the asset (i.e. rehabilitations or renewals), or activities that are expected to occur once an asset has reached the end of its useful life (i.e. replacements) where renewal or rehabilitation is no longer an option.
- **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.
- **Service Improvement:** Planned activities to improve LOS, such as increasing an asset's capacity, improve quality, or implement new technologies or services. By definition service improvements are not driven by growth needs.
- **Growth Activities:** Planned activities required to extend services to previously unserved areas or expand services to meet growth demands to maintain LOS.

The lifecycle activities for each asset Segment are detailed in the individual asset Category chapters. These activities are aligned with the asset hierarchy and include the frequency at which they are performed in terms of the assets' EUL. Each asset type is unique in the needs for the activities that are completed within the asset's lifecycle.

To appropriately forecast the expenditure needs of each asset Category, the lifecycle activities were reviewed for all Renewal, Rehabilitation, and Replacement activities as these activities are crucial for ensuring that infrastructure remains in a state of good repair to continue to provide services to the community. The activities were then applied in the forecast scenarios outlined below.

1.4.2.4 Lifecycle Strategies and Forecast Scenarios Assumptions

O. Reg. 588/17 requires a 10-year assessment which selects the lowest cost life cycle activities that are projected to maintain service levels over the assessment period. Keeping in line with the 2018-2019 AMP, the 2024 AMP provides a 20-year forecast and assessment. This extended analysis period provides a more comprehensive look at the City's projected infrastructure needs over the medium term.

As part of the Lifecycle Management Strategy, an assessment is completed to understand not only the costs associated with the lifecycle activities, but to also forecast the performance (condition) of the City's assets over the next 20 years should all of the identified Lifecycle Activities be undertaken. In total, three forecasting scenarios are run to assess the City's assets and gain insight on the City's ability to continue to provide services into the future. This involves evaluating asset performance against needs and budgetary or condition-based targets.

Scenario 1: Current Funding – This scenario evaluates asset performance under the current funding level that the City anticipates allocating towards each asset category. The current budgets were obtained from the City's 2024 Capital Budget and extended based on current and approved-in-principle amounts to estimate approximate 20-year funding levels. This is used to illustrate the change in performance (condition) under anticipated funding levels. It is also used as a baseline scenario, which can be used to assess the other scenarios analyzed.

Scenario 2: Maintain Current Performance (Level of Service) – This scenario evaluates the cost to maintain assets at approximately the same performance (condition) they are currently in over the 20-year forecast period and is used to determine the cost to provide the current level of service for the asset category, which is a requirement of July 1, 2024 milestone of O. Reg. 588/17. The analysis is completed using the assumption that maintaining the current performance (condition) of assets will ensure that the City continues to provide existing service levels moving forward.

Scenario 3: Infrastructure Needs as Per Lifecycle Strategies – This scenario is run to determine the projected infrastructure needs for the 20-year analysis period based on expected or planned rehabilitation, renewals and replacements of assets as per their defined lifecycle strategy. This scenario also identifies outstanding infrastructure needs, which is work that, should have been completed by the time of this assessment, if all identified lifecycle activities had been undertaken. Typically, these are assets that are beyond their identified service life.

Using the results of these scenarios, the infrastructure expenditure needs are then identified. The scenarios are compared to review the current annual average budget, the annual average cost to maintain current performance and the annual average cost to meet infrastructure needs as per lifecycle strategies. The Infrastructure Gap represents the differences between the average annual budget and the average annual expenditure needs required for Scenario 2 and 3.

1.4.2.5 Data Confidence and Improvement Plan

Each chapter of the 2024 AMP will provide information on the data confidence and improvement plan specific to that asset Category and give further details on the sources used to develop the asset register, and their accuracy and reliability. A data quality grade will be assigned, based on the criteria outlined in Table 1-4.

Based on the confidence level assigned and the analysis that goes along with determining that confidence level, the data confidence and improvement plan within each chapter will provide category specific opportunities for improvement in an effort to improve data accuracy in and reliability for future AMPs.

Table 1-4. City of Windsor Data Confidence Rating

Asset Data	Evaluation Criteria	Confidence Rating (/10)
Source	- Data is stored in a singular database that is maintained regularly and has user policies and procedures.	**High Confidence** (Score of 9 or 10)
Accuracy	- Assumptions not required for age, replacement values, condition, and useful lives. - Condition values are sourced from formalized condition assessments based on best practices for the asset type. - Replacement values are sourced from recent industry quotes.	**High Confidence** (Score of 9 or 10)
Reliability	- Data is based upon sound records. - Asset Registries are considered complete and are reviewed/maintained at least annually.	**High Confidence** (Score of 9 or 10)
Source	- Data is stored in a singular database that is maintained regularly but does not have user policies and procedures.	**Moderately High Confidence** (Score of 8 or 7)
Accuracy	- Some assumptions are required for age and/or replacement values, and/or condition and/or useful lives, but are considered minimal and immaterial. - Condition values are sourced mostly from formalized condition assessments; some may be based on expert visual observation and/or expert verbal opinion. - Replacement values are based on recent industry quotes or the last recorded replacement cost plus inflation.	**Moderately High Confidence** (Score of 8 or 7)
Reliability	- Data is based upon sound records or analyses that have been acceptably documented and are recognized as the best method of assessment. - Asset Registries are considered complete but have not been recently reviewed/maintained.	**Moderately High Confidence** (Score of 8 or 7)

Asset Data	Evaluation Criteria	Confidence Rating (/10)
Source	- Data is stored in a singular or multiple database(s) that is not maintained regularly and may not have user policies and procedures.	**Moderate Confidence** (Score of 5 or 6)
Accuracy	- Assumptions are required for most ages, and/or replacement values, and/or conditions, and/or and useful lives. - Condition values are sourced mostly from out-of-date industry quotes or formalized condition assessments; the remainder may be based on expert visual observation and/or expert verbal opinion. - Replacement values are based on recent industry quotes or the last recorded replacement cost plus inflation.	**Moderate Confidence** (Score of 5 or 6)
Reliability	- Data is based upon out-of-date inventory or study, purchasing records, and internally maintained records. - Asset Registries were at one point considered complete but have not been recently reviewed/maintained.	**Moderate Confidence** (Score of 5 or 6)
Source	- Data is not stored (at any hierarchy level) in any location and may reside only with the expert individual.	**Moderately Low Confidence** (Score of 3 or 4)
Accuracy	- Assumptions are required for all fields including age, replacement values, condition, and useful lives. - None of the condition values are based on formalized condition assessments based on best practices for the asset type. - Replacement values are solely based expert opinion.	**Moderately Low Confidence** (Score of 3 or 4)
Reliability	- Data is based upon documents that are out-of-date and/or expert verbal opinion or cursory inspections/observations. - Asset Registries exist but are known to be incomplete and have not been recently reviewed/updated.	**Moderately Low Confidence** (Score of 3 or 4)

Asset Data	Evaluation Criteria	Confidence Rating (/10)
Source	- Data sources are not known and/or available.	**Low Confidence** (Score of 1 or 2)
Accuracy	- Assumptions are required for all fields including age, replacement values, condition, and useful lives. - Condition values are solely based on expert opinion and/or are not available for reporting. - Replacement values are solely based on expert opinion and/or are not available for reporting.	**Low Confidence** (Score of 1 or 2)
Reliability	- Data based solely upon expert verbal opinion or cursory inspections/ observations. - Asset Registries do not currently exist.	**Low Confidence** (Score of 1 or 2)

1.4.2.6 Financial Overview

The Financial Overview is one of the key components within the AMP and provides a way for municipalities to integrate Asset Management planning with financial budgeting.

In the Financial Overview chapter, the scenarios for each asset category are combined to assess the City's forecasted expenditures to understand the full cost of maintaining service levels and meeting infrastructure needs over the 20-year forecast period. Forecasts for expenditures are compared to current capital budget forecasts to determine if an infrastructure gap is present. Strategies to address this gap will also be discussed.

The forecasts for major capital works including renewal, rehabilitation and replacement activities are derived from analysis of the data provided by the City, the LOS metrics developed with City staff, and the lifecycle strategies developed with SMEs based on best practices. For other lifecycle activities such as non-infrastructure, operations and maintenance, disposal, service improvement and growth, it is assumed that current funding levels are adequate to meet customer's expectations.

1.4.2.7 Improvement and Monitoring Plan

As the City matures in through its Asset Management journey, the processes for Asset Management planning will continue to evolve and improve. Within each chapter, the data confidence and improvement plan section provides opportunities for improvements specific to the asset Category, while the overall Improvement and Monitoring Plan will speak to the opportunities for maturity on a city-wide or program level.

1.5 Asset Management Plan Assumptions and Limitations

The 2024 AMP was developed based on the best available information and by employing professional judgement and assumptions to address gaps where necessary. Assumptions specific to the assets within the asset Category are recorded throughout the chapters. Where gaps or opportunities were identified, they have been included in the improvement plan. There are however, key assumptions that should be considered when reading through the AMP:

- **Scope:** The scope of this AMP covers the assets directly owned by the City of Windsor. Assets managed by the City's ABCs have also been incorporated where required under the O. Reg. 588/17. Details related to ABCs have been included in Appendix A.
- **Costs:** All costs are reported in 2023 dollars, with no inflationary measure applied unless specified otherwise. Service improvement to an asset is generally not included in the CRV, however in some instances exceptions have been made where it is standard practice to upgrade infrastructure at the time of replacement, such as replacing a combined sewer with two separated sewers.
- **Growth:** There are no costs in this AMP associated with new assets acquired or constructed due to growth.

- **Risk:** The City has not fully implemented an asset risk management strategy that goes beyond legislative requirements for all assets however using risk to prioritize investment is currently being used for Roads infrastructure. As part of ongoing improvement, administration will work to add risk optimized decision making tools to more asset types.
- **Climate Change:** The cost of climate change has not been included in the CRVs identified in this AMP. Unexpected events such as severe storms attributed to climate change can cause immediate infrastructure replacement/renewal needs not identified in this AMP. Also not included are the likely effects climate change will have on the EUL of the City's assets. The impact of Climate Change on the City's infrastructure will be considered within the analysis of the July 1, 2025 AMP, under the O. Reg. 588/17 requirements.
- **Capital Budget:** Current funding for the Annual Average Budget amounts is based on the budgets identified in the City's 10-year capital plan covering the 2024-2033 fiscal years. These budget amounts were then applied to the following ten-year period covering 2034 – 2043 to allow for a 20-year forecast amount to be determined. For the purposes of this AMP, the model does not assume any increases in current funding over the forecast period. It is assumed that the projected capital budgets will occur as planned over the analysis period. This AMP assumes that the current budgets are sufficient to meet current needs for non-infrastructure, operations and maintenance, growth, service improvement, and disposal activities to maintain current LOS.
- **Operating Budget:** The operating budget amounts have been included in the Operations and Maintenance Lifecycle Management Activities category for illustrative purposes only to present the full lifecycle cost LCC of the assets. For asset Categories where operating costs fully align with the assets presented in that chapter, the full, approved operating budget has been included in the figures presented. For asset Categories where there are several departments represented, only the operating costs related to direct repairs and maintenance have been captured. The cost of these activities does not form part of the infrastructure needs modeling but is being presented to provide a more comprehensive look at the full LCC of asset ownership. It should further be noted that the forecast does not assume any increases in current operating funding over the forecast period for these activities.
- **Lifecycle Management Scenarios Forecast:** The forecast scenarios within this AMP relies on CRV which could be over/understated. The strategies developed for the AMP were developed based on expert staff opinion on when the Lifecycle Management (LCM) activities take place and how much is spent for each of the LCM activities but are still considered high-level estimates. For assets with an LCM strategy based on age and not condition, EUL was used which may result in a larger outstanding infrastructure needs assessment and more frequent replacements.

- **Lifecycle Costs**: Costs associated for non-infrastructure, service improvement, disposal, and growth activities, and in particular the costs for operations and maintenance (both operating and capital), are presented to provide additional information on the cost of lifecycle asset use and ownership. These amounts are not included in the calculation of the infrastructure gap. The 2024 AMP assumes that non-infrastructure, operations and maintenance, service improvement, disposal and growth funding levels are adequate to meet the assets needs. As the City continues to mature its Asset Management program, it is recommended that efforts be made to quantify the true cost and need of operations and maintenance to ensure that appropriate funding levels are available for the maintenance of the assets in this category. Optimizing maintenance and leveraging new technologies can enhance operational efficiency and extend the lifespan of assets, ensuring that assets are being provided and maintained at the lowest possible cost.

1.6 Asset Management Pressures

The management of public assets faces various pressures that can impact its operations, strategies, and overall success. Some of these pressures include:

- **Market Volatility:** Asset managers must navigate constantly changing market conditions, including fluctuations in asset prices, and interest rates. Market volatility can make it challenging to appropriately plan for future asset needs.
- **Regulatory Changes:** Municipalities are often subject to a wide range of regulations that can vary by jurisdiction. Changes in regulations, such as those related to reporting requirements, can require asset managers to adapt their processes and systems.
- **Budget Constraints & Funding Options:** Municipalities often operate within tight budget constraints, requiring the balancing of a number of competing priorities. Municipalities must explore various funding and financing options to support asset management initiatives, and other infrastructure needs. Identifying sustainable funding sources and securing financing on favourable terms can be challenging.
- **Population Growth and Urbanization:** Growing populations and urbanization place increased strain on municipal infrastructure and services. Municipalities must manage the demands for housing, transportation, utilities, and public amenities while ensuring sustainable development, and balancing the current asset portfolios.
- **Aging Infrastructure:** Many municipalities face aging infrastructure. Maintaining and upgrading this infrastructure requires significant investment, but funding may be insufficient to address all needs.

- **Environmental Regulations:** Municipalities must comply with environmental regulations related to air, water quality, waste management and land use. Meeting these regulations often requires investment in infrastructure upgrades and environmental mitigation measures. There is also significant staff time required for data tracking and reporting to ensure compliance.
- **Climate Change and Natural Disasters:** Climate change poses significant challenges for municipal asset management, including increased risk of extreme weather events such as floods and storms. Municipalities must invest in resilience measures to protect infrastructure and communities from climate-related risks.
- **Limited Human Resources:** Municipalities may face challenges in recruiting and retaining qualified staff with expertise.
- **Political and Public Pressure:** Asset management decisions are often subject to political and public scrutiny. Balancing the needs and preferences of various stakeholders, including elected officials, residents, and businesses can be complex and contentious.
- **Data Management and Technology Adoption:** Effective asset management relies on accurate data collection, analysis, and decision-making. This requires reliable asset data, and implementing systems and processes that leverage technology to optimize asset performance.
- **Resilience and Sustainability Goals:** There are increasingly greater pressures to prioritize resilience and sustainability in asset management practices. This includes incorporating green infrastructure, renewable energy, and sustainable transportation solutions into asset planning and management.

Overall, municipal asset management requires navigating a complex landscape of financial, regulatory, environmental, and social pressures to effectively manage infrastructure and deliver services to residents.

1.7 Risk to the Asset Management Strategy

An assessment of the risks to the delivery of the City's Asset Management Strategy has identified a number of areas that will require close monitoring in the future. These risks are not specifically associated with failing assets, project delivery or LOS but are rather focused on large scale, corporate enterprise risks. These risk factors could ultimately impact the ability of the City to deliver established LOS and must be monitored and addressed throughout the life of the plan.

Table 1-5 reflects risks outside of the asset specific operations and maintenance, that could pose a threat to the implementation of the Corporation's various asset management strategies.

Table 1-5. Summary of Potential Risks and Mitigation Strategies

Identified Risk	Potential Mitigating Actions
Ability to retain/attract staff ensuring accurate and timely information is being collected and analyzed	Establish proper training and recruitment programs with particular emphasis on positions within CMMS network
Funding levels lower than those projected	Look into alternative funding strategies
Funding not allocated to asset management improvement initiatives such as further condition assessment work	Develop a robust business case that sets out the benefits versus the risks of "doing nothing"
Occurrence of climate change/adverse weather/unforeseen events resulting in funds being diverted to assets that were not originally planned for	Establish alternative funding methodologies to ensure all essential projects can be funded without allowing others to be pushed back beyond a reasonable timeframe
Growth projections/population movements not as planned	Conduct annual needs studies across all service areas and tie to most recent census data
Construction/Inflation prices not as assumed	Ensure all service areas tie funding requests to most up to date construction price index

In developing the 2018-2019 AMP, an approach to identify risk for select core assets was developed. The approach was based on using Corporate Risk tools, guidelines and processes and adapted for use with assets. The tool identifies various consequences to be assessed, as well as guidelines on how the impact of the risk should be considered on a scale of "Insignificant" to "Severe".

As part of the 2025 O. Reg. 588/17 requirements to identify PLOS and the related funding strategy to support the identified infrastructure needs, all assets reported on in the 2024 AMP will be assessed using this tool. This assessment will allow for the comparison of risk associated with the deterioration of the assets across all categories and will also be helpful in the identification of funding priorities.

Table 1-6 and Table 1-7 provides the measurement criteria used in assisting with the assessment of Risk, as outlined in the Corporate Enterprise Risk Management (ERM) Framework.

Table 1-6. Enterprise Risk Management Framework: Detailed Measurement Criteria - Probability

Rating - Descriptor	1 - Rare	2 - Unlikely	3 - Possible	4 - Likely	5 - Almost Certain
Description - *Frequency or approximate probability*	May only occur in certain conditions. Every 10 + years or 0% to 10%	Could occur sometime. Every 5 to 10 years or 10% to 40%	Might occur at some time. Every 3 to 5 years or 40% to 60%	Will probably occur in most circumstances. Every 2 to 3 years or 60% to 90%	Almost certain to occur. Annually or more frequently or 90% to 100%

Table 1-7. Enterprise Risk Management Framework: Detailed Measurement Criteria - Consequence

Rating - Descriptor	1 - Insignificant	2 - Minor	3 - Moderate	4 - Major	5 - Severe
Health & Safety - *injuries to staff, public or stakeholders*	No treatment required	Minor injury or illness requiring medical treatment	Serious injury or illness requiring medical treatment	Permanent disability or widespread illness	Death
Damages & Liability, Legal Liability - *incur $ (claims, lawsuits, etc.)*	< $25K	$25K-250K	$250K-500K	$500K-3M	> $3M
Damages & Liability, Physical Assets - *replacement of*	Replaceable worth < $25k	Replaceable worth $25k-250k	Replaceable worth $250k-500k	Replaceable worth $500k-3M	Replaceable worth over $3M or significant asset is irreplaceable
Damages & Liability, Environment - *damage to*	Negligible event, non-permanent impact requiring no clean-up measures @ ($0-25K)	Minor event, non-permanent impact requiring very little cleanup effort @ ($25-250k)	Major event, some permanent impact requiring moderate clean-up effort @ ($250k-500k)	Major event, some permanent impact requiring extensive clean-up effort @ ($500k-3M)	Severe event, permanent impact requiring significant clean-up @ (> $3M)

Rating - Descriptor	1 - Insignificant	2 - Minor	3 - Moderate	4 - Major	5 - Severe
Operational Impact, Availability - *number of people impacted by failure (considering impact to overall service)*	Under 1% of service users	2%-25% of service users	26%-50% of service users	51%-100% of service users	100% of service users for sustained period of time
Operational Impact, Quality - *impact or disruption to overall quality of service delivered*	Limited impact to overall quality of discretionary service	Moderate or localized impact to overall quality of discretionary service OR Limited impact to overall quality of essential service	Serious or widespread disruption to overall quality of discretionary service OR Moderate or localized impact to overall quality of essential service	Inability to provide a discretionary service OR Serious or widespread impact to overall quality of essential service	Inability to provide an essential service
Operational Impact, Budget - *cost overruns or reallocation of funds for service or project*	< $25K	$25K-250K	$250K-500K	$500K-3M	> $3M
Operational Impact, Funding - *loss of external funding or revenue (e.g. grants, leasing revenue, user fees)*	< $25K	$25K-250K	$250K-500K	$500K-3M	> $3M

Rating - Descriptor	1 - Insignificant	2 - Minor	3 - Moderate	4 - Major	5 - Severe
Regulation & Reputational Impacts, Public Trust / Media Attention - *negative attention*	Limited attention by media, limited impact on public confidence	Local media coverage, department official fielding media questions, moderate impact on public confidence	Regional media coverage, significant impact on public confidence that damages City's image	National or Provincial media coverage, external agency inquiry, major impact on public confidence that is difficult to regain	Significant National or Provincial media coverage, external agency criminal investigation, sustained serious loss of confidence in management of City
Regulation & Reputational Impacts, Governance - *management oversight (e.g. Min. of Labour, TSSA)*	Some unfavourable comments by governing body (i.e. Management or Council)	Request for change recommendations by governing body (i.e. Management or Council)	Senior governing body issues recommendations for change (i.e. Federal or Provincial)	Senior governing body demanding immediate changes to status quo (i.e. Federal or Provincial)	Senior governing body imposing temporary leadership (i.e. Federal or Provincial)
Regulation & Reputational Impacts, Legislative - *violation of legislation*	Infraction of legislation with limited penalties (under $25k)	Minor infraction of legislation with penalties ($25k-$250k)	Moderate infraction of legislation with penalties ($250k-$500k)	Major violation of legislation with significant penalties ($500k-$3M), high profile trial	Multiple major violations of legislation with significant penalties (over $3M), public inquiry & high-profile trial
Strategic	Impairment of 1 corporate strategic goal	Failure of 1 corporate strategic goal	Failure of 2 or more corporate strategic goals	Majority of corporate strategic goals fail	Failure of corporate strategic goals

1.8 Growth

1.8.1 Growth Projections

Windsor is experiencing steady to above average population and employment growth. Since the start of the COVID-19 pandemic in 2020, Windsor has experienced a substantial building boom that is hypothesized to be related to lower housing costs relative to the Greater Golden Horseshoe area of Ontario, the opportunity for remote work, an influx of recent immigration, major infrastructure investments such as the Gordie Howe International Bridge, and significant re-investment in the local automotive manufacturing sector with EV Battery technologies. Windsor also experiences population movement within the municipality and is affected by the ever-changing age and social demographic. Historically the City has seen growth of new Canadians trending towards an older demographic makeup however, in recent years there has been significant growth in post-secondary enrolment from international students.

The Canada Census information published in 2021 indicated that Windsor's population increased from 217,188 in 2016 to 229,660 in 2021. In 2022 Altus Group Economic Consulting was retained as part of the Multi-Residential Interim Control By-law Study to provide demographic and economic analysis on factors driving intensification and infill demand in the City. The study reports that steady population and job growth levels are anticipated through 2041. Between the years 2021-2041, Windsor-Essex is projected to grow by about 1,978 persons per year (Figure 1-7). This growth results in a surge of service and asset capacity needs, resulting in demand for new and/or enhanced municipal infrastructure construction. It should be noted that the Altus Group report was prepared before the announcement of significant investments (such as the NextStar Battery Plant), therefore this forecast may be conservative.

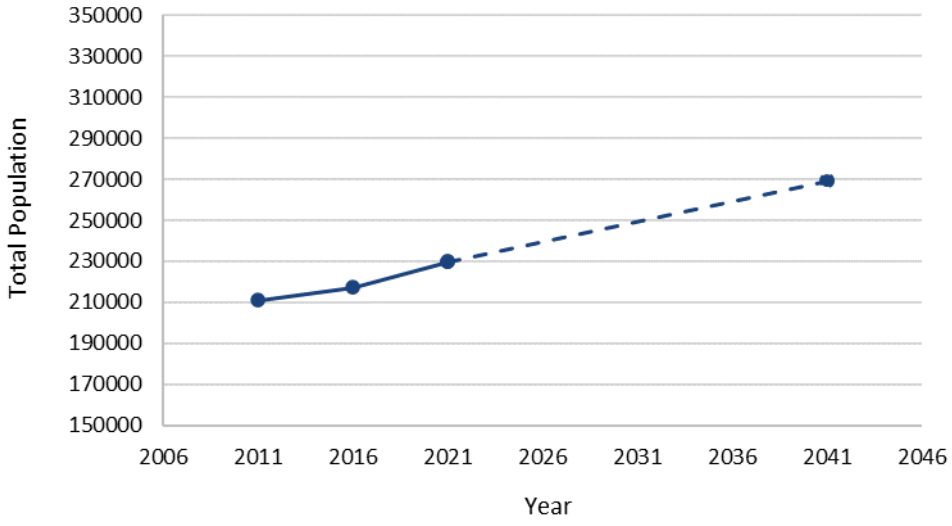


Figure 1-7. Historical and Long-term Forecast Population, 2011 to 2041 (Altus Group Economic Consulting; Statistics Canada)

The study notes that although the City of Windsor's population is growing, the inner areas of the City have seen a decline in population. This is attributed to a lack of new housing options and shrinking average household sizes. This decline in Windsor's core areas can result in high business vacancy rates, lack of amenities, and a lack of investment in vacant land and ageing residential buildings and infrastructure. According to their report, Altus Group suggests that Windsor needs more housing in the inner areas of the City. This will need to be encouraged with supportive planning policies permitting, targeting, and recommending high-density residential projects in existing built-up parts of the City, and reinvestment in updated infrastructure in core areas.

1.8.2 Growth and Asset Management

We know that with every home built, there is a corresponding infrastructure need that must be met. All new housing is dependent on municipal infrastructure, from roads, to wastewater facilities, to community amenities, public transit and more.

Many municipalities across Canada are commissioning studies to show the financial and environmental costs of urban and suburban growth specifically in their cities. Studies undertaken by municipalities consistently show that lower-density, greenfield housing developments is more expensive to service; however while increasing density in existing neighbourhoods is generally more cost-effective, significant investment may still be required if the capacity and condition of existing infrastructure cannot accommodate increased demand.

Growth within urban areas may require current infrastructure to be renewed, as discussed in many of the City's Master Planning documents. New assets required to meet greenfield suburban demand may be acquired, donated or constructed by the City. Acquiring new assets will commit the City of Windsor to ongoing operations, maintenance and renewal costs in the future. These future costs will be considered in the 2025 AMP as per O. Reg. 588/17 requirements.

1.9 Climate Change

1.9.1 Climate Change and Infrastructure

The impacts of climate change affect many aspects of daily life. Canada's buildings and public infrastructure systems such as bridges, roads, water and wastewater systems and facilities are guided by codes and standards that have largely been developed based on historical climate data. In many cases, this has resulted in assets that have not been designed to withstand the extreme weather events we are currently experiencing, let alone the enduring impacts of climate change. The growing risk of building and infrastructure failure, as well as the associated hazards to the well-being of Canadians, create an increasing need to adapt and build resilience.

Municipal infrastructure and communities must be better prepared for climate risks including floods, increased heat and extreme weather events. Investing in traditional and natural

infrastructure solutions, including retrofits and upgrades, can help communities build resilience, reduce disaster risks, and save costs over the long term.

A 2023 report published by the Financial Accountability Office (FAO) Summary Report (*2023)* of Ontario called “Costing Climate Change Impacts to Public Infrastructure” (Financial Accountability Office of Ontario) states that climate hazards are accelerating asset deterioration, resulting in the need for higher capital investments for more frequent rehabilitations and earlier renewals, as well as higher spending for more operations and maintenance activities. The FAO projects that in the absence of adaptation, these changing climate hazards will add $4.1 billion per year on average to the cost of maintaining the $708 billion portfolio of existing public infrastructure assets across the Province of Ontario (Figure 1-8). This represents a 16% increase in infrastructure costs relative to a stable climate base case.

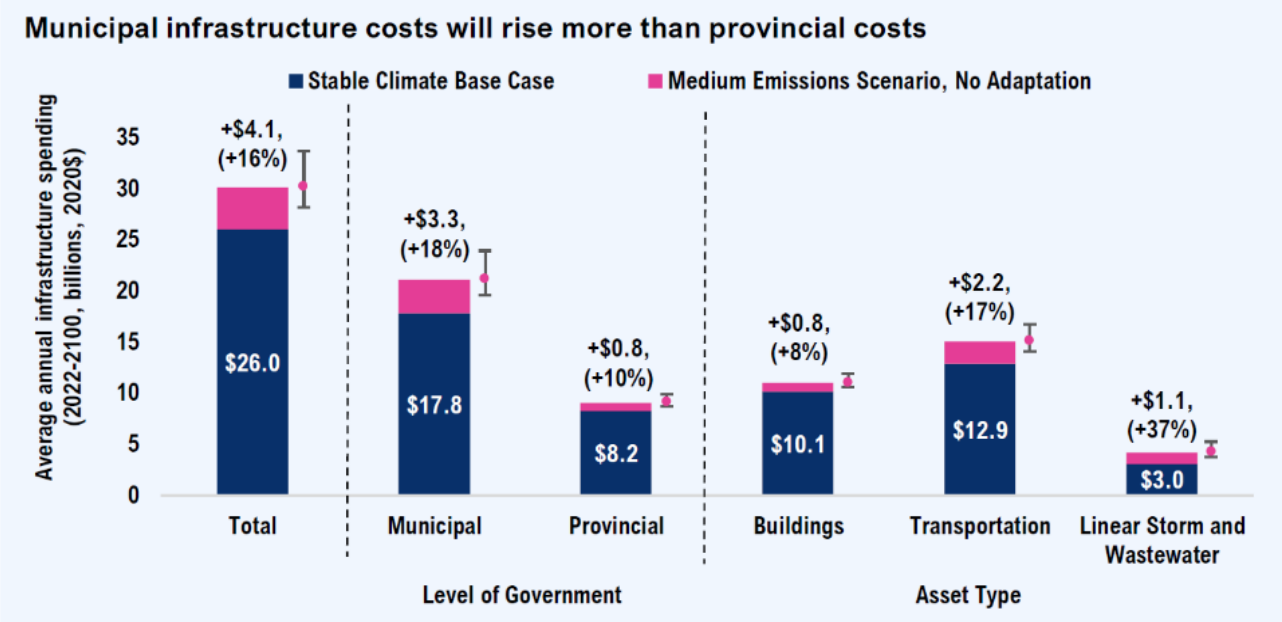


Figure 1-8. Infrastructure cost increase analysis per level of government and asset type (Financial Accountability Office of Ontario)

As further described in the report, municipalities will bear most of the climate-related infrastructure costs, in part because they manage 70% of the portfolio in scope, and because their portfolio is more susceptible to these climate hazards. The increase in costs shown are based on a medium emissions scenario, which the report identifies as the moderate scenario for planning. However, due to current emissions trajectory, a high-emission scenario is more likely until 2050. By late century, climate-related infrastructure costs under the high-emissions scenario are more than double those of the medium emission scenario. These costs do not include the societal costs of infrastructure service disruptions.

Across the Province of Ontario, municipal climate-related infrastructure costs are projected to range between $2.4 billion and $3.3 billion per year on average over the century, depending on the asset management strategy used – proactive adaptation, reactive adaptation, or no adaptation. Proactive adaptation occurs when asset managers adapt infrastructure to climate

change either during an asset's next major rehabilitation or upcoming renewal, whichever comes first. Reactive adaptation occurs when the infrastructure is adapted only when they are replaced at the end of their useful lives.

Figure 1-9 compares the climate-related infrastructure costs of all three asset management strategies. The proactive adaptation strategy results in the smallest increase in average annual infrastructure costs over the century at $3.0 billion per year. These climate-related costs represent an 11% increase in infrastructure costs above the stable climate base case and are $1.1 billion lower per year on average than the no adaptation strategy. Across all climate scenarios, adaptation strategies are consistently less expensive over the century when compared with the no adaptation strategy, with the proactive strategy consistently the least expensive.

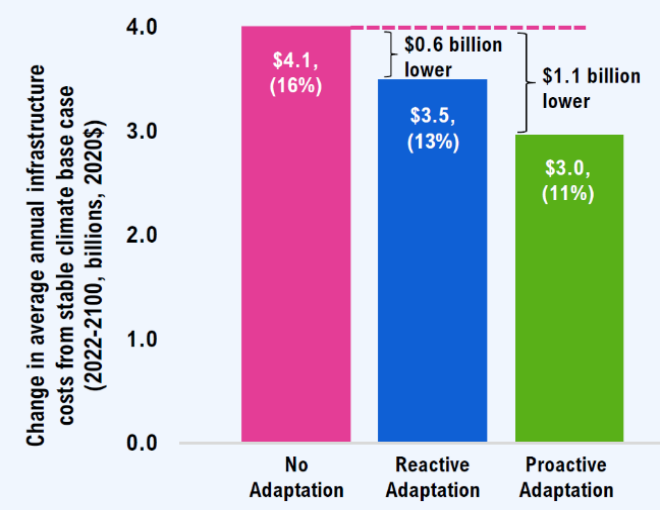


Figure 1-9. Adaptation can Lower Infrastructure Costs (Source: FAO report Costing Climate Change Impacts to Public Infrastructure)

1.9.2 City of Windsor Context

The City of Windsor has been monitoring local climate trends, projections and their associated impacts on municipal infrastructure and services for many years. Windsor citizens and the City's infrastructure are vulnerable to climate change and it is expected to result in more extreme weather events for the region. Projections show that the average number of days above 30°C will more than double by 2050s and more than triple by 2080s, coupled with increasingly warm seasonal temperatures. An increase in average precipitation is expected, particularly in winter and spring, while summer may eventually see a slight decrease in precipitation, while the intensity of storms is projected to increase.

Windsor has experienced several significant storm events in recent years that have resulted in widespread basement and surface flooding throughout the City. As an example, the 2016 and 2017 rain events resulted in over $200 million each in economic losses to the community of Windsor. In addition to these events, recently high Lake St. Clair and Detroit River water levels have put a strain on the municipal sewer system and pose risks to property owners in

coastal and low-lying areas, while high wind events have resulted in tree damage across the City.

These events have lead the City to be proactive in planning for the future climate. The City has worked with Health Canada since 2009 on heat health risk and developing policy and practices to address this concern in the community. Adaptation work has also lead to the adoption of the Sewer and Coastal Flood Protection Master Plan (2020) (2020 SMP) to identify and evaluate solutions, complete high level design and cost estimates for proposed infrastructure improvements, and to provide an implementation strategy for the recommended solutions.

The SMP defined LOS for a 1-in-100 year storm for the sanitary system, storm system, and coastal flood protection infrastructure. In addition, an *enhanced* level of service for a “Climate Change” storm (120mm over 4 hours) was defined and applied to major roadways and vulnerable areas. Vulnerable areas include schools, hospitals, long-term care centers, emergency services and evacuation centers.

1.9.3 Climate Change Adaptation Planning

It is crucial to ensure that risks to Windsor’s built infrastructure are measured thoroughly and adaptive measures are put in place to protect these valuable resources and those who use them. A well-adapted city is able to absorb the effects of climate change, such as extreme summer heat or intense rain events, through the advancement of sustainable policies, infrastructure investment, and public education. This requires the City to be forward thinking and take initiative. Being prepared to handle climate challenges will be beneficial to our health, our environment and our economy. At a minimum the City must consider how to manage existing assets given potential climate change impacts for our region. Changes to Windsor’s climate will impact City assets in the following ways:

- Affect the asset lifecycle;
- Affect the LOS that can be provided and the cost to maintain;
- Increase or change the demand on some of our systems; and,
- Increase or change the risks involved in delivering service.

To begin to address these risks, the City’s first Climate Change Adaptation Plan was completed in 2012 with the overall aim to create a more resilient city to the effects of a changing climate. The Plan outlined action items to combat climate change impacts on our infrastructure and services. An update to the Plan completed in 2020 allowed the City to identify and build on work already completed, check in on existing stressors, risks and implementation process; and advance the community further toward climate resilience of its social, economic, built and natural systems.

The Plan identified many proactive adaptation strategies that would increase our infrastructures resilience to climate change as part of seven key objectives:

1. Integrate Climate Change Thinking and Response
2. Protect Public Health and Safety
3. Reduce Risk to Buildings and Property
4. Strengthen Infrastructure Resilience
5. Protect Biodiversity and Enhance Ecosystem Functions
6. Reduce Community Service Disruptions
7. Build Community Resilience

The 'Integrate Climate Change Thinking and Response' objective speaks to incorporating climate change considerations into Municipal Decision Making which includes asset management planning. The 'Strengthen Infrastructure Resilience' objective speaks to implementing the 2020 SMP; incorporating climate change considerations into infrastructure design, development, maintenance, and renewal; review design standards and maintenance practices as they relate to newest climate projections; etc.

Departments across the Corporation work with the Environmental Sustainability & Climate Change Office to implement these strategies. In addition, many funding opportunities such as the Disaster Mitigation Adaptation Fund and the Natural Infrastructure Fund require municipalities to ensure their infrastructure is adapted to climate change to be eligible.

Incorporating climate change resilience into community infrastructure can have the following benefits:

- Assets are better able to withstand the impacts of climate change;
- Services can be sustained for the community;
- Newly constructed or renewed assets can incorporate energy and greenhouse gas reductions to slow the progression of climate change and work towards our Corporate Energy and Green House Gasses (GHG) emissions targets; and
- Assets that incorporate climate change resilience may have the potential to lower the LCC of the asset.

1.9.4 Climate Change Mitigation Planning

The way in which we construct or renew assets should also recognize that there is opportunity to build in resilience to climate change impacts and mitigate climate change through decreased energy consumption and GHG emissions.

The City's Community Energy Plan (CEP) and its associated Corporate Climate Action Plan (CCAP) address both energy conservation and climate change mitigation. The CEP aims to create economic advantage, mitigate climate change, and improve energy performance. It strives to position Windsor as an energy centre of excellence that boasts efficient, innovative, and reliable energy systems that contribute to the quality of life of residents and businesses.

The CEP is a long-term plan that identifies ways to support Windsor's local economy by increasing competitiveness, creating jobs in the energy sector, and serves as a business retention strategy. The CEP also identifies ways to improve energy efficiency, improve energy security, and reduce greenhouse gas emissions while contributing to the overall quality of life of the Windsor Community. The CEP describes and quantifies the types of energy used across the entire Windsor community by homes, buildings, local transportation and travel, and explores how population, employment and land use impact Windsor's energy needs.

Municipalities are noted to have direct or indirect control of over 44% of the national GHG emissions. There are a number of strategies in the CEP that link corporate assets to the reduction targets approved, including but not limited to:

- Encouraging a modal shift toward Public Transit
- Develop and Implement an Active Transportation Master Plan
- Foster the Adoption of Electric Vehicles
- Installation of Solar Arrays
- Designate and Plan District Energy Areas

The CCAP is a corporate-wide plan to reduce energy usage and emissions from municipal operations and fleet and considers both direct and indirect GHG emissions produced by the City as a result of its operations. The CCAP is tightly linked to, and takes direction from, the broader CEP.

Corporate Targets

The City of Windsor will reduce its primary energy use from the 2014 baseline by:

11% by 2030 and 25% by 2041

The City of Windsor will reduce its GHG emissions from the 2014 baseline by:

20% by 2030 and 40% by 2041

The CCAP identifies 29 specific actions to be taken by the City of Windsor to reduce energy use and mitigate climate change impacts. Some of these strategies are policy based but a large number are linked to Corporate assets. The Plan advocates for energy retrofits for buildings, increased energy efficiency through new building design, exploring electric vehicles and renewable energy generation etc.

Departments across the Corporation work with the Environmental Sustainability & Climate Change Office to implement these strategies. In addition, many funding opportunities such as the Green and Inclusive Community Buildings Program and the Zero Emission Transit Fund require municipalities to ensure their infrastructure is near net-zero to be eligible.

Renewing City assets with a consideration for energy efficiency, and minimizing greenhouse gas emissions may have many benefits, including:

- Lower life cycle costs for buildings and fleet as ongoing energy costs can be reduced;
- Improve comfort in buildings;
- Reduce burden on the Provincial energy systems;
- Support the Government of Canada, the Province of Ontario and the City's Greenhouse Gas emissions targets; and
- Support the global commitment to strive to stay within 1.5°C global temperature increase which over the long-term will reduce the level of adaptation requirements.

1.9.5 Climate Change & Asset Management

The need to bring climate change information into asset management is key and identified in the City's Asset Management Policy. As stated in Section 5 of the AM Policy - Governing Rules and Regulations:

At the direction of City Council the City of Windsor shall use best efforts to:

- 5.1.6 - Manage assets to achieve sustainable service delivery, considering financial, social and environmental sustainability goals, including awareness of intergenerational equity, climate change, resource scarcity, and the precautionary principle; and
- 5.1.10 - Consider climate change impacts, how they may directly affect LOS, and systematically build resiliency characteristics into assets, systems, and services.

Administration continues to work towards bringing these discussions into various meetings and asset management practices. Efforts are continually being made to include the information and recommendations of the Climate Change Adaptation Plan and the CCAP into our various asset management practices and strategies. Consideration of how to incorporate the value associated with cutting carbon and energy costs in life cycle costing calculations is being reviewed. Fundamentally, as assets are replaced or built the question we need to keep asking is, "Will our current designs for assets ensure that the asset will last 60 years plus be resilient in our climate in 30-40-50 years time so they last 60 years, or should we be considering alternatives?" As shown in Figure 1-10, asset management provides a substantial opportunity to address a changing climate over the long-term. The impact of climate change on assets is a new and complex discussion and further opportunities will be developed in future revisions of this AMP.

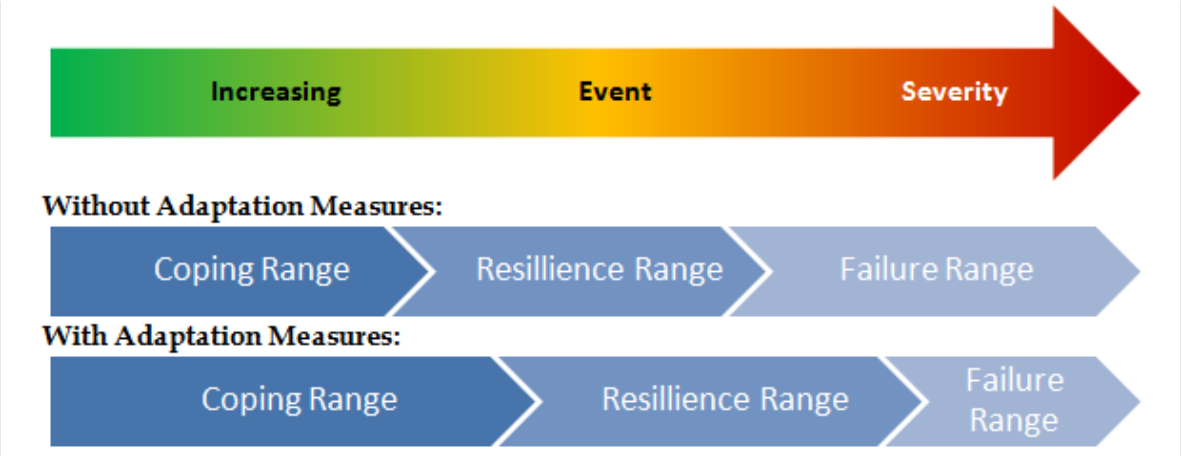
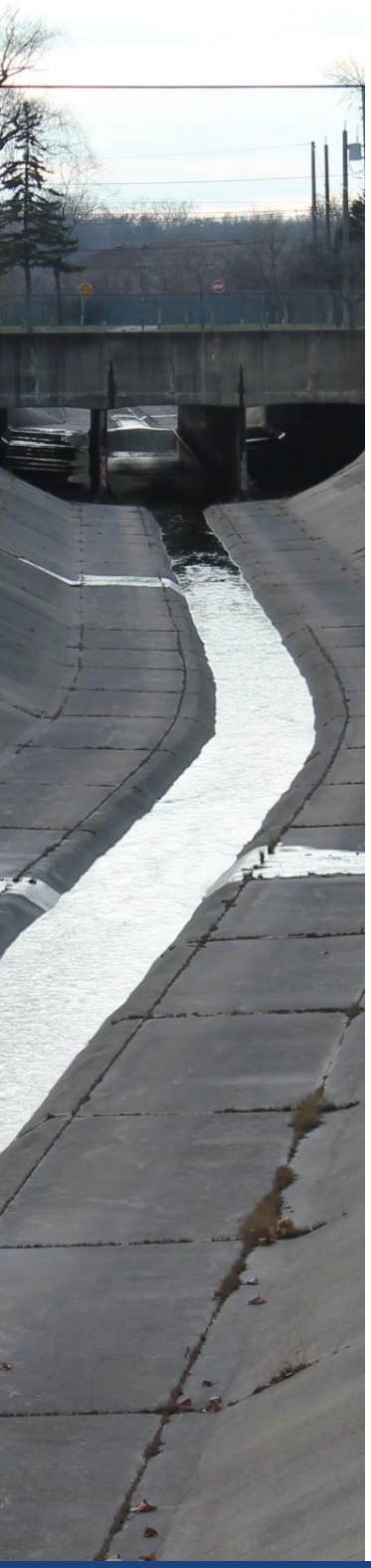


Figure 1-10. Resilience of Infrastructure With and Without Adaptation Measures (City of Windsor, Asset Management Philosophy and Framework)

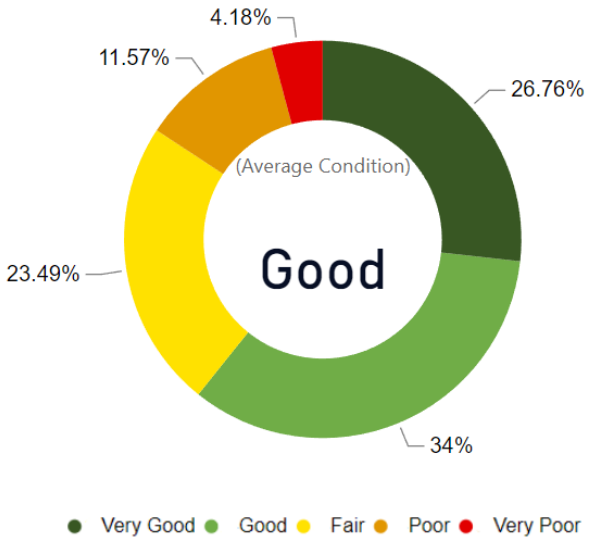
2 Environmental Protection



Replacement Value

Asset Segment	Replacement Value
Stormwater Collection	$2,298,419,188
Wastewater Collection	$2,529,921,032
Wastewater Treatment	$1,566,583,966
Total Replacement Value	**$6.4 B**

Overall Asset Condition Breakdown as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$10.0 M	**$37.4 M**

Quick Facts

To provide Environmental Protection Services, the City owns:

- 820 km of Stormwater Sewers
- 357 km of Municipal Drains and Roadside Ditches
- 53 Stormwater and Wastewater Pumping Stations and Interceptor Facilities
- 950 km of Combined & Sanitary Sewers
- 2 Wastewater Treatment Plants and 1 Biosolids Processing Facility

2 Environmental Protection

2.1 State of the Infrastructure

The City's Environmental Protection services play a crucial role in managing and maintaining the infrastructure necessary for handling both wastewater and stormwater. This includes a wide range of assets such as Wastewater Treatment Plants, Pumping Stations & Interceptors, Municipal Drains & Roadside Ditches, Underground Storage Facilities, Sanitary and Storm Sewers; all of which are collectively valued at over $6 billion.

The Impacts of climate change have had a significant impact on the Environmental Protection assets included in this asset Category. Windsor has experienced several significant storm events in recent years that have resulted in widespread basement and surface flooding throughout the City. In addition, the high water levels in Lake St. Clair and Detroit River have put a strain on the municipal sewer system and increased risks to property owners. In response to these events, the City has implemented the 2020 SMP. This comprehensive plan aims to identify and assess potential solutions, as well as create high-level designs and cost estimates for proposed infrastructure improvements. The 2020 SMP will drive the sewer and related infrastructure programs for at least the next 20 years and includes projects that are generally focused on service improvements and growth.

Within this asset Category, assets have been grouped in the Segments described below.

Stormwater Collection: Includes municipal drains and roadside ditches, stormwater sewers and pumping stations, stormwater management ponds and underground storage assets. The City's stormwater system is designed to mitigate flooding risks to both private and public properties. By effectively managing stormwater through infrastructure like drains, ditches, and stormwater storage, the City aims to minimize property damage and maintain the overall safety and functioning of the urban environment during heavy rainfall events. The City continues to mitigate climate change impacts and reduce the risk of flooding by enhancing and adapting its stormwater infrastructure.

Wastewater Collection: Includes combined and sanitary sewers as well as wastewater pumping stations & interceptors. This involves the collection of wastewater from homes and businesses within the City and conveyance to the wastewater treatment facilities.

Wastewater Treatment: Includes the City's two wastewater treatment plants as well as the Biosolids processing facility. By conveying wastewater to treatment plants, the City aims to reduce health risks associated with exposure to pathogens in untreated wastewater. This process is vital for protecting public health, the environment, aquatic life, and contributing to thriving water features suitable for recreation.

These Environmental Protection assets are critical for safeguarding public health, protecting the environment, and ensuring the resilience of the City's infrastructure in the face of wastewater and stormwater challenges.

2.1.1 Asset Valuation

The following sections summarize the portfolio associated with the City's Environmental Protection assets. Table 2-1 provides the inventory and current replacement value for the assets included under this AMP.

Table 2-1. Inventory and Current Replacement Value – Environmental Protection Assets

Segment & Sub-Segment	Count	Unit	2023 Estimated Replacement Value
Stormwater Collection			
Municipal Drains and Roadside Ditches	357	km	TBD
Storm Sewers	820	km	$2,180,313,967
Stormwater Management Ponds & Underground Storage	34	Each	TBD
Stormwater Pumping Stations & Interceptors	33	Each	$118,105,222
Wastewater Collection			
Combined Sewers	204	km	$836,996,524
Sanitary Sewers	746	km	$1,570,390,301
Wastewater Pumping Stations & Interceptors	20	km	$122,534,208
Wastewater Treatment			
Wastewater Treatment Plants & Biosolids Facility	3	Each	$1,566,583,966
Total			**$6,394,924,186**

Current replacement values for both stormwater and wastewater sewer infrastructure assets are based on unit costs obtained from recent tenders. These costs consider various factors such as engineering and design, project management, and prevailing construction costs. The cost of replacing a combined sewer with both a sanitary and a stormwater sewer is accounted for in the replacement cost for all combined sewer assets. However, for all other sewers, the replacement cost reflects a like-for-like asset replacement.

Current replacement values for pumping stations and interceptors (both stormwater and wastewater), wastewater treatment plants and the Biosolids facility are primarily based on building condition assessments (BCAs), which were conducted in 2019. Where BCAs were not available, historical construction costs were inflated to 2023 dollars using the Construction Price Index.

Since the COVID-19 pandemic, the availability of building materials, as well as exceedingly high inflation rates have contributed to a substantial increase in replacement costs for sewer and wastewater treatment assets.

Municipal drains and roadside ditches, as well as stormwater management ponds and underground storage facilities assets do not have a replacement value identified. These assets are unique and determining accurate replacement costs can be challenging. The replacement cost for these types of assets is typically focused on the associated restoration, maintenance, and operational activities, rather than the full replacement of the asset. The City continues to work to accurately define these replacement costs which will be included in future iterations of the AMP. These assets are important to highlight as they provide significant value to the City and their maintenance is essential to the City's ability to lower the impact of extreme weather and flooding events. As development of the City's urban area continues, many of the municipal drains and roadside ditches will be replaced with sewers, filled in, or abandoned.

2.1.2 Asset Condition

Sewer condition data is primarily based on Zoom camera work and where required, Closed Circuit Television (CCTV). This has greatly improved the accuracy of sewer condition ratings in the last few years. As a result of these programs, 80% of the sewer network has been given an objective condition rating. The remaining 20% of sewers have been given a subjective condition rating based on the material type and age of the sewer.

Condition values for the pumping stations, the wastewater treatment plants and the Biosolids facility are based on BCAs conducted in 2019. The condition of these assets was determined based on the overall health and condition of the facility as a single entity and did not consider the highly specialized building components and equipment housed at these facilities. As future iterations of the AMP are developed, these condition values will be re-assessed at the component level to more accurately reflect the condition, needs, and replacement values of these complex facilities.

Municipal drains and roadside ditches have not been given condition values in this report. Although most drains have drainage assessment reports, these are not currently mapped to the corresponding asset Segments managed in the asset registries. Stormwater management ponds and underground storage facilities have conditions that are based on the age of these assets. Work to assess condition on stormwater management ponds is underway and will be incorporated in future iterations of the AMP.

2.1.2.1 Asset Category Condition Overview

The overall condition of Environmental Protection assets, as a percentage of replacement value, is illustrated in Figure 2-1.

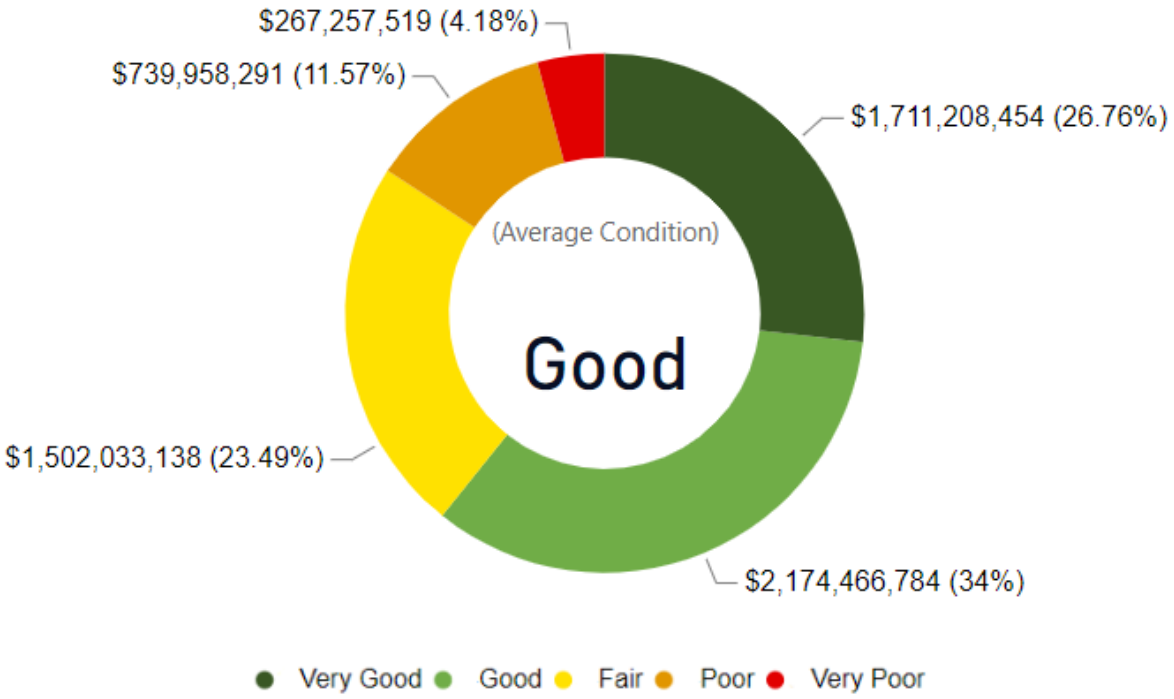


Figure 2-1. Category Condition as a Percentage of Replacement Value – Environmental Protection Assets

The Environmental Protection assets are, on average, in Good condition. Significant investments in this infrastructure, with the help of grant funding, have contributed to this overall condition rating. Although the overall average condition reported is Good, there are nearly $1 billion in stormwater and wastewater assets that are in Poor to Very Poor condition, indicating the need for continued investments in this area. In addition, the $1.5 billion of infrastructure shown in Fair condition (Figure 2-1), will fall into the Poor category without proper investment in this infrastructure.

2.1.2.2 Segment Condition Overview

The condition profiles of Environmental Protection assets can be further reviewed at the Segment level in Figure 2-2.

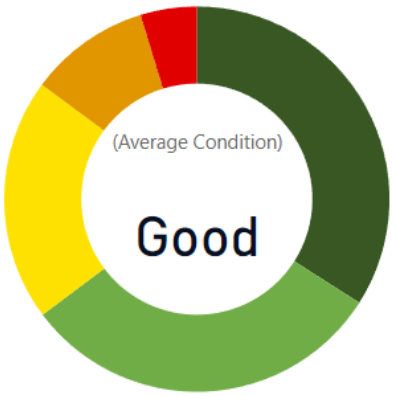
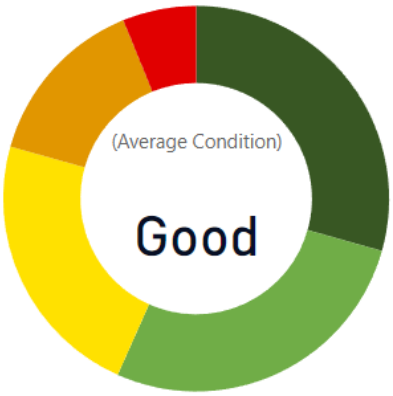
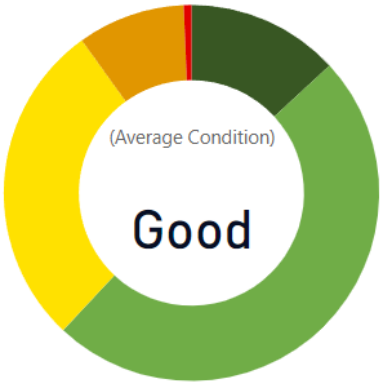
Stormwater Collection	Wastewater Collection	Wastewater Treatment
		
• 33 Pumping Stations & Interceptors • 820 km of Storm Sewers • 34 Stormwater Management Ponds & Underground Storage	• 204 km of Combined Sewers • 746 km of Sanitary Sewers • 20 Pumping Stations & Interceptors • High-Rate Retention Treatment Basin	• 3 Wastewater Treatment Plants & Biosolids Facility

Figure 2-2. Segment Condition as a Percentage of Replacement Value – Environmental Protection Assets

All Segments of Environmental Protection assets are, on average, in Good condition. Recent grant funding such as the Disaster Mitigation and Adaptation Fund is greatly contributing to renewal and service improvements in this area. Climate change adaptation is a driving force behind these funding opportunities and as a result, the City is increasing its resilience to climate change by investing in this infrastructure. Provincial and Federal policy is suggesting a shift from climate change adaptation to housing enabling infrastructure in the coming years. Funding opportunities are anticipated to arise for upgrades to infrastructure supporting residential development intensification and infill growth related projects.

2.1.2.3 Sub-Segment Condition Overview

Environmental Protection asset condition, as a percentage of replacement value, is further broken down at the Sub-Segment level in Figure 2-3.

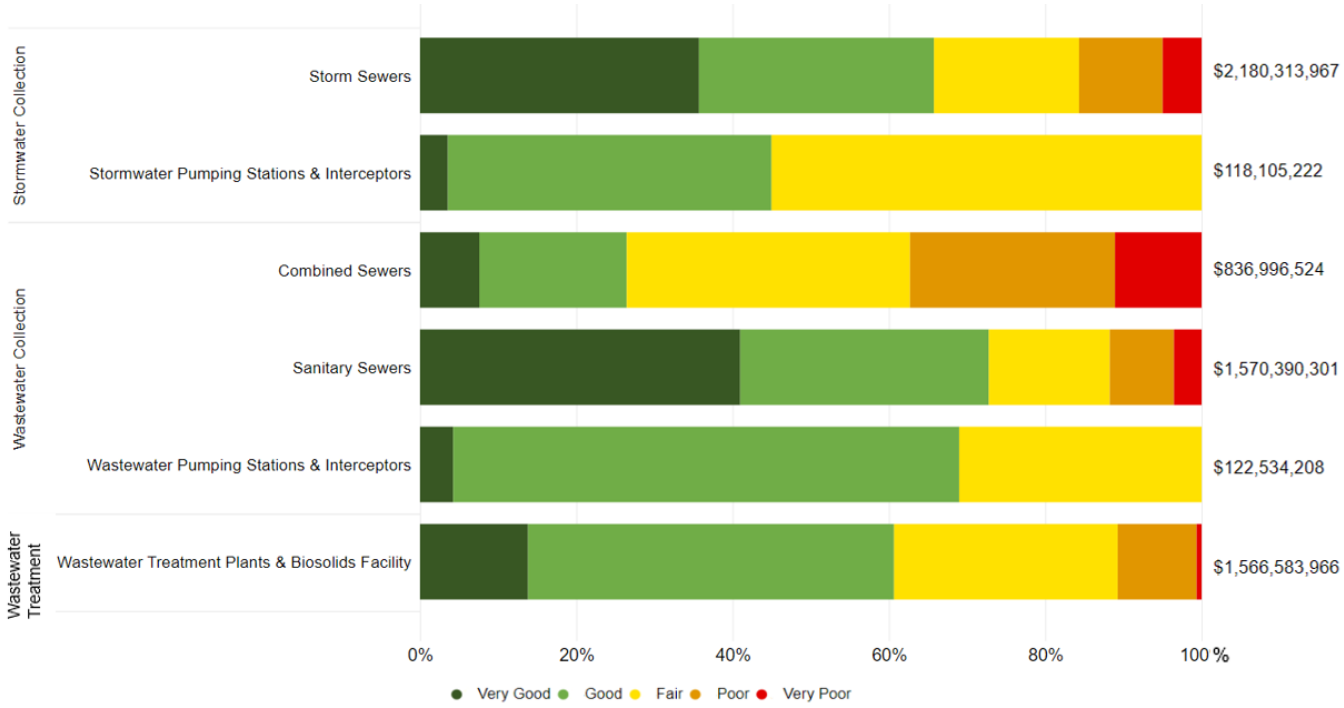


Figure 2-3. Sub-Segment Condition as a Percentage of Replacement Value – Environmental Protection Assets

Information collected from sewer inspections allow the City to take proactive measures in repairing and maintaining sewers to prevent further damage or decay. Administration continues to collaborate across departments, as well as with the Windsor Utilities Commission (WUC), to bundle road, water and sewer construction projects. It is recommended that the City continue to review and address the sewer infrastructure needs for all assets that are in Poor and Very Poor condition through separation, rehabilitation, and replacement of these assets. The 2020 SMP now guides prioritization of these projects to be approved as they are recommended by Administration and as funding is available.

The City continues to separate combined sewers to gradually reduce overflow volumes and reduce flows in the wastewater sewer system, as funding is available, in conjunction with other projects, and as the assets reach their end of life. A long-term goal of the City is to separate all combined sewer assets under the acknowledgement, as detailed in the 2020 SMP, of the capital funding and logistical timing associated with this initiative. The 2020 SMP recommends priority improvements such as removal of downspouts and foundation drains from the combined system and construction of new storm systems to increase the conveyance and storage capacity of the existing system in strategic locations throughout the City.

Although the condition of the pumping stations and interceptors, wastewater treatment plants and Biosolids facility assets appear to be Good overall, over 40% of these assets are in Fair or worse condition. In addition, there are specialized components and equipment at these facilities that are in Poor and Very Poor condition, which has not been identified in this report. These assets must adhere to strict Ministry regulations and standards and a failure of any component at a pollution control plant or pumping station could have significant health, environmental and financial ramifications for the City and surrounding region. Pollution Control equipment and systems are highly specialized and often necessitate more extensive maintenance protocols, further necessitating the need for a more robust funding formula and the continued funding of a maintenance reserve.

Wastewater treatment assets are in continual need of reinvestment to maintain service levels. Additional consideration must also be given as these assets are impacted by climate change and the increase in the intensity and the frequency of rainfall events. These critical infrastructure assets need to be maintained in working condition with additional redundancies incorporated to ensure essential wastewater treatment services are provided to the community. In addition, the Little River Pollution Control Plant will need to be expanded and upgraded to accommodate the growth of the community. Continual investment in these facilities is critical to prevent further asset degradation.

Funding awarded to the City of Windsor through the Disaster, Mitigation and Adaptation Fund will increase capacity and overall asset condition as assets are adapted through expansion or new construction. Since the COVID-19 pandemic, the diminished availability of building materials, as well as exceedingly high inflations rates, has meant that further investment has been required to realize these improvements. If construction costs and inflation remain high over the next few years, this trend is expected to continue.

2.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset Categories. Assumptions have been made regarding the installation dates for sewers in instances where this data was not available. The City has a robust inspection and maintenance program for most Environmental Protection assets in this asset Category. For this reason, the City's Asset Management practices are based on the associated condition data for assets in this Category, rather than the physical age of the asset. The average age of Environmental Protection assets is illustrated in Figure 2-4.

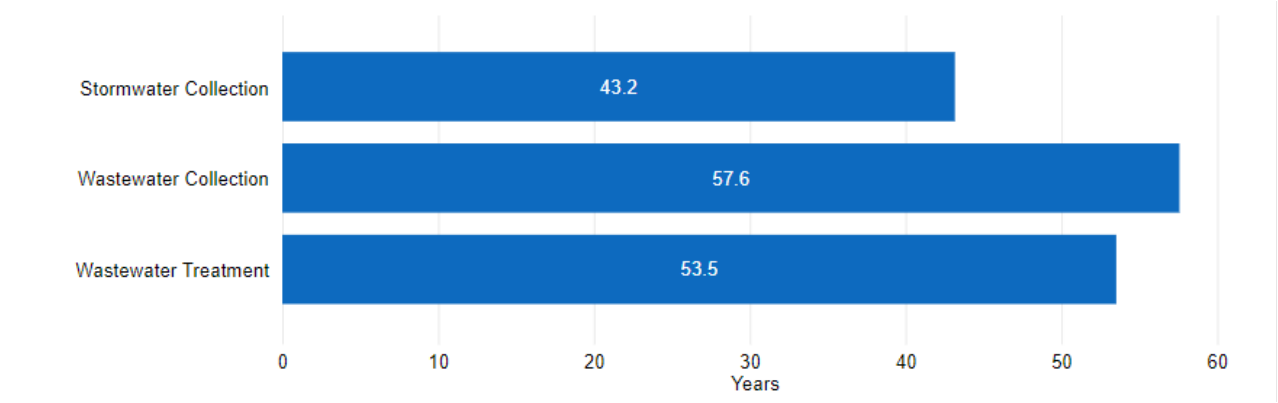


Figure 2-4. Average Age – Environmental Protection Assets

2.2 Levels of Service

Level of Service Statement: Environmental Protection infrastructure enables the City to deliver stormwater collection, wastewater collection, and wastewater treatment services to the community and surrounding municipalities. The City protects its citizens, and the natural and built environments through the management and treatment of wastewater and stormwater drainage.

The City places a high priority on delivering effective wastewater and stormwater collection and treatment services to its community while prioritizing the protection of its citizens and the natural and manufactured environments. The management and treatment of wastewater and stormwater drainage are crucial components of environmental protection efforts. The 2020 SMP is guiding the renewal, service improvements and growth of these assets into the future. Although the 2020 SMP has been approved, projects must still come forward for approval and funding on an individual basis.

The LOS for Environmental Protection provide information on the City's efforts to manage and treat wastewater and stormwater, including the reporting of performance benchmarks, regulatory compliance requirements, and internal reporting mechanisms to ensure the effectiveness of Environmental Protection infrastructure.

The Environmental Protection assets provide critical services that are essential for public health, environmental protection, and overall community well-being. The following are some of the key services these assets provide.

Wastewater Treatment: These assets are responsible for the collection and treatment of sewage and other wastewater from residential, commercial, and industrial sources. This process involves removing contaminants and pollutants to ensure that the treated water can be safely discharged back into the environment.

Public Health Protection: Proper wastewater treatment and stormwater management play a crucial role in controlling pollutants and protecting public health by capturing and treating harmful substances such as chemicals, heavy metals, and pathogens. Providing municipal sanitary sewers where they don’t exist allows for decommissioning of aging septic systems

that contribute to contamination of groundwater and receiving watercourses. These measures can significantly reduce contamination of water bodies, the spread of waterborne diseases, harm to aquatic ecosystems and exposure of citizens to harmful pollutants and pathogens.

Flood Management: Stormwater assets help manage stormwater runoff by collecting, conveying, retaining and safely discharging excess rainwater to prevent flooding in urban areas. This involves the construction and maintenance of stormwater drainage systems, including pipes, culverts, drains, ditches, stormwater management ponds and retention basins.

Water Quality Improvement: Both wastewater and stormwater assets contribute to improving water quality by reducing the amount of pollutants and contaminants that enter the Detroit River. This helps protect drinking water sources, aquatic habitats, and recreational areas.

Environmental Conservation: Effective management of wastewater and stormwater helps preserve natural ecosystems and biodiversity by reducing the impact of pollution, erosion and sedimentation on aquatic habitats, wetlands, and other sensitive environments.

The following tables provide a summary of the LOS metrics for the City's wastewater, stormwater, and treatment services. These are segmented into metrics that are required under the O. Reg. 588/17 and metrics that are defined by the City. The City has selected metrics that define and measure the current LOS being delivered by the assets. These metrics assist in setting goals, evaluating performance, allocating resources effectively, and communicating expectations to stakeholders. By establishing LOS metrics, municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance.

Table 2-2. O. Reg. 588/17 - Community Levels of Service - Environmental Protection Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Stormwater Collection	Scope	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	See map provided in Appendix G.
Wastewater Collection	Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.	See map provided in Appendix G.
Wastewater Collection	Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes.	The City no longer constructs combined sewers and is actively replacing combined sewers with two separated sewers. To avoid basement flooding and backups into homes, sewer overflows exist on both combined and separated sewers to provide system relief. The City maintains 36 combined sewer overflows in order to control flow in the sewer network during severe weather events. The City also owns and operates a High-Rate Retention Treatment Basin to help control and partially treat influent during wet weather events before being discharged.

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Wastewater Collection	Reliability	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches.	The frequency and volume of combined sewer overflow varies based on the intensity and duration of wet weather events. The data available at the time of reporting was for the year 2022. There were a total of 333 overflow events with a total effluent discharge of 950,713m^3 reported.
Wastewater Collection	Reliability	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes.	Inflow and infiltration (I & I) are a common source of unwanted entry and is the result of inappropriate connections to the sanitary networks as well as broken or cracked pipe segments and defective pipe joints. Many properties have both downspouts and sump pumps improperly connected to the sanitary network causing further problems during extreme weather events. Unwanted stormwater can also enter through manholes and connections within an over-under sewer segment. In 2019 and 2020, high water levels along the Detroit River also contributed to inflow into combined and sanitary network.

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Wastewater Collection	Reliability	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3.	The 2020 SMP took a system-wide approach to identify existing flood-prone areas for surface, basement, and coastal flooding, and recommends solutions to address these risks during extreme rain events. The City's High-Rate Retention Treatment Basin helps control and partially treat influent during wet weather events. The City is working to separate sewer systems wherever possible and offers free downspout disconnection services to property owners. Recently updated Intensity-Duration-Frequency (IDF) curves included climate change projections, and along with recent rainfall data contributed to the Region Stormwater Management Standards Manual recommendations that new developments include a climate "stress test" be completed as part of stormwater management development requirements.

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Wastewater Treatment	Reliability	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.	The City of Windsor operates 2 wastewater treatment plants which, over the years, have been expanded to include secondary treatment capacity using cutting-edge technology such as Biological Aerated Filtration (BAF) process and ultraviolet disinfection. The effluent from these two treatment facilities have documented compliance limits, objectives, and performance parameters. Effluent discharge criteria include effluent flow rates, and parameters for suspended solids, Biological Oxygen Demand (BOD), pH, phosphorous, ammonia, and E. coli.

Table 2-3. O. Reg. 588/17 - Technical Levels of Service - Environmental Protection

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Stormwater Collection	Scope	Percentage of properties in municipality resilient to a 100-year storm	0% of properties are resilient to a 100-year storm. Only those properties developed without a lower level and on raised lands would be considered resilient, however the City does not plan for this. The sewer model completed for the 2020 SMP illustrates the areas that are at risk of basement flooding for 1:100 year storms.

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Stormwater Collection	Scope	Percentage of the municipal stormwater management system resilient to a 5-year storm	The entire stormwater management system (100%) is technically developed to be resilient to a 5-year storm. This does not mean however that system issues and backups do not occur during severe weather events. The sewer model completed for the 2020 SMP illustrates the areas that are at risk of basement flooding for 1:5 year storms.
Wastewater Collection	Scope	Percentage of properties connected to the municipal wastewater system	99%
Wastewater Collection	Reliability	The number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	In 2022, there were 333 combined sewer overflow events compared to 78,093 properties connected to the municipal wastewater system.
Wastewater Collection	Reliability	The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system	In 2022, there were 23 reported number of basement flooding calls to the City's 311 system compared to 78,093 properties connected to the municipal wastewater system. The reported number of basement flooding calls could include flooding from multiple sources not strictly related to wastewater backups.
Wastewater Treatment	Reliability	The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	In 2022, there were 17 instances where effluent performance objectives were not met compared to 78,093 properties connected to the municipal wastewater system.

Table 2-4. City-Defined Levels of Service – Environmental Protection Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Stormwater Collection & Wastewater Collection	Fiscal Sustainability	Reinvestment Rate (Sewers)	0.98%
Wastewater Treatment	Fiscal Sustainability	Reinvestment Rate (Wastewater Treatment)	0.28%
All Segments	Environmental Stewardship	Annual GHG emissions	8,462.32 tCO2e
Stormwater Collection	Reliable	Percentage of drains (length) with Municipal Drainage Reports	75% approximately[1]
Stormwater Collection	Available	Total number of properties that completed the City's downspout disconnection program	4,974 downspouts have been disconnected under the free program. 165 downspouts have been disconnected under the mandatory program.
Stormwater Collection & Wastewater Collection	Reliable	Percentage of total replacement cost for sewer assets in Good to Very Good condition	60.99%
Stormwater Collection & Wastewater Collection	Reliable	Length of sewers Zoom/CCTV inspected (2022)	42.66 km
Stormwater Collection & Wastewater Collection	Reliable	Length of sewers flushed (2022)	194.17 km

[1] Please note that many drainage reports are out-of-date and need updating.

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Wastewater Treatment	Reliable	Percentage of total replacement cost for Pollution Control assets in Good to Very Good condition	60.65%
Wastewater Treatment	Environmental Stewardship	Wastewater Treatment annual electricity consumption per ML wastewater treated	572.7 kWh/ML
Wastewater Treatment	Environmental Stewardship	Wastewater Treatment annual natural gas consumption per ML wastewater treated	42.94 m^3/ML
Wastewater Treatment	Available	Annual Average Daily Influent Flow	Little River Pollution Control Plant – 51% Lou Romano Water Reclamation Plant – 55%
Wastewater Treatment	Available	Windsor Biosolids Processing Facility capacity range	The Windsor Biosolids Processing Facility rated capacity ranged from 47,000 (low end) to 52,000 (high end) tonnes of wet dewatered sludge per year. In 2022, the capacity used ranged from 72 to 80%.

2.3 Lifecycle Management Strategy

The objective of the Lifecycle Management Strategy is to outline and establish a set of planned actions, based on best practices, that will enable the City's assets to provide a sustainable LOS to the residents of Windsor, while managing risk at the lowest LCC.

The following is a high-level description of the asset management strategies and activities that the City has in place for Environmental Protection assets.

2.3.1 Lifecycle Activities

Lifecycle activities for Environmental Protection typically include a range of planning, design, construction, operation, maintenance, and rehabilitation efforts aimed at effective management of these essential infrastructure systems. The following is an overview of some of the key lifecycle activities involved in wastewater and stormwater management.

Non-Infrastructure Solutions

- Conducting feasibility studies and environmental impact assessments; developing comprehensive master plans for wastewater and stormwater systems; designing infrastructure components such as collection systems, treatment plants, stormwater management ponds, and conveyance channels.
- Obtaining necessary permits and approvals from regulatory agencies; ensuring compliance with local, provincial and federal regulations governing wastewater, and stormwater management.
- Developing emergency response plans and protocols for handling spills, floods, and other environmental incidents.
- Engaging with the public through educational programs to raise awareness about wastewater and stormwater management issues, encouraging water conservation practices, and promoting pollution prevention measure to protect water quality.
- Collecting, analyzing data and creating reports related to system performance, water quality, and regulatory compliance.
- Recommending and implementing a stormwater financing plan to provide a fair and equitable method of funding stormwater system improvements.

Operations & Maintenance

- Operating and monitoring wastewater treatment plants, pumping stations, and stormwater management facilities.
- Conducting regular inspections and maintenance activities to ensure proper functioning.
- Monitoring water quality parameters and flow rates to assess system performance and compliance with regulatory standards.

- Performing routine maintenance tasks such as cleaning pipes, removing debris, and inspecting infrastructure for signs of deterioration.
- Conducting emergency repairs and implementing measures to mitigate the impacts of extreme weather events on wastewater and stormwater systems.

Renewal, Rehabilitation & Replacements

- Implementing rehabilitation and major repair projects to address aging or damaged infrastructure components.

Disposal

- Planning and executing decommissioning activities at the end of asset lifecycle, including asset disposal or abandonment.
- Managing environmental remediation, waste disposal, and regulatory compliance during decommissioning processes.

Service Improvement & Growth Activities

- Upgrading systems to incorporate new technologies or improve efficiency and resilience.
- Installing assets to provide services to the growing population.

These lifecycle activities are essential to ensure effective management of wastewater and stormwater system assets and their performance, but also protect public health and the environment, and maintain sustainable resources for current and future generations.

Despite the current practices in place to manage the sewer network, there are still several challenges facing this vast underground network. The City maintains a considerable portion of combined sewers which are relatively old and are in the latter part of their estimated useful life and pose a significant risk of failing and hence wastewater backup. The 2020 SMP provides guidance in determining specific areas susceptible to flooding, reasons for flooding, and strategies for mitigation and should be incorporated into the evaluation process when new projects are under consideration.

The Pollution Control Division has a robust ongoing maintenance program that is administered through the Antero computerized maintenance management system (CMMS), allowing the Pollution Control Division to maintain, manage and monitor asset data on a daily basis leading to a level of stability and reliability within the maintenance program.

The unique nature of pollution control components and the environment in which they operate often leads to trends that show specific systems can function perfectly well until they simply stop working or are affected by another system. Therefore, certain components that appear to be in good condition do not necessarily follow a simple degradation curve and often slide quickly from a Good or Fair condition into a condition of immediate need. The City is also

seeing many cases of premature degradation of facility components which simply cannot be captured effectively in a long-term condition program plan. Systems and components often appear to be functional and operating as needed until a point in which they begin to degrade rapidly. Therefore, even systems deemed to be in Good condition may need significant attention within a few years. This is the unique nature pollution control components and the environment in which they operate. Options to fortify reserve funds for these types of assets may assist in reducing risk of failure of the systems and therefore the City's ability to remain within regulatory compliance.

Specific Asset Management practices for Environmental Protection assets and their associated frequency are found in Table 2-5. The activities listed represent the comprehensive approach required throughout the full lifecycle of assets to meet the current levels of service provided by the City while minimizing costs. The activities and strategies listed within this chapter also provide the City's best chance to avoid the risks associated with asset ownership. The risks associated with not following the lifecycle strategies and activities listed can be significant and wide-ranging, which are further explained in section 10.4 - Risks of Not Closing the Gap and Meeting Infrastructure Needs. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies. By prioritizing operations and maintenance, asset renewal and strategic investments, the City can enhance the resilience, sustainability and vitality of the community while minimizing potential risks and ensuring long-term prosperity.

Table 2-5. Asset Management Practices, Planned Activities, and Frequency – Environmental Protection Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Wastewater & Stormwater Collection – Sewers	
• Maintenance Hole Inspection Program	• Based on criticality - annually, as required
• Planning and Studies (Master Plans, Financial Plans, Capacity Studies, Environmental Assessments)	• As required
• Flow Monitoring Program	• Continuous
• Zoom Camera (Condition Inspection) Program	• Annual, 4-year cyclical program
• Sewer Modeling	• As required, annual data updates based on as-built information
• Rain Gauge Data Collection	• Continuous
• Downspout Disconnection	• As requested by user
• CMMS – Hansen	• Ongoing
Stormwater Collection – Ponds and Drains	
• Pond Surveys	• As required (frequency to be set upon further review)
• Municipal Drain Reports	• As required
• Educational/Awareness Activities	• Ongoing
Pumping Stations and Treatment Plants	
• Condition Assessment Programs	• As required
• CMMS – Anterro	• Ongoing
• Planning and Studies (Financial Plans, Environmental Assessments)	• As required
• Educational/Awareness Activities	• Ongoing
• Integrated Energy Plan	• As needed
Operations & Maintenance	
Wastewater & Stormwater Collection – Sewers	
• CCTV (Condition Inspection) Program	• Ongoing
• Lining (Spot Repairs)	• As required

Asset Management Practices / Planned Activities	Frequency
• Flushing, Rodding, Root Cutting	• As per preventative maintenance program • Reactive
• Root Foaming	• As required
• Sewer Trunk Inspections	• As required
• Lateral Repairs	• As required
• Maintenance Hole Repairs	• As required
• Eeling	• As requested by user
Stormwater Collection – Ponds and Drains	
• Brushing of Municipal Drains	• Annual (5–7-year cycle)
• Chemical Treatment to Combat Blue/Green Algae	• Annual (3 ponds currently with potential to expand)
• Aquatic Plant Harvesting/Phrag Control at Stormwater Management Ponds	• Every 3-4 years (should be done more frequently)
• Pond Level Adjustment	• Seasonally
Pumping Stations and Treatment Plants	
• Staff Inspections	• As needed
• Preventive Maintenance	• Ongoing
• Reactive Maintenance	• Daily
• Maintenance Deficiency Reports	• Ongoing
Renewal, Rehabilitation & Replacements	
Wastewater & Stormwater Collection – Sewers	
• Trenchless Technology (Lining)	• As needed • As funding is available
• Combined Sewer Separation	• As funding is available
• Sewer Replacement	• As funding is available
Stormwater Collection – Ponds and Drains	
• Dredging	• Future requirement once survey is complete
• Pond Pump Rebuild	• As required
• Municipal Drain Rehab	• As funding is available
• Replacement/Rehab of Non-Natural Drain Infrastructure	• As funding is available

Asset Management Practices / Planned Activities	Frequency
Pumping Stations and Treatment Plants	
• Centrifuge, Bar Screen	• As required
• Pump Rebuild	• As needed
• Settling Tanks Recoating	• 8 years
• Sludge Pumping Facilities (Controls)	• As required
• Sludge Pump Renewal	• Annual
• UV System Lamps	• As required
• UV System Maintenance	• As required
• BAF Cells	• 8 years
• Pump Replacements	• As required to adhere to licensing requirements • As needed
• Asset Replacement	• As funding is available, as required to adhere to licensing requirements
• Equipment or Building Component Replacement	• As funding is available, as required to adhere to licensing requirements
Disposal	
Wastewater & Stormwater Collection – Sewers	
• Pipe Removal/Abandonment	• As required
Stormwater Collection – Ponds and Drains	
• Disposal as a Result of Dredging and Harvesting	• As required
Pumping Stations and Treatment Plants	
• Building and Equipment Disposal	• As required
• Equipment Re-Use	• As required
• Disposal of Assets	• As identified
• Leachate Treatment from Old Landfills	• Daily
Service Improvement & Growth	
Wastewater & Stormwater Collection – Sewers	
• New Asset to Address Flooding	• As funding is available

Asset Management Practices / Planned Activities	Frequency
• New/Extension of Collection System	• Driven by development
• Replacing Septic Systems - Connecting to Sanitary System	• As required • As a result of successful local improvements
• Pipe Upsizing	• As funding is available
• Separating Combined/Dual Sewers	• As funding is available
Stormwater Collection – Ponds and Drains	
• Increasing Capacity, Re-Routing	• As funding is available
• New Assets	• As funding is available/driven by development
Pumping Stations and Treatment Plants	
• New Assets to Increase Capacity	• As funding is available/driven by development
• Supervisory Control and Data Acquisition (SCADA) System and Software Upgrades	• Ongoing
• Remote Access to Controls/Monitoring for Security Purposes	• Ongoing (program being established)
• Technology Improvements (Telemetry)	• As identified • Ongoing
• Process/Energy Improvements	• As identified • Ongoing
• Plant Expansion to Increase Capacity	• As required
• New Asset/Facility	• As required (annually reviewed)

2.4 Funding the Lifecycle Activities

The City uses the lifecycle strategies described in Section 2.3 to plan work and determine future expenditure needs for Environmental Protection assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring the City can meet the demands of current services and existing infrastructure.

The scenarios are informed by identified lifecycle strategies for Environmental Protection assets developed through consultation with staff and are based on best practices. This AMP focuses on the necessary lifecycle activities and funding to maintain existing wastewater and stormwater assets in operational condition. This includes various rehabilitation programs such as relining for sewers and various replacements at the wastewater treatment plants and pumping stations to ensure continued functioning of the assets to Ministry standards. The scenarios consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City population.

2.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding levels on asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for Environmental Protection assets is approximately $24.9 million annually. Figure 2-5 shows the projected condition distribution of assets over the 20-year forecast period under the current funding scenario.

The forecast illustrates a decline in condition over the forecast period. Assets in Good to Very Good condition decreases from 61% to 54%, while assets in Very Poor condition increases from 5% to 9%. This scenario highlights challenges the City will face in maintaining Environmental Protection infrastructure assets with the current anticipated budget allocations. This suggests that the budget will not be sufficient to keep up with the needs of the assets over time, leading to a decline in overall asset condition.

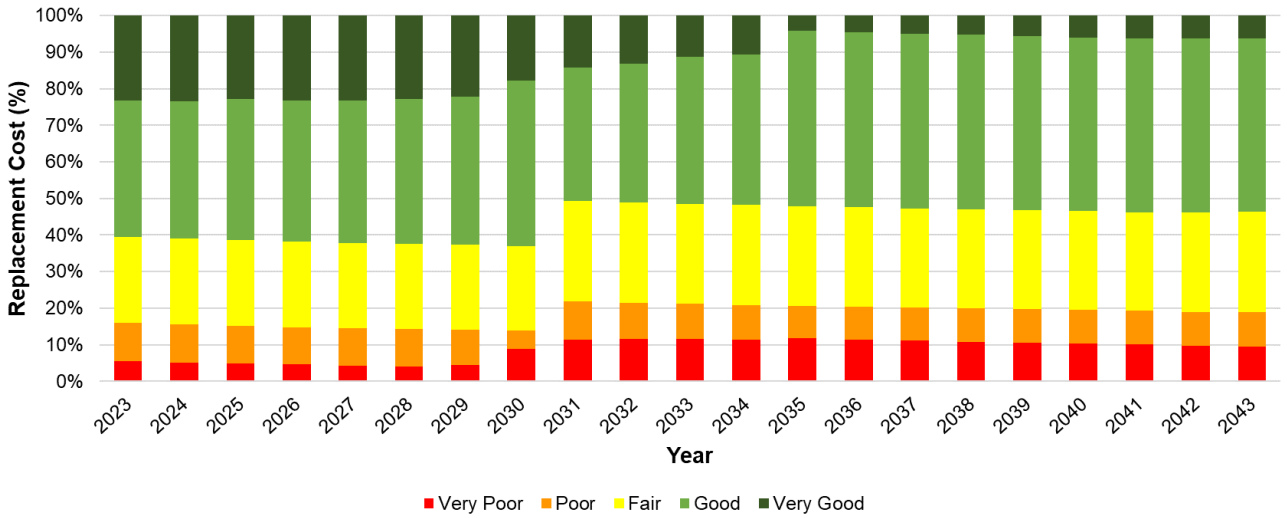


Figure 2-5. Scenario 1: Performance Forecast with Current Funding – Environmental Protection Assets

2.4.2 Scenario 2: Maintain Current Performance (Levels of Service)

Scenario 2 reflects the cost to maintain Environmental Protection assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the current level of service for the asset Category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of Environmental Protection assets was determined to be approximately $35.0 million annually, resulting in an average annual gap of $10.0 million. Figure 2-6 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition does drop slightly from 61% to 58%, while the assets in Very Poor condition remain constant at 5% throughout the 20-year period.

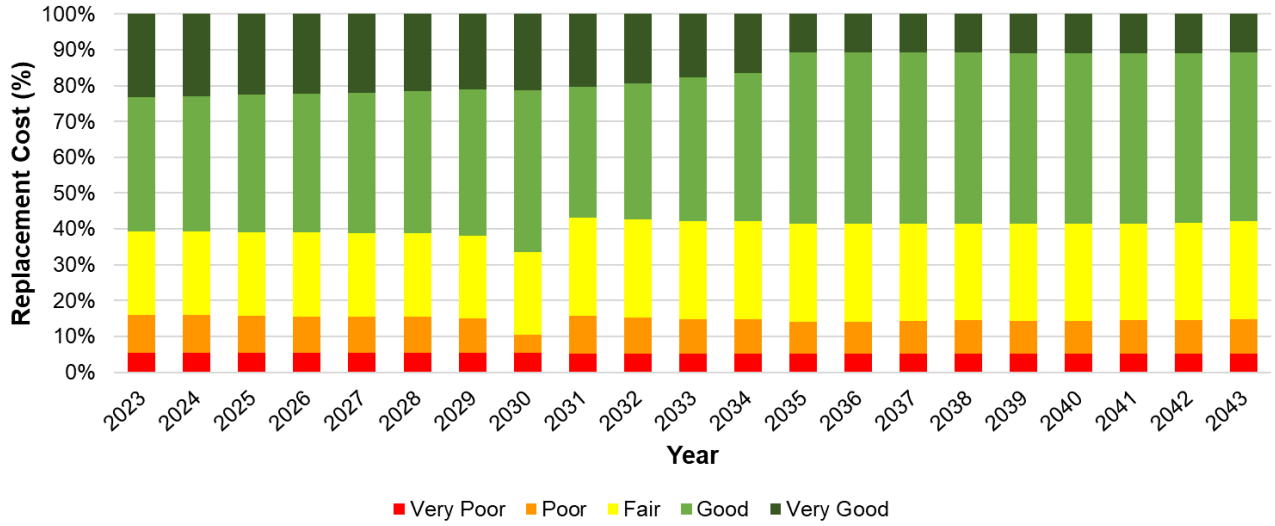


Figure 2-6. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) – Environmental Protection Assets

2.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of Environmental Protection assets renewal, rehabilitation, and replacement activities to be approximately $62.3 million annually. Under this scenario, the City faces an annual average gap of $37.0 million for its Environmental Protection assets.

This projected asset performance forecast is shown in Figure 2-7. The forecast shows moderate improvement to the condition of the Environmental Protection assets compared to Scenario 1 and 2. Under this scenario, assets in Good to Very Good condition increases from 61% to 62% and the assets in Very Poor condition decreases from 5% to 3% by the end of the 20-year scenario. This scenario provides the best overall performance of Environmental Protection assets.

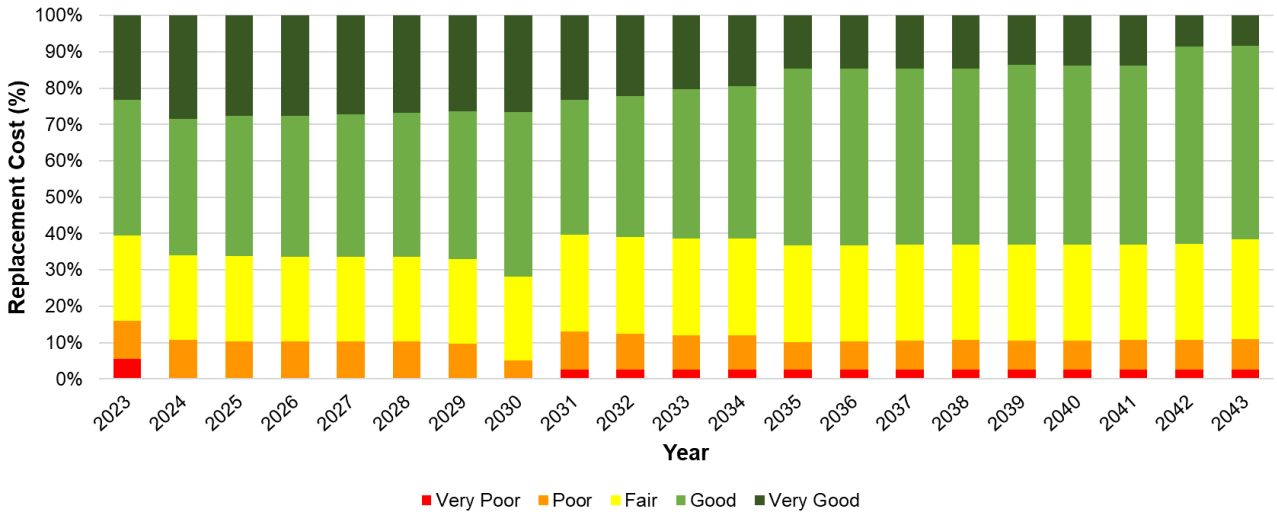


Figure 2-7. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies – Environmental Protection Assets

2.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 2-8. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

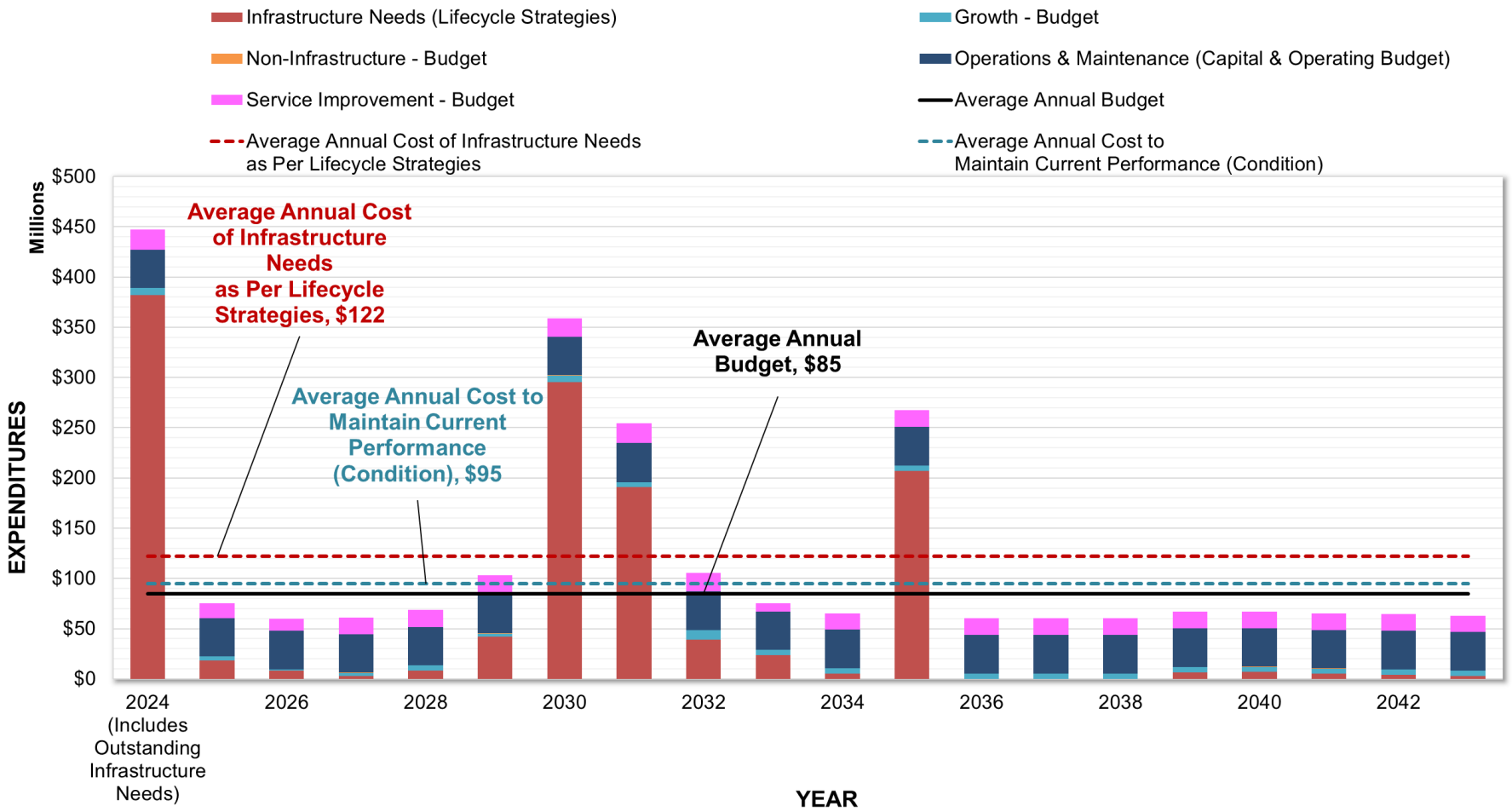


Figure 2-8. Scenario Comparison – Environmental Protection Assets

The scenario comparison indicates that the Environmental Protection infrastructure is facing an annual gap of $10.0 million to maintain their current performance. If all lifecycle activities identified under the lifecycle strategy were to be undertaken, the gap increases to $37.4 million. This calculated infrastructure gap is further detailed in Table 2-6.

Table 2-6. Lifecycle Activity Investments & Average Annual Infrastructure Gap – Environmental Protection Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$245,000	$245,000	$245,000
Operations & Maintenance	$38,342,449	$38,342,449	$38,342,449
Service Improvement	$16,381,566	$16,381,566	$16,381,566
Disposal	$0	$0	$0
Growth	$5,041,063	$5,041,063	$5,041,063
Renewal, Rehabilitation & Replacement	$24,958,927	$35,007,589	$62,388,412
Total	**$84,969,005**	**$95,017,667**	**$122,398,490**
Funding Gap		**$10,048,662**	**$37,429,485**

Closing this outstanding infrastructure needs and addressing the annual investment gap is critical for ensuring the long-term sustainability and optimal performance of the City's Environmental Protection assets. It may require reassessing budget priorities, seeing additional funding sources, or exploring more efficient and cost-effective ways to manage and maintain these assts. By addressing the outstanding infrastructure needs and adequately funding ongoing maintenance and replacement needs, the City can better protect the environment, meet regulatory requirements, and ensure the well-being of its residents.

2.5 Data Confidence and Improvement Plan

Table 2-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on the number of assumptions required for the analysis and the reliability of the data sources.

Table 2-7. Data Confidence – Environmental Protection Assets

Asset Segment	Data Source	Data Confidence (/10)
Stormwater Collection	Infor *IPS* (Hansen) CMMS Building Condition Assessments GIS Subject Matter Experts	8
Wastewater Collection	Infor *IPS* (Hansen) CMMS Building Condition Assessments	8
Wastewater Treatment	Building Condition Assessments	6

Stormwater & Wastewater Collection

Sewer asset registry data is housed in the *Infor* IPS (Hansen) CMMS database and is based upon sound records and known procedures. This data is updated regularly. This database does not house current replacement costs, which are evaluated independently and are based on recent tenders. As previously mentioned, the recent focus on Zoom and CCTV ratings programs has greatly improved the percent of sewer assets with objective condition. Overall, minimal assumptions are required for this asset data, which is reflected in the overall high data confidence score.

While asset data for municipal drains & roadside ditch assets are housed in the *Infor* IPS (Hansen) CMMS database, condition values and replacement costs are difficult to assess and validate for these asset types. As a result of this data being low in accuracy and only moderately reliable, their values have not been included in this report.

Wastewater Treatment

Pollution Control uses Antero CMMS software to track and maintain work order data only. Condition data for these assets is largely based on building condition assessments completed at the overall facility level. In order to improve the accuracy and reliability of the data, the asset registries for pumping stations, interceptors, the wastewater treatment plant and the biosolids facility should be reassessed on a component level to better reflect the complexities of these facilities. The current over data confidence score for this asset Segment is considered moderate, however, further work on these detailed component assessments will greatly improve data source scores resulting in an overall increase in the overall data confidence score.

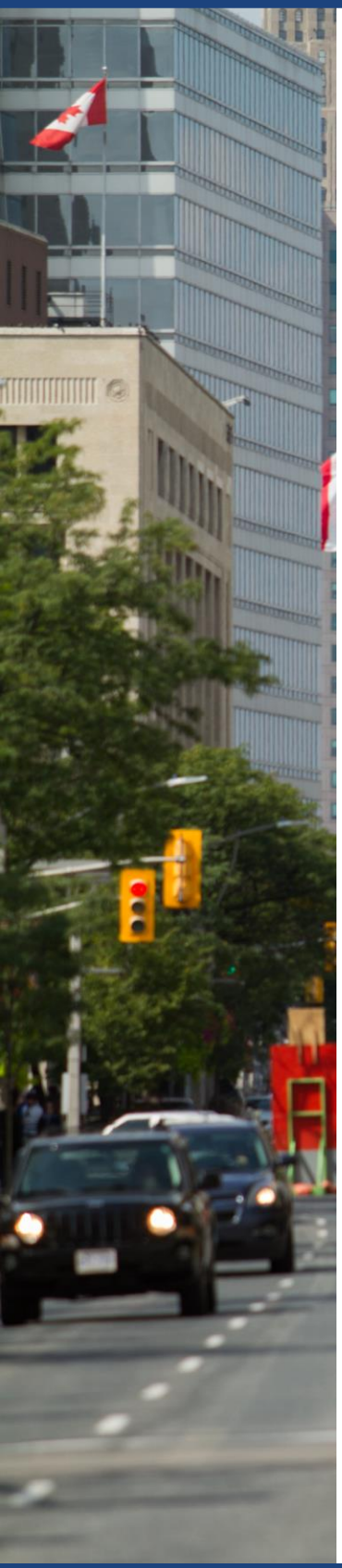
2.5.1 Recommendations for Improvement

Recommendations for data improvements to the Environmental Protection asset Category are listed in Table 2-8.

Table 2-8. Environmental Protection Assets – Improvement Plan

Task No.	Task	Resources Required	Responsibility
1	Consider using BCAs and Pollution Control data to break down buildings/pumping stations into large components with own condition, EUL and CRV. This would better inform the lifecycle management model.	Internal/ External	Pollution Control Asset Planning
2	Work to collect more data on the Stormwater Management Ponds - area, condition, timing, and cost to dredge and use this for replacement cost. Develop a process to maintain asset registry on an annual basis.	Internal	Pollution Control Operations Parks Asset Planning
3	Develop a process to tie drainage assets in Hansen with Drainage Assessment Reports (drainage superintendent) to begin to map condition for drains, as well as work to determine unit cost to clean/maintain and use for replacement cost.	Internal	Engineering Technical Support Operations Asset Planning
4	Work to further align data sources for the Pumping Stations and develop a process to maintain asset registry on an annual basis.	Internal	Pollution Control Technical Support Asset Planning
5	Consider process for including Parks' Sewers in the asset registry.	Internal	Parks Technical Support

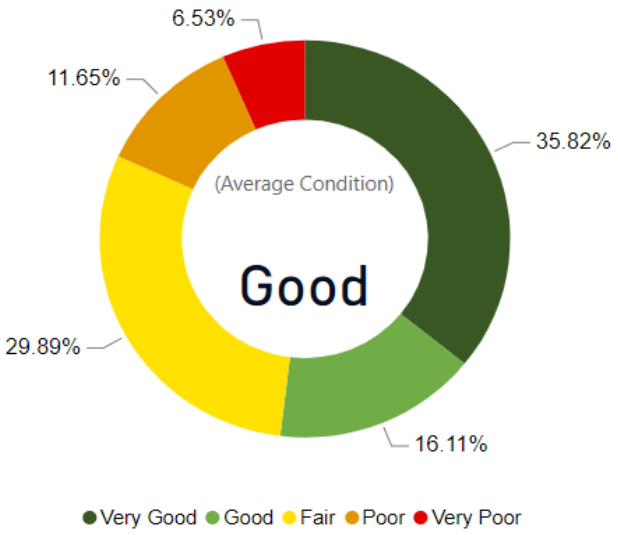
3 Transportation



Replacement Value

Asset Segment	Replacement Value
Active Transportation	$151,218,292
Roads & Paved Alleys	$4,941,887,411
Structures	$488,554,218
Traffic Infrastructure	$217,763,046
Total Replacement Value	**$5.8 B**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$38.2 M	**$31.7 M**

Quick Facts

The Transportation assets captured in this Category include:

- 1,153 km of public roads and paved alleys, including 131 km of On-Road Bike Facilities, and 978 km of sidewalks
- 74 Bridges, Subways and Culverts (>3m), 5 Pedestrian Bridges (ROW)
- 2 Parking Garages, 26375 Street Lights, 17470 Street Light Poles, 301 Traffic Signals, Pedestrian Crossing (and related infrastructure), Noise Barriers, and Pay & Display Parking Lots

3 Transportation

3.1 State of the Infrastructure

The City's Transportation assets provide a wide range of services that are essential for facilitating the movement of people, goods, and services within and between communities. The transportation network consists of assets such as roads and sidewalks as well as bridges, culverts, parking lots and assets supporting traffic infrastructure, which are collectively valued at $5.8 billion.

Within this asset Category, assets have been grouped in the Segments described below.

Active Transportation: Includes sidewalks and on-road bike facilities. Active transportation is an important service provided by the City that gives citizens safe and efficient mobility options for alternative transportation within the City.

Roads & Paved Alleys: Includes road classifications such as Arterial (A1 and A2), Collector (C1 and C2), Expressways, Local Residential, Local Commercial/Industrial, and Scenic Parkways. A definition of these classes can be found in Appendix F. These assets include road base, drainage, pavement, curb and gutter and islands. Paved alleys are also included in this report. The City's road infrastructure network allows residents to contribute to the economy, provides social opportunities and encourages travel to the region. The importance of efficient transportation is essential to building a strong economy and improving the quality of the environment and of life for Windsor citizens.

Structures: Includes bridges and subways (subways are structures that support vehicle movement below ground level – typically under railways), major culverts which span a distance larger than 3 meters, pedestrian bridges in the right of way (ROW), and noise barrier walls. These structures span bodies of water, railways, or roadways providing critical connections for all forms of traffic. The noise barrier walls also provide residential areas with relief from the noise that comes with major transportation routes.

Traffic Infrastructure: Includes a variety of assets including parking garages, pay and display parking lots (including equipment), streetlights and streetlight poles, as well as traffic signals and pedestrian crossings (PXO) assets and their associated infrastructure. Safety features such as traffic signals, lighting, and pedestrian crossings help manage traffic flow and improve visibility. Parking provides services to allow residents and visitors access to essential services, recreation, and businesses. Signage and pavement markings have not been included under this AMP, however work to include these assets is underway and will be incorporated in future iterations of the AMP.

3.1.1 Asset Valuation

The following sections summarize the portfolio associated with the City's Transportation assets. Table 3-1 provides the inventory and current replacement value for the assets included under this AMP.

Table 3-1. Inventory and Current Replacement Value – Transportation Assets

Segment & Sub-Segment	Count	Unit	2023 Estimated Replacement Value
Active Transportation			
Sidewalks	977.56	km	$151,218,292
On-Road Bike Facilities	131	km	Included in Roads
Roads & Paved Alleys			
Class 1 Arterial	9.85	km	$104,039,477
Class 1 Collector	96.28	km	$468,358,603
Class 2 Arterial	125.63	km	$947,770,667
Class 2 Collector	79.31	km	$347,750,837
Expressway	56.28	km	$326,645,073
Local Commercial & Industrial	21.38	km	$77,516,023
Local Residential	669.67	km	$2,445,999,058
Paved Alleys	78.98	km	$149,514,232
Scenic Parkway	16.05	km	$74,293,441
Structures			
Bridges & Subways	62	Each	$441,413,905
Major Culverts (>3m)	12	Each	$13,550,804
Noise Barrier Walls	Pooled	N/A	$16,987,432
Pedestrian Bridges (ROW)	5	Each	$16,602,077
Traffic Infrastructure			
Parking Garages	2	Each	$35,425,227
Pay & Display Parking Lots	Pooled	N/A	$5,319,966
Street Lighting (ROW) Luminaires	26,375	Each	$39,847,300
Street Lighting (ROW) Poles	17,470	Each	$67,332,000
Traffic Signals and Pedestrian Crossings (PXO)	301	Each	$69,838,553
Total			**$5,799,422,968**

Current replacement costs for roads, paved alleys, sidewalks, traffic signals and street lighting infrastructure are based on unit costs obtained from recent tenders. These costs consider various factors such as engineering and design, project management, and prevailing construction costs and are considered to be highly reliable. For structures and other traffic infrastructure assets, historical cost inflated to 2023 dollars was used. These costs were reviewed and confirmed by expert staff in their respective areas. These replacement costs reflect a like-for-like asset replacement and do not include road or sidewalk widening. It should be noted that at the time of replacement projects, road and sidewalks will be brought to current standards including Accessibility for Ontarians with

disabilities Act standards (AODA) for sidewalk widths and Transportation Association of Canada standards for lane widths.

Although all asset Categories are feeling the impacts of the increasing cost of construction materials as well as the exceedingly high inflation rates since the COVID-19 pandemic, the Transportation asset Category has seen one of the most significant increases in the replacement costs of its assets in recent years.

3.1.2 Asset Condition

Asset condition for the large majority of Transportation assets is assessed objectively, based on formal condition assessments performed in-house by expert staff and by third party consultants as required. Where an assessed value was not available, age and expert opinion are used to determine asset condition.

For all roads, paved alleys and sidewalks assets, City staff perform pavement inspections on a frequency ranging from a maximum of once every year to a minimum of once in a 7-year period based on set criteria. The criteria includes last inspection date, age of current pavement, road classification, and current condition rating. Generally speaking, the higher the traffic volumes and the worse the pavement condition, the more frequent the inspections on a road segment. Alley segments are scheduled for inspection on a lesser frequency because of the lower traffic volume.

On-Road Bike Facilities are designated on the road and their condition is therefore assessed as a part of the roads that they are located on.

Bridges, subways, and culverts (>3m) are inspected and assessed according to Ontario Structure Inspection Manual (OSIM) managed in-house by expert staff. The condition for noise barrier walls is determined based on the age of the asset in combination with expert observation and opinion.

With respect to traffic signals and related infrastructure within the Traffic Infrastructure Category Segment, subjective condition ratings based on remaining useful life is used with a final review and confirmation by expert staff in this area.

3.1.2.1 Asset Category Condition Overview

Overall condition of Transportation assets, as a percentage of replacement value, is illustrated in Figure 3-1.

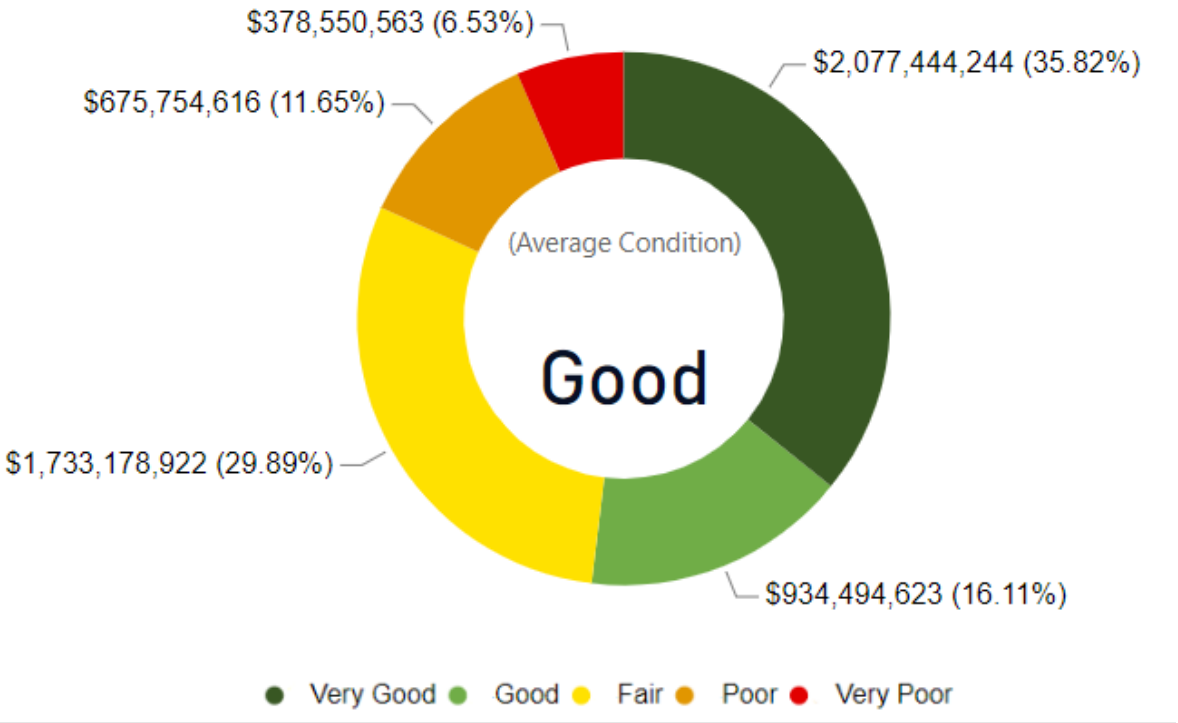
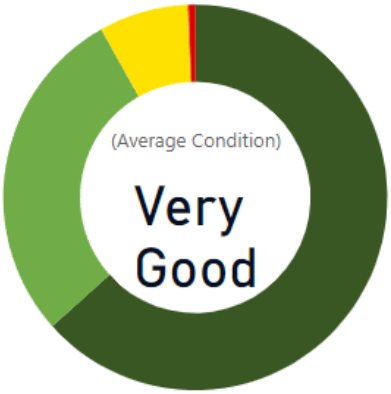
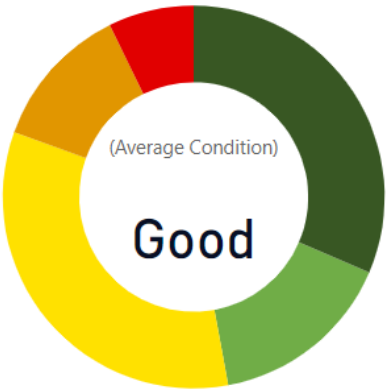


Figure 3-1. Category Condition as a Percentage of Replacement Value – Transportation Assets

The City's Transportation assets are, on average, in Good condition. Significant investments in this infrastructure, with the help of grant funding, have contributed to this overall condition rating. Although the overall average condition reported is Good, there are over $1 billion in Transportation assets that are in Poor to Very Poor condition, indicating the need for continued investments in this area. In addition, the $1.7 billion of infrastructure shown in Fair condition, will fall into the Poor category without proper investment in this infrastructure.

3.1.2.2 Segment Condition Overview

The condition profiles of Transportation assets can be further reviewed at the Segment level in Figure 3-2.

Active Transportation	Roads & Paved Alleyways
	
• 978 km of Sidewalks • 131 km On-Road Bike Facilities (not assessed for condition, considered as part of road asset)	• 9.85 km Class 1 Arterial • 96.28 km Class 1 Collector • 125.63 km Class 2 Arterial • 79.31 km Class 2 Collector • 56.28 km Expressway • 21.38 km Local Commercial & Industrial • 669.67 km Local Residential • 78.98 km Paved Alleyways • 16.05 km Scenic Parkway

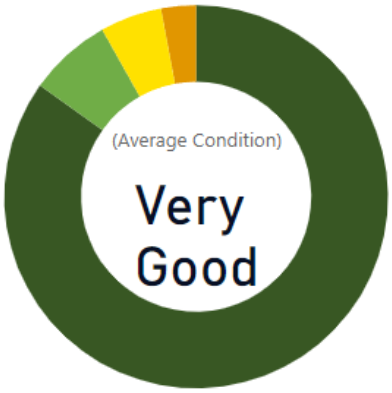
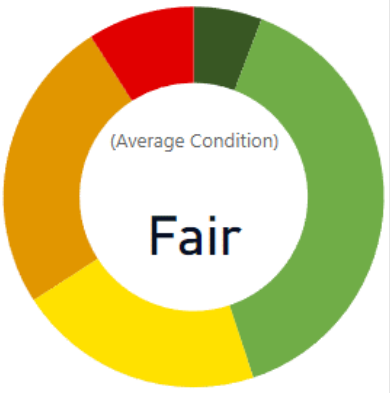
Structures	Traffic Infrastructure
	
• 62 Bridges and Subways • 12 Major Culverts (>3) • Noise Barrier Walls • 5 Pedestrian Bridges (ROW)	• 2 Parking Garages • Pay and Display Parking Lots • 26,375 Street Lighting (ROW) Luminaires • 17,470 Street Lighting (ROW) Poles • 301 Traffic Signals and Pedestrian Crossings (PXO)

Figure 3-2. Segment Condition as a Percentage of Replacement Value – Transportation Assets

Active transportation assets (sidewalks only) are, on average, in Very Good condition, noting that the condition for on-road bike facilities is not shown in the above graph since it is a component of the condition of the road segment.

Roads and paved alleys are, on average, in Good condition. As discussed, significant recent investments have contributed to the condition of these assets. Continual investment in priority roads, identified by the risk level, will be necessary to keep assets currently in Fair condition from moving down to Poor condition.

Structures assets, other than noise barrier walls, are also in Very Good condition, which is to be expected as a reflection of the robust inspection program which supports these assets. Noise barrier walls are overall in Fair condition. These assets show signs of degradation and are being managed more reactively, as opposed to being managed to the lowest LCC.

Traffic infrastructure assets are overall in Fair condition. Traffic signal assets are in Very Good condition and the parking garages are both in Good condition, however these assets do not make up the majority of the overall replacement value of this asset Segment type.

3.1.2.3 Sub-Segment Condition Overview

Transportation asset condition, as a percentage of replacement value, is further broken down at the Sub-Segment level in Figure 3-3.

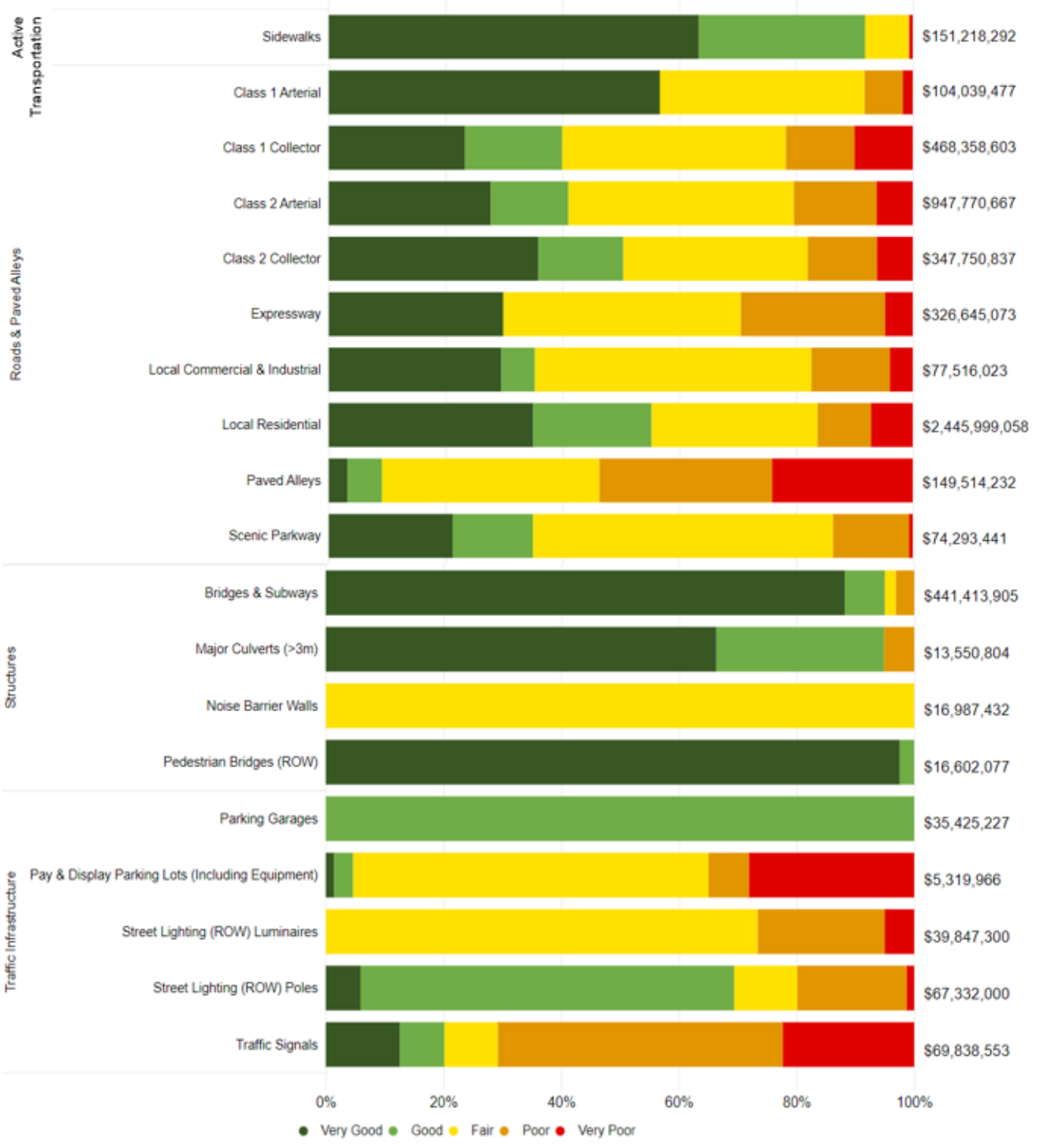


Figure 3-3. Sub-Segment Condition as a Percentage of Replacement Value – Transportation Assets

The City has a robust sidewalk inspection program that allows for proactive measures to be undertaken in order to repair and maintain these assets in good working condition.

Since publication of the 2018-2019 AMP, several positive steps have been taken resulting in the overall rating of Good for roads and paved alleys. The City has focused on priority roads, identified by the risk level, to ensure the safety of the overall road network. Several of the major road reconstruction projects completed since the last AMP have renewed significant segments of E.C. Row Expressway, Huron Church Road, Lauzon Parkway, Provincial Road and Cabana Road West.

As construction costs and inflation rates have increased recently, more funding will be required for the ongoing rehabilitation and renewal of these high value assets. It is critical to prioritize addressing the needs of high-risk road segments in Fair to Very Poor condition for renewal and replacement to ensure the overall safety of the City's roads network. Overall, the recommendation to allocate further resources and increase investments in the City's roads and paved alleys, underscores the importance of proactive Asset Management. Adequate funding is needed to meet this recommendation to ensure the long-term sustainability and performance of these critical infrastructure assets, as well as to minimize assets degrading to the point of needing more expensive replacement interventions.

The assets within the structures Segment are, on average, in Very Good condition. The noise barrier walls are the only outlier for this Segment, all of which having been assessed in Fair condition. Since the replacement cost of the noise barrier walls is small relative to that of the remaining structures assets, it does not significantly affect the average condition score for this combined Segment. It is recommended that the City continue to review the noise barrier walls to ensure they continue to provide their service function.

Other than parking garages, which are in Good condition, the majority of all other assets under the traffic infrastructure portfolio are in Fair to Very Poor condition. Streetlighting and traffic signals play a crucial role in ensuring the safety and functionality of transportation networks. The City must invest in these assets to create safer and more accessible environments for all users of the transportation network, including motorists, pedestrians, and cyclists.

3.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset Categories. The City has a robust inspection and maintenance program for most Transportation assets in this asset Category. For this reason, the City's Asset Management practices are based on the associated condition data for assets in this Category, rather than the physical age of the assets. The average age of Transportation assets is illustrated in Figure 3-4.

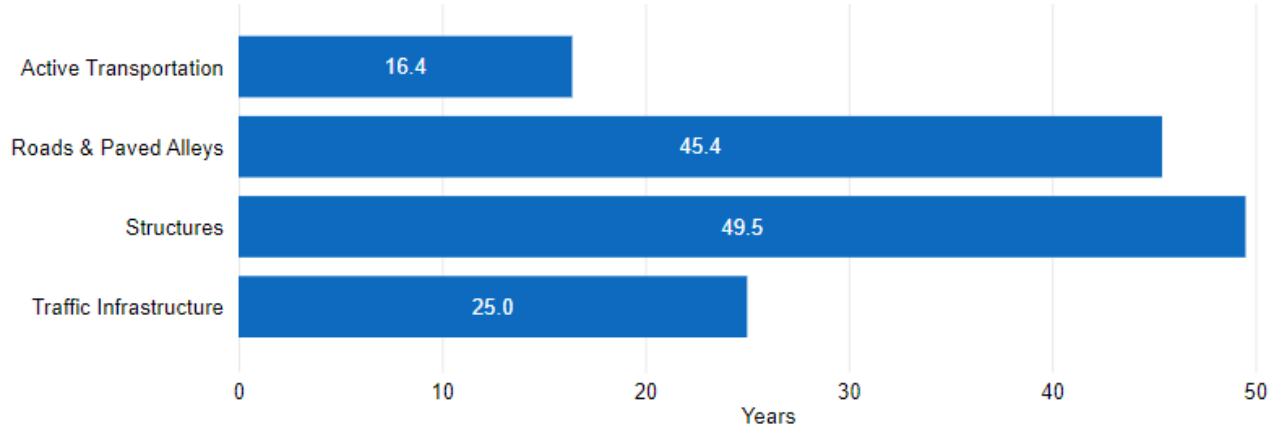


Figure 3-4. Average Age – Transportation Assets

3.2 Levels of Service

Level of Service Statement: Transportation infrastructure enables the City to deliver multi-modal transportation services and give people a range of options for moving about in a safe and efficient manner. This allows residents to contribute to the economy, provides social opportunities and encourages travel to the region. The importance of efficient transportation is essential to building a strong economy and improving the quality of life for Windsor citizens.

Transportation assets play a critical role in shaping the economic, social, and environmental fabric of communities, supporting sustainable development, and enhancing quality of life for residents and businesses alike. These services can be broadly categorized into the following several key functions.

Mobility & Economic Development: Transportation assets enable the movement of people and goods from one location to another, facilitating access to employment, education, healthcare, recreation, and other essential services. They provide the physical infrastructure necessary for travel. These networks stimulate economic development by facilitating trade, investment, and economic activity. Well planned infrastructure attracts businesses and supports job creation.

Accessibility & Connectivity: Transportation assets enhance accessibility by connecting communities and regions, improving connectivity between urban and rural areas. They provide the essential links that enable individuals and businesses to access markets, services, and opportunities. Transportation assets also promote connectivity by integrating different modes of transportation and providing seamless connections between them.

Safety: Transportation assets contribute to safety by providing well-designed and maintained infrastructure that minimizes the risks of accidents and injuries. Safety features such as traffic signals, lighting, and pedestrian crossings help manage traffic flow and improve visibility.

Efficiency & Reliability: Transportation assets support economic efficiency by facilitating the movement of goods and services in a timely and cost-effective manner. They also contribute

to reliability by providing dependable transportation services that operate consistently and predictably.

Table 3-2, Table 3-3, and Table 3-4 provide a summary of the LOS for the City's transportation services. These are separated into those that are required by O. Reg. 588/17 and other LOS metrics that have been defined by the City. The City has chosen metrics that define and measure the desired standards for delivering services that are provided by Transportation assets. These metrics help set goals, evaluate performance, allocate resources effectively, and communicate expectations to stakeholders. By establishing LOS metrics, municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance.

Table 3-2. O. Reg. 588/17 - Community Levels of Service – Transportation Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Roads & Paved Alleys	Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	See map provided in Appendix G.
Roads & Paved Alleys	Quality	Description or images that illustrate the different levels of road class pavement condition.	**Very Good** = The infrastructure in the system or network is generally in very good condition, typically new or recently rehabilitated. A few elements show general signs of deterioration that require attention. **Good** = The infrastructure in the system or network is in good condition; some elements show general signs of deterioration that require attention. A few elements exhibit significant deficiencies. **Fair** = The infrastructure in the system or network is in fair condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies. **Poor** = The infrastructure in the system or network is in poor condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. **Very Poor** = The infrastructure in the system or network is in unacceptable condition with widespread signs of advanced deterioration. Many components in the system exhibit signs of imminent failure, which is affecting service.

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Structures	Quality	Description or images of the condition of bridges and how this would affect use of the bridges.	Condition ratings for bridges and culverts adhere to strict OSIM requirements and are therefore inspected and maintained to strict standards. All bridges and culverts in the municipality are open to traffic both vehicular and pedestrian. Assets deemed in Poor to Very Poor condition often may only have a single component of the larger "whole" asset in a Poor condition which reflects on the entire asset condition rating. The asset, however is typically considered structurally sound. Assets in Poor to Very Poor condition are also often subject to inspections from third party engineers/consultants to ensure safe operation and delivery of expected LOS. **Very Good** = The infrastructure in the system or network is generally in very good condition, typically new or recently rehabilitated. A few elements show general signs of deterioration that require attention. **Good** = The infrastructure in the system or network is in good condition; some elements show general signs of deterioration that require attention. A few elements exhibit significant deficiencies. **Fair** = The infrastructure in the system or network is in fair condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies. **Poor** = The infrastructure in the system or network is in poor condition and mostly below standard, with

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
			many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. **Very Poor** = The infrastructure in the system or network is in unacceptable condition with widespread signs of advanced deterioration. Many components in the system exhibit signs of imminent failure, which is affecting service.
Structures	Quality	Description or images of the condition of culverts and how this would affect use of the culverts.	See "Description or images of the condition of culverts and how this would affect use of the culverts" metric.
Structures	Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Traffic supported by municipal bridges is general public and commercial duty which includes heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, and cyclists.

Table 3-3. O. Reg. 588/17 - Technical Level of Service – Transportation Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Roads & Paved Alleys	Scope	Number of lane-kilometers of each of arterial roads, collector roads and local roads as a proportion of square kilometers of land area of the municipality	Arterial = 492.075 Lane km (includes C1 & C2 Arterial) Collector = 381.878 Lane km (includes C1 & C2 Collector) Local = 1,390.031 Lane km (includes L/R & LCI) Paved Alleys = 78.82 Lane km

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Roads & Paved Alleys	Quality	For paved roads in the municipality, the average pavement condition index value.	Total Weighted Average Rating = 10.25 - this falls into the overall condition category of 1-5 Year Deficient Roads Notes: (1) The City uses SCI instead of PCI (2) Includes “In Service” Segments only
Roads & Paved Alleys	Quality	For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair, poor)	The municipality does not technically own any roads that are unpaved and any alleys that contain grass, stone and/or other materials that are generally inaccessible to the general public by vehicle.
Structures	Scope	Percentage of bridges in the municipality with loading or dimensional restrictions	None
Structures	Quality	For bridges in the municipality, the average bridge condition index value	92.17 - this average is for all bridges and culverts including those in the Parks and Golf Courses Categories
Structures	Quality	For structural culverts in the municipality, the average bridge condition index value	Culverts are included in the average bridge condition index value

Table 3-4. City-Defined Levels of Service – Transportation Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
All Segments	Fiscal Sustainability	Reinvestment Rate (All Transportation Assets)	0.97%
Active Transportation	Available	Kilometers of On-Road Bike Facilities	131 km

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Active Transportation	Reliable	Percentage of sidewalk reconstructed annually	1.17%
Roads & Paved Alleys and Sidewalks	Fiscal Sustainability	Reinvestment Rate	0.94%
Roads & Paved Alleys and Sidewalks	Reliable	Percentage of total replacement cost for Roads, Paved Alleys & Sidewalk assets in Good to Very Good condition	48.43%
Roads & Paved Alleys	Reliable	Percentage of road renewal annually by road classification	Expressway - 0.65% Arterial - 1.38% Collector - 1.11% Local - 0.66% Scenic Parkway - 0% Paved Alleys – 0.08%
Roads & Paved Alleys	Reliable	Percentage of road mill and pave work annually by road classification	Expressway - 1.37% Arterial - 0.36% Collector - 0.88% Local - 0.41% Scenic Parkway - 0% Paved Alleys – 0%
Roads & Paved Alleys	Reliable	Percentage of concrete panel repair annually by road classification	Expressway - 0% Arterial - 0.11% Collector - 0% Local - 0.01% Scenic Parkway - 0% Paved Alleys – 0%
Structures	Reliable	Percentage of total replacement cost for Structures in Good to Very Good condition	91.86%

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Structures	Fiscal Sustainability	Reinvestment Rate	0.34%
Traffic Infrastructure	Available	Total number of available parking spaces (garages, off street lots, on street metered spaces)	4,042 as of 2023
Traffic Infrastructure	Reliable	Percentage of total replacement cost for Traffic Infrastructure assets in Good to Very Good condition	44.30%
Traffic Infrastructure	Reliable	Percentage of the total replacement cost for Traffic Signals assets past EUL	54.89%
Traffic Infrastructure	Environmental Stewardship	Percentage of streetlights that are LED	81%
Traffic Infrastructure	Fiscal Sustainability	Reinvestment Rate	2.79%

3.3 Lifecycle Management Strategy

The objective of the Lifecycle Management Strategy is to outline and establish a set of planned actions, based on best practices that will enable the City's assets to provide a sustainable LOS to residents, while managing risk at the lowest LCC.

The choice of strategy for maintaining Transportation assets has been focused on maintaining the City's existing assets and halting the decline in service levels. There are defined roadways which are planned for growth and/or enhanced services. This means the road will be expanded either for additional vehicle traffic and or alternative modes of transportation as well as impacting underground assets such as water, storm and sanitary pipes. The roads network represents the most significant portion of the City's Transportation infrastructure. Therefore, appropriate funding for the rehabilitation and reconstruction of the existing road network is imperative to ensure current condition and levels of service do not decrease since this would result in an increased risk to the City. Since the majority of roads assets carry significant risk to the City, as identified in the 2018-2019 AMP, this would also create a significant financial challenge in trying to reduce associated risk levels once assets fall into Poor or Very Poor condition, as less costly treatment options, such as mill and pave and panel repairs, are not viable and require instead reconstruction. The ability to have an impact on the deterioration trend therefore requires a prompt and proactive response.

3.3.1 Lifecycle Activities

Lifecycle activities for the City's Transportation assets involve a series of tasks and processes aimed at effectively managing these assets throughout their lifecycle. The following is an overview of some key lifecycle activities involved in the management of Transportation assets.

Non-Infrastructure Solutions

- Conducting regular assessment of Transportation assets to understand their condition, performance and remaining useful life.
- Developing long-term AMPs and budgets that prioritize maintenance, rehabilitation, and replacement activities based on asset condition, criticality, and available funding. This includes forecasting future needs, setting performance targets, and allocating resources effectively.
- Planning, designing, and constructing transportation assets to meet current and future needs while considering factors such as safety, accessibility, sustainability, and cost-effectiveness.
- Identifying and mitigating risks associated with Transportation assets, including factors such as natural hazards, climate change impacts, regulatory compliance, and funding uncertainties.

- Continuing robust data/asset management systems that are leveraged to support optimized decision-making. This includes GIS, maintenance management and decision support systems.

Operations & Maintenance

- Implementing proactive maintenance programs to preserve and extend the life of Transportation assets. This includes routine inspections, preventative maintenance tasks, repairs, emergency response activities to address issues such as potholes, pavement distress, damage to traffic assets, and malfunctions.

Renewal, Rehabilitation & Replacements

- Performing renewal and rehabilitation activities to restore or upgrade Transportation assets as they age or deteriorate. This includes resurfacing roads, repairing bridges, upgrading traffic signals, and replacing aging infrastructure to maintain service levels and safety standards. For roads and paved alleys assets, renewal and rehabilitation activities provide the lowest cost to stakeholders, as they extend the life of the asset, and prevent much more costly replacement activities.

Disposal

- Planning and executing decommissioning of assets and the removal from service and disposed of in an environmentally friendly manner.

Service Improvement & Growth Activities

- New assets to service growing populations and service areas, as well as to offer new assets and technologies to improve customer experience, accessibility and safety.

By implementing these lifecycle activities, the City can effectively manage their Transportation assets to optimize performance, maximize value, and meet the needs of the community in a sustainable and cost-effective manner. These activities are also critical to maintain a safe and efficient transportation system.

The following are specific Asset Management strategies the City has in place for assets within this Category.

Sidewalks: The City's sidewalk inspection program identifies immediate, short and long term needs and provides an overall rating for each sidewalk segment which is used for maintenance, legal defense, rehabilitation and budget planning. A risk-based approach is used to establish inspection frequencies of 1 to 4 years for a sidewalk segment based on the location, pedestrian traffic level and the current condition rating.

Roads: In recent years, there has been a shift from a 'worst first' prioritization approach based on condition to a risk-based prioritization approach where the City's most important assets are given preferential treatment. Best efforts are made to keep EC Row, Arterial and Collectors from sliding into the 'reconstruction only' category, aiming to have none of these assets in Poor or Very Poor condition;

The slide of assets from rehabilitation to reconstruction will be managed by:

- Mill and Pave will only be done on roads where it will yield 10 to 15 years of added life;
- Local roads will be managed as best as possible recognizing that, based on current funding levels, a percentage of those roads will always be in the Very Poor category. Local Improvement and sewer reconstruction work will also be factored into decisions; and
- Roads which have sewer or water work scheduled to be completed will have priority to maximize benefits of shared capital costs between the City's service areas.

One of the key strategies that the City has incorporated into the road preventative maintenance program is a comprehensive crack sealing operation. This is utilized early on in the assets life cycle and is helping to extend useful life and maintain the asset in an overall Good condition rating.

The City also directly ties the road operation and maintenance functions with the capital budget as outlined below:

- **Reconstruction:** Performed when the overall structure of the road has deteriorated to a point where the only economical action is the reconstruction of the entire road structure. Typically roads in the Poor and Very Poor corporate condition categories would require full reconstruction as they are not good candidates for a mill and pave.
- **Rehabilitation:** Roads which are in Fair condition are within 1 to 5 years of becoming deficient and needing additional work to improve them and therefore are candidates for Mill and Pave.
- **Expanded asphalt method:** Rural roads that have enough structure to be able to repurpose the base before laying another top coat of asphalt. This is used predominately for Very Poor category roads where complete rehabilitation is required.
- **Preventative Maintenance:**
    - Small road repair:
        - Roads which are in Good condition are 6 to 10 years away from becoming deficient and being looked at for this program; and
        - Will address sections of bad road to improve its life cycle and potentially improve overall condition of roads.
    - Crack sealing:
        - Pilot projects have shown positive results. Additional funding is required to expand this program.
    - Pothole patching program:
        - Preventative maintenance measure as well as a short-term repair measure; funded through operating budget.

Structures: A preventative maintenance strategy is in place, including:

- The bridge washing program which aims to keep debris from key elements and remove corrosive de-icing chemicals;
- Recoating of barrier walls to prevent decay and or deterioration; and
- Minor maintenance repairs that are identified through the bi-annual inspections.

The City also has in place a bridge rehabilitation program which includes changing from expansion joints to semi integral joints when the design of the bridge allows for it, this extends the life of the joint significantly for older bridges;

Streetlights: The City has an established Streetlight Pole Inspection/Replacement Program which allows for a 4-year cyclical inspection program. Deficient poles are identified, prioritized and replaced as needed.

Parking Garages and Equipment: Most upgrades and repairs are done proactively so as not to have sudden and higher-priced repairs to these assets. Staff technicians and maintenance crews do regular checks of facilities, as well as 5-year outside engineering agency studies.

Traffic Signals: Assets are managed under a preventative maintenance program with the annual winterizing and de-winterizing of controller cabinets, and conflict monitor testing. Poles are replaced reactively due to accidents and incidents as they are damaged. Intersections are evaluated annually based upon their original construction dated and current conditions. A capital project has been established to allow for the GPS data locating of all traffic maintenance holes and associated fiber and wiring in order to assess their condition.

A full listing of Asset Management practices for Transportation assets and their associated frequency are found in Table 3-5. The activities listed represent the comprehensive approach required throughout the full lifecycle of assets to meet the current levels of service provided by the City while minimizing costs. The activities and strategies listed within this chapter also provide the City's best chance to avoid the risks associated with asset ownership. The risks associated with not following the lifecycle strategies and activities listed can be significant and wide-ranging, which are further explained in section 10.4 - Risks of Not Closing the Gap and Meeting Infrastructure Needs. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies. By prioritizing operations and maintenance, asset renewal and strategic investments, the City can enhance the resilience, sustainability and vitality of the community while minimizing potential risks and ensuring long-term prosperity.

Table 3-5. Asset Management Practices, Planned Activities, and Frequency – Transportation Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Roads and Paved Alleys	
• 311 Calls – major issues concerning capacity, drainage, traffic	• As identified
• Stormwater Management	• As required
• Environmental Assessment	• As required
• Hansen Work Order Tracking	• Based on preventative maintenance program • As activities are performed
• Road Pavement Inspection Program	• Annual (1 to 7 year cycle) • Scheduled for inspection based on set criteria including last inspection date, age of current pavement, road classification and current condition rating
• Master Plans Servicing / Transportation Studies	• As required (related to growth)
Active Transportation	
• 311 Calls – major issues concerning capacity, drainage, traffic	• As identified
• Active Transportation Master Plan	• Every 2 years • Every 5 years for metric updates
• Hansen Work Order Tracking	• Based on preventative maintenance program • As activities are performed
• Sidewalk Inspection Program	• Annual (1 to 4 year cycle) • Scheduled for inspection based on set criteria including last inspection date, age of current pavement, road classification and current condition rating
Structures	
• 311 Calls – major issues concerning capacity, drainage, traffic	• As identified

Asset Management Practices / Planned Activities	Frequency
• Hansen Work Order Tracking	• Based on preventative maintenance program • As activities are performed
• Municipal Drain Report	• As required
• OSIM (Condition) Inspections	• Every 2 Years
• Other condition assessments (3rd Party)	• As required
Traffic Infrastructure	
• 311 Calls – major issues concerning capacity, drainage, Traffic	• As identified
• Annual sign inspection program (Traffic Signs)	• Annual
• Off street parking inspection (Parking / Parking Meters)	• Annual
• Streetlight Inspections (Streetlights / Poles)	• Annual • As required
• Traffic Studies	• As required
Operations & Maintenance	
Roads and Paved Alleys	
• Guiderail maintenance (includes activities related to Vehicle Impacts, Vandalism, Graffiti)	• As required
• Pothole Patching Program	• Ongoing / daily
• Small Road Repair (small areas, panels)	• Annual
• Winter Maintenance - Bridge Decks Brine (anti-icing)	• As required
Structures	
• Bridge Washing Program	• Annual (on select structures)
• Minor repairs identified in bi-annual inspections	• As identified by OSIM
• Recoating of barrier walls to prevent decay or deterioration	• As identified by OSIM
Traffic Infrastructure	

Asset Management Practices / Planned Activities	Frequency
• Annual inspections of meters and displays (operating)	• Annual (general) • Weekly (as identified by collection officers)
• Bi-annual inspection of sign structure (operating)	• Bi-annual
• Traffic Sign replacement	• As required
• Line painting/pavement markings	• Annual
• Preventative (winterizing, de-winterizing, conflict monitor testing)	• Annual
• Replacing burned out light bulbs	• As required
• Sign replacement	• As required
• Streetlight poles maintenance	• Every other year
Active Transportation	
• Sidewalk Panel Grinding	• As required
• Sidewalk Reactive maintenance	• As identified (complaint, work order)
• Sidewalk Spot repairs, slab replacements	• As required
• Winter Control • (Adjacent to municipal infrastructure/property and municipal by-law)	• Annual as required
Renewal, Rehabilitation & Replacements	
Roads and Paved Alleys	
• Crack Sealing	• Annual
• Road Rehabilitation Program • Mill and Pave Program • Expanded Asphalt Method • Concrete Road Renewal	• Annual
Structures	
• Bridge Rehabilitation/Replacement Program	• As identified by the prioritized plan
Traffic Infrastructure	
• LED Replacement	• Every 10 years

Asset Management Practices / Planned Activities	Frequency
• Replacement of Traffic luminaire and/poles	• Every 10 years for luminaires • Every 25 years for poles
• Replacement of Traffic Signal assets	• Every 25 years
• Replacement of Pay assets	• As required
• Photometric Design	• As required
Active Transportation	
• On-Road Bike Facilities Reconstruction	• Concurrent with road reconstruction program
• Sidewalks Reconstruction	• Concurrent with road reconstruction program • As identified through sidewalk inspection program
Disposal	
Roads and Paved Alleys	
• Decommissioning assets at the end of their useful life (abandoned or obsolete infrastructure)	• As required
• Disposal of asset	• As required
Structures	
• Remove bridge	• As required
Traffic Infrastructure	
• Decommissioning assets at the end of their useful life (abandoned or obsolete infrastructure)	• As required
• Disposal of asset	• As required
Active Transportation	
• Decommissioning assets at the end of their useful life (abandoned or obsolete infrastructure)	• As identified
• Disposal of asset	• As required
Service Improvement & Growth	
Road and Paved Alleys	
• New Asset	• As required
• New roads to support developments	• As required

Asset Management Practices / Planned Activities	Frequency
• New traffic signals, new subdivisions	• As required
Structures	
• New asset	• As required
• Municipal Drain Report	• As required
Traffic Infrastructure	
• New asset	• As required
• LED Replacement of decorative fixtures	• Every 5 years
• New traffic signals, new subdivisions	• As required
• Upgrade traffic signal	• As required
Active Transportation	
• New asset	• As required
• New active transportation facilities/infrastructure to support developments	• As required • As identified (through the Active Transportation Master Plan)
• Retrofit of transportation system to include Active Transportation	• As identified (through the Active Transportation Master Plan)

3.4 Funding the Lifecycle Activities

The City uses the lifecycle strategies described in Section 3.3 to plan work and determine future expenditure needs for Transportation assets. These activities, along with the scenarios outlined below, provide a comprehensive framework for managing infrastructure assets and ensuring the City can meet the demands of current services and existing infrastructure.

The scenarios are informed by identified lifecycle strategies for Transportation assets developed through consultation with staff and are based on best practices. This AMP focuses on the necessary life cycle activities and funding to maintain these assets in operational condition, which includes various rehabilitation programs such as mill and pave programs for roads, bridge inspection programs for bridges, and replacements of traffic infrastructure assets to ensure continued functionality of transportation services.

The scenarios consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City population.

3.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding levels on asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for Transportation is approximately $42.2 million annually. Figure 3-5 shows the projected condition distribution of assets over the 20-year forecast period under the current funding scenario.

The forecast illustrates a gradual decline in condition over the forecast period. Assets in Good to Very Good condition decreases from 61% to 55%, while assets in Very Poor condition increases from 5% to 9%. This scenario highlights challenges the City will face in maintaining Transportation infrastructure assets with the current anticipated budget allocations. This suggests that the budget may not be sufficient to keep up with the infrastructure needs of the assets over time, leading to a decline in overall asset condition.

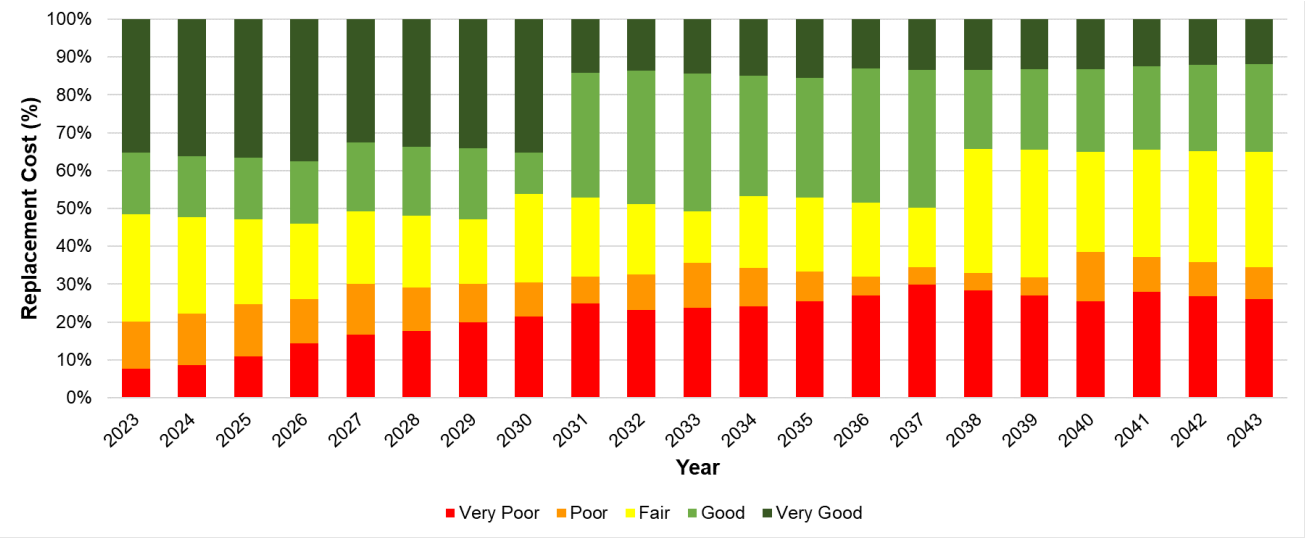


Figure 3-5. Scenario 1: Performance Forecast with Current Funding – Transportation Assets

3.4.2 Scenario 2: Maintain Current Performance (Levels of Service)

Scenario 2 reflects the cost to maintain Transportation assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the LOS for the asset Category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of Transportation assets was determined to be approximately $80.5 million annually, resulting in an average annual gap of $38.2 million. Figure 3-6 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition increases slightly from 52% to 57%, while assets in Very Poor condition increases from 8% to 13% throughout the 20-year period.

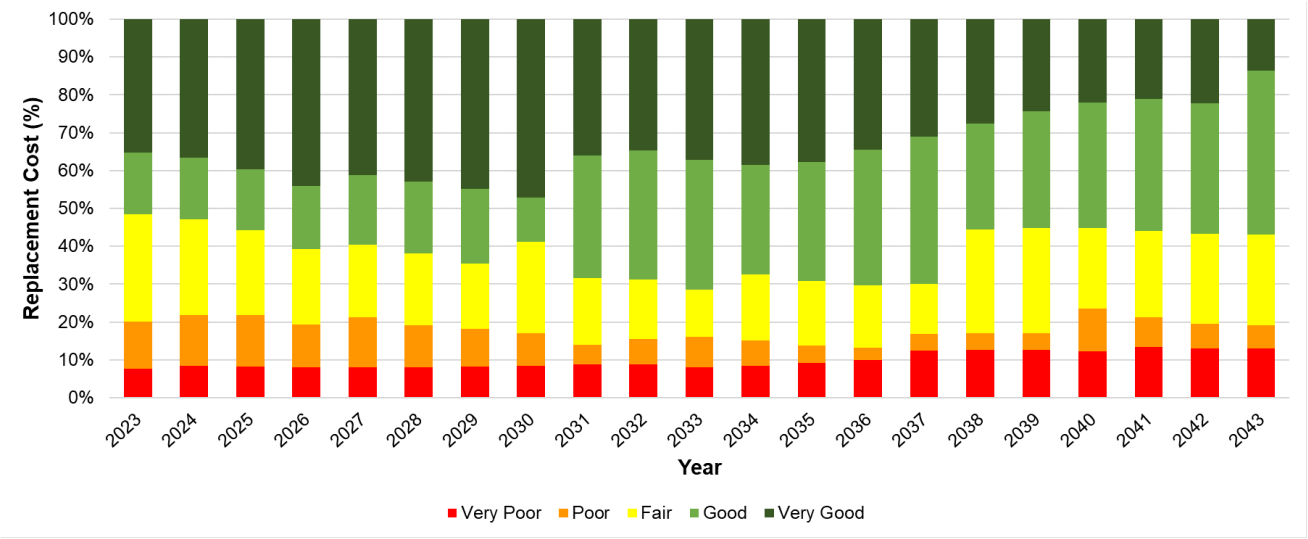


Figure 3-6. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) – Transportation Assets

3.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of Transportation renewal, rehabilitation, and replacement activities to be approximately $74.0 million annually. Under this scenario, the City faces an annual average gap of $31.7 million for its Transportation assets.

This projected asset performance forecast is shown in Figure 3-7. The forecast shows slight decrease in overall asset condition by the end of the 20-year forecast through the application of the identified lifecycle strategies. The model indicates that assets in Good to Very Good condition decreases slightly from 52% to 47%, while assets in Very Poor condition increases from 8% to 10% throughout the 20-year period.

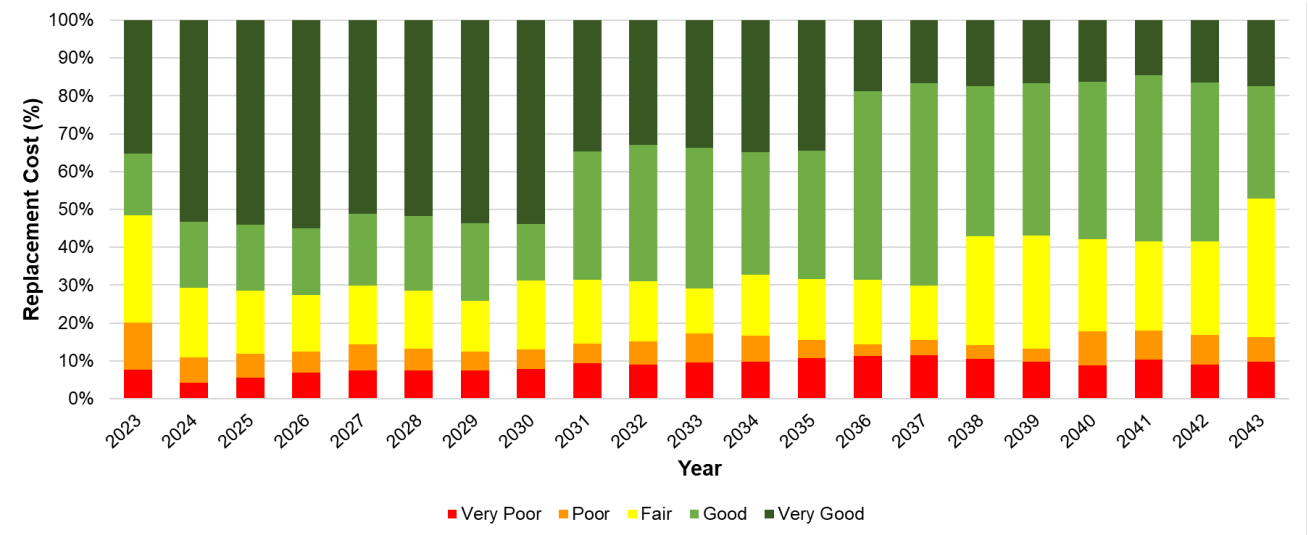


Figure 3-7. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies – Transportation Assets

3.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The required investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 3-8. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

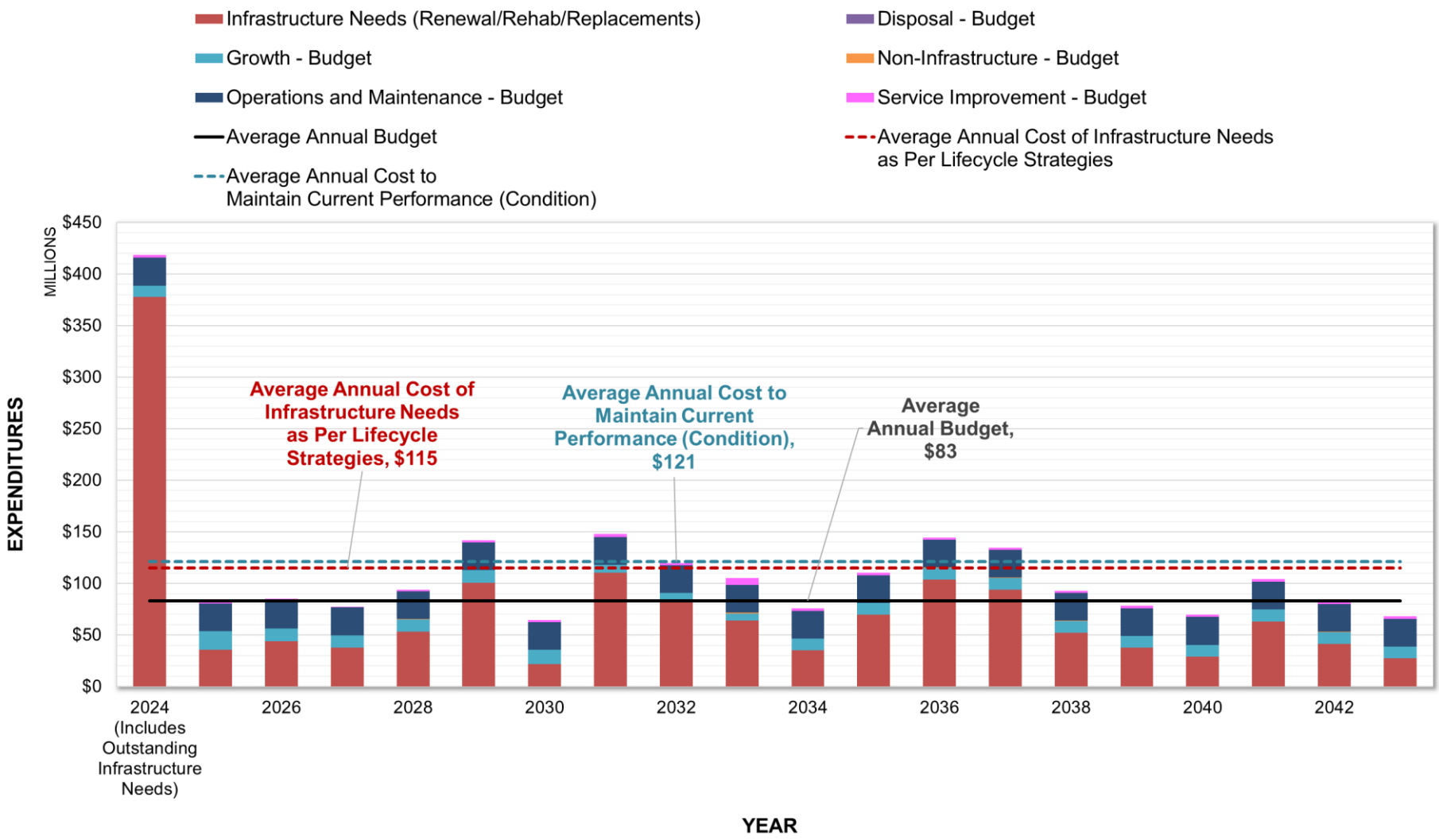


Figure 3-8. Scenario Comparison – Transportation Assets

The scenario comparison indicates that the Transportation asset infrastructure is facing an annual gap of $38.2 million to maintain their current performance. If all lifecycle activities identified under the lifecycle strategy were to be undertaken, the gap decreases to $31.7 million. This calculated infrastructure gap is further detailed in Table 3-6.

Table 3-6. Lifecycle Activity Investments & Average Annual Infrastructure Gap – Transportation Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$206,780	$206,780	$206,780
Operations & Maintenance	$26,836,921	$26,836,921	$26,836,921
Service Improvement	$2,345,482	$2,345,482	$2,345,482
Disposal	$0	$0	$0
Growth	$11,411,539	$11,411,539	$11,411,539
Renewal, Rehabilitation & Replacement	$42,287,411	$80,513,600	$74,007,537
Total	**$83,088,133**	**$121,314,322**	**$114,808,259**
Funding Gap		**$38,226,189**	**$31,720,126**

The City has been working to improve funding levels for transportation assets, which is a positive step toward maintaining and enhancing this critical infrastructure. Despite these efforts however, the costs for renewal, rehabilitation, and replacements have significantly increased in recent years. This situation has created challenges for the City, limiting its ability to make substantial improvements to the condition of these assets compared to the previous 2018-2019 AMP. This increase in costs is attributed to inflation, and changes in material and labour costs due to the profound impact of the COVID-19 pandemic on the construction industry.

The City has implemented advanced technologies and strategies to enhance the performance of many of the Transportation assets (especially roadways and structures), as described in Sections 3.1 and 3.3. Prioritized inspection programs, leveraging technology and software for asset inventory management, and undertaking road reconstruction and rehabilitation programs are all crucial components of effective Asset Management.

Additionally, the City's decision to incorporate more renewal and rehabilitation activities into their asset lifecycle strategies, such as crack sealing for roads, demonstrates a proactive approach to maintenance. These activities not only improve cost efficiency by being less expensive than full replacements, but also extend the lifespan and performance of Transportation assets. By addressing issues early through preventative maintenance and

renewals, the City can mitigate the need for more costly repairs or replacements in the future, ultimately providing Transportation services at the lowest possible cost for customers.

Overall, the combination of advanced technologies, strategic Asset Management practices, and a focus on cost-effective maintenance activities reflects the City's commitment to optimizing the performance and longevity of its assets. Continued investment in these areas will be essential for ensuring the reliability, safety, and sustainability of the Transportation infrastructure network, and continue to build on the successes of the asset managers, as well as address the infrastructure gap. It will also be imperative to continue to improve asset information and lifecycle management strategies for other assets within this Category.

3.5 Data Confidence and Improvement Plan

Table 3-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on the number of assumptions needed and the reliability of the data sources.

Table 3-7. Data Confidence – Transportation Assets

Asset Segment	Data Source	Data Confidence (/10)
Active Transportation	Infor *IPS* (Hansen) CMMS	9
Roads & Paved Alleys	Infor *IPS* (Hansen) CMMS	9
Structures	Infor *IPS* (Hansen) CMMS PSD Citywide CMMS (TCA Database)	8
Traffic Infrastructure	PSD Citywide CMMS (TCA Database) Excel Subject Matter Experts	7

Active Transportation

Asset registry data for on-road bike facilities and sidewalks is housed in the *Infor* IPS (Hansen) CMMS database and is based upon sound records and known procedures. This data is updated regularly. This database does not house current replacement costs, which are evaluated independently, and are based primarily on recent tenders. For sidewalks, condition is assessed through formal in-house condition assessments (i.e. pavement inspection program) and is considered highly reliable and accurate. For on-road bike facilities, the condition, as well as the replacement cost, is not assessed separately from the road pavement on which they reside. Although additional consideration should be made in development of a stand-alone condition and replacement value assessment process for on-road bike facilities, the overall data confidence for this asset Segment is considered high.

Roads & Paved Alleys

Asset registry data for roads and paved alleys is also housed in the *Infor* IPS (Hansen) CMMS database. The data is based upon sound records and known procedures and is continually updated. Replacement costs for roads and paved alleys are based on unit costs obtained from recent tenders, while condition is based on formal in-house condition assessment. This results in highly reliable and accurate data for these asset types, the overall data confidence for this asset Segment is considered high.

Structures

Bridges, subways, major culverts (>3m), and pedestrian bridges are also housed in the *Infor* IPS (Hansen) CMMS database. Replacement costs for bridges, subways, major culverts (>3m), and pedestrian bridges is primarily based on historical costs inflated to 2023 dollars, while their condition is assessed through OSIM inspections or in-house assessments. Where OSIM is not a requirement for a particular asset, the condition is determined by expert opinion. This data is considered highly reliable and highly accurate.

Asset registry data for noise barriers, unlike the other structures asset, are housed in PSD Citywide CMMS software and managed as TCA assets. Replacement costs are determined using historical costs inflated to 2023 dollars, and condition is based on in-house expert opinion, resulting in a moderate accuracy and a moderate reliability.

The overall data confidence for this asset Segment is considered moderately high.

Traffic Infrastructure

Asset registry data for traffic infrastructure assets should be developed further, maintained regularly, and stored in one location. Other than street lighting, these assets are housed in PSD Citywide CMMS software as pooled TCA assets. Street lighting data is stored in an excel database. Both sources provide low reliability and moderate accuracy data. While current replacement costs for parking garages, street lighting, traffic signals and pedestrian crossings are based on unit costs obtained from recent tenders and are considered highly accurate, the current replacement cost for pay & display parking lots is based on historical costs inflated to 2023 dollars which are considered to have moderate accuracy. Condition data for these assets is based on age and then reviewed and confirmed by expert staff. The overall data confidence for this asset Segment is considered moderately high.

3.5.1 Recommendations for Improvements

Recommendations for data improvements to the Transportation asset Category are listed in Table 3-8.

Table 3-8. Improvement Plan – Transportation Assets

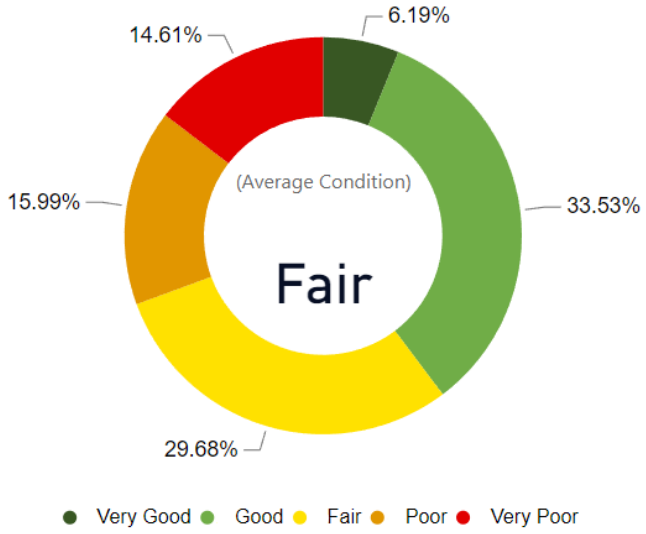
Task No.	Task	Resources Required	Responsibility
1	Develop an itemized asset registry for noise barrier wall assets and a process to assess these assets at least once per year.	Internal	Operations Engineering Asset Planning
2	Develop a more accurate asset registry data gathering method for the City's traffic and street lighting assets.	Internal	Operations Asset Planning
3	Consider a process to better align related data between right-of-way sidewalks and maintained recreation trails in parks.	Internal	Parks Technical Support
4	Consider adding retaining walls to the Structures asset registry.	Internal	Operations Engineering Technical Support

4 Facilities

Replacement Value

Asset Segment	Replacement Value
Administrative & Operational	$248,556,013
Community	$750,209,773
Emergency Response	$135,000,000
Long Term Care	$67,590,423
Other & Transitional	$116,445,035
Total Replacement Value	**$1.3 B**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$8.4 M	**$22.2 M**

Quick Facts

City of Windsor Facilities included in this asset Category:

- 155 municipal buildings which support administrative, operational, recreational, health and emergency services to the community
- This Category does not include Facilities managed by Transit Windsor or the ABCs

4 Facilities

4.1 State of the Infrastructure

The City of Windsor recognizes the importance of its municipal facilities in serving the public and supporting the operations of all City departments. The Facilities service area encompasses a very wide network of diverse buildings and is therefore quite unique in its purpose and function. Facilities included in this asset Category provide administrative, operational, recreational, health and emergency services to the community. This Category does not include facilities managed by Transit Windsor or the City's ABCs.

Well-maintained facilities contribute to a sense of pride and identity among residents, fostering a strong community spirit and engagement. To provide these services, the City employs various strategies including Asset Management, facility planning, maintenance programs, and capital improvement projects to optimize the performance, sustainability, and resilience of all facilities. By implementing these strategies, the City aims to enhance the social, economic, and environmental well-being of its communities through the effective management and maintenance of its municipal facilities.

Within this asset Category, assets have been grouped in the Segments described below.

Administrative & Operational: Administrative and operational buildings such as City Hall and the Operations Yards enable administration to deliver services efficiently and effectively to residents.

Community: Community buildings include community centers and recreational facilities. Providing services through these assets contributes to the overall quality of life in the community, making Windsor a more desirable place to live, work and visit.

Emergency Response: This includes the City's fire halls, which are essential for public safety.

Long Term Care: This includes the Huron Lodge facility, which services the City's ageing community.

Other & Transitional: These are buildings currently within the City's facility portfolio that are typically either under long-term lease or are transition-type properties that currently do not have long-term plans established for them.

4.1.1 Asset Valuation

The following sections summarize the portfolio associated with the City's Facilities assets included in this Category. Table 4-1 provides the inventory and current replacement value for the assets included under this AMP.

Table 4-1 Inventory and Current Replacement Value – Facilities Assets

Segment & Sub-Segment	Count	Unit	2023 Estimated Replacement Value
Administrative & Operational			
Administrative	6	Each	$139,214,400
Operations	15	Each	$109,341,613
Community			
Community Centers	5	Each	$32,376,200
Heritage & Culture	14	Each	$207,476,603
Multi-Use Recreation	6	Each	$350,842,389
Outdoor Pools	6	Each	$23,000,000
Outdoor Rink	1	Each	$2,816,866
Parks	49	Each	$90,001,761
Recreation	19	Each	$43,695,954
Emergency Response			
Fire	8	Each	$135,000,000
Long Term Care			
Huron Lodge	1	Each	$67,590,423
Other & Transitional			
Other Long Term	14	Each	$84,510,311
Transitional	11	Each	$31,934,722
Total			**$1,317,801,242**

For the majority of facilities, replacement cost was estimated by subject matter experts using per square foot unit costs based on current market values. In other instances, insurance values or building condition assessment data was used to determine replacement cost. Replacement values for these facilities are assessed at the building level and may not fully capture the cost of highly specialized building components or amenities within the buildings.

Moving forward it is the intent of the City to include specialized building components and amenities within the buildings into the analysis. Through further development of facility component data, the City can make informed decisions regarding budget allocations, capital planning, and resource management. This enables efficient prioritization of maintenance activities and capital improvement projects to address the most critical needs and ensure the long-term sustainability of facility assets.

4.1.2 Asset Condition

Condition is assessed based on the overall health and performance of the facility, not by building components. Building condition assessments are used to determine condition where available, and staff expertise is used where there were no previous condition assessments completed.

Administration is working to develop a consistent and robust facility condition assessment program to better inform the AMP based on component level facility information for more accurate and comparable analysis of Facilities assets.

4.1.2.1 Category Condition Overview

Overall condition of Facility assets, as a percentage of replacement value, is illustrated in Figure 4-1.

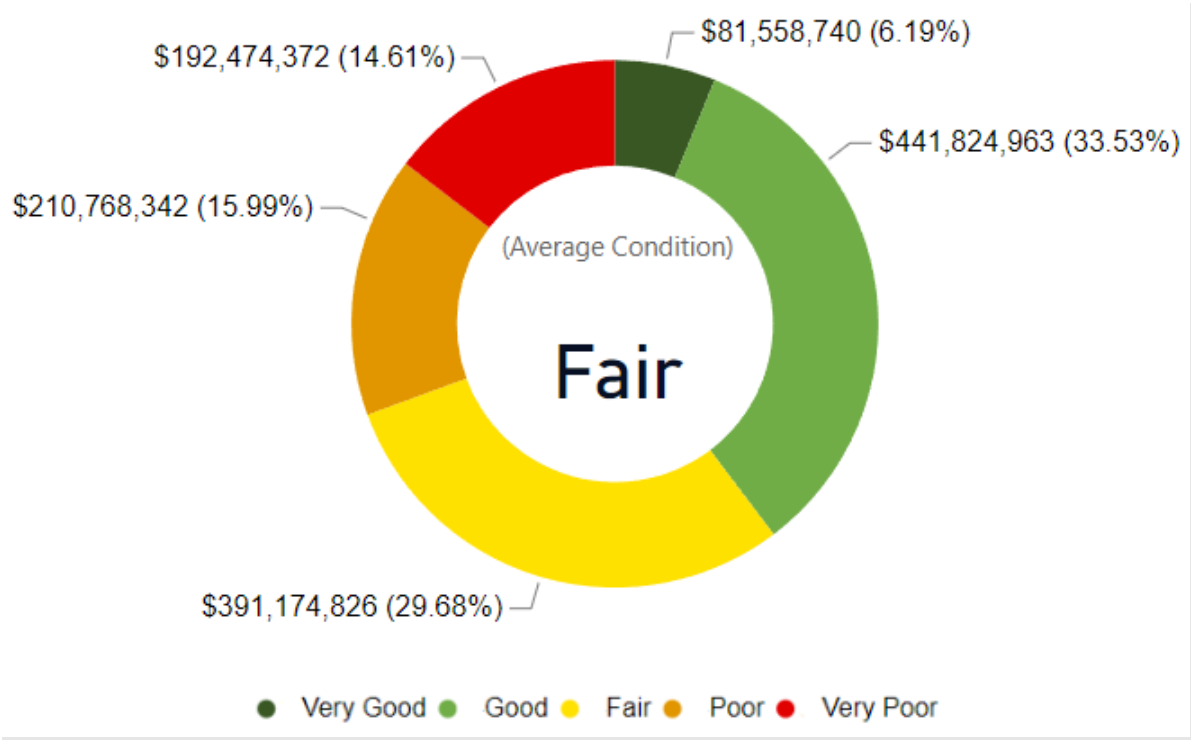
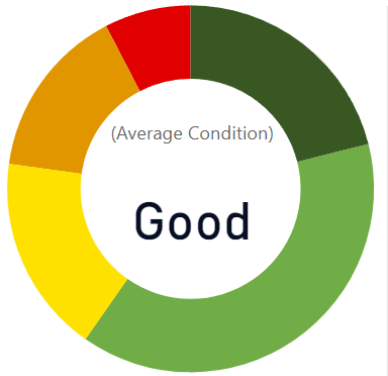
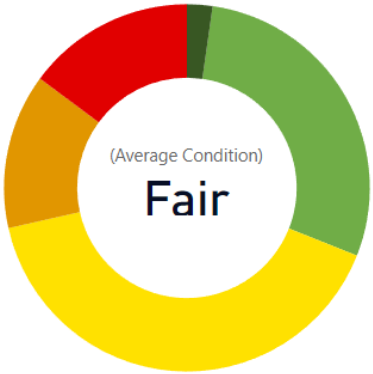
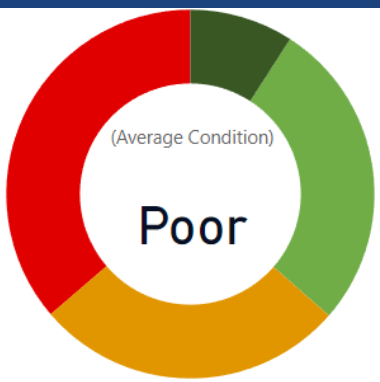


Figure 4-1. Category Condition as a Percentage of Replacement Value – Facilities Assets

Facilities assets included in this Category are, on average, in Fair condition. This may indicate that the City's facilities are being managed more reactively, as opposed to being managed at the lowest LCC. Without proper funding for replacement and upgrades to building components, the City's facilities will remain in Fair condition or move to a Poor overall condition. This poses a risk to the corporate and community services provided by these facilities.

4.1.2.2 Segment Condition Overview

The condition profiles of Facilities assets can be further reviewed at the Segment level in Figure 4-2.

Administrative & Operational	Community	Emergency Response
		
• 6 Administrative Buildings • 15 Operational Buildings	• 5 Community Centers • 14 Heritage & Culture • 6 Multi-Use Recreation • 6 Outdoor Pools • 1 Outdoor Rinks • 49 Parks Facilities • 19 Recreation Facilities	• 8 Fire Facilities

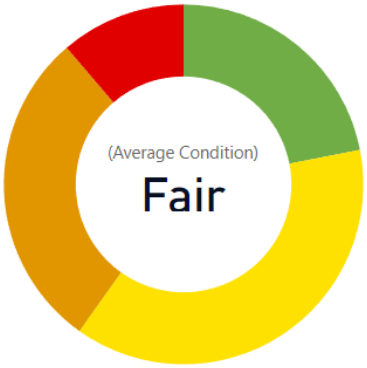
Long Term Care	Other & Transitional
	
• Huron Lodge	• 14 Other Long Term • 11 Transitional Buildings

Figure 4-2. Segment Condition as a Percentage of Replacement Value – Facilities Assets

As shown in Figure 4-2 community, emergency response, and other long term and transitional facilities are deteriorating. While community facilities are able to provide services as prescribed, many of these facilities have not been modernized and many building components are in need of repair or replacement. Fire Hall 1 is contributing substantially to

the Poor rating of the emergency response facilities due to its Very Poor condition rating and high replacement cost. Huron Lodge is a facility that is governed by strict government regulations to address facility risk. This facility needs to be kept in Good condition to mitigate this risk. In general, the City does not spend capital dollars on transitional buildings as they are not expected to be owned and operated by the City in the future. The uncertainty of ownership timelines can result in heavy operating and maintenance costs that have not been forecast for these buildings.

4.1.2.3 Sub-Segment Condition Overview

Facilities asset condition, as a percentage of replacement value, is further broken down at the Sub-Segment level in Figure 4-3.

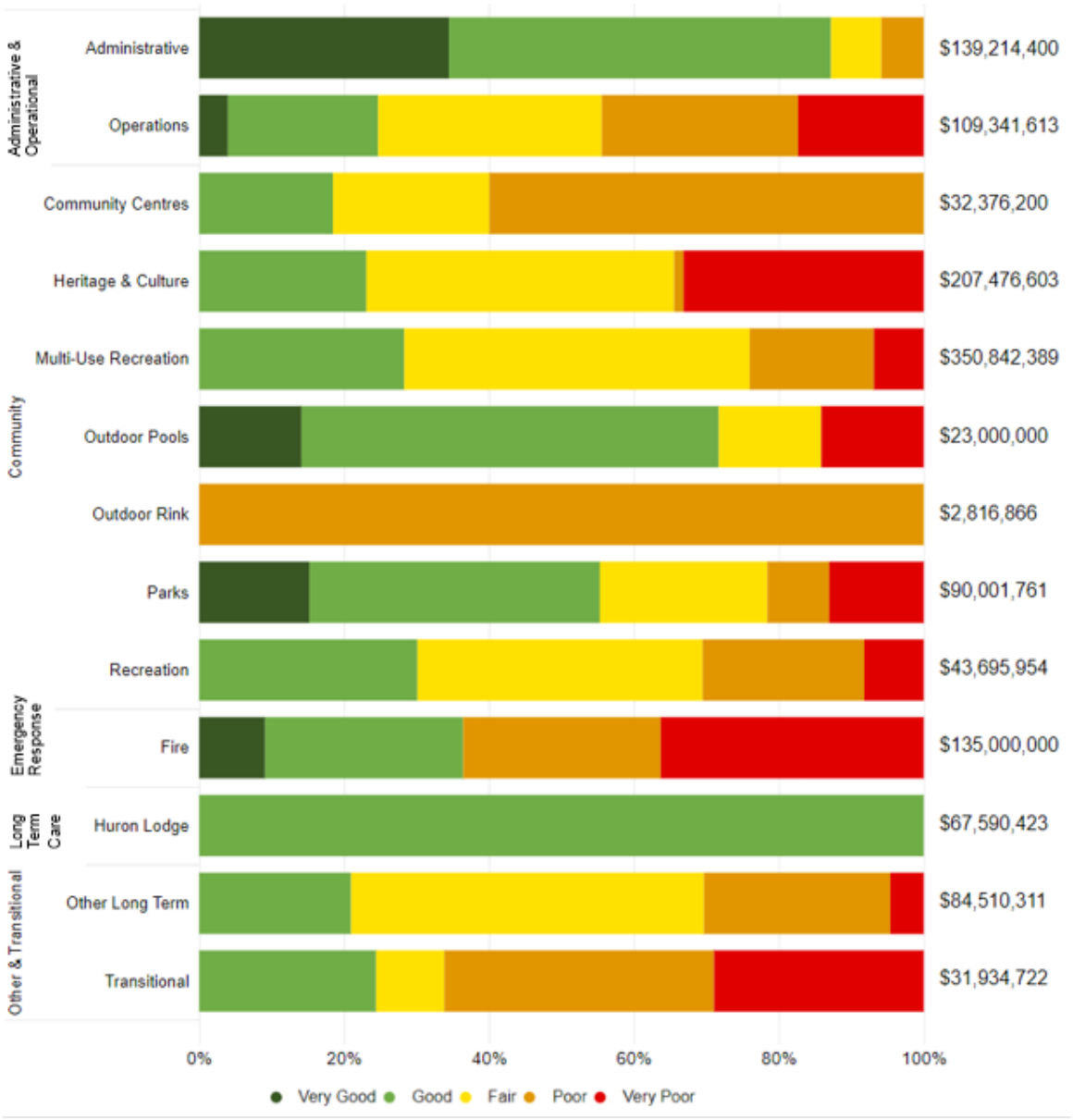


Figure 4-3. Sub-Segment Condition as a Percentage of Replacement Value – Facilities Assets

The condition profiles provided in Figure 4-3 indicate that there are significant signs of deterioration in the City's Facilities assets. Since the COVID-19 pandemic, availability of building materials as well as exceedingly high inflation rates have meant that investments since the last AMP have not realized improvements in building condition. If construction costs and inflation remain high, this trend is expected to continue.

In recent years administration has found that new facilities are constructed from less durable materials with shorter life spans. The technological components being incorporated into new buildings are more expensive to replace, has a higher risk of failure, and requires software and hardware upgrades. This results in modern buildings being more expensive to maintain and renew than older buildings. Along with this, ever increasing regulatory standards for social and safety requirements are placing both technical and financial pressures on old and new buildings alike.

The City's Facilities Service Area has taken ownership of newly constructed or acquired facilities, with limited consideration to the associated significant operating and maintenance costs. The result is a deficit of the corresponding financial and human resources required to support the true needs of these long-term facilities. It is crucial to conduct an LCC analysis when new corporate buildings are in discussion to be constructed or acquired. If the staffing, operating and maintenance requirements, as well as component rehabilitation and replacement costs, are not identified in the early stages, the building and its components will not be managed to the lowest possible LCC.

Administration continues to seek out grant funding for upgrades and renewal of facility infrastructure, particularly as it relates to making facilities more accessible. While there are currently many high dollar value funding opportunities available for renewal and rehabilitation, these funding opportunities are requiring a strict commitment to produce net-zero buildings. This means that the total amount of energy used by the building on an annual basis is equal to the amount of renewable energy created on or off-site. The rising cost of energy and the availability of grant funding tied to net-zero buildings, in addition to energy and greenhouse reduction targets, provides an incentive for the City to consider moving in this direction.

4.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset Categories. For Facilities in general, total building age does not impact Asset Management practices. Building components are renewed and replaced due to their criticality and available funding. The average age of Facilities assets is illustrated in Figure 4-4.

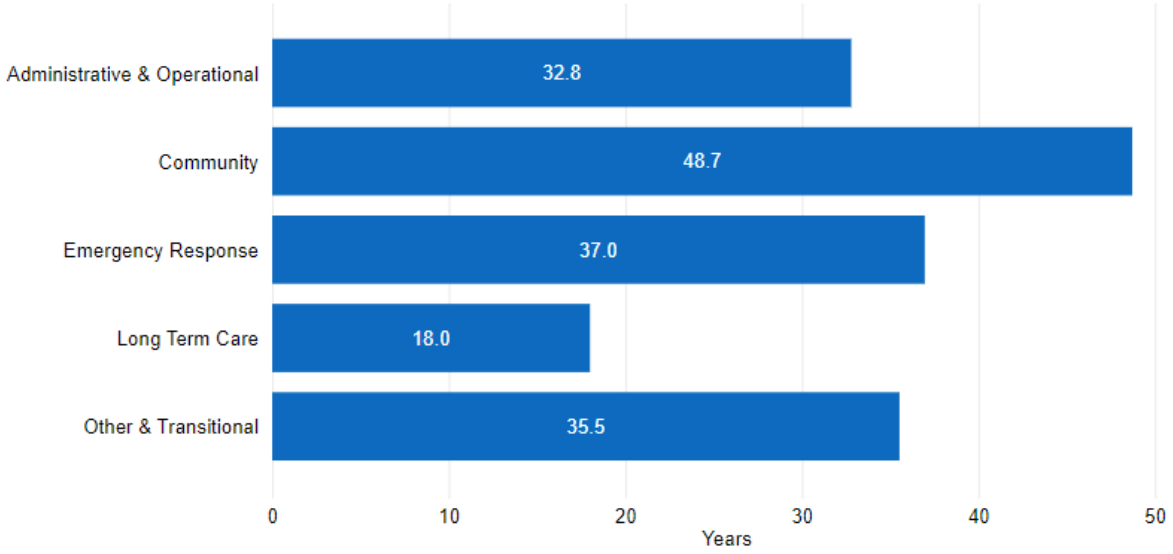


Figure 4-4. Average Age – Facilities Assets

4.2 Levels of Service

Level of Service Statement: Facilities infrastructure enables the City to deliver a wide range of services to the community. Corporate facilities support municipal service delivery by providing safe and efficient workspaces for City staff. Community facilities deliver safe and welcoming environments for the members of the community to gather, facilitate social connection and promote community vibrancy.

Facilities infrastructure plays a vital role in enabling the City to deliver a diverse array of services to its community. The following are ways in which municipal facilities contribute to service delivery.

Support for City Staff: Corporate facilities provide essential workspaces for City staff to carry out their duties efficiently and effectively. These facilities encompass offices, meeting rooms, administrative centers, operation yards and other workspaces necessary for various municipal departments to operate smoothly.

Safe and Efficient Work Environment: By maintaining safe, comfortable, and functional work environments, corporate facilities contribute to employee productivity and well-being. This, in turn, enhances the delivery of municipal services to the community.

Social Connection and Engagement: Community facilities serve as gathering places where members of the community can come together to socialize, participate in recreational activities, attend events, and engage in cultural or educational programs. These facilities may include community centers, recreational centers, libraries, and other public spaces.

Livability: Maintaining and improving municipal facilities contributes to the overall quality of life in the community, making Windsor a more desirable place to live, work, and visit.

Promotion of Community Vibrancy: Community facilities play a crucial role in fostering a sense of belonging and community pride. By providing accessible and inviting spaces for

residents to connect and interact, these facilities contribute to the vibrancy and cohesion of the community.

Facilitation of Social Services: Municipal facilities also host social service programs and support initiatives aimed at addressing the needs of vulnerable populations, promoting equity, and enhancing the overall quality of life for residents.

Overall, all municipal facilities are essential components of the City's infrastructure, supporting municipal service delivery and contributing to the well-being and livability of the community. By investing in the maintenance, improvement, and expansion of these facilities, the City can ensure that it continues to meet the diverse needs of its residents and promote a thriving and inclusive community environment.

O. Reg. 588/17 does not regulate any metrics that must be used for LOS for non-core infrastructure. The City has chosen metrics that define and measure the desired standards for delivering services that are provided by its facilities. These metrics help set goals, evaluate performance, allocate resources effectively, and communicate expectations to stakeholders. Table 4-2 provides a summary of the LOS for the City’s Facilities services. By establishing LOS metrics, municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance.

Table 4-2. City-Defined Levels of Service – Facilities Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
All Segments	Fiscal Sustainability	Reinvestment Rate	1.40%
All Segments	Environmental Stewardship	Annual electric energy consumption per square foot	12.26 kWh/Sq.Ft.
All Segments	Environmental Stewardship	Annual natural gas consumption per square foot	2.15 m^3/Sq,Ft
All Segments	Environmental Stewardship	Annual water consumption per square foot	0.28 L/Sq.Ft.
All Segments	Environmental Stewardship	Annual GHG emissions	12,871 tCO2e
All Segments	Reliable	Percentage of total replacement cost for Facilities assets in Good to Very Good condition	39.72%

4.3 Lifecycle Management Strategy

The objective of the Lifecycle Management Strategy is to outline and establish a set of planned actions based on best practice that will enable the City's assets to provide a sustainable level of service to the residents, while managing risk at the lowest LCC.

4.3.1 Lifecycle Activities

Lifecycle activities for Facilities involve a series of processes and tasks aimed at effectively managing the entire lifespan of a facility, from planning and design to decommissioning or repurposing. These activities ensure that Facilities assets continue to provide the intended services efficiently, effectively, and sustainably throughout their lifecycle, and maximize the value they provide to the community. This approach aligns with best practices in Asset Management, where preventative maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets. The following is a high-level overview of lifecycle management activities related to Facilities assets.

Non-Infrastructure Solutions

- Strategic planning and needs assessments through master plans and condition assessments.
- Developing facility design plans based on identified needs, regulatory requirements, and industry standards.
- Asset Management and performance monitoring.
- Ensuring facility compliance with building codes, safety standards and environmental regulations.
- Identifying and assessing risks associated with facility operations, including safety hazards, security vulnerabilities, and natural disasters; developing and implementing emergency response plans and mitigation measures to minimize risks and ensure business continuity.

Operations & Maintenance

- Maintenance programs to ensure ongoing functionality, safety, and efficiency of facility systems and components.
- Conducting routine inspections, preventative maintenance tasks, and reactive repairs to address issues and prolong asset lifespan.

Renewal, Rehabilitation and Replacements

- Planning and executing renewal, renovation and replacement projects while minimizing disruptions to ongoing operations.

Disposals

- Planning and executing facility decommissioning activities at the end of its lifecycle, including asset disposal, demolition, or repurposing.
- Managing environmental remediation, waste disposal, and regulatory compliance during decommissioning processes.

Service Improvement & Growth Activities

- Identifying opportunities for facility renovations or upgrades to improve functionality, energy efficiency, and occupant comfort.

Maintaining facilities in Good condition not only extends their lifespan but also helps avoid more significant expenses associated with major repairs or premature replacements. It also ensures that residents continue to receive high-quality services and amenities from well-maintained facilities, contributing to their overall satisfaction and well-being.

The unique nature of facility components show that systems typically function in Good condition until they simply fail. Components that appear to be in Good condition do not necessarily follow a prescribed deterioration curve and can rapidly fall from Good or Fair condition to a condition of immediate need. The City has observed premature degradation of facility components that cannot be captured effectively in long-term condition program plans. The development of an ongoing and robust Building Condition Assessments Program will allow for a regular condition inspection cycle as well as the procurement of proper assessments on a project or as needed basis. The establishment of appropriate lifecycle management activities are essential for ensuring that facilities operate effectively, efficiently, and sustainably throughout their lifespan, meeting the needs of users and stakeholders while maximizing value and minimizing risks.

Specific Asset Management practices or planned actions, and their frequency are outlined in Table 4-3. The activities listed represent the comprehensive approach required throughout the full lifecycle of assets to meet the current levels of service provided by the City while minimizing costs. The activities and strategies listed within this chapter also provide the City's best chance to avoid the risks associated with asset ownership. The risks associated with not following the lifecycle strategies and activities listed can be significant and wide-ranging, which are further explained in section 10.4 - Risks of Not Closing the Gap and Meeting Infrastructure Needs. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies. By prioritizing operations and maintenance, asset renewal and strategic investments, the City can enhance the resilience, sustainability and vitality of the community while minimizing potential risks and ensuring long-term prosperity.

Table 4-3. Asset Management Practices, Planned Activities, and Frequency – Facilities Assets

Asset Management Practices / Planned Activities	Frequency Associated with Practices / Planned Activities
Non-Infrastructure	
• Roof Inspection Program	• Ongoing
• Condition Assessment Program	• Every 3 - 5 years depending on facility type
• Master Plan for Facilities	• Updated based on facility type • Comprehensive completed every 10 years
• Feasibility Study for Level of Service Changes (e.g. Space Needs Study)	• As directed by Council
Operations & Maintenance	
• Staff inspections	• As required depending on facility type
• Reactive maintenance	• As required • As funding is available
• Preventative maintenance	• As required by PM Plan (captured in CMMS software)
Renewal, Rehabilitation & Replacements	
• Rehabilitation needs	• As funding is available
• Building replacement	• As directed by Council
Disposal	
• Building disposal	• As directed by Council
• Repurposing of building	• As directed by Council
Service Improvement & Growth	
• Expansion	• As directed by Council
• New technology	• As funding is available
• Interior renovations	• As funding is available
• New Facilities	• As directed by Council
• Equipment Upsizing	• As funding is available

4.4 Funding the Lifecycle Activities

The City uses the lifecycle strategies described in Section 4.3 to plan work and determine future expenditure needs for Facilities assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring the City can meet the demands of current services and existing infrastructure.

The scenarios are informed by identified lifecycle strategies for Facilities assets developed through consultation with staff and are based on best practices. The scenarios consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City population.

4.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding levels on asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for Facilities is approximately $14.9 million annually. Figure 4-5 shows the projected condition distribution of assets over the 20-year forecast period under the current funding scenario.

The forecast illustrates substantial decline in overall condition over the forecast period. Assets in Good to Very Good condition decreases from 41% to 11%, while assets in Very Poor condition increases from 15% to 38%. This scenario highlights challenges the City will face in maintaining Facilities infrastructure assets with the current anticipated budget allocations. This suggests that the budget will not be sufficient to keep up with the needs of the assets over time, leading to a significant decline in overall asset condition.

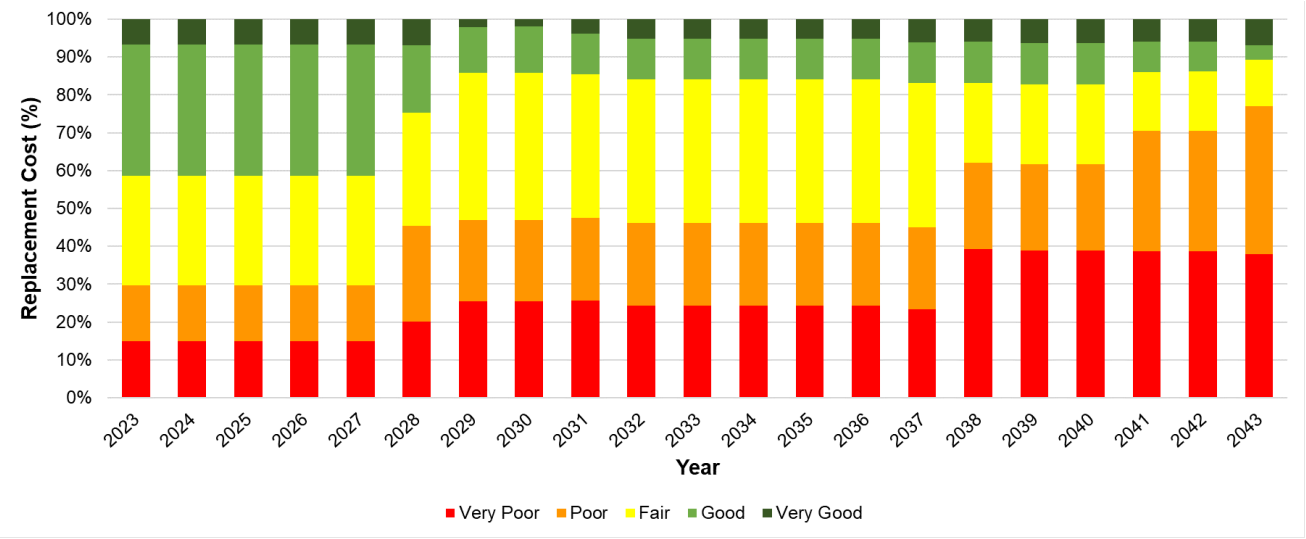


Figure 4-5. Scenario 1: Performance Forecast with Current Funding – Facilities Assets

4.4.2 Scenario 2: Maintain Current Performance (Levels of Service)

Scenario 2 reflects the cost to maintain Facilities assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the current LOS for the asset Category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of Facilities assets was determined to be approximately $23.3 million annually, resulting in an average annual gap of $8.4 million. Figure 4-6 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition decreases from 41% to 27%, while assets in Very Poor condition increases from 15% to 22% throughout the 20-year period. The forecast was unable to perfectly align the performance over the 20-year forecast as a result of the facilities being assessed on a facility level, rather than a component level.

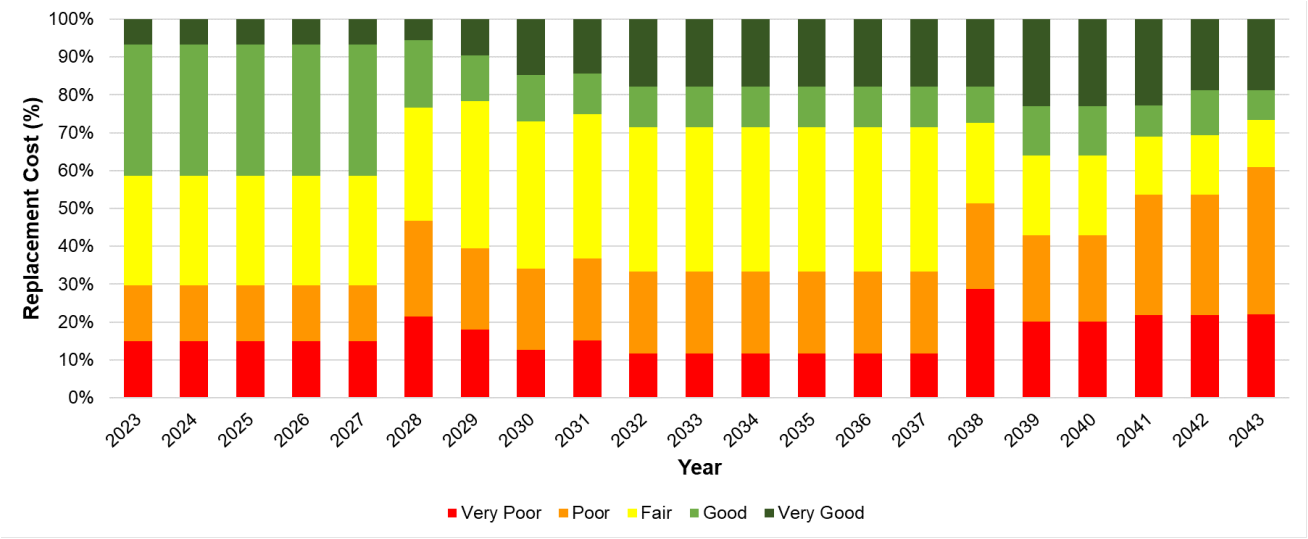


Figure 4-6. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) – Facilities Assets

4.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of Facilities renewal, rehabilitation, and replacement activities to be approximately $37.1 million annually. Under this scenario, the City faces an annual average gap of $22.1 million for its Facilities assets.

This projected asset performance forecast is shown in Figure 4-7. Similar to Scenario 2, the modelling shows an overall gradual decline in the condition of assets. The model indicates that assets in Good to Very Good condition decrease by the same amount as Scenario 2, from 41% to 27% and assets in Very Poor condition increases from 15% to 21%. This scenario provides the best overall performance of Facilities assets.

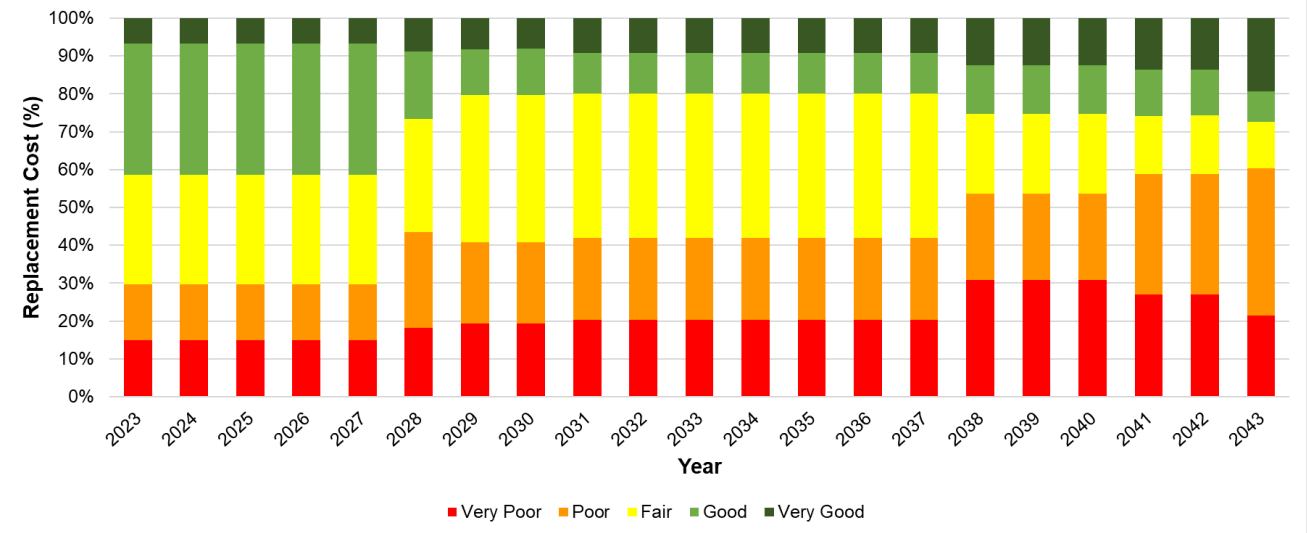


Figure 4-7. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies – Facilities Assets

4.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The required investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 4-8. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

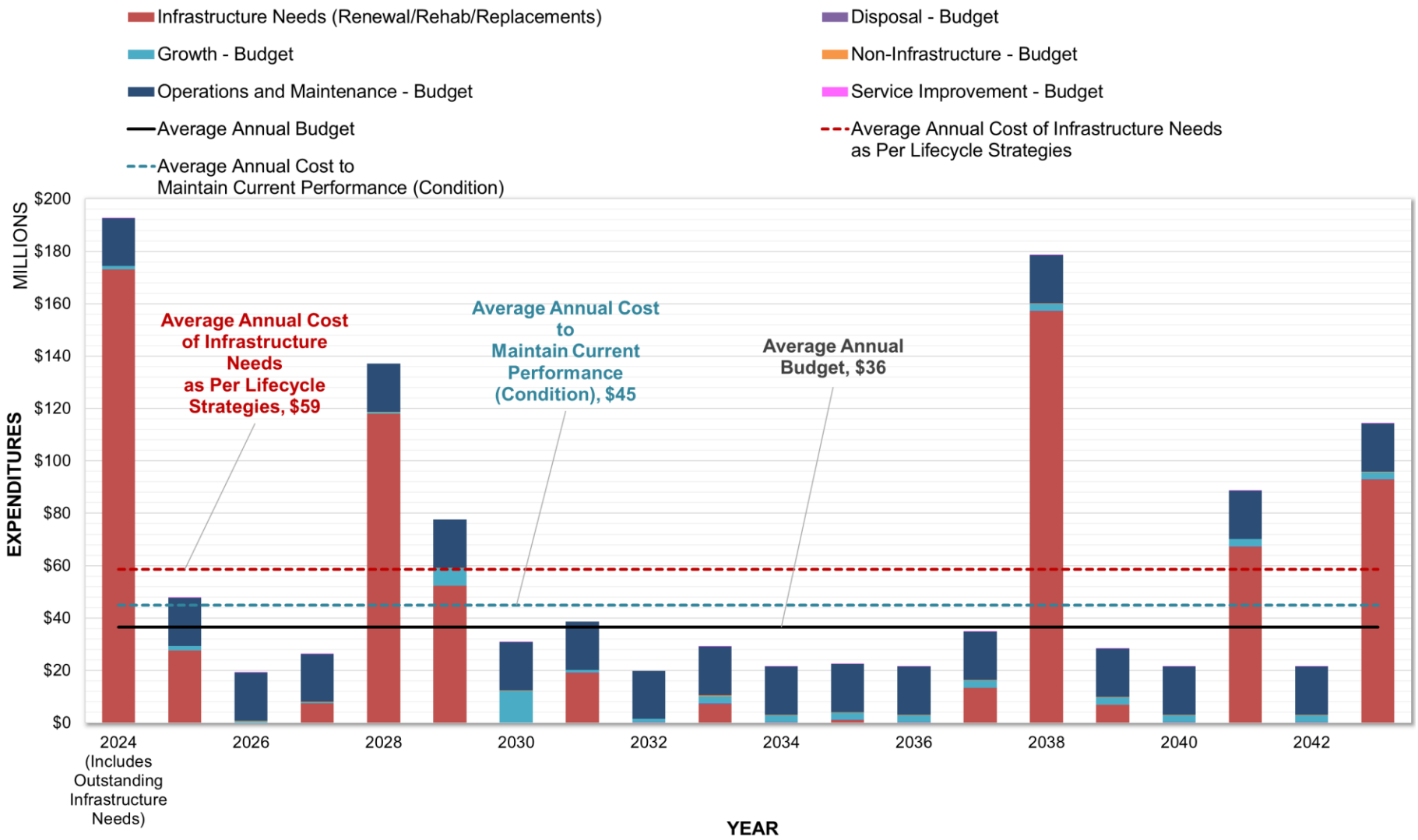


Figure 4-8. Scenario Comparison – Facilities Assets

The scenario comparison indicates that the Facilities infrastructure is facing an annual gap of $8.4 million to maintain their current performance. If all lifecycle activities identified under the lifecycle strategy were to be undertaken, the gap increases to $22.1 million. This calculated infrastructure gap is further detailed in Table 4-4.

Table 4-4. Lifecycle Activity Investments & Average Annual Infrastructure Gap – Facilities Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$124,800	$124,800	$124,800
Operations & Maintenance	$18,415,579	$18,415,579	$18,415,579
Service Improvement	$57,440	$57,440	$57,440
Disposal	$157,500	$157,500	$157,500
Growth	$2,780,250	$2,780,250	$2,780,250
Renewal, Rehabilitation & Replacement	$14,951,472	$23,367,136	$37,117,001
Total	**$36,487,051**	**$44,902,715**	**$58,652,580**
Funding Gap		**$8,415,664**	**$22,165,529**

As the Facilities assets are currently being maintained on a facility level rather than in a componentized register, the results of these assessments are less accurate than if developed based on the more detailed asset register of facility components. This change in approach is included in the recommendations for improvements below.

4.5 Data Confidence and Improvement Plan

Table 4-5 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on the number of assumptions needed and the reliability of the data sources.

Table 4-5. Data Confidence – Facilities Assets

Asset Segment	Data Source	Data Confidence (/10)
Administrative & Operational	Building condition assessments PSD Citywide CMMS Subject Matter Experts	6
Community	Building condition assessments PSD Citywide CMMS Subject Matter Experts	6

Asset Segment	Data Source	Data Confidence (/10)
Emergency Response	Building condition assessments PSD Citywide CMMS Subject Matter Experts	7
Long Term Care	Building condition assessments PSD Citywide CMMS Subject Matter Experts	8
Other & Transitional	PSD Citywide CMMS Subject Matter Experts	6

The Facilities asset registry data is currently housed in multiple locations. FAMIS360 CMMS software is used to track and maintain work order data only, whereas the majority of the asset infrastructure data is house in PSD Citywide CMMS software. Work is currently underway to reconcile these databases, which will improve the reliability and accuracy of this asset data. As discussed, current replacement costs for facilities are assessed at the building level and do not specifically account for any highly specialized building components or amenities within the buildings. Replacement value is determined by subject matter experts using per square foot unit costs based on market values. Condition data is assessed based on the overall health and performance of the facility, without consideration of the building component data.

4.5.1 Recommendations for Improvements

Recommendations for data improvements to the Facilities asset Category are listed in Table 4-6.

Table 4-6. Improvement Plan – Facilities Assets

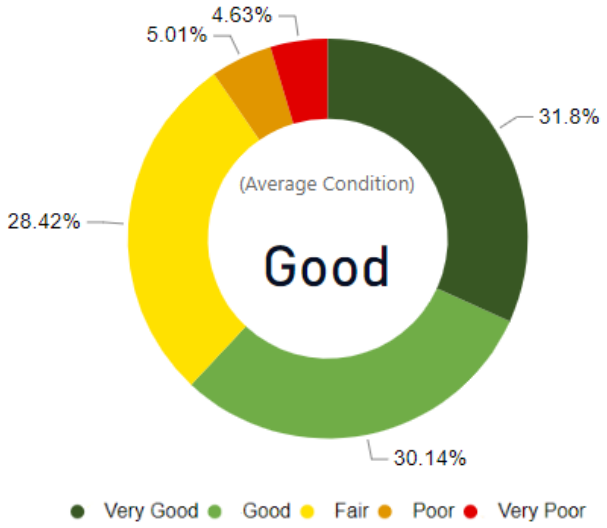
Task No.	Task	Resources Required	Responsibility
1	Continue to conduct building conditions regularly.	Internal	Corporate Projects
2	Develop process for appropriately storing, maintaining, and utilizing building condition assessment data in the AMP.	Internal/ External	Corporate Projects Facilities Asset Planning
3	Continue transition of facilities work order information from FAMIS360 to PSD Citywide CMMS software.	Internal/ External	Facilities Asset Planning

5 Fleet and Corporate Equipment

Replacement Value

Asset Segment	Replacement Value
Equipment	$38,359,170
Fuel Sites	$2,120,668
Vehicles	$64,746,163
Total Replacement Value	**$105.2 M**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$1.4 M	**$228 K**

Quick Facts

Fleet & Corporate Equipment assets in this Category include:

- 38 EV Charging stations and 10 Fuel Sites
- 423 Corporate, Fire and Off-Road Fleet Vehicles
- A wide range of corporate equipment assets utilized by various departments

5 Fleet & Corporate Equipment

5.1 State of the Infrastructure

Fleet and Corporate Equipment assets support all City departments, as well as provide services to the public. These are important assets for the City as they play a crucial role in delivering essential services, maintaining infrastructure, and supporting municipal operations.

The proactive approach taken by the City's Corporate Fleet Division to assess replacement values and adjust the Asset Management strategies accordingly, demonstrates its commitment to responsible Asset Management and ensuring the continued functionality and reliability of the fleet and corporate equipment assets despite external challenges.

Within this asset Category, assets have been grouped in the Segments described below.

Equipment: Includes energy systems and department specific equipment used by Windsor Fire, Huron Lodge, Parks, Public Works and Recreation. Corporate equipment enables City staff to operate and maintain assets so that they are available for public use.

Fuel Sites: Includes City-owned EV charging stations and fuel sites, which provide fuel to City fleet and equipment.

Vehicles: Includes corporate fleet vehicles, Fire fleet and support vehicles, and off-road fleet vehicles. Corporate vehicles allow City staff to carry out their work, protect public health, and maintain and operate City infrastructure.

5.1.1 Asset Valuation

The following sections summarize the portfolio associated with the City's Fleet & Corporate Equipment assets included in this Category. Table 5-1 provides the inventory and current replacement value for the assets included under this AMP.

Table 5-1. Inventory and Current Replacement Value – Fleet & Corporate Equipment Assets

Segment & Sub-Segment	Count	Unit	2023 Estimated Replacement Value
Equipment			
Energy Systems	7	Each	$14,607,621
Fire Equipment	40	Each	$5,613,385
Huron Lodge Equipment	48	Each	$2,802,543
Parks Equipment	30	Each	$1,090,755
Public Works Equipment	70	Each	$9,468,059
Recreation Equipment	18	Each	$4,776,807

Segment & Sub-Segment	Count	Unit	2023 Estimated Replacement Value
Fuel Sites			
EV Charging Stations	38	Each	$492,195
Fuel Sites	10	Each	$1,628,473
Vehicles			
Corporate Fleet	244	Each	$25,975,000
Fire Fleet	15	Each	$24,280,000
Fire Support Vehicles	32	Each	$2,014,000
Off-Road Fleet	132	Each	$12,477,163
Total			**$105,226,002**

It should be noted that the Corporate Radio System has not been captured in the above table, however Table 5-2 provides information regarding this corporate asset, which will be fully incorporated in future iterations of the AMP.

Table 5-2. Inventory and Current Replacement Value – Corporate Radio System

Segment & Sub-Segment	Count	Unit	Estimated Useful Life (EUL)	2023 Estimated Replacement Value	Condition
Equipment					
Corporate Radio System	1	Each	15 years	$31,242,98	**Very Good**

Most of the assets in this Category are managed by the Corporate Fleet Division. It should be noted that the assets captured under this Category do not include similar assets (like vehicles and equipment) that have been captured under the Parks and Transit Windsor Categories, as well as within the ABCs (Police, Airport). Replacement values are based on current market values for like-to-like purchases and do not reflect replacement of gas-powered vehicles to electric vehicles. By reviewing recent purchases and estimating current replacement values for these assets, the City ensures that the replacement value accurately reflects the current market conditions and the specific characteristics of its assets. The impacts of high inflation rates, the COVID-19 pandemic, and supply chain issues have led to dramatic increases in the cost to procure fleet assets.

The remaining assets in the Category are housed in the City's TCA database with replacement values being based on historical costs adjusted for inflation. Moving forward, these assets should be reviewed on an annual basis and be given a market value replacement cost where available.

5.1.2 Asset Condition

Fleet & Corporate Equipment condition is assessed using an age-based approach, with a few exceptions where staff expertise is used to assign condition. Fleet and equipment assets managed by the Corporate Fleet Division are assessed as they come due for replacement and a decision is made if the asset should or should not be replaced based on its actual condition and mileage. Moving forward, equipment assets stored in the TCA database should be reviewed on an annual basis to ensure that they are still in service and their condition is reflected appropriately.

5.1.2.1 Category Condition Overview

The overall condition of the City's Fleet & Corporate Equipment assets, as a percentage of replacement value, is illustrated in Figure 5-1.

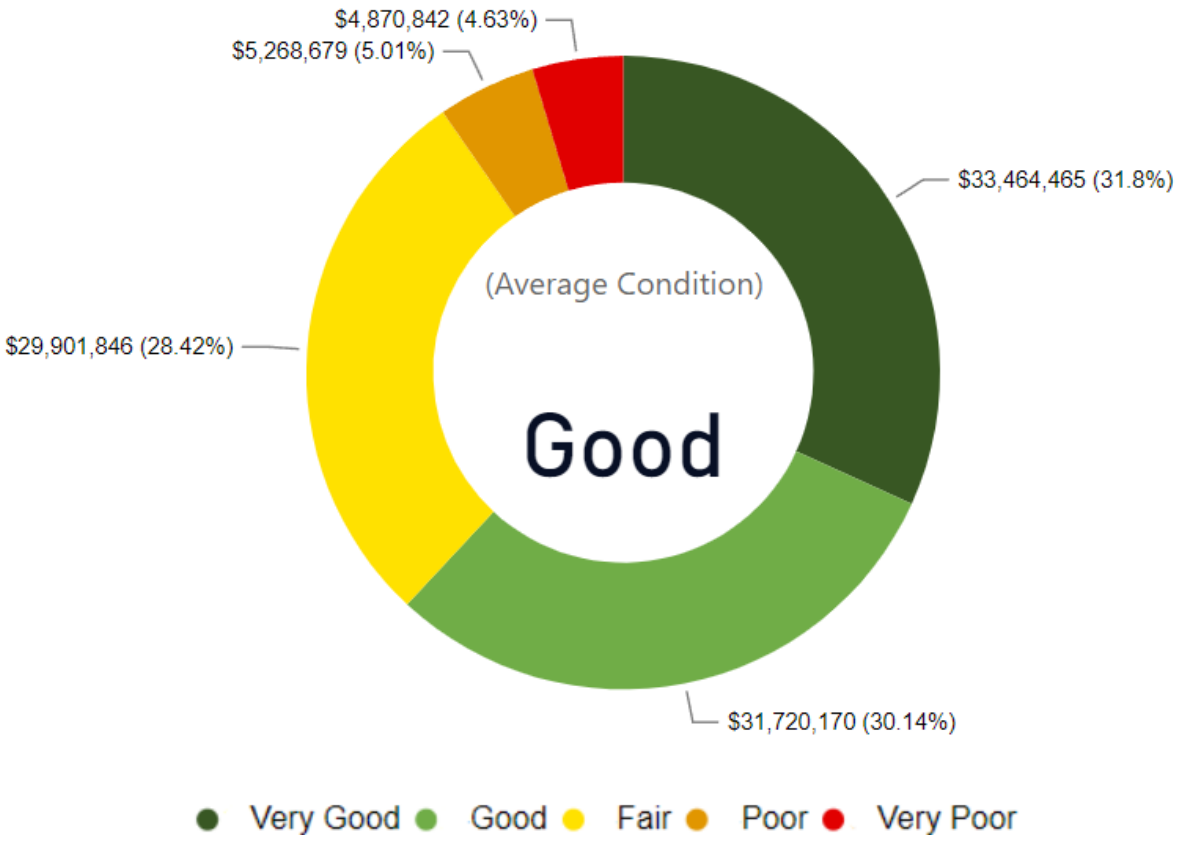


Figure 5-1. Category Condition as a Percentage of Replacement Value – Fleet & Corporate Equipment Assets

The Fleet & Corporate Equipment assets are, on average, in Good condition. The vehicles and equipment managed by Corporate Fleet have strong replacement strategies and funding in place to ensure that the majority of these assets meet current needs.

5.1.2.2 Segment Condition Overview

The condition profiles of Fleet & Corporate Equipment assets can be further reviewed at the Segment level in Figure 5-2.

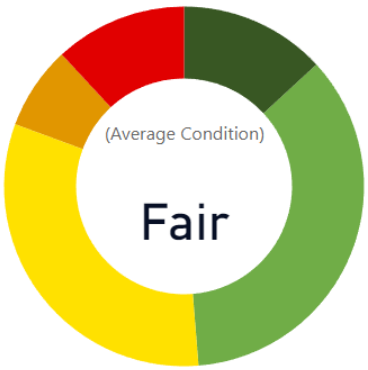
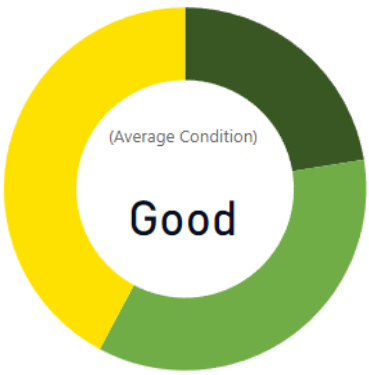
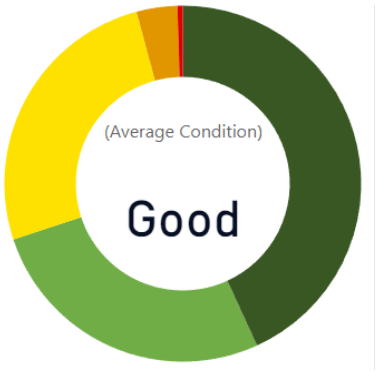
Equipment	Fuel Sites	Vehicles
		
• 7 Energy Systems • 40 Fire Equipment • 48 Huron Lodge Equipment • 30 Parks Equipment • 70 Public Works Equipment • 18 Recreation Equipment	• 38 EV Charging Stations • 10 Fuel Sites	• 244 Corporate Fleet • 15 Fire Fleet • 32 Fire Support Vehicles • 132 Off-Road Fleet

Figure 5-2. Segment Condition as a Percentage of Replacement Value – Fleet & Corporate Equipment Assets

In general, the equipment Segment assets are in Fair condition, while fuel sites and vehicles are in Good condition. The fuel sites and vehicles assets managed by the Corporate Fleet Division follow well documented and established Asset Management practices, resulting in assets which are well maintained and funded. With respect to the equipment Segment, less formal processes are in place.

5.1.2.3 Sub-Segment Condition Overview

Fleet & Corporate Equipment asset condition, as a percentage of replacement value, is further broken down at the Sub-Segment level in Figure 5-3.

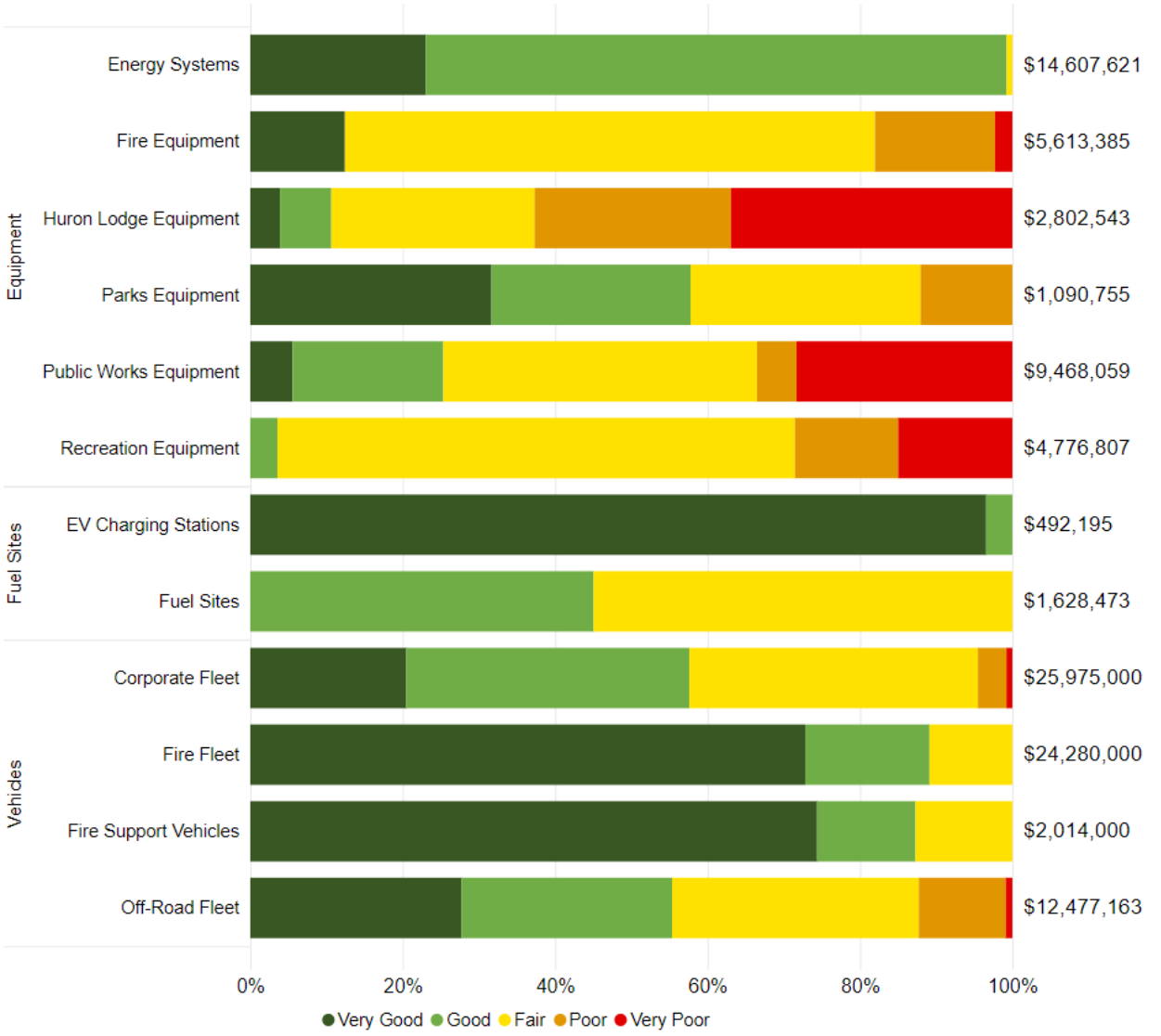


Figure 5-3. Sub-Segment Condition as a Percentage of Replacement Value – Fleet & Corporate Equipment Assets

As the energy systems are generally new assets, these assets are mostly in Good to Very Good condition. The remainder of the equipment assets are showing significant portions of the assets within the Fair to Very Poor categories. These assets will require investments to be made to ensure they are still providing the functions expected of them by the various departments. While the City-owned EV charging stations are new and in Good condition, investment will need to be made into the City's fuel sites in the near term to prevent them from falling into the Poor condition category. Fuel sites have a dedicated fund that renews and replaces components as required. Corporate fleet, Fire fleet and Off-Road fleet are

managed by the Corporate Fleet Division and assets are generally replaced before they are in Very Poor condition.

5.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset Categories. The City has a robust inspection and maintenance program for the majority of the assets in this Category. For this reason, the City's Asset Management practices are based on the associated condition data for assets in this Category, rather than the physical age of the asset. Age is used by the City's Corporate Fleet Division when planning for vehicle and equipment replacement however, an inspection as well as mileage information is used to determine actual replacement of these assets. The average age of the City's Fleet & Corporate Equipment assets can be seen in Figure 5-4.

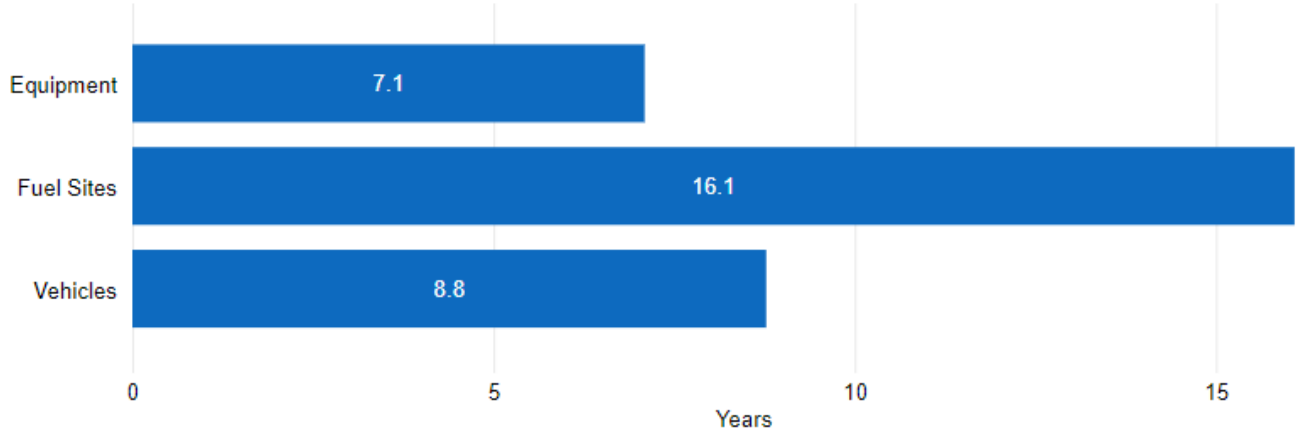


Figure 5-4. Average Age – Fleet & Corporate Equipment Assets

5.2 Levels of Service

Level of Service Statement: Fleet and Corporate Equipment infrastructure provides the necessary vehicles and equipment to enable various City departments to deliver much needed services to the public. Services include Corporate Vehicles and Fuel Sites, as well as specialized corporate equipment for Fire, Huron Lodge, Energy Systems, Parks, Public Works and Recreation.

The assets within this Category are significant for the City as they play a crucial role in delivering essential services, maintaining infrastructure, and supporting municipal operations. The following are some key aspects highlighting the importance of the Fleet & Corporate Equipment assets.

Service Delivery: The assets are essential for delivering a wide range of services to residents, businesses, and visitors. This includes snow removal, street sweeping, road maintenance, emergency response, bylaw enforcement, building inspections and utility management.

Infrastructure Operations and Maintenance: Fleet and equipment are used to maintain and repair critical infrastructure such as roads, sidewalks, sewer systems, parks, and public buildings. This helps ensure the safety, functionality, and longevity of other City assets.

Emergency Services and Public Safety: Fire fleet and support vehicles are integral to public safety operations, including fire suppression, emergency medical services, and disaster and emergency response. Well-maintained and reliable vehicles are essential for ensuring timely and effective emergency response and public protection.

Efficiency and Productivity: Well maintained fleet and equipment improves the efficiency and productivity of municipal operations by enabling staff to perform tasks more effectively and expediently. Properly maintained and modern equipment can increase operational efficiency, reduce downtime, and enhance productivity across various departments and functions.

Environmental Impact and Quality of Life: By investing in fuel-efficient vehicles, alternative fuel technologies, and emission reduction measures, municipalities can reduce their carbon footprint and contribute to conservation efforts. Well-maintained vehicles can also contribute to the overall appearance, cleanliness, and functionality of communities, enhancing resident's quality of life and promoting a positive community image, which can attract businesses, tourists, and new residents to the area.

Table 5-3 provides a summary of the LOS for the City's Fleet & Corporate Equipment services. The City has chosen metrics that define and measure the desired standards for delivering services that are provided by the assets in this Category. These metrics help set goals, evaluate performance, allocate resources effectively, and communicate expectations to stakeholders. By establishing LOS metrics, municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance.

Table 5-3. City-Defined Levels of Service – Fleet & Corporate Equipment Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Vehicles	Fiscal Sustainability	Reinvestment Rate	7.49%
Fleet & Corporate Equipment	Reliable	Percentage of total replacement cost for Corporate Fleet & Equipment assets in Good to Very Good condition	61.94%
Vehicles	Reliable	Percentage of the count of Vehicles past EUL	9.46%
Vehicles	Environmental Stewardship	Number of Electric Vehicles	15
Vehicles	Environmental Stewardship	Annual GHG emissions	4,924.4 tCO2e
Equipment	Reliable	Percentage of total replacement cost for Equipment assets past EUL	10.27%
Equipment	Reliable	Total system efficiency of CHP (Energy Systems)	Huron Lodge CHP – 74% WFCU Centre CHP - 69% WIATC CHP – 71%
Equipment	Environmental Stewardship	Renewable energy generated from solar PV (Energy Systems)	WIATC PV – 390 MWh WFCU Centre PV – 671 MWh Transit PV – 598 MWh

5.3 Lifecycle Management Strategy

The objective of the Lifecycle Management Strategy is to outline and establish a set of planned actions, based on best practice that will provide a sustainable LOS, while managing risk at the lowest LCC.

The Fleet Division provides fleet management services covering the acquisition, maintenance, repair, disposal and management of the corporate fleet and in the provision of services for outside agencies. The Fleet Division is the most advanced area in implementation of strong asset management practices and processes. The program is well defined in how and when assets are replaced.

The City has the following Fleet Asset Management strategies in place:

- The replacement schedule is well defined and based on replacing like with like vehicles;
- There is a defined means to fund the reserve for replacement;
- Preventative maintenance practices are in place to ensure the assets meet or exceed their EUL;
- The division has also developed a ‘greening the fleet’ initiative which outlines the cost and which fleet assets would be ideal to move towards more electric vehicles; and
- Any Corporate Fleet growth or service level increases continue to be addressed outside of this reserve funding model. This includes the addition of new vehicles to the inventory, which needs to be 100% funded outside of the reserve and or significant changes to the type of vehicles, such as transitioning to electric vehicles, which will require additional funding for the cost increase above the cost of replacing with a like vehicle.

The City is continuing to develop specific strategies for the broad range of assets within the Corporate Equipment Category, and will be detailed in future iterations of the AMP.

5.3.1 Lifecycle Activities

Significant changes in the market underscore the importance of sound Asset Management practices and a proactive approach to managing assets. This ensures the expected and continued functioning and reliability of Fleet & Corporate Equipment assets. One of the ways to accomplish this is to ensure lifecycle activities are being undertaken as planned, which ultimately help provide efficiencies and ensure that services are able to continue at the level required, at the lowest possible cost. The following summarizes the activities that take place during the lifecycle of Fleet & Corporate Equipment assets.

Non-Infrastructure Solutions

- Compliance with various regulations and standards related to fleet and equipment operations, safety, emissions, and maintenance. Proper management practices ensure compliance with these requirements, avoiding penalties and liabilities.
- Proper cost management practices for Fleet and Corporate Equipment can help control costs and optimize resources. This includes strategies such as asset tracking, maintenance, fuel management, lifecycle planning, and scheduling to maximize the value and lifespan of assets while minimizing operational expenses.
- Identifying the City's fleet and equipment needs and requirements, as well as the procurement of assets that meet the departments needs for usage within budget constraints. This also includes new asset deployment and training where required.

Operations & Maintenance

- Implementing scheduled maintenance programs to proactively maintain vehicles, and equipment according to manufacturer recommendations. This includes routine inspections, fluid changes, tire rotations, and component replacement.
- Addressing service requests, repairs and breakdowns promptly to minimize downtime and maintain operational efficiency.
- Routine and reactive daily, weekly, monthly, and regulatory inspections.

Renewal, Rehabilitation & Replacements

- The City must react to unplanned asset renewals and replacements because of asset failures, as well as the planned replacements of assets.

Disposals

- Decommissioning or disposing of assets at the end of their useful life by determining appropriate disposal methods, such as resale, trade-in, donation, recycling, or environmentally responsible disposal. Asset disposals may also include re-purposing of an asset for alternate use by another department or keeping it for spare parts where possible.

Service Improvement & Growth Activities

- New assets to service growing populations and service areas, as well as to offer new assets and technologies to improve customer experience, accessibility, and safety.

By implementing these lifecycle activities, the City can effectively manage Fleet & Corporate Equipment assets, optimize operational efficiency, minimize costs, ensure regulatory compliance, and maximize the value and lifespan of their assets. These activities are also critical for maintaining safe and efficient infrastructure.

Specific Asset Management practices or planned actions, as well as their frequencies, are outlined in Table 5-4. The activities listed represent the comprehensive approach required

throughout the full lifecycle of assets to meet the current LOS provided by the City while minimizing costs. The activities and strategies listed within this chapter also provide the City's best chance to avoid the risks associated with asset ownership. The risks associated with not following the lifecycle strategies and activities listed can be significant and wide-ranging, which are further explained in section 10.4 - Risks of Not Closing the Gap and Meeting Infrastructure Needs. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies. By prioritizing operations and maintenance, asset renewal and strategic investments, the City can enhance the resilience, sustainability and vitality of the community while minimizing potential risks and ensuring long-term prosperity.

Table 5-4. Asset Management Practices, Planned Activities, and Frequency – Fleet & Corporate Equipment Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Corporate Fleet & Equipment	
• Condition Assessments	• Annual
• Ministry of Transportation Inspections	• Annual
Energy Systems	
• Energy Management Plan	• 5 years
• Feasibility Studies	• As required
Huron Lodge	
• Condition Assessments	• Annual
Operations & Maintenance	
Corporate Fleet & Equipment	
• Preventative Maintenance Schedule by class of vehicle	• Ongoing
• Reactive Maintenance (damage, accidents, breakdowns, etc.)	• Ongoing
• Spraying of Vehicles	• Annual
Fuel Sites	
• Check for flow at the pump	• Annual
• Inspections of Fuel sites, painting of bollards etc.	• Weekly
• Inspections and dips (measuring fuel levels)	• Weekly
• Check for water in tanks	• Monthly
Energy Systems	
• Preventative Maintenance	• As required
• Reactive Maintenance	• As needed
Huron Lodge Equipment	
• Daily Inspections	• Daily
• Health & Safety Inspections	• Monthly
• Preventative Maintenance	• As per regulations

Asset Management Practices / Planned Activities	Frequency
• Reactive Maintenance	• Ongoing
Public Works, Parks, and Recreation Equipment	
• Compressor Inspections	• Every 3 years
• Crane Inspection (third party)	• Annual
• Hoist Inspections	• Monthly • Annually by third party
• Seasonal Inspections on Seasonal Equipment	• Seasonally
• Preventative Maintenance	• As per schedule
• Reactive Repairs	• As required
Renewal, Rehabilitation & Replacements	
Corporate Fleet & Equipment	
• Vehicle Refurbishments	• As required
• Replacement	• As required
Fuel Sites	
• Replacement of Fuel Sites/Equipment	• As required
Energy Systems	
• Engine Rehabilitation for Combined Heat & Power Units	• Every 4 years for minor rehabilitation • Every 8 years for major rehabilitation
• Replacement	• As Funding is Available
• Solar Panel Inverters Rehab	• As required
Huron Lodge Equipment	
• Asset/Equipment Replacements	• Annual
Public Works, Parks, and Recreation Equipment	
• Renewal of Equipment	• As funding is available
• Replacement of Equipment	• As funding is available
• Vehicle Replacement	• As required • Annual

Asset Management Practices / Planned Activities	Frequency
Disposal	
Corporate Fleet & Equipment	
• Keep for Spare Parts	• As required
• Sell to Department	• As requested
• Disposal of Assets	• As required
• Sell / Auction	• Obsolete and surplus items
Fuel Sites	
• Disposal of Contaminated Soil if there were leaks	• As required
• Disposal of Old Tanks / Equipment / Used Oil	• As required
Hurons Lodge Equipment	
• Disposal of Asset	• As required
Public Works, Parks, and Recreation Equipment	
• Disposal of Assets	• As required
Service Improvement & Growth	
Corporate Fleet & Equipment	
• Vehicle/Equipment Upgrade	• As funding is available
• New Vehicles/Equipment	• As funding is available
Fuel Sites	
• Expansion of fuel sites for Coloured Diesel, adding premium fuel at sites	• As funding is available
Energy Systems	
• New Asset	• As funding is available
• New Technology	• As funding is available
• System Expansion	• As funding is available
Huron Lodge Equipment	
• New / Upgraded Equipment	• As directed by Ministry • As funding is available
Public Works, Parks, and Recreation Equipment	

Asset Management Practices / Planned Activities	Frequency
• Additional Lighting (Bright Lights) / Displays (activations)	• As funding is available
• Fleet Additions / Upgrades Requiring New Equipment	• As funding is available
• New Assets	• As funding is available

5.4 Funding the Lifecycle Activities

The City uses the lifecycle strategies described in Section 5.3 to plan work and determine future expenditure needs for Fleet & Corporate Equipment assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring the City can meet the demands of current services and existing infrastructure.

The scenarios are informed by identified lifecycle strategies for Fleet & Corporate Equipment assets developed through consultation with staff and are based on best practices. The scenarios consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City population.

5.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding levels on asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for Fleet & Corporate Equipment is approximately $7.6 million annually. Figure 5-5 shows the projected condition distribution of assets over the 20-year forecast period under the current funding scenario.

The forecast illustrates an overall decline in condition over the forecast period. Assets in Good to Very Good condition decreases from 62% to 32%, while assets in Very Poor condition increases from 5% to 26%.

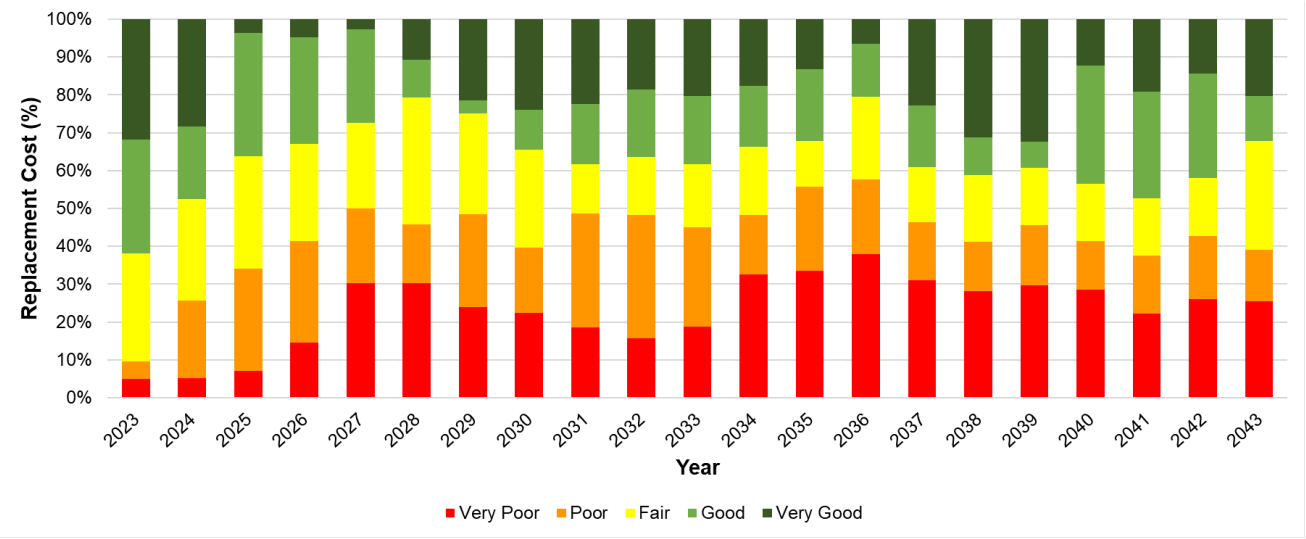


Figure 5-5. Scenario 1: Performance Forecast with Current Funding – Fleet & Corporate Equipment Assets

5.4.2 Scenario 2: Maintain Current Performance (Levels of Service)

Scenario 2 reflects the cost to maintain Fleet & Corporate Equipment assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the current LOS for this asset Category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of Fleet & Corporate Equipment assets was determined to be approximately $9.0 million annually, resulting in an average annual gap of $1.4 million. Figure 5-6 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition decreases from 62% to 37%, while assets in Very Poor condition remain constant at 5% throughout the 20-year period.

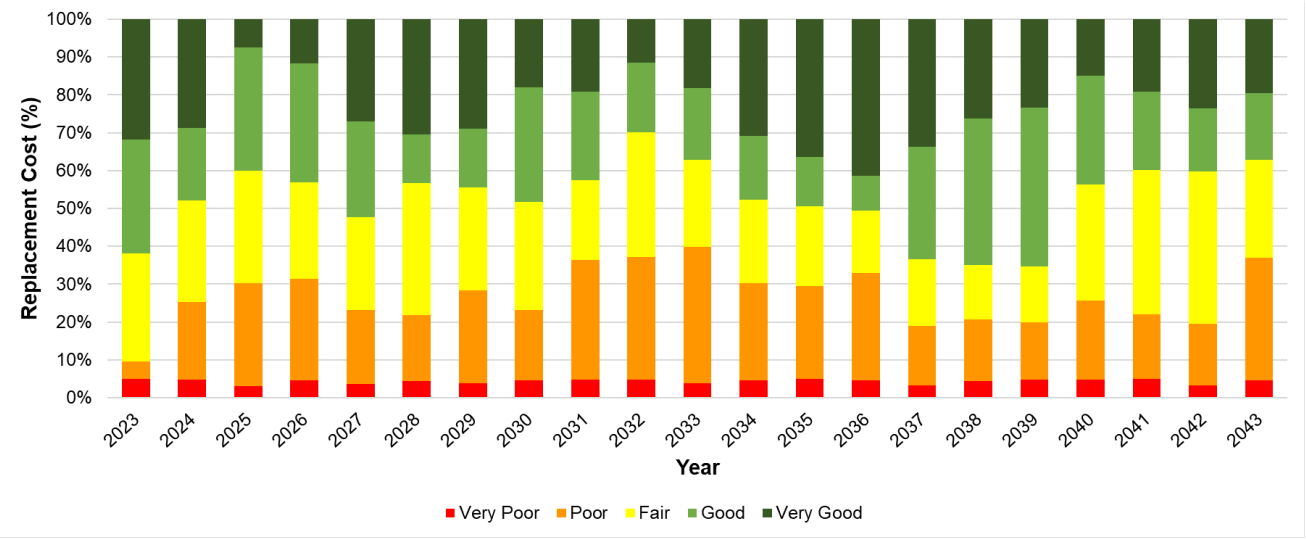


Figure 5-6. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) – Fleet & Corporate Equipment Assets

5.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of Fleet & Corporate Equipment renewal, rehabilitation, and replacement activities to be approximately $7.8 million annually. Under this scenario, the City faces an annual average gap of $228 thousand for its Fleet & Corporate Equipment assets.

This projected asset performance forecast is shown in Figure 5-7. The model indicates that assets in Good to Very Good condition decreases from 62% to 42%, while assets in Very Poor condition increases from 5% to 15%.

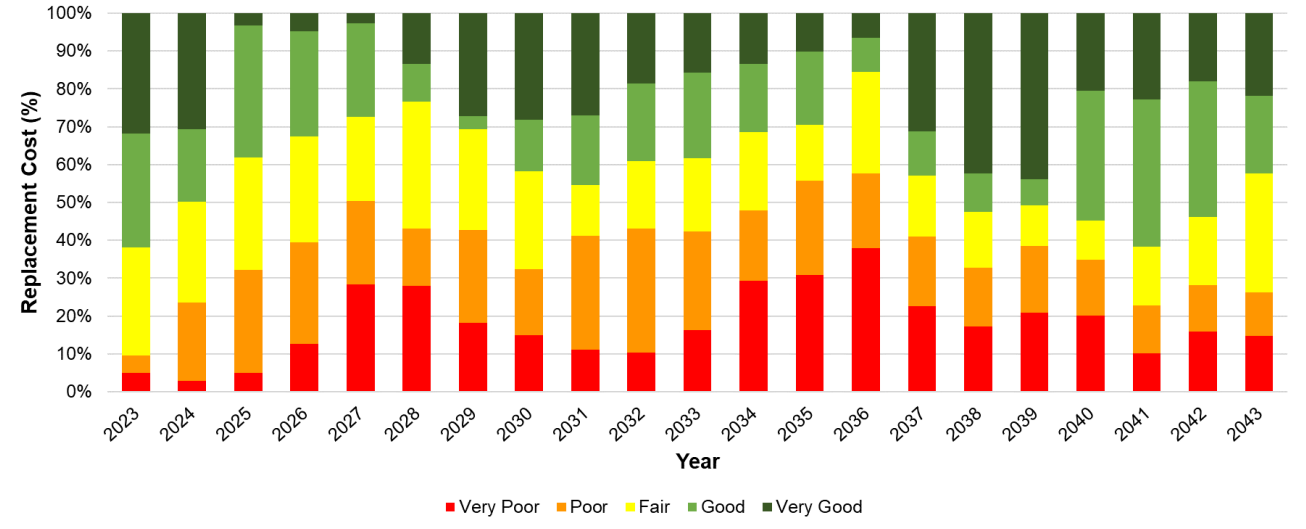


Figure 5-7. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies – Fleet & Corporate Equipment Assets

5.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 5-8. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

The scenario comparison indicates that the Fleet & Corporate Equipment infrastructure is facing an annual gap of $1.4 million to maintain their current performance. To meet the infrastructure needs as per the lifecycle management strategy, there is a minimal gap of 1%, which is typically seen for fleet and equipment assets in municipalities.

Fleet assets, which have a much shorter lifespan than most municipal assets (such as watermains, or a facility), typically have defined replacement schedules which are followed, as highlighted in the scenario comparison above. The City's budget for fleet and equipment is almost perfectly in line with the infrastructure needs scenario, which follows the lifecycle strategies defined by the City.

Fleet assets often follow cycles, especially as a large group approaches the end of their useful life. During this phase, it is common to see a higher proportion of assets in Very Poor condition due to wear and tear over time. As these assets are replaced, there can be a significant improvement in the overall condition profile, with the new assets starting in Very Good condition. At the time of the development of this AMP, the current condition profile for Fleet and Corporate Equipment was very favourable, with only 5% of assets in Very Poor condition and 62% in Good to Very Good condition. As a result of this favourable condition profile, it is more expensive to maintain assets at this higher LOS than the cost of maintaining them at a level consistent with their defined lifecycle activities.

Based on this analysis, it underscores that the City is following proactive Asset Management and planning for their Fleet & Corporate Equipment assets by anticipating these cycles, and strategically managing asset replacement and maintenance schedules.

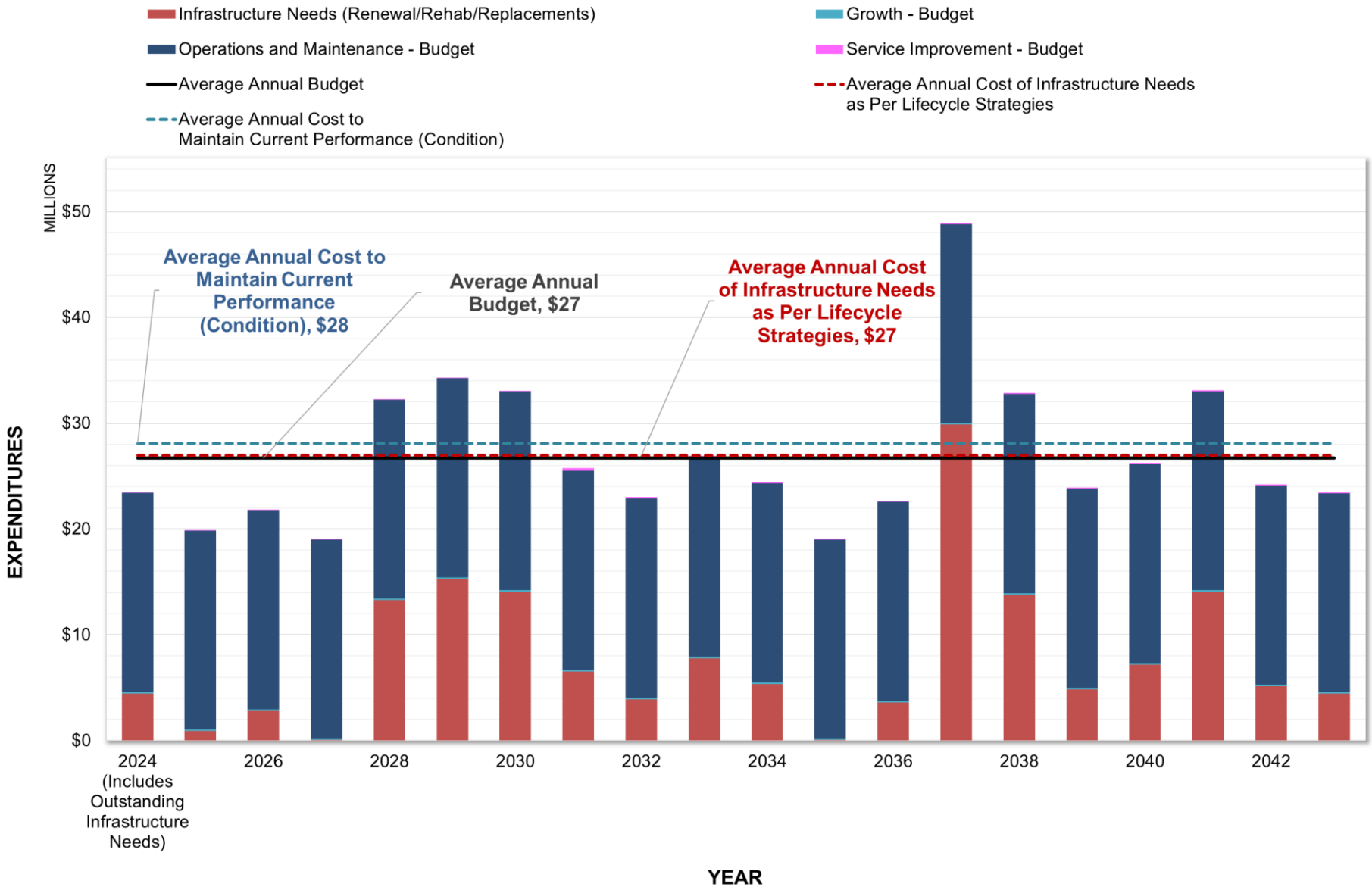


Figure 5-8. Scenario Comparison – Fleet & Corporate Equipment Assets

Table 5-5. Lifecycle Activity Investments & Average Annual Infrastructure Gap – Fleet & Corporate Equipment Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$0	$0	$0
Operations & Maintenance	$18,815,228	$18,815,228	$18,815,228
Service Improvement	$92,000	$92,000	$92,000
Disposal	$0	$0	$0
Growth	$154,000	$154,000	$154,000
Renewal, Rehabilitation & Replacement	$7,632,140	$9,050,900	$7,860,839
Total	**$26,693,368**	**$28,112,128**	**$26,922,067**
Funding Gap		**$1,418,760**	**$228,699**

By applying lifecycle strategies and receiving adequate funding for replacement activities, the Fleet & Corporate Equipment assets have achieved maintaining assets at a high level of performance, as well as meeting the identified infrastructure needs. This is largely due to the establishment of solid Asset Management practices, including the funding of the Corporate fleet, Fire fleet, and Parks Off-Road fleet reserves. It is important to monitor these plans closely to ensure that any marginal gaps in funding do not compromise the City's ability to sustain its infrastructure effectively over time. Regular assessment and adjustments may be necessary to address any emerging challenges or changing needs.

Considering the increases to the replacement values of this Category since the COVID-19 pandemic, these replacement values could potentially continue to rise. Recent years have seen dramatic increases in costs to fleet and equipment prices.

It is recommended that efforts be made to quantify the true cost and need of operations and maintenance, to ensure that appropriate staffing is available to continue the successes of maintaining the assets in this Category. Optimizing maintenance and leveraging new technologies can enhance operational efficiency and extend the lifespan of assets, ensuring that assets are being provided and maintained at the lowest possible cost.

5.5 Data Confidence and Improvement Plan

Table 5-6 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on the number of assumptions made and the reliability of the data sources.

Table 5-6. Data Confidence – Fleet & Corporate Equipment Assets

Asset Segment	Data Source	Data Confidence (/10)
Equipment	Fleet Focus CMMS PSD Citywide CMMS (TCA database)	7
Fuel Sites	PSD Citywide CMMS (TCA database) Excel Subject Matter Experts	7
Vehicles	Fleet Focus CMMS PSD Citywide CMMS (TCA database)	9

Equipment & Fuel Sites

The majority of the corporate equipment assets and all fuel sites are housed in PSD Citywide CMMS software and managed as TCA assets. Replacement values for these assets are based on historical costs inflated to 2023 dollars. The condition of these assets is primarily assessed using age, with a few exceptions where staff expertise is used. Improvements to the accuracy and reliability of this data can be achieved by ensuring the data is reviewed on an annual basis. The source, accuracy, and reliability for these asset Segments is considered moderately high.

Vehicles

Vehicle asset data managed by the Corporate Fleet Division is housed using Fleet Focus CMMS software. This database is very well maintained, and based upon sound records, known procedures, and is continually updated. This database includes current replacement costs based on market value and is considered highly reliable and accurate. Condition data for these assets is based on age, and as asset come due for replacement, they are assessed, and a decision is made if the asset should or should not be replaced based on its actual condition and mileage. This is considered best practice for these types of assets. Data confidence for this asset Segment is considered high.

5.5.1 Recommendations for Improvements

Recommendations for data improvements to the Fleet & Corporate Equipment asset Category is listed in Table 5-7.

Table 5-7. Improvement Plan – Fleet & Corporate Equipment Assets

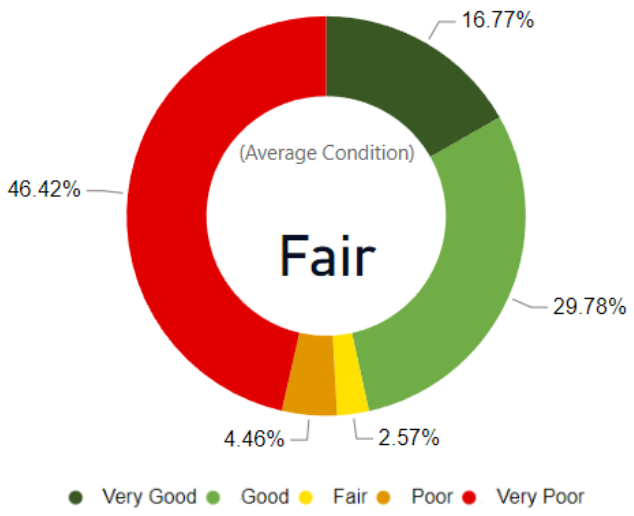
Task No.	Task	Resources Required	Responsibility
1	Parks to determine equipment replacement needs and bring forward requests to add to Corporate Fleet and Parks Equipment replacement schedules managed by the Corporate Fleet Department.	Internal	Parks
2	Consider gathering component data for fuel sites as the EUL, condition and replacement costs varies among components.	Internal	Corporate Fleet
3	Consider process to review TCA assets on a yearly basis to ensure registry is up to date, includes accurate condition and replacement costs.	Internal	Recreation Huron Lodge Fire Parks Public Works Asset Planning

6 Information Technology

Replacement Value

Asset Segment	Replacement Value
Applications and Software	$46,122,957
Hardware Infrastructure	$12,332,906
Total Replacement Value	**$58.5 M**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$1.4 M	**$6.6 M**

Quick Facts

Information Technology (IT) assets captured in this Category include:

- Hardware Infrastructure including communication equipment, computers, firewalls, servers and many other types of hardware
- Applications and Software Systems which enable City departments to streamline and deliver services more efficiently and provide improved communication and collaboration between City staff, departments, and the public

6 Information Technology

6.1 State of the Infrastructure

Technology is essential for the City of Windsor to operate efficiently, deliver services effectively, engage with residents, manage resources, and respond to various challenges and opportunities in the modern urban environment. The City's Information Technology (IT) department also carries the responsibility of keeping employee City assets, as well as the data therein, secured. IT is a unique asset class within the AMP, as the assets within the Category are not handled in the same way typical infrastructure assets are handled. IT also faces extreme pressures from a fast-paced environment that is continually evolving with new technology for both hardware and software, and increasingly more sophisticated threats to security. IT systems and services enable the City to function daily.

Within this asset Category, assets have been grouped in the Segments described below.

Applications and Software: This includes applications and software that are installed and maintained by the IT department on servers and individual computers that are used as business solutions by City departments to enable efficient service delivery. This Category also includes "cloud" or software-as-a-service (SaaS) applications. Although these types of applications provide some efficiencies for City staff, they require a great deal of staff time to implement, integrate, and maintain to ensure maximum benefit to City departments and the public. Licensing for servers, decentralized software and some other software applications have not been captured in this AMP, however work to include these assets is underway and will be incorporated into future iterations of the AMP.

Hardware Infrastructure: Includes communications equipment, computers, infrastructure software, firewalls, servers (physical and virtual), switches, wireless access points and many other types of hardware and equipment. These are the assets necessary to support and operate IT systems within the City. Hardware incorporates various devices, equipment and components that enable the processing, storage, transmission of data and information within the City and to the public. In addition, hardware assets enable the implementation of robust cybersecurity measures to protect against unauthorized access and cyber threats. Several assets of notable value which were not were not captured under this AMP are the projectors and video conferencing equipment (such as the Council Chambers and EOC video conferencing systems). These assets are currently under review and are targeted to be included under future iterations of the AMP.

6.1.1 Asset Valuation

The following sections summarize the portfolio associated with the City's IT assets. Table 6-1 provides the inventory and current replacement value for the assets included under this AMP.

Table 6-1. Inventory and Current Replacement Value – Information Technology Assets

Segment & Sub-Segment	Count	Unit	2023 Estimated Replacement Value
Applications and Software			
Enterprise Applications & Software	8	Each	$34,516,113
Other Application and Software	16	Each	$11,606,844
Hardware Infrastructure			
Communications Equipment	Pooled	N/A	$1,842,319
Computers	Pooled	N/A	$3,090,985
Firewall	18	Each	$175,465
Infrastructure Software	41	Each	$4,453,549
Other Corporate IT Equipment	Pooled	N/A	$173,713
Server	85	Each	$1,143,134
Switches & Wireless Access Points	389	Each	$1,453,742
Virtual Servers	171	Each	$0
Total			**$58,455,863**

Current replacement values for hardware infrastructure assets are mostly based on recent quotes for the purchase of a new assets (i.e. like-for-like replacements) or recent service contract renewals. Communications equipment and computers are pooled assets housed in the TCA database and replacement costs are based on adjusting historical costs for inflation to 2023. City staff, using their expert opinion, have assessed the applications and software replacement values expressly for the purposes of Asset Management planning. For reasons further detailed below, these assets are unique in Asset Management planning as compared to other infrastructure assets within the City, and are challenging to provide accurate replacement values and expected useful life.

Delivery Models: Applications and software are either installed on-premise within the City's network with a perpetual license, or installed in the "cloud" with a regular SaaS fee. Perpetual licenses are typically purchased one-time and are coupled with an annual support agreement to provide upgrades and maintenance to the application. This perpetual license model often requires an upfront capital investment for licenses, hardware, and implementation costs. In contrast, the SaaS model provides use of applications that are hosted by a 3rd party outside of the City's network and is licensed through an ongoing, regular service fee (monthly or annual) that includes usage of the system, upgrades and maintenance for the life of the asset. There is a lower initial cost in a SaaS model however the ongoing fees are typically higher. The current industry trend is towards the SaaS model, and less applications are being offered under the perpetual license model. In both cases, a great deal of staff time is required to implement, integrate, and maintain these types of applications to ensure maximum benefit

to City departments and the public. Assessing the value and costs of these different delivery models requires considering factors such as scalability, maintenance, and flexibility.

Rapid Technological Changes: The pace of technological innovation in the software industry is rapid, leading to frequent updates, new features, and emerging technologies. This has been highlighted in recent years by the need for increased cyber security needs for many corporations housing personal data. This rapid development cycle can make it challenging to assess the expected useful life of software assets accurately. Organizations must continually evaluate the relevance and effectiveness of their software investments considering evolving technologies.

Complexity and Costs: Implementing software systems across large organizations can be complex and costly. Factors such as customization, integration with existing systems, training, and ongoing support contribute to the total cost of ownership. Additionally, the complexity of modern software solutions, such as Enterprise Resource Planning (ERP) systems, customer relationship management (CRM), or computerized maintenance management systems (CMMS), can make it difficult to determine their replacement value and expected lifespan. The pace at which newer technologies are being introduced to industries and associated organizations is at an exceptional rate. Technologies like Artificial Intelligence, remote workplace collaboration, and advanced insights are disrupting how organizations are functioning. Understanding what those technologies are, let alone the cost of those technologies, are extremely difficult to predict and adopt. Recommendations for how to address some of these complexities, and to improve the assessment of these valuations and forecasts are provided in Section 6.5.1

6.1.2 Asset Condition

Condition for hardware infrastructure assets is assessed using age as the indicator for condition. Applications and software asset condition is assessed based a combination of the age of the system, overall performance of the asset, staff expertise, and information from 3rd party consultants.

6.1.2.1 Category Condition Overview

The overall condition of the City's IT assets, as a percentage of replacement value, is illustrated in Figure 6-1.

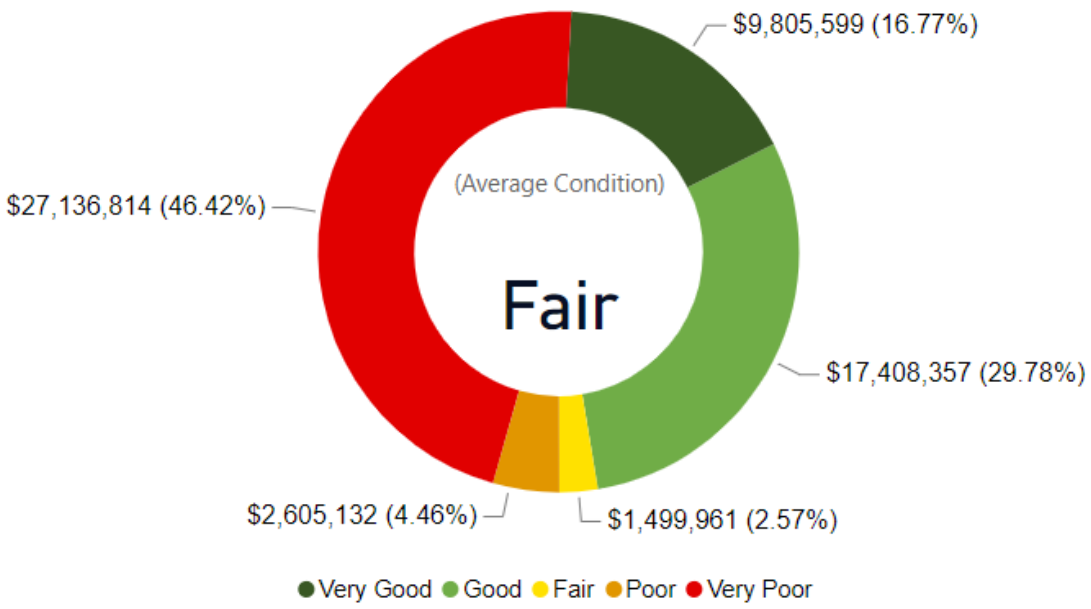


Figure 6-1. Category Condition as a Percentage of Replacement Value – Information Technology Assets

The City's IT assets are on average, in Fair condition, which highlights the need for investment in this service area to prevent further asset degradation. In particular, the applications and software assets observe more than 50% of their assets in Very Poor condition by replacement value.

6.1.2.2 Segment Condition Overview

The condition profiles of Information Technology assets can be further reviewed at the Segment level in Figure 6-2.

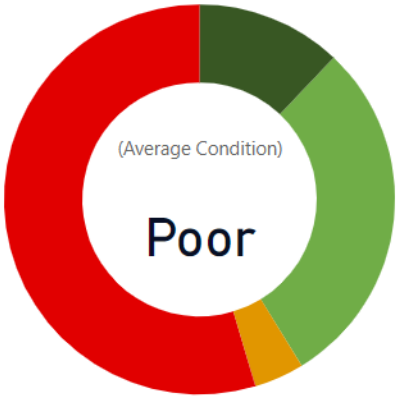
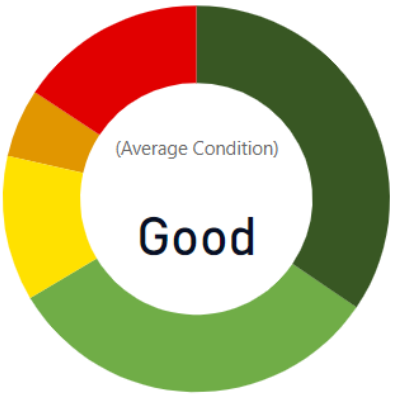
Applications and Software	Hardware Infrastructure
	
• 7 Enterprise Applications & Software • 14 Other Applications & Software	41 Infrastructure Software 18 Firewalls 85 Servers 389 Switches & Wireless Access Points 171 Virtual Servers Communication Equipment, Computers, and Other Corporate IT Equipment

Figure 6-2. Segment Condition as a Percentage of Replacement Value – Information Technology Assets

There are significant signs of deterioration in the City's Applications and Software assets. These assets represent a very complex asset for the City to manage as their replacement values (which have been steadily increasing) and their value and condition are difficult to assess. Applications and Software have a large impact on the performance of all departments, which rely heavily on these services to conduct their daily tasks. The replacement of any application or software within the City typically requires up-front costs for implementation, as well as ongoing maintenance and support.

IT Hardware Infrastructure assets are the most replaced assets within the organization, as their useful life is much shorter than those of other asset categories. These assets, such as computers, must be maintained at a high LOS, as they impact the ability of other departments to provide expected services to the City.

6.1.2.3 Sub-Segment Condition Overview

IT asset condition, as a percentage of replacement value, is further broken down at the Sub-Segment level in at the Sub-Segment level in Figure 6-3.

Figure 6-3. Sub-Segment Condition as a Percentage of Replacement Value – Information Technology Assets

As mentioned, Applications and Software assets show a significant percentage of their value in Very Poor condition. This is attributed to only two assets, representing an estimated $20 million of replacement value – the PeopleSoft systems (Financials & HRMS), used predominately by the Finance and Human Resources departments. These assets have not been upgraded in over a decade, are no longer compatible with other dependent applications, and are failing to meet the ongoing needs of the departments to modernize how they deliver their services. A project is currently underway to assess these applications and make recommendations to either replace or upgrade the systems to meet their expected service level. The Poor condition of the PeopleSoft assets is also putting other software and hardware assets at risk because of the inter-dependency of the technology. An example is the

SQL software and Windows Operating system (OS) that is installed on the servers that run PeopleSoft. It has become a challenge to maintain the SQL software and OS asset condition because of compatibility issues with the PeopleSoft applications. The age and condition of PeopleSoft in this case has a direct impact on the condition of the SQL software and OS.

Hardware Infrastructure Sub-Segment conditions show a distribution of assets in generally Good condition with most Sub-Segments having over 40% of assets in Good condition. The assets within the Computers and Communication Equipment Sub-Segments still meet their functional requirements, however are in Very Poor condition as they are either at, or approaching, their EUL. The condition distribution for Virtual Servers was not incorporated into the AMP since the replacement value for these assets is captured within other related assets such as the physical hardware (servers) and infrastructure hardware.

It is recommended that the City continue to review the condition and address needs through replacement of IT assets which are in Very Poor condition.

6.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset Categories. The City's Asset Management practices for IT assets is based mostly on age for hardware assets and condition (or ability to meet the user's needs) for software and applications assets. Based on these methods, these assets are preforming as expected based on their age. Asset monitoring, maintenance, and replacement of infrastructure over time contribute to the functionality and efficacy of providing necessary IT services to the municipal workers and community. The average age of Information Technology assets is illustrated in Figure 6-4.

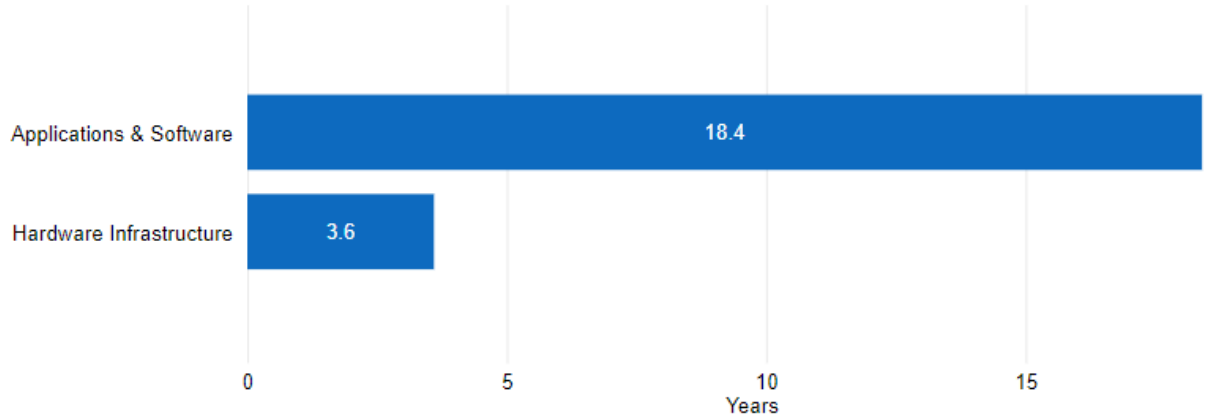


Figure 6-4. Average Age – Information Technology Assets

6.2 Levels of Service

Level of Service Statement: IT infrastructure enables City departmental systems to function effectively and efficiently to deliver critical services to all municipal workers and community members. These services include advising on the proper maintenance, refurbishment and acquisition of all corporate hardware and software, as well as all infrastructure assets

including computer servers (digital and cloud), security systems and communications systems.

IT is an enabler, as it plays a major role in service delivery for every department in the City, as well as to the public. The following are some of the highlights of the importance of IT services.

Efficient Service Delivery: Service delivery is comprised of three elements to enable departments to streamline their operations and deliver their services more efficiently. People, process, and technology make up an effective service delivery model. Technology is used as a key enabler to improve business practices and has a direct impact on the type, and number of people that are needed to deliver a service. The Corporate Technology Strategy Plan (CTSP) addresses technology challenges and is designed to transform the way digital services are planned, delivered, and supported to effectively enable the City to offer an improved service delivery model. As an example, IT systems are vital for managing municipal finances, including budgeting, accounting, and revenue collection. These systems ensure the accuracy, efficiency of the service, and compliance with regulations. The type of technology used, and its capabilities have a direct impact on business practices and the number of staff resources that are necessary to deliver the service.

Data Management and Security: Windsor deals with vast amounts of data related to citizens, infrastructure, finances and more. IT systems help in managing this data effectively, ensuring its accuracy, security, and accessibility when needed by internal and external stakeholders. With the increasing complexity and sophistication of cyber threats, cybersecurity technologies are required to continually evolve to protect IT infrastructure and data from unauthorized access, breaches, and cyber attacks.

Communication, Collaboration and Citizen Engagement: Especially throughout the COVID-19 pandemic, IT was instrumental in the City's ability to continue to provide services and allow staff and Council to continue to function and provide services that residents need and expect. They also provide the tools necessary for continued communication between staff and the public. Systems made available by IT help the City enhance transparency by providing access to information such as budgets, policies, and public records. This fosters trust among residents and promotes accountability in municipal operations.

Emergency Response: IT plays a role in all emergency response and disaster management. Systems for communication, data analysis, and resource allocation are instrumental for coordinating responses to natural disasters, public health emergencies or other crises.

Table 6-2 provides a summary of the LOS for the City's IT services. The City has chosen metrics that define and measure the desired standards for delivering services that are provided by IT. These metrics help set goals, evaluate performance, allocate resources effectively, and communicate expectations to stakeholders. By establishing LOS metrics, municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance.

Table 6-2. City-Defined Levels of Service – Information Technology Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
All Segments	Fiscal Sustainability	Reinvestment Rate (All IT assets)	8.00%
All Segments	Reliable	Percentage of total replacement cost for IT assets in Good to Very Good condition	46.55%
All Segments	Reliable	Percentage of total replacement cost for IT assets past EUL	45.19%

6.3 Lifecycle Management Strategy

The objective of the Lifecycle Management Strategy is to outline and establish a set of planned actions based on best practice that will enable the City's assets to provide a sustainable level of service to the citizens of Windsor, while managing risk at the lowest LCC.

6.3.1 Lifecycle Activities

Lifecycle activities for IT include a range of activities that ensure IT assets are effectively utilized, maintained, and optimized throughout their lifecycle. The following summarizes the activities that take place during the lifecycle of IT assets.

Non-Infrastructure Solutions

- Identifying and fulfilling business needs and requirements by coordinating with stakeholders and based on market research for best available options for hardware and software for the organization and master plans.
- Negotiation of contracts, pricing and service level agreements with software and hardware vendors.
- Conduct testing and validation to ensure proper functionality and compatibility.
- Create and enforce organizational policies and licensing agreements.

Operations & Maintenance

- Provide technical support and training to end-users.
- Monitor and manage IT assets to ensure optimal performance and availability.
- Conduct regular maintenance, updates, and patches to address security vulnerabilities and performance issues.
- Monitor usage patterns and resource utilization to identify optimization opportunities.
- Implement performance tuning and optimization measures to enhance efficiency and scalability.

Renewal, Rehabilitation & Replacements

- Plan and schedule the deployment of IT hardware infrastructure and software systems as identified through planning activities while considering business continuity and operational requirements.
- Configure, install, and integrate IT hardware and software.

Disposals

- Decommission and dispose of obsolete IT assets through environmentally responsible methods.

Service Improvement & Growth Activities

- Implement new technologies and assets to provide improved services and efficiencies for City staff and the public.
- Increase hardware and software as identified for new staff.

These lifecycle activities ensure the effective management of IT assets to ensure optimal performance and efficiencies to all stakeholders. The following measures are in place to provide high availability and continuity of the corporate technology systems and information assets, and the processes necessary to perform normal business through various activities.

- Capacity planning is carried out to ensure business growth can be supported by available IT infrastructure.
- When a new system is implemented, or a significant change is made to an existing production system, the affected asset is reviewed for security risks, and any residual risk, resulting from the change, must be approved prior to implementing the change.
- Processes are in place for the control of the entire development and maintenance life cycle, with the system development and test environment being separated and isolated from the production environment, including segregation of duties so that development personnel are not able to implement changes to production systems.
- Processes are in place covering authorization to access the corporate technology systems, and the data that it holds and are reviewed at regular intervals.
- The boundary connections to outside networks are protected by gateways that limit access and monitor attempts to interfere with the internal network, thereby enforcing the protection of the internal network.
- Processes are in place to ensure that purchased and outsourced systems have the necessary features that allow the implementation of security controls to comply with the Information Security Policy, Corporate Directives, and Standards.

For software assets, the coordination and implementation of software replacements or upgrades requires in-depth analysis to ensure minimal disruption to the day-to-day operations of the City. Incorrect deployment of software could affect server, storage, data security, and/or network performance creating roadblocks in end-user accessibility, impacting critical City functionality such as processing of property tax payments, payroll administration, permits and licensing, fire and building inspections, routing of 311 calls.

Specific lifecycle management activities for IT and their associated frequency, can be found in Table 6-3. The activities listed represent the comprehensive approach required throughout the full lifecycle of assets to meet the current levels of service provided by the City while

minimizing costs. The activities and strategies listed within this chapter also provide the City's best chance to avoid the risks associated with asset ownership. The risks associated with not following the lifecycle strategies and activities listed can be significant and wide-ranging, which are further explained in section 10.4 - Risks of Not Closing the Gap and Meeting Infrastructure Needs. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies. By prioritizing operations and maintenance, asset renewal and strategic investments, the City can enhance the resilience, sustainability and vitality of the community while minimizing potential risks and ensuring long-term prosperity.

Table 6-3. Asset Management Practices, Planned Activities, and Frequency – Information Technology Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Applications & Software	
• Business Process Review	• As identified, through needs assessments
Hardware Infrastructure	
• Capacity Planning	• As needed / part of budget process
• Contingency and Redundancy Planning	• As required
• Heat mapping (Switches & Wireless Access Points only)	• On-demand
• Master Plan	• As need is identified and budget allows
• Monitor recalls & updates (patching and security) on assets to ensure proper functionality	• Auto updates monthly, also on-demand security patching
• Security Risk Reviews	• As identified for equipment and software
• Annual Testing	• Per testing policy procedure and industry best practices
Operations & Maintenance	
Applications & Software	
• Agreement Renewals	• Varies by terms in the agreements
• Alerts for Software Updates and Defective Equipment	• Varies by product (vendor schedules / product lifecycles / as required)
• Case by Case Process Assessment	• As identified
• Planned Maintenance - updates on firmware and software	• Varies by product (vendor schedules / product lifecycles)
• Software Licensing	• As needed (typically annually)
• Support Contracts	• Varies by terms in the agreements
Hardware Infrastructure	
• Purchase of Small Equipment and Materials	• As needed
• Repairs	• As needed
• Ruggedize (Computers only)	• As needed

Asset Management Practices / Planned Activities	Frequency
• Security risk reviews	• As identified for equipment and software
• Software licensing	• As needed (typically annually)
• Support and maintenance	• Varies by terms in the agreements
• Support contracts	• Varies by terms in the agreements
• Updates (Computers, Servers, Enterprise Software)	• As needed (per vendor notification / software approaching EUL / departmental request for software updates)
Renewal, Rehabilitation & Replacements	
Applications & Software	
• Major upgrade (consultant assistance, etc.)	• Varies (based on product Lifecycle determined by the vendor)
• Replacements	• End-of-Life, as required / as budget is available
Hardware Infrastructure	
• Refurbishing	• As needed
• Replacements	• Ongoing
Disposal	
Applications & Software	
• Uninstall	• As required
Hardware Infrastructure	
• Decommission and dispose of obsolete IT assets through environmentally responsible methods	• End-of-Life • As needed
Service Improvement & Growth	
Applications & Software	
• Enhancements to process and/or technology	• As identified, through needs assessments
• New software for new need	• As identified, through needs assessments
• Software enhancements	• As identified, through needs assessments
Hardware Infrastructure	
• Pilots	• As requested • As new technology becomes available
• Technology improvements	• As needed / as able

Asset Management Practices / Planned Activities	Frequency
• New Assets	• Driven by growth to maintain LOS • As identified through planning and studies
• New City sites (locations)	• Per corporate needs
• New employees	• Per corporate needs

6.4 Funding the Lifecycle Activities

The City uses the lifecycle strategies described in Section 6.3 to plan work and determine future expenditure needs for IT assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring the City can meet the demands of current services and existing infrastructure.

The scenarios are informed by the identified lifecycle strategies for IT assets developed through consultation with staff and are based on best practices. The scenarios consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City population.

6.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding levels on asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for IT is approximately $2.4 million annually. Figure 6-5 shows the projected condition distribution of assets over the 20-year forecast period under the current funding scenario.

The forecast illustrates a gradual decrease in condition, which is already significantly Very Poor, over the forecast period. Assets in Good to Very Good condition decreases from 33% to 6%, while assets in Very Poor condition increases from 55% to 74%. This scenario highlights challenges the City will face in maintaining IT infrastructure assets with the current anticipated budget allocations. This suggests that the budget will not be sufficient to keep up with the needs of assets over time, leading to further decrease in the condition of the assets, which are already significantly in Very Poor condition.

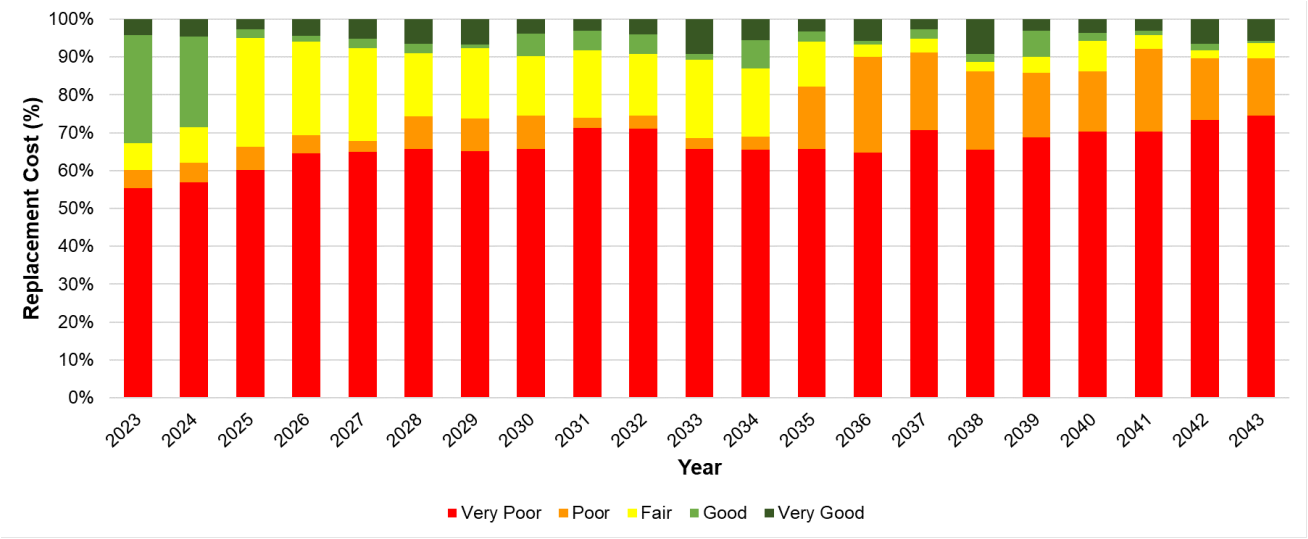


Figure 6-5. Scenario 1: Performance Forecast with Current Funding – Information Technology Assets

6.4.2 Scenario 2: Maintain Current Performance (Levels of Service)

Scenario 2 reflects the cost to maintain IT assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the current LOS for the asset Category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of IT assets was determined to be approximately $3.8 million annually, resulting in an average annual gap of $1.4 million. Figure 6-6 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition decreases from 33% to 15%, while assets in Poor to Very Poor condition increases from 60% to 72%.

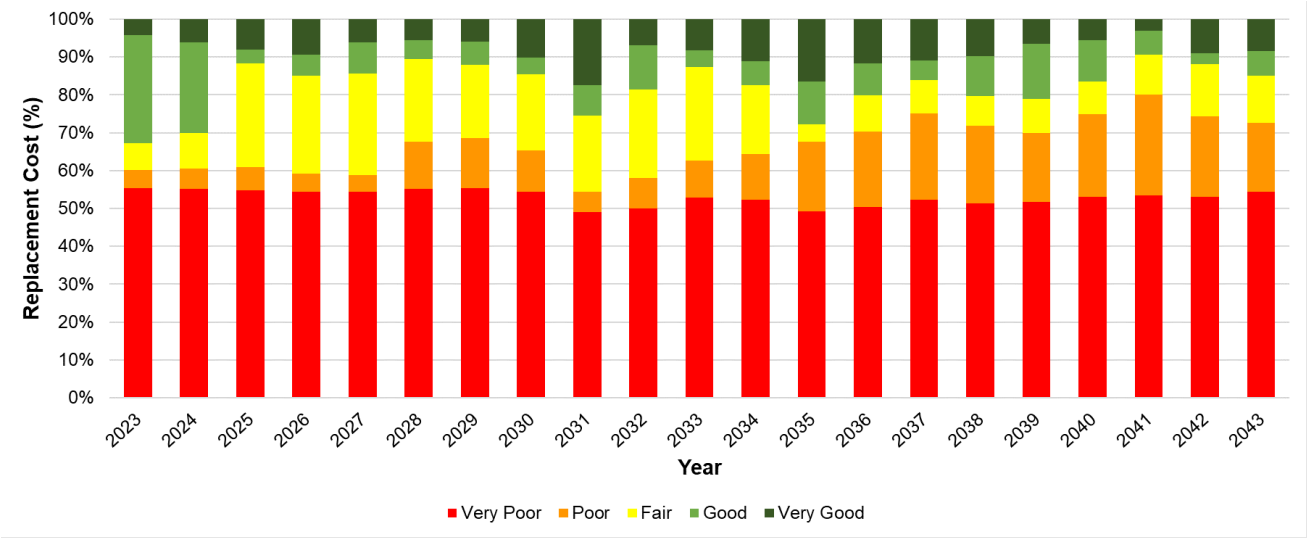


Figure 6-6. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) – Information Technology Assets

6.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of IT renewal, rehabilitation, and replacement activities to be approximately $9.0 million annually. Under this scenario, the City faces an annual average gap of $6.6 million for its IT assets.

This projected asset performance forecast is shown in Figure 6-7. While the modelling shows a significant fluctuation in overall asset condition over the 20-year forecast, the resulting overall asset condition has decreased by the end of the 20-year forecast through the application of the identified lifecycle strategies. The model shows that assets in Good to Very Good condition decreases from 33% to 15%, while assets in Poor to Very Poor condition increases from 60% to 69%. This scenario provides the best overall performance of IT assets over the 20-year forecast period.

For IT, these strategies involve replacing assets at the end of their expected useful life. Although this forecast does not remove all assets from the Very Poor condition category, it improves the overall condition of the assets. Hardware assets typically have a much shorter lifespan compared to other infrastructure assets within the City (like roads, buildings, etc.), and are heavily relied on within the organization for their performance and security needs, which is why replacing these assets at the end of their EUL is paramount for the success of all City departments. For many of the software systems that have been identified in this AMP, it is recommended to further analyze the appropriate life and condition of these assets.

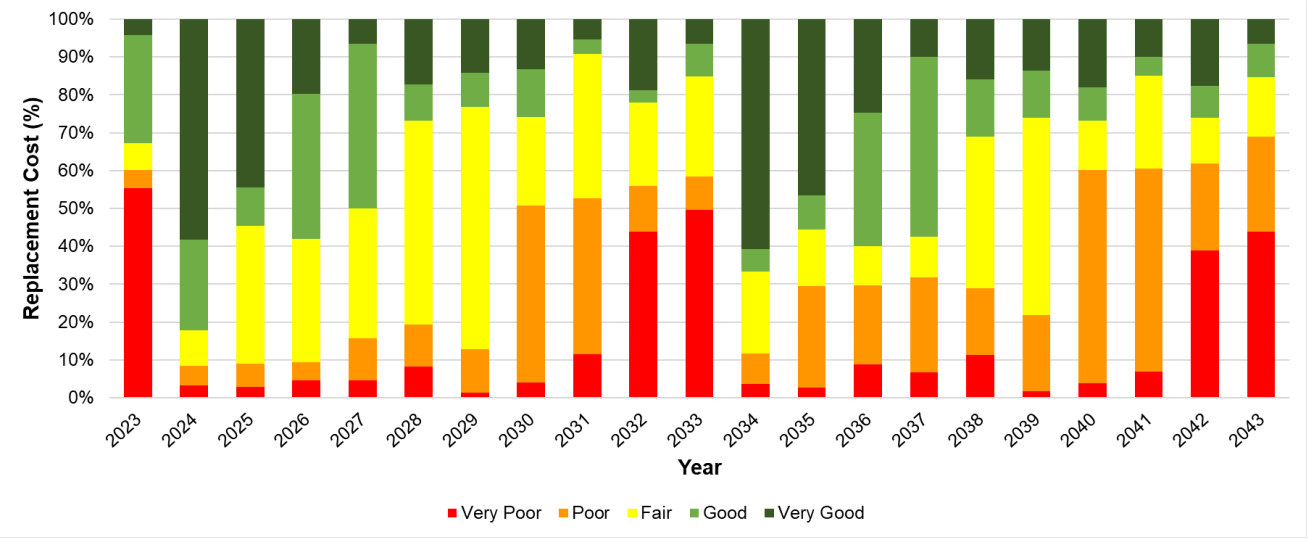


Figure 6-7. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies – Information Technology Assets

6.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 6-8. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

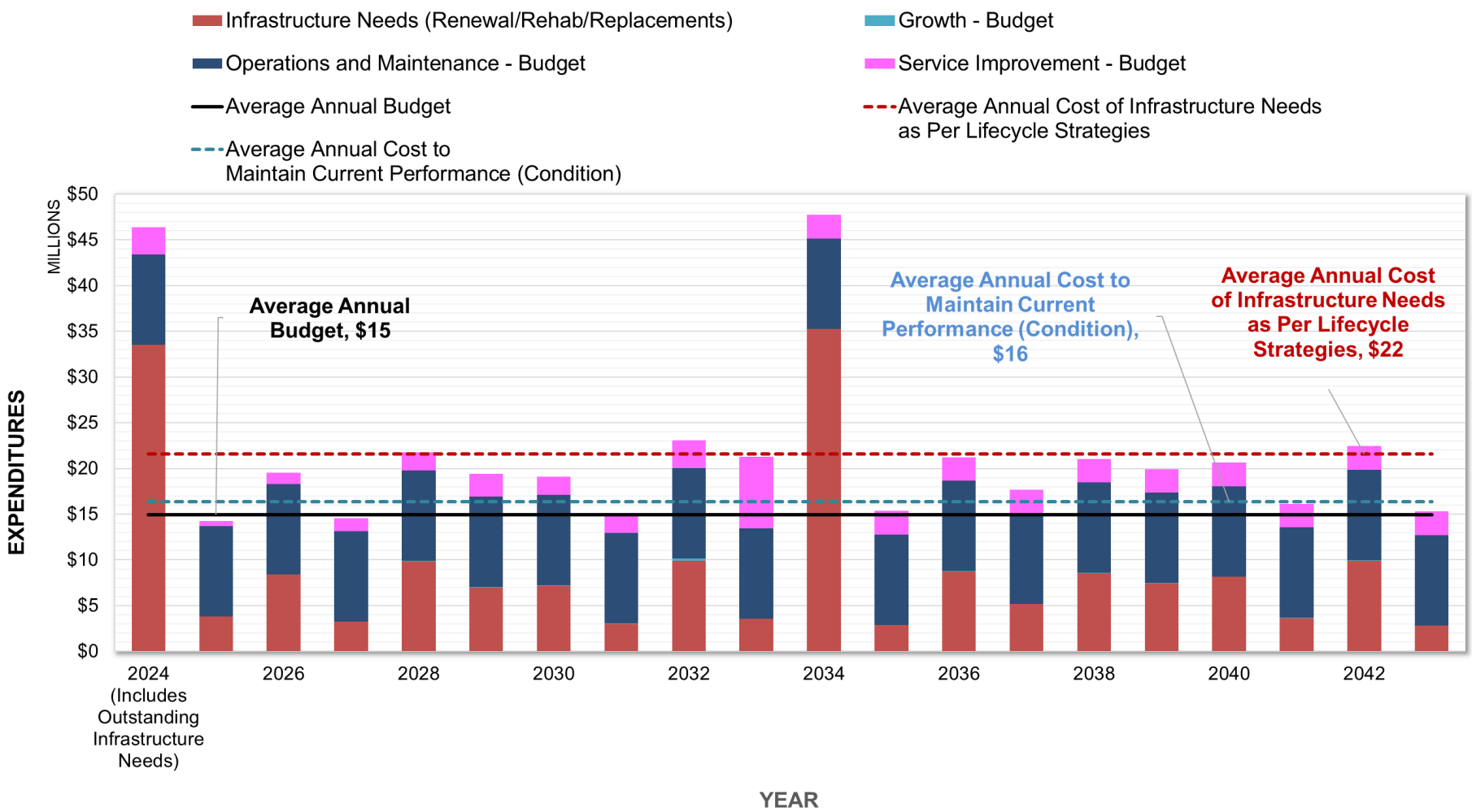


Figure 6-8. Scenario Comparison – Information Technology Assets

The scenario comparison indicates that the IT infrastructure is facing an annual gap of $1.4 million to maintain their current performance. If all lifecycle activities identified under the lifecycle strategy were to be undertaken, the gap increases to $6.7 million. This calculated infrastructure gap is further detailed in Table 6-4.

Table 6-4. Lifecycle Activity Investments & Average Annual Infrastructure Gap – Information Technology Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$0	$0	$0
Operations & Maintenance	$9,879,728	$9,879,728	$9,879,728
Service Improvement	$2,578,814	$2,578,814	$2,578,814
Disposal	$0	$0	$0
Growth	$45,000	$45,000	$45,000
Renewal, Rehabilitation & Replacement	$2,422,417	$3,866,566	$9,094,508
Total	**$14,925,959**	**$16,370,108**	**$21,598,050**
Funding Gap		**$1,444,149**	**$6,672,091**

Key recommendations in the CTSP will require investments for IT to meet the goals and recommendations laid out in that Plan, to meet the vision of **"Modern, customer centric"** City services powered by digital, data and technology." As part of the strategic plan, every business unit was reviewed and identified many opportunities for technology to make processes more efficient, to reduce duplication and superfluous activities, and to make customer experiences better. Appropriate investments in technology would assist to streamline and automate processes and improve service delivery.

At a high level, the strategic plan highlighted the need for the following:

- Web and Digital Service Capabilities;
- Digitized End-to-End Business Processes Supported by Fully Utilized Business Solutions;
- Modern Tools for a Modern Workforce;
- Modern Infrastructure; and
- GIS and Data Capabilities.

The CTSP also identified the risks of not addressing these significant gaps to operating and capital expenditures which include reputational risk, recruitment and retention challenges, limitations with respect to modernization of systems and processes, loss of access to

valuable data insights which drive service experiences, efficiencies and effectiveness, and the inability to take advantage of and leverage emergent technologies.

There is also significantly increasing risks to security as a result of cyberattacks, which have been recently experienced by the City of Hamilton, Woodstock, Richmond, St. John's, and St. Mary's. There have also been recent attacks to schoolboards and hospitals.

By addressing the outstanding infrastructure needs of IT assets, and adequately funding ongoing lifecycle activities, the City has the "potential to use technology to drive major efficiency and productivity improvements, to realize significant improvements to customer experiences, and to make staff experiences best-in-class." (CTSP).

6.5 Data Confidence and Improvement Plan

Table 6-5 outlines the main data sources and overall confidence in the data used for this AMP as it relates to IT assets. Data confidence is based on the number of assumptions made and the reliability of the data sources.

Table 6-5. Data Confidence – Information Technology Assets

Asset Segment	Data Source	Data Confidence (/10)
Applications & Software	Service Now Software PSD Citywide CMMS (TCA database) Subject Matter Experts	7
Hardware Infrastructure	Service Now Software PSD Citywide CMMS (TCA database) Subject Matter Experts System Software Inventories	7

Applications and Software

Asset registry data for applications and software, and the hardware infrastructure required to run them, is housed primarily in Service Now, a platform managed by the IT department which assists in the management of on-premises and cloud IT assets. Determination for which assets were included on the asset registry for this AMP was focused on those that are used enterprise wide and those of significant replacement value. Other applications and software that are used departmentally were not included in this AMP but should be reviewed for inclusion under future iterations of the AMP in order to improve the reliability and accuracy of this data. Condition and replacement values for all software and applications assets is assessed using a combination of the age of the system, overall performance of the asset, staff expertise, and information from 3rd party consultants.

Hardware Infrastructure

Most of the Hardware Infrastructure assets, other than Communications Equipment and Computers assets, are newly added to this AMP and are currently tracked through various systems and licensing managers and are considered to have a moderate reliability. Current

replacement values for hardware infrastructure assets are mostly based on recent quotes for the purchase of a new assets or recent service contract renewals and condition is based on the age of the asset, providing a high level of accuracy. However, as previously discussed, additional consideration in determining replacement costs is given to the particular challenges in acquiring accurate replacement values for IT assets.

Communications Equipment and Computers asset data is sourced from pooled TCA assets managed in PSD Citywide CMMS software. Current replacement values for Communications Equipment and Computers assets are based on adjusting historical costs for inflation to 2023 and condition is based on the age of the asset.

Overall, the data confidence for both of these asset Segments are considered moderately high.

6.5.1 Recommendations for Improvements

Recommendations for data improvements to the IT asset Category is listed in Table 6-7.

Table 6-7. Improvement Plan – Information Technology Assets

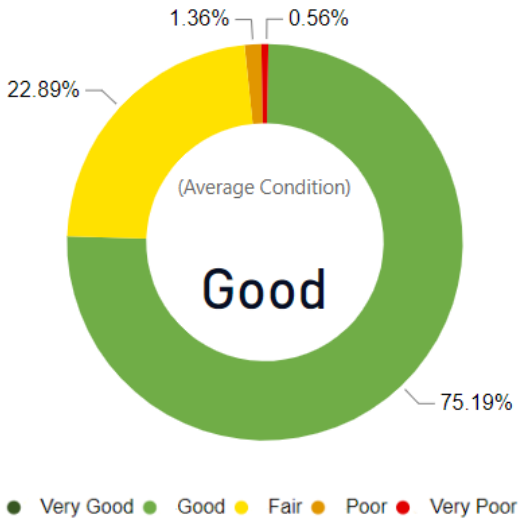
Task No.	Task	Resources Required	Responsibility
1	Look to expand the asset registry to include other hardware and infrastructure systems (i.e. Video Conferencing Equipment).	Internal	Information Technology Asset Planning
2	Break down pooled assets and maintain asset register to per asset for increased accuracy for Asset Management planning.	Internal	Information Technology Asset Planning
3	Consider a process to evaluate condition data annually as tech support contracts, subscription-based pricing and IT Security systems can change/evolve very quickly.	Internal	Information Technology Asset Planning
4	Expand the asset registry to include software assets that were not considered under this AMP.	Internal	Information Technology Asset Planning
5	Develop a method of identifying the dependencies that exist between software and hardware assets.	Internal	Information Technology Asset Planning

7 Natural Assets

Replacement Value

Asset Segment	Replacement Value
Natural Shorewall	$19,593,906
Trees	$377,186,480
Total Replacement Value	**$396.8 M**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$579 K	**$579 K**

Quick Facts

The Natural Assets Category currently includes:

- 22 Sections of Natural Shorewall
- Over 18,000 Park Trees
- Over 68,000 Street Trees

7 Natural Assets

7.1 State of the Infrastructure

The Natural Assets Category is a new addition to the City's 2024 Corporate AMP. In the 2018-2019 AMP, City-owned trees were discussed briefly as part of the financial strategy as they pertained to the tree trimming program. In 2020, the City completed an Urban Tree Canopy Assessment Report (2020) to locate and assess all City-owned park and street trees. Every tree was measured to determine its diameter-at-breast-height (DBH) and assessed for its structure, health, and risk. Administration is currently in the process of developing an Urban Forest Master Plan that will produce recommendations for increasing Windsor's urban tree canopy. Integrating natural assets into City planning promotes environmental sustainability, enhances the quality of life for residents, and creates resilient urban landscapes that can withstand the challenges of climate change and urban development. Incorporating the City's trees and natural shorelines into City planning and development is a sustainable approach that offers various benefits for both the environment and the community.

Within this asset Category, assets have been grouped in the Segments described below.

Natural Shorewall: Refers to a type of shoreline protection structure that utilizes natural materials and processes to prevent erosion and maintain the stability of the shoreline. Unlike engineered structures such as concreate seawalls, or bulkheads, which are man-made and often require significant maintenance, natural shorewalls work harmoniously with the environment.

Trees: The City is responsible for over 86,000 trees within the municipal right of way and within City-owned property. The 2020 Urban Tree Canopy Assessment Report also indicated the City's Urban Tree Canopy was 19% (or 2,798 hectares of the City's 14,793 total hectares). For the purposes of this study, only City-owned park and street trees are included.

7.1.1 Asset Valuation

The following sections summarizes the portfolio associated with the City's Natural Assets. Table 7-1 provides the inventory and current replacement value for the assets included under this AMP.

Table 7-1. Inventory and Current Replacement Value – Natural Assets

Segment & Sub-Segment	Count	Unit	2023 Estimated Replacement Value
Natural Shorewall			
Natural Shorewall	22	Each	$19,593,906
Trees			
Park Trees	18,285	Each	$71,397,960
Street Trees	68,433	Each	$305,788,520
Total			**$396,780,386**

Natural Assets are a unique type of asset and it is challenging to determine an accurate current replacement value for them. Unlike other assets, trees are living and increase in value with age for most of their lifecycle. Natural Asset Valuation is a process by which an inventory of natural assets is generated, specific ecosystem services that they provide are identified, and financial value for those services is assigned. Many municipalities are using this type of valuation study to inform their AMPs. The City has yet to undertake this process for all Natural Assets but it is something to be considered in the future.

As per the Council approved Landscape Requirements for Development Manual (1996), for every unit of diameter of tree removed, a similar diameter of new trees must be planted. Currently, City Forestry typically purchases and plants 5cm DBH caliper trees. Thus, for each City-owned tree in the asset inventory a calculation was done to determine how many trees would be planted to replace that tree. The unit cost to plant a tree was then used to determine the overall replacement cost. Natural shoreline replacement values were developed based on present day costs for construction and taking into consideration recent natural shoreline protection projects costs on Peche Island. The City will continue to evaluate appropriate current replacement values for these assets.

7.1.2 Asset Condition

Unlike other assets which focus on age and wear and tear, the condition of a tree relates primarily to its health. City-owned trees are assessed through objective condition assessment using a 4-point condition scale. As such, there is no Very Good condition rating for trees. In addition, any trees that were assessed as dead were given a condition of Very Poor for the purposes of this AMP. Condition of the natural shorewall assets were assessed by a consultant in 2020. These objective condition assessments, combined with consideration of their long EUL and a best understanding of current age, were used to determine an overall condition.

7.1.2.1 Category Condition Overview

Overall condition of Natural Assets as a percentage of replacement value is illustrated in Figure 7-1. The Natural Assets are, on average, in Good condition, with over 75% of the assets falling in this Category.

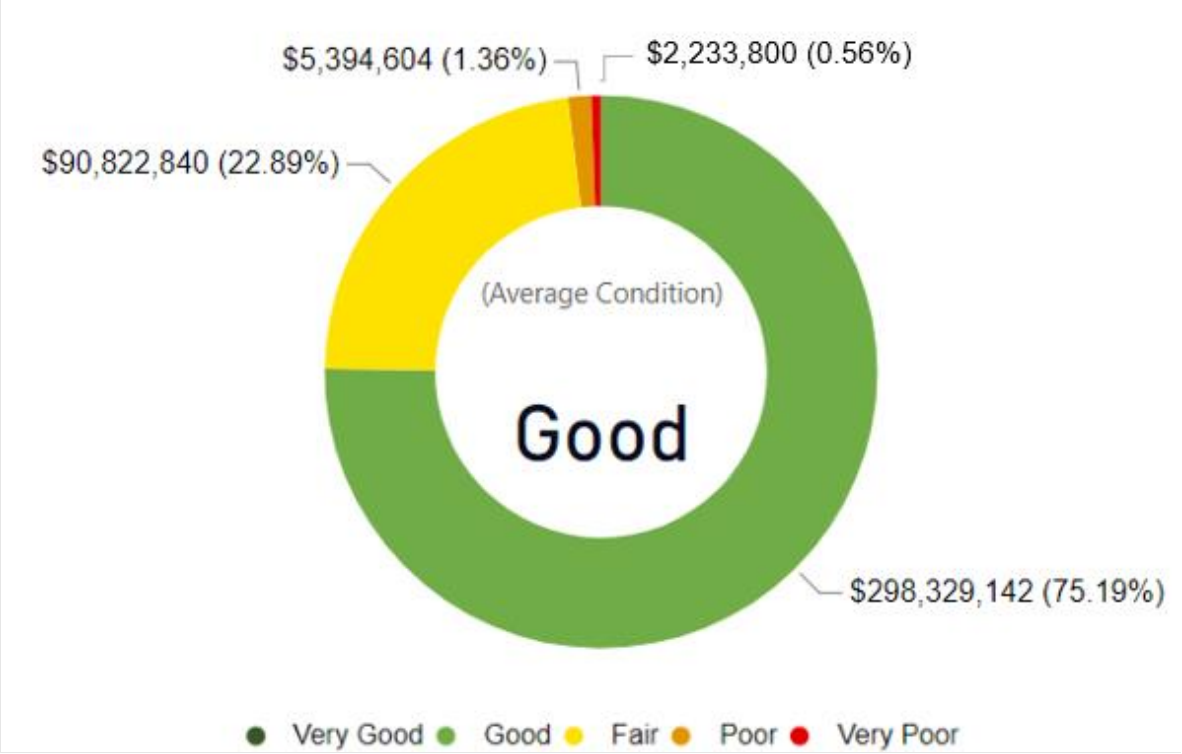


Figure 7-1. Category Condition as a Percentage of Replacement Value – Natural Assets

7.1.2.2 Segment Condition Overview

The condition profiles of Natural Assets' assets can be further reviewed at the Segment level in Figure 7-2.

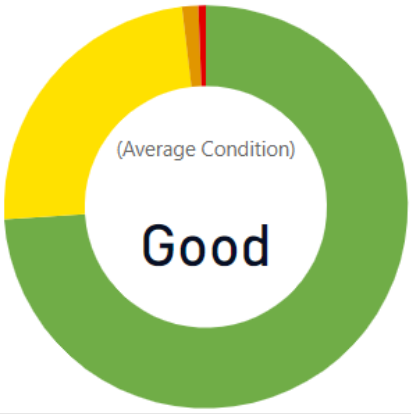
Natural Shorewall	Trees
	
• 22 Natural Shorewall	• 18,285 Park Trees • 68,433 Street Trees

Figure 7-2. Segment Condition as a Percentage of Replacement Value – Natural Assets

Natural shorewall and tree assets are, on average, in Good condition. A small portion of trees have been assessed as dead and the City should prioritize their safe removal.

7.1.2.3 Sub-Segment Condition Overview

Natural Assets' asset condition, as a percentage of replacement value, is further broken down at the Sub-Segment level in Figure 7-3.

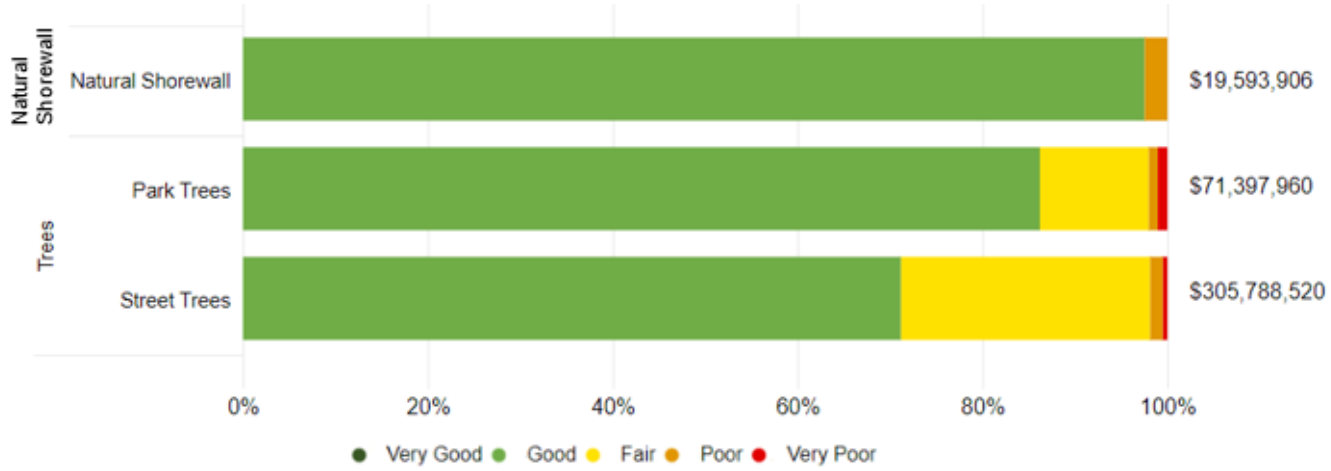


Figure 7-3 Sub-Segment Condition as a Percentage of Replacement Value – Natural Assets

Natural shorewall assets are relatively new and include large investments made along Peche Island which were constructed with assistance from Federal grant funding. These sheltering islands were created to help mitigate erosion along the shore of Peche Island, as well as to provide fish habitat. There is only one section of Natural Shorewall noted to be in Poor condition and it is recommended that this asset be renewed in the coming years.

As discussed, the Urban Tree Canopy Assessment Report (2020) greatly improved the City's knowledge of street and park trees. Further work is needed to manage this large database and keep it updated regularly with the constant addition and removal of trees on City property. City-owned trees are maintained on a 7-year trimming program that has been identified as a key strategy to manage these assets.

7.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset Categories. The City has a robust inspection and maintenance program for the assets in this Category. As mentioned, natural assets generally increase in value as they age. Many of the natural shorewall asset ages are unknown, therefore the average age below only includes the assets with a known age. Average age for natural shorewall assets is illustrated in Figure 7-4.

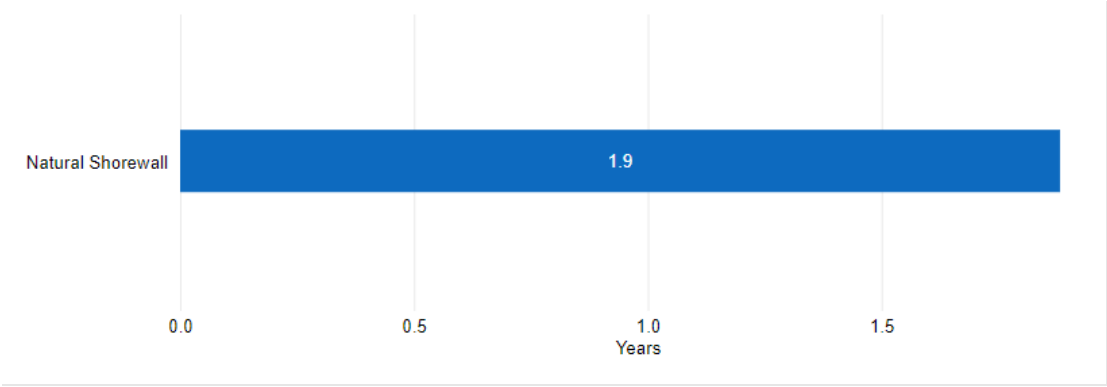


Figure 7-4. Average Age – Natural Shorewall Assets

The installation dates of all trees within the Trees inventory are unknown. The benefits of determining the actual age of trees does not necessarily provide value for Asset Management purposes, therefore it is recommended that the City continue to assess the actual condition of the trees. Figure 7-5 shows the count of trees by DBH to better quantify the maturity of urban trees.

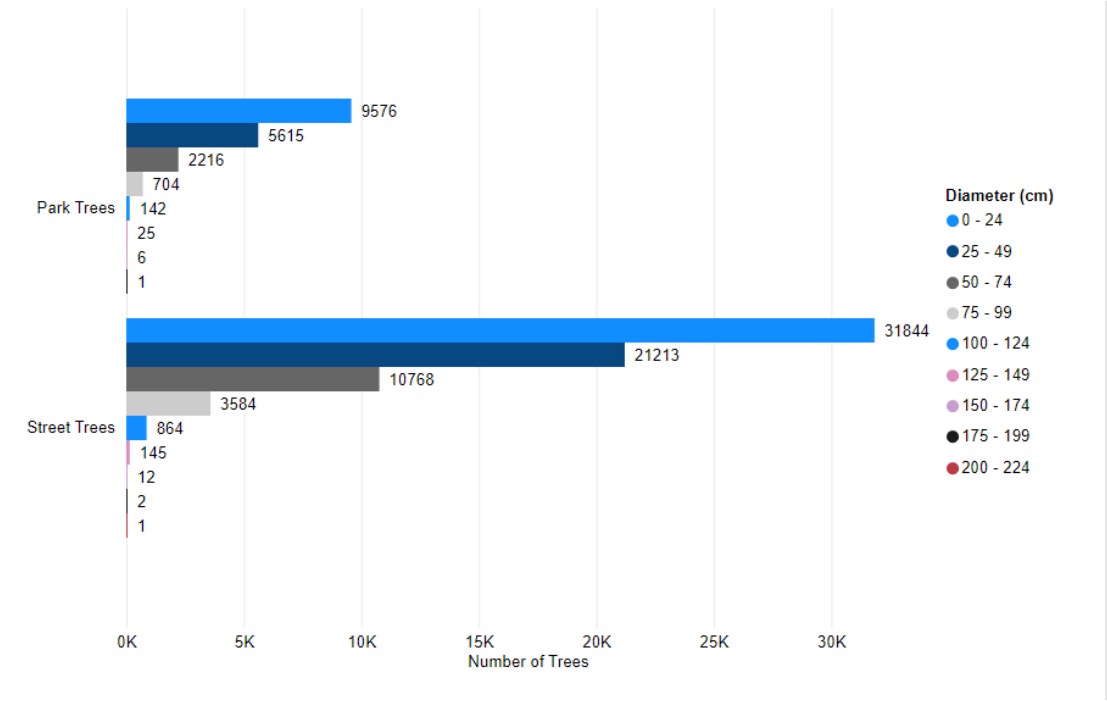


Figure 7-5. Count of Trees by Diameter at Breast Height (cm)

The City's urban forest is at risk from insect, disease, weather damage and development pressures. In the past, there has been a reactive approach to managing these issues, however it is crucial to ensure trees stay healthy and thriving to combat these pressures. The development of the Urban Forest Master Plan will bring recommendations forward to enhance the City's tree canopy and continue to sustain a healthy urban forest.

7.2 Levels of Service

Level of Service Statement: Natural Assets infrastructure provides equitable access to nature that meets recreational and leisure needs, supports health and well-being, protects the environment and offers opportunities to connect to the environment and others in the community. The City's natural assets such as trees, wetlands, prairie and green infrastructure contribute to increased biodiversity, avoided infrastructure costs, pollution reduction and climate action.

Natural Assets play a crucial role in enhancing the well-being and resilience of municipalities. Specifically, the urban forest holds millions of dollars of savings in avoided infrastructure costs, pollution reduction, and stored carbon. The Urban Tree Canopy Assessment Report (2020) used the best available science from i-Tree tools to calculate some of the benefits and functions provided by trees and forests in Windsor. i-Tree is a set of scientific-based tools developed by the USDA Forest Service and other organizations, and it is used to estimate ecosystem service values from Natural Assets. Recognizing, valuing, and managing Natural Assets can lead to more sustainable, resilient, and cost-effective municipal planning and development.

In general, Natural Assets are able to provide the following benefits the City.

Cost Savings: Integrating Natural Assets into municipal planning and management can lead to significant cost savings. By relying on natural systems, municipalities can reduce the need for expensive engineered infrastructure, including for flood control, water filtration and erosion control.

Erosion Control & Flood Mitigation: Trees and natural vegetation along shorelines act as a natural buffer against erosion caused by water movement. Their root systems help stabilize the soil, reducing the risk of shoreline erosion due to wave action. They also absorb water, reducing the risk of flooding by slowing down surface runoff and allowing water to infiltrate into the soil.

Climate Resilience: Natural Assets are adaptable to changing climate conditions. They can help municipalities cope with extreme weather events, sea-level rise, and temperature fluctuations through urban heat island mitigation (creating shade to mitigate the urban heat island effect), flood mitigation, and carbon sequestration (absorbing carbon dioxide).

Health and Well-being: Access to Natural Assets positively impacts the public’s physical and mental health by encouraging physical activity and relaxation in recreation spaces and enriching the environment through the support of biodiversity.

Cultural and Spiritual Significance: Natural Assets hold cultural and spiritual value for communities. Indigenous knowledge and practices often center around the land, water and natural elements.

The following tables provide a summary of the LOS for the City’s Natural Asset services. The City has chosen metrics that define and measure the desired standards for delivering services that are provided by Natural Assets. These metrics help set goals, evaluate

performance, allocate resources effectively, and communicate expectations to stakeholders. By establishing LOS metrics municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance.

Table 7-2. City-Defined Levels of Service – Natural Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Park Trees & Street Trees	Fiscal Sustainability	Reinvestment Rate (Trees)	0.55%
Natural Shorewall	Fiscal Sustainability	Reinvestment Rate (Natural Shorewall)	0.39%
Trees	Reliable	Percentage of total replacement cost for Trees assets in Good to Very Good condition	74.03%
Natural Shorewall	Reliable	Percentage of total replacement cost for Natural Shorewall assets in Good to Very Good condition	97.54%
Trees	Reliable	Percentage of tree related work orders closed within designated timeline	71%
Trees	Environmental Stewardship	Percentage of canopy coverage	19%
Trees	Environmental Stewardship	Number of tree inspection requests per year	6,717
Trees	Environmental Stewardship	Number of trees planted per year by City Forestry office	2,644

7.3 Lifecycle Management Strategy

The objective of the Lifecycle Management Strategy is to outline and establish a set of planned actions based on best practice that will enable the City's assets to provide a sustainable level of service to the citizens of Windsor, while managing risk at the lowest LCC.

7.3.1 Lifecycle Activities

Lifecycle activities for Natural Assets involve a series of activities aimed at sustaining and enhancing the value of these assets over time to ensure their longevity. Some key activities are provided below.

Non-Infrastructure Solutions

- Conducting a comprehensive inventory and assessment of Natural Assets to understand their current condition, location, and ecological significance.
- Developing long-term plans and designs that integrate Natural Assets into urban development and infrastructure projects.
- Engaging the community in stewardship activities and educations programs to raise awareness about the value of Natural Assets and promote sustainable behaviour.
- Implementing adaptive management strategies to respond to changing environmental conditions, emerging threats, and community needs.

Operations & Maintenance

- Implementing regular maintenance activities to ensure the health and vitality of the assets. Including vegetation management, invasive species control, erosion control, and monitoring.

Renewal, Rehabilitation & Replacements

- Restoration and Enhancement – implementing restoration and enhancement projects to improve the ecological function and resilience of Natural Assets.

Disposals

- Planning and scheduling for the removal of trees, including stumping.

Service Improvement & Growth Activities

- New assets to service new developments, as well as urban forest expansion.

By implementing these lifecycle management activities, the City can effectively conserve and enhance their Natural Assets, promoting ecological resilience, biodiversity conservation, and sustainable development.

The following is a brief overview of some of the current asset management practices in place across the City for Natural Assets.

- Residents can request an inspection of City Trees if they suspect an issue affecting the health and safety of the tree. The City's Certified Arborist can inspect for a wide range of issues and take appropriate action.

- The Tree Trimming Program is done to maintain tree health and form. Tree trimming involves the removal of dead, broken or crossing limbs. Lower limbs may be removed to provide clearance from buildings, over lawns, sidewalk and roadways. In 2020, the City introduced the Area Tree Trimming Program to ensure that all city street trees will be visited once for assessment and trimming over a 7-year cycle.

- If and when a tree is considered to be a safety hazard or has died, the determination may be made to remove the tree completely, including the stump. The City's first intent is to preserve and protect healthy, viable trees.

- The City undertakes an annual tree-planting program each Spring and Fall season. Trees are planted along the city right-of-way in front of residences, in parks and around various City facilities.

- A Preventative Maintenance program in place for the City's Natural Shorewall which considers the long-term life expectancy of this asset type and is carried out once every 5 years.

These activities represent the comprehensive approach required throughout the full lifecycle of assets to meet the current LOS provided by the City while minimizing costs. The activities and strategies listed within this chapter also provide the City's best chance to avoid the risks associated with asset ownership. The risks associated with not following the lifecycle strategies and activities listed can be significant and wide-ranging, which are further explained in section 10.4 - Risks of Not Closing the Gap and Meeting Infrastructure Needs. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies. By prioritizing operations and maintenance, asset renewal and strategic investments, the City can enhance the resilience, sustainability and vitality of the community while minimizing potential risks and ensuring long-term prosperity.

Table 7-3. Asset Management Practices, Planned Activities, and Frequency – Natural Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Natural Shorewall	
• Condition Assessments	• As identified (Completed by 3rd party engineering consultants)
• Studies	• As required
Trees	
• Public Education and Program	• Ongoing
• Condition Assessment	• As needed
• Tree Canopy Assessment	• 10 years
• Urban Forestry Management Plan	• As required
Operations & Maintenance	
Natural Shorewall	
• Inspections	• Reactive (as needed)
Trees	
• Preventative (trimming)	• Every 7 years
• Reactive Maintenance	• As needed
• Trimming, Inspections, Pruning, Road Clearance	• Ongoing
Renewal, Rehabilitation & Replacements	
Natural Shorewall	
• Rehabilitation Needs	• As funding is available
• Replacement	• As funding is available
Trees	
• Tree Removal, Stumping, and Replanting	• Replacement twice per year • Removal and stumping as required
Disposal	
Trees	
• Tree Removal	• As required

Asset Management Practices / Planned Activities	Frequency
Service Improvement & Growth	
Natural Shorewall	
• New Shorewall	• As funding is available
Trees	
• Urban forest expansion	• Seasonal
• New development (streets) to include trees	• As required

7.4 Funding the Lifecycle Activities

The City uses the lifecycle strategies described in Section 7.3 to plan work and determine future expenditure needs for Natural Assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring the City can meet the demands of current services and existing infrastructure.

The scenarios are informed by the identified lifecycle strategies for Natural Assets developed through consultation with staff and are based on best practices. The scenarios consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City population.

7.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding levels on asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for Natural Assets is approximately $543 thousand annually. Figure 7-6 shows the projected condition distribution of assets over the 20-year forecast period under the current funding scenario.

The forecast illustrates a sharp decline in condition over the forecast period. Assets in Good to Very Good condition decreases from 75% to 1%, while assets in Very Poor condition increases from 2% to 83%. This suggests that the budget will not be sufficient to keep up with the needs of the assets over time, leading to a significant decline in overall asset condition.

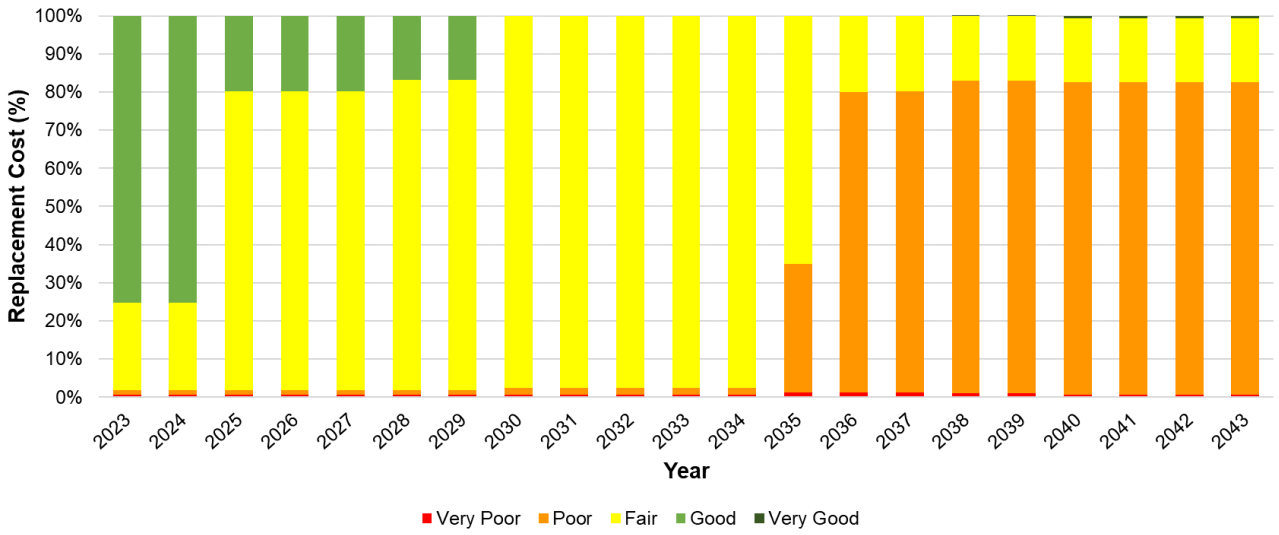


Figure 7-6. Scenario 1: Performance Forecast with Current Funding – Natural Assets

7.4.2 Scenario 2: Maintain Current Performance (Levels of Service)

Scenario 2 reflects the cost to maintain Natural Assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the current LOS for the asset Category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of Natural Assets was determined to be approximately $1.1 million annually, resulting in an average annual gap of $579 thousand. Figure 7-7 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition decreases slightly from 75% to 71%, while assets in Very Poor condition remain relatively the same at 1% throughout the 20-year period.

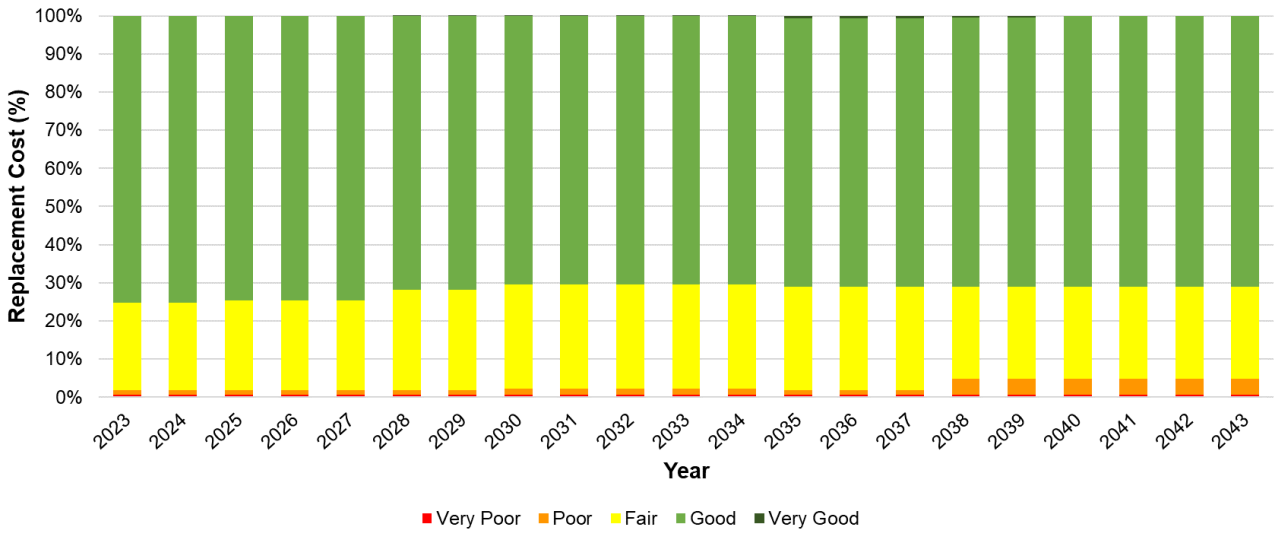


Figure 7-7. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) – Natural Assets

7.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of Natural Assets renewal, rehabilitation, and replacement activities to be approximately $1.1 million annually. Under this scenario, the City faces an annual average gap of $579 thousand for its Natural Assets. Figure 7-8 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition decreases slightly from 75% to 71%, while assets in Very Poor condition remains the same at 1% throughout the 20-year period.

Scenario 2 and 3 were determined to have the same impact to the condition of the assets, as well as the cost, which means that the lifecycle strategies developed with subject matter experts are the same as what is required to maintain these assets in approximately the condition they are currently in.

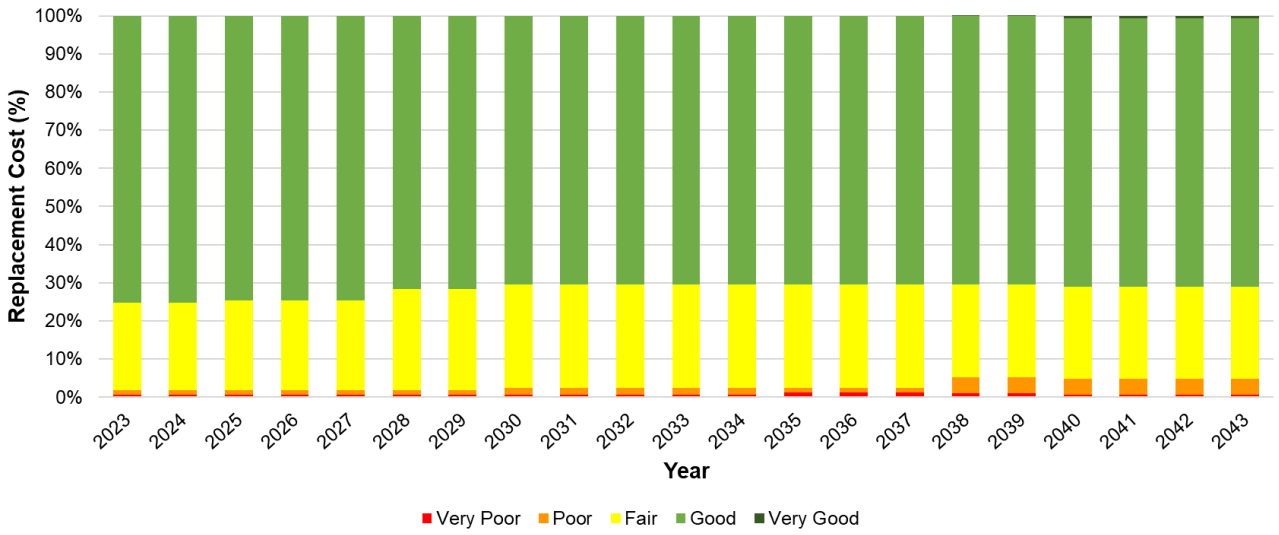


Figure 7-8. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies – Natural Assets

7.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 7-9. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

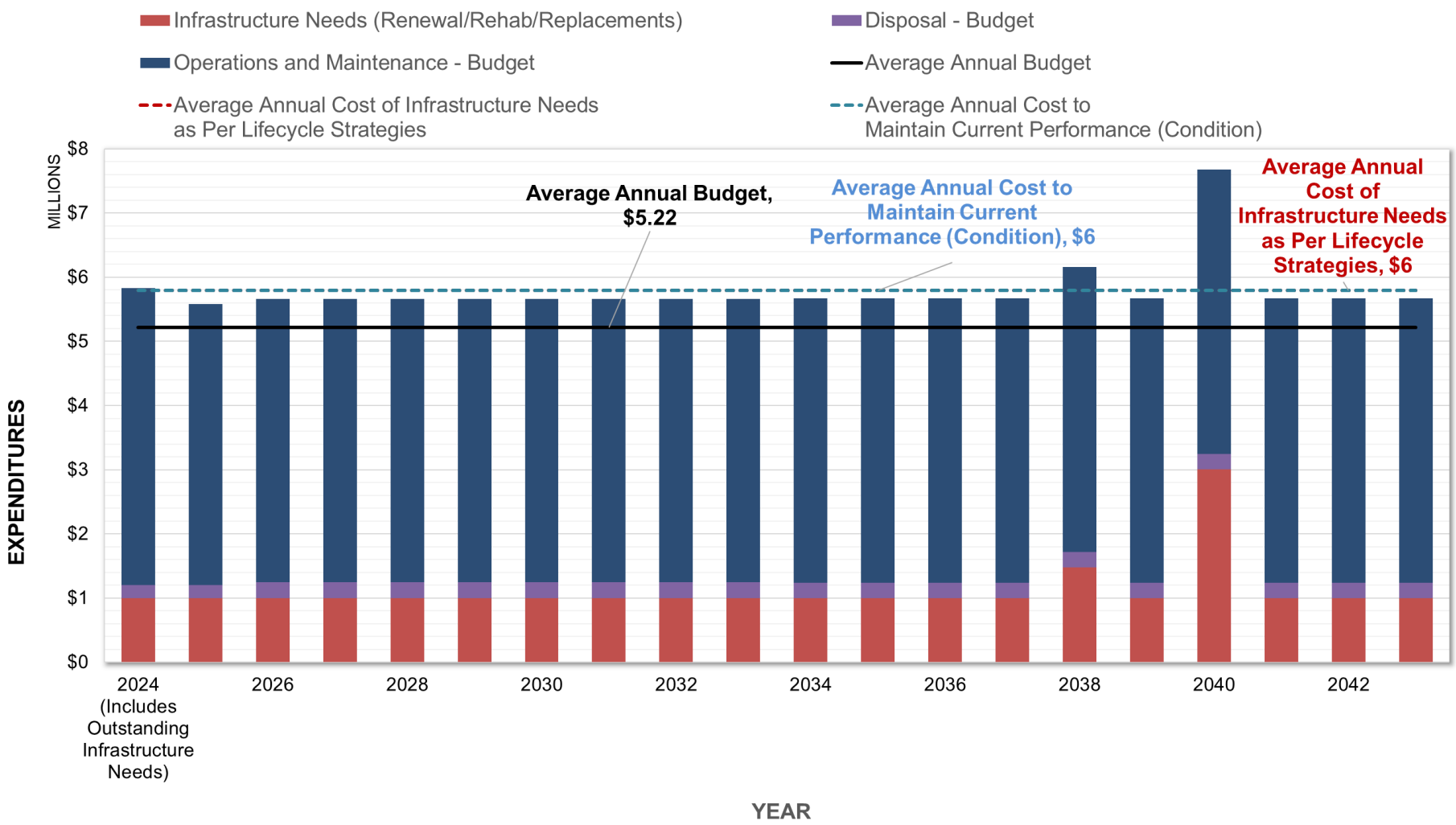


Figure 7-9. Scenario Comparison – Natural Assets

The scenario comparison indicates that the Natural Assets infrastructure is facing an annual gap of $579 thousand to maintain their current performance. This gap is the same if all lifecycle activities identified under the lifecycle strategy were to be undertaken. This calculated infrastructure gap is further detailed in Table 7-4.

Table 7-4. Lifecycle Activity Investments & Average Annual Infrastructure Gap – Natural Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$0	$0	$0
Operations & Maintenance	$4,433,981	$4,433,981	$4,433,981
Service Improvement	$0	$0	$0
Disposal	$240,000	$240,000	$240,000
Growth	$0	$0	$0
Renewal, Rehabilitation & Replacement	$543,963	$1,123,747	$1,123,747
Total	**$5,217,944**	**$5,797,728**	**$5,797,728**
Funding Gap		**$579,784**	**$579,784**

Due to the nature of this asset Category, the identified lifecycle strategies represent the best possible forecast of SMEs. It is recommended that further analysis be completed to ensure that the forecasting suggested in this plan will meet the needs of the Natural Asset infrastructure. Given the inherent nature of these assets, a significant portion of the necessary investments is allocated to operations and maintenance activities to maintain the assets throughout their long lifespan. It is recommended that efforts be made to quantify the true cost of maintaining LOS on the operational side. It should be noted that if the City wishes to grow the tree canopy, these needs have not been identified in this AMP. If the City wishes to expand these Natural Assets to realize the full potential of the eco-benefits provided by these assets (briefly described in Section 7.2), further investments for growth will be required.

7.5 Data Confidence and Improvement Plan

Table 7-5 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on the number of assumptions made and the reliability of the data sources.

Table 7-5. Data Confidence – Natural Assets

Asset Segment	Data Source	Data Confidence (/10)
Natural Shorewall	PSD Citywide CMMS (TCA database) 3rd Party Consultant	7
Trees	Excel Subject Matter Experts	7

Natural Shorewall

The natural shorewall asset registry should be developed further, be maintained regularly, and stored in one location. Work to include this registry in the PSD Citywide CMMS software database is underway and will improve the reliability and accuracy of this data. Current replacement values for natural shorewall assets were developed based on present day costs for construction, taking into consideration recent natural shoreline protection project costs on Peche Island. Condition of the natural shorewall assets were assessed by a consultant in 2020. The overall data confidence for this asset Segment is considered moderately high.

Trees

The asset data for the City-owned tree inventory is currently housed in an excel spreadsheet that is considered accurate and complete. However, this data has not been maintained since 2019. Work is underway to update this inventory in the PSD Citywide CMMS software, which will improve the reliability and accuracy of this data. CRV for trees was determined using the unit cost to plant a 5cm DBH tree, multiplied by the number of trees required to replace the total DBH of each tree asset. Condition was assessed by a consultant using objective condition assessment methods which are considered best practice. The data confidence of for this asset Segment is considered moderately high.

7.5.1 Recommendations for Improvements

Assets in this Category will continue to be expanded upon in future years. Work is underway to include green infrastructure and low impact development assets, as well as mapped Natural Assets such as forests and prairies under this AMP Category. Replacement costs for these types of assets may be more focused on restoration and protection activities.

Recommendations for data improvements to the Natural Assets asset Category are listed in Table 7-6.

Table 7-6. Improvement Plan – Natural Assets

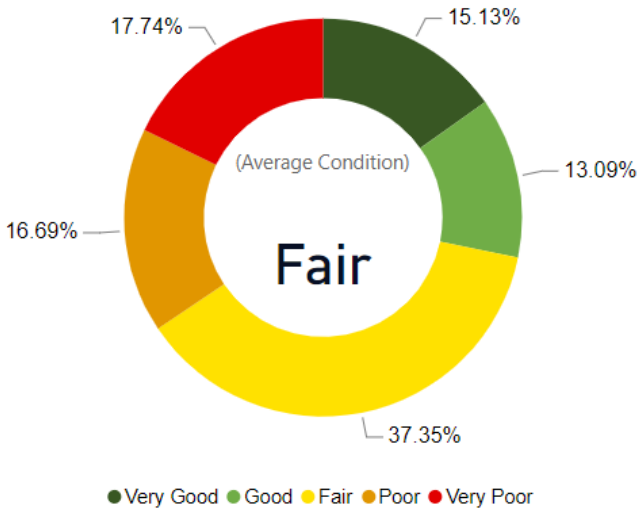
Task No.	Task	Resources Required	Responsibility
1	Develop program for mapping other natural assets such as forest, prairie, riperian areas etc. with the intention of adding these assets to this Category.	Internal/ External	Forestry & Natural Areas GIS Environment & Climate Change Asset Planning
2	Continue to build this asset register by including green infrastructure assets such as raingardens, bio swales, green roofs etc.	Internal	Forestry & Natural Areas Asset Planning
3	Consider conducting a Natural Areas Valuation to continue to report on the value natural assets provide to the community and continue to include this information in the AMP.	Internal/ External	Forestry & Natural Areas Asset Planning
4	Develop a process to update and maintain the 2019 tree inventory on an annual basis	Internal	Forestry & Natural Areas
5	Develop a process to maintain asset registry on an annual basis.	Internal	Forestry & Natural Areas Asset Planning
6	Continue to develop a better understanding of the costs to maintain and grow the City's tree canopy.	Internal/ External	Forestry & Natural Areas Environment & Climate Change Asset Planning

8 Parks

Replacement Value

Asset Segment	Replacement Value
Amenities	$199,984,446
Equipment	$4,749,503
Riverfront Parks Shorewall	$90,285,489
Sports Fields & Courts	$42,276,471
Structures & Parking	$130,645,407
Total Replacement Value	**$467.9 M**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$10.9 M	**$12.1 M**

Quick Facts

To provide Parks services to the community and visitors, the City owns and operates many assets including:

- 126 Playgrounds
- 222 Sports Fields & Courts
- 140 km of Maintained Recreation Trails

8 Parks

8.1 State of the Infrastructure

The City's Park assets encompass a wide range of natural and built features within public parks which contribute to the quality of life and well-being of residents and visitors in the community. Park assets included in this Category are built infrastructure within parks. Natural assets are included in the Natural Assets Category of the AMP.

"Rediscover Our Parks" is the City's Parks and Outdoor Recreation Master Plan. This high-level document identifies the needs and recommendations for consideration within the Parks capital and operational budgets from 2015-2035. The focus of this Plan is to promote the existing parks system for people to rediscover. While some recommendations in the Plan may be acted upon immediately, others will be brought forward to Council for consideration and approval.

Within this asset Category, assets have been grouped in the Segments described below.

Amenities: Includes assets such as benches, bike facilities, trails, picnic shelters, playgrounds and splashpads. These assets provide recreation, social and aesthetic benefits to the public and are features that have become expected to be included and maintained in the parks within the City.

Equipment: Includes the equipment assets that are used to maintain the parks and the assets within them. These are assets that are separately maintained from the Park assets (Off-Road Parks equipment, vehicles, zamboni's etc.) included in the Fleet & Corporate Equipment Category.

Riverfront Parks Shorewall: These assets are the shoreline protection that runs within the Riverfront Park. The shorewall assets provide significant value to the residents of the community such as erosion control, flooding protection, and helps to make the shoreline a beautiful recreation space.

Sports Fields & Courts: These assets include all types of sports fields and courts that are available to the public within City Parks, including baseball diamonds, basketball courts, soccer fields, tennis and pickleball courts.

Structures & Parking: Includes pedestrian bridges and boardwalks as well as the parking lots that ensure the public are able to enjoy the amenities provided within City Parks.

8.1.1 Asset Valuation

The following sections summarize the replacement value of the portfolio associated with the City's Park assets. Table 8-1 provides the inventory and current replacement value for the assets included under this AMP.

Table 8-1. Inventory and Current Replacement Value – Parks Assets

Segment & Sub-Segment	Count	Unit	2023 Estimated Replacement Value
Amenities			
Benches	1,666	Each	$6,349,200
Bike Facilities	2	Each	$986,881
Community Gardens	122	Each	$81,130
Dog Parks	6	Each	$3,450,000
Lights	1,591	Each	$12,814,100
Maintained Recreation Trails	140	km	$69,213,837
Ornamental & Drinking Fountains	29	Each	$21,810,000
Picnic Shelter	33	Each	$25,750,000
Playgrounds	126	Each	$51,450,000
Skateboard Parks	2	Each	$1,229,298
Splash Pads	13	Each	$6,850,000
Equipment			
Off-Road Equipment	39	Each	$4,218,214
Other Equipment	464	Each	$531,289
Riverfront Parks Shorewall			
Riverfront Parks Shorewall	28	Each	$90,285,489
Sports Fields & Courts			
Baseball Diamonds	60	Each	$15,600,000
Basketball Courts	41	Each	$8,223,206
Soccer Fields	64	Each	$10,240,000
Tennis & Pickleball Courts	57	Each	$8,213,265
Structures & Parking			
Non-Pay & Display Parking Lots	99	Each	$120,391,822
Pedestrian Bridges and Boardwalks	19	Each	$10,253,585
Total			**$ 467,941,316**

For the majority of Park assets, current replacement value is based on per asset unit costs obtained from recent tenders. Where that information is not available, historical costs inflated using the construction price index is used to determine replacement cost.

Moving forward it is the intent to update these replacement costs annually and continue to track operations and maintenance costs of Park assets in the department's CCMS database.

8.1.2 Asset Condition

For most Park assets, condition data is provided by SMEs based on visual or formal asset inspections. In other instances, age-based condition is used. Moving forward, condition will continue to be assessed this way on a regular basis and maintained in the parks CMMS database.

8.1.2.1 Category Condition Overview

The overall condition of the City's Park assets as a percentage of replacement value is illustrated in Figure 8-1.

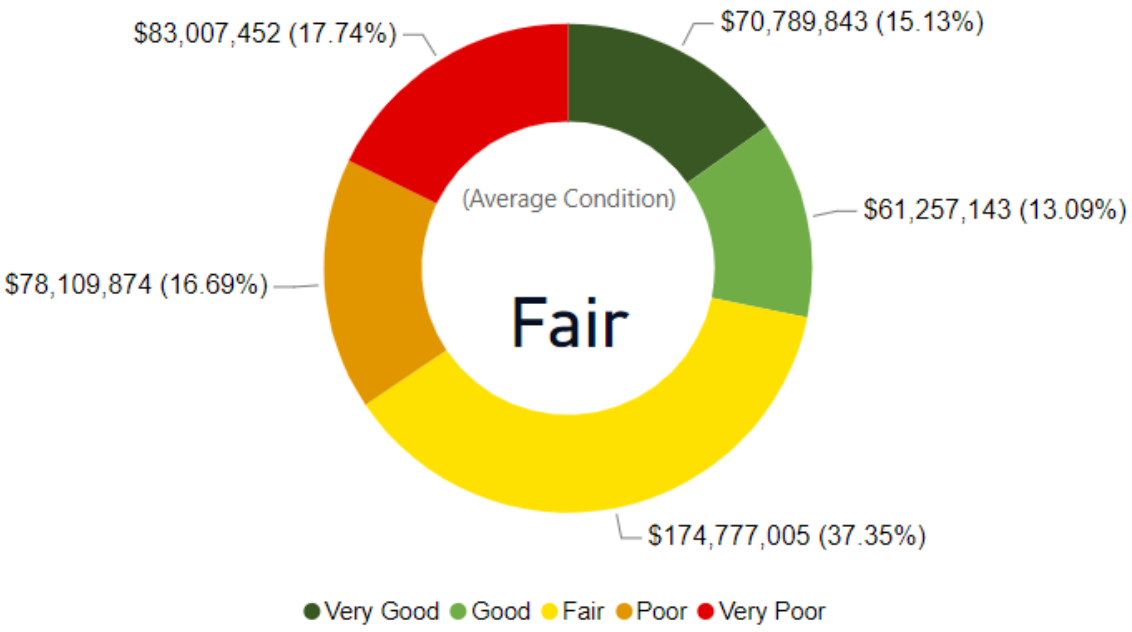
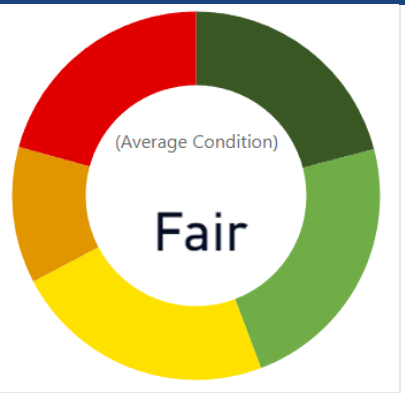
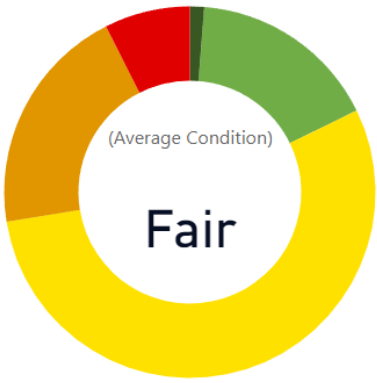
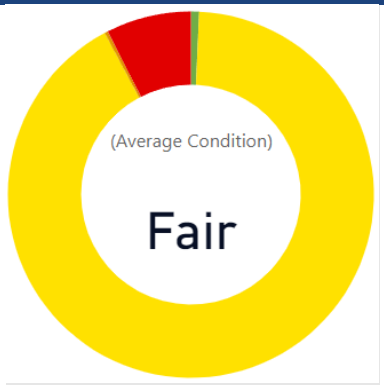


Figure 8-1. Category Condition as a Percentage of Replacement Value – Parks Assets

Park assets are, on average, in Fair condition. This demonstrates that the assets in this Category have been deteriorating over time without proper investment to ensure a Good overall condition rating. This has resulted in Park assets being managed more reactively, as opposed to being managed at the lowest LCC. Without proper funding for replacement and upgrades to Park assets they will stay in a Fair condition or move to a Poor overall condition. This poses a risk to the community services provided by our Parks assets.

8.1.2.2 Segment Condition Overview

The condition profiles of Parks assets can be further reviewed at the Segment level in Figure 8-2.

Amenities	Equipment	Riverfront Parks Shorewall
		
• 1666 Benches • 2 Bike Facilities • 122 Community Gardens • 6 Dog Parks • 1,591 Lights • 140 Km Maintained Rec. Trails • 29 Ornamental & Drinking Fountains • 33 Picnic Shelters • 126 Playgrounds • 2 Skateboard Parks • 13 Splashpads	• 39 Off-Road Equipment • 464 Other Equipment	• Riverfront Parks Shorewall

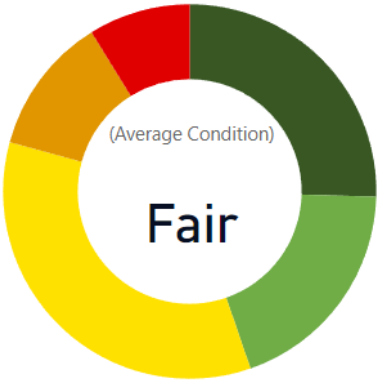
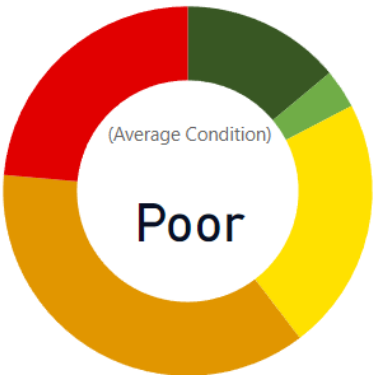
Sports Fields & Courts	Structures & Parking
	
• 60 Baseball Diamonds • 41 Basketball Courts • 64 Soccer Fields • 57 Tennis & Pickleball Courts	• 99 Non-Pay & Display Parking Lots • 19 Pedestrian Bridges and Boardwalks

Figure 8-2. Segment Condition as a Percentage of Replacement Value – Parks Assets

As shown in Figure 8-2, the majority of Segments are, on average, in Fair condition, while the Structures & Parking Segment is considered to be in Poor condition. In general, assets in Poor and Very Poor condition will be showing increased signs of deterioration and are at risk of failing to provide service levels as expected by the community. Given that the majority of these assets are regularly used by the public, prioritizing their assessment, renewal, and replacement needs is crucial to ensure public safety and the continued provision of amenities expected by the community.

8.1.2.3 Sub-Segment Condition Overview

Parks asset condition, as a percentage of replacement value, is further broken down at the Sub-Segment level in Figure 8-3.

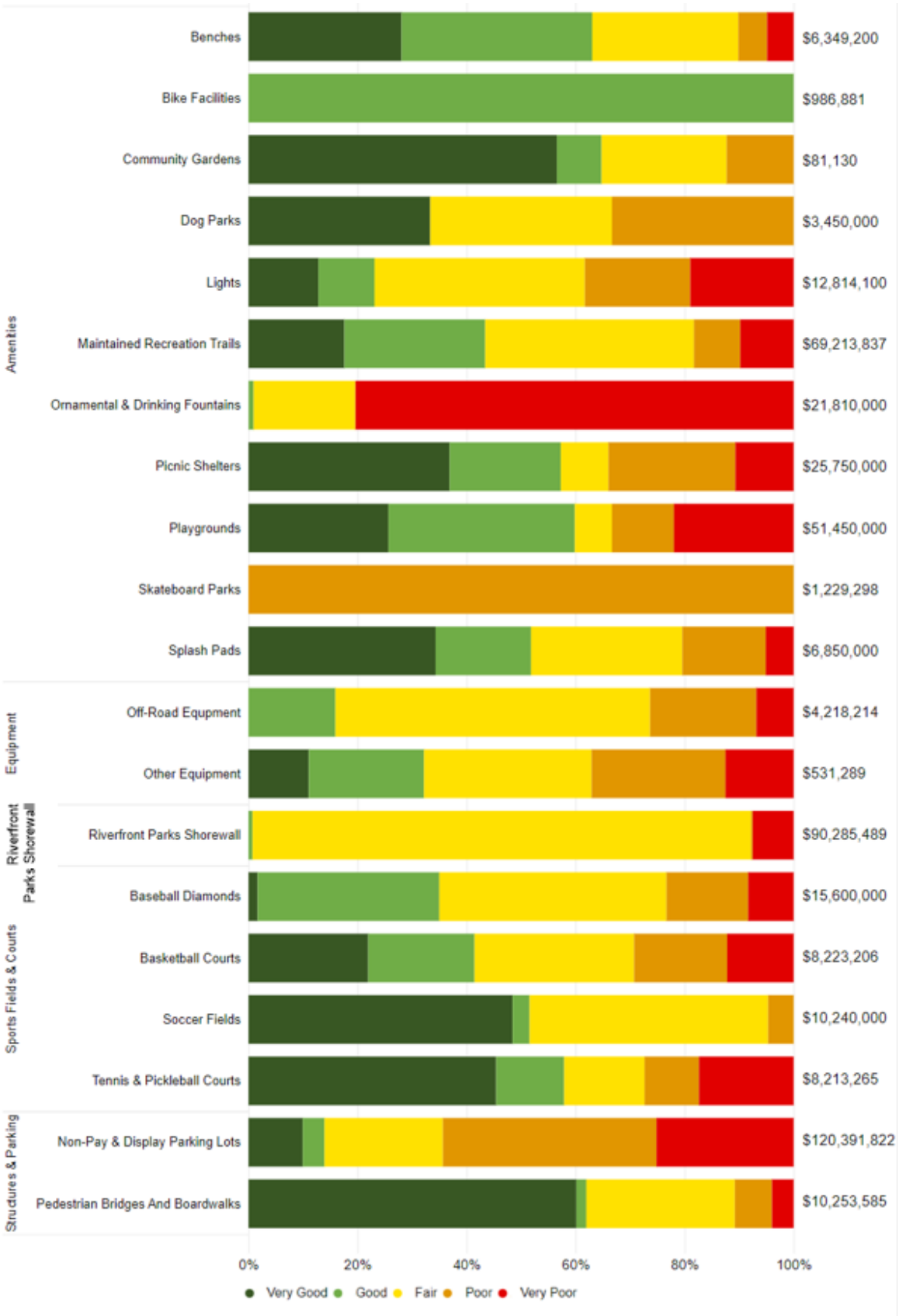


Figure 8-3. Sub-Segment Condition as a Percentage of Replacement Value – Parks Assets

The condition profiles above indicate that there are significant signs of deterioration in the City's Park assets. Many of the City's Ornamental Fountains have fallen into a state of disrepair or Very Poor condition. These assets require substantial operating, maintenance and renewal budgets to keep them operational which is often not considered when these assets are constructed. While there have been large investments in playgrounds over the last few years, there are still 33% of playgrounds in Poor to Very Poor condition. In addition, both of Windsor's skateboarding parks are in Poor condition. These assets will require replacement in the near future if they are to continue to provide service to the community.

The Parks department typically constructs or acquires Park assets without a corresponding increase to its operational, maintenance and staffing resources. The addition of assets such as splash pads, trails, lighting and sports courts without additional staffing resources and funding results in assets that are not managed to the lowest LCC. In addition, these assets are at risk of not providing service to the community if they are deteriorating prematurely or failing. It is crucial to conduct an LCC analysis when new Park assets are in discussion to be constructed or acquired.

Administration continues to seek out grant funding, third party partnerships, and opportunities for upgrades and renewal of parks infrastructure, particularly as it relates to ensuring public spaces are thriving and accessible.

8.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset Categories. In general, the age of the assets in this Category does not substantially impact the City's Asset Management practices. Parks assets are renewed and replaced based on their criticality and available funding. The average age of Park assets is illustrated in Figure 8-4.

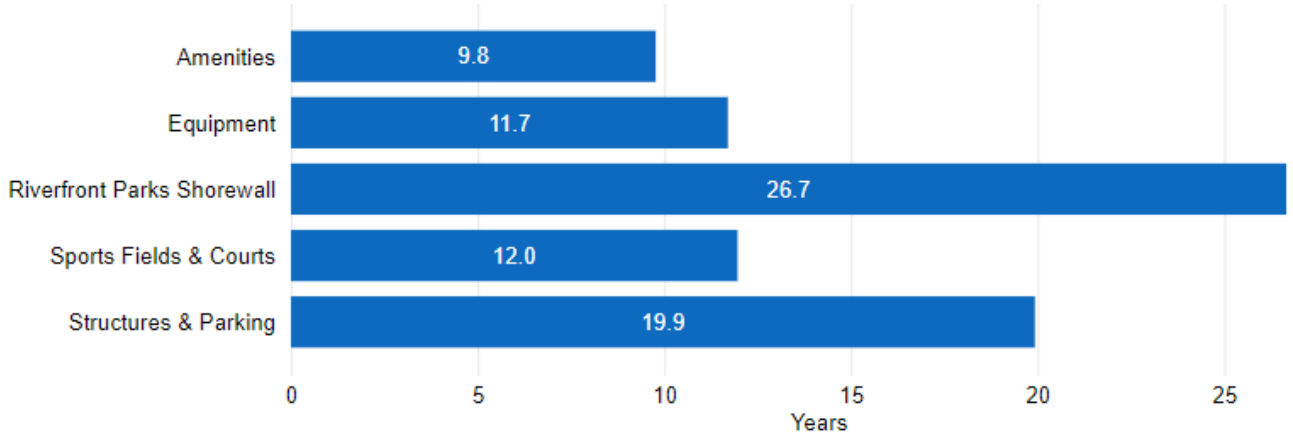


Figure 8-4. Average Age – Parks Assets

8.2 Levels of Service

Level of Service Statement: Parks infrastructure enables the City to provide overall beautification, active lifestyle and well-being services to its residents and visitors. Parks

services help engage residents and visitors of all ages and abilities to improve quality of life and contribute to healthy and safe neighbourhoods.

Overall, Parks provide a wide range of services and benefits that contribute to the physical, social, cultural, and economic well-being of communities. They serve as valuable assets that enhance the quality of life and contribute to the vitality and resilience of urban environments. The following are some key services that municipal parks provide.

Recreation and Leisure Activities: Parks feature playgrounds and play areas equipped with swings, slides, climbing structures and other equipment. These facilities provide safe and accessible spaces for children to engage in active play and social interaction.

Sports and Fitness Facilities: Sports fields and courts allow for various recreation activities that support and provide the space for exercise and physical activity for the health and well-being of residents. These amenities also support sports tourism and bring visitors to Windsor.

Cultural/Community Events and Social Gathering: The City's parks provide venues for cultural events, community festivals, tourism opportunities and special events. These events promote community engagement, cultural enrichment, and social interaction, fostering a sense of belonging and unity among residents. These areas provide space where the public can meet, socialize and connect with others in their community through the use of picnic areas, pavilions, and green space.

Environmental Conservation: Parks play a role in environmental conservation by preserving natural habitats, protecting biodiversity, and enhancing ecosystem services. They serve as green corridors and wildlife habitats, contributing to urban biodiversity and ecological resilience.

Aesthetic, Culture and Economic Benefits: Parks contribute to the aesthetic and cultural enhancement of communities by providing beautiful and well-maintained green spaces, gardens, and landscaped areas. They enhance the visual appeal of neighbourhoods, increase property values, and contribute to a sense of pride and identity. They also attract visitors, tourists, and businesses to the area, which support local businesses, stimulate tourism, and contribute to the economic vitality of surrounding neighbourhoods.

The following tables provide a summary of the LOS for the City's Parks services. The City has chosen metrics that define and measure the desired standards for delivering services that are provided by Parks. These metrics help set goals, evaluate performance, allocate resources effectively, and communicate expectations to stakeholders. By establishing LOS metrics, municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance. The LOS are aligned with the City's strategic goals as outlined in section 1-3 of this AMP.

Table 8-2. City-Defined Levels of Service – Parks Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
All Segments (excluding Riverfront Parks Shorewall)	Fiscal Sustainability	Reinvestment Rate (Parks assets excluding Riverfront Parks Shorewall)	1.93%
Riverfront Parks Shorewall	Fiscal Sustainability	Reinvestment Rate (Parks Riverfront Parks Shorewall)	1.07%
All Segments	Available	All Parkland in Municipality as a percent of Total Area of Municipality	7%
Riverfront Parks Shorewall	Reliable	Percentage of total replacement cost for Riverfront Parks Shorewall assets in Good to Very Good condition	0.73%
All Segments (excluding Riverfront Parks Shorewall)	Reliable	Percentage of total replacement cost for all Park assets excluding Riverfront Parks Shorewall in Good to Very Good condition	34.79%
All Segments (excluding Riverfront Parks Shorewall)	Reliable	Percentage of total replacement cost for Parks assets past their EUL (excluding Riverfront Parks Shorewall)	14.61%
All Segments	Fiscal Sustainability	Operating Cost Per Hectare - Maintained and Natural Parkland	$22,850.23

8.3 Lifecycle Management Strategy

The objective of the Lifecycle Management Strategy is to outline and establish a set of planned actions based on best practice that will enable the municipality's assets to provide a sustainable level of service to residents, while managing risk at the lowest LCC.

8.3.1 Activities and Strategies

By implementing lifecycle activities, the City can effectively manage and enhance their parks, ensuring the provision of valuable services and benefits to residents and visitors while promoting community well-being and environmental sustainability.

Non-Infrastructure Solutions

- The City must comply with various regulations and standards related to the provision of the safety of public spaces.
- Develop master plans and designs for parks, considering factors such as community needs, environmental sustainability, accessibility, safety, and aesthetics.

Operations & Maintenance

- Implementing a scheduled inspection program for all asset types that includes identifying preventative maintenance activities.
- Implementing routine maintenance activities to ensure the cleanliness, safety, and functionality of park assets, including landscaping, turf management, litter removal, restroom cleaning, and equipment maintenance.
- Responding to service requests from the public through 311 and other issues that are identified through ongoing staff field work. In addition, reacting in a timely manner to equipment that needs to be repaired, address vandalism within the public spaces, and various other activities.

Renewal, Rehabilitation & Replacements

- Conduct periodic renewal, rehabilitation and replacement projects to address aging infrastructure as funding allows and as directed by Council.

Disposals

- Removing assets at the end of their actual useful life by determining appropriate decommission and disposal methods in an environmentally responsible manner.

Service Improvement & Growth Activities

- New assets to service growing populations and service areas as funding permits.
- New assets to offer new services, improve customer experience, accessibility, and safety as funding permits.

By prioritizing lifecycle activities, the City can effectively manage and enhance their parks, ensuring they continue to provide valuable services and benefits to residents and visitors.

The recent integration of Parks360/Citywide CMMS has significantly enhanced the management of Parks assets by allowing for the integration of asset data and work order information. 311 is also used as a source of information on the condition of Parks assets.

Specific Asset Management practices or planned actions and the associated frequency of these actions are outlined in Table 8-3. The activities listed represent the comprehensive approach required throughout the full lifecycle of assets to meet the current levels of service provided by the City while minimizing costs. The activities and strategies listed within this chapter also provide the City's best chance to avoid the risks associated with asset ownership. The risks associated with not following the lifecycle strategies and activities listed can be significant and wide-ranging, which are further explained in section 10.4 - Risks of Not Closing the Gap and Meeting Infrastructure Needs. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies. By prioritizing operations and maintenance, asset renewal and strategic investments, the City can enhance the resilience, sustainability and vitality of the community while minimizing potential risks and ensuring long-term prosperity.

Table 8-3. Asset Management Practices, Planned Activities, and Frequency – Parks Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Amenities, Sports Fields & Courts	
• Condition Assessment	• As per Playground Audit and additional information provided during monthly and annual inspections
• Parks Masterplan	• Updated every 5 years
Riverfront Parks Shorewall	
• Condition assessment by third party	• As needed
• Shorewall Studies	• As needed
Structures & Parking	
• OSIM Inspection (Pedestrian bridges)	• Every 2 years
Operations & Maintenance	
Amenities, Sports Fields & Courts	
• Deficiencies/Reactive Maintenance	• As identified
• Fencing repairs	• As needed
• Inspections	• Annual or monthly (Amenities)
• Planned Maintenance	• Annual/monthly
• Grooming, grass cutting, line and general field/court maintenance	• As needed to provide useable condition
Riverfront Parks Shorewall	
• Inspections	• Reactive (as needed)
Structures & Parking	
• Cosmetic maintenance (painting, graffiti removal)	• Reactive (as needed) • As identified in the inspections
• Reactive maintenance (pothole patching, etc.)	• Every 7-10 years (painting) • Potholes as identified
• Winter control maintenance (snow/ice removal)	• As needed
Equipment	

Asset Management Practices / Planned Activities	Frequency
• Preventative maintenance	• As scheduled
• Reactive repairs/maintenance	• As required
• Seasonal inspections on seasonal equipment	• Seasonally
Renewal, Rehabilitation & Replacements	
Amenities, Sports Fields & Courts	
• Roof replacements, sanding/painting, concrete renewal, etc.	• As funding is available
• Rubber surface renewal	• Based on inspection/audit as funding is available
• Replacement of asset	• As funding is available
Riverfront Parks Shorewall	
• Rehabilitation needs	• As funding is available
• Replacement	• As funding is available
Structures & Parking	
• Crack sealing	• Based on inspection/audit as funding is available
• Replacement	• As funding is available
Disposal	
Amenities, Sports Fields & Courts	
• Removal of asset	• As directed by Council
Equipment	
• Disposal of equipment	• As needed
Service Improvement & Growth	
Amenities, Sports Fields & Courts	
• Accessibility improvements	• As required (regulated)
• Improved lighting	• As funding is available
• New assets to enhance service	• As funding is available
• New assets to accommodate growth	• As funding is available
Riverfront Parks Shorewall	
• New shorewall	• As funding is available

Asset Management Practices / Planned Activities	Frequency
Structures & Parking	
• New assets as a result of a new park	• As funding is available

8.4 Funding the Lifecycle Activities

The City uses the lifecycle strategies described in Section 8.3 to plan work and determine future expenditure needs for Parks assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring the City can meet the demands of current services and existing infrastructure.

The scenarios are informed by the identified lifecycle strategies for Parks assets developed through consultation with staff and are based on best practices. The scenarios consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City population.

8.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding levels on asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement activities for Parks is approximately $6.5 million annually. Figure 8-5 shows the projected condition distribution of assets over the 20-year forecast period under the current funding scenario.

The forecast illustrates a decline in condition over the forecast period. Assets in Good to Very Good condition decreases from 28% to 14%, while assets in Very Poor condition increases from 18% to 58%. This scenario highlights challenges the City will face in maintaining Parks infrastructure assets with the current anticipated budget allocations. This suggests that the budget will not be sufficient to keep up with the needs of the assets over time, leading to a significant decline in overall asset condition.

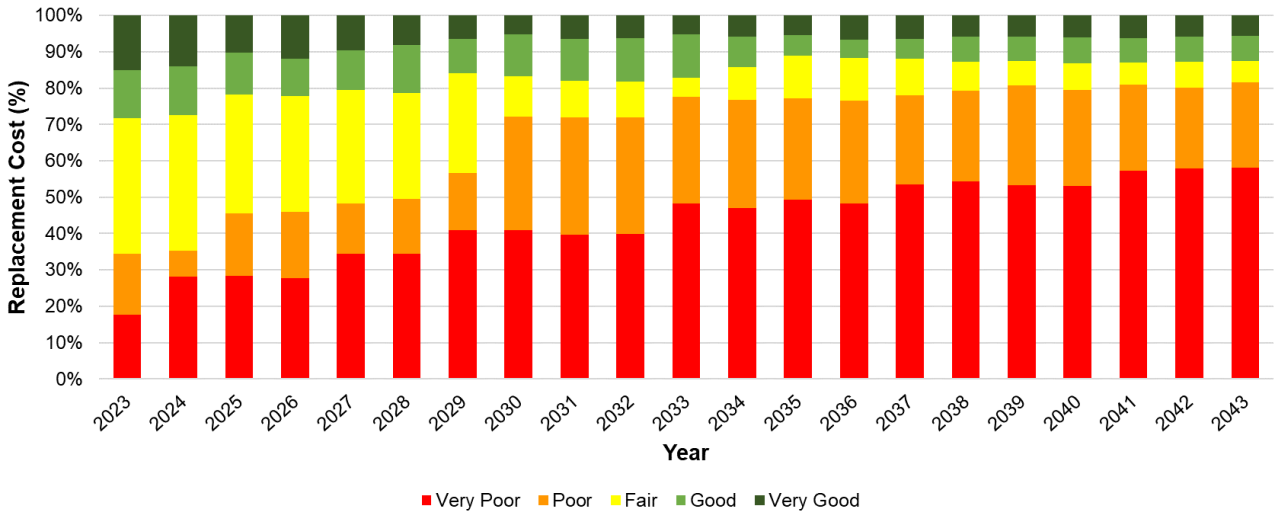


Figure 8-5. Scenario 1: Performance Forecast with Current Funding – Parks Assets

8.4.2 Scenario 2: Maintain Current Performance (Levels of Service)

Scenario 2 reflects the cost to maintain Parks assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the current LOS for the asset Category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of Parks assets was determined to be approximately $17.4 million annually, a significant increase from Scenario 1, resulting in an average annual gap of $10.9 million. Figure 8-6 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition increases from 28% to 48%, while assets in Very Poor condition only slightly decreases from 18% to 17% throughout the 20-year period.

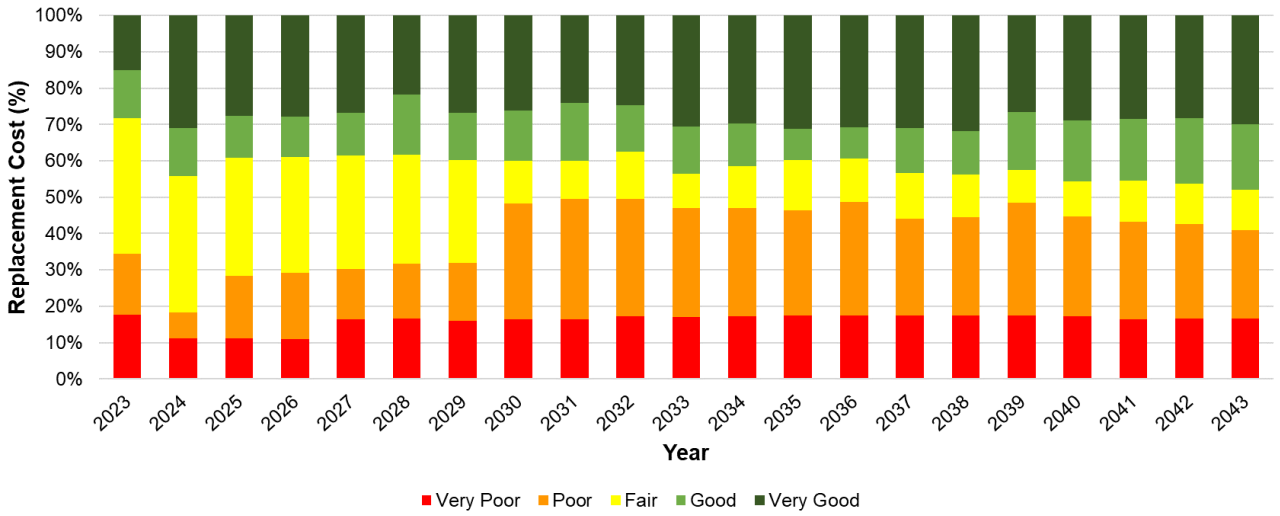


Figure 8-6. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) – Parks Assets

8.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of Parks renewal, rehabilitation, and replacement activities to be approximately $18.6 million annually. Under this scenario, the City faces an annual average gap of $12.1 million for its Parks assets.

This projected asset performance forecast is shown in Figure 8-7. The forecast shows a substantial improvement in overall asset condition by the end of the 20-year forecast through the application of the identified lifecycle strategies. The model indicates that assets in Good to Very Good condition increase over the forecast from 28% to 54%, and assets in Very Poor condition decrease over the forecast from 18% to 12%. This scenario provides the best overall performance of Parks assets.

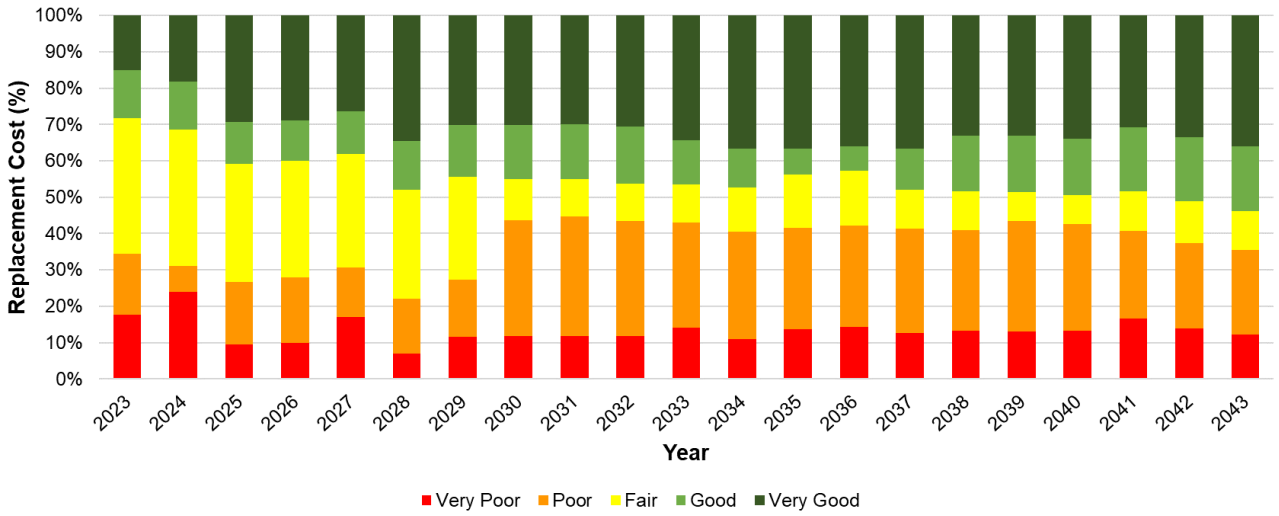


Figure 8-7. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies – Parks Assets

8.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 8-8. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

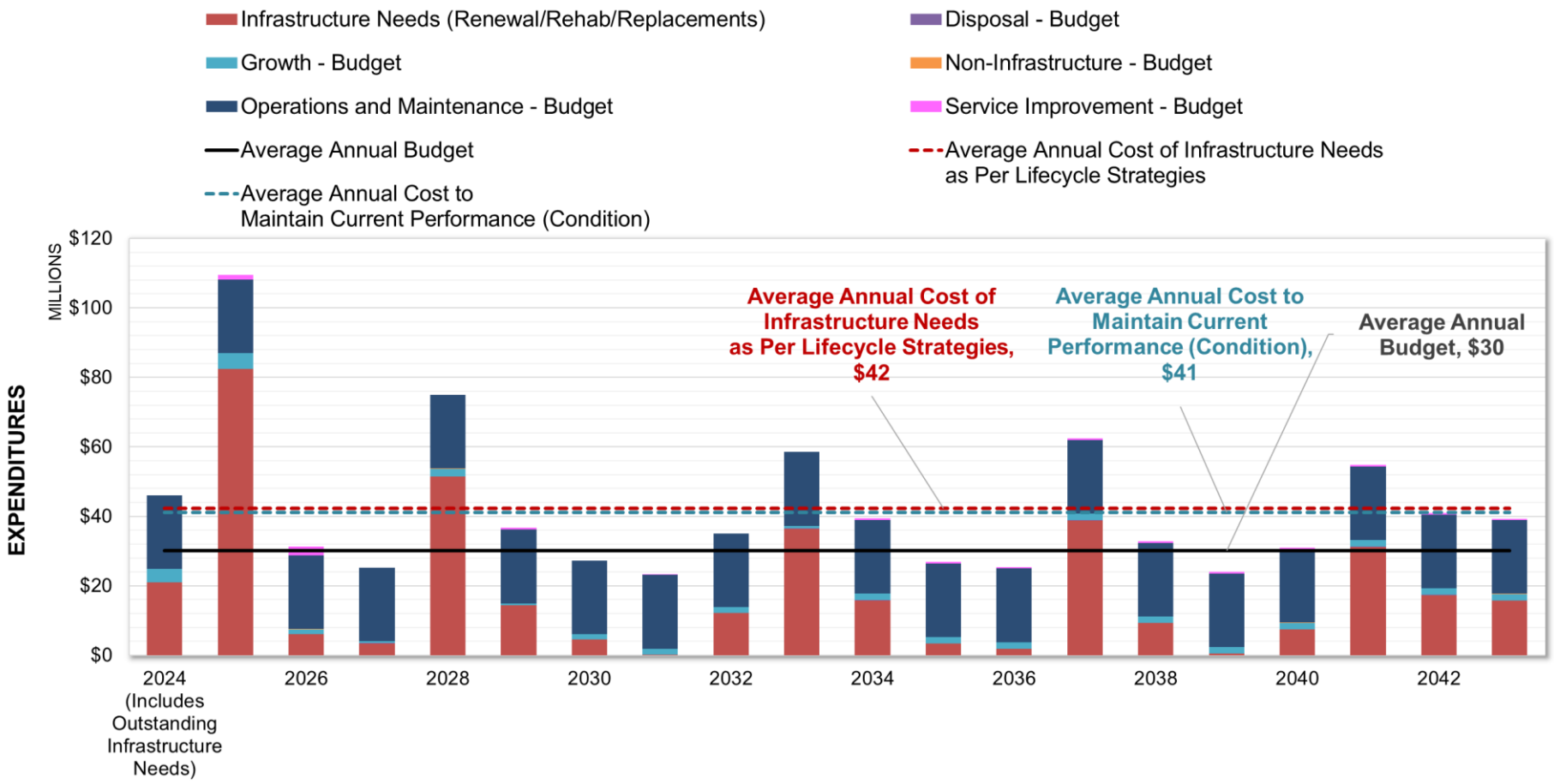


Figure 8-8. Scenario Comparison – Parks Assets

The scenario comparison indicates that the Parks infrastructure is facing an annual gap of $10.9 million to maintain their current performance. If all lifecycle activities identified under the lifecycle strategy were to be undertaken, the gap increases to $12.1 million. This calculated infrastructure gap is further detailed in Table 8-4.

Table 8-4. Lifecycle Activity Investments & Average Annual Infrastructure Gap – Parks Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$22,500	$22,500	$22,500
Operations & Maintenance	$21,190,900	$21,190,900	$21,190,900
Service Improvement	$451,367	$451,367	$451,367
Disposal	$55,000	$55,000	$55,000
Growth	$1,894,090	$1,894,090	$1,894,090
Renewal, Rehabilitation & Replacement	$6,535,487	$17,481,759	$18,645,334
Total	**$30,149,344**	**$41,095,616**	**$42,259,161**
Funding Gap		**$10,946,272**	**$12,109,847**

Park assets play a vital role in communities, serving as spaces for recreation, relaxation and social interaction. These assets are heavily used by the public who hold high expectations for the level of service they provide. As a result, maintaining these assets in good repair is crucial. All three Scenarios show that the City may face challenges in the future in maintaining their Parks assets in a state of good repair for both current and future generations. By prioritizing maintenance and ensuring that Park assets are kept in a state of good repair, the City demonstrates its commitment to public safety and well-being.

8.5 Data Confidence and Improvement Plan

Table 8-5 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on the number of assumptions made and the reliability of the data sources.

Table 8-5. Data Confidence – Parks Assets

Asset Segment	Data Source	Data Confidence (/10)
Amenities	PSD Citywide CMMS Subject Matter Experts	7
Equipment	PSD Citywide CMMS Subject Matter Experts	6

Asset Segment	Data Source	Data Confidence (/10)
Sports Fields & Courts	PSD Citywide CMMS Subject Matter Experts	6
Structures & Parking	PSD Citywide CMMS Subject Matter Experts	7
Riverfront Parks Shorewall	PSD Citywide CMMS Formal Asset Inspections	6

Parks assets in this Category are primarily housed in and managed using PSD Citywide CMMS software. The recent incorporation of Parks assets into this database has improved the reliability and accuracy of this asset registry in recent years, however establishing processes to maintain condition and replacement cost data is still ongoing. For the majority of these assets, current replacement values are primarily based on unit costs obtained from recent tenders. Condition data is objective and is provided by subject matter experts. The data confidence for these assets is considered moderate, other than for Structures & Parking assets which is considered moderately high due to an increased reliability and source as the data for these assets, which is housed and managed in the *Infor* IPS (Hansen) CMMS database. As shown in table 8-6, the overall data confidence for these asset groups varies from moderate to moderately high.

8.5.1 Data Confidence and Improvement Plan

Recommendations for data improvements to the Parks asset Category can be found in Table 8-6.

Table 8-6. Improvement Plan – Parks Assets

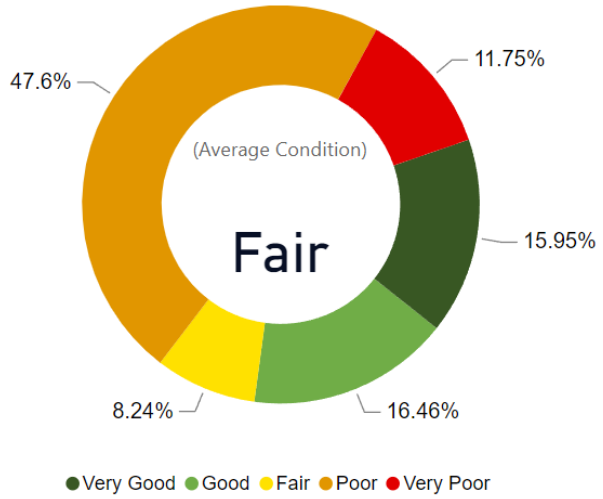
Task No.	Task	Resources Required	Responsibility
1	Continue developing a process to input current replacement costs into PSD Citywide CMMS software on a yearly basis for all asset classes	Internal	Parks
2	Consider adding parks drainage/sewers to the asset registry	Internal	Parks Technical Support
3	Develop a process to maintain asset registry on an annual basis.	Internal	Parks Asset Planning
4	Develop a process to maintain asset registry in a single location to facilitate data alignment between right-of-way sidewalks and maintained recreation trails in parks.	Internal	Parks Technical Support

9 Public Transportation

Replacement Value

Asset Sub-Segment	Replacement Value
Bus Shelters	$3,249,400
Equipment	$8,345,287
Facilities	$90,845,052
Fuel Sites	$469,602
Transit Fleet	$97,113,856
Transit Support Vehicle	$1,165,702
Total Replacement Value	**$201.2 M**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$6.8 M	**$7.3 M**

Quick Facts

To provide Public Transportation services, the City owns:

- 117 Transit Fleet and 19 Support Vehicles, as well as various types of equipment
- 2 Facilities, 1 Fuel Site and 204 Bus Shelters

9 Public Transportation

9.1 State of the Infrastructure

Public transportation is an essential component of the urban infrastructure in the City of Windsor and provides an accessible, efficient, and sustainable means of transportation for residents and visitors alike. Public Transportation assets encompass a wide range of physical resources owned and operated by the City to provide public transportation services. These assets are vital for the efficient functioning of the transit system to ensure the mobility of residents and visitors. The City's Public Transportation assets are operated by Transit Windsor.

In 2019 Transit Windsor completed the More Than Transit Master Plan. This document contains short to long term actions and recommendations from a comprehensive service delivery review and addresses issues heard from the community. Projects and initiatives outlined in the Master Plan are brought forward individually for funding approval.

Within this asset Category, assets have been grouped in the Segments described below.

Transit Fleet and Support Vehicles: Transit Windsor owns and operates a fleet of buses and support vehicles. Public transportation services levels are dependent on these assets remaining operational.

Facilities and Bus Shelters: Facilities (including one maintenance facility and the Windsor International Transit Terminal), bus shelters, and fuel sites are all necessary assets for the operation of transit services for the City.

Equipment and Fuel Sites: Transit Windsor relies heavily on various technological systems and equipment to support their operations and enhance the passenger experience for scheduling and routing, as well as fare collection systems. Transit Windsor requires specialized equipment and tools for the maintenance and upkeep of their vehicles and infrastructure, include fuel sites.

Effective management of municipal transit assets is crucial for ensuring the reliability, safety, and efficiency of public transportation services.

9.1.1 Asset Valuation

The following sections summarizes the portfolio associated with the City's Public Transportation assets. Table 9-1 provides the inventory and current replacement value for the assets included under this AMP.

Table 9-1. Inventory and Current Replacement Value – Public Transportation

Segment & Sub-Segment	Count	Unit	2023 Estimated Replacement Value
Transit Windsor			
Bus Shelters	204	Each	$3,249,400
Equipment	31	Each	$8,345,287
Facilities	2	Each	$90,845,052
Fuel Sites	1	Each	$469,602
Transit Fleet	117	Each	$97,113,856
Transit Support Vehicles	19	Each	$1,165,702
Total			**$201,188,899**

Current replacement values for the majority of the assets in this Category are based on unit costs obtained from recent tenders. Replacement values are for like-to-like purchases and do not reflect replacement of gas-powered vehicles to electric vehicles.

Current replacement costs for Facilities is assessed at the building level, which may not fully capture the cost of highly specialized building components or amenities within the buildings. For Transit Windsor's main facility, replacement cost was estimated by SMEs using per square foot unit costs based on market values. For the downtown Windsor International Transit Terminal, historical cost inflated using the construction price index was used. The remaining assets in this Category use historical cost inflated to today's dollars.

Since the COVID-19 pandemic, availability of building materials and transit buses, as well as exceedingly high inflation rates, have contributed to high replacement costs for facilities and transit fleet.

9.1.2 Asset Condition

Condition ratings for the City's Public Transportation assets are primarily based on age and reviewed by SMEs. Condition assessments on Transit Fleet assets are completed as required to ensure their safety and function. Facility condition is informed by building condition assessments reviewed by SMEs. Building component data was not used in this AMP and buildings are assessed as single entity. Moving forward, administration will work towards including building component information into the analysis.

9.1.2.1 Segment Condition Overview

The overall condition of Public Transportation assets as a percentage of replacement value is illustrated in Figure 9-1.

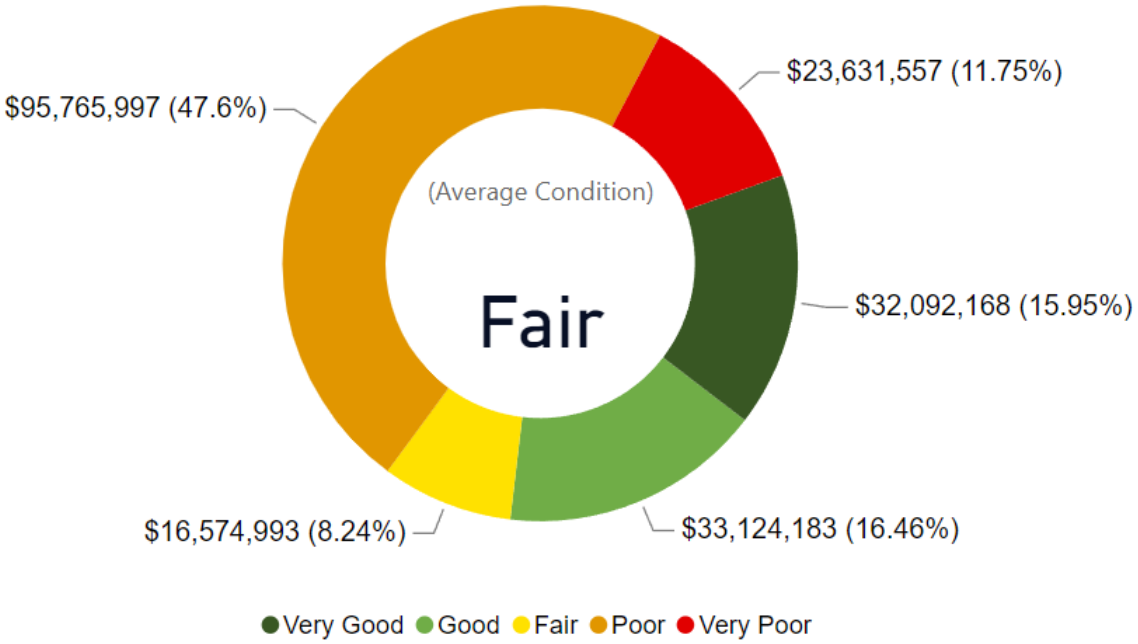


Figure 9-1. Segment Condition as a Percentage of Replacement Value – Public Transportation Assets

The Public Transportation assets are, on average, in Fair condition. A large proportion (67%) of these assets are in Fair to Very Poor condition. This has resulted in Public Transportation assets being managed more reactively, as opposed to being managed at the lowest LCC. Without proper funding for replacement and upgrades to these assets they will stay in a Fair condition or move to a Poor overall condition. This poses a risk to the community services provided by the City's public transportation system.

9.1.2.2 Sub-Segment Condition Overview

Public Transportation asset condition, as a percentage of replacement value, is further broken down at the Sub-Segment level in Figure 9-2.

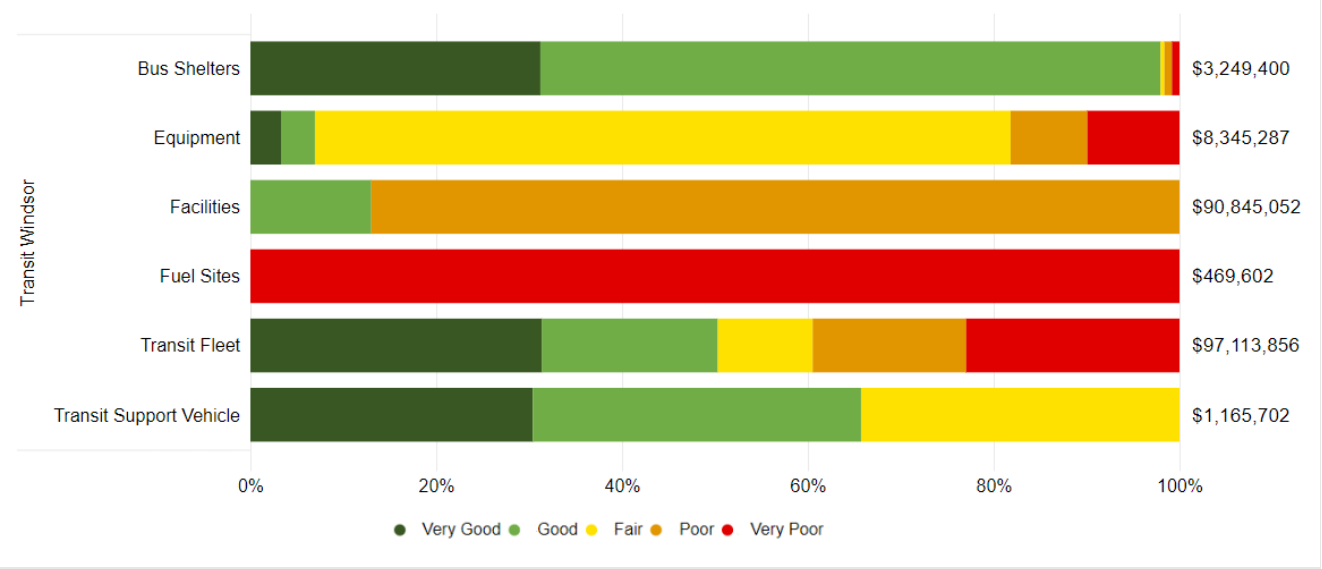


Figure 9-2. Sub-Segment Condition as a Percentage of Replacement Value – Public Transportation Assets

Transit Windsor bus shelters are relatively new and are shown to be in Good condition. The equipment, facilities and fuel sites all show heavy signs of deterioration. Approved funding as part of the Investing in Canada Infrastructure Program will be used in the near future for major investments to Transit Windsor's maintenance facility, large equipment such as hoists, and their Fuel Sites. These investments are predicted to improve the condition of these assets.

Although close to 40% of the Transit fleet is in Poor to Very Poor condition, the average condition of these assets has improved in the last number of years. This improvement is largely attributed to government grant funding, again through the Investing in Canada Infrastructure Program. Funding requirements for public transit providers is becoming more stringent, with an emphasis on purchasing hybrid or full EVs. Currently, the Transit Windsor facility does not have the equipment or capacity to support fully electric buses. Recent information suggests that diesel/hybrid buses will not be available for purchase after 2030 at the latest. Transit Windsor is currently working on an electrification feasibility study through the Zero Emission Transit Fund.

It is recommended that the City continue to review the condition of its Public Transportation infrastructure and address needs through maintenance and replacement of assets which are in Poor and Very Poor condition. Frequent assessments and servicing plans are required to mitigate deterioration and enhance longevity of fleet, facility and equipment assets included in public transportation needs. Additionally, prioritizing investments in the maintenance and improvements of these assets based on the severity of deterioration and the criticality of

affected assets can help allocate resources effectively and keep this vital transportation system available and accessible to the public.

9.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset Categories. With the exception of the Transit Fleet, the age of the assets in this Category does not substantially impact the City's Asset Management practices. Public Transportation assets are renewed and replaced based on their criticality and available funding. The average age of Public Transportation assets is illustrated in Figure 9-3.

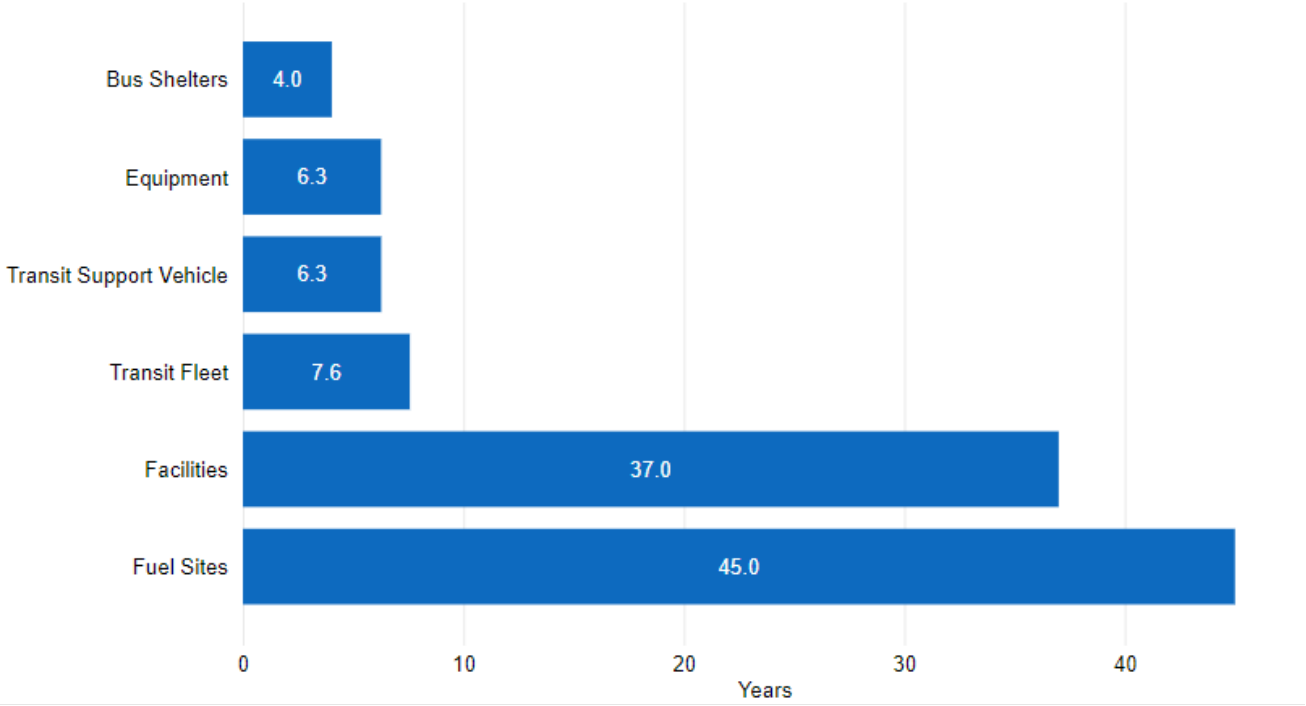


Figure 9-3. Sub-Segment Average Age – Public Transportation Assets

9.2 Levels of Service

Level of Service Statement: Public Transportation infrastructure enables the City to provide a reliable, safe and convenient mobility service option that is accessible to all. Transit Windsor provides services to residents and businesses in the community and connects Windsor to surrounding communities.

Currently, ridership is at a high with buses regularly over capacity. The City's approved 2024 Capital Budget includes the addition of one new bus to the Transit Fleet. The More Than Transit Master Plan will guide service improvements, growth and the development of public transportation services for the foreseeable future. The following are some key aspects of the City's Public Transportation services.

Modes of Transportation: Different modes of transportation are available to the public to ensure everyone has access to Public Transportation services.

Accessibility: Transit Windsor strives to be accessible to all members of the community, including individuals with disabilities and those with limited mobility. This is accomplished through the different modes of transportation available, as well as ensuring fleet and facilities meet accessibility standards.

Infrastructure: Providing Public Transportation services requires various types of infrastructure, such as Fleet Vehicles, Bus Shelters, Fuel Fites and Facilities.

Environmental Benefits: Providing Public Transportation services contributes to environmental sustainability by reducing greenhouse gas emissions, air pollution, and traffic congestion by offering transportation options other than personal vehicles.

Table 9-2 provides a summary of the LOS for the City's Public Transportation services. The City has chosen metrics that define and measure the LOS for delivering services that are provided by Transit Windsor. These metrics help set goals, evaluate performance, allocate resources effectively, and communicate expectations to stakeholders. By establishing LOS metrics, municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance.

Table 9-2. City-Defined Levels of Service – Public Transportation Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
All Segments	Fiscal Sustainability	Reinvestment Rate	2.67%
All Segments	Reliable	Percentage Transit Windsor assets in Good to Very Good condition based on total replacement cost	32.41%
Bus Shelters	Available	Percentage of residents within 400m of a bus stop	84%
Bus Shelters	Available	Percentage of bus stops that are not accessible	38%
Facilities	Environmental Stewardship	Annual electric energy consumption per square foot	10.58 kWh/Sq.Ft.
Facilities	Environmental Stewardship	Annual electric energy consumption per square foot (District Energy)	0.01 GJ/Sq.Ft.
Facilities	Environmental Stewardship	Annual natural gas consumption per square foot	1.62 m3/Sq.Ft
Facilities	Environmental Stewardship	Annual water consumption per square foot	0.04 L/Sq.Ft.
Facilities	Environmental Stewardship	Annual GHG emissions	554.46 tCO2e
Transit Fleet	Available	Number of regular service passenger trips per capita in service area	22.68 Regular service trips per service area
Transit Fleet	Available	Revenue Vehicle Hours per capita in service area	1.14 Revenue vehicle hours per service area
Transit Fleet	Available	Number of total service hours per year	299,231 total service hours per year in 2023
Transit Fleet	Reliable	Average age of Transit Windsor Fleet (buses)	7 years

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Transit Fleet	Environmental Stewardship	Annual GHG emissions	7,482 tCO2e
Transit Fleet	Environmental Stewardship	Annual Fuel distance per Litre	2.075 km/L

9.3 Lifecycle Management Strategy

The objective of the Lifecycle Management Strategy is to outline and establish a set of planned actions based on best practice that will enable the municipality's assets to provide a sustainable level of service to residents, while managing risk at the lowest LCC.

9.3.1 Lifecycle Activities

Public Transportation is responsible for managing the lifecycle of their assets to ensure the safe, efficient, and reliable operation of the transit system. Asset lifecycle management involves undertaking various activities throughout the lifespan of assets, from acquisition to disposal. The following is an overview of some key lifecycle activities related to Public Transportation assets.

Non-Infrastructure Solutions

- Needs assessments, considering ridership demand, service coverage, and infrastructure requirements, strategic plans, procurement processes for new assets.
- Monitor performance of assets for reliability, availability, safety and cost effectiveness.

Operations & Maintenance

- Maintenance routines, including routine and preventative maintenance to ensure ongoing functionality and safety of Transit assets, as well as reactive maintenance addressing asset failures.

Renewal, Rehabilitation & Replacements

- Implementing rehabilitation and renewal work on assets to extend their service life or improve asset performance.
- Replace assets past their useful life ensuring reliability and safety of assets.

Disposals

- Planning and executing decommissioning of assets and the removal from service and disposed of in an environmentally friendly manner.

Service Improvement & Growth Activities

- Acquiring new assets to service growing populations and service areas, as well as to offer new assets and technologies to improve the customer experience.

To help manage its assets, Public Transportation uses several advanced software programs such as Fleet Focus CMMS, which is a comprehensive fleet management program that is capable of tracking vehicle information, as well as all functions related to the maintenance of vehicle equipment, including repair and preventive maintenance work orders (operating expenses including fuel and mileage). The database also manages Transit Windsor's parts inventory and purchasing functions.

In addition, Public Transportation uses Winfuel as their fuel management program and the information collected in the database is interfaced daily with the Fleet Focus program. Meter updates are used to trigger the scheduling of preventative maintenance work within Fleet Focus CMMS.

Specific Asset Management practices or planned actions, and the associated frequency of these actions are outlined in Table 9-3. The activities listed represent the comprehensive approach required throughout the full lifecycle of assets to meet the current levels of service provided by the City while minimizing costs. The activities and strategies listed within this chapter also provide the City's best chance to avoid the risks associated with asset ownership. The risks associated with not following the lifecycle strategies and activities listed can be significant and wide-ranging, which are further explained in section 10.4 - Risks of Not Closing the Gap and Meeting Infrastructure Needs. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies. By prioritizing operations and maintenance, asset renewal and strategic investments, the City can enhance the resilience, sustainability and vitality of the community while minimizing potential risks and ensuring long-term prosperity.

Table 9-3. Asset Management Practices, Planned Activities, and Frequency – Public Transportation Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Facilities & Fuel Site	
• Roof Inspection Program	• Annual / as scheduled / ongoing
• Transit Windsor Master Plan	• As required
• Building Feasibility Study	• As needed
• Condition Assessment	• As funding is available
Fleet & Support Vehicles	
• Corporate Climate Adaptation Plan	• Every 5 years
• Condition Assessment	• As per schedule
• Transit Windsor Master Plan	• As required
• Annual Service Plan	• Annual
Equipment & Bus Shelters	
• Condition Assessment	• Annual
Operations & Maintenance	
Facilities & Fuel Site	
• Reactive Maintenance	• As funding is available
Fleet & Support Vehicles	
• Preventative Maintenance	• As prescribed
• Reactive Inspections	• As required
• Reactive Maintenance	• As required
• Safeties	• 6 months
Equipment & Bus Shelters	
• Cleaning (bus shelters)	• Bi-monthly
• Reactive Maintenance	• As required
Renewal, Rehabilitation & Replacements	
Facilities & Fuel Site	
• Replacement of Facility & Components	• As funding is available

Asset Management Practices / Planned Activities	Frequency
• Renewal of Facility & Components	• As funding is available
Fleet & Support Vehicles	
• Renewal/Rehab	• As funding is available
• Replacement	• As funding is available
Equipment & Bus Shelters	
• Rehabilitation of Components and Equipment	• As required
• Replacement	• As funding is available
Disposal	
Facility & Fuel Site	
• Disposal of old Tanks / Equipment / Used Oil	• As required
• Building component disposal	• As required
Fleet & Support Vehicles	
• Auction, Gov Deals, Scrapped	• As required
Equipment & Bus Shelters	
• Damaged Assets	• As required
• Disposal of Equipment	• As required
Service Improvement & Growth	
Facility & Fuel Site	
• Addition / Expansion or new facility to increase service	• As funding is available
Fleet & Support Vehicles	
• New Technology	• As funding is available
• New Asset	• As funding is available
Equipment & Bus Shelters	
• New Asset	• As funding is available
• New Technology	• As funding is available

9.4 Funding the Lifecycle Activities

The City uses the lifecycle strategies described above in Section 9.3 to plan work and determine future expenditure needs for Public Transportation assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring the City can meet the demands of current services and existing infrastructure.

The scenarios below are informed by the identified lifecycle strategies for Public Transportation assets developed through consultation with staff and are based on best practices. The scenarios below consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City population.

9.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding levels on asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for Public Transportation is approximately $7.7 million annually. It should be noted that the $7.7 million in current funding is due to the availability of grants. Without future grant funding, a significant portion of the replacement activities costs identified will be unfunded. This also impacts the funding gap data provided in Table 9-4. Figure 9-4 shows the projected condition distribution of assets over the 20-year forecast period under the current funding scenario.

The forecast illustrates a sharp decline in condition over the forecast period. Assets in Good to Very Good condition decreases from 32% to 13%, while assets in Very Poor condition increases from 12% to 72%. This scenario highlights challenges the City will face in maintaining Public Transportation infrastructure assets with the current anticipated budget allocations. This suggests that the budget will not be sufficient to keep up with the needs of the assets over time, leading to a significant decline in overall asset condition.

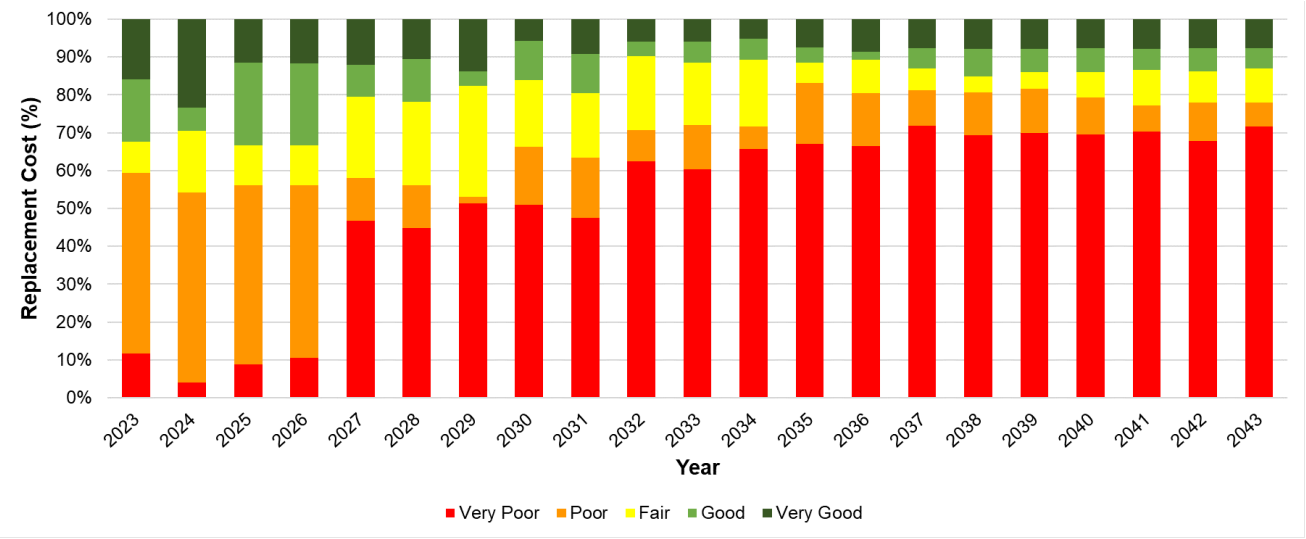


Figure 9-4. Scenario 1: Performance Forecast with Current Funding – Public Transportation Assets

9.4.2 Scenario 2: Maintain Current Performance (Levels of Service)

Scenario 2 reflects the cost to maintain Public Transportation assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the current level of service for the asset Category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of Public Transportation assets was determined to be approximately $14.5 million annually, resulting in an average annual gap of $6.8 million. Figure 9-5 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition increases by 32% from 59%, while assets in Very Poor condition stays the same throughout the 20-year period.

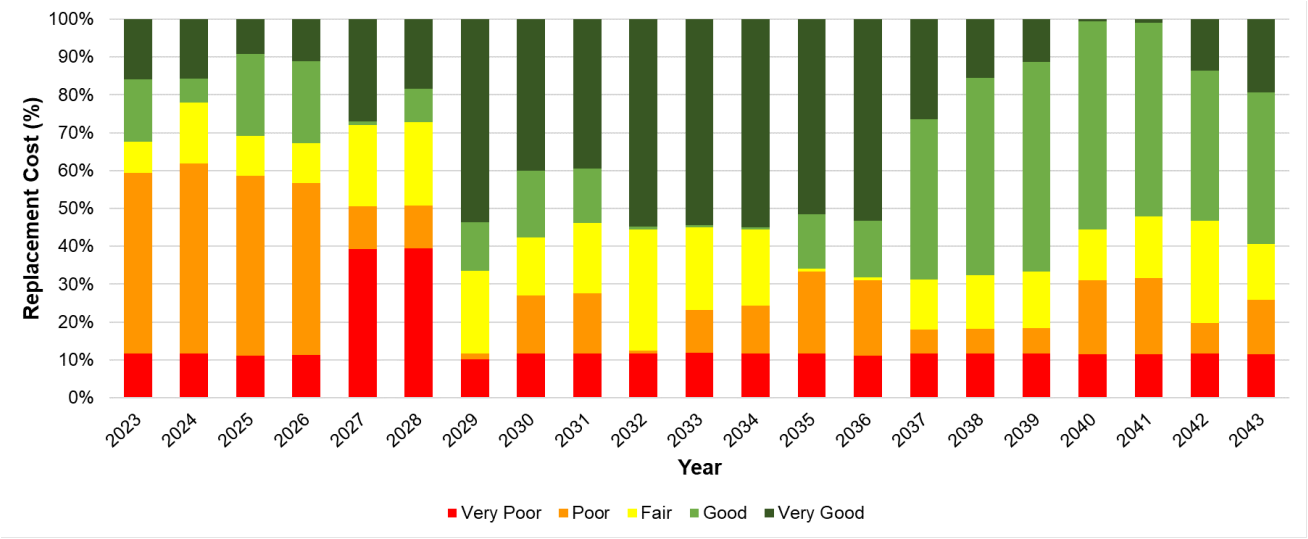


Figure 9-5. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) – Public Transportation Assets

9.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of Public Transportation renewal, rehabilitation, and replacement activities to be approximately $15.0 million annually. Under this scenario, the City faces an annual average gap of $7.3 million for its Public Transportation assets.

This projected asset performance forecast is shown in Figure 9-6. While the modelling shows a continued increase to the value of assets in Very Poor condition through years 2027 to 2034, the forecast shows a significant improvement in overall asset condition by the end of the 20-year forecast through the application of the identified lifecycle strategies. The model indicates that assets in Good to Very Good condition increase over the forecast by 30% from 32%, while assets in Very Poor condition decrease over the forecast by 6% from 12%. This scenario provides the best overall performance of Public Transportation assets.

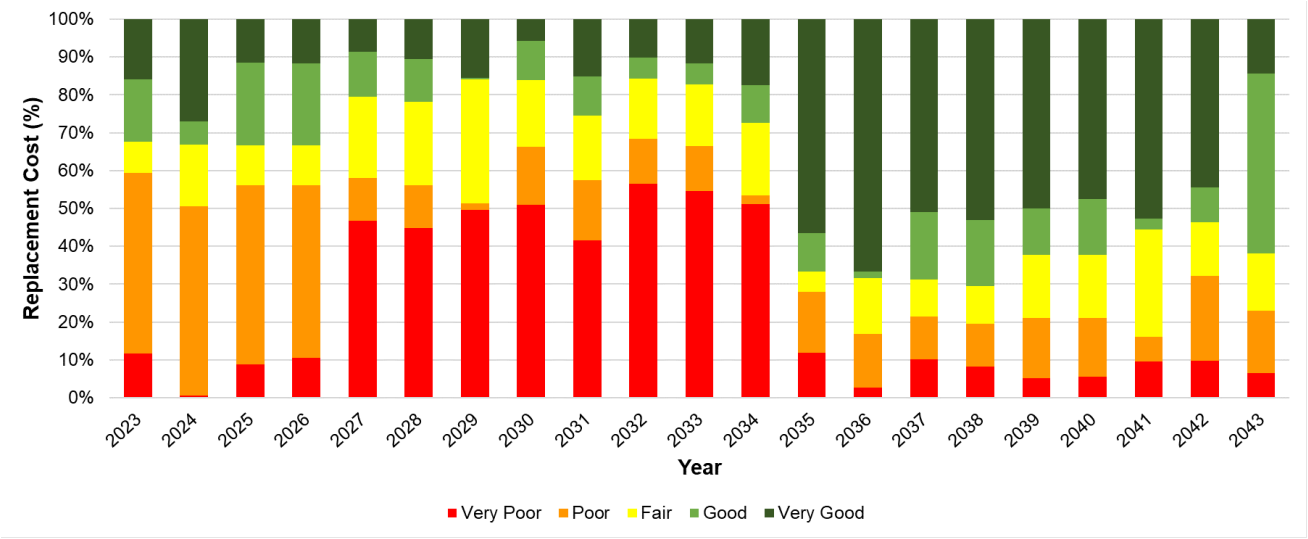


Figure 9-6. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies – Public Transportation Assets

9.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 9-7. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

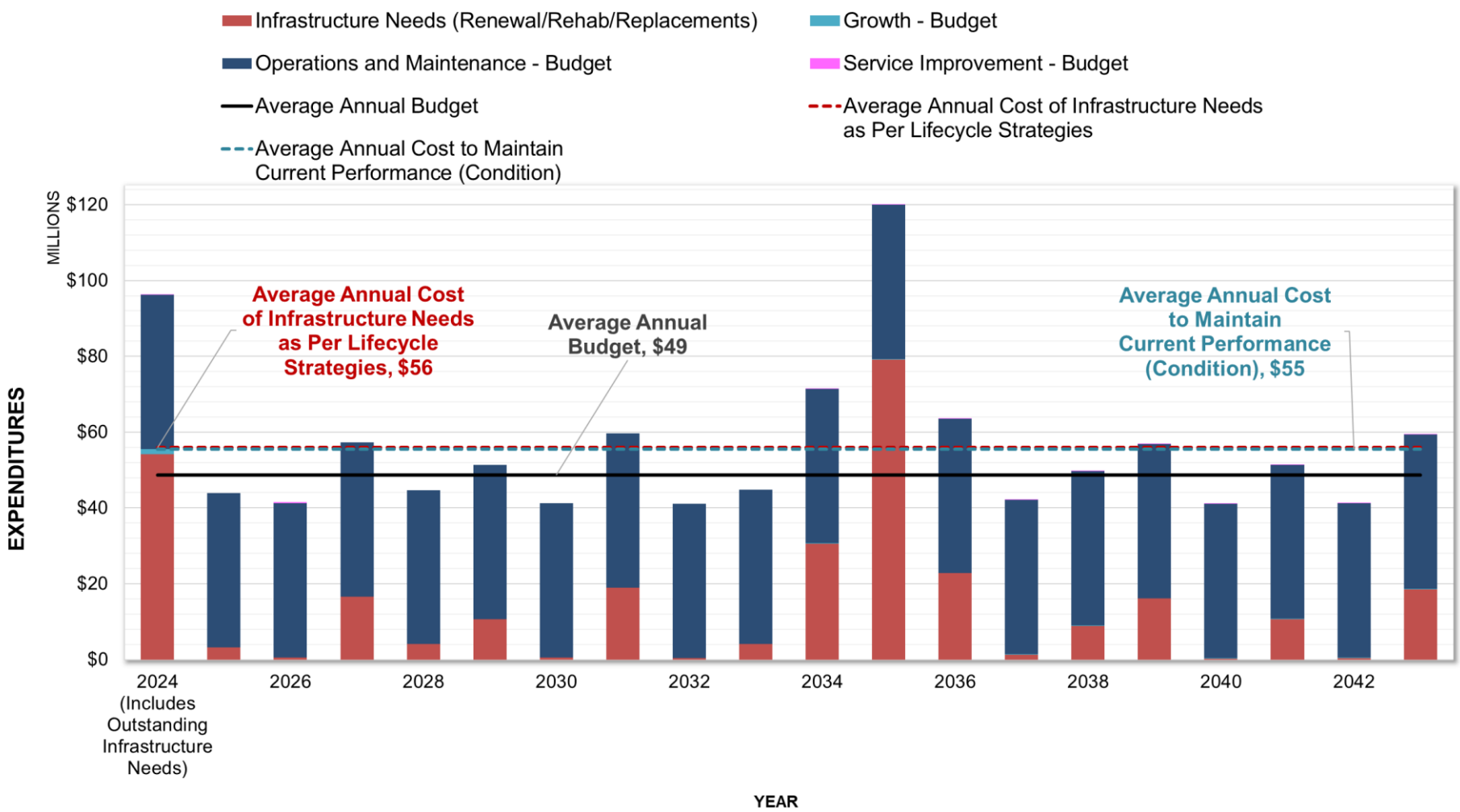


Figure 9-7. Scenario Comparison – Public Transportation Assets

The scenario comparison indicates that the Public Transportation infrastructure is facing an annual gap of $6.8 million to maintain their current performance. If all lifecycle activities identified under the lifecycle strategy were to be undertaken, the gap increases to $7.3 million. This calculated infrastructure gap is further detailed in Table 9-4.

Table 9-4. Lifecycle Activity Investments & Average Annual Infrastructure Gap – Public Transportation Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$0	$0	$0
Operations & Maintenance	$40,692,959	$40,692,959	$40,692,959
Service Improvement	$51,000	$51,000	$51,000
Disposal	$0	$0	$0
Growth	$130,000	$130,000	$130,000
Renewal, Rehabilitation & Replacement	$7,747,011	$14,586,968	$15,082,758
Total	**$48,620,970**	**$55,460,927**	**$55,956,717**
Funding Gap		**$6,839,957**	**$7,335,747**

Transit Windsor received a significant investment from the Investing in Canada Infrastructure Program, which has contributed to the City's ability to renew many Public Transportation infrastructure assets. This injection of funding has been instrumental in addressing a portion of the infrastructure needs and has been factored into the 10-year capital budget available for this asset Category. However, it is crucial to recognize that this funding represents a one-time grant and cannot be relied upon as a sustainable solution to address the remaining infrastructure gap. Moving forward, it is essential for Transit Windsor to explore alternative funding sources and strategies to bridge the remaining gap in operational and capital funding. This may involve seeking additional grants, exploring public-private partnerships, and continuing to prioritize asset management practices and making strategic investment decisions to maximize the impact of available funding resources.

9.5 Data Confidence and Improvement Plan

Table 9-5 outlines the main data sources and overall confidence in the Public Transportation data used for this AMP. Data confidence is based on the number of assumptions made and the reliability of the data sources.

Table 9-5. Data Confidence – Public Transportation Assets

Asset Segment	Data Source	Data Confidence (/10)
Public Transportation	Fleet Focus CMMS Building Condition Assessments PSD Citywide CMMS (TCA database) Excel Subject Matter Experts	8

Transit Fleet and Support Vehicles

The asset data for Transit Fleet and support vehicles is housed using Fleet Focus CMMS software and managed by Transit Windsor. This database is based upon sound records and known procedures and is continually updated. Replacement costs for these assets are based on current market value and considered highly reliable, while condition is based primarily on age. These assessment methods are considered best practice for these types of assets and the data confidence for these assets is high.

Facilities

The facilities asset registry needs to be developed further. Work to house this registry in the City's PSD Citywide Asset Manager software is underway and will improve the reliability and accuracy of this asset data. Replacement values for these assets are assessed at the building level, which does not include component data, and were based either on estimates provided by SMEs using per square foot unit costs based on market values, or on historical costs inflated to 2023 values. Determining a unit cost for the facilities based on building components in the future will improve the accuracy of these assets. Condition data was assessed based on the overall health and performance of the facility, based on building condition assessments conducted in 2019. These Facilities will be included under the current effort administration is working towards in development of a consistent and robust facility condition assessment program based on component level facility information. This will result in more accurate asset data.

Bus Shelters

Transit Windsor's bus shelter inventory is housed in an Excel spreadsheet and considered complete and kept up to date regularly. Condition for these assets is based on age, and replacement cost is based on market value unit costs.

Other Equipment

The remaining assets in the Category are housed in the City's PSD Citywide CMMS software as TCA assets. Replacement costs for these assets are based on historical costs inflated to 2023 dollars, while condition is assessed using age, with a few exceptions where staff expertise is used. Moving forward, equipment assets managed as TCA assets should be reviewed on an annual basis to ensure that the assets are still in service, their condition is

reflected appropriately, and their replacement cost is updated to reflect market value where available.

Overall, the data confidence for the Public Transportation assets is considered to be moderately high.

9.5.1 Recommendations for Improvements

Recommendations for data improvements to the Public Transportation asset Category can be found in Table 9-6.

Table 9-6. Improvement Plan – Public Transportation Assets

Task No.	Task	Resources Required	Responsibility
1	Consider completing updated BCAs for Transit Windsor buildings and establish regular BCA updates every 5 years.	Internal/ External	Corporate Projects
2	Consider further developing equipment register to include equipment such as fareboxes/automatic passenger counters	Internal	Transit Windsor Asset Planning
3	Develop a process to maintain asset registry on an annual basis.	Internal	Transit Windsor Asset Planning

10 Financial Overview

10 Financial Overview

Effective asset management planning requires that an approved AM strategy be fully integrated into annual financial planning and budgeting processes. This financial overview aims to highlight the funding necessary to maintain and enhance the City's infrastructure assets based upon current LOS and to identify any resulting funding gaps. The overview provides an analysis of the average annual funding available, the expenditures required to maintain current performance, or LOS, and identifies funding required to meet infrastructure needs based on the lifecycle activities and strategies defined throughout this document.

The financial overview includes the following:

Budget Overview: The City's budgets are developed to allocate funds to cover the costs of providing services, maintain existing infrastructure, and construct new assets. The budgets are designed to balance required costs (expenditures) with available funding (revenues) and are categorized into:

- **Operating Budget:** Supports the day-to-day activities and functions to provide City services. Samples of the expenditures funded from the operating budget include staff salaries, equipment maintenance, material supply and facility services. These are expensed within the fiscal year.
- **Capital Budget:** Includes large expenditures associated with repair, rehabilitation, renewal, and construction or purchase of new infrastructure. It leverages various available funding sources over a ten-year planning period. The establishment of capital budgets includes the evaluation of long-term investment proposals along with estimating future cash flows.

Revenue and Capital Funding Sources: The City obtains revenues from various sources to fund the expenditures outlined in the Operating and Capital budgets. Revenue sources include, but are not limited to, property taxes, federal and provincial funding, grants and subsidies, and user rates. These revenues are then used to fund all aspects of municipal services, which includes the funding of capital expenditures.

Funding Approach and Assumptions: The AMP aims to determine the funding levels needed to support the capital expenditures, LOS and infrastructure needs across all asset categories.

10.1 Budget Overview

As part of the annual budget development process, the City ensures continued financial sustainability through effective financial planning and risk management. The goal of this AMP is to provide information to Council and the public on the state of the City's infrastructure, to further inform the data used for purposes of preparing the City's budget and to provide responsible financial management to sustain and improve the City's infrastructure while balancing current needs with long-term financial sustainability.

10.1.1 Operating Budget

The Operating Budget provides for expenditures required by the municipality for the current year. In preparing the Operating Budget, the Capital Budget forecast is also taken into consideration. This ensures that sufficient funding is available to operate, repair and maintain existing assets and supports the operation and maintenance of any new assets that are created. Throughout the operating budget development process, the ongoing infrastructure maintenance requirements to hold assets in Good condition continues to be a priority. Other factors, such as expected inflation rates, are also considered as part of budget development.

In preparing the annual Operating Budget, consideration is also given to the level of funding that is allocated to capital reserves, which will be used to fund future maintenance and capital projects. Figure 10-1 provides historical information on the allocation of the City's Operating Budget allocation to various expense categories.

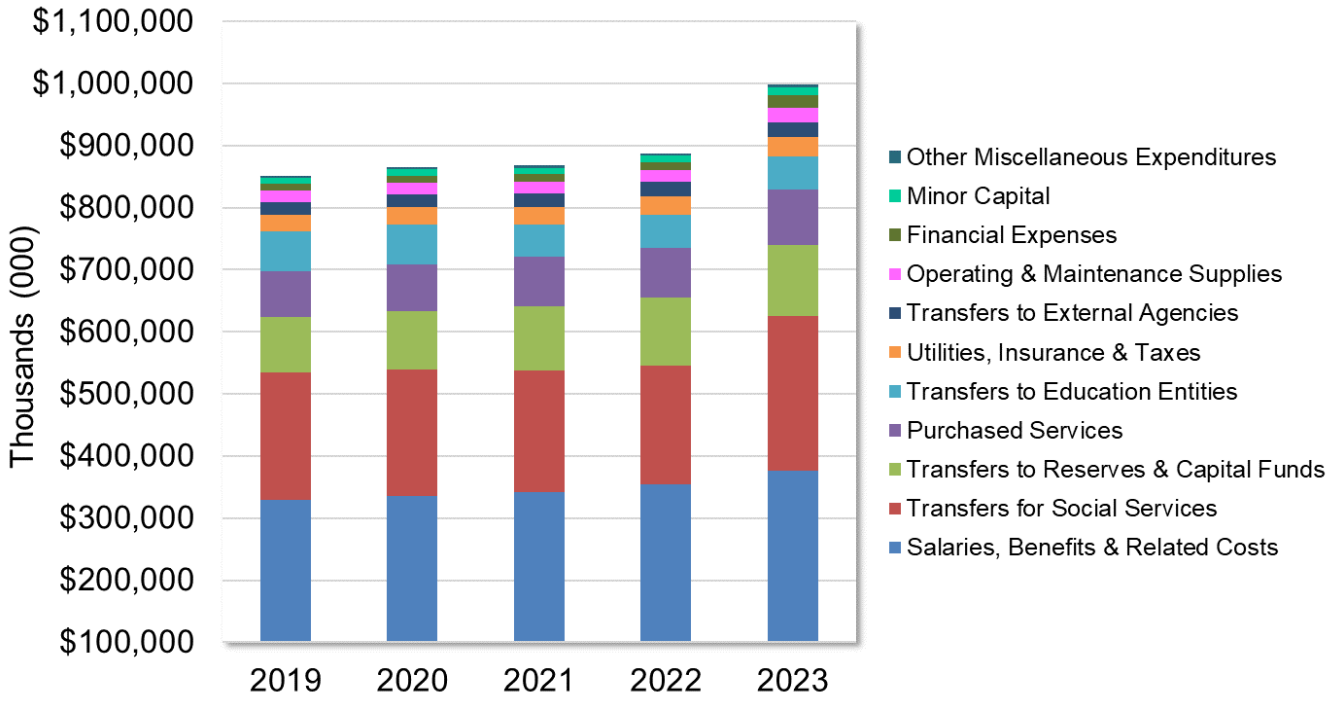


Figure 10-1. Funding Sources for Operating Budget: Expenditure History by Type 2019 to 2023 (adjusted for intra fund allocations)

As noted, Transfer to Reserves and Capital Funds form an important part of the Operating Budget allocation. Operating budgets continue to be developed, keeping in mind the capital and reserve needs to address the City's assets, and should continue to be reviewed in conjunction with the needs identified in this AMP.

10.1.2 Capital Budget

The City prepares a multi-year capital budget on an annual basis, which provides funding for priority capital works based on a number of identified factors such as asset conditions, program needs, economic development opportunities, and others. Table 10-1, and Table

10-2, and Figure 10-2 reflect the allocation of the approved 2024 10-year Capital Budget into the categories of Service Sustainability, Service Enhancement & Growth, Economic Development, and ABCs.

Table 10-1. Projected Capital Budget Expenditures (000's) 2024 to 2028

Type of Expenditure	2024	2025	2026	2027	2028
Service Sustainability	$137,896	$118,094	$125,829	$121,229	$133,600
Service Enhancement & Growth	$42,105	$47,360	$30,969	$24,160	$24,347
Economic Development	$15,204	$10,972	$20,458	$27,637	$18,201
ABCs	$11,915	$10,897	$17,714	$16,307	$16,778
Total	**$207,120**	**$187,323**	**$194,970**	**$189,332**	**$192,926**

Table 10-2. Projected Capital Budget Expenditures (000's) 2029 to 2033

Type of Expenditure	2029	2030	2031	2032	2033
Service Sustainability	$130,850	$121,519	$119,788	$132,358	$128,314
Service Enhancement & Growth	$39,507	$41,792	$33,935	$30,582	$39,738
Economic Development	$5,766	$7,495	$9,473	$6,000	$5,915
ABCs	$13,289	$13,159	$13,114	$13,170	$16,912
Total	**$189,412**	**$183,964**	**$176,310**	**$182,110**	**$190,879**

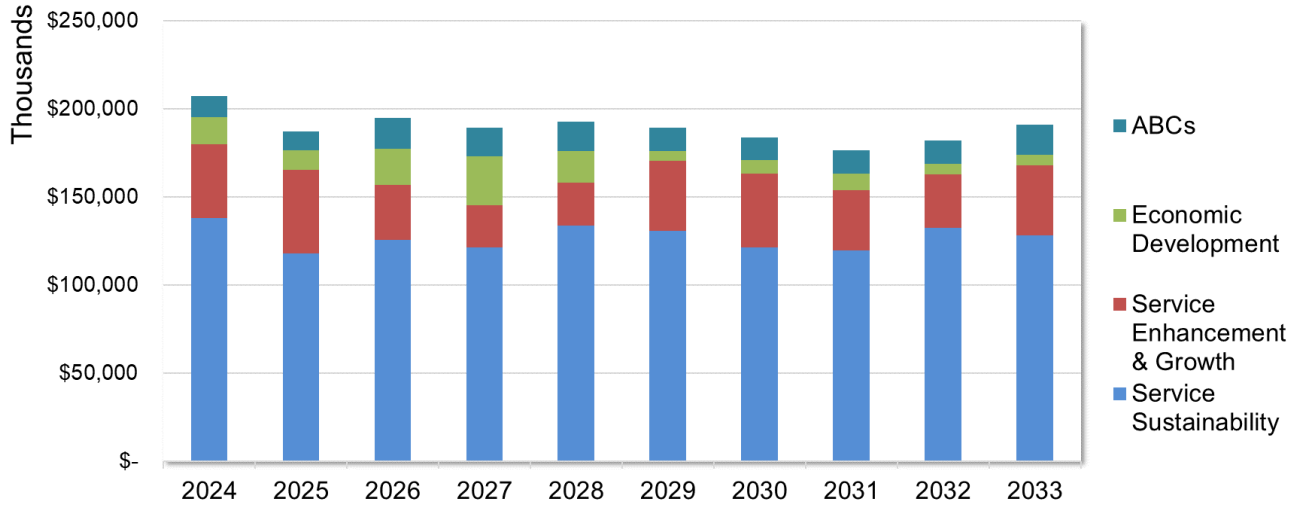


Figure 10-2. Approved 2024 10-Year Capital Budget 2024 to 2033 by Investment Type

The 2018-2019 AMP placed an emphasis on ensuring project funding requirements be categorized separately for maintenance and rehabilitation of existing assets versus those funds to be set aside for service enhancements, growth and economic development. As a result, Fund 221 – Service Sustainability was created to ensure that appropriate capital

funding levels could be maintained to allow for the required repair, rehabilitation and renewal of corporate infrastructure.

An approved AMP Levy, as adopted with the 2018-2019 AMP, provided an annual increase to the capital budget specifically for the purpose of maintaining the condition of existing assets. Once fully implemented in 2025, the AMP Levy will continue to provide incremental funding of approximately $33M annually as a permanent and ongoing increase to the capital budget. In addition, in 2023, Council supported the extension of the AMP Levy through 2026 to allow for the relocation of the H4 Hub and approved a Local Residential Roads Levy which, when fully implemented, will result in increased annual funding of $4M to directly support the rehabilitation of roads in this category. Long term sustainable funding is foundational to being able to address challenges in infrastructure deficits. Continued development and adherence to a measured and well-thought asset management approach will ensure that capital funding continues to address the sustainability of existing assets at current LOS.

10.1.3 Revenue and Capital Funding Sources

The City's revenues, by source, are outlined in Figure 10-3. Revenues include those generated from property taxes, contributions from senior levels of government, rents, concessions, fines, income from investments, and other miscellaneous revenue sources.

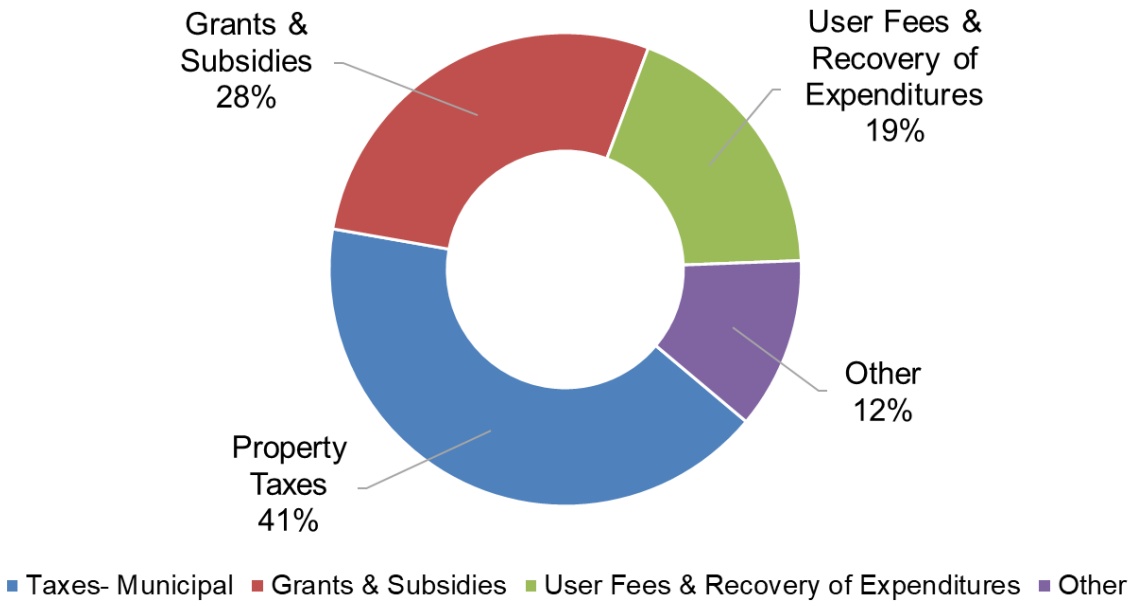


Figure 10-3. Current Funding Sources for Operating Budget Expenditures (2023)

As shown, over 40% of the City's revenue is derived from Property Taxes. The next largest revenue source for the City are Grants & Subsidies, typically provided by senior levels of government.

With regard to the funding of capital projects, the main sources of current funding for the City are as follows:

Levy / User Fee Based Revenue Sources

- Pay-As-You-Go
- Service Sustainability
- Sewer Surcharge

Corporate Reserves

- Capital Expenditure Reserve
- Development Charges Reserves
- Other Reserves

External Sources

- Provincial Transit Funding
- Canada Community-Building Fund (formerly Federal Gas Tax)
- Various Grants including, but not limited to: Public Transit Infrastructure Funding, Disaster Mitigation and Adaptation Fund
- Development Charges
- Other One-time Funding
- Third-Party Recoveries

10.1.4 AMP Financial Development

The approved 2024-2033 capital budget, along with select information from the approved 2023 operating budget, was used as the basis for the analysis within this AMP and is shown as the Average Annual Budget. In determining the Annual Average Budget amounts, both the City's Capital and Operating budgets were analyzed to ensure alignment between the asset categories being reported on in this AMP and the funding that supports them. The calculated average annual budget amounts were then applied to the following ten-year period covering 2034 – 2043 to allow for a 20-year forecast amount to be determined. For purposes of this AMP, the model did not assume any increases in current funding levels over the forecast period.

A summary of the forecasted Average Annual Budgets identified for all asset categories reported in this AMP, excluding ABCs, is shown below in Table 10-3.

Table 10-3. AMP Capital and Operating Budget Overview by Category (excluding ABCs)

Asset Category	Average Annual Budget
Environmental Protection	$84,969,005
Transportation	$83,088,133
Facilities	$36,487,050
Fleet and Corporate Equipment	$26,693,368
Information Technology	$14,925,959

Asset Category	Average Annual Budget
Natural Assets	$5,217,944
Parks	$30,149,344
Public Transportation	$48,620,970
Grand Total	**$330,151,774**

The Average Annual Budget can be further reviewed based on Lifecycle Activities, as shown in Table 10-4.

Table 10-4. AMP Capital and Operating Budget Overview by Lifecycle Activity (excluding ABCs)

Lifecycle Activity	Average Annual Budget
Non-Infrastructure	$599,080
Operations & Maintenance	$178,607,755
Service Improvement	$21,957,669
Disposal	$452,500
Growth	$21,455,942
Renewal, Rehabilitation & Replacement	$107,078,828
Grand Total	**$330,151,773**

The AMP focuses to identify renewal, rehabilitation and replacement needs for infrastructure investments, therefore only these lifecycle activities, and their estimated costs, are utilized in the calculation of the infrastructure needs gap. Expenditures required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, disposal, service improvement, and growth are based on current operating and capital budget expenditures and, while not informing the model, have been captured to provide high-level information on the full LCC of asset ownership.

The dollar figure associated with Operations and Maintenance activities represents both Operating and Capital Budget expenditures for these activities. As previously noted, select Operating Budget amounts have been included in the Operations and Maintenance Lifecycle Management Activities category for illustrative purposes only. For asset categories where operating costs fully align with the assets presented in that chapter, the entire approved operating budget has been included in the figures presented. For AMP categories where there are several departments represented, only the operating costs related to direct repairs and maintenance activities of the reported assets have been captured.

It is important to note that the AMP modeling assumes that non-infrastructure, operations and maintenance, service improvement, disposal and growth funding levels are adequate to meet

the assets needs. As the City continues to mature its Asset Management program, it is recommended that efforts be made to quantify the true cost and need of operations and maintenance to ensure that appropriate funding levels are available for the maintenance of the City's assets. Optimizing maintenance and leveraging new technologies can enhance operational efficiency and extend the lifespan of assets, ensuring that assets are being provided and maintained at the lowest possible cost.

10.2 Forecasting Approach and Assumptions

Investment needs have been assessed against the projected funding for the next twenty (20) years. The assumed annual expenditures are based on the scenarios outlined in the chapters for each asset Category.

As indicated, for the purposes of this AMP, only renewal, rehabilitation and replacement lifecycle activity costs and needs are analyzed for the forecasted scenarios. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Details of the expenditures and funding required for the remaining lifecycle activities (non-infrastructure, operations and maintenance, service improvement, disposal and growth) have been reported on to consider the entire LCC of the City's assets and services, which are based on the Operating and Capital Budgets for the City. For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City population.

Scenario 1: Current Budget Summarizes the current funding available for the lifecycle activities for all asset categories. This AMP has used data from the 2024 Approved 10-year Capital Plan and the 2023 Approved Operating Budget to support the analysis on available funding.

Scenario 2: Maintain Current Performance (Condition) This scenario forecasts the expected expenditures needed to maintain performance levels (condition). This forecast scenario is a requirement of O. Reg. 588/17.

Scenario 3: Infrastructure Needs as Per Lifecyle Management Strategies This scenario identifies the ideal expenditures on assets based on lifecycle activities developed with staff and based on best practices.

10.3 Projected Expenditures & Infrastructure Gap

The compiled investment needs under each of the three analysis scenarios are presented in Figure 10-4 and Table 10-5, which illustrate the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap

analysis also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

This AMP has identified an annual overall funding gap of $78 million in order to maintain current LOS for all asset categories, and an annual gap of $118 million for infrastructure needs as per the identified lifecycle strategies for each asset Segment. These figures do not include the infrastructure needs of the City's ABCs, which are outlined in the following sections. By taking a proactive and multifaceted approach to addressing the infrastructure gap, the City can work towards ensuring the continued functionality, safety, and resiliency of its essential assets for the benefit of residents and businesses.

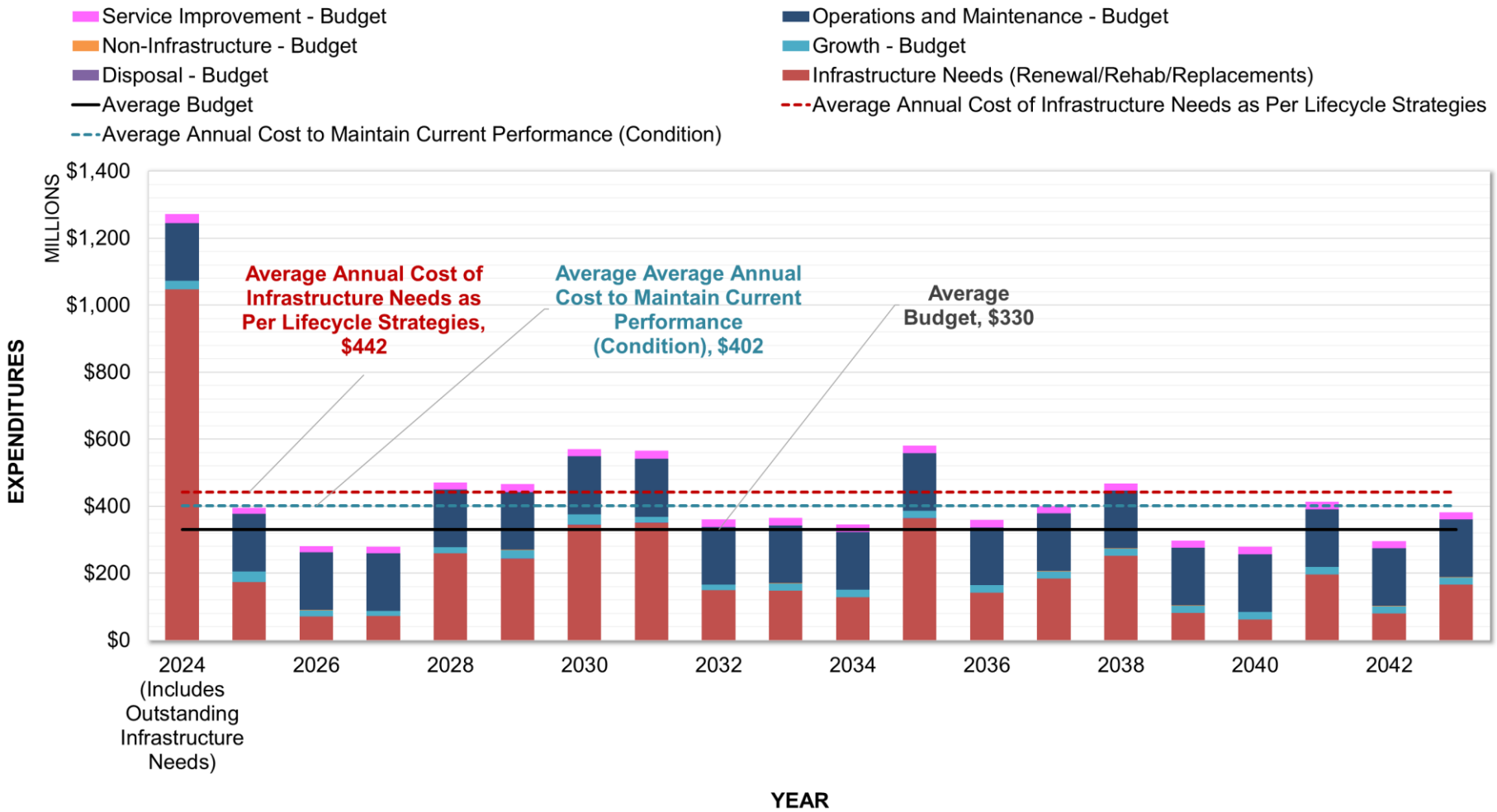


Figure 10-4. Forecasted Lifecycle Expenditures for All Asset Categories (Excluding ABCs)

The consolidated information can be further displayed as follows:

Table 10-5. Combined Average Annual Budget and Lifecycle Investment Scenarios (Excluding ABCs)

Lifecycle Activity	Average Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Identified Infrastructure Spending Requirements
Non-Infrastructure	$599,080	$599,080	$599,080
Operations & Maintenance	$178,607,755	$178,607,755	$178,607,755
Service Improvement	$21,957,669	$21,957,669	$21,957,669
Disposal	$452,500	$452,500	$452,500
Growth	$21,455,942	$21,455,942	$21,455,942
Renewal, Rehabilitation & Replacement	$107,078,828	$184,998,265	$225,320,136
Total	**$330,151,774**	**$408,071,211**	**$448,393,082**
Funding Gap		**$77,919,437**	**$118,241,308**

10.3.1 Cumulative Infrastructure Gap

The cumulative results of these scenarios highlights that significant investment, along with the adoption of strategic asset management practices and policies, will be required to meet expected infrastructure needs in order to keep assets in their current condition. The infrastructure gap is further demonstrated in Figure 10-5 which illustrates the identified cumulative gap over the 20-year forecast. The figure highlights the cumulative effect of this gap over the 20-year forecast period, emphasizing the impact of inflation on the required funding. The inflation rate used in this analysis is 2.5%. If left unaddressed, the cumulative infrastructure gap, factoring in inflation, would amount to $4.5 B by the end of the 20-year period. It is crucial for the City to consider ways in which to address this gap through strategic investments and planning to ensure sustainable and resilient infrastructure for the future.

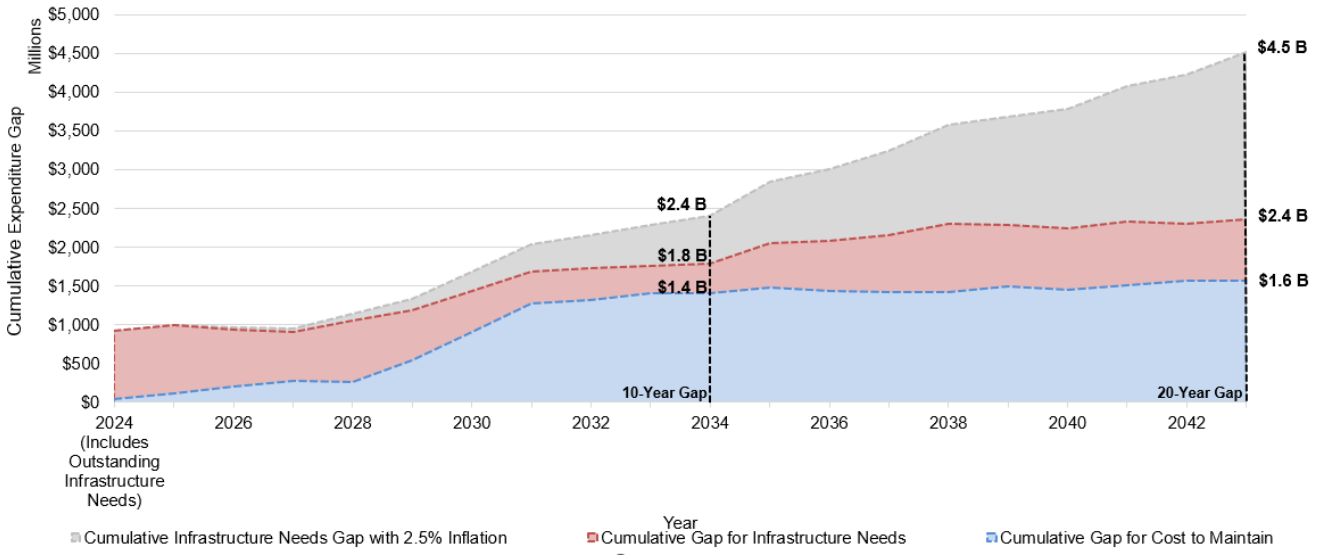


Figure 10-5. Cumulative Infrastructure Gap based on Total Lifecycle Expenditures (excluding ABCs)

10.3.2 ABCs Considerations

O. Reg. 588/17, defines an “infrastructure asset” as any asset directly owned by the municipality or included on the consolidated financial statements of a municipality. With this consideration, the City’s ABCs worked collaboratively with City Asset Planning staff in developing an AMP for the City-owned assets they manage and maintain within their respective portfolios. These AMPs have been included as appendices to this document and can be found in Appendix A.

The ABCs consolidated within this document include City of Windsor Airport, City of Windsor Golf Courses, City of Windsor Police Services, Windsor Public Library Board, Windsor-Essex Community Housing Corporation, and the Windsor-Essex Solid Waste Authority.

The identified infrastructure gap for each of the ABCs is provided in Table 10-6. ABCs Infrastructure Gap.

Table 10-6. ABCs Infrastructure Gap

Lifecycle Activity	Annual Average Infrastructure Gap to Maintain Current Performance (Condition)	Annual Average Infrastructure Gap to Meet Infrastructure Needs as Per Lifecycle Strategies
City of Windsor Airport	$6,100,802	$9,124,996
City of Windsor Golf Courses	$770,509	$884,506
Windsor Police Services	$3,216,944	$6,532,147
Windsor Public Library Board	$2,177,537	$33,027
Windsor Essex Community Housing Corporation (CHC)	$7,300,000	$11,700,000
Essex Windsor Solid Waste Authority (EWSWA)	$5,700	$0

10.4 Risks of Not Closing the Gap and Meeting Infrastructure Needs

It is important to understand and take into consideration the linkages and trade-offs between options to address the gap. The goal of proper asset management is to continuously deliver the required service levels to citizens, at an acceptable level of risk, while minimizing LCC.

10.4.1 Risks Associated with Lifecycle Management

Following the lifecycle strategies and activities outlined in this AMP are the City's best way to avoid risk. Ignoring the infrastructure gap, and not completing lifecycle activities and strategies as outlined in this AMP can lead to a range of negative consequences, both immediate and long-term. These risks and their consequences could include:

Deterioration of Infrastructure and Asset Failure: Without proper investments for renewal, rehabilitation and replacement activities, infrastructure assets will deteriorate over time, leading to increased breakdowns, service disruptions, and potentially safety hazards.

Decreased Operational Efficiency: Without proper lifecycle management strategies, infrastructure may become inefficient, leading to increased downtime, delays, and reduced productivity.

Increased Costs: Delaying infrastructure investments leads to higher costs in the long run. Deferred maintenance and rehabilitations can result in more extensive reactive maintenance, or the need for premature asset replacements, which are significantly more expensive than timely maintenance and upgrades. Ultimately by not adequately keeping assets in a good state of repair leads to higher LCC.

Improper Forecasts: Many non-infrastructure activities such as the development of master plans and asset management planning, provide valuable insights into the infrastructure needs. If these activities are not completed, it can lead to inaccurate estimations for funding requirements and capacity requirements.

Service Disruptions: The deterioration of assets, or asset failure, often leads to unplanned and unexpected disruptions to the services the community currently enjoys and relies on.

Negative Impact to Quality of Life: Poor infrastructure affects the quality of life for residents, including issues like traffic congestion, inadequate public transportation, sewer backups, basement flooding, or lack of access to services. Assets in poor working order also increase the risk of potential health and safety impacts.

Environmental Impacts: Inefficient infrastructure can have adverse environmental impacts such as increased emissions from old facility or fleet assets, or sewage reaching the environment through leaks in pipes. This also increases the potential risk of not meeting regulatory requirements.

Regulatory Non-Compliance: Many of the assets, in particular Environmental Services and Transportation, are highly regulated assets that require assets to be properly maintained and reported on their compliance. Failure to meet regulatory requirements for infrastructure maintenance and safety can result in fines, penalties, legal actions, and possible loss of licenses or permits.

Loss of Public Trust and Confidence: Persistent neglect of infrastructure needs can erode public trust in government institutions and undermine confidence in the ability of leaders to address pressing challenges and could result in difficulties in implementing future infrastructure initiatives.

Negative Economic Impact: Inadequate infrastructure can hinder economic growth because of inefficient and unreliable services to residents and businesses.

Safety Risks: Aging or poorly maintained infrastructure can pose safety hazards to users, workers, and the surrounding community, potentially leading to accidents, injuries, or even fatalities.

Addressing infrastructure needs requires proactive planning, investment, and ongoing maintenance to ensure the resilience and vitality of the community while mitigating the various risks outlined above.

10.5 Funding Strategies and Recommendations

As the previous section demonstrates, there is a significant gap between the currently projected infrastructure needs and the current funding levels. To address this gap, the City will need to explore options to increase funding, reduce the projected infrastructure costs or a combination of the two. Addressing such a substantial gap will require careful consideration and a combination of strategies, including non-financial and financial, some of which are outlined below. Many of the non-financial strategies are best practices in Asset Management.

Non-Financial Strategies

- **Levels of Service Targets:** The 2025 iteration of this AMP will allow the City the opportunity to set targets for the LOS that are reported in this AMP. It will offer the municipality the opportunity to assess the current performance of the asset categories

and consider adjusting objectives against affordability and willingness to pay. The City may need to reduce or reprioritized service levels to meet infrastructure needs.

- **Asset Prioritization**: Identifying critical assets and focusing resources on maintaining those that are most essential for public safety and service delivery.
- **Efficiency Measures:** Implementing measures to optimize asset management processes and reduce operational costs where possible.
- **Long-Term Planning:** Continue to develop long-term financial plans that allocate resources strategically over multiple budget cycles to address both immediate needs and reduce outstanding infrastructure needs over time. The City has begun these efforts and is working on the implementation of Predictor Decision Support Tool for this purpose.
- **Community Engagement:** Engaging with the community to communicate the importance of infrastructure investment. This would also be beneficial when evaluating target performance for LOS.
- **Advocacy:** Advocating for increased funding support from senior levels of government and seeking partnerships with neighbouring municipalities to share resources and costs.

Financial Strategies

- **Reserves & Reserve Funds**: Consideration of level of contribution to reserves and reserve funds each year to save up and create a buffer for years with high expenditures. These reserves are funded by sources such as taxes, user fees, grants, etc.
- **Debt Financing:** Consideration of debt financing for construction or acquisition of assets. The municipality has constraints with the amount that it can borrow.
- **Grant Funding:** Continue to apply and search for opportunities for further grant funding.
- **Revenue Increase & Infrastructure Levy:** Consider revenue increases to fund the infrastructure gap through incremental tax increases, as well as a dedicated Infrastructure Levy.
- **User Fees and Charges:** Implementing or adjusting fees and charges for municipal services to address the gap in renewals and replacements for the systems.
- **Growth:** Increasing density and new developments can provide additional revenue produced from taxes and rates, particularly if new growth is focused in areas where the costs to service the development are less than the additional revenues.
- **Divestitures:** The City may need to sell assets, providing revenue from the proceeds, as well as reducing operating and maintenance costs. This option is not possible with many asset types (such as linear infrastructure like watermains).

By adopting a combination of strategies, the City can better address its infrastructure needs, improve service delivery, and enhance the quality of life for residents while ensuring fiscal sustainability and responsible stewardship of public resources.

11 Improvement and Monitoring

11 Improvement and Monitoring Plan

Continual improvement in Asset Management involves an ongoing process of refining strategies, practices, and systems to optimize the performance and value of assets over time. Some key aspects include:

Data-driven decision-making: Utilizing data analytics and performance metrics to assess asset performance, identify trends, and make informed decisions. This includes collecting data on asset condition, usage, maintenance history, and LCC.

Risk management: Implementing strategies to identify, assess, and mitigate risks associated with asset ownership and operation.

Asset Performance: Regularly monitoring asset performance against predefined performance indicators and benchmarks to identify areas for improvement and ensure alignment with organizational goals.

By continuously refining Asset Management practices through these principles, the City can enhance asset performance, reduce costs, and ultimately achieve their strategic objectives more effectively.

Below are specific recommendations the City may consider to further mature their Asset Management planning program, which ultimately will enhance the accuracy of the information included in future iterations of the AMP.

11.1 Recommended Improvements

Table 11-1. Asset Management Recommended Improvements

Description	Benefit & Outcomes
Business Processes: Develop and maintain business processes, a detailed easy to read visual component outlining the process of a venture from start to finish. This not only applies to asset management processes, but data and lifecycle management as well. This includes reviewing current processes and explicitly defining tasks, decision points, inputs and outputs, as well as roles and responsibilities.	Ensures data will support data-driven, defensible, and strategic decision-making. Asset management planning forecasts will be more accurate, and more time available further enhancing problem solving than simply reporting. The outcome from this visual will reduce costs, confusion on asset information and asset planning.
Information Systems: The City maintains multiple asset inventories within expert systems, as well as their Citywide system. While these inventories serve different purposes, finding a way to better align these inventories will help to improve consistency of data across the organization. Each category is at varying levels of maturity in this regard and ensuring clear definition of the “source of truth” for all assets is key to ensuring the asset registers developed for the AMP are accurate. Where possible, pools of assets should be broken down to asset specific registers, typically found in expert systems (i.e. GIS).	Provides the most accurate and up-to-date information, allows for ease of reporting with clear definitions of sources of information.

Description	Benefit & Outcomes
Asset Data: Maintaining organized and reliable asset data is fundamental to AM as it is the basis that drives decision-making. Some opportunities to improve confidence in the asset data include: • Asset hierarchy development which should be applied and maintained to asset registers. • Asset data improvements. • Review and develop consistent methods for determining data fields that may change over time (e.g. replacement value). • Review and update basic asset information where possible, such as installation dates to improve accuracy and precision. This may include reviewing historic documents to determine values or developing consistent strategies for addressing gaps and understanding how these assumptions may impact decision-making.	Improves efficiency in reporting and ensures the quality of the assessment. Will allow for more regular asset reporting to provide to stakeholders for decision making purposes.
Condition Assessment Programs: Review condition assessment/data collection business processes, protocols, schedules, and roles and responsibilities to ensure data collected from these programs can be linked to inventory and used to drive decision-making.	More reliable condition information that will provide more accurate forecasts which are consistent throughout the City.

Description	Benefit & Outcomes
Condition Definition: Document and provide more information on condition definitions and how condition ratings are assigned to individual asset categories. Condition assessments (even when subjective) should have clearly defined definitions and agreed upon terms.	Defining how condition ratings are assigned provides increased transparency and reliability in the data when how condition is evaluated is clear. It is also a requirement of O.Reg. 588/17 to provide "a description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate."
Decision Support System: Decision support systems allow forecasting to be done similar to the analyses completed for this AMP. The City currently has different systems in place for decision support, but at varying levels of maturity. It is recommended that the City further investigate the use of these tools and implement the chosen platform to include all assets. This will allow for repeatable processes for the City to allow for continual update and improvement of asset management planning and forecasting to assist in decision making.	Consistent and repeatable reporting to allow for improved decision making.
Criticality & Risk Analysis: The ranking of how catastrophic a failure of an asset will be within the web of systems. The analysis of the risks a system or project poses and the failure modes that are identified with them.	Ranking criticality helps clarify which assets to focus on when limited by the resources at hand. Beneficial for identifying the most likely problem areas and risks.

Description	Benefit & Outcomes
Failure Analysis: List of failure modes and mitigating actions. All decisions about the refurbishment and replacement of an asset and the timing of these activities should be based on a sound determination of the asset's critical failure mode. Identification of critical failure modes will ensure that the City focuses on the assets and failures that can have the most impact on its ability to deliver services.	By having an improved understating of asset failure, the City can more accurately forecast asset needs and target assets more likely to fail based on reliable data. Assets as they reach the end of their useful life are prone to increased risks of failures, and more costly reactive maintenance.
Operational Assessment: To further understand and optimize maintenance being completed on assets and the resources available for operations and maintenance.	Maximize operations and maintenance to ensure increased productivity and reliability of assets to reduce costs.
Budget Development: Align budgets to Lifecycle Activities, specifically for Operation Budget, or incorporate CMMS data into analysis.	To assist in determining the whole lifecycle cost of assets, and to assess these costs, aligning the budget process with asset management defined lifecycle activities will provide more clarity and tie expenditures to assets.
Lifecycle Strategies: Continue to expand and improve on lifecycle management strategies used to forecast the infrastructure needs of assets.	Improved accuracy of forecasted needs.

11.2 2018-2019 AMP Work Plan

The City has made many improvements to the information used to inform this AMP from the previous 2018-2019 iteration to satisfy the 2024 regulation requirements. An update on the status of the 2018-2019 AMP work plan can be found in Table 11-2.

Table 11-2. Status of 2018-2019 AMP Work Plan

Task No.	AMP Category	Task	Required Resources	Responsibility	Status
1	All	Identify, define, document, and implement LOS and Risk for remaining assets.	Internal	Asset Planning	Complete
2	All	Focus efforts in creating a single AMP which will provide an executive summary for City Council in future Council Reports.	Internal/ External	Asset Planning	Complete
3	All	Implement Council approved Asset Management tools (Whole Life-cycle Costing, Triple Bottom Line Plus, and Business Case Evaluation) for projects as identified by the Asset Planning Steering Committee.	Internal	Asset Planning	Ongoing
4	All	Work with departments to identify which subjectively rated assets require formal objective condition rating process and seek to define and implement. This could involve use of third-party services.	Internal/ External	Asset Planning Various Departments	Ongoing
5	All	Development of process to annually review asset sub-systems and TCA data. Process to include identification of gaps in current process to ensure better alignment between the two systems going forward.	Internal/ External	Asset Planning Various Departments	Ongoing

Task No.	AMP Category	Task	Required Resources	Responsibility	Status
6	All	Implementation of balance of Asset Manager Software of automation of LOS, Risk, and deterioration models as well as the Capital Budgeting and Planning software. This will improve efficiency of data gathering for asset management plan as well as capital budgeting and TCA data management.	Internal/ External	Asset Planning Capital Budget & Planning Various Departments	Implementation of software is complete. Assessment of software functionality and integration is ongoing.
7	All	Develop and implement a project plan based on 2023/2024 regulation requirements. This includes but is not limited to 10-year funding numbers, costs to meet Proposed Levels of Service, expansion of growth needs based on results of various plans identified in Section 2 of this AMP.	Internal	Asset Planning Various Departments Steering Committee Appropriate ABCs	On target to meet the 2025 O. Reg. 588/17 requirements.
8	Parks, Natural Assets	Implementation of Parks asset and work order system.	Internal/ External	Asset Planning Parks	Complete
9	All	Development of a process to determine proposed LOS for assets as well as public engagement as required for O.Reg 588/17.	Internal/ External	Asset Planning Steering Committee	On target to meet the 2025 O. Reg. 588/17 requirements.

11.3 2024 AMP Work Plan

Asset Management Plans are designed to be “living” documents which require continuous updates and improvements. This allows the City to understand the ever-changing state and needs of the system, while utilizing new information and processes

to improve decision-making around these assets. The City is taking a proactive approach to asset management, recognizing the importance of continually improving their forecasting and planning processes. The 2024 AMP workplan is shown in Table 11-3.

Table 11-3. 2024 AMP Work Plan

Task No.	AMP Category	Task	Required Resources	Responsibility
1	All	Continue work to meet the requirements of O. Reg. 588/17 as it relates to the July 1, 2025 milestone of defining proposed LOS and the related financing implications and strategy.	Internal/ External	Asset Planning Various Departments
2	All	Continue to educate and advocate for the adoption and use of best practices in Asset Management across all areas of the organization.	Internal	Asset Planning
3	All	Support departments in implementing Asset Management best practices such as risk assessment, analysis of lifecycle costing, whole life-cycle costing, and business case evaluation for various projects.	Internal	Asset Planning
4	All	Continue to work with all asset owners to align data sources, ensure that asset registries are maintained regularly and stored appropriately and continue the development of processes to annually review asset sub-systems and TCA data. Process to include identification of gaps in current process to ensure better alignment between all systems going forward.	Internal	Asset Planning Various Departments

Task No.	AMP Category	Task	Required Resources	Responsibility
5	All	Work with departments to identify which subjectively rated assets require a formal objective condition rating process and look to define and implement those processes, where able.	Internal	Asset Planning Various Departments
6	All	Continue to explore opportunities to address financial pressures and infrastructure gaps identified in the AMP.	Internal/ Third Party, where appropriate and/or required	Asset Planning Capital Budget & Planning Various Departments
7	All	Build on lessons learned from past Building Condition Assessments and move forward with an improved Building Condition Assessment program that can be used for all corporate buildings.	Internal/ Third Party, where appropriate and/or required	Asset Planning Various Departments
8	All	Assessment of functionality and integration of Asset Manager Software for automation of LOS, Risk, and deterioration models as well as the Capital Budgeting and Planning software.	Internal/ External	Asset Planning Capital Budget & Planning Various Departments

APPENDIX A
City of Windsor ABCs

City of Windsor Airport

Asset Management Plan

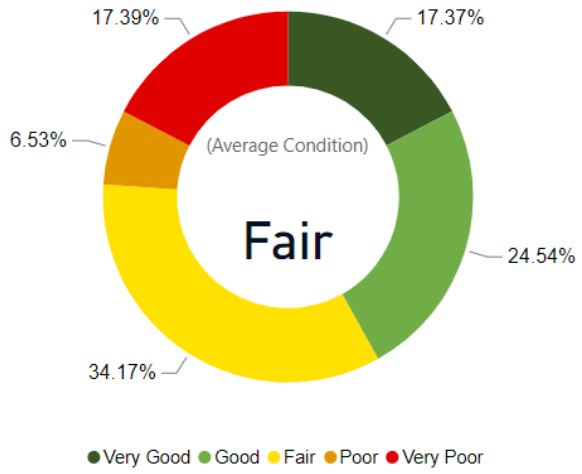
2024

City of Windsor Airport

Replacement Value

Asset Segment	Replacement Value
Equipment	$5,196,418
Facilities	$89,151,542
Fleet	$5,735,381
Other	$6,086,227
Roadways	$14,803,306
Runways and Aprons	$73,860,000
Sewers	$8,970,393
Taxiways	$21,961,008
Total Replacement Value	**$225.8 M**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastrucurue Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecycle Strategies
$6.1 M	**$9.1 M**

Quick Facts

- 10 Municipally owned buildings on Airport lands: 6 directly support the Airport's aviation functions; 4 are leased bldgs
- 2 runways: 1 rmeasuring 1.570 km; 1 measuring 2.743 km, which accommodates for any size aircraft
- Ideally situated on the Canada/United States international border

1 City of Windsor Airport

1.1 State of the Infrastructure

As a key transportation asset, Windsor International Airport (Airport) is centrally located within the City of Windsor (the 16th largest census metropolitan area in Canada), within the Region of Essex County (population of approximately 420,000 people). It is the only business and general aviation airport in the region, serving the surrounding communities of Essex and Kent County. The Airport is ideally situated on an international border between Canada and the United States, a modest 45-minute drive from downtown Detroit.

The Airport assets included in this report:

Equipment: Includes security systems, winter control and lawn maintenance equipment, sweepers (sidewalk & runway), a passenger ramp, line painters, aircraft *(below the wing)* servicing equipment, and other specific equipment[1] used by Airport staff to operate and maintain the infrastructure assets that support the full functionality of the Airport.

Facilities: There are a total of ten[2] municipally owned buildings within the Airport property. Six of these buildings directly support administrative, operational, recreational, and commercial, aviation functions of the Airport. These include the main terminal building, the operations garage, three storage facilities and the Maintenance Repair and Overhaul (MRO) facility, which is operated by a third party. The remaining four buildings are leased to third parties unrelated to Airport operations. Building condition assessing is done by staff expertise as well as independent engineers when required to ensure a comprehensive and accurate condition assessment. This assists in planning and prioritising for future repair and maintenance works.

Fleet: Includes corporate fleet vehicles, aircraft rescue vehicles, and tractors and trailers. These vehicles are used by staff for Aircraft Rescue and Firefighting (ARFF), airfield inspections, wildlife control and various other functions to support Airport operations. Some of the Airport Fleet is specialty equipment, essential to providing the required maintenance and services to comply with the Canadian Aviation Regulations (CARS). Under the Canadian Aviation

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[1] *Parking Shades & Hoop Buildings* - 2023 Replacement Value $16,000 Condition Poor; this asset was not captured under the State of the Infrastructure analysis for this AMP as asset data was finalized subsequent to the point in time when revisions to asset registries were under deliberation. This asset will be included in the analysis under future AMP updates.

[2] Three additional Airport buildings were recognized subsequent to the point in time when revisions to asset registries were under deliberation. These buildings are: (1) *Electrical Building* - 2023 Replacement Value $4,483,000 Condition Fair; (2) *Two-Car Garage* - 2023 Replacement Value of $15,000 Condition Very Poor; (3) *Dry Building* - 2023 Replacement Value $200,000 Condition Fair. These buildings are significant assets, which is why they have been mentioned here. These assets will be included in the analysis under future AMP updates.

Regulations and the Airport's maintenance program, the Airport must provide sufficient and suitable equipment to conduct:

- Runway Condition Reporting on a regular basis year round
- Snow clearing and de-ice operations on the airfield and terminal area as per the Airport's snow and ice control plan
- Conduct Wildlife Control year-round using appropriate measures such as, vegetation control, habitat modification/removal, lethal and non-lethal hazing methods where necessary
- Provide the required emergency response using approved Airport-designed apparatus vehicles
- Provide appropriate Security on and around the Airport by completing regular patrols inside and outside the security perimeter
- Maintain the drainage network to prevent flooding of aircraft maneuvering area
- Maintain the airfield lighting and navigational aids to no less than 98%

Other: Includes security fence, wildlife fence, parking lot pay stations, lights and gates, baggage belts, double face illuminated sign, ramp lighting, and diesel and gas pumps. These are important features in the day-to-day operations of the Airport such as facilitating passenger parking, baggage handling, securing the Airport perimeter and providing fuel for fleet as well as ensuring runway lighting in operational for landings and take-offs, etc.

Roadways: These assets include the road base, the drainage system, and the pavement. Two main roadways go through Airport property, which provide access to other facilities within the grounds.

Runway & Aprons: Includes runways for takeoff and landing of aircraft, as well as the aprons, located off the airport runway. Aprons serve as the airplane's parking area, where all aircraft (both commercial planes and private jets) are loaded and unloaded, as well as fueled de-iced and/or maintained before their next flight.

Stormwater Collection: Includes municipal drains and roadside ditches, as well as stormwater sewers. The City's stormwater system is designed to mitigate flooding risks and property damage to both private and public properties, by effectively managing stormwater.

Wastewater Collection: Includes sanitary sewers (gravity and force main). This involves the collection of wastewater from the businesses within Airport property and conveyance to the City's wastewater treatment facilities.

Taxiway: Includes paved paths connecting runways with aprons, hangars, terminals, and other facilities. These assets are essential in providing safe travel for aircrafts to and from these facilities.

1.1.1 Asset Valuation

The following sections summarize the portfolio associated with the Airport assets. Table 1-1 provides the inventory and current replacement value of these assets.

Table 1-1. Inventory and Current Replacement Value – City of Windsor Airport Assets

Segment & Sub-Segment	Count	Unit	2023 Estimated Total Replacement Value
Airport			
Equipment	30	Each	$5,196,418
Facilities	10	Each	$89,151,542
Fleet	20	Each	$5,735,381
Other	15	Each	$6,086,227
Roadways	2	Each	$14,803,306
Runways and Aprons	5	Each	$73,860,000
Sewers	46	Each	$8,970,393
Taxiways	11	Each	$21,961,008
TOTAL			**$225,764,275**

Current replacement values for facilities, roadways, runways, aprons, storm, sewer collection and taxiway are based on unit costs obtained from recent tenders or indexed historical costs. These costs consider various factors such as engineering and design, project management, and prevailing construction costs and are highly reliable. For equipment, facilities, fleet, and other Airport assets, historical cost inflated to 2023 dollars was used. These costs were reviewed and confirmed by expert staff in their respective areas. These replacement costs reflect a like-for-like asset replacement and do not include any lengthening or widening of roadways or runways.

1.1.2 Asset Condition

The condition for equipment, fleet, and other assets are typically assessed using an age-based approach. In other instances, staff expertise is used to assign condition. One such example is the security fence and wildlife fencing, which is inspected by expert staff daily. Fleet and equipment assets are assessed as they come due for replacement, and a decision is made if the asset should or should not be replaced based on its actual condition, mileage, and maintenance costs. Fleet and equipment management is provided by Your Quick Getaway (YQG) management company using manufacturers recommendations for scheduled maintenance and augmented by the Vortex fleet software managed by YQG. The stormwater/wastewater network is also assessed using an age-based approach. Moving forward, equipment assets stored in the City's TCA database should be reviewed on an annual basis to ensure that they are still in-service, and their condition is reflected appropriately.

Condition of the facilities assets is assessed based on the overall health and performance of the facility, and not by components within the facility. Building conditions have been determined by staff expertise. Administration is working to develop an accurate and reliable facility condition assessment process. Once established, it is the intention to use these building condition assessments to better inform the Asset Management Plan based on component-level facility information for more accurate and comparable analysis of facility assets.

The Airport runways and aprons are subject to the design and standard under the International Civil Aviation Organization (ICAO), load ratings and friction characteristics, but not for condition ratings. Airport staff perform daily pavement inspections to monitor cracking, deterioration and looking for possible separation of layers. Friction testing is completed in wet and winter conditions, and a third-party technical company is brought in on a bi-annual basis to perform friction readings which determines if the surface requires additional rehabilitation or maintenance/cleaning (rubber removal). Roadways condition values are based on expert opinion of trained YQG staff to ensure the current conditions are monitored until detailed assessments are completed.

1.1.2.1 Segment Condition Overview

Overall condition of the Airport assets as a percentage of replacement value is illustrated in Figure 1-1.

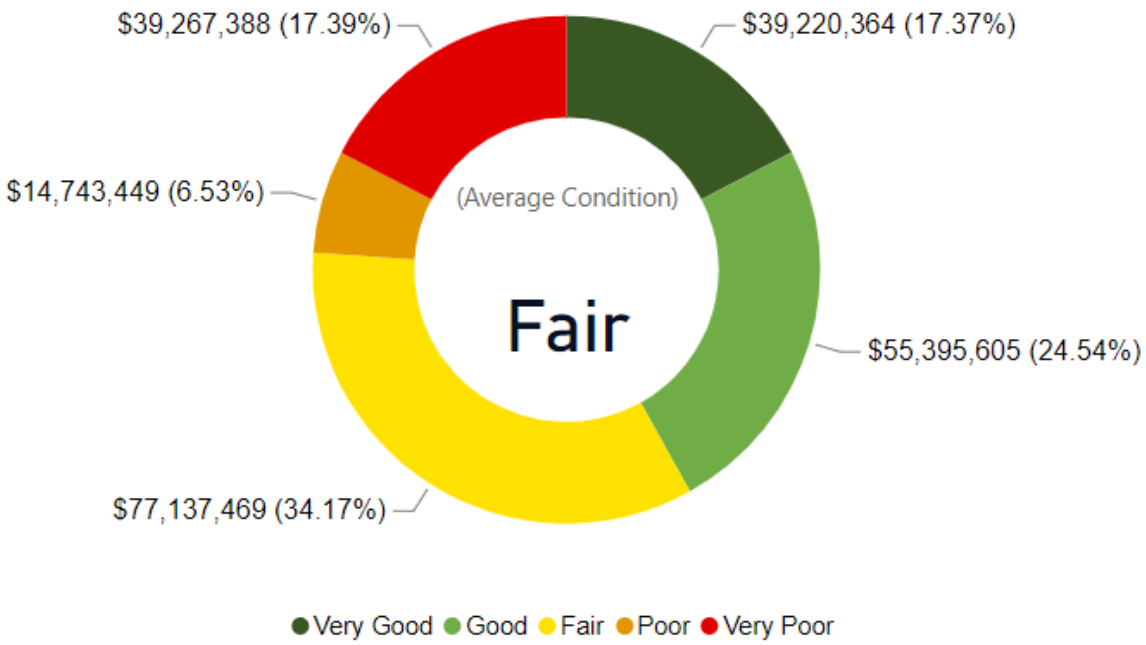


Figure 1-1. Segment Condition as a Percentage of Replacement Value – City of Windsor Airport Assets

The Airport assets are on average in Fair condition, showing that some of these assets have been deteriorating over time without proper investment to ensure a Good overall condition

rating. This has resulted in these assets being managed more reactively, rather than being managed at the lowest lifecycle cost. These assets will need proper funding for replacement and rehabilitation to ensure these assets will not move to a Poor overall condition.

1.1.2.2 Sub-Segment Condition Overview

Airport asset condition as a percentage of replacement value is further broken down at the sub-segment level in Figure 1-2.

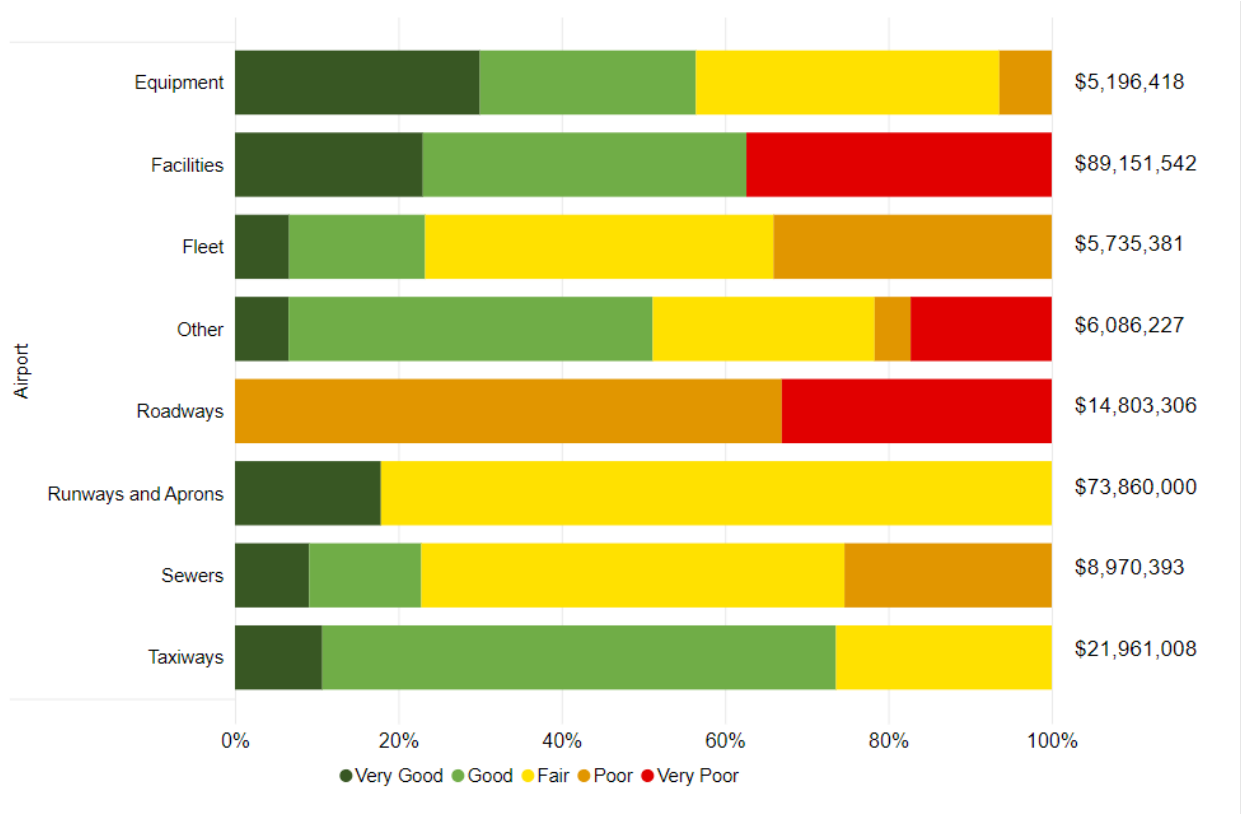


Figure 1-2. Sub-Segment Condition as a Percentage of Replacement Value – City of Windsor Airport Assets

Taxiways are in Good condition, while runways and aprons are currently in an averaged Fair condition. The shorter runway, 12-30 (1.570 km), is in very good condition whereas the larger runway, 07-25 (2.743 km), and 80% of the taxiways are in Fair condition. These assets (other than taxiways) are regulated assets and must be kept in Fair to Very Good condition to decrease risk to users, as well as to improve financial sustainability. The cost to reconstruct a kilometer of runway is significantly higher than a local road, therefore, it is recommended that the condition of these assets be maintained at a Fair level to meet the regulatory requirements while also mitigating overall costs to sustain them by ensuring various maintenance and rehabilitation measures are implemented to reduce the risk associated with runway deterioration below a Fair condition.

The sewers within Airport property are in Fair condition, the Airport should continue to collect information to take a proactive measure in repairing and maintaining sewers to prevent further damage or decay.

The roads within Airport property are in Poor and Very Poor condition and are currently used primarily for internal traffic between the lease properties. Although they do not see regular local traffic, it is recommended that the Airport invest in rehabilitation of these assets before a full reconstruction is required. Specific costs and activities required to improve the condition of the roads and paved alleys can be further evaluated in the Transportation chapter of this AMP, which outlines lifecycle management activities such as pavement maintenance, rehabilitation, and reconstruction.

Fleet and other assets are mostly within Very Good to Fair condition. These assets will require continued investments to ensure they are still providing the functions expected of them and to meet regulated requirements.

Facilities assets are, on average, in Good to Very Good condition. However, upon further analysis of the data, it is determined that most of the facilities in Very Good condition were constructed within the last 5-10 years and are relatively new. These facilities are leased out to third party entities not related to Airport operations but are included in this report as they are situated on surplus Airport lands and owned by the City of Windsor. In contrast, the main facilities of the Airport such as the Main Terminal, and other buildings used directly in the operations of the Airport, are in Very Poor condition. These assets, some constructed over 68 years ago, will require significant investment in the short term to ensure they are still providing the functions expected of them and to meet regulatory requirements.

1.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset categories. The Airport has a robust inspection and maintenance program for the majority of the assets in this chapter. For this reason, the majority of the Airport's asset management practices are based on the associated condition data for assets in this chapter, rather than the physical age of the asset. The average age of Airport assets can be seen below in Figure 1-3.

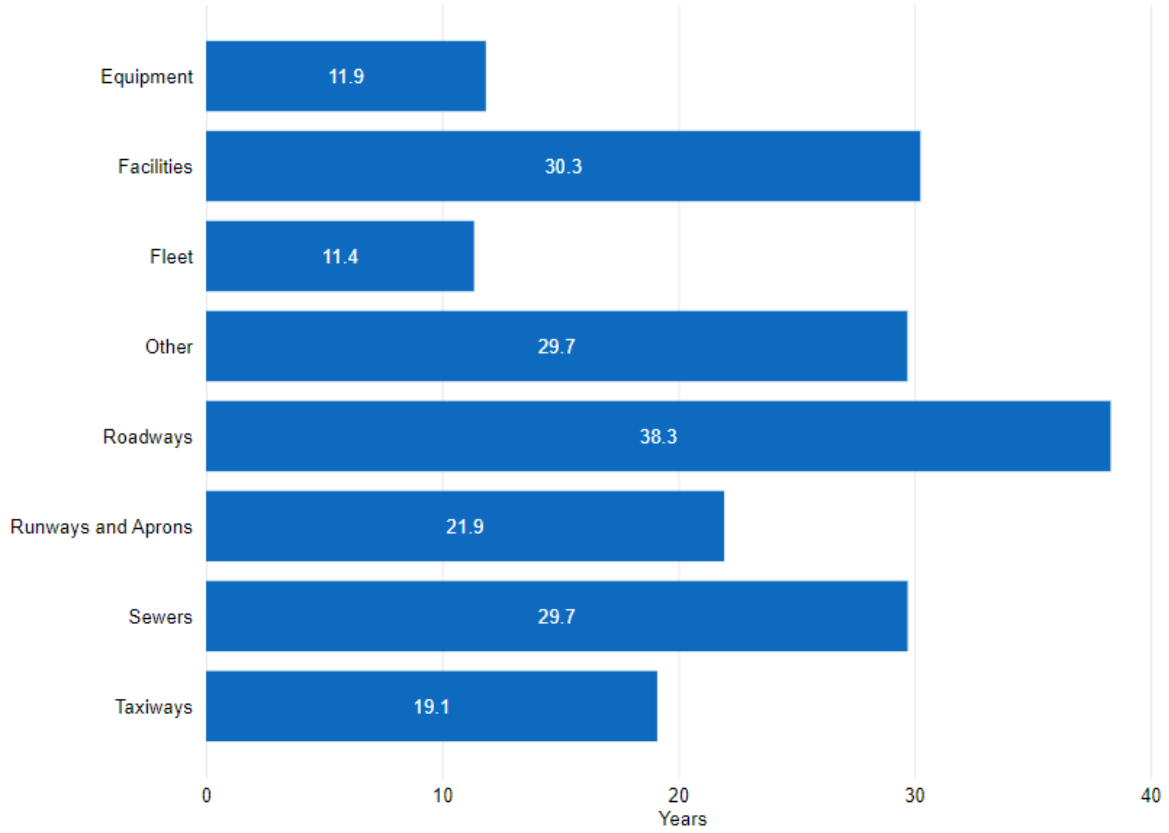


Figure 1-3. Average Age - City of Windsor Airport Assets

1.2 Levels of Service

Levels of service (LOS) are metrics describing measurable aspects of the types of services that the Airport provides to its customers, residents, and visitors. They support the organization's strategic goals and are derived from customer needs and expectations, Board objectives, legislative and regulatory requirements, standards, along with the financial capacity of the Airport to deliver those LOS. These services can be broadly categorized into several key functions:

Mobility & Economic Development: Airport assets enable the movement of people and goods from one location to another, facilitating access to employment, education, healthcare, recreation, and other essential services. They provide the physical infrastructure necessary for travel. These networks stimulate economic development by facilitating trade, investment, and economic activity. Well planned and maintained infrastructure attracts businesses and supports job creation.

Accessibility & Connectivity: Airport assets enhance accessibility by connecting communities and regions. They provide the essential links that enable individuals and businesses to access markets, services, and opportunities.

Safety: Airport assets contribute to safety by providing well-designed and maintained infrastructure that minimizes the risks of accidents and injuries.

Table 1-2 provides a summary of the LOS for the Airport services. The Airport has chosen metrics that define and measure the desired standards for delivering services that are provided by Airport assets. These metrics help set goals, evaluate performance, allocate resources effectively, and communicate expectations to stakeholders. By establishing levels of service metrics, municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance. The Airport has selected LOS performance metrics as they relate to standards in the industry that correspond to passenger and patron expectations of levels of service in the air sector. The Airport strives to deliver an Airport service that is safe, meets or exceeds Transportation Canada regulations, is available to the various tenants and users with reliable customer service while meeting quality standards expected of the air sector.

Table 1-2. Airport-Defined Levels of Service – City of Windsor Airport Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Airport-Defined - Levels of Service			
All segments	Fiscal Sustainability	Reinvestment Rate	7%
All segments	Reliable	Percentage of total replacement cost for assets in good to very good condition	41.91%
Fleet	Reliable	Percentage of dedicated fleet vehicles beyond estimated useful life	35%
Runways	Reliable	Percentage of total replacement cost for Runways in fair to very good condition	100%
Taxiways and Aprons	Reliable	Percentage of total replacement cost for Taxiways and Aprons in good to very good condition	73.59%
Other	Reliable	Percentage of total replacement cost for Other assets in good to very good condition	23.11%
Facilities	Reliable	Percentage of total replacement cost for Facilities in good to very good condition	62.62%

1.3 Lifecycle Management Strategy

The objective of a Lifecycle Management Strategy is to outline and establish a set of planned actions based on best practice that will enable assets to provide a sustainable level of service to residents, while managing risk at the lowest lifecycle cost.

The Airport has the following asset management strategies in place:

- A comprehensive runway inspection program to help manage and identify potential problems and pavement weaknesses enabling staff to identify issues before they become a liability.
- Safety inspection program - Leveling of driveway to sidewalk crossings across the front of the entire Air Terminal Building to help manage and eliminate a tripping hazard to the passengers and general public.
- The Airport Emergency Power Generation is supported by a regular scheduled preventative maintenance program and augmented by weekly (or less) simulated power outages to ensure all systems are in working order. This ensures all airfield lighting and navigational aids will remain active in the case of a main power failure.
- Annual and bi-annual training programs for operations staff help maintain and keep staff current with Wildlife Control, Winter Maintenance and ice control activities and Airport Security awareness.
- Drainage maintenance and inspection to ensure flooding is avoided, keeping the Aircraft Maneuvering area safe and preventing the flooding of Buildings on the airport property.
- Annual third-party audits are conducted as part of our Safety Management System to ensure the airport remains compliant and up to date with regulatory changes.

1.3.1 Lifecycle Activities

The choice of strategy for maintaining Airport assets considers the risk failure and the risk to service delivery. Risks relating to asset failure are mitigated through investment planning and maintenance programs which provide the necessary input to ensure the Airport is meeting the defined levels of service. Airport projects seek to work with external stakeholders to align projects to minimize disruption and reduce costs. Strategies implemented are at the most economical cost given the requirements of the Airport operations to allow the Airport to maintain the current levels of service.

Assets are maintained to manufacture’s specifications where possible and regulatory requirements where necessary. Assets are also utilized to the fullest extent of their lifecycle – with most exceeding the expected useful life. Assets are maintained mostly on a reactive basis with the exception of mechanical systems that follow a regular preventative maintenance schedule. Firefighting equipment must be maintained and replaced based on designated expirations dates as per National Fire Protection Associations (NFPA) standards.

Non-Infrastructure Solutions

- Asset Management and performance monitoring.
- Ensuring facility compliance with building codes, safety standards and environmental regulations.
- Identifying and assessing risks associated with facility operations, including safety hazards, security vulnerabilities, and natural disasters; developing and implementing emergency response plans and mitigation measures to minimize risks and ensure business continuity.

Operations & Maintenance

- Implementing scheduled maintenance programs to proactively maintain equipment, facilities, fencing, fleet, runways, taxiways, and stormwater assets according to manufacturer recommendations. This includes routine inspections, fluid changes, tire rotations, and component replacement. Reactive/Corrective Maintenance – Address service requests, repairs, and breakdowns promptly to minimize downtime and maintain operational efficiency.
- Routine and reactive daily, weekly, monthly, seasonal, and regulatory inspections.

Renewal, Rehabilitation & Replacements

- Implementing rehabilitation and major repair projects to address aging or damaged infrastructure components.
- Performing renewal and rehabilitation activities to restore or upgrade runways and taxiways as they age or deteriorate. This includes resurfacing activities, reconstruction, and replacement activities to maintain service levels and safety standards while minimizing disruptions to ongoing operations.
- The Airport must react to unplanned asset renewals and replacements due to asset failures, as well as the planned replacements of assets.

Disposals

- Decommissioning or disposing of assets at the end of their useful life by determining appropriate disposal methods, such as resale, trade-in, donation, recycling, or environmentally responsible disposal. Asset disposals may also include re-purposing of an asset for alternate use or keeping it for spare parts where possible.
- Planning and executing facility decommissioning activities at the end of its lifecycle, including asset disposal, demolition, or repurposing.

Service Improvement & Growth Activities

- New assets to service growing populations and service areas, as well as to offer new assets and technologies to improve customer experience, accessibility, and safety.

- Identifying opportunities for facility renovations or upgrades to improve functionality, energy efficiency, and occupant comfort.

Specific asset management practices or planned activities and the associated frequencies with these actions are outlined in Table 1-3.

Table 1-3. Asset Management Practices, Planned Activities, and Frequency – City of Windsor Airport Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Facilities	
• Roof Inspection Program (non-formal program)	• Bi-annual
Fencing Systems	
• Inspections	• Daily
Operations & Maintenance	
Equipment	
• Staff inspections	• Daily
• Reactive maintenance	• As required
• Preventative maintenance	• Per annual PM Plan
• Seasonal inspections on seasonal equipment	• Seasonally (Planned scheduled maintenance/inspections)
Facilities	
• Reactive maintenance (damage, accidents, breakdowns. etc.)	• On-going (PO Schedule)
• PM on HVAC	• Monthly
Fencing Systems	
• Preventative maintenance	• As required
• Reactive maintenance	• As required
Fleet	
• PM schedule by class of vehicle	• On-going
• Reactive maintenance (damage, accidents, breakdowns. etc.)	• On-going
Fuel Tanks	
• Reactive maintenance (damage, accidents, breakdowns. etc.)	• On-going
• Planned inspections	• Every 6 months
Other	
• Staff inspections	• Daily
• Reactive maintenance	• As required
• Preventative maintenance	• Per annual PM Plan
• Seasonal inspections on seasonal equipment	• Seasonally
Roadways	
• Staff inspections	• Daily
• Small road repair	• As required

Asset Management Practices / Planned Activities	Frequency
Runways & Taxiways	
• Staff inspections	• Daily
• Preventative maintenance	• Annual
• Preventative maintenance	• Every two years (PO Schedule)
Stormwater & Wastewater Collection	
• Preventative maintenance	• Every two years (PO Schedule)
Parking Gates	
• CCTV	• On Going
Parking Lots and Lighting	
• Reactive maintenance	• As required
Renewal, Rehabilitation & Replacements	
Equipment	
• Renewal Activities	• As required
• Replacement of Equipment	• On Going
Facilities	
• Rehabilitation	• As required
• Building Replacement	• As required
Fencing Systems	
• Replacement	• As required
Fleet	
• Renewal Activities	• As required
• Replacement of Fleet	• As required
Fuel Tanks	
• Painting of bollard etc.	• Seasonally
• Replacement of Fuel tanks	• As required
Other	
• Renewal Activities	• As required
• Replacement of Equipment	• On Going
Roadways	
• Rehabilitation	• As required
• Reconstruction Program	• As required
Runways & Taxiways	
• Rehabilitation	• As needed

Asset Management Practices / Planned Activities	Frequency
• Reconstruction Program	• As required
Stormwater & Wastewater Collection	
• Lining	• As required
• Replacement	• At end of life, as needed
Disposal	
Equipment, Facilities, Fencing Systems, Fleet, Fuel Tanks, Other, Roadways, Runways & Taxiways, Stormwater & Wastewater Collection	
• Disposal	• As required
Service Improvement & Growth	
Facilities	
• Interior Renovations	• On Going / As Required
Fleet	
• Fuel conversion to electric vehicles	• Possible/funding

1.4 Funding the Lifecycle Activities

The Airport uses the lifecycle strategies identified in Section 1.3 to plan work and determine future expenditure needs for Airport assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring the Airport can meet the demands of current services and existing infrastructure.

The scenarios consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in continuing to deliver the services as expected by the aviation sector. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City annual capital budgets.

1.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding to the asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for the Airport is, on average, $812,000 annually. Figure 1-4 shows the projected condition distribution of assets over the 20-year forecast period under the current funding scenario. The forecast illustrates a gradual decline in condition over the forecast period. Assets in good to very good condition decrease from 42% to 3%, while assets in very poor condition increase from 17% at the start of the forecast to 68% at the end of the forecast period. This scenario highlights challenges the City will face in maintaining Airport infrastructure assets with the current anticipated budget allocations. This suggest that the budget may not be sufficient to keep up with the infrastructure needs of the assets over time, leading to a significant decline in overall asset condition.

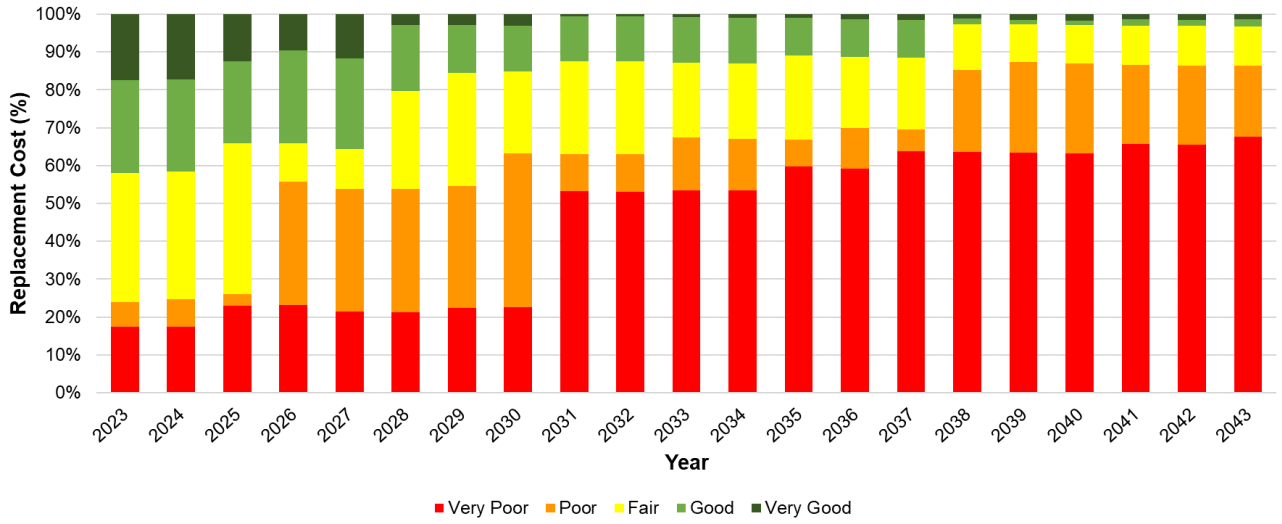


Figure 1-4. Scenario 1: Performance Forecast with Current Funding - City of Windsor Airport Assets

1.4.2 Scenario 2: Maintain Current Performance (Level of Service)

Scenario 2 determines the cost to maintain Airport assets in approximately the same performance (condition) they are currently in, which is being used to determine the cost to provide the current level of service for the asset category, a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of Airport assets was determined to be approximately $6.9 million annually, resulting in an average annual gap of $6.1 million. Figure 1-5 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition decreases from 42% to 18%, while assets in Very Poor condition stays the same, at 18%, throughout the 20-year period.

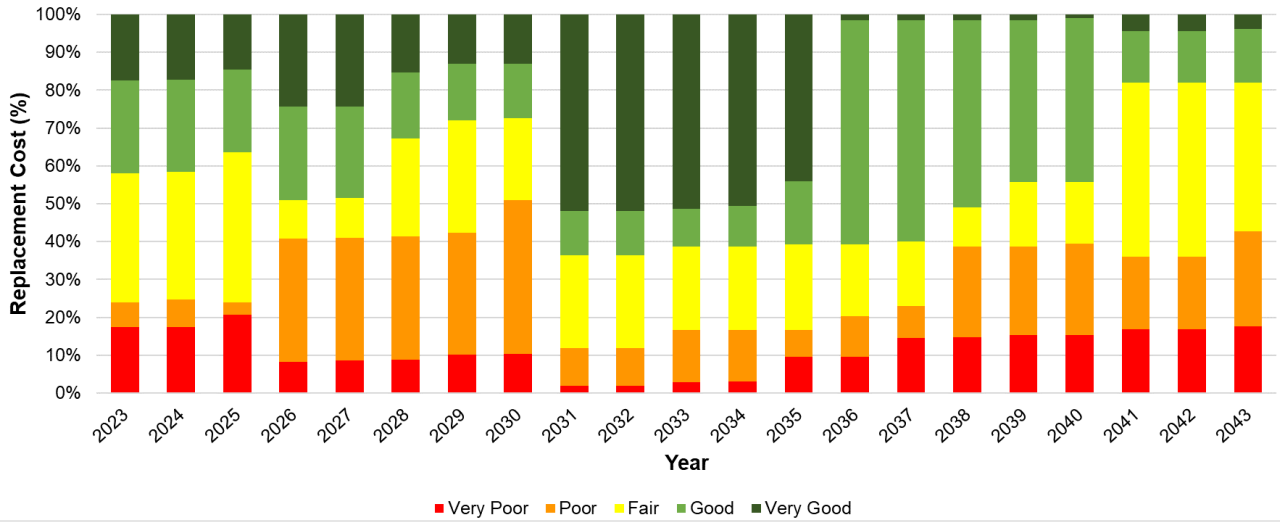


Figure 1-5. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) - City of Windsor Airport Assets

1.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of Airport renewal, rehabilitation, and replacement activities to be approximately $9.9 million annually. Under this scenario, the Airport faces an annual average gap of $9.1 million for its infrastructure assets.

The projected asset performance forecast is shown in Figure1-6. The modelling shows an overall increase in the condition of the assets. The model indicates that assets in Good to Very Good condition increases from 42% to 58%, and assets in Very Poor condition decreases from 17% to 7%. This scenario provides the best overall performance of Airport assets.

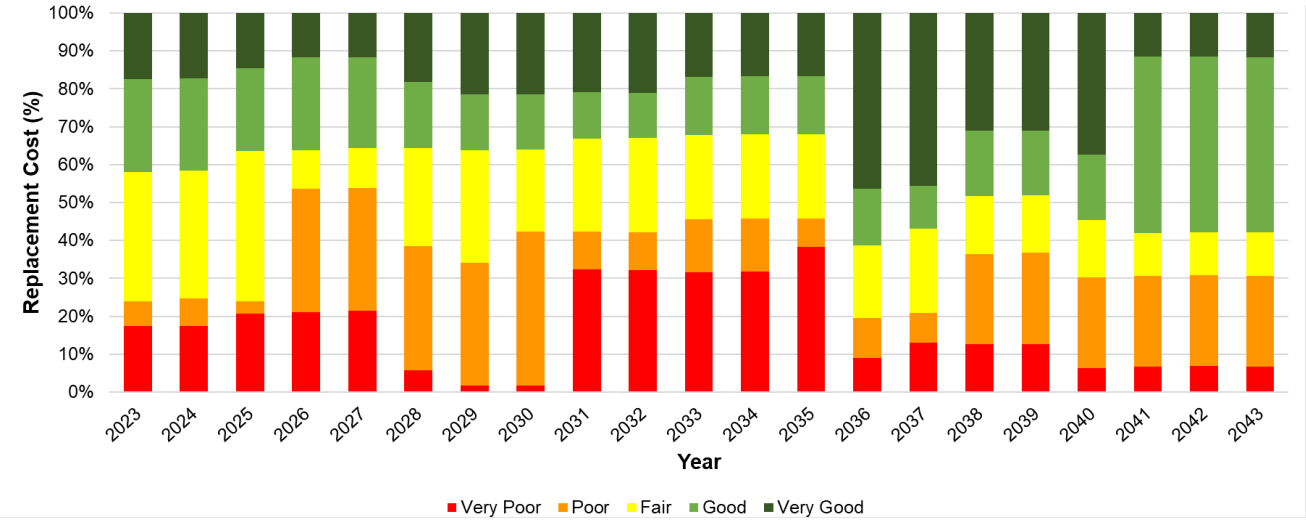


Figure 1-6. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies - City of Windsor Airport Assets

1.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 1-7. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

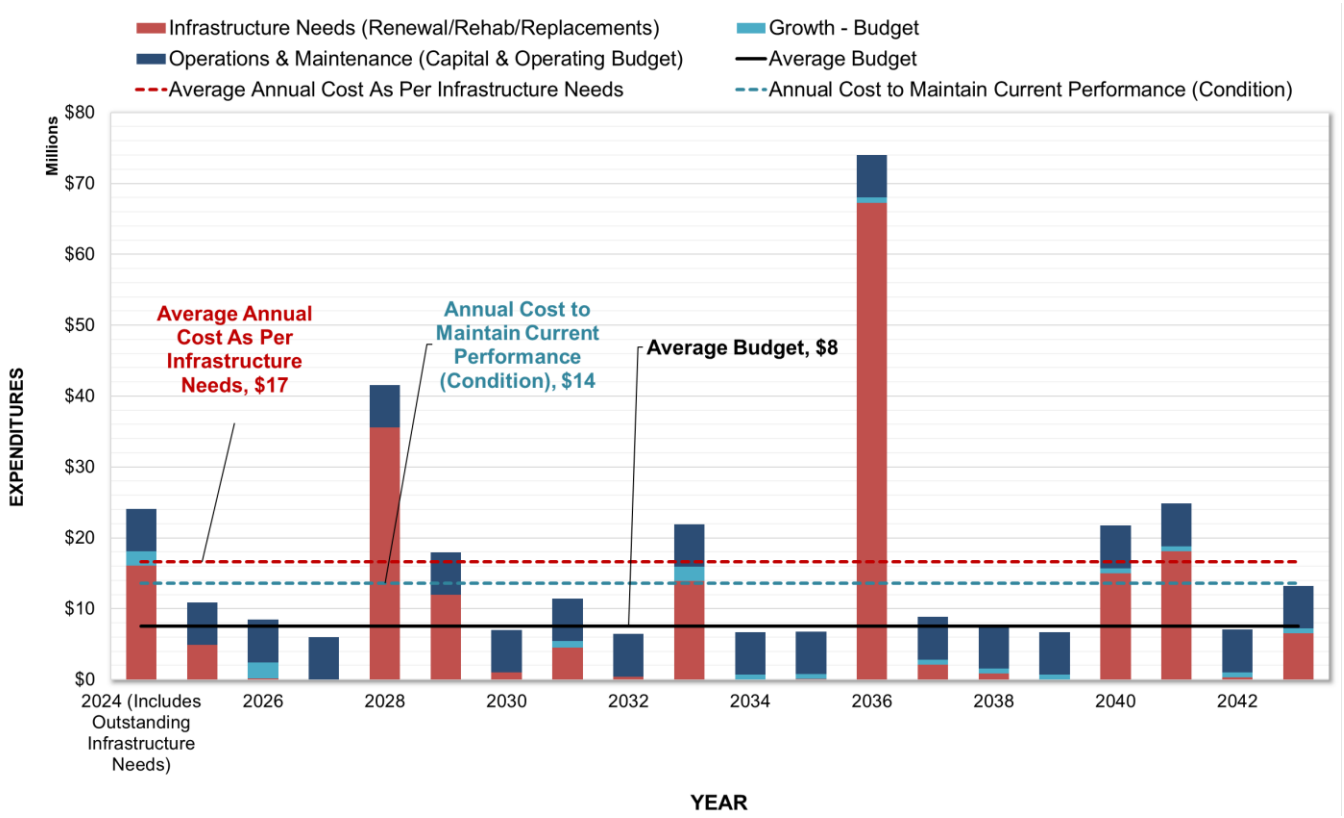


Figure 1-7. Scenario Comparison - City of Windsor Airport Assets

The scenario comparison indicates that the Airport category is facing an annual gap of $6.1 million to maintain their current performance to continue to provide assets in approximately the same condition they are currently in. However, if the Airport aims to optimize the performance of these assets, and adhere to the lifecycle strategies, there is an increase of the annual gap to $9.1 million. This calculated infrastructure gap is further detailed in Table 1-4.

Table 1-4. Lifecycle Activity Investments & Average Annual Infrastructure Gap - City of Windsor Airport Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$0	$0	$0
Operations & Maintenance	$6,000,000	$6,000,000	$6,000,000
Service Improvement	$0	$0	$0
Disposal	$0	$0	$0
Growth	$720,000	$720,000	$720,000
Renewal, Rehabilitation & Replacement	**$812,000**	**$6,912,802**	**$9,936,996**
Total	**$7,532,000**	**$13,632,802**	**$16,656,996**
Funding Gap		**$6,100,802**	**$9,124,996**

This gap underscores the challenge the Airport faces in adequately funding the necessary renewal, rehabilitation, and replacement activities for its assets. Figure 1-7 highlights a substantial funding requirement in year 2036, which include the replacement of taxiways and runways and aprons making up the bulk of this spike, with some other fleet and equipment replacement expenditures required as well. This requirement represents renewal, rehabilitation and replacement activities that have been identified and deemed necessary but will ultimately place a heavy burden on future budget allocations. Grant and industry funding plays an important role in helping to support the rehabilitation and replacement of aging infrastructure of the Airport. Those funds however, are not guaranteed and have not been factored into the above figures.

1.5 Improvement Plan

Improving asset management processes is essential for organizations to enhance efficiency, reduce costs, and maximize the value of their assets. The Airport is committed to continual improvement strategies such as conducting annual reviews of asset performance data and identifying areas for improvement; regular reviews of the Lifecycle Activities and Maintenance Schedules to find optimizations in order to minimize downtime and reduce costs.

Through the development of this AMP, several areas of improvement were identified which should be considered for incorporation into the Airport Asset Management practices as the AM program matures. Recommendations for improvements to the Airport asset data are listed in Table 1-5.

Table 1-5. Improvement Plan - City of Windsor Airport Assets

Task No.	Task	Resources Required	Responsibility
1	Continue developing a process to input current replacement costs into Citywide on a yearly basis for all asset classes	Airport Asset Planning (City)	Airport Asset Planning (City)
2	Include the replacement cost for the Parking Shades/Hoop Buildings and the Electrical, Two-Car Garage and Dry buildings into the SOTI analysis for future AMP updates.	Airport Asset Planning (City)	Airport Asset Planning (City)
3	Develop a process to maintain asset registry on an annual basis.	Airport Asset Planning (City)	Airport Asset Planning (City)

City of Windsor Golf Courses

Asset Management Plan

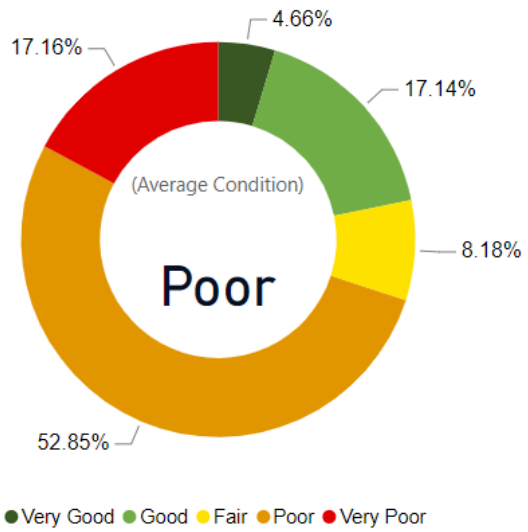
2024

City of Windsor Golf Courses

Replacement Value

Asset Segment	Replacement Value
Equipment	$3,211,578
Facility	$15,266,886
Fleet	$128,447
Irrigation	$3,481,000
Pedestrian Bridges	$967,629
Total Replacement Value	**$23.1 M**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$770 K	**$884 K**

Quick Facts

- Roseland Golf Course: 18-hole championship golf course, main clubhouse & 6 other facilities, 9-hole par 3 course, driving range, pro shop and halfway hut
- Little River Golf Course: 9-hole course, one main clubhouse & 2 other facilities
- 92 golf carts & other fleet/equipment to service golf courses

1 City of Windsor Golf Courses

1.1 State of the Infrastructure

The City of Windsor Golf Courses (Golf Courses) owns the 9-hole Littler River Course and the 18-hole Roseland Course & Par 3 Course and driving range at Roseland. Roseland was designed by Donald Ross in 1926 and remains true to the original layout. The Little River golf course is a 9-hole golf course located on the East side of Windsor. Little River was purchased by the City of Windsor in 1982. These courses include 1 club house and several maintenance buildings providing affordable golf opportunities to residents and visitors.

The Golf Courses assets contained in this AMP consist of the following 5 types:

Equipment: This includes several pieces of specialized lawn maintenance equipment from mowers (green, fairway and ruff), tractors, bunker rakes, backhoe, turf sprayer, roller, trencher, aerator golf carts, club carts, turbine blower, safety netting, gator, trailer, and other specific equipment used by Golf Courses staff to operate and maintain the infrastructure assets that support the full functionality of the City's Golf Courses.

Facility: There are 8 combined facilities between the two premises which support administrative, operational and storage. Roseland facilities include a clubhouse with banquet halls, a kitchen, storage areas, an administration officies and a 6 sheet curling rink. The Roseland pro shop is designed to collect fees for golf patrons, a administration office, a pro shop show room for selling merchandise, a staff washroom, two outside patron washrooms and a underground storage facility to store 72 power carts and two beverage carts.

The Roseland halfway hut facility offers food & bevereage options for golfers, a staff washroom inside, two patron washrooms on the outside and some storage area. Roseland has two grounds maintenance buildings.

The main grounds building features two bays to repair equipment, staff offices, washrooms and staff washrooms. This building also stores chemical and equipment.The maintenance building on the course stores equipment and some product including seed and gravel.

The Little River golf course features a clubhouse that includes a Point-of-Sale (POS) area, small sitting area, staff washroom and storage area, two inside patron washrooms, a outsidet patron washroom and storage garage for power carts and and golf course machinery. A small storage garage is located behind the pro shop and is used to store power carts. There is a small pump house for the course irrigation pump

Fleet: Includes two support vehicles. These fleet vehicles allow Golf Courses staff to perform their duties in maintaining and operating the infrastructure.

Irrigation System: Consisting of pumps, panel, controllers, satelites and underground lines, the Roseland irrigation system supplies water to the golf course as needed to grow turf. The system is at the end of its life cycle and requires frequent maintenance. There are 600 irrrigation heads, 31 satellite control boxes, extensive underound piping running to each irrigation head,

two irrigation pumps and a pump controll panel located in the pump house. The Little River golf club has one irrigation pump located in the pump house, 60 irrigation heads, two satellite control boxes and piping underground supplying water to the irrigation heads.

Pedestrian Bridges: Includes 3 Pedestrian bridges located within Little River. These structures span bodies of water providing connections throughout the golf course. The bridges at Little River allow patrons to cross by walking or driving power carts to play the hole. The grounds crew also uses these bridges to drive equipment across to maintain the golf course. The bridges are in good shape and are inspected and assessed according to Ontario Structure Inspection manual (OSIM) by expert City staff.

1.1.1 Asset Valuation

The following sections summarize the portfolio associated with Golf Courses. Table 1-1 provides the inventory and current replacement value of these assets.

Table 1-1. Inventory and Current Replacement Value – City of Windsor Golf Courses

Segment & Sub-Segment	Count	Unit	2023 Estimated Total Replacement Value
Golf Courses			
Equipment	33	Each	$3,211,578
Facility	8	Each	$15,266,886
Fleet	2	Each	$128,447
Irrigation	3	Each	$3,481,000
Pedestrian Bridge	3	Each	$967,629
TOTAL			**$23,055,540**

Current replacement values for equipment, fleet and pedestrian bridges are based on historical cost inflated to 2023 dollars. These costs were reviewed and confirmed by expert staff in their respective areas. Moving forward, these assets should be reviewed on an annual basis and be given a market value replacement cost where available.

Replacement values for facilities are assessed at the building level and does not consider any highly specialised building components or amenities within the buildings. For all facilities, replacement cost was estimated by subject matter experts using per square foot unit costs based on market values. The current replacement value used in this report for the Roseland clubhouse is based on a new, smaller facility as the current 60,0000 sq foot facility no longer fits the needs of the club and community.

Current replacement costs for the irrigation systems are based on recent quotes provided by a third party and are based on current market value. By reviewing recent purchases and estimating current replacement values for these assets, the City ensures that the replacement value accurately reflects the current market conditions and the specific characteristics of its assets.

1.1.2 Asset Condition

Equipment assets managed by the staff of the Golf Courses are assessed as they come due for replacement and a decision is made if the asset should or should not be replaced based on its actual condition. Moving forward, equipment assets stored in the City's TCA database should be reviewed on an annual basis to ensure that they are still in service, and their condition is reflected appropriately.

Fleet and other assets are assessed using an age-based approach, with a few exceptions, where staff expertise was used to assign condition. Fleet assets managed by the grounds contractor and the general manager are assessed as they come due for replacement, and a decision is made if the asset should or should not be replaced based on its actual condition and mileage.

Facilities condition is assessed based on the overall health and performance of the facility, and not by components within the facility. Building condition assessments have been made based on staff inspection expertise. Administration is working to develop an accurate and reliable facility condition assessment process. Once established it is the intention to use these building condition assessments to better inform the AMP based on component level facility information for more accurate and comparable analysis of facility assets.

Irrigation systems assets are assessed using an age-based approach, and staff expertise was used to assign condition.

Pedestrian bridges asset data is managed and maintained in the Infor (Hansen) CMMS Database and is subject to an objective condition inspection program providing increased reliability and accuracy on the condition of these assets.

1.1.2.1 Overall Asset Condition Overview

Overall condition of the Golf Courses assets as a percentage of replacement value is illustrated in Figure 1-1.

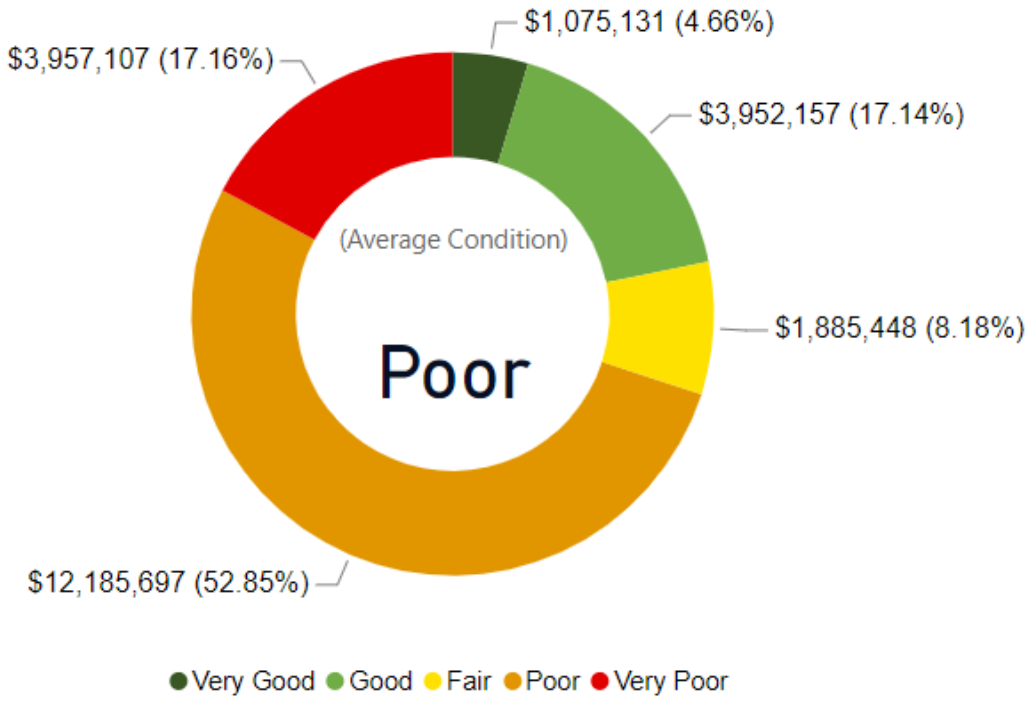


Figure 1-1. Segment Condition by Replacement Value – City of Windsor Golf Courses Assets

The Golf Courses assets are on average in Poor condition. This demonstrates that some of these assets have been deteriorating over time without proper investment to ensure a Good overall condition rating. This has resulted in these assets being managed more reactively, as opposed to being managed at the lowest lifecycle cost. Golf Courses assets will need proper funding for replacement and rehabilitation to ensure these assets will not move to a Very Poor overall condition.

1.1.2.2 Sub-Segment Condition Overview

The condition of Golf Courses assets can be further reviewed at the Sub-Segment level in Figure 1-2.

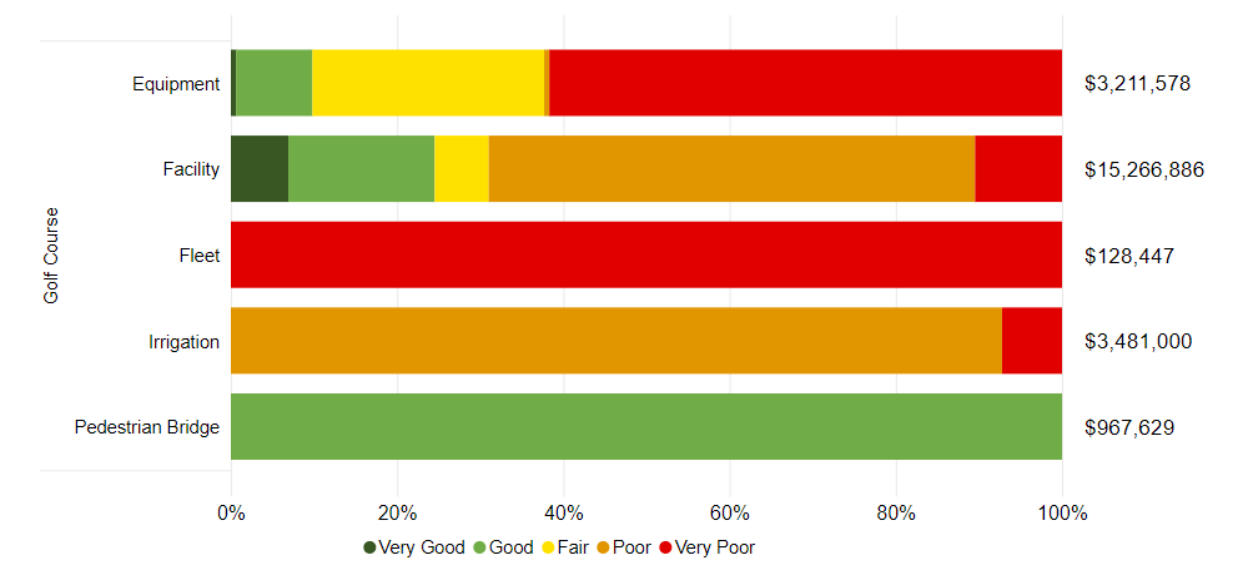


Figure 1-2. Sub-Segment Condition as a Percentage of Replacement Value – City of Windsor Golf Courses Assets

The majority of the Golf Courses Equipment is in Very Poor condition, while still in working order, and is repaired, as required, throughout the season. At the end of the season, any equipment that requires refurbishment is completed by the Golf Courses staff or sent to a third party to complete the task. When repair or replacement parts are no longer available, the equipment will be either kept for spare parts or is disposed. Some of the Golf Courses equipment and systems are specialized and are known to require greater maintenance, further necessitating the need for a more robust maintenance program. Key Golf Courses equipment includes a GPS sprayer, 4500 mower and sand pro units. These are specialized units are generally not repairable by our grounds department and must be sent out for repair when they fail. Failure of this equipment jeopardizes the operations and course conditions. Winter maintenance for these assets is key to extending the life expectancy of the robust and specialized equipment.

The Facilities are in overall Poor condition. Replacement with a new facility is currently being considered at the Roseland Golf Course.

The Fleet assets are in overall Very Poor condition. These assets will require investments to ensure they are kept in reasonable condition. The registry for Fleet includes two support vehicles which allow the Golf Courses staff to perform duties and maintain and operate asset infrastructure.

The irrigation system is also in overall Poor condition, and the intent is to replace portions over years to come, as budgeting allows. In the Spring of 2024, two new pumps and a control panel for the pumps were purchased and are expected to be installed in the Fall of 2024. Year-to-year, the expenses incurred are a result of failure of the irrigation system, as the current system is beyond its lifecycle and replacement parts are no longer available from irrigation companies.

When the opportunity presents itself, Roseland purchases parts for the irrigation system from other clubs that are replacing their irrigation system. This allows for parts to be stockpiled to avoid a complete failure of the system, which would result in the loss of turf at Roseland. This approach is not ideal since the risk of system failure is very high.

Pedestrian Bridges are in Good condition and provide the functions expected of them by Golf Courses.

1.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset categories. In general, Golf Courses has a robust inspection and maintenance program for the majority of the assets captured under this AMP. For this reason, actual age of the assets does not impact asset management practices. Equipment, Facility, Fleet, and Irrigation components are renewed and replaced based on their criticality and available funding. The average age of Golf Courses assets is illustrated in Figure 1-3.

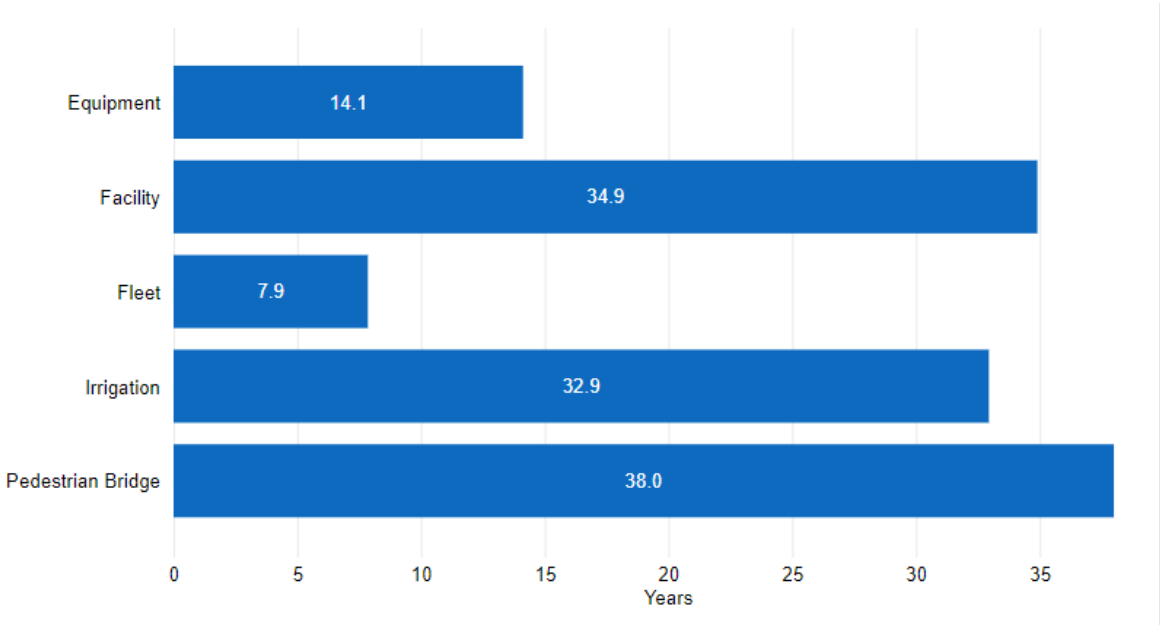


Figure 1-3. Average Age - City of Windsor Golf Courses Assets

1.2 Levels of Service

Levels of service (LOS) are measures that support the services the Golf Course provides to its customers, residents and visitors. They support the strategic goals and are derived from customer needs and expectations, Board objectives, legislative and regulatory requirements, standards, along with the financial capacity of to deliver those LOS. These services can be broadly categorized into several key functions:

Recreation: Recreation assets help to provide accessible opportunities that promote a safe, healthy, fun life style and providing affordable golf opportunities for residents and visitors. Golf plays a significant role in community building through the facilitation of active activity and opportunities for structured and spontaneous play, strengthening of neighbourhood connections and more.

Support for Golf Courses Staff: Golf Courses facilities provide essential workspaces for Golf Course staff to carry out their duties efficiently and effectively. These facilities encompass offices, meeting rooms, storage areas and other workspaces necessary to operate smoothly.

Safe and Efficient Work Environment: By maintaining safe, comfortable, and functional work environments, the Golf Course contributes to employee productivity and well-being.

Table 1-2 provides the LOS for Golf Courses. These metrics help set goals, evaluate performance, allocate resources effectively, and communicate expectations to stakeholders. By establishing LOS metrics municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance.

Table 1-2. Golf Courses-Defined Levels of Service – City of Windsor Golf Courses Assets

AMP Segment(s)	Key Service Attribute	LOS Metric	Current Performance
Golf Courses-Defined - Levels of Service			
All Segments	Fiscal Sustainability	Reinvestment Rate	%17
All Segments	Reliable	Percentage of total replacement cost for Golf Courses assets in Good to Very Good condition	21.8%
Facilities	Available	Gross Square Footage	192,500 Sq.Ft (Facilities) 170 acres (Courses)
Facilities	Environmental Stewardship	Annual GHG emissions	146.52 tCO2e
Facilities	Environmental Stewardship	Annual electric energy consumption per square foot	3.78 kWh/Sq.Ft.
Facilities	Environmental Stewardship	Annual natural gas consumption per square foot	0.34 m3/Sq.Ft
Facilities	Environmental Stewardship	Annual water consumption per square foot	0.41 L/Sq.Ft

1.3 Lifecycle Management Strategy

The objective of a Lifecycle Management Strategy is to outline and establish a set of planned actions, based on best practice that will enable assets to provide a sustainable level of service, while managing risk at the lowest lifecycle cost.

Golf Courses continues to improve its approach to the management of its assets and will continue to put in place processes, procedures and tools to enable a more consistent approach. Detailed below is a brief overview of some of the current asset management practices in place for Golf Courses assets.

1.3.1 Lifecycle Activities

The choice of strategy for maintaining Golf Courses assets considers the risk failure and the risk to service delivery. Risks relating to asset failure are mitigated through investment planning and maintenance programs which provide the necessary input to ensure Golf Courses is meeting the defined levels of service. Golf Courses projects seek to work with external stakeholders to align projects to minimize disruption and reduce costs. Strategies implemented are at the most economical cost given the requirements of the Golf Courses operations to allow the Golf Courses to maintain the current levels of service.

Assets are maintained to manufacturer specifications where possible and regulatory requirements where necessary. Assets are also utilized to the fullest extent of their lifecycle, with most exceeding the expected useful life. Assets are maintained mostly on a reactive basis with the exception of mechanical systems that follow a regular preventative maintenance schedule. As an example, firefighting equipment which supports a fire monitoring system and the clubhouse kitchen suppression system must be maintained and replaced based on designated expirations dates as per National Fire Protection Associations (NFPA) standards. An overview of some key lifecycle activities involved in Golf Courses include:

Non-Infrastructure Solutions

- Strategic planning and needs assessments through master plans and condition assessments.
- Identifying the Golf Courses asset needs and requirements, as well as the procurement of assets that meet the departments needs for usage within budget constraints. This also includes new asset deployment and training where required.
- Ensuring facility compliance with building codes, safety standards and environmental regulations.
- Identifying and assessing risks associated with facility operations, including safety hazards, security vulnerabilities, and natural disasters; Developing and implementing emergency response plans and mitigation measures to minimize risks and ensure business continuity.

Operations & Maintenance

- Routine and reactive daily, weekly, monthly, seasonal, and regulatory inspections.
- Implementing scheduled maintenance programs to proactively maintain vehicles, and equipment according to manufacturer recommendations. This includes routine inspections, fluid changes, tire rotations, and component replacement.
- Address service request, repairs, and breakdowns promptly to minimize downtime and maintain operational efficiency.

Renewal, Rehabilitation & Replacements

- Implementing rehabilitation and major repair projects to address aging or damaged infrastructure components.
- Performing renewal and rehabilitation activities to restore or upgrade runways and taxiways as they age or deteriorate. This includes resurfacing activities, reconstruction, and replacement activities to maintain service levels and safety standards while minimizing disruptions to ongoing operations.
- Golf Courses must react to unplanned asset renewals and replacements due to asset failures, as well as the planned replacements of assets.

Disposals

- Decommissioning or disposing of assets at the end of their useful life by determining appropriate disposal methods, such as resale, trade-in, donation, recycling, or environmentally responsible disposal. Asset disposals may also include re-purposing of an asset for alternate use by another department or keeping it for spare parts where possible.
- Planning and executing facility decommissioning activities at the end of its lifecycle, including asset disposal, demolition, or repurposing.
- Managing environmental remediation, waste disposal, and regulatory compliance during decommissioning processes.

Service Improvement & Growth Activities

- New assets to service growing populations and service areas, as well as to offer new assets and technologies to improve customer experience, accessibility, and safety.
- Identifying opportunities for facility renovations or upgrades to improve functionality, energy efficiency, and occupant comfort.

By implementing these lifecycle activities, the Golf Courses can effectively manage their assets to optimize performance, maximize value, and meet the needs of the community in a sustainable and cost-effective manner. Specific asset management practices or planned activities and the associated frequencies with these actions are outlined in Table 1-3.

Table 1-3. Asset Management Practices, Planned Activities and Frequency – City of Windsor Golf Courses Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Facilities	
• Roof Inspection Programme	• Annual / Scheduled / On-going
• Condition Assessments Programme	• Every 5 years, but lower threshold depending on facility type – every 3 years for arenas
• Master plan for facilities	• Updated based on facility type
• Feasibility Study for Level of Service Changes (i.e. Space Needs Study)	• As required
• Master Fire Safety Plan	• As required
Fleet	
• Condition assessment	• Annual
• MTO Inspections	• Annual
• Planning, collision review committee, etc.	• Quarterly
Equipment	
• Seasonal Inspections on seasonal equipment	• Seasonally
Pedestrian Bridges	
• OSIM (Condition) Inspections	• Every 2 years
• Municipal Drain Report	• As required
• Other condition assessments (3rd Party)	• As Needed
• Hansen Work Order Tracking	• As activities are performed
Operations & Maintenance	
Facilities	
• Staff Inspections	• As required depending of facility type (typically monthly)
• Reactive maintenance	• As required
• Preventative maintenance	• As required
Fleet	
• Preventative Maintenance by class of vehicle	• On-going
• Reactive Maintenance	• On-going
• Spraying of vehicles	• Annual (seasonal)
Equipment	

Asset Management Practices / Planned Activities	Frequency
• Regular oil changes on Golf carts, lubrication, tires, spart plugs, reels, hydraulics, Regular maintenance	• On-going
Pedestrian Bridges	
• Minor repairs identified in bi-annual inspections	• As needed/identified through OSIM
• Guide rail maintenance	• As needed/identified
Renewal, Rehabilitation & Replacements	
Facilities	
• Rehabilitation needs	• As required or scheduled
• Building replacement	• As needed
Fleet	
• Vehicle refurbishments	• As required
Equipment	
• Renewal activities (rebuilding of mowers in the winter)	• Annual
• Replacement of equipment	• On-going
• Replacement of Golf Carts	• On-going
Pedestrian Bridges	
• Bridge Rehabilitation Program	• As required
• Replacement	• As required
Disposal	
Facilities	
• Building and equipment disposal	• As needed
• Repurposing of asset	• Disposal is governed by the by-law, project specific/triggered
Equipment	
• Disposal of equipment	• On-going
Pedestrian Bridges	
• Remove Bridge	• As required
Service Improvement & Growth	
Facilities	
• New Facilities	• As directed
• Equipment Upsizing	• As needed
• Expansion	• On-going / as needed

Asset Management Practices / Planned Activities	Frequency
• New Technology	• As needed
• Interior renovations	• As required
Fleet	
• New Vehicles	• As required
Equipment	
• Equipment additions	• As required
• Upgrade	• As required
Pedestrian Bridges	
• New asset	• As required
• As required	• As required

1.4 Funding the Lifecycle Activities

The Golf Courses uses the lifecycle strategies described above in Section 1.3 to plan work and determine future expenditure needs for Golf Courses assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring Golf Courses can meet the demands of current services and existing infrastructure.

The scenarios below consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City annual capital budgets.

1.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding levels on asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for Golf Courses is approximately $400 thousand annually. Figure 1-4 shows the projected condition distribution of assets over the 20-year forecast period, under the current funding scenario.

The forecast illustrates a sharp decline in condition over the forecast period. Assets in Good to Very Good condition decreases from 21% to 8%, while assets in Very Poor condition increases from 18% to 75%. This scenario highlights challenges Golf Courses will face in maintaining infrastructure assets with the current anticipated budget allocations. It suggests the budget will not be sufficient to keep up with the needs of assets over time, leading to a significant decline in overall asset condition.

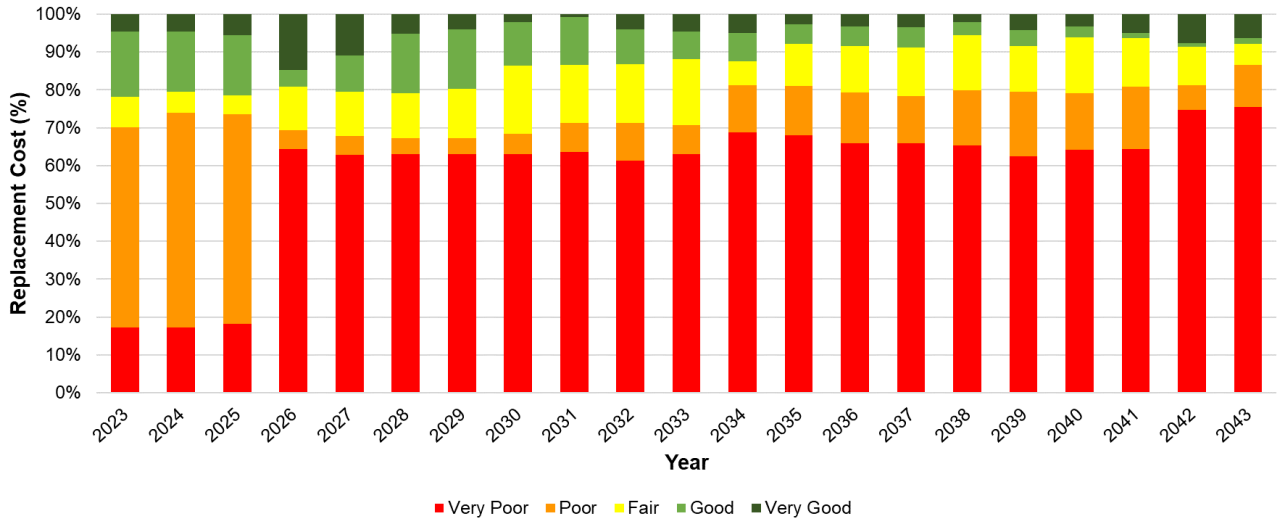


Figure 1-4. Scenario 1: Performance Forecast with Current Funding - City of Windsor Golf Courses Assets

1.4.2 Scenario 2: Maintain Current Performance (Levels of Service)

Scenario 2 reflects the cost to maintain Golf Courses assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the current level of service for the asset category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of Golf Courses assets was determined to be approximately $1.2 million annually, resulting in an average annual gap of $770 thousand. Figure 1-5 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition decreases from 22% to 20%, while assets in Very Poor condition decreases from 17% to 14% throughout the 20-year period.

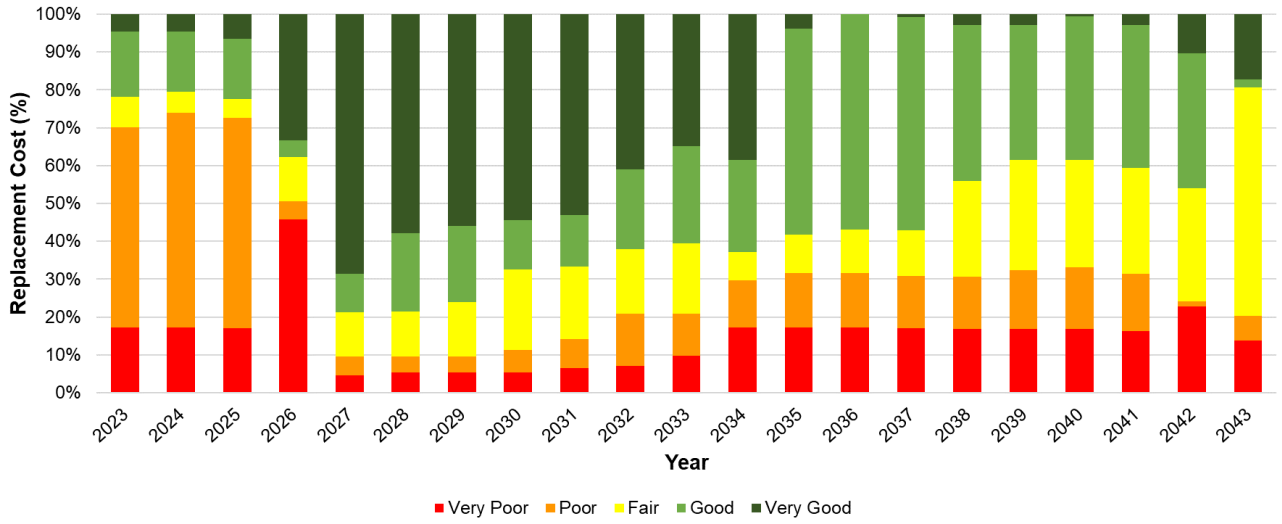


Figure 1-5. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) - City of Windsor Golf Courses Assets

1.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of Golf Courses renewal, rehabilitation, and replacement activities to be approximately $1.3 million annually. Under this scenario, the Golf Course faces an annual average gap of $884 thousand for its infrastructure assets.

The projected asset performance forecast is shown in Figure1-6. The modelling shows an overall increase in the condition of the assets. The model indicates that assets in Good to Very Good condition increases from 22% to 39%, and assets in Very Poor condition decreases from 18% to 16%. This scenario provides the best overall performance of Golf Course assets.

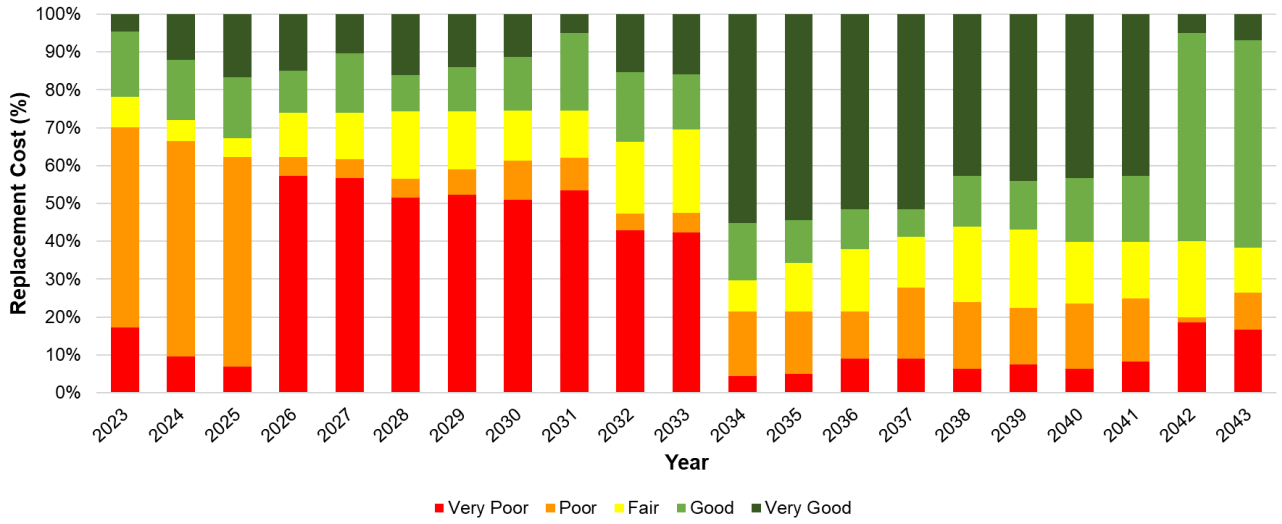


Figure 1-6. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies - City of Windsor Golf Courses Assets

1.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 1-7. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

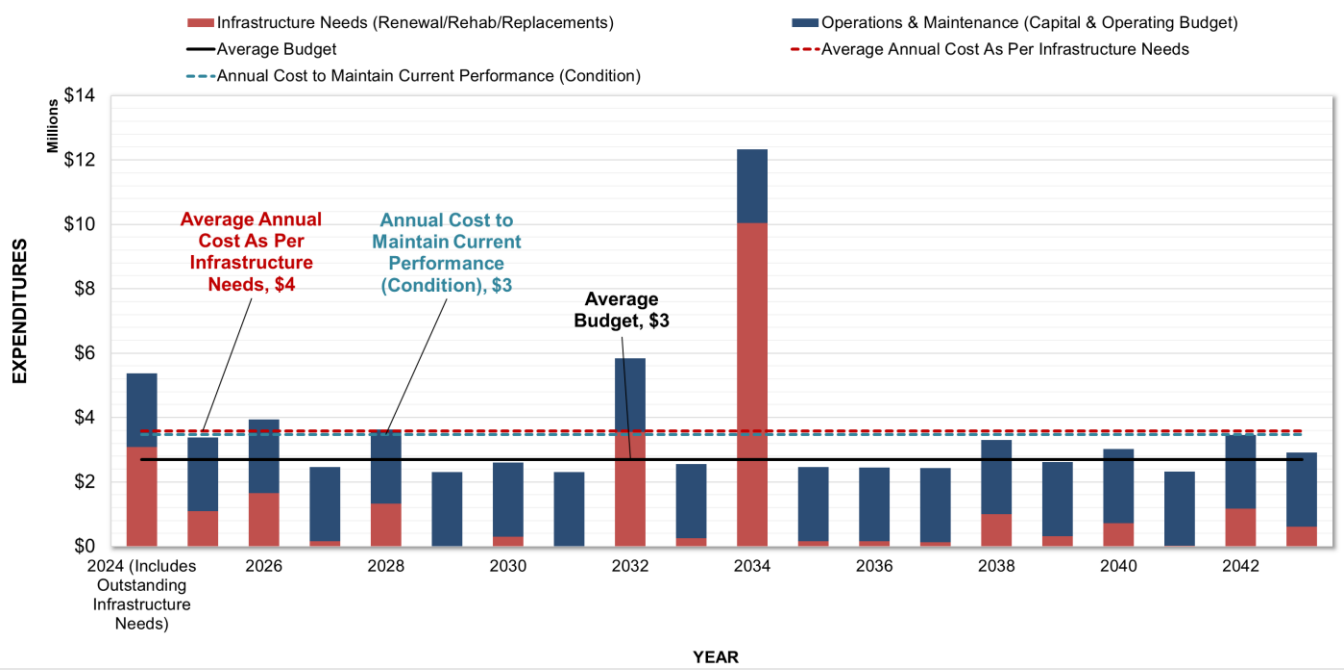


Figure 1-7. Scenario Comparison - City of Windsor Golf Courses Assets

The scenario comparison indicates that Golf Courses is facing an annual gap of $770 thousand to maintain their current performance. If all lifecycle activities identified under the lifecycle strategy were to be undertaken, the gap increases to $884 thousand. This calculated infrastructure gap is further detailed in Table 1-4.

Table 1-4. Lifecycle Activity Investments & Annual Average Infrastructure Gap - City of Windsor Golf Courses Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$0	$0	$0
Operations & Maintenance	$2,300,000	$2,300,000	$2,300,000
Service Improvement	$0	$0	$0
Disposal	$0	$0	$0
Growth	$0	$0	$0
Renewal, Rehabilitation & Replacement	**$400,938**	**$1,171,447**	**$1,285,444**
Total	**$2,700,938**	**$3,471,447**	**$3,585,444**
Funding Gap		**$770,509**	**$884,506**

1.5 Improvement Plan

Improving asset management processes is essential for organizations to enhance efficiency, reduce costs, and maximize the value of their assets. Golf Courses is committed to continual improvement strategies such as conducting annual reviews of asset performance data and identifying areas for improvement, and regular reviews of the Lifecycle Activities and Maintenance Schedules to find optimizations in order to minimize downtime and reduce costs.

Recommendations for improvements to Golf Courses asset data are listed in Table 1-5.

Table 1-5. Recommendations for Improvements - City of Windsor Golf Courses Assets

Task No.	Task	Resources Required	Responsibility
1	Develop a process to maintain asset registry and associated data on an annual basis.	Internal/ External	City of Windsor Golf Courses Asset Planning (City)

City of Windsor Police Services

Asset Management Plan

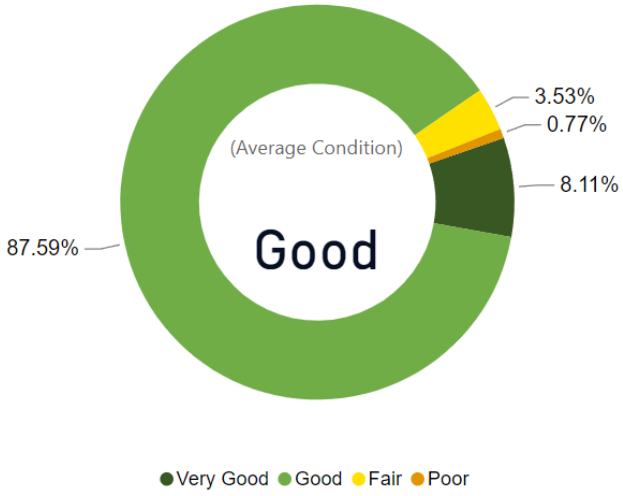
2024

City of Windsor Police Services

Replacement Value

Asset Segment	Replacement Value
Equipment	$6,079,811
Facilities	$159,674,400
Information Technology	$10,993,968
Vehicles	$21,105,427
Total Replacement Value	**$197.8 M**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$3.2 M	**$6.5 M**

Quick Facts

- The Windsor Police Service operates out of four buildings (one within leased space), including its Headquarters facility, which is shared with the Ontario Court of Justice.
- The three municipal buildings, totaling over 210,000 square feet, function as shared facilities with other community partner organizations for optimized efficiency.

1 City of Windsor Police Service

1.1 State of the Infrastructure

The Windsor Police Service (WPS) is committed to excellence in service, guided by core values of integrity, teamwork, and dedication. WPS's vision is to serve the community with unwavering professionalism, ensuring the overall public safety and well-being of all residents.

The mission of the WPS is to work collaboratively with the community, striving to prevent, investigate, and resolve incidents of crime and disorder, while providing essential support to those in need. WPS duties are carried out with accountability and integrity, reflecting commitment to safeguarding the diverse members of our community.

Facilities: Includes the Windsor Justice Facility (ownership of this shared facility is allocated approximately 50% to the City of Windsor and 50% to the Province of Ontario), the Jefferson Operational Support Services Facility, the Sandwich Community Police station (which is situated within school board leased space), and the Major FA Tilston Armoury & Police Training Centre.

The Windsor Justice Facility, which houses the WPS Headquarters, serves as the central hub for most of the Windsor Police Service's branches and divisions. It supports both administrative and operational functions, housing key facilities such as the Uniform Patrol Division, Investigative Services, Emergency 911 call centre, Prisoner Detention, Forensics, Fleet Services, and Quartermaster (police equipment/supplies). The Jefferson Operational Support Services Facility is an innovative partnership with the private sector to provide comprehensive service delivery for those involved in a motor vehicle accident. The Major FA Tilston Armoury & Police Training Centre is a collaboration between the Windsor Police Service and the Department of National Defence (DND). This facility houses the F.A. Tilston Armoury and offers comprehensive firearms and classroom-based training curriculum. Additionally, it provides the home base for the Windsor Police Service Dog Unit and its training activities. The Sandwich Community Police station houses the organization's Community Services Branch, the unit that directly connects with numerous community groups, schools, cultural organizations, etc.

Equipment: Includes equipment assets that are required for outfitting and equipping WPS employees required in carrying out specialized duties performed by WPS. This equipment is used across various critical work areas within WPS, including, Explosives Disposal Unit (EDU), Emergency Services Unit (ESU), Forensic Identification, Public Order Unit (POU), Uniform Patrol, Emergency 911, Fleet, Marine Unit, Crisis Negotiators, and Training.

Information Technology: These assets enable WPS to operate and maintain the infrastructure assets and properly equip employees in a manner that supports the full functionality of their service delivery. Information Technology assets are meticulously maintained and constantly upgraded in order to meet the ever changing and complex challenges of the policing profession.

Vehicles: Includes all WPS vehicles, such as cars, trucks, SUV's, trailers, marine vessels, scooters, and other fleet assets which serve various functions to support WPS operations.

1.1.1 Asset Valuation

The following sections summarize the portfolio associated with the Windsor Police Service's Assets. Table 1-1 provides the inventory and current replacement value of these assets.

Table 1-1. Inventory and Current Replacement Value – City of Windsor Police Services Assets

Segment & Subsegment	Count	Unit	2023 Estimated Total Replacement Value
Windsor Police Service			
Equipment	19	Each	$6,079,811
Facilities	3	Each	$159,674,400
Information Technology	21	Each	$10,993,968
Vehicles	224	Each	$21,105,427
TOTAL			**$197,854,606**

1.1.2 Asset Condition

Facility condition is primarily based on the overall health and performance of the facility, not by building components. Building condition assessments are used to determine condition where available, and staff expertise is used where there are no previous conditions completed. WPS stays regularly engaged in all building condition assessment activities with City Facilities staff to develop a consistent and robust facility condition assessment program. This results in outcomes that will better inform the AMP based on component level facility information for more accurate and comparable analysis of facility assets. Major capital projects are reviewed collaboratively and on an ongoing basis to optimize investments for maintaining functionality.

Vehicle and equipment condition is assessed using an age-based approach, combined with results of regular asset inspections they are managed by the WPS. Assessed assets are reviewed as they come due for replacement, and a decision is made if the asset should or should not be replaced based on its actual condition, mileage and/or productivity.

1.1.2.1 Segment Condition Overview

The overall condition of WPS assets as a percentage of replacement value is illustrated in Figure 1-1.

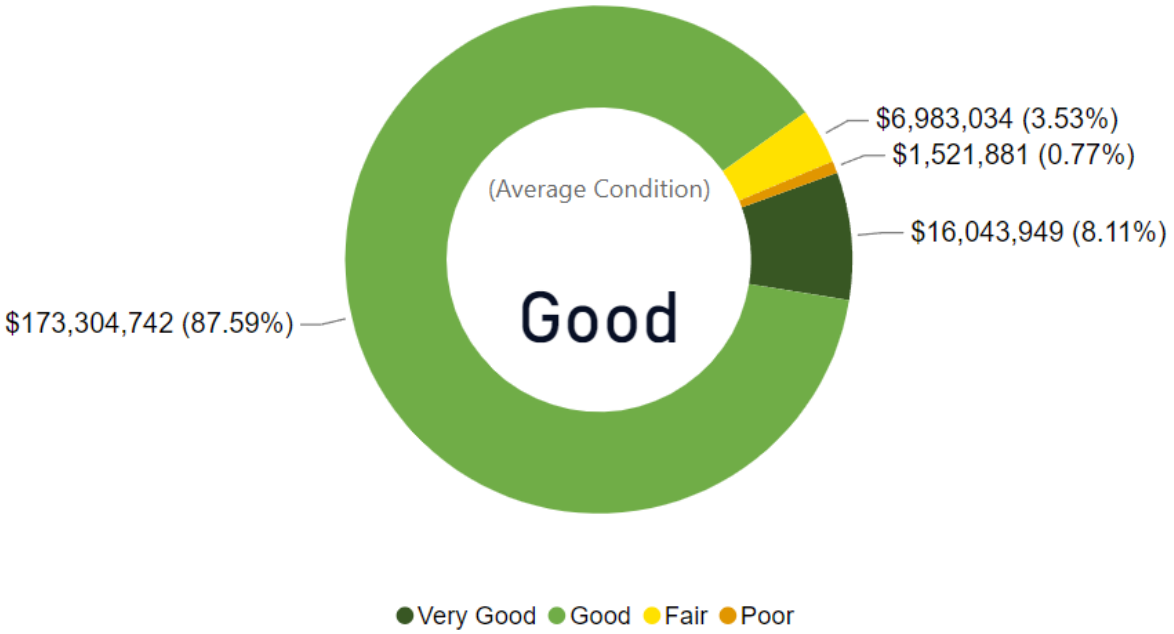


Figure 1-1. Segment Condition by Replacement Value – City of Windsor Police Services Assets

WPS assets are, on average, in Good condition, with nearly 96% of all assets rated as either Good or Very Good. This demonstrates that these assets have strong replacement strategies being followed and in place to ensure the majority of these assets remain in sound working order.

1.1.2.2 Sub-Segment Condition Overview

The condition profiles of WPS assets can be further reviewed at the Sub-Segment level in Figure 1-2.

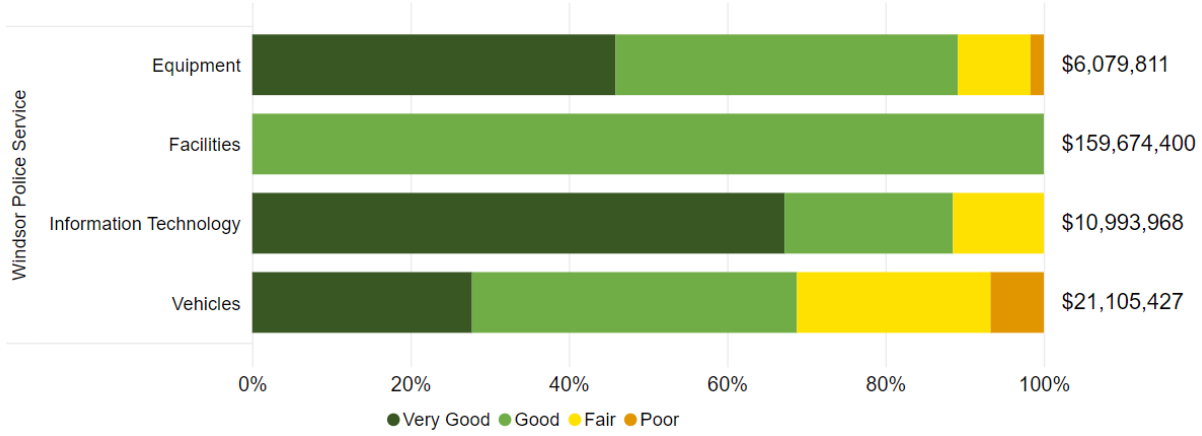


Figure 1-2. Sub-Segment Condition as a Percentage of Replacement Value – City of Windsor Police Services Assets

Equipment, Facilities, IT and Vehicle assets are all in Good condition.

Facilities: To ensure all facility assets are maintained in the highest possible level of functional condition, the WPS employs a comprehensive approach to regular facility reviews, combined with well thought out re-capitalization projects, where necessary. This approach allows for constant monitoring to ensure all WPS facilities perform to the highest level for supporting police service delivery. The use of established capital funding reserves and detailed capital project plans contributes significantly to the process on an ongoing basis.

Equipment: All equipment assets acquired and utilized by the WPS are carefully procured at the front end, based on industry best practices that ensure high performance outcomes. Equipment is meticulously inspected throughout its lifespan to achieve high condition quality and functional use over its lifespan.

Information Technology: Similar to the approach used for police equipment, all I.T. assets are first procured following a comprehensive selection process. Assets are routinely inspected and upgraded, as needed, to ensure optimal performance over their lifespan.

Vehicles: All WPS vehicles are maintained to an above industry standard level, as it relates to maximizing both lifespan and performance capacity. A key part of establishing and maintaining a high degree of asset condition is through a rigorous preventative maintenance program for every piece of the fleet inventory.

1.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset categories. For Facilities in general, total building age does not impact asset management practices. Building components are renewed and replaced due to their criticality and available funding. The average age of WPS assets is illustrated in Figure 1-3.

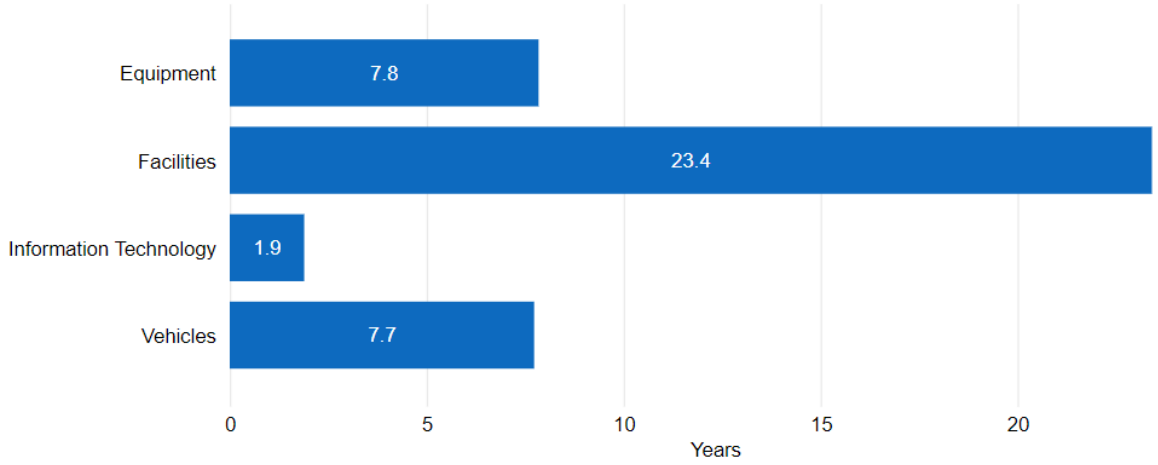


Figure 1-3. Average Age – City of Windsor Police Services Assets

1.2 Levels of Service

Windsor Police Service infrastructure facilitates the provision of effective service delivery using assets and resources that ensure the safety and well being of all employees, residents, property owners, and visitors. Having proper buildings, vehicles, equipment, and trained staff who utilize them allows delivered services to meet everyone's public safety needs each and every day.

Some of the key services provided include:

Facilities: WPS facilities provide essential workspaces for WPS staff to carry out their duties efficiently and effectively. These facilities encompass offices, meeting rooms, evidence handling and analysis spaces, prisoner detention spaces, public call centre spaces, administrative and training centres, operation yards and other workspaces necessary to operate smoothly.

Equipment: WPS equipment infrastructure provides the necessary and specialized equipment required for enabling WPS to deliver much needed, legislatively mandated public safety services to the public. This often means deploying very complex and specialized pieces of equipment to address and resolve more complex outcomes from crime and disorder events.

Vehicles: WPS fleet assets are integral to supporting public safety operations, including crowd control, emergency public health and well being incidents, prevention-oriented patrolling throughout the community, and disaster and emergency response. Well-maintained and reliable vehicles and their integrated equipment are essential for ensuring timely and effective emergency response and public protection.

Information Technology: IT plays a key role in all emergency response and disaster management activities for communication, data analysis, and resource allocation. These assets represent a critical operational support foundation, directly connected to police service delivery, most notably in optimizing greater efficiency in resource allocation and deployment.

The following tables provide a summary of the LOS for WPS. These metrics have been chosen to define and measure the desired standards for delivering services that are provided by WPS. These metrics help set goals, evaluate performance, allocate resources effectively, and communicate expectations to stakeholders. By establishing LOS metrics, WPS can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance.

Table 1-2. WPS-Defined Levels of Service – City of Windsor Police Service

WPS-Defined - Levels of Service			
AMP Segment(s)	**Key Service Attribute**	**LOS Metric**	**Current Performance**
All Segments	Fiscal Sustainability	Reinvestment Rate	19%
All Segments	Reliable	Percentage of total replacement cost for Police assets in Good to Very Good condition	95.7%
Facilities	Reliable	Percentage of total replacement cost for Facilities assets in Good to Very Good condition	100%
Facilities	Environmental Stewardship	Annual electric energy consumption per square foot	1.51 kWh/Sq.Ft.
Facilities	Environmental Stewardship	Annual natural gas consumption per square foot	0.65 m3/St.Ft.
Facilities	Environmental Stewardship	Annual water consumption per square foot	0.01 L/Sq.Ft
Facilities	Environmental Stewardship	Annual GHG emissions	1023 tCO2e
Information Technology	Reliable	Percentage of total replacement cost for IT assets in Good to Very Good condition	88.52%
Equipment	Reliable	Percentage of equipment beyond estimated useful life	5%
Information Technology	Reliable	Percentage of total replacement cost for IT assets past their estimated useful life	0%
Vehicles	Reliable	Percentage of Vehicles beyond estimated useful life	29.02%
Vehicles	Environmental Stewardship	# of Electric Vehicles	Currently 0: 2 to 4 plug-in, fully electric vehicles anticipated to be procured in 2024
Vehicles	Environmental Stewardship	# of Hybrid Vehicles	16

Vehicles	Environmental Stewardship	Annual GHG emissions	4.52 tCO2e (Diesel) 1,402 tCO2e (Gasoline)

1.3 Lifecycle Management Strategy

The objective of the WPS Lifecycle Management Strategy is to outline and establish a set of planned actions, based on best practice, that will enable assets to provide a sustainable level of service to the citizens of Windsor, while managing risk at the lowest lifecycle cost.

WPS is committed to continually improving its approach to the management of its assets and will continue to put in place processes, procedures and tools to enable a more consistent approach. Detailed below is a brief overview of some of the current asset management practices in place at WPS.

1.3.1 Lifecycle Activities

Lifecycle activities for the WPS assets involve a series of tasks and processes aimed at effectively managing these assets throughout their lifecycle. Detailed below is a brief overview of some of the current practices in place:

Non-Infrastructure Solutions

- Regulatory Compliance – WPS must comply with various regulations and standards related to fleet and equipment operations, safety, emissions, and maintenance. These are consistent with the recently passed *"Community Safety and Policing Act"* legislation (April 2024). Proper management practices ensure compliance with these requirements, avoiding penalties, liabilities, and organizational and community risk.
- Cost Management – Proper management practices for Vehicles, Equipment and IT assets can help control costs and optimize resources. This includes strategies such as asset tracking, maintenance, fuel management, lifecycle planning, and scheduling to maximize the value and lifespan of assets while minimizing operational expenses.
- Asset/Lifecycle Planning – Identifying WPS vehicle and equipment needs and requirements, as well as the procurement of assets that meet the departments needs for usage within budget constraints. This also includes new asset deployment and training where required. Needs assessments are conducted regularly to allow the organization to forecast asset needs well in advance of when they must be acquired.

Operations & Maintenance

- Preventative Maintenance – Implementing scheduled maintenance programs to proactively maintain vehicles, and equipment according to manufacturer recommendations. This includes routine inspections, fluid changes, tire rotations, and component replacement. In many cases, operations and maintenance practices employed by WPS exceed industry requirements/standards in recognition of the above average stress police assets experience, compared to assets in other sectors.
- Reactive/Corrective Maintenance – Address service requests, repairs, and breakdowns promptly to minimize downtime and maintain operational efficiency.

- Inspections – Routine and reactive daily, weekly, monthly, and regulatory inspections.

Renewal, Rehabilitation & Replacements

- Planned and Unexpected Renewals and Replacements – WPS must react to unplanned asset renewals and replacements due to asset failures, as well as planned replacements of assets.
- Planning and executing facility renewal, renovation and replacement projects while minimizing disruptions to ongoing operations.

Service Improvement & Growth Activities

- New assets to service growing populations and service areas, as well as to offer new assets and technologies to improve customer experience, accessibility, and safety.
- Identifying opportunities for facility renovations or upgrades to improve functionality, energy efficiency, and occupant comfort.

Disposals

- Decommissioning or disposing of assets at the end of their useful life by determining appropriate disposal methods, such as resale, trade-in, donation, recycling, or environmentally responsible disposal. Asset disposals may also include re-purposing of an asset for alternate use by another department or keeping it for spare parts where possible.
- Planning and executing facility decommissioning activities at the end of its lifecycle, including asset disposal, demolition, or repurposing.
- Managing environmental remediation, waste disposal, and regulatory compliance during decommissioning processes

By implementing these lifecycle activities, WPS can effectively manage their assets to optimize operational efficiency, minimize costs, ensure regulatory compliance, and maximize the value and lifespan of their assets. These activities are also critical for maintaining safe and efficient infrastructure. Specific asset management practices or planned actions as well as their frequencies are outlined in Table 1-3.

Table 1-3. Asset Management Practices, Planned Activities, and Frequency – City of Windsor Police Services Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Facilities	
• Roof Inspection Program	• Annual / Scheduled / Ongoing
• Condition Assessment Program	• Every 5 years, depending on facility type
• Master plan for Facilities	• Updated based on facility type • Comprehensive completed every 10 years
• Feasibility Study for Level of Service Changes (ie Space Needs Study)	• As required
Vehicles	
• Condition assessment - some age based	• Annual
• MTO inspections	• Annual
• Planning, collision review committee, etc.	• Quarterly
Equipment	
• Condition Assessments	• Annual or more frequent as required
Information Technology	
• Business process review for Applications & Software	• As identified, through needs assessments
• Capacity Planning for Hardware Infrastructure	• As needed/part of budget process
• Monitor recalls & updates (patching and security) on assets to ensure proper functionality	• Auto updates monthly, also on-demand security patching
• Contingency and Redundancy Planning for Hardware Infrastructure	• As required
• Master plan for Hardware Infrastructure	• As need identified and budget allows
• Testing for Hardware Infrastructure	• Annual / Per testing policy procedure and industry best practices
• Security Risk Reviews for Hardware Infrastructure	• For new equipment
• Heat Mapping for Switches / Wireless Access Points	• On demand
Operations and Maintenance	
Facilities	
• Staff Inspections	• As required depending on facility type (typically monthly)
• Reactive Maintenance	• As required • As funding is available
• Preventative Maintenance	• As required by PM Plan (captured in CMMS software)
• Legislated Inspection	• As required depending on facility type and legislated inspection schedule requirements

Vehicles	
• Reactive repairs	• Daily and as required
• Preventative Maintenance	• As scheduled; every 5,000 km
• Circle checks, inspections	• Ongoing for each work shift
• PM schedule by class of vehicle	• Ongoing
• Reactive Maintenance (damage, accidents, breakdowns. etc.)	• Ongoing
Information Technology	
• Planned maintenance - updates on firmware and software	• Varies by product (vendor schedules / product lifecycles)
• Software licensing	• As needed (typically annually)
• Agreement renewals for Applications & Software	• As defined in contracts
• Alerts for software & applications updates and defective equipment	• Varies by product (vendor schedules / product lifecycles or adhoc)
• Case by case process assessments for Applications & Software	• As identified
• Support contracts for Applications & Software	• Varies by terms in the product (FYI SaaS fees include the support - this is for most subscription-based products)
• Security Risk Reviews for Hardware Infrastructure	• For new equipment
• Purchase of small equipment and materials for Hardware Infrastructure	• As needed
• Repairs for Hardware Infrastructure	• As needed
• Support contracts for Hardware Infrastructure	• Varies by terms in the product (FYI SaaS fees include the support - this is for most subscription-based products)
• Support and maintenance for Hardware Infrastructure	• Per Contract (typically yearly but more 3-year or 5-year contracts)
• Ruggedize Computers	• As needed
• Updates to Computers, Servers, Virtual Servers, Enterprise Software	• As needed
Fuel Sites	
• Check for water in tanks	• Monthly
• Check for flow at the pump	• Annual or more frequent if concerns arise
• Inspections and dips (measuring fuel levels)	• Weekly
Renewal, Rehabilitation & Replacements	
Facilities	
• Rehabilitation needs	• As required / as scheduled
• Building Replacement	• As needed
Vehicles	
• Vehicle Refurbishments	• As required

• Replacement	• As required / annual
Equipment	
Equipment Replacements	• As required
Information Technology	
• Major upgrade for Applications & Software (consultant assistance, etc.)	• Varies (based on product Lifecycle determined by the vendor)
• Refurbishing for Hardware Infrastructure	• As required
• End of Life for Applications and Software	• As required / as able
• Replacement for Hardware Infrastructure	• Ongoing
Fuel Sites	
• Inspections of Fuel sites, paintings of bollards etc.	• Seasonally
• Replacement of Fuel Sites / Equipment	• Ongoing
Disposal	
Facilities	
• Building disposal	• As required
• Repurposing of asset	• As required
Vehicles	
• Sell/Auction	• Annually or at vehicle end-of-lifespan for police usage
• Keep for spare parts	• As required
• Sell to department	• As requested
• Scrap Vehicle	• As required
Equipment	
• Disposal of Equipment	• Ongoing
Information Technology	
• Uninstall for Applications & Software	• As required
Fuel Sites	
• Disposal of contaminated soil if there were leaks	• As required
• Disposal of old tanks / equipment	• As required
Service Improvement and Growth	
Facilities	
• Expansion	• Ongoing / as needed
• New technology	• As funding is available
• Interior renovations	• As funding is available
Vehicles	
• New Vehicles	• As required

Equipment	
• New Assets	• As identified
Information Technology	
• Enhancements to process and/or technology for Applications & Software	• As identified, through needs assessments
• Technology improvements for Hardware Infrastructure	• As needed / as able
• Pilots for Hardware Infrastructure	• As requested / as new technology emerges
• New Software for new need	• As identified, through needs assessments
• New Hardware for new need	• Driven by growth to maintain LOS; as identified through Planning & Studies
Fuel Sites	
• Site expansion, adding premium fuel at sites	• As required

1.4 Funding the Lifecycle Activities

The Windsor Police Service uses the lifecycle strategies described above in Section 1.3 to plan work and determine future expenditure needs for WPS assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring WPS can meet the demands of current services and existing infrastructure.

The scenarios below consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing City population. The ongoing use of a comprehensive set of performance metrics offers additional insight into decision making associated with changes to asset acquisitions or modifications to meet community needs.

1.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding levels on asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for WPS is approximately $2.9 million annually. Figure 1-4 shows the projected condition distribution of assets over the 20-year forecast period.

The forecast illustrates a decline in condition over the forecast period. Assets in Good to Very Good condition decreases from 94% to 4%, while assets in Very Poor condition increases from 0% to 12%. This scenario highlights challenges WPS will face in maintaining WPS infrastructure assets with the current anticipated budget allocations. It suggests the budget will not be sufficient to keep up with the needs of assets over time, leading to a significant decline in overall asset condition. The WPS has recognized this growing shortfall in overall asset condition as it relates to vehicles by adjusting the 6-year strategic fleet plan accordingly. An increase to funding sources used to purchase vehicles, plus police equipment, have also been brought forward to the Windsor Police Services Board. This offers a tangible manner in which asset condition shortfalls can be addressed effectively going forward.

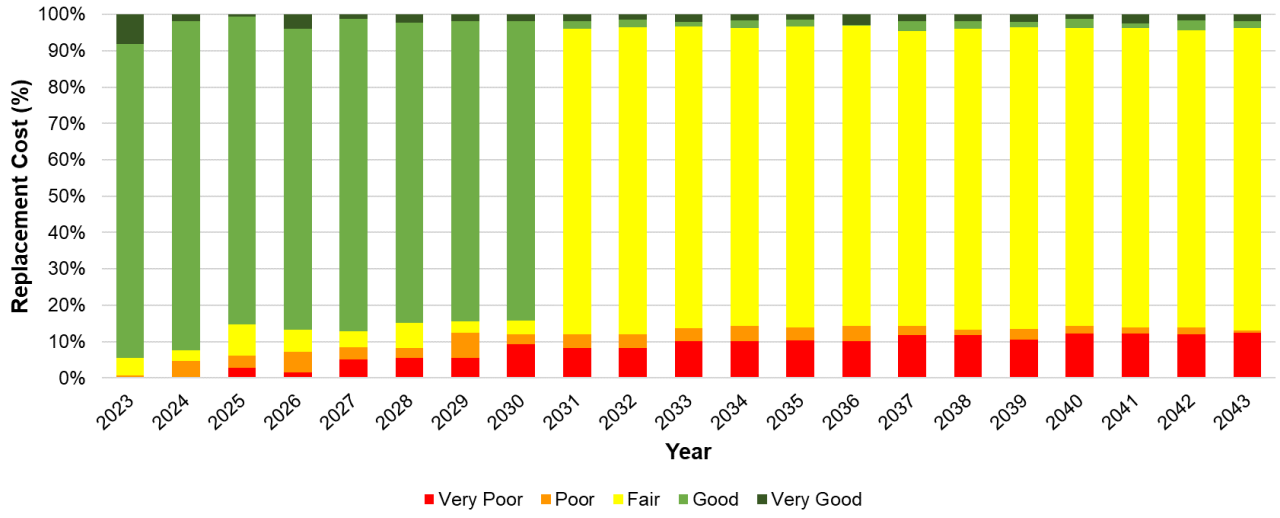


Figure 1-4. Scenario1: Performance Forecast with Current Funding – City of Windsor Police Services Assets

1.4.2 Scenario 2: Maintain Current Performance (Levels of Service)

Scenario 2 reflects the cost to maintain WPS assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the current level of service for the asset category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of WPS assets was determined to be approximately $6.2 million resulting in an average annual gap of $3.2 million. Figure 1-5 shows the projected condition profile of assets over the forecast period. Assets in Good to Very Good condition significantly decreases from 94% to 9%, while assets in Very Poor condition stays the same, at 0%, throughout the 20-year period. The overall condition of assets decreases throughout the 20-year forecast period under the maintain current performance forecast.

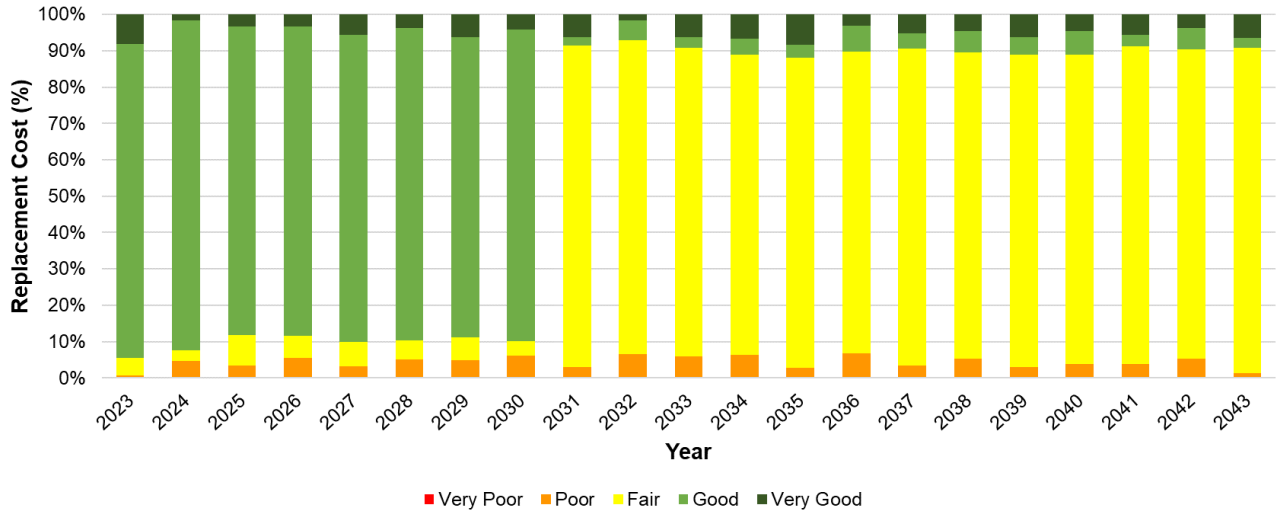


Figure 1-5. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) – City of Windsor Police Services Assets

1.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these assets. Based on this, the infrastructure needs assessment has determined the total cost of WPS renewal, rehabilitation, and replacement activities to be approximately $9.5 million annually. Under this scenario, WPS faces an annual average gap of $6.5 million annually, for its assets.

This projected asset performance forecast is shown in Figure 1-6. While the modelling shows relative stability in the value of assets in Good to Very Good condition through the 20-year forecast, there is a significant increase in the value of assets in Fair condition in years 2031 to 2043, and a significant decrease in overall asset condition by the end of the 20-year forecast through the application of the identified lifecycle strategies. In 2031 the facilities move into fair condition, this represents the majority of the replacement value. In future buildings should be assessed by components based on BCAs for more accurate forecasting. The model indicates that assets in Good to Very Good condition decrease over the forecast from 94% to 12% (an overall decrease of 82%) and assets in Very Poor condition increase over the forecast from 0% to 1% annually. This scenario provides the best overall performance of WPS assets.

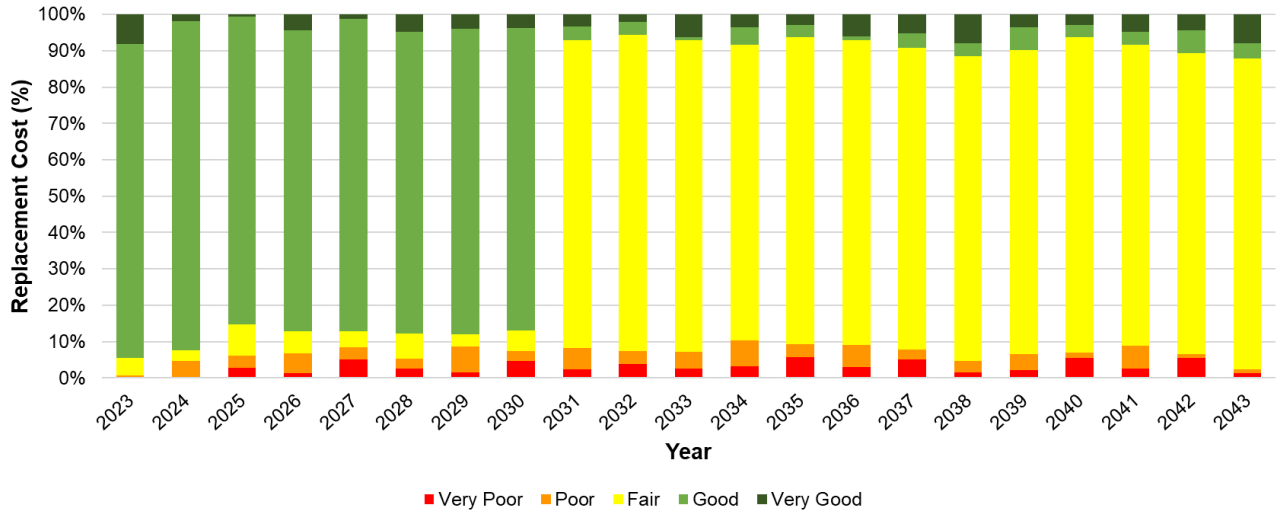


Figure 1-6. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies – City of Windsor Police Services Assets

1.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The required investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 1-7. This Figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

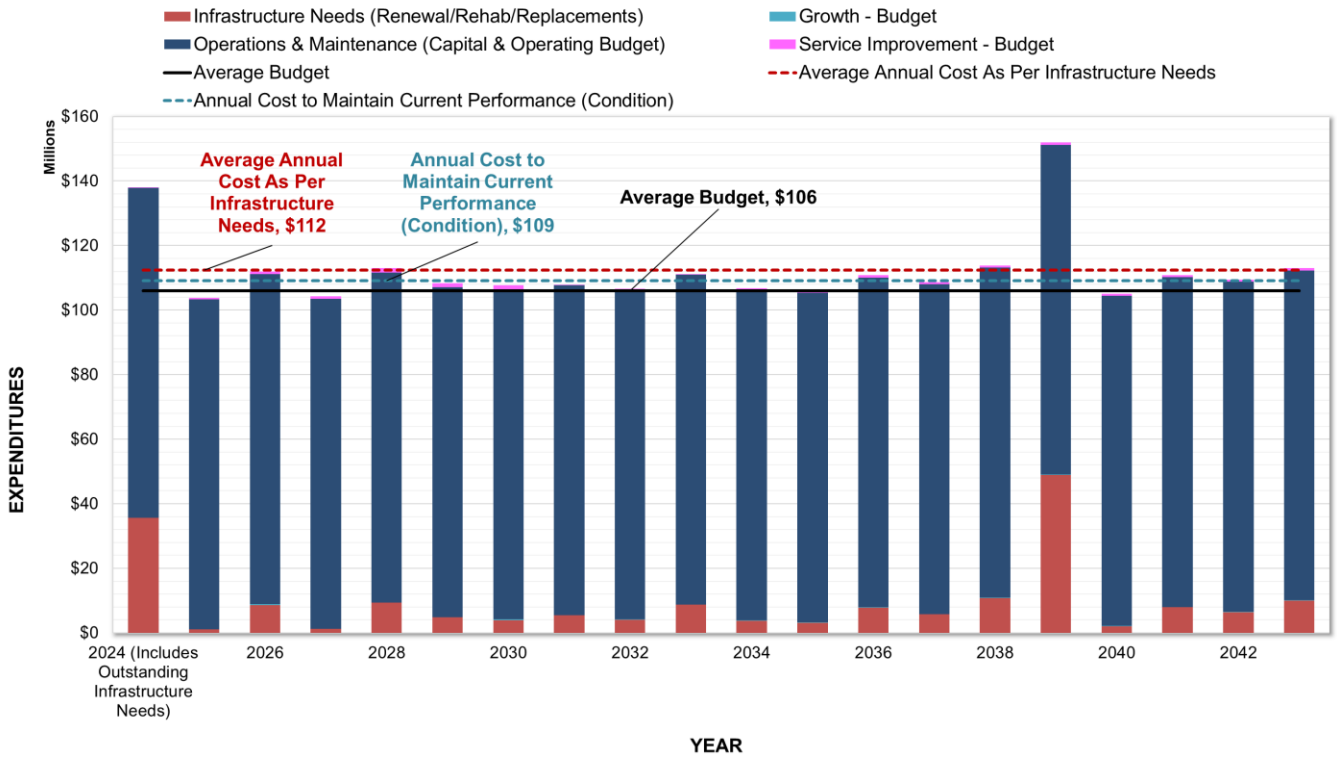


Figure 1-7. Scenario Comparison – City of Windsor Police Services Assets

The scenario comparison indicates that WPS is facing an annual gap of $3.2 million annually to maintain their current performance. If all lifecycle activities identified under the lifecycle strategy were to be undertaken, the gap increases to $6.5 million annually. This calculated infrastructure gap is further detailed in table 1-4.

Table 1-4. Lifecycle Activity Investments & Average Annual Infrastructure Gap – City of Windsor Police Services Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$0	$0	$0
Operations & Maintenance	$102,190,704	$102,190,704	$102,190,704
Service Improvement	$686,500	$686,500	$686,500
Disposal	$0	$0	$0
Growth	$88,000	$88,000	$88,000
Renewal, Rehabilitation & Replacement	**$2,954,000**	**$6,170,944**	**$9,486,147**
Total	**$105,919,204**	**$109,136,148**	**$112,451,351**
Funding Gap		**$3,216,944**	**$6,532,147**

WPS will continue to explore the use of large, circumstance-specific grant opportunities to assist in funding asset acquisitions. However, it is crucial to recognize that this form of funding typically only represents a one-time source of funding and therefore cannot be relied upon as a sustainable solution to address the remaining infrastructure gap. Moving forward, it is essential for WPS to explore alternative funding sources and strategies, if they become available, to bridge the remaining gap in operational and capital funding. This may involve seeking additional grants, exploring public-private partnerships, and continuing to prioritize asset management practices and making strategic investment decisions to maximize the impact of available funding resources.

1.5 Improvement Plan

Recommendations for data improvements to WPS is found in Table 1-5.

Table 1-5. Improvement Plan – City of Windsor Police Services Assets

Task No.	Task	Resources Required	Responsibility
1	WPS to continue to refine equipment replacement needs and lifecycle management strategies.	Internal	Windsor Police Service
2	Continue to conduct building condition assessments (BCAs) regularly and work towards development of a process for having BCAs assessed at the building component level.	Internal/ External	Windsor Police Service City Corporate Projects
3	Undertake process to review all assets (vehicles and equipment, & Information Technology) on a yearly basis, and according to existing strategic forecasts for such assets, to ensure registry is up to date, includes accurate condition and replacement costs.	Internal	Windsor Police Service

City of Windsor Public Library Board

Asset Management Plan

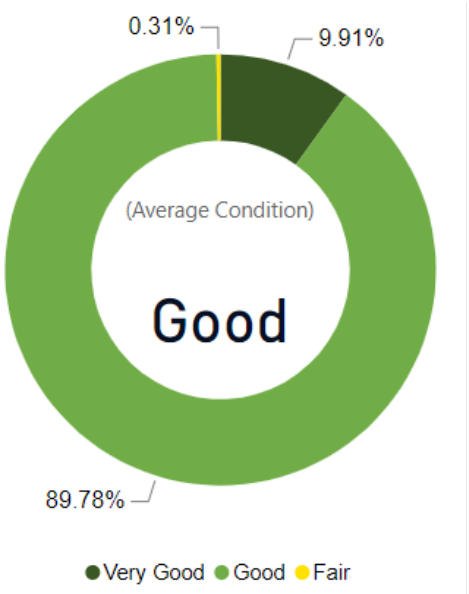
2024

Windsor Public Library Board

Replacement Value

Asset Segment	Replacement Value
Equipment	$142,539
Facilities	$46,738,200
Vehicles	$990,422
Total Replacement Value	**$47.9 M**

Overall Average Asset Condition as a Percentage of Replacement Value



Average Annual Infrastructure Gap to Maintain Current Performance (Condition)	Average Annual Infrastructure Gap to Meet Infrastructure Needs as Per Lifecyle Strategies
$2.1 M	**$33 K**

Quick Facts

To provide public library services, the Windsor Public Library Board manages:

- 11 Facilities, 7 of which are owned by the City and included in this AMP,
- Vehicles and equipment including a Bookmobile and self check out scanners.

1 Windsor Public Library Board

1.1 State of the Infrastructure

The Windsor Public Library Board (WPLB) manages the City's public libraries and the services they provide. The City of Windsor recognizes the importance of its public libraries as emerging dynamic community hubs offering access to resources and providing a community gathering space.

The following asset types included in this report are:

Facilities: Although there are 11 public library facilities located across Windsor, only seven are included in this section of the AMP. Three library facilities are leased to the WPLB, and the Archives branch located in a City of Windsor parking facility, was included in the Transportation section of this AMP. These community buildings provide services that enrich our community by providing access to resources that inform and entertain.

Vehicles: Includes three corporate vehicles that help staff carry out day-to-day library operations. The WPLB recently purchased a new Bookmobile that will provide public event library services to the community.

Equipment: Includes the self check-out scanners located at each of the library facilities. These scanners allow patrons to check out materials.

Well-maintained public library facilities and mobile services contribute to a strong community with shared values. To provide these services, the WPLB and the City of Windsor work together to manage our assets and adapt to changing community needs.

1.1.1 Asset Valuation

The following sections summarizes the portfolio associated with the WPLB assets included in this chapter. Table provides the inventory and current replacement value of these assets.

Table 1-1. Inventory and Current Replacement Value – Windsor Public Library Board Assets

Segment & Sub-Segment	Count	Unit	2023 Estimated Total Replacement Value
Windsor Public Library Board			
Equipment	10	Each	$142,539
Facilities	7	Each	$46,738,200
Vehicles	4	Each	$990,422
TOTAL			**$47,871,161**

Replacement values for the library facilities are assessed at the building level and do not specify any building components or amenities within the buildings. Replacement cost was estimated by subject matter experts using per square foot unit costs based on market values. The John Muir

library and a portion of the Budimir library are heritage buildings and the cost of replacement is determined to be much higher for these facilities. Moving forward it is the intent to develop specialised building components and amenities within the facilities into the analysis. Through further development of facility component data, WPLB can make informed decisions regarding budget allocations, capital planning, and resource management. This enables efficient prioritization of maintenance activities and capital improvement projects to address the most critical needs and ensure the long-term sustainability of facility assets.

Replacement values for vehicles and equipment are for like-to-like purchases and do not reflect any changes in technology. Replacement values for these assets is based on current market value. By reviewing recent purchases and estimating current replacement values for these assets, the WPLB ensures that the replacement value accurately reflects the current market conditions and the specific characteristics of its assets.

1.1.2 Asset Condition

Condition was assessed based on the overall health and performance of the facility, not by building components. Building condition assessments are used to determine condition where available, and staff expertise is used where there were no previous condition assessments completed. Administration is working to develop a consistent and robust facility condition assessment program to better inform the AMP based on component level facility information for more accurate and comparable analysis of facility assets.

Vehicle and equipment condition is assessed using an age-based approach, with many of these assets being very recent purchases. Fleet and equipment assets managed by the Corporate Fleet department are assessed as they come due for replacement, and a decision is made if the asset should or should not be replaced based on its actual condition and mileage. Moving forward, additional equipment assets stored in WPLB's TCA databased should be reviewed to determine if they should be included in this AMP.

1.1.1.1 Segment Condition Overview

Overall condition of WPLB assets, as a percentage of replacement value, is illustrated in Figure
.

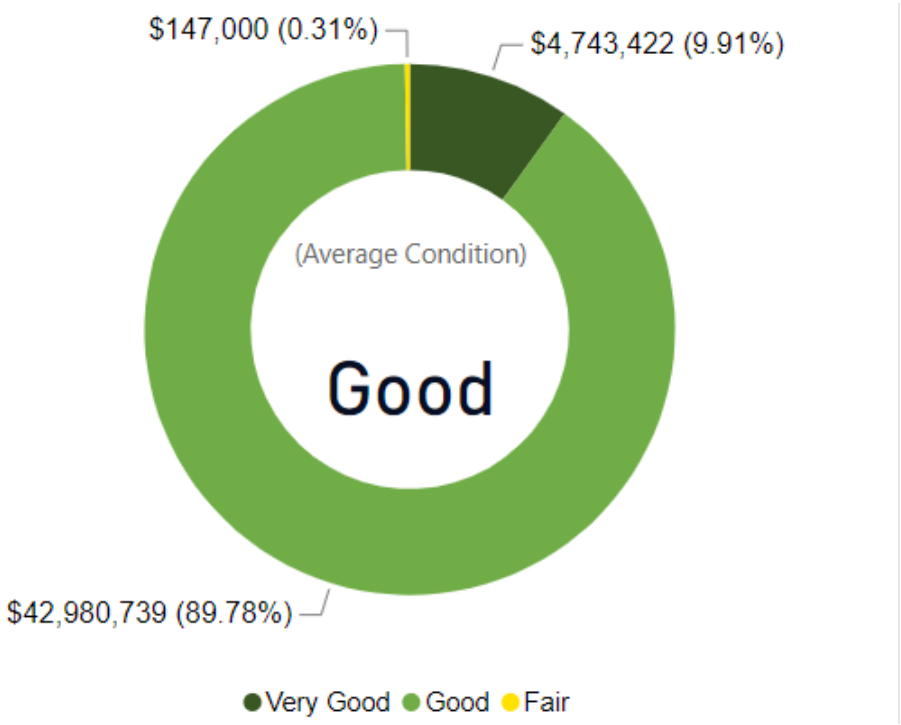


Figure 1-1. Segment Condition by Replacement Value – Windsor Public Library Board Assets

The WPLB assets included in this chapter are in overall Good condition. This demonstrates that these assets have strong replacement strategies and funding in place to ensure that the majority of these assets meet current needs.

1.1.1.2 Sub-Segment Condition Overview

The condition of WPLB assets can be further reviewed at the Sub-Segment level in Figure .

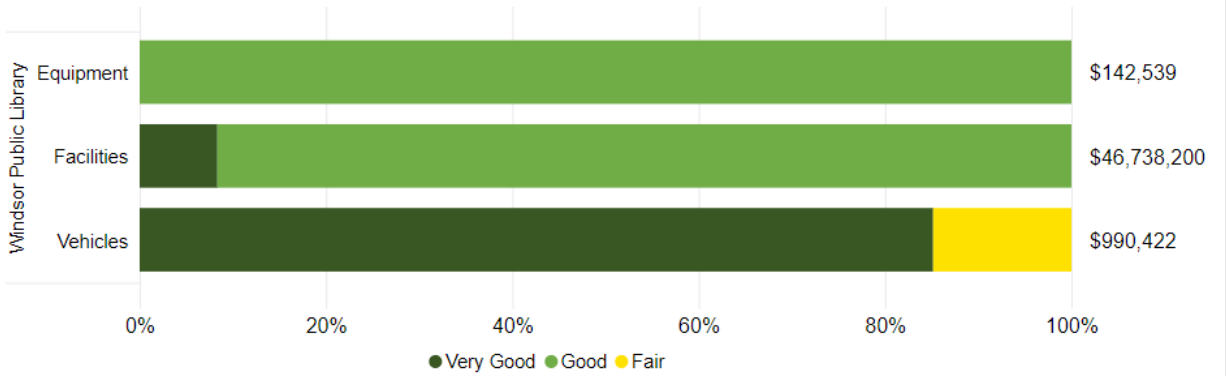


Figure 1-2. Sub-Segment Condition as a Percentage of Replacement Value – Windsor Public Library Board Assets

The WPLB assets are well maintained and in Good condition. Although the condition of the facilities is either Good or Very Good, building component level data is not included in this analysis, and this means that there may be components of each building that are in Fair to Very Poor condition that are not shown here. Further analysis of building component data is required to gain a better understanding of facility condition.

Vehicles and Equipment operated by the WPLB are all fairly new. Investing in regular maintenance as well as budgeting for their replacement is necessary to ensure the services provided by these assets are available in the future.

1.1.3 Average Age

O. Reg. 588/17 requires average age to be reported on all asset categories. In general, for WPLB assets, the age of the asset does not impact asset management practices. Building components are renewed and replaced due to their criticality and available funding. Replacement funding for the self scanners is planned for their end of useful life however their actual replacement will be based on condition. The average age of WPLB assets is illustrated in Figure 1-3.

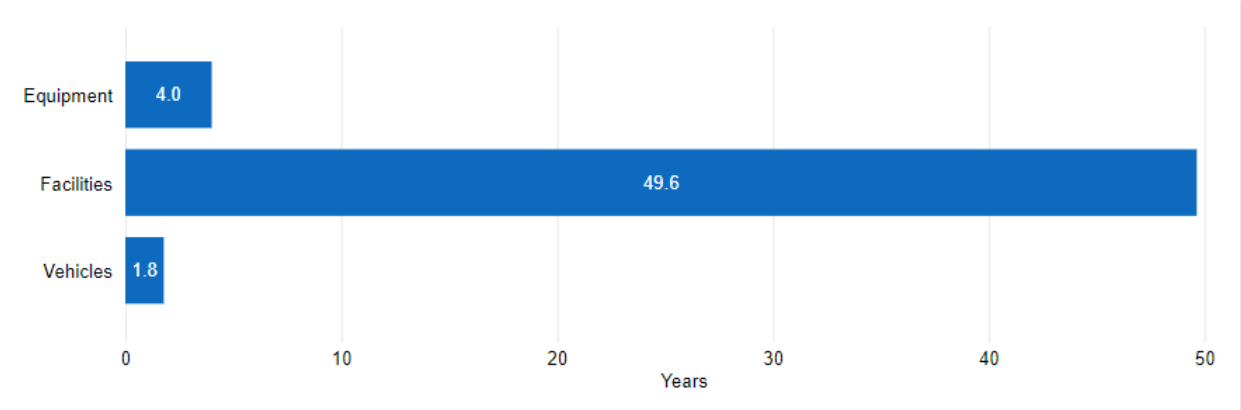


Figure 1-3. Average Age - Windsor Public Library Board Assets

1.2 Levels of Service

WPLB infrastructure enables access to resources that inform and entertain to enrich the lives of all residents. WPLB services are driven by the belief in the freedom of reading, learning and discovery as a part of daily life. These services can be broadly categorized into several key functions:

Social Connection and Engagement: Public libraries serve as gathering places where members of the community can come together to socialize, participate in activities, attend events, and engage in cultural or educational programs. These facilities may include community centers, recreational centers, libraries, parks, and other public spaces.

Livability: Maintaining and improving municipal facilities contributes to the overall quality of life in the community, making Windsor a more desirable place to live, work, and visit.

Promotion of Community Vibrancy: Public libraries play a crucial role in fostering a sense of belonging and community pride. By providing accessible and inviting spaces for residents to connect and interact, these facilities contribute to the vibrancy and cohesion of the community.

Facilitation of Services: Public libraries host programs and support initiatives aimed at promoting a love of learning, improving literacy, science and technology.

Table 1-2 provides a summary of the LOS for WPLB. These metrics help set goals, evaluate performance, allocate resources effectively, and communicate expectations to stakeholders. By establishing levels of service metrics municipalities can assess their performance, identify areas for improvement, and make informed decisions to better meet the needs of their communities while optimizing resource allocation and promoting accountability and transparency in municipal governance.

Table 1-2. Windsor Public Library Board-Defined Levels of Service – Windsor Public Library Board Assets

AMP Segment	Key Service Attribute	Levels of Service Metric	Current Performance
Windsor Public Library Board-Defined - Levels of Service			
All Segments	Fiscal Sustainability	Reinvestment Rate	16%
All Segments	Reliable	Percentage of total replacement cost for all WPLB assets in Good to Very Good condition	99.69%
Facilities	Available	Gross Square Footage of Facilities	61,013 Sq.Ft
Facilities	Environmental Stewardship	Annual GHG emissions	195.18 tCO2e
Facilities	Environmental Stewardship	Annual electric energy consumption per square foot	13.61 kWh/Sq.Ft.
Facilities	Environmental Stewardship	Annual natural gas consumption per square foot	1.47 m3/Sq.Ft
Facilities	Environmental Stewardship	Annual water consumption per square foot	0.10 L/Sq.Ft
Facilities	Available	Number of Library Branches	11[1]

[1] Some library branches are located in shared municipal spaces or buildings, therefore the number of branches does equal the number of facilities that are included in the analysis of this AMP as stated in indicated in Table 1-1.

1.3 Lifecycle Management Strategy

The objective of the Lifecycle Management Strategy is to outline and establish a set of planned actions, based on best practice that will enable assets to provide a sustainable level of service to residents, while managing risk at the lowest lifecycle cost.

The WPLB has implemented routine scheduled preventative maintenance programs to examine, inspect and maintain its facilities and equipment assets. By doing so this helps assist in pre-emptive corrective actions and extends the useful life of its facilities and equipment. Using this documentation and the continued regular check-ins, while working collaboratively with the City of Windsor, the WPLB is continuously monitoring the facility needs and developing a schedule to ensure maintenance and, if required, replacement is able to be completed on an appropriate timeline, therefore mitigating the risk of additional unforeseen costs to arise. This assists to ensure an appropriate budget is in place at the time the work is required to be completed.

1.3.1 Lifecycle Activities

Lifecycle activities for WPLB assets involve a series of processes and tasks aimed at effectively managing these assets throughout their lifecycle. Detailed below is a brief overview of some of the current practices in place:

Non-Infrastructure Solutions

- Strategic planning and needs assessments through master plans and condition assessments.
- Developing facility design plans based on identified needs, regulatory requirements and industry standards.
- Identifying the WPLB's asset needs and requirements, as well as the procurement of assets that meet the departments needs for usage within budget constraints. This also includes new asset deployment and training where required.
- Ensuring facility compliance with building codes, safety standards and environmental regulations. Ensuring regulations and standards related to vehicle operation, safety, emissions, and maintenance are complied with.
- Identifying and assessing risks associated with facility operations, including safety hazards, security vulnerabilities, and natural disasters; developing and implementing emergency response plans and mitigation measures to minimize risks and ensure business continuity.

Operations & Maintenance

- Maintenance programs to ensure ongoing functionality, safety, and efficiency of facility systems and components.
- Conducting routine inspections, preventative maintenance tasks, and reactive repairs to address issues and prolong asset lifespan.

- Implementing scheduled maintenance programs to proactively maintain vehicles, and equipment according to manufacturer recommendations. This includes routine inspections, fluid changes, tire rotations, and component replacement.
- Addressing service requests, repairs and breakdowns promptly to minimize downtime and maintain operational efficiency.

Renewal, Rehabilitation & Replacements

- Planning and executing facility renewal, renovation and replacement projects while minimizing disruptions to ongoing operations.
- Planned and unplanned vehicle and equipment renewals and replacements because of asset failures, as well as the planned replacements of assets.

Disposals

- Planning and executing facility decommissioning activities at the end of its lifecycle, including asset disposal, demolition, or repurposing.
- Managing environmental remediation, waste disposal, and regulatory compliance during decommissioning processes.

Service Improvement & Growth Activities

- New assets to service growing populations and service areas, as well as to offer new assets and technologies to improve customer experience, accessibility, and safety.
- Identifying opportunities for facility renovations or upgrades to improve functionality, energy efficiency, and occupant comfort.

By implementing these lifecycle activities, the WPLB can effectively manage their assets to optimize performance, maximize value, and meet the needs of the community in a sustainable and cost-effective manner. Specific asset management practices or planned activities and the associated frequencies with these actions are outlined in Table 1-3.

Table 1-3. Asset Management Practices, Planned Activities, and Frequency – Windsor Public Library Board Assets

Asset Management Practices / Planned Activities	Frequency
Non-Infrastructure	
Facilities	
• Roof Inspection Program	• On-going
• Condition Assessment Program	• Every 3 - 5 years depending on facility type
• Master Plan for Facilities	• Updated based on facility type • Comprehensive completed every 10 years
• Feasibility Study for Level of Service Changes (i.e. Space Needs Study)	• As directed by the WPLB and at times Council
Vehicles	
• Condition assessment	• Annual
• Ministry of Transportation inspections	• Annual
Operations & Maintenance	
Facilities	
• Staff inspections	• As required depending on facility type
• Reactive maintenance	• As required • As funding is available
• Preventative maintenance	• As required by PM Plan (captured in CMMS software)
Vehicles	
• Preventative maintenance schedule by class of vehicle	• On-going
• Reactive maintenance (damage, accidents, breakdowns. etc.)	• On-going
• Spraying of vehicles	• Annual
Equipment	
• Operations/maintenance of scanners	• As required
Renewal, Rehabilitation & Replacements	
Facilities	
• Rehabilitation needs	• As funding is available
• Building replacement	• As directed by the WPLB and at times Council
Vehicles	
• Vehicle refurbishments	• As required
• Replacement	• As required
Equipment	
• Replacement of Scanners	• As required

Asset Management Practices / Planned Activities	Frequency
Disposal	
Facilities	
• Building disposal	• As directed by the WPLB and at times Council
• Repurposing of asset	• As directed by the WPLB and at times Council
Vehicles & Equipment	
• Disposal of asset	• As required
Service Improvement & Growth	
Facilities	
• Expansion	• As directed by the WPLB and at times Council
• New technology	• As funding is available
• Interior renovations	• As funding is available
• New facilities	• As directed by the WPLB and at times Council l
• Equipment upsizing	• As funding is available
Vehicles	
• New vehicles	• As funding is available
• Vehicle upgrade	• As funding is available
Equipment	
• Additional scanners	• As funding is available

1.4 Funding the Lifecycle Activities

WPLB uses the lifecycle strategies described above in Section 1.3 to plan work and determine future expenditure needs for WPLB assets. These activities, along with the scenarios outlined below provide a comprehensive framework for managing infrastructure assets and ensuring WPLB can meet the demands of current services and existing infrastructure.

The scenarios below consider only renewal, rehabilitation and replacement lifecycle activity cost and needs. In order to supplement the analysis, the funding required for the remaining lifecycle activities of non-infrastructure, operations and maintenance, service improvements, disposal, and growth, have also been accounted for in the Scenario Comparison. For the purposes of this AMP, these activities and their costs are assumed to be adequate in meeting current needs. This AMP does not provide an analysis on optimizing these activities and costs as it is out of scope. Growth needs to address the growing population are captured through planned capital projects funded through the City of Windsor's Capital Budget and will also be brought forward as required through the annual City Budget process.

1.4.1 Scenario 1: Current Funding

This scenario analyzes the impact of the current funding to the asset performance (condition) over the 20-year forecast. The current budget for renewal, rehabilitation, and replacement for WPLB, on average is $1.4 million annually. Figure 1-4 shows the projected condition distribution of assets over the 20-year forecast period.

The forecast illustrates a staged and significant decrease in condition over the 20-year period. Assets in Good to Very Good condition decreases from 99% to 1%, while assets in Very Poor condition increases from 0% to 89%. This scenario highlights challenges WPLB will face in maintaining infrastructure assets with the current anticipated budget allocations. It suggests that the budget will not be sufficient to keep up with the needs of the assets over time, leading to a significant decline in overall asset condition.

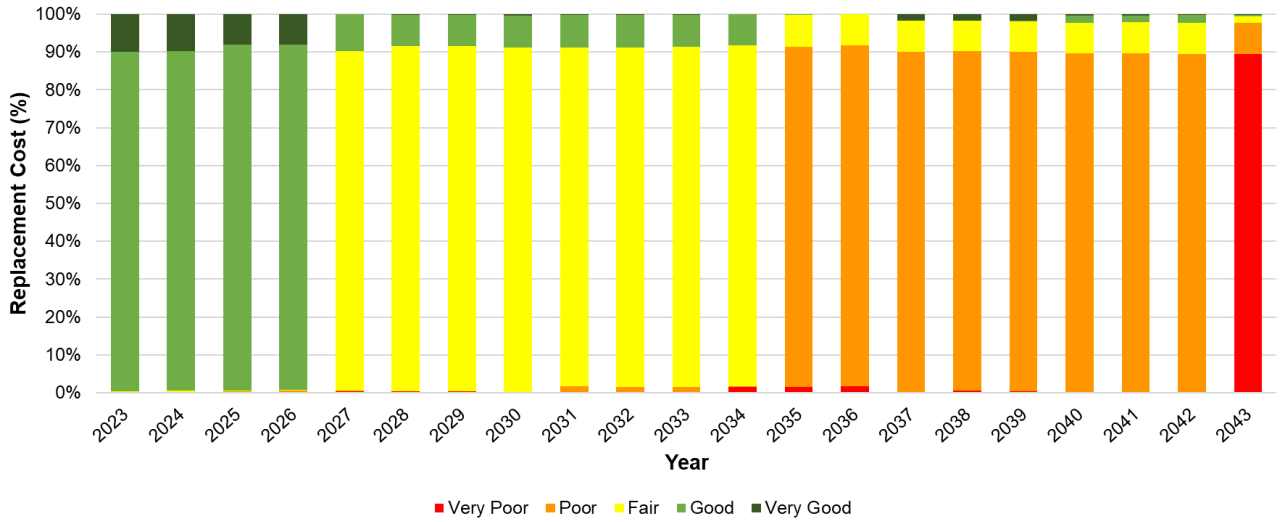


Figure 1-4. Scenario 1: Performance Forecast with Current Funding - Windsor Public Library Board Assets

1.4.2 Scenario 2: Maintain Current Performance (Level of Service)

Scenario 2 reflects the cost to maintain WPLB assets in approximately the same performance (condition) they are currently in and forecasts the estimated cost to provide the current level of service for the asset category. This is a requirement of O. Reg. 588/17. As illustrated by the variation in condition seen throughout the 20-year forecast period, the modeling does not consider condition distribution as a whole but rather, the model attempts to maintain the overall percent of assets identified in Very Poor condition in year 2023 to those reported in year 2043. This is done through the selection and management of the lifecycle activities for each of the asset types that work to achieve this goal.

As a result of this modeling, the renewal, rehabilitation, and replacement costs to maintain the current performance of WPLB assets was determined to be approximately $3.5 million annually, resulting in an average annual gap of $2.1 million. Figure 1-5 shows the projected condition profile of assets over the forecast period.

Figure 1-5. Scenario 2: Performance Forecast to Maintain Current Performance (Levels of Service) - Windsor Public Library Board Assets

1.4.3 Scenario 3: Infrastructure Needs as Per Lifecycle Strategies

Scenario 3 considers the full implementation of the identified lifecycle strategies for these WPLB assets. Based on this, the infrastructure needs assessment has determined the total cost of WPL renewal, rehabilitation, and replacement activities to be approximately $1.4 million annually. Under this scenario, the WPL faces an annual average gap of $33 thousand for its infrastructure assets.

The projected asset performance forecast is shown in Figure 1-6. The modelling shows a significant decrease in overall condition of the assets over the 20-year period. Assets in Good to Very Good condition decrease from 99% to 1%, while assets in Very Poor condition increase from 0% at the start of the forecast to 89% throughout the 20-year period.

The infrastructure needs scenario shows the WPLB may face challenges in the future in maintaining their assets in a state of good repair for both current and future generations. This suggests that the lifecycle strategies for this infrastructure need to be assessed and further developed in future AMPs to ensure their implementation would result in maintained levels of service for the WPLB.

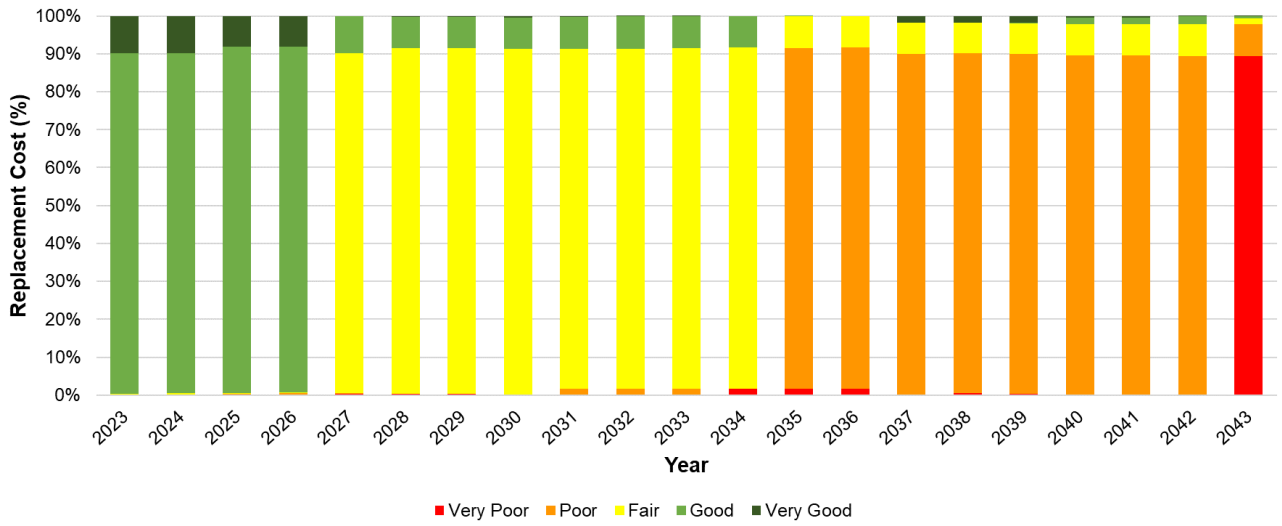


Figure 1-6. Scenario 3: Performance Forecast with Infrastructure Needs as per Lifecycle Strategies - Windsor Public Library Board Assets

1.4.4 Scenario Comparison & Forecasted Infrastructure Gap

The investment needs under each of the aforementioned scenarios are consolidated and presented in Figure 1-7. This figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current Performance (Scenario 2) and the Average Annual Cost of Infrastructure Needs based on Lifecycle Strategies (Scenario 3). The gap is calculated by comparing the forecasted renewal, rehabilitation and replacement expenditures under each Scenario against the Average Annual Budget attributed to these assets. The gap also considers Outstanding Infrastructure Needs in its calculation, which is included in the 2024 expenditure amount. Outstanding Infrastructure Needs represent the outstanding renewal, rehabilitation and replacement activities that have been identified and deemed necessary but have not yet been completed due to budget constraints and other limitations.

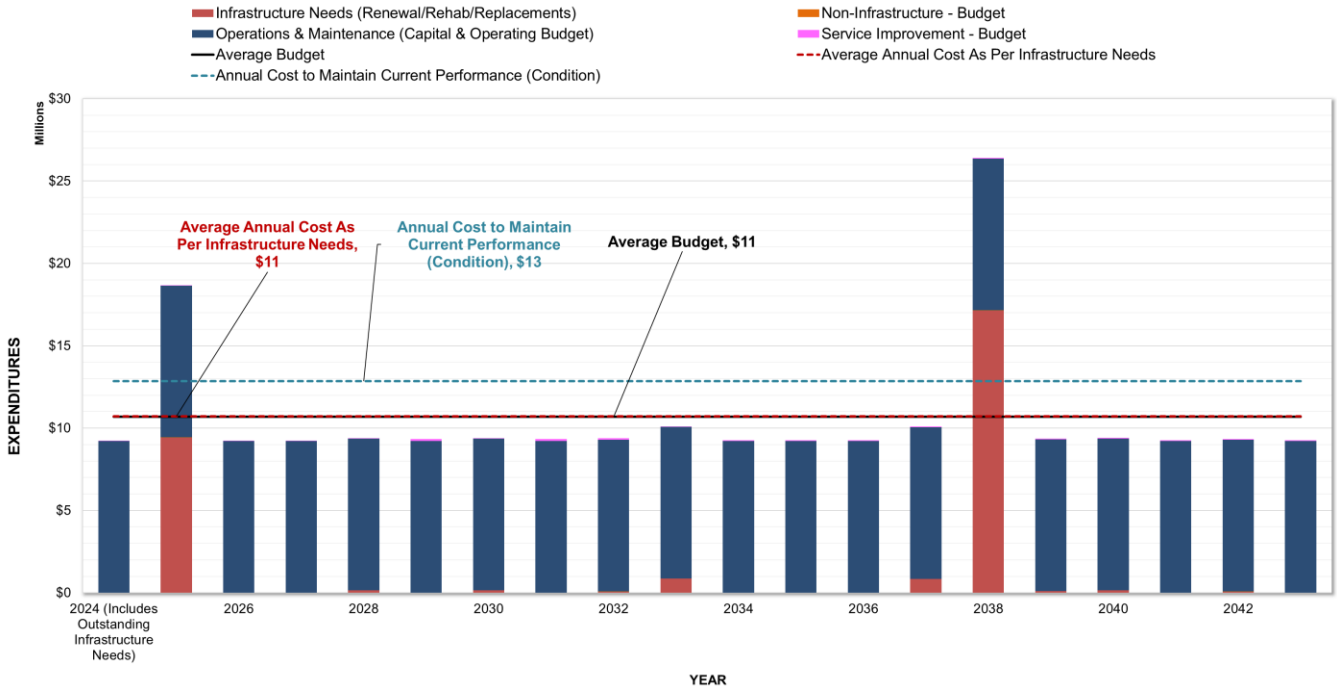


Figure 1-7. Scenario Comparison - Windsor Public Library Board Assets

The scenario comparison indicates that the WPLB category is facing an annual gap of $2.1 million to maintain their current performance. If all lifecycle activities identified under the lifecycle strategy where to be undertaken, the gap decreases to $33 thousand. This calculated infrastructure gap is further detailed in Table 1-4.

Table 1-4. Lifecycle Activity Investments & Average Annual Infrastructure Gap - Windsor Public Library Board Assets

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current Performance (Condition)	Average Annual Cost of Infrastructure Needs as Per Lifecyle Strategies
Non-Infrastructure	$5,200	$5,200	$5,200
Operations & Maintenance	$9,216,081	$9,216,081	$9,216,081
Service Improvement	$51,560	$51,560	$51,560
Disposal	$0	$0	$0
Growth	$0	$0	$0
Renewal, Rehabilitation & Replacement	**$1,412,239**	**$3,589,776**	**$1,445,266**
Total	**$10,685,080**	**$12,862,617**	**$10,718,107**
Funding Gap		**$2,177,537**	**$33,027**

The WPLB continues to work with available and approved funding to monitor, maintain and replace assets as required. Continuing preventative maintenance to extend the useful life of assets is a way the WPLB works to mitigate increase costs that come with the need to completely replace an asset. Although administration continues to work within approved funding, as assets deteriorate, the need for replacement will occur. Adequate funding will need to be in place in order to maintain a good condition rating for all Library assets over the next 20 years.

The WPLB continues to look for grants that come available in order to assist with funding for Library operations as well as asset maintenance and replacement. Overall, WPL will continue to work within available funding to maintain and replace assets strategically in order to ensure continued public service and branch functionality for all patrons.

1.5 Improvement Plan

The information presented in this AMP offers a comprehensive overview of WPLB assets. Moving forward, WPLB is committed to enhancing its asset documentation and tracking processes to provide a more nuanced understanding of its asset portfolio. This strategic approach aims to facilitate informed decision-making and effective asset management practices.

Furthermore, WPLB is working collaboratively with the City of Windsor to enhance the monitoring of library assets. Efforts are underway to develop detailed tracking sheets for all maintenance requirements through this increased communication between City Facilities and WPLB staff. By ensuring a clear understanding of upcoming needs at each branch location, this collaborative effort promotes better planning and facilitates timely budget allocation to address evolving needs.

Improving asset management processes is essential for organizations to enhance efficiency, reduce costs, and maximize the value of their assets. WPLB is committed to continual improvement strategies such as conducting annual reviews of asset performance data and identifying areas for improvement; regular reviews of the Lifecycle Activities and Maintenance Schedules to find optimizations in order to minimize downtime and reduce costs.

Through the development of this AMP, several areas of improvement were identified which should be considered for incorporation into WPLB Asset Management practices as the AMP program matures. Recommendations for improvements to WPLB asset data are listed in Table 1-5.

Table 1-5. Recommendations for Improvements - Windsor Public Library Board Assets

Task No.	Task	Resources Required	Responsibility
1	Work with Corporate Projects/Facilities to make better use of information obtained in building condition assessments moving forward.	Internal/ External	WPLB Corporate Projects Facilities Asset Planning

2	Consider how to add and manage additional assets such as IT and security equipment, cultural assets etc. to the asset registry.	Internal/ External	WPLB Asset Planning
3	Develop a process to maintain asset registry on an annual basis	Internal/ External	WPLB Asset Planning

Windsor Essex Community Housing Corporation

Asset Management Plan

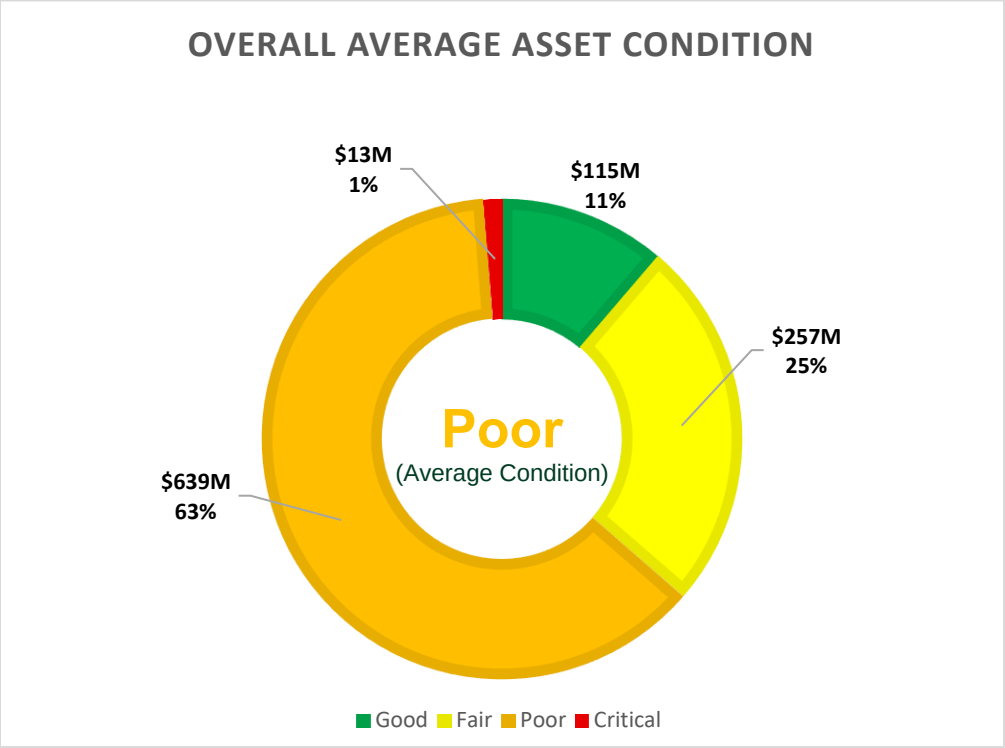
2024

Windsor Essex Community Housing Corporation (CHC)

Replacement Value

$1,024 M (Table 1)

Overall Average Asset Condition



Quick Facts

CHC has total of 4884 units as follows:

- 3533 Public Housing units
- 573 Non-profit Family units
- 597 Non-profit Senior units
- 181 Affordable Housing units

1 Windsor Essex Community Housing Corporation (CHC)

1.1 State of the Infrastructure

CHC is the leading affordable housing provider in Windsor Essex. Across the region, more than 12,000 people are housed in a CHC property. As a corporation, we maintain more than 4,800 units that are affordable, deeply affordable and market rent.

CHC currently operates four distinct housing portfolios. These portfolios were created under various Federal and/or Provincial programs and are administered differently. The details of each housing portfolio are as follows:

Public Housing (PH) represents roughly **72%** of the asset base and is 100% Rent-Geared-to- Income (RGI).

Non-Profit Family (NPF) represents roughly **12%** of CHC's assets based on unit count and is comprised of 60% RGI units and 40% "Affordable Market" units.

Non-Profit Senior (NPS) represents about **12%** of CHC's assets based on unit count and is comprised of 100% Affordable Market units.

Affordable Housing (AH) accommodates roughly **4%** of CHC's assets based on unit count and it is compromised of new built or acquired buildings.

1.1.1 Asset Valuation

The following sections summarize the portfolios associated with the CHC assets. Table 1 provides the inventory and current replacement value of these assets.

Table 1. Inventory and Current Replacement Value – CHC

Sub-segment	Unit Type					2023 Replacement value
	Single Family	Semi Detached	Row Housing	Apartment	Total	
Public Housing	160	238	1036	2099	3533	$ 695,136,422
Non-Profit Family	80	200	187	106	573	$ 172,820,061
Non-Profit Senior	0	0	224	373	597	$ 88,594,116
Affordable Housing	0	0	21	160	181	$ 67,630,150
	240	**438**	**1468**	**2738**	**4884**	**$ 1,024,180,749**

The replacement values utilized in this analysis were extracted from the Asset Planner software as of January 2024. These values were initially reviewed and validated by subject matter experts in their respective fields in 2016 and have since been updated annually to reflect inflationary adjustments. It is important to note that these replacement costs represent a like-for-like asset replacement scenario, and do not account for any potential building enhancements or upgrades.

1.1.2 Asset Condition

Currently, the overall condition of CHC's asset portfolio is characterized as poor to fair, with an average [1]Facility Condition Index (FCI) score of 15%. Figure 1 illustrates the Condition distribution of all CHC's assets.

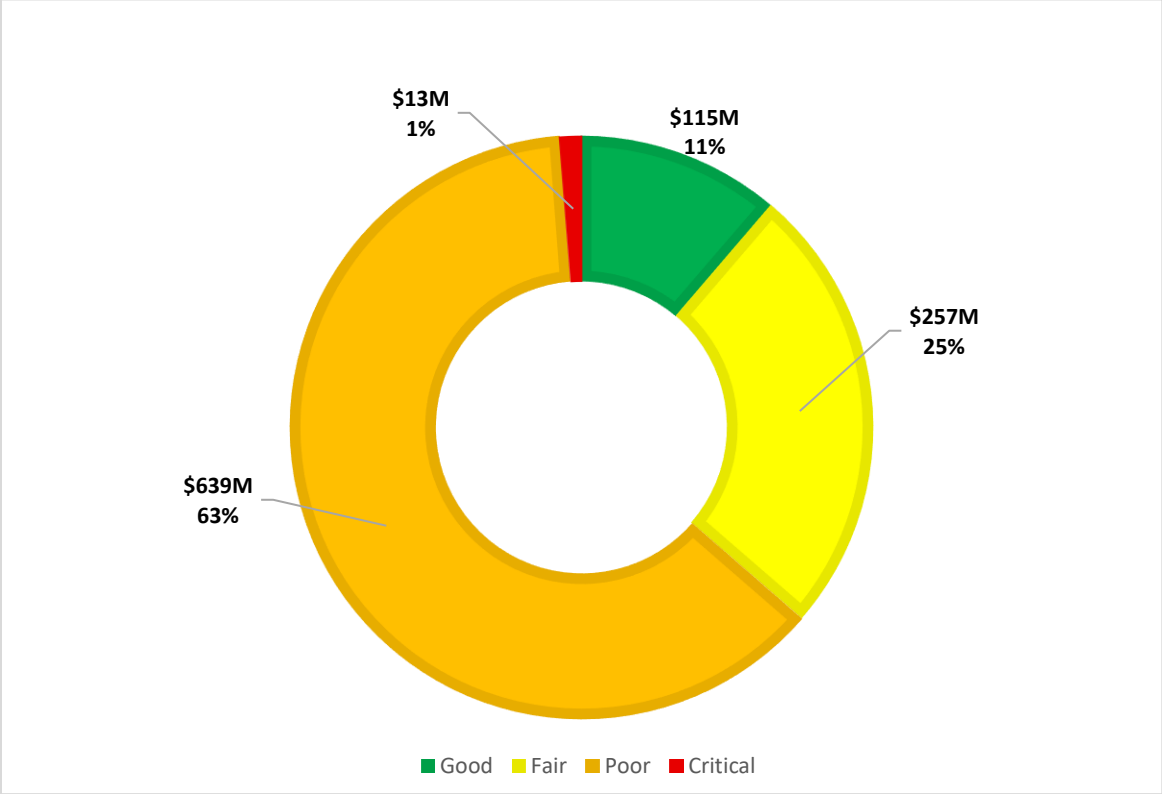


Figure 1. CHC's Overall Asset Condition by Replacement Value

In 2016, CHC undertook a comprehensive facility condition assessment of its entire building portfolio, with the resulting data subsequently integrated into the Asset Planner software platform for strategic asset management and planning purposes. Since the initial assessment, CHC has ensured data integrity and relevance by consistently updating the platform with completed projects and studies, thereby facilitating informed decision-making and strategic asset management.

- FCI 0 - 5% Good
- FCI 5 - 10% Fair
- FCI 10 - 30% Poor
- FCI > 30% Critical

1.1.2.1 Asset Sub-Segment Condition

CHC asset condition as a percentage of replacement value is further broken down by portfolio in Figure 2. Affordable Housing portfolio is in a good condition while the rest are in poor condition. The reason behind the poor condition is the growing unfunded capital needs due to the aging of the infrastructure (average age of CHC building is around 50 years) as well as a general underfunding of capital needs and the lack of a reserve fund since CHC's inception.

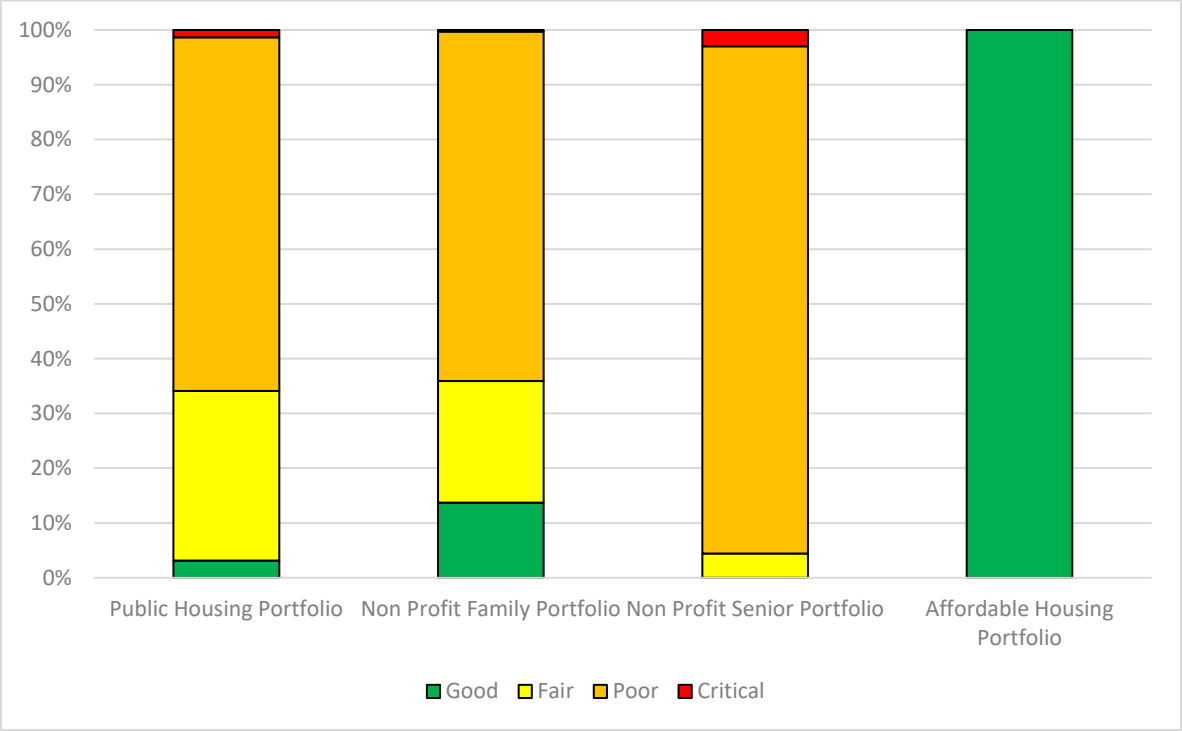


Figure 2. CHC Condition by Asset Sub-Segment

1.1.3 Average Age

CHC asset age compared to estimated useful life is shown in Figure 3. The Average Estimated Useful Life (***Average ESL***) of the asset was determined by calculating the age at which the asset's FCI is projected to reach 40%, based on current funding levels.

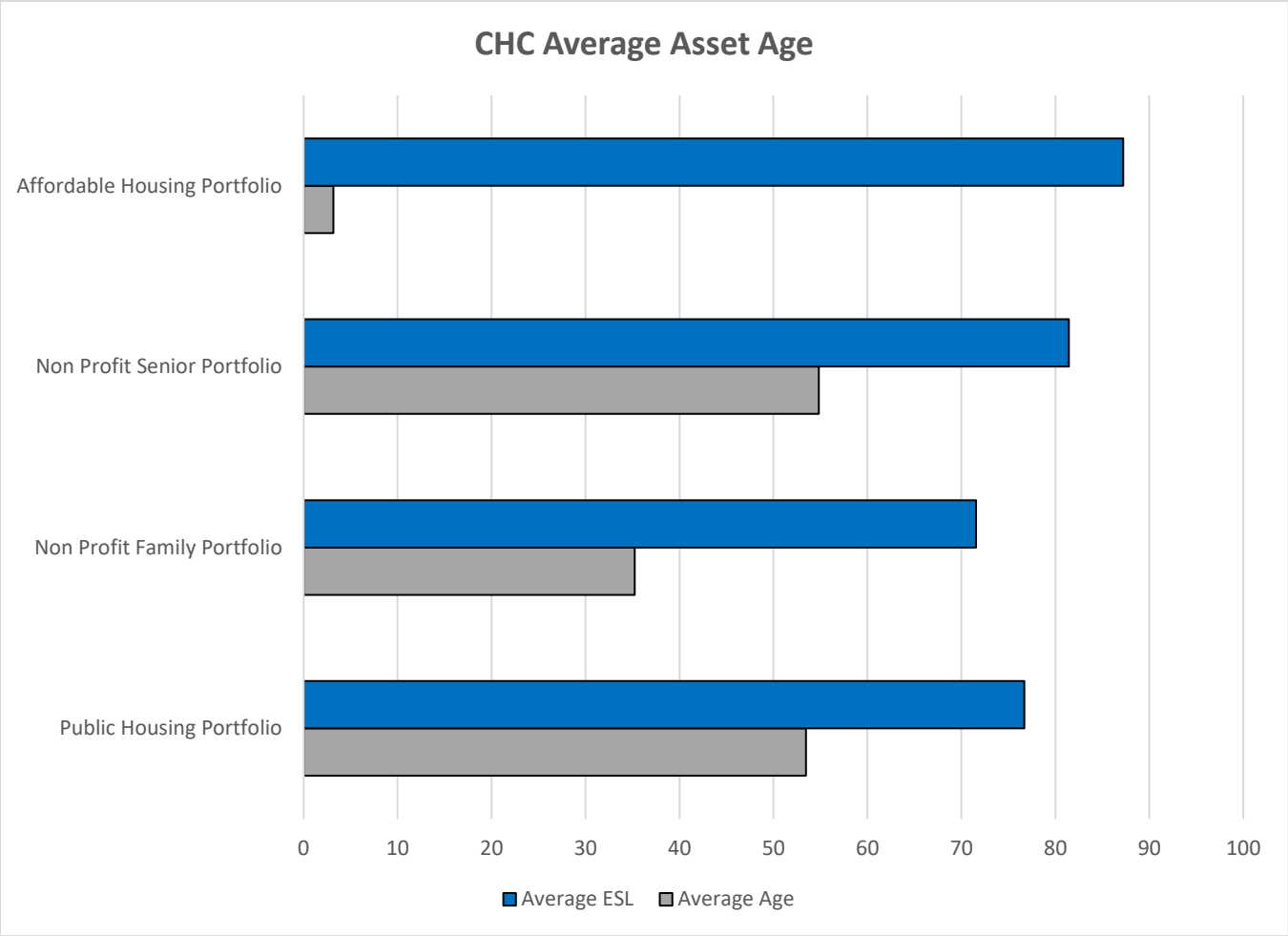


Figure 3. CHC Average Age

1.2 Levels of Service

Levels of service (LOS) are measures for what CHC provides to its customers, residents, and visitors. They support the organization's strategic goals and are derived from customer needs and expectations, Board objectives, legislative and regulatory requirements, standards, along with the financial capacity of CHC to deliver those LOS.

CHC has selected level of service performance measures as they relate to our Corporate Values of fiscal sustainability, scope, quality, availability, reliability, and environmental stewardship.

The following tables provide a summary of the customer and technical LOS performance measures and current performance. Future versions of the AMP will start to consider what level of service is desired to be achieved for assets, and what investment is required to achieve it. This is also a requirement by 2025 under O.Reg. 588/17.

Table 2. CHC Level of Service Metrics

AMP Sub Segment	Key Service Attribute	Performance Measure	Current Performance (2023)
City Defined LOS			
Public Housing Portfolio	Reliable	% of assets in fair to good condition[1]	30%
	Environmental Stewardship[2]	Annual electric energy consumption	10.85 kWh/ Sq Ft
	Environmental Stewardship[2]	Annual Natural gas consumption	0.78 m^3/ Sq Ft
	Environmental Stewardship[2]	Annual water consumption per square foot	0.18 m^3/ Sq Ft
	Environmental Stewardship[2]	Annual GHG emissions	1.58 tons/ 1000 Sq Ft
Non-Profit Family Portfolio	Reliable	% of assets in fair to good condition	35%
	Environmental Stewardship[2]	Annual electric energy consumption	10 kWh/ Sq Ft

	Environmental Stewardship[2]	Annual Natural gas consumption	0.94 m^3/ Sq Ft
	Environmental Stewardship[2]	Annual water consumption per square foot	0.20 m^3/ Sq Ft
	Environmental Stewardship[2]	Annual GHG emissions	1.83 tons/ 1000 Sq Ft
Non-Profit Senior Portfolio	Reliable	% of assets in fair to good condition[1]	5%
	Environmental Stewardship[2]	Annual electric energy consumption	10.53 kWh/ Sq Ft
	Environmental Stewardship[2]	Annual Natural gas consumption	0.48 m^3/ Sq Ft
	Environmental Stewardship[2]	Annual water consumption per square foot	0.13 m^3/ Sq Ft
	Environmental Stewardship[2]	Annual GHG emissions	0.93 tons/ 1000 Sq Ft
Affordable Housing Portfolio[2]	Reliable	% of assets in fair to good condition[1]	100%
	Environmental Stewardship[3]	Annual electric energy consumption	[3]Not available
	Environmental Stewardship[3]	Annual Natural gas consumption	[3]Not available
	Environmental Stewardship[3]	Annual water consumption per square foot	[3]Not available
	Environmental Stewardship[3]	Annual GHG emissions	[3]Not available

[1]CHC's target is to have all its asset in fair to good condition.
[2] The date provided only represents multi residential buildings.
[3] This is a new portfolio and CHC is currently in process to track the identified LOS.

1.3 Lifecycle Management Strategy

The objective of our Lifecycle Management Strategy is to outline and establish a set of planned actions, based on best practice that will enable our assets to provide a sustainable level of service to the citizens of Windsor, while managing risk at the lowest lifecycle cost.

CHC continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach. Detailed below is a brief overview of some of the current asset management practices in place at CHC.

1.3.1 Lifecycle Activities

Specific asset management practices or planned actions as well as specific risks associated with these actions are outlined in Table 3.

Table 3. Asset Management Practices and Associated Frequency

<table>
<tr><th>Lifecycle Activity Type</th><th>Asset Management Practices/ Planned Actions</th><th>Frequency Associated with Practices/Planned Actions</th></tr>
<tr>
<td>Non-Infrastructure Solution
Actions or policies that can lower costs or extend useful life.</td>
<td>Estimated Useful Life

Estimated useful life means the estimated number of months or years that an asset will be able to be used for the purpose for which it was acquired. Eligible fixed assets should be depreciated over their estimated useful lives. CHC started establishing a table of useful lives when an asset is added to the system, depending upon the sub-category of fixed assets selected, a corresponding estimated useful life would be assigned CHC Capturing the data in Asset Planner.

Asset Planner is a software suite for capital planning focused on facility management solutions as a real-time tool that provides an accurate snapshot of our portfolio’s condition in the present moment. It also projects its condition into the future so you can proactively plan – calculating the costs for the replacement of key building components and prioritizing capital improvements, forecasting our needs up to 50 years into the future. Asset Planner is comprised of multiple, integrated modules including tracking, prioritizing, and reporting on deficiencies, rating assets and forecasting renewals based on pre-defined lifecycle projections. Asset Planning Module Audit Planner Mobile App, Project Planning Module Preventative Maintenance Module Service Request Module In this module, we track the present needs and lifecycles of our assets. We can also create and manage capital works, produce real-time reports, budgets, capital plans and projections. This app</td>
<td>Building and Building Components:

<table>
<tr><th>Description</th><th>Useful Life (in years)</th></tr>
<tr><td>General Construction</td><td>50</td></tr>
<tr><td>Site Preparation</td><td>Unlimited*</td></tr>
<tr><td>Roof</td><td>25</td></tr>
<tr><td>Interior Construction</td><td>30</td></tr>
<tr><td>Plumbing</td><td>30</td></tr>
<tr><td>HVAC</td><td>30</td></tr>
<tr><td>Electrical</td><td>30</td></tr>
<tr><td>Fire Protection</td><td>25</td></tr>
<tr><td>Elevators</td><td>25</td></tr>
<tr><td>Miscellaneous</td><td>25</td></tr>
<tr><td>Land Improvements and Infrastructure</td><td>20</td></tr>
</table>
</td>
</tr>
</table>

Lifecycle Activity Type	Asset Management Practices/ Planned Actions	Frequency Associated with Practices/Planned Actions
	allows us to enter data collected during a site visit. We can collect data, take photos and transfer everything into the database in one click.	
Operations & Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	Each building acquired or constructed is divided into 10 major building components. The components are as follows: 1. General construction 2. Site preparation (this component is classified as land on the financial statements) 3. Roof and drainage 4. Interior construction 5. Plumbing 6. Heating, ventilation, and air conditioning 7. Electrical 8. Fire protection. 9. Elevators 10. Miscellaneous	CHC's Asset Management and purchasing issued service contracts complete with preventive maintenance program for daily weekly, semie annual and annual testing and maintenance complete with monitoring systems services: - Fire Safety Inspections and Monitoring Services - Generator Services - Mechanical 1 - Residential Services and Preventive Maintenance - Mechanical 2 - Multi Residential Services and Preventive Maintenance - Elevators Services - Electrical and Solar Systems Services - Electrical Services - Security cameras and monitoring system services. - Heat Management and monitoring systems services. Daily, Monthly, seasonal, annual, 5 years inspections and preventive maintenance as per recent applicable Safety, Codes, and Regulations.

Lifecycle Activity Type	Asset Management Practices/ Planned Actions	Frequency Associated with Practices/Planned Actions
Renewal/Replacement Activities Significant repairs designed to extend the life of the asset, or activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehab is no longer an option.	**1.** Elevators modernizations: - 2455 Rivard + 860 Mercer- 5 elevators in 2017 - 120 Oak +4365 Wyandotte - 3 elevator in 2018 - 445 Glengarry – 2 elevators in 2019 - 255 Riverside – 3 elevators in 2020 - 415 University– 1 elevator in 2022 - 333 Glengarry – 2 elevators in 2023 - 395 University + 920 Ouellette + 140 Bridge – 7 elevators in 2024 - 438 Niagara + 605 Mill – 4 elevators in 2025	Elevators modernized under capital projects complete with 5 years preventive maintenance for Monthly, Annual and, 5 years inspections as per the latest cods and regulations. Also, we have 24/7 as directed services and emergency after hours calls.

Lifecycle Activity Type	Asset Management Practices/ Planned Actions	Frequency Associated with Practices/Planned Actions
	2. Generators and Automatic Transfer Switches, ATS, modernization within 12 developments as follows: - 140 Bridge- Generator and ATS - 2012 - 120 Oak- Generator and ATS - 2012 - 2455 Rivard - Generator and ATS- 2012 - 333 Glengarry - Generator and ATS -2016 - 605 Mill - Generator and ATS -2018 - 920 Ouellette- Generator and ATS- 2019 - 445 Glengarry- Generator and ATS - 2024/2025 - 415 University- Generator and ATS- 2024/2025 - 395 University - Generator and ATS- 2024/2025 - 255 Riverside - Generator and ATS- 2024/2025 - 860 Mercer - Generator and ATS - 2024/2025 - 438 Niagara- Generator and ATS- 2024/2025	- **Weekly Inspection**, Test, and Maintenance Requirements (Table 2 - CSA C282-15) - **Monthly Inspection**, Test, and Maintenance Requirements (Table 3 - CSA C282-15) - **Semi-Annual** Inspection, Test, and Maintenance Requirements (Table 4 - CSA C282-15) - **Annual Inspection**, Test, and Maintenance Requirements (Table 5 - CSA C282-15) - **Quinquennial (every 5 years) Inspection,** Test and Maintenance Requirements (Table 6 - CSA C282-15)

Lifecycle Activity Type	Asset Management Practices/ Planned Actions	Frequency Associated with Practices/Planned Actions
Disposal Activities Activities 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.	CHC is required to maintain a service level that approved by the Service Manager. No disposal activities have been approved at this time. Should any opportunity arise that requires the disposal of an asset, CHC will seek the approval through Service Manager.	As needed
Service Improvement & Growth Activities Planned Planned activities to improve an asset's capacity, quality, and system reliability or extend services to previously unserved areas.	- At the current time, CHC is funded by the Service Manager to maintain the service level, predetermined capital improvements and growth activities. Repair and Renewal (R&R) funding is being utilized to complete the predetermined capital improvement. Currently, unplanned growth activities are sanctioned as funding becomes available from time to time through the Service manager and other government levels.	As needed

Current funding for these identified Lifecycle activities is summarized in Table 4. Current funding for operating budgets presented is the average of budgeted 2022 & 2023 fiscal years. Lifecycle Capital Budget is based on Repair and Renewal (R&R[1]) funding and historical average capital budget[2] prior to R&R funding.

Table 4. CHC Current Lifecycle (Operating and Capital), and Service Improvement Budgets (Capital)

Budget Type	Current Funding (Avg. Annual Activity Currently Practiced)
Operating Budget	
PH	$31.5.M
NPF	$ 6.6M
NPS	$ 5.2M
AH	$ 1.9M
Total	**$45.2M**
Lifecycle Capital Budget	
PH	$7.5M
NPF	$1.7M
NPS	$1.8M
AH	$0.2M
Total	**$11.2M**
Growth/Service Improvement Budget	
PH	$0.0M
NPF	$0.0M
NPS	$0.0M
AH	$0.0M
Total	**$0.0M**

[1]CMHC Co-Investment Funding for Repair and Renewal is federal fund that CHC received for capital projects. The total funding is $170M to be spent between 2020 and 2028.

[2]CHC historical capital budget is $3.5M.

1.4 Funding the Lifecycle Activities

1.4.1 Infrastructure Needs Assessment

The AMP focuses to identify renewal, rehabilitation and replacement needs for infrastructure investments. Therefore, only these lifecycle activities are captured in the forecast scenarios and the infrastructure gap modeling. Expenditures required for the remaining lifecycle activities (non-infrastructure, operations, and maintenance) are based on current operating expenditures and are estimates which may not be reflective of actual operational needs. These activities and their associated expenditures, while not forming part of the model, have been captured to provide high-level information on the full lifecycle cost of asset ownership.

The following figure forecasts long-term capital requirements and compare this to the planned budget (Figure 4). The capital needs represent the average amount per year that CHC should allocate towards funding rehabilitation and replacement needs. The following figure identifies average capital requirements over the next 10 years. As illustrated in the figure, CHC requires an additional annual investment of $7.3 million to maintain its asset portfolio at the current FCI level of 15%. Furthermore, to achieve its target FCI of 10%, CHC needs an additional $11.7 million per year.

The “Capital Need Backlog” represents the cumulative backlog of deferred capital work needed to be completed. This back log represents nearly $150M of deferred works that have accumulated over multiple decades and have created a significant backlog of necessary works.

Deferring renewals create risks of higher financial costs, decreased availability, and decreased satisfaction with asset performance. Ultimately, continuously deferring renewals works ensures CHC will not achieve intergenerational equality. If CHC continues to push out necessary renewals, there is a high risk that future generations will be unable to maintain the level of service customers currently enjoy. It will burden future generations with significant costs that inevitably they will be unable to sustain.

Continued deferrals of projects will lead to significantly higher operational and maintenance costs and will affect the availability of services in the future. Properly funded and timely renewals will ensure the assets perform as expected and it is recommended to continue to analyze asset renewals based on criticality and availability of funds for future AM Plans.

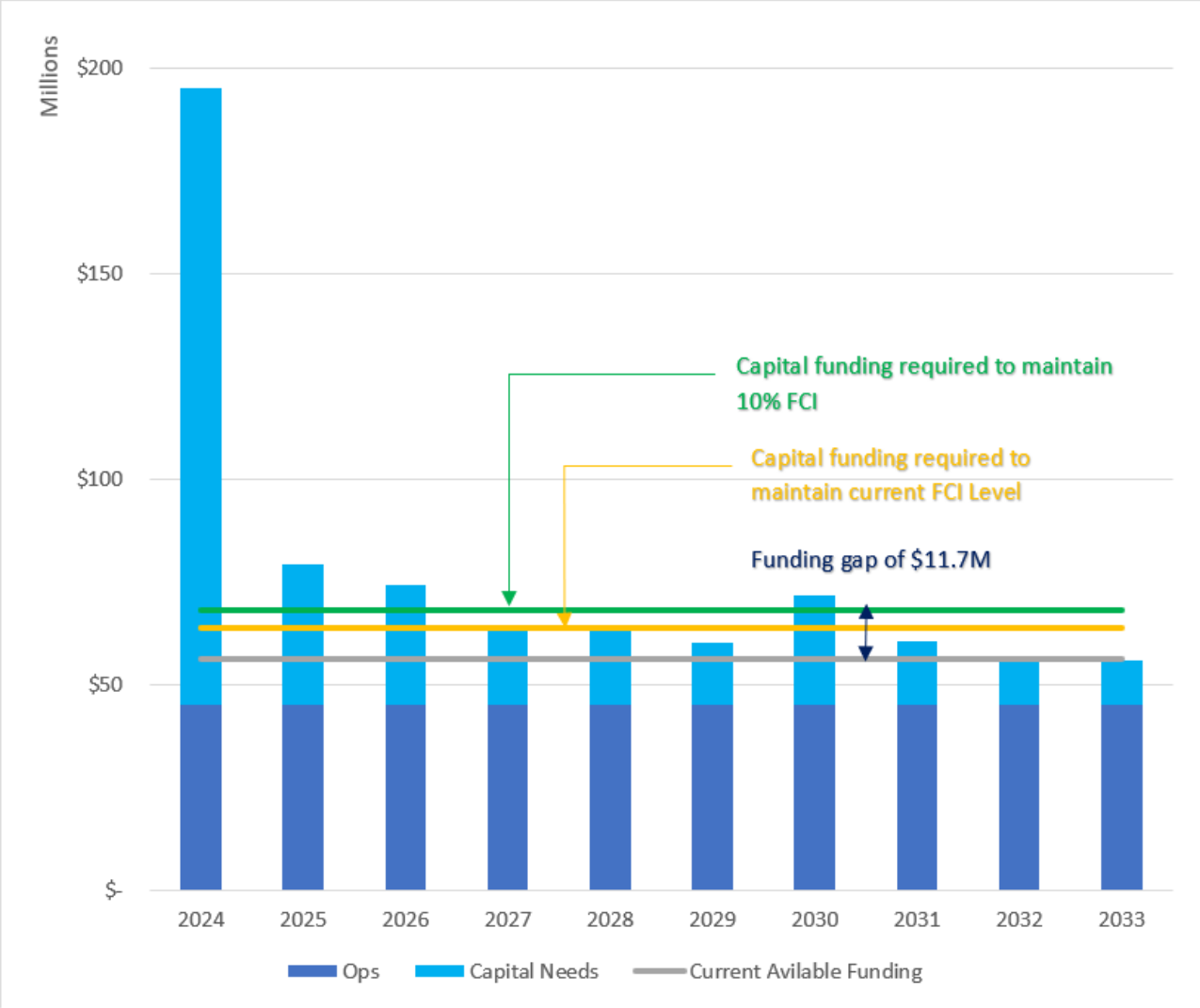


Figure 4. Infrastructure Needs Assessment Compared to Planned Budget

1.4.1.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 5. Current funding for capital budgets presented are the annual average of approved budgets (as of 2024) for the 2024-2034 fiscal years.

Table 5. Current and Optimal Capital Funding and Funding Gap

Asset Sub-Segment	Current Funding (Average Annual)	Optimal Budget to Maintain Current LOS	Funding Gap (Average Annual)
PH	$7.5 M	$17.4M	$9.9M
NPF	$1.7 M	$2.6M	$0.9M
NPS	$1.8 M	$2.7M	$0.9M
AH	$0.2 M	$0.2M	$0M
Total	**$11.2 M**	**$ 22.9M**	**$11.7M**

To attain CHC goal of a 10% FCI, an additional annual funding allocation of $11.7M ($22.9M Total) will be necessary. This additional funding will enable CHC to address maintenance backlogs, perform necessary repairs, and implement capital upgrades, ultimately achieving the desired FCI target and ensuring the long-term sustainability and quality of its housing portfolio.

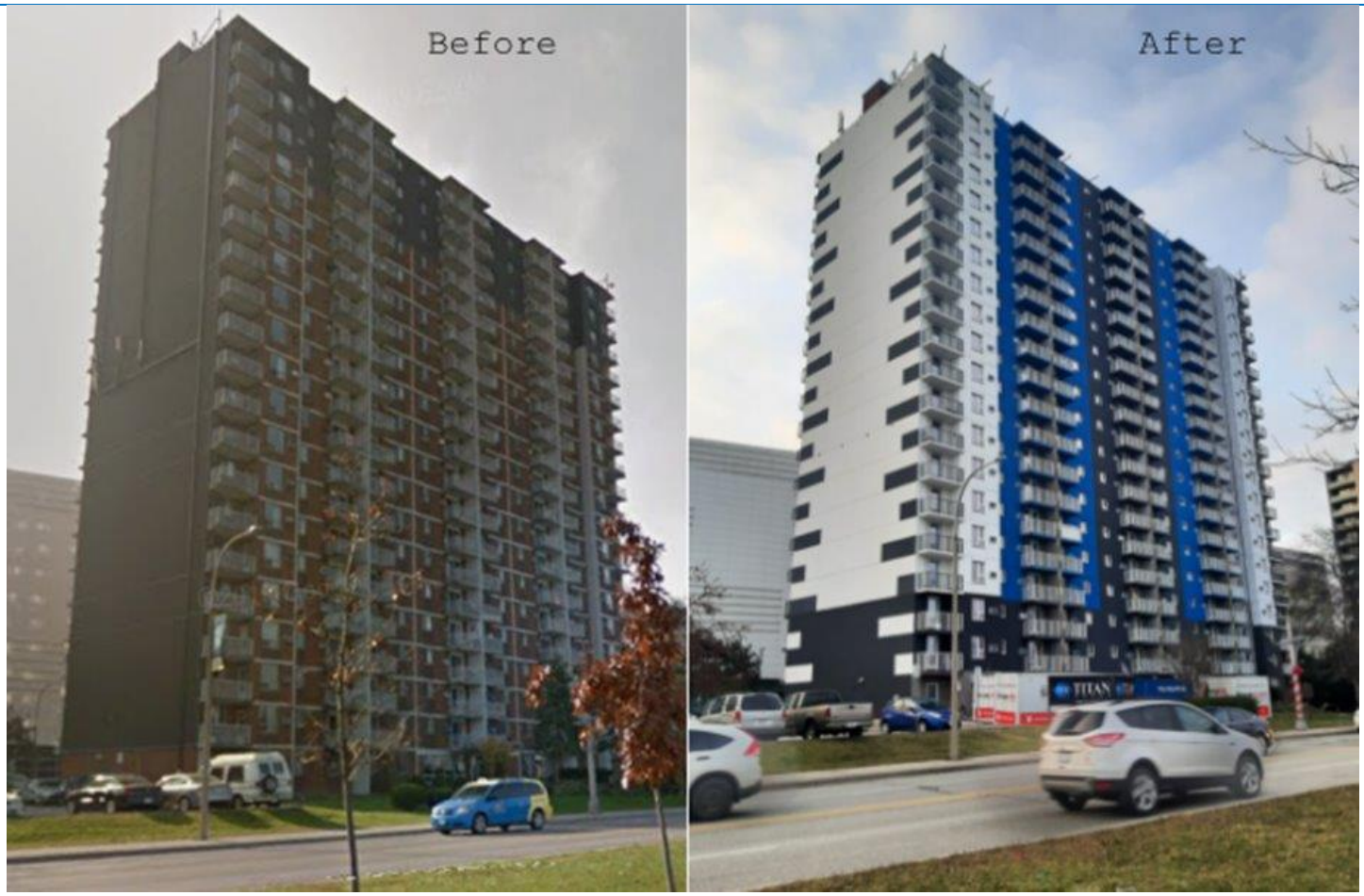
1.5 Improvement Plan

1.5.1 Recommendations for Improvements

Through the development of this AMP, several areas of improvement were identified which should be considered for incorporation into the CHC's Asset Management practices as the AM program matures in accordance with O. Reg. 588/17. Recommendations for data improvements to the CHC chapter listed in Table 6.

Table 6. Improvement Plan

Task No.	Task	Resources Required	Responsibility
1	Explore new asset management software for preventive maintenance	CHC	CHC
2	Explore new software for Energy management.	CHC	CHC
3	Adding new financial Yardi Module	CHC	CHC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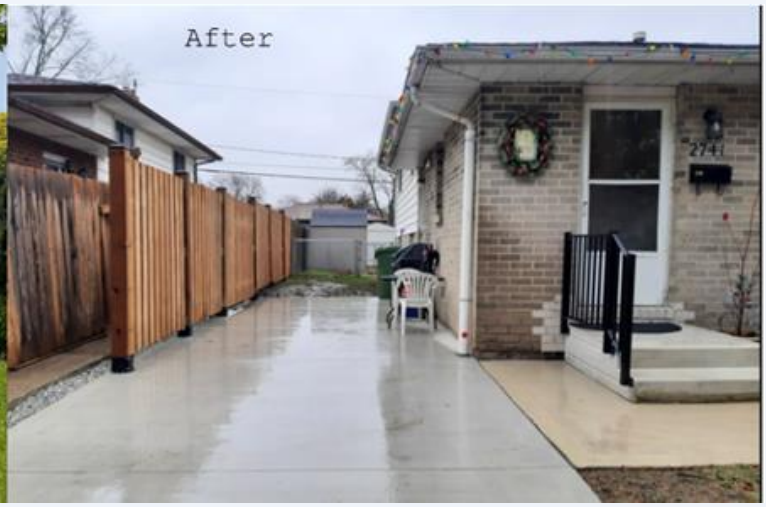
After


Before
After


Before


2779
After


Before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Essex-Windsor Solid Waste Authority

Asset Management Plan

2024

1.0 Essex Windsor Solid Waste Authority

1.1 Asset Portfolio: Segment, Quantity and Replacement Cost

The Essex-Windsor Solid Waste Authority ("EWSWA") is the governmental agency charged with the responsibility of providing an economical and environmentally conscious integrated solid waste management system for the seven local communities of the County of Essex and the City of Windsor. EWSWA provides programs to manage the solid non-hazardous waste generated in the County of Essex and the City of Windsor in an environmentally sound manner through processes which include, but are not necessarily limited to reduction, reuse, recycling, composting, and landfilling.

The EWSWA owns and operates an array of solid waste disposal and diversion assets. The Table below highlights the key attributes of the EWSWA assets, including quantity, current replacement cost and the method used to estimate replacement cost by segment.

The EWSWA owns and operates the Essex-Regional Landfill ("Landfill"). The Landfill is subdivided into 10 approximately equal-sized Cells. The Table below only includes the replacement costs of the three (3) remaining unconstructed Cells (Cell 4 South, Cell 5 North and South). The replacement costs do not consider the costs of siting and building an entirely new Landfill, such as procuring land, constructing the leachate system, lagoons, cell development, etc.

Equipment is further broken down into 2 sub-segments: Heavy Machinery and Other. Each of these sub-segments has different estimated useful lives, and therefore the timing of the replacement cost varies. The "Other" segment includes assets such as furniture, servers and information technology equipment.

Table 1-1: EWSWA Asset Portfolio Summary

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Building	13	$16,741,900	CPI Tables
Landfill	1	$37,294,200*	User-Defined
Land Improvements	18	$7,393,900	CPI Tables

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Fleet	11	$706,300	CPI Tables
Equipment – Heavy Machinery	11	$5,376,500	CPI Tables
Equipment – Other	23	$2,257,600	CPI Tables
Other	9	$173,200	CPI Tables
Total	**86**	**$69,943,600**	

*The cost of the Landfill was calculated based on the EWSWA environmental consultants' proposed estimate for the construction and engineering of Cell 5 North. The EWSWA management estimates that Cell 4 South and Cell 5 South will cost the same as Cell 5 North since the overall size is approximately the same.

1.2 State of the Local Infrastructure

The Table below identifies the average age (weighted average by replacement cost), useful life and the average condition of the EWSWA assets.

Table 1-2: EWSWA Asset Age, Useful Life and Condition

Asset Segment	Average Age	Useful Life	Average Condition (%)
Building	17 years	20 years	87% (Very Good)
Landfill	26 years	43 years	65% (Good)
Land Improvements	18 years	20 years	52% (Fair)
Fleet	11 years	10-25 years	51% (Fair)
Equipment – Heavy Machinery	4 years	5-10 years	67% (Good)
Equipment – Other	10 years	10 years	49% (Fair)

Asset Segment	Average Age	Useful Life	Average Condition (%)
Other	8 years	3 years	47.0% (Fair)

Asset conditions are assessed by management and based on professional judgement and knowledge of the asset's repair history, performance and reliability, regular maintenance activities and expectations for remaining service life. The Landfill's condition has been set to 65% (Good) based on professional judgement. The condition accounts for all assets which include but are not limited to: leachate management system, leachate lagoons, pumps, leachate aerators, gas management system & leachate land application systems.

Figure 1-1: Projected EWSWA Asset Conditions

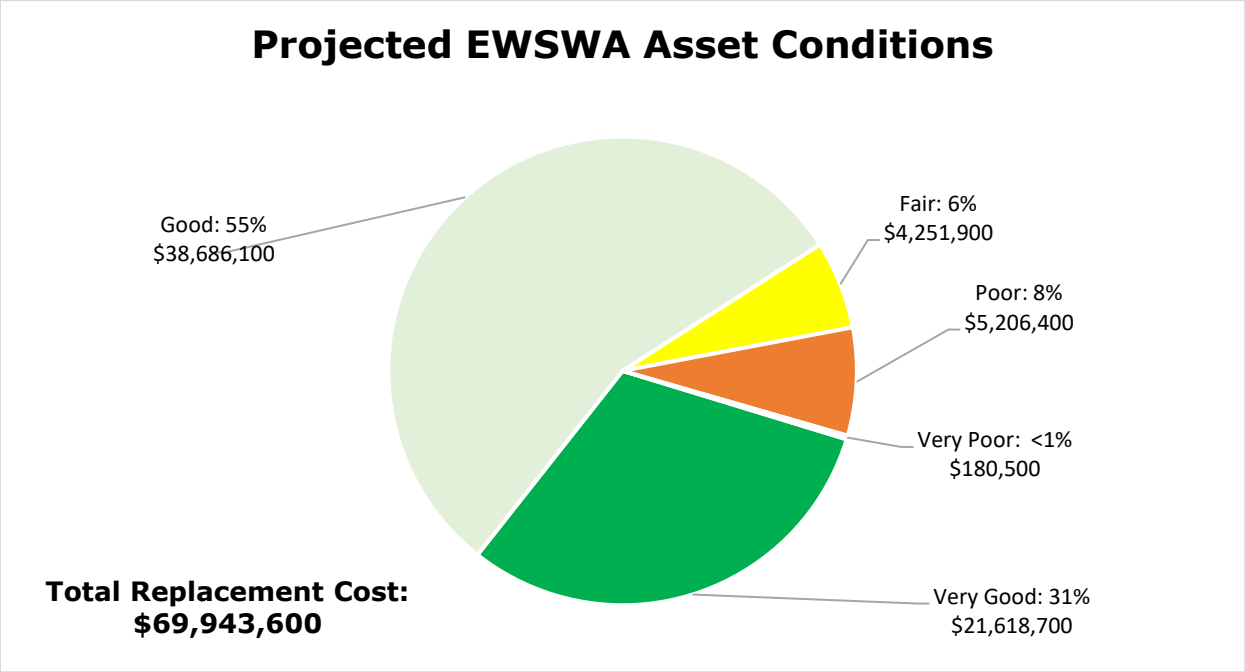
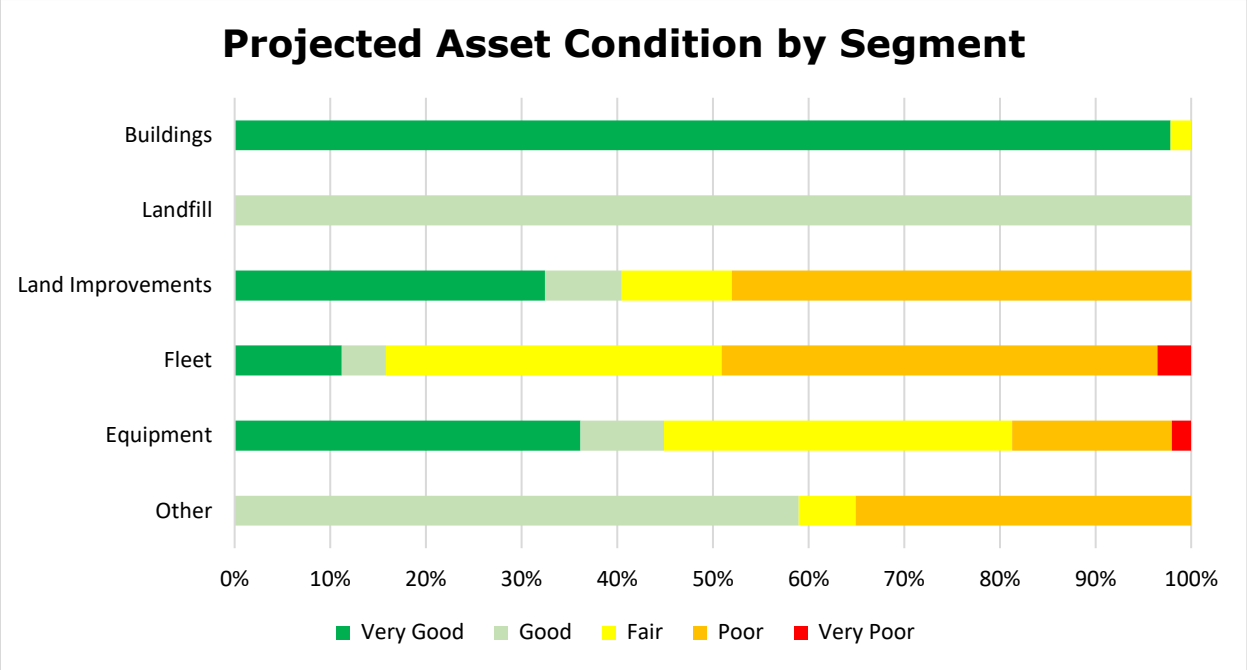


Figure 1-2: Projected EWSWA Asset Conditions by Segment



Overall, 86% of EWSWA's assets are in Good to Very Good condition which includes the Landfill and 70% of EWSWA's assets are in Good to Very Good condition if the Landfill was exclude. The Good condition rating of the assets is a result of regular repairs and maintenance, and periodic replacement.

1.3 Levels of Service Statement

The EWSWA is committed to operating an integrated solid waste management system in the most economical and environmentally-conscious manner possible.

The following tables illustrate the current level of services for the assets used by the EWSWA. These metrics include performance measures established by EWSWA that are relevant and reflective of the risk associated with the asset.

1.3.1 Community Levels of Service

The following Table outlines the qualitative descriptions that determine the community levels of service provided by the EWSWA.

Table 1-3: EWSWA Community Levels of Service

Core Values	Community Levels of Service
Environmental Stewardship	Solid waste services are provided in a manner that has a minimal impact on the environment.
Reliable	The provision of solid waste disposal and recycling collection services are reliable and meet the public needs.
Efficiency	Solid waste and diversion services are provided in a cost-efficient manner to maximize the value of the taxpayers' dollars.

1.3.2 Technical Levels of Service

The following Table outlines the qualitative descriptions that determine the technical levels of service provided by EWSWA.

Table 1-4: EWSWA Technical Levels of Service

Core Values	Key Performance Indicator	Current LOS
Environmental Stewardship	% of facilities operating within Environmental Compliance Approval ("ECA")	100%
Environmental Stewardship	% of residential waste diverted from the Landfill	32.4%
Reliability	% of assets in Good to Very Good condition	86%
Reliability	Average tonnes of per household waste landfilled	0.758

1.4 Lifecycle Management Strategy

In order to maximize the estimated useful life of an asset, a lifecycle management strategy must be adopted to proactively maintain an asset's condition, and prevent accelerated deterioration. The following lifecycle strategy was developed to provide timely repairs and enhancements to the asset, and extend its service life at a lower total lifecycle cost.

Table 1-5: EWSWA Lifecycle Activities

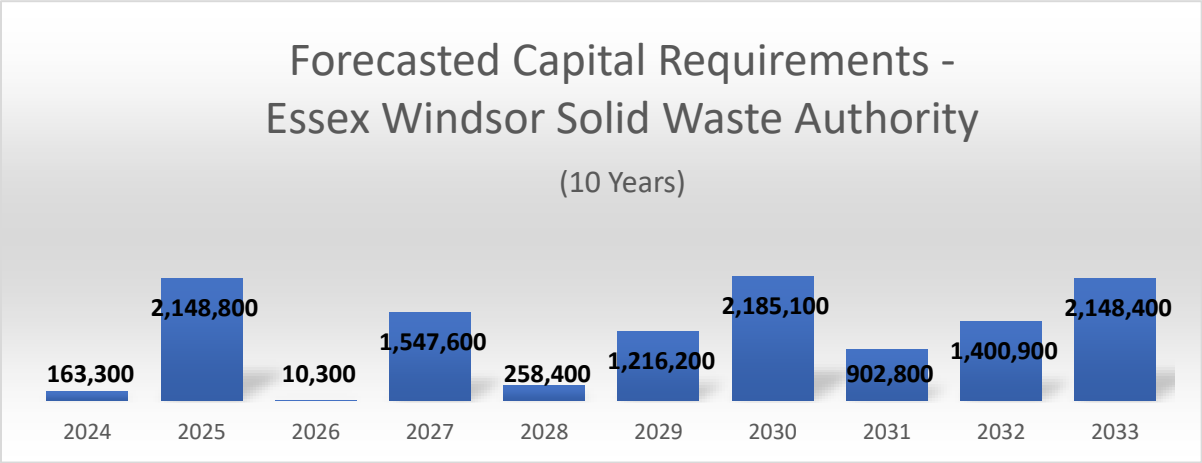
Activity Type	Description of Strategy
Inspection & Monitoring	Inspection of buildings and equipment are performed regularly by EWSWA staff. The EWSWA scales and fire suppression systems require regular inspection and are performed by licensed inspectors. The Landfill requires regular monitoring and maintenance per its ECA. The monitoring and reporting requirement of the Landfill are conducted by contracted environment engineers. Heavy equipment used at the Landfill are inspected daily by EWSWA's contracted operators. Fleet vehicles are inspected by EWSWA staff and major repairs are performed by their respective dealers.
Maintenance	General repairs and maintenance are completed as necessary by EWSWA staff or contracted staff while significant repairs are completed by equipment manufacturers, or third-party contractors. Maintenance procedures at the Landfill are conducted by third-party contractors which would be as a result of EWSWA's staff inspection processes or through the recommendations made by EWSWA's contracted environmental engineers. Some maintenance tasks performed at the Landfill include, but are not limited to, the cleaning and scraping of roads, performing litter and dust control and maintaining the leachate collection system. Fleet vehicles are serviced regularly by their EWSWA staff and major repairs are performed by their respective dealers.

Activity Type	Description of Strategy
Replacement / Construction Activities	Heavy equipment is generally held until end of its service maintenance contract, and replaced with new equipment. The equipment manufacturers regularly service the heavy equipment and perform all major repairs per their contract. The Landfill Cells have a finite amount of space in which waste can be disposed. Once a Cell is nearing capacity, a new Cell is designed using EWSWA's environmental engineer and construction is conducted by a third-party contractor.

1.5 Forecasted Capital Requirements

The forecasted capital requirements for EWSWA assets, excluding the landfill, for the next 10 years are outlined in the following Chart. The annual capital requirements represent the average amount of funding per year that the EWSWA should allocate towards future rehabilitation and replacement needs. The figures presented do not consider any funds held in Reserve. In addition, the metrics do not include the forecasted capital requirements of the Landfill as it is addressed separately in the following section.

Figure 1-3a: 10-year Forecasted Capital Requirements (excluding Landfill)– EWSWA



Annual Capital Requirement: $1,648,800 per year
Target Reinvestment Rate: 2.87%
Actual Reinvestment Rate: 2.86%
Funding Deficit: $5,700

The forecasted capital requirements for the Landfill are unique as unlike many other EWSWA assets, a new Cell construction is only required once the previous Cell reaches capacity. The funding requirements typically transpired over a 1 to 2-year period. The Table below illustrates the estimated funding requirements needed to build Cell 4 South, 5 North and 5 South using the estimated costs provided by EWSWA environmental engineers to build Cell 5 North. The EWSWA uses a combination of internally borrowed funds and reserves to fund the purchase of a new Cell.

Figure 1-3b: 10-year Forecasted Capital Requirements of the Landfill– EWSWA

In addition, EWSWA has forecasted that $3,729,420 per year will be required over the next 10 years to finance the significant operating costs relating to the lifecycle activities identified in Section 11-1. This estimate assumes an annual inflation rate of 3% for R&M type activities and 1.5% for Fuel.

The post-closure costs have not been captured in the capital funding requirements as it is anticipated that the need for funds extends beyond 10 years as the anticipated Landfill closure date is set to be 2038.

1.6 Risk Management

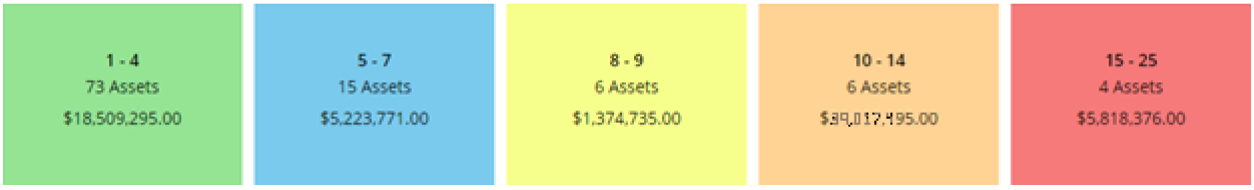
The assessment of risk is determined based on the asset segment, with consideration for the asset's criticality to operations. In all cases, the probability of failure is based 100% on the condition of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an almost certain failure. The consequence of failure is based 100% on the replacement cost of the asset, on a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences.

The assessment is determined by multiplying the probability of failure by the consequences of failure.

The Figure on the following page summarizes the overall risk assessment for each asset, and categorizes them according to the level of risk they carry.

Assets identified as carrying the most risk include 4 pieces of heavy equipment used in Landfill and Transfer Station operations, the roadways at the Windsor Depot (due to their age), and the Landfill itself

Figure 1-4: Essex Windsor Solid Waste Authority Risk Matrix



1.7 Recommendations

The Administrations recommendation is to contract a third-party evaluator to assess the EWSWA's buildings in order to determine a replacement cost and provide a conditional assessment. The EWSWA Windsor Depot roadways should be reviewed as part of the EWSWA updated Master Site Plan to determine an optimal site design and determine future infrastructure needs.

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References

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APPENDIX E
List of Acronyms, Abbreviations and Definitions

Acronyms

AMP	Asset Management Plan
AODA	Accessibility for Ontarians with Disability Act
ARFF	Aircraft Rescue and Firefighting
BAF	Biological Aerated Filtration
BCA	Building Condition Assessment
BOD	Biological Oxygen Demand
CAO	Chief Administrative Officer
CARS	Canadian Aviation Regulations and Standards
CCAP	Corporate Climate Action Plan
CCTV	Closed Circuit Television
CEP	Community Energy Plan
CHP	Combined Heat and Power
CMMS	Computerized Maintenance Management System
Core Assets	As defined by Ontario Regulation 588/17: “core municipal infrastructure asset” means any municipal infrastructure asset that is a, (a) water asset that relates to the collection, production, treatment, storage, supply or distribution of water, (b) wastewater asset that relates to the collection, transmission, treatment or disposal of wastewater, including any wastewater asset that from time to time manages stormwater, (c) stormwater management asset that relates to the collection, transmission, treatment, retention, infiltration, control or disposal of stormwater, (d) road, or (e) bridge or culvert;
COVID-19	Coronavirus disease 2019
CRM	Customer Relationship Management
CRV	Current Replacement Value
CTSP	Corporate Technology and Strategic Plan
DBH	**Diameter-at-breast-height** The tree diameter measured at 4.5 feet above the ground.
EDU	Emergency Deployment Unit
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning

ESU	Emergency Services Unit
EUL	**Estimated Useful Life** The period over which an asset is designed to deliver the agreed upon level of service (LOS) before replacement.
EV	Electric Vehicle
FAO	Financial Accountability Office of Ontario
GHG	Greenhouse Gas
GIS	Geographic Information System
GPS	Global Positioning System
Historical Cost	The original cost to acquire an asset and/or make it operational.
i-Tree	Software suite from the USDA Forest Service that provides urban and rural forestry analysis and benefits assessment tools
Infrastructure Gap	Represents the estimated annual funding requirement under the designated scenario, based on the defined lifecycle activities
ICAO	International Civil Aviation Organization
IDF Curves	Intensity-Duration-Frequency are graphical tools that describe the likelihood of extreme rainfall events.
LCC	**Lifecyle Cost** The total cost of ownership over the life of an asset. This may include but is not limited to capital costs, operating costs, maintenance costs, renewal costs, replacement costs, environmental costs, and user delay.
LOS	**Level of Service** The parameters or combination of parameters that reflect the social, political, economic, and environmental outcomes that the organization delivers. Levels of service statements describe the outputs or objectives an organization or activity provides to customers.
OS	Operating System
OSIM	Ontario Structure Inspection Manual
PLOS	**Proposed Level of Service** Similar to Level of Service (LOS), where the parameters and statements reflect the desired or expected levels of service that the organization intends to deliver to its customers.
PO	Purchase Order
Pooled Asset	Assets that are homogenous in terms of their physical characteristics, use, and expected useful life. Pooled assets are amortized using a composite amortization rate based on the average useful life of the different assets in a group.

PXO	Pedestrian Crossings
Rehabilitation	Work to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification.
Renewal	Work to upgrade, refurbish, or replace existing assets or facilities with assets or facilities of equivalent capacity or performance capability.
ROW	Right-of-Way
SaaS	Software-as-a-Service
SCADA	Supervisory Control and Data Acquisition
SME	Subject Matter Expert
SMP	Sewer and Coastal Flood Protection Master Plan (2020)
SQL	Structured Query Language
TCA	**Tangible Capital Assets** Non-financial assets having physical substance that: (a) are held for use in the production or supply of goods and services, for rental to others, for administrative purposes or for the development, construction, maintenance or repair of other tangible capital assets; (b) have useful economic lives extending beyond an accounting period; (c) are to be used on a continuing basis. (d) are not for sale in the ordinary course of operations.
TBL	**Triple Bottom Line** Expands on the traditional view of an organization's financial bottom line by also measuring the organization's commitment to economic, socio-cultural and environmental factors.
USDA	United States Department of Agriculture Forest Service
Valuation	An estimation of asset worth, typically carried out by a professional appraiser.
WECHC	Windsor Essex Community Housing Corporation
WLC	**Whole Lifecycle Costing** Similar to Lifecycle Costing (LCC), with the inclusion of client and user costs, such as project financing, land, income and external costs.
WPLB	Windsor Public Library Board
WPS	Windsor Police Services
WUC	Windsor Utilities Commission
YQG	Your Quick Getaway

APPENDIX F
Functional Road Classification

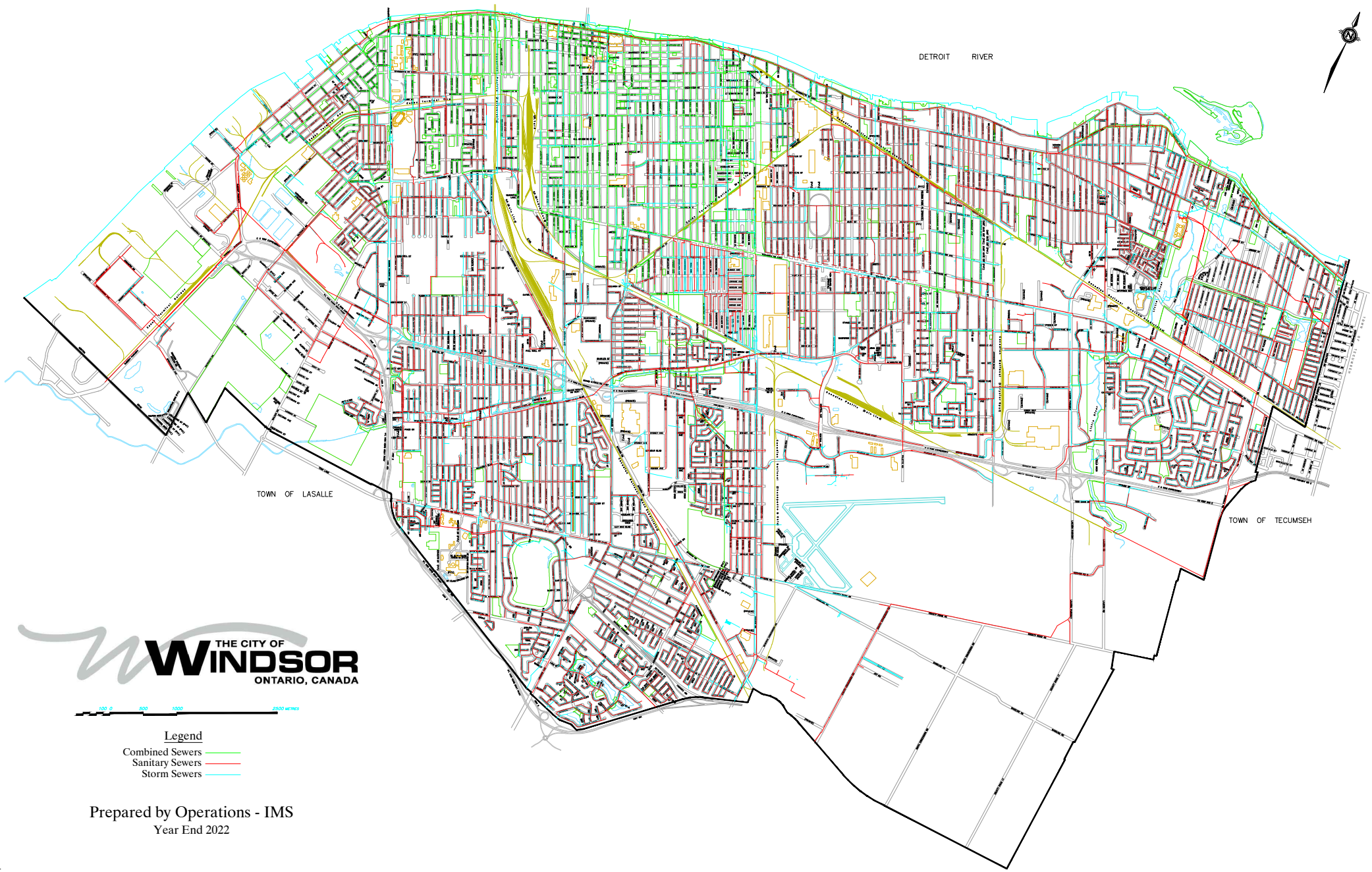
Functional Roads Classifications

Characteristic	Expressway	Class I Arterial Roads	Class II Arterial Roads	Class I Collector Roads	Class II Collector Roads	Scenic Drives	Local Roads - Residential and Industrial
Motor vehicle traffic volume	High - Control Access Highways	High - Control Access Highways	High - Control Access Highways	Moderate	Moderate	Low to moderate	Low
Minimum right-of-way width	100	46	42	28	26	24	20
New connections permissions	New interchanges shall **only** be permitted with Class I Arterial Roads and Class II Arterial Roads, Expressways or Provincial Highways	New interchanges shall **only** be permitted with Provincial Highways, Expressways, Class I Arterial Roads, Class II Arterial Roads or Class I Collector Roads	New intersections shall **not** be permitted with Provincial Highways; new intersections with local roads shall be discouraged	New intersections shall **not** be permitted with Provincial Highways and Expressways	New intersections shall **not** be permitted with Provincial Highways, Expressway and Class I Arterial Roads	New intersections shall **not** be permitted with Provincial Highways, Expressways and Class I Arterial Roads	New intersections shall **not** be permitted with Provincial Highways, Expressways, Class I Arterial Roads and Class II Arterial Roads

Characteristic	Expressway	Class I Arterial Roads	Class II Arterial Roads	Class I Collector Roads	Class II Collector Roads	Scenic Drives	Local Roads - Residential and Industrial
Property access	Direct property access shall not be permitted	Direct property access shall not be permitted	Direct property access will be discouraged where other alternatives exist	Direct property access may be permitted with some controls	Direct property access may be permitted with some controls	Direct property access may be permitted with some controls	Direct property access may be permitted with some controls
On Street Parking	Not permitted	Not permitted	May be removed to facilitate installation of turn lanes	May be removed to facilitate installation of turn lanes	May be permitted	Not permitted	May be permitted
Accommodation of cyclists	Cyclists prohibited	May be permitted	May be permitted	May be permitted	May be permitted	May be permitted	May be permitted

Characteristic	Expressway	Class I Arterial Roads	Class II Arterial Roads	Class I Collector Roads	Class II Collector Roads	Scenic Drives	Local Roads - Residential and Industrial
Other	Access shall only be facilitated through interchanges or partial interchanges	N/A	N/A	N/A	N/A	All-way stops shall not be permitted. Municipal streetscape design of the Scenic Drive shall be guided by the urban design policies in this Official Plan.	N/A
Examples	EC Row Expressway	Huron Church, Lauzon	Jefferson, Cabana	Erie, Pillette, Dougall	Norfolk, Parent	Riverside Drive	McKay, Arthur, Deziel

APPENDIX G
Maps



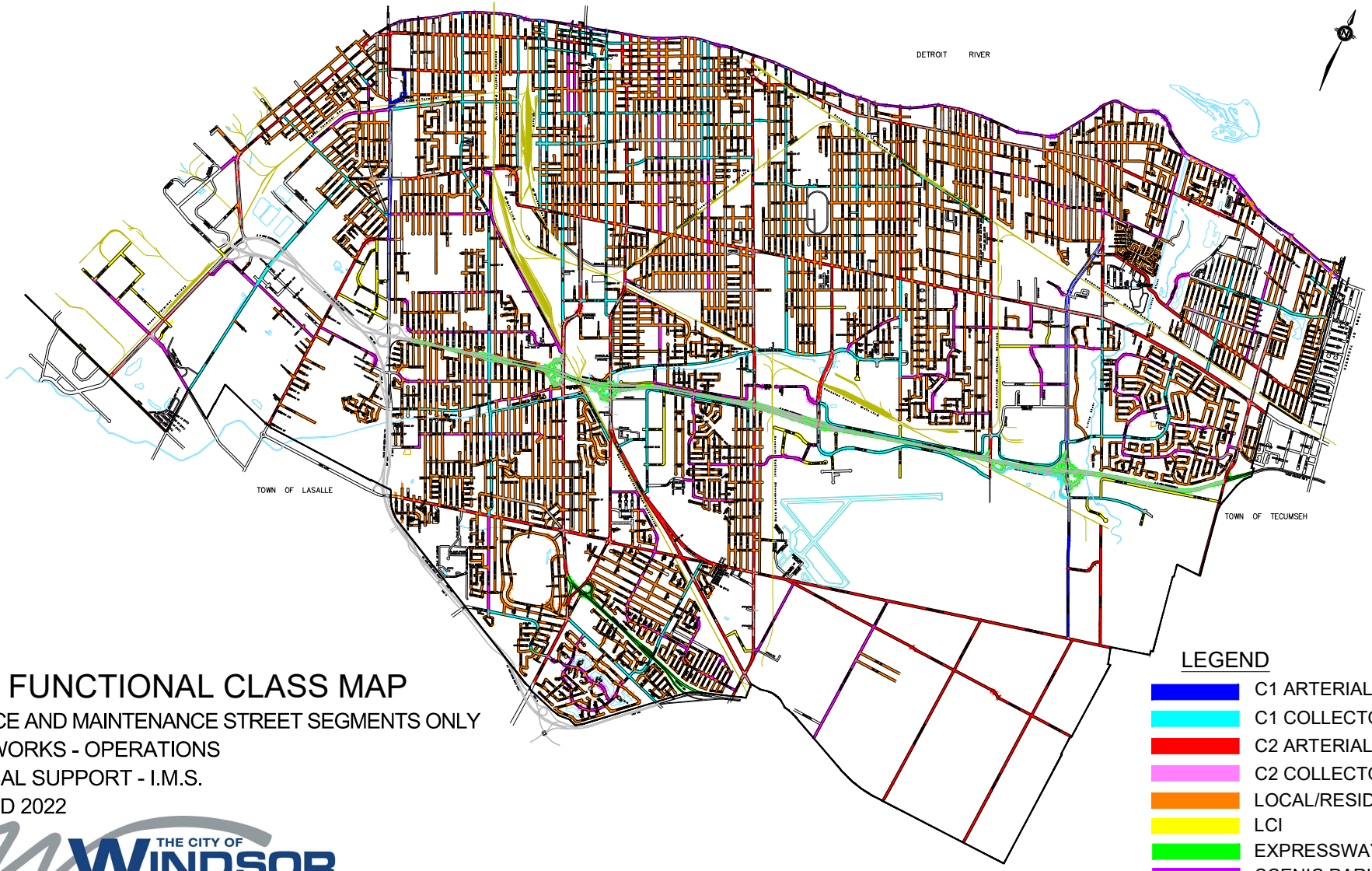
THE CITY OF WINDSOR
ONTARIO, CANADA

100 0 500 1000 2500 METRES

Legend

Combined Sewers
Sanitary Sewers
Storm Sewers

Prepared by Operations - IMS
Year End 2022



ROAD FUNCTIONAL CLASS MAP

IN SERVICE AND MAINTENANCE STREET SEGMENTS ONLY

PUBLIC WORKS - OPERATIONS

TECHNICAL SUPPORT - I.M.S.

YEAR END 2022

THE CITY OF WINDSOR
ONTARIO, CANADA

APPENDIX H

O. Reg. 588/17 Compliance

Section 3: Strategic Asset Management Policy

O. Reg. Section	O. Reg. Description	Requirement met
3.1	Every municipality shall prepare a strategic asset management policy that includes the following	-
3.1.1	Any of the municipality's goals, policies or plans that are supported by its asset management plan.	Yes
3.1.2	The process by which the asset management plan is to be considered in the development of the municipality's budget or of any long-term financial plans of the municipality that take into account municipal infrastructure assets.	Yes
3.1.3	The municipality's approach to continuous improvement and adoption of appropriate practices regarding asset management planning.	Yes
3.1.4	The principles to be followed by the municipality in its asset management planning, which must include the principles set out in section 3 of the Act.	Yes
3.1.5	The municipality's commitment to consider, as part of its asset management planning,	-
3.1.5.i	the actions that may be required to address the vulnerabilities that may be caused by climate change to the municipality's infrastructure assets, in respect of such matters as,	Yes
3.1.5.i.A	operations, such as increased maintenance schedules,	Yes
3.1.5.i.B	levels of service, and	Yes
3.1.5.i.C	lifecycle management,	Yes
3.1.5.ii	the anticipated costs that could arise from the vulnerabilities described in subparagraph i,	Yes

O. Reg. Section	O. Reg. Description	Requirement met
3.1.5.iii	adaptation opportunities that may be undertaken to manage the vulnerabilities described in subparagraph i,	Yes
3.1.5.iv	mitigation approaches to climate change, such as greenhouse gas emission reduction goals and targets, and	Yes
3.1.5.v	disaster planning and contingency funding.	Yes
3.1.6	A process to ensure that the municipality's asset management planning is aligned with any of the following financial plans:	-
3.1.6.i	Financial plans related to the municipality's water assets including any financial plans prepared under the Safe Drinking Water Act, 2002.	Yes
3.1.6.ii	Financial plans related to the municipality's wastewater assets.	N/A
3.1.7	A process to ensure that the municipality's asset management planning is aligned with Ontario's land-use planning framework, including any relevant policy statements issued under subsection 3 (1) of the Planning Act, any provincial plans as defined in the Planning Act and the municipality's official plan.	Yes
3.1.8	An explanation of the capitalization thresholds used to determine which assets are to be included in the municipality's asset management plan and how the thresholds compare to those in the municipality's tangible capital asset policy, if it has one.	Yes
3.1.9	The municipality's commitment to coordinate planning for asset management, where municipal infrastructure assets connect or are interrelated with those of its upper-tier municipality, neighbouring municipalities or jointly-owned municipal bodies.	Yes
3.1.10	The persons responsible for the municipality's asset management planning, including the executive lead.	Yes

O. Reg. Section	O. Reg. Description	Requirement met
3.1.11	An explanation of the municipal council's involvement in the municipality's asset management planning.	Yes
3.1.12	The municipality's commitment to provide opportunities for municipal residents and other interested parties to provide input into the municipality's asset management planning.	Yes

Section 4: Update Of Asset Management Policy

O. Reg. Section	O. Reg. Description	Requirement met
4.1	Every municipality shall prepare its first strategic asset management policy by July 1, 2019 and shall review and, if necessary, update it at least every five years.	Yes

Section 5: Asset Management Plans, Current Levels Of Service

O. Reg. Section	O. Reg. Description	Requirement met
5.1	Every municipality shall prepare an asset management plan in respect of its core municipal infrastructure assets by July 1, 2022, and in respect of all of its other municipal infrastructure assets by July 1, 2024. O. Reg. 193/21, s. 1.	-
5.2	A municipality's asset management plan must include the following:	-
5.2.1	For each asset category, the current levels of service being provided, determined in accordance with the following qualitative descriptions and technical metrics and based on data	-

O. Reg. Section	O. Reg. Description	Requirement met
	from at most the two calendar years prior to the year in which all information required under this section is included in the asset management plan:	
5.2.1.i	With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.	Yes
5.2.1.ii	With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.	Yes
5.2.2	The current performance of each asset category, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency, and based on data from at most two calendar years prior to the year in which all information required under this section is included in the asset management plan.	Yes
5.2.3	For each asset category,	-
5.2.3.i	a summary of the assets in the category,	Yes
5.2.3.ii	the replacement cost of the assets in the category,	Yes
5.2.3.iii	the average age of the assets in the category, determined by assessing the average age of the components of the assets,	Yes
5.2.3.iv	the information available on the condition of the assets in the category, and	Yes
5.2.4.v	a description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.	Yes

O. Reg. Section	O. Reg. Description	Requirement met
5.2.4	For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service as described in paragraph 1 for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined and the costs of providing those activities based on an assessment of the following:	-
5.2.4.i	The full lifecycle of the assets.	Yes
5.2.4.ii	The options for which lifecycle activities could potentially be undertaken to maintain the current levels of service.	Yes
5.2.4.iii	The risks associated with the options referred to in subparagraph ii.	Yes
5.2.4.iv	The lifecycle activities referred to in subparagraph ii that can be undertaken for the lowest cost to maintain the current levels of service.	Yes
5.2.5	For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, the following:	N/A
5.2.5.i	A description of assumptions regarding future changes in population or economic activity.	N/A
5.2.5.ii	How the assumptions referred to in subparagraph i relate to the information required by paragraph 4.	N/A
5.2.6	For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census, the following:	-
5.2.6.i	With respect to municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are set out in Schedule 3 or 7 to the 2017 Growth Plan, those forecasts.	N/A

O. Reg. Section	O. Reg. Description	Requirement met
5.2.6.ii	With respect to lower-tier municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are not set out in Schedule 7 to the 2017 Growth Plan, the portion of the forecasts allocated to the lower-tier municipality in the official plan of the upper-tier municipality of which it is a part.	N/A
5.2.6.iii	With respect to upper-tier municipalities or single-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the municipality that are set out in its official plan.	Yes
5.2.6.iv	With respect to lower-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the lower-tier municipality that are set out in the official plan of the upper-tier municipality of which it is a part.	N/A
5.2.6.v	If, with respect to any municipality referred to in subparagraph iii or iv, the population and employment forecasts for the municipality cannot be determined as set out in those subparagraphs, a description of assumptions regarding future changes in population or economic activity.	Yes
5.2.6.vi	For each of the 10 years following the year for which the current levels of service under paragraph 1 are determined, the estimated capital expenditures and significant operating costs related to the lifecycle activities required to maintain the current levels of service in order to accommodate projected increases in demand caused by growth, including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets.	Yes
5.3	(3) Every asset management plan must indicate how all background information and reports upon which the information required by paragraph 3 of subsection (2) is based will be made available to the public.	Yes
5.4	(4) In this section,	-

O. Reg. Section	O. Reg. Description	Requirement met
	"2017 Growth Plan" means the Growth Plan for the Greater Golden Horseshoe, 2017 that was approved under subsection 7 (6) of the Places to Grow Act, 2005 on May 16, 2017 and came into effect on July 1, 2017; ("Plan de croissance de 2017")	-
	"Greater Golden Horseshoe growth plan area" means the area designated by section 2 of Ontario Regulation 416/05 (Growth Plan Areas) made under the Places to Grow Act, 2005. ("zone de croissance planifiée de la région élargie du Golden Horseshoe")	-

Section 6: Asset Management Plans, Proposed Levels Of Service - 2025

O. Reg. Section	O. Reg. Description	Requirement met
6.1	6. (1) Subject to subsection (2), by July 1, 2025, every asset management plan prepared under section 5 must include the following additional information:	-
6.1.1	For each asset category, the levels of service that the municipality proposes to provide for each of the 10 years following the year in which all information required under section 5 and this section is included in the asset management plan, determined in accordance with the following qualitative descriptions and technical metrics:	-
6.1.1.i	With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.	2025 AMP
6.1.1.ii	With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.	2025 AMP
6.1.2	An explanation of why the proposed levels of service under paragraph 1 are appropriate for the municipality, based on an assessment of the following:	2025 AMP

O. Reg. Section	O. Reg. Description	Requirement met
6.1.2.i	The options for the proposed levels of service and the risks associated with those options to the long-term sustainability of the municipality.	2025 AMP
6.1.2.ii	How the proposed levels of service differ from the current levels of service set out under paragraph 1 of subsection 5 (2).	2025 AMP
6.1.2.iii	Whether the proposed levels of service are achievable.	2025 AMP
6.1.2.iv	The municipality's ability to afford the proposed levels of service.	2025 AMP
6.1.3	The proposed performance of each asset category for each year of the 10-year period referred to in paragraph 1, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency.	2025 AMP
6.1.4	A lifecycle management and financial strategy that sets out the following information with respect to the assets in each asset category for the 10-year period referred to in paragraph 1:	2025 AMP
6.1.4.i	An identification of the lifecycle activities that would need to be undertaken to provide the proposed levels of service described in paragraph 1, based on an assessment of the following:	2025 AMP
6.1.4.i.A	The full lifecycle of the assets.	2025 AMP
6.1.4.i.B	The options for which lifecycle activities could potentially be undertaken to achieve the proposed levels of service.	2025 AMP
6.1.4.i.C	The risks associated with the options referred to in sub-subparagraph B.	2025 AMP
6.1.4.i.D	The lifecycle activities referred to in sub-subparagraph B that can be undertaken for the lowest cost to achieve the proposed levels of service.	2025 AMP
6.1.D.ii	An estimate of the annual costs for each of the 10 years of undertaking the lifecycle activities identified in subparagraph i, separated into capital expenditures and significant operating costs.	2025 AMP

O. Reg. Section	O. Reg. Description	Requirement met
6.1.D.iii	An identification of the annual funding projected to be available to undertake lifecycle activities and an explanation of the options examined by the municipality to maximize the funding projected to be available.	2025 AMP
6.1.D.iv	If, based on the funding projected to be available, the municipality identifies a funding shortfall for the lifecycle activities identified in subparagraph i,	2025 AMP
6.1.D.iv.A	an identification of the lifecycle activities, whether set out in subparagraph i or otherwise, that the municipality will undertake, and	2025 AMP
6.1.D.iv.B	if applicable, an explanation of how the municipality will manage the risks associated with not undertaking any of the lifecycle activities identified in subparagraph i.	2025 AMP
6.1.5	For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, a discussion of how the assumptions regarding future changes in population and economic activity, set out in subparagraph 5 i of subsection 5 (2), informed the preparation of the lifecycle management and financial strategy referred to in paragraph 4 of this subsection.	2025 AMP
6.1.6	For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census,	2025 AMP
6.1.6.i	the estimated capital expenditures and significant operating costs to achieve the proposed levels of service as described in paragraph 1 in order to accommodate projected increases in demand caused by population and employment growth, as set out in the forecasts or assumptions referred to in paragraph 6 of subsection 5 (2), including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets,	2025 AMP
6.1.6.ii	the funding projected to be available, by source, as a result of increased population and economic activity, and	2025 AMP

O. Reg. Section	O. Reg. Description	Requirement met
6.1.6.iii	an overview of the risks associated with implementation of the asset management plan and any actions that would be proposed in response to those risks.	2025 AMP
6.1.7	An explanation of any other key assumptions underlying the plan that have not previously been explained.	2025 AMP
6.2	(2) With respect to an asset management plan prepared under section 5 on or before July 1, 2021, if the additional information required under this section is not included before July 1, 2023, the municipality shall, before including the additional information, update the current levels of service set out under paragraph 1 of subsection 5 (2) and the current performance measures set out under paragraph 2 of subsection 5 (2) based on data from the two most recent calendar years.	2025 AMP

Section 7: Update of Asset Management Plans

O. Reg. Section	O. Reg. Description	Requirement met
7.1	Every municipality shall review and update its asset management plan at least five years after the year in which the plan is completed under section 6 and at least every five years thereafter.	After 2025 AMP
7.2	The updated asset management plan must comply with the requirements set out under paragraphs 1, 2 and 3 and subparagraphs 5 i and 6 i, ii, iii, iv and v of subsection 5 (2), subsection 5 (3) and paragraphs 1 to 7 of subsection 6 (1).	After 2025 AMP

Section 8: Endorsement And Approval Required

O. Reg. Section	O. Reg. Description	Requirement met
8.1	Every asset management plan prepared under section 5 or 6, or updated under section 7, must be,	-
8.1.a	endorsed by the executive lead of the municipality; and	Yes
8.1.b	approved by a resolution passed by the municipal council.	Pending

Section 9: Annual Review of Asset Management Planning Progress

O. Reg. Section	O. Reg. Description	Requirement met
9.1	Every municipal council shall conduct an annual review of its asset management progress on or before July 1 in each year, starting the year after the municipality's asset management plan is completed under section 6.	2026+
9.2	The annual review must address,	-
9.2.a	the municipality's progress in implementing its asset management plan;	2026+
9.2.b	any factors impeding the municipality's ability to implement its asset management plan; and	2026+
9.2.c	a strategy to address the factors described in clause (b).	2026+

Section 10: Public Availability

O. Reg. Section	O. Reg. Description	Requirement met
10	Every municipality shall post its current strategic asset management policy and asset management plan on a website that is available to the public and shall provide a copy of the policy and plan to any person who requests it.	Yes

APPENDIX I

O. Reg. 588/17

Ontario

Français

Infrastructure for Jobs and Prosperity Act, 2015

ONTARIO REGULATION 588/17

ASSET MANAGEMENT PLANNING FOR MUNICIPAL INFRASTRUCTURE

Consolidation Period: From March 15, 2021 to the e-Laws currency date.

Las amendment: 193/21.

Legislative History: [+]

This is the English version of a bilingual regulation.

CONTENTS [−]

Interpretation and Application

Definitions

1. (1) In this Regulation,

"asset category" means a category of municipal infrastructure assets that is,

(a) an aggregate of assets described in each of clauses (a) to (e) of the definition of core municipal infrastructure asset, or

(b) composed of any other aggregate of municipal infrastructure assets that provide the same type of service; ("catégorie de biens")

"core municipal infrastructure asset" means any municipal infrastructure asset that is a,

(a) water asset that relates to the collection, production, treatment, storage, supply or distribution of water,

(b) wastewater asset that relates to the collection, transmission, treatment or disposal of wastewater, including any wastewater asset that from time to time manages stormwater,

(c) stormwater management asset that relates to the collection, transmission, treatment, retention, infiltration, control or disposal of stormwater,

(d) road, or

(e) bridge or culvert; ("bien d'infrastructure municipale essentiel")

"ecological functions" has the same meaning as in Ontario Regulation 140/02 (Oak Ridges Moraine Conservation Plan) made under the *Oak Ridges Moraine Conservation Act, 2001*; ("fonctions écologiques")

"green infrastructure asset" means an infrastructure asset consisting of natural or human-made elements that provide ecological and hydrological functions and processes and includes natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces and green roofs; ("bien d'infrastructure verte")

"hydrological functions" has the same meaning as in Ontario Regulation 140/02; ("fonctions hydrologiques")

"joint municipal water board" means a joint board established in accordance with a transfer order made under the *Municipal Water and Sewage Transfer Act, 1997*; ("conseil mixte de gestion municipale des eaux")

"lifecycle activities" means activities undertaken with respect to a municipal infrastructure asset over its service life, including constructing, maintaining, renewing, operating and decommissioning, and all engineering and design work associated with those activities; ("activités relatives au cycle de vie")

"municipal infrastructure asset" means an infrastructure asset, including a green infrastructure asset, directly owned by a municipality or included on the consolidated financial statements of a municipality, but does not include an infrastructure asset that is managed by a joint municipal water board; ("bien d'infrastructure municipale")

"municipality" has the same meaning as in the *Municipal Act, 2001*; ("municipalité")

"operating costs" means the aggregate of costs, including energy costs, of operating a municipal infrastructure asset over its service life; ("frais d'exploitation")

"service life" means the total period during which a municipal infrastructure asset is in use or is available to be used; ("durée de vie")

"significant operating costs" means, where the operating costs with respect to all municipal infrastructure assets within an asset category are in excess of a threshold amount set by the municipality, the total amount of those operating costs. ("frais d'exploitation importants")

(2) In Tables 1 and 2,

"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. ("jours-branchements")

(3) In Table 4,

"arterial roads" means Class 1 and Class 2 highways as determined under the Table to section 1 of Ontario Regulation 239/02 (Minimum Maintenance Standards for Municipal Highways) made under the *Municipal Act, 2001*; ("artères")

"collector roads" means Class 3 and Class 4 highways as determined under the Table to section 1 of Ontario Regulation 239/02; ("routes collectrices")

"lane-kilometre" means a kilometre-long segment of roadway that is a single lane in width; ("kilomètre de voie")

"local roads" means Class 5 and Class 6 highways as determined under the Table to section 1 of Ontario Regulation 239/02. ("routes locales")

(4) In Table 5,

"Ontario Structure Inspection Manual" means the Ontario Structure Inspection Manual (OSIM), published by the Ministry of Transportation and dated October 2000 (revised November 2003 and April 2008) and available on a Government of Ontario website; ("manuel d'inspection des structures de l'Ontario")

"structural culvert" has the meaning set out for "culvert (structural)" in the Ontario Structure Inspection Manual. ("ponceau structurel")

Application

2. For the purposes of section 6 of the Act, every municipality is prescribed as a broader public sector entity to which that section applies.

Strategic Asset Management Policies

Strategic asset management policy

3. (1) Every municipality shall prepare a strategic asset management policy that includes the following:

1. Any of the municipality's goals, policies or plans that are supported by its asset management plan.
2. The process by which the asset management plan is to be considered in the development of the municipality's budget or of any long-term financial plans of the municipality that take into account municipal infrastructure assets.
3. The municipality's approach to continuous improvement and adoption of appropriate practices regarding asset management planning.
4. The principles to be followed by the municipality in its asset management planning, which must include the principles set out in section 3 of the Act.
5. The municipality's commitment to consider, as part of its asset management planning,
    i. the actions that may be required to address the vulnerabilities that may be caused by climate change to the municipality's infrastructure assets, in respect of such matters as,
        A. operations, such as increased maintenance schedules,
        B. levels of service, and
        C. lifecycle management,
    ii. the anticipated costs that could arise from the vulnerabilities described in subparagraph i,
    iii. adaptation opportunities that may be undertaken to manage the vulnerabilities described in subparagraph i,
    iv. mitigation approaches to climate change, such as greenhouse gas emission reduction goals and targets, and
    v. disaster planning and contingency funding.
6. A process to ensure that the municipality's asset management planning is aligned with any of the following financial plans:
    i. Financial plans related to the municipality's water assets including any financial plans prepared under the *Safe Drinking Water Act, 2002*.
    ii. Financial plans related to the municipality's wastewater assets.

7. A process to ensure that the municipality's asset management planning is aligned with Ontario's land-use planning framework, including any relevant policy statements issued under subsection 3 (1) of the *Planning Act*, any provincial plans as defined in the *Planning Act* and the municipality's official plan.

8. An explanation of the capitalization thresholds used to determine which assets are to be included in the municipality's asset management plan and how the thresholds compare to those in the municipality's tangible capital asset policy, if it has one.

9. The municipality's commitment to coordinate planning for asset management, where municipal infrastructure assets connect or are interrelated with those of its upper-tier municipality, neighbouring municipalities or jointly-owned municipal bodies.

10. The persons responsible for the municipality's asset management planning, including the executive lead.

11. An explanation of the municipal council's involvement in the municipality's asset management planning.

12. The municipality's commitment to provide opportunities for municipal residents and other interested parties to provide input into the municipality's asset management planning.

(2) For the purposes of this section,

"capitalization threshold" is the value of a municipal infrastructure asset at or above which a municipality will capitalize the value of it and below which it will expense the value of it. ("seuil de capitalisation")

Update of asset management policy

4. Every municipality shall prepare its first strategic asset management policy by July 1, 2019 and shall review and, if necessary, update it at least every five years.

Asset Management Plans

Asset management plans, current levels of service

5. (1) Every municipality shall prepare an asset management plan in respect of its core municipal infrastructure assets on or before July 1, 2022, and in respect of all of its other municipal infrastructure assets on or before July 1, 2024. O. Reg. 193/21, s. 1.

(2) A municipality's asset management plan must include the following:

1. For each asset category, the current levels of service being provided, determined in accordance with the following qualitative descriptions and technical metrics and based on data from at most the two calendar years prior to the year in which all information required under this section is included in the asset management plan:

    i. With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.

    ii. With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.

2. The current performance of each asset category, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency, and based on data from at most two calendar years prior to the year in which all information required under this section is included in the asset management plan.

3. For each asset category,

    i. a summary of the assets in the category,

    ii. the replacement cost of the assets in the category,

    iii. the average age of the assets in the category, determined by assessing the average age of the components of the assets,

iv. the information available on the condition of the assets in the category, and

v. a description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.

4. For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service as described in paragraph 1 for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined and the costs of providing those activities based on an assessment of the following:

i. The full lifecycle of the assets.

ii. The options for which lifecycle activities could potentially be undertaken to maintain the current levels of service.

iii. The risks associated with the options referred to in subparagraph ii.

iv. The lifecycle activities referred to in subparagraph ii that can be undertaken for the lowest cost to maintain the current levels of service.

5. For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, the following:

i. A description of assumptions regarding future changes in population or economic activity.

ii. How the assumptions referred to in subparagraph i relate to the information required by paragraph 4.

6. For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census, the following:

i. With respect to municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are set out in Schedule 3 or 7 to the 2017 Growth Plan, those forecasts.

ii. With respect to lower-tier municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are not set out in Schedule 7 to the 2017 Growth Plan, the portion of the forecasts allocated to the lower-tier municipality in the official plan of the upper-tier municipality of which it is a part.

iii. With respect to upper-tier municipalities or single-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the municipality that are set out in its official plan.

iv. With respect to lower-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the lower-tier municipality that are set out in the official plan of the upper-tier municipality of which it is a part.

v. If, with respect to any municipality referred to in subparagraph iii or iv, the population and employment forecasts for the municipality cannot be determined as set out in those subparagraphs, a description of assumptions regarding future changes in population or economic activity.

vi. For each of the 10 years following the year for which the current levels of service under paragraph 1 are determined, the estimated capital expenditures and significant operating costs related to the lifecycle activities required to maintain the current levels of service in order to accommodate projected increases in demand caused by growth, including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets. O. Reg. 588/17, s. 5 (2).

(3) Every asset management plan must indicate how all background information and reports upon which the information required by paragraph 3 of subsection (2) is based will be made available to the public. O. Reg. 588/17, s. 5 (3).

(4) In this section,

"2017 Growth Plan" means the Growth Plan for the Greater Golden Horseshoe, 2017 that was approved under subsection 7 (6) of the *Places to Grow Act, 2005* on May 16, 2017 and came into effect on July 1, 2017; ("Plan de croissance de 2017")

"Greater Golden Horseshoe growth plan area" means the area designated by section 2 of Ontario Regulation 416/05 (Growth Plan Areas) made under the *Places to Grow Act, 2005*. ("zone de croissance planifiée de la région élargie du Golden Horseshoe") O. Reg. 588/17, s. 5 (4).

Asset management plans, proposed levels of service

6. (1) Subject to subsection (2), on or before July 1, 2025, every asset management plan prepared under section 5 must include the following additional information:

1. For each asset category, the levels of service that the municipality proposes to provide for each of the 10 years following the year in which all information required under section 5 and this section is included in the asset management plan, determined in accordance with the following qualitative descriptions and technical metrics:
    i. With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.

    ii. With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.

2. An explanation of why the proposed levels of service under paragraph 1 are appropriate for the municipality, based on an assessment of the following:
    i. The options for the proposed levels of service and the risks associated with those options to the long term sustainability of the municipality.

    ii. How the proposed levels of service differ from the current levels of service set out under paragraph 1 of subsection 5 (2).

    iii. Whether the proposed levels of service are achievable.

    iv. The municipality's ability to afford the proposed levels of service.

3. The proposed performance of each asset category for each year of the 10-year period referred to in paragraph 1, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency.
4. A lifecycle management and financial strategy that sets out the following information with respect to the assets in each asset category for the 10-year period referred to in paragraph 1:
    i. An identification of the lifecycle activities that would need to be undertaken to provide the proposed levels of service described in paragraph 1, based on an assessment of the following:

        A. The full lifecycle of the assets.

        B. The options for which lifecycle activities could potentially be undertaken to achieve the proposed levels of service.

        C. The risks associated with the options referred to in sub-subparagraph B.

D. The lifecycle activities referred to in sub-subparagraph B that can be undertaken for the lowest cost to achieve the proposed levels of service.

ii. An estimate of the annual costs for each of the 10 years of undertaking the lifecycle activities identified in subparagraph i, separated into capital expenditures and significant operating costs.

iii. An identification of the annual funding projected to be available to undertake lifecycle activities and an explanation of the options examined by the municipality to maximize the funding projected to be available.

iv. If, based on the funding projected to be available, the municipality identifies a funding shortfall for the lifecycle activities identified in subparagraph i,

A. an identification of the lifecycle activities, whether set out in subparagraph i or otherwise, that the municipality will undertake, and

B. if applicable, an explanation of how the municipality will manage the risks associated with not undertaking any of the lifecycle activities identified in subparagraph i.

5. For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, a discussion of how the assumptions regarding future changes in population and economic activity, set out in subparagraph 5 i of subsection 5 (2), informed the preparation of the lifecycle management and financial strategy referred to in paragraph 4 of this subsection.

6. For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census,

i. the estimated capital expenditures and significant operating costs to achieve the proposed levels of service as described in paragraph 1 in order to accommodate projected increases in demand caused by population and employment growth, as set out in the forecasts or assumptions referred to in paragraph 6 of subsection 5 (2), including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets,

ii. the funding projected to be available, by source, as a result of increased population and economic activity, and

iii. an overview of the risks associated with implementation of the asset management plan and any actions that would be proposed in response to those risks.

7. An explanation of any other key assumptions underlying the plan that have not previously been explained. O. Reg. 588/17, s. 6 (1); O. Reg. 193/21, s. 2 (1).

(2) With respect to an asset management plan prepared under section 5 on or before July 1, 2022, if the additional information required under this section is not included before July 1, 2024, the municipality shall, before including the additional information, update the current levels of service set out under paragraph 1 of subsection 5 (2) and the current performance measures set out under paragraph 2 of subsection 5 (2) based on data from the two most recent calendar years. O. Reg. 193/21, s. 2 (2).

Update of asset management plans

7. (1) Every municipality shall review and update its asset management plan at least five years after the year in which the plan is completed under section 6 and at least every five years thereafter.

(2) The updated asset management plan must comply with the requirements set out under paragraphs 1, 2 and 3 and subparagraphs 5 i and 6 i, ii, iii, iv and v of subsection 5 (2), subsection 5 (3) and paragraphs 1 to 7 of subsection 6 (1).

Endorsement and approval required

8. Every asset management plan prepared under section 5 or 6, or updated under section 7, must be,

(a) endorsed by the executive lead of the municipality; and

(b) approved by a resolution passed by the municipal council.

Annual review of asset management planning progress

9. (1) Every municipal council shall conduct an annual review of its asset management progress on or before July 1 in each year, starting the year after the municipality's asset management plan is completed under section 6.

(2) The annual review must address,

(a) the municipality's progress in implementing its asset management plan;

(b) any factors impeding the municipality's ability to implement its asset management plan; and

(c) a strategy to address the factors described in clause (b).

Public availability

10. Every municipality shall post its current strategic asset management policy and asset management plan on a website that is available to the public, and shall provide a copy of the policy and plan to any person who requests it.

TABLE 1
WATER ASSETS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	1. Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system. 2. Description, which may include maps, of the user groups or areas of the municipality that have fire flow.	1. Percentage of properties connected to the municipal water system. 2. Percentage of properties where fire flow is available.
Reliability	Description of boil water advisories and service interruptions.	1. The number 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. *2.* The number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system.

TABLE 2
WASTEWATER ASSETS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.	Percentage of properties connected to the municipal wastewater system.

Reliability	1. Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes. 2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches. 3. Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes. 4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3. 5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.	1. The number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system. 2. The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system. 3. The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.

TABLE 3
STORMWATER MANAGEMENT ASSETS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	1. Percentage of properties in municipality resilient to a 100-year storm. 2. Percentage of the municipal stormwater management system resilient to a 5-year storm.

TABLE 4
ROADS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality.
Quality	Description or images that illustrate the different levels of road class pavement condition.	1. For paved roads in the municipality, the average pavement condition index value. 2. For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).

TABLE 5
BRIDGES AND CULVERTS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Percentage of bridges in the municipality with loading or dimensional restrictions.
Quality	1. Description or images of the condition of bridges and how this would affect use of the bridges. 2. Description or images of the condition of culverts and how this would affect use of the culverts.	1. For bridges in the municipality, the average bridge condition index value. 2. For structural culverts in the municipality, the average bridge condition index value.

11. Omitted (provides for coming into force of provisions of this Regulation).

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