2025

City of Kitchener Asset Management Plan
Proposed Levels of Service

KITCHENER

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Contents

1.0 EXECUTIVE SUMMARY

1.1 The Purpose of the Plan

This City of Kitchener Proposed Levels of Service Asset Management Plan (AM Plan) details information about infrastructure assets with actions required to achieve proposed levels of service in a cost-effective manner while outlining associated risks. The plan defines the services to be provided, how the services are provided, and what funds are required over a 10-year planning period. The AM Plan is aligned with the City's Long-Term Financial Plan which considers a 10-year planning period.

1.2 Asset Description

This AM Plan covers the infrastructure assets that provide multiple City services. The largest portion of the asset mix are Sanitary Utility assets with a replacement value of $3,144.7M (approximately 21% of the total replacement value of all City assets). The infrastructure assets covered by this AM Plan are shown in Table 1.1.

Table 1.1: Assets covered by this Plan

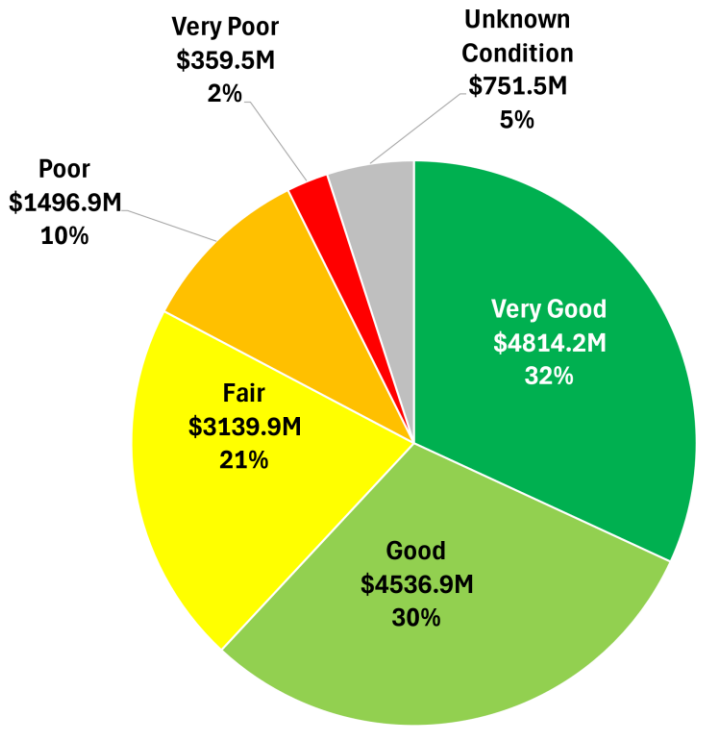
Service Area	Asset Categories	Replacement Value (2025$, M)	%
Fleet	Misc Small Equipment, Lawn/Turf Equipment, Off Road Equipment, Licensed Equipment, Arena Equipment, Dump/Fire Trucks	$78.4	0.5%
Cemeteries	Cemetery Infrastructure (Gates, Bollards, Garbage Cans, Fountains, Benches, Roadways, Parking Lots, & Fences), Cemetery Structures, Equipment, Horticulture, Interment Features, Interment Memorials	$9.2	0.1%
Golf	Course Infrastructure (Irrigation Systems, Lighting, Biek Racks, Flag Poles, & Benches), Course Structures, Course Features, Golf Carts	$15.2	0.1%
Forestry	Street Trees, Park, Cemetery, Golf & Other Trees	$172.0	1.1%
Parking	Parking Lots – Above Ground, Parking Equipment, EV Charging Stations, Parking Sundry & Miscellaneous	$3.3	0.0%
Parks, Open Spaces & Trails	Recreational Fields, Recreational Hard Surfaces, Playgrounds, Pedestrian Network, Park Amenities & Furnishings	$124.7	0.8%
Transportation	Streetlights & Poles, Traffic Signs & Pedestrian Crossings, Pedestrian Railings, Road and Pedestrian Islands & Traffic	$59.3	0.4%

Service Area	Asset Categories	Replacement Value (2025$, M)	%
	Calming, Street Furniture & Other Furnishings		
Water Utility	Mains, Service Pipes and Appurtenances, Valves, Hydrants, Bulk Water Stations, Meters	$2,791.4	18.5%
Sanitary Utility	Mains, Service Pipes and Other Appurtenances, Manholes, Pumping Stations	$3,144.7	20.8%
Stormwater	Mains, Service Pipes & Other Appurtenances, Ditches, Culverts & Other Conveyances, Manholes, Catchbasins, Quality Control Devices, Stormwater Management Facilities & Ponds, Low Impact Development, Storm Leads, Inlets, Outlets & Weirs	$2,023.5	13.4%
Bridges & Culverts	Bridges, Culverts	$479.1	3.2%
Roads & Sidewalks	Roads, Sidewalks, Walkways and Crosswalks, Pathways, Cycling, Network Links, Guiderails	$2,018.6	13.4%
Gas Utility	Distribution System, Meters, Water Heaters	$2,171.5	14.4%
Facilities	Administration, Aquatics, Arenas, Arts & Culture, Cemeteries, Commercial, Community Centres, Fire, Golf, Operations, Parking Garages, Parks & Open Spaces, Residential, Sport	$2,007.9	13.3%
TOTAL		**$15,098.8**	**100%**

The above infrastructure assets have a replacement value estimated at $15.1 billion with a condition profile of these assets shown in

Figure 1-1.

Figure 1-1 – Condition Profile



1.3 Levels of Service

Levels of Service (LOS) and current performance on these various measures are tracked in each service area appendix section. Measures include those defined by O. Reg. 588/17 for roads, structures, sanitary, water, and stormwater infrastructure, as well as measures defined by the City to reflect specific priorities and concerns related to service delivery across all the service areas.

In general, the LOS measures were organized into three categories:

- **Capacity & Use LOS** demonstrate if services have enough capacity and are accessible to the customers. This includes measures that outline the growth needs for the City to meet the needs from increases in population.

- **Functional LOS** demonstrate if services meet the community's needs and meet their intended or required purpose. Typical functional LOS for the City include meeting legislative requirements and energy efficiency initiatives for facilities and fleet.
- **Quality & Reliability LOS** demonstrate if services are reliable and responsive to customers. These LOS measures focus on ensuring that assets are kept in a state of good repair and that maintenance work is being performed on time.

Along with each LOS, a proposed target was outlined by the City which was used to support the modelling of lifecycle costs needed to achieve that target. A summary of the LOS framework for each service area is provided in the service area summaries included in the Appendix.

1.4 Future Demand

Demand drivers are circumstances that may impact future service delivery and use of assets. These drivers can include things such as population change, climate change, regulations, and changes in demographics. Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets, and providing new assets to meet demand.

1.5 Lifecycle Management Plan

1.5.1 What does it Cost?

The forecasted lifecycle costs which are necessary to provide the services covered by this AM Plan include growth, upgrade, operation, maintenance, and renewal of assets. The summary of forecasted lifecycle costs for each service area are shown in Table 1.2.

Table 1.2: Summary of Lifecycle Costs

Service Area	Annual Average Planned Growth & Upgrade ($M/year)	Annual Average Planned O&M ($M/year)	Annual Average Renewal Needs for Proposed LOS ($M/year)
Fleet	$2.0	$12.6	$8.3
Cemeteries	$0.1	$2.7	$0.07
Golf	N/A	$3.3	$0.3
Forestry	$7.4	$6.2	$0.5
Parking	N/A	$2.9	$0.02
Parks, Open Spaces & Trails	$4.0	$21.3	$6.9
Transportation	$1.8	$5.1	$0.4
Water Utility	$15.3	$63.2	$18.4
Sanitary Utility	$22.1	$107.0	$25.7
Stormwater	$14.3	$32.7	$8.6
Bridges & Culverts	N/A	$2.4	$0.7
Roads & Sidewalks	$14.5	$20.8	$22.6

Service Area	Annual Average Planned Growth & Upgrade ($M/year)	Annual Average Planned O&M ($M/year)	Annual Average Renewal Needs for Proposed LOS ($M/year)
Gas Utility	$5.3	$99.7	$14.4
Facilities	$14.5	$24.6	$36.7
TOTAL	**$101.3**	**$404.4**	**$143.8**

1.6 Financial Summary

1.6.1 Planned Budgets and Forecast Costs

As shown in Table 1.2, the growth and upgrade need for City assets is estimated at an average of $101.3 million per year over the next 10 years which includes a 0.5% year-over-year growth and upgrade of assets to account for development. There is currently no quantifiable funding gap for growth and upgrade, however on-going development of Master Plan updates will inform future growth-related service levels and recommendations.

The operating budget focused on asset-related operations and maintenance is $404.4 million per year from 2025-2034. The estimated increase accounts for growth in the asset portfolio (at least 0.5% annually from development) to maintain service levels over the next 10 years.

The renewal need for City assets is estimated at an average of $143.8 million per year over the next 10 years and total funding gap of $30.6 million per year. This renewal need is forecasted to meet proposed service levels that the City selected based on affordability and risk. A summary of renewal needs and funding gaps is shown in Table 1.3.

Table 1.3: Renewal Needs Summary

Service Area	Annual Average Renewal Needs for Proposed LOS ($M/year)	Annual Average Planned Budget ($M/year)	Funding Gap ($M/year)
Fleet	$8.3	$8.3	N/A
Cemeteries	$0.07	$0.07	N/A
Golf	$0.3	$0.3	N/A
Forestry	$0.5	$0.5	N/A
Parking	$0.02	$0.02	N/A
Parks, Open Spaces & Trails	$6.9	$6.9	N/A
Transportation	$0.4	$0.4	N/A
Water Utility	$18.4	$18.4	N/A
Sanitary Utility	$25.7	$25.7	N/A
Stormwater	$8.6	$8.6	N/A
Bridges & Culverts	$0.7	$0.7	N/A

Service Area	Annual Average Renewal Needs for Proposed LOS ($M/year)	Annual Average Planned Budget ($M/year)	Funding Gap ($M/year)
Roads & Sidewalks	$22.6	$22.6	N/A
Gas Utility	$14.4	$8.3	$6.1
Facilities	$36.7	$12.3	$24.5
TOTAL	**$143.8**	**$113.2**	**$30.6**

1.6.2 Funding Gap

The funding gaps shown in Table 1.3 illustrate that over the next 10-years, the City has allocated enough budget to meet the proposed LOS for all the service areas except for Gas Utility and Facilities. This is primarily due to the challenges with linear infrastructure in the recent past which has required significant investment to improve asset condition and continue to receive large budgets to maintain condition. Additionally, there are data gaps for other service areas (i.e., Parks, Open Spaces, and Trails) that limit the accuracy of the forecasted renewal needs to meet the proposed LOS. Service areas like Golf and Cemeteries do not need to plan for managing growth in their portfolio often while Parking, Transportation, and Fleet run much high percentages of run-to-failure given the low criticality nature of their assets. Forestry's assets are living assets that rely more on O&M than renewal. Additionally, this AM Plan is a medium-term planning document looking only at the next 10 years, and there are service areas that will have funding gaps in the future if the current funding is maintained (see appendix sections for specific lifecycle costs for each service area).

The allocation in the planned budget for renewal of assets is insufficient to provide the proposed level of service modelled in this AM Plan, for the planning period for the following service areas:

- **Gas Utilities**: The condition of assets is expected to deteriorate based on the currently available budget for capital renewal over the next 10 years. The proposed performance is to maintain the overall condition of assets similar to the current state over the next 10 years. This results in a funding gap of $6.1 million/year which the utility plans to fund through requesting rate increases.
- **Facilities**: The condition of assets is expected to deteriorate based on the currently available budget for capital renewal over the next 10 years. The proposed performance is to maintain the overall condition of assets similar to the current state over the next 10 years. This results in a funding gap of $24.5 million/year which the City plans to manage through seeking grant opportunities, improved planning and maintenance processes, ensuring that building condition assessments are completed regularly to identify critical repairs, and updating the acquisition and disposals framework. Additionally, the City will continue to strategically plan initiatives that help extend building life and reduce long-term costs.

1.6.3 Managing the Risks

To manage the risks of the renewal funding gaps, the City will continue to prioritize available funding based on the criticality of projects to prevent disruptions to service delivery. The City

also continues to improve planning and coordination of capital projects between departments to maximize resources. The City will continue to identify funding opportunities through federal and provincial programs and explore potential partnerships and corporate sponsorships to raise external funds.

1.7 Monitoring and Improvement Program

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

- City to formalize a condition assessment program to complete assessments for any assets currently listed in *Unknown* condition or assets that use age as a proxy for condition to support more accurate lifecycle needs and financial strategies.
- City to monitor and update replacement values of assets as they undertake renewal projects and review unit costs in future updates of asset replacement values.
- City to formalize levels of service, monitor performance on measures included in the AM Plan on an annual basis, and review and update service levels (add or remove measures, and set targets) as required to reflect alignment with other City plans and studies.
- Conduct formal risk assessments to prioritize preventative maintenance activities and renewal / capital investments.
- City to continue to develop and update the 10-year forecast of lifecycle activities based on formalized / updated levels of service, formal risk assessments, and updated asset information (as applicable). A summary of the improvement recommendations for each service area is provided in the service area summaries included in the Appendix.
- City to implement capital planning software and preventative maintenance programs.

2.0 INTRODUCTION

The City of Kitchener (the City) is in Waterloo Region, in the middle of southwestern Ontario. The City covers an area of 137 square kilometres and has a population of approximately 320,360[1]; making it the largest City in the Region. The City has been designated as a growth area through the Provincial Growth Plan: Places to Grow and has seen significant population growth that is expected to continue through the next decade. The City owns and maintains assets that support City departments providing a wide range of services to its residents.

This Asset Management Plan (AM Plan) will communicate the requirements for the sustainable delivery of services through efficient management of assets, compliance with regulatory requirements, and required funding to provide the appropriate levels of service over the planning period (2025-2034). The AM Plan has been prepared in accordance with Ontario Regulation (O.Reg.) 588/17 – Asset Management Planning for Municipal Infrastructure, under the Infrastructure for Jobs and Prosperity Act, 2015. The Regulation lays out the requirements for all AM Plans, as well as deadlines to meet to certain milestones. This iteration of the AM Plan meets requirements for Proposed Levels of Service.

2.1 City Services Included in this Plan

The City provides many services directly to residents and visitors and between departments. The services included in this AM Plan are indicated below.

Fleet	**Cemeteries**	**Golf**	**Forestry**
Parking	**Parks, Open Spaces & Trails**	**Transportation**	**Water Utility**
Sanitary Utility	**Stormwater**	**Bridges & Culverts**	**Roads & Sidewalks**
Gas Utility	**Facilities**		

2.2 Provincial Asset Management Requirements

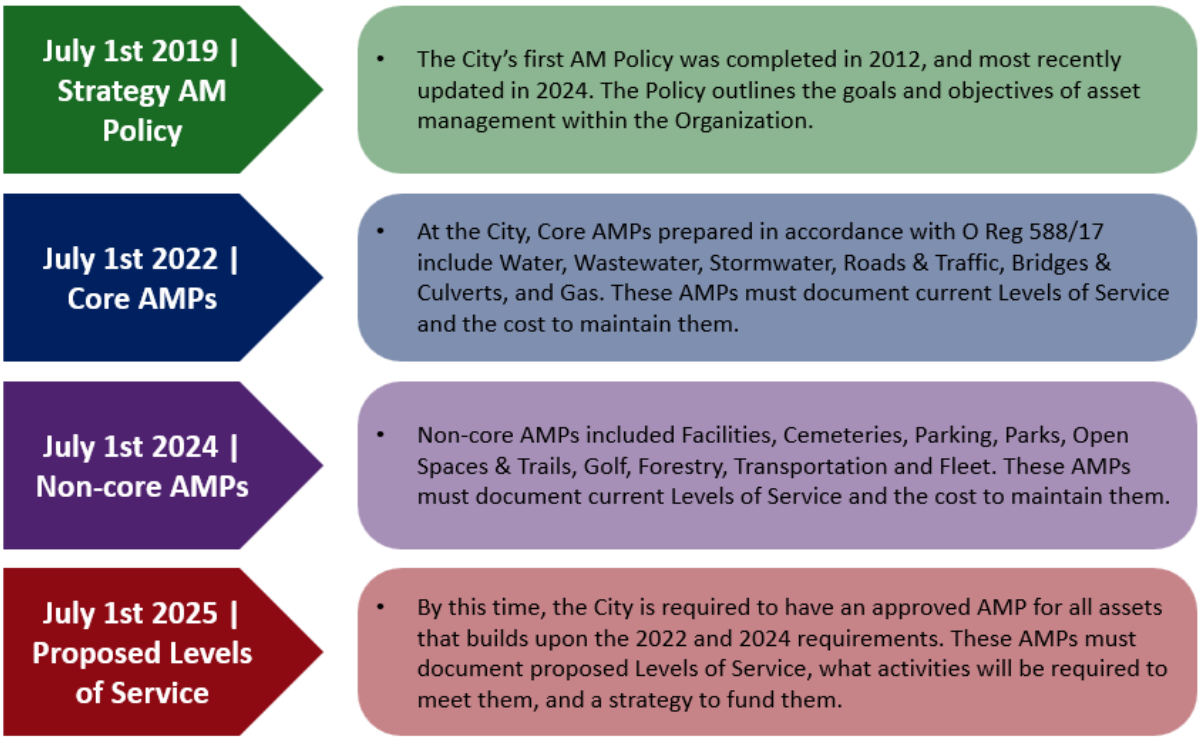
The Province of Ontario requires all municipalities that seek provincial infrastructure funding have an asset management plan, or plans, in place. To encourage a similar approach across municipalities, in 2012, the province introduced Building Together: Guide for Municipal Asset Management Plans, which defined the key components of an effective asset management plan.

More recently in 2017, the province approved O. Reg. 588/17 – Asset Management Planning for Municipal Infrastructure, under the *Infrastructure for Jobs and Prosperity Act, 2015*. The Regulation mandates the development of an asset management policy, asset management

[1] As per Statistics Canada Estimate

plans, and their content. Additionally, milestones are included for when municipalities must fulfill certain requirements, outlined below in Figure 2-1.

Figure 2-1 – O.Reg. 588/17 Milestones



2.3 Asset Management at the City of Kitchener

The City of Kitchener has been practicing asset management planning for at least 15 years, starting with the introduction of Public Sector Accounting Board (PSAB) legislation. Since 2007, several efforts have resulted in well-established asset management programs and procedures, as well as the inclusion of a dedicated Asset Management Division in the City's corporate structure. Kitchener City Council adopted the most recent Corporate Asset Management Strategy in 2016. The goals outlined in the strategy are to extend the useful life of all assets, in the most cost-effective way, while managing risk and meeting the agreed upon levels of service.

The AM Plan is a key tactical (medium-term, 2-10 year) planning document that relies on input from strategic planning activities and informs shorter-term decision making. The AM Plan provides a framework to validate the City's budgeting processes and assist in prioritizing work activities, including capital projects, based on risk. It discusses levels of service that align with the 2023 to 2026 Strategic Plan goals and lifecycle management strategies intended to reduce the overall cost of asset ownership.

2.3.1 Corporate Asset Management System

An asset management system should aim to achieve a line of sight between corporate strategic goals outlined in the strategic plan, and operational plans, policies and procedures, as illustrated in Figure 2-2. The two guiding documents in this system are the Asset Management Strategy and Asset Management Policy, most recently updated in 2016 and 2024, respectively. The Asset Management Policy defines the intent, scope and principles of

asset management at the City of Kitchener, and who is responsible for enacting the policy. Section 5.3 – Climate Change Impacts of this AM plan discusses these impacts specific to the City and strategies to build and maintain assets through the lens of resiliency, sustainability, adaptation, and mitigation. The Asset Management Strategy defines how the principles of the policy will be put into practice and the three guiding principles of asset management at the City of Kitchener which are to:

1. Balance asset condition and levels of service,
2. Allocate financial resources among priorities and,
3. Shift how we do business – such as introducing programs to support the requirement for high-quality data services.

Figure 2-2 – City of Kitchener Asset Management System

In addition to the Asset Management Strategy and Policy, this AM Plan should be read in conjunction with other planning documents, outlined in Table 2.1 below. Additionally, The City of Kitchener resides within the Region of Waterloo and has adopted various planning documents for the Region (i.e., TransformWR, etc.)

Table 2.1: Key Planning Documents

Key Planning Document	Document Description
2023-2026 Corporate Strategic Plan	The document outlines the strategic goals that are to be championed by Council and staff across the City.
Official Plan (2014)	The Official Plan is a legal document that contains goals, objectives and policies to manage and direct physical and land use change and their effects on the cultural, social, economic and natural environment within the City. This Plan provides a framework for decision-making and plays several essential roles in the future planning of the City.

Key Planning Document	Document Description
Kitchener, Changing for Good - Corporate Climate Action Plan (2019)	The City's Corporate Climate Action Plan aims to achieve meaningful and measurable carbon emission reductions throughout its operation, while also adapting to impacts resulting from climate change.
Energy Conservation & Demand Management Plan (2019-2023)	Under Ontario Regulations 25/23, public sector agencies in Ontario must report annual energy consumption and develop a five - year conservation and demand management plan intended to reduce energy consumption and greenhouse gas emissions.
Development Charges Background Study (2022)	The DC Study includes preparing a development forecast, establishing historical service levels, determining the increase in need for services arising from development and appropriate shares of costs and attribution to development types (residential and non-residential).

Key stakeholders in the preparation and implementation of this AM Plan are shown in Table 2.2.

Table 2.2 - Key Stakeholders in the AM Plan

Key Stakeholder	Role in Asset Management Plan
City of Kitchener Elected Council	City Council are the overall owners of the City's assets. Council approves asset management policies and asset funding allocation through the annual corporate budget process. An overarching expectation of a standard of care is required by Council to ensure commitment to effective asset Management practices.
Corporate Leadership Team	The Leadership Team provides corporate oversight to the program to ensure that the goal and directions of the Corporate Asset Management program are maintained, and the program remains consistent with the overall Strategic Plan.
Asset Management Steering Committee	This committee provides leadership and strategic direction for supporting systems/processes specific to the delivery of asset/work management information for the City of Kitchener. Further, in support of the city-wide asset management strategies, the committee provides leadership and governance to the Asset Management Policy statement through the provision of information necessary for the long-range forecasts of asset investment needs, services levels, risks, costs and other performance measures.
Fleet, Cemetery, Golf, Forestry, Parking, Parks,	These service areas of the City are responsible for the operation and maintenance of City assets and to ensure the

Key Stakeholder	Role in Asset Management Plan
Open Spaces & Trails, Transportation, Water Utility, Sanitary Utility, Stormwater, Bridges & Culverts, Roads & Sidewalks, Gas Utility, Facility Service Areas	assets are meeting their service requirements. These groups were engaged throughout the AM Plan development to ensure their service area was accurately reflected in this plan.
Finance	The Finance division within Financial Services prepares an annual operating budget and 10-year capital forecast for Council's consideration. The annual budget helps identify the spending plans and priorities for the City for the upcoming year and is informed by the City's Strategic Plan, various master plans, and feedback from the community.

2.3.2 Asset Management Plan Methodology

The information presented in the AM Plan is based on O. Reg. 588/17 requirements, the Guide for Municipal Asset Management Plans, originally issued by the Ontario Ministry of Infrastructure, and leading asset management practices.

Costs and replacement values in this AM Plan are estimated in 2025 dollars.

The AM Plan was developed by SLBC Inc. in collaboration with City staff through:

- Review of background materials available on the City's web site and provided by the City's project team including asset inventories, planning documents, and budgets
- Workshops with internal partners
- Interim meetings with the City's project team
- Data and information transfers
- Review of interim outputs by the City's project team and other stakeholders, and incorporation of comments into the final AM Plan.

3.0 STATE OF LOCAL INFRASTRUCTURE

3.1 Asset Inventory and Valuation

A variety of assets support the delivery of the City's services. The assets covered by this AM Plan are shown in Table 3.1. All table and figure values are shown in this report are reported at the start of (2025) dollars.

The largest portion of the asset mix are Sanitary Utility assets with a replacement value of $3,144.7M (approximately 21% of the total replacement value of all City assets).

Table 3.1 – Assets covered by this Plan

Service Area	Asset Categories	Replacement Value (2025$, M)	%
Fleet	Misc Small Equipment, Lawn/Turf Equipment, Off Road Equipment, Licensed Equipment, Arena Equipment, Dump/Fire Trucks	$78.4	0.5%
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Golf	Course Infrastructure (Irrigation Systems, Lighting, Biek Racks, Flag Poles, & Benches), Course Structures, Course Features, Golf Carts	$15.2	0.1%
Forestry	Street Trees, Park, Cemetery, Golf & Other Trees	$172.0	1.1%
Parking	Parking Lots – Above Ground, Parking Equipment, EV Charging Stations, Parking Sundry & Miscellaneous	$3.3	0.0%
Parks, Open Spaces & Trails	Recreational Fields, Recreational Hard Surfaces, Playgrounds, Pedestrian Network, Park Amenities & Furnishings	$124.7	0.8%
Transportation	Streetlights & Poles, Traffic Signs & Pedestrian Crossings, Pedestrian Railings, Road and Pedestrian Islands & Traffic Calming, Street Furniture & Other Furnishings	$59.3	0.4%
Water Utility	Mains, Service Pipes and Appurtenances, Valves, Hydrants, Bulk Water Stations, Meters	$2,791.4	18.5%
Sanitary Utility	Mains, Service Pipes and Other Appurtenances, Manholes, Pumping Stations	$3,144.7	20.8%

Service Area	Asset Categories	Replacement Value (2025$, M)	%
Stormwater	Mains, Service Pipes & Other Appurtenances, Ditches, Culverts & Other Conveyances, Manholes, Catchbasins, Quality Control Devices, Stormwater Management Facilities & Ponds, Low Impact Development, Storm Leads, Inlets, Outlets & Weirs	$2,023.5	13.4%
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Facilities	Administration, Aquatics, Arenas, Arts & Culture, Cemeteries, Commercial, Community Centres, Fire, Golf, Operations, Parking Garages, Parks & Open Spaces, Residential, Sport	$2,007.9	13.3%
TOTAL		**$15,098.8**	**100%**

The age profile of the assets included in this AM Plan are shown in each of the service area chapters located in the Appendix.

3.2 Asset Hierarchy

An asset hierarchy provides a framework for structuring data in an information system to assist in collection of data, reporting information and making decisions. The hierarchy includes the asset class and component used for asset planning and financial reporting and service level hierarchy used for service planning and delivery.

The service hierarchy is shown is Table 3.2.

Table 3.2 – Asset Service Hierarchy

Service Hierarchy	Service Level Objective
Fleet	Ensure that the City's fleet of vehicles and equipment is reliable, safe, and operational when needed, with minimal downtime for repairs or maintenance, and a planned replacement schedule.
Cemeteries	Provide well-maintained, accessible cemetery grounds that serve the needs of families and the community, with regular grounds maintenance, efficient burial services, and a respectful environment.

Service Hierarchy	Service Level Objective
Golf	Ensure that golf course facilities are well-maintained and provide a high-quality experience for golfers, with well-kept greens, fairways, and other amenities.
Forestry	Maintain healthy, sustainable urban forests by managing tree planting, pruning, removal, and ensuring safety around trees while protecting the urban canopy from disease and pests.
Parking	Provide an adequate number of well-maintained parking spaces in convenient locations, with clear signage and minimal congestion.
Parks, Open Spaces & Trails	Maintain parks, open spaces, and trails that are safe, clean, and accessible for recreational use, supporting the health and well-being of the community.
Transportation	Provide an efficient, safe, and well-maintained transportation network.
Water Utility	Provide safe, potable water to residents and businesses, ensuring water distribution and quality are maintained at high standards.
Sanitary Utility	Ensure the safe and efficient collection of wastewater while maintaining system integrity to prevent blockages or overflows.
Stormwater	Effectively manage stormwater runoff to prevent flooding, protect water quality, and maintain drainage systems to handle various storm events.
Bridges & Culverts	Ensure that bridges and culverts are safe, structurally sound, and capable of handling traffic loads while minimizing disruptions from necessary repairs or maintenance.
Roads & Sidewalks	Maintain safe, smooth, and accessible roads and sidewalks, minimizing disruptions from potholes, cracks, and other issues, while ensuring high mobility for residents and businesses.
Gas Utility	Provide a safe, reliable, and efficient gas distribution system that meets the needs of residents and businesses, while ensuring environmental sustainability and regulatory compliance.
Facilities	Ensure that all City-owned and operated facilities are properly maintained, accessible, and safe for public use, including regular cleaning, repair, and security measures.

3.3 Asset Capacity and Performance

Assets are generally provided to meet design and service standards, when available. Any service performance deficiencies are detailed in the Appendix service area summaries.

3.4 Asset Condition

Assets can be inspected and monitored through multiple methods as shown in Table 3.3. The City employs both internal staff and external contractors and consultants to perform inspections of City owned assets using the frequency listed in Table 3.3 or on an as needed basis for assets not included in the table. The results of these inspection programs provide the City with meaningful empirical data that can be used to gauge the condition of assets and needs for asset maintenance or renewal. The cost for these condition assessments is included in the operational costs Section 6.3 of this AM Plan.

Table 3.3 – Condition Assessments

Asset Category	Condition Assessment Description	Frequency in Years
Roads & Sidewalks	• Pavement Quality Index (PQI) for roads	• Every 2 years (roads) • Every year (sidewalks)
Stormwater	• CCTV Inspections for Mains	• 12-year cycle for CCTV inspections (~8% per year)
	• Bathymetric Surveys for Stormwater Management Facilities and Ponds (including forebay)	• 5-10 year cycle for Bathymetric Surveys
Sanitary Utility	• CCTV Inspections for Mains	• 12-year cycle for CCTV inspections (~8% per year)
	• Visual Inspections for Maintenance Holes and Catch Basins	• 10-year cycle for Maintenance Holes and Catch Basins
Water Utility	• Condition evaluation based on age, material and break history	• Ongoing monitoring with comprehensive reviews on an as needed basis
Facilities	• Facility Condition Index (FCI) which involves a detailed evaluation of building components, systems, and structures to determine repair and replacement needs	• Typically conducted every 5-7 years
Bridges & Culverts	• Bridge Condition Index (BCI) which involves detailed structural inspections to evaluate the condition of bridges and culverts	• Required every two years by Ontario regulations.
Gas Utility	• CP Survey to measure the cathodic protection program effectiveness for steel pipe • Leak Survey to identify and investigate gas leaks	• Annually for CP Survey • 1/3 of gas pipes are surveyed annual for leaks

Condition is measured using a 1 – 5 grading system as detailed in Table 3.4. This consistent approach for assessing asset performance is used across the City to enable effective decision support. A finer grading system may be used at a more specific level, however, the AM Plan results are translated to a 1 – 5 grading scale for ease of communication.

Table 3.4 – Condition Grading System

Condition Grading	Description of Asset	Lifecycle Needs	Typical Age-Based Mapping
1 – Very Good	New or recently rehabilitated	Regular maintenance	>75 – 100% Remaining Life
2 – Good	Physically sound with some elements showing signs of wear.	Maintenance/repair costs fit within operating budget	>50 – 75% Remaining Life
3 – Fair	Signs of deterioration, performing at lower level than intended.	Minor capital repairs needed	>25 – 50% Remaining Life
4 – Poor	Significant deterioration is evident.	Major capital repairs needed	>0 – 25% Remaining Life
5 – Very Poor	Advanced deterioration, possible inability to meet service levels	Replacement or refurbishment needed	At or Beyond Service Life

The condition profile of the City's assets is shown in

Figure 3-1. The condition assessment of the City's assets provides insight into the reliability of its infrastructure. Overall, approximately 85% of the City's assets have a condition rating of fair or better (excluding assets in unknown condition). This highlights the City's commitment to maintaining their services.

The largest portion of unknown condition assets includes: Sanitary ($390.4 million), Stormwater ($300.9 million), Roads & Sidewalks ($18.2 million), Forestry ($17.9 million), and Water ($15.5 million). The other service areas also have unknown assets with a total replacement value of $8.5 million. The City plans to identify these asset conditions in the coming years through improved data collection and management practices.

Figure 3-1 – Asset Condition Profile

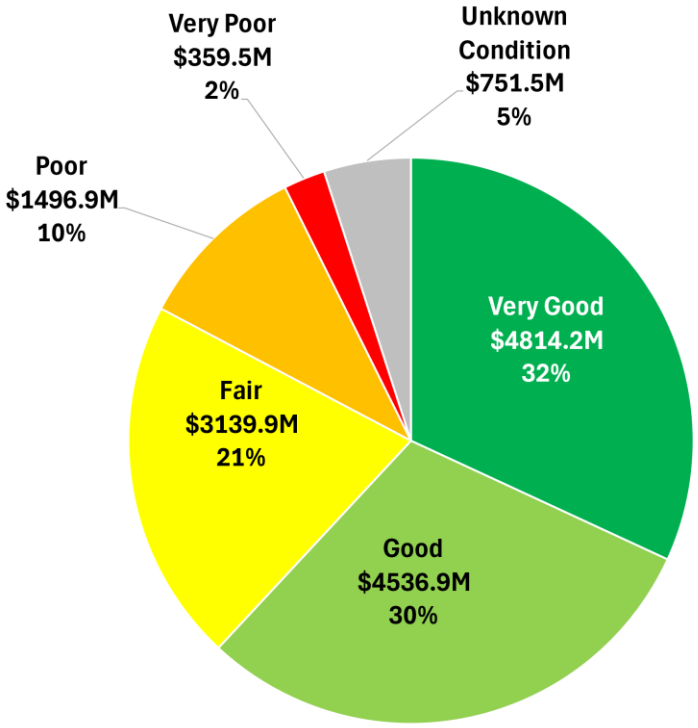
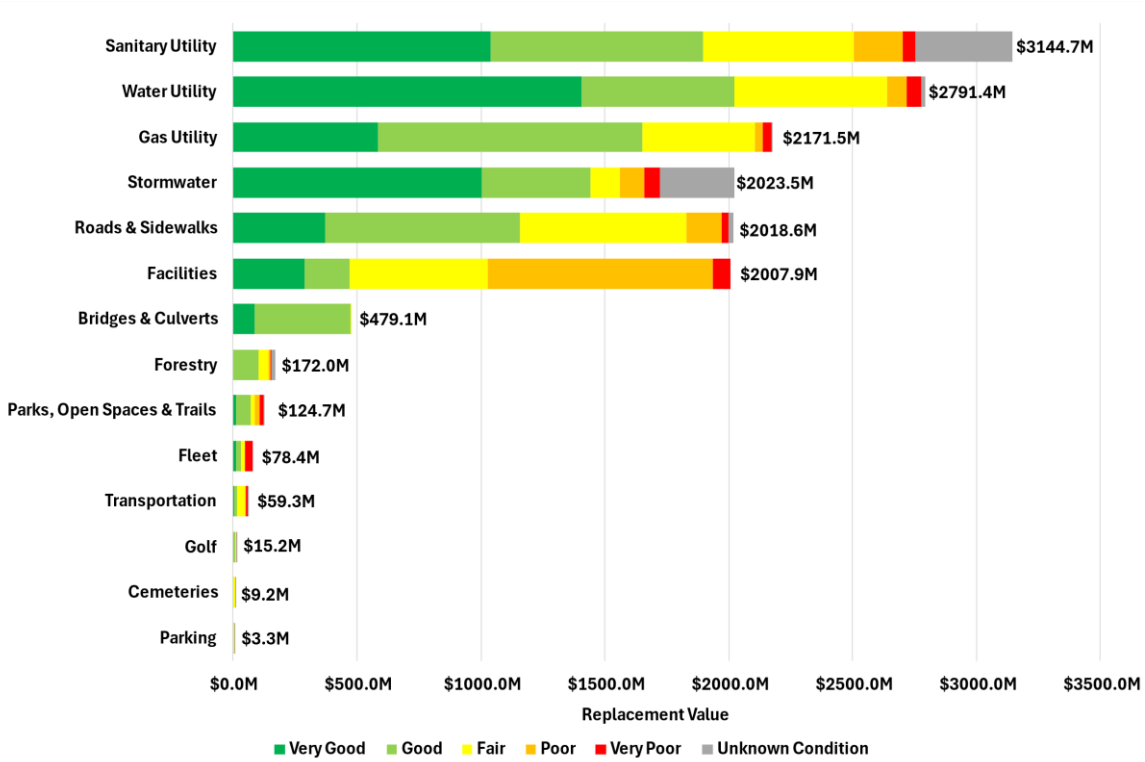


Figure 3-2 – Asset Condition Profile by Service Area



3.5 Asset Registry Completeness & Assumptions

In compiling this AM Plan, all asset registries used by the City were reviewed to understand the responsible stakeholders for asset data across the City and to assess the completeness of the register (i.e., register exists and fields that are critical to the assets' lifecycle and financial management are populated with accurate values). The information included in the registries was used to develop the AM Plan.

The following categories have been employed to assess the completeness of asset registries:

Table 3.5 – Asset Registry Rating Categories

Data Rating	Description
Good	Data based on sound records, procedures, investigations and analysis, documented properly but may have minor shortcomings. Dataset is complete and estimated to be accurate ± 10%.
Fair	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated ± 25%
Poor	Dataset may not exist or be fully complete, and most data is estimated or extrapolated

Each service area's data was assessed for their asset register and LOS. The assessment's results, using the rating scale above, are provided in Table 3.6.

Table 3.6 – Asset Registry Assessment

Asset Category	Completeness of Asset Registry		Completeness of Existing Asset Registry Fields				
		Defined LOS	Initial Construction Costs	Installation Year	Condition	Estimated Service Life	Description
Fleet	Good	Good	Good	Good	Poor	Good	Good
Cemeteries	Good	Good	Good	Good	Good	Good	Good
Golf	Good	Fair	Good	Fair	Fair	Good	Good
Forestry	Fair	Fair	Fair	Fair	Fair	N/A	Fair
Parking	Good	Good	Good	Fair	Fair	Good	Good
Parks, Open Spaces & Trails	Fair	Fair	Fair	Fair	Fair	Fair	Fair
Transportation	Good	Fair	Good	Fair	Fair	Good	Good
Water Utility	Good	Good	Good	Good	Good	Good	Good
Sanitary Utility	Good	Good	Good	Fair	Fair	Good	Good
Stormwater	Good	Good	Good	Fair	Fair	Good	Good
Bridges & Culverts	Good	Good	Good	Good	Good	Good	Good
Roads & Sidewalks	Good	Good	Good	Good	Good	Good	Good
Gas Utility	Good	Good	Good	Good	Poor	Good	Good
Facilities	Good	Good	Good	Good	Good	Good	Good

Where asset registries are missing critical data or fields are found to be incomplete, assumptions were made to complete this AM Plan. Specific assumptions are outlined in the service area summaries in the Appendix or included as improvement areas for the next AM Plan.

4.0 LEVELS OF SERVICE

Levels of Service (LOS) define the performance the City's assets are intended to deliver over their service lives.

LOS are statements that describe the outputs and objectives the City intends to deliver to its residents, businesses, and other stakeholders. LOS are guided by a combination of customer expectations, legislative requirements, internal policies and procedures, and affordability. Effective asset management requires that LOS be formalized and supported through a framework of performance measures, performance levels, and timeframes to achieve performance levels, such that the activities and costs to deliver the documented LOS can be determined.

Figure 4-1 shows the LOS framework and line of sight from higher-level Corporate priorities to detailed asset-specific Technical LOS. Corporate commitments and legislated LOS guide the development of Community LOS. The Community LOS outline the services that the assets need to deliver to the City's residents and businesses. Community LOS can be categorized into one of the following customer service attributes:

- **Capacity & Use:** Services have enough capacity and are available to customers.
- **Function:** Services meet customer needs while limiting health, safety, security, natural and heritage impacts.
- **Quality & Reliability:** Services are reliable and responsive to customers.
- **Financial Sustainability:** Services are affordable and provided at the lowest cost.

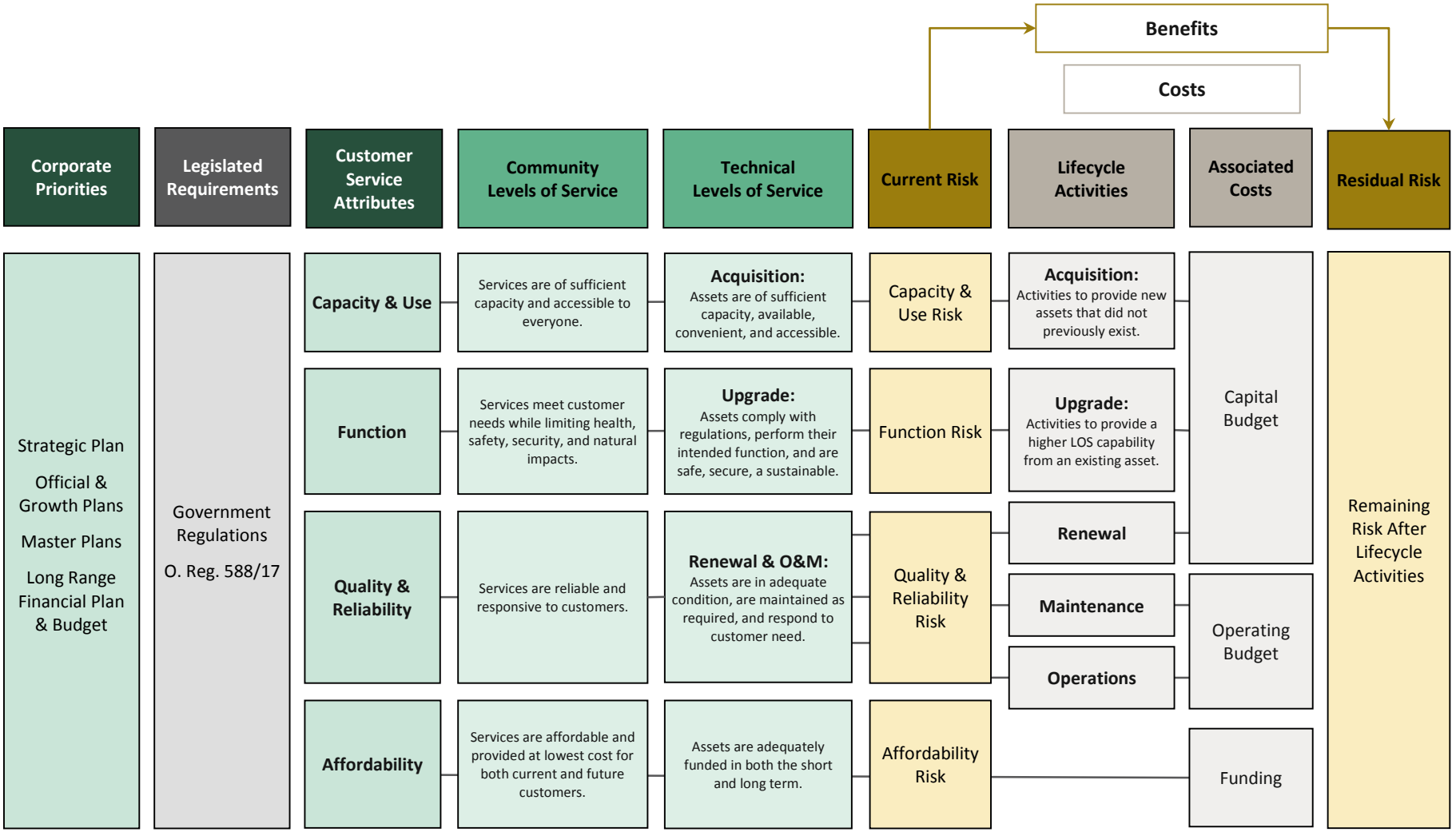
Customer service attributes are translated into Community LOS, which measure services from a community resident/business perspective, and Technical LOS that define asset performance levels. These LOS define asset needs and drive the required lifecycle activities and associated funding to mitigate risks, as follows:

- Capacity & Use LOS inform **Acquisition** needs
- Function LOS inform **Upgrade** needs
- Quality & Reliability LOS inform **Renewal, Operations and Maintenance** needs
- Financial Sustainability LOS inform **Funding** needs

This *line of sight* shows how the day-to-day management of City assets supports the achievement of higher-level strategic priorities.

Risk is evaluated according to each of the four community LOS. This evaluation is described further in Section 7.0. A risk management summary for each service area is included in their respective Appendix summary.

Figure 4-1: Levels of Service Framework



4.1 Customer Research and Expectations

This AM Plan is prepared to facilitate consultation prior to adoption of levels of service by the City of Kitchener. Future revisions of the AM Plan will incorporate customer consultation on service levels and costs of providing services. This will assist Council and stakeholders in matching the level of service required, service risks and consequences with the customer's ability and willingness to pay for the service.

Research on customer expectations has been done periodically for some service areas, but not on a consistent basis. This will be investigated for future updates of the AM Plan.

4.2 Strategic and Corporate Goals

This AM Plan is prepared under the direction of the Corporate Asset Management Strategy which is in alignment with the City of Kitchener's Strategic Plan (2023 – 2026). The City of Kitchener's Strategic Plan was developed with the consultation of residents, community organizations, businesses and councillors. Further to this, the AM Strategy supports the United Nations Sustainability Goals (SDGs) which outline the ways to achieve a better and more sustainable future for all.

The City's vision is:

"Building a city for everyone where, together, we take care of the world around us – and each other."

Strategic goals have been set by the City of Kitchener. The relevant goals and objectives and how these are addressed in this AM Plan are summarised in Table 4.1.

Table 4.1 – Goals and how these are addressed in this Plan

Goal	Objective	How Goal and Objectives are addressed in the AM Plan
Building a Connected City Together	We live in all kinds of neighbourhoods and types of housing. We work together to ensure that we each have secure and affordable homes. We get around easily, sustainably and safely to the places and spaces that matter most to us.	The AM Plan ensures that transportation infrastructure (such roads, sidewalks, bridges, and culverts) is well-maintained for safe and efficient travel. Parking facilities are provided in convenient locations, and facilities are accessible for all residents.
Cultivating a Green City Together	We follow a sustainable path to a greener, healthier city. We work together to enhance and protect our parks and natural environment while transitioning to a low-carbon future. We support businesses and residents to make more climate-positive choices.	The AM Plan focuses on sustainable practices for parks, open spaces, forestry, and stormwater management. It includes strategies for maintaining urban forests, reducing carbon emissions, and using climate-resilient infrastructure. It also includes preserving green spaces and enhancing water quality through the

Goal	Objective	How Goal and Objectives are addressed in the AM Plan
		water, stormwater, and sanitary utilities.
Creating an Economically Thriving City together	We use our collective strengths to grow an agile and diverse local economy powered by talented entrepreneurs, workers and artists. We work together to create opportunities for everyone and a resilient future that propels our city forward.	The AM Plan supports economic growth by ensuring reliable infrastructure such as roads, water, stormwater, gas, and sanitary utilities are maintained. It focuses on efficient operation of facilities, parking, and transportation systems, contributing to the business environment and economic opportunities for the community.
Fostering a Caring City Together	We welcome residents of all ages, backgrounds and lived experiences. We work together on the decisions that matter to us and have a meaningful influence in our community. We're healthy and thriving as we easily access the diverse and inclusive programs and services we need to succeed.	The AM Plan ensures that public spaces such as parks, community centres, and recreational facilities are well-maintained and accessible. It emphasizes safe and clean environments for all residents, focusing on inclusivity and meeting the needs of the community with accessible and well-maintained public spaces.
Stewarding a Better City Together	We, the City's employees, are stewards of Kitchener's present and its future. We're responsive, innovative, diverse and accountable public servants who work together efficiently to serve residents. We remove barriers and champion residents' collective vision for a better city and a better world.	The AM Plan guides City operations with a focus on sustainability, innovation, and accountability. It outlines how the City will invest in infrastructure and services that align with long-term goals, including climate action and public safety.

4.3 Legislative Requirements

A sample of the legislative requirements relating to the City's management of assets are provided provided in

Table 4.2. This AM Plan is prepared in accordance with O. Reg 588/17, which lays out the requirements for Asset Management Plans prepared by municipalities across Ontario and milestones that all municipalities are required to meet. Please note that the list of legislative requirements is not exhaustive.

Table 4.2 – Legislative Requirements

Legislation	Requirement
Ontario Regulation 588/17	Establishes strategic, long-term, sustainable plans to manage core and non-core capital infrastructure assets by 2024. The Regulation requires: • Municipal governments to adopt AM Plans for all infrastructure assets including identifying levels of service and costs of maintaining services. • Municipal governments to set technical metrics and qualitative descriptions for each asset.
Funeral, Burial and Cremation Services Act	The purpose of the Funeral, Burial and Cremation Services Act is to regulate bereavement service providers. The Act provides guidelines for the operation of cemeteries, crematoriums and funeral homes.
The Accessibility for Ontarians with Disabilities Act (AODA)	The purpose of the AODA is to develop, implement and enforce standards for accessibility related to goods, services, facilities, employment, accommodation and buildings.
Technical Standards and Safety Act	Facilities must comply with technical standards and safety regulations depending on the industry or equipment they include such as elevating devices.
Highway Traffic Act	Regulates the operation of vehicles, including municipal fleets, road safety, and signage. Impacts transportation, roads, and fleet management.
Environmental Protection Act	Governs environmental management related to air, land, and water, impacting stormwater, wastewater, parks, forestry, and landfill management.
Safe Drinking Water Act	Ensures safe drinking water through compliance with water quality standards, asset maintenance, and risk management planning for the Water Utility.
Ontario Water Resources Act	Governs the protection and conservation of water resources, impacting water, sanitary, and stormwater utilities.
Ontario Heritage Act	Objects of Trust 7 (d) to preserve, maintain, reconstruct, restore and manage property of historical, architectural, archaeological, recreational, aesthetic, natural and scenic interest. This act is of specific relevance to the protection of heritage trees.
Professional Foresters Act	The practice of professional forestry is the provision of services in relation to the development, management, conservation and sustainability of forests and urban forests where those services require knowledge, training and

Legislation	Requirement
	experience equivalent to that required to become a member under this Act.
Conservation Land Act	2 (c) watershed protection and management. This act defines "areas of natural and scientific interest" and "wetland".
Forestry Act	The Minister may establish programs to protect, manage or establish woodlands and to encourage forestry that is consistent with good forestry practices. 2002, c. 17, Sched. C, s. 12 (2). 11 (1) The council of a municipality may pass by-laws, (c) for planting and protecting trees on any land acquired for or declared to be required for forestry purposes. 2002, c. 17, Sched. C, s. 12 (3).
Fire Protection and Prevention Act	Facilities, especially public spaces, must comply with fire safety regulations.
Ontario Building Code	The Ontario Building Code has specific requirements facilities, such as parking garages.
Ontario Regulation 239/02, Minimum Maintenance Standards (MMS)	Establishes minimum standards for road and highway maintenance for all municipalities. MMS regulations pertain to various elements of road repair and maintenance, such as the frequency of road inspections, weather monitoring, ice formation on roadways, snow accumulation, and sidewalk trip ledges.
Technical Standards and Safety Act, 2000	Under this act, Regulation 212/01: Gaseous Fuels and Regulation 210/01 Oil and Gas Pipeline Systems define all the standards and requirements of gas distributors to ensure the safe operation of gas distribution systems.
Ontario Energy Board Act, 1998	The Ontario Energy Board (OEB) facilitates competition in the sale of gas to users, informs consumers and protects their interests with respect to prices and the reliability and quality of gas service, and ensures the financial viability of the gas industry for the transmission, distribution and storage of gas. Gas distribution companies seek OEB approval to set their rates however, Kitchener Utilities is exempted from section 36 of the act related to rate setting mechanisms. All other regulations of the Act about competition, marketing, customer rights, and licensing apply to Kitchener Utilities.

4.4 Customer Values and Community Levels of Service

The LOS discussed in this AM Plan are focused on measures developed to support achievement of the City's higher level strategic priorities and key areas of investment.

This AM Plan summarizes the performance of the measures based on the most current data available. The City has determined targets and proposed service levels (as per O.Reg.588/17

requirements for Proposed LOS) and has aligned these service levels with information in other planning documents.

As discussed in Section 4.0, service levels are defined in three ways: community levels of service, customer levels of service and technical levels of service. Community LOS are qualitative statements categorized by service values and attributes. They can be identified as community expectations on certain services as well as how the more technical work activities are impacting customer experiences. The Community LOS performance measures highlight data that has direct impact on a citizen. Service area specific Community LOS can be found in the service area summaries in the Appendix

Service values and attributes indicate what aspects of the service is important to the customer. A description of the service values and their alignment to customer and community LOS is provided in

Table 4.3.

Table 4.3 – Service Values and Community LOS

Service Value	Service Attribute	Customer Satisfaction Measure	Community LOS (Customer Satisfaction Measure)
Capacity & Use	Capacity/Use	Is the service over or under used? Do we need more or less of these assets?	Ensure adequate infrastructure to meet growing population and community needs.
	Available	The service can be used/reached at convenient times.	
	Scope	The service is broad enough that it serves the entire population.	
Function	Function	Services meet customer needs while limiting health, safety, security, natural and heritage impacts.	Provide accessible infrastructure for inclusion and meeting diverse resident needs.
	Safety	The service is provided in a manner that protects users from harm.	
	Resilience	Considers future impacts such as climate change that may put stress on the system.	
Quality & Reliability	Quality	The standard to which the service is provided.	Provide infrastructure in acceptable condition and cleanliness by following and providing proper maintenance standards and inspections.

Service Value	Service Attribute	Customer Satisfaction Measure	Community LOS (Customer Satisfaction Measure)
	Reliable	Consistently good quality or performance - works when service users expect it to work.	Maintain infrastructure proactively to minimize unexpected failures.
Financial Sustainability	Affordable	How much does the service cost? Is it fair and is the service provided worth this cost?	Provide infrastructure management services in an efficient and cost-effective manner.
	Efficient	Service is provided with maximum productivity and minimal wasted effort.	

A summary of the LOS framework for each service area is provided in the service summaries included in the Appendix.

4.5 Technical Levels of Service

Operational or technical measures of performance are used to demonstrate delivery of customer service values (i.e., the achievement of Customer LOS). These technical measures relate to the activities and allocation of resources to best achieve the desired customer outcomes and demonstrate effective performance.

Technical service measures are linked to the activities and annual budgets covering:

Acquisition The activities to provide a new service that did not exist previously, or an expansion of an existing service.

Upgrade The activities to provide a higher level of service than previously provided.

Operation The regular activities to provide services.

Maintenance The activities necessary to retain an asset as near as practicable to an appropriate service condition. Maintenance activities enable an asset to provide service for its planned life.

Renewal The activities that return the service capability of an asset up to that which it had originally provided.

In most cases, Technical LOS have been measured and reported on over the past three years. By comparing the LOS for the current year against that of previous years, a trend can be identified and qualified. It is important to monitor the service levels regularly as circumstances can and do change. Current performance is based on data availability, existing resource provision, and work efficiencies. It is acknowledged changing circumstances such as technology and customer priorities and lifestyle trends will change over time.

In order to provide a comprehensive understanding of service expectations, the levels of service for each service area are outlined in the individual service area summaries located in the Appendix.

5.0 FUTURE DEMAND

Demand drivers are circumstances that may impact future service delivery and use of assets. These drivers can include things such as population change, climate change, regulations, changes in demographics, seasonal factors, vehicle ownership rates, consumer preferences and expectations, technological changes, economic factors, environmental considerations, etc. The City is in the process of updating their Official Plan to outline additional specifics on how the City plans to grow to 2051.

Based on the most recent Official Plan (2014), the City was projected to have a population of 319,500 and an employment of 132,500 by 2031. Statistics Canada's estimate of the 2024 population of the City was 320,360[2]. This exceeds the forecasted population seven years earlier than predicted. The new official plan (that is currently under development) is estimating, at a high level, that the City's population will grow to approximately 500,000 by 2051. With this significant and rapid growth, demand for City services has increased and will continue to increase as the City looks to grow to 500,000.

Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets, and providing new assets to meet demand and demand management. Demand management practices can include non-infrastructure solutions, insuring against risks and managing failures. Demand management is a key focus for the Kitchener Utilities as they look to manage their portfolio of assets through the energy transition.

This AM Plan incorporates the known growth assets to help meet this expected new demand for services, but the City is currently working on various forward-looking plans to provide more accurate estimates of the long-term infrastructure and service delivery needs that will be required to serve a population of 500,000.

[2] See Statistics Canada reference here

6.0 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

The lifecycle management plan details how the City plans to manage and operate the assets at the agreed levels of service (outlined in the service area summaries in the Appendix) while managing life cycle costs.

6.1 Acquisition Plan

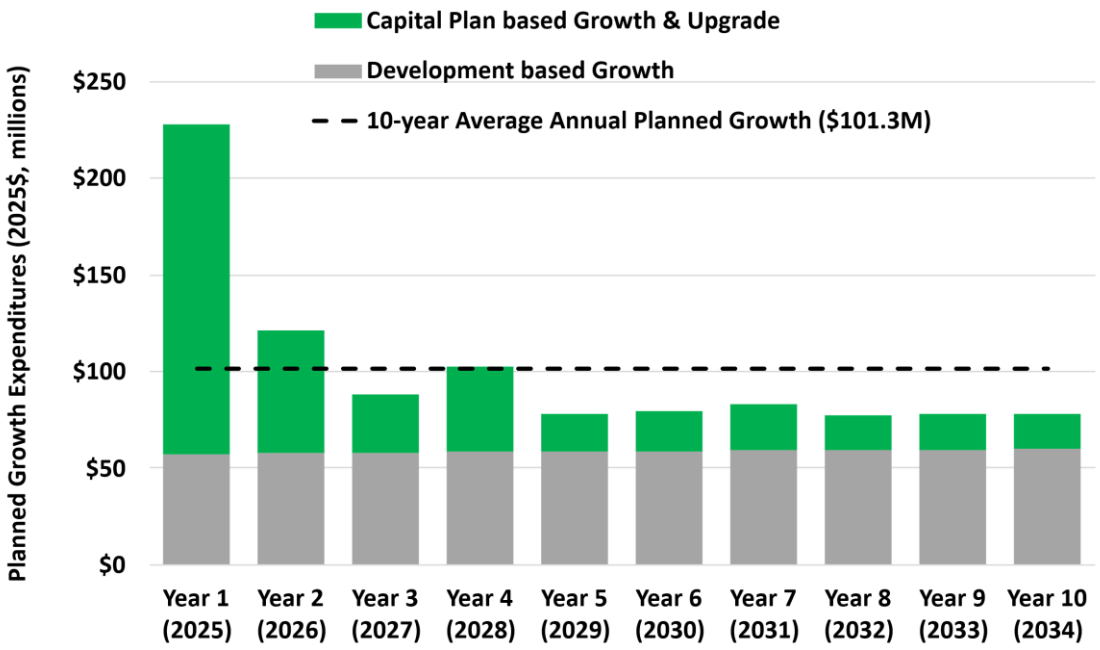
Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social, or environmental needs. Assets may also be donated to the City though various means including subdivision development and expansion of existing services or the inclusion of new services.

Proposed acquisition of new assets, and upgrade of existing assets, are identified from various sources such as community requests, proposals identified by strategic plans or master plans, and partnerships with others. Potential upgrades and new works should be reviewed to verify that they are essential to the City's needs and fits long range planning. Proposed upgrades and new work analysis should also include the development of a preliminary renewal estimate to ensure that the services are sustainable over the longer term. Verified proposals by City leadership can then be ranked by priority and available funds and scheduled in future works programs. Currently, no ranking criteria has been established for the acquisition of City assets, however this will be developed in a future revision of this AM Plan through the development of a dedicated asset management acquisition policy. Where applicable, the City assumes that there will be at least a 0.5% growth in the asset portfolio annually to account for assets assumed through development. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

Forecast acquisition asset costs for all City assets are summarized in

Figure 6-1. The assumed 0.5% growth in assets is indicated by the grey bars and the specified growth in the capital plan is shown by the green bars. The City is working to improve the accuracy of this forecast as it looks to manage growth demand in the future. The forecast acquisition costs for each service area can be found in the appendix.

Figure 6-1 – Yearly Acquisition Summary



When the City introduces new assets, there must be a recognition for the need for future operational funding for service, maintenance, and renewal costs. Future depreciation must be accounted for when reviewing long term sustainability, lifecycle, and total cost of ownership.

Expenditure on new assets and services in the capital works program will be accommodated in the long-term financial plan, but only to the extent that there is available funding. The City plans for growth such that there is sufficient community infrastructure and facilities to meet the current and projected needs of the population. Acquiring these new assets will commit the funding of ongoing operations, maintenance, and renewal costs for the period that the service provided from the assets is required.

6.2 Disposal Plan

Disposal includes any activity associated with the permanent disposal of a decommissioned asset including sale, demolition or relocation. Currently, the City has plans to decommission and demolish the Moore St. SPS within the next 1-2 years.

Currently, no process has been established for the disposal of City assets, however this will be developed in a future revision of this AM Plan through the development of a dedicated asset management disposal policy.

6.3 Operations and Maintenance Plan

Operations include regular activities to provide services and may not have a direct impact to the overall health of the asset. Examples of typical operational activities include cleaning, asset inspection and supply of power.

Asset condition is ideally determined from asset inspections, either from internal staff or from external parties. When possible, asset inspection programs should be developed and regularly employed to collect asset data.

Maintenance includes all actions necessary for retaining an asset in an appropriate condition including regular ongoing day-to-day work necessary to keep assets operating. Regular maintenance activities allow asset degradation to follow an expected lifecycle rather than accelerating towards an earlier disposal or replacement. Examples of typical maintenance activities include scheduled asset care and minor repairs.

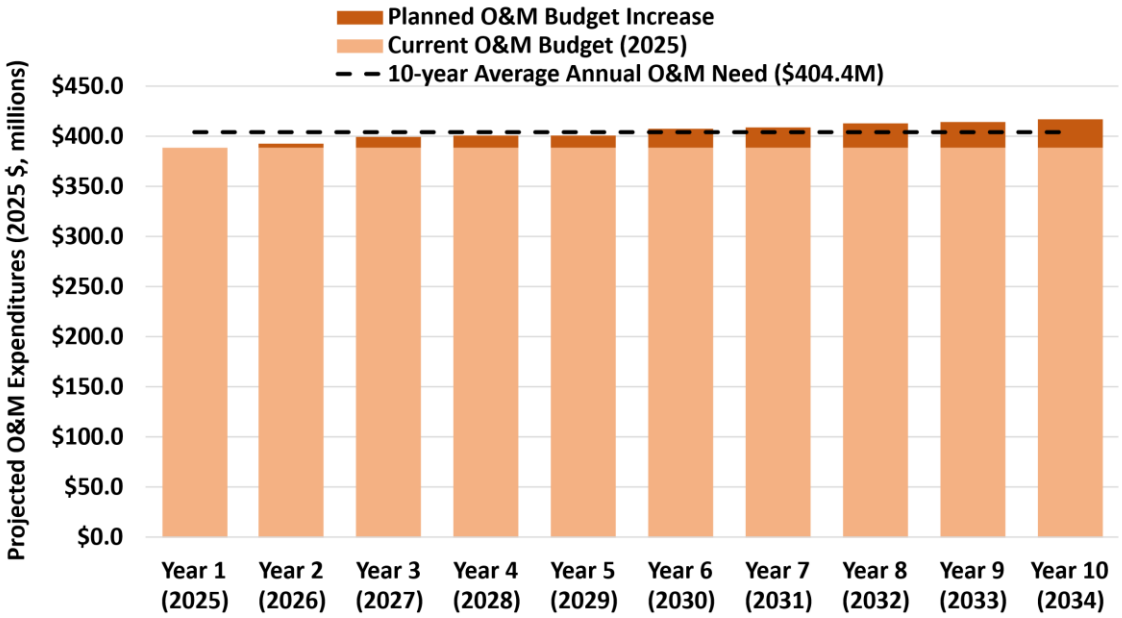
All maintenance activities are either planned or reactive in nature. When possible, the majority of maintenance activities should be planned and executed through preventative maintenance programs.

Where maintenance budget allocations are such that they will result in a lesser level of service, the service consequences and service risks have been identified and are highlighted in this AM Plan. Assessment and priority of reactive maintenance is undertaken by staff using experience and judgement.

The forecasted operations and maintenance costs are expected to vary in relation to the total value of the asset inventory. If additional assets are acquired, the future operations and maintenance costs are forecast to increase. If assets are disposed of, the forecast operations and maintenance costs are expected to decrease.

Figure 6-2 shows the forecast operations and maintenance costs at the corporate level. The values in the figure do not consider inflation but only consider the increase expenses due to growth in the asset portfolio. The forecast operations and maintenance costs for each service area can be found in the Appendix.

Figure 6-2: Operations and Maintenance Summary



As shown in the figure, the O&M budget is planned to increase by approximately $29.0 million per year 2034 to keep pace with asset growth and aging infrastructure. If O&M funding does not increase accordingly, there is a risk that deferred maintenance will accelerate asset deterioration which can lead to higher renewal costs in the future. This highlights the importance of sustained O&M investment to maintain service levels and extend asset life.

6.4 Renewal Plan

Renewal is typically carried out through major capital work which does not significantly alter the original service provided by the asset. This work typically restores, rehabilitates, replaces or renews an existing asset to its original service potential. Work over and above restoring an asset to original service potential is considered to be an acquisition resulting in additional future operations and maintenance costs.

Assets requiring renewal are identified from either:

- Using the Asset Register data to project the renewal costs (current replacement cost) and renewal timing, or
- Using an alternative approach to estimate the timing and cost of forecast renewal work (i.e. condition modelling system, staff judgement, average network renewals, or other).

The useful lives of assets used to develop projected asset renewal forecasts are located in Section 24.1 in the Appendix. The estimates for renewals in this AM Plan were based on the asset register data.

6.4.1 Renewal Ranking Criteria

Asset renewals are typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the expected service it was constructed to, or
- To ensure the infrastructure is of sufficient quality to meet the service requirements.

Asset renewals are typically prioritized by identifying assets or asset groups that:

- Have a high consequence of failure,
- Have a condition score that is less than the threshold to provide an expected level of service,
- Have high use and subsequent impact on users would be significant,
- Have higher than expected operational or maintenance costs, and
- Have the potential to reduce life cycle costs by replacing it with a modern equivalent asset that would provide the equivalent service.

A detailed ranking/rating of renewal projects within each service area was not within the scope of this AM Plan and is recommended to be conducted for all service areas in the future.

The ranking criteria used to determine priority of identified renewal proposals is detailed in Table 6.1.

Table 6.1 – Renewal Priority Ranking Criteria

Criteria	Weighting
Consequence of Failure • Environmental Impact • Health & Safety Impact • Service Delivery Impact • Financial Impact	50%
Probability of Failure • Physical Condition Rating • Performance Rating	50%
Total	**100%**

6.4.2 Summary of Forecasted Renewal Costs

Renewal costs are projected to increase over time if the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized. The forecast of renewal costs is based on the available inventory data and feedback provided by the City.

Generally, good asset management practice allows for a small portion of the asset portfolio to be replace when failed and not on a set schedule. This would typically occur for assets that are easily replaced, of lower value, and are readily available. These assets generally

make up a small portion of the service area asset portfolios as each area has a small portion of their assets that they run to failure (indicating they would be in Very Poor condition).

This analysis incorporates two separate renewal forecasting scenarios; the Planned Budget / Expected Performance renewal forecast scenario (which defers the replacement of certain assets in order to align with the planned renewal budget in the 2025 – 2034 Capital Plan) and the Proposed LOS renewal scenario (which aligns the replacement of assets with the lifecycle activities the City would like to undertake to achieve their proposed service levels).

The intention of the renewal costs figures is to show the average annual renewal need/budget over the 10-year forecasted period. This is used to assess the financial sustainability of the current budget and to understand the associated condition impacts.

Table 6.2 shows the Annual Average Renewal Needs for the Proposed LOS. The associated appendix describes the specific actions that each service area is taking to manage the indicated funding gap.

Table 6.2 – Renewal Needs Forecast

Service Area	Annual Average Renewal Needs for Proposed LOS ($M/year)
Fleet	$8.3
Cemeteries	$0.07
Golf	$0.3
Forestry	$0.5
Parking	$0.02
Parks, Open Spaces & Trails	$6.9
Transportation	$0.4
Water Utility	$18.4
Sanitary Utility	$25.7
Stormwater	$8.6
Bridges & Culverts	$0.7
Roads & Sidewalks	$22.6
Gas Utility	$14.4
Facilities	$36.7
TOTAL	**$143.8**

6.5 Non-Infrastructure Solutions

Non-Infrastructure solutions are infrastructure related costs that may not be associated with any one specific asset in the City's asset registry but are important in the planning and execution of the previous asset lifecycle categories. Some of the non-infrastructure solutions

can include the consultant costs in the creation of a master plan, working with partner organizations, customer surveys, demand management, restocking of maintenance vehicles, and inventory updates. The costs for the development of plans and strategies are incorporated into the operations and maintenance cost summary for each service area.

7.0 RISK MANAGEMENT

The City of Kitchener has Enterprise Risk Management strategy which outlines the process to identify, assess, and mitigate risks to ensure that corporate objectives are achieved. Risk management is embedded in many City processes including strategic planning, business planning, and project approval procedures. In addition, the City's risk management approach assists in allocation of resources to the areas of highest risk across the City's portfolio.

7.1 Critical Assets

Critical assets provide life safety and public health and well-being to the community based on Provincial standards. Assets found in this category may be included for having a high consequence of failure (COF) causing significant loss or reduction of service directly impacting services to the community. Critical assets have been identified as having a consequence of failure rating of 4. The COF ratings for each individual service area can be found in Appendix Section 24.2

By identifying critical assets and failure modes the City can ensure that investigative activities, condition inspection programs, maintenance, and capital expenditure plans are targeted to minimize risks.

7.2 Risk Assessment

The City has adopted an impact criteria and risk category matrix that quantifies the impact and likelihood criteria and assigns a numerical value to the resulting score. A majority of City risk registers use this terminology to support consistency across the City's assets.

For the purpose of this plan, risk was assessed at a high level. A granular risk assessment within in each service area was not within the scope of this AM Plan and is recommended to be conducted for all service areas in the future.

The risk register is an assessment process that identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, and evaluation of the risk. The City will develop a risk treatment plan for non-acceptable risks as part of future improvement.

Risk is evaluated using the following formula:

$$Risk\ Score = Probability\ of\ Failure * Consequence\ of\ Failure$$

The consequence of failure is determined based on the highest rating across the consequence categories in the following matrix.

Table 7.1 – Consequence of Failure Rating Scale

COF Categories	C1 Minor	C2 Moderate	C3 Major	C4 Catastrophic
Service Delivery	-Some business unit goals not met (75 - 90% achieved) -Project scope: scope change is barely noticeable - Project deadlines overrun >5%<25%.	-Underachievement of business unit goals (50-75% achieved) -Unable to perform non-essential services -Disclosure of non-confidential but embarrassing information -Project scope: moderate changes required -Project deadlines overrun >25%<50%.	-Underachievement of business unit goals (<50% achieved) -Unable to perform non-essential service -Disclosure of non-confidential but embarrassing information -Project scope: major changes required -Project deadlines overrun >50% <75%.	-Unable to perform one or more essential services and no alternatives exist. -Unrecoverable loss of information from critical systems. -Unrecoverable facility loss. -External exposure of critical confidential information -Project end product is essentially useless -Project cancellation -Project deadlines overrun > 75%.
Employees	-Minor reportable employee injury -Short term additional effort required by existing staff to fix the situation.	-Employee injury, non-life-threatening -Significant increase in number of errors (>10%) -Increase in the number of union grievances (>5%) -Short term extra resources required to fix the situation	-Employee injury, critical -No improvement in employee satisfaction -Increase in the number union grievances (>10%) -Short term additional resources required to fix the situation.	-Death in the workplace -Significant loss of employee knowledge -External exposure of confidential employee information -Strike -No amount of existing or additional resources can address the event.
Public	-Minor decrease in social programs (<5%)	-Non-life-threatening injury to members of the public because of City action/ inaction -Loss of privacy, safety or quiet in neighborhood -Moderate decrease in social programs (<20%)	-Critical injury to member of the public because of City action/ inaction -Major decrease in social programs (<50%).	-Death of member of the public due to City actions or inactions -Cancellation of a program that supports equitable access, social justice, quality of life and no alternatives are available
Physical Environment	-Potential to cause non- lasting damage to environmental assets	-Potential to cause short term repairable environmental damage impacting a small area	-Potential to cause short term repairable environmental damage impacting a large area	-Potential to cause long term environmental damage with lasting consequences. -Consequences of not including environmental considerations has potential to create long environmental damage.

COF Categories	C1	C2	C3	C4
	Minor	Moderate	Major	Catastrophic
Reputation	-Small amount of negative medial coverage or complaints to the City -1 Negative media story from 1 - 2 local media outlets.	-Complaints elevated to Director / GM level -Moderate media coverage or editorial comment -3 - 4 negative media stories and/or editorials spanning multiple days, from 2+ local media outlets	-Complaints elevated to CAO/City Council level -Public outcry for removal of employee -Significant negative media coverage or editorial comment -5+ negative media stories and / or editorials spanning multiple days, from local media -Negative media coverage on provincial or national stage	-Public/media outcry for change in administration or Council. -Public or senior officials criminally charged or convicted -Fraud > $500,000 -Integrity breach resulting in decreased trust in City Council or Administration Recurring negative media coverage on national and/or international stage
Financial	-Loss of replaceable asset -Project cost >5<10% overrun	-Some decreased usefulness of infrastructure -Fines <$100K -Reduced revenues for some businesses -Some reduced economic development -Project cost >10<50% overrun	-Significantly decreased usefulness of infrastructure -Fines $100K - $1M -Inefficient processes -Reduced revenue for many businesses -Significantly reduced economic development -Project cost >50<100% overrun	-Uninsured loss > $10M -Insured loss > $10M -Fines or loss > $1M -File for bankruptcy -Failure to maintain financial capacity to support current demands. -Decrease in Kitchener economic condition greater than a 20% decrease in assessment base -Project cost > 100% overrun
Regulatory	-Isolated non-compliance to policy or rules by few employees	-1st warning from regulatory bodies -Internal compliance reporting deficiencies in one division	-2nd warning from regulatory bodies -Internal compliance reporting deficiencies in multiple divisions or depts.	-Legal judgment against the City -Loss of license to operate (CVOR, drinking water, gas) -Imprisonment of staff -Other sanctions imposed by regulatory bodies

The probability of failure is determined either by the physical condition or the performance ratings outlined in Table 7.2 for a specific asset:

Table 7.2 – Probability of Failure Rating Scale

POF Score	Condition Rating	Probability of Failure	Description
1	Very Good	Rare	No material likelihood; not considered further in risk assessment.
2	Good	Unlikely	Occurs infrequently in municipal environments but is not impossible.
3	Fair	Somewhat Likely	Occurs periodically in municipal environments and could happen at the City of Kitchener.
4	Poor	Likely	Occurs frequently in municipal environments and has occurred or is likely to occur at the City of Kitchener.
5	Very Poor	Almost Certain	Extremely likely to occur at the City of Kitchener.

The risk map shown in Figure 7-1 combines the consequence of failure ratings with the probability of failure ratings for all infrastructure represented within this AM Plan. Of note is that unknown condition assets are not included in the risk exposure map as there was no way to accurately quantify their probability of failure.

Figure 7-1 – Risk Exposure Map for All City Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$2,794.5	$2,355.3	$1,228.2	$494.3	$59.0
Major	$642.1	$1,245.9	$1,005.3	$509.6	$121.2
Moderate	$1,329.0	$890.9	$886.0	$472.2	$148.8
Minor	$48.7	$47.9	$20.5	$20.8	$27.4
	Probability of Failure				

Risk Exposure	$	%
High	$2,561.1	17.9%
Moderate	$5,964.6	41.6%
Low	$5,821.7	40.6%
Total	$14,347.4	100.0%

Critical risks are those assessed with a risk rating of High. The City has mitigation plan for all High-risk assets which are outlined in the service area summaries in the Appendix. These

mitigation plans primarily involved priority renewal work for these assets which reduces the risk to the City.

7.3 Infrastructure Resilience Approach

The resilience of the City's infrastructure is vital to ensure services are provided to residents and customers. To adapt to changing conditions the City's requires an understanding of its capacity to 'withstand a given level of stress or demand', and to respond to possible disruptions to ensure continuity of service.

Resilience recovery planning, financial capacity, climate change risk assessment and crisis leadership are key components to consistency.

The City does not currently measure resilience in service delivery. This will be included in future iterations of the AM Plan.

7.4 Service and Risk Trade-Offs

The City's decisions related to balancing costs, resources, service levels, and risk aim to maximize benefits from available resources.

Potential Gaps

There are some operations and maintenance activities and capital projects that are potentially unable to be undertaken within the next 10 years. These may include:

- Planned maintenance (preventive maintenance programs)
- Deferred renewal work

Service Trade-Off

If there is forecasted work (operations, maintenance, renewal, acquisition, or disposal) that cannot be undertaken due to available resources, then this will result in service consequences for users. These service consequences can include:

- If some of the planned maintenance is not completed, this typically results in more unplanned service disruptions.
- Deferred capital renewal work may result in lower asset condition that does not meet user expectations and potential asset closures.

Risk Trade-Off

The operations and maintenance activities and capital projects that cannot be undertaken may sustain or create risk consequences. These risk consequences include:

- An increase in unplanned repairs and associated service disruptions.
- Higher lifecycle management costs, deteriorating assets, and potential asset closures.
- Deteriorating assets may become unsafe or have safety concerns and expose the City to potential liabilities.

These actions and expenditures are considered and included in the forecast costs as outlined in Section 6.0 and in each service area summary in the Appendix.

8.0 FINANCIAL SUMMARY

This AM Plan identifies the forecast operations, maintenance, and renewal costs required to provide an agreed level of service to the community over a 10-year period. This provides input into 10 year financial and funding plans aimed at providing the required services in a sustainable manner.

This AM Plan focuses on identifying the state of good repair or renewal need for infrastructure investments to meet proposed service levels and identifying any funding gaps associated with these service levels. The funding gap is the shortfall of the planned investment in the 10-Year Capital Plan compared to the forecasted needs to meet proposed service levels. Funding gaps for other lifecycle activities such as growth and service improvements are estimated where data is currently available but have generally not yet been quantified and will be informed by future development of Master Plans or Strategic Plans.

8.1 Funding Sources

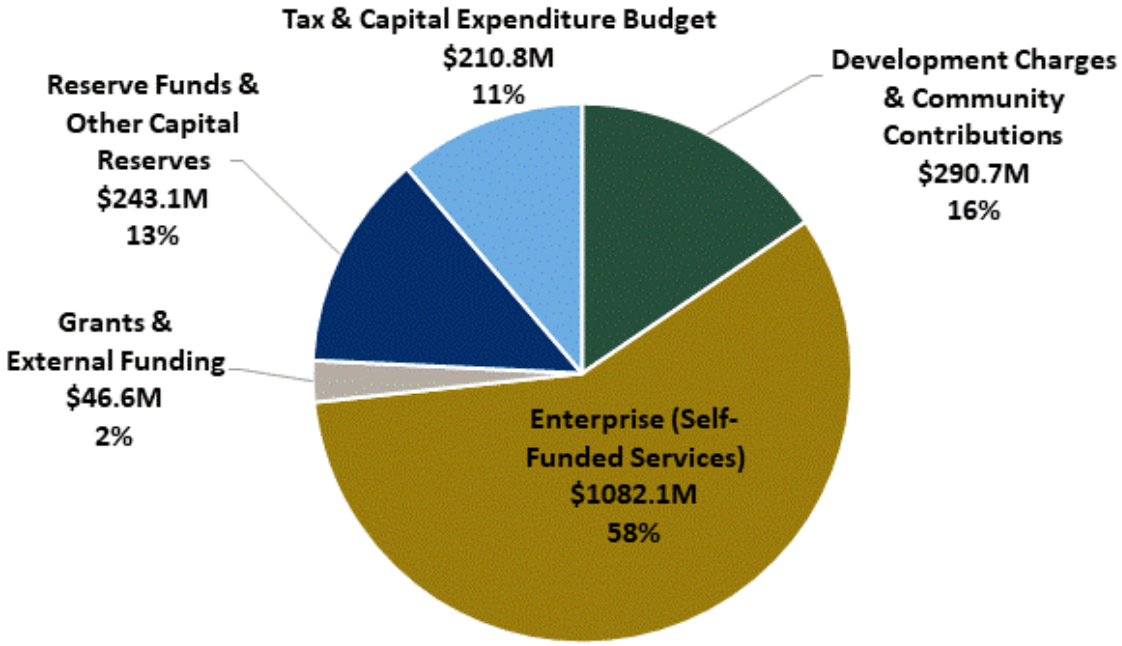
Through the City's budgeting process, capital project and operating activity expenditure information is gathered from each service area. These financial plans include several key sources of funding as outlined in Table 8.1. Figure 8-1 shows the funding sources and the amounts allocated to each source from 2025-2034.

Table 8.1 – Summary of Funding Sources

Funding Source	Description
Development Charges & Community Contributions	This funding is collected from developers to help fund infrastructure required to support new growth. These funds are used to pay for capital costs associated with growth-related projects, such as water and wastewater expansions, roads, and community facilities. This funding source ensures that growth pays for growth and helps reduce the financial burden on existing taxpayers.
Enterprise (Self-Funded Services)	This funding applies to services that operate as self-sustaining business units, such as water, wastewater, stormwater, and gas utilities. These services are funded through user fees and charges, rather than property taxes, ensuring that costs are recovered directly from those who use the service. The revenues generated are reinvested into operations, maintenance, and capital renewal of the associated infrastructure.
Grants & External Funding	This funding includes financial contributions from other levels of government (e.g., federal or provincial) or agencies. These are typically provided through infrastructure programs, stimulus packages, or environmental initiatives. While not guaranteed annually, grants can significantly offset capital costs and are often tied to specific projects or outcomes.

Funding Source	Description
Reserve Funds & Other Capital Reserves	These funds are designated savings set aside by the City to finance future capital needs or to address unexpected expenditures. These reserves support long-term financial sustainability by smoothing out year-to-year budget fluctuations and providing funding for asset renewal, replacement, or major repairs. They may be specific to asset types or more broadly allocated to general capital needs.
Tax & Capital Expenditure Budget	This funding includes municipal property tax revenues and serves as a primary source for capital investment in non-growth-related infrastructure. This funding supports the renewal and upgrade of all assets. The budget is approved annually and aligns with strategic priorities, lifecycle needs, and available fiscal capacity.

Figure 8-1 – Funding Sources (2025-2034)



8.2 Affordability of Proposed Service Levels

The Financial Strategy section compares the planned capital funding available in the City's 10-year Capital Plan against the forecasted capital needs to determine if there is a funding gap to meet proposed service levels.

8.2.1 Growth & Upgrade

As discussed in Section 6.1, the growth and upgrade need for City assets is estimated at an average of $101.3 million per year over the next 10 years which includes a 0.5% year-over-year growth and upgrade of assets to account for development. Currently, the only known funding gap for upgrades is $2M/year for achieving the GHG emissions reduction service

levels for facilities but this is a preliminary gap and it will be confirmed in the future as additional mechanical/GHG studies are completed. There is no current quantifiable funding gap for growth and upgrade of the other service areas, however on-going development of Master Plan updates will inform future growth-related service levels and recommendations.

8.2.2 Operations & Maintenance

The operating budget focused on asset-related operations and maintenance is $404.4 million per year from 2025-2034. The estimated increases account for growth in the asset portfolio to maintain service levels over the next 10 years and includes a 0.5% year-over-year growth to account for development.

Operating budget pressures were noted primarily for Roads & Sidewalks and Sanitary Utility Assets:

- Roads & Sidewalks: If renewal projects are deferred, leading to deterioration of the asset portfolio over the 10-year period covered in this AM Plan, there will be a need to increase the spending on O&M to account for the increased reactive maintenance to manage the deteriorated asset condition (i.e., fixing potholes, repairing cracks, etc.).
- Sanitary Utility: While there is a specific budgetary item related to spills, there is difficulty tracing the spill back to the responsible party and recovering costs associated with remediating the spill.

8.2.3 Renewal

As discussed in Section 6.4, the renewal need for City assets is estimated at an average of $143.8 million per year over the next 10 years and total funding gap of $30.6 million per year. This renewal need is forecasted to meet proposed service levels selected by the City considering affordability and risk. For most service areas, the proposed service level at least maintains the current condition. For some assets, an improved condition is proposed where the service level is based on recommendations from formal engineering reports or inspections such as OSIM inspections for bridges or BCAs for facilities.

The funding gaps represent needs that exceed the overall funding available in the 10-year Capital Plan for infrastructure renewal. A significant investment gap is estimated for Gas Utility and Facilities assets. A summary of renewal needs and funding gaps is shown in Table 8.2.

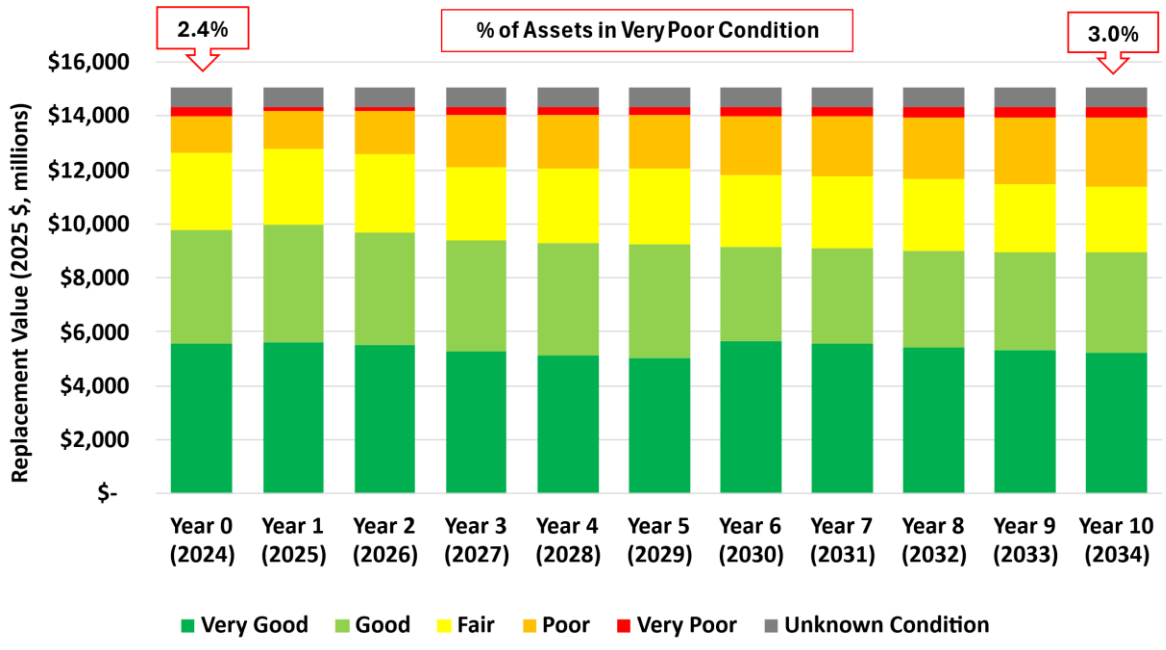
Table 8.2 – Renewal Needs Summary

Service Area	Annual Average Renewal Needs for Proposed LOS ($M/year)	Annual Average Planned Budget ($M/year)	Funding Gap ($M/year)
Fleet	$8.3	$8.3	N/A
Cemeteries	$0.07	$0.07	N/A
Golf	$0.3	$0.3	N/A
Forestry	$0.5	$0.5	N/A
Parking	$0.02	$0.02	N/A

Service Area	Annual Average Renewal Needs for Proposed LOS ($M/year)	Annual Average Planned Budget ($M/year)	Funding Gap ($M/year)
Parks, Open Spaces & Trails	$6.9	$6.9	N/A
Transportation	$0.4	$0.4	N/A
Water Utility	$18.4	$18.4	N/A
Sanitary Utility	$25.7	$25.7	N/A
Stormwater	$8.6	$8.6	N/A
Bridges & Culverts	$0.7	$0.7	N/A
Roads & Sidewalks	$22.6	$22.6	N/A
Gas Utility	$14.4	$8.3	$6.1
Facilities	$36.7	$12.3	$24.5
TOTAL	**$143.8**	**$113.2**	**$30.6**

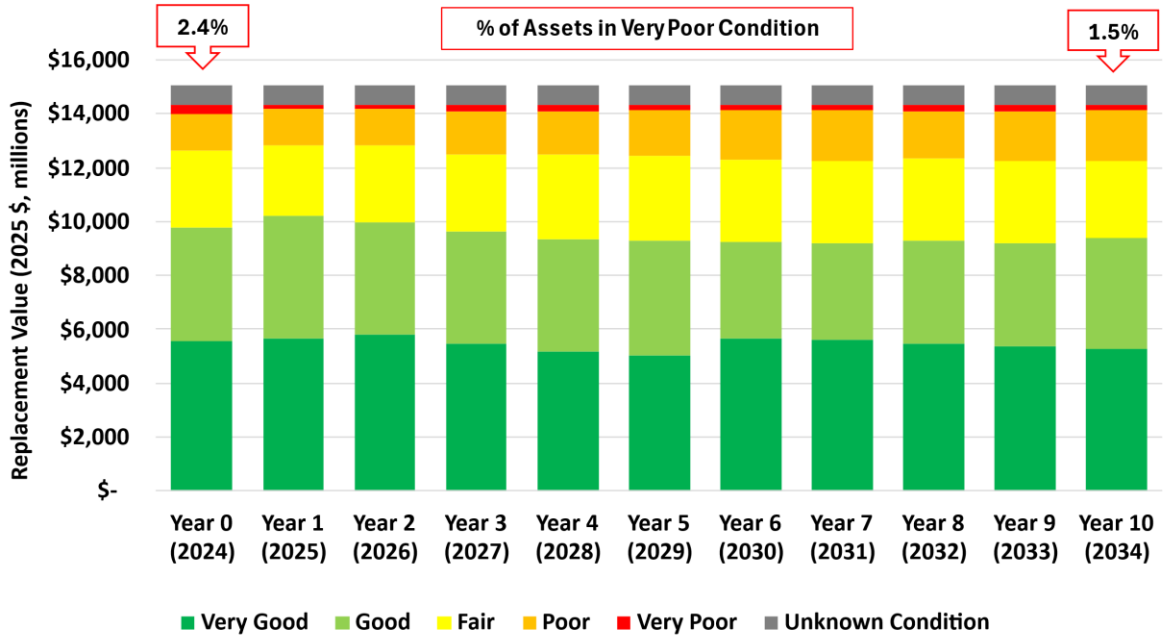
Figure 8-2 illustrates the resulting condition profile for all City assets based on the Planned Budget for each service area. Based on the Planned Budget renewal scenario, the overall asset condition for all City assets is expected to slightly deteriorate over the next 10 years.

Figure 8-2: Planned Budget Condition Profile



Error! Not a valid bookmark self-reference. illustrates the resulting condition profile for all City assets based on the Proposed LOS the City has chosen for each service area. Based on the Proposed LOS renewal funding scenarios chosen by the City, the overall asset condition for all City assets is expected to improve over the next 10 years. This scenario is unlikely to be realized given that there is a $30.6 million / year funding gap to meet the Proposed LOS.

Figure 8-3: Proposed LOS Condition Profile



The forecast condition profiles for each of the service areas listed above are outlined in the service area summaries in the Appendix.

8.3 Managing Risks Associated with Funding Gaps

The City reviews and updates Master Plans to assess what is working well and what may need adjustment, to ensure the plan continues to reflect the needs and priorities of a growing community. The Master Plans help manage risks related to population growth by identifying where growth is occurring and deciding if planned projects are in the right places, or if changes are needed to better serve growing communities.

To manage the risks of the renewal funding gaps, the City will continue to prioritize available funding based on the criticality of projects to prevent disruptions to service delivery. The City also continues to improve coordination and collaboration to improve planning and coordination of capital projects between departments to maximize resources. The City will also continue to identify funding opportunities through federal and provincial programs and explore potential partnerships and corporate sponsorships to raise external funds.

8.4 Limitations of Forecasts and Funding Gaps

The forecasts and funding gap estimates in this AM Plan are based on currently available data and are expressed in 2025 dollars. For assets where construction year and formal condition assessments are not available, the renewal forecast assumes that these assets require a regular average annual reinvestment amount based on their replacement value and estimated service life. Timing of lifecycle activities can therefore be improved by investment in data collection or expanding the condition assessment program, as identified for various service areas. Some forecasts are also based on older condition assessments which should be updated for critical infrastructure to increase the accuracy of the renewal forecast. Data gaps were resolved where possible through consultation with City staff during development of this AM Plan.

9.0 REFERENCES

United Nations, Managing Infrastructure Assets for Sustainable Development

Kitchener Changing for Good, Our Climate Strategy Action Plan

City of Kitchener, Corporate Risk Management (GOV-COR-016), p 2

O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure

City of Kitchener Cycling and Trails Master Plan 2020

City of Kitchener Places & Spaces – Parks Strategic Plan

City of Kitchener Development Charges Study 2022

City of Kitchener Leisure Facilities Master Plan 2019

City of Kitchener Strategic Plan 2023-2026

City of Kitchener Official Plan 2014

City of Kitchener Sanitary Master Plan

City of Kitchener Stormwater Master Plan

TransformWR, 2021

10.0 APPENDIX A – FLEET SERVICES

The Fleet service area is responsible for the procurement, maintenance, and lifecycle management of the City's vehicle and equipment inventory used across all departments to support service delivery.

10.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

A variety of assets support the delivery of the City's Fleet services. The assets managed by Fleet Services and included in this AM Plan are shown in Table 10.1. The largest portion of the asset mix are Dump/Fire Truck assets with a replacement value of $29.8M (approximately 38% of the total replacement value of all Fleet assets).

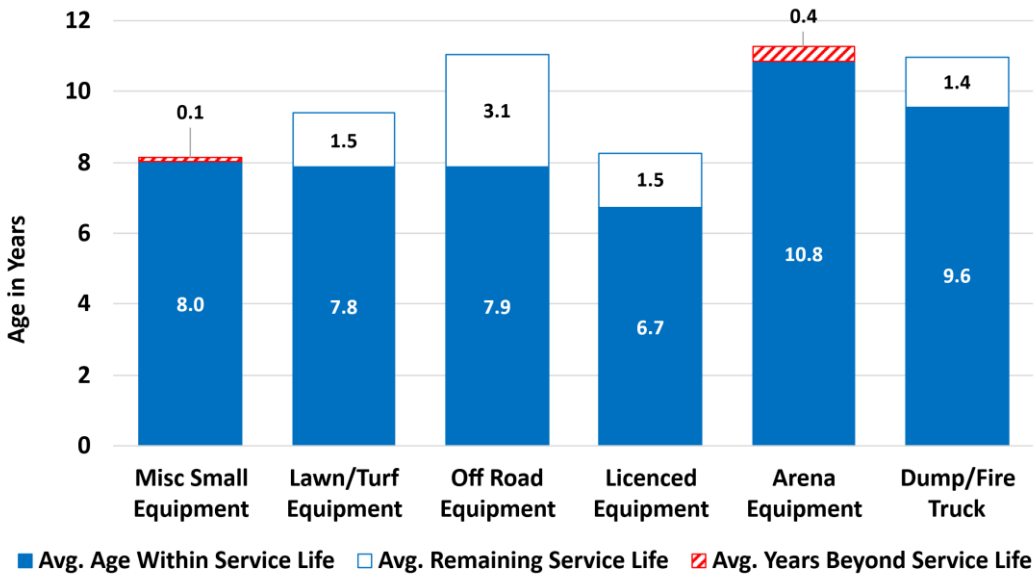
Table 10.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Misc Small Equipment	Augers, Compactors, Pallet Truck, Scissor Lifts, etc.	$1.6M	2.0%
Lawn/Turf Equipment	Aerators, Lawn Mowers, Seeders, Tractors, etc.	$7.5M	9.5%
Off Road Equipment	Backhoes, Excavators, Forklifts, Sweepers, etc.	$18.7M	23.9%
Licensed Equipment	Cars, Pickups, Trailers, Vans, etc.	$19.5M	24.9%
Arena Equipment	Ice Edgers and Ice Resurfacers	$1.4M	1.7%
Dump/Fire Trucks	Aerial Pumpers, Dump Trucks, Fire Rescues, Garbage Packers, etc.	$29.8M	38.0%
TOTAL		**$78.4M**	**100%**

The age profile of the assets included in this AM Plan are shown in

Figure 10-1.

Figure 10-1 – Asset Age Profile



Notes on the above Asset Age Profile:

- Misc Small Equipment and Arena Equipment have an average age that has surpassed their average service life.

Asset condition

The asset condition profile by replacement cost for Fleet services is shown in

Figure 10-2. The asset condition profile by asset category is shown in Figure 10-3. The condition assessment of the City's Fleet assets provides insight into the reliability of its infrastructure. Overall, approximately 62% of the City's Fleet assets have a condition rating of fair or better.

Figure 10-2 – Asset Condition Profile

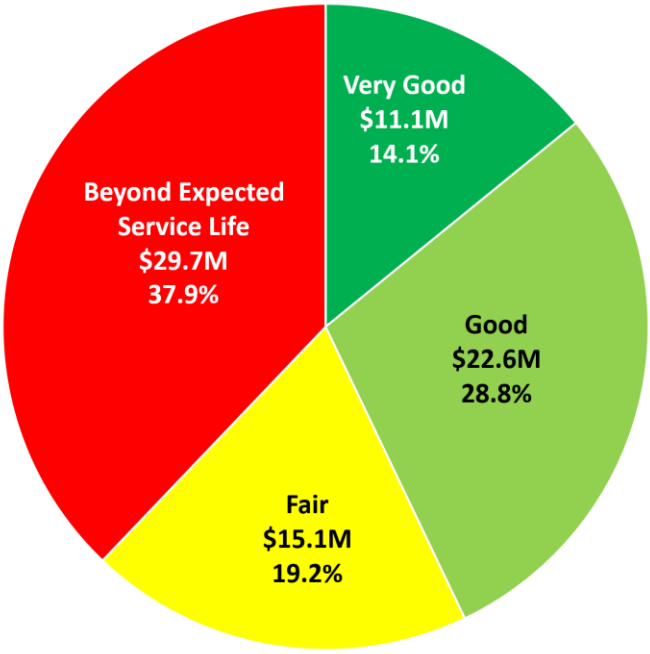
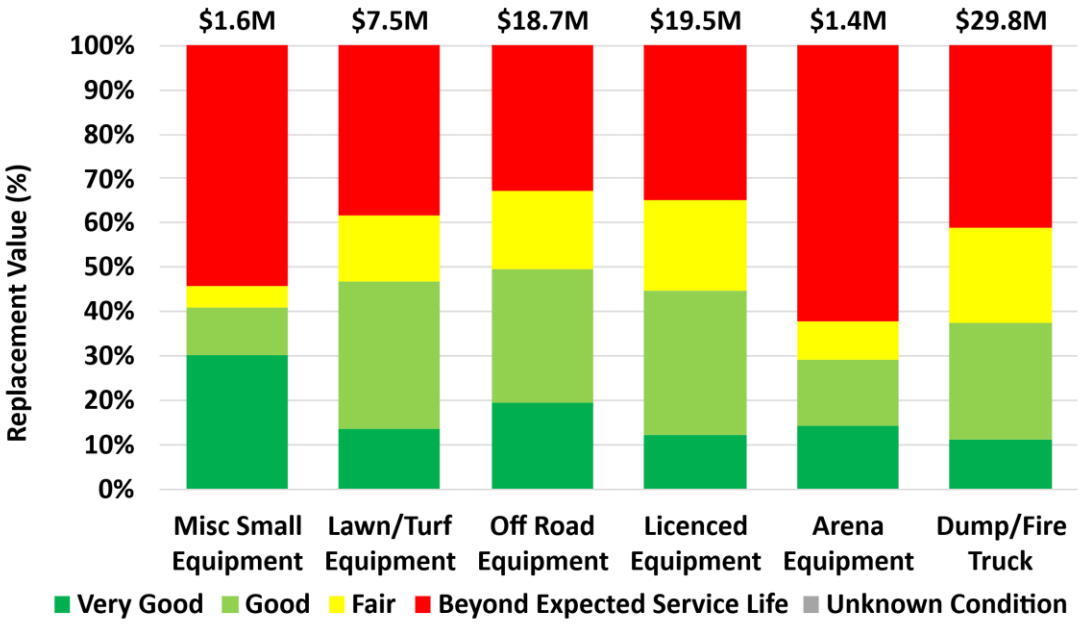


Figure 10-3 – Asset Condition Profile by Asset Category



10.2 LEVELS OF SERVICE

Table 10.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 10.2 – Levels of Service

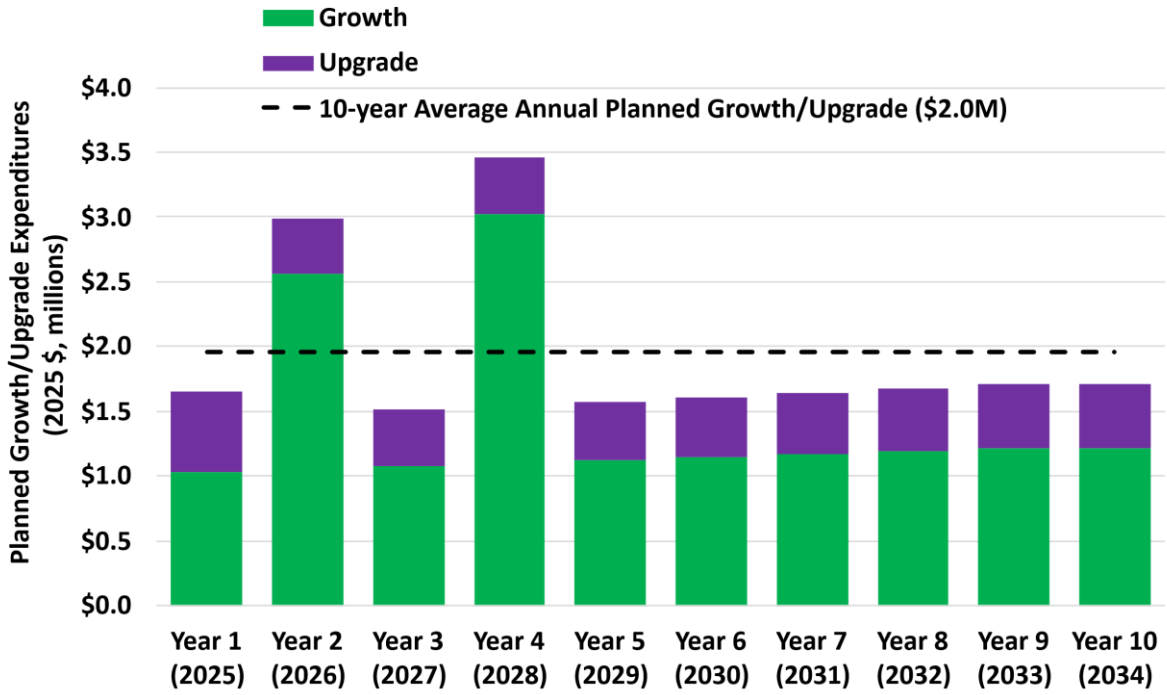
Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Quality & Reliability	The City aims to maintain a safe, reliable, and cost-effective fleet that supports operational and community needs by ensuring timely and compliant maintenance and inspections.	% of Completed Inspections Non-CVOR	52%	37%	40% (excl. Q4)	100%	
		% of Completed Inspections CVOR PM	79%	62%	51% (excl. Q4)	100%	
		% of Completed Inspections CVOR PMCVI	76%	N/A	84% (excl. Q4)	100%	
		Average # of days past due PM (Non-Commercial)	6.6 days	7.8 days	8.2 days (excl. Q4)	100%	
		Average # of days past due PMCVI (Commercial)	N/A	N/A	15.1 days (excl. Q4)	0 days	
		Average vehicle downtime	3.0 days	2.8 days	2.5 days (excl. Q4)	< 2 days	
		% of planned work compared to unplanned work	83.7% planned	76.5% planned	85.3% planned	>85% planned	
Quality & Reliability	The City aims to maintain its Fleet assets in a state of good repair	% of critical fleet assets within Expected Life	Possible future metric				

10.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

10.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social, or environmental needs. Forecast acquisition asset costs are summarized in Figure 10-4. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

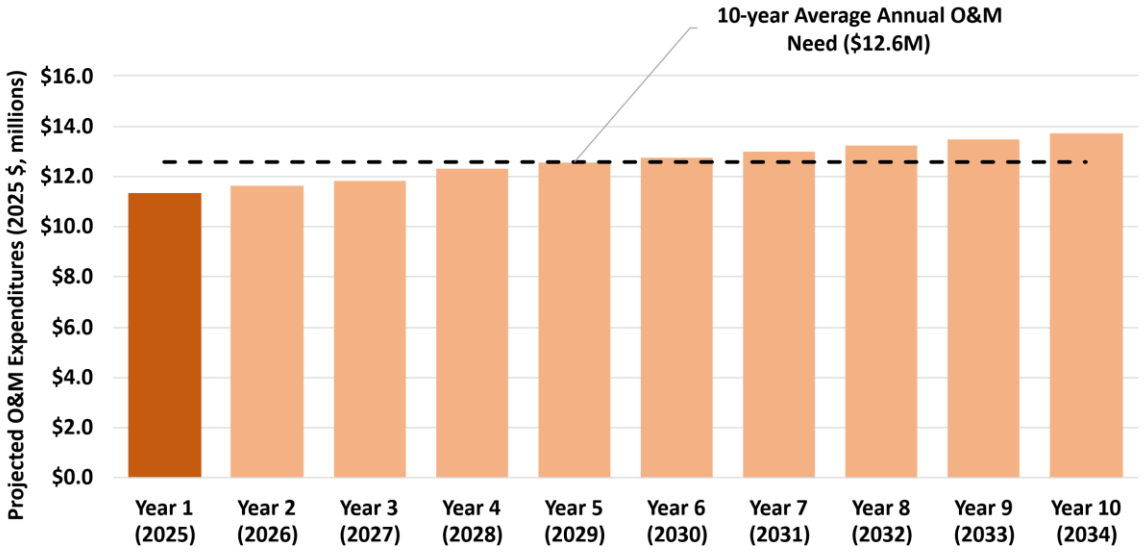
Figure 10-4 – Yearly Acquisition and Upgrade Summary



10.3.2 Summary of Forecast Operations and Maintenance Costs

Figure 10-5 shows the forecast operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased relative to the growth of the overall asset portfolio (See Section 10.3.1 for related growth costs). Regular increases due to inflation were not included.

Figure 10-5 – Operations and Maintenance Summary



10.3.3 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed, and/or budgets are reprioritized.

Figure ***10-6*** shows the forecasted condition of Fleet assets over the next 10 years, based on two scenarios:

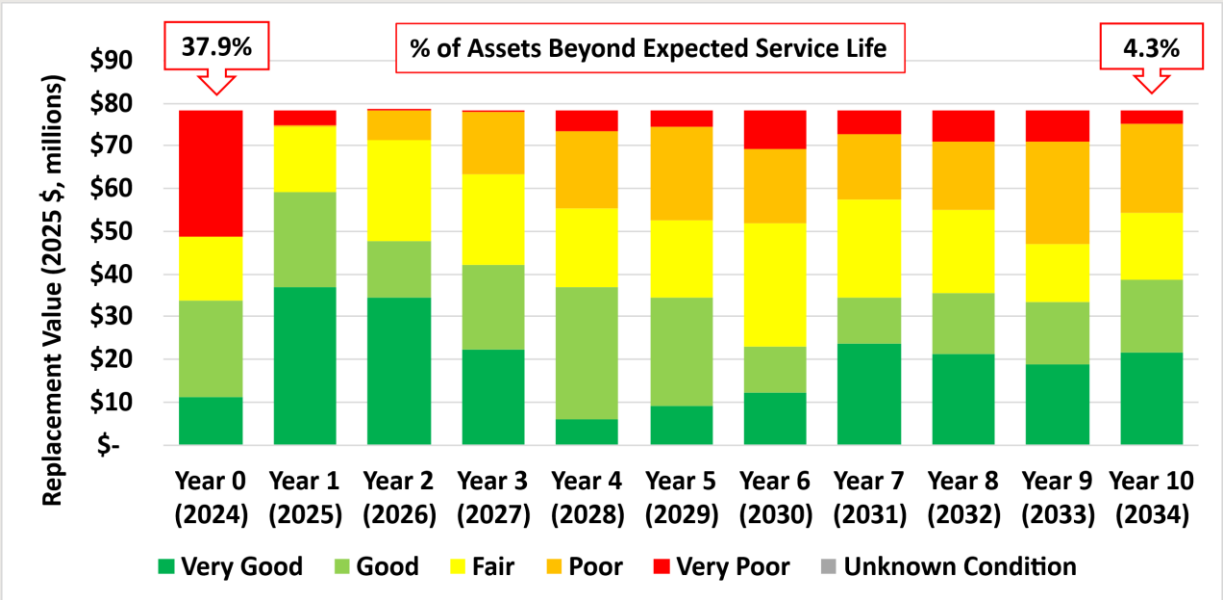
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $8.3 million per year to invest in the renewal of its Fleet assets.

Figure 10-6 – Forecast Renewal Scenarios

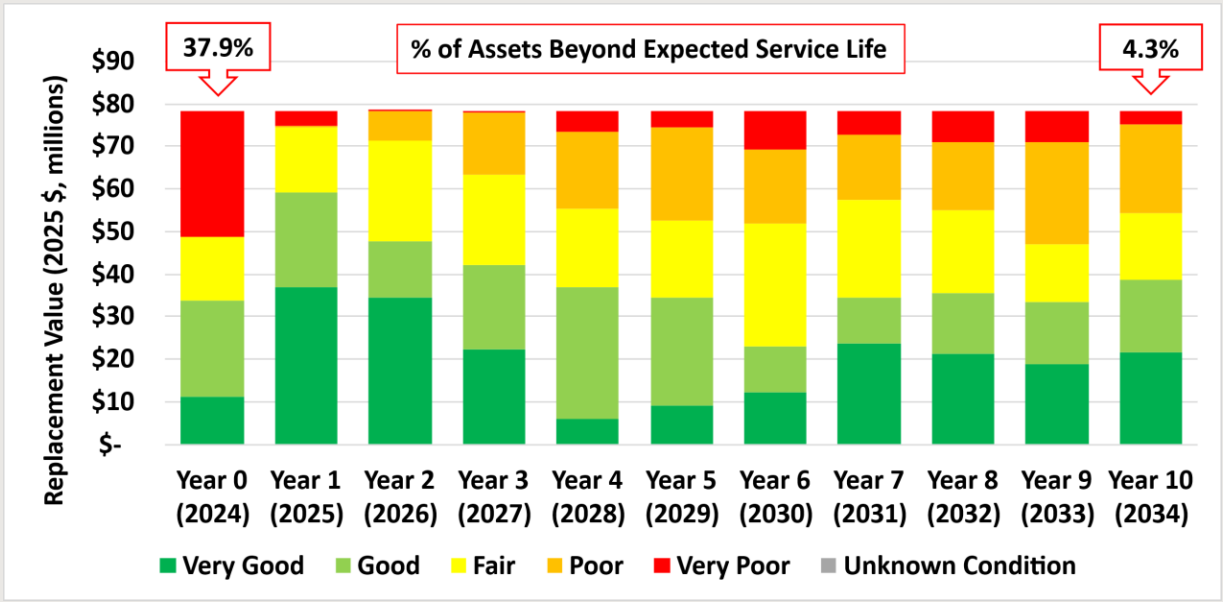
1. Planned Budget / Expected Performance ($8.3 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to improve (% of assets beyond expected service life) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based on its age relative to its estimated service life** (see Table 24.1 in Appendix O) and estimates the planned replacement year based on when the asset has reached end of life. Renewal of certain assets have been deferred in order to align the forecast with the planned budget.



2. Proposed LOS: Planned Budget ($8.3 million per year average renewal investment from 2025 – 2034)

The proposed performance is the same as the expected performance, which improves asset condition over the next 10 years. As a result, there is no funding gap associated with Fleet assets.



Additionally, the lifecycle average annual renewal need for Fleet assets is approximately **$8.7 million per year.** This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** The City's proposed renewal investment of $8.3 million per year in the renewal of Fleet assets from 2025 – 2034 aligns well with the expected need in the years beyond the analysis period.

10.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Supply Chain Disruptions:** The procurement team is always looking for alternative suppliers to strengthen the supply chain and make it more resilient. There is pre-committed capital funding which helps to get orders in early so that the fleet arrives when it is needed.
- **Electric Vehicle Infrastructure:** Some charging stations are set up, but the City is working to develop an improved strategy for future electrification that includes fleet, supporting infrastructure, etc. This strategy will also consider the risks due to power outages and how deployment of the assets will occur.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.14 in Appendix O) with the probability of failure ratings for all infrastructure represented within Fleet services. As shown in Figure 10-7, an estimated $32.4 million (41.4%) of Fleet assets currently have a high-risk exposure.

Figure 10-7 – Risk Exposure Map for Fleet Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$3.4	$7.8	$6.4	$0.0	$12.2
Major	$6.2	$12.2	$7.4	$0.0	$13.7
Moderate	$0.0	$0.0	$0.0	$0.0	$0.0
Minor	$1.5	$2.7	$1.2	$0.0	$3.7
	Probability of Failure				

Risk Exposure	$	%
High	$32.4	41.4%
Moderate	$27.3	34.9%
Low	$18.6	23.8%
Total	$78.4	100.0%

Critical asset risks are those assessed with a risk rating of High. The mitigation plan, residual risk risk and mitigation costs of implementing the selected mitigation plan are shown in

Table 10.3.

Table 10.3 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Arena Equipment	Poor asset condition resulting in the inability to perform services	High	Renewal work to perform any necessary repairs or replacement of assets	Low	$0.9
Dump/Fire Trucks					$18.7
Licensed Equipment					$6.8
Off Road Equipment					$6.1

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

10.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Fleet asset management are shown in

Table 10.4.

Table 10.4 – Improvement Recommendations – Fleet

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Develop more accurate unit costing for fleet assets, particularly for specialized equipment • Develop a condition assessment approach applicable to all assets to support a more comprehensive asset management approach allowing the City to transition away an age based approach

AM Plan Section	Improvement Recommendation
Levels of Service	• Consider breaking out metrics by asset categories to better reflect the City's fleet management practices • Develop formal metrics for capacity and use to track vehicle utilization during comprehensive condition assessments • Create functional levels of service metrics related to environmental initiatives, such as converting vehicles to electric alternatives • Refine the tracking of fuel consumption data to support environmental initiatives and align with the City's corporate climate action plan • Refine the tracking of preventative maintenance completion rates by separating different categories of inspections (commercial vehicles, non-commercial vehicles, specialized equipment) • Consider excluding lower-value assets from certain metrics to get a more accurate picture of fleet performance
Lifecycle Management and Financial Summary	• Embed vehicle equivalency analysis into asset attributes to help quantify the financial impact of fleet maintenance • Analyze the financial impact of adjusting the preventative maintenance schedule • Develop specific budget accounts to fund inspections and preventative maintenance • Create a model to understand the financial impact of not achieving target performance levels • Develop a clearer understanding of future growth acquisitions that are required to meet service targets
Risk Management	• Improve the alignment of the fleet risk assessment with Enterprise Risk Framework and asset management • Consider the impact of parts availability on vehicle downtime and incorporate this into risk assessments • Develop a risk assessment for managing fleet maintenance during unpredictable events like bad winters •

11.0 APPENDIX B – CEMETERY SERVICES

The Cemeteries service area manages municipal and abandoned burial grounds, ensuring respectful interment services, maintenance of cemetery infrastructure, and preservation of historical and cultural assets.

11.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

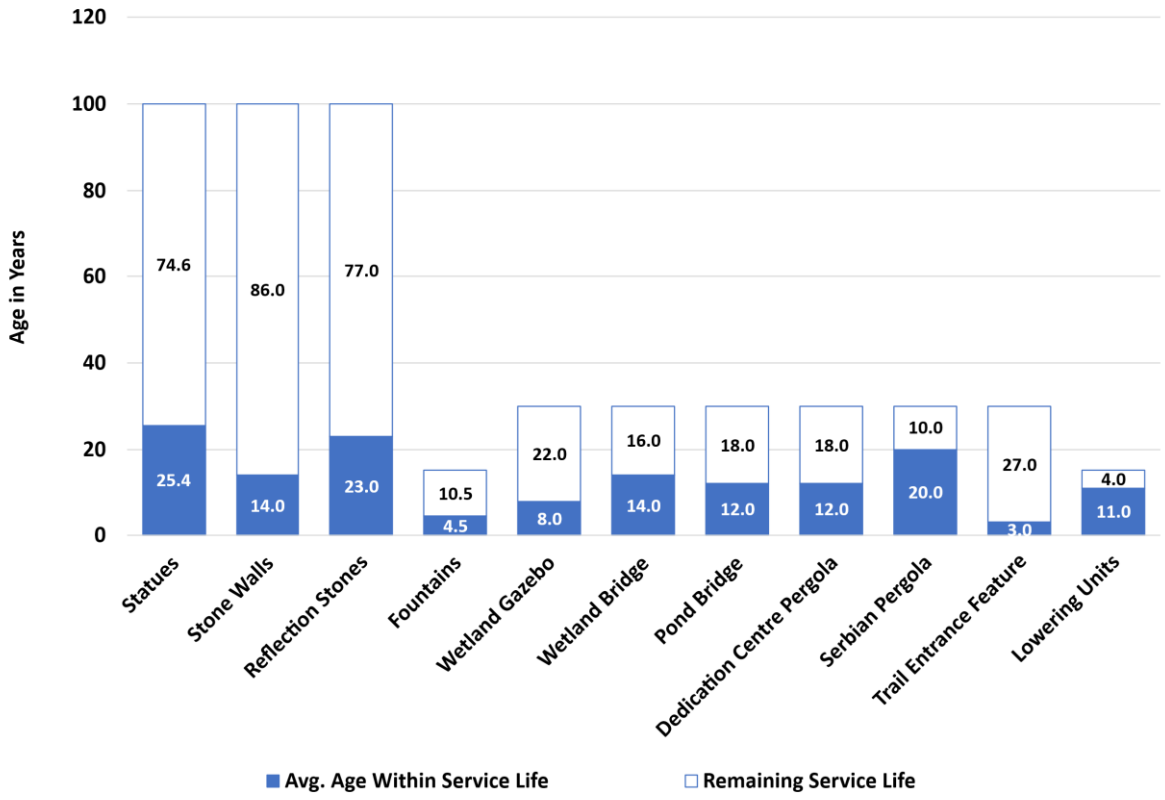
A variety of assets support the delivery of the City's Cemetery services. The Cemetery assets covered by this AM Plan are shown in Table 11.1. The largest portion of the asset mix are Interment Memorials assets with a replacement value of $5.7M (approximately 62% of the total replacement value). Note that buildings structures (i.e., mausoleums, etc.) are included in the Facilities Appendix and not this Appendix section.

Table 11.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Cemetery Infrastructure – Discrete	Garbage Cans, Fountains, Gates, Bollards, Benches	$0.1M	1.1%
Cemetery Infrastructure – Linear	Roadways/Parking Lots, Fences	$2.1M	22.3%
Cemetery Structures	Wetland Gazebo, Wetland Bridge, Pond Bridge, Dedication Centre Pergola, Serbian Pergola, Trail Entrance Features	$0.6M	6.0%
Equipment	Lowering Units	$0.02M	0.2%
Horticulture	Horticultural Beds	$0.2M	2.6%
Interment Features	Art/Artifacts, Stone Walls, Reflection Stones	$0.6M	6.0%
Interment Memorials	Statues, Memorial Trees, Memorial Benches, Burial Greens, Urn Tables, Columbarium, Ossuary/Scattering Gardens, Memorial Plaques	$5.7M	61.7%
TOTAL		**$9.2M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 11-1.

Figure 11-1 – Asset Age Profile



Notes on the above Asset Age Profile:

- Any assets missing information on install date have been excluded from the asset age profile shown above.

Asset condition

The asset condition profile by replacement cost for cemetery services is shown in Figure 11-2. The asset condition profile by asset category is shown in Figure 11-3. The condition assessment of the City's Cemetery assets provides some perspective on the overall reliability of its infrastructure. Overall, approximately 99% of the City's cemeteries assets have a condition rating of fair or better.

Approximately $0.1 million (1%) of Cemetery assets are in unknown condition. These unknown assets are comprised primarily of Memorial Benches (0.1 million).

Figure 11-2 – Asset Condition Profile

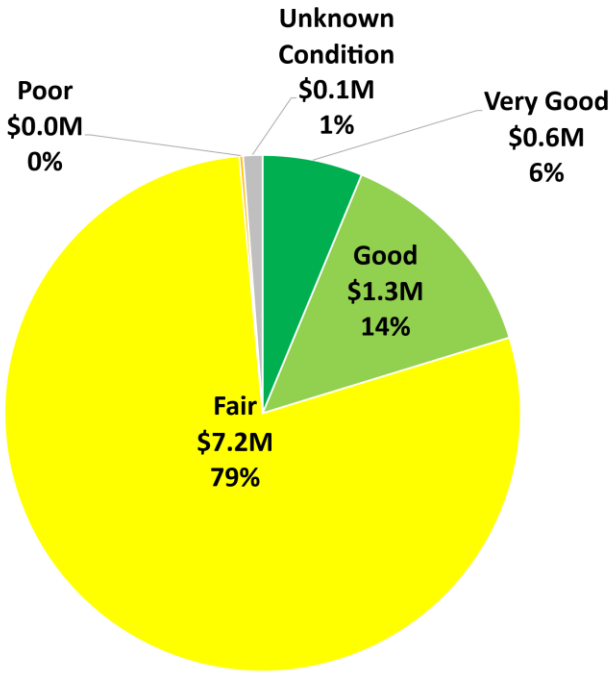
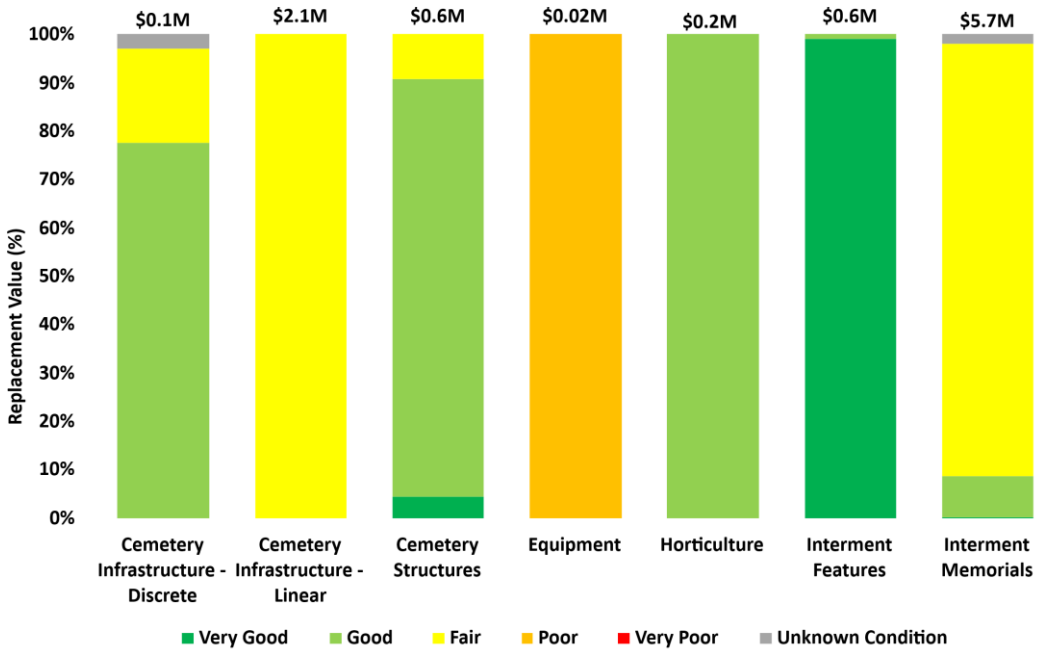


Figure 11-3 – Asset Condition Profile by Asset Category



11.2 LEVELS OF SERVICE

Table 11.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 11.2 – Levels of Service

Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Capacity & Use	Ensure adequate infrastructure to meet growing population and community needs	Number of casket burials performed per year	383	370	347	N/A	
		Number of cremation interments performed per year	508	464	485	N/A	
		Percentage of remaining lots available	Possible future metric				
		Active acreage of maintained Cemeteries (hectares)	N/A	N/A	51.4 (City is currently in the process of taking over a cemetery	City is currently working with other municipalities to create benchmarks for this metric	
Quality & Reliability	Provide infrastructure in acceptable condition by following proper maintenance standards	% of assets within service life	N/A	99.5% (of assets with age data)	100% (of assets with age data)	N/A	
		Average pavement condition index (PCI) of cemetery roads	Possible future metric				
		Number of work orders completed	959	1064	1026	City currently has information on total work orders. Critical work orders are	

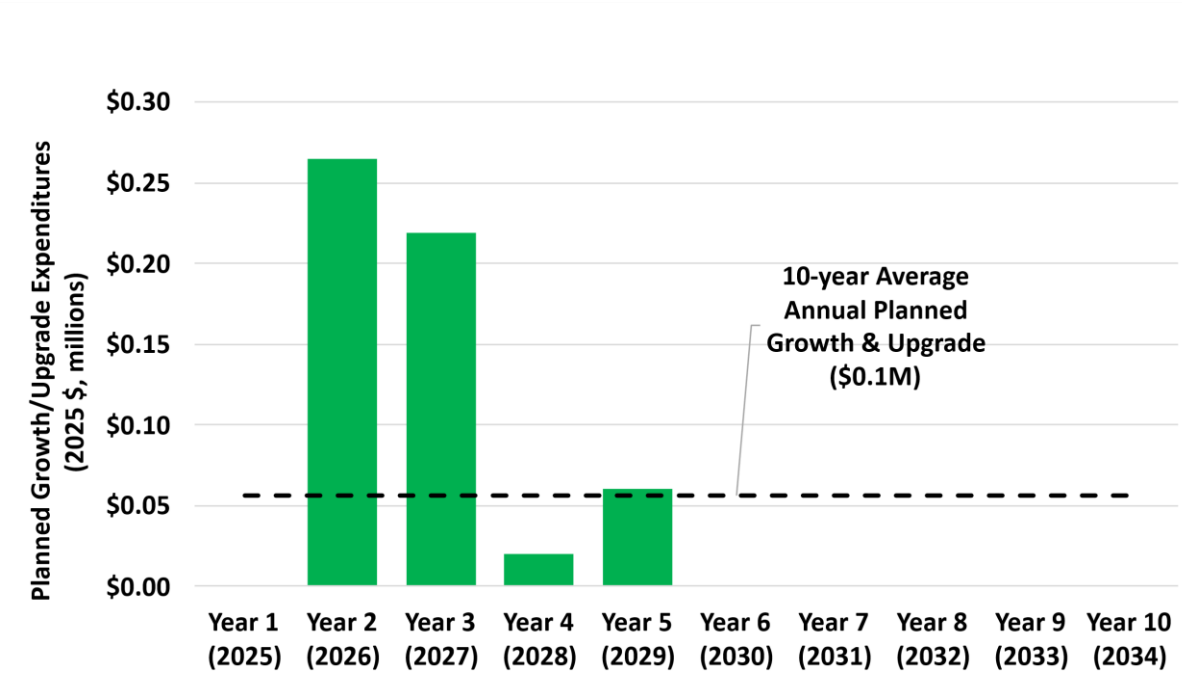
Technical Focused Levels of Service							
LOS Category	Community Level of Service	Performance Measure	Performance			Target/Proposed Performance (Value or Qualitative Trend)	Notes
			2022	2023	2024		
						completed within one week, non-critical within 4 weeks. The City also has information on when work orders were opened and closed. Some work orders are seasonal based and would be open over the winter.	
		Number of interment rights sales	425	402	403	Achieve an annual increase in interment rights sales that is at least equal to the local population growth rate, ensuring a sustainable balance between supply and demand for cemetery services.	

11.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

11.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social, or environmental needs. Forecast acquisition asset costs are summarized in Figure 11-4. The City assumes that there will be at least a 0.5% growth in the asset portfolio annually (some of which might not be reflected in the following figure). City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

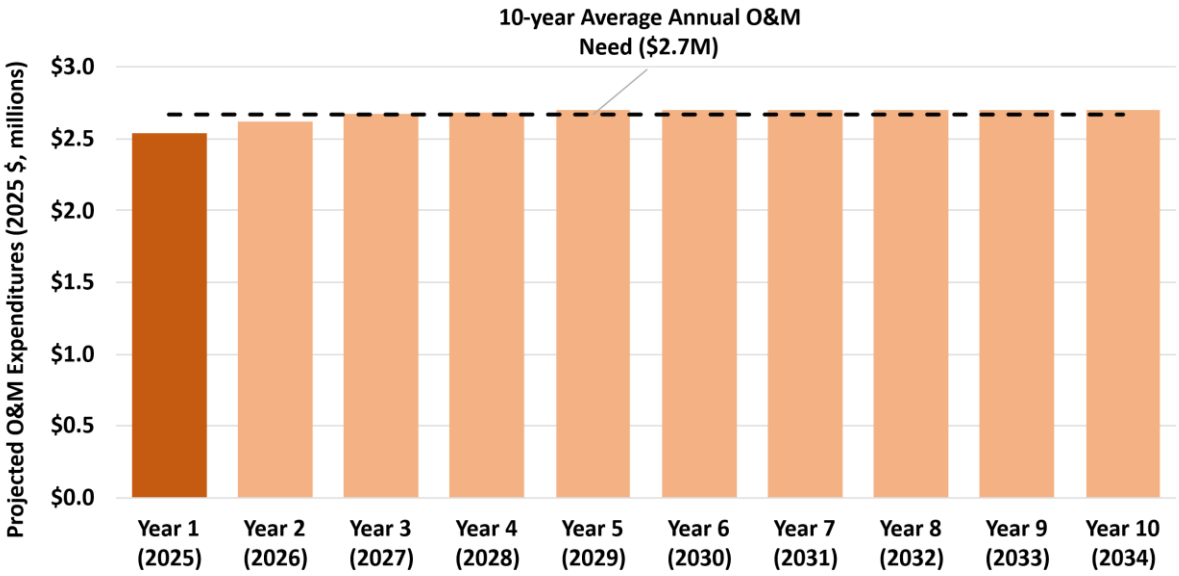
Figure 11-4 – Yearly Acquisition Summary



11.3.2 Summary of Forecast Operations and Maintenance Costs

Figure 11-5 shows the forecast operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased relative to the growth of the overall asset portfolio (See Section 11.3.1 for related growth costs). Regular increases due to inflation were not included.

Figure 11-5 – Operations and Maintenance Summary



11.3.3 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 11-6 shows the forecasted condition of Cemetery assets over the next 10 years, based on two scenarios:

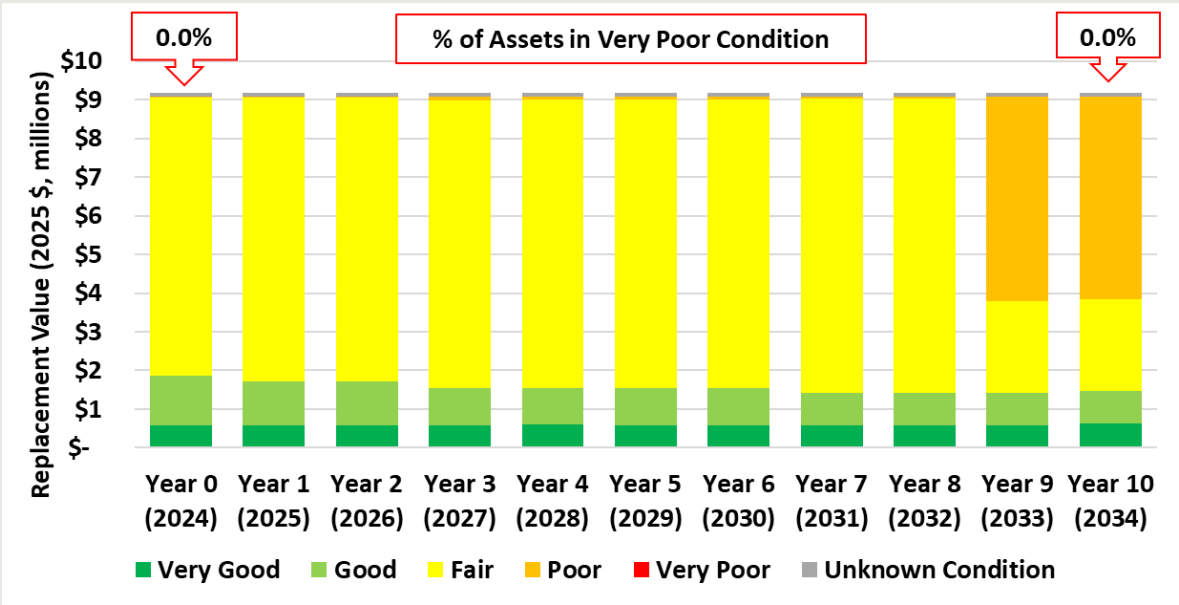
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $0.07 million per year to invest in the renewal of its Cemetery assets.

Figure 11-6 – Forecast Renewal Scenarios

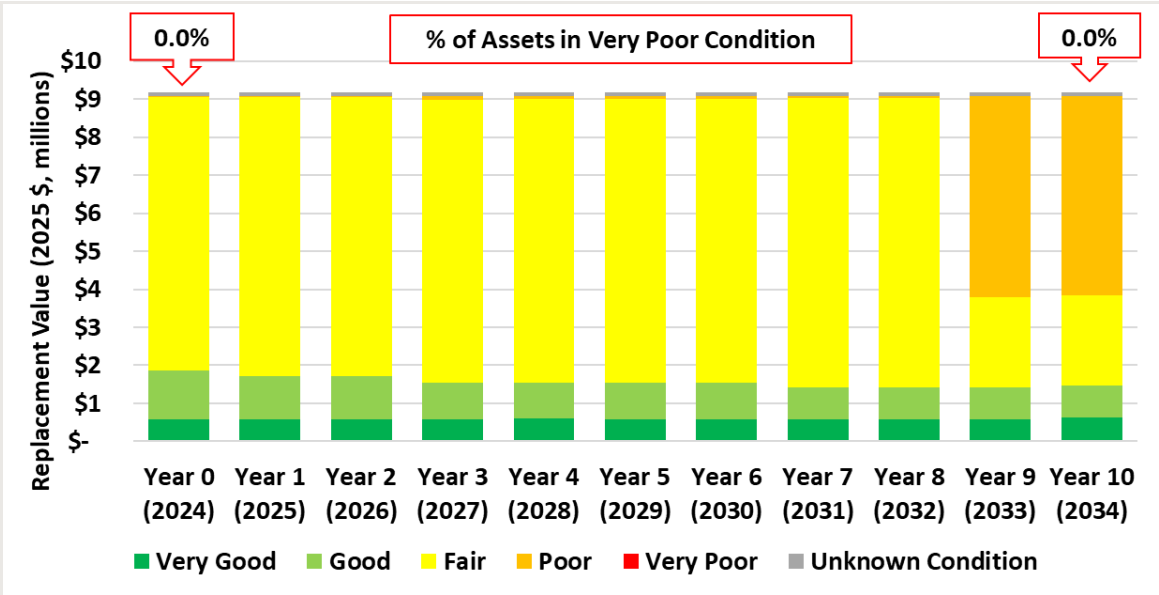
1. Planned Budget / Expected Performance ($0.07 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to be maintained (% of assets in very poor condition) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based primarily on staff reported condition (86% of assets by replacement value).** For the remaining assets, the condition is determined based on their age relative to their estimated service life (see Table 24.2 in Appendix O). The forecast then estimates the planned replacement year based on when the asset has reached end of life.



2. Proposed LOS: Planned Budget ($0.07 million per year average renewal investment from 2025 – 2034)

The proposed performance is the same as the expected performance, which maintains asset condition over the next 10 years. As a result, there is no funding gap associated with Cemetery assets.



Additionally, the lifecycle average annual renewal need for Cemetery assets is approximately **$0.2 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** Therefore, the City's proposed renewal investment of $0.07 million per year in the renewal of Cemetery assets from 2025 – 2034, may be insufficient to address renewal need in the years beyond the analysis period.

11.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Overcrowding:** The Cemeteries Strategic Plan completed in 2025 and lays out recommendation for managing capacity in the future.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.15 in Appendix O) with the probability of failure ratings for all infrastructure represented within Cemetery services. As shown in Figure 11-7, an estimated $0.02 million (0.2%) of Cemetery assets currently have a high-risk exposure.

Figure 11-7 – Risk Exposure Map for Cemetery Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$0.00	$0.00	$0.00	$0.02	$0.00
Major	$0.00	$0.15	$5.07	$0.00	$0.00
Moderate	$0.54	$0.32	$0.05	$0.00	$0.00
Minor	$0.04	$0.81	$2.07	$0.00	$0.00
	Probability of Failure				

Risk Exposure	$	%
High	$0.02	0.2%
Moderate	$5.28	58.1%
Low	$3.78	41.6%
Total	$9.1	100.0%

Critical risks are those assessed with a risk rating of High. The mitigation plan, residual risk, and mitigation costs of implementing the selected mitigation plan are shown in

Table 11.3.

Table 11.3 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs
Lowering Units	Poor asset condition resulting in the inability to perform burial services	High	Renewal work to perform any necessary repairs on the assets and regular planned maintenance to prevent unplanned downtime	Low	Approximately $4,500 per year

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

11.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Cemetery asset management are shown in Table 11.4.

Table 11.4 – Improvement Recommendations – Cemeteries

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Consider centralizing all parking lots across different service areas (including cemeteries) for consistent management and reporting • Develop a more comprehensive inventory of cemetery roads and integrate them into the Roads Program for better long-term maintenance planning • Determine condition of assets currently reported in unknown condition

AM Plan Section	Improvement Recommendation
Levels of Service	• Develop usage-based measures rather than simple ratios to better reflect cemetery access and utilization • Consider incorporating customer service metrics, including: total inquiries received, sales completed, number of emails and phone calls received and placed • Separate metrics for outdoor maintenance teams and administrative teams to better track customer service and staffing costs • Develop a more accurate method to track cremation interments and lot sales to better forecast capacity needs • Upgrade cemetery management software to better track and manage cemetery assets and operations
Lifecycle Management and Financial Summary	• Develop a detailed cost estimation process for taking on new cemeteries, including labour and equipment implications • Create a more accurate method to estimate burial and staffing costs, accounting for seasonality and labour allocation challenges • Develop a comprehensive maintenance strategy for cemetery roads that aligns with the city's overall road maintenance program • Develop detailed cost estimate for abandoned cemeteries the City must assume ownership of as per legislation
Risk Management	• Develop a risk assessment framework specific to cemetery operations, considering: capacity constraints, maintenance requirements and heritage preservation needs • Create a risk mitigation strategy for cemetery expansion, aligned with the master plan recommendations

12.0 APPENDIX C – GOLF SERVICES

The Golf service area operates the City-owned golf courses, providing recreational opportunities to residents while maintaining the associated grounds, buildings, and equipment.

12.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

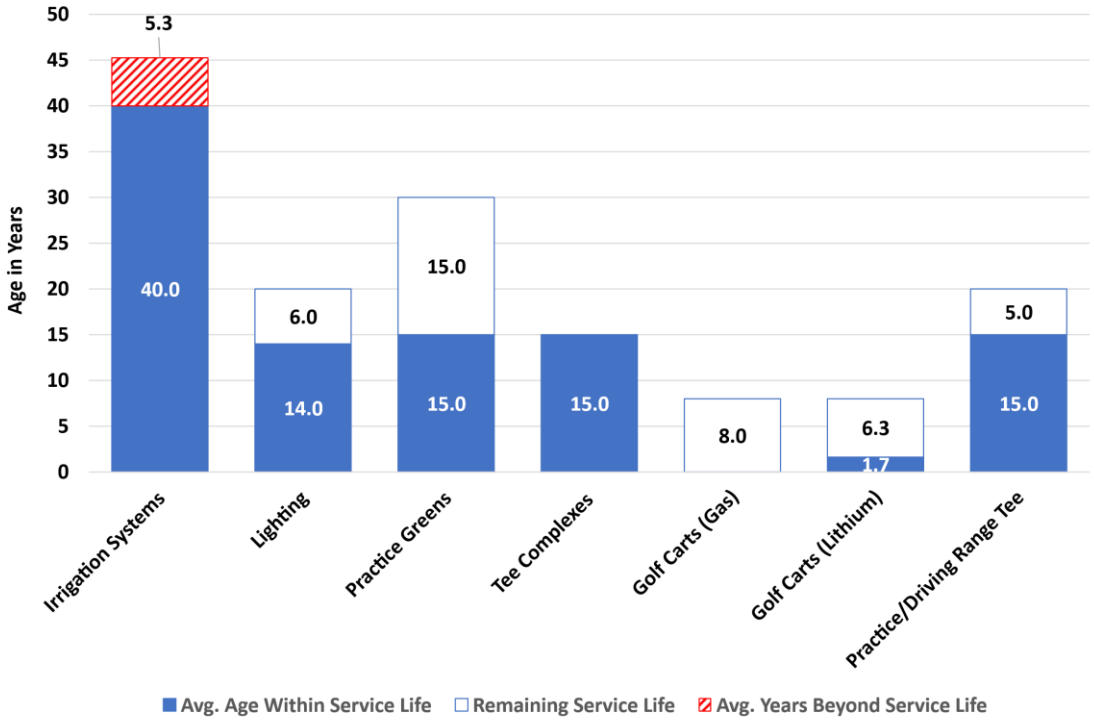
A variety of assets support the delivery of the City's golf services. The golf assets covered by this AM Plan are shown in Table 12.1. The largest portion of the asset mix are Course Infrastructure - Linear assets with a replacement value of $8.6M (approximately 57% of the total replacement value).

Table 12.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Course Infrastructure – Discrete	Lighting, Bike Racks, Flag Poles, Benches, Water Fountains, Garbage Cans	$0.1M	0.9%
Course Infrastructure – Linear	Irrigation Systems, Pedestrian Bridges	$8.6M	56.6%
Course Structures	Entrance Features	$0.01M	0.1%
Course Features	Bunkers, Fairways, Greens, Rough, Practice Greens, Tee Complexes, Short Course Greens, Short Course Tees (Synthetic), Practice Ranges (Synthetic), Practice Ranges (Natural)	$4.9M	31.9%
Golf Carts	Golf Carts (Gas), Golf Carts (Electric), Golf Carts (Lithium)	$1.6M	10.5%
TOTAL		**$15.2M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 12-1.

Figure 12-1 – Asset Age Profile



Notes on the above Asset Age Profile:

- Irrigation systems are shown to, on average, be beyond their expected service life and City staff noted that as issues arise, they manage and fix leaks.
- Any assets missing information on install date have been excluded from the asset age profile shown above.

Asset condition

The asset condition profile by replacement cost for golf services is shown in Figure 12-2. The asset condition profile by asset category is shown in Figure 12-3. The condition assessment of the City's golf assets provides some perspective on the overall reliability of its infrastructure. Overall, approximately 71% of the City's golf assets have a condition rating of fair or better.

Approximately $3.8 million (25%) of Golf assets are in unknown condition. These unknown assets are comprised of Greens (1.8 million), Bunkers (1.2 million), Rough (0.6 million) and Fairways (0.2 million).

Figure 12-2 – Asset Condition Profile

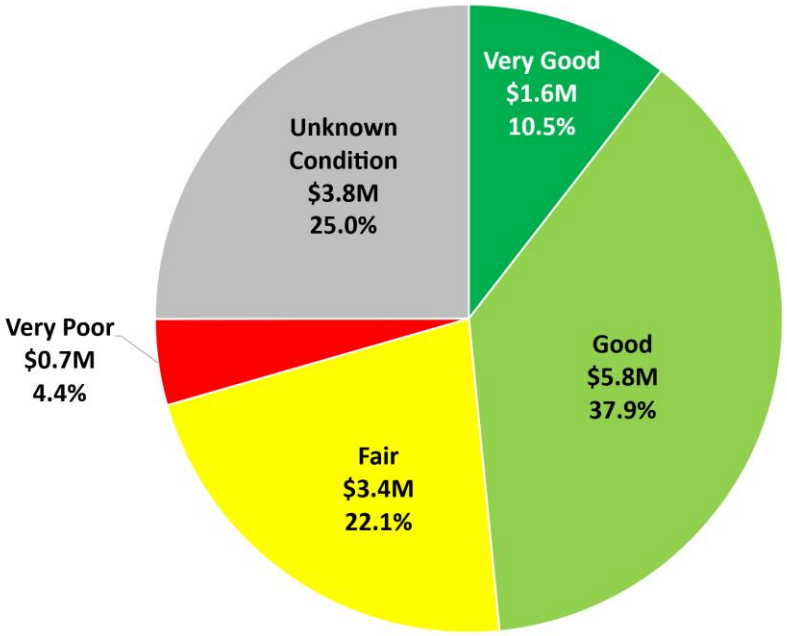
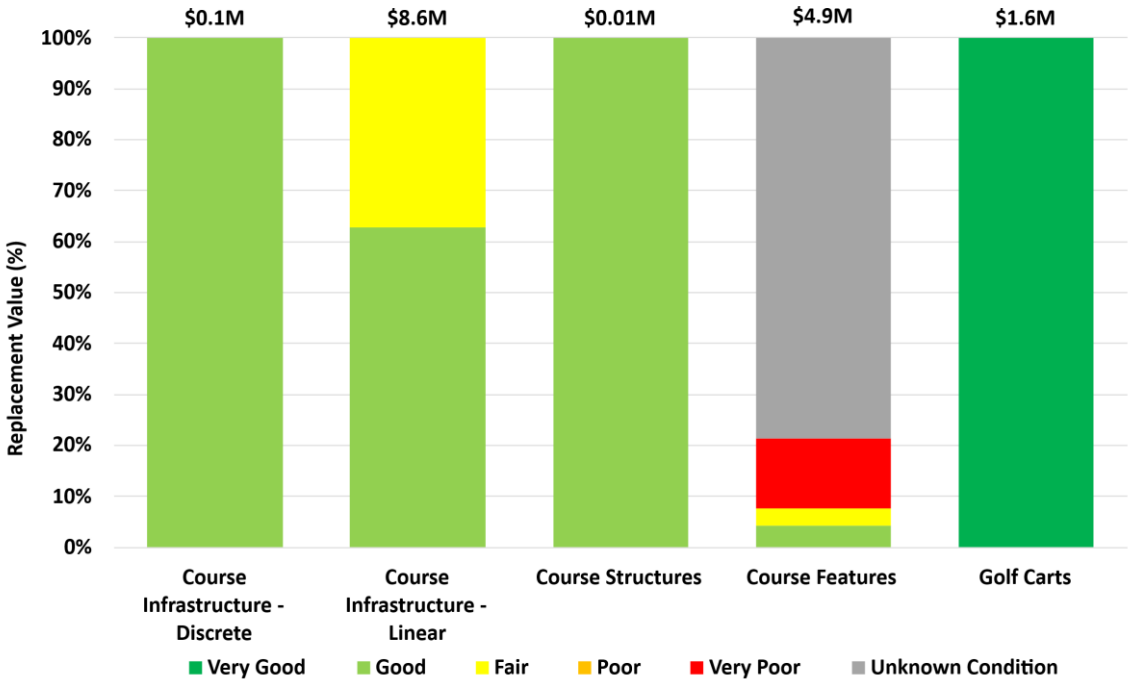


Figure 12-3 – Asset Condition Profile by Asset Category



12.2 LEVELS OF SERVICE

Table 12.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 12.2 – Levels of Service

Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Capacity & Use	Ensure adequate infrastructure to meet growing population and community needs	Number of rounds of golf played compared to the number of days open for use (excluding rain days).	81,064 rounds : 198 days Average 409.4	96,615 rounds : 200 days Average 483.1	88,340 rounds : 206 days Average 428.8	Due to variable nature of the golf season no target is being set.	
Quality & Reliability	Provide infrastructure in acceptable condition and cleanliness by following and providing proper maintenance standards and inspections	Number of buckets (or number of balls hit) used at the driving range compared to the number of days open	4,878 buckets : 198 days Average 24.6	5,035 buckets : 200 days Average 25.2	6,686 buckets : 206 days Average 32.5	Due to variable nature of the golf season no target is being set.	
		% of assets within service life (by replacement value)	N/A	62% (of assets with age data)	50% (of assets with age data)	Based on available budget	
		Number of breaks in the irrigation system (Pump House) compared to water use	1 break : 164.7 million litres	1 break : 73.6 million litres	1 break : 64.9 million litres	Maintain current performance	
		Grass cutting cycle	Possible future metric				
		Maintenance standards	Possible future metric				
Financial Sustainability		Cost per round played	Possible future metric				

12.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

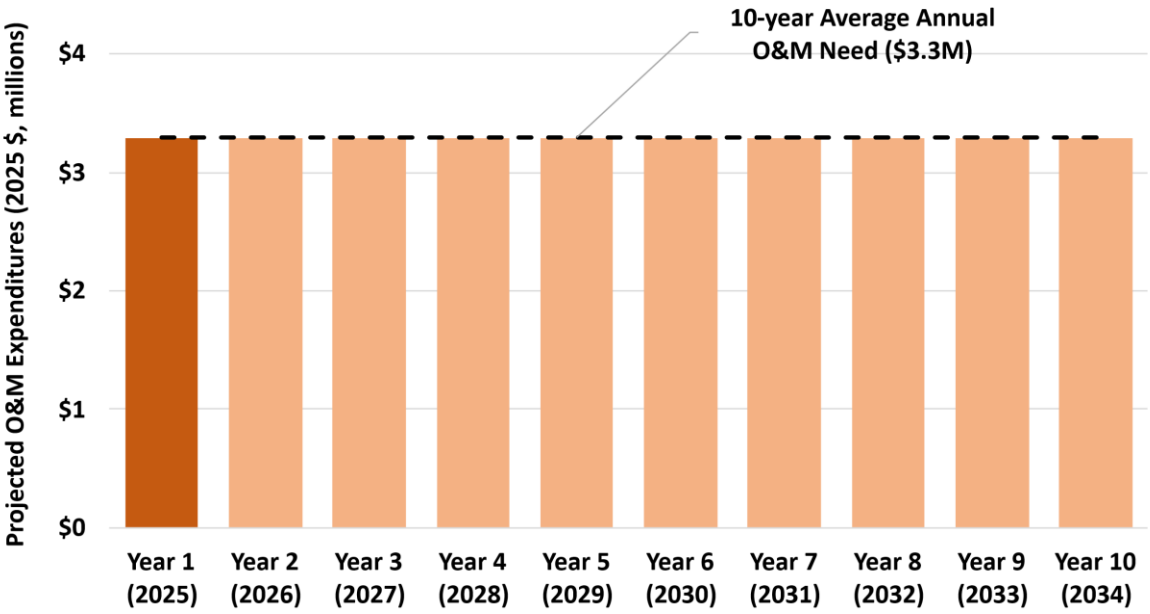
12.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. However, the City has no planned growth or expansion of golf assets during the analysis period.

12.3.2 Summary of Forecast Operations and Maintenance Costs

Figure 12-4 shows the operations and maintenance costs that were forecasted to remain steady as there is no plan to increase the Golf portfolio in the next 10 years, with the exception of regular inflation increases.

Figure 12-4 – Operations and Maintenance Summary



12.3.3 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 12-5 shows the forecasted condition of Golf assets over the next 10 years, based on two scenarios:

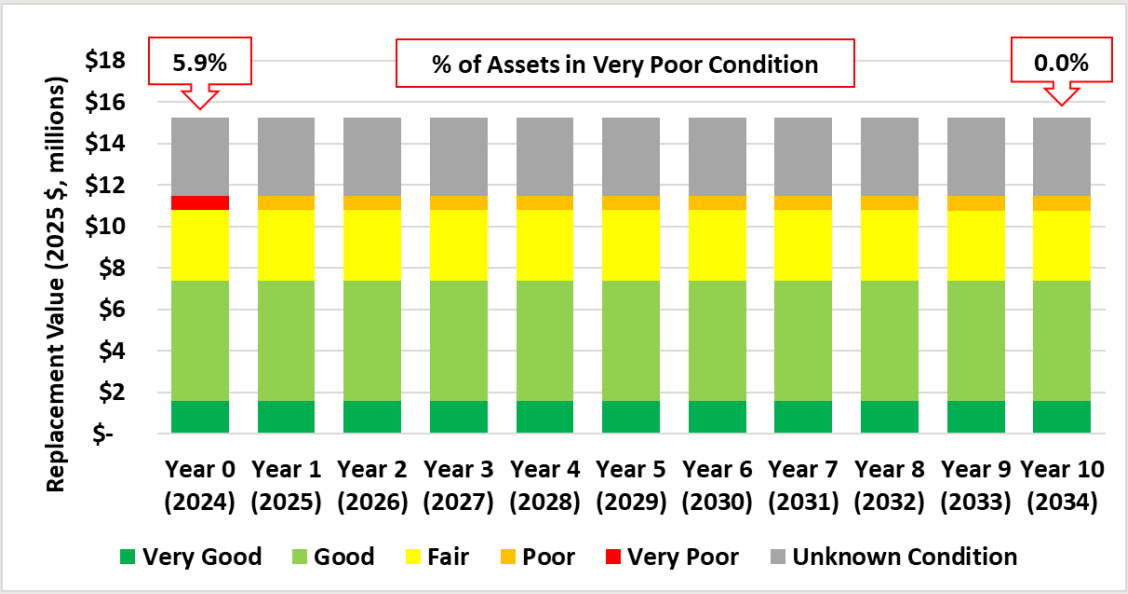
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $0.3 million per year to invest in the renewal of its Golf assets.

Figure 12-5 – Forecast Renewal Scenarios

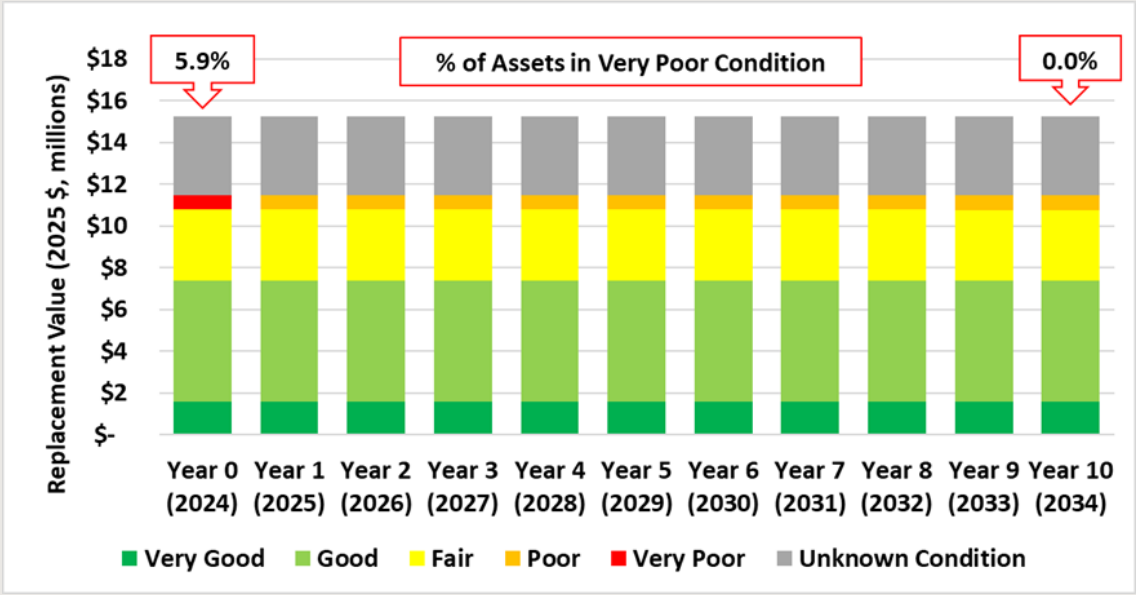
1. Planned Budget / Expected Performance ($0.3 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to be improved (% of assets in very poor condition) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based primarily on staff reported condition (75% of assets by replacement value).** For the remaining assets, the condition is determined based on their age relative to their estimated service life (see Table 24.3 in Appendix O). The forecast then estimates the planned replacement year based on when the asset has reached end of life.



2. Proposed LOS: Planned Budget ($0.3 million per year average renewal investment from 2025 – 2034)

The proposed performance is the same as the expected performance, which improves asset condition over the next 10 years. As a result, there is no funding gap associated with Golf assets.



Additionally, the lifecycle average annual renewal need for Golf assets is approximately **$0.6 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** Therefore, the City's proposed renewal investment of $0.3 million per year in the renewal of Golf assets from 2025 – 2034, may be insufficient to address renewal need in the years beyond the analysis period.

12.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Supply Chain Disruptions:** Most procurement for golf assets is conducted with suppliers in Ontario which staff indicated improves the resilience.
- **Electric Vehicle Infrastructure:** Staff noted that upgrades to the Maintenance Building would be required in order to electrify additional fleet assets.
- **Irrigation:** Staff manage irrigation needs annually based on weather conditions. Irrigation breaks are managed as needed.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.15 in Appendix O) with the probability of failure ratings for all infrastructure represented within Cemetery services. As shown in Figure 12-6, there are currently no Cemetery assets with high-risk exposure.

Figure 12-6 – Risk Exposure Map for Golf Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$0.0	$0.0	$0.0	$0.0	$0.0
Major	$0.0	$2.0	$0.0	$0.0	$0.0
Moderate	$1.6	$3.5	$3.2	$0.0	$0.0
Minor	$0.0	$0.3	$0.2	$0.0	$0.7
Probability of Failure					

Risk Exposure	$	%
High	$0.0	0.0%
Moderate	$5.3	45.9%
Low	$6.2	54.1%
Total	$11.5	100.0%

Critical risks are those assessed with a risk rating of High, however, there are currently no golf assets with a risk rating of High.

12.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Golf asset management are shown in Table 12.3.

Table 12.3 – Improvement Recommendations – Golf

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Improve condition assessment methodology beyond age-based ratings to better reflect actual asset performance, especially for irrigation systems • Develop a more comprehensive inventory of golf course equipment with standardized service life estimates • Asses the current condition of the “Unknown” condition assets
Levels of Service	• Consider adding "cost per round" as a financial efficiency metric to evaluate operational performance • Consider developing maintenance standards for grass cutting cycles as a quality metric, though this would need to account for weather variability
Lifecycle Management and Financial Summary	• Improve tracking of operating costs against rounds played to better understand financial sustainability • Develop more detailed replacement schedules for high-value assets like irrigation systems and pump houses • Create a more structured approach to cart fleet management based on usage data to optimize replacement timing • Establish clearer categorization of capital projects between growth, renewal, and upgrade to improve budget allocation • Develop a more detailed maintenance strategy for golf course assets that accounts for seasonal variations
Risk Management	• Incorporate climate change considerations into risk assessments, particularly for irrigation systems and course conditions

13.0 APPENDIX D – FORESTRY SERVICES

The Forestry service area oversees the management and stewardship of the City's urban forest, including street trees, park trees, and natural wooded areas, supporting canopy health and biodiversity while also expanding the canopy to meet City canopy targets.

13.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

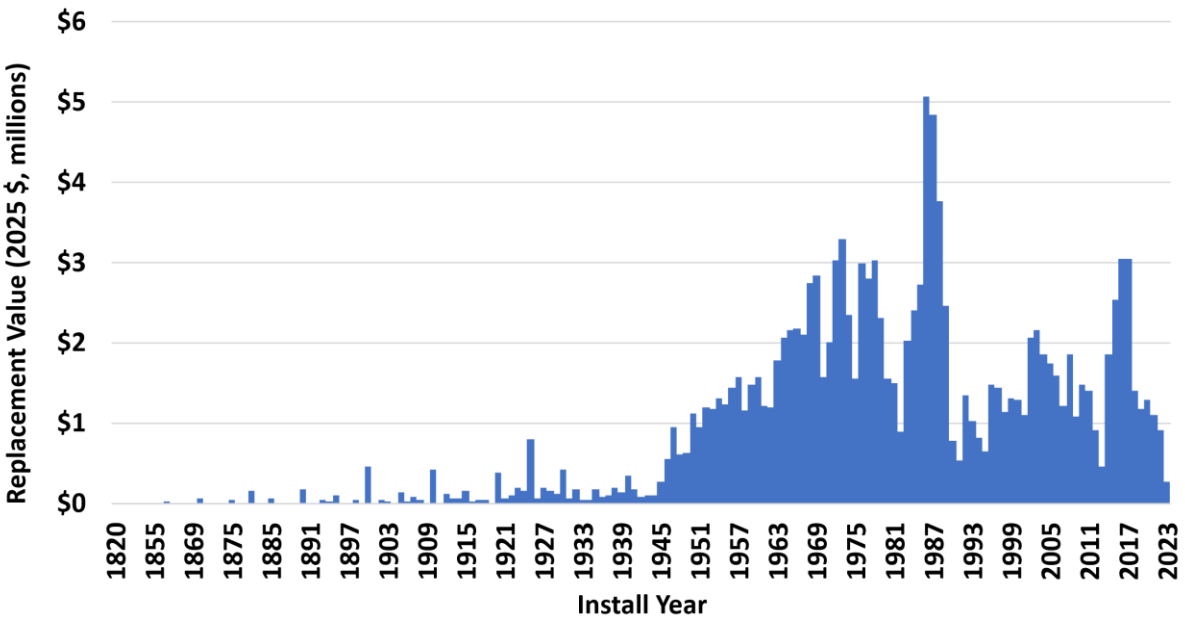
A variety of assets support the delivery of the City's forestry services. The forestry assets covered by this AM Plan are shown in Table 13.1.

Table 13.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Street Trees	Trees	$129.9M	75.5%
Park, Cemetery, Golf & Other Trees		$42.1M	24.5%
TOTAL		**$172.0M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 13-1. Overall Street Trees have an average age of 41.8 years and Park, Cemetery, Golf & Other Trees have an average age of 44.6 years.

Figure 13-1 – Asset Age Profile



Asset condition

The asset condition profile by replacement cost for forestry services is shown in Figure 13-2. The asset condition profile by lifecycle category is shown in Figure 13-3. The condition assessment of the City's forestry assets provides insight into the reliability of its assets. Overall, approximately 83% of the City's forestry assets have a condition rating of fair or

better. Approximately $17.9 million (10%) of Forestry assets are in unknown condition. These unknown assets are comprised of Street Trees (10.6 million) and Park, Cemetery, Golf & Other Trees (7.3 million).

Figure 13-2 – Asset Condition Profile

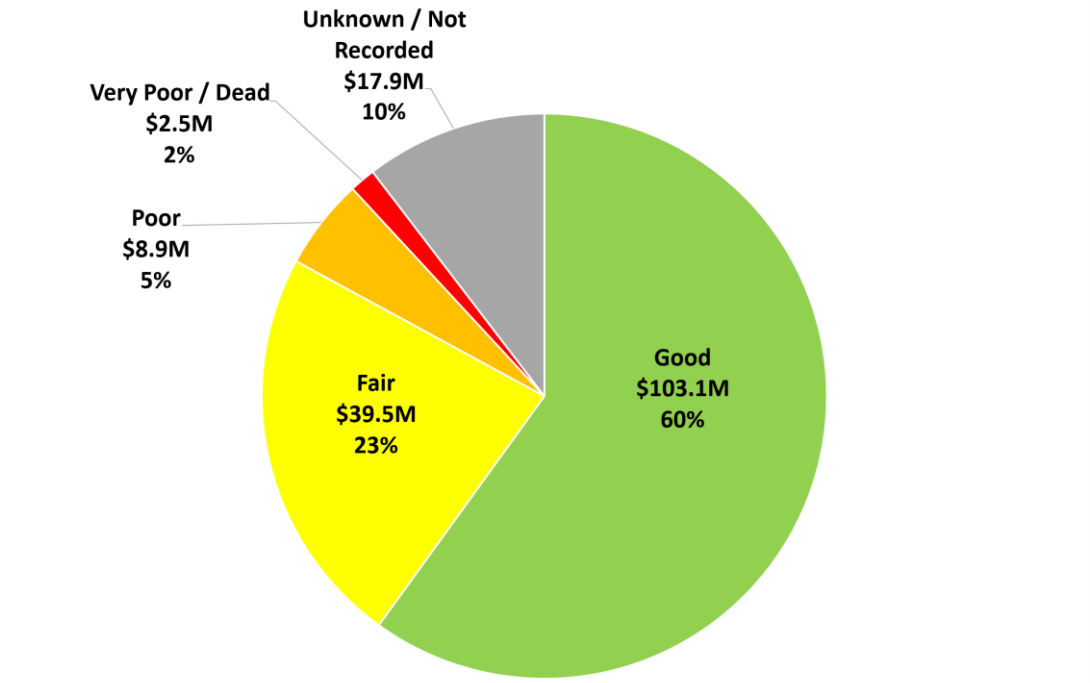
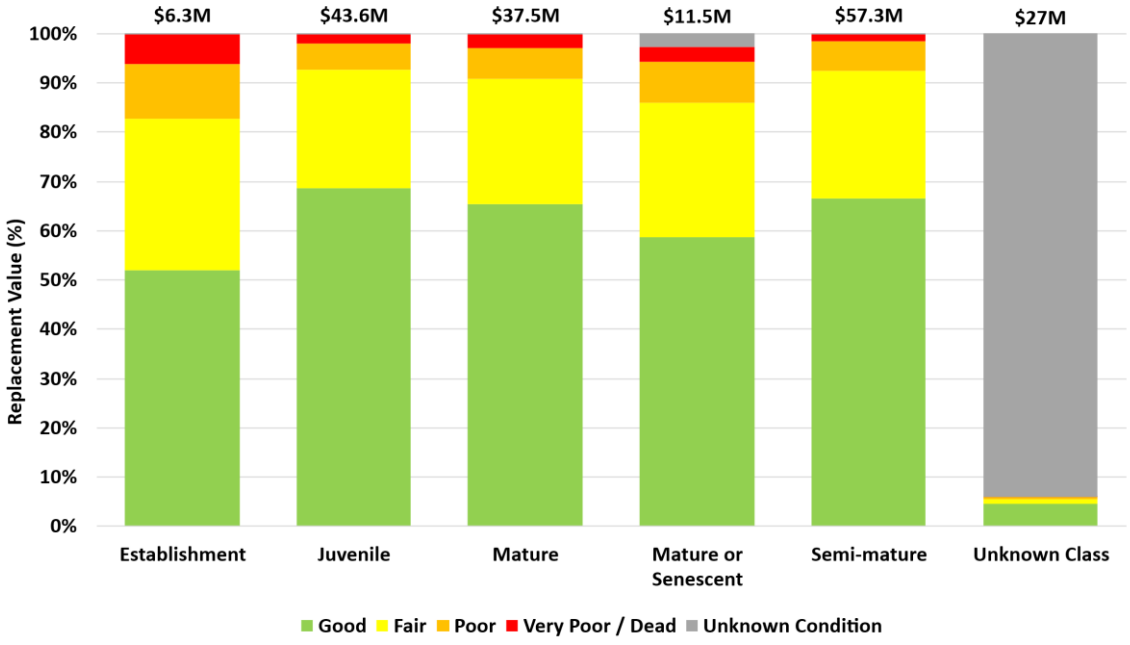


Figure 13-3 – Asset Condition Profile by Lifecycle Category



13.2 LEVELS OF SERVICE

Table 13.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 13.2 – Levels of Service

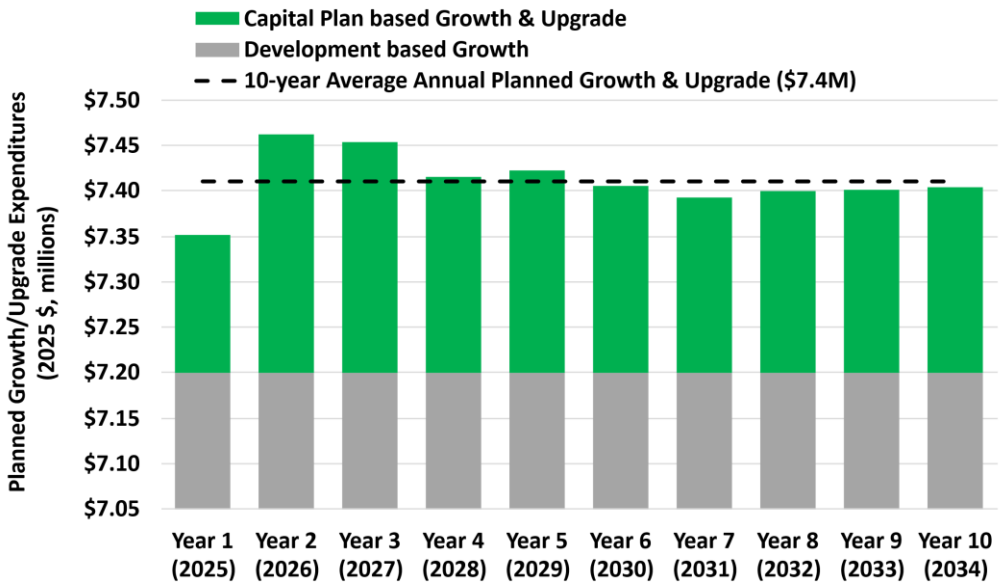
Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Capacity & Use	Services have enough capacity and are available to everyone	# of trees planted per year	1,158	710	1,012	Target of planting 900 street and park trees per year.	
Quality & Reliability	Provide infrastructure in acceptable condition by following proper maintenance standards	Number of trees receiving preventative maintenance	1,700 trees pruned	4,500 trees pruned	7,200 trees pruned	The City aims to prune 6,000 trees per year	
		Ratio of preventative maintenance to reactive work	N/A	1,240 : 4,782	9,485 : 2,082	General trend to advance forestry program to a proactive program based on tree pruning to encourage healthy and long living trees vs reactive program based on customer driven complaints.	
		Average time to remove and replace tree fully (using phased approach – remove canopy, remove stump, grind stump, replace)	N/A	N/A	The City is achieving the target on average, but does not have accurate information on a tree-by-tree basis	Defined service level is 2 years. The City is looking to improve this target to 1 year	

13.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

13.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social or environmental needs. Forecast acquisition asset costs are summarized in Figure 13-4. This figure includes an estimated 4,000 trees per year that are being assumed by the City from existing developments (estimated replacement value is $1800/tree).

Figure 13-4 – Yearly Acquisition and Upgrade Summary

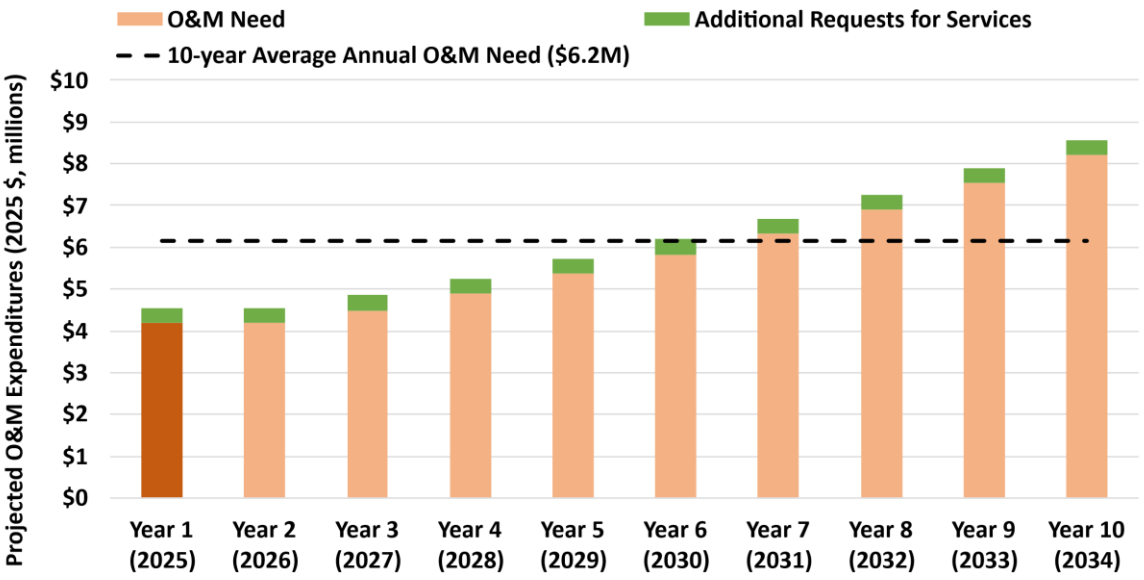


Summary of Forecast Operations and Maintenance Costs

Figure 13-5 shows the forecast operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased by 10% annually to account for an increase in the size of the asset portfolio, as identified by the department leadership. Regular increases related to inflation were not included. Additional annual increases to operations and maintenance costs, outside of the existing budget, included:

- $225k/year to meet a 7 year pruning cycle instead of a 10 year cycle.
- $114k/year to hire 2 additional arborists to implement the juvenile street tree pruning program.
- $20k/year to support an incentive program to encourage the retention of mature trees located on private property. This program would allow homeowners to access funding to subsidize cost of pruning on private trees. Similar programs have been implemented successfully elsewhere.

Figure 13-5 – Operations and Maintenance Summary



13.3.2 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 13-6 shows the forecasted condition of Forestry assets over the next 10 years, based on two scenarios:

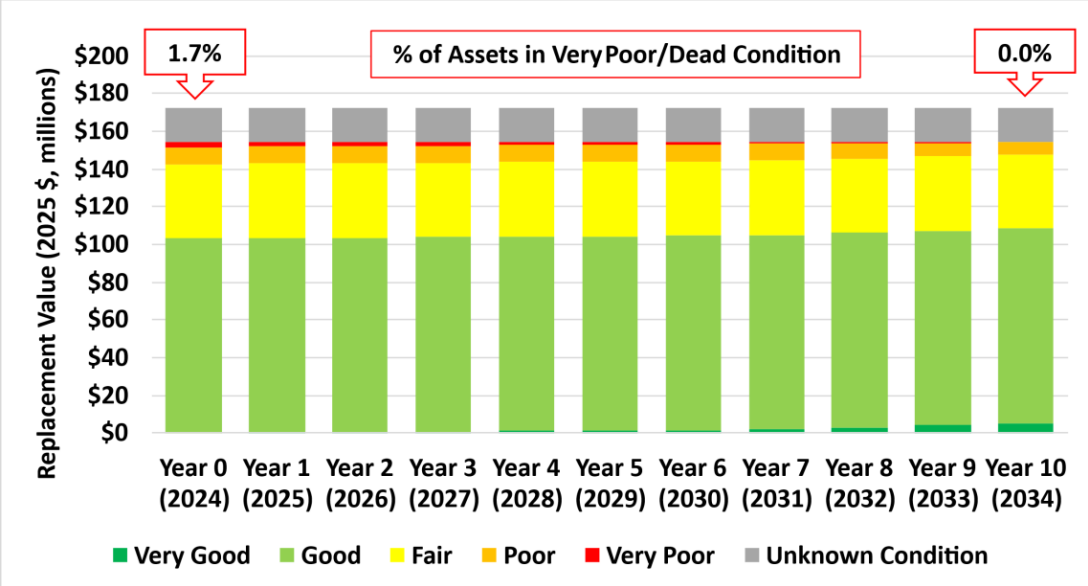
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $0.5 million per year to invest in the renewal of its Forestry assets.

Figure 13-6 – Forecast Renewal Scenarios

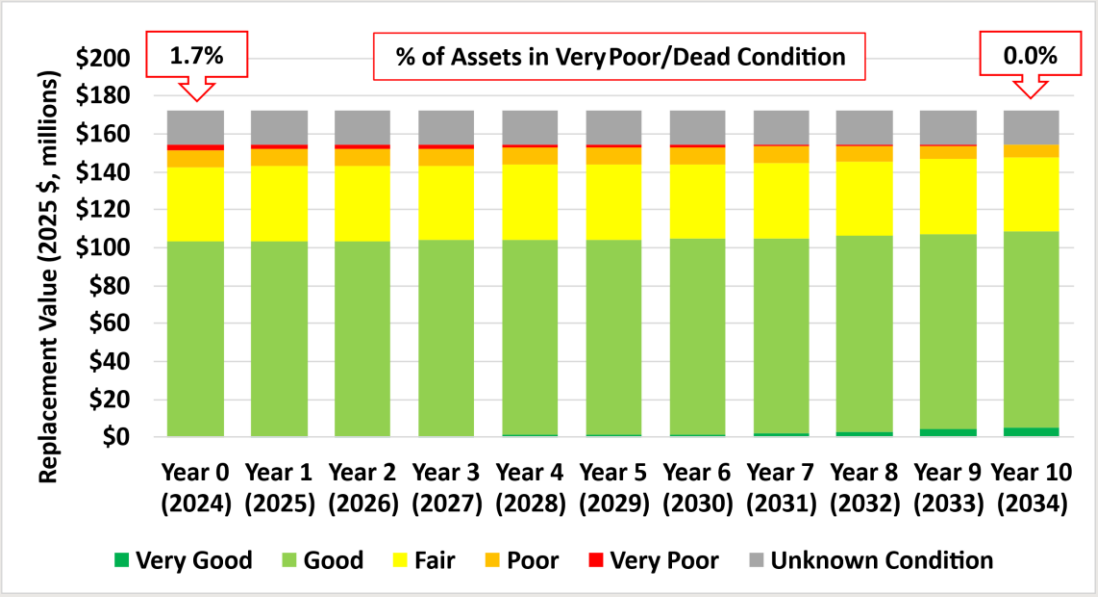
1. Planned Budget / Expected Performance ($0.5 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to be improved (% of assets in very poor condition) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based primarily on staff reported condition (86% of assets by replacement value).** For the remaining assets, the condition is reported as "Unknown". The forecast then estimates the replacement of assets based on the reduction of Very Poor and Poor condition assets to align with the planned budget.



2. Proposed LOS: Planned Budget ($0.5 million per year average renewal investment from 2025 – 2034)

The proposed performance is the same as the expected performance, which improves asset condition over the next 10 years. As a result, there is no funding gap associated with renewal of Forestry assets.



Currently, it is not possible to determine a lifecycle average annual renewal need for Forestry assets (this value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life). The City is currently working on developing approximate replacement values of Forestry assets by species in order to determine this amount for future iterations of the AM Plan.

13.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Weather-Related:** The City has a proactive pruning program that helps to reduce the weight of the tops of trees. Staff noted a need to improve the pruning program for young trees so that they become more resilient to weather.
- **Biological:** Staff are working on an invasive species management plan which will outline the needs for the future.
- **Lack of Watering:** Current watering program allows for watering for the tree's first two years. Staff noted that there are not enough resources to increase watering during period of drought in summer months.
- **People's Use/Abuse of Trees:** Staff hang information on doors regarding new trees that are planted in resident's yards.
- **Tree Procurement:** Staff have specific tree procurement specifications based on where trees will be planted which has helped trees meet their expected service life.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.17 in Appendix O) with the probability of failure ratings for all infrastructure represented within Forestry services. As shown in Figure 13-7, an estimated $10.2 million (6.6%) of Forestry assets currently have a high-risk exposure.

Figure 13-7 – Risk Exposure Map for Forestry Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$0.0	$0.0	$0.0	$0.0	$0.0
Major	$0.0	$75.9	$34.2	$7.6	$1.7
Moderate	$0.0	$27.3	$5.3	$1.3	$0.8
Minor	$0.0	$0.0	$0.0	$0.0	$0.0
Probability of Failure					

Risk Exposure	$	%
High	$10.2	6.6%
Moderate	$116.7	75.7%
Low	$27.3	17.7%
Total	$154.1	100.0%

Critical risks are those assessed with a risk rating of High. The mitigation plan, residual risk, and mitigation costs of implementing the selected mitigation plan are shown in Table 13.3.

Table 13.3 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Street Trees	Poor asset condition resulting in potential safety risks to the public	High	Renewal work to perform any necessary maintenance or replacement of assets	Low	$10.2

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

13.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Forestry asset management are shown in Table 13.4.

Table 13.4 – Improvement Recommendations – Forestry

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Update tree inventory data regularly to ensure the most accurate representation of forestry assets • Develop a more comprehensive valuation methodology for trees that accounts for ecological and social benefits • Improve data collection for tree species diversity to support urban forest resilience planning • Incorporate woodlots into future AM Plans • Asses the current condition of the “Unknown” condition assets

AM Plan Section	Improvement Recommendation
Levels of Service	• Refine the tree canopy cover measurement methodology to allow for more frequent updates than the current 5-year interval • Develop a more detailed tracking system for the average time to remove and replace trees, with a goal to reduce from two years to one year • Create metrics to track the percentage of new trees planted versus replacement trees to measure canopy expansion • Establish clear performance measures for tree planting in new developments to ensure consistent application of standards
Lifecycle Management and Financial Summary	• Develop more accurate costing models for preventative maintenance activities to better forecast budget needs • Develop an improved deterioration model for trees that accounts for early tree failures (<5 years) • Incorporate tree planting targets (1,000 trees per year) into long-term financial modelling • Establish clearer financial implications for improving the ratio of preventative to reactive work • Develop a funding strategy to support the City's tree canopy target of 30% by 2050 and 33% citywide by 2070 • Incorporate the financial value of ecosystem services provided by trees into the asset valuation
Risk Management	• Create a methodology to prioritize preventative maintenance based on risk factors • Establish clear risk ratings for different tree species based on susceptibility to pests, diseases, and climate change • Implement a risk-based approach to tree planting that considers location, species selection, and climate resilience • Develop contingency plans for extreme weather events that may impact the urban forest

14.0 APPENDIX E – PARKING SERVICES

The Parking service area manages on-street and off-street municipal parking assets, including surface lots, meters, and other equipment to support mobility and downtown vitality.

14.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

A variety of assets support the delivery of the City's Parking services. The Parking assets covered by this AM Plan are shown in Table 14.1. The largest portion of the asset mix are Surface Lots assets with a replacement value of $2.5M (approximately 76% of the total replacement value).

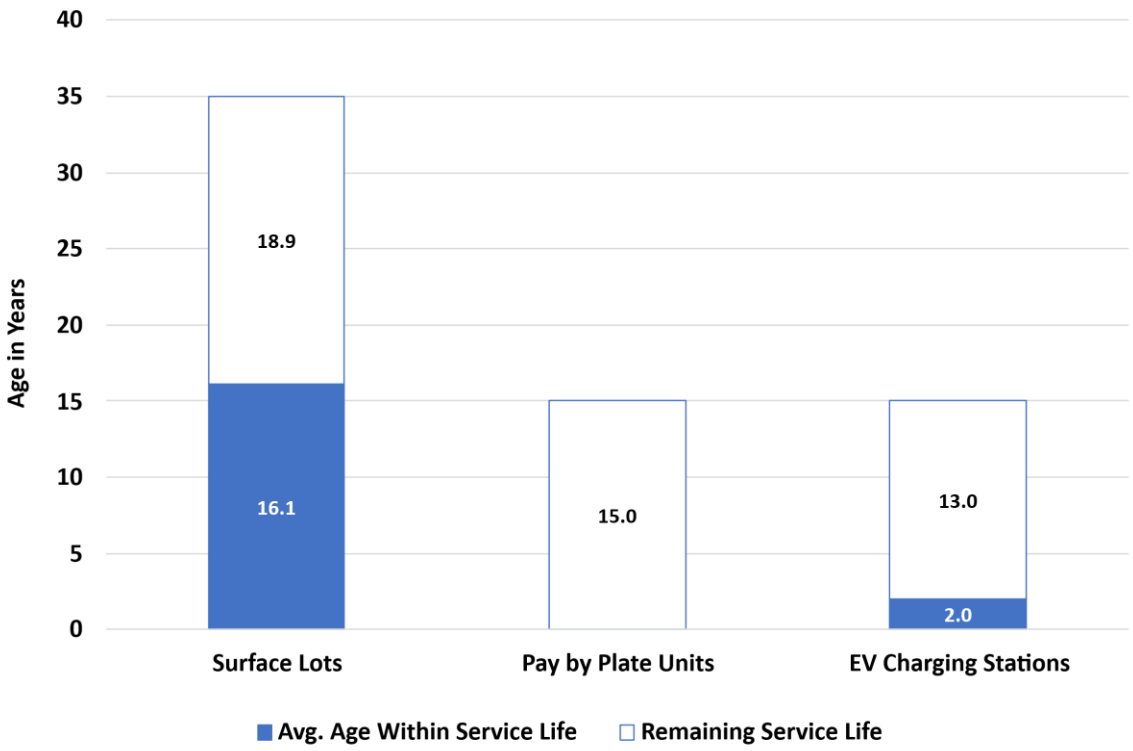
Table 14.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Parking Lots – Above Ground	Surface Lots	$2.5M	75.6%
Parking Equipment	Pay by Plate Units	$0.2M	6.2%
EV Charging Stations	EV Charging Stations	$0.1M	2.1%
Parking Sundry & Miscellaneous	Bike Racks, Light Standards	$0.5M	16.1%
TOTAL		**$3.3M**	**100%**

The age profile of the assets included in this AM Plan are shown in

Figure 14-1.

Figure 14-1 – Asset Age Profile



Notes on the above Asset Age Profile:

- Any assets missing information on install date have been excluded from the asset age profile shown above.

Asset condition

The asset condition profile by replacement cost for Parking services is shown in

Approximately $0.5 million (16%) of Parking assets are in unknown condition. These unknown assets are comprised primarily of Light Standards ($0.4 million) and Parking Bollards ($0.1 million).

Figure 14-2. The asset condition profile by asset category is shown in

Figure 14-3. The condition assessment of the City's Parking assets provides insights into the reliability of its infrastructure. Overall, approximately 81% of the City's Parking assets have a condition rating of fair or better.

Approximately $0.5 million (16%) of Parking assets are in unknown condition. These unknown assets are comprised primarily of Light Standards ($0.4 million) and Parking Bollards ($0.1 million).

Figure 14-2 – Asset Condition Profile

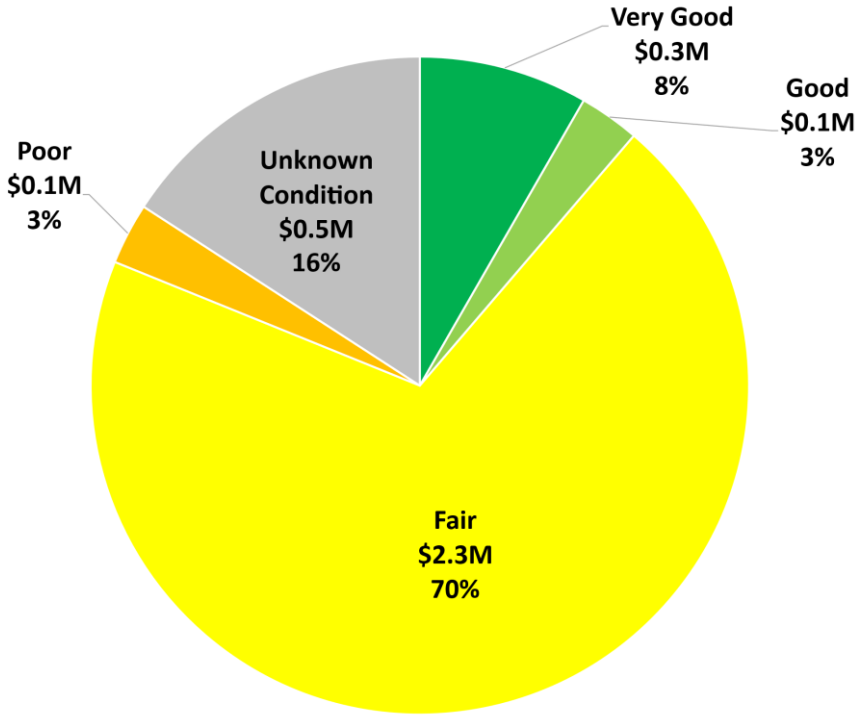
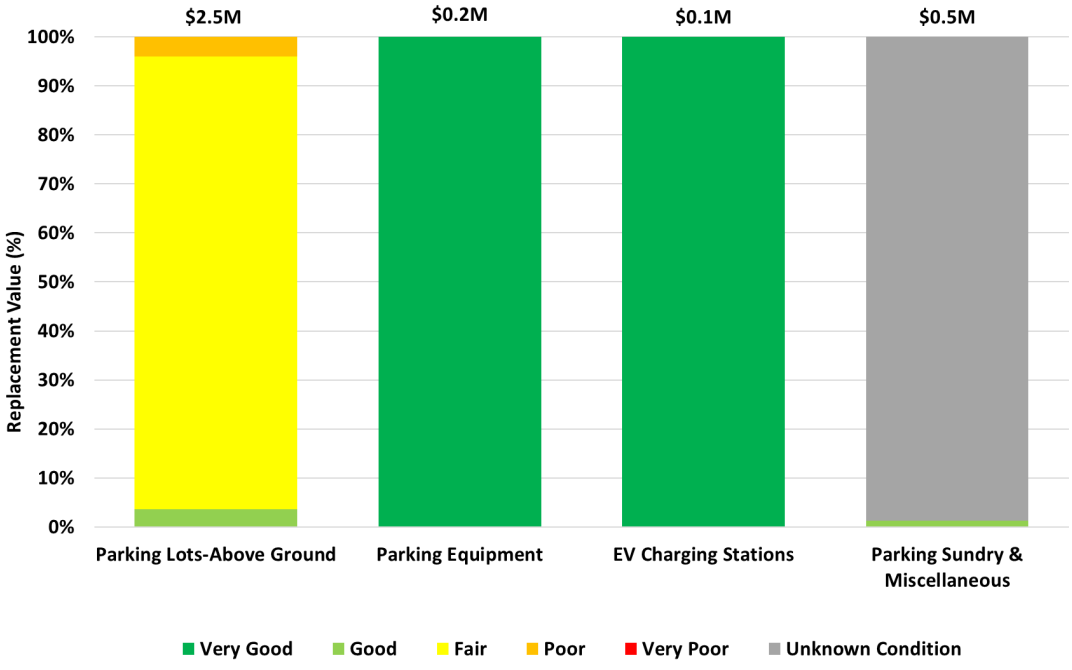


Figure 14-3 – Asset Condition Profile by Asset Category



14.2 LEVELS OF SERVICE

Table 14.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 14.2 – Levels of Service

Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Quality & Reliability	Provide infrastructure in acceptable condition and cleanliness by following and providing proper maintenance standards and inspections	% of assets within service life (by replacement value)	N/A	100% (of assets with age data)	100% (of assets with age data)	N/A: The City plans to review the need for parking assets once they fail in accordance with the Economic Development Plan.	
Financial Sustainability	City services are affordable and sustainable	Annual net revenue generated per parking space (including garages and off-street)	$313.63	$371.63	366.87	The City wants to make sure that this metric stays the same or improves over time.	

14.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

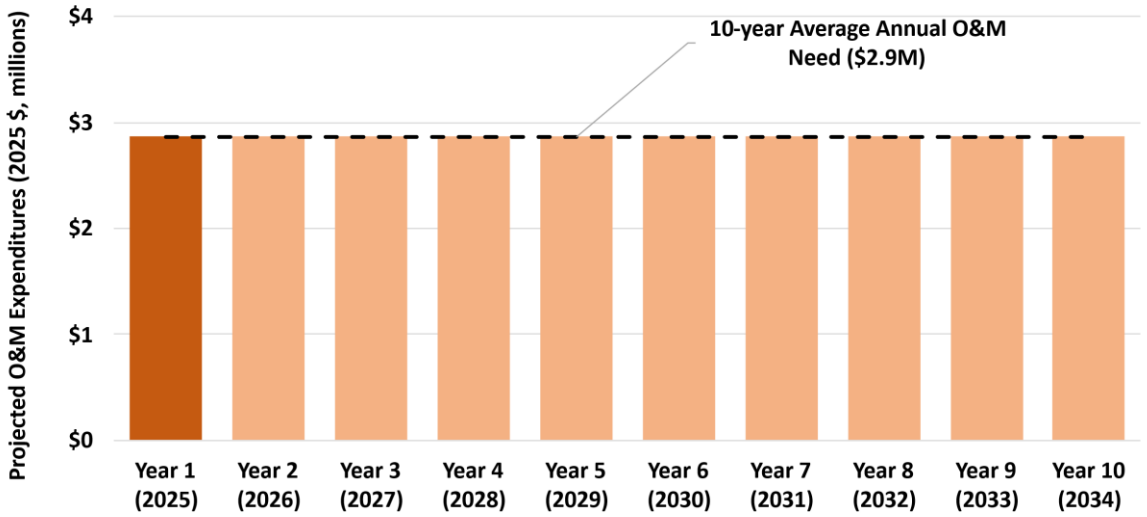
14.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. However, the City has no planned growth or expansion of Parking assets during the analysis period.

14.3.2 Summary of Forecast Operations and Maintenance costs

Figure 14-4 shows the operations and maintenance costs that were forecasted to remaining steady as there is no plan to increase the asset portfolio in the next 10 years, with the exception of regular inflation increases.

Figure 14-4 – Operations and Maintenance Summary



14.3.3 Summary of Forecast Renewal Costs

Forecast renewal costs are not projected to increase for parking assets as there is no plans to grow the portfolio and as assets fail, there is a process to review if the asset is required to be replaced or if the space could be repurposed for other City initiatives.

Figure 13-6 shows the forecasted condition of Parking assets over the next 10 years, based on two scenarios:

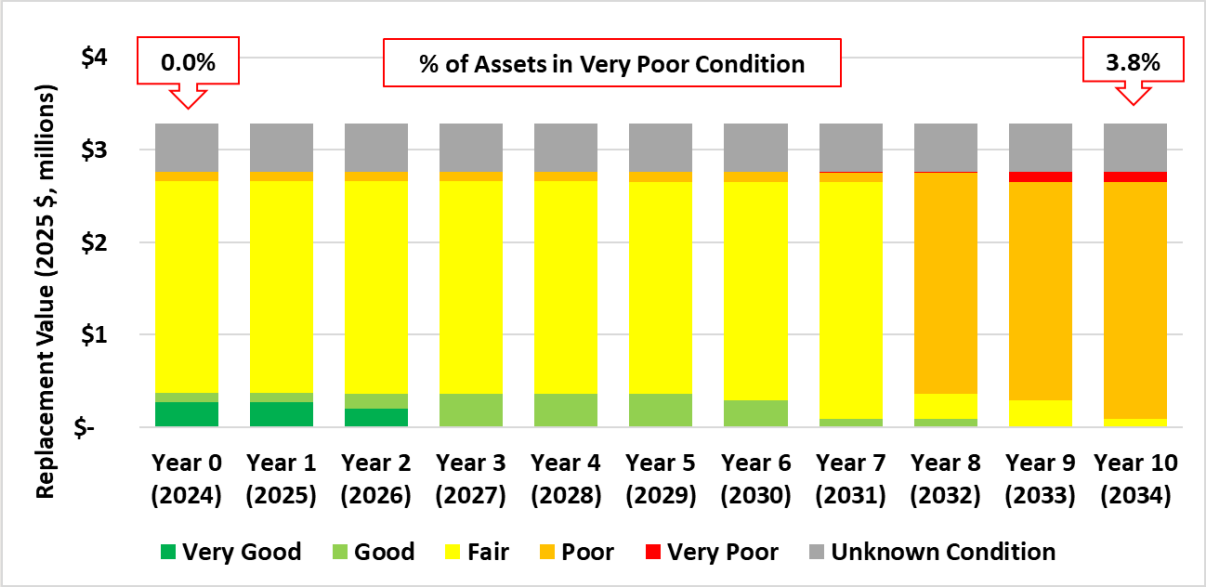
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $0.02 million per year to invest in the renewal of its Parking assets.

Figure 14-5 – Forecast Renewal Scenarios

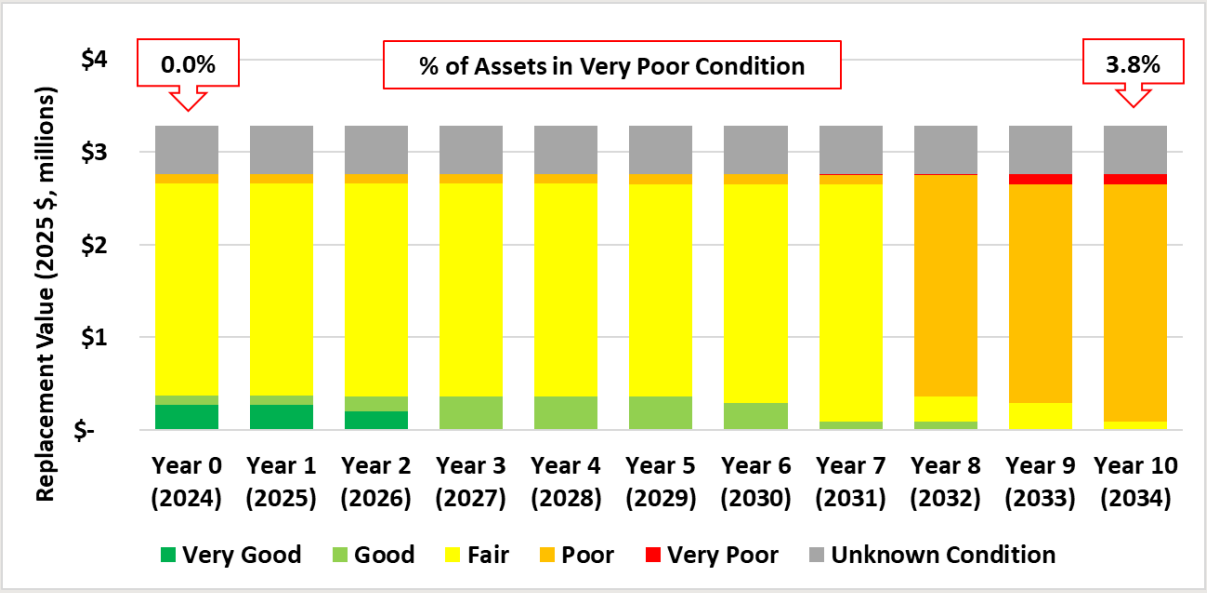
1. Planned Budget / Expected Performance ($0.02 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to deteriorate (% of assets in very poor condition) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based primarily on staff reported condition (82% of assets by replacement value).** For the remaining assets, the condition is determined based on their age relative to their estimated service life (see Table 24.4 in Appendix O). The forecast then estimates the planned replacement year based on when the asset has reached end of life. Renewal of certain assets have been deferred in order to align the forecast with the planned budget.



2. Proposed LOS: Planned Budget
($0.02 million per year average renewal investment from 2025 – 2034)

The proposed performance is the same as the expected performance, which will cause asset condition to deteriorate over the next 10 years. As a result, there is no funding gap associated with Parking assets. This aligns with the City's run-to-failure strategy for Parking assets. Once the assets have reached failure, the City plans to dispose of these assets for development purposes.



Additionally, the lifecycle average annual renewal need for Parking assets is approximately **$0.1 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** However, this analysis is not relevant due to the City's run-to-failure strategy for Parking assets.

14.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Maintenance Issues:** Staff visit and inspect parking lots daily and conduct an annual review of asphalt condition to identify needs.
- **Capacity Planning:** A long-term parking strategy is being developed in 2025 which will outline the parking needs for the City.
- **System Failures:** There is a 10-year contract with an existing contractor with 9-years remaining. This contract includes service level agreements for response times for outages.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.18 in Appendix O) with the probability of failure ratings for all infrastructure represented within Parking services. As shown in Figure 14-6, there are currently no Parking assets with high-risk exposure.

Figure 14-6 – Risk Exposure Map for Parking Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$0.0	$0.0	$0.0	$0.0	$0.0
Major	$0.0	$0.0	$0.0	$0.0	$0.0
Moderate	$0.0	$0.1	$2.3	$0.1	$0.0
Minor	$0.3	$0.0	$0.0	$0.0	$0.0
Probability of Failure					

Risk Exposure	$	%
High	$0.0	0.0%
Moderate	$2.4	86.6%
Low	$0.4	13.4%
Total	$2.8	100.0%

Critical risks are those assessed with a risk rating of High, however, there are currently no Parking assets with a risk rating of High.

14.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Forestry asset management are shown in Table 14.3.

Table 14.3 – Improvement Recommendations – Parking

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Create an inventory for bollards in the above ground parking lots • Asses the current condition of the "Unknown" condition assets
Levels of Service	• Consider adding capacity and use metrics to track parking utilization rates • Align parking service levels with the City's 2023-2026 strategic plan objectives
Lifecycle Management and Financial Summary	• N/A
Risk Management	• N/A

15.0 APPENDIX F – PARKS, OPEN SPACES & TRAILS SERVICES

The Parks, Open Spaces & Trails service area includes the planning, development, and maintenance of the City's parks, natural areas, sports fields, and trail networks, promoting recreation, environmental stewardship, and community well-being.

15.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

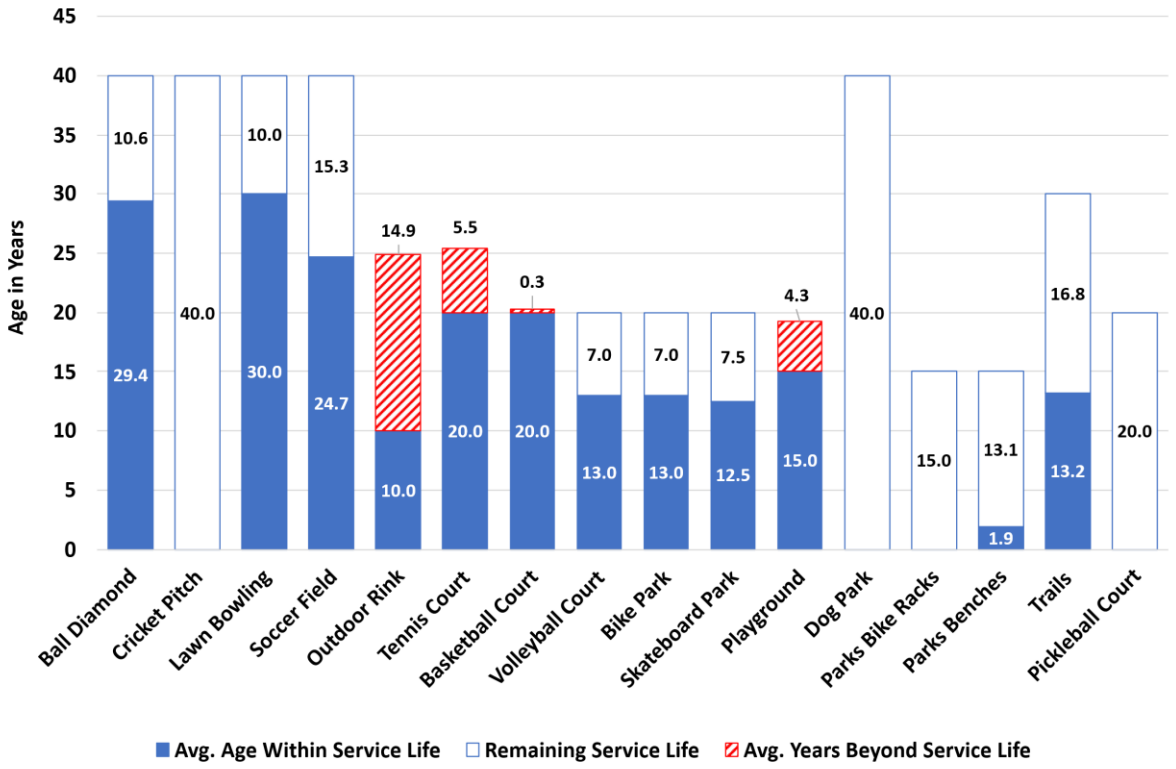
A variety of assets support the delivery of the City's parks, open spaces, and trails services. The park, open space, and trail service assets covered by this AM Plan are shown in Table 15.1. The largest portion of the asset mix are Pedestrian Network assets with a replacement value of $74.1M (approximately 59% of the total replacement value).

Table 15.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Recreational Fields	Ball Diamonds, Cricket, Lawn Bowling, Soccer Fields, Disc Fields, Field Hockey Pitch	$27.6M	22.1%
Recreational Hard Surfaces	Outdoor Rinks, Tennis Courts, Basketball Courts, Volleyball Courts, Bike Parks, Skateboard Parks, Shuffleboard Court, Pickleball Court	$8.6M	6.9%
Playgrounds	Playgrounds	$12.3M	9.9%
Pedestrian Network	Boardwalks, Bridges, Trails	$74.1M	59.4%
Park Amenities & Furnishings	Dog Parks, Bike Racks, Garbage Containers, Picnic Tables, Bollards, Benches	$2.2M	1.8%
TOTAL		**$124.7M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 15-1.

Figure 15-1 – Asset Age Profile



Notes on the above Asset Age Profile:

- Any assets missing information on install date have been excluded from the asset age profile shown above.
- Outdoor Rinks, Tennis Courts, Basketball Courts and Playgrounds have an average age that has surpassed their average service life.

Asset condition

The asset condition profile by replacement cost for parks, open spaces and trails services is shown in Figure 15-2. The asset condition profile by asset category is shown in Figure 15-3. The condition assessment of the City's parks, open spaces and trails assets provides insight into the reliability of its infrastructure. Overall, approximately 69% of the City's parks, open spaces and trails assets have a condition rating of fair or better.

Approximately $2.8 million (2%) of Parks, Open Spaces & Trails assets are in unknown condition. These unknown assets are comprised primarily of Parks Garbage Containers (0.8 million), Trails (0.6 million), Dog Parks (0.5 million), Parks Picnic Tables (0.3 million) and Parks Bike Racks (0.2 million).

Figure 15-2 – Asset Condition Profile

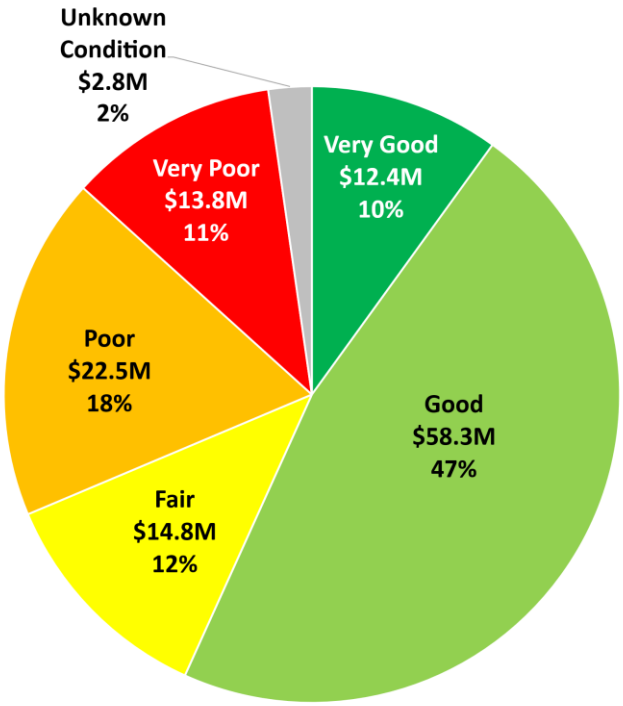
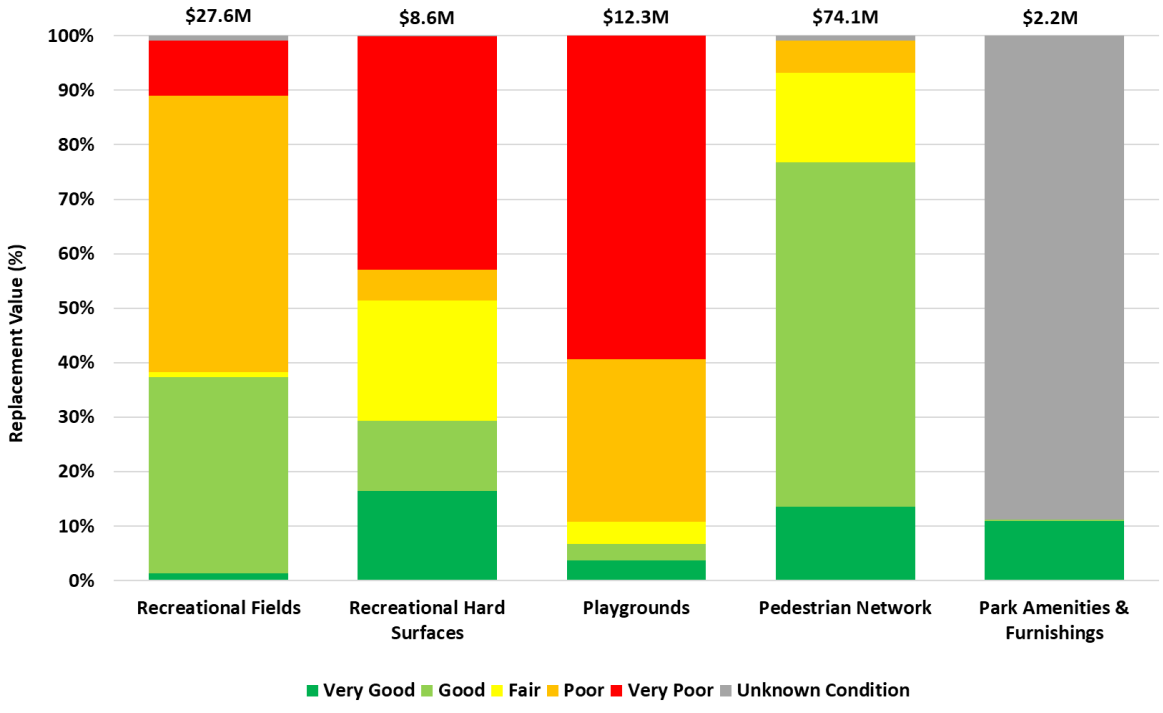


Figure 15-3 – Asset Condition Profile by Asset Category



15.2 LEVELS OF SERVICE

Table 15.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 15.2 – Levels of Service

Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Capacity & Use	Provide access to Parklands for the whole community	Total parkland supply (Planned Parks) (ha) / 1,000 residents	1,942.6 ha / 281,359 population[3]	1,942.4 ha / 301,147 population	1,949.4 ha / 320,360 population	1 ha / 1,000 residents	
	Provide access to Park amenities and programs for the whole community	Population to Sports field Ratio (Number of sports fields per 1,000 population)	Possible future metric				
		% of Trails that are paved % of Trails that have winter maintenance	Possible future metric				
		Utilization rates of recreation assets	Possible future metric				
Function	Services meet customer needs while limiting health, safety, security, natural and heritage impacts	Number of wards with a fully accessible playground	0	0	Some playgrounds have accessible components, but almost none of the playgrounds are fully	Potential target of 1 accessible playground per ward (10 wards for 10 total playgrounds)	

[3] Population numbers are based on Statistics Canada Information

Technical Focused Levels of Service							
LOS Category	Community Level of Service	Performance Measure	Performance			Target/Proposed Performance (Value or Qualitative Trend)	Notes
			2022	2023	2024		
					accessible (Current performance of 0)		
	Active recreation facilities are provided with adequate features	% of active recreation facilities that are lighted	21%	N/A[4]	N/A[4]	The City will look to make current fields lighted on a project-by-project basis.	
Quality & Reliability	Provide infrastructure in acceptable condition by following proper maintenance standards	% of assets in fair or better condition	N/A	70.1%	70.2%	N/A	
		% of playgrounds in fair or better condition	N/A	9.3%	10.8%	N/A	
		% of sport fields in fair or better condition	N/A	38.6%	38.6%	N/A	
		% of trails in fair or better condition	N/A	90.5%	90.6%	N/A	
		Report on completion of Cycling & Trails Master Plan recommendations	N/A	N/A	24 of 35	100%	

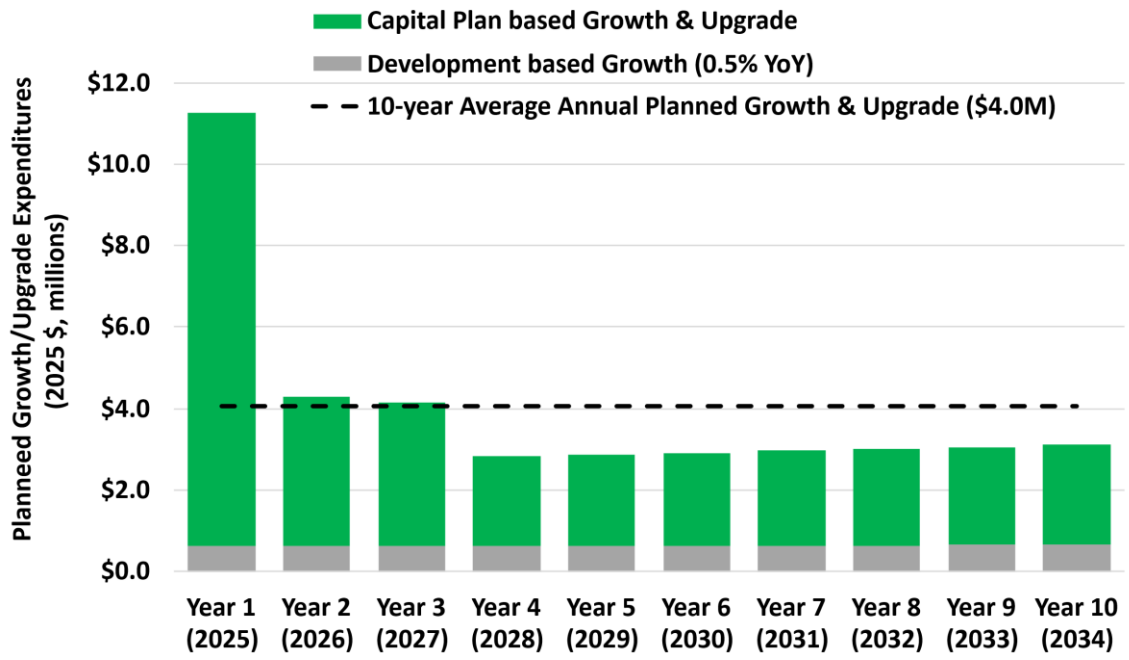
[4] Values were not available at the time of this document publication.

15.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

15.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social or environmental needs. Forecast acquisition asset costs are summarized in Figure 15-4. The City assumes that there will be at least a 0.5% growth in the asset portfolio annually to account for assets assumed through development. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

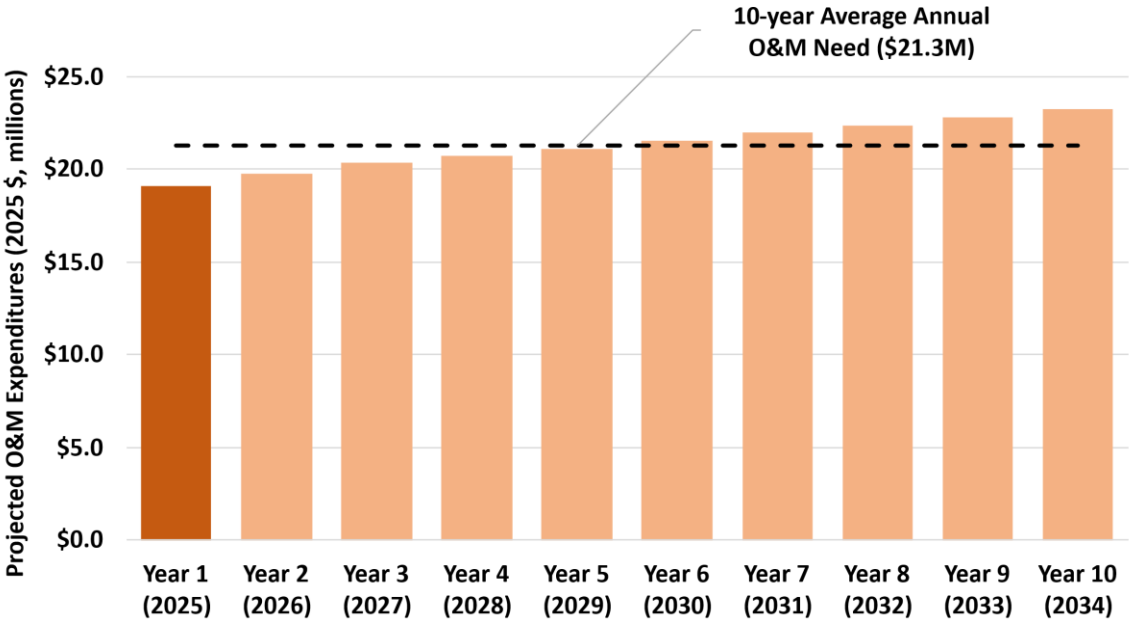
Figure 15-4 – Yearly Acquisition and Upgrade Summary



Summary of Forecast Operations and Maintenance Costs

Figure 15-5 shows the operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased relative to the growth of the overall asset portfolio (See Section 15.3.1 for related growth costs). Regular increases due to inflation were not included.

Figure 15-5 – Operations and Maintenance Summary



15.3.2 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 15-6 shows the forecasted condition of Parks, Open Spaces and Trails assets over the next 10 years, based on two scenarios:

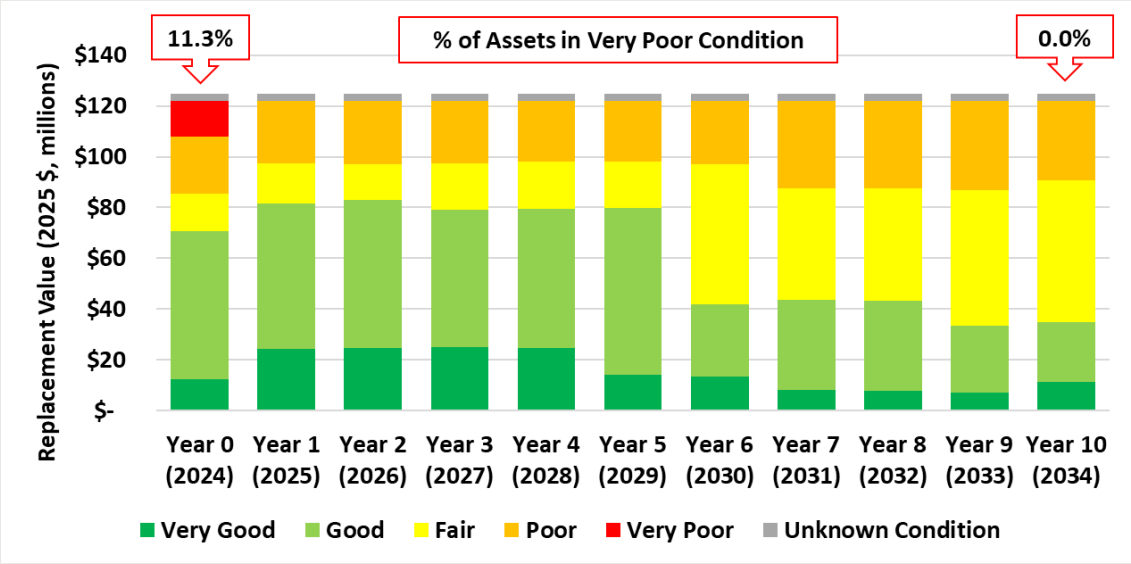
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $6.9 million per year to invest in the renewal of its Parks, Open Spaces and Trails assets. **City staff noted that the capital plan estimates are more accurate than the condition reported for each asset due to gaps in the available data. City staff are working to improve the condition assessment of Parks, Open Spaces, and Trails assets to ensure improved alignment of the capital plan with the condition of physical assets.**

Figure 15-6 – Forecast Renewal Scenarios

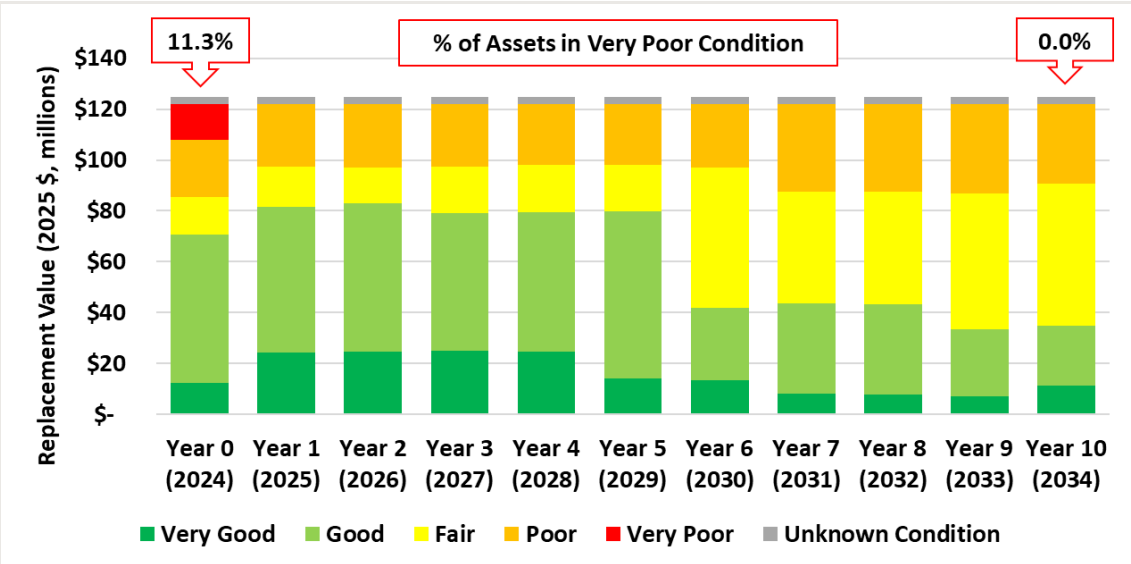
1. Planned Budget / Expected Performance ($6.9 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to improve (% of assets in very poor condition) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based primarily on staff reported condition (71% of assets by replacement value).** For the remaining assets, the condition is determined based on their age relative to their estimated service life (see Table 24.5 in Appendix O). The forecast then estimates the planned replacement year based on when the asset has reached end of life. Renewal of certain assets have been deferred in order to align the forecast with the planned budget.



2. Proposed LOS: Planned Budget ($6.9 million per year average renewal investment from 2025 – 2034)

The proposed performance is the same as the expected performance, which improves asset condition over the next 10 years. As a result, there is no funding gap associated with Parks, Open Spaces and Trails assets.



Additionally, the lifecycle average annual renewal need for Fleet assets is approximately **$4.7 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** The City's proposed renewal investment of $6.9 million per year in the renewal of Parks, Open Spaces and Trails assets from 2025 – 2034 is sufficient to meet the expected need in the years beyond the analysis period based on the available asset data.

15.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Climate Change:** Staff are looking into moving trails that are prone to flooding issues, adjusting the planting list to include species that are better suited to warmer climates, using drought tolerant grasses for open spaces, improving access to shade in parks to help deal with heat waves, and installing weather stations to detect wind bursts to support faster operational response.
- **Inequitable Access:** There is an update parkland strategy in 2025 that addresses intensification and equitable access.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure failure ratings (see

Table 24.19 in Appendix O) with the probability of failure ratings for all infrastructure represented within Parks, Open Spaces & Trails services. As shown in Figure 15-7, an estimated $18.8 million (15.4%) of Parks, Open Spaces & Trails assets currently have a high-risk exposure.

Figure 15-7 – Risk Exposure Map for Parks, Open Spaces and Trails Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$7.6	$21.6	$1.3	$0.0	$0.8
Major	$0.5	$0.4	$0.5	$3.7	$7.3
Moderate	$4.3	$36.4	$13.0	$18.8	$5.6
Minor	$0.1	$0.0	$0.0	$0.0	$0.0
	Probability of Failure				

Risk Exposure	$	%
High	$18.8	15.4%
Moderate	$54.3	44.5%
Low	$48.8	40.1%
Total	$121.9	100.0%

Critical risks are those assessed with a risk rating of High. The mitigation plan, residual risk, and mitigation costs of implementing the selected mitigation plan are shown in

Table 15.3.

Table 15.3 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Playgrounds	Poor asset condition resulting in the inability to perform services	High	Renewal work to perform any necessary repairs or replacement of assets	Low	$11.0
Skateboard Parks					$1.7
Bike Parks					$0.5
Soccer Fields					$2.8
Outdoor Rinks					$0.4
Basketball Courts					$0.9
Tennis Courts					$1.5

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

15.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Parks, Open Spaces and Trails asset management are shown in Table 15.4.

Table 15.4 – Improvement Recommendations – Parks, Open Spaces and Trails

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Improve condition information for all assets (i.e., sports fields, playgrounds, etc.) to better inform lifecycle management strategies • Establish an inventory system to better manage asset acquisitions and disposals so the City knows what assets they are managing.

AM Plan Section	Improvement Recommendation
Levels of Service	• Add a metric for the percentage of trail network that is paved or winter-maintained • Add metrics on utilization rates of bookable sports resources (average occupancy or percentage of use) • Align levels of service with the Park Strategic Plan objectives, particularly regarding: evaluating current and future location/quantity of parks, providing strategic guidance for acquiring new parks, assessing underserved areas and growth projections and applying an equity lens to prioritize acquisitions
Lifecycle Management and Financial Summary	• Clarify ownership and management of assets related to the cycling and trails master plan recommendations • Determine where funding flows for maintenance of various assets to ensure proper budgeting • Develop a more detailed understanding of maintenance requirements for horticulture assets • Develop a more accurate method for budgeting growth due to development, rather than using a simple percentage increase
Risk Management	• Implement risk assessment for both asset management and project prioritization that aligns with Enterprise Risk Framework • Re-assess risk following improvement in condition assessments to gather a better reflection of asset portfolio risk

16.0 APPENDIX G – TRANSPORTATION SERVICES

The Transportation service area encompasses the planning, maintenance, and enhancement of road related infrastructure to ensure safe and efficient mobility for all modes of travel.

16.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

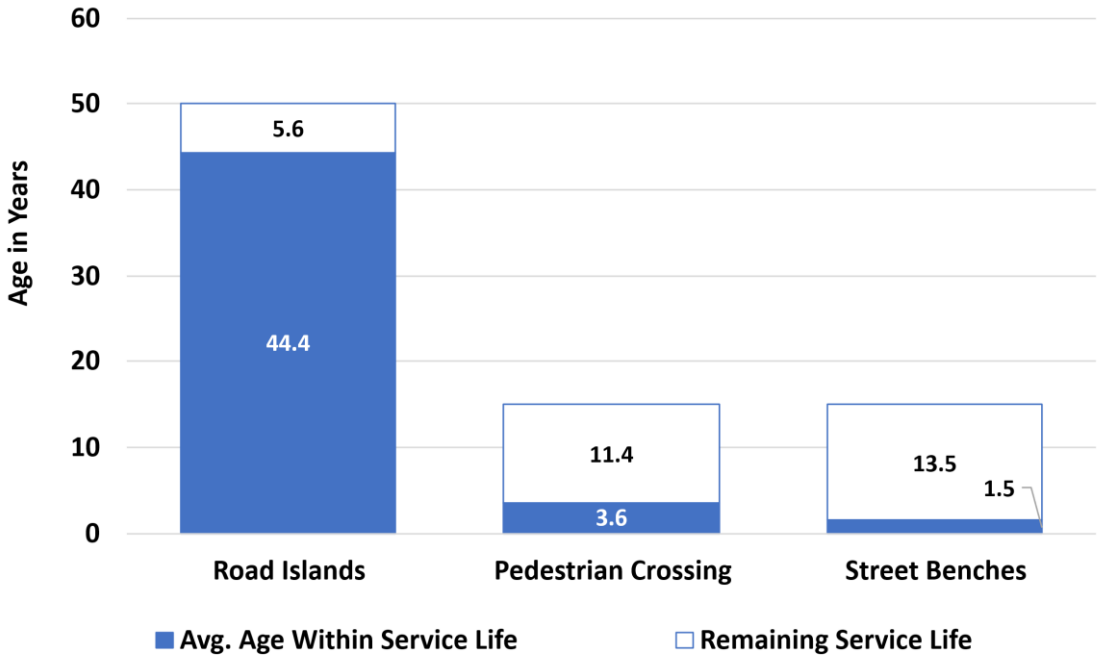
A variety of assets support the delivery of the City's Transportation services. The Transportation assets covered by this AM Plan are shown in Table 16.1. The largest portion of the asset mix are Streetlight & Poles assets with a replacement value of $36.7M (approximately 62% of the total replacement value).

Table 16.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Streetlights & Poles	Streetlight, Streetlight Pole	$36.7M	61.8%
Traffic Signs & Pedestrian Crossings	Traffic Signs, Pedestrian Crossings & Beacons	$6.3M	10.6%
Pedestrian Railings	Railing	$0.1M	0.2%
Road and Pedestrian Islands & Traffic Calming	Road Islands, Raised Crosswalks, Speed Humps, Pedestrian Pads	$15.3M	25.8%
Street Furniture & Other Furnishings	Street Benches, Bollards	$1.0M	1.6%
TOTAL		**$59.3M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 16-1.

Figure 16-1 – Asset Age Profile



Notes on the above Asset Age Profile:

- Any assets missing information on install date have been excluded from the asset age profile shown above.

Asset condition

The asset condition profile by replacement cost for Transportation services is shown in Figure 16-2. The asset condition profile by asset category is shown in Figure 16-3. The condition assessment of the City's Transportation assets provides insights into the reliability of its infrastructure. Overall, approximately 83% of the City's Transportation assets have a condition rating of fair or better.

Approximately $1.2 million (2%) of Transportation assets are in unknown condition. These unknown assets are comprised primarily of Transportation Bollards (0.9 million), Traffic Signs (0.1 million) and Railings (0.1 million).

Figure 16-2 – Asset Condition Profile

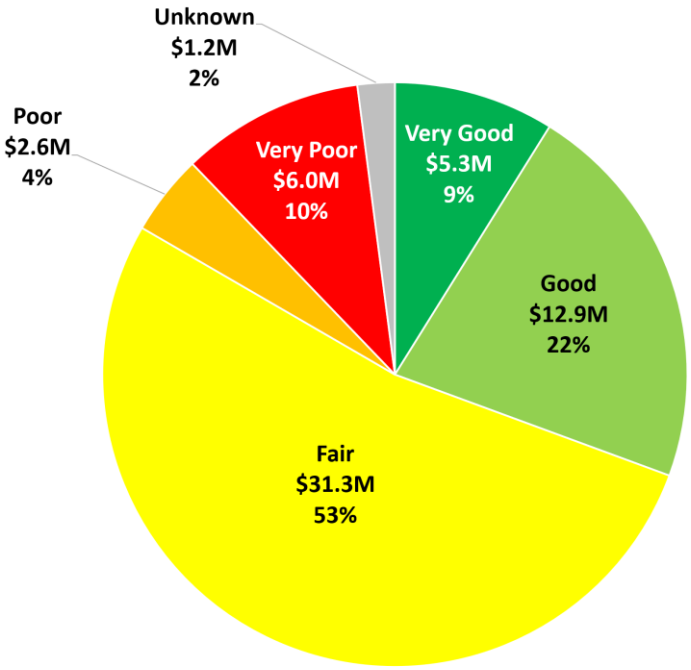
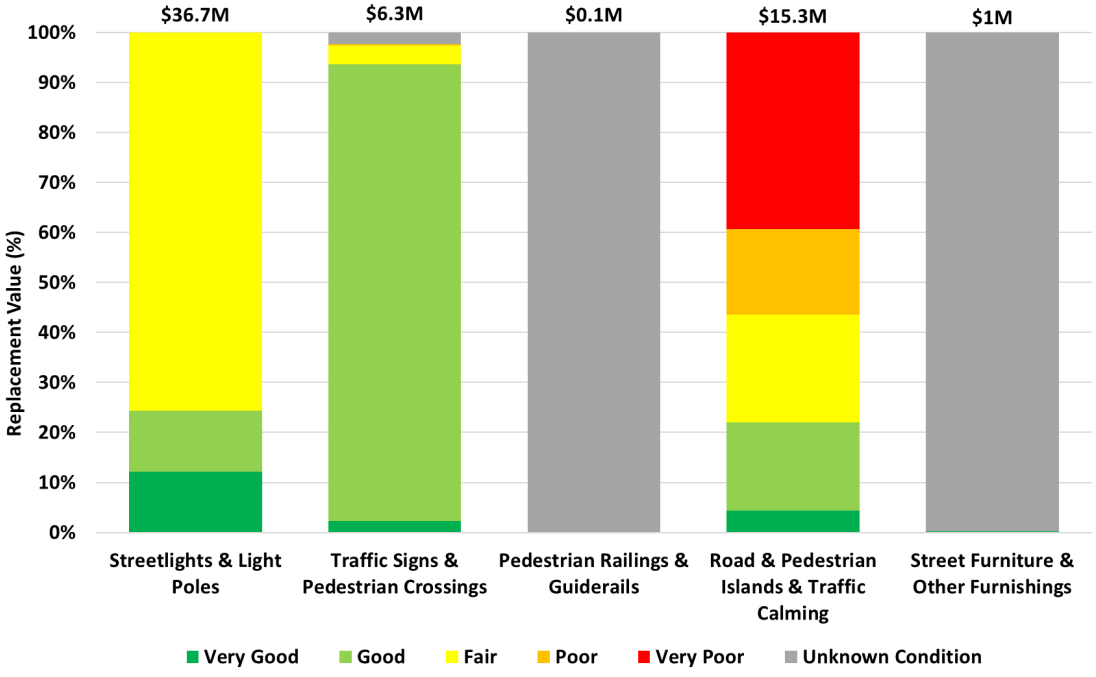


Figure 16-3 – Asset Condition Profile by Asset Category



16.2 LEVELS OF SERVICE

Table 16.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section. The City adds Traffic Calming and Street Lighting assets as it expands or acquires assets from developers. Assets related to improving safety and traffic calming are identified through other data exercises/audits.

Table 16.2 – Levels of Service

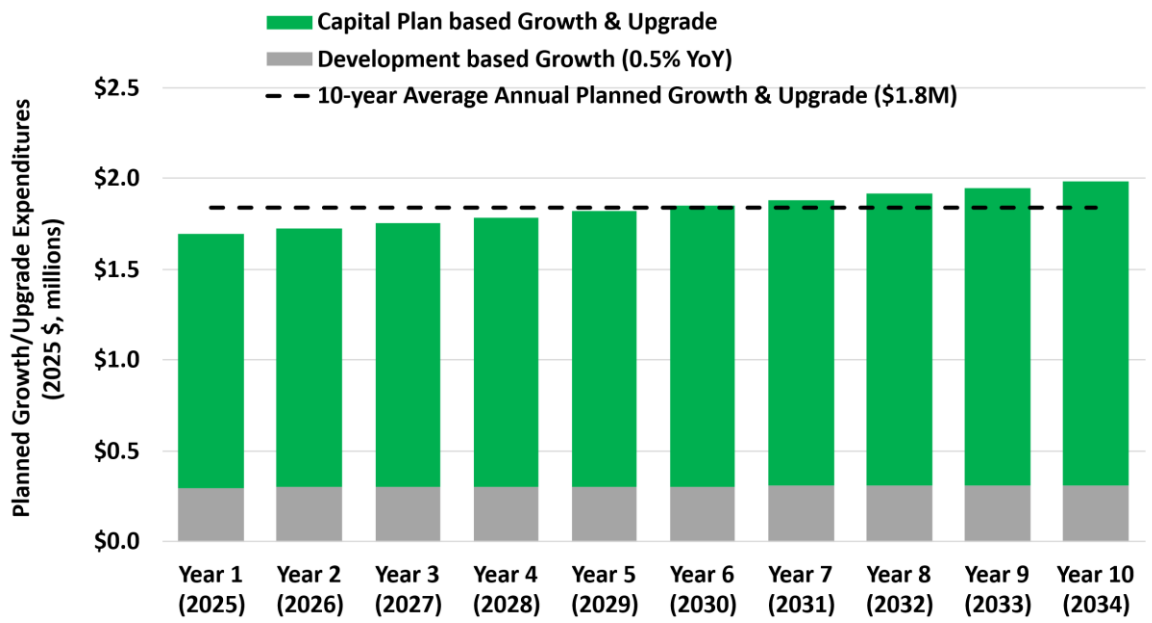
Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Function	Meet customer needs while limiting health, safety, and natural impacts	# of permanent road safety improvements installed per year	14	27	33	No firm target. City assesses the network as a whole and prioritizes safety improvements based on the highest risk for fatality or injury areas based on available budget.	
		Percentage of streets that meet minimum lighting standards	Possible future metric				
		Percentage of streetlights with outages	N/A	N/A	2.2%	~2% with outages	
		% of regulatory signs passing sign reflectivity testing standards	97%	97.4%	98.6%	100%	
Quality & Reliability	Provide infrastructure in acceptable condition and cleanliness by following and providing proper maintenance standards and inspections	% of assets within service life (by replacement value)	N/A	91.3%	89.2%	N/A	

16.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

16.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social, or environmental needs. Forecast acquisition asset costs are summarized in Figure 16-4. The City assumes that there will be at least a 0.5% growth in the asset portfolio annually to account for assets assumed through development. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

Figure 16-4 – Yearly Acquisition Summary

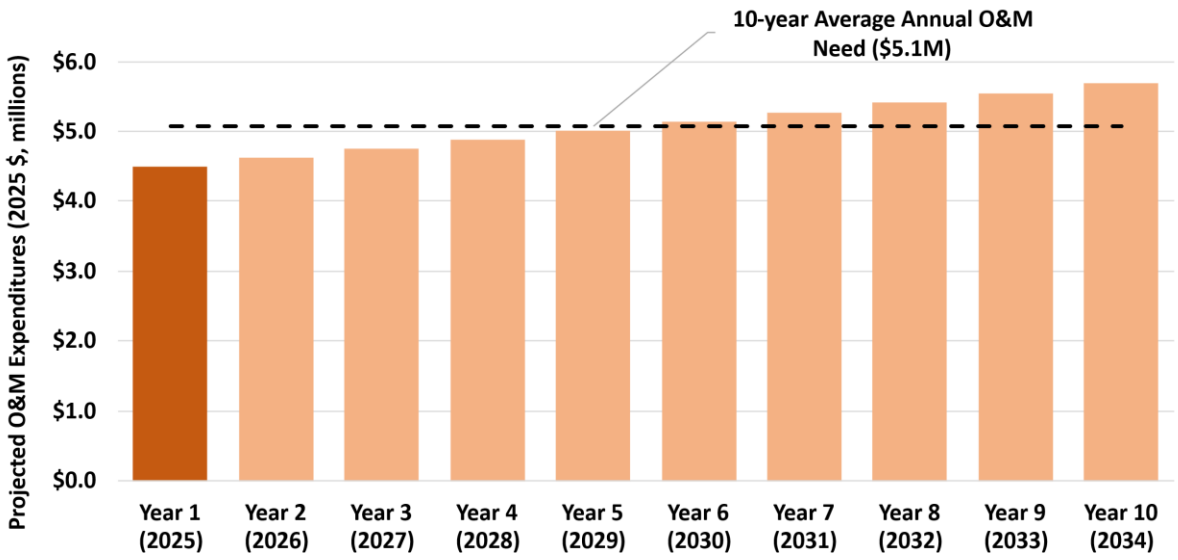


Summary of Forecast Operations and Maintenance Costs

Figure 16-5 shows the operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased relative to the

growth of the overall asset portfolio (See Section 16.3.1 for related growth costs). Regular increases due to inflation were not included.

Figure 16-5 – Operations and Maintenance Summary



16.3.2 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 15-6 shows the forecasted condition of Transportation assets over the next 10 years, based on two scenarios:

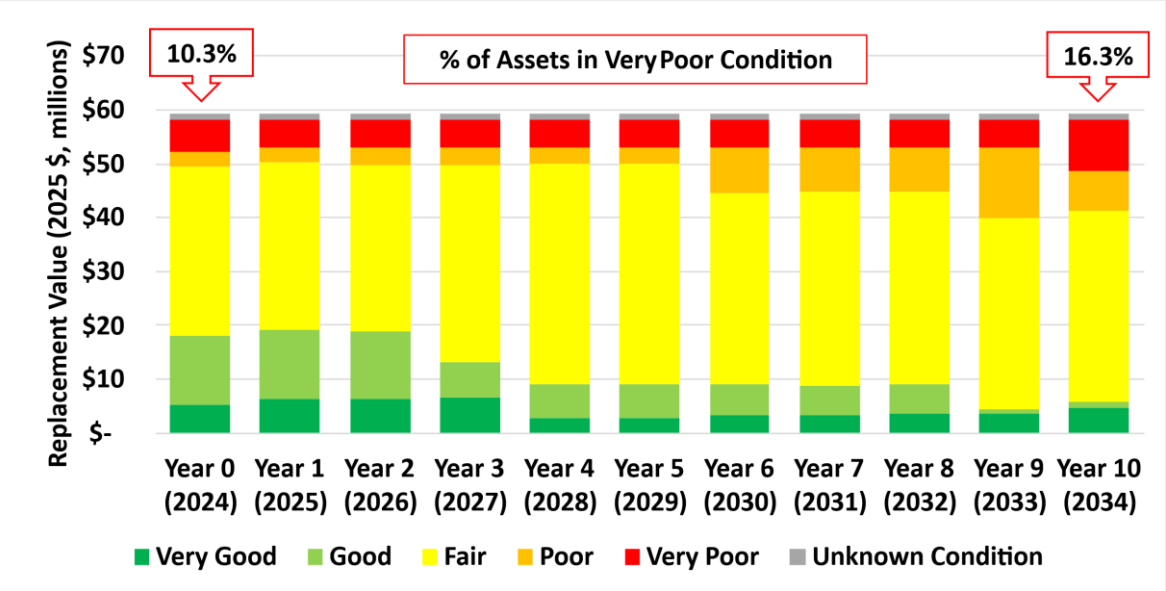
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $0.4 million per year to invest in the renewal of its Transportation assets.

Figure 16-6 – Forecast Renewal Scenarios

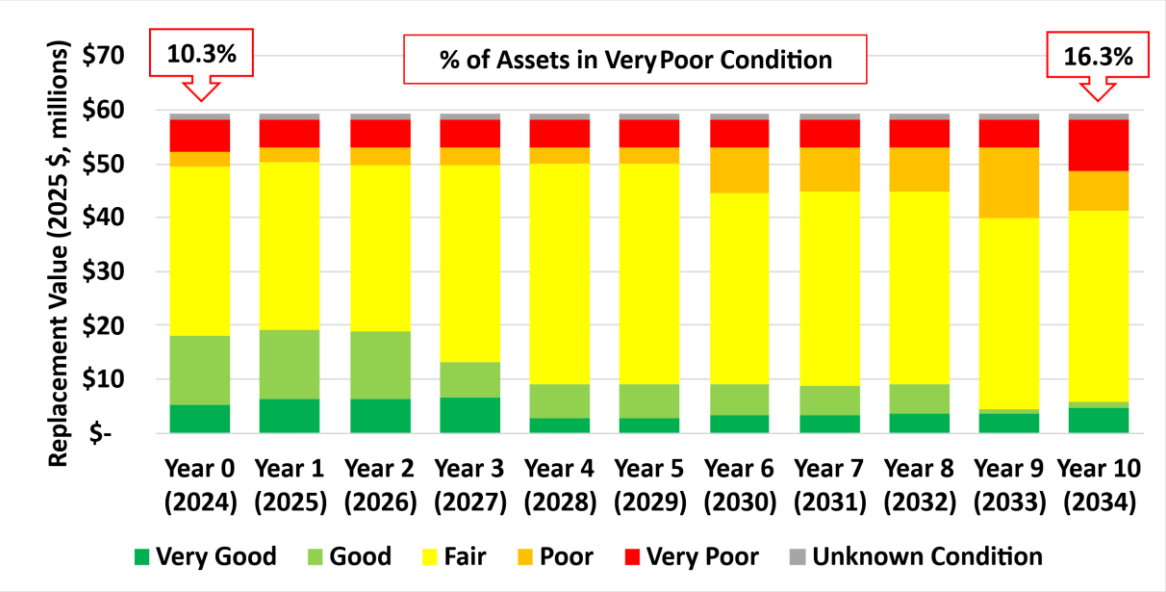
1. Planned Budget / Expected Performance ($0.4 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to deteriorate (% of assets in very poor condition) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based primarily on staff reported condition (75% of assets by replacement value).** For the remaining assets, the condition is determined based on their age relative to their estimated service life (see Table 24.6 in Appendix O). The forecast then estimates the planned replacement year based on when the asset has reached end of life. Renewal of certain assets have been deferred in order to align the forecast with the planned budget.



2. Proposed LOS: Planned Budget
($0.4 million per year average renewal investment from 2025 – 2034)

The proposed performance is the same as the expected performance, which will cause asset condition to deteriorate over the next 10 years. As a result, there is no funding gap associated with Transportation assets. This aligns with the City's current plan to operate many Transportation assets to failure. The City is generally targeting around a 20% failure rate in order to better understand asset service lives before seeking additional funding from Council.



Additionally, the lifecycle average annual renewal need for Transportation assets is approximately **$1.8 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** However, this analysis is not relevant due to the City's operate to failure strategy for Transportation assets.

16.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Weather Events:** All traffic assets are designed to be weather-proof.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.20 in Appendix O) with the probability of failure ratings for all infrastructure represented within Transportation services. As shown in Figure 16-7, there are currently no Transportation assets with high-risk exposure.

Figure 16-7 – Risk Exposure Map for Transportation Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$0.0	$0.0	$0.0	$0.0	$0.0
Major	$4.6	$4.6	$27.8	$0.0	$0.0
Moderate	$0.2	$5.8	$0.2	$0.0	$0.0
Minor	$0.5	$2.5	$3.3	$2.6	$6.0
Probability of Failure					

Risk Exposure	$	%
High	$0.0	0.0%
Moderate	$32.6	56.1%
Low	$25.5	43.9%
Total	$58.1	100.0%

Critical risks are those assessed with a risk rating of High, however, there are currently no Transportation assets with a risk rating of High.

16.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Transportation asset management are shown in Table 16.3.

Table 16.3 – Improvement Recommendations – Transportation

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Clarify the delineation of assets between Roads, Parks and Transportation, particularly for multi-use trails and raised crosswalks
Levels of Service	• Track the percentage of signalized intersections equipped with accessible pedestrian signals and the percentage of streetlights with LED fixtures
Lifecycle Management and Financial Summary	• Develop a more accurate method for budgeting growth due to development, rather than using a simple percentage increase
Risk Management	• N/A

17.0 APPENDIX H – WATER UTILITY SERVICES

The Water Utility service area delivers safe, potable water to residents and businesses through the operation and maintenance of water treatment mains, service connections and other appurtenances.

17.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

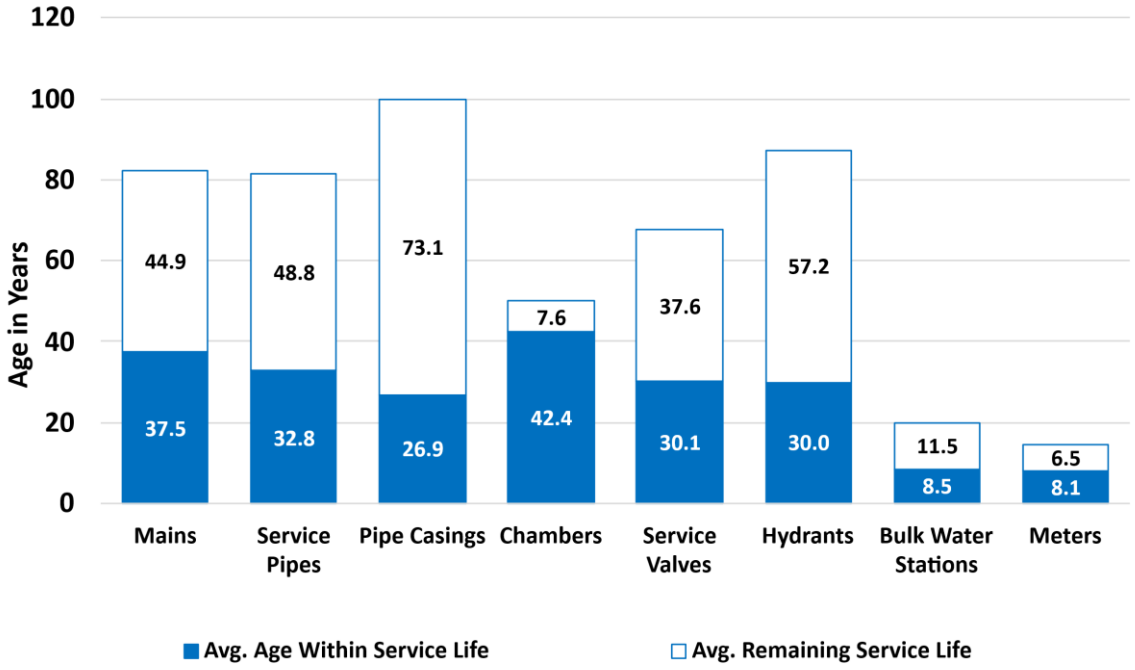
A variety of assets support the delivery of the City's water utility services. The water utility assets covered by this AM Plan are shown in Table 17.1. The largest portion of the asset mix are Mains assets with a replacement value of $1,254.0M. This category of assets accounts for approximately 45% of the total replacement value of all water utility assets.

Table 17.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Mains, Service Pipes and Appurtenances	Mains	$1,254.0M	44.9%
	Service Pipes	$1,140.0M	40.8%
	Pipe Casings	$5.4M	0.2%
	Chambers	$20.7M	0.7%
Valves	Main Valves	$148.6M	5.3%
	Service Valves	$113.3M	4.1%
Hydrants	Hydrants	$89.9M	3.2%
Bulk Water Stations	Bulk Water Stations	$0.1M	0.0%
Meters	Meters	$20.3M	0.7%
TOTAL		**$2,791.4M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 17-1.

Figure 17-1 – Asset Age Profile



Asset condition

The asset condition profile by replacement cost for water utility services is shown in

Figure 17-2. The asset condition profile by asset category is shown in Figure 16-3. The condition assessment of the City's water utility assets provides insight into the reliability of its infrastructure. Overall, approximately 94% of the City's Water Utility assets have a condition rating of fair or better. It should be noted that water main breaks occur on assets with varying conditions (not only limited to assets in Very Poor or Poor condition). Replacement of water mains is primarily driven by the number of water main breaks.

Approximately $15.5 million (1%) of Water Utility assets are in unknown condition. These unknown assets are comprised of Service Pipes ($7.2 million), Service Valves ($3.1 million), Pipe Casings ($2.5 million), Main Valves ($1.4 million), Chambers ($0.9 million) and Hydrants ($0.5 million).

Figure 17-2 – Asset Condition Profile

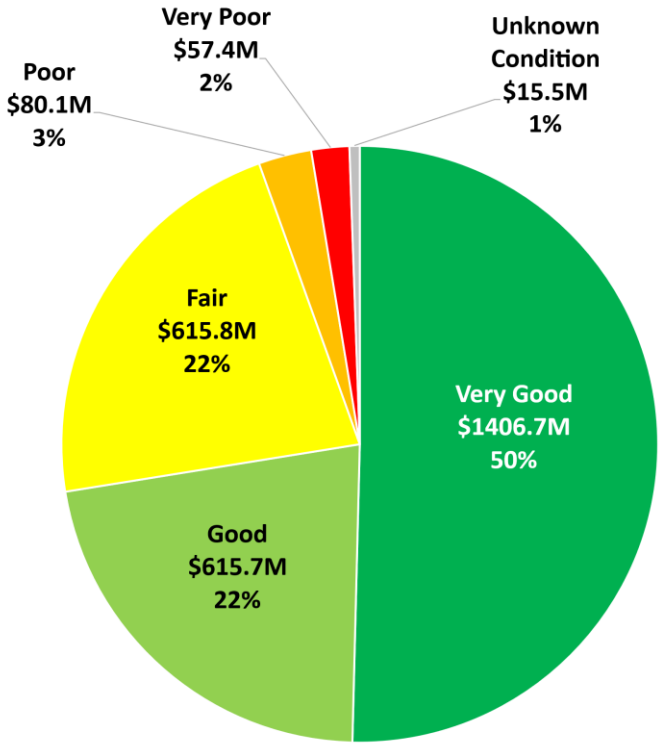
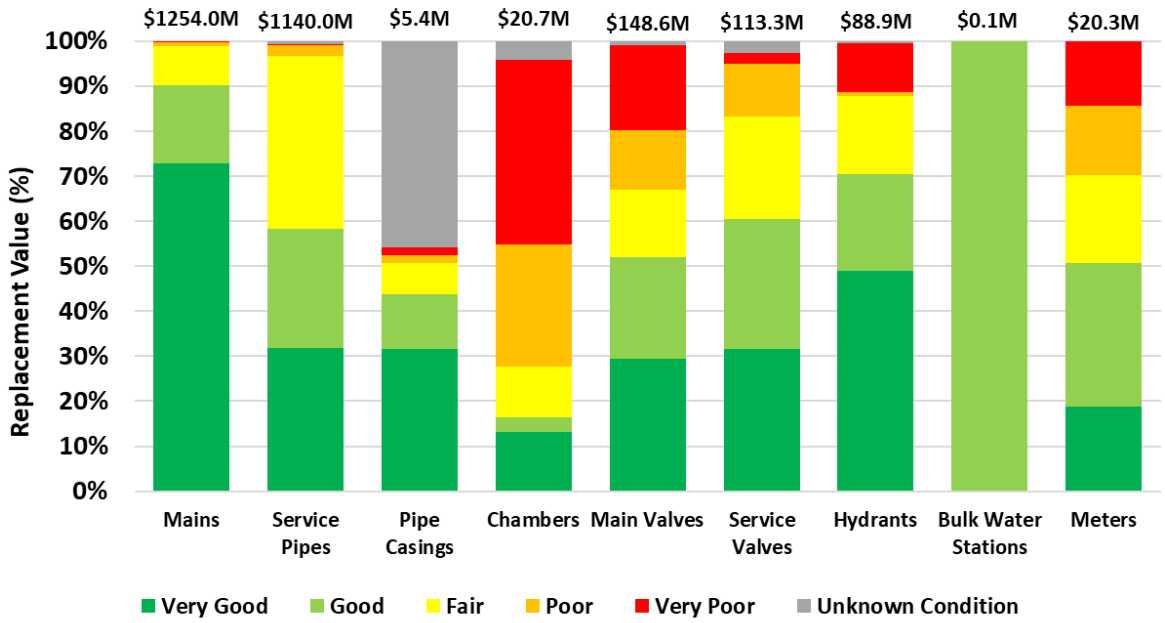


Figure 17-3 – Asset Condition Profile by Asset Category



17.2 LEVELS OF SERVICE

Table 17.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 17.2 – Levels of Service

Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Capacity & Use	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.	Percentage of properties connected to the municipal water system	94%	94%	95%	Maintain current performance	
		Percentage of properties where fire flow is available	94%	94%	95%	Maintain current performance	
Function	Provide a water service that considers the environment	Unaccounted for water	10%	9.9%	4.5%[5]	< 10%	
	Provide a supply of water that is consistently safe and of high quality	Adverse Water Quality Incidents (AWQIS)	15	20	17	< 30	

[5] This value is currently under review by the City and will be updated in future LOS reporting.

Technical Focused Levels of Service							
LOS Category	Community Level of Service	Performance Measure	Performance			Target/Proposed Performance (Value or Qualitative Trend)	Notes
			2022	2023	2024		
Quality & Reliability	Description of boil water advisories and service interruptions	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 (scaled to boil advisory days/1000 connections)	0.02	2.33	0	< 0.6	
		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 (presented as watermain breaks per 100km)	10.1	4.7	5.9	< 9.0	

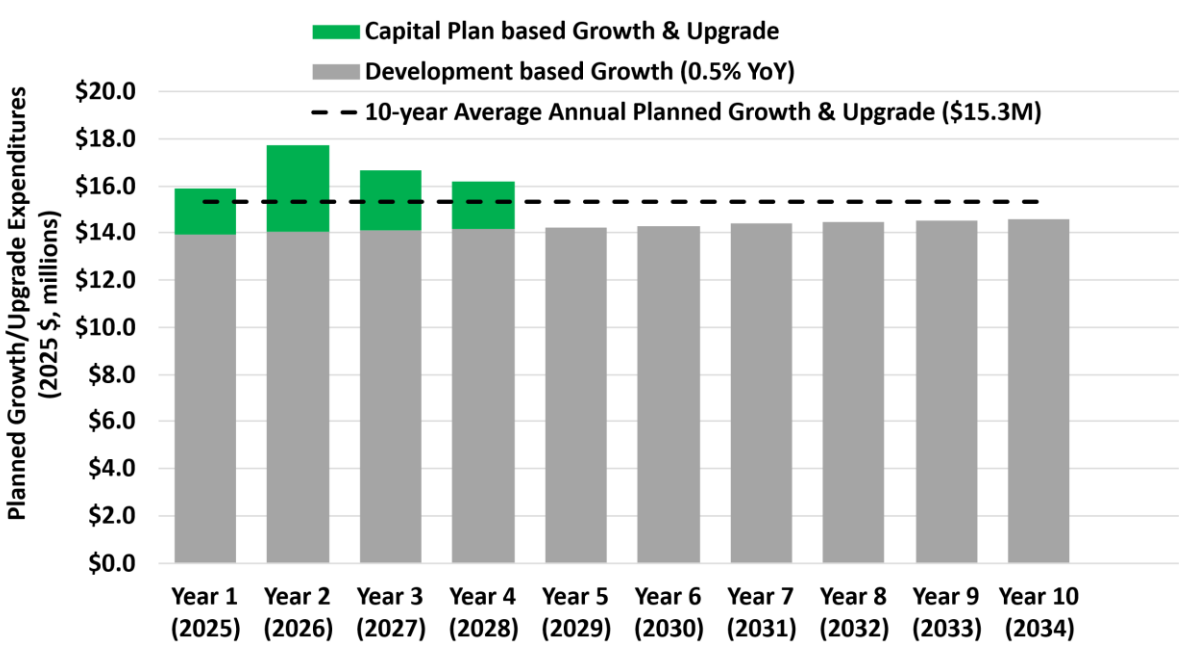
Technical Focused Levels of Service							
LOS Category	Community Level of Service	Performance Measure	Performance			Target/Proposed Performance (Value or Qualitative Trend)	Notes
			2022	2023	2024		
	Provide a supply of water that is consistently safe and of high quality	# of water quality complaints per 1000 people	0.38	0.33	0.46	< 0.6	
	Supply water to all users who require it with minimal service interruptions	% valves cycled	23.4%	17.1%	23%	17% (or 1/6th of the City per year)	
		% of mains in fair or better condition	N/A	N/A	99.0% (weighted by replacement value)	Maintain current performance	

17.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

17.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social, or environmental needs. Forecast acquisition asset costs are summarized in Figure 17-4. The City assumes that there will be at least a 0.5% growth in the asset portfolio annually to account for assets assumed through development. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

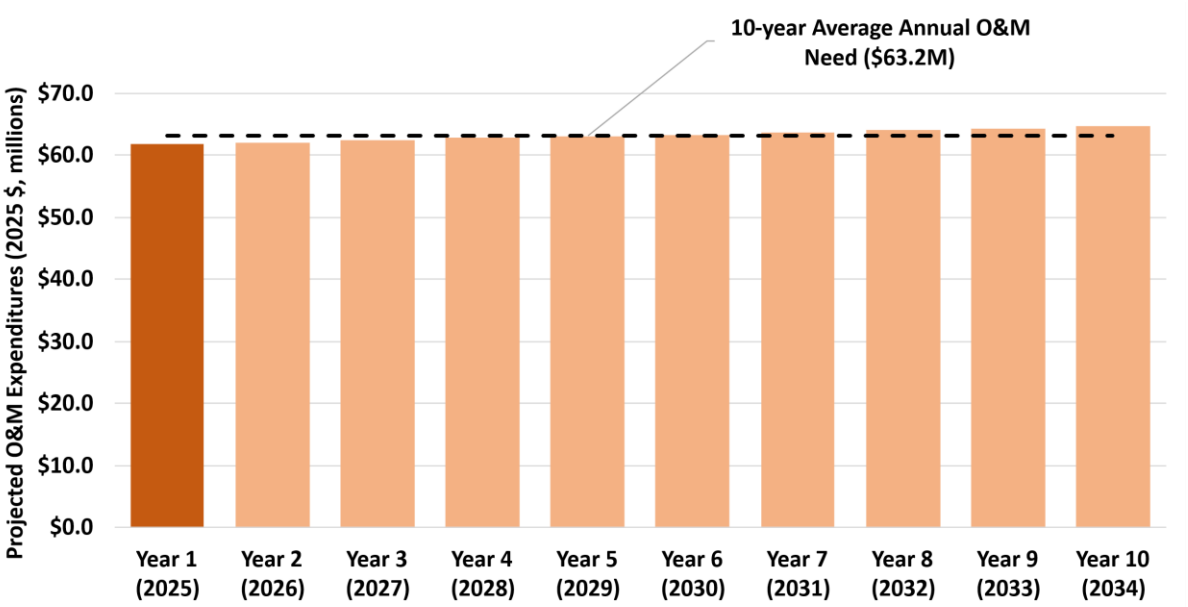
Figure 17-4 – Yearly Acquisition and Upgrade Summary



Summary of Forecast Operations and Maintenance Costs

Figure 17-5 shows the operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased relative to the growth of the overall asset portfolio (See Section 17.3.1 for related growth costs). Regular increases due to inflation were not included.

Figure 17-5 – Operations and Maintenance Summary



17.3.2 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 17-6 shows the forecasted condition of Water Utility assets over the next 10 years, based on two scenarios:

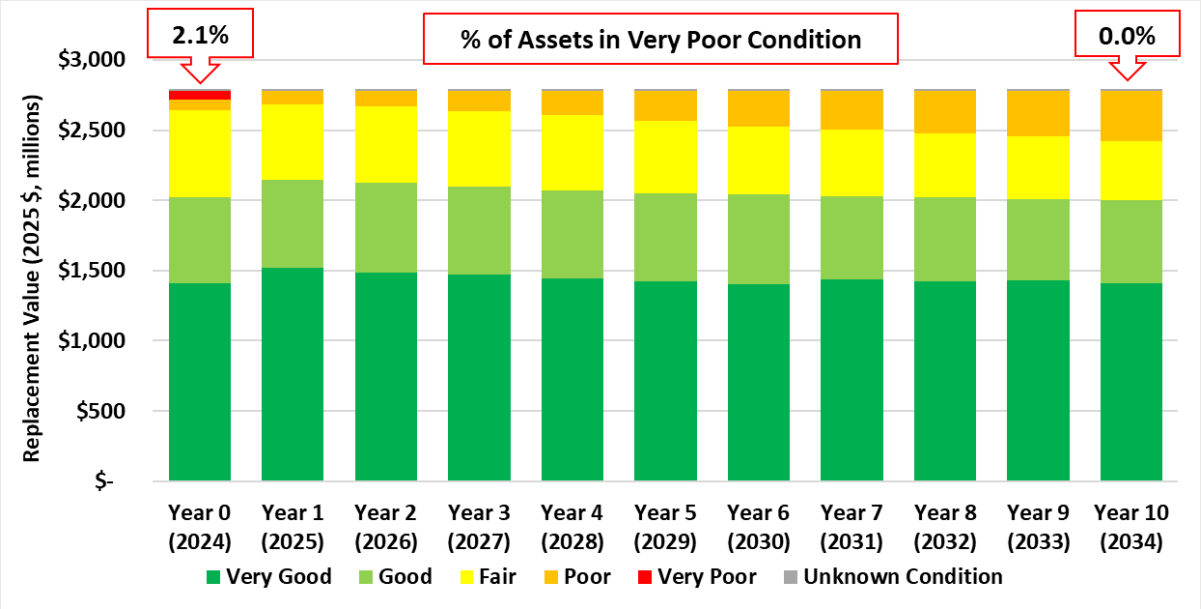
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $18.4 million per year to invest in the renewal of its Water Utility assets.

Figure 17-6 – Forecast Renewal Costs

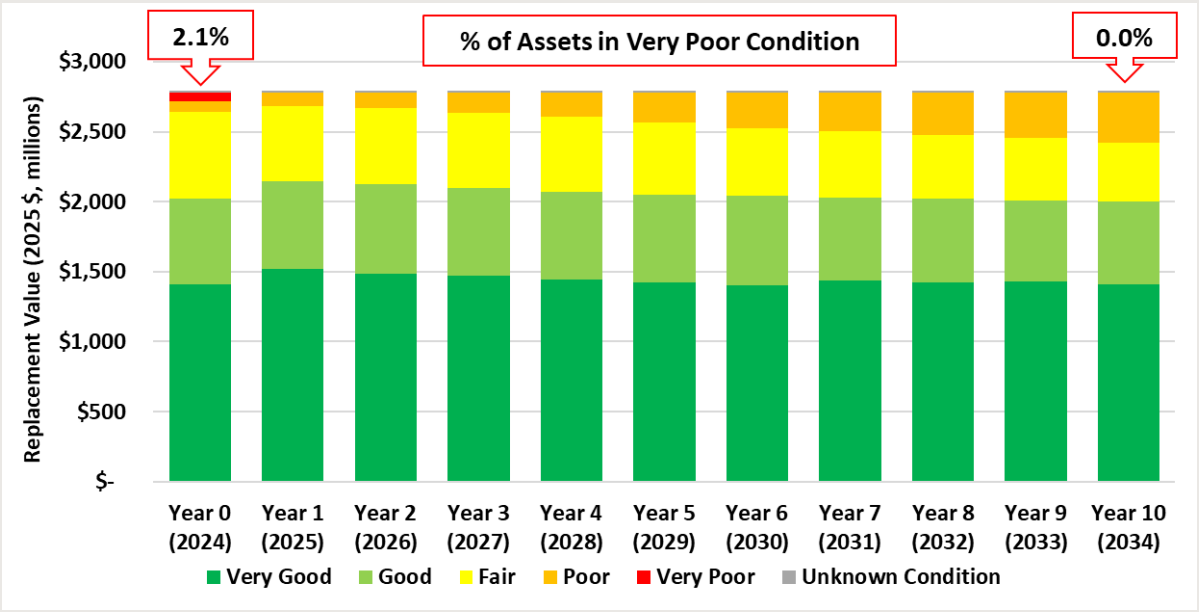
1. Planned Budget / Expected Performance ($18.4 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to improve (% of assets in very poor condition) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based primarily on their age relative to their estimated service life (55% of asset by replacement value)** (see Table 24.7 in Appendix O). For the remaining assets, the condition is determined based on staff reported condition. The forecast then estimates the planned replacement year based on when the asset has reached end of life. Renewal of certain assets have been deferred in order to align the forecast with the planned budget.



2. Proposed LOS: Planned Budget
($18.4 million per year average renewal investment from 2025 – 2034)

The proposed performance is the same as the expected performance, which improves asset condition over the next 10 years. As a result, there is no funding gap associated with Water Utility assets.



Additionally, the lifecycle average annual renewal need for Water Utility assets is approximately **$38.0 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** Therefore, the City's proposed renewal investment of $18.4 million per year in the renewal of Water Utility assets from 2025 – 2034, may be insufficient to address renewal need in the years beyond the analysis period.

17.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Climate Change:** The City is a member of ONWarn which is an early warning system for issues. There is a formalized process for responding to frozen services and a backflow prevention program. There is also a plan to remove air relief chambers to reduce flooding impacts.
- **Overuse and Demand Growth:** The City works closely with the Region on water supply master planning and mitigation measures. The City is also working on an official plan that includes a plan to respond to infill development.
- **Asset Criticality:** There is a criticality rating system for all water assets and it is currently being updated in alignment with the Region's information. This work will identify high criticality pipes which will support targeted future investment.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.21 in Appendix O) with the probability of failure ratings for all infrastructure represented within Water Utility services. As shown in Figure 17-7, an estimated $201.4 million (7.3%) of Water Utility assets currently have high-risk exposure.

Figure 17-7 – Risk Exposure Map for Water Utility Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$913.6	$218.7	$108.6	$10.1	$3.0
Major	$43.2	$34.2	$25.2	$25.9	$38.4
Moderate	$405.8	$372.0	$481.4	$57.0	$15.3
Minor	$3.8	$6.8	$5.3	$3.4	$4.0
Probability of Failure					

Risk Exposure	$	%
High	$201.4	7.3%
Moderate	$816.5	29.4%
Low	$1,757.9	63.3%
Total	$2,775.8	100.0%

Critical risks are those assessed with a risk rating of High. The mitigation plan, residual risk, and mitigation costs of implementing the selected mitigation plan is shown in Table 17.3.

Table 17.3 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Mains	Poor asset condition resulting in the inability to perform services	High	Renewal work to perform any necessary repairs or replacement of assets	Low	$121.7
Main Valves					$49.8
Service Valves					$3.0
Chambers					$14.6
Hydrants					$9.6
Service Pipes					$2.7

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

17.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Water Utility asset management are shown in

Table 17.4.

Table 17.4 – Improvement Recommendations – Water Utility

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Asses the current condition of the “Unknown” condition assets • Develop a condition grading program that converts current annual Hydrant inspections to a condition grade
Levels of Service	• Consider adding a metric for tracking the effectiveness of proactive maintenance programs like valve cycling and main cleaning • Develop relationship between LOS metric data collection and asset management reporting and decision making
Lifecycle Management and Financial Summary	• Develop a more accurate method for budgeting growth due to development, rather than using a simple percentage increase • Develop a more detailed work plan for water main renewal, particularly focusing on areas with known issues like the Forest Heights area • Establish an improved condition forecast that considers capital work as part of broader reconstruction projects to show the condition improvements to the portfolio
Risk Management	• Implement risk assessment for both asset management and project prioritization that aligns with Enterprise Risk Framework

18.0 APPENDIX I – SANITARY UTILITY SERVICES

The Sanitary Utility service area manages the collection and conveyance of wastewater to pumping stations, protecting public health and the environment through a reliable sewer network.

18.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

A variety of assets support the delivery of the City's sanitary utility services. The sanitary utility assets covered by this AM Plan are shown in Table 18.1 and Table 18.2. The largest portion of the asset mix are Mains assets with a replacement value of $2,035.4M (approximately 67% of the total replacement value).

Table 18.1 – Linear Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Mains, Service Pipes and Other Appurtenances	Mains	$2,035.4M	66.9%
	Force Mains	$101.4M	3.3%
	Service Pipes	$791.1M	26.0%
	Plugs	$0.3M	0.0%
Manholes	Maintenance Holes	$116.3M	3.8%
TOTAL		**$3044.6M**	**100%**

Table 18.2 – Vertical Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Pumping Stations	Stoke SPS	$3.0M	3.0%
	Patricia SPS	$1.2M	1.2%
	Moore SPS	$0.7M	0.7%
	Oxford SPS	$1.4M	1.4%
	Falconridge SPS	$2.4M	2.4%
	Victoria/Breslau (Shirley) SPS	$8.4M	8.4%
	Carson SPS	$2.4M	2.4%
	Manchester SPS	$4.3M	4.3%
	Otterbein SPS	$4.0M	4.0%
	Springmount SPS	$3.0M	3.0%
	Bancroft SPS	$1.6M	1.6%
	Apple Tree SPS	$2.0M	2.0%
	Woolner Trail SPS	$8.4M	8.4%

Asset Category	Asset Types	Replacement Value (2025$, M)	%
	Chandos SPS	$2.3M	2.3%
	King Street SPS	$7.6M	7.5%
	River Birch SPS	$2.6M	2.6%
	Pioneer Tower SPS	$2.6M	2.6%
	Homer Watson SPS	$10.8M	10.8%
	Conestoga College SPS	$1.9M	1.9%
	New Dundee SPS	$9.7M	9.7%
	Nathalie SPS	$7.4M	7.4%
	New Old Mill SPS	$12.3M	12.3%
TOTAL		**$100.1M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 18-1 and

Figure 18-2.

Figure 18-1 – Linear Asset Age Profile

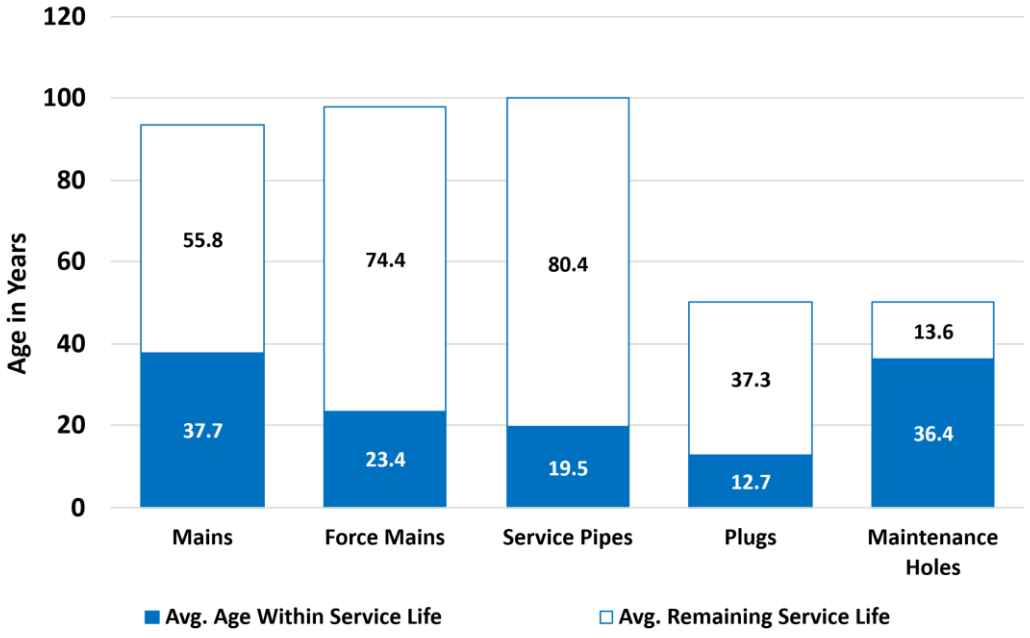
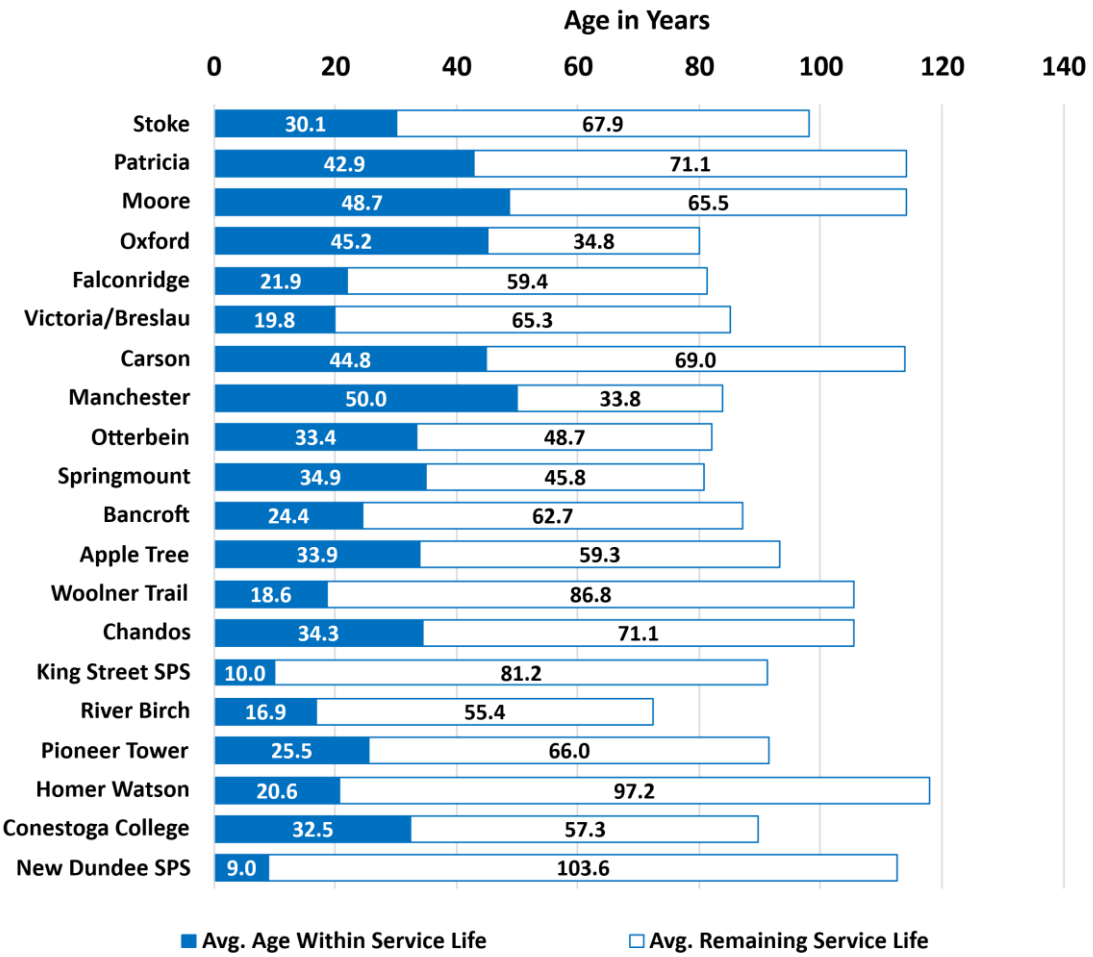


Figure 18-2 – Vertical Asset Age Profile



Notes on the above Asset Age Profiles:

- Any assets missing information on install date have been excluded from the asset age profiles shown above.

Asset condition

The asset condition profiles by replacement cost for sanitary utility services is shown in

Figure 18-3 and

Figure 18-5. The asset condition profiles by asset category are shown in

Figure 18-4 and

Figure 18-6. The condition assessment of the City's sanitary utility assets provides insight into the reliability of its infrastructure. Overall, approximately 80% of the City's linear sanitary utility assets have a condition rating of fair or better and approximately 78% of the City's vertical sanitary utility assets have a condition rating of fair or better.

Approximately $370.7 million of Linear Sanitary Utility assets are in unknown condition. These unknown assets are comprised of Service Pipes ($355.8 million), Mains ($12.9 million), and Maintenance Holes ($2.0 million). Approximately $19.7 million of Vertical Sanitary Utility assets are in unknown condition. These unknown assets are comprised of Nathalie SPS ($7.4 million) and New Old Mill SPS ($12.3 million).

Figure 18-3 – Linear Asset Condition Profile

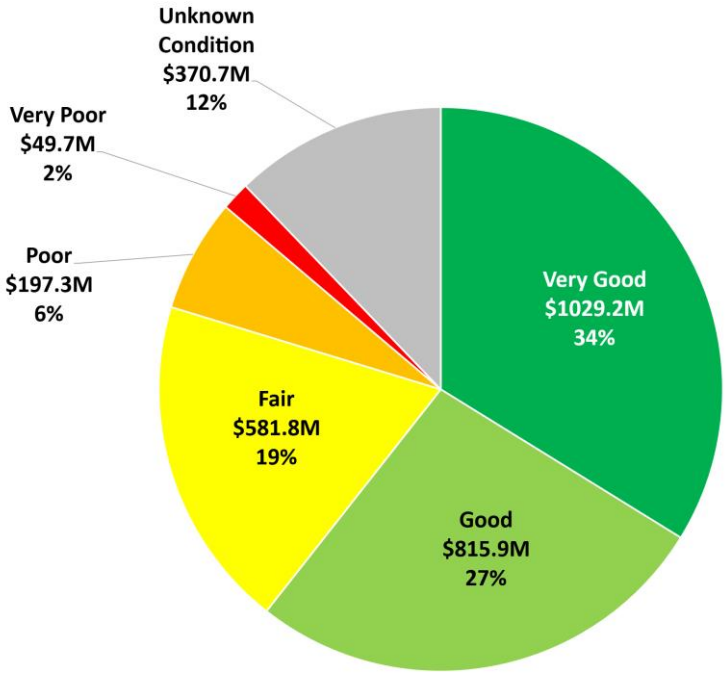


Figure 18-4 – Linear Asset Condition Profile by Asset Category

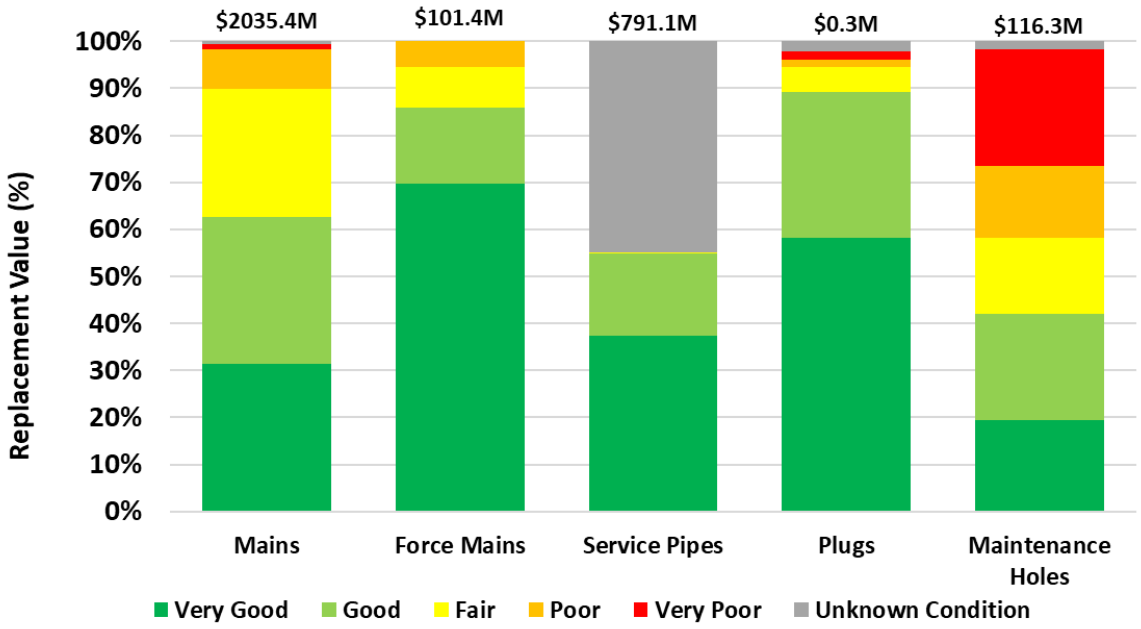


Figure 18-5 – Vertical Asset Condition Profile

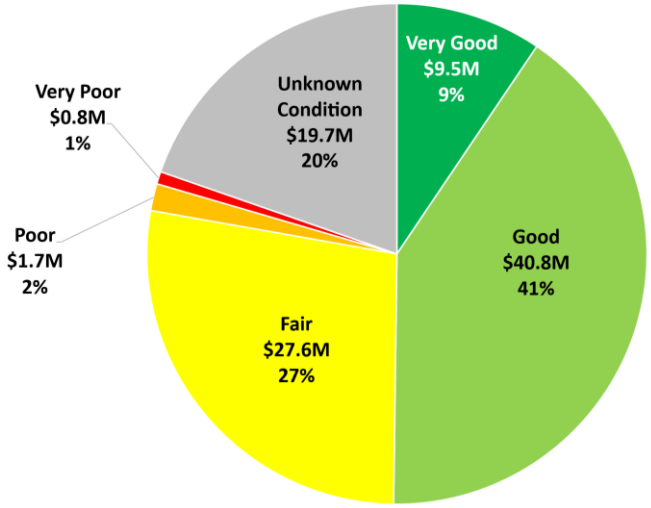
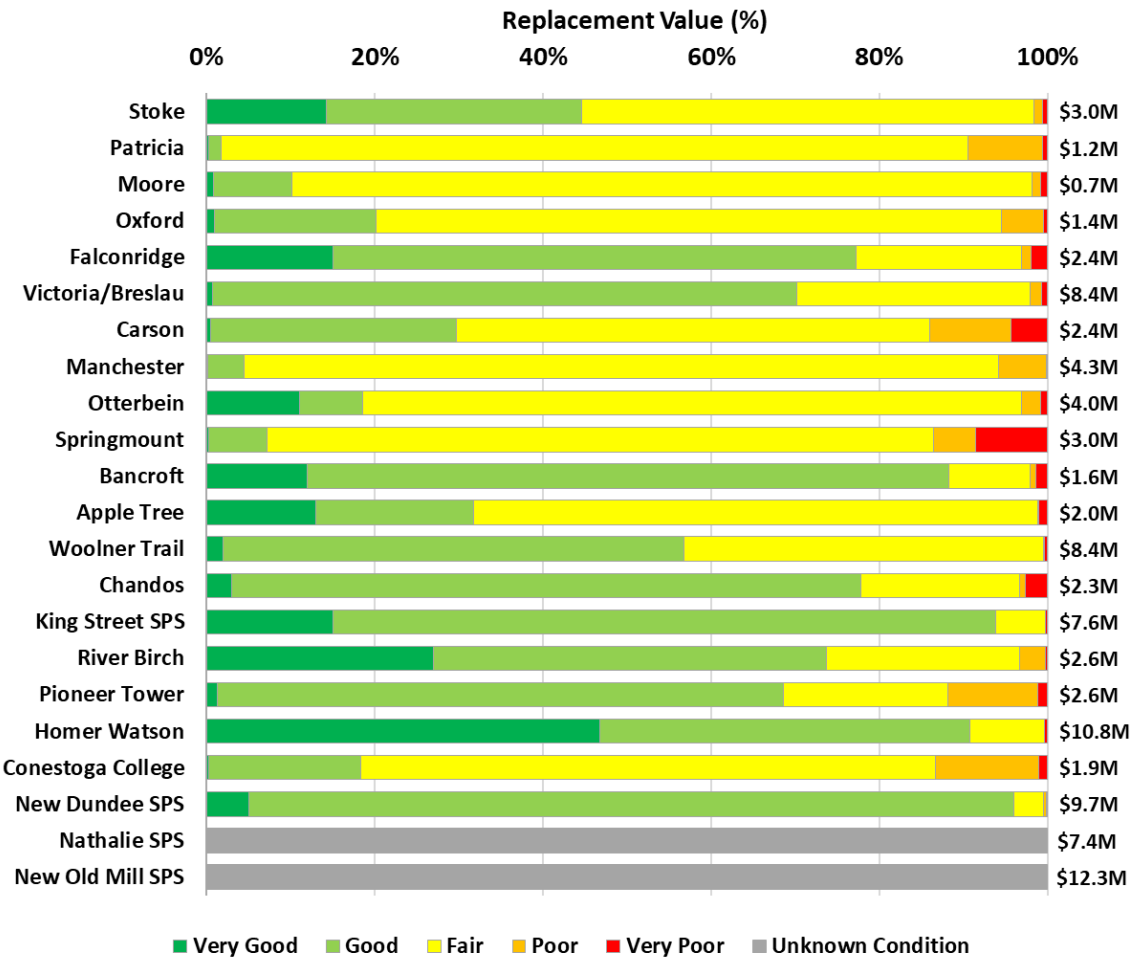


Figure 18-6 – Vertical Asset Condition Profile by Asset Category



18.2 LEVELS OF SERVICE

Table 18.3 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 18.3 – Levels of Service

Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Capacity & Use	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.	85%	85%	97%	>85% (Maintain current performance)	
Function	Maintain adequate number of FTEs and proper equipment to ensure customer complaints and requests are responded to in a quick and efficient manner	Ratio of reactionary work orders compared to total work orders	1,318 / 1,461	2,135 / 2,306	2,164 / 2,383	The City is tracking the cleaning of blockages for residential users. Some complaints are caused by issues on the private side. City is tracking this issue through work orders. Certain aspects of the maintenance programs will always be reactionary.	
Quality & Reliability	1. Description of how combined sewers in the municipal wastewater system are designed with	The number of events per year where combined sewer flow in the	City does not use combined sewers	City does not use combined sewers	City does not use	N/A	

Technical Focused Levels of Service							
LOS Category	Community Level of Service	Performance Measure	Performance			Target Performance (Value or Qualitative Trend)	Notes
			2022	2023	2024		
	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.	municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system (Reported previously as # of times system capacity was exceeded)			combined sewers		
		The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system. (Currently reported as # of City issues out of total property connections in a given year)	1,369 (based on 87 blockages, 13 of which were city issues out of 63,488 property connections)	3,640 (based on 61 blockages, 47 of which were a city issues out of 64,097 property connections)	2,141 (based on 104 blockages, 50 of which were city issues, out of 65,881 property connections)	City is evaluating target for this measure and the inputs to evaluate its effectiveness. Generally target would be to decrease number of blockages.	

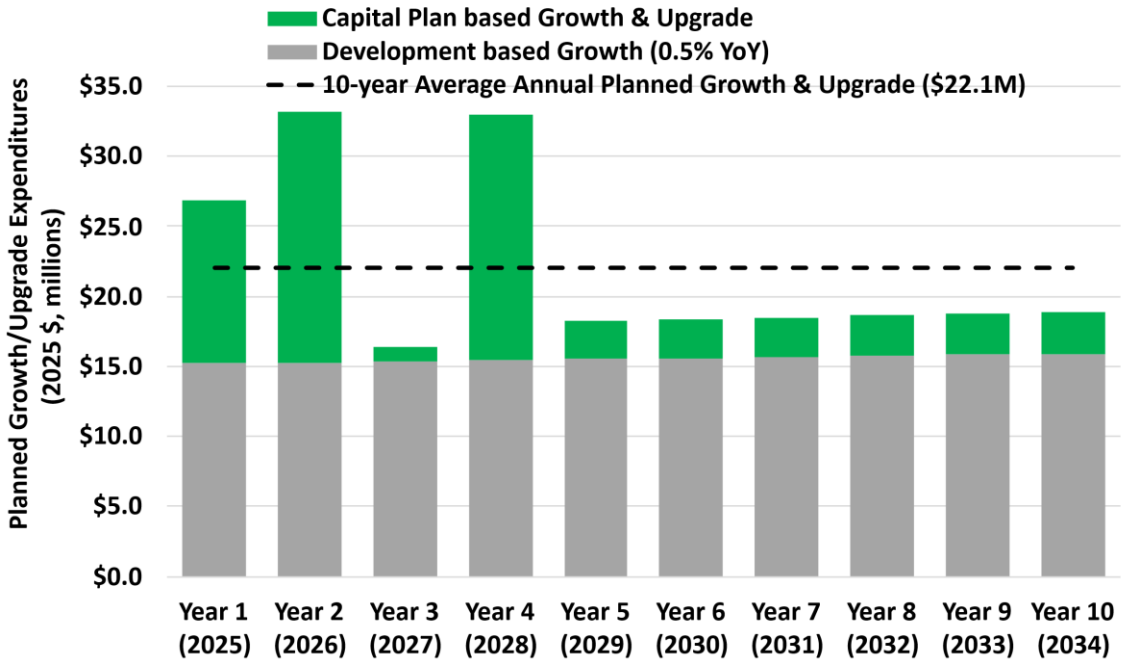
Technical Focused Levels of Service							
LOS Category	Community Level of Service	Performance Measure	Performance			Target Performance (Value or Qualitative Trend)	Notes
			2022	2023	2024		
		The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.	0 (this is likely tracked as number of environmental spills)	0 (this is likely tracked as number of environmental spills)	0 (this is likely tracked as number of environmental spills)	0	
	Reliability/resiliency of the infrastructure to provide consistent sanitary service.	Percentage of pipes inspected using CCTV	3.03%	0.62%	4.93%	Current cycle is set based on available budget. However, City would like to be on a cycle that is more consistent with the industry standard of approximately once every 5-years.	
	Assets are maintained in a state of good repair to provide reliable services to the community.	Percentage of Mains in fair or better condition	N/A	N/A	89.8%	Maintain current performance	
		Percentage of Pumping Stations in fair or better condition	N/A	N/A	77.8%	Maintain current performance	

18.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

18.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social, or environmental needs. Forecast acquisition asset costs are summarized in Figure 18-7. Of note is that the City will be assuming the Region's Spring Valley Sanitary Pumping Station ($17.4M) and associated force main infrastructure in the coming years. The City is working closely with the Region to determine allocation of costs for the force main infrastructure. The City assumes that there will be at least a 0.5% growth in the asset portfolio annually to account for assets assumed through development. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

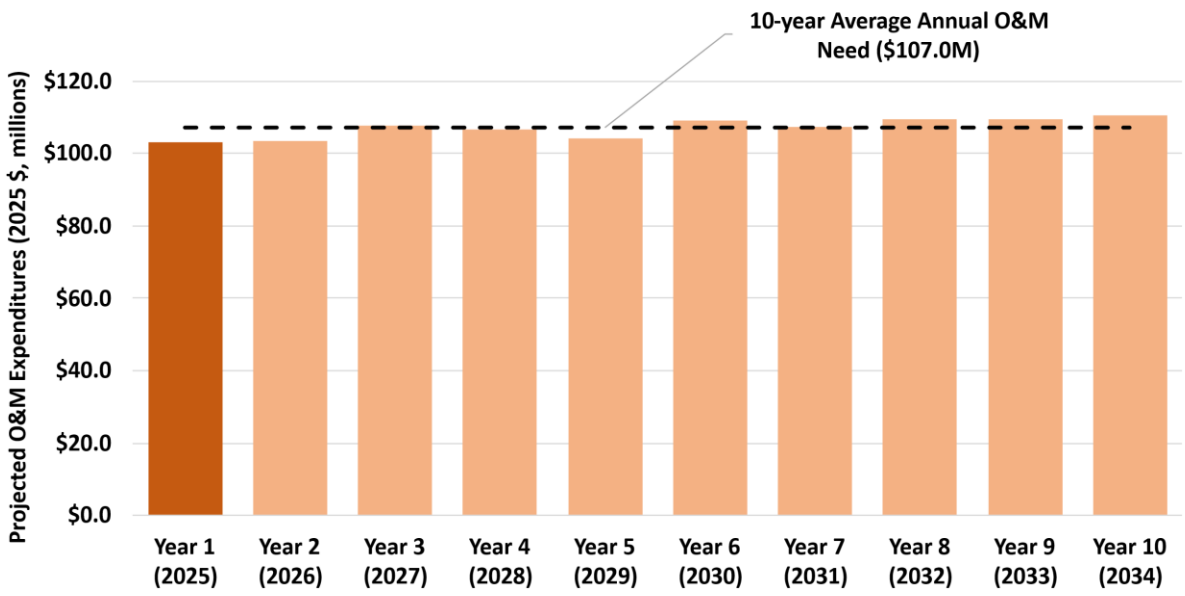
Figure 18-7 – Yearly Acquisition Summary



Summary of Forecast Operations and Maintenance Costs

Figure 18-8 shows the operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased relative to the growth of the overall asset portfolio (See Section 18.3.1 for related growth costs). Regular increases due to inflation were not included.

Figure 18-8 – Operations and Maintenance Summary



18.3.2 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 18-9 shows the forecasted condition of Sanitary Utility assets over the next 10 years, based on two scenarios:

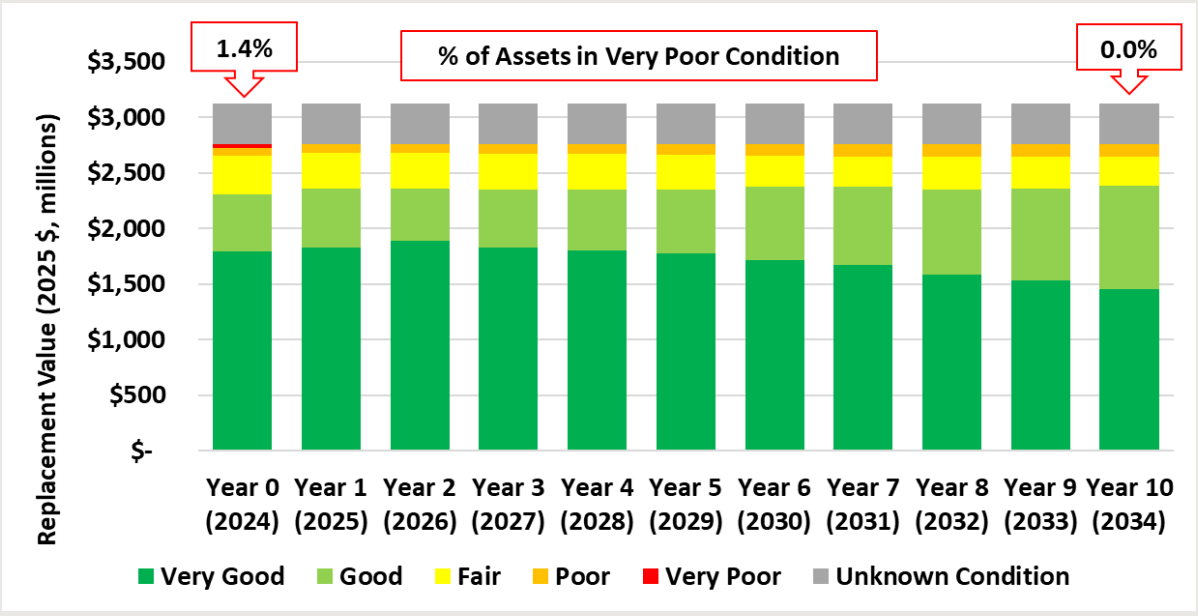
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $25.7 million per year to invest in the renewal of its Sanitary Utility assets.

Figure 18-9 – Forecast Renewal Costs

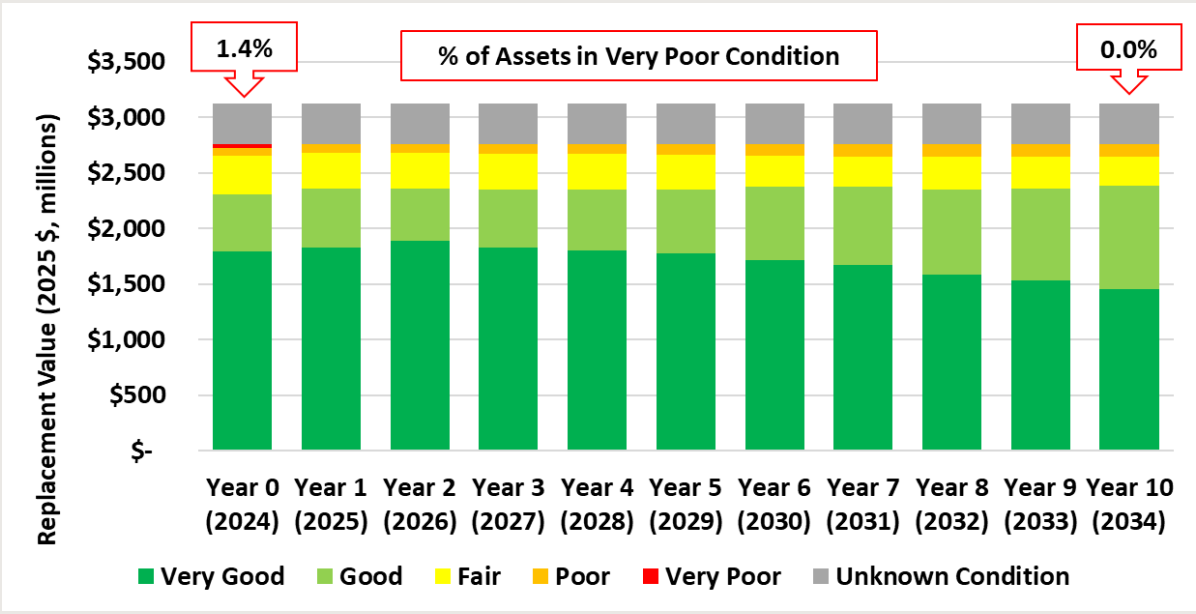
1. Planned Budget / Expected Performance ($25.7 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to improve (% of assets in very poor condition) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based primarily on their age relative to their estimated service life (60% of asset by replacement value)** (see Table 24.8 in Appendix O). For the remaining assets, the condition is determined based on staff reported condition. The forecast then estimates the planned replacement year based on when the asset has reached end of life. Renewal of certain assets have been deferred in order to align the forecast with the planned budget.



2. Proposed LOS: Planned Budget
($25.7 million per year average renewal investment from 2025 – 2034)

The proposed performance is the same as the expected performance, which improves asset condition over the next 10 years. As a result, there is no funding gap associated with Sanitary Utility assets.



Additionally, the lifecycle average annual renewal need for Sanitary Utility assets is approximately **$33.3 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** Therefore, the City's proposed renewal investment of $25.7 million per year in the renewal of Sanitary Utility assets from 2025 – 2034, may be insufficient to address renewal need in the years beyond the analysis period.

18.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Climate Change:** The Sanitary Master Plan outlines specific actions that support the City's approach to managing climate change for sanitary assets.
- **Demand Growth:** The Sanitary Master Plan outlines how the sanitary system plans to grow to respond to City population growth.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.22 in Appendix O) with the probability of failure ratings for all infrastructure represented within Sanitary Utility services. As shown in Figure 18-10 and

Figure 18-11, an estimated $790.3 million (29.6%) of Linear Water Utility assets and $30.1 million (37.5%) of Vertical Sanitary Utility assets currently have high-risk exposure.

Figure 18-10 – Risk Exposure Map for Linear Sanitary Utility Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$710.8	$651.8	$561.0	$179.7	$20.7
Major	$0.0	$0.0	$0.0	$0.0	$0.0
Moderate	$318.4	$164.1	$20.8	$17.6	$29.0
Minor	$0.0	$0.0	$0.0	$0.0	$0.0
	Probability of Failure				

Risk Exposure	$	%
High	$790.3	29.6%
Moderate	$690.3	25.8%
Low	$1,193.3	44.6%
Total	$2,673.9	100.0%

Figure 18-11 – Risk Exposure Map for Vertical Sanitary Utility Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$9.5	$40.8	$27.6	$1.7	$0.8
Major	$0.0	$0.0	$0.0	$0.0	$0.0
Moderate	$0.0	$0.0	$0.0	$0.0	$0.0
Minor	$0.0	$0.0	$0.0	$0.0	$0.0
	Probability of Failure				

Risk Exposure	$	%
High	$30.1	37.5%
Moderate	$40.8	50.7%
Low	$9.5	11.8%
Total	$80.4	100.0%

Critical risks are those assessed with a risk rating of High. The mitigation plan, residual risk, and mitigation costs of implementing the selected mitigation plan are shown in Table 18.4.

Table 18.4 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Mains – 100 year	Poor asset condition resulting in the inability to perform services	High	Renewal work to perform any necessary repairs or replacement of assets. Increase pipe inspections.	Low	$193.5
Mains – 80 year					$553.5
Force Mains – 100 year					$6.5
Force Mains – 80 year					$7.7
Service Pipes – 100 year					$0.1
Maintenance Holes					$28.9
Various assets at all pumping stations					$30.1

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

18.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Sanitary Utility asset management are shown in Table 18.5.

Table 18.5 – Improvement Recommendations – Sanitary Utility

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Develop a condition assessment program for the City's Force Mains • Improve the condition assessment methodology for pipes without previous CCTV data, currently using age as a proxy • Update the condition ratings to account for outdated CCTV information that may not reflect current conditions • Develop a condition assessment program for pipes 600 millimetres and larger, which currently lack condition data • Asses the current condition of the "Unknown" condition assets
Levels of Service	• Develop a more accurate tracking system for the percentage of properties connected to the municipal wastewater system • Develop definitions for reactionary versus preventative maintenance work orders to enable future tracking of this ratio
Lifecycle Management and Financial Summary	• Develop a more accurate method for budgeting growth due to development, rather than using a simple percentage increase • Include non-recoverable costs for spills in the financial planning • Establish a budget line item specifically for addressing spills and their cleanup • Account for the cost impact of contractor-caused main breaks, including the challenges of recouping costs
Risk Management	• Implement risk assessment for both asset management and project prioritization that aligns with Enterprise Risk Framework • Consider the impact of the cathodic protection program on the condition assessment of assets

19.0 APPENDIX J – STORMWATER SERVICES

The Stormwater service area manages surface water runoff through a network of pipes, ponds, ditches, and green infrastructure, mitigating flooding risks and enhancing water quality.

19.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

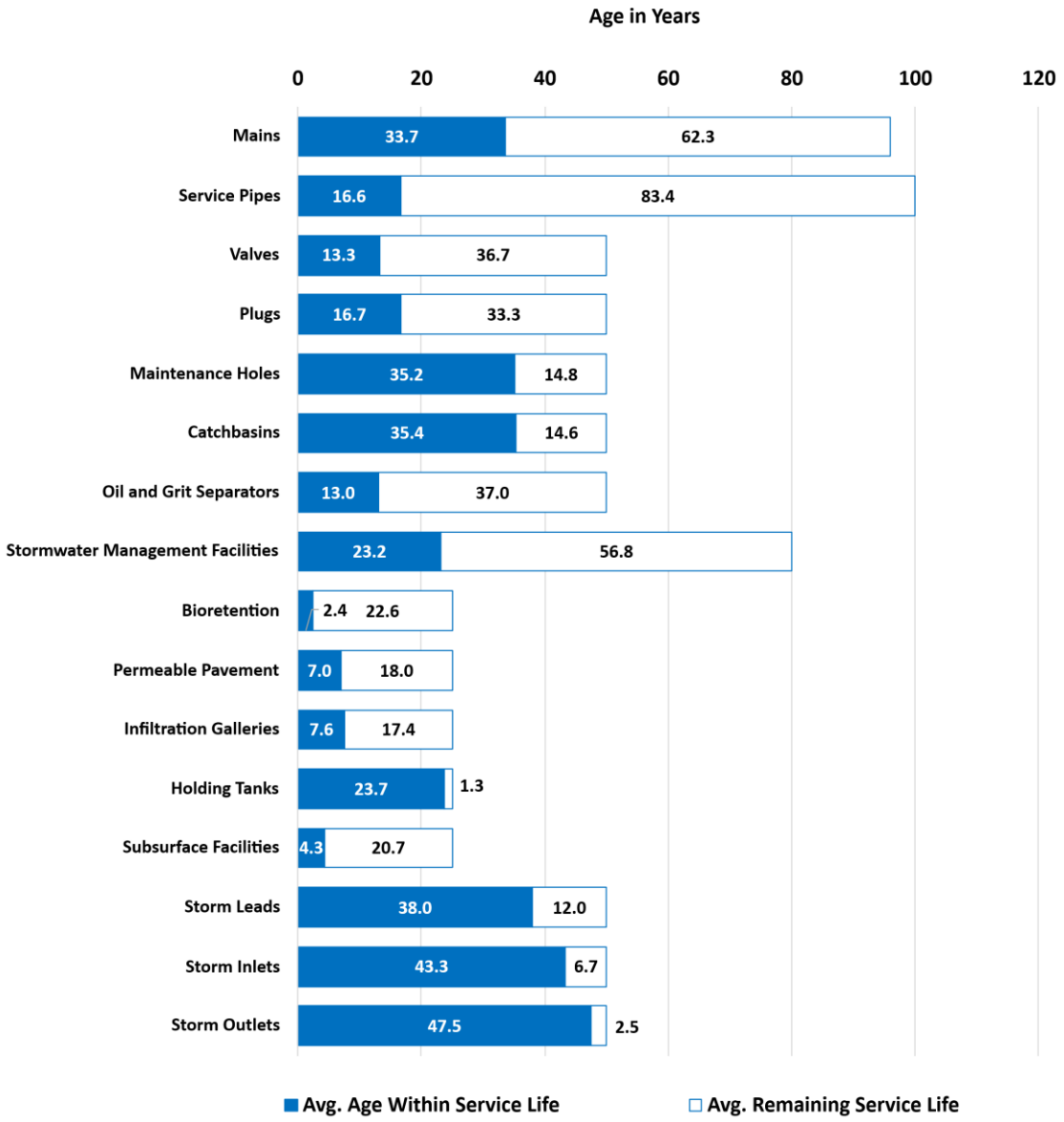
A variety of assets support the delivery of the City's stormwater services. The stormwater assets covered by this AM Plan are shown in Table 19.1. The largest portion of the asset mix are Mains assets with a replacement value of $1,101.1M (approximately 54% of the total replacement value).

Table 19.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Mains, Service Pipes & Other Appurtenances	Mains	$1,101.1M	54.4%
	Service Pipes	$265.4M	13.1%
	Valves	$0.2M	0.0%
	Plugs	$0.3M	0.0%
Ditches, Culverts & Other Conveyances	Ditches	$4.7M	0.2%
	Culverts	$0.3M	0.0%
	Driveway Culverts	$1.5M	0.1%
Maintenance Holes	Maintenance Holes	$121.9M	6.0%
Catchbasins	Catchbasins	$79.0M	3.9%
Quality Control Devices	Oil and Grit Separators	$15.5M	0.8%
Stormwater Management Facilities & Ponds	Stormwater Management Facilities	$134.3M	6.6%
	Stormwater Ponds	$240.8M	11.9%
Low Impact Development	Bioretention	$0.1M	0.0%
	Permeable Pavement	$0.1M	0.0%
	Infiltration Galleries	$25.8M	1.3%
	Holding Tanks	$1.6M	0.1%
	Underground Facilities	$0.2M	0.0%
Storm Leads, Inlets, Outlets & Weirs	Storm Leads	$16.2M	0.8%
	Storm Inlets	$2.6M	0.1%
	Storm Outlets	$5.4M	0.3%
	Storm Weirs	$1.0M	0.1%
	Storm Forebays	$5.5M	0.3%
TOTAL		**$2,023.5M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 19-1.

Figure 19-1 – Asset Age Profile



Notes on the above Asset Age Profile:

- Any assets missing information on install date have been excluded from the asset age profile shown above.

Asset condition

The asset condition profile by replacement cost for stormwater services is shown in Figure 19-2. The asset condition profile by asset category is shown in

Figure 19-3. The condition assessment of the City's stormwater assets provides insights into the reliability of its infrastructure. Overall, approximately 77% of the City's stormwater assets have a condition rating of fair or better.

Approximately $300.9 million (15%) of Stormwater assets are in unknown condition. These unknown assets are comprised primarily of Stormwater Ponds ($240.8 million), Stormwater Management Facilities ($33.2 million), Mains ($8.0 million), Storm Forebays ($5.5 million),

Ditches ($4.7 million), Driveway Culverts ($1.5 million), Service Pipes ($1.2 million) and Storm Weirs (1.0 million).

Figure 19-2 – Asset Condition Profile

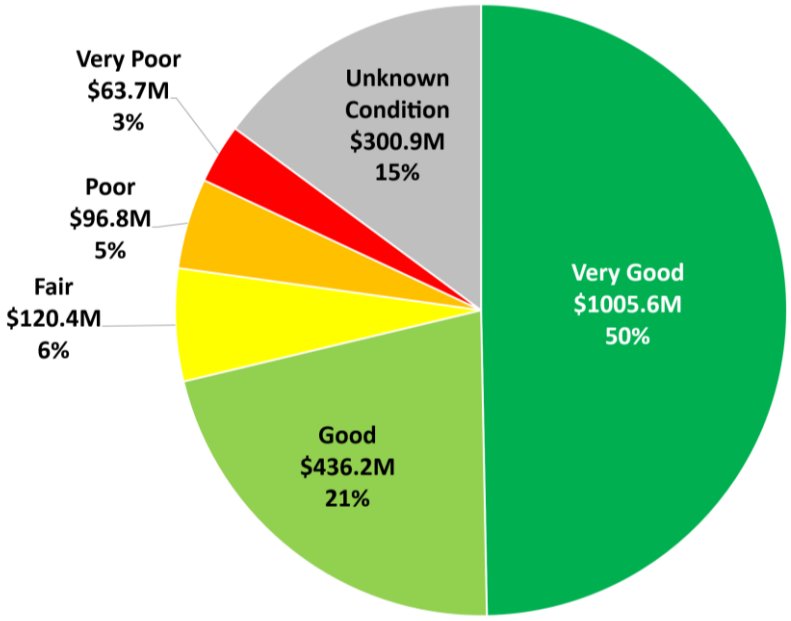
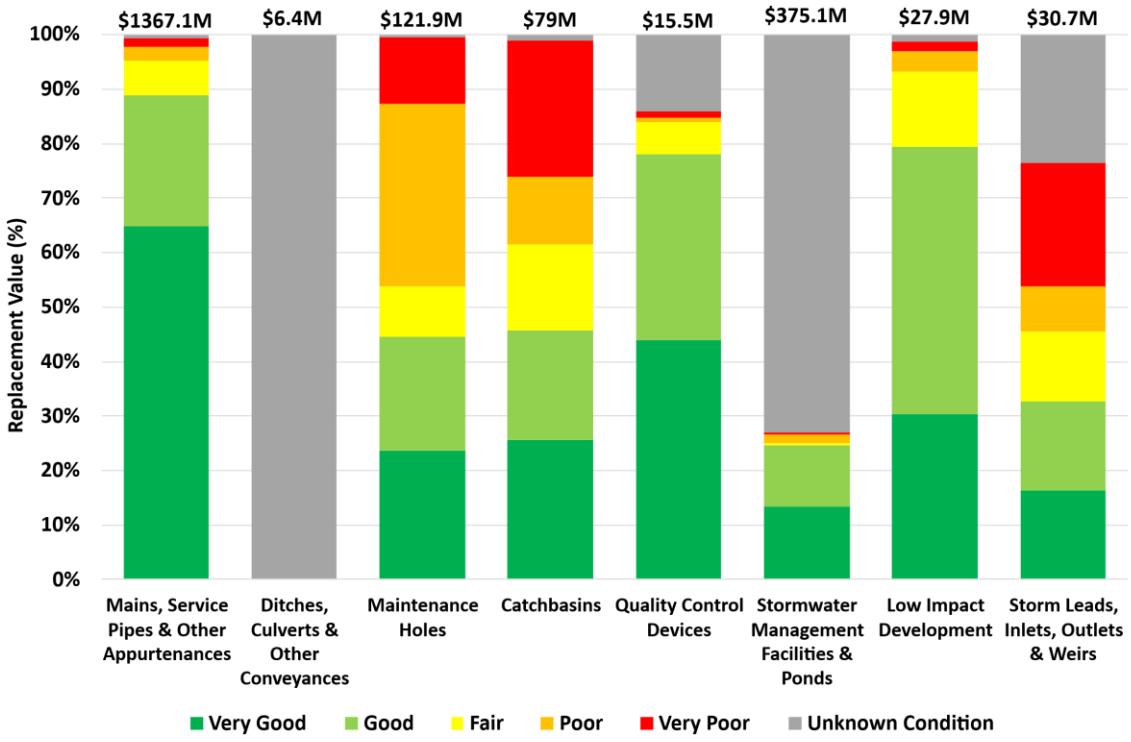


Figure 19-3 – Asset Condition Profile by Asset Category



19.2 LEVELS OF SERVICE

Table 19.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 19.2 – Levels of Service

Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Capacity & Use	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.	Percentage of properties in municipality resilient to a 100-year storm	N/A	N/A	96.25%	Maintain current performance	
		Percentage of the municipal stormwater management system resilient to a 5-year storm	92.35%	N/A	N/A	>92% as per the GRCA flood plain mapping	
Quality & Reliability	Assets are maintained in a state of good repair to provide reliable services to the community.	Number of SWM Facilities maintained through sediment removal per year	4 facilities, Sediment Volume = 659m^3	4 facilities, Sediment Volume = 335 m^3	4 facilities, Sediment Volume = 915 m^3	4-5 facilities cleaned per year	
		% of pipes inspected using CCTV	10.87%	0.53%	5.24%	The City is on a 12-year cycle for CCTV inspections (~8% per year)	

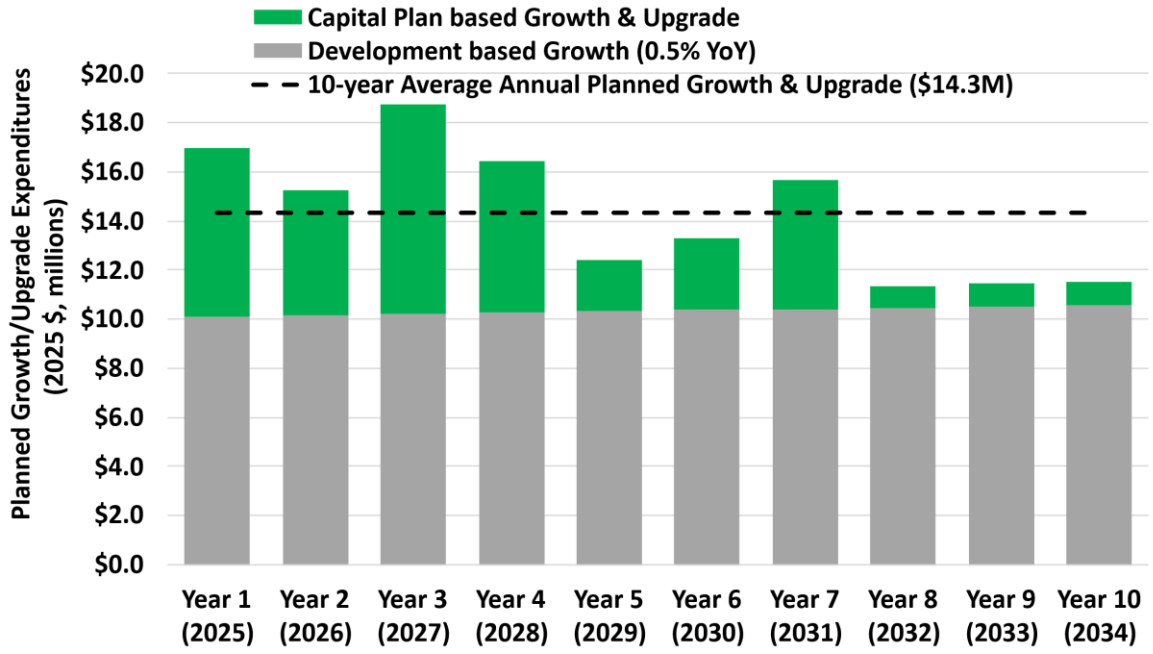
Technical Focused Levels of Service							
LOS Category	Community Level of Service	Performance Measure	Performance			Target/Proposed Performance (Value or Qualitative Trend)	Notes
			2022	2023	2024		
		Catch Basin Cleaning OGS Units Cleaned Out	Possible future metric				
		Percentage of stormwater mains in fair or better condition	N/A	N/A	94.1%	Maintain current performance	
		Percentage of other assets within service life	N/A	N/A	90.7%	Maintain current performance	

19.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

19.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social, or environmental needs. Forecast acquisition asset costs are summarized in Figure 19-4. The City assumes that there will be at least a 0.5% growth in the asset portfolio annually to account for assets assumed through development. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

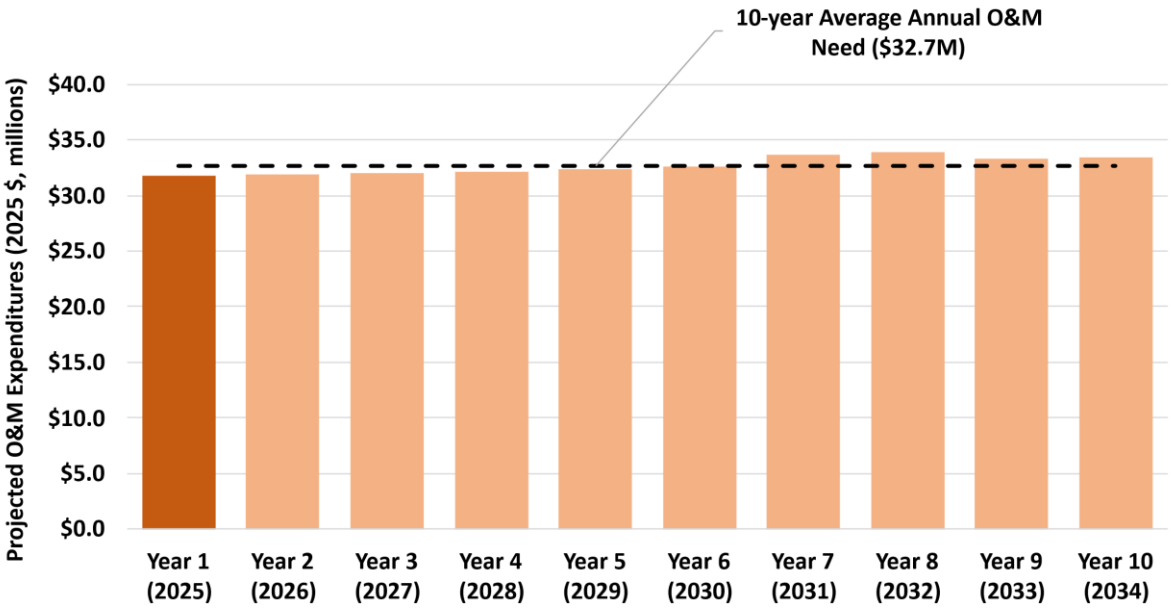
Figure 19-4 – Yearly Acquisition Summary



Summary of Forecast Operations and Maintenance Costs

Figure 19-5 shows the operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased relative to the growth of the overall asset portfolio (See Section 19.3.1 for related growth costs). Regular increases due to inflation were not included.

Figure 19-5 – Operations and Maintenance Summary



19.3.2 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 19-6 shows the forecasted condition of Stormwater assets over the next 10 years, based on two scenarios:

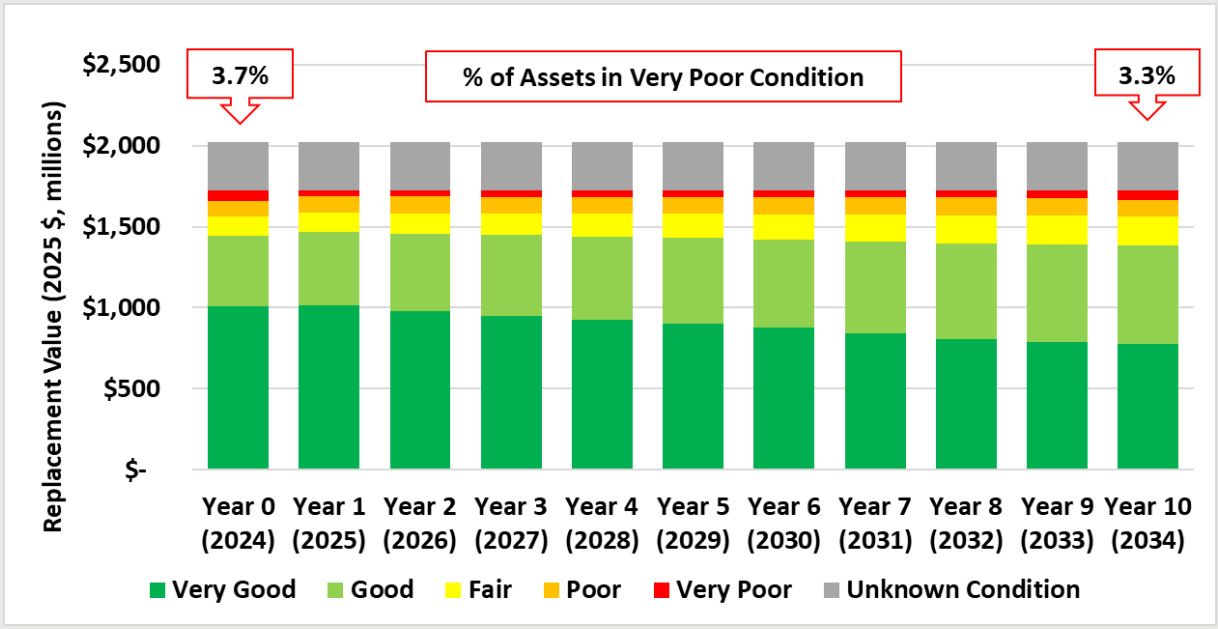
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $8.6 million per year to invest in the renewal of its Stormwater assets.

Figure 19-6 – Forecast Renewal Costs

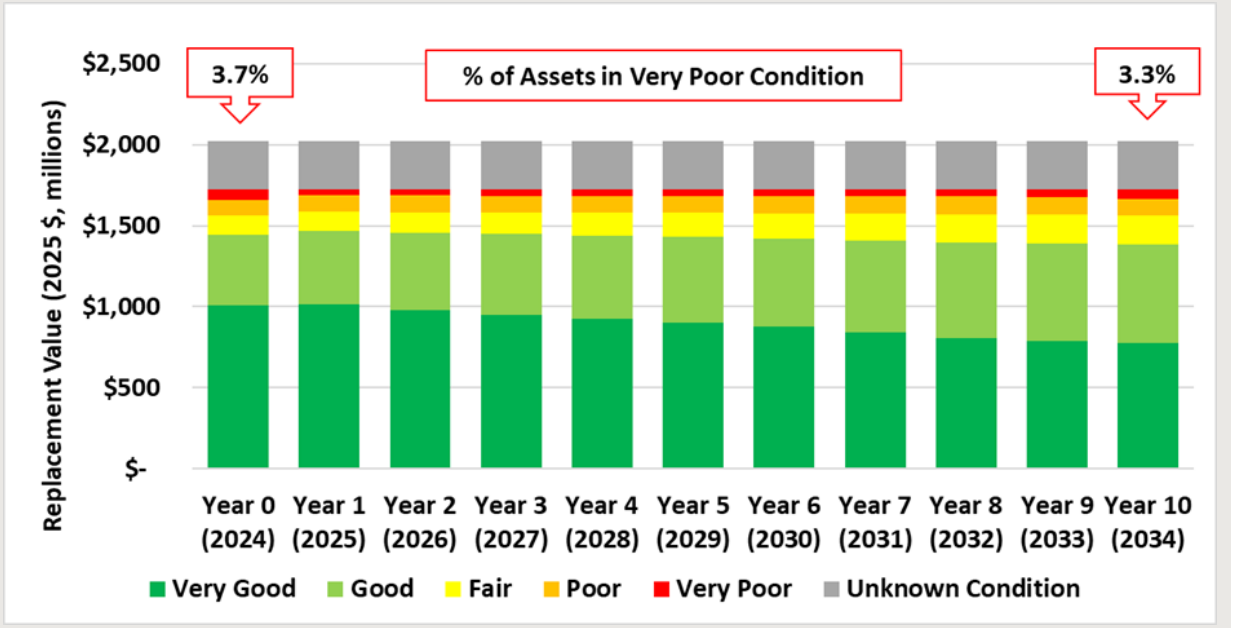
1. Planned Budget / Expected Performance ($8.6 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to be improved (% of assets in very poor condition) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based primarily on their age relative to their estimated service life (67% of asset by replacement value)** (see Table 24.9 in Appendix O). For the remaining assets, the condition is determined based on staff reported condition. The forecast then estimates the planned replacement year based on when the asset has reached end of life. Renewal of certain assets have been deferred in order to align the forecast with the planned budget.



2. Proposed LOS: Planned Budget
($8.6 million per year average renewal investment from 2025 – 2034)

The proposed performance is the same as the expected performance, which improves asset condition over the next 10 years. As a result, there is no funding gap associated with Stormwater assets. This City may have the opportunity to additionally improve the overall condition of assets based on coordination of specific capital projects (i.e., road reconstructions).



Additionally, the lifecycle average annual renewal need for Stormwater assets is approximately **$25.2 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** Therefore, the City's proposed renewal investment of $8.6 million per year in the renewal of Stormwater assets from 2025 – 2034, may be insufficient to address renewal need in the years beyond the analysis period.

19.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Climate Change:** A Master Plan is under development currently which will include recommended actions to address climate change impacts. The City uses InforWorks ICM to support improved hydraulic modelling. Additionally, IDF curve scenarios are expected to be included in the Master Plan to understand climate impacts.
- **Blockages and Maintenance Issues:** There is a Cityworks code in place to address blockages/maintenance issues and weekly checks are completed in addition to the service requests.

- **Human-Induced:** The City has robust standard operating procedures for how spills are managed and the impacts mitigated. Ponds are used as secondary containment when required.
- **Urbanization:** Permeable pavement is being installed in high-flooding-risk areas, pipes are being increased in size in urban areas, and the City has established a policy to help control stormwater at the source.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.23 in Appendix O) with the probability of failure ratings for all infrastructure represented within Stormwater services. As shown in Figure 19-7, an estimated $196.1 million (11.4%) of Stormwater assets currently have high-risk exposure.

Figure 19-7 – Risk Exposure Map for Stormwater Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$725.1	$317.7	$87.4	$42.5	$21.4
Major	$5.1	$5.2	$3.9	$2.5	$7.0
Moderate	$275.4	$113.3	$29.1	$51.7	$35.3
Minor	$0.0	$0.0	$0.0	$0.0	$0.0
	Probability of Failure				

Risk Exposure	$	%
High	$196.1	11.4%
Moderate	$407.6	23.7%
Low	$1,118.9	65.0%
Total	$1,722.7	100.0%

Critical risks are those assessed with a risk rating of High. The mitigation plan, residual risk, and mitigation costs of implementing the selected mitigation plan are shown in

Table 19.3.

Table 19.3 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Mains – 100 year	Poor asset condition resulting in the inability to perform services	High	Renewal work to perform any necessary repairs or replacement of assets	Low	$92.8
Mains – 80 year					$46.1
Mains – 50 year					$3.7
Holding Tanks					$0.5
Maintenance Holes					$14.8
Storm Inlets					$0.9
Storm Leads					$6.4
Storm Outlets					$2.2

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Stormwater Management Facilities					$8.9
Catchbasins					$19.8
Oil Grit Separators					$0.2

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

19.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Stormwater asset management are shown in

Table 19.4.

Table 19.4 – Improvement Recommendations – Stormwater

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Improve data collection for ditches, culverts, and driveway culverts which currently have unknown condition due to missing installation dates and condition assessments • Develop a more robust inspection program for stormwater assets to reduce reliance on age-based condition assessments • Asses the current condition of the “Unknown” condition assets
Levels of Service	• Improve data collection for resilience metrics, particularly for the percentage of properties resilient to 100-year storms and percentage of municipal stormwater system resilient to 5-year storms • Utilize GRCA mapping and hydraulic model results to better determine resilience levels for stormwater infrastructure • Implement tracking for maintenance activities in City Works and GIS to improve data reliability for performance metrics • Develop metrics for cleaning programs such as catch basin and OGS cleanouts once data becomes available
Lifecycle Management and Financial Summary	• Develop a more accurate method for budgeting growth due to development, rather than using a simple percentage increase

AM Plan Section	Improvement Recommendation
Risk Management	• Implement risk assessment for both asset management and project prioritization that aligns with Enterprise Risk Framework

20.0 APPENDIX K – BRIDGES & CULVERTS SERVICES

The Bridges & Culverts service area includes the inspection, maintenance, and rehabilitation of bridge and culvert structures that ensure connectivity and safe passage over waterways and other obstructions.

20.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

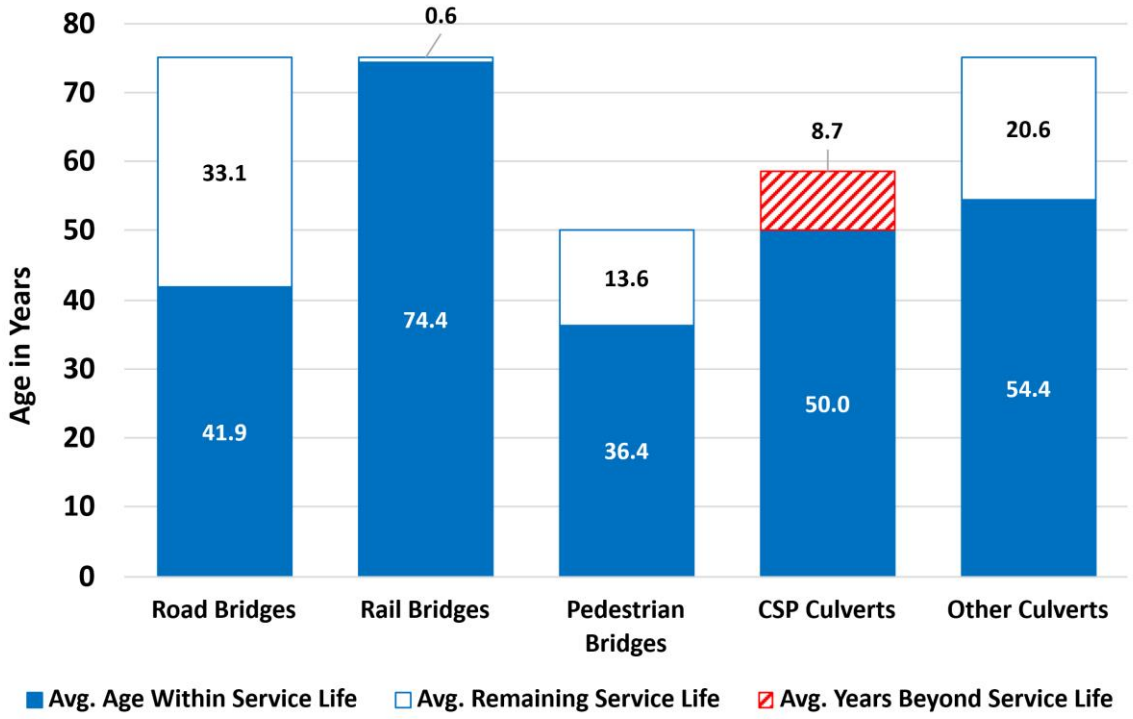
A variety of assets support the delivery of the City's bridges and culverts services. The bridge and culvert assets covered by this AM Plan are shown in Table 20.1. The largest portion of the asset mix are Road Bridges assets with a replacement value of $391.3M (approximately 81.7% of the total replacement value).

Table 20.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Bridges	Road Bridges	$391.3M	81.7%
	Rail Bridges	$8.2M	1.7%
	Pedestrian Bridges	$5.8M	1.2%
Culverts	CSP Culverts	$8.5M	1.8%
	Other Culverts	$65.3M	13.6%
TOTAL		**$479.1M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 20-1.

Figure 20-1 – Asset Age Profile



Notes on the above Asset Age Profile:

- CSP Culverts have an average age that has surpassed their average service life.

Asset condition

The asset condition profile by replacement cost for bridges and culverts services is shown in Figure 20-2. The asset condition profile by asset type is shown in Figure 20-3. The condition assessment of the City's bridges and culverts assets provides insight into the reliability of its infrastructure. Overall, 100% of the City's bridges and culverts assets have a condition rating of fair or better.

Figure 20-2 – Asset Condition Profile

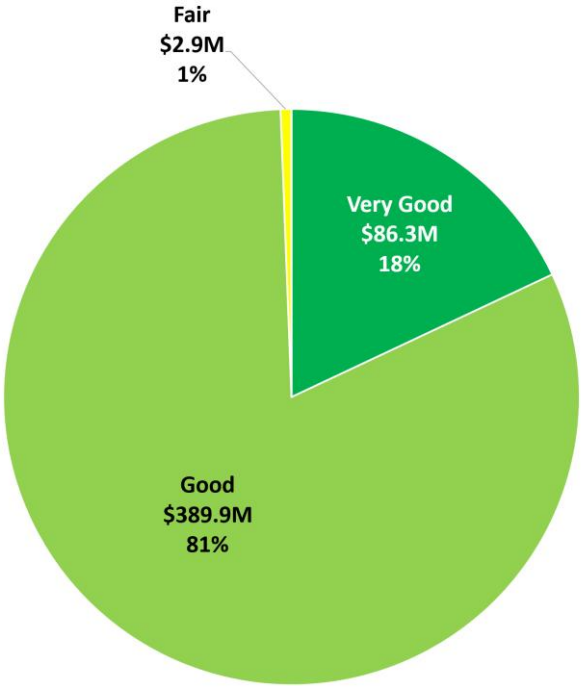
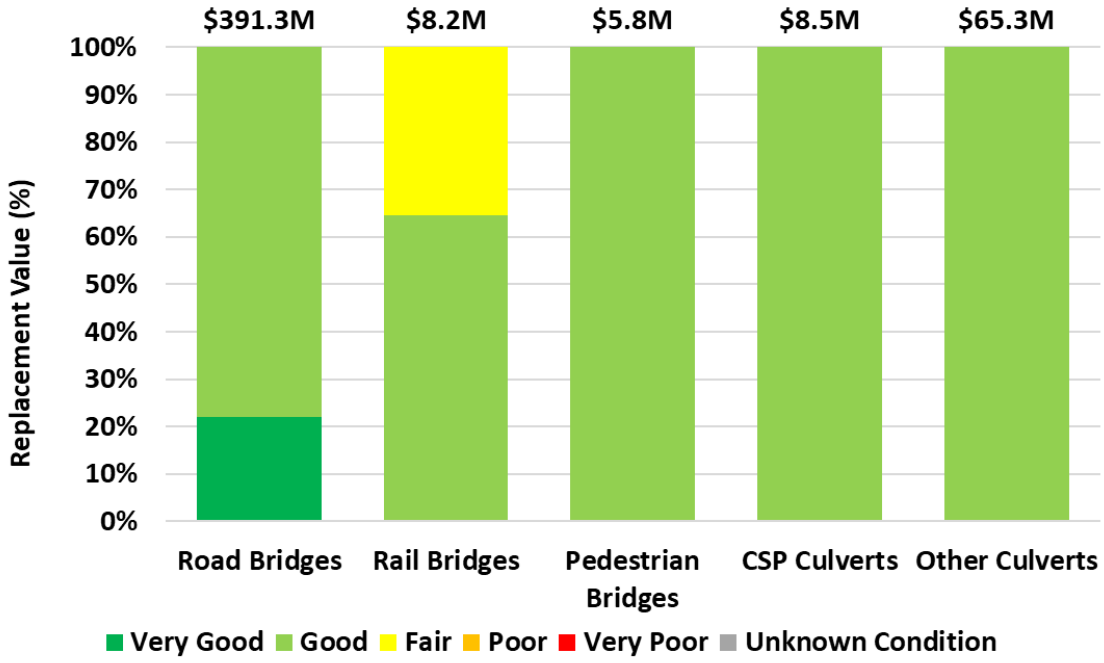


Figure 20-3 – Asset Condition Profile by Asset Type



20.2 LEVELS OF SERVICE

Table 20.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 20.2 – Levels of Service

Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Function	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	0%	0%	0%	Maintain current LOS (the City noted that they have some historical bridges that may need restrictions in the future)	
Quality & Reliability	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	For bridges in the municipality, the average bridge condition index value.	N/A	74	75.0 (weighted by Replacement Value)	Maintain current service level (~75.0 BCI)	
		For structural culverts in the municipality, the average bridge condition index value.	N/A	73	73.2 (weighted by Replacement Value)	Maintain current service level (~73.0 BCI)	

20.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

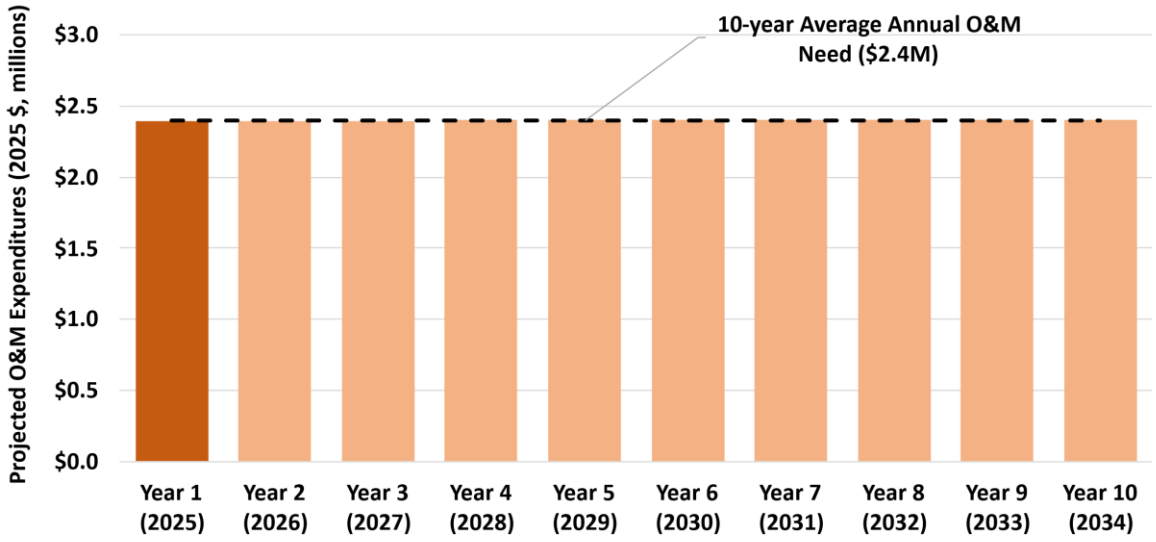
20.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social, or environmental needs. However, the City has no planned growth or expansion of bridge and culvert assets during the analysis period.

Summary of Forecast Operations and Maintenance costs

Figure 20-4 shows the operations and maintenance costs that were forecasted to remain steady as there is no plan to increase the Bridge portfolio in the next 10 years, with the exception of regular inflation increases.

Figure 20-4 – Operations and Maintenance Summary



20.3.2 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 20-5 shows the forecasted condition of Bridges & Culverts assets over the next 10 years, based on two scenarios:

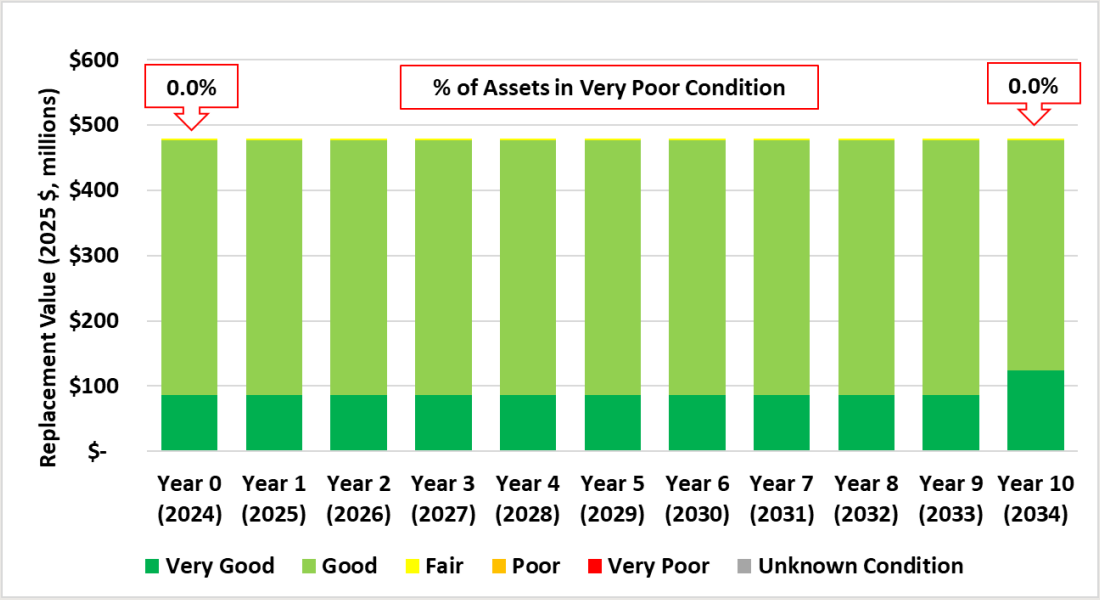
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $0.7 million per year to invest in the renewal of its Bridges & Culverts assets.

Figure 20-5 – Forecast Renewal Costs

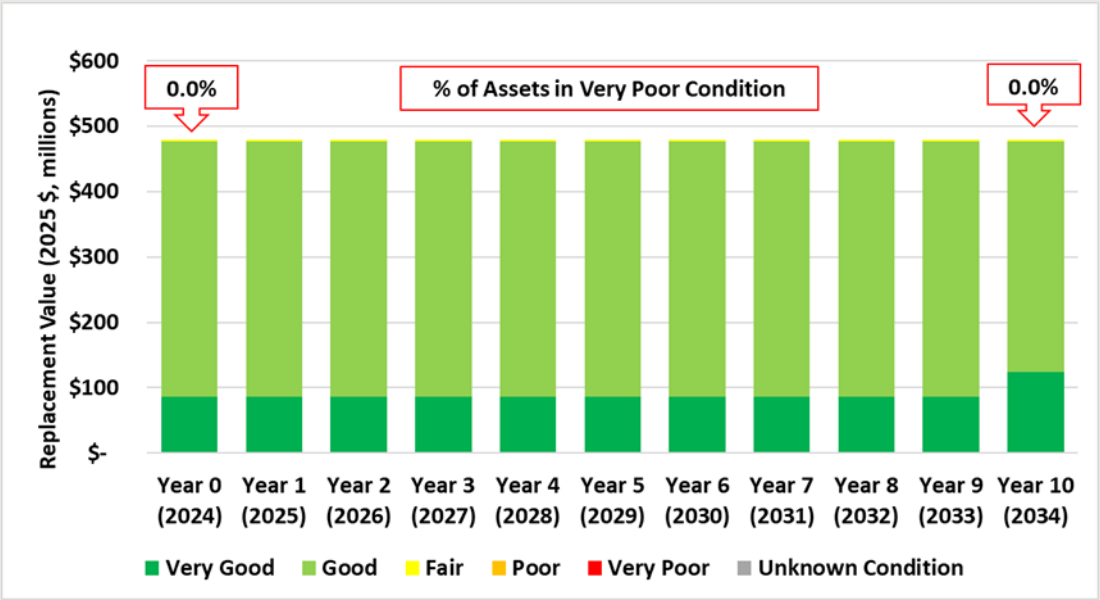
1. Planned Budget / Expected Performance ($0.7 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to be maintained based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based on OSIM condition assessments.** The OSIM condition assessment was an independent assessment of bridge and culvert condition and deterioration.



2. Proposed LOS: Planned Budget ($0.7 million per year average renewal investment from 2025 – 2034)

The proposed performance is to complete the rehabilitation recommendations found in the OSIM report over the next 10 years. Since the planned budget is sufficient to fund the OSIM rehabilitation recommendations, there is no funding gap associated with Bridges & Culverts assets.



Additionally, the lifecycle average annual renewal need for Bridges & Culverts assets is approximately **$6.5 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** Therefore, the City's proposed renewal investment of $0.7 million per year in the renewal of Bridges & Culverts assets from 2025 – 2034, may be insufficient to address renewal need in the years beyond the analysis period.

20.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Extreme Weather Events:** OSIM inspections are completed every 2 years to track any asset deterioration that might have been caused by extreme weather.
- **Traffic Overload:** Average Annual Daily Traffic (AADT) counts are being reviewed and monitored to understand their impacts on asset condition.
- **Cost Escalation:** Staff reviews cost estimates on an ongoing basis and tracks all tender values with the MTO and Construction Statistics Canada information.
- **Outdated Design Standards:** All load restriction bridges are known and the OSIM inspections that are conducted every two years will identify any new restrictions.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.24 in Appendix O) with the probability of failure ratings for all infrastructure represented within Bridges & Culverts services. As shown in Figure 20-6, an estimated $2.9 million (0.6%) of Bridges & Culverts assets currently have high-risk exposure.

Figure 20-6 – Risk Exposure Map for Bridges & Culverts Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$86.3	$375.7	$2.9	$0.0	$0.0
Major	$0.0	$14.2	$0.0	$0.0	$0.0
Moderate	$0.0	$0.0	$0.0	$0.0	$0.0
Minor	$0.0	$0.0	$0.0	$0.0	$0.0
	Probability of Failure				

Risk Exposure	$	%
High	$2.9	0.6%
Moderate	$389.9	81.4%
Low	$86.3	18.0%
Total	$479.1	100.0%

Critical risks are those assessed with a risk rating of High. The mitigation plan, residual risk, and mitigation costs of implementing the selected mitigation plan are shown in

Table 10.3.

Table 20.3 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Park St. Railway Underpass (Asset ID – 916)	Poor asset condition resulting in the inability to perform services	High	Renewal work to perform any necessary repairs or replacement of assets	Low	$2.9

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

20.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for bridge and culvert asset management are shown in Table 20.4.

Table 20.4 – Improvement Recommendations – Bridges & Culverts

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• N/A
Levels of Service	• Establish clear aspirational targets for Bridge Condition Index (BCI) values to guide long-term planning • Establish a consistent methodology for tracking and reporting on loading or dimensional restrictions for both road and pedestrian bridges
Lifecycle Management and Financial Summary	• Develop a bridge lifecycle model that algins with the OSIM inspections to forecast the required operations, maintenance, and renewal activities needed to meet specified conditions • Develop a long-term capital investment forecast to better understand rehabilitation / replacement needs for current bridges and culverts outside of the 10-year forecast.
Risk Management	• N/A

21.0 APPENDIX L – ROADS & SIDEWALKS SERVICES

The Roads & Sidewalks service area manages the condition and functionality of municipal roadways, sidewalks, and related infrastructure to support accessibility and safe movement for vehicles and pedestrians.

21.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

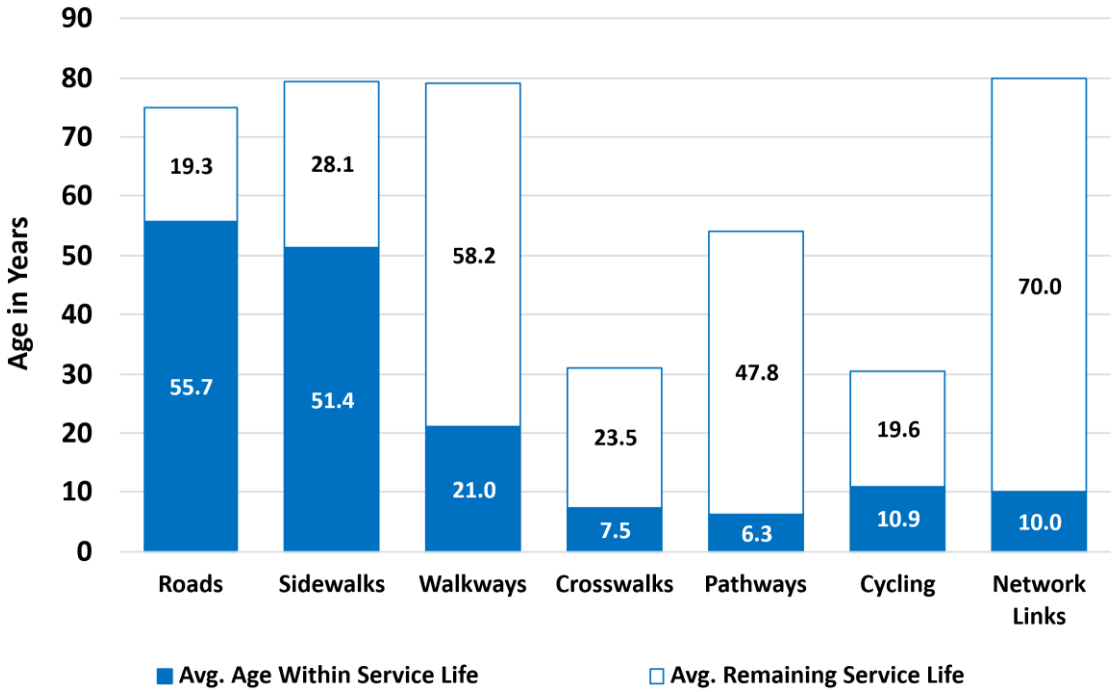
A variety of assets support the delivery of the City's roads and sidewalks services. The road and sidewalk assets covered by this AM Plan are shown in Table 21.1. The largest portion of the asset mix are Roads assets with a replacement value of $1,827.2M (approximately 91% of the total replacement value).

Table 21.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Roads	Roads	$1,827.2M	90.5%
Sidewalks, Walkways and Crosswalks	Sidewalks	$178.9M	8.9%
	Walkways	$0.6M	0.0%
	Crosswalks	$0.2M	0.0%
Pathways	Pathways	$0.1M	0.0%
Cycling	Cycling	$10.0M	0.5%
Network Links	Network Links	$0.0M	0.0%
Guiderails	Guiderails	$1.6M	0.1%
TOTAL		**$2,018.6M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 21-1.

Figure 21-1 – Asset Age Profile



Notes on the above Asset Age Profile:

- Guiderails are not included in the analysis above because they are missing information on install date.

Asset condition

The asset condition profile by replacement cost for roads and sidewalks services is shown in Figure 21-2. The asset condition profile by asset category is shown in Figure 21-3. The condition assessment of the City's roads and sidewalks assets provides insight into the reliability of its infrastructure. Overall, approximately 91% of the City's road and sidewalk assets have a condition rating of fair or better (excluding assets in unknown condition).

Approximately $18.2 million (1%) of Roads & Sidewalks assets are in unknown condition. These unknown assets are comprised of Roads (16.0 million), Guiderails (1.6 million) and Sidewalks (0.6 million).

Figure 21-2 – Asset Condition Profile

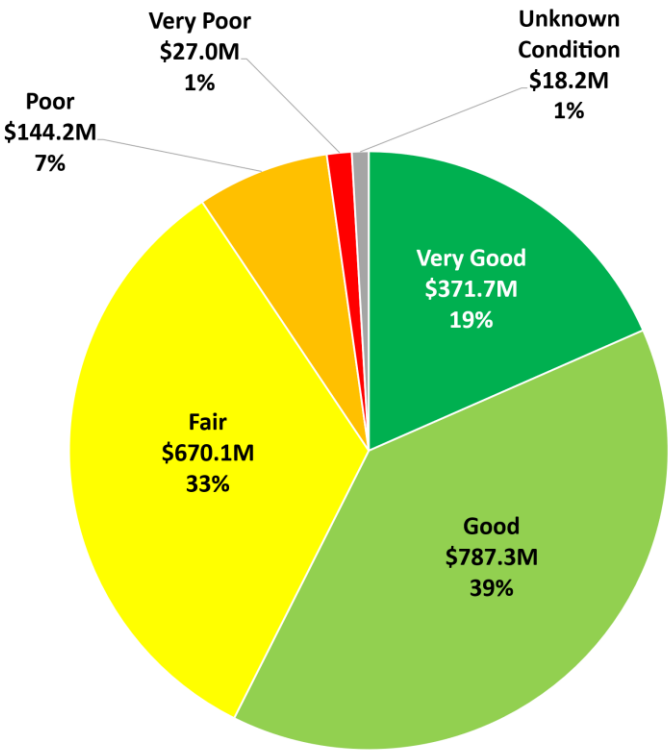
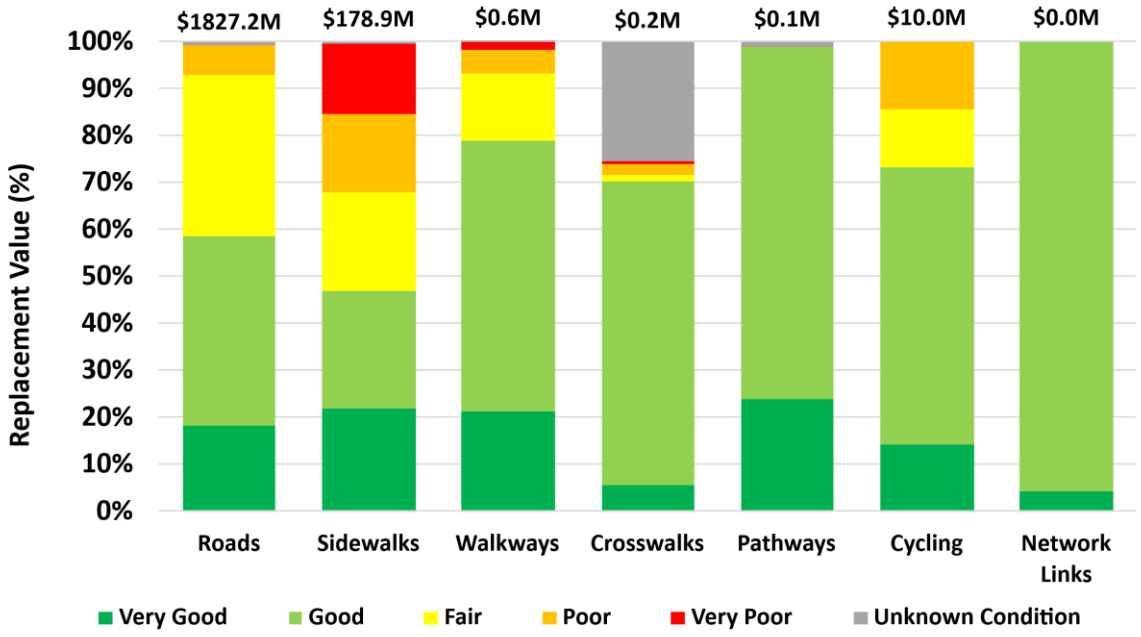


Figure 21-3 – Asset Condition Profile by Asset Category



21.2 LEVELS OF SERVICE

Table 21.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 21.2 – Levels of Service

Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Capacity & Use	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.	Arterial: 572.8 Lane-km Collector: 417.3 Lane-km Local: 1,066.8 Lane-km City Area: 138.31 km^2	Arterial: 572.4 Lane-km Collector: 420.0 Lane-km Local: 1,071.8 Lane-km City Area: 138.31 km^2	Arterial: 572.3 Lane-km Collector: 420.3 Lane-km Local: 1,078.5 Lane-km City Area: 138.31 km^2	Target performance will be determined based on Transportation Master Plan (to be completed in 2025)	
	Provide a network of sidewalks with good connectivity	Roads with 1 or 2 sides of sidewalk	1 Side: 6% 2 Sides: 61.9%	1 Side: 5.8% 2 Sides: 61.9%	1 Side: 5.7% 2 Sides: 62.9%	All roads to have sidewalks on both sides (Sidewalk infill policy)	
	Provide a network of All Ages and Abilities (AAA) Cycling Infrastructure with good connectivity	Total length of uninterrupted AAA network	48.0 km	52.0 km	53.8 km	Increase to meet Cycling and Trails Master Plan	

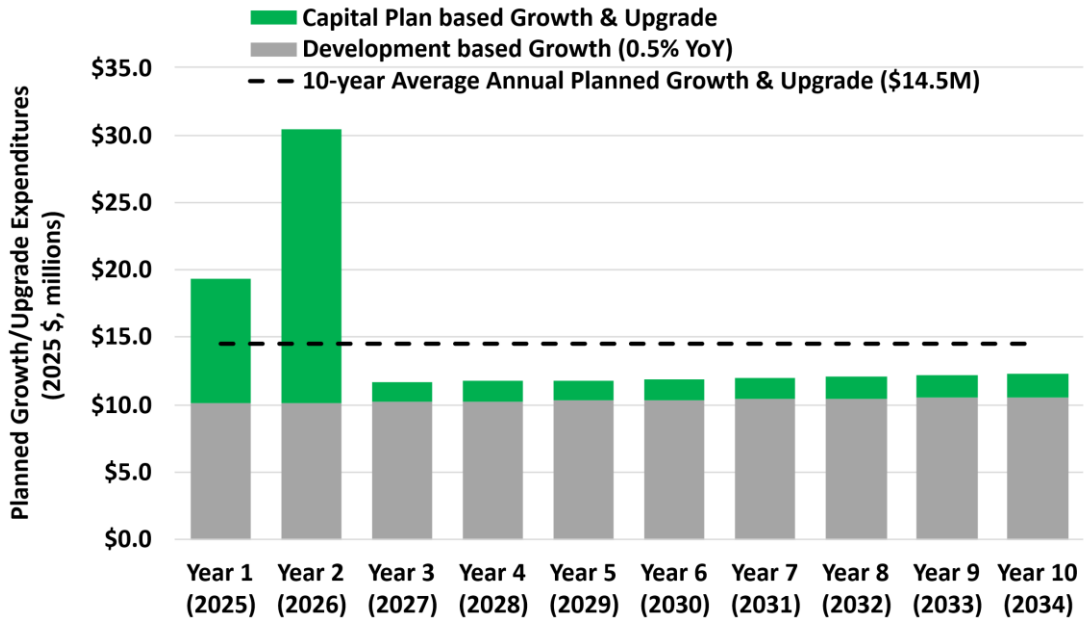
Technical Focused Levels of Service							
LOS Category	Community Level of Service	Performance Measure	Performance			Target/Proposed Performance (Value or Qualitative Trend)	Notes
			2022	2023	2024		
Function	Meet customer needs while limiting health, safety, and natural impacts	Number of lane-kilometres of on-road cycling routes	159.3	162.9	164.5	Increase to meet Cycling and Trails Master Plan	
Quality & Reliability	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).	78.3 (2021)	N/A	75.4 (weighted by replacement value)	70	
	Assets are maintained in a state of good repair to provide reliable services to the community.	Percentage of Active Transportation Assets in fair or better condition (excl. Roads)	N/A	N/A	70.6%	N/A	

21.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

21.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social, or environmental needs. Forecast acquisition asset costs are summarized in Figure 21-4. The City assumes that there will be at least a 0.5% growth in the asset portfolio annually to account for assets assumed through development. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

Figure 21-4 – Yearly Acquisition and Upgrade Summary

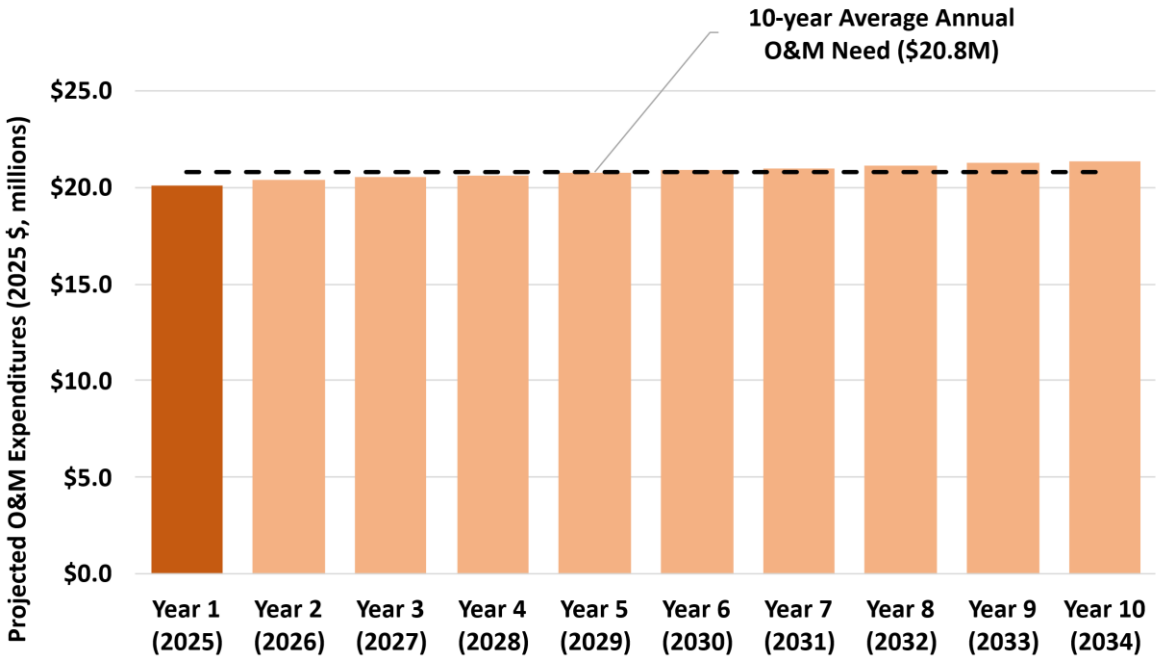


Summary of Forecast Operations and Maintenance Costs

Figure 21-5 shows the forecast operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased relative to the growth of the overall asset portfolio (See Section 21.3.1 for related growth costs). Regular increases due to inflation were not included.

If renewal projects are deferred, leading to deterioration of the asset portfolio over the 10-year period covered in this AM Plan, there will be a need to increase the spending on O&M to account for the increased reactive maintenance to manage the deteriorated asset condition (i.e., fixing potholes, repairing cracks, etc.).

Figure 21-5 – Operations and Maintenance Summary



21.3.2 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 21-6 shows the forecasted condition of Roads & Sidewalks assets over the next 10 years, based on two scenarios:

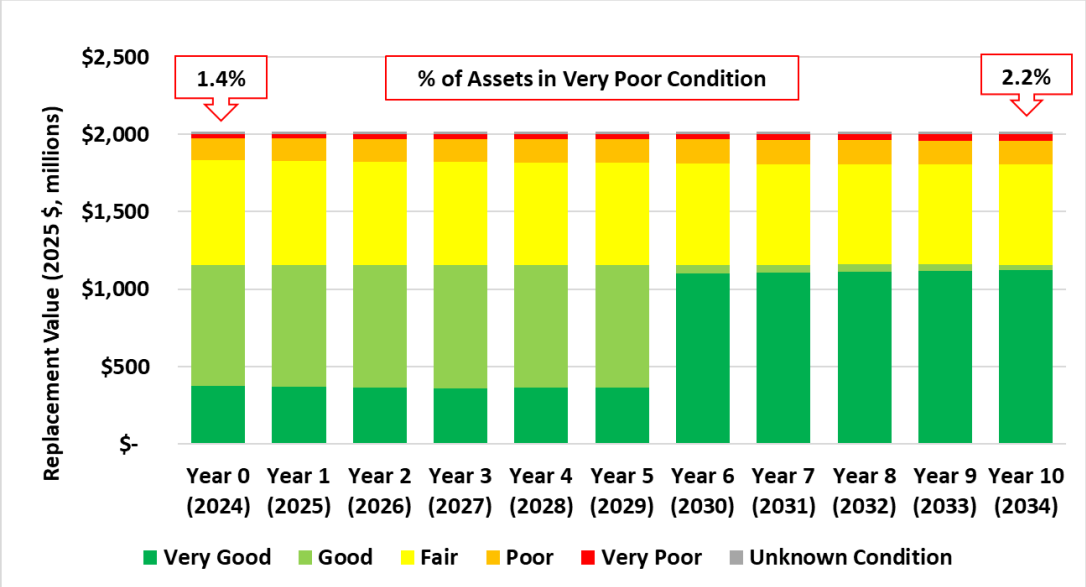
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $22.6 million per year to invest in the renewal of its Roads & Sidewalks assets.

Figure 21-6 – Forecast Renewal Costs

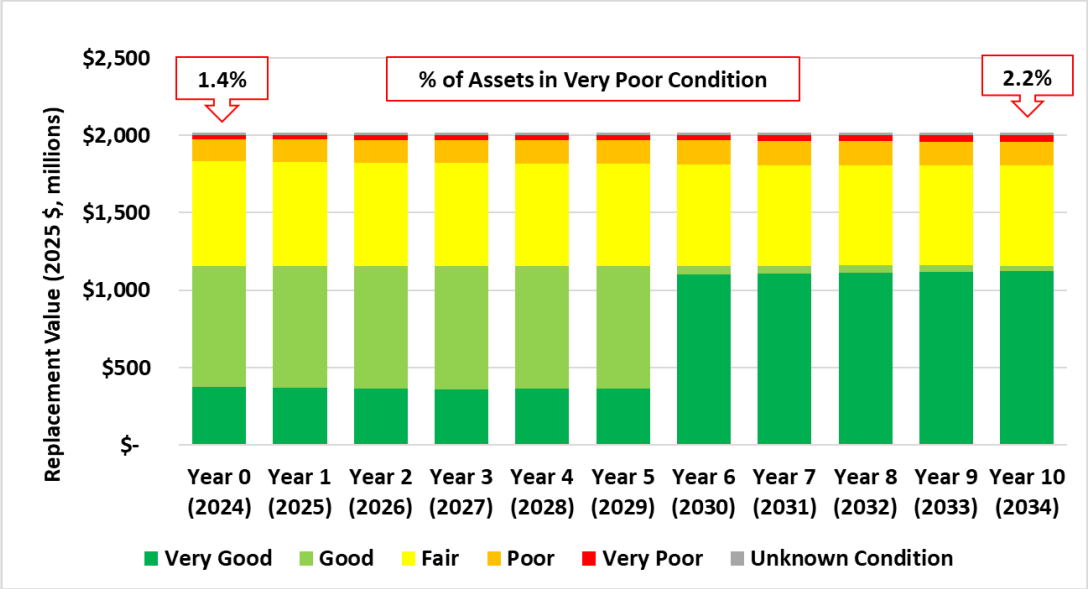
1. Planned Budget / Expected Performance ($22.6 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to deteriorate (% of assets in very poor condition) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based primarily on staff reported condition (90% of assets by replacement value).** For the remaining assets, the condition is determined based on their age relative to their estimated service life (see Table 24.11 in Appendix O). The forecast then estimates the planned replacement year based on when the asset has reached end of life. Renewal of certain assets have been deferred in order to align the forecast with the planned budget.



2. Proposed LOS: Planned Budget
($22.6 million per year average renewal investment from 2025 – 2034)

The proposed performance is to follow the planned budget which will result in minor deterioration of the road portfolio over the next 10 years. This deterioration would lead to an increase in operations and maintenance costs and the City will be managing this deterioration through improved planning and coordination of preventive maintenance activities.



Additionally, the lifecycle average annual renewal need for Roads & Culverts assets is approximately **$27.0 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** Therefore, the City's proposed renewal investment of $23.6 million per year in the renewal of Roads & Sidewalks assets from 2025 – 2034, may be insufficient to address renewal need in the years beyond the analysis period.

21.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Extreme Weather Events:** Any changes to road conditions are captured through roads needs studies conducted every two years or through the road patrol in the interim time between road studies.
- **Cost Escalations:** Procurement bids are evaluated against MTO, tender prices changes, and Statistics Canada information. The procurement team typically has a plan in place if costs unexpectedly escalate for tenders.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.25 in Appendix O) with the probability of failure ratings for all infrastructure represented within Roads & Sidewalks services. As shown in Figure 21-7, an estimated $169.8 million (8.5%) of Roads & Sidewalks assets currently have high-risk exposure.

Figure 21-7 – Risk Exposure Map for Roads & Sidewalks Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$0.0	$0.0	$0.0	$0.0	$0.0
Major	$370.2	$781.3	$668.9	$142.8	$27.0
Moderate	$1.5	$6.0	$1.2	$1.4	$0.0
Minor	$0.0	$0.0	$0.0	$0.0	$0.0
	Probability of Failure				

Risk Exposure	$	%
High	$169.8	8.5%
Moderate	$1,452.9	72.6%
Low	$377.7	18.9%
Total	$2,000.3	100.0%

Critical risks are those assessed with a risk rating of High. The mitigation plan, residual risk, and mitigation costs of implementing the selected mitigation plan are shown in Table 21.3.

Table 21.3 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Roads	Poor asset condition resulting in the inability to perform services	High	Renewal work to perform any necessary repairs or replacement of assets	Low	$113.0
Sidewalks					$56.7

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

21.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for road and sidewalk asset management are shown in Table 21.4.

Table 21.4 – Improvement Recommendations – Roads & Sidewalks

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Determine condition of assets currently reported in unknown condition
Levels of Service	• N/A
Lifecycle Management and Financial Summary	• Incorporate improved deterioration modelling to assess and plan road repair, rehabilitation, and reconstruction projects • Develop a forecast for O&M spending that accounts for deterioration of the road and sidewalk assets • Develop a more accurate method for budgeting growth due to development, rather than using a simple percentage increase
Risk Management	• Implement risk assessment for both asset management and project prioritization that aligns with Enterprise Risk Framework

22.0 APPENDIX M – GAS UTILITY SERVICES

The Gas Utility service area oversees the delivery and maintenance of the municipal gas distribution system, ensuring safe, reliable, and efficient energy service to customers.

22.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

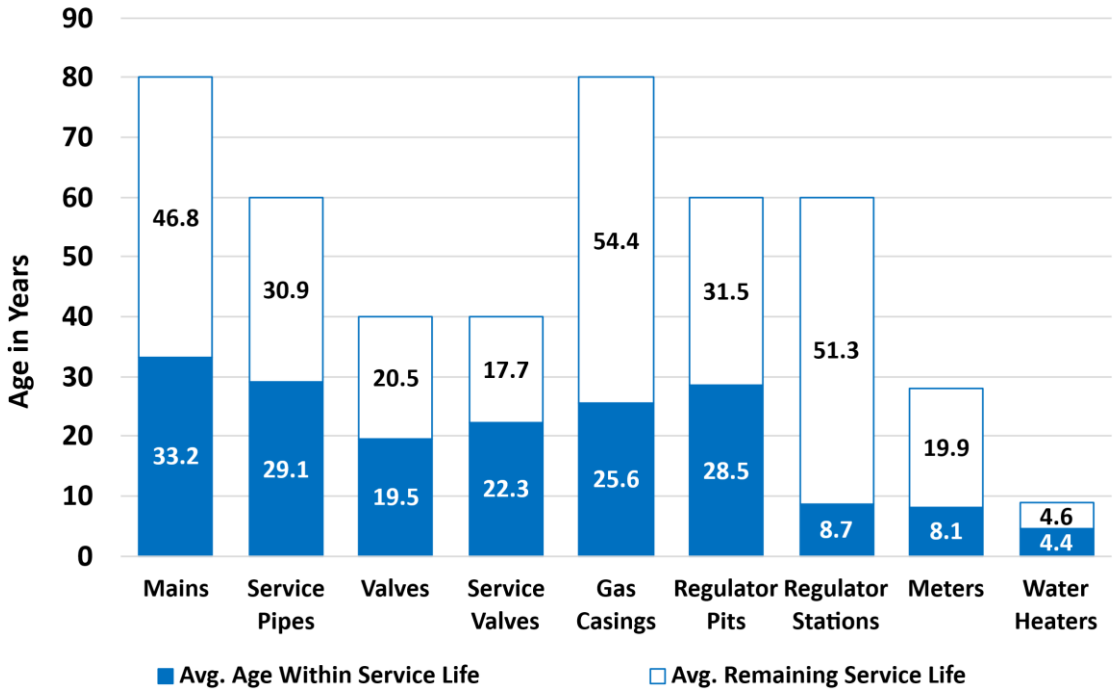
A variety of assets support the delivery of the City's gas utility services. The gas utility assets covered by this AM Plan are shown in Table 22.1. The largest portion of the asset mix are Mains assets with a replacement value of $1,259.0M (approximately 58% of the total replacement value).

Table 22.1 – Assets Inventory Summary

Asset Category	Asset Types	Replacement Value (2025$, M)	%
Distribution System	Mains	$1,259.0M	58.0%
	Service Pipes	$790.7M	36.4%
	Valves	$11.5M	0.5%
	Service Valves	$1.9M	0.1%
	Gas Casings	$0.5M	0.0%
	Regulator Pits	$0.0M	0.0%
	Regulator Stations	$3.0M	0.1%
Meters	Meters	$59.9M	2.8%
Water Heaters	Water Heaters	$44.9M	2.1%
TOTAL		**$2,171.5M**	**100%**

The age profile of the assets included in this AM Plan are shown in Figure 22-1.

Figure 22-1 – Asset Age Profile



Asset condition

The asset condition profile by replacement cost for gas utility services is shown in Figure 22-2. The asset condition profile by asset category is shown in Figure 22-3. The condition assessment of the City's gas utility assets provides insight into the reliability of its infrastructure. The condition of gas utility assets was based on the age of each asset. The gas utility team implements risk mitigation measures, as indicated in the Risk section, for any infrastructure assets that are having performance issues. Overall, approximately 97% of the City's gas utility assets have a condition rating of fair or better (excluding assets in unknown condition).

Approximately $0.1 million ($70K) of Gas Utility assets are in unknown condition. These unknown assets are comprised of Gas Casings ($52K) and Water Heaters ($18K).

Figure 22-2 – Asset Condition Profile

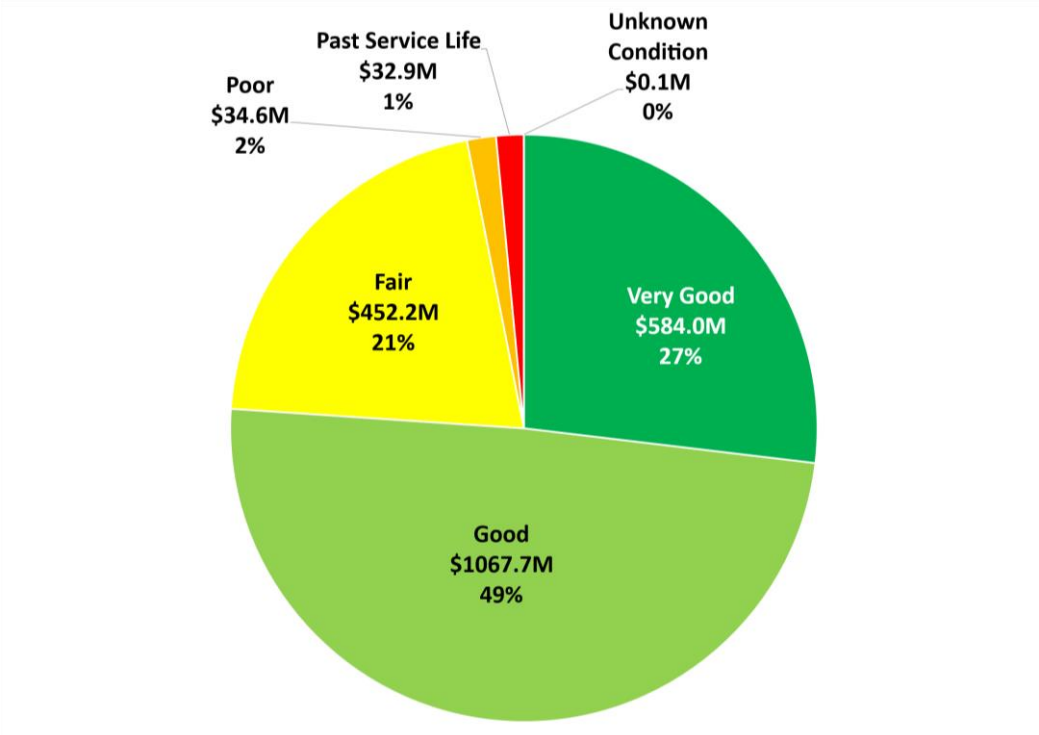
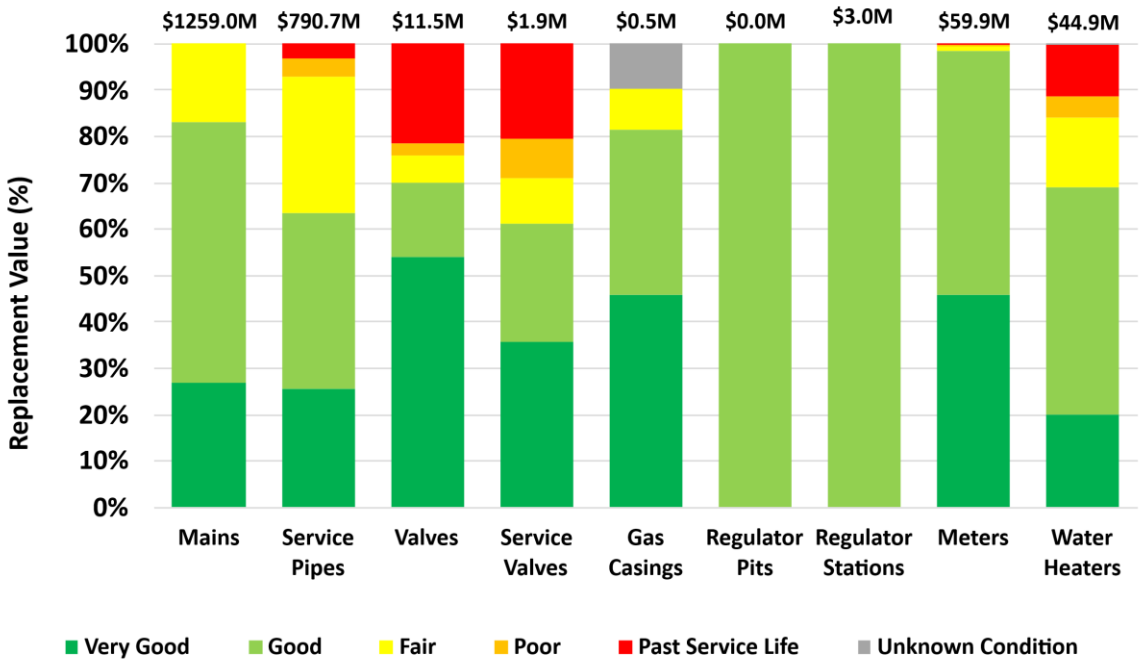


Figure 22-3 – Asset Condition Profile by Asset Category



22.2 LEVELS OF SERVICE

Table 22.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 22.2 – Levels of Service

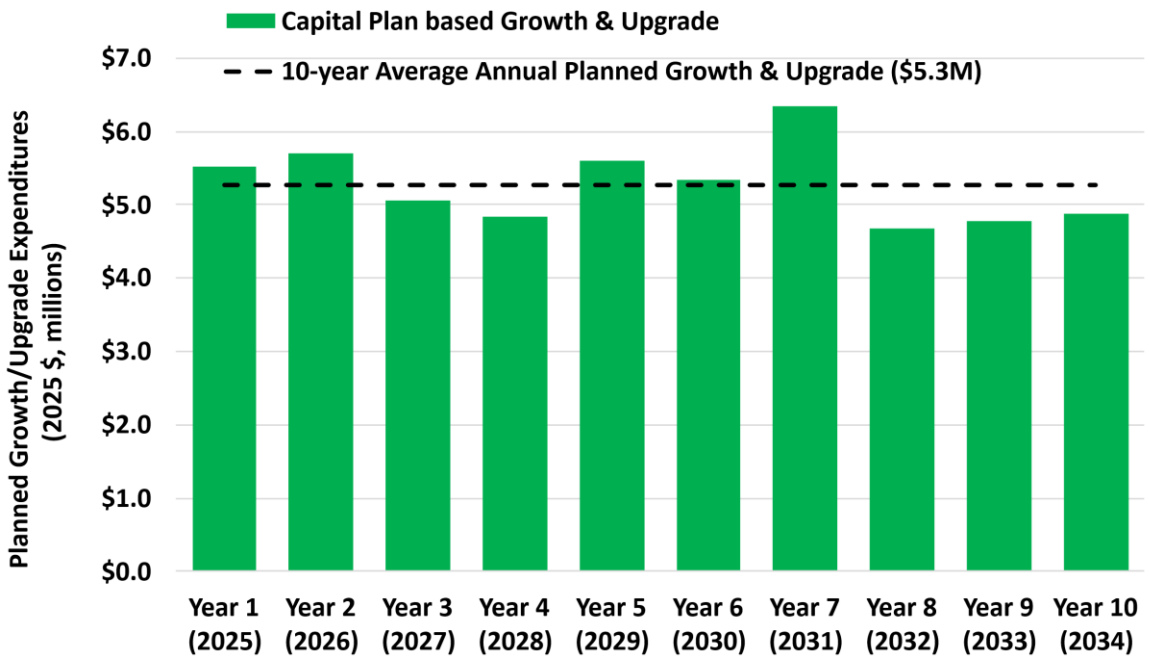
Technical Focused Levels of Service							
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Target/Proposed Performance (Value or Qualitative Trend)**	**Notes**
			2022	**2023**	**2024**		
Capacity & Use	The City aims to ensure reliable and efficient delivery of natural gas to meet customer and contractual obligations.	Number of hours below 20 PSI	0	0	0	0	
		Number of times exceeding contractual demand (Enbridge Gas Inc.) by more than 3% per year	0 (the last exceedance was in 2019)	0	0	0	
Quality & Reliability	The City is committed to delivering safe, reliable, and efficient natural gas services through proactive asset management and maintenance.	% assets within service life	N/A	N/A	98.0%	>75%	
		% unplanned down time and % of service returning in 8 hours during heating season or 24 hours outside of heating season	N/A	N/A	N/A	0% down time (100% service returning within timeframe)	
		% of leak surveys completed annually	Met target	Met target	Met target	33.3% (1/3) of system annually	
		% of meters with valid Measurement Canada seal	100%	100%	100%	100%	

22.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

22.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social, or environmental needs. There is limited forecast growth beyond 2031 as the Gas Utility is in the process of exploring and studying the impact of the energy transition to their business. This transition will be explored in a separate project and incorporated into future AM Plans. Forecast acquisition asset costs are summarized in Figure 22-4.

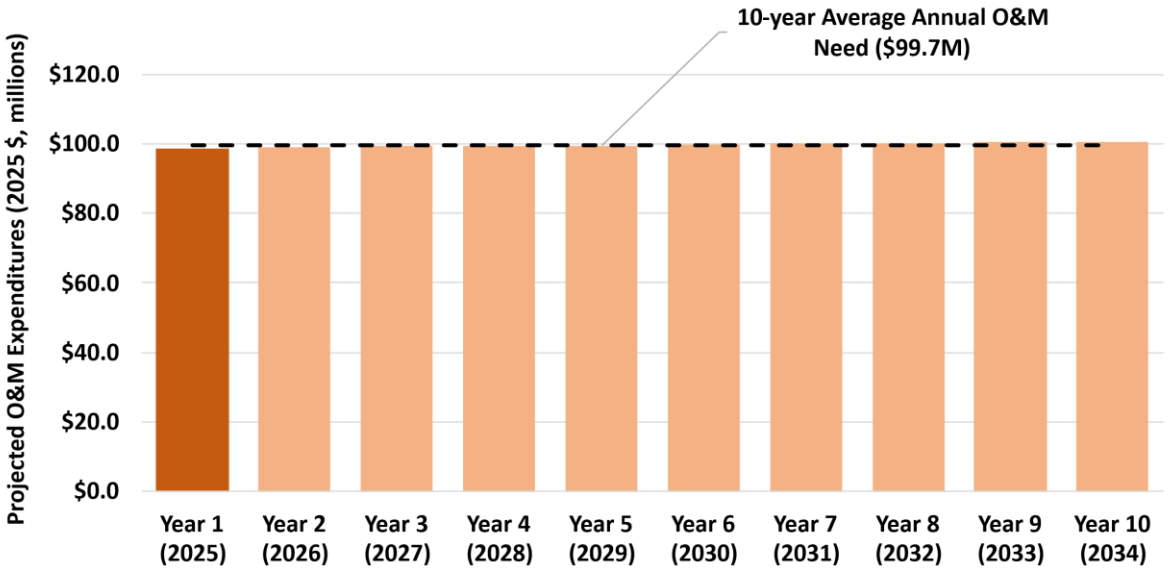
Figure 22-4 – Yearly Acquisition Summary



Summary of Forecast Operations and Maintenance Costs

Figure 22-5 shows the operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased relative to the growth of the overall asset portfolio (See Section 22.3.1 for related growth costs). Regular increases due to inflation were not included.

Figure 22-5 – Operations and Maintenance Summary



22.3.2 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed, and/or budgets are reprioritized.

Figure 21-6 shows the forecasted condition of Gas Utility assets over the next 10 years, based on two scenarios:

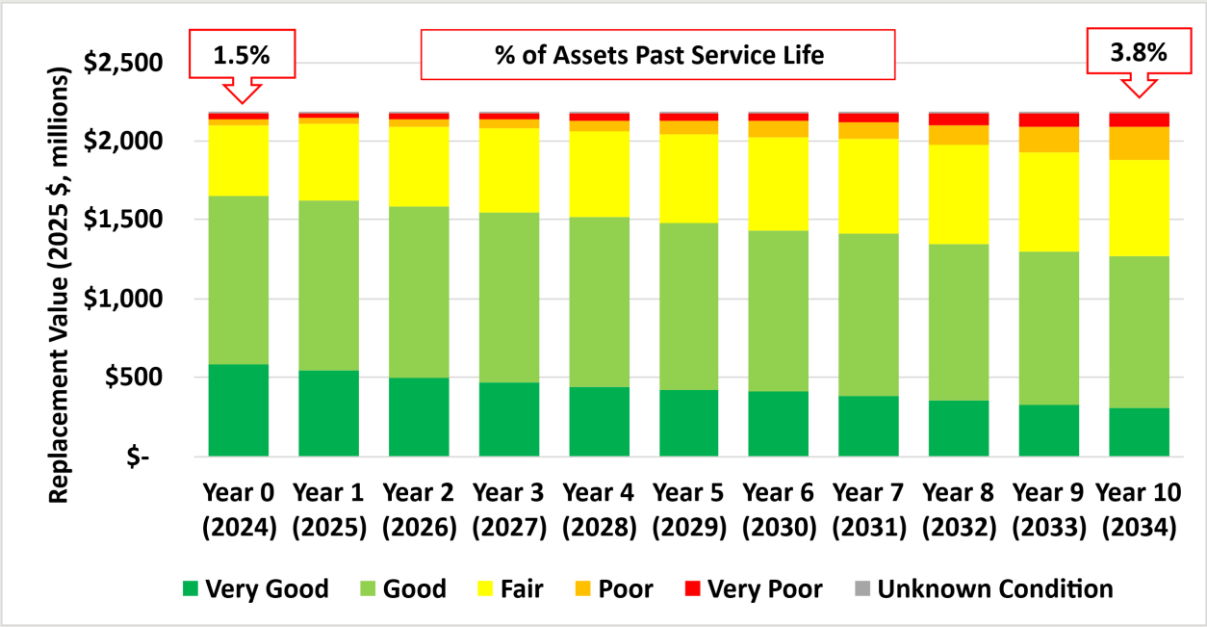
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $8.3 million per year to invest in the renewal of its Gas Utility assets.

Figure 22-6 – Renewal Needs Forecast

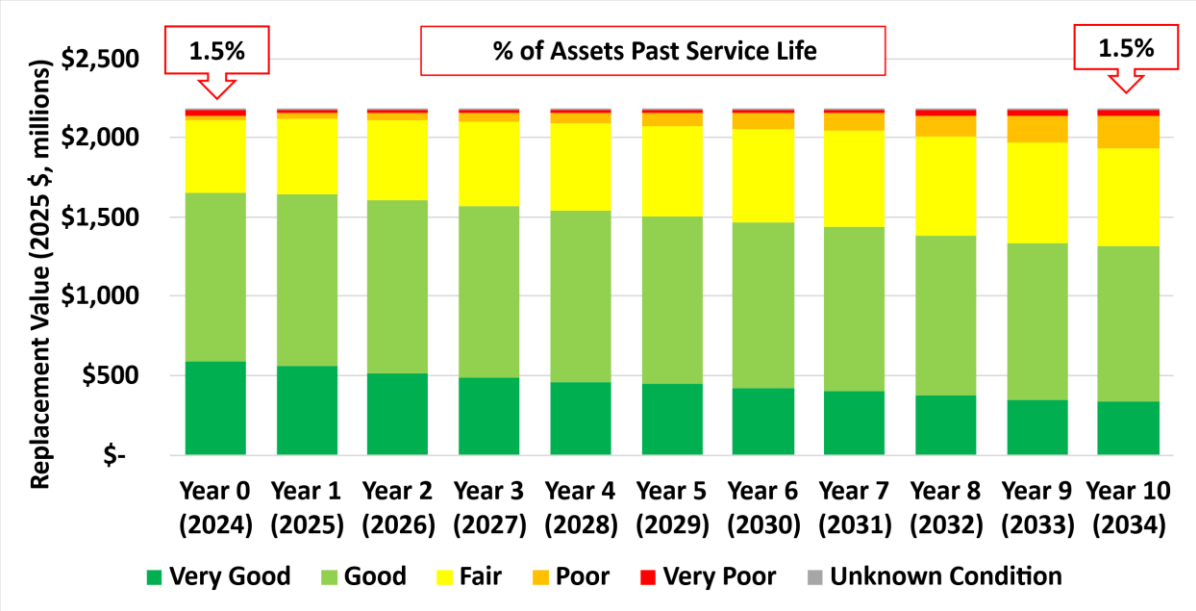
1. Planned Budget / Expected Performance ($8.3 million per year average renewal investment from 2025 – 2034)

The condition of assets is expected to deteriorate (% of assets beyond expected service life) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast determines the current condition of each asset **based on its age relative to its estimated service life** (see Table 24.12 in Appendix O) and estimates the planned replacement year based on when the asset has reached end of life. Renewal of certain assets have been deferred in order to align the forecast with the planned budget.



2. Proposed LOS: Maintain Current Condition ($14.4 million per year average renewal investment from 2025 – 2034)

The proposed performance is to maintain the overall condition of assets similar to the current state over the next 10 years. **This results in a funding gap of approximately $6.1 million per year.** The Gas Utility will be exploring increasing user rates over the next 10-years to support the long-term maintenance of asset condition to meet the proposed LOS.



Additionally, the lifecycle average annual renewal need for Gas Utility assets is approximately **$36.4 million per year**. This value is determined by taking the sum of the replacement value of each asset in the portfolio divided by its estimated service life. **The purpose of this value is to evaluate if there is potential renewal investment needed outside of the analysis period (2035 onward).** Therefore, the City's proposed renewal investment of $14.4 million per year in the renewal of Gas Utility assets from 2025 – 2034, will be insufficient to address renewal need in the years beyond the analysis period.

22.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Supply Chain Disruptions:** Gas meters are ordered at least one year in advance and the City maintains a surplus inventory of pipe. There are also many options for suppliers of gas utility assets.
- **Electrification Trends:** Staff use a gas demand model that reviews capacity in the pipes and evaluated growth needs. Staff are looking at future demand in the 5–10-year timeframe to try to forecast needs.
- **Peak Load:** Staff are challenged in determining future load demands and are working to be more strategic in the long-term investments to manage load demands.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk exposure framework shown in Section 7.0 combines the consequence of failure ratings (see Table 24.26 in Appendix O) with the probability of failure ratings for all infrastructure represented within Gas Utility services. As shown in Figure 22-7, an estimated $280.2 million (12.9%) of Gas Utility assets currently have high risk exposure.

Figure 22-7 – Risk Exposure Map for Gas Utility Assets

Risk exposure in year 2025 $, millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$338.3	$708.7	$212.1	$0.0	$0.0
Major	$209.1	$302.3	$232.7	$32.3	$30.7
Moderate	$9.2	$22.3	$6.8	$2.0	$5.1
Minor	$27.5	$31.4	$0.6	$0.3	$0.1
Probability of Failure					

Risk Exposure	$	%
High	$280.2	12.9%
Moderate	$1,252.5	57.7%
Low	$638.7	29.4%
Total	$2,171.4	100.0%

Critical risks are those assessed with a risk rating of High. The mitigation plan, residual risk and mitigation costs of implementing the selected mitigation plan are shown in Table 22.3. The City has a robust monitoring program to mitigate the probability of failure of gas utility assets to keep the public safe.

Table 22.3 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Mains	Poor asset condition resulting in the inability to perform services	High	Renewal work to perform any necessary repairs or replacement of assets	Low	$212.1
Service Pipes					$56.7
Valves					$2.8
Service Valves					$0.5
Water Heaters					$5.1

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

22.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for gas utility asset management are shown in

Table 22.4.

Table 22.4 – Improvement Recommendations – Gas Utility

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Develop a more robust inspection program for Gas Utility assets to reduce reliance on age-based condition assessments
Levels of Service	• Develop a more robust system for tracking and reporting the number of hours below 20 psi to ensure service reliability • Implement a formal tracking system for instances of exceeding contractual demand with associated costs and penalties • Establish a formal system to track and distinguish between planned maintenance outages and unplanned downtime • Formalize the tracking of the valve turning program to ensure all valves are exercised according to schedule
Lifecycle Management and Financial Summary	• Develop more comprehensive documentation of preventative maintenance programs and their financial impacts • Create a dedicated capital budget line for statutory meter replacements to ensure compliance with regulatory requirements • Develop a more detailed lifecycle costing model that accounts for the unique characteristics of gas utility assets, including regulatory requirements • Implement a system to track maintenance costs by asset type to better inform lifecycle management decisions • Confirm service life for gas pipes to better forecast replacement needs

AM Plan Section	Improvement Recommendation
Risk Management	• Develop a more comprehensive approach to identifying critical assets • Develop methods to quantify safety risks associated with gas asset failures to better prioritize investments • Incorporate environmental risk considerations into the asset management decision-making process • Implement risk assessment for both asset management and project prioritization that aligns with Enterprise Risk Framework

23.0 APPENDIX N – FACILITIES SERVICES

The Facilities service area manages the lifecycle of City-owned buildings and structures, including community centers, administrative offices, and operations buildings, ensuring they remain safe, accessible, and functional.

23.1 STATE OF LOCAL INFRASTRUCTURE

Asset inventory and valuation

A variety of assets support the delivery of the City's facilities services. The facility assets covered by this AM Plan are shown in Table 23.1. The largest portion of the asset mix are Arenas, with a replacement value of $487.8M and a total building area of 590,303 square feet. Arenas account for approximately 24.3% of the replacement value of all facilities assets.

Table 23.1 – Assets Inventory Summary

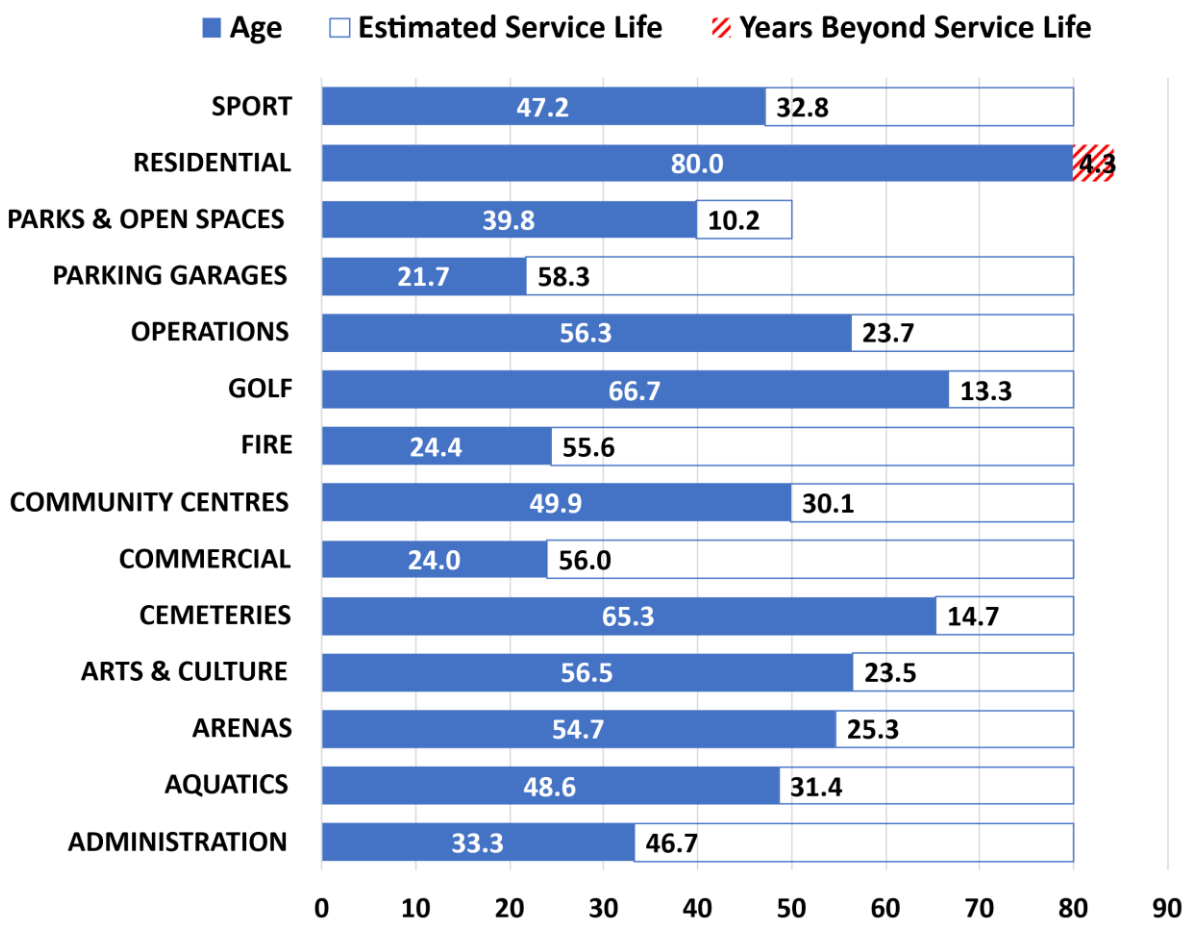
Service Area	Dimension (sq ft)	Replacement Value (2025$, M)	%
Administration	227,378	$212.6M	10.6%
Aquatics	97,636	$123.0M	6.1%
Arenas	590,303	$487.8M	24.3%
Arts & Culture	278,740	$248.7M	12.4%
Cemeteries	34,464	$20.6M	1.0%
Commercial	101,473	$151.5M	7.5%
Community Centres	185,076	$159.6M	8.0%
Fire	62,304	$101.2M	5.0%
Golf	45,210	$20.8M	1.0%
Operations	387,725	$221.4M	11.0%
Parking Garages	518,776	$149.3M	7.4%
Parks & Open Spaces	75,701	$28.1M	1.4%
Residential	7,828	$2.2M	0.1%
Sport	111,431	$81.2M	4.0%
TOTAL	**2,724,045**	**$2,007.9M**	**100%**

The age profile of the assets included in this AM Plan are shown in

Figure 23-1. Asset Age Profile was calculated using a weighted average age of assets based on current replacement value (CRV). All table and figure values are shown in current day dollars.

Residential assets are the oldest City facilities with an average age of 84.3 years against a useful life expectancy of 80 years. This suggests that these assets have, on average, met or exceeded their anticipated lifespan, potentially warranting closer attention and investment in maintenance, refurbishment, or disposal to ensure the continued well-being and safety of residents. In contrast, parking garages exhibit a notably lower average age of 21.7 years against a useful life expectancy of 80 years, emphasizing recent investments in this area.

Figure 23-1 – Asset Age Profile



Asset condition

The asset condition profile by replacement cost for facilities services is shown in Figure 23-2. The asset condition profile by asset category is shown in Figure 23-3. The condition assessment of the City's facilities assets provides insight into the reliability of its infrastructure. Overall, approximately 51% of the City's facilities assets have a condition rating of fair or better.

Figure 23-2 – Asset Condition Profile

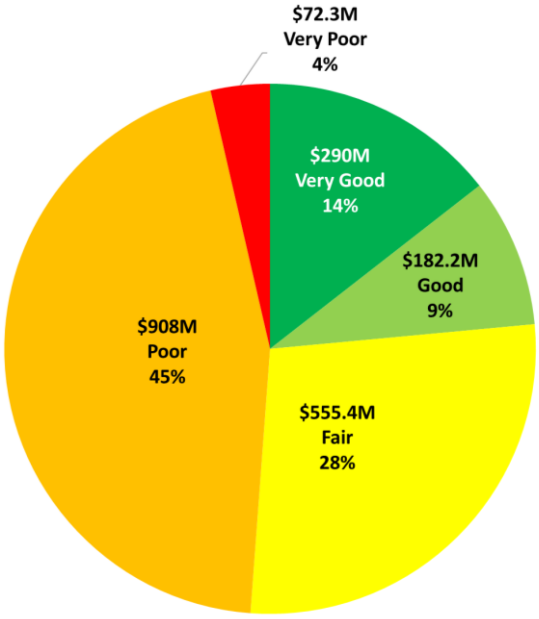
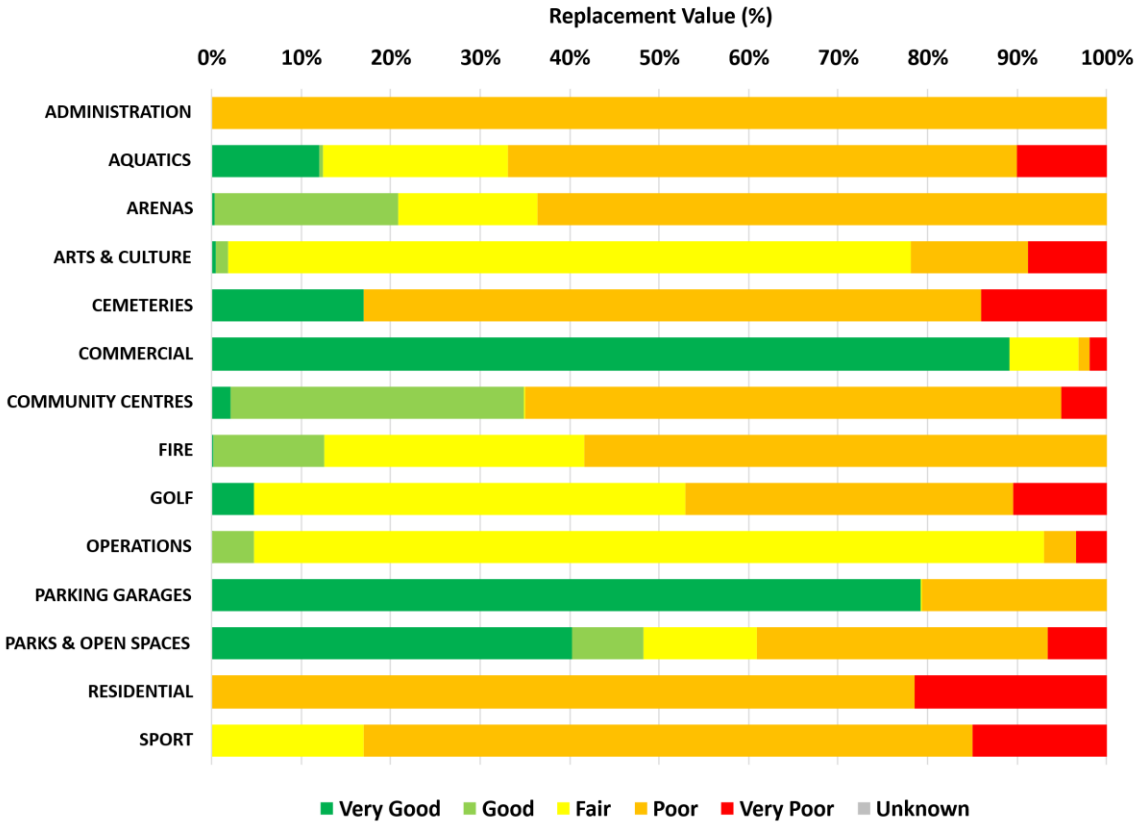


Figure 23-3 – Asset Condition Profile by Asset Category



23.2 LEVELS OF SERVICE

Table 23.2 shows the current service levels and planned target for each LOS. The lifecycle activities and resulting costs were developed to meet the target service levels identified within this section.

Table 23.2 – Levels of Service

Technical Focused Levels of Service						
LOS Category	**Community Level of Service**	**Performance Measure**	**Performance**			**Proposed Performance (Value or Qualitative Trend)**
			2022	**2023**	**2024**	
Functional	To promote a sustainable and energy efficient community by minimizing energy consumption and greenhouse gas (GHG) emissions across all City Facilities	Percentage of critical facilities (SFU 3, 4, 5) with accessibility audits completed	32.9%	36.6%	36.6%	100%
		GHG emissions for buildings	6685 tCO2e	6133 tCO2e	5773 tCO2e	3,550 tCO2e by 2034 (0 by 2050)
		GHG emissions for buildings per sq.m.	33.02 kgCO2e/m2	30.29 kgCO2e/m2	28.52 kg CO2e/m2	17.55 kg CO2e/m2 by 2034 (0 by 2050)
Quality & Reliability	Provide facilities in acceptable condition and cleanliness by following and providing proper maintenance standards and inspections.	Facility Condition Index	76%	9.9%	12.6%	Maintain current FCI of 12.6% by 2034, at $36.7M/yr
		Ratio of Planned versus Unplanned Work (by cost)		30% planned (July 2022 – June 2023)	22% planned (Jan 2024 – Dec 2024)	-
Financial Sustainability	Promote cost effective and resource efficient facilities services	Facility asset renewal budget as a percentage of replacement value	N/A	N/A	0.6%	1.8%

To address the demands due to the increasing population, the City is currently developing an Arenas Strategy that will be examining whether to maintain older facilities or build new multi-pad facilities. This strategy as well as other studies will address capacity-related issues for existing facilities and inform future measures for inclusion in the next AM Plan

Kitchener Public Library has been included in the calculation of the GHG emissions measures, as the City will manage these service levels by applying emissions reductions activities across all facilities. Kitchener Public Library has been excluded from all other measures, and from all other sections of the AM Plan.

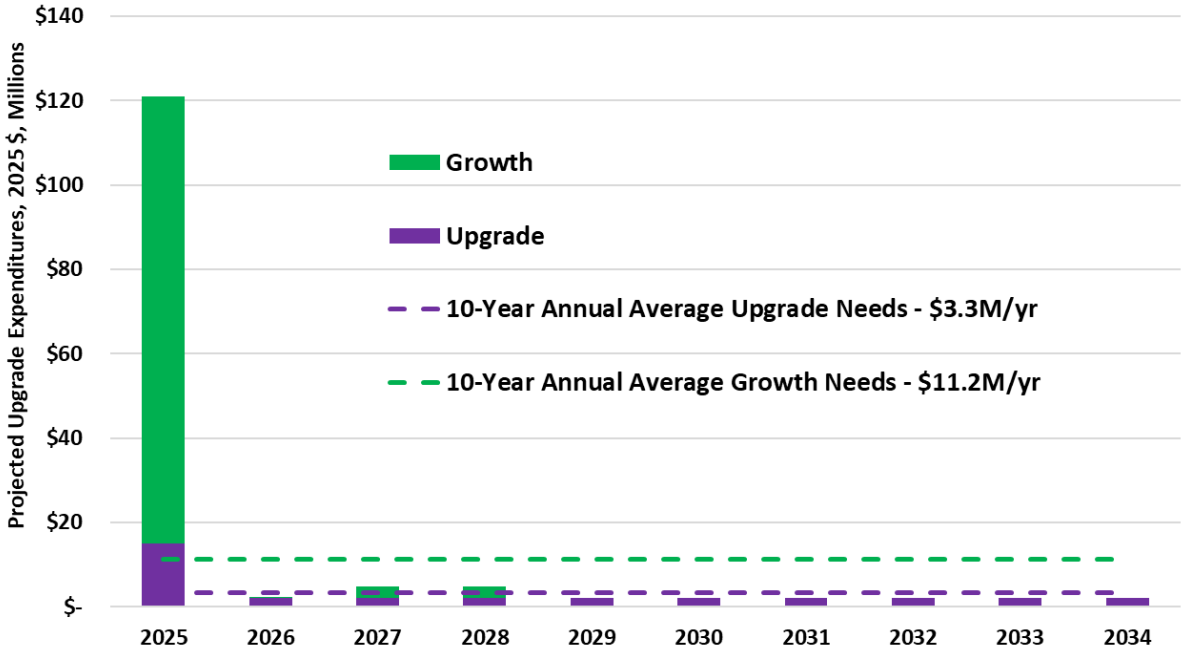
It is not possible to determine a proposed performance for, or the impact of available funding on, the ratio of planned versus unplanned work measure at this time. The City is optimizing the work order and planning process to be more efficient, and will monitor how the performance of this measure will change over the next few years.

23.3 LIFECYCLE MANAGEMENT AND FINANCIAL SUMMARY

23.3.1 Summary of Forecast Acquisition Costs

Acquisition reflects new assets that did not previously exist within the inventory. They may result from growth, demand, social or environmental needs. Forecast acquisition asset costs are summarized in Figure 23-4.

Figure 23-4 – Yearly Acquisition and Upgrade Summary

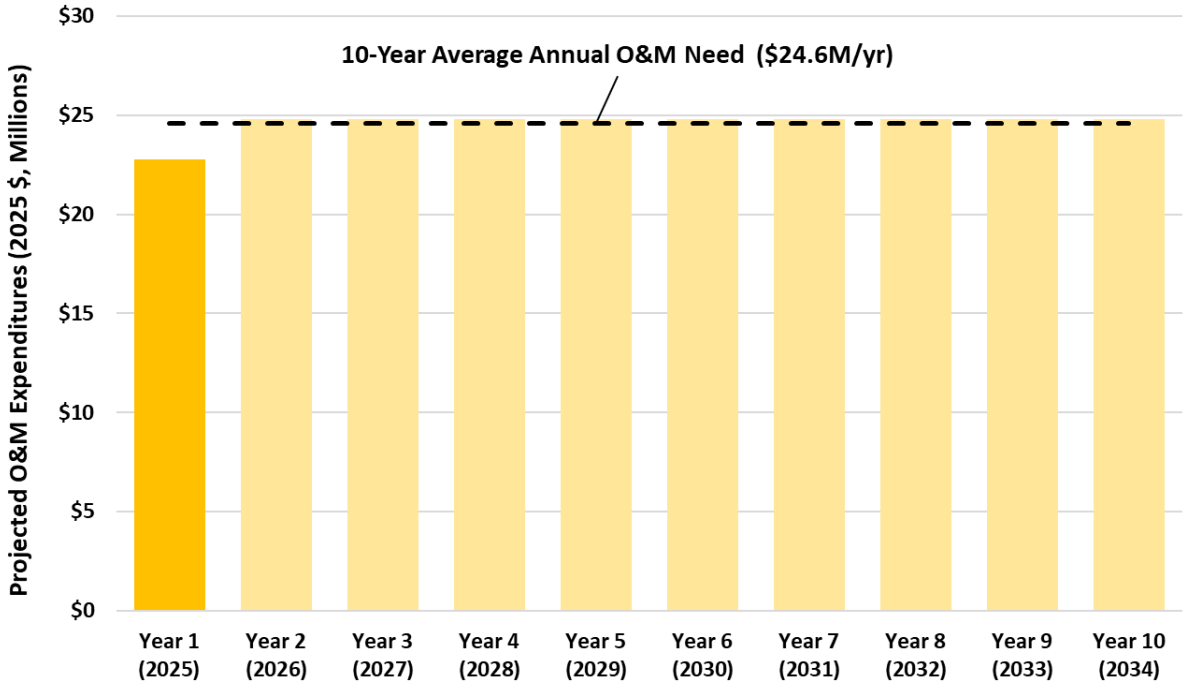


Growth projects for facilities typically span over several years. Expenditures for the 2024 and prior funded portions of growth projects total $80.5M, and are not included in Figure 23-4. Upgrade needs are concentrated in 2025 because future upgrade needs have not yet been identified. There is an estimated minimum $2 million per year need to meet the GHG emissions reductions targets, which the City expects to refine further through future audits.

Summary of Forecast Operations and Maintenance Costs

Figure 23-5 shows the operations and maintenance costs that are forecasted to increase over the next 10 years. Operations and maintenance costs were increased according to the growth projections outlined in Figure 23-4.

Figure 23-5 – Operations and Maintenance Summary



23.3.2 Summary of Forecast Renewal Costs

Forecast renewal costs are projected to increase over time as the asset inventory increases, renewal schedules are delayed and/or budgets are reprioritized.

Figure 21-6 shows the forecasted condition of Facilities assets over the next 10 years, based on two scenarios:

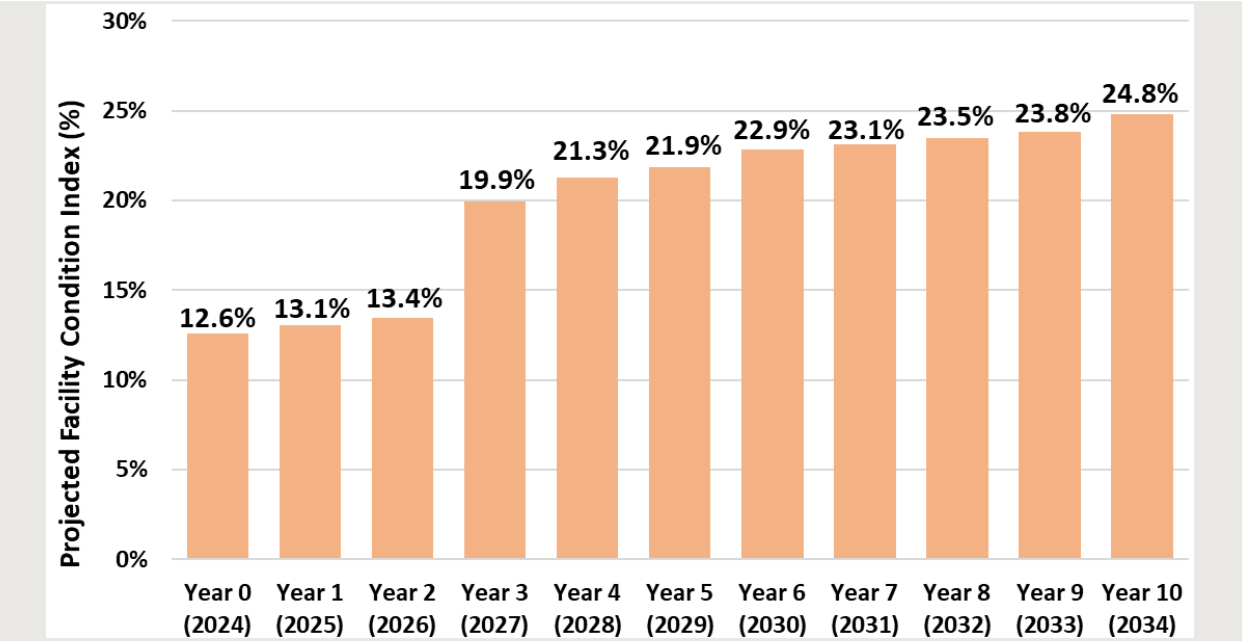
1. The planned budget
2. The proposed LOS the City has chosen

Based on the planned budget outlined in the 2025 – 2034 Capital Plan, the City has approximately $12.3 million per year to invest in the renewal of its Facilities assets.

Figure 23-6 – Forecast Renewal Costs

1. Planned Budget / Expected Performance ($12.3 million per year average renewal investment from 2025 – 2034)

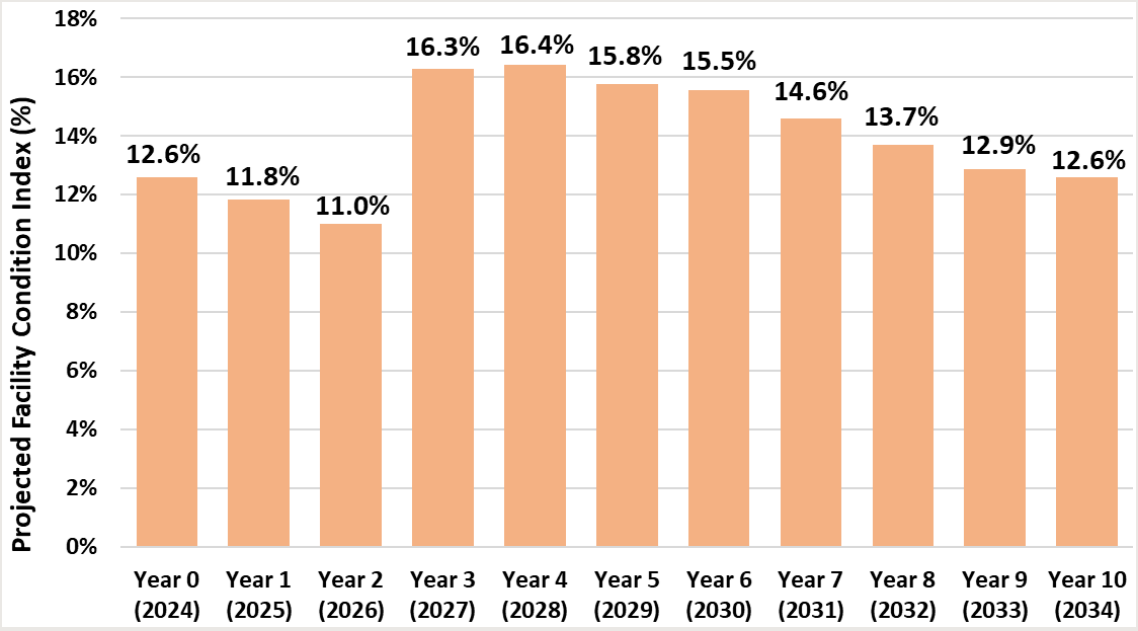
The condition of assets is expected to deteriorate (an increase in % FCI) based on the currently available budget for capital renewal over the next 10 years. The renewal forecast is determined **based on condition assessments,** which forecast the planned replacement year for each asset, based on condition and estimated remaining service life**.** Table 24.13 in Appendix O provides typical service lives of building elements. Renewal of certain assets have been deferred in order to align the forecast with the planned budget.



2. Proposed LOS: Maintain Current Condition ($36.7 million per year average renewal investment from 2025 – 2034)

The proposed performance is to maintain the overall condition of assets similar to the current state over the next 10 years, at an FCI of 12.6% by 2034. The cost to maintain this service level is $36.7 million per year. With an available budget of $12.3 million per year, achieving this proposed service level results in a funding gap of approximately $24.5 million per year.

The City is managing this shortfall and the potential deterioration in condition through seeking grant opportunities, improved planning and maintenance processes, prioritizing preventive and predictive maintenance over reactive maintenance, and developing an improved project prioritization process. To manage building condition while in a funding deficit, the City will continue to conduct condition assessments to identify critical repairs and leverage existing asset management tools to streamline operations. The City will also continue with strategic planning initiatives to help extend building life and reduce long-term costs. Consideration of outsourcing specialized tasks and adopting a prioritization framework will optimize maintenance by ensuring limited resources are focused on the most urgent and impactful needs.



23.4 RISK MANAGEMENT PLAN

Risk to Capacity & Function Levels of Service

The City is expected to grow significantly over the next 10-years and they are enhancing their service delivery through targeted improvements to service function (i.e., environmental, accessibility, performance, etc.). The capacity growth and functional improvements yield multiple risks that need to be managed by the City including:

- **Provision of Services:** The City has committed to adding several new facilities and expanding spaces at existing facilities, as noted in Figure 22-4, to provide sufficient capacity of services and manage the risks associated with population growth. Future capacity needs and associated risks will be evaluated through master planning and ongoing service reviews.

- **GHG Emissions:** The City has set an aspirational target of net zero emissions by 2050. To help achieve this, the City will continue to refine estimates on the need to reduce emissions through future audits and GHG pathway studies on high emission facilities. The City will pursue grants from higher levels of government for projects related to reducing GHG emissions.

Risk to Reliability Levels of Service

The Reliability LOS refers to the City's aim to ensure that its assets are kept in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. The risk map shown in Figure 23-7 combines the consequence of failure ratings with the probability of failure ratings for all infrastructure represented within the service area. To align with the corporate risk framework, assets with an SFU (Supporting Functional Use) score of 1 and 2 have been reclassified as a Minor consequence of failure.

Figure 23-7 – Risk Exposure Map for Facilities Assets

Risk exposure in year 2025 $, Millions

Consequence of Failure	Rare	Unlikely	Somewhat Likely	Likely	Almost Certain
Catastrophic	$0.0	$12.5	$220.8	$260.3	$0.0
Major	$0.0	$10.5	$0.0	$295.6	$0.2
Moderate	$276.7	$156.3	$325.9	$337.4	$58.2
Minor	$13.3	$2.9	$8.8	$14.7	$13.9
	Probability of Failure				

Risk Exposure	$	%
High	$ 835.1	42%
Moderate	$ 686.3	34%
Low	$ 486.6	24%
	$2,008.0	100%

Critical risks are those assessed with a risk rating of High. The mitigation plan, residual risk and mitigation costs of implementing the selected mitigation plan are shown in Table 23.3 for High-risk assets.

Table 23.3 – Risk Mitigation and Plans

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Fire Station 1	Poor facility condition resulting in facility closure and disruption of critical services	High	Renewal work including: Roof replacement, HVAC replacements	Moderate	$7.2M

Asset	Risk	Risk Rating	Risk Mitigation Plan	Residual Risk *	Treatment Costs ($M)
Fire Station 2	Poor facility condition resulting in facility closure and disruption of critical services	High	Renewal work including: Roof replacement, HVAC replacements, Roadway pavement replacement	Moderate	$1.8M
Fire Station 3 and Ambulance Station	Poor facility condition resulting in facility closure and disruption of critical services	High	Renewal work including: LED lighting	Moderate	$2.2M
Kitchener City Hall	Poor facility condition resulting in facility closure and disruption of critical services	High	Renewal work including: Major rehabilitation of Berlin Tower (glass curtain walls), replacement of lighting, elevator modernization, replacement of exterior aluminum wall panels	Moderate	$59.6M

Note * The residual risk is the risk remaining after the selected risk mitigation plan is implemented.

23.5 AM PLAN IMPROVEMENT AND MONITORING

It is vital in any AM Plan to recognize areas of future improvements to ensure effective asset management and informed decision making. The improvement recommendations for Facilities asset management are shown in Table 23.4.

Table 23.4 – Improvement Recommendations – Facilities

AM Plan Section	Improvement Recommendation
State of Local Infrastructure	• Continue to conduct regular building condition assessments
Levels of Service	• Consider past safety issues and incorporate added safety elements into corporate facility design standards

AM Plan Section	Improvement Recommendation
Lifecycle Management and Financial Summary	• The overarching corporate goal is to net zero emissions by 2050. Develop costs related to GHG reduction and energy consumption • Complete accessibility audits and determine accessibility upgrade needs • Determine funding gap related to planned maintenance and implement formal preventive maintenance activities as required to lower unplanned maintenance and risk of unexpected service disruptions • Develop strategies regarding disposals, acquisitions, temporary facilities, replacement versus rehabilitations of old facilities as part of overall approaches to manage the funding gap
Risk Management	• Improve the alignment of the facilities risk assessment with Enterprise Risk Framework • Monitor potential impacts on accelerated deterioration of facility elements due to extreme weather events, and account for added costs in renewal forecasts

24.0 APPENDIX O – ADDITIONAL ASSET DATA

24.1 ESTIMATED SERVICE LIVES

Table 24.1 – Estimated Service Lives - Fleet

Asset	Estimated Service Life (years)
Cars	8
Pickups	8
Vans	8
Crew Cabs	8
Small Dumps (10,000 to 18,000 lb. GVW)	7
Single Axle Dump Trucks (30,000 to 39,000 lb. GVW)	8
Tandem Dump Trucks (50,000 to 55,000 lb. GVW)	9
Tridem	11
Flushers	16
Sweepers (large and small)	6
Rollers	13
Tractor Loaders	11
Tractor Loader Backhoes	10
Heavy Loaders	16
Graders	16
Turf Tractors LCG	13
Tar Kettles	16
Self-Propelled Gang Mowers	11
Trailer-Mounted Compressors 160 CFM	11
Ice Machines	11
Self-Propelled Rotary and Reel Mowers	8
Diesel Garden Tractor	13

Table 24.2 – Estimated Service Lives - Cemeteries

Asset	Estimated Service Life (years)
Ossuary/Scattering Gardens	100
Statues	100
Art/Artifacts	100
Stone Walls	100
Reflection Stones	100
Memorial Plaques	100
Memorial Trees	100
Memorial Benches	15
Burial Greens	10
Urn Tables	10
Columbarium	40

Asset	Estimated Service Life (years)
Horticultural Beds	100
Roadways & Parking Lots	30
Fences	50
Gates	10
Cemetery Bollards	10
Cemetery Garbage Cans	10
Fountains	15
Cemetery Benches	15
Wetland Gazebo	30
Wetland Bridge	30
Pond Bridge	30
Dedication Centre Pergola	30
Serbian Pergola	30
Trail Entrance Feature	30
Lowering Units	15

Table 24.3 – Estimated Service Lives - Golf

Asset	Estimated Service Life (years)
Irrigation Systems	40
Lighting	20
Golf Bike Racks	10
Entrance Features	20
Flag Poles	20
Golf Benches	10
Bunkers	30
Fairways	30
Greens	30
Rough	30
Practice Greens	30
Tee Complexes	15
Short Course Greens	30
Short Course Tees (Synthetic)	10
Practice Ranges (Synthetic)	15
Practice Ranges (Natural)	15
Ball Washers	15
Golf Carts (Gas)	8
Golf Carts (Lithium)	8
Golf Cart Bridges	50
Practice/Driving Range Tee	20
Golf Cart Path	50

Table 24.4 – Estimated Service Lives - Parking

Asset	Estimated Service Life (years)
Surface Lots	35
Pay by Plate Units	15
EV Charging Stations	15
Parking Bike Racks	10
Light Standards	30
Parking Bollards	10
Parking Gates	10

Table 24.5 – Estimated Service Lives – Parks, Open Spaces & Trails

Asset	Estimated Service Life (years)
Ball Diamond	40
Cricket Pitch	40
Lawn Bowling	40
Soccer Field	40
Outdoor Rink	10
Tennis Court	20
Basketball Court	20
Volleyball Court	20
Bike Park	20
Skateboard Park	20
Playground	15
Boardwalk	15
Bridge	30
Shuffleboard Court	15
Disc Field	40
Field Hockey Pitch	40
Dog Park	40
Parks Bike Racks	15
Parks Garbage Containers	15
Huron Natural Area Picnic Shelter	15
Picnic Tables	15
Parks Bollards	15
Parks Benches	15
Trails	30
Pickleball Court	20

Table 24.6 – Estimated Service Lives – Transportation

Asset	Estimated Service Life (years)
Streetlight Pole	50
Streetlight	20
Railing	50
Road Islands	50
Raised Crosswalk	50
Speed Hump	50
Pedestrian Crossing	15
Transportation Bollards	15
Street Benches	15
Pedestrian Pad	50
Traffic Signs	15

Table 24.7 – Estimated Service Lives – Water Utility

Asset	Estimated Service Life (years)
Mains	**100** (HDPE, HDPE in CI, PVC, PVCB, PVCF, PVCO) **80** (DI, COP, CPP, ST) **50** (AC, CI)
Service Pipes	
Pipe Casings	100 (HDPE)
Chambers	50
Hydrants	Same as Mains
Main Valves	**55** (100mm Dia.) **55** (150mm Dia.) **50** (200mm Dia.) **45** (Remaining Sizes)
Service Valves	
Permanent Bulk Water Stations	25
Temporary Bulk Water Stations	15
Meters	**15** (3/4", 5/8") **12** (1") **10** (Remaining Sizes)

Table 24.8 – Estimated Service Lives – Sanitary Utility

Asset	Estimated Service Life (years)
Mains	**100** (CP, HDPE, PVC, RCP) **80** (AC, DIP, PE, SP, VCP, XXX)
Force Mains	
Service Pipes	
Plugs	50
Manholes	50

*Estimated Service Lives for Vertical Assets vary by building component

Table 24.9 – Estimated Service Lives – Stormwater

Asset	Estimated Service Life (years)
Mains	100 (CP, CSB, CSU, HDPE, PVC, RVC) 80 (AC, PE, VCP) 50 (CSP)
Service Pipes	
Valves	50
Plugs	50
Ditches	50
Culverts	50
Driveway Culverts	50
Manholes	50
Catchbasins	50
Oil and Grit Separators	50
Stormwater Management Facilities	80
Stormwater Ponds	80
Bioretention	25
Permeable Pavement	25
Infiltration Galleries	25
Holding Tanks	25
Subsurface Facilities	25
Storm Leads	50
Storm Inlets	50
Storm Outlets	50
Storm Weirs	50
Storm Forebays	50

Table 24.10 – Estimated Service Lives – Bridges & Culverts

Asset	Estimated Service Life (years)
Road Bridges	75
Rail Bridges	75
Pedestrian Bridges	50
CSP Culverts	50
Other Culverts	75

Table 24.11 – Estimated Service Lives – Roads & Sidewalks

Asset	Estimated Service Life (years)
Roads	20 (Surface) 40 (Base)
Sidewalks, Walkways & Crosswalks	80 (Concrete) 30 (Asphalt/Other)
Pathways	

Asset	Estimated Service Life (years)
Cycling	
Network Links	
Guiderails	50

Table 24.12 – Estimated Service Lives – Gas Utility

Asset	Estimated Service Life (years)
Mains	80
Service Pipes	60
Valves	40
Service Valves	40
Gas Casings	80
Regulator Pits	60
Regulator Stations	60
Meters	24
Water Heaters	9

Table 24.13 – Estimated Service Lives – Facilities

Asset Category	Estimated Service Life (years)
Substructure	40
Floor Construction	40
Roof Construction	40
Exterior Walls	40
Exterior Windows	30
Exterior Doors and Grilles	30
Exterior Horizontal Enclosures	20
Interior Partitions	50
Interior Doors	30
Interior Specialties	10
Stairs	50
Wall Finishes	20
Flooring	20
Ceiling Finishes	20
Stair Finishes	20
Conveying	25
Plumbing	30
HVAC	30
Fire Protection	30
Electrical Service	30
Lighting	30

Asset Category	Estimated Service Life (years)
Other Electrical	30
Communications, Electronic Safety and Security and Integrated Automation	10
Equipment and Furnishings	10
Special Construction	50
Sitework	30

24.2 COF RATINGS

Table 24.14 – COF Ratings - Fleet

Asset Category	COF Rating
Misc Small Equipment	1
Lawn/Turf Equipment	1
Off Road Equipment	3
Licensed Equipment	3
Arena Equipment	2
Dump/Fire Trucks	4

Table 24.15 – COF Ratings - Cemeteries

Asset	COF Rating
Ossuary/Scattering Gardens	1
Statues	1
Art/Artifacts	1
Stone Walls	2
Reflection Stones	2
Memorial Plaques	1
Memorial Trees	1
Memorial Benches	1
Burial Greens	1
Urn Tables	1
Columbarium	3
Horticultural Beds	1
Roadways & Parking Lots	2
Fences	1
Gates	1
Cemetery Bollards	1
Cemetery Garbage Cans	1
Fountains	1
Cemetery Benches	1
Wetland Gazebo	2
Wetland Bridge	2
Pond Bridge	3
Dedication Centre Pergola	2
Serbian Pergola	2
Trail Entrance Feature	2
Lowering Units	4

Table 24.16 – COF Ratings - Golf

Asset	COF Rating
Irrigation Systems	2
Lighting	2
Golf Bike Racks	1
Entrance Features	1
Flag Poles	1
Golf Benches	1
Bunkers	2
Fairways	2
Greens	2
Rough	2
Practice Greens	1
Tee Complexes	1
Short Course Greens	1
Short Course Tees (Synthetic)	1
Practice Ranges (Synthetic)	1
Practice Ranges (Natural)	1
Ball Washers	1
Golf Carts (Gas)	2
Golf Carts (Lithium)	2
Golf Cart Bridges	3
Practice/Driving Range Tee	1
Golf Cart Path	2

Table 24.17 – COF Ratings - Forestry

Asset Category	COF Rating
Street Trees	3
Park, Cemetery, Golf & Other Trees	2

Table 24.18 – COF Ratings - Parking

Asset Category	COF Rating
Surface Lots	2
Pay by Plate Units	1
EV Charging Stations	1
Parking Bike Racks	1
Light Standards	1
Parking Bollards	1
Parking Gates	1

Table 24.19 – COF Ratings – Parks, Open Spaces & Trails

Asset Category	COF Rating
Ball Diamond	2
Cricket Pitch	2
Lawn Bowling	2
Soccer Field	2
Outdoor Rink	2
Tennis Court	2
Basketball Court	2
Volleyball Court	2
Bike Park	4
Skateboard Park	4
Playground	3
Boardwalk	4
Bridge	4
Shuffleboard Court	2
Disc Field	2
Field Hockey Pitch	2
Dog Park	2
Parks Bike Racks	1
Parks Garbage Containers	1
Picnic Tables	1
Parks Bollards	1
Parks Benches	1
Trails	2
Pickleball Court	2

Table 24.20 – COF Ratings – Transportation

Asset Category	COF Rating
Streetlight Pole	3
Streetlight	3
Railing	2
Road Islands	1
Raised Crosswalk	2
Speed Hump	1
Pedestrian Crossing	3
Transportation Bollards	1
Street Benches	1
Pedestrian Pad	1
Traffic Signs	Warning – 3 Other - 2

Table 24.21 – COF Ratings – Water Utility

Asset Category	COF Rating
Mains	4
Service Pipes (>4”)	4
Service Pipes (<=4”)	2
Pipe Casings	1
Chambers	3
Hydrants	2
Main Valves	3
Service Valves	2
Permanent Bulk Water Stations	1
Temporary Bulk Water Stations	1
Meters	1

Table 24.22 – COF Ratings – Sanitary Utility

Asset Category	COF Rating
Mains	4
Force Mains	4
Service Pipes	2
Plugs	2
Manholes	2
Stoke SPS	4
Patricia SPS	4
Moore SPS	4
Oxford SPS	4
Falconridge SPS	4
Victoria/Breslau SPS	4
Carson SPS	4
Manchester (Lift Station) SPS	4
Otterbein SPS	4
Springmount SPS	4
Bancroft SPS	4
Apple Tree SPS	4
Woolner Trail SPS	4
Chandos SPS	4
King Street SPS	4
River Birch SPS	4
Pioneer Tower SPS	4
Homer Watson SPS	4
Conestoga College SPS	4
New Dundee SPS	4

Asset Category	COF Rating
Nathalie SPS	4
New Old Mill SPS	4

Table 24.23 – COF Ratings – Stormwater

Asset Category	COF Rating
Mains	4
Service Pipes	2
Valves	3
Plugs	2
Ditches	2
Culverts	4
Driveway Culverts	2
Manholes	2
Catchbasins	2
Oil and Grit Separators	2
Stormwater Management Facilities	4
Stormwater Ponds	4
Bioretention	2
Permeable Pavement	2
Infiltration Galleries	2
Holding Tanks	2
Subsurface Facilities	2
Storm Leads	3
Storm Inlets	3
Storm Outlets	3
Storm Weirs	3
Storm Forebays	4

Table 24.24 – COF Ratings – Bridges & Culverts

Asset Category	COF Rating
Mains	4
Service Pipes	2
Valves	3
Plugs	2
Ditches	2
Culverts	4
Driveway Culverts	2
Manholes	2
Catchbasins	2

Asset Category	COF Rating
Oil and Grit Separators	2
Stormwater Management Facilities	4
Stormwater Ponds	4
Road Bridges	4
Rail Bridges	4
Pedestrian Bridges	3
CSP Culverts	3
Other Culverts	4

Table 24.25 – COF Ratings – Roads & Sidewalks

Asset Category	COF Rating
Roads	4 (Class 1 & 2) 3 (Class 3, 4 & 5)
Sidewalks, Walkways & Crosswalks	3
Pathways	3
Cycling	3
Network Links	3
Guiderails	2

Table 24.26 – COF Ratings – Gas Utility

Asset Category	COF Rating
Mains	4
Service Pipes	3
Valves	3
Service Valves	3
Gas Casings	2
Regulator Pits	2
Regulator Stations	3
Meters	1
Water Heaters	2

*Note that COF ratings for Facilities vary by individual facility