

2023

Corporate Asset Management Plan

City of London



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2023 CAM Plan







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Acknowledgement

Land Acknowledgment

We acknowledge that the City of London resides on the traditional lands of the Anishinaabeg, Haudenosaunee, Lūnaapéewak and Attawandaron. We acknowledge all the treaties that are specific to this area: the Two Row Wampum Belt Treaty of the Haudenosaunee Confederacy/Silver Covenant Chain; the Beaver Hunting Grounds of the Haudenosaunee NANFAN Treaty of 1701; the McKee Treaty of 1790, the London Township Treaty of 1796, the Huron Tract Treaty of 1827, with the Anishinaabeg, and the Dish with One Spoon Covenant Wampum of the Anishnaabek and Haudenosaunee. This land continues to be home to diverse Indigenous people (First Nations, Métis and Inuit) whom we recognize as contemporary stewards of the land and vital contributors to society. As representatives of the people of the City of London, we are grateful to have the opportunity to work and live in this territory.

Staff Acknowledgment

The Corporate Asset Management office would like to acknowledge the efforts of the staff of the individual City of London service areas, Tangible Capital Assets, Development Finance, Financial Planning and Policy, and Corporate Communications, for the effort and support they put forth to help accumulate the data and develop the findings of this Corporate Asset Management Plan. We are also sincerely thankful to City Council for their continued support.

City of London Council (2022-2026)

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Section 1. Executive Summary

Summary	Maintain Current LOS	Achieve Proposed LOS
Replacement Value (\$millions)	\$28,465	\$28,465
Cumulative 10-Year Infrastructure Gap (\$millions)	\$946	\$1,378
Infrastructure Gap as a Percentage of Replacement Value	3.32%	4.84%

1.1: 2023 CAM Plan Introduction

The Corporation of the City of London's ("City of London" or "City") infrastructure systems are the backbone of our community. They support a range of municipal services that enable the quality of life experienced by residents, businesses, and other community partners.

The City's Corporate Asset Management (CAM) Program is designed to enable management of infrastructure assets in a way that connects strategic Council and community objectives to day-to-day and long-term infrastructure investment decisions.

Under the City's Asset Management Policy, this CAM Plan is a tactical outcome of the CAM Program, setting out the current plan for the City to manage its \$28.5 billion worth of infrastructure under the direct ownership and control of the City of London. This is accomplished by:

- Aligning with the Provincial regulatory landscape, meeting the requirements of O.Reg. 588/17, and positioning London for grant funding applications.
- Understanding the current state of the infrastructure systems.
- Measuring and monitoring levels of service (LOS) to quantify how well an infrastructure system is meeting expectations.
- Establishing asset lifecycle management activities (e.g., how infrastructure is operated, maintained, rehabilitated, and replaced).
- Determining the optimal costs of the asset lifecycle activities required to ensure the infrastructure systems provide service levels that meet community expectations.

- Assessing how to split optimal costs between those that maintain current LOS, and those that achieve proposed LOS;
- Establishing an infrastructure gap financing strategy to fund the expenditures that are required to complete the optimal lifecycle activities for Council's approval.
- Prepare conclusions and provide recommendations resulting from the data analysis performed.

Based on existing City budget and forecast, (2022 Annual Budget Update, inclusive of 2022-2031 capital plan) and to conform with O. Reg 588/17, there are two 10-year infrastructure gaps concepts disclosed within this Plan. The first concept is to maintain current LOS and with the second concept being to achieve proposed LOS. The 10-year maintain current LOS infrastructure gap is \$946.1 million. The 10-year achieve proposed LOS infrastructure gap is \$1,378.1 million. The preferred strategy is to find a balance between the affordability of municipal taxes and utility rates with the needs of the City. Failing to address growing infrastructure needs will result in increased risk of infrastructure failures that will negatively affect Londoners quality of life through more frequent impacts like road closures, water alerts, unkempt parks, etc. Failure to take care of a minor repair in the short term can lead to more costly solutions in the future.

The City's projected lifecycle renewal investment plans currently do not meet the needs of the actual lifecycle replacements infrastructure investments. If nothing is done to address the projected shortfall, the infrastructure gap will continue to grow, resulting in an untenable situation. The most efficient way to manage the assets is through well planned investments, making the right investment at the right time for the right amount.

Table 1.1 2023 CAM Plan Summary Information

Summary Information	Maintain Current LOS	Achieve Proposed LOS
Replacement Value (\$millions)	28,465.1	28,465.1
10-Year Infrastructure Gap (\$millions)	946.1	1,378.1
Infrastructure Gap as a Percentage of Replacement Value	3.32%	4.84%

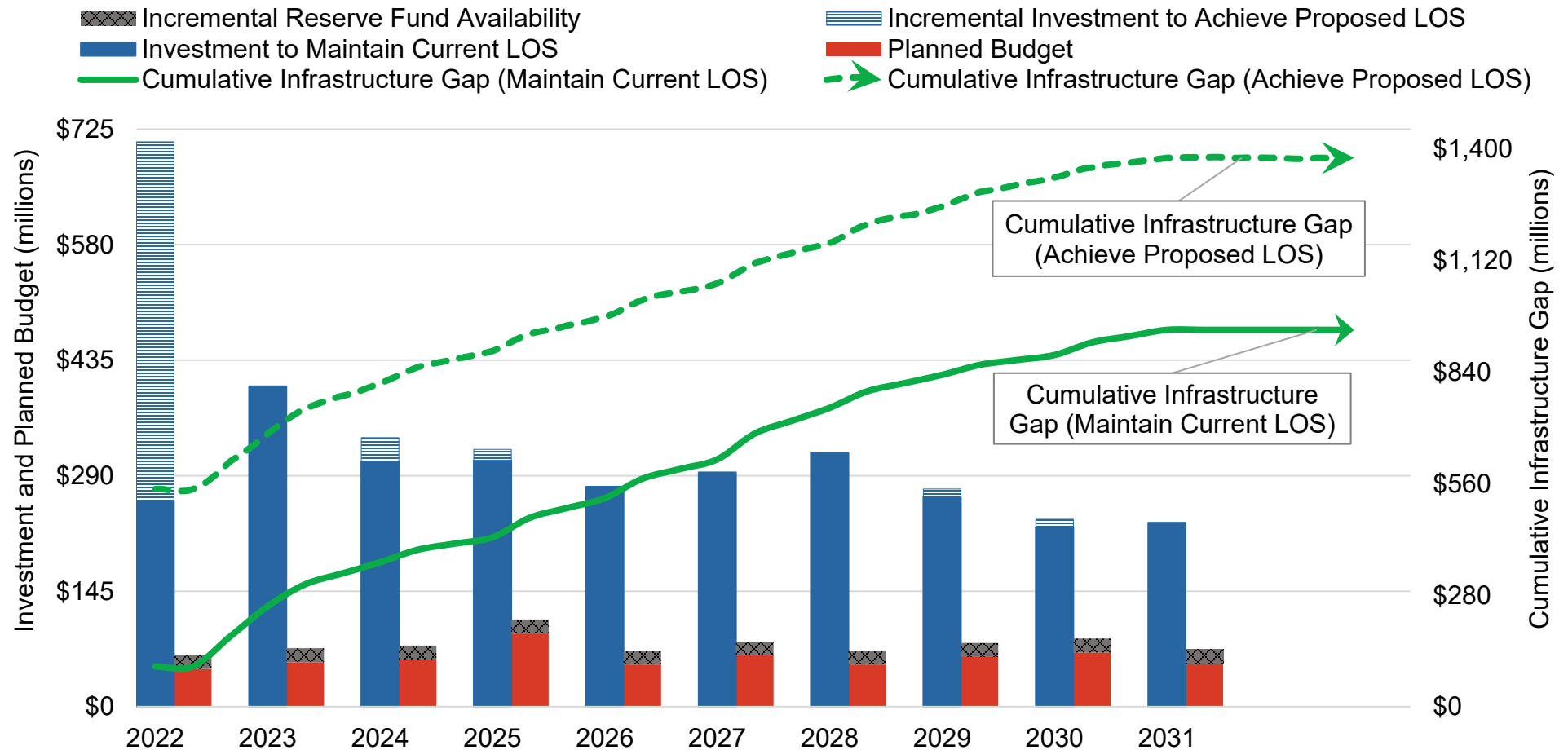


Figure 1.1 10-Year Planned Budget, LOS Investments and Infrastructure Gaps (millions) (Assets Within CAM Plan Scope)

PROGRAM AREAS AND SERVICES OVERVIEW

The service areas and services that are included in the scope of the 2023 CAM Plan are listed in Table 1.2. This framework aligns with budget and highlight how the different programs are

responsible for delivering specific services along with the associated infrastructure assets used to deliver the service.

Table 1.2 City Service Areas and Service(s) in Scope of the 2023 CAM Plan

Service Area	Services
Environment and Infrastructure	Water
	Wastewater (Sanitary)
	Wastewater (Stormwater)
	Transportation and Mobility (Roadways, Structures, Traffic)
	Waste Management
	Parks
	Forestry
Planning and Economic Development	Parking
	Municipal Housing Development
Enterprise Supports	Information Technology
	Emergency Management and Security Services
Neighbourhood and Community Wide Services	Recreation and Sport
	Culture Services
	London Fire Department
Social and Health Development Services	Long Term Care
Finance Supports	Land
	Corporate Facilities
	Fleet

1.2: Ontario Regulation 588/17 (O. Reg. 588/17)

In 2012, the Province of Ontario published 'Building Together: Guide for Municipal Asset Management Plans' (AMP) to encourage and support municipalities in Ontario to develop AMP(s) in a consistent manner. Ontario then passed the Infrastructure for Jobs and Prosperity Act, 2015, which affirmed the role that municipal infrastructure systems play in supporting the vitality of local economies. After a yearlong industry review process, the province created Ontario Regulation 588/17 – Asset Management Planning for Municipal Infrastructure under the Infrastructure for Jobs and Prosperity Act, 2015.

O.Reg. 588/17 further expands on the Building Together guide, mandating specific requirements for municipal asset management policies and Asset Management Plan, phased in over a five-year period. O. Reg. 588/17 has a phased approach with three deadlines of July 1, 2022, July 1, 2024, and July 1, 2025. The July 1, 2022, and July 1, 2024, deadline is including 'Core' assets (water, wastewater, stormwater, road and bridges) and all other City infrastructure assets, respectively will have an asset management plan documenting maintain current LOS. The final deadline (July 1, 2025) is to document achieve proposed LOS and financial strategies to fund these expenditures.

2023 CAM Plan Scope

This 2023 CAM Plan is compliant with the July 1, 2024, and July 1, 2025, Regulation requirements for directly owned city assets. O. Reg. 588/17 defines a municipal infrastructure asset as directly owned by a municipality or included on the consolidated financial statements of a municipality (excluding joint municipal water boards). Agencies, Boards, and Commissions (ABC) of the City of London will develop their CAM Plan by July 1, 2024.

To fulfill this requirement, the City and applicable ABC's completed asset management maturity assessments. These assessments helped to determine the initial work and resources necessary to ensure the July 1, 2024, regulatory requirements are met. Furthermore, because of these assessments the City and applicable ABC's have, or are working towards, executed service level agreements that define the shared Asset Management Plan responsibilities and associated due dates that are in-line with requirements. For additional information regarding the asset management maturity assessment process and results refer to the Corporate Services Committee May 31, 2021, meeting, report titled Agency, Board, and Commission Asset Management Maturity Assessment Review.

1.3: Pressures

Inflation

As Canada's economy has emerged from the pandemic, inflationary pressures beyond those accounted for within the 2020-2023 Multi-Year Budget (MYB) and associated 10-year capital plans started developing in 2021 and continued throughout 2022 and into 2023 due to COVID-19 induced supply chain disruptions and supply-demand imbalances.

As of 2022, these higher input costs have been incorporated into the 2023 CAM Plan and are a material component of the infrastructure replacement value and 10-year infrastructure gap increases reported. These increases and resulting capital financing pressures represent a significant risk to the condition and LOS associated with municipal infrastructure assets.

Climate Emergency Action Plan (CEAP)

In 2019, London City Council declared a climate emergency at the urgency of the community. London's CEAP, approved in 2022, builds on work done since the 1990s to reduce emissions and prepare for severe weather.

The assessment is underway to determine the cost associated with implementing the CEAP and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets. There are current and future challenges that must be contended with. It is important to address these challenges thoroughly and promptly if we are to leave a positive legacy for future generations.

The 2023 CAM Plan incorporates preliminary 'green for like' costs. Examples include upgrading a scheduled facilities' lifecycle renewal of being a 'green for like' replacement,

meaning a more energy efficient boiler being considered instead of replacing the boiler with a similarly performing boiler.

Achieve Proposed LOS Pressures

The community is changing and their expectations and needs along with it. New and/or enhanced LOS initiatives are contained within the City's 2023-2027 Strategic Plan, various master plans, and Council approved committee reports. These documents help define proposed LOS performance metrics for each service area contained in the CAM Plan. At times, these LOS initiatives may represent both asset capacity and financial pressures beyond what can be accommodated.

Such imbalances are presented in the CAM Plan as the cost to achieve proposed LOS infrastructure gaps. When an infrastructure gap exists, this indicates the estimated future expenditures required to achieve the proposed LOS exceeds the existing planned budget and available reserve fund balance. Thus, there is a need to examine proposed LOS targets, lifecycle management activities, and financing strategies to address future infrastructure needs.

Growth

Like many Canadian municipalities, London is experiencing steady to above average population and employment growth. This growth triggers a surge of service and asset capacity needs, resulting in a proportional boom in new and/or enhanced municipal infrastructure construction.

As the asset portfolio increases due to construction or assumption of new infrastructure, ongoing renewal of these new assets require more resources. To accommodate the tax-supported financing pressures Council approved the

Assessment Growth Policy to ensure new property tax dollars attributable to growth are used to fund the long-term operating and capital financing needs of the associate services and assets. For Water and Wastewater these financial pressures are addressed through each multi-year budget.

Additionally, this growth may correspond to increased demand on existing assets, such as increasing ‘wear and tear’ due to volume. As a result, maintaining existing infrastructure capacity and quality, especially with climate change impacts as well, poses continuous challenges as intensification occurs and as additional urban and rural development continues.

More Homes Built Faster Act, 2022

As outlined in the report titled Financial Implications of the More Homes Built Faster Act, 2022, it is anticipated that this new legislation will present significant financial challenges for the City beyond 2023. Fortunately, many of those impacts, such as the mandatory phase-in of Development Charge (DC) rates, can be delayed until the implementation of the new DC By-law, for which the planned effective date is January 1, 2028.

Although the Provincial government has committed to addressing funding shortfalls associated with these legislative changes, details of this commitment are unclear at this time. Should additional funding not be provided to offset these impacts on municipalities, this will represent an added pressure on the budget to maintain current LOS.

Aging Infrastructure

Like most Canadian municipalities, City of London owns and maintains aging infrastructure as many assets were built post World War II and in the late 1960s or 1970s through Centennial-era or lottery-funded grant programs. This aging portfolio leads to the need of substantial capital investments to maintain their condition and operational functionality. For example, these could include replacing many facilities / buildings’ elements such as roofs, and repairing and updating mechanical, electrical, and plumbing systems. Additionally, many of these facilities contain outdated designs and features that are not barrier-free or able to meet contemporary needs.

1.4: State of Local Infrastructure

The City owns infrastructure with a total current replacement value of \$28.5 billion. The condition of the infrastructure is overall in Good condition meaning that the infrastructure is adequate for now with some elements showing general signs of deterioration that require attention and a few elements exhibiting significant deficiencies. The Current State of Infrastructure summarizes the existing asset inventory, its replacement value, condition, age distribution, and how London stores its asset data.

Although this report is directed at assets, assets alone do not reflect the entire value of the services provided by the City. Many important services such as Parking, Emergency Management and Security Services, etc. have very little hard asset value. While reading this report, one must bear in mind that funding for assets is only one aspect of our City's financial requirements. The focus of the City is providing services that sustain or improve quality of life.

Condition

Figure 1.2 summarizes the overall condition distribution of the City assets, overall rated as Good. The assets that are of concern to the City are the smaller fraction of assets listed in Poor and Very Poor condition, which only make up approximately 11% of the city portfolio. These are the assets that are approaching the end of their useful lives. They may still be functioning but at a questionable LOS and the City needs to be prepared to respond to failures or proactively address them before they fail. This reflects an area in need of investment. This report uses a combination of methods to determine the asset conditions presented. Some assets undergo routine formal condition assessments while for some assets, condition information is based on the age and expected useful life of the asset or expert judgment.

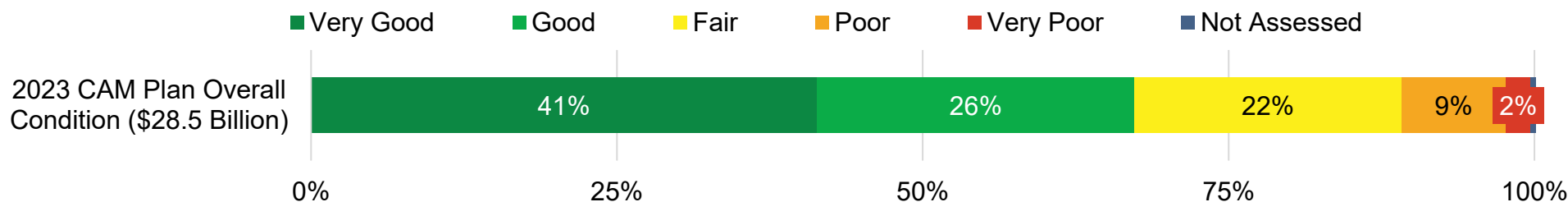


Figure 1.2 Overall Condition (Assets Within CAM Plan Scope)

1.5: Levels of Service

The CAM Plan quantifies the LOS provided by infrastructure systems through a series of performance metrics for each service area. LOS tables for each service area are developed and maintained through discussions with staff in all service areas that support the provision of the respective service(s).

Overall, the City strives to provide services to the community that are accessible, cost efficient, provide customer satisfaction, demonstrate environmental stewardship, reliable, and safe, with suitable scope. As shown in Figure 1.3, City of London, similar to other municipalities, face a complex trade-off challenge in delivering public services, which includes three primary parameters: Cost, Level of Service, and Risk. A high level of service is desirable for public satisfaction but may involve elevated costs and resource allocation. Cost constraints requires efficient allocation of resources, yet reduction on capital and operating budgets could compromise service quality. Meanwhile, mitigating risks—such as asset failures or service disruptions—is crucial but also financially demanding. Ultimately, the trade-off involves a multi-criteria decision-making process that requires cost-benefit analysis and risk assessments to achieve a balanced approach.

The LOS tables follow a consistent structure across service areas. They include components such as identifying customer values, customer/Council focused performance measures, and technical focused performance measures.



Figure 1.3 Trade-off Cost, Risk, and Levels of Service

The LOS measures are established through discussions with staff and include mandatory metrics that are prescribed by O. Reg. 588/17. LOS metrics are split between Direct, Related, and Other Measures. Direct LOS provide a clear line-of-sight for service areas between assets and the required investments to meet maintain current LOS and achieve proposed LOS over a 10-year period. Related LOS and Other Measures are useful but either do not have a clear line-of-sight with asset investment or considered lagging indicators.

1.6: Asset Lifecycle Management Strategy

Asset Lifecycle Activities

The asset lifecycle management activities are the range of actions funded through the operating or capital budget that are practiced on the asset category. Asset lifecycle activities are generally grouped into the categories as shown in Table 1.3. Each service area section also documents the risks associated with each lifecycle activity.

Asset Lifecycle Management Strategy

The asset lifecycle management strategy is the set of planned actions (i.e., operate, maintain, rehabilitate, or replace) that will enable the assets to maintain current and/or achieve proposed LOS in a sustainable way, while managing risk, at the lowest lifecycle cost. Each section of the CAM Plan:

1. Describes the asset lifecycle activities applied to the asset category;
2. Establishes the condition profile expected from the current budget and the expected impact on LOS metrics; and

3. Establishes the optimal budget to achieve the ideal condition profile to maintain current or achieve the proposed LOS.

Examples of these condition profiles are provided below in Figure 1.4, Figure 1.5, and Figure 1.6, which list summary condition profiles of services that have 20-year condition modelling. The modelling is for 20-year estimates of planned budget, maintain current LOS, and achieve proposed LOS. Modelling for Water, Wastewater, Transportation, Parking, Fire, Fleet, Culture Services, Parks, Recreation and Sport, and Corporate Facilities are included. Modelling for other services, such as Forestry and Land, is not listed as they typically do not lend well to traditional modelling techniques. An assessment is underway to determine the cost associated with implementing the City's CEAP and achieving proposed LOS. The costs presented in the 2023 CAM Plan align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the Greenhouse Gases (GHG) emission targets.

Table 1.3 Definitions for Lifecycle Activities

Activities	Description
Non-Infrastructure Solutions	Actions or policies that can lower costs or extend useful lives.
Maintenance	Including regularly scheduled inspection and maintenance or more significant repair and activities associated with unexpected events.
Renewal / Rehab	Significant repairs designed to extend the life of the asset.
Replacement / Construction	Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehab is no longer an option.
Disposal	Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.
Service Improvement	Planned activities to improve an asset's capacity, quality, and system reliability.
Growth	Planned activities required to extend services to previously unserved areas – or expand services to meet growth demands.

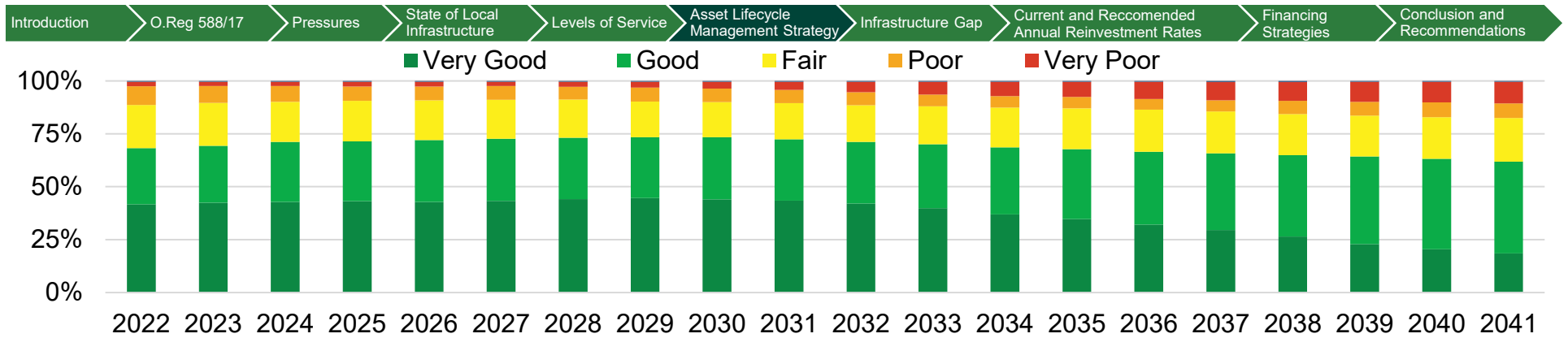


Figure 1.4 Condition Profile Projected from Current Budget (City Assets with Condition Modelling)

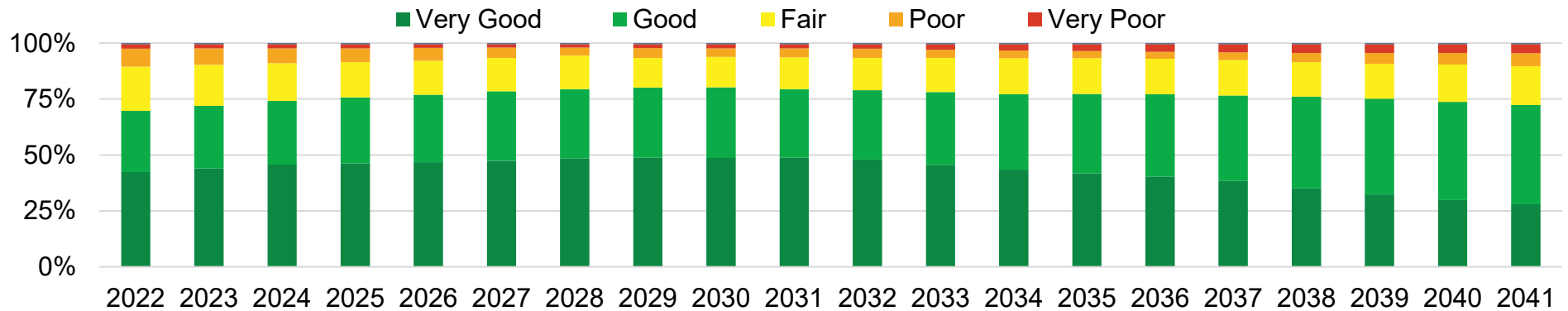


Figure 1.5 Condition Profile Projected from Maintain Current LOS (City Assets with Condition Modelling)

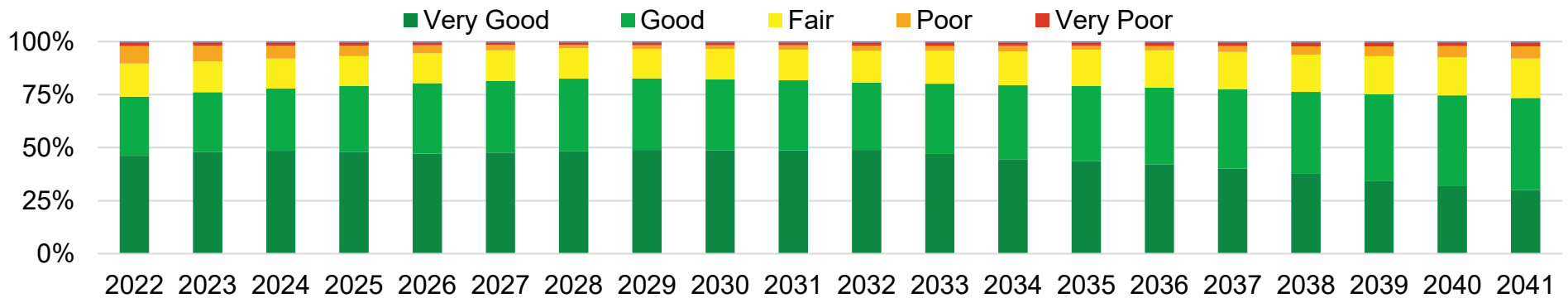


Figure 1.6 Condition Profile Projected from Achieve Proposed LOS (City Assets with Condition Modelling)

1.7: Infrastructure Gap

This report measures the difference between what is planned to invest through the 2022 Annual Budget Update and what is needed to invest to sustain the services delivered using infrastructure to the defined LOS. The applicable Capital Asset Renewal and Replacement Reserve Funds are analyzed to determine what reserve funds may have availability to reduce the infrastructure gap. Figure 1.7, Figure 1.8, and Figure 1.9 show the optimal expenditures compared to expected budget and additional reserve fund availability, and the resulting infrastructure gap.

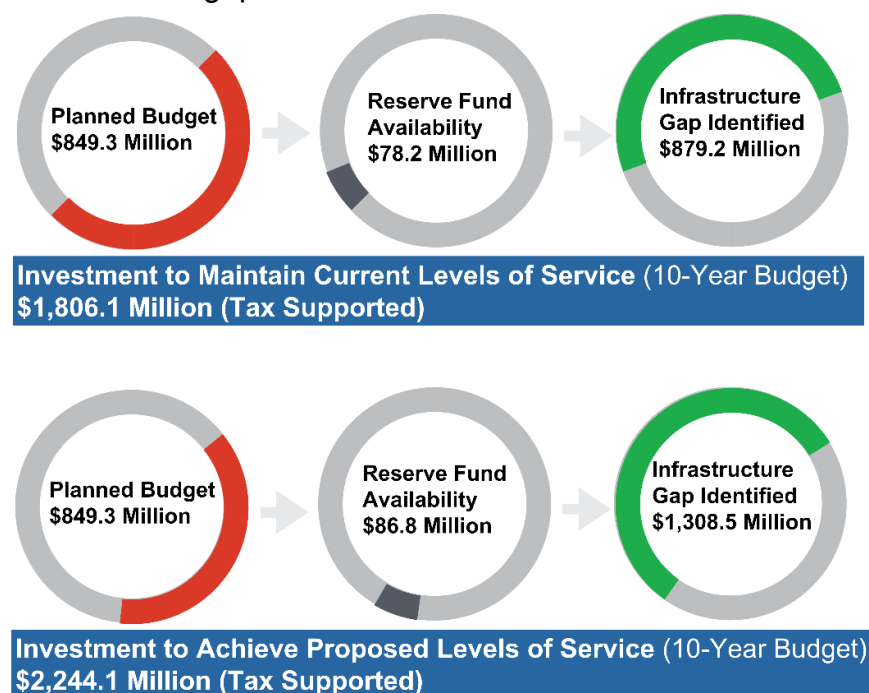


Figure 1.7 Visualization of Maintain Current and Achieve Proposed LOS Infrastructures Gaps (Tax Supported Assets)



Figure 1.8 Visualization of Maintain Current and Achieve Proposed LOS Infrastructures Gaps (Water Rate Supported Assets)

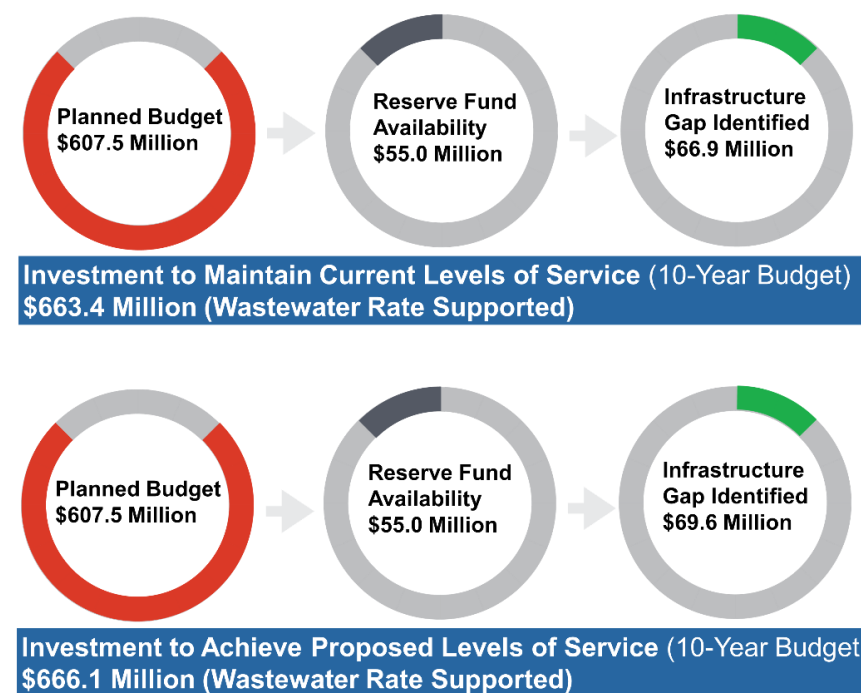


Figure 1.9 Visualization of Maintain Current and Achieve Proposed LOS Infrastructures Gaps (Wastewater Rate Supported Assets)

The infrastructure gap is split between Property Tax, Water Rate, and Wastewater Rate supported assets. The gap breakdown by service area is then represented in Figure 1.10 grouping the top five gap contributors representing over 95% of the achieve proposed LOS infrastructure gap and over 97% of the maintain current LOS infrastructure gap. It is also noted that 50% of service areas (by count) do not have an infrastructure gap.

This CAM Plan aims to outline the measures in place for managing infrastructure gaps to ensure acceptable service levels over time, while also acknowledging that planned investments in asset lifecycle initiatives might not fully address LOS requirements. Addressing these challenges is a multifaceted task without a singular solution. Instead, it requires a combination of collective actions to meet London's infrastructure needs. In this context, potential asset failures are a realistic concern, and the City is prepared to tackle the growing gap.

The following section highlights the primary factors contributing to this gap, which includes an increase in demand along with a corresponding increase in cost to maintain levels of service. It is

crucial for the City to carefully address these challenges to maintain and improve the overall quality of services provided to its residents.

Table 1.4 lists each service in CAM Plan scope by replacement value and 10-year infrastructure gap (either maintain current LOS or achieve proposed LOS). The typical method is to rank by dollar size of gap; however, the results are not intended to suggest service areas with higher replacement values or infrastructure gaps should have their needs prioritized over the needs of any other group. Rather, the City should maintain all its assets in a condition that supports service delivery. The funding gap does not reflect the importance of any service(s) over another to the City as a whole. All services have critical elements. Furthermore, there is an interconnectedness in the system where failure of one service may impact another. For example, a sink hole has the potential to affect road, water, sewer, IT, fleet, and traffic assets. Deterioration of any of the assets within the City's asset network has potential to affect the performance and/or the integrity of other assets and ultimately the services delivered.

Table 1.4 Asset Replacement Value, Maintain Current and Achieve Proposed LOS 10-Year Infrastructure Gaps (\$Thousands)

Service	Replacement Value	Maintain Current LOS 10-Year Infrastructure Gap	Achieve Proposed LOS 10-Year Infrastructure Gap
Water Rate Supported	7,653,185	None Identified	None Identified
Wastewater (Sanitary)	6,759,752	57,685	58,185
Wastewater (Stormwater)	6,335,485	9,158	11,358
Wastewater Rate Supported (Subtotal)	13,095,237	66,843	69,543
Transportation and Mobility (Roadways, Structures, Traffic)	4,761,691	677,525	994,527
Parking	7,097	None Identified	None Identified
Corporate Facilities	324,320	9,887	24,919
Fleet	70,864	None Identified	8,983
Information Technology	39,697	None Identified	None Identified
Culture Services	122,528	1,016	12,209
Waste Management	136,442	None Identified	None Identified
Recreation and Sport	533,610	72,430	111,679
Parks	236,144	65,719	87,448
Forestry	443,083	None Identified	9,024
Emergency Management and Security Services	9,129	None Identified	None Identified
London Fire Department	175,989	41,836	47,542
Municipal Housing Development	21,223	None Identified	None Identified
Long Term Care	75,631	10,815	12,208
Land	759,240	Not Applicable	Not Applicable
Tax Supported (Subtotal)	7,716,688	879,228	1,308,539
Total	28,465,110	946,071	1,378,082

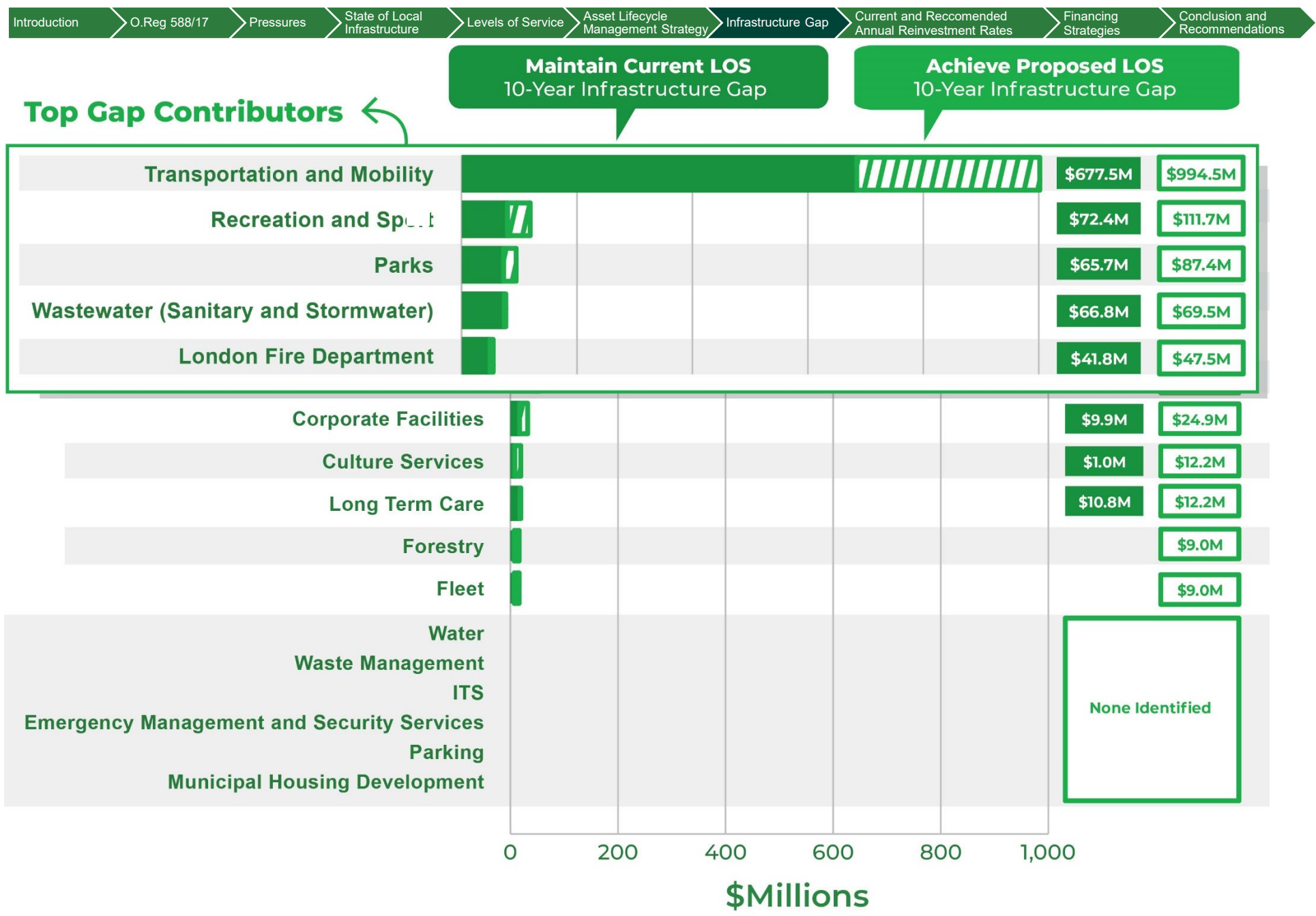


Figure 1.10 Top Contributors to the Maintain Current and Achieve Proposed LOS Infrastructures Gaps

1.7.1: Transportation and Mobility Gap

- Maintain Current LOS gap: \$677.5 million.
- Achieve Proposed LOS gap: \$994.5 million.

Transportation service area employs advanced asset management practices, enabling the forecast of needs based on multiple factors with a higher degree of precision. These advanced practices are used to meet the legislated requirements of the service. However, current reinvestment rates are lower than recommended, leading to a growing infrastructure gap.

Nevertheless, this is also the service area with the highest infrastructure gap and potentially highest risk of unanticipated failures. The amount of funding Transportation received led to an overall decline of infrastructure and a significant accumulation of backlog works. This is in part due to inconsistencies in transfer funding from senior governments which strongly influence London's capital programs. This service area does not have a dedicated revenue source such as rates or fees which limits its ability to address sustainability needs.

Transportation infrastructure serves a variety of needs from active mobility by walking and cycling, to transit or personal vehicle. Additionally, it supports the economy by enabling the efficient movement of goods and services. An increased Transportation infrastructure gap can lower LOS that are realized in several ways including pavement potholes, bridge load reductions and uneven sidewalks, illegible signs, less reliable streetlights and traffic signals, and other distresses.

This can result in:

- Lower levels of customer satisfaction,
- Lower levels of road safety,
- Challenges to personal mobility, particularly for the less mobile and disabled,
- Increased liability and claims,
- Longer times to commute to work and/or school, and
- Impacts to quality of life.

Roadways account for roughly 87% of the maintain LOS gap, and for roughly 77% of the achieve proposed LOS gap.

The rise in road construction costs has significantly contributed to an increased infrastructure gap in recent years. A confluence of factors, including escalating raw material prices, labor costs, and stringent environmental regulations, has driven up the overall cost of road lifecycle activities.

1.7.2: Recreation and Sport Infrastructure Gap

- Maintain Current LOS gap: \$72.4 million.
- Achieve Proposed LOS gap: \$111.7 million.

Recreation and Sport assets consist of Arenas, Aquatics, Community Centres, Attractions (Storybook Gardens), Golf, and Senior Centres. The 10-year maintain current LOS infrastructure gap relates to investment required to maintain Recreation and Sport facilities condition in a consistent state. The 10-year achieve proposed LOS infrastructure gap is based on the costs associated with addressing all the facilities' needs related to Recreation and Sport services.

The preliminary estimate for CEAP funding in Recreation and Sport facilities includes incorporating 'green premium' into lifecycle management needs. This means that instead of simply

replacing existing infrastructure with a similar one ‘like for like’, there will be an increased focus on incorporating ‘green for like’ infrastructure replacements whenever feasible.

These infrastructure gaps will impact Londoners through localized and global service reductions such as fewer recreation amenities /facilities per capita, visual signs of deterioration, potential closures of amenities, high maintenance costs, reduced operating hours, etc. It also leads to reduced quality of life and less recreation opportunities for the public.

1.7.3: Parks Infrastructure Gap

- Maintain Current LOS gap: \$65.7 million.
- Achieve Proposed LOS gap: \$87.4 million.

Parks has a maintain current LOS infrastructure gap over the next decade largely driven by the needs of the Thames Valley Parkway, multi-use pathway systems and park amenities. There is a projected annual shortfall for capital maintenance and renewal of the Thames Valley Parkway, multi-use pathway system and park amenities.

The achieve proposed LOS gap is primarily influenced by the Linear pathways and Amenities, which account for approximately 91% of the total infrastructure gap. The proposed gap is resulting from amenity replacement and pathways rehabilitation/reconstruction following their exact expected useful lives.

There is also a preliminary estimate for CEAP funding in Parks Facilities incorporating ‘green premium’ into lifecycle management needs.

Park infrastructure is highly desired by residents. It supports healthy/active lifestyles, community building efforts, social inclusion, quality public spaces and civic pride, and helps

protect natural heritage features. Continued and increased investment in park infrastructure is needed in order to maintain accepted LOS and to ensure public safety and accessibility. Without addressing the infrastructure gap, decisions will need to be made on reducing service standards and removing amenities from parks, such as playgrounds.

1.7.4: Wastewater Services Gap (Sanitary and Stormwater)

- Maintain Current LOS gap: \$66.8 million.
- Achieve Proposed LOS gap: \$69.5 million.

Sanitary’s maintain current LOS infrastructure gap relates to significant investments identified within Wastewater Treatment Plants and Pumping Stations that exceed their planned budgets.

Stormwater’s maintain current LOS gap results from emerging needs with Stormwater Management facilities. Stormwater Management’s asset base has been updated and formally assessed with external reports to now include Minor Culverts, Erosion Control Structures, and updated information with previously reported assets. Quantified needs regarding Erosion Control Structures, dykes’ renewals, are key drivers of the infrastructure gap. Additional investment for minor culverts needs is driving the increased investment to achieve proposed LOS.

The Sanitary achieve proposed LOS infrastructure gap includes a preliminary assessment of CEAP needs with a ‘green premium’ for a Pumping Station.

These Wastewater infrastructure gaps will impact Londoners through localized reductions to service provision, increased break frequency, sewer backups, service outages, increased maintenance costs, etc. This area receives revenue primarily through utility rates.

1.7.5: London Fire Department Infrastructure Gap

- Maintain Current LOS gap: \$41.8 million.
- Achieve Proposed LOS gap: \$47.5 million.

The 10-year maintain current LOS infrastructure gap is driven from Emergency Vehicles and Stations/Facilities' needs.

The recently approved London Fire Department (LFD) Fire Master Plan Action Plan outlines how The Insurance Board of Canada and the Fire Underwriters Survey recommends all front-run vehicles be replaced on a 15-year cycle for larger cities. Therefore, LFD proposed alignment of Emergency Vehicle 12-years of front-line unit estimated life, and 3-years end of lifecycle as a spare vehicle. This is anticipated to enhance the overall condition of the assets, reduce staff and repair costs in the long run and allow Apparatus mechanics to focus better on preventative maintenance. However phasing Fleet vehicles that are relying on expected useful lives in effect prior to the Fire Master Plan Action Plan adjustment will take time and allows a balanced approach of managing cost increases with replacing this critical infrastructure.

Achieving proposed LOS infrastructure gap relates to addressing all needs relating to Facilities. There is also a preliminary estimate for CEAP funding in Fire Department Facilities includes incorporating 'green premium' into lifecycle management needs.

1.7.6: Corporate Facilities

- Maintain Current LOS gap: \$9.9 million.
- Achieve Proposed LOS gap: \$24.9 million.

The maintain current LOS infrastructure gap relates to investment keeping Corporate Facilities in a consistent service state.

Investment to achieve proposed LOS addresses all Corporate Facilities' needs. Pending Council decisions on MAP, it is

assumed that planned budget will be used to address needs in the 10-year timeframe of the CAM plan. The preliminary estimate for CEAP funding in Corporate Facilities includes incorporating 'green premium' into lifecycle management needs.

1.7.7: Culture Services

- Maintain Current LOS gap: \$1.0 million.
- Achieve Proposed LOS gap: \$12.2 million.

The maintain current LOS infrastructure gap is primarily attributed to the additional project management investment to maintain existing service levels. Achieving proposed LOS infrastructure gap addresses all needs relating to Culture Services, and the preliminary identification of CEAP initiatives. The preliminary estimate for CEAP funding in Culture Facilities includes incorporating 'green premium' into lifecycle management needs.

1.7.8: Long Term-Care (Dearness Home)

- Maintain Current LOS gap: \$10.8 million.
- Achieve Proposed LOS gap: \$12.2 million.

The maintain current LOS infrastructure gap is primarily driven by the lifecycle renewal needs of this facility, with the remainder comprising equipment required to provide services to Dearness Home residents.

The achieve proposed LOS infrastructure gap is to address all needs relating to Long Term Care services plus preliminary estimates for CEAP facilities funding including incorporating 'green premium' into lifecycle management needs.

Failure to address the Long-Term Care infrastructure gap will, in the long-term, impact the quality of life for the residents at the Dearness Home; potentially resulting in the City failing to comply with regulations

1.7.9: Forestry

- Maintain Current LOS gap: None identified.
- Achieve Proposed LOS gap: \$9.0 million.

Achieve proposed LOS infrastructure gap incorporates best practices to address woodlands invasive species infestations.

Forestry infrastructure gap manifests itself in increased insect and disease damage, increased tree related damage, and a reduction to the number of trees along with the benefits they provide for air and water quality, habitat, and recreational uses.

1.7.10: Fleet

- Maintain Current LOS gap: None identified.
- Achieve Proposed LOS gap: \$9.0 million.

Achieve proposed LOS infrastructure gap relates to preliminary CEAP costs. The incremental investment for proposed LOS is limited to the potential replacement to electric vehicle units and the related estimated capital costs.

The preliminary estimate for CEAP funding incorporates the conversion to electrical vehicle into lifecycle management needs.

1.7.11: Services With No Identified Infrastructure Gaps

No infrastructure gaps are identified for Water, Parking, ITS, Waste Management, Emergency Management and Security Services, and Municipal Housing Development. Land is typically disclosed within the CAM Plan, but infrastructure gaps are not typically identified with these assets.

It is noted while there may be no identified infrastructure gaps, these services have complex service delivery models and, in many instances need reserve fund drawdown availability to address all requirements (Water, EMSS, Waste Management are examples of this).

1.8: Current and Recommended Annual Reinvestment Rates

Table 1.5 highlights the current annual reinvestment rate a service is expected to spend over the 10-year period of analysis. It is compared to the recommended annual reinvestment rate. The recommended annual reinvestment rate is based on several sources:

- 1) The 2016 Canadian Infrastructure Report Card lists reinvestment rates for Core Assets (Water, Wastewater, Stormwater, Roads, Bridges) and Buildings/Facilities. It provides guidance for approximately 72% (weighted by replacement value) of City assets.
- 2) The expected useful life of an asset, and the implied annual average amount that should be spent on the asset. For example, an asset with a 10-year life should, on an annual average basis, have 10% of its replacement value spent on asset renewal or replacement. It is noted this average annual amount is not always practical – for example, a roof is replaced at once, not over an average annual period.
- 3) Maintain current LOS requirements – as identified throughout the 2023 CAM Plan, the average annual required investment to maintain current LOS informs the recommended annual reinvestment rate.
- 4) Achieve proposed LOS requirements – as identified throughout the 2023 CAM Plan, the average annual required investment to achieve proposed LOS informs the recommended annual reinvestment rate. These rates provide insight and assist decision making if sufficient infrastructure spending is occurring.

Table 1.5 Current and Recommended Annual Reinvestment Rates

Service Area	Services	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate
Environment and Infrastructure	Water	0.5%	1.0% to 1.5%
	Wastewater (Sanitary)	0.5%	1.1% to 1.5%
	Wastewater (Stormwater)	0.4%	1.1% to 1.4%
	Transportation and Mobility (Roadways, Structures, Traffic)	0.9%	2.3% to 3.0%
	Waste Management	3.8%	3.1% to 4.1%
	Parks	2.2%	5.2% to 6.1%
	Forestry	0.7%	1.1% to 1.3%
Planning and Economic Development	Parking	2.6%	2.1% to 2.6%
	Municipal Housing Development	0%	1.7% to 2.5%
Finance Supports	Corporate Facilities	1.6%	2.5% to 2.7%
	Fleet	9.4%	10.9% to 12.2%
	Land	Not Applicable	Not Applicable
Enterprise Supports	Information Technology	10.6%	10.6%
	Emergency Management and Security Services	11.2%	8.4% to 11.2%
Neighbourhood and Community Wide Services	Recreation and Sport	0.8%	2.5% to 3.2%
	Culture Services	0.8%	0.9% to 2.1%
	London Fire Department	2.1%	3.5% to 4.1%
Social and Health Development Services	Long Term Care	0.8%	2.3% to 2.5%

1.9: Infrastructure Gap Financing Strategies

The Infrastructure Gap Financing Strategies section of the CAM Plan starts by summarizing the infrastructure financing strategy components followed by providing a financial overview as a precursor and context to the options for addressing the infrastructure funding gaps that has been identified in each service area. This section is perhaps the most important element of the CAM Plan as it provides the approach to funding the needs of the asset base to achieve service delivery goals.

In 2022 the maintain current infrastructure gap is identified at \$100.7 million and projected to grow to \$946.1 million by 2031. In 2022 the achieve proposed LOS gap is \$546.3 million and projected to grow to \$1,378.1 million by 2031. The CAM Plan assumes that updating the Water and Wastewater 20-year financial plans for the utilities will address the Wastewater (Sanitary and Stormwater) infrastructure gaps (approximately \$66.6 million).

Any funding to reduce this remaining infrastructure gap and sustain existing services will be additional to the current revenues projected by the City. Municipal revenue can come from property tax, government transfers, user fees or debt. The CAM Plan provides various options to either mitigate or

eliminate the infrastructure funding gaps, noting the mitigate approach is recommended. Realizing that faster tax increases have a larger impact on the affordability of Municipal taxation on the community plus considering the impracticality and unaffordability of completely eliminating the gap in this time period, the CAM Plan provides options to mitigate the growth of the gap over the next 10, 22, 27, 52, and 77 years.

Table 1.6 identifies the 2023 CAM Plan recommended years at which the annual funding gap is mitigated for four different revenue increase alternatives (assumed to begin in 2024) for the Tax Supported Budget. These recommendations are subject to revision and approval as part of 2024-2027 MYB development as final tax levy increase recommendations will take into account numerous 2023-2027 Strategic Plan priorities and affordability of Municipal taxation on the community. Never the less, the figures presented illustrate the differing infrastructure levy (or property tax increases) that would occur if the City decided to mitigate the growth of the 10-year infrastructure gaps (maintain current and achieve proposed LOS) through financing 80% of the gap.

Table 1.6 Tax Supported Optional Gap Mitigation Average Annual Tax Levy Increases and Timeframes

Year Financial Sustainability Realized	Maintain Current LOS Average Annual Tax Levy Impact	Achieve Proposed LOS Average Annual Tax Levy Impact
2033 (Year 10)	0.78%	1.11%
2045 (Year 22)	0.36%	0.48%
2050 (Year 27)	0.30%	0.39%
2075 (Year 52)	0.16%	0.19%
2100 (Year 77)	0.11%	0.13%

The CAM Plan recommends the 80% funding target as it is anticipated 20% of the funding required will be sourced outside of a tax increase, which is consistent with the 2022-2031 capital plan. Furthermore, the CAM Plan recommends that the City should target infrastructure gap financial sustainability between 22-years (2045) to 27-years (2050), which could result in

average annual tax increases of 0.36% (22-years) and 0.30% (27-years) for maintaining current LOS.

Figure 1.11 illustrates the projected 2023 CAM Plan infrastructure gaps versus the 2019 CAM Plan infrastructure gap curve. It demonstrates the progress realized while representing the continued need for investment.

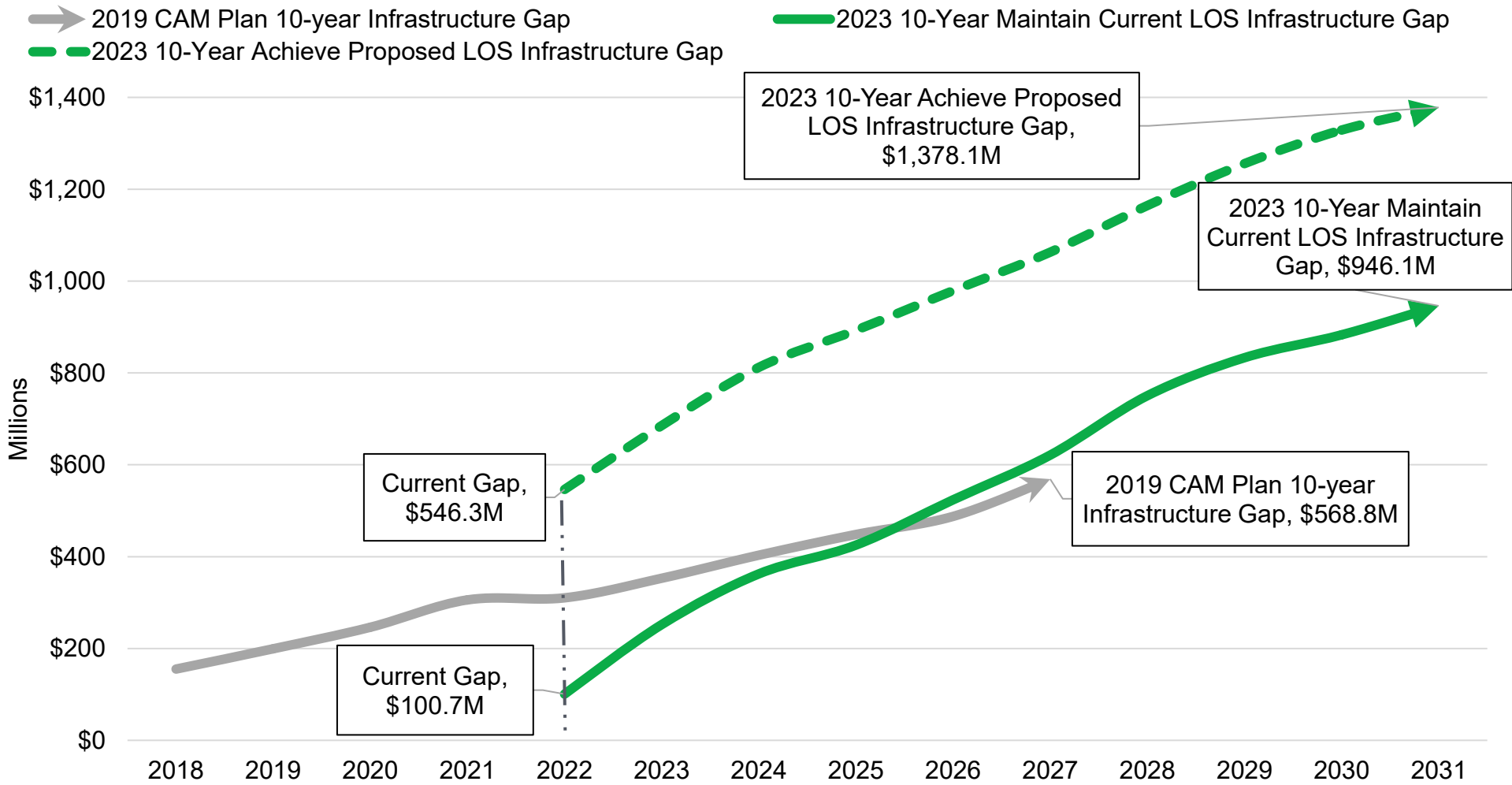


Figure 1.11 Infrastructure Gap Comparison

1.10: Conclusion and Recommendations

Conclusion

The CAM Plan is a tactical outcome of the CAM Program, setting out the current plan for the City to manage its \$28.5 billion worth of infrastructure. There are no easy solutions to how the entire infrastructure system works together to achieve an optimal delivery of services. Additional efforts are required to address the infrastructure gaps beyond what is currently planned. This document will guide efforts of the City to address these needs of the infrastructure.

The 2023 CAM Plan identifies a 2022 maintain current LOS infrastructure gap of \$100.7 million. Compared to a \$28.5 billion asset base this is considered a well managed gap. On the other hand, the 2022 achieve proposed LOS gap of \$546.3 million could be cause for review and consideration. Without further investment this will result in projected 10-year infrastructure gaps of \$946.1 for maintain current LOS and \$1,378.1 for achieve proposed LOS. Over 10-years this growth has the potential to escalate beyond the City's ability to manage effectively. As there is no intent to allow this to occur, further action is needed to address both the understanding and forecasted growth of the infrastructure gaps.

Choices are available as to how the City can manage the infrastructure gaps. The City can continue to deliver services at their existing levels by committing to make required investments thereby mitigating or even eliminating the infrastructure gaps. This funding can come from either tax/rate supported or non-tax/rate supported sources of financing. However, funding sources are limited, and the City needs to manage its services in an affordable manner with due regard to community impacts.

Paying for the gap is not the only opportunity. The City can reduce LOS to match its ability to pay, but there may be an

unwillingness to give up services currently enjoyed and a strong desire to improve services. There is also recognition that some services are essential and cannot be eliminated.

A third opportunity for the City is to find more efficient and effective ways of delivering services, including changing the asset mix that supports service delivery to the community. The City strongly supports this direction and regularly invests in improvements. One element of this third approach is the work underway to enhance asset management practices.

Overall, the City has a long-standing practice of pursuing all possible means to achieve service delivery goals and has been reasonably successful delivering quality services when compared to other municipalities. In effect the City adopts a blend of the three approaches outlined above and is continuously seeking to improve these strategies.

Recommendations

The CAM Plan includes 4 strategic recommendations that aim to address the infrastructure gaps identified through both non-monetary and monetary means. These strategic recommendations are categorized as follows:

- 1) Strengthen the Corporate Asset Management Plan.
- 2) Explore opportunities to address the infrastructure gap through various financing strategies.
- 3) Progress the Corporate Asset Management Program.
- 4) Extend CAM practices to the City's Agencies, Boards, and Commissions (ABC).

The comprehensive list of these recommendations is contained in Section 23 Conclusion and Recommendations.



Section 2. Introduction

2.1: Supporting the City of London's Goals Through the CAM Program

The City of London's (The City) infrastructure systems are the backbone of the community. They support a range of municipal services that enable residents, businesses, and other City of London partners to live, work, and play in the City. London's strategic community objectives are established through the City's Strategic Plan. This document establishes the vision, goals and objectives that guide the City's municipal government in a way that aligns with the core values of our community. The City's vision, mission, and values are listed below:

Vision

London is a sustainable city within a thriving region, committed to culture, innovation and providing a safe, affordable, welcoming, and healthy future for today and for next generation.

Mission

Improving quality of life and building a **strong and vibrant community** through bold, proactive, and accountable City services.

Values

- Inclusivity and Respect
- Accountability and Trust
- Compassion
- Teamwork and Collaboration
- Commitment and Drive
- Learning
- Financial Stewardship

The City's Corporate Asset Management (CAM) Program is designed to enable the management of the infrastructure assets in a way that connects the strategic community objectives to

day-to-day decisions related to when, why, and how investments are made into the infrastructure systems. There are four layers to the CAM Program which enable this connection as shown in Figure 2.1.

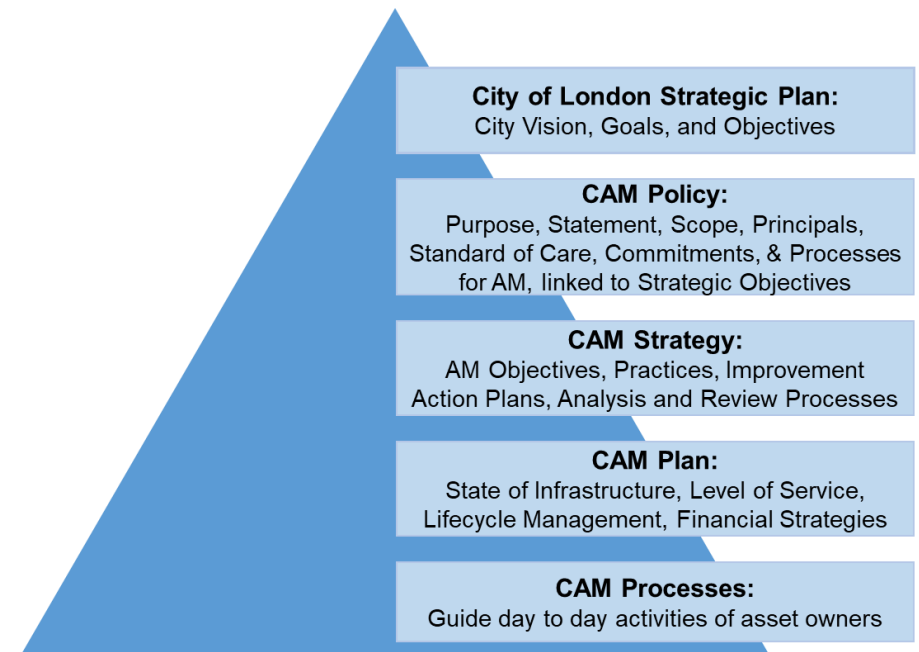


Figure 2.1 Structure of the CAM Program

The structure of the CAM Program is summarized as follows:

1. The City's Strategic Plan sets the direction for the future. It identifies Council's Vision, Mission, Values, Strategic Areas of Focus, and the specific strategies that define how Council and Administration will respond to the needs and aspirations of Londoners. The Vision, Mission, and Values in the Strategic Plan are used to develop the CAM Policy.
2. The CAM Policy describes the rationale to planning, designing, constructing, acquiring, operating, maintaining, renewing, replacing, and disposing of the City's municipal infrastructure assets in a way that ensures sound stewardship of public resources while delivering effective customer service. The Policy also identifies the roles and responsibilities of staff who make infrastructure-related decisions to provide a clear governance structure to ensure that other elements of the CAM Program (CAM Strategy, CAM Plan, CAM Processes) align with the CAM Policy and the 2023-2027 Strategic Plan. The CAM Policy is a requirement of Ontario Regulation 588/17 - Asset Management Planning for Municipal Infrastructure (refer to Section 2.2:).
3. CAM Strategy shown in Figure 2.2 describes the approach to developing an Asset Management system that enables the line-of-sight from tactical decisions made in the CAM Plan and CAM Processes to the principles and commitments identified in the CAM Policy. The CAM program is an integrated set of processes that work together to create connections between service areas and is comprised of strategies related to data management levels of service, risk management, asset lifecycle management, integration, communication, and governance. These connections enable staff across the organization to

make more holistic infrastructure related decisions that consider factors beyond their immediate function.

4. The CAM Plan sets out how the City of London's infrastructure will be managed to achieve the commitments and principles outlined in the CAM Policy.

This is accomplished by:

- Understanding the current state of local infrastructure systems.

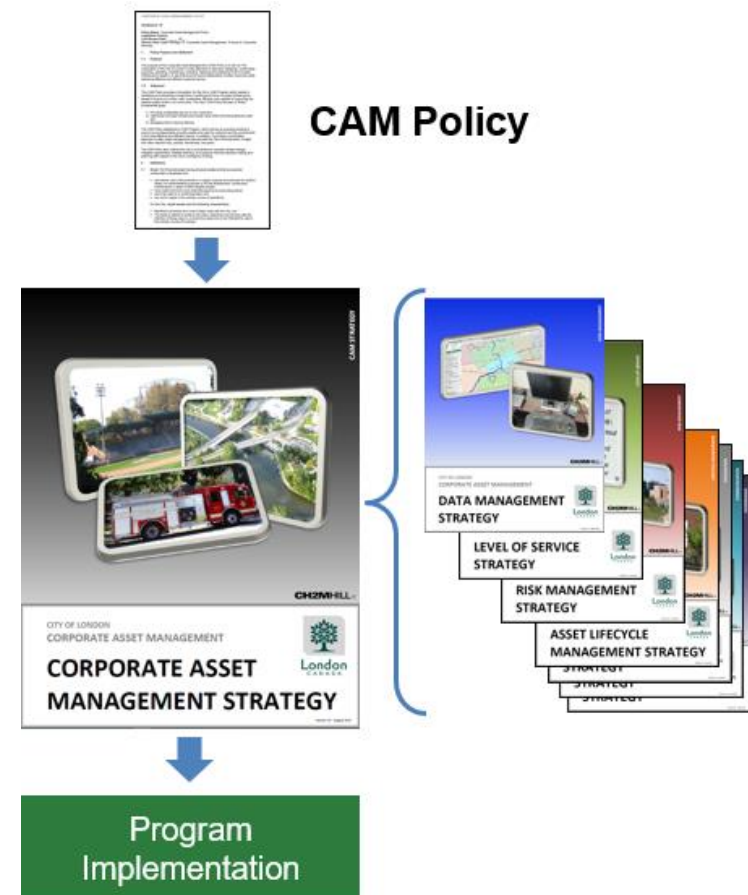


Figure 2.2 CAM Strategies Overview

- Measuring and monitoring levels of service (LOS) metrics that are established by staff to enable a quantitative connection between aspects of infrastructure systems and the degree to which the systems are achieving the commitments laid out in the CAM Policy. The levels of service are shaped by a series of drivers that reflect both the visions, mission, and values of City of London. Among these influential drivers are the 2023-2027 Strategic Plan, CAM Policy, The London Plan (Official Plan), Multi-Year Budget and Annual Updates (Financial Plans), Master Plans, and Climate Emergency Action Plan (CEAP). Each of these documents and policies plays a crucial role in determining the direction, priorities, and benchmarks for the services provided, ensuring a cohesive approach that aligns with the organization's core mission, vision, and values. Development approach of the CAM Plan is outlined in Appendix A. Additional lists of the key drivers for each service area is included in Appendix B.
- Developing a relationship between the asset lifecycle management strategies executed by staff (i.e., how we operate, maintain, rehabilitate, or replace assets) and the LOS. This relationship will detail the method in which the lifecycle management strategies will impact the LOS metrics in the future and enable staff to determine the optimal lifecycle management strategies to maintain the current LOS or achieve the proposed LOS.
- Establishing a financial strategy to fund the expenditures that are required to achieve the desired LOS metrics. The CAM Plan has been designed to ensure that it is compliant with the requirements of Ontario Regulation 588/17 - Asset Management Planning for Municipal

Infrastructure. Refer to Section 2.2 for an overview of this Regulation.

5. The CAM Processes guide the day-to-day activities of staff who are responsible for managing the infrastructure systems. This step ensures that the CAM Program is embedded and integrated throughout the organization, so it becomes part of every process undertaken by City staff in all service areas.

2.2: Provincial Asset Management Planning Requirements

This CAM Plan builds upon asset management activities that have been developing in the City since the establishment of the CAM Program. London's AM journey began in 2008 when Canada's Public Sector Accounting Board (PSAB) established new requirements for municipalities to practice Tangible Capital Asset (TCA) accounting. This accounting process resulted in the development of the first comprehensive inventory of all assets owned by the City. In 2012, the Province published 'Building Together: Guide for Municipal Asset Management Plans' to encourage and support municipalities in Ontario to develop Asset Management Plans (AMPs) in a consistent manner. The Building Together guide describes a general approach to structuring AMPs and provides insight into the content that should be included in sections related to the State of Local Infrastructure, Levels of Service, Asset Lifecycle Management Strategies, and Financing Strategies.

Building Together outlines the information and analysis that municipal asset management plans are to include and was designed to provide consistency across the province for asset management. To encourage the development of CAM Plans, the Provincial and Federal governments also made an AMP as a prerequisite to accessing capital funding grants.

In 2015, Ontario passed the Infrastructure for Jobs and Prosperity Act which affirmed the role that municipal infrastructure systems play in supporting the vitality of local economies. After a year-long industry review process, the Province created Ontario Regulation 588/17 - Asset Management Planning for Municipal Infrastructure under the Infrastructure for Jobs and Prosperity Act. O.Reg. 588/17 further expands on the Building Together guide, mandating specific requirements for municipal AM Policies and AM Plans, phased

in over a five-year period and the plan was to have all phases completed by 2024. However, on March 15, 2021, the Ministry of Infrastructure extended O. Reg 588/17 deadlines (all three phases) due to COVID-19 pandemic. The following points summarize the general requirements and timelines of O.Reg. 588/17 with their amended dates:

- By July 1, 2019, the City requires an AM policy that articulates specific principles and commitments that will guide decisions around when, why and how money is spent on infrastructure systems.
- By July 1, 2022, the City's requires an AMP that documents the current levels of service being provided, the costs to sustain them, and the financing strategy for the City's water, wastewater, stormwater, road and bridges infrastructure systems (i.e., 'core' assets per O.Reg. 588/17).
- By July 1, 2024, the City requires an AMP that documents the current levels of service being provided, the costs to sustain them, and the financing strategy for all infrastructure systems in the City.
- By July 1, 2025, the City requires an AMP that documents the current levels of service being provided, the costs to sustain the current levels of service, the proposed levels of service, the costs to achieve the proposed levels of service, and the financial strategy to fund the expenditures necessary to achieve the proposed levels of service for all infrastructure systems in the City.

This 2023 CAM Plan is the third iteration produced through the City's CAM Program. It builds upon the first and second CAM Plans that were published in 2014 and 2019, following

the same overall approach while complying with all phases of the Provincial regulatory landscape. The purpose of the CAM Plan is to:

- Set out the plan for managing the infrastructure assets to ensure they can provide services at levels that meet the community and corporate objectives.
- Forecast the expected impact that 2022 Annual Budget Update, inclusive of 2022-2031 capital plan (hereon referred to as “Planned Budget”), will have on the state of the infrastructure assets.
- Understand the changes in lifecycle strategies and associated risks if there are funding gaps between the Planned budget and the expenditures required to deliver current or proposed LOS.
- Comply with Ontario Regulation 588/17 – Asset Management Planning for Municipal Infrastructure.

Appendix D, titled 'O.Reg.588/17 Asset Management Plan Requirements,' serves as a comprehensive guide to the specific section within O.Reg. 588/17 regulatory requirements. It provides mapping to the corresponding sections of the 2023 CAM Plan that address each requirement outlined in O.Reg. 588/17.

2.3: Developing the CAM Plan

This CAM Plan is the culmination of efforts from staff across the organization who are involved with managing infrastructure assets, including finance staff involved with funding capital projects and operating programs, technical staff involved with planning and executing the construction of infrastructure assets, and on-the-ground staff who operate and maintain infrastructure assets as see in Table 2.1. This CAM Plan was developed in consultation with key asset partners, using the best information available at the time of its development and with external support from consultant. The excellent work conducted by the City in its previous 2019 CAM Plan was carried forward where possible and enhanced to align with the purpose of this new plan. This CAM Plan provides a rational framework enabling the City to create a line-of-sight between high-level corporate drivers and the assets required to deliver services. This CAM Plan addresses the following questions:

- What do we own and why?
- What is it worth?
- What condition is it in?
- What are its current and proposed service levels?
- What activities do we employ to manage the assets?
- What does it all cost?

A more modern question is also to ask, “Is this asset providing the community the service it expects and is willing to pay for?” Assets may be in very good condition but may not be providing service at a level that is satisfactory to the community. The City of London’s municipal infrastructure assets provide the foundation upon which the City delivers services essential to the livelihood of its citizens and businesses. The City currently owns and operates municipal infrastructure assets worth over \$28.5 billion that contribute to community health, citizen satisfaction,

economic prosperity and enables the City’s future growth. The City’s well-established AM practices are a set of integrated strategies to plan investments regarding the building, operating, maintaining, renewing, replacing, and disposing of these assets while being as efficient as possible with the resources entrusted to City. These AM practices have been developed over more than two decades and have positioned the City to address recent changes to the landscape related to municipal asset management in Ontario.

Table 2.1 CAM Plan Resources

Teams	Members
CAM Section	8
Senior Leadership Team <ul style="list-style-type: none"> • City Managers • Deputy City Managers 	8
CAM Steering Team <ul style="list-style-type: none"> • Service Area Directors • Service Area Managers • Management Staff 	11
CAM Network Team <ul style="list-style-type: none"> • Service Area Managers • Management Staff • Subject Matter Experts 	180+

This CAM Plan provides public, Council, and City staff with insight into the analysis of trends and driving forces impacting City assets and the decisions made to manage them. At a service and asset level, it shows this analysis connecting into the City’s well-established capital and operational planning and budgeting processes and supports decision making. Figure 2.3 illustrates the framework guiding the development of this and future CAM Plans along with the important connections to the MYB processes.

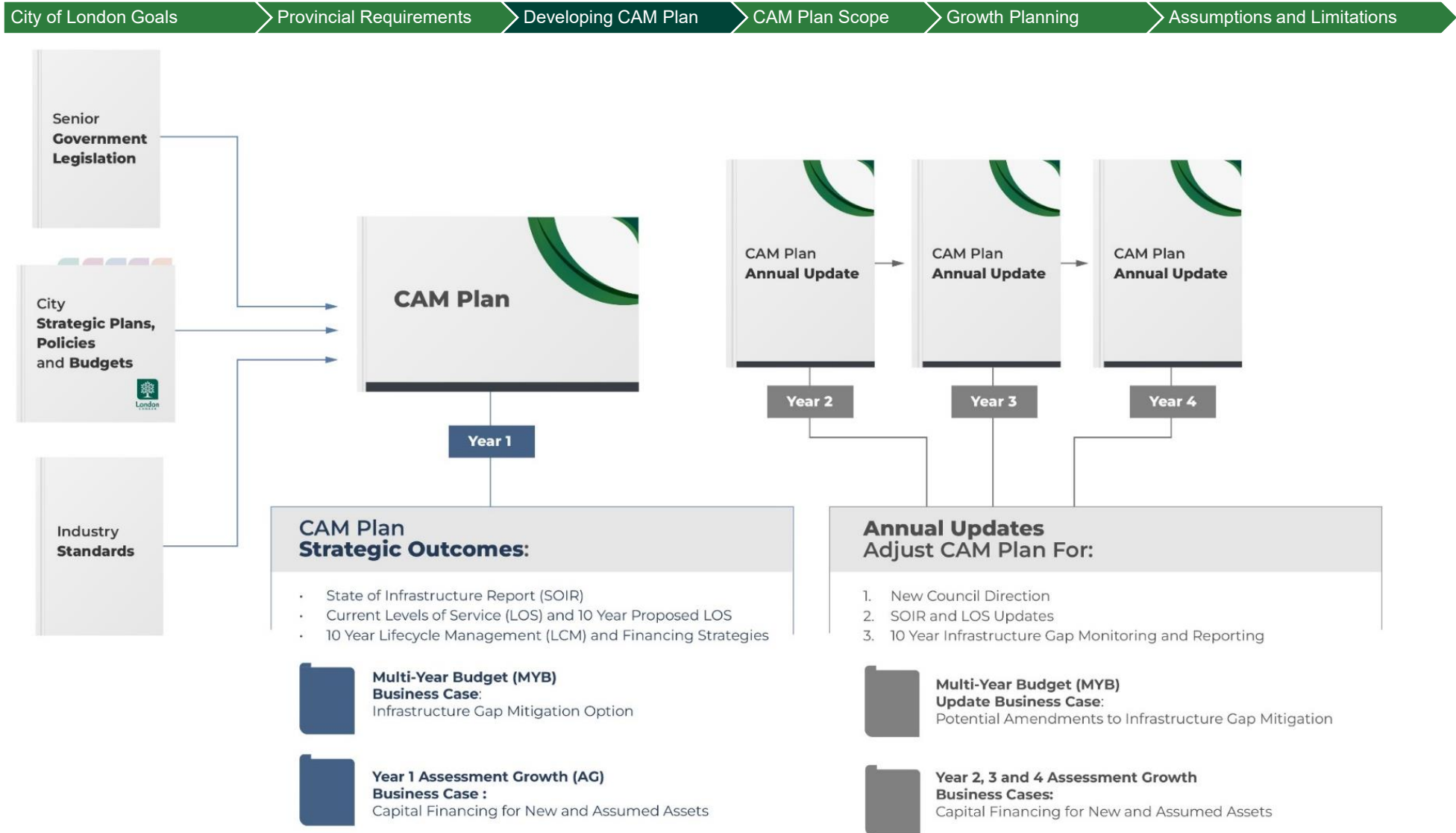


Figure 2.3 CAM Plan Development Process

It demonstrates how the CAM Plan is driven by government legislation, such as Ontario Regulation 588/17, the City's strategic plans, policies, budgets, and industry asset management standards and guidelines. The framework also illustrates how the outcomes of the CAM Plan help inform the

MYB processes and business cases like the Assessment Growth Business Case. The CAM Plan's progress will undergo an annual review, which should reflect updates to the state of local infrastructure and level of service, any budget amendments, and monitoring of the 10-year infrastructure gap.

2.3.1: Continually Improving the CAM Plan

Since 2019, the CAM Program has been planning to continuously update the CAM Policy every 5 years and produce a new CAM Plan every four years, aligning with the MYB cycle as detailed in Table 2.2. The CAM Section is continually improving various elements of the CAM Program by advancing the CAM Strategy, which will in turn increase the competency of the AM system. This will enable the creation of more sophisticated CAM Plan's to accompany future budgets. Some of these improvement activities include:

- A living city-wide asset registry in a formal hierarchy for use by all city staff. It will include asset management parameters and conventional asset parameters such as description, location, size, etc.
- A city-wide level of service registry in a formal hierarchy for use by all.
- A city-wide risk registry for use by all.
- Modeling tools for levels of service, risk, and optimized decision-making.
- A computerized system or systems that enable all of the above in a user-friendly fashion allowing for the analysis of options during decision-making.
- Documentation templates for reports, plans, cases, etc. to ensure the considerations of asset management are embedded in day-to-day activities.
- Procedures that embed asset management practices.

Table 2.2 Timeframes and Frequency for Update

Document	Frequency
Asset Management Policy	Every 5 years
Corporate Asset Management Plan	<ul style="list-style-type: none"> • Annual Progress review/update • Full re-evaluation every 4 years

2.3.2: Communication and Public Engagement Strategy

Municipalities across Canada are increasingly engaging their citizens in helping staff develop recommendations and Council decision making about strategic direction and priorities for resource allocations. This is particularly true in these times of numerous priorities and limited resources.

The most effective public engagement strategy is one whereby all of a municipality's citizens (or a representative cross section of them) can provide their views and opinions to Council in a statistically valid way.

The Asset Management Planning for Municipal Infrastructure Regulation (Ontario Regulation 588/17) requires several commitments and activities regarding public engagement be within the City's CAM Policy and CAM Plan. The City's CAM Policy (CPOL.-389-123) commits to:

- Coordinating asset management planning with Community partners;
- Providing opportunities to the public to offer input;
- Considering the needs of the public by having record of the long-term view of local demographic trends and economic trends;
- Making information publicly available;
- Leveraging other existing City public consultation; and
- Communicating to the community.

To fulfil these obligations, CAM Section established and implemented an Asset Management Public Engagement Strategy using the International Association for Public Participating (IAP2) spectrum of public participation (see Table 2.3 below). Currently, the public engagement activities consist of the "Inform" and "Consult" type activities. As the CAM

Program and CAM Plan evolve, consideration will be given to expanding upon the spectrum of engagement activities.

The Public Engagement Workplan provides objectives, content, approach, Partners, and estimates timing of activities. It also provides a description of expected results or outcomes.

In addition to specific asset management public engagement, the City of London completes various other public engagement activities such as annual customer satisfaction surveys and service area master plan consultations. These engagement activities provided feedback that can be measured against

levels of service metrics (LOS) and measure information such as the percentage of visitors/residents that had a good or excellent experience while using a particular service. When and where these public engagement results lend themselves to asset management LOS metrics, they are reflected in the CAM Plan LOS tables and used to establish LOS targets and/or performance results. This approach to information collection and utilization demonstrates the respectful and efficient approaches (avoidance of public and staff duplication of effort) incorporated within the asset management public engagement framework.

Table 2.3 The International Association for Public Participation (IAP2) spectrum¹

	Inform	Consult	Involve	Collaborate	Empower
Message	"Here's what's happening"	"Here are some options, what do you think?"	"Here's a problem, what ideas do you have?"	"Let's work together to solve this problem"	"You care about this issue; how can we support you?"
Objectives	<ul style="list-style-type: none"> Provide the necessary context and background information in a timely manner. Clear communication channels are established 	<ul style="list-style-type: none"> Listen to and learn about views, ideas, concerns, and expectations. Participants feel heard. City hears the community narrative 	<ul style="list-style-type: none"> Collect feedback on options and alternatives. Participants see their feedback in action. Citizens are offered a high-level opportunity to contribute 	<ul style="list-style-type: none"> Partner with the public in each aspect of the decision 	<ul style="list-style-type: none"> Place final decisions in the hands of the public
Channel Examples	<ul style="list-style-type: none"> Website Newsletter Department email Council 	<ul style="list-style-type: none"> Get Involved platform Open House Survey Master Plans 	<ul style="list-style-type: none"> Get Involved platform. Survey Workshop Discussion Dialogue Charette 	<ul style="list-style-type: none"> Citizen advisory committees Co-Design 	<ul style="list-style-type: none"> Citizen juries Ballots Referenda

¹ Adopted and modified from the International Association for Public Participation (IAP2)

2.4: Corporate Asset Management Plan Scope

This CAM Plan covers all City directly owned, maintained, and operated infrastructure assets that provide services to the community. The City's approach is to take a service-focused perspective to the CAM Program, and therefore the various

infrastructure systems are described in terms of services and service areas rather than asset categories shown in Table 2.4 and illustrated in Figure 2.4 City Scope.

Table 2.4 Corporate Asset Management Plan Asset Scope

Service Area	Service	Assets
Environment and Infrastructure	Water	Water transmission and distribution mains, appurtenances (service connections, valves, hydrants, chambers, PRV), water meters, pump stations (including re-chlorination), bulk water stations, storage reservoirs and wells.
	Wastewater (Sanitary)	Sanitary systems for the collection and treatment of residential, commercial, and industrial wastewater including local sewers, trunk sewers, forcemains, wastewater treatment plants and equipment, pumping stations and equipment.
	Wastewater (Stormwater)	Stormwater conveyance systems including storm sewers and trunk sewers. Stormwater management facilities including wet/dry facilities, dissipation pools, online flood and erosion control facilities; stormwater green infrastructure such as drywells and bioretention cells with or without underdrain; and minor treatment facilities (oil/grit separators).
	Transportation and Mobility	Roadways include sidewalks, local streets, primary and secondary collectors, arterials and City-owned expressways and freeways with the inclusion of road base, asphalt, curb and gutter and traffic islands. Road structures include bridges, footbridges, major/minor culverts, pedestrian tunnels, major retaining walls and noise walls. Traffic assets include street lighting units, vehicular and pedestrian signals, regulatory and informative signage to control traffic and ensure reliable, efficient, and safe transportation of both pedestrian and vehicular traffic. Traffic assets also includes Transportation Management Centre equipment.
	Waste Management	Diversion of waste includes the Material Recovery Facility and equipment, Enviro Depots, Household Special Waste Depot. Disposal of waste includes the W12A Buildings (including site works and equipment), W12A Stormwater Management Ponds, W12A Leachate Collection System, W12A Landfill Gas Collection System, W12A Land and On-Site buffer, W12A Off-Site buffer lands, closed landfill with equipment locations (active mechanical systems) and closed landfill locations (active and passive).
	Parks	Operation and maintenance of a network of parks pathways and facilities as well as other parks tangible assets. Parks linear assets include Thames Valley Parkway (including footbridges), multi-use pathways (including footbridges), park roads and trails. Park amenities include play structures (including exercising stations), soccer fields, baseball diamonds, outdoor tennis

City of London Goals		Provincial Requirements	Developing CAM Plan	CAM Plan Scope	Growth Planning	Assumptions and Limitations
Service Area	Service	Assets				
		courts, pickleball, cricket pitch, synthetic turf football fields, skateboarding facilities, volleyball, basketball courts, swing sets, multi-use pads, off-leash dog park and community gardens. Park facilities include bandshells, clubhouse and buildings, pavilions, shelters, stadium, washrooms and concession, facilities site works.				
	Forestry	Tree inventory includes street trees within road allowances, manicured park trees in manicured portions of parks, and woodland trees including trees in woodlands or wooded portions of parks.				
Planning and Economic Development	Parking	Pay stations, pay station shelters, parking meters, surface lots and stalls in surface lots (both managed and owned) provide controlled short-term on-street parking and long-term off-street parking to supply business, commercial, institutional and entertainment facilities.				
	Municipal Housing Development	An apartment building, alongside future development lands that are intended to provide affordable housing options to the London community.				
Finance Supports	Corporate Facilities	Corporate Facilities include administration buildings, main centres, and other facilities such as salt domes and storage buildings.				
	Fleet	Vehicles range from light, medium and heavy, and includes cars, mini vans, SUVs, pick-up trucks, 350 and 450 Series Utility Trucks, Small Aerial Units, packers, dump trucks, street sweepers, flushers, and tanker trailers. Equipment ranges from light, medium and heavy off-road and on-road equipment including job trailers, farm tractors, trackless attachments, mowers, snowplow blades and wings, float trailers, trackless S/W machines, sanders, aerial lift units, front end loaders, snow blowers and road graders.				
	Land	Park land and natural areas, road allowance, general government, closed landfill and natural methane areas, industrial and stormwater.				
Enterprise Supports	ITS	IT infrastructure includes network, access points, switches routers, storage and backup system, servers, blade enclosures, Load Balancers, phone systems, ITS Fibre Network. Applications and software includes enterprise applications and enterprise software. End User Devices and Applications include desktops, laptops, cellphones, iPads, and IT Equipment (New Council Chambers and Committee Room).				
	Emergency Management and Security Services	One Voice Communication System (infrastructure and communication system), Emergency Operation Centre and equipment, security operation equipment and public safety program.				
Neighbourhood and Community-Wide Services	Recreation and Sport	Facilitation of active and passive activities and opportunities for structured and spontaneous play, including recreation site works. Arenas and equipment include arenas and outdoor ice rinks. Aquatics and equipment includes outdoor community pools, wading pools, spray pads and indoor pools. Community centres and equipment includes community centres, indoor tennis				

Service Area	Service	Assets
		courts, T-Block and the J.A. Building, the Storybook Gardens attraction and senior centres and equipment. Golf assets includes the 18-hole courses, clubhouses, service buildings, washrooms, and concessions
	Culture Services	Culture Services include municipally owned heritage buildings, arts and entertainment, public art monuments, and site works.
	London Fire Department	Stations and Facilities include fire stations and sites, training tower, training building, storage garage and fueling stations. Vehicles and equipment include front line vehicles, non-emergency vehicles and equipment, fire-fighting apparel and light equipment, and communication equipment and software.
Social and Health Development	Long Term Care	Dearness Home long-term care facility providing its residents with respite, medical, nursing, personal, therapeutic, and social work services. This includes the Dearness Retirement Home Building and site works, as well as equipment for food services, nursing, recreations services and other building equipment.

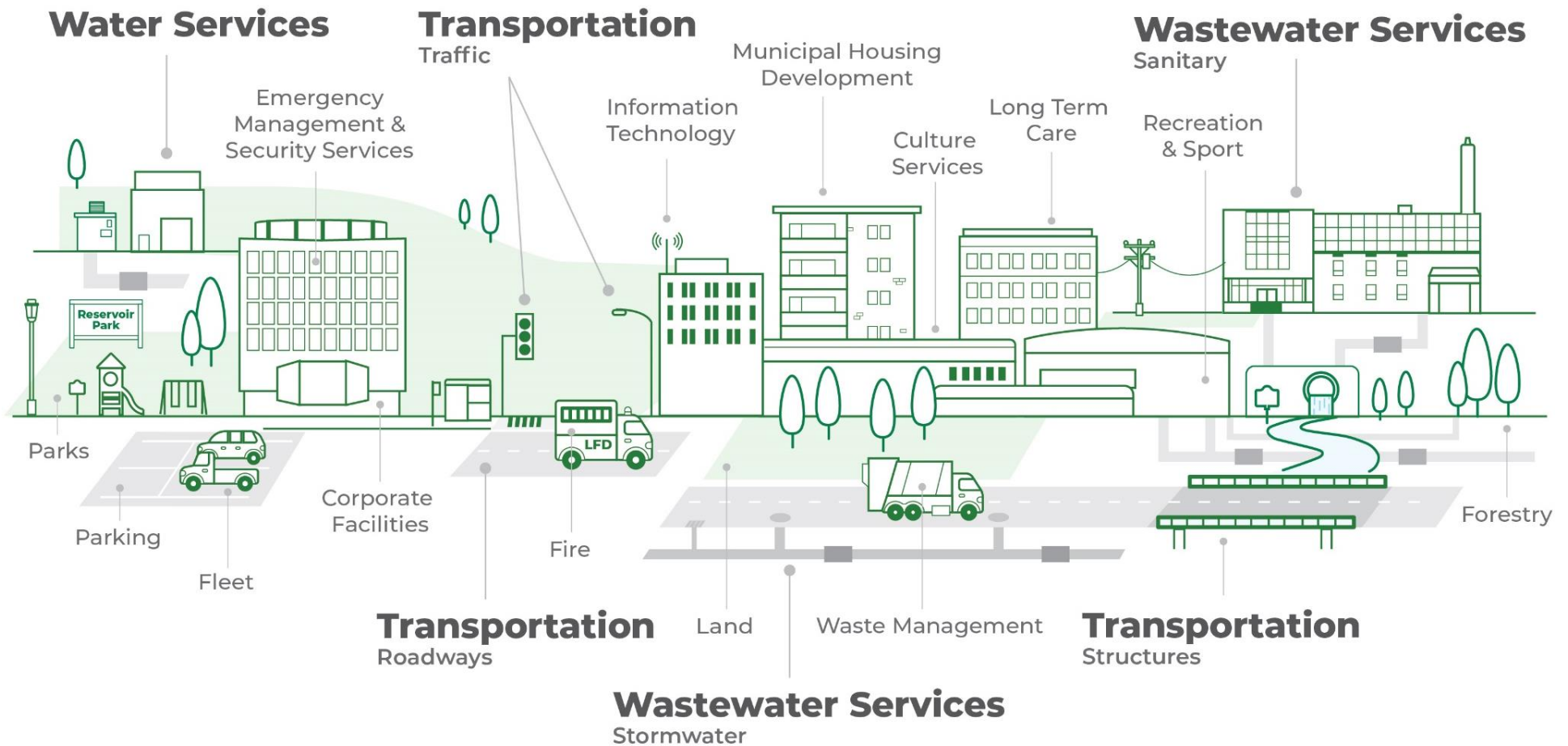


Figure 2.4 City Scope

2.5: Growth Planning

There are two primary factors that impact the expansion of the City's infrastructure systems:

- 1) Growth – population and employment growth resulting in additional assets, such as new roads, watermain, and facilities to service new subdivisions, industrial areas, etc.
- 2) Service Improvement – to provide a new or higher level of service resulting in new/larger asset bases (e.g., the construction of new stormwater management assets to provide higher service levels in areas that have existing stormwater infrastructure).

Both factors are considered by staff in each service area as part of their decision-making processes.

Coordination with Land Use Planning

The City's respective infrastructure systems should be expected to grow at approximately the same rates as population and employment rates. However, a push toward more intensification (as opposed to sprawl development) may result in the growth rate of infrastructure systems being less than population and employment growth rates. The CAM Program includes opportunities to coordinate AM planning processes with land use planning processes to ensure that the infrastructure systems that are built to service new growth and service improvement can be sustained over the long-term.

2.6: Assumptions and Limitations

The following points summarize the assumptions and limitations of this CAM Plan:

- The scope of this CAM Plan covers the assets directly owned by the City of London. There are significant services divested to Agencies, Boards and Commissions (ABCs) which are not covered in this CAM Plan but are important to London and its citizens such as London Police, London Transit Commission, Social Housing, Libraries and more. The CAM Section conducted an Asset Management Maturity Assessment (AMMA) for all ABCs entities in 2021 and developed detailed reports. The Asset Management Maturity Assessment reports included an overview of each ABC asset management practices, maturity level, and areas of strength and improvement recommendations, Staffing Recommendations, and Priority Initiatives. CAM section is currently supporting each ABC entity to develop an AMP that is compliant with the Ontario Regulations 588/17 requirements. These ABC AMPs are expected to be completed by July 2024.
- This CAM Plan is compliant with the July 2022, 2024, and 2025 requirement of O.Reg. 588/17 for directly owned city assets in that it encompasses both maintain and proposed levels of service and associated financing strategies.
- The City has not fully implemented an asset risk management strategy that goes beyond legislative requirements, although one has been drafted and is planned for full implementation over the next few years. Nevertheless, CAM Section recently developed preliminary asset risk models for Transportation, Parks,

and Recreation and Sport assets. These developed models were part of a pilot project that CAM section is planning to extend to all other service areas.

- The City addresses condition information in three ways.
 - i. Condition may be technically assessed and reported on in a quantifiable technique. This method is the most accurate and most expensive (e.g., Pavement Quality Index).
 - ii. Condition may be assumed based on age and estimated useful life.
 - iii. Finally, in few instances, condition may be based on the expert opinion of staff using the asset.
- Restoration cost allocations between core assets (i.e., Water, Sanitary, Storm, and Transportation) will continue historic practices of integration (Corridor Rehabilitation Approach) maximizing cost efficiency.
- Unexpected events (e.g., severe storms attributed to climate change) will not disrupt infrastructure replacement and renewal projects over the period of analysis.
- The projected capital budgets and expected available reserve funds will occur as planned over the period of analysis.
- Generally, the current operating budget is sufficient to meet current operating needs and maintain current levels of service (unless specifically known).



Section 3. Corporate Asset Management Pressures



3.1: Pressures Introduction

The Corporate Asset Management (CAM) Plan utilizes the best available information, such as the 2023-2027 Strategic Plan, service area master plans, and asset inventories to identify all asset costs associated with meeting current and/or proposed Levels of Service (LOS). This comprehensive approach aims to determine the full extent of infrastructure needs, rather than just what the City can afford to address. Thus, the infrastructure financing needs presented in the CAM Plan are often greater than those presented and approved in the Multi-Year Budget (MYB). This demonstrates the existence of an infrastructure gap between the required investment and the budgeted amount. The CAM Plan analysis takes both financial and non-financial mitigation approaches into consideration to address this gap effectively.

The 2023 CAM Plan reflects capital financing pressures that go beyond what can be accommodated in the 2024-2027 MYB. The following capital financing pressures highlighted within this section of the CAM Plan are:

- Inflation - the rising cost of goods and services can put additional strain on the budget for infrastructure projects,
- Climate Emergency Action Plan (CEAP) – addressing the impact of climate change and implementing climate-related initiatives can require significant financial resources,
- Achieve Proposed LOS – meeting the desired LOS may require additional investments in infrastructure.,
- Aging Infrastructure – the need to upgrade or replace versus rehabilitating aging assets can contribute to capital financing pressures.

Additionally, due to evolving legislative changes and ongoing CAM Program development and implementation, the following capital financing pressures have not been fully analyzed in the 2023 CAM Plan, but are summarized here to provide information regarding future CAM Plan amendments:

- Growth – as the city expands and develops, additional infrastructure investments will be required to support the increasing population and demands.,
- *More Homes Built Faster Act, 2022* – legislative changes may impact the city's growth costs and funding.

By acknowledging these capital financing pressures and considering both current and future challenges, the CAM Plan sets the foundation for strategic infrastructure planning and helps the City prioritize and address its infrastructure needs effectively.

3.2: Pressures Summaries

3.2.1: Inflation

Inflation represents a financial pressure that erodes available cash flow from approved budgets.

As previously reported², municipalities, including the City of London, are similar to other individuals, families and businesses in that inflationary pressures impact the cost of delivering the more than 90 services that the City provides. Where the City differs from others is in the nature of goods and services purchased as outlined below. While most identify the Canadian Consumer Price Index (CPI) as the primary measure of inflationary pressures, it is important to note that this is one of many inflationary indices.

Municipal governments have their own spending patterns that are different than those of other economic sectors³.

Municipalities are also different from a household “basket” of goods and services which CPI is meant to represent. As it relates to infrastructure/capital spending, these differences are highlighted in the following Table 3.1.

Despite the differences in goods and services purchased, it is unquestionable that significant inflationary pressures are being experienced. As Canada’s economy has emerged from the pandemic, inflationary pressures beyond those accounted for within the 2020-2023 MYB and associated 10-year capital plans started developing in 2021 and continued throughout 2022 and into 2023 due to COVID-19 induced supply chain disruptions and supply-demand imbalances.

Table 3.1 Comparison of CPI to Municipal Spending

Consumer Price Index – Basket of Goods/Services	Typical Municipal Spending – Example Basket of Goods/Services
Food Shelter Transportation Clothing and Footwear Health and Personal Care Household Operations and Furnishings Recreation Education and Reading Alcoholic Beverages and Tobacco Etc.	Infrastructure Design – Engineering Construction – General and Trade Contractors Vehicle, Equipment, and Machinery Construction Materials – Lumber, Iron and Steel, Asphalt, etc. Wages/Salaries and Benefits Etc.

As of 2022, these higher input costs have been incorporated into the 2023 CAM Plan and are a material component of the infrastructure replacement value and 10-year infrastructure gap increases reported. These increases and resulting capital financing pressures represent a significant risk to the condition and LOS associated with municipal infrastructure assets. For example, if budgets are not adjusted for the appropriate rates of inflation, the City must deliver the levels of service with less available funds. This may reduce the funds available for state of good repair programs. Furthermore, due to these inflationary cost pressures an extended long-term approach to infrastructure gap mitigation will likely be required to maintain tax/rate payer affordability, noting these outcomes are subject to the 2024-2027 multi-year budgeting process.

² Strategic Priorities and Policy Committee meeting April 10, 2023, 2024-2027 Multi-Year Budget Report.

³ Developing a Municipal Price Index – Government Finance Review April 2010 – Government Finance Officers Association

3.2.2: Climate Emergency Action Plan (CEAP)

The assessment is underway to determine the cost associated with implementing the CEAP and achieving the proposed LOS. The costs presented in the CAM Plan align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets. To meet these initial CEAP targets there are current and future challenges that must be contended with. It is important to address these challenges thoroughly and promptly if a positive legacy for future generations is to be left.

The 2023 CAM Plan incorporates preliminary 'green for like' costs. Examples include upgrading a scheduled facilities' lifecycle renewal of being a 'green for like' replacement, meaning a more energy efficient boiler being considered instead of replacing the boiler with a similarly performing boiler. Fleet has made preliminary assessments of electrical vehicles to replace existing gas-powered vehicles. However, it is not clear at this time if electrical versions of existing models can be achieved in every instance. For example, Heavy Vehicles may not have an electrical equivalent. In addition, CEAP implementation can be broad ranging and can involve assessments of downstream and upstream impacts. This includes potentially assessing the nature of GHG reducing infrastructure and how it is manufactured, and if current electrical grids can support the charging station output, and what costs may be to upgrade operations centres to meet required needs. The City is still in an introductory phase with implementing CEAP; as its maturity increases greater clarity of expected cost, infrastructure and LOS impacts will be provided.

3.2.3: Achieve Proposed LOS Pressures

The City of London 2023-2027 Strategic Plan, various master plans, and Council approved committee reports play a crucial

role in shaping new and enhanced LOS initiatives for each service area, as outlined in each service area section of this CAM Plan. These initiatives are designed to achieve the desired performance metrics for each service area, aligning with the proposed LOS standards. These LOS initiatives may represent both asset capacity and financial pressures beyond what can be accommodated within existing assets and budgets.

Such imbalances are presented in the CAM Plan as achieve proposed LOS infrastructure gaps. When an infrastructure gap exists, this indicates the estimated future expenditures required to achieve the proposed LOS exceeds the existing planned budget and available reserve fund balance. Thus, there is a need to examine proposed LOS targets, lifecycle management activities, and financing strategies to address future infrastructure needs associated with stated proposed LOS.

By highlighting achieve proposed infrastructure gaps and considering both financial and non-financial approaches, the CAM Plan aims to create a comprehensive roadmap for infrastructure development, to inform of the challenges ahead and enable decisions to bridge the gap between desired service levels and available resources. It prompts the City to explore innovative financing methods, optimize asset lifecycle management, and potentially seek additional funding sources to meet its infrastructure objectives and provide the best possible services to its community.

3.2.4: Aging Infrastructure

Similar to most Canadian municipalities, City of London owns and maintains aging facilities as many were built post World War II and in the late 1960s or 1970s through Centennial-era or lottery-funded grant programs. This aging infrastructure portfolio leads to the need for substantial capital investments beyond current budgets to maintain its condition and operational

functionality/LOS. For example, growing needs could include replacing many buildings' elements such as roofs, and repairing and updating mechanical, electrical, and plumbing systems. Additionally, many of these facilities contain outmoded designs and features that are not barrier-free or able to meet contemporary needs. Regarding sustainability considerations, many buildings may not be energy efficient which means more capital renewal investment may be needed to improve energy efficiency, and in extreme cases complete buildings (structure, foundation, etc.) must be demolished and redeveloped due to a combination of the considerations noted above.

These factors often result in CAM Plan infrastructure lifecycle renewal requirements (reinvestment rates) greater than planned budgets and available reserve fund balances. This imbalance highlights the need for careful strategic planning and financial management to address the infrastructure gaps effectively.

To cope with these challenges, the City of London must prioritize the renewal and improvement of aging infrastructure, allocate adequate funds, explore alternative financing options, and consider sustainable and energy-efficient measures in repairs and replacement.

3.2.5: Growth

Like many Canadian municipalities, London is experiencing steady to above average population and employment growth. This growth results in a surge of service and asset capacity needs, resulting in a proportional boom in new and/or enhanced municipal infrastructure construction.

Since 2011, the rate of population growth across the City has increased substantially, primarily driven by steady net migration across all major demographic groups. Between 2011 and 2021,

this growth resulted in an average annual population growth rate of 1.5%.

For many Ontario municipalities, including the City of London, this steady population growth, coupled with the impacts of the COVID-19 pandemic, has been a significant driver of both ownership and rental housing demand. Growth was largely led by the ultra-low interest rate environment generated throughout 2020, 2021, and early 2022 in response to the pandemic, combined with steady outward growth pressure during this period, particularly from the larger urban centres of the Greater Toronto Hamilton Area. This recent trend of relatively stronger demand toward housing is anticipated to continue over the medium to long term, notwithstanding a potential near term general cooling in the housing ownership market due to current interest rates.

As reported in the City of London Growth Projections 2021-2051 report, Figure 3.1 summarizes three long-term population forecast scenarios for the City of London over the 2021 to 2051 forecast period relative to historical population between 2001 and 2021.

By 2051, the City's permanent population base is forecasted to grow to a range between 601,500 to 692,100. This represents an increase of approximately 164,300 to 254,900 persons between 2021 and 2051. Under the Medium Growth Scenario, the City of London population base is forecast to grow to 647,500, representing an increase of approximately 210,300 and an annual average growth rate of 1.3%. The Medium Scenario represents the "recommended" growth forecast scenario for the City of London.

Long-term Forecast Population Scenarios, 2021 to 2051

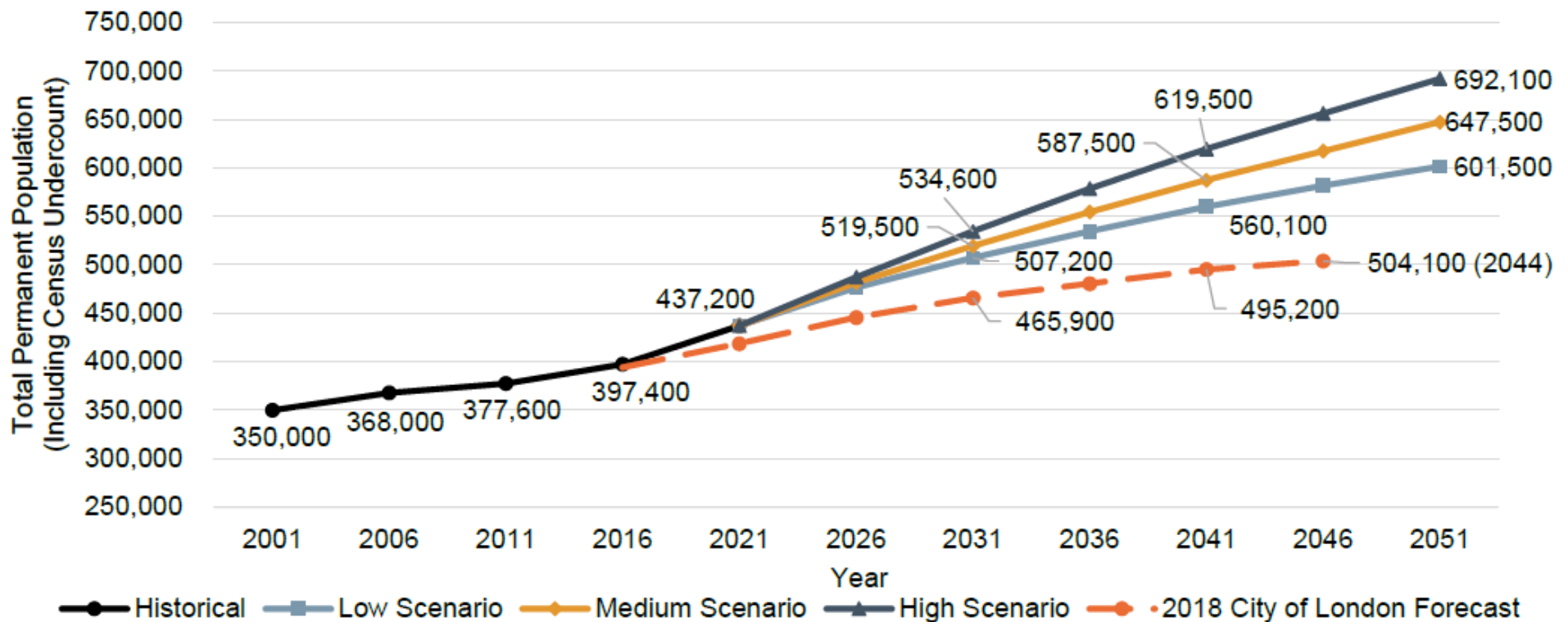


Figure 3.1 Long-Term Forecast Population Scenarios (2021 to 2051)⁴

Based on these growth forecasts, it is likely the City's population will increase to over 547 thousand people by 2035, which represents an increase of greater than 73 thousand in population compared to the City of London Official Plan estimate of 474 thousand.

In addition to the positive population growth forecasts presented in the City of London Growth Projections 2021-2051 report, the

report outlines steady employment growth forecasts as well. Figure 3.2 summarizes the long-term employment forecast scenarios for the 2021 to 2051 forecast period relative to historical employment trends between 2001 and 2021. It shows that by 2051 the City's employment base is forecasted to grow to between 295,000 and 339,300 jobs. This represents an increase of approximately 97,700 to 142,000 jobs between 2021 and 2051. Under the Medium Growth Scenario, the City of

⁴ Source: City of London 2022 Population, Housing, and Employment Growth Study.

London employment base is forecast to grow to 302,800, representing an increase of approximately 105,500, and an annual average growth rate of 1.6% or 4,010 jobs per year to

2051. This is considerably higher than the historical annual employment growth rate of 0.5% from years 2001 to 2021.

Long-Term Total Employment Forecast Scenarios, 2021 to 2051

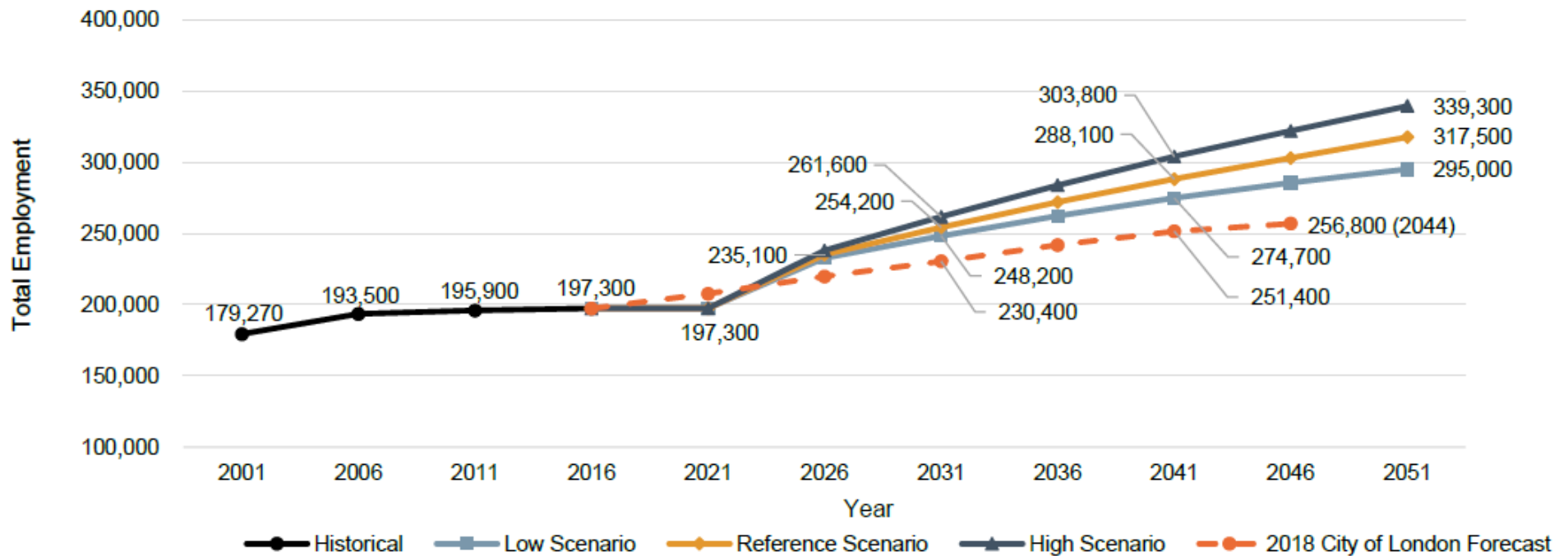


Figure 3.2 Long-Term Employment Forecast Scenarios (2021 to 2051)⁵

This growth demonstrates the City of London continues to have a strong appeal to residents and businesses of all types. This appeal is largely attributed to the City's geographic location, infrastructure systems, and services available. For example, the City offers opportunities for urban living within proximity to public

and private transportation, retail, entertainment, and other urban amenities, including public and private schools, three regional hospitals, two post-secondary institutions, access to urban indoor and outdoor recreational facilities, as well as access to

⁵ Source: City of London 2022 Population, Housing, and Employment Growth Study.

recreational opportunities within the surrounding rural countryside.

The Development Charge Background Study process thoroughly assesses the impacts of such growth on municipal infrastructure demand and the resulting capital and significant operating expenditures that are anticipated. These forecasts, results and recommendations are used in the CAM Plan discussions for each service area but presently has no gaps identified.

However, as the City's asset portfolio is increasing due to the construction and assumption of new growth infrastructure assets, operations, maintenance, and lifecycle renewal of these new assets within the expanded infrastructure portfolio requires more resources. To accommodate these financing pressures Council approved the Assessment Growth Policy to ensure new property tax dollars attributable to growth are used to fund the long-term operating and capital budget needs of the associate services and assets to the greatest extent possible.

Additionally, this growth may correspond to increased demand on existing assets, such as increasing 'wear and tear' due to volume, especially for intensification type growth developments. Maintaining existing infrastructure capacity (which is a LOS) and quality (condition), poses continuous challenges as intensification builds up and additional urban and rural development continues.

Civic Administration continuous CAM Plan improvement initiatives began to assess how these pressures can be evaluated and quantified within future CAM Plans.

3.2.6: More Homes Built Faster Act, 2022

As outlined in the report titled Financial Implications of the *More Homes Built Faster Act, 2022*, it is anticipated that this new legislation will present significant financial challenges for the City beyond 2023. Fortunately, many of those impacts, such as the mandatory phase-in of DC rates, can be delayed until the implementation of the new Development Charges (DC) By-law, for which the planned effective date is January 1, 2028.

However, there are a few changes that will result in financial pressures over the 2024-2027 MYB, including:

- Funding for required DC exemptions and discounts (e.g., affordable, rental and attainable housing) prescribed in the *More Homes Built Faster Act, 2022*;
- Funding of inflationary pressures associated with the non-growth funding portion of the 2019 Development Charges Background Study capital plan; and

Additional staff resources to address increased volume associated with the *More Homes Built Faster Act, 2022*, and other Provincial efforts to increase housing supply.



Section 4. Water

Asset Information	Water
Replacement Value	\$7.65 billion
10 year Maintain Current Levels of Service Infrastructure Gap	None identified
10 year Achieved Proposed Levels of Service Infrastructure Gap	None identified

Quick Facts
Over 1,600 kilometer of water mains
Five Storage Reservoirs



4.1: State of Local Infrastructure

The City of London supplies safe, clean, high-quality water to the residents and businesses of London. This involves managing a reliable water system capable of providing sufficient quality, flow, and pressure to satisfy drinking, recreational, irrigation, sanitary, fire protection, and business needs. Treated drinking water is purchased from the Lake Huron and Elgin Area Water Supply Systems, which draw water from Lake Huron and Lake Erie respectively. Drinking quality water is pumped from the treatment plants at each lake into the City where it is distributed and metered to all the water customers while meeting pressure, flow, and quality standards. This requires an extensive network of infrastructure valued at approximately \$7.65 billion, which is operated and maintained by the City of London.

4.1.1: Asset Inventory and Valuation

Table 4.1 summarizes Water's asset inventory and their replacement values. Water assets are managed and maintained to meet provincially issued system and facility operating permits, as well as City of London technical targets for performance and reliability. Valued at approximately \$7.65 billion, this extensive network of assets can be grouped into two types: Linear and Water Facilities. They are further divided, ranging from transmission mains to storage reservoirs.

It is also noted that this replacement value is considered as if this service area would be replaced on a complete and standalone basis. In practice, the City's Core services (Transportation, Wastewater Sanitary, Wastewater Storm, and Water) coordinate to ensure cost efficiencies to maintain the current LOS at the lowest cost. While the Core chapters are presented separately, they should be read and considered as whole when considering their infrastructure lifecycle needs.

Administrative, maintenance and storage buildings are maintained by the City's Facilities group. Fleet and associated equipment is provided and serviced by Fleet Management Services and are dealt with in the Fleet section. Land is also excluded from this asset pool and dealt with in the Land section.

The Water infrastructure is grouped into Water Linear (pipes, appurtenances, and meters) and Water Facilities (pumping stations, bulkwater stations and storage reservoirs). Water assets are managed and maintained to meet provincial drinking water quality requirements. Along with City of London technical targets for performance and reliability, the utility adheres to its accreditation requirements through the Council-endorsed Drinking Water Quality Management Standard - Operational Plan.

Water Linear assets are the largest of the inventory categories and include the pipes, appurtenances like valves, chambers, fire hydrants and meters. Pressure Reducing Valves (PRV) are tracked as their own category given the critical nature of these valves. London implements a variety of initiatives to maintain the water linear assets in an acceptable condition.

Watermain rehabilitation programs include cleaning/lining and cathodic protection. These programs are run on an ongoing basis and are funded annually. Pipe lining focuses on cast iron watermain, where cathodic protection is applied to ductile iron watermain. Optimized water chemistry, and external corrosion mitigation methods are also used to minimize failures.

Watermain renewal efforts are targeted towards cast iron watermain, as they are prone to internal corrosion which has a significant impact on both the quality of the water and the hydraulic capacity of the pipe. Most of the cast iron pipe is

replaced with PVC. By following the 20 Year Water Financial Plan, many of the cast iron water mains will be renewed by the mid to late 2030's and cast iron breaks will be substantially eliminated. Although watermain renewal is prioritized by break history, age, material, and capacity to support revitalization/growth amongst other factors using a Microsoft Access based program called Water Condition Assessment Program (WCAP), coordination with Wastewater and Stormwater linear asset replacement is often what drives the project. The coordination with the other Environmental Engineering Services allows for significant cost savings in restoration. The City of London also undertakes inspection and monitoring techniques to check for leaks, mitigate risk, and optimize the use of replacement funds. Condition inspections prioritized based on likelihood and consequence of failure for transmission mains. In addition, an acoustic fibre optic

monitoring system on certain critical transmission mains. Leak detection is also utilized on smaller distribution mains.

Water Meters are planned for replacement through an accelerated program at approximately 12,000 meters per year to eliminate the backlog of meters that have exceeded their useful life and achieve a level of sustainability. The inventory of remote reading meters is relatively young but ever-increasing, recently becoming standard installation hardware. They are checked, recalibrated, and/or replaced based on manufacturer recommendations.

Water Facilities include pump stations, bulkwater stations, and storage reservoirs. These water facilities are assessed on an individual and planned basis through a mix of normal maintenance and engineering studies.

Table 4.1. Inventory and Valuation (Water Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Linear	Distribution Mains lesser than 416 mm diameter	1,429	Km	\$4,623,886
	Transmission Main Mains greater than and equal to 416 mm diameter	205	Km	\$905,004
	Service Connection Appurtenances	124,644	Each	\$1,495,728
	Valves Appurtenances	14,043	Each	\$126,387
	Hydrants Appurtenances	7,330	Each	\$54,975
	Chambers with mains lesser than and equal to 450mm diameter Appurtenances	220	Each	\$22,000
	Chambers with mains greater than 450mm diameter Appurtenances	333	Each	\$118,800
	PRV (Pressure Release Valve) Appurtenances	14	Each	\$2,800
	Water Meters	122,492	Each	\$48,604
Water Facilities	Pump Stations (Including Rechlorination)	9	Each	\$91,260
	Bulk Water Stations	9	Each	\$955
	Storage Reservoirs	5	Each	\$162,786
Total				\$7,653,185

4.1.2: Age Summary

Figure 4.1 shows the Water average asset age as a proportion of the average useful life by asset. Asset ages have been established using data from the City's geomatics (GIS) database, consultant reports, and Tangible Capital Asset database.

The watermain infrastructure is approximately 45% through the expected useful life. Detailed construction date information exists, and the average age is under 40.

Limited appurtenances installation dates exist. The limited installation date is reflective of watermain age (and condition) and would generally be the deciding factor in replacing or rehabilitating watermain (and associated appurtenances) assets.

Detailed water meters data exists with the assets two fifths through their expected useful life.

Storage reservoir average age is representative of two reservoirs built the past 25 years, two built approximately 55 years ago, and one reservoir approximately 90 years ago. Two storage reservoir roof membranes are undergoing replacement which will decrease average age and another reservoir will be replaced with the project commencing within the year.

Bulk Water Station age indicates the assets are in the last one-quarter of their expected useful life. Pump stations on average are two-thirds through their asset life.

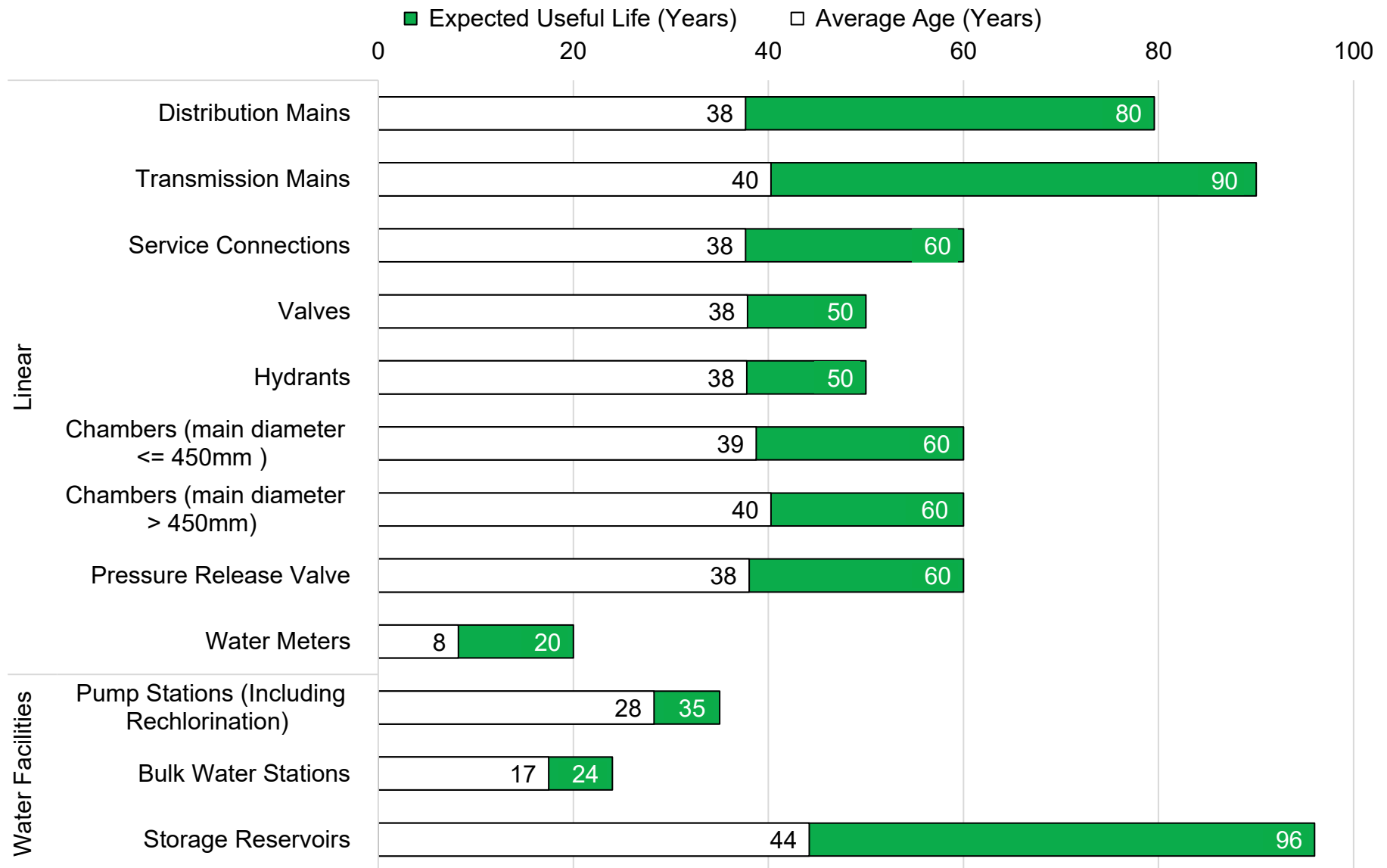


Figure 4.1. Average Age and Expected Useful Life (Water Services)

4.1.3: Asset Condition

As shown in Figure 4.2, the City's Water assets are overall in Very Good to Good condition, indicating that they are meeting current needs. The Water service area has approximately 89% of assets in Fair, Good, or Very Good condition. The remainder are approaching the end of their expected useful lives,

indicating a need for investment in the short to medium term. The City's Water assets are overall in Good condition. However, a significant portion are in Fair to Good condition, which indicates that they are meeting current needs but are aging and may require attention in the near term.

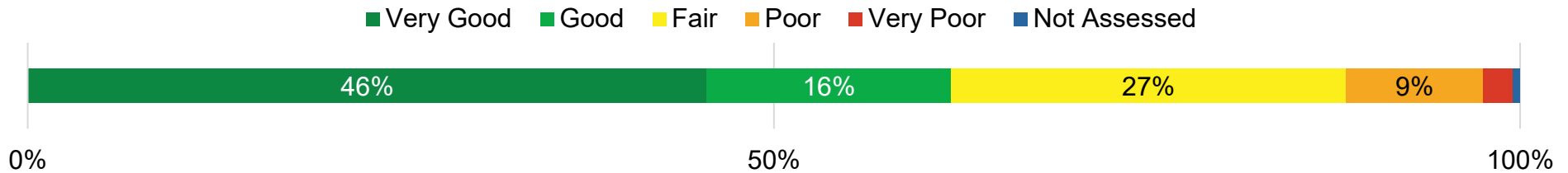


Figure 4.2. Overall Condition (Water Services)

Detailed Water condition is outlined in Figure 4.3. Watermains represent the bulk of the value of the water asset base and are rated in Fair, Good, or Very Good condition. The remainder are approaching the end of their expected useful lives, indicating a need for investment in the short to medium term. The continuing focus on the renewal of cast iron mains is necessary to meet the City's service goals.

Appurtenances conditions are based on linear asset condition, thus, are in similar condition and investment requirement timeline.

Over 78% of Water Meters are in Fair, Good, or Very Good condition and managed to ensure integrity and sustainability of the billing process. The condition assessment is based on the age and expected useful life of the water meters.

Water Facilities (pump stations, storage reservoirs and bulkwater stations) are ranging between Very Good to Poor condition. This assessment is based on a combination of consultant reports and expert opinion. It is consistent with storage reservoirs either being relatively recently constructed (last 25 years) or construction dates of both approximately 55 years ago and over 90 years ago. Pumping Stations, while currently in a Good condition, would deteriorate if the needs identified through consultant reports are not met. Nearly half of bulkwater stations are in Good condition which resulted from stations having greater than originally estimated expected useful life. Approximately one third bulkwater stations are in Poor condition given they are nearing the end of their expected useful life, and thus require replacement over the next 10 years.

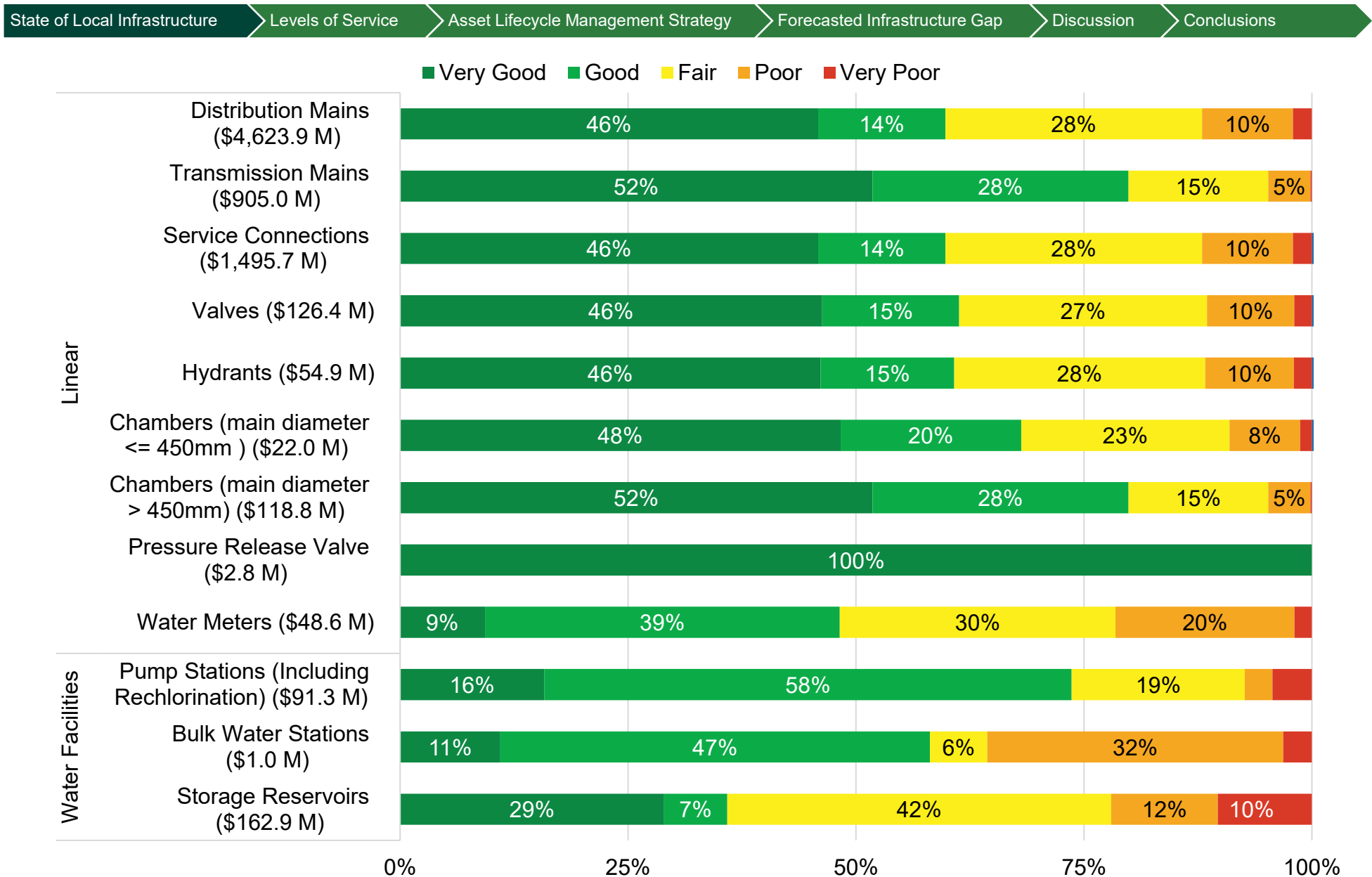


Figure 4.3. Asset Condition Details (Water Services)

4.2: Levels of Service

O.REG 588/17 REQUIREMENTS

O. Reg. 588/17 requires legislated community levels of service (LOS) for core assets. Community LOS use qualitative descriptions to describe the scope or quality of service delivered by an asset category. Examples of legislated community LOS include a map showing areas of the municipality that are serviced by the water and wastewater system. In this example, a map provides an illustrative view of the extent of the services provided through the infrastructure assets.

O. Reg. 588/17 also requires legislated technical LOS for core assets. Technical LOS use metrics to measure the scope or quality of service being delivered by an asset category. Examples of technical LOS include the percentage of urban properties serviced by the municipal water and wastewater system. Technical LOS for core assets are provided below. Table 4.2 lists O. Reg 588/17 requirements for Water assets. References are provided to show where O. Reg 588/17 requirement has been attained.

Table 4.2. O.Reg. 588/17 LOS Metrics (Water Services)

Customer Level of Service	Technical Level of Service
Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system. (Table 4.3 and Figure 4.4)	Percentage of properties connected to the municipal water system. (97% - Table 4.3)
Description, which may include maps, of the user groups or areas of the municipality that have fire flow. (Table 4.3 and Figure 4.4).	Number of properties where fire flow is available. (97% - Table 4.3)
Description of boil water advisories. (Table 4.3)	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. (0 - Table 4.3)
Description of service interruptions. (Table 4.3)	Number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system. (46.9 - Table 4.3)

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan is striving for levels of service (LOS) performance measures linked to Customer Values of Accessible, Cost Efficiency, Customer Satisfaction, Environmental Stewardship, Reliability, Safety, and Scope.

Direct and Related LOS

After review with Water, LOS considered most representative of Water services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'direct LOS' and are listed in Table 4.4.

LOS that have a causal relationship with direct LOS are documented in Table 4.5 as related LOS but cannot be as readily costed to Water services.

Metrics

Lastly, Table 4.6 listed metrics that are useful information, especially when considered in conjunction with O. Reg, direct LOS, and related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Water provides.

4.2.1: O. Reg 588/17 Levels of Service (Water Services)

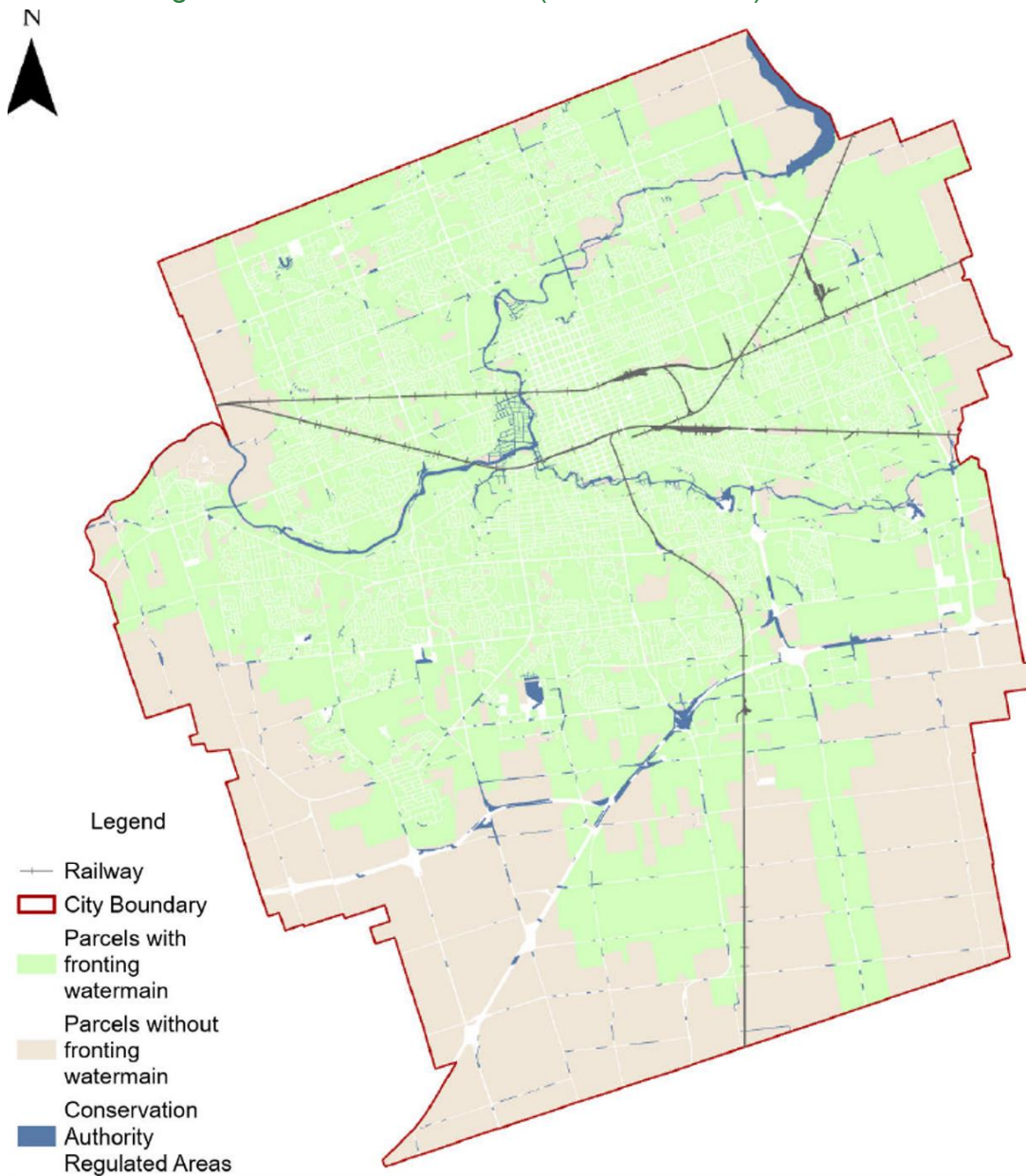


Figure 4.4. Properties in the City of London Connected to the Municipal Water System (Water Services)

Table 4.3 O. Reg. 588/17 Levels of Service (Water Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Scope	Customer/Council	Description, which may include maps, of the user groups or areas of the municipality that have fire flow.	See Figure 4.4	Maintain current
		Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system.	See Figure 4.4	
	Technical	Percentage of properties where fire flow is available	97%	
		Percentage of properties connected to the municipal water system	97%	
Reliability	Customer/Council	Description of boil water advisories and service interruptions.	No boil water advisories.	Maintain current
	Technical	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	Zero boil water advisories to 106,804 parcels with fronting watermain.	
		Number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system	46.9 days to 106,804 parcels with fronting watermain.	

4.2.2: Direct Levels of Service

Table 4.4 Direct Levels of Service (Water Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Cost Efficiency	Customer/Council	Water Overall Reinvestment Rate	0.5%	1.0%
Environmental Stewardship	Customer/Council	Residential Water consumption (L/cap/day)	180.95	Maintain current
	Technical	Infrastructure Leakage Index (ILI)	1.7	
Reliability	Customer/Council	Percentage of Water assets in Fair or better condition	89%	Maintain current
Reliability	Technical	Number of watermain breaks per 100 kilometers	4.7	
Reliability	Technical	Number of boil water advisories	0	
Safety	Customer/Council	Percentage compliance with all applicable water quality regulations	100%	Maintain current
Safety	Technical	Water sampling percentage meeting Regulatory requirements	100%	

4.2.3: Related Levels of Service

Table 4.5 Related Levels of Service (Water Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Water Facility Reinvestment Rate	1.7%
Cost Efficiency	Technical	Water linear (Mains + Appurtenances) Reinvestment Rate	0.4%
Cost Efficiency	Technical	Water Meter Reinvestment Rate	4.9%
Reliability	Technical	Percentage of facility assets in Poor or Very Poor condition	16.8%
Reliability	Technical	Percentage of water meters in Poor or Very Poor condition	21.5%
Reliability	Technical	Percentage of watermains in Poor or Very Poor condition	11.0%
Reliability	Customer/Council	Number of complaints due to rusty/discoloured water	88
Safety	Customer/Council	Percentage of City owned Hydrants with sufficient fire flow by hydrant.	99.4%

4.2.4: Other Measures

Table 4.6 Metrics - Other Dashboard Measures (Water Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Operating budget for water services	\$45,442,295
Cost Efficiency	Technical	Annual operating cost to provide water service (\$/household)	\$260.18
Customer Satisfaction	Customer/Council	Percentage of residents satisfied with water services	91.0%
Environmental Stewardship	Technical	Energy consumption - kWh per ML supplied	166.7
Reliability	Customer/Council	Percentage of watermain breaks repaired in less than 6 hours	94.8%
Reliability	Technical	Percentage of system serviced by sources that provide substandard water	0%
Reliability	Technical	Percentage of system that is unlined Cast Iron or Ductile Iron	33.8%
Reliability	Technical	Number of leaking services fixed	286
Reliability	Technical	Number of watermain breaks	77
Reliability	Technical	Number of watermains susceptible to freezing	0
Reliability	Customer/Council	Percentage of customers where service is interrupted above target frequency	0.1%
Safety	Technical	Number of lead services replacements per year	191
Safety	Technical	Percentage of red hydrants/Total # of hydrants. Red hydrants as the lowest of four flow delivery categories (0 to 32 liters per second)	1.6%

4.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs.

The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, which may trigger asset investment needs.

4.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current LOS while striving to optimize costs and risks. Table 4.7 lists specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A.

Asset management practices or planned actions employed by cities can entail certain specific risks. Many types of risks such as health and safety, financial, environmental, etc. are summarized in Table 4.8 classified by each lifecycle activity. The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 4.7 Current Asset Management Practices or Planned Actions (Water Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Linear (Mains, Appurtenances, or Meters) and Water Facilities (Pump Stations, Reservoirs) <ul style="list-style-type: none"> Encouragement of conservation of water and energy through policy, procedures, public outreach, etc. Management of water chemistry to reduce corrosion. Coordination efforts to optimize construction between city projects and external parties (UCC).
Maintenance	Linear (Mains, Appurtenances, or Meters) <ul style="list-style-type: none"> Scheduled preventative maintenance programs including air and vacuum valve maintenance program. Scheduled inspection programs for key assets – e.g., leak detection and pipeline detection. Continuous condition monitoring for key assets through Acoustic Fibre Optic Monitoring. 24 hour maintenance response capability. Reactive maintenance for significant portion of asset inventory.

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
	Water Facilities (Pump Stations, Reservoirs) <ul style="list-style-type: none"> Refer to Appendix A. 					
Renewal/ Rehabilitation	Linear (Mains, Appurtenances, or Meters) <ul style="list-style-type: none"> Watermain rehabilitation based on the current condition of the pipe: Structural Re-lining. Cathodic protection (anode program). Water meter rehabilitation would generally not be performed – the asset would be replaced. Water Facilities (Pump Stations, Reservoirs) <ul style="list-style-type: none"> Water facilities are rehabilitated based on facility inspection reports. 					
Replacement/ Construction	Linear (Mains, Appurtenances, or Meters) <ul style="list-style-type: none"> Watermain replacement is based on the condition rating of the infrastructure and the infrastructure needs of other service areas. Once a watermain has been identified for replacement, the method of replacement is determined by the site conditions during the design. Examples listed: <ul style="list-style-type: none"> Complete open-cut replacement. Horizontal directional drilling (HDD). Lead service replacement program. Water meter replacement using newer technology that maintains the current LOS. Coordinate with wastewater, roads projects and through UCC. Water Facilities (Pump Stations, Reservoirs) <ul style="list-style-type: none"> Water facilities replaced based on facility inspection reports which recommend replacing pumps, valves, roofs, etc. 					
Disposal	Linear (Mains, Appurtenances, or Meters) <ul style="list-style-type: none"> Watermains are either removed during construction or are disconnected and abandoned in place depending on the construction circumstances. Abandoned mains are capped and/or grouted to protect other infrastructure. Data on active and abandoned watermains is stored in GIS. GIS tracks the asset status (i.e. active, abandoned, and/ or removed). Water Facilities (Pump Stations, Reservoirs) <ul style="list-style-type: none"> Water facilities disposal: <ul style="list-style-type: none"> Equipment removed. Land reused or sold. Equipment disposed or inventoried as spare parts, no cost recovery. 					
Service Improvement	Linear (Mains, Appurtenances, or Meters) <ul style="list-style-type: none"> Increased capacity and water quality for watermains because of cleaning and structural lining. Replaced watermains are increased in size as appropriate to improve flow, pressure, and reliability along the 					

State of Local Infrastructure	Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions				
	<p>watermain and in the greater area.</p> <p>Water Facilities (Pump Stations, Reservoirs)</p> <ul style="list-style-type: none"> In some cases, pumps can be modified to change the flow curve in a way that improves operations, efficiency, and pump life. 				
Growth	<p>Water – All</p> <ul style="list-style-type: none"> Capital growth projects are identified by Development Charges and Water (subject to <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i>, requirements and City of London policy). Undertake Environmental Assessments. Assumption of subdivisions, commercial and industrial extensions, local improvements, etc. Interim works (typically one to ten years) built to provide temporary service pending construction of permanent infrastructure assets. <p>Linear (Mains, Appurtenances, or Meters)</p> <ul style="list-style-type: none"> Projects relate to extensions and expansions. <p>Water Facilities (Pump Stations, Reservoirs)</p> <ul style="list-style-type: none"> Projects typically relate to pump stations process upgrades. Interim work generally needed for Water pump stations. 				

Table 4.8 Risks Associated with Asset Management Practices or Planned Actions (Water Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Refer to Appendix A.
Maintenance	Refer to Appendix A.
Renewal/ Rehabilitation	<ul style="list-style-type: none"> Incorrect assumptions regarding improved expected useful life after rehabilitating a main. Specifically, the estimated service life of a full-length cure-in-place pipe is still not well founded in the scientific literature as it is a comparatively new process (developed over the past two decades).
Replacement/ Construction	Refer to Appendix A.
Disposal	<ul style="list-style-type: none"> Lack of planning and funding may limit the options to efficiently replace existing and add new capacity. Cost increases resulting from unexpected health concerns resulting from disposal (such as uncovering asbestos pipe).
Service Improvement	Refer to Appendix A.
Growth Activities	Refer to Appendix A

4.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the forecasted change in the condition profile of

each asset type. Figure 4.5 shows the projection of the condition of the Water assets based on two scenarios. The projected condition with current budget and maintain current LOS condition projection. The figure also shows planned budget, the required investments to maintain the current LOS and Investments to achieve proposed LOS, which include a pumping station investment. These are considered the first, but not comprehensive, investments in the City's Climate Order of Magnitude and Climate Emergency Action Plan implementation.

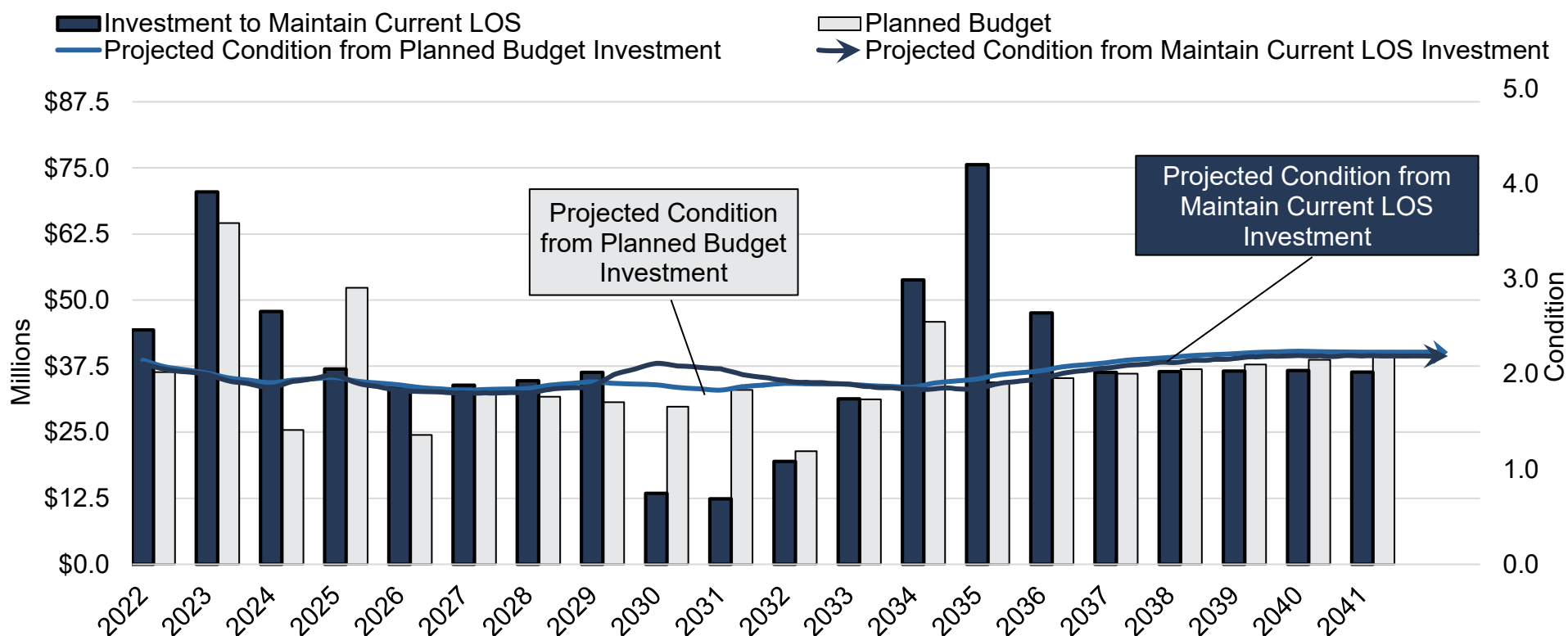


Figure 4.5 Projected Service State of Two Funding Scenarios (Water Services)

A. Scenario One: Planned Budget Condition Profile

The Water average annual activity and planned funding is summarized in Table 4.9. The condition profile expected from the planned budget is forecasted by using the same logic related to condition degradation rates and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. Figure 4.6 presents the expected condition profile for the next 20 years based in the current budgets for Water assets. This scenario indicates the condition profile trending to most assets ranging from Fair and above condition.

Current funding for operating budget and capital budgets are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget. Growth activities are analyzed using the 2021 Development Charges Background Study Update. Major upcoming projects include industrial oversizing projects, Kilally Road watermain, and Arva Pumping Station and surrounding watermain upgrades.

Other reasons for Water growth budgets relate to built area works, and high- and low-level systems, infill and intensification nodes. All number in tables are rounded to nearest thousand.

Table 4.9 Scenario One - Average Annual Planned Budget (\$Thousands) (Water Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	44,727	53,673
Renewal, Replacement, Rehabilitation, Disposal	32,887	38,157
Service Improvement	513	4,782
Growth Activities	7,405	10,118

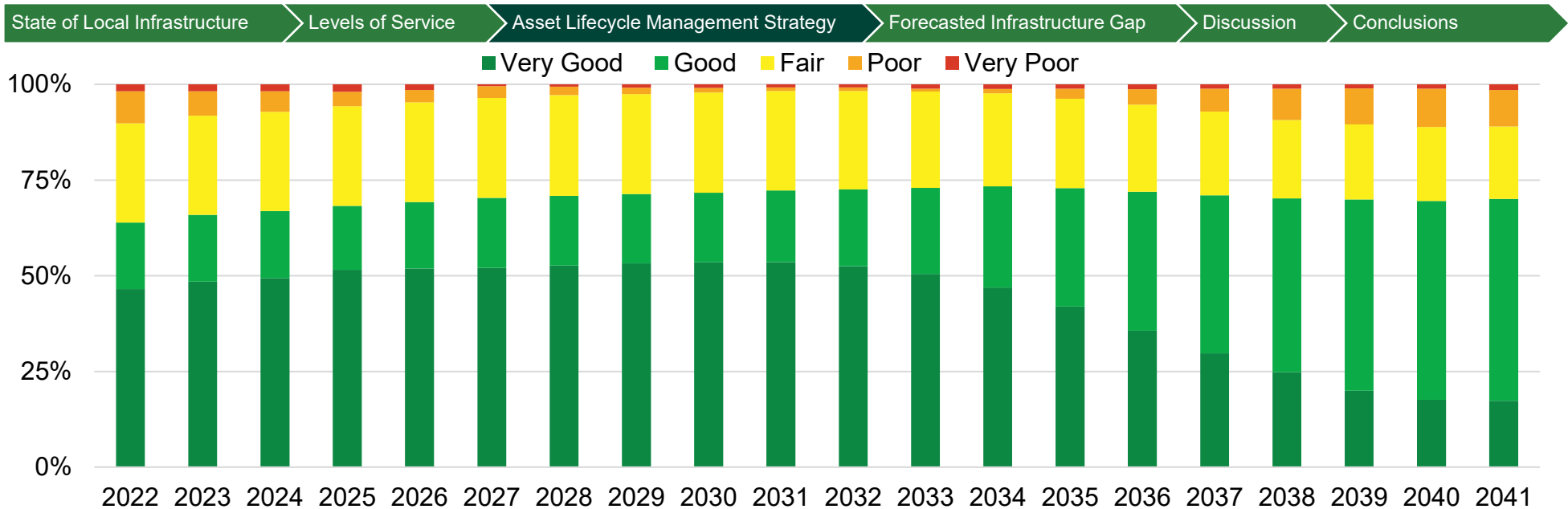


Figure 4.6 Projected 20-Year Planned Budget Condition Profile (Water Services)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

Table 4.10 summarizes the cost to maintain current LOS. This scenario forecasts the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are

adjusted until the forecasted condition profile meets the current condition profile for these assets. Figure 4.7 presents the expected condition profile for the next 20 years based on investment required for maintain current LOS for Water assets. This scenario indicates the condition profile trending to most assets ranging from Fair and above condition.

Table 4.10 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Water Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	53,673	None identified	53,673	None identified
Renewal, Replacement, Rehabilitation, Disposal	38,157	3,418	41,575	None identified
Service Improvement	4,782	None identified	4,782	None identified
Growth Activities	10,118	None identified	10,118	None identified

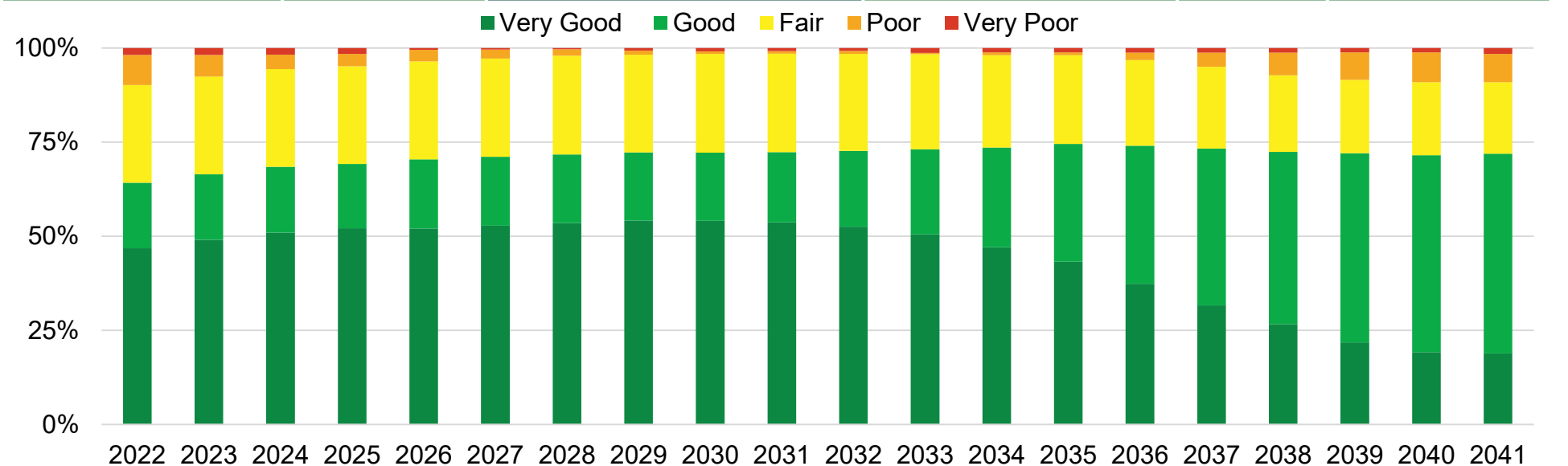


Figure 4.7 Projected 20-Year Maintain Current LOS Condition Profile (Water Services)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

There have been no identified needs to achieve proposed Water LOS. Table 4.11 reiterates this.

Table 4.11 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Water Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁶	Achieve Proposed LOS Infrastructure Gap ⁷
Operating Budget	53,673	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	38,157	3,418	None identified	None identified	None identified
Service Improvement	4,782	None identified	None identified	None identified	None identified
Growth Activities	10,118	None identified	None identified	None identified	None identified

⁶ Incremental investment to achieve proposed LOS excludes CEAP costs.
⁷ Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

4.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized in Table 4.12 and illustrated in Figure 4.8. The analysis documented above is related to the lifecycle rehabilitation or replacement lifecycle activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities.

Water is projected to not have an infrastructure gap assuming that reserve funds are available to address needs. There are no

proposed LOS identified that would create additional funding gaps.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

Table 4.12 Average Annual Budget and Gap Analysis (\$Thousands) (Water Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Linear	31,433	2,468	33,901	None identified	None identified	None identified	None identified
Meters	2,372	None identified	2,197	None identified	None identified	None identified	None identified
Water Facilities	4,352	1,125	5,477	None identified	None identified	None identified	None identified
Water	38,157	3,418	41,575	None identified	None identified	None identified	None identified

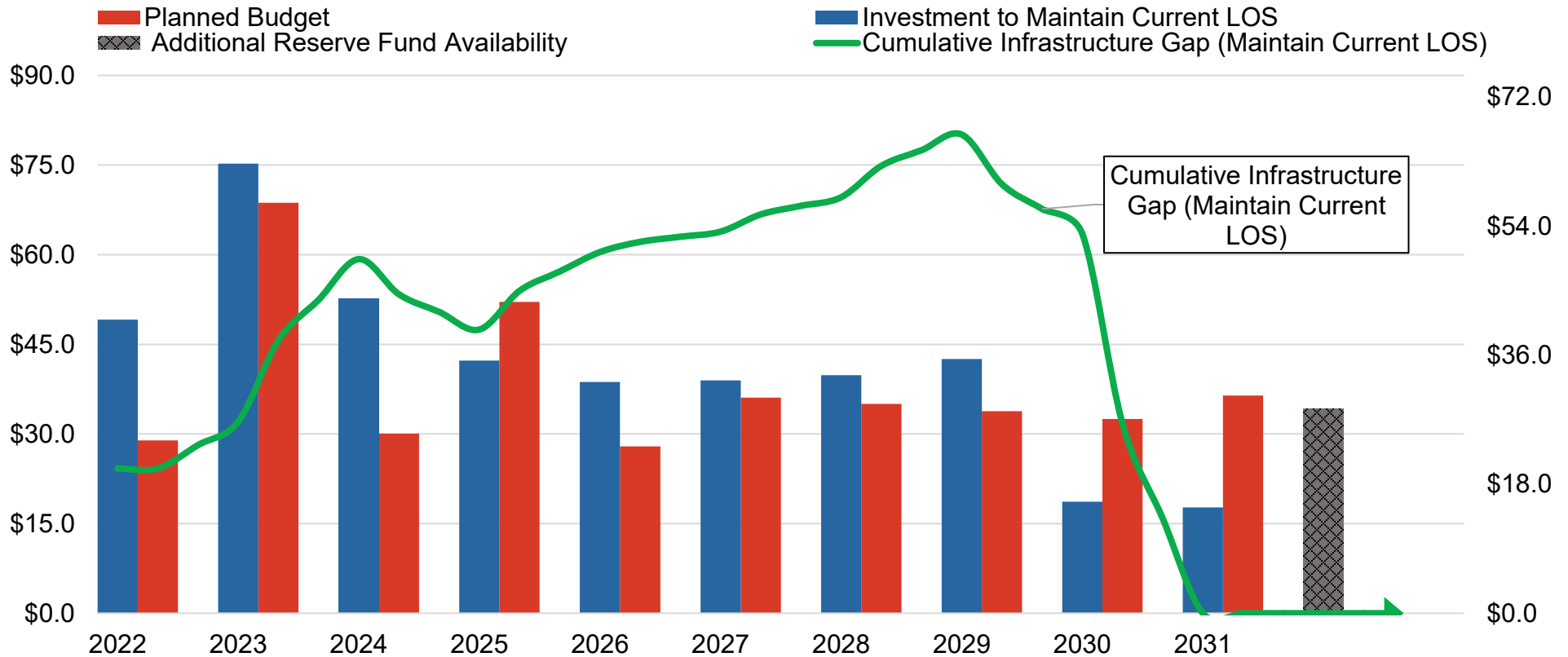


Figure 4.8 Maintain Current LOS Cumulative Infrastructure Gap (Millions) (Water Services)

For linear water assets the City is addressing its infrastructure needs by continuing proactive management techniques like targeted renewal, regular inspection, condition assessment and the use of trenchless technologies. Further use of these technologies will help control the gap over the long term.

Evaluating planned budget vs. required investment shows that the Water infrastructure gap will be reduced to \$0, assuming additional reserve fund availability of approximately \$34 million. Total required investment represents the costs to renew and maintain the existing assets so services can continue to be delivered. The estimate does not account for any costs to

improve service (e.g., water pressure, reliability, aesthetics), accommodate growth or expand service to new areas or customers. If forecasted reserve fund balances are not achieved this will increase Water's infrastructure gap.

The largest portions of the investment in Water are represented by future requirements in pipes and service connections. The required investment for pipes except for service connections in the ten-year period is derived from Water Main Renewal Plan. Other significant investments relate to reservoirs. In 2022 there were two roof membrane replacements at Springbank 1 and 3

and the upcoming Springbank 2 Reservoir rebuild is a significant project.

The required investment for service connections and water facilities assumes that assets identified as being in Poor or Very Poor condition will need renewal over the next 20 years. The infrastructure gap increases over time due to ductile iron replacement needs and other pipe groups reaching the end of their expected useful lives. For example, many watermains installed in the 1930's through the 1970's are experiencing pipe breaks. The 1950's through 60's watermains are failing at a much higher rate than those installed before and since due to construction and material practices of the time. Cast iron pipes are failing at a higher frequency every year. Lead service connections need to be replaced. The City has already implemented proactive management techniques like targeted renewal, acoustic fibre optic monitoring, condition assessment, lining, cathodic protection, etc. to optimize management of the water assets. Further use of these technologies will help mitigate the gap over the long term.

This is consistent with the principles of the 20 Year Water Financial Plan that confirms a commitment to full cost recovery, financial stability and closing the water infrastructure gap (not

necessarily in the ten-year period), while achieving sustainability of the system in the years to come. The plan is a commitment to continue renewing infrastructure as it approaches the end of its useful life, prior to failure, thereby minimizing maintenance and repair costs, social disruption and water loss. The future projected rate increases will be used to address infrastructure that requires significant renewal (replacement and rehabilitation) work to close the infrastructure gap ensuring that future generations and businesses are not faced with a water system that is failing, unreliable and expensive to maintain. The 20 Year Water Financial Plan includes allowances for growth and inflation while closing the infrastructure gap over several decades. This report uses a 10-year period to study the infrastructure gap. The results of this report reflect an initial increase in the Water infrastructure gap which the 20-year plan resolves over several decades.

Deferring renewal efforts due to budget limitations would contribute to the infrastructure gap. Success of the 20 Year Water Financial Plan will be determined through monitoring. However, the plan will also need to be flexible to address the myriad of changes that will occur over time.

4.5: Discussion

4.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Water assets condition comparison is provided in Figure 4.9. The 2019 CAM Plan condition data used a variety of relevant information including inspection information for key assets, historic failure information and professional internal and external opinion. The 2023 CAM Plan refined these processes, particularly with watermain condition data.

Replacement value increases are primarily driven by Non-Residential Build Consumer Price Index changes (NRBCPI). While this is consistent with other City processes (such as the City's Development Charge service group relying on NRBCPI to adjust rates) ideally recent bids and tenders will inform replacement unit values. This information is expected for CAM's annual plan update.

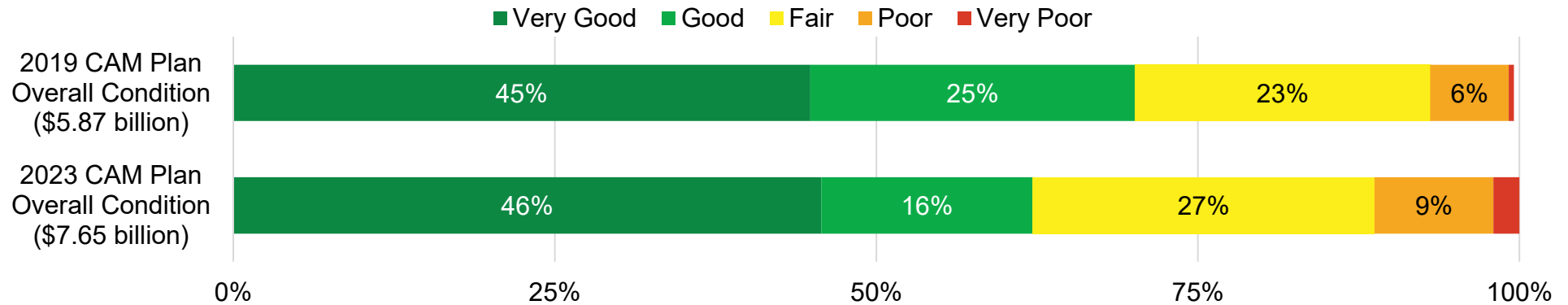


Figure 4.9 2019 CAM Plan to 2023 CAM Plan Condition Summary (Water Services)

4.5.2: Lifecycle Management Scenarios

The lifecycle Management section included two scenarios of Planned budget and maintain current LOS.

Scenario One planned budget is identified to have some constraints on the City's capacity to effectively maintain Water infrastructure. This leads to a gradual deterioration in their condition. This decline might not be immediate but, over time, it becomes more visible to the public and causing operating problems, increasing the operating and maintenance costs, and potentially leading to higher repair or replacement costs in the future. Scenario Two maintain current LOS funding is greater

than what is currently allocated for Water, illustrating some financial strain of maintaining a healthy asset portfolio. This scenario acknowledges the need for continual investment in assets to maintain their current state, eliminating the degradation seen in the first scenario. It prevents further decline and slightly enhances the condition of the assets.

These two scenarios show different results depending on the level of funding for the assets life cycle renewal actions. The choices made will have implications for Water's asset condition and their performances.

4.5.3: Current and Future Challenges

There are current and future challenges that must be contended with. It is important to address these challenges thoroughly and promptly if we are to leave a positive legacy for future generations.

The premature failure of 1950s and 1960s cast iron watermain continues to be a major challenge for both London's system and many other water systems. Fortunately, these watermain lend themselves well to structural relining which has been our main method of renewal for these watermain. Targeted replacement is also used on streets where it can be coordinated with other capital needs such as asphalt replacement.

While the water system has historically had consistent investment in renewal, the sanitary and storm systems have not always had this investment in the past. This has resulted in many streets through the City having watermain that are in fairly good shape following replacement in the 1980s and 1990s with sanitary sewers that are over a century old and failing.

Due to their depth, the replacement of these sewers often necessitates the replacement of the watermain, even though that watermain has a significant amount of remaining life.

Replacement of the larger, more expensive components of the water system also present a challenge moving forward.

Springbank #2 reservoir is nearing the end of its useful life and is scheduled to be imminently replaced. Proactive planning has been beneficial but the large capital costs of this replacement will still be a financial challenge for the Water Service Area.

Looking into the future, a significant amount of our large diameter trunk watermain will begin to become a concern. A disproportionate amount of the large diameter trunk system dates to the 1960s when London moved from drawing our water from municipal wells to connecting to the Huron water supply.

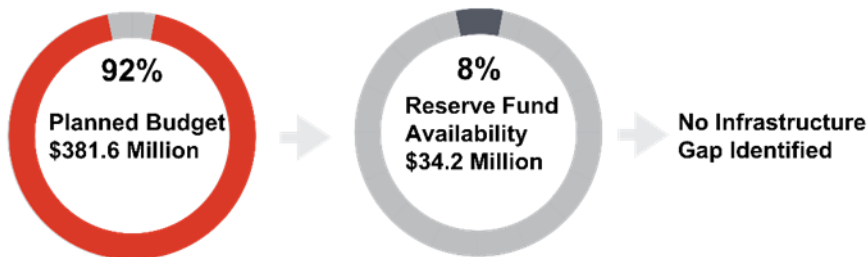
While these pipes are currently performing well, we must be mindful that their replacement will likely be needed around the same time and will be very costly. The key to addressing this financial pressure is preparing and planning early.

4.6: Conclusions

The City's water system is valued at \$7.65 billion and is generally in Fair to above condition indicating that they meet current needs, but are aging. Figure 4.10 illustrates the infrastructure gap as a proportion to the required investment over the next decade. Table 4.13 presents the summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment rates for Water assets. Failure to address the infrastructure gap could result in localized reductions to service. These may include increased break frequency, localized service outages, increased maintenance costs on assets past their optimal life, increased water quality concerns due to changes in flow patterns, etc. The infrastructure gap suggests that condition and funding need to be monitored and asset requirements addressed to continue to deliver high quality service to the

London community. The 20 Year Water Financial Plan demonstrates an existing commitment to continue renewing infrastructure as it approaches the end of its useful life.


Overall, London's Water System is in relatively good shape which allows it to continue providing a plentiful, high quality, and reliable water supply to Londoners. This is a positive legacy left by previous generations of staff and decision makers and one we strive to continue. For over a century, under the Public Utilities Commission and then the City of London, there has been consistent investment in renewing water infrastructure and expanding our system in a sustainable way. Our challenge moving forward is how we protect this legacy to ensure future generations can benefit from an excellent water system.



Investment to Maintain Current Levels of Service (10-Year Budget)
\$415.7 Million

Figure 4.10 Visualization of Maintain Current LOS Infrastructure Gap (Water Services)

Table 4.13 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Water Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS ⁸	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁹
Linear	\$7,349.6	Good	None Identified	None Identified	0.4%	1.0% to 1.5%
Meters	\$48.6	Fair	None Identified	None Identified	4.9%	5.0%
Facilities	\$255.0	Fair	None Identified	None Identified	1.7%	2.1% to 2.5%
Water	\$7,653.2		None Identified	None Identified	0.5%	1.0% to 1.5%

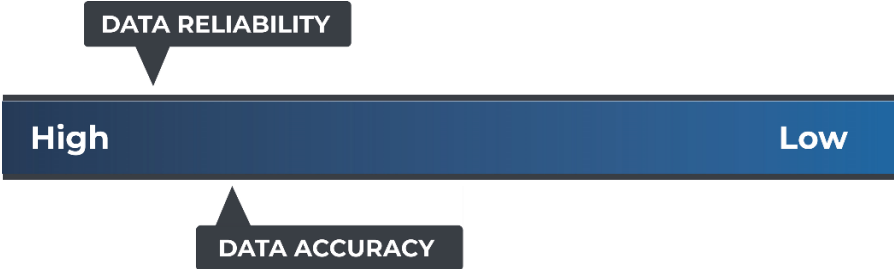


Figure 4.11 Accuracy Reliability Scale (Water Services)

Accuracy and Reliability Commentary

Data reliability for the Water service area is rated as moderately high to high. Watermain Inventory has been verified through GIS. Water facilities have been corroborated through appraisal reports and publicly available information for bulkwater stations. Watermain valuation is based on external expert opinion based on recent tender prices which factors width of watermain and depth which the watermain is installed, and restoration costs. Condition for linear assets with diameter less than 600mm (approximately 65% of replacement value) are based on

engineering analysis and internal database of watermain data. Watermains greater than 600mm have received external opinion data to assess condition and risk profile. Investment profile is based on engineering estimates. Most water facilities are based on external expert opinion on condition, replacement value, and lifecycle investment needs. Remaining assets (bulkwater stations, storage facilities) have condition based on age and expected useful life. Lifecycle needs forecasts are based on age and expected useful life estimates combined with expert opinion, which may vary from actuals. Accuracy is rated moderately low, as forecasts and condition assessments of pumping station/reservoir external reports have a disclaimer of accuracy of +/- 25% (Class D estimates) or (+/-50% or Class 5 estimates).

⁸ This projected infrastructure gap is reduced by the forecasted reserve fund drawdown availability over the next decade.

⁹ Source: Linear and Upper Range Facilities rates based on Canadian Report Card Recommended Annual Reinvestment Rate. Lower range Facilities investment based on maintain current LOS investments. Meters based on expected useful life.

Section 5. Wastewater – Sanitary

Asset Information	Sanitary
Replacement Value	\$6.7 billion
10 year Maintain Current Levels of Service Infrastructure Gap	\$57.7 million
10 year Achieved Proposed Levels of Service Infrastructure Gap	\$58.2 million

Quick Facts
Approximately 1,500 kilometers of Sanitary mains
5 Wastewater Treatment Plants



5.1: State of Local Infrastructure

The City's Wastewater Sanitary (or Sanitary) infrastructure is a combination of linear sewers and pumping stations that convey flows from homes and business to the treatment plants, where it is cleaned and discharged into the environment.

The City of London protects its citizens and the natural and built environments through the management and treatment of the City's Sanitary wastewater. The Sanitary system is designed to collect and treat residential, commercial, and industrial Wastewater Sanitary. Sanitary sewers carry Wastewater Sanitary from homes, commercial buildings, institutional, and industrial sources to Wastewater Sanitary treatment plants designed and operated to meet strict provincial standards. Treated Wastewater Sanitary outlets are dispersed to the Thames River.

5.1.1: Asset Inventory and Valuation

Sanitary assets are managed and maintained to meet provincially issued system and facility operating permits, as well as City of London technical targets for performance and reliability. Table 5.1 lists Sanitary's replacement value at approximately \$6.8 billion, this extensive system of assets can be grouped into two categories: collection and treatment; and, further divided into five categories ranging from local sewers to Wastewater Sanitary treatment plants.

It is also noted that this replacement value is considered as if this service would be replaced on a complete and standalone basis. In practice, the City's core services (Transportation, Water, Wastewater Storm, and Wastewater Sanitary) coordinate to ensure cost efficiencies to maintain the current LOS at the lowest cost. While the core chapters are presented separately, they should be read and considered as whole when considering their infrastructure lifecycle needs.

Collection assets represent the largest component of the Sanitary system inventory, and include pipes, manholes, fittings, and related equipment. A small portion is dedicated as a storage tank. Collection assets undergo regular maintenance and inspection. Combined sewers are part of the system but are being reduced and eventually removed from the system. The City no longer constructs combined sewers. Combined sewer replacement value is based on the rationale of construction two sewer mains (Sanitary and Storm). Video inspections (CCTV) identify problems and blockages. Where possible, existing assets are rehabilitated using trenchless technologies at a fraction of the cost of traditional practices. This also reduces social impact. Trenchless technology can extend service life by approximately 50 years. It also reinstates initial design functionality and capacity. As part of capital project analysis, determinations of whether sanitary pipe replacement or relining occur.

Treatment assets include the City's five Wastewater Sanitary Wastewater Sanitary Treatment Plants, and their related equipment, including treatment train components (e.g. screens, clarifiers, disinfection units, etc.). Also included in the treatment category are Wastewater Sanitary Pumping Stations, which share many similar equipment type assets, and are operated and maintained by the same staff who operate the treatment plants. Pumping stations are fixed facilities dispersed throughout the collection system. Treatment assets and equipment undergo extensive maintenance regimes to sustain their reliable operation. Investment needs are identified and coordinated with normal operations to minimize disruptions to service. Major replacements are planned and accommodated using system redundancy and changes to operations, to maintain service. It is critical to maintain Sanitary service to

protect public health and the environment. Technology and requirements can change rapidly in the treatment industry.

Several factors will influence the Sanitary asset base in the coming years. London is challenged by the need to discharge its treated wastewater to the Thames River rather than a larger body of Water. The limited capacity of the river means that discharge criteria are stringent making treatment requirements

more rigorous than for many peer communities in Ontario. Criteria are expected to become even tighter in the future, triggering the need for new ways to treat our wastewater. Consumers of wastewater are making progress at minimizing wastewater use in the City which lowers flows to the treatment plants. At the same time, the impacts of climate change may result in varying effects to peak and low flow conditions.

Table 5.1 Inventory and Valuation (Wastewater - Sanitary Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Collection	Local sanitary sewers lesser than 450 mm diameter	1,189	km	\$4,379,992
	Trunk sanitary sewers greater than and equal to 450 mm and less than 1500 mm diameter	226	km	\$999,805
	Trunk sanitary sewers greater than and equal to 1500 mm diameter	7	km	\$55,258
	Combined Sewers	14	km	\$65,384
	Storage tanks	77,373	Cubic meters	\$24,430
Treatment	Wastewater treatment plants	5	Each	\$923,301
	Pump stations	37	Each	\$113,867
	Forcemains	62	km	\$197,715
Total				\$6,759,752

5.1.2: Age Summary

Figure 5.1 shows the average asset age compared to the average useful life by asset. Combined sewers have reached their expected useful life but nearly twenty percent of them have been removed since the last CAM Plan. Sewers with diameters less than 1,500 millimeters (mm) are generally less than halfway through the expected useful life. Trunk sewers with diameter greater than 1,500 mm are approximately one third through the

expected useful life. Forcemains have undergone extensive work since the previous CAM Plan and are less than one quarter through their expected useful life. Similarly, storage tanks are generally recent construction and not quite one quarter through their expected useful life. Treatment assets are at the end of expected useful life. Pumping stations average age is approximately two thirds of expected useful life.

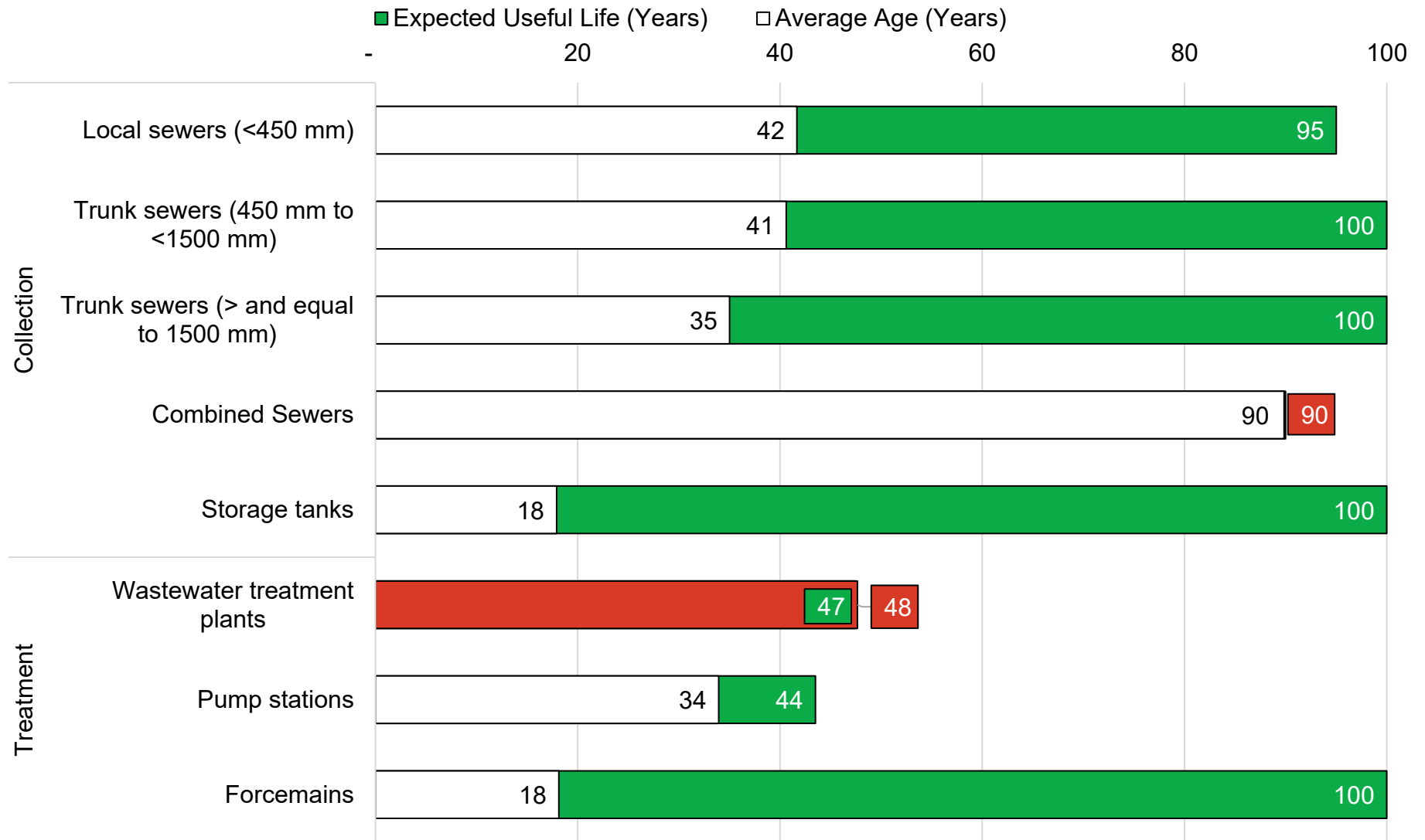


Figure 5.1 Average Age and Expected Useful Life (Wastewater - Sanitary Services)

5.1.3: Asset Condition

Figure 5.2 shows Sanitary service has approximately 96% of assets in Fair, Good, or Very Good condition. The remainder is approaching the end of their expected useful lives, indicating a

need for investment in the short to medium term. the City's Sanitary assets are overall in Very Good to Good condition, indicating that they are meeting current needs.

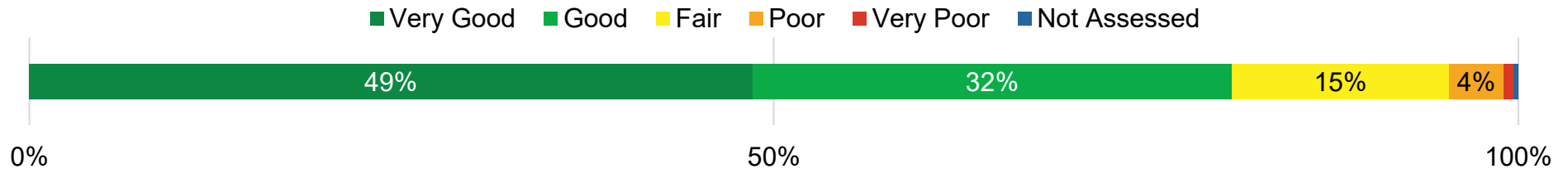


Figure 5.2 Overall Condition (Wastewater - Sanitary Services)

Figure 5.3 shows sewers represent the bulk of the value of the Sanitary asset base and are rated in Very Good to Good condition based on information collected from the City's sewer inspection program. Sewers are inspected on a rotating basis and evaluated using a standardized rating system to evaluate the risk of failure and anticipated investment needs. Trunk sewers with diameter 1,500 mm and greater are in the best condition, noting it represents a small portion of the Sanitary system when weighted by replacement value (approximately 0.5%).

Wastewater Treatment Plants and Pump Stations are in Fair to Good condition based on assessments with consultant (Treatment Plants) and internal expert opinion (Pump Stations). With respect to capacity, many of the treatment plants are currently being operated at the limit of their capabilities, but upgrades and expansions. Other expansions are planned and considered as part of growth studies, and asset renewal activities.

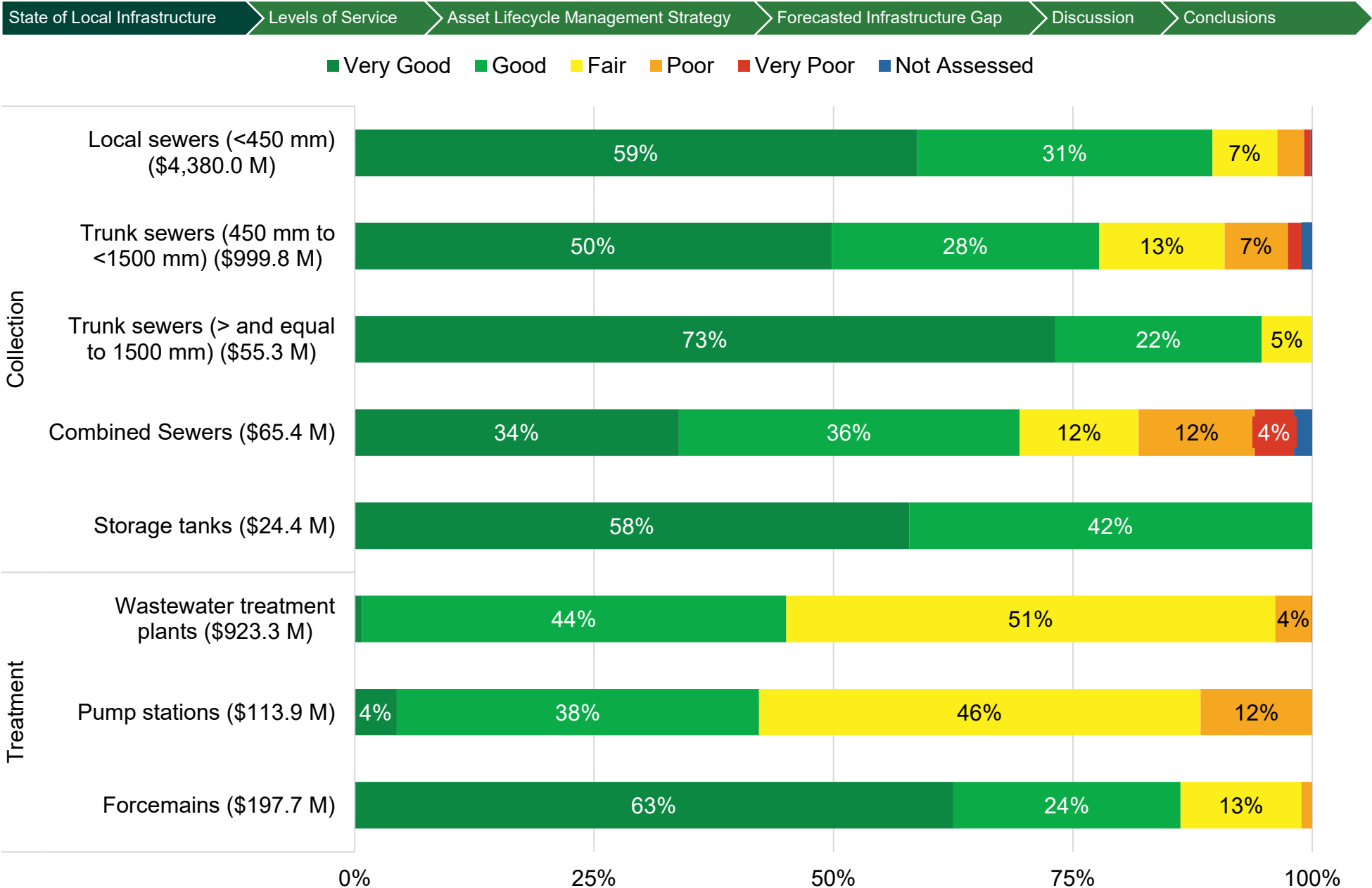


Figure 5.3 Asset Condition Detail (Wastewater - Sanitary Services)

5.2: Levels of Service

O.REG 588/17 REQUIREMENTS

O. Reg. 588/17 requires legislated community levels of service (LOS) for core assets. Community LOS use qualitative descriptions to describe the scope or quality of service delivered by an asset category. Examples of legislated community LOS include a map showing areas of the municipality that are serviced by the wastewater system. In this example, a map provides an illustrative view of the extent of the services provided through the infrastructure assets.

O. Reg. 588/17 also requires legislated technical LOS for core assets. Technical LOS use metrics to measure the scope or quality of service being delivered by an asset category. Examples of technical LOS include the percentage of urban properties serviced by the municipal wastewater system. Technical LOS for core assets are provided below.

Table 5.2 lists performance measures that are O.Reg 588/17 requirements for wastewater (or Sanitary) assets. References are provided to show where O. Reg 588/17 requirement has been attained.

Table 5.2 O.Reg. 588/17 Levels of Service (Wastewater - Sanitary Services)

Customer Level of Service	Technical Level of Service
Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system. (Table 5.5)	Percentage of properties connected to the municipal wastewater system. (98%, Table 5.5 and Figure 5.4)
Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes. (Table 5.5)	Number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system. (Table 5.5)
Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches. (Table 5.5)	The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system. (Table 5.5)
Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes. (Table 5.5)	The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system. (Table 5.4 and Table 5.5)
Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in previous paragraph. (Table 5.5)	Not Applicable
Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system. (Table 5.5)	Not Applicable

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan is striving for LOS performance measures linked to Customer Values of Accessible, Cost Efficiency, Customer Satisfaction, Environmental Stewardship, Reliability, Safety, and Scope.

Direct and Related LOS

After review with Sanitary, LOS considered most representative of Sanitary services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'direct LOS' and are listed in Table 5.6. LOS that have a causal relationship with direct LOS are documented

in Table 5.7 as related LOS but cannot be as readily costed to Sanitary services.

Metrics

Lastly, Table 5.8 listed metrics that can convey useful information, especially when considered in conjunction with O. Reg, direct LOS, and related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Sanitary provides.

CCTV sewer main screenshots that visualize the CAM condition rating of Very Good (condition 1) to Very Poor (condition 5) are provided in Table 5.3

Table 5.3 CCTV Inspection Condition screenshots and Condition Rating (Wastewater - Sanitary Services)

Very Good Condition 1	Good Condition 2	Fair Condition 3	Poor Condition 4	Very Poor Condition 5
				

5.2.1: O. Reg 588/17 Levels of Service (Wastewater – Sanitary Services)

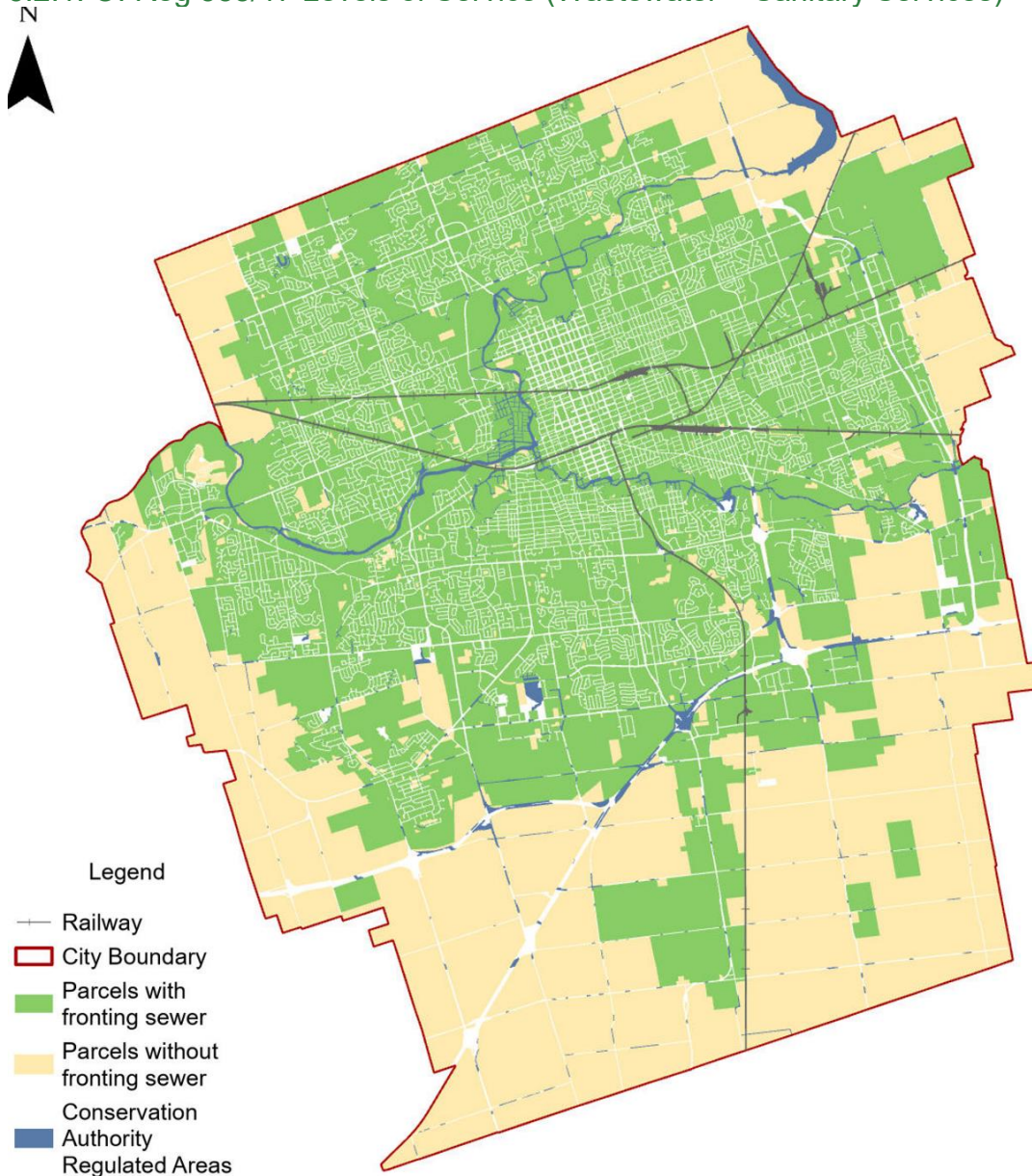


Figure 5.4 Properties in the City of London Connected to the Municipal Wastewater System (Wastewater – Sanitary Services)

Table 5.4 London Wastewater Plant Effluent Performance vs Objective and Compliance Limits (Wastewater Sanitary Services)

Treatment Plant	Flow (MLD) Actual/Rated	Suspended Solids Actual/Obj/Limit	cBOD ₅ Actual/Obj/Limit ¹⁰	Total Phosphorus Actual/Obj/Limit	Ammonia Actual/Obj/Limit ¹¹	E.coli (cfu/100 mls) Actual/Limit ¹²
Adelaide	24.38 / 36.4	6/5/2010	3/5/2010	0.52/0.7/1	0.003/0.08/0.1	57/150/200
Greenway	118.42 / 170	5.8/7.5/9	2.7/7.5/9	0.31/0.4/0.58	0.22/3/4	104/150/200
Oxford	11.2 / 17.25	1.6/5.0/10	2/5.0/10	0.37/0.5/0.65	0.33/2/3	2/150/200
Pottersburg ¹³	25.1 / 39.1 / 26	4.5/8.5/10	2.2/5/10	0.27/0.5/0.75	0.2/3/4	22/150/200
Vauxhall	13.3 / 20.9	3.2/15/20	1.5/15/20	0.16/0.75/1.0	0.1/3/4	41/150/200

Table 5.5 O.Reg. 588/17 Levels of Service (Wastewater - Sanitary Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Reliability	Technical	1. Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes.	Combined sewers are defined within context of the F-5-5 Determination of treatment requirements for municipal and private combined; A Combined Sewer System (CSS) is a wastewater collection system designed to convey both sanitary wastewater and stormwater runoff through a single-pipe system to a sewage treatment works. Of the approximate 1,500 km wastewater sewers, 14.1 km are combined with stormwater. The City no longer constructs combined sewers. To avoid basement flooding and backups into homes, existing combined sewers have a sewer system overflow to provide system relief. Sewer overflows exist to prevent Sanitary sewer backup into basements by instead relieving overloaded Sanitary sewers into an adjacent storm sewer or receiving water body.	Maintain current

¹⁰ Biochemical Oxygen Demand is the quantity of oxygen utilized in biochemical oxidation of organic and inorganic matter in five (5) days at twenty (20) degrees Celsius expressed in milligrams per litre.

¹¹ Adelaide still has a unionized ammonia limit, but all the rest of the plants have ammonia limits. The ammonia limits have seasonal objectives and limits. For Greenway, Pottersburg and Vauxhall ammonia Objectives 3.0 mg/L (May 1 to Nov 30) 5.0 mg/L (Dec 1 to Apr 30). Limits 4.0 mg/L (May 1 to Nov 30) 6.0 mg/L (Dec 1 to Apr 30. Oxford ammonia objectives are 2 mg/L (May 1 to November 30) and 4 mg/L (December 1 to April 30) and the ammonia limit is 3 mg/L (May 1 to November 30) and 5 mg/L (December 1 to April 30).

¹² E. Coli are geometric means with monthly limits. The E. Coli in the table are geometric means for the disinfection period (April 1 to September 30).

¹³ Pottersburg has a rated capacity of 39.1 MLD, but functional limitations restrict actual monthly averages to about 26 MLD.

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)		Proposed LOS (2022 to 2031)	
			In 2021 the City annually reported on six (6) combined sewer overflows sites. It reports on frequency and volume of sewer overflows. It is noted the City has completed sewer separation projects which have eliminated the status of outfalls being classified as CSO outfalls.			
Reliability	Technical	2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches.	The six (6) combined sewer overflows sites that the City reported in 2021 on are not habitable areas or beaches but directly to the river. The amounts relating to the six combined sewer overflow sites would be (4,008 cubic meters for 2021). It is noted the City has completed sewer separation projects which have eliminated the status of outfalls being classified as CSO outfalls		Maintain current	
Reliability	Technical	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.	Infiltration inflow into Sanitary sewers in both groundwater and stormwater which are not intended to be in Sanitary system. Infiltration can enter through a variety of sources (cracks in pipes, weeping tile connections, cross connection, catch basins, etc.).		Maintain current	
Reliability	Technical	4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3.	To minimize sewage overflow into streets or backup into homes, the City of London has established design standards to convey flows under ultimate conditions, design sheets for capacity needs that include infiltration inflow.		Maintain current	
Reliability	Technical	5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent can be defined as water pollution, such as the outflow from a sewage treatment facility. The effluent from the five active treatment facilities in London have documented compliance limits, objectives, and actual performance. The effluent criteria include effluent flow rates, and parameters for suspended solids, Biochemical Oxygen Demand (BOD), phosphorous, ammonia, and E. coli. Table 5.4 gives technical parameters.		Maintain current	
Reliability	Technical	6. The number of effluent	Six effluent violations compared to 104,383 connected		Maintain	

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)		Proposed LOS (2022 to 2031)	
		violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.	parcels.		current	
Reliability	Technical	7. The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system.	114 connection days of basement flooding confirmed because of mainline sewer occurrence (includes pipe obstructions/blockages and hydraulic overloading due to wet weather influence), compared to 104,383 connected parcels.		Maintain current	
Reliability	Technical	8. Number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system.	The six (6) combined sewer overflows sites that the City reports on are not habitable areas or beaches but directly to the river. The amounts relating to the six combined sewer overflow sites would be 4,008 cubic meters for 2021. Approximately 89% of the annual overflow was associated with a large September event. The total annual events approximated 15, compared to 104,383 properties connected to the municipal wastewater system. It is noted the City has completed sewer separation projects which have eliminated the status of outfalls being classified as CSO outfalls.		Maintain current	
Scope	Technical	1. Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.	See Figure 5.4		Not Applicable	
Scope	Technical	2. Percentage of properties connected to the municipal wastewater system	98%.		Maintain current	

5.2.2: Direct Levels of Service

Table 5.6 Direct Levels of Service (Wastewater – Sanitary Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Cost Efficiency	Customer/ Council	Wastewater Sanitary Overall Reinvestment Rate	0.5%	1.1%
Environmental Stewardship	Technical	Energy consumption kWh/ML from collection at Pumping Stations	88	Maintain current
Environmental Stewardship	Technical	Energy consumption kWh/ML from treatment	461	Maintain current
Environmental Stewardship	Technical	Total volume of untreated wastewater discharged into the natural environment via pumping station overflows	44.5 ML noting that 36.7 ML from Dingman PS went into the Dingman Storage pond prior to release and would be equivalent to primary treatment.	Maintain current
Reliability	Customer/ Council	Percentage of wastewater assets in Fair or better condition	95.3%	Maintain current
Reliability	Technical	Percent of flushing per total length	166%	Maintain current (Flush 100% of flushable local sewers once over a two year period)
Reliability	Customer/ Council	Kilometers of remaining combined sewers.	14.1	Reduce combined sewer
Reliability	Technical	Percentage of maintenance holes (of flushable sewers) inspected annually.	169%	Maintain current (Inspect 100% of manhole inventory associated with flushable local sewers)
Reliability	Technical	Annual number of blocked sewers per 100 kilometers length.	0.20	Maintain current

5.2.3: Related Levels of Service

Table 5.7 Related Levels of Service (Wastewater – Sanitary Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Treatment Reinvestment Rate	0.6%
Cost Efficiency	Technical	Collection Reinvestment Rate	0.5%
Environmental Stewardship	Customer/ Council	Percentage of wastewater flows that meet environmental objectives when discharged.	Environmental Compliance Approval (ECA) contains the effluent criteria for each wastewater treatment plant. Objective limits were achieved in two treatment plants. Adelaide achieved 93.8% of objectives, Greenway had achieved 99.9.%, and Vauxhall achieved 99.3% of objectives.
Environmental Stewardship	Technical	Number of secondary bypass events	10
Environmental Stewardship	Technical	Number of primary bypass events without primary treatment	27
Reliability	Technical	Percentage of Treatment assets in Poor or Very Poor condition	4.1%
Reliability	Technical	Percentage of Collection sewers in Poor or Very Poor condition	4.4%
Reliability	Technical	Kilometers of system Closed Caption Television inspected annually	55.7
Reliability	Technical	Number of inspections per maintenance hole in a two-year period	1.66

5.2.4: Other Measures

Table 5.8 Metrics – Other Dashboard Measures (Wastewater – Sanitary Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Operating budget for wastewater services	\$27,828,541
Cost Efficiency	Technical	Operating cost to provide service (cost per household) for wastewater services	\$159.33
Customer Satisfaction	Customer/ Council	Percentage of residents satisfied with the wastewater system.	74%
Environmental Stewardship	Technical	Percentage removal of suspended solids in wet weather flows (primary treatment)	69%
Environmental Stewardship	Customer/ Council	Percentage removal of BOD in wet weather flows (primary treatment)	81% removal of BOD5 based on average raw BOD5 in 2021
Environmental Stewardship	Technical	Number of days discharging safe treated effluent	365
Environmental Stewardship	Customer/ Council	Odour events	7
Reliability	Technical	Number of locations with odour control devices	15
Reliability	Technical	Percentage of preventative maintenance activities completed on schedule	95%
Reliability	Technical	Percentage of sewers with operational issues likely to cause service interruption having preventative inspection/maintenance at minimum once a year	100%

5.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs.

The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, which may trigger asset investment needs.

5.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current LOS while striving to optimize costs and risks. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections. Table 5.9 identifies specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections.

Asset management practices or planned actions employed by cities can entail certain specific risks. Many types of risks such as health and safety, financial, environmental, etc. are summarized in Table 5.10 classified by each lifecycle activity.

The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 5.9 Current Asset Management Practices or Planned Actions (Wastewater – Sanitary Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Collection (Sewer mains) and Treatment (Treatment Plants and Pump Stations) <ul style="list-style-type: none"> Sewer Use Bylaw that regulates discharge quality to sewer. Automation and online monitoring help maximize the capacity of existing assets. Coordination efforts to optimize construction between city projects and external parties (UCC).
Maintenance	Collection <ul style="list-style-type: none"> Routine Flushing and Cleaning. 24-hour maintenance response capability. Scheduled inspections include CCTV visual. Treatment Plants and Pump Stations <ul style="list-style-type: none"> Use JDE for work orders.

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
	<ul style="list-style-type: none"> Failures in one facility can be inspected at other facilities and added to scheduled preventative maintenance routines. 					
Renewal/ Rehabilitation	<p>Collection</p> <ul style="list-style-type: none"> Sanitary sewer rehabilitation is based on the current condition of the pipe: <ul style="list-style-type: none"> Pipe lining e.g., Cured In Place Pipe (CIPP). Spot repairs. Manhole replacement. Joint sealing. Flushing and Cleaning. Calcite Removal. <p>Wastewater Treatment Plants and Pump Stations</p> <ul style="list-style-type: none"> Renewal programs on the collection system may offer opportunities to reduce the number or size of wastewater pumping stations. Wastewater treatment facilities are rehabilitated based on facility inspection reports and expertise of service area: <ul style="list-style-type: none"> Refurbish tanks, pumps, mixers, aerators, filters etc. Incinerator refurbished routinely. 					
Replacement/ Construction	<p>Collection</p> <ul style="list-style-type: none"> Sanitary sewer replacement is based on the condition rating of the infrastructure. In most cases, once the pipe has been inspected and given a condition rating, City staff can determine the best method for replacement: <ul style="list-style-type: none"> Complete open-cut replacement. Trenchless methods (example of Horizontal directional drilling (HDD)). Full replacement is the most common method for collapsed or heavily deteriorating pipe. Look for clusters of Poor condition rated sewers and apply high priority. Coordinate with water, roads projects and through UCC. <p>Treatment Plants and Pump Stations</p> <ul style="list-style-type: none"> Wastewater facilities are replaced based on facility inspection reports, service area expertise and are usually done on the components within the facility rather than the replacement of an entire wastewater treatment plant such as replace pumps, repair tankage, incinerator refurbishments, etc. More stringent effluent criteria, new technology and the fact that major components of many wastewater facilities are approaching the end of their service life may drive the replacement of much of the existing wastewater infrastructure over the next 20-40 years. 					

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
Disposal	<p>Collection</p> <ul style="list-style-type: none"> Current practice is removal with no cost recovery. Historically some left in situ (original place). Data on old sewers is stored in GIS. GIS tracks the asset status (i.e. active, abandoned, and/ or removed). Assessment of material type and special considerations of health and safety concerns (such as asbestos pipe) is part of disposal process. <p>Treatment Plants and Pump Stations</p> <ul style="list-style-type: none"> Wastewater facilities are replaced based on facility inspection reports, service area expertise and are usually done on the components within the facility rather than the replacement of an entire wastewater treatment plant such as replace pump station, tankage, incinerator refurbishments, etc. Equipment disposed or inventoried as spare parts, usually no cost recovery. Wastewater facilities identified for disposal often provide required capacity and may occupy an area needed for the replacement capacity. In this case the facility must have enough available capacity for the end-of-life component to be removed from service to allow the construction of the new asset while maintaining adequate treatment. Some plants do not have the space to build. 					
Service Improvement	<p>Collection</p> <ul style="list-style-type: none"> These can include improved technologies such as oversizing/expansions, trunk extensions of Sanitary sewer. <p>Treatment Plants and Pump Stations</p> <ul style="list-style-type: none"> These can include improved technologies such as upgraded sludge and ash dewatering facilities. Plant optimization can maximize a plant's capacity at relatively low cost compared to a major plant expansion. 					
Growth	<p>Wastewater – All</p> <ul style="list-style-type: none"> Capital growth projects are identified by Development Charges and Wastewater – Sanitary (subject to <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i> requirements and City of London policy). Undertake Environmental Assessments. Assumption of subdivisions, commercial and industrial extensions, local improvements, etc. Interim works (typically one to ten years) built to provide temporary service pending construction of permanent infrastructure assets. These are usually Sanitary pump stations and force mains. <p>Collection</p> <ul style="list-style-type: none"> Projects relate to wastewater trunk extensions and expansions. Projects that relate to upsizing local wastewater collection pipe sections. <p>Treatment Plants and Pump Stations</p> <ul style="list-style-type: none"> Projects typically relate to process upgrades. Interim work generally needed for Sanitary pump stations. Plant refurbishments/rehabilitations have been coordinated with the construction of additional capacity to service growth. 					

Table 5.10 Risks Associated with Asset Management Practices or Planned Actions (Wastewater – Sanitary Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Collection <ul style="list-style-type: none"> Asset failure leading to basement flooding. Environmental Spills/discharge and associated health risks.
Maintenance	<ul style="list-style-type: none"> Collection - Incomplete annual preventative maintenance. Collection – incorrect diagnosing/labelling of existing pipe condition. Overscheduling preventative maintenance can lead to excessive maintenance and additional costs with no actual benefits, and impacting affordability to the public. Asset failure leading to basement flooding. Environmental Spills/discharge and associated health risks.
Renewal/Rehabilitation	<ul style="list-style-type: none"> Incorrect assumptions regarding improved expected useful life after rehabilitating a main. Specifically, the estimated service life of a full-length cure-in-place pipe is still not well founded in the scientific literature as it is a comparatively new process (developed over the past two decades). Renewal/rehab on major components must be completed prior to failure due to extended engineering and equipment delivery times, and potential loss of service due to unplanned failure. Asset failure leading to basement flooding. Environmental Spills/discharge and associated health risks.
Replacement/Construction	<ul style="list-style-type: none"> Renewal/rehab on major components must be completed prior to failure due to extended engineering and equipment delivery times, and potential loss of service due to unplanned failure. Asset failure leading to basement flooding. Environmental Spills/discharge and associated health risks.
Disposal	<ul style="list-style-type: none"> Lack of planning and funding may limit the options to efficiently replace existing and add new capacity. Cost increases resulting from unexpected health concerns resulting from disposal (such as uncovering asbestos pipe).
Service Improvement	<ul style="list-style-type: none"> Lack of planning and funding may limit the options to efficiently replace existing and add new capacity. Cost increases resulting from unexpected health concerns resulting from disposal (such as uncovering asbestos pipe).
Growth	Wastewater – All <ul style="list-style-type: none"> Capital growth projects are identified by Development Charges and Wastewater – Sanitary (subject to <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i> requirements and City of London policy). Undertake Environmental Assessments. Assumption of subdivisions, commercial and industrial extensions, local improvements, etc.

State of Local Infrastructure	Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions				
	<ul style="list-style-type: none"> Interim works (typically one to ten years) built to provide temporary service pending construction of permanent infrastructure assets. These are usually Sanitary pump stations and force mains. <p>Collection</p> <ul style="list-style-type: none"> Projects relate to wastewater trunk extensions and expansions. Projects that relate to upsizing local wastewater collection pipe sections. <p>Treatment Plants and Pump Stations</p> <ul style="list-style-type: none"> Projects typically relate to process upgrades. Interim work generally needed for Sanitary pump stations. Plant refurbishments/rehabilitations have been coordinated with the construction of additional capacity to service growth. 				

5.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the forecasted change in the condition profile of each asset type. Figure 5.5 shows the projection of the condition of the Wastewater - Sanitary assets based on three scenarios. They include projected condition with current budget, maintain current LOS and proposed LOS condition projection.

The figure also shows planned budget, the required investments to maintain the current LOS and Investments to achieve proposed LOS, which include a pumping station investment. These are considered the first, but not comprehensive, investments in the City's Climate Order of Magnitude and Climate Emergency Action Plan implementation.

The assessment is underway to determine the cost associated with implementing the CEAP and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

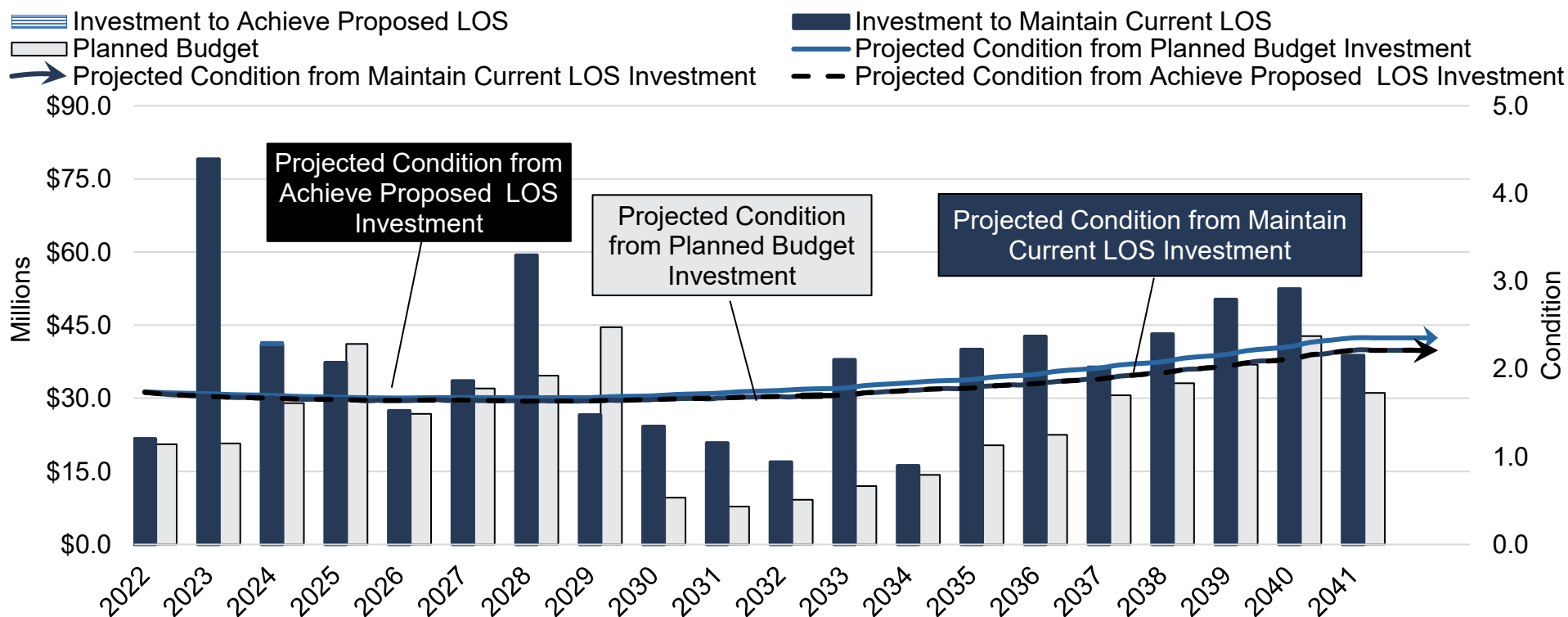


Figure 5.5 Projected Service State of Three Funding Scenarios (Wastewater - Sanitary Services)

A. Scenario One: Planned Budget Condition Profile

The Wastewater Sanitary average annual activity and planned funding is summarized in Table 5.11. The condition profile expected from the planned budget is forecasted by using the same logic related to condition degradation rates and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. Figure 5.6 presents the expected condition profile for the next 20 years based in the current budgets for Wastewater Sanitary assets. This scenario indicates the condition profile trending to most assets being in Good to Fair condition.

Current funding for operating budget and capital budgets are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget. Select service improvement budgets are factored in funding gap analysis and commented on below.

Growth activities are analyzed using the 2021 Development Charges Background Study Update. Major upcoming projects include industrial oversizing projects, internal oversizing projects, built area works, Dingman Creek and Byron pumping stations. All numbers in tables are rounded to nearest thousand.

Table 5.11 Scenario One - Average Annual Planned Budget (\$Thousands) (Wastewater – Sanitary Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	27,763	28,194
Renewal, Replacement, Rehabilitation, Disposal	23,916	29,798
Service Improvement	11,093	5,054
Growth Activities	9,489	4,988

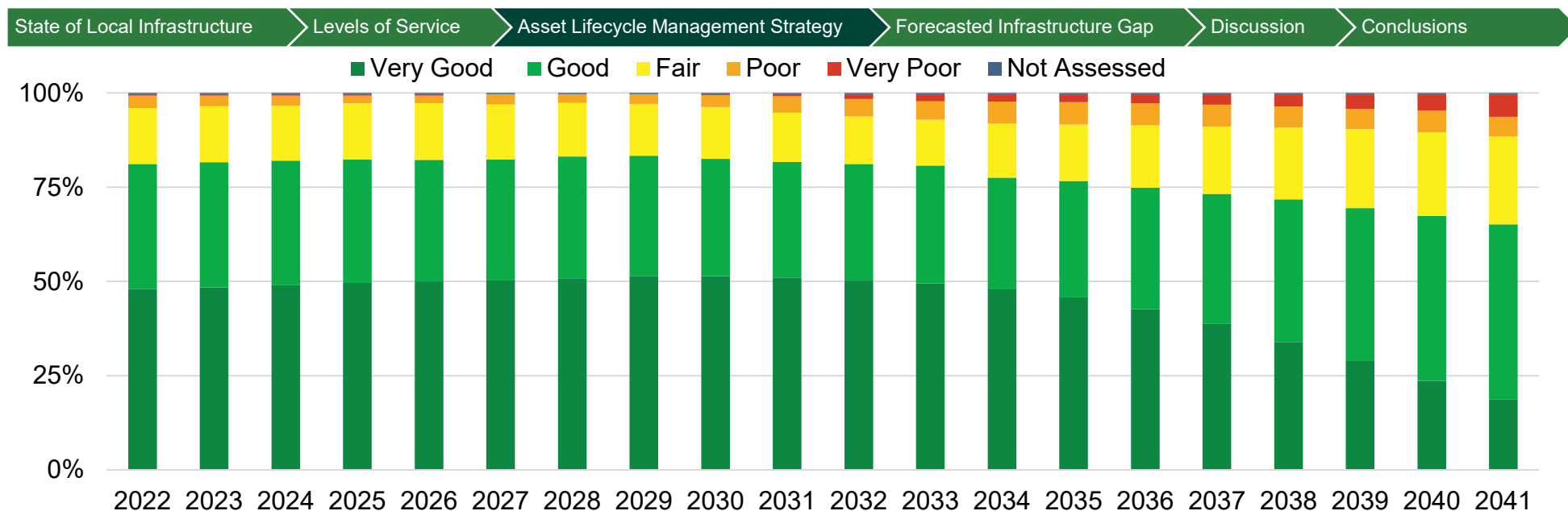


Figure 5.6 Projected 20-year Planned Budget Condition Profile (Wastewater - Sanitary)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

Table 5.12 summarizes the cost to maintain current LOS. This scenario forecasts the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the current condition profile for these assets.

Figure 5.7 presents the expected condition profile for the next 20 years based on investment required for maintain current LOS for Wastewater Sanitary assets. This scenario indicates the condition profile trending to most assets being in Good to Fair condition. The condition profile is like the planned budget scenario. This is consistent given the scope of assets relative to the infrastructure gap identified to maintain current LOS.

Table 5.12 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Wastewater – Sanitary Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	28,194	None identified	28,194	None identified
Renewal, Replacement, Rehabilitation, Disposal	33,246	5,500	38,498	5,769
Service Improvement				
Growth Activities	4,988	5,500	4,988	None identified

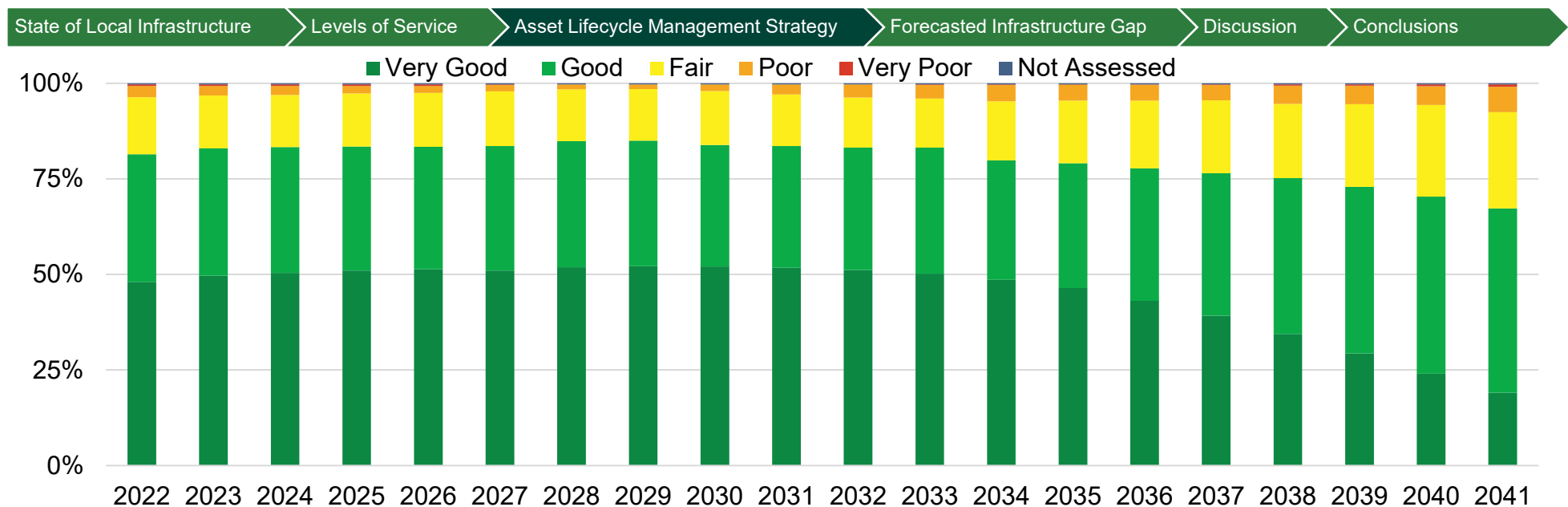


Figure 5.7 Projected 20-year Maintain Current LOS Condition Profile (Wastewater – Sanitary Services)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

Table 5.13 summarizes the cost to achieve proposed LOS. This scenario forecasts the lifecycle activities that are required to achieve the proposed LOS. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the expectation of the City’s staff involved with the management of the assets. The future lifecycle activities that are required to achieve the desired condition profile are then used to establish the average annual investment to achieve the proposed LOS condition profile. Figure 5.8 presents the expected condition profile for the next 20 years based on investment required for achieving proposed

LOS for Wastewater Sanitary assets. This scenario indicates the condition profile trending to most assets being in Good to Fair condition. The condition profile is like the other scenarios condition profiles. This is consistent given preliminary and limited in scope CEAP investments identified to date to achieve proposed LOS.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

Table 5.13 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Wastewater – Sanitary Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ¹⁴	Achieve Proposed LOS Infrastructure Gap ¹⁵
Operating Budget	28,194	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	33,246	5,500	50	None identified	5,819
Service Improvement					
Growth Activities	4,988	None identified	None identified	None identified	None identified

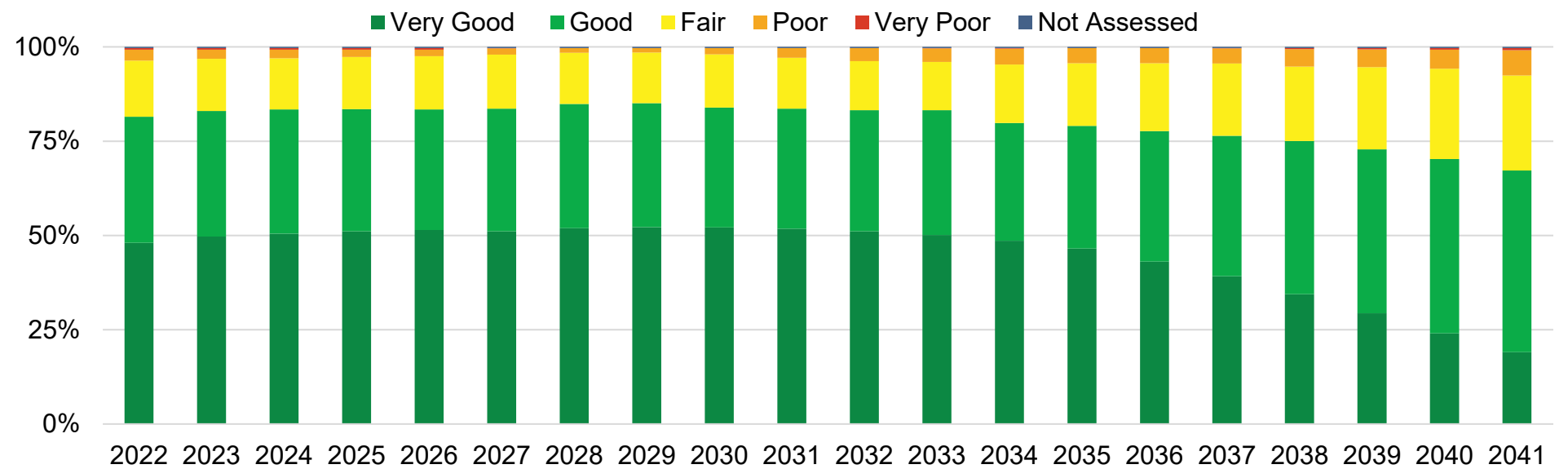


Figure 5.8 Projected 20-year Achieved Proposed LOS Condition Profile (Wastewater – Sanitary Services)

If funding for proposed LOS is not sufficient, the City will:

1. Continue lifecycle activities to maintain current LOS.
2. Carry out the Climate Emergency Action Plan within current funding scope. A green initiative life cycle renewal

activity may be otherwise not feasible. The pumping station asset would otherwise be functional but not addressing green initiative strategic needs.

¹⁴Incremental investment to achieve proposed LOS excludes CEAP costs.

¹⁵Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

5.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 5.14 and illustrated in Figure 5.9. The analysis documented above is related to the lifecycle rehabilitation or replacement lifecycle activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities.

Wastewater Sanitary is projected to have an infrastructure gap even assuming that reserve funds are available to address needs. There are preliminary CEAP pumping station

investments identified that would create additional funding gaps for proposed LOS.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

It is noted the Wastewater Treatment lifecycle capital budget includes budget amounts for capacity improvements and upgrades that have been identified to having a lifecycle component.

Table 5.14 Average Annual Budget and Gap Analysis (\$Thousands) (Wastewater – Sanitary Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Collection	25,950	None identified	19,934	None identified	None identified	None identified	None identified
Treatment	7,296	5,500	18,564	50	None identified	5,769	5,819
Wastewater Sanitary	33,246	5,500	38,498	50	None identified	5,769	5,819

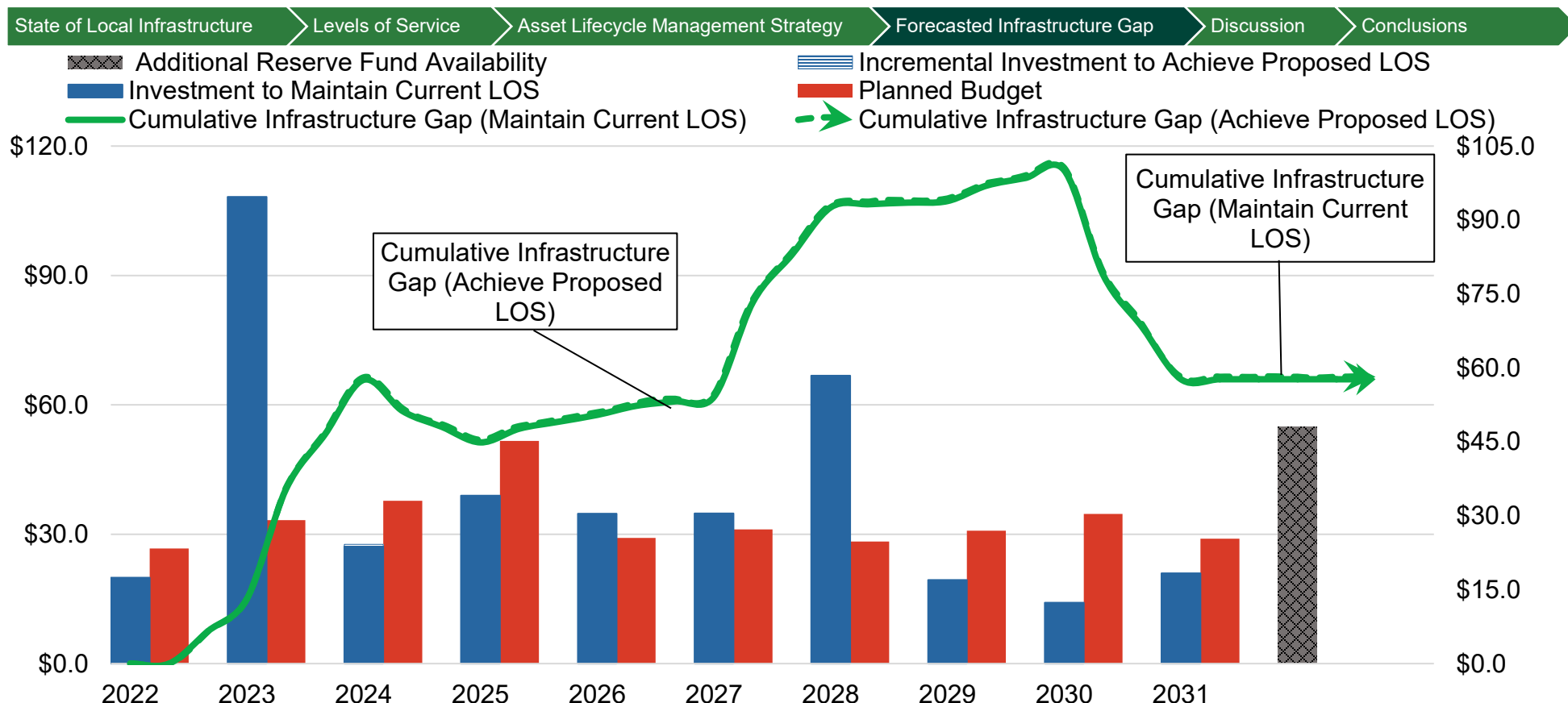


Figure 5.9 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Wastewater – Sanitary Services)

Evaluating planned budget compared to required investments shows a 10-year maintain current LOS infrastructure gap of \$57.7 million. It relates to significant investments identified within Treatment that exceed their planned budgeting. Total required investment represents the costs to renew and maintain the existing assets so services can continue to be delivered. The 10-year achieve proposed LOS estimate includes a preliminary assessment of CEAP needs; however, it is not considered comprehensive. It also does not account for growth or expand service to new areas or customers. The trend is influenced by treatment assets nearing the end of their expected

useful lives over the next 20 years. Most of these assets are nearing 50 years of age and are at the end of their useful life.

For collection and trunk sewer systems the City is addressing its infrastructure needs by continuing proactive management techniques like targeted renewal, regular inspection, condition assessment and the use of trenchless technologies. Further use of these technologies will help control the gap over the long term.

The 2021 wastewater capital budget addresses needs which have been identified through the sewer inspection program and

engineering studies such as the Sanitary and Storm Sewerage Master Plan updates and the 20 Year Sewer System Plan. This 20 Year Sewer System Plan works within the constraints of the debt servicing ratio, gradually increasing the pay-as-you-go funding for lifecycle replacement, and slowly growing the reserve funds.

Success of the 20 Year Sewer System Plan will be determined through monitoring. The City has developed and continues to use a Pollution Prevention and Control Plan to provide a “road map” for the phased implementation of infrastructure projects that will mitigate the impacts of combined sewer overflows and bypasses on the Thames River. This will align with the City’s commitment to environmental stewardship and the protection of water resources.

Required investment values presented are based on estimates of external reports, age, and expected useful life noting that inventory and condition information for Treatment assets is improved since the 2019 CAM Plan.

It is noted that risk assessment and consequence of failure is not explicitly addressed in this CAM Plan. For example, the consequence of failure of a forcemain in Very Poor condition is expected to have a greater impact than a local Sanitary pipe in Very Poor condition. Once a risk assessment methodology is embedded in asset management analysis, it could have a material impact on needs identified for Sanitary main (Collection) infrastructure gap.

5.5: Discussion

5.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Wastewater – Sanitary assets condition comparison is provided in Figure 5.10.

The 2019 CAM Plan condition data used a variety of relevant information including inspection information for key assets, historic failure information and professional internal and external opinion. The 2023 CAM Plan refined these processes, particularly with a comprehensive appraisal of the City’s wastewater treatment plants. Replacement value increases are primarily driven by Non-Residential Build Consumer Price Index Changes (NRB CPI). While this is consistent with other City processes (such as the City’s Development Charge service group relying on NRBCPI to adjust rates) ideally recent bids and tenders will inform replacement unit values. This information is expected for CAM’s annual plan update.

The change in condition profile is attributed updated sewer main inspection assessments and adjusting Sanitary main expected useful life by materials classification. The cumulative 10-year infrastructure gap from the 2019 CAM Plan was approximately \$36.28 million. Currently there is a \$57.7 million maintain current LOS gap. The change is attributed to more accurate and reliable data from engineering assessments of the City’s Wastewater Treatment plants.

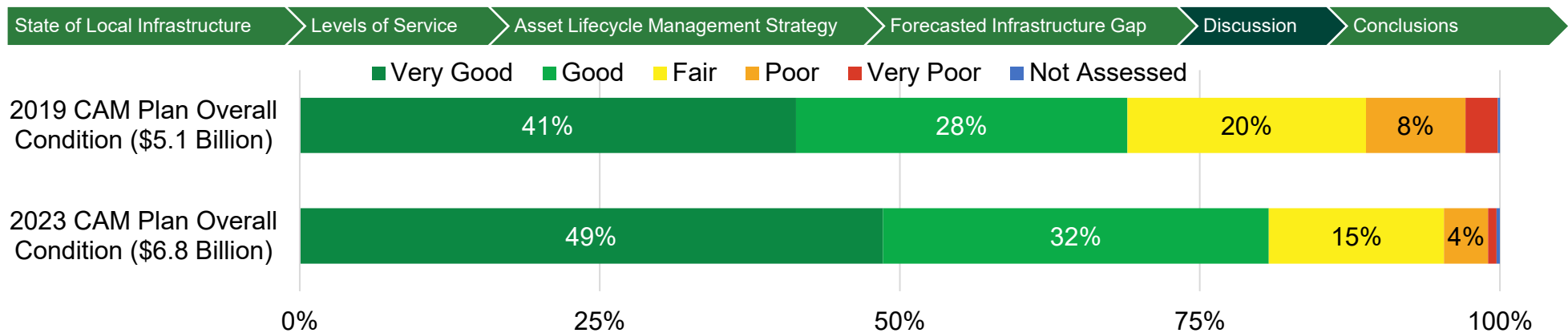


Figure 5.10 2019 CAM Plan to 2023 CAM Plan Condition Summary (Wastewater – Sanitary Services)

5.5.2: Lifecycle Management Scenarios

The lifecycle Management section included three scenarios – planned budget, maintain current LOS, and achieve proposed LOS.

Scenario One planned budget is identified to have some constraints on the City’s capacity to effectively maintain Sanitary infrastructure. This leads to a gradual deterioration in their condition. This decline might not be immediate but, over time, it becomes more visible to the public and causes operating problems, increasing the operating and maintenance costs, and potentially leading to higher repair or replacement costs in the future.

Scenario Two maintain current LOS indicates this level of funding is greater than what is currently allocated for Sanitary, specifically Treatment assets, illustrating the financial strain of maintaining a healthy asset portfolio. This scenario acknowledges the need for continual investment in assets to maintain their current state, eliminating the degradation seen in the first scenario. It prevents further decline and slightly enhances the condition of the assets.

Scenario Three achieve proposed LOS relates to Lifecycle needs of Pumping Stations. These needs are a preliminary identification of Climate Emergency Action Plan (CEAP) initiatives. This level of funding is greater than both the current budget and the one needed to maintain the assets' existing state. The advantages of this approach are alignment with CEAP, improved LOS and asset condition, extended asset lifespans, and potential long term cost savings. This preliminary CEAP assessment shows the financial challenge the City faces to achieve the proposed LOS.

These three scenarios show different results depending on the level of funding for the assets life cycle renewal actions. The choices made will have an implication for Sanitary asset condition and performance.

5.5.3: Current and Future Challenges

Current challenges relate to coordination and optimization of Core service lifecycle needs and continuously assessing representative condition and replacement values. The 2019 CAM Plan replacement value approximates \$5.1 billion compared to the 2023 CAM Plan \$6.8 billion amount. The increase is attributed to inflating recently tendered project costs

by NRBCPI. The project costs quantify both sewer main construction and restoration costs (costs of restoring roadway after a main is installed). Restoration cost efficiencies are realized through coordinating projects with Core assets (Transportation, Wastewater, and Water). If these projects cannot be coordinated or restoration costs continue to increase, infrastructure funding shortfalls will increase. The infrastructure gap of \$57.7 million assumes that the forecasted reserve fund balances are achieved and that the reserve fund amounts are available for lifecycle activities.

The City has implemented first phases for its Computerized Maintenance Management System (CMMS). Inspection data has been collected for nearly a year and while not yet comprehensive enough to inform the asset management plan, the expectation is that after several years of use, the breadth of data will further inform condition and lifecycle management needs.

5.6: Conclusions

Figure 5.11 illustrates the infrastructure gap as a proportion to the required investment over the next decade. Table 5.15 presents the summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment rates for Wastewater Sanitary assets.

Valued at approximately \$6.8 Billion, the City's Wastewater assets are overall in Fair to Good condition, indicating that they are meeting the City's immediate needs. However, detailed

condition data is now available for Treatment plants indicating they are nearing the end of useful life, with significant investment required over the next 10 to 20 years. It is also noted Sanitary connection services, and sewermain video inspections do not cover the entire Sanitary system.

Failure to address the infrastructure gap could result in localized and or global reductions to service. These may include blockages, sewer backups, basement flooding, localized service outages, increased maintenance costs on assets past their optimal life, poor quality effluent, damage to the natural environment, fines, etc.

The 20 Year Wastewater Financial Plan demonstrates an existing commitment to continue renewing infrastructure as it approaches the end of its useful life. Overall, London's Wastewater Sanitary System is in relatively good shape which allows it to continue providing high quality, and reliable Wastewater Sanitary Collection and Treatment services supply to Londoners. This is a positive legacy left by previous generations of staff and decision makers and one we strive to continue.

For over a century, under the Public Utilities Commission and then the City of London, there has been consistent investment in renewing Wastewater Sanitary infrastructure and expanding our system in a sustainable way. Our challenge moving forward is how we protect this legacy to ensure future generations can benefit from an excellent Wastewater Sanitary system.

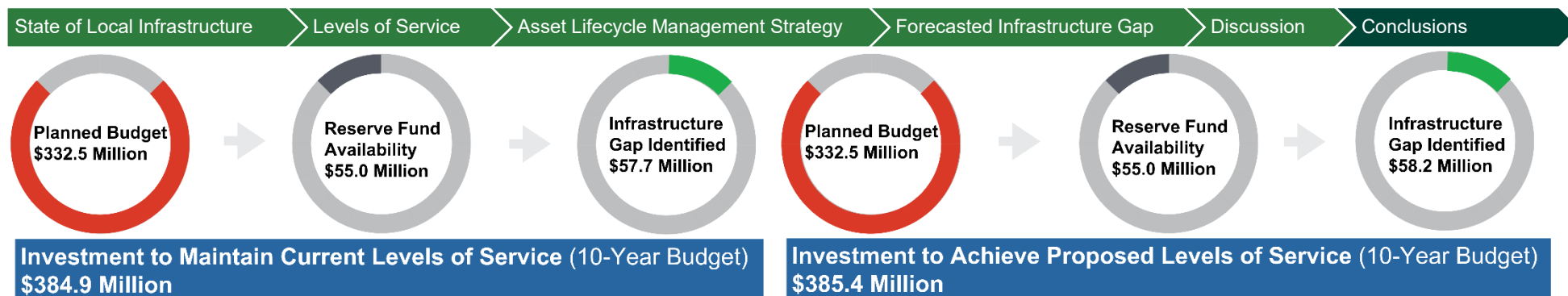


Figure 5.11 Visualization of Maintain Current and Achieve Proposed LOS Infrastructure Gaps (Wastewater – Sanitary Services)

Table 5.15 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Wastewater – Sanitary Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS ¹⁶	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ¹⁷
Collection	\$5,525	Good	None Identified	None Identified	0.5%	1.0% to 1.3%
Treatment	\$1,235	Good	\$57.7	\$58.2	0.6%	1.7% to 2.5%
Wastewater Sanitary	\$6,760		\$57.7	\$58.2	0.5%	1.1% to 1.5%

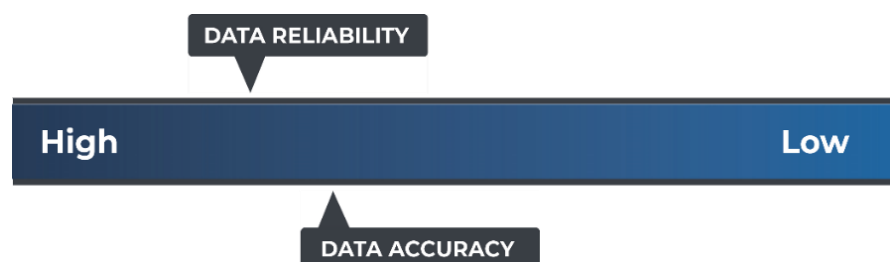


Figure 5.12 Accuracy Reliability Scale (Wastewater – Sanitary Services)

Accuracy and Reliability Commentary

Data reliability is rated as high. Sewermain Inventory has been verified through GIS. Valuation is based on external expert opinion based on recent tender prices which factors width of sewermain and depth which the sewermain is installed, and restoration costs.

Condition and investment forecasts for Collection assets (~80% of replacement value) are based on engineering analysis. Pumping station condition has been assessed with external expert and replacement with corroboration of engineering

¹⁶ This projected infrastructure gap is reduced by the forecasted reserve fund drawdown availability over the next decade.

¹⁷ Source: Based on Canadian Report Card Recommended Annual Reinvestment Rate.

analysis. Treatment assets have completed a formal assessment of replacement value and condition with detailed lifecycle forecast. While forecasts are based on age, expected useful life estimates, and quantifies risk components, projections may vary from actuals. Accuracy is rated as moderate high, forecasts for Treatment Assets (~20% of replacement value) are based on external consulting studies, however sewermain forecasts not completely integrated with engineering estimates.



Section 6. Wastewater – Stormwater

Asset Information	Wastewater - Stormwater
Replacement Value	\$6.3 billion
10-year Maintain Current Levels of Service Infrastructure Gap	\$9.2 million
10-year Achieved Proposed Levels of Service Infrastructure Gap	\$11.4 million

Quick Facts
1,441 kilometers of Stormwater mains
99 kilometers of Open Conveyance
171 Stormwater Green Infrastructure Assets



6.1: State of Local Infrastructure

The City of London protects its citizens and the natural and built environments through the management and treatment of stormwater and drainage. The City's Wastewater – Stormwater (or Stormwater) system aids in preventing flooding by draining rain water away from buildings and roads and controlling the rate of discharge to rivers and streams. Most of the run-off water from areas developed in recent decades is treated to help remove sediment and pollutants before it outlets to the natural environment. The City also works to protect groundwater aquifers through managing infiltration and being compliant with source water protection laws when considering development approvals.

6.1.1: Asset Inventory and Valuation

Stormwater assets are managed and maintained to meet provincially issued system and facility operating permits, as well as City of London technical targets for performance and an extensive network of infrastructure and equipment is operated and maintained by the City to manage stormwater. Table 6.1 lists Stormwater's replacement value at approximately \$6.3 Billion. The Stormwater infrastructure consists of two asset types - Conveyance and Management.

The Stormwater Conveyance network is divided between storm sewers and appurtenances, such as catchbasins and maintenance holes, and inlets/outlets; and linear systems such as watercourses, municipal drains, channels, and flood control dykes and erosion control structures. The bulk of the stormwater inventory value lies in the storm sewer network.

The Stormwater Management (SWM) category is divided between open conveyance, facilities (primarily stormwater ponds in London), SWM green infrastructure, minor culverts

(defined as culverts with a diameter less than 1.8m), and smaller treatment equipment such as oil/grit separators.

Stormwater green infrastructure was added to the inventory in 2016. The intent of Stormwater green infrastructure is to create small scale, de-centralized water quantity and quality control infrastructure with a reduced environmental impact.

It is also noted that this replacement value is considered as if this service would be replaced on a complete and standalone basis. In practice, the City's Core services (Transportation, Wastewater Sanitary, Wastewater Stormwater, and Water) coordinate to ensure cost efficiencies to maintain the current LOS at the lowest cost. While the Core chapters are presented separately, they should be read and considered as whole when considering their infrastructure lifecycle needs.

Stormwater Conveyance assets undergo regular maintenance and inspection, which identify proactive and reactive investment requirements. Inspections include a limited use of CCTV inspection where different small portions of the underground network are viewed annually. Inspections also occur in response to complaints. Where possible, existing sewers are rehabilitated using trenchless technologies, which extend their lives at a fraction of the cost of replacement.

Stormwater Management assets include open conveyance linear systems, storm water management facilities, stormwater management green infrastructure, minor treatment, and minor culverts. The open conveyance linear systems include municipal drains, drains, channels, erosion control structures, and dykes. The Storm water Management Facilities (SWMF) provide water quantity, quality and/or erosion control for most recently developed areas. Stormwater management facilities are relatively new (consistent construction since the late 1980's)

and are expected to have long lives. Stormwater management green infrastructure includes low impact development (LID) catchbasins, catchbasin infiltration, bioretention, exfiltration

systems, and several drywells. In addition, some smaller treatment facilities, such as oil/grit separators, are strategically placed where needed in the City.

Table 6.1 Inventory and Valuation (Wastewater - Stormwater Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Conveyance	Local storm sewers lesser than 450 mm diameter	517	km	\$1,653,491
	Trunk storm sewers greater than or equal to 450 mm and less than 1500 mm diameter	804	km	\$3,135,940
	Trunk storm sewers greater than or equal to 1500 mm diameter	120	km	\$793,486
Management	Open Conveyance (Municipal Drains, Drains, Channels, Dyke, Erosion Control Structures)	99	km	\$349,101
	Storm Water Management Facilities (Wet Facility, Dry Facility, Dissipation Pools, Online Flood and Erosion Control Facilities)	100	Each	\$357,996
	SWM Green Infrastructure (Bioretention cells with or without underdrain, Drywells)	171	Each	\$34,897
	Minor Treatment (Oil/Grit Separators)	55	Each	\$4,637
	Minor Culverts (Up to 1.8 meter in diameter)	3	km	\$5,937
Total				\$6,335,485

6.1.2: Age Summary

Figure 6.1 outlines the Stormwater Conveyance infrastructure is approximately mid-way through its life. Storm sewers with diameter less than 450 mm are nearing halfway through their expected useful life. Storm sewers 450 mm in diameter and above are approximately 38 years old. The stormwater management facilities assets are in the early stages of life. Management facilities are at the first sixth of their expected useful life. Green infrastructure has only been introduced in the

past several fiscal years. Minor treatment assets are approximately fifteen percent through their expected useful life. While the known average age of open conveyance assets are approximately 19 years old, the exact ages of many open conveyance assets (specifically dykes, waterways, and municipal drains) have not been systematically documented or the information is not readily available. Minor culverts age is unknown.

6.1.3: Asset Condition

As listed in Figure 6.2, Stormwater service has 95% of assets in Fair, Good, or Very Good condition. The remainder is approaching the end of their expected useful lives, indicating a need for investment in the short to medium term. The City's

Stormwater assets are overall in Fair to Very Good condition, indicating that they are meeting current needs but are aging and may require attention.

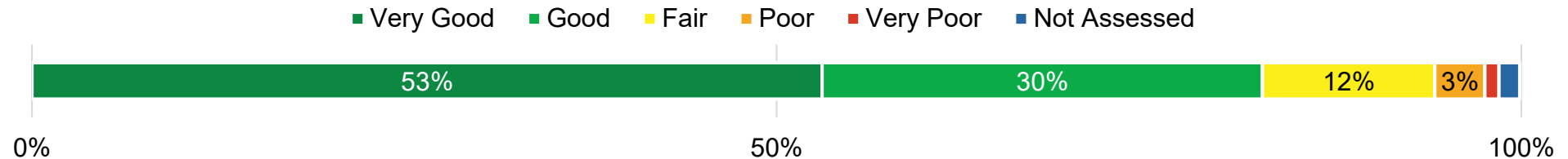


Figure 6.2 Overall Condition (Wastewater - Stormwater Services)

Detailed condition is presented in Figure 6.3. Stormwater Conveyance system assets are the highest value Stormwater asset type and are shown to be in Very Good to Good condition based on information collected from the City's limited sewer inspection program. Sewers are closed-circuit television (CCTV) inspected on a rotating basis and evaluated using a standardized rating system to evaluate the risk of failure and anticipated investment needs. The fraction of total storm sewers inspected annually is small which weakens the overall integrity of the condition data for this inventory class.

Detailed condition data is incomplete for Open Conveyance assets, primarily as it relates to municipal drain condition. Condition is primarily based on age, estimated useful life information, and internal expert opinion regarding recent drain rehabilitations. Consultant reports to assess dykes' condition were also used. Failures (blockage) could result in flooding requiring immediate response. Proactive remediation is undertaken based on routine staff observations and annual planned programs. To date, this strategy has been generally adequate to protect against flooding. For this assessment, in the absence of data, assets have been distributed based on age

recorded in the Geomatics (GIS) stormwater management listings that are regularly maintained by the City, noting that age is not a good methodology to gauge condition of open conveyance systems. However, it is the best available method. Limited storm channel maintenance occurs as part of the annual planned program and work rotates through the assets depending on available time and resource. Investment requirements are determined based on staff observations and public inquiries and complaints. However, many of these channels are overgrown with vegetation and will need to be rehabilitated in the near term to ensure flooding does not occur.

Stormwater Management Facility assets in London have a documented history of rehabilitation, which assists in determining the condition of the SWMF generally as Very Good to Good. There are some major maintenance/rehabilitation needs identified over the next ten years. Recently the City has taken over construction of the SWMF and post-construction monitoring. The bulk of the capital SWMF construction costs originate from excavating the initial basin. As such, the initial capital expenditure is a one-time only cost. The ongoing expense will occur as it relates to maintenance and sediment

removal. The SWMF do need to be cleaned more frequently when heavy construction is undertaken within the drainage area of the SWMF. SWMFs are managed on a proactive basis with work performed, recorded, and analyzed for each location. Unplanned work is also undertaken based on staff observations of issues and public inquiries and complaints.

Green Stormwater assets (Low Impact Development) are a minor part of the asset base and are considered in Very Good to Good condition, based on age and expected useful life. These

assets are assessed as requiring little maintenance, or in the instance of LID, given they are very new assets, there is not yet a historic pattern to estimate maintenance needs.

Minor Treatment (oil/grit separators) are considered in Very Good condition, based on age recorded in GIS and expected useful life.

Minor culverts data are being included in the City's asset management plan for the first time. Most of these assets are considered in Very Good to Good condition.

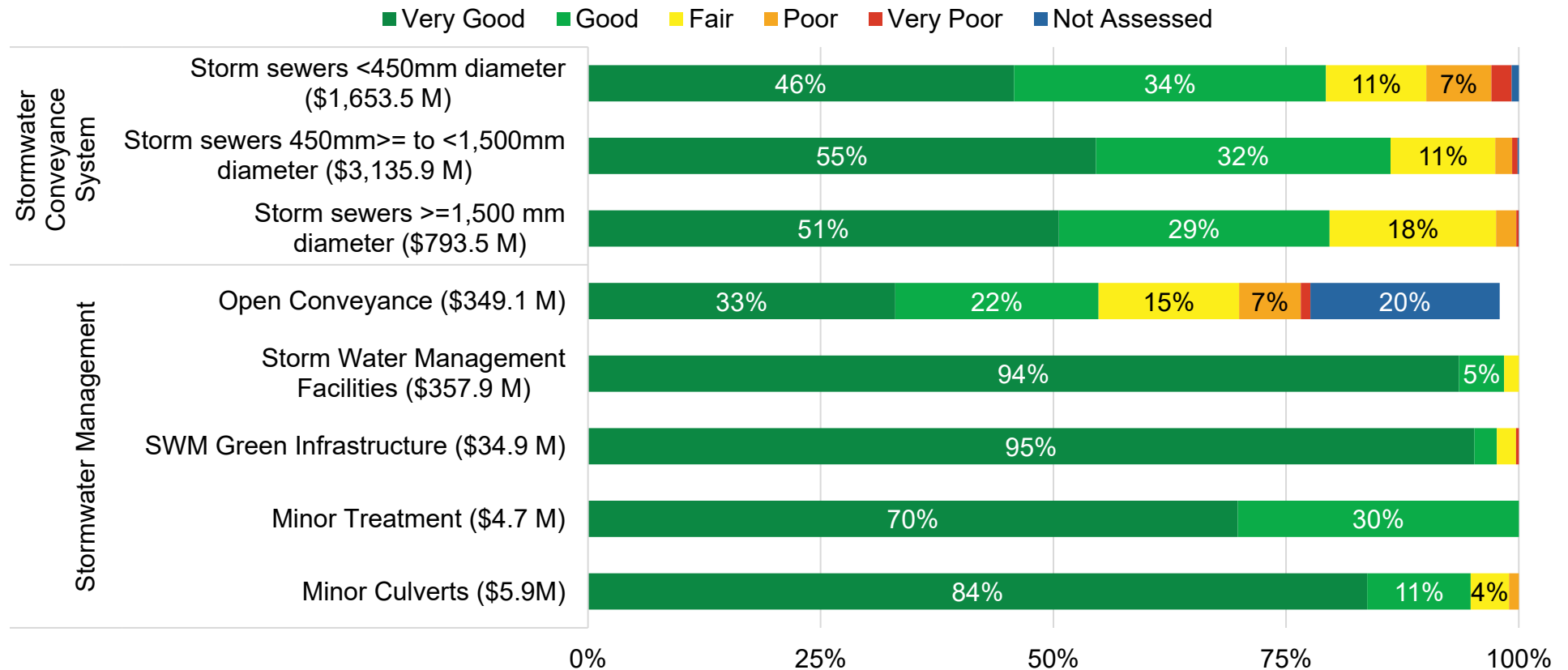


Figure 6.3 Asset Condition Detail (Wastewater – Stormwater Services)

6.2: Levels of Service

O.REG 588/17 REQUIREMENTS

O. Reg. 588/17 requires legislated community levels of service (LOS) for core assets. Community LOS use qualitative descriptions to describe the scope or quality of service delivered by an asset category. Examples of legislated community LOS include a map showing areas of the municipality that are serviced by the water and wastewater system, or images that illustrate the different levels of pavement condition grade of roads. In this example, maps provide an illustrative view of the extent of the services provided through the infrastructure assets.

O. Reg. 588/17 also requires legislated technical LOS for core assets. Technical LOS use metrics to measure the scope or quality of service being delivered by an asset category. Examples of technical LOS include the percentage of properties resilient to 100-year and 5-year storm events.

Table 6.2 lists performance measures in the LOS Table that are O.Reg. 588/17 requirements for Stormwater assets. References are provided to show where O. Reg 588/17 requirement has been attained.

Table 6.2 O.Reg. 588/17 Levels of Service (Wastewater - Stormwater Services)

Customer Level of Service	Technical Level of Service
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. (Table 6.4 and Figure 6.4 and Figure 6.5)	<p>Percentage of the municipal stormwater management system resilient to a 5-year storm. (86.5%, Table 6.4 and Figure 6.4).</p> <p>Percentage of properties in municipality resilient to a 100-year storm. (91.6%, Table 6.4 and Figure 6.5).</p>

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for Levels of Service (LOS) performance measures linked to Customer Values of Accessible, Scope, Cost Efficient, Environmental Stewardship/Sustainability, Reliability, Quality, and Safety.

Direct and Related LOS

After review with Stormwater, LOS considered most representative of Stormwater's services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'Direct LOS' and are listed in Table 6.5 LOS that have a causal relationship with direct LOS are

documented in Table 6.6 as Related LOS but cannot be as readily costed to Stormwater's services.

Metrics

Table 6.7 listed metrics that are useful information, especially when considered in conjunction with O. Reg., Direct LOS, and Related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Wastewater - Stormwater assets provide.

CCTV sewer main screenshots that visualize the CAM condition rating of Very Good (condition 1) to Very Poor (condition 5) are provided in Table 6.3.

Table 6.3 CCTV Inspection Condition Screenshots and Condition Rating (Wastewater – Stormwater Services)

Very Good Condition 1	Good Condition 2	Fair Condition 3	Poor Condition 4	Very Poor Condition 5
				

N

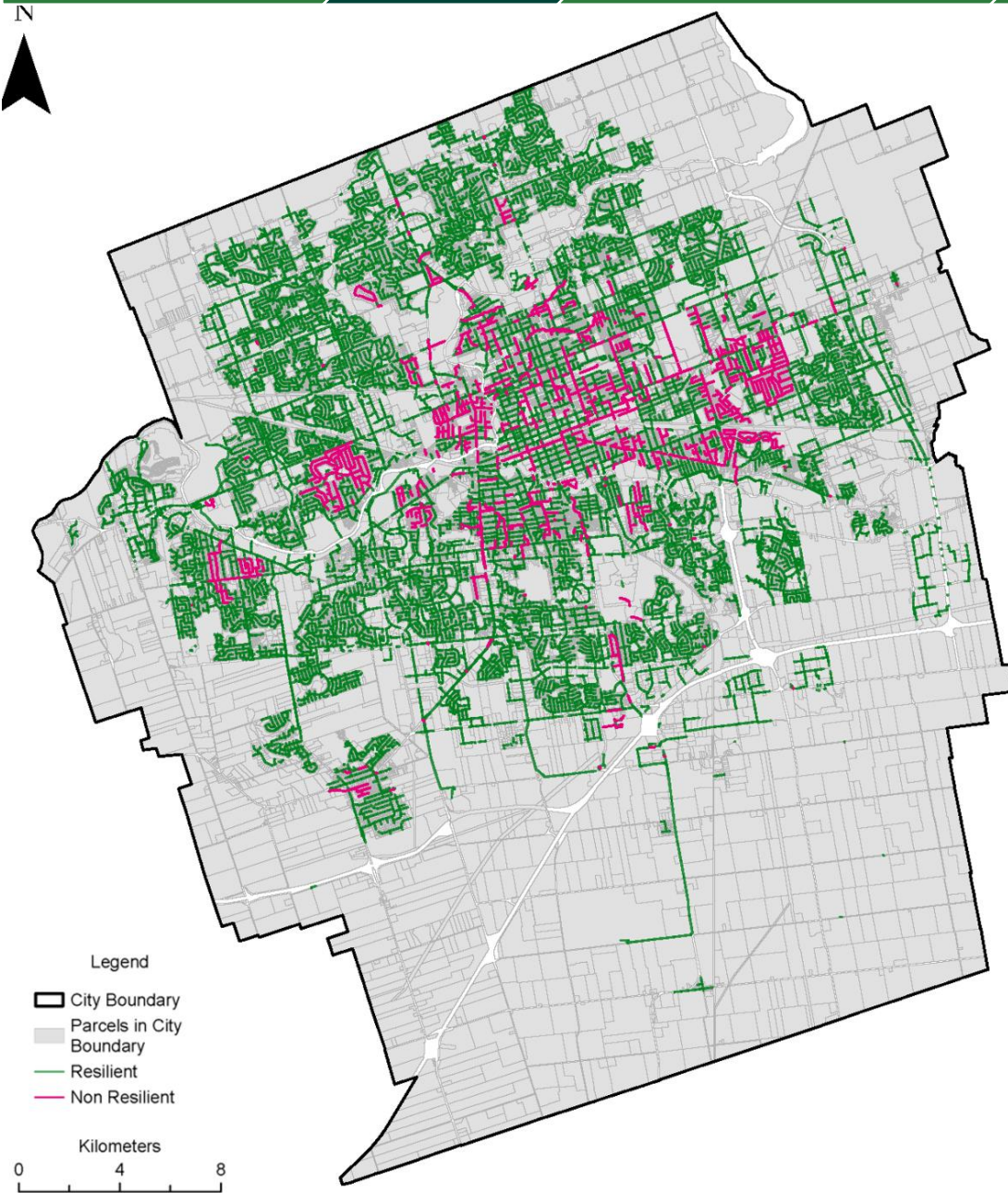


Figure 6.4 Properties in the City of London Resilience to 5 Year Storm (Wastewater – Stormwater Services)

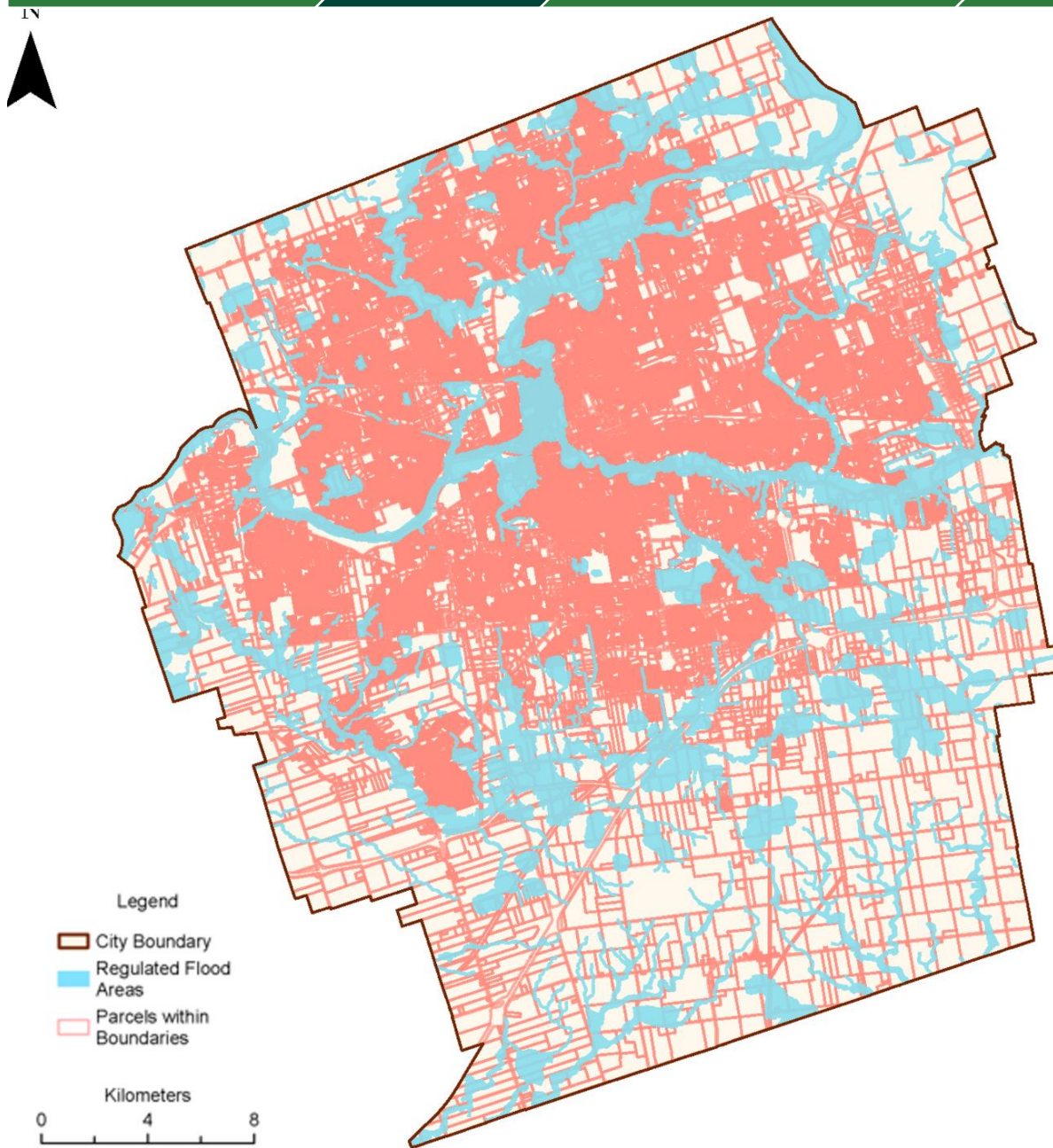


Figure 6.5 Properties in the City of London Resilience to 100 Year Storm (Wastewater – Stormwater Services)

6.2.1: O. Reg 588/17 Levels of Service (Wastewater – Stormwater Services)

Table 6.4 O.Reg. 588/17 Levels of Service (Wastewater - Stormwater Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Scope	Customer/ Council	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	See maps in Figure 6.4 and Figure 6.5.	Maintain current
Reliability	Technical	Percentage of properties in municipality resilient to a 100-year storm.	91.6%	Maintain current
Reliability	Technical	Percentage of the municipal stormwater management system resilient to a 5-year storm.	86.5%	Maintain current

6.2.2: Direct Levels of Service

Table 6.5 Direct Levels of Service (Wastewater – Stormwater Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Cost Efficiency	Customer/ Council	Stormwater Reinvestment Rate	0.4%	1.1%
Environmental Stewardship	Technical	Percentage of stormwater management facilities that meet the Province's five percent Total Suspended Solids (TSS) reduction requirement	80% achievement of 5% Total Suspended Solids (TSS) reduction requirement on all stormwater management facilities (wet)	Maintain current
Environmental Stewardship	Technical	Dollar amount in planned erosion control measures	\$0	\$16.8 million
Reliability	Customer/ Council	Percentage of Stormwater assets in Fair or better condition	94.2%	Maintain current
Reliability	Customer/ Council	Percentage of community with stormwater quality and quantity control (percentage of properties within the catchment area of a wet or dry pond.)	29.8%	Maintain current

6.2.3: Related Levels of Service

Table 6.6 Related Levels of Service (Wastewater – Stormwater Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Stormwater Management Reinvestment Rate	1.4%
Cost Efficiency	Technical	Stormwater Conveyance Reinvestment Rate	0.3%
Environmental Stewardship	Technical	Annual number of Low Impact Development technologies implemented (Raingardens and bioswales)	28
Reliability	Technical	Percentage of Stormwater Conveyance assets in Poor or Very Poor condition	4.4%
Reliability	Technical	Percentage of Stormwater Management assets in Poor or Very Poor condition	3.6%
Reliability	Technical	Percentage of locations in the City prone to flooding during wet weather events	8.4%
Reliability	Technical	Kilometers of storm network CCTV inspected annually	59.9

6.2.4: Other Measures

Table 6.7 Metrics – Other Dashboard Measures (Wastewater – Stormwater Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Operating budget for Stormwater services	\$7,382,170
Cost Efficiency	Customer/Council	Annual operating cost to provide service (Per household)	\$42.27
Customer Satisfaction	Customer/Council	Percentage of residents satisfied with stormwater management services	73%
Environmental Stewardship	Technical	Percentage of storm sewer flushed when silt and debris accumulation greater than one quarter internal pipe diameter	100% flushing of pipe discovered with accumulations exceeding a depth equal to or greater than one-quarter of its internal diameter
Reliability	Technical	Percentage of catchbasin total inspected and cleaned annually	42%
Reliability	Technical	Percentage of inspections and routine maintenance carried out on wet stormwater management facilities annually	100%
Reliability	Technical	Flood prevention – complete a current list of inspections on isolated, high risk flooding locations	100%
Reliability	Technical	Percentage of inlets/outlets annual inspections and maintenance carried out	100%
Reliability	Technical	Percentage of oil/grit separator annual inspection and maintenance carried out	100%
Reliability	Technical	Percentage of flap gates annual inspections and maintenance carried out	100%

6.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs.

The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, which may trigger asset investment needs.

6.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current LOS while striving to optimize costs and risks. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections. Table 6.8 lists specific asset management practices or planned actions the City conducts for each lifecycle activity. Asset management practices or planned actions employed by cities can entail certain specific risks. Many types of risks such as health and safety, financial, environmental, etc. are summarized in Table 6.9 classified by each lifecycle activity. The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 6.8 Current Asset Management Practices or Planned Actions (Wastewater – Stormwater Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Stormwater – All <ul style="list-style-type: none"> • Sewer Use Bylaw that regulates discharge quality to sewer. • Increased street sweeping to reduce sediment loads to SWMF. • Increased enforcement of sediment and erosion controls for new construction to reduce sediment loads to SWMF. • Coordination efforts to optimize construction between city projects and external parties (UCC).
Maintenance	Stormwater Conveyance <ul style="list-style-type: none"> • Reactive Flushing and Cleaning on as required basis. • 24-hour maintenance response capability. • Scheduled inspections include CCTV visual. Stormwater Management

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
	<ul style="list-style-type: none"> Specific maintenance programs include annual clean out program for catchbasins, stormwater facilities inlet/outlets cleaning, etc.). Open Conveyance – create a program to (1) rehabilitate the 30-year old channels within the City and (2) establish a program to remove vegetation in its juvenile state along the channel and at headwalls or culvert crossings, particularly following a rehabilitation project. Maintenance programs for Oil/Grit Separators are conducted annually and cleaned out as required. Observations will determine frequency of cleaning required. Green stormwater facilities, such as Low Impact Development assets, are approximately 1 year old. Preventative maintenance includes protection of the features from sediment loading during active construction and regular mulching or weed removal in bioswales. 					
Renewal/ Rehabilitation	<p>Stormwater Conveyance</p> <ul style="list-style-type: none"> Stormwater sewer rehabilitation is based on the current condition of the pipe or will be reconstructed in conjunction with a sanitary sewer or watermain project: Pipe lining e.g. Cured In Place Pipe (CIPP). Spot repairs. Manhole replacement. Joint sealing. Flushing and Cleaning. <p>Stormwater Management</p> <ul style="list-style-type: none"> Stormwater Management assets are generally newer, but ‘wet’ SWMF require regular inspection to assess if sediment removal is required. The City has conducted consultant reviews of the sediment loading to the facilities and has developed a 10-year cleanout plan. An update to this study is expected to occur in 2024 to underway to develop and approximate sediment loading estimates. Open Conveyance –The City has a desire to rehabilitate sections of the open channels that are approximately 40 years old over the next 10 years. Rehabilitation of Dykes and other flood/erosion control are triggered by field observations, consultant reports, and in coordination with conservation authority (UTRCA). Oil/Grit Separators are generally newer with minimal rehabilitation expected over the next 10 years. Green stormwater facilities, such as Low Impact Development assets, are new assets with minimal rehabilitation work expected over the next 10 years. 					
Replacement/ Construction	<p>Stormwater Conveyance</p> <ul style="list-style-type: none"> Stormwater sewer replacement is based on the condition rating of the infrastructure. In most cases, once the pipe has been inspected and given a condition rating, city staff can determine the best method for replacement: Complete open-cut replacement. 					

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
	<ul style="list-style-type: none"> Trenchless methods (example of Horizontal directional drilling (HDD)). Full replacement is the most common method for collapsed or heavily deteriorating pipe. Look for clusters of Poor condition rated sewers and apply high priority. Coordinate with water, roads projects and through UCC. Stormwater Management <ul style="list-style-type: none"> Stormwater management projects are generally developer driven. SWMF are not replaced, rather they are rehabilitated. Open Conveyance – there is not a history of replacement. Oil/Grit Separators have no history of full replacement. If a replacement were to occur, the assets within the separator ‘shell’ would be replaced. Green stormwater facilities, such as Low Impact Development assets, have no history of replacement. 					
Disposal	Stormwater Conveyance <ul style="list-style-type: none"> Current practice is removal with no cost recovery. Historically some left in situ (original place). Data on old sewers is stored in GIS. GIS tracks the asset status (i.e. active, abandoned, and/ or removed). Stormwater Management <ul style="list-style-type: none"> Aside from occasional decommissioning of temporary SWMF, stormwater management assets are not typically disposed. However, should disposal of a permanent facility occur, the City could sell the land if no longer needed or retain it as parkland. Linear Dykes - if a dyke were to be disposed of, activities could include purchasing residential properties that would be impacted if the dyke was no longer in effect. It also includes decommissioning costs which would restore the formerly protected area back to floodplain. 					
Service Improvement	Stormwater Conveyance <ul style="list-style-type: none"> These can include improved technologies or use existing technology for oversizing/expansions or trunk extensions of Stormwater sewer. Stormwater Management <ul style="list-style-type: none"> These can include improved technologies that minimize environmental impact, such as Green Stormwater Management Facilities (i.e. low impact development assets). 					
Growth	Stormwater – All <ul style="list-style-type: none"> Capital growth projects are identified by Development Charges and Stormwater service are a (subject to <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i> requirements, and City of London policy). Undertake Environmental Assessments. Assumption of subdivisions, commercial and industrial extensions, local improvements, etc. Interim works (typically one to ten years) built to provide temporary service pending construction of permanent 					

Asset Activity	Specific Asset Management Practices or Planned Actions
	<p>infrastructure assets.</p> <p>Stormwater Conveyance</p> <ul style="list-style-type: none"> Projects relate to stormwater trunk extensions and expansions. <p>Stormwater Management</p> <ul style="list-style-type: none"> Interim works (typically one to ten years) built to provide temporary service, usually temporary stormwater SWMF. New SWMF are planned in the next 10 years to provide servicing for growth. The City follows a Growth Management Implementation Plan to schedule the timing of Development Charges projects within the 5-year window. Expansions to previously existing facilities may occur to enhance the Stormwater functions and allow for more growth area to be serviced.

Table 6.9 Risks Associated with Asset Management Practices or Planned Actions (Wastewater – Stormwater Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Refer to Appendix A.
Maintenance	<ul style="list-style-type: none"> Completing planned maintenance activities while managing the need to execute reactive maintenance activities. Incorrectly planned maintenance activities can lead to premature asset failure. Overscheduling preventative maintenance can lead to excessive maintenance and additional costs with no actual benefits.
Renewal/Rehabilitation	<ul style="list-style-type: none"> Incorrect assumptions regarding improved expected useful life after rehabilitating a main. Specifically, the estimated service life of a full-length cure-in-place pipe is still not well founded in the scientific literature as it is a comparatively new process (developed over the past two decades). Renewal/rehab on major components must be completed prior to failure due to extended engineering and equipment delivery times, and potential loss of service due to unplanned failure. Incorrect assumptions regarding improved expected useful life after rehabilitating a main. Specifically, the estimated service life of a full-length cure-in-place pipe is still not well founded in the scientific literature as it is a comparatively new process (developed over the past two decades). The facilities will not meet the water quality targets specified by the provincial Environmental Compliance Approval if they are not maintained through the removal of sediment. The City may be subject to enforcement and penalties from the Ministry of Environment, Conservation and Parks.
Replacement/Construction	Cost over-runs during large, complex design and construction projects.
Disposal	<ul style="list-style-type: none"> Lack of planning and funding may limit the options to efficiently replace existing and add new capacity.

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions					
	<ul style="list-style-type: none"> • Cost increases resulting from unexpected health concerns resulting from disposal (such as uncovering asbestos pipe). 					
Service Improvement	Refer to Appendix A					
Growth Activities	<ul style="list-style-type: none"> • Incorrect growth assessments may result in overabundance of assets. • Risk of insufficient funding to maintain new asset. • Incorrect asset size will cost more money and may cause operational challenges (too large asset), or may result in the need to prematurely expand the asset (too small asset). • This is exacerbated by the unknown related to climate change and the need to make Stormwater infrastructure larger to accommodate more frequent, intense rainfall events. 					

6.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the forecasted change in the condition profile of each asset type. Figure 6.6 shows the projection of the condition of the Stormwater assets based on three scenarios. They include projected condition with current budget, maintain current LOS and achieving proposed LOS condition projection.

The figure also shows planned budget, the required investments to maintain the current LOS and Investments to achieve proposed LOS, which include a Minor culverts Climate Emergency Action Plan (CEAP) estimate. These are considered the first, but not comprehensive, investments in the City's Climate Order of Magnitude and CEAP implementation.

The assessment is underway to determine the cost associated with implementing the CEAP and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

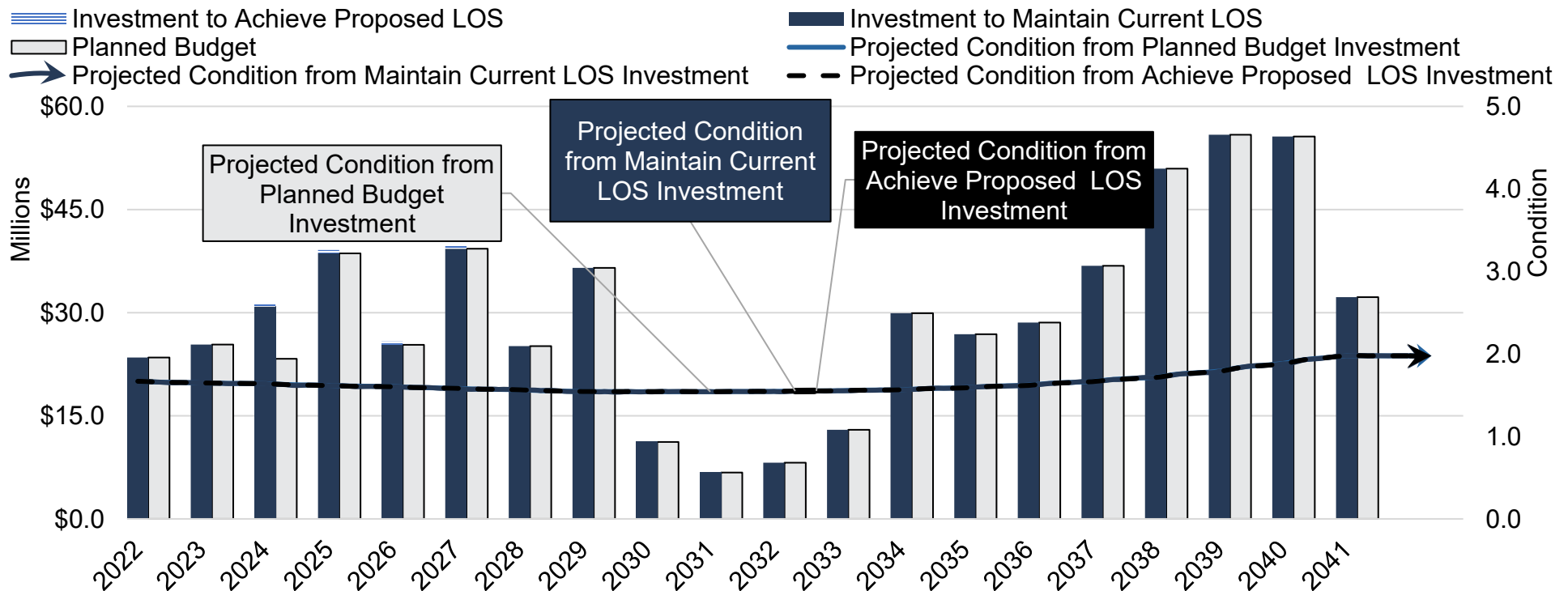


Figure 6.6 Projected Service State of Three Funding Scenarios (Wastewater – Stormwater Services)

A. Scenario One: Planned Budget Condition Profile

The Stormwater average annual activity and planned funding is summarized in Table 6.10. The condition profile expected from the current budget is forecasted by using the same logic related to condition deterioration rates that helps forecast and analyze the decline in an asset's condition, performance, and functionality over time and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. Figure 6.7 presents the expected condition profile for the next 20 years based in the current budgets for Wastewater - Stormwater assets. This scenario indicates the condition profile trending to most assets being in Good to Fair condition.

Current funding for operating budgets is presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget. Select service improvement budgets are factored in funding gap analysis and commented on below.

Approximately 60% of Stormwater approved growth budgets relate to Management projects of various locations ranging across the City boundaries. Approved Stormwater main projects either are required for intensification projects. Stormwater conveyance needs are attributed to oversizing and Built Area Works identified. Approximately thirty Stormwater Management growth projects have been identified and various locations ranging across the City boundaries.

All numbers in the tables are rounded to the nearest thousands.

Table 6.10 Scenario One – Average Annual Planned Budget (\$Thousands) (Wastewater – Stormwater Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	7,312	7,564
Renewal, Replacement, Rehabilitation, Disposal	14,218	22,814
Service Improvement	5,800	8,814
Growth Activities	27,180	25,991

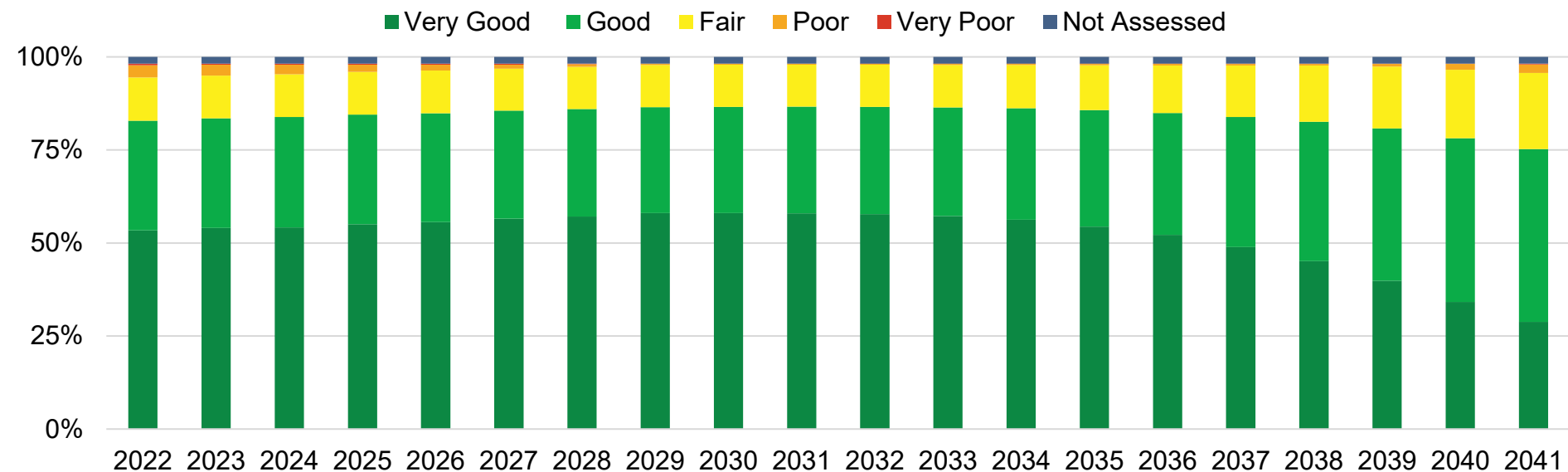


Figure 6.7 Projected 20-year Planned Budget Condition Profile (Wastewater – Stormwater Services)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

The cost to maintain current LOS are summarized in Table 6.11. This scenario forecasts the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the current

condition profile for these assets. Figure 6.8 presents the expected condition profile for the next 20 years based on investment required for maintain current LOS for Stormwater assets. This scenario indicates the condition profile trending to most assets being in Fair to Very Good condition. This is consistent given the scope of assets relative to the infrastructure gap identified to maintain current LOS.

Table 6.11 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Wastewater – Stormwater Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	7,564	None identified	7,564	None identified
Renewal, Replacement, Rehabilitation, Disposal	27,534	None identified	27,850	916
Service Improvement				
Growth Activities	25,991	None identified	25,991	None identified

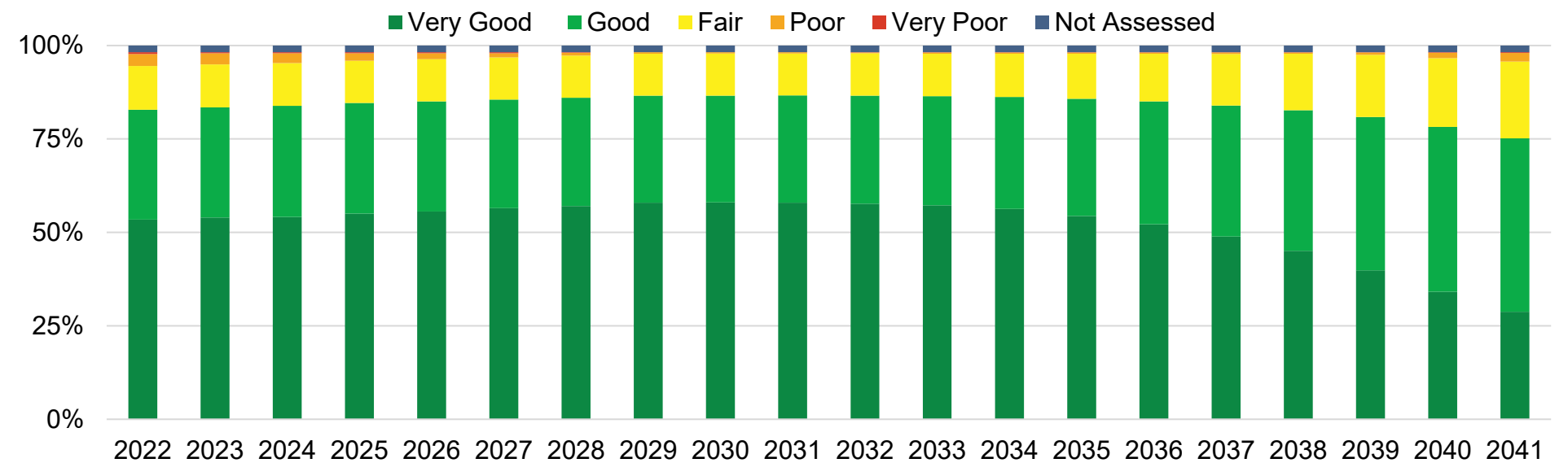


Figure 6.8 Projected 20-year Maintain Current LOS Condition Profile (Wastewater – Stormwater Services)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

The cost to achieve proposed LOS are summarized in Table 6.12. This scenario forecasts the lifecycle activities that are required to achieve the proposed LOS. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the expectation of the City's staff involved with the management of the assets. The future lifecycle activities that are required to achieve the desired condition profile are then used to establish the average annual investment to achieve the proposed LOS condition profile.

Figure 6.9 presents the expected condition profile for the next 20 years based on investment required for achieving proposed LOS for Stormwater assets. This scenario indicates the condition profile trending to nearly all assets being in Fair to Very Good condition.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

Table 6.12 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Wastewater – Stormwater Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ¹⁸	Achieve Proposed LOS Infrastructure Gap ¹⁹
Operating Budget	7,564	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	27,534	None identified	220	None identified	1,136
Service Improvement					
Growth Activities	25,991	None identified	None identified	None identified	None identified

¹⁸ Incremental investment to achieve proposed LOS excludes CEAP costs.

¹⁹ Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

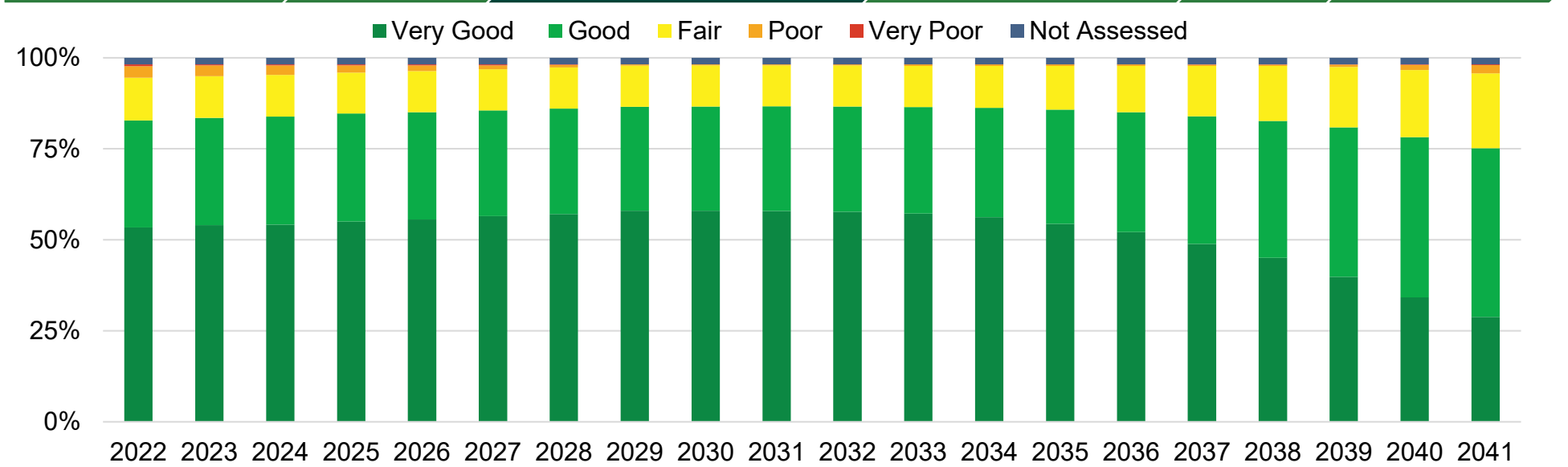


Figure 6.9 Projected 20-year Achieved Proposed LOS Condition Profile (Wastewater – Stormwater Services)

If funding for proposed LOS is not sufficient, the City will:

- 1. Continue lifecycle activities to maintain current LOS.
- 2. Carry out the Climate Emergency Action Plan within current funding scope. A green initiative life cycle renewal

activity may be otherwise not feasible. The minor culvert asset would otherwise be functional but not addressing green initiative strategic needs.

6.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 6.13 and illustrated in Figure 6.10. The analysis is related to the lifecycle rehabilitation or replacement lifecycle activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

Certain capital budgets are intended and approved for both Sanitary and Stormwater sewer mains. The historical split as to

how these capital budgets were used between Sanitary and Stormwater mains for these single budget items were discussed with each service and assumed would be applicable for future years. When combined, the listed Sanitary and Stormwater lifecycle budgets match the 2022-2031 budgets approved as of December 31, 2021.

It is noted the Stormwater Management lifecycle capital budget includes budget amounts for Upper Thames River Conservation Authority-related activities (dykes) that have been identified to having a lifecycle component.

Table 6.13 Average Annual Budget and Gap Analysis (\$Thousands) (Wastewater – Stormwater Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Conveyance	16,966	None identified	16,366	None Identified	None identified	None identified	None identified
Management	10,568	None identified	11,484	220	None identified	916	1,136
Total	27,534	None identified	27,850	220	None identified	916	1,136

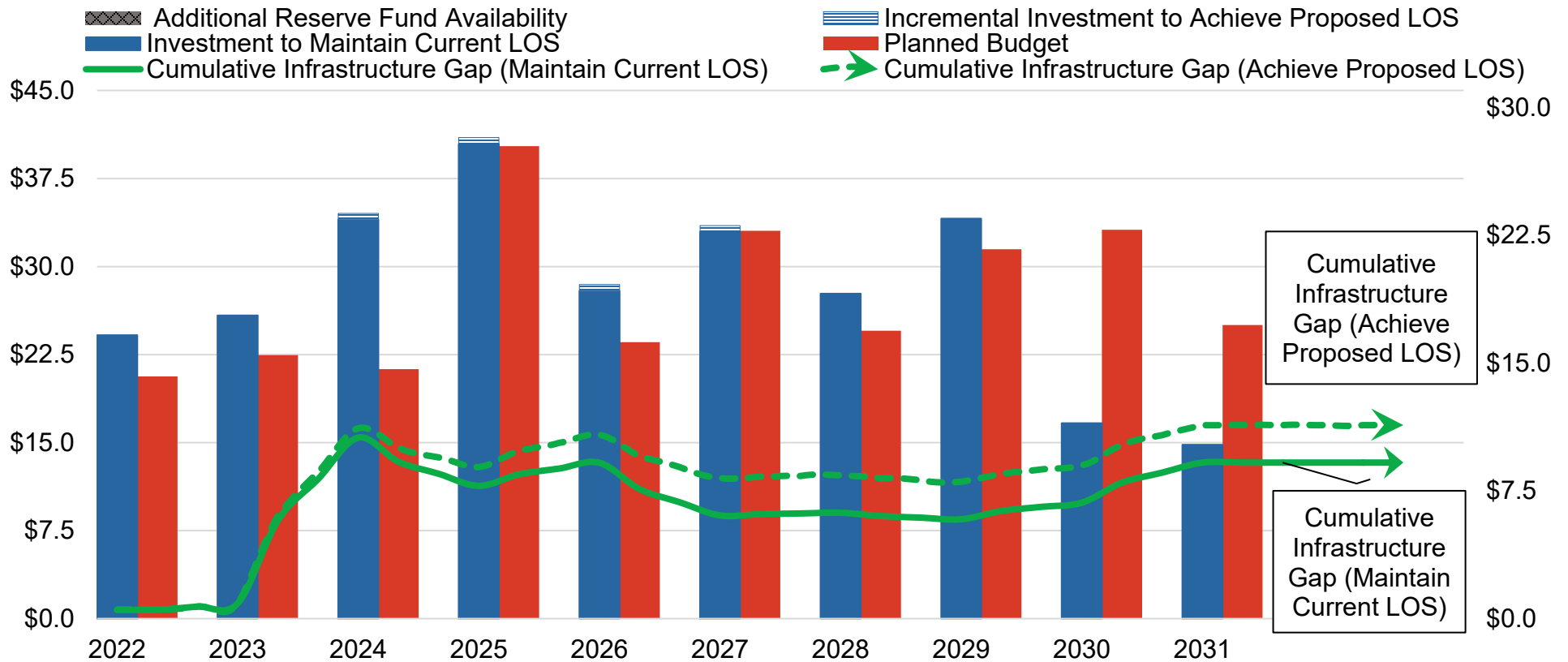


Figure 6.10 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Wastewater – Stormwater Services)

Evaluating planned budget vs. required investments shows that Stormwater's 10-year maintain current LOS gap is \$9.2 million, with emerging needs with Stormwater Management. Stormwater Management's asset base has been updated and formally assessment with external reports to now include Minor culverts, Erosion Control Structures, and updated information with previously reported assets. Quantified needs regarding Erosion Control Structures, dykes renewals, are key drivers of the infrastructure gap. Additional investment for minor culverts needs are driving the increased investment to achieve proposed LOS with a projected 10-year infrastructure gap of \$11.4 million.

Total required investment represents the costs to renew and maintain the existing assets so services can continue to be delivered.

The Stormwater service shares the same 20 Year Sewer System Plan as the Wastewater – Sanitary service. This 20 Year Sewer System Plan works within the constraints of the debt servicing ratio, gradually increasing the pay-as-you-go funding for lifecycle replacement, and slowly growing the reserve funds.

Required investment values presented are based on estimates of external reports, age, and expected useful life noting that inventory and condition information for Stormwater assets is improved since the 2019 CAM Plan.

It is noted that risk assessment and consequence of failure is not explicitly addressed in this CAM Plan. This equal distribution of risk does not consider that the consequence of failure of a channel that conveys a once in 250-year stormwater event is considered greater than that of a Stormwater main that conveys stormwater relating to a once in two-year storm event. Once a risk assessment methodology is embedded in asset management analysis, it could have a material impact on needs identified for the Stormwater infrastructure gap.

6.5: Discussion

6.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Wastewater - Stormwater assets condition comparison is provided in Figure 6.11.

The 2019 CAM Plan condition data used a variety of relevant information including inspection information for key assets,

historic failure information and professional internal and external opinion. The 2023 CAM Plan refined these processes. Replacement value increases are primarily driven by adjusting Stormwater mains by Non-Residential Build Consumer Price Index Changes (NRBCPI). While this is consistent with other City processes (such as the City's Development Charge service group relying on NRBCPI to adjust rates) ideally recent bids and tenders will inform replacement unit values. This information is expected for CAM's annual plan update.

The change in condition profile is attributed updated sewer main inspection assessments and adjusting Stormwater main expected useful life by materials classification. The cumulative 10-year infrastructure gap from the 2019 CAM Plan was approximately \$3.75 million. The 2023 CAM Plan 10-year maintain current LOS gap of \$9.2 million relates to Management funding for erosion control structures. Achieving proposed LOS relates to additional funding to meet preliminary CEAP targets for Minor culverts needs.

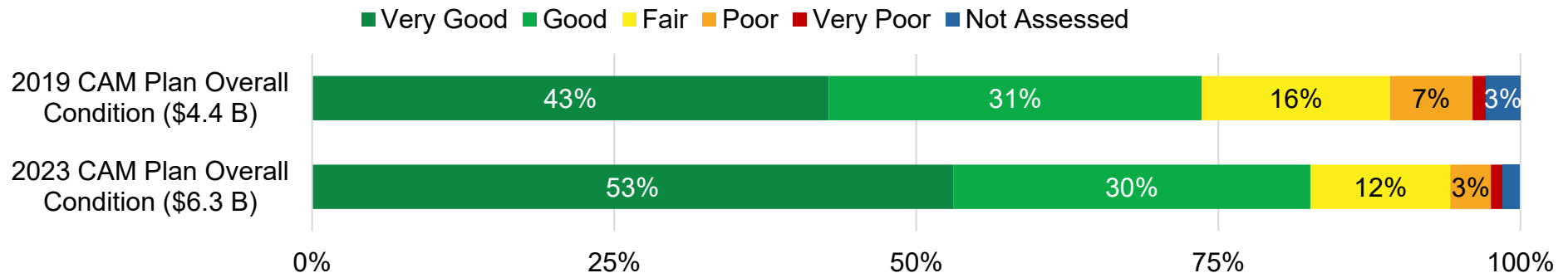


Figure 6.11 2019 CAM Plan to 2023 CAM Plan Condition Summary (Wastewater – Stormwater Services)

6.5.2: Lifecycle Management Scenarios

The lifecycle Management section included three scenarios – planned budget, maintain current LOS, and achieve proposed LOS.

Scenario One planned budget is identified to have some constraints on the City's capacity to effectively maintain Stormwater Management infrastructure. This leads to a gradual deterioration in their condition. This decline might not be immediate but, over time, it becomes more visible to the public and causing operating problems, increasing the operating and maintenance costs, and potentially leading to higher repair or replacement costs in the future.

Scenario Two maintain current LOS funding is greater than what is currently allocated for Stormwater Management, illustrating the financial strain of maintaining a healthy asset portfolio. This scenario acknowledges the need for continual investment in assets to maintain their current state, eliminating the degradation seen in the first scenario. However, while it prevents further decline, it does not enhance the condition of the assets.

Scenario Three achieve proposed LOS relates to lifecycle needs of Minor culverts (those with less than 1.8 m in diameter). These needs are a preliminary identification of Climate Emergency Action Plan (CEAP) initiatives. This level of funding is greater than both the current budget and the one needed to maintain the assets' existing state. The advantages of this approach are alignment with CEAP, improved LOS and asset condition, extended asset lifespans, and potential long term cost savings. This preliminary CEAP assessment shows the financial challenge the City faces to achieve the proposed LOS.

These three scenarios show different results depending on the level of funding for the assets life cycle renewal actions. The

choices made will have an implication for Stormwater condition and their performances.

6.5.3: Current and Future Challenges

Current challenges relate to coordination and optimization of Core service lifecycle needs and continuously assessing representative condition and replacement values. The 2019 CAM Plan replacement value approximates \$4.4 billion, while the 2023 CAM Plan lists \$6.3 billion. The increase is attributed to inflating recently tendered project costs by NRBCPI. The project costs quantify both sewer main construction and restoration costs (costs of restoring roadway after a main is installed). Restoration cost efficiencies are realized through coordinating projects with Core assets (Transportation, Wastewater, and Water). If these projects cannot be coordinated or restoration costs continue to increase, infrastructure funding shortfalls will increase.

The City has implemented first phases for its Computerized Maintenance Management System (CMMS). Inspection data has been collected for nearly a year and while not yet comprehensive enough to inform the asset management plan, the expectation is that after several years' of use, the breadth of data will further inform condition and lifecycle management needs.

6.6: Conclusions

Figure 6.12 illustrates the infrastructure gap as a proportion to the required investment over the next decade. Table 6.14 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (millions) (Wastewater – Stormwater Services) presents the summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment rates for Wastewater Stormwater assets.

Valued at roughly \$6.3 Billion, the City's Stormwater assets are overall in Fair to Very Good condition, indicating that they are meeting the City's immediate needs. Detailed condition data is generally limited for Stormwater services, except for recent engineering estimates which inform erosion control structure and minor culverts required investments over a 10-year period. These assets are considered drivers of the 10-year maintain current LOS gap and 10-year achieved proposed LOS gap, respectively.

A loss of Stormwater services can result in localized and/or City-wide reductions to service. These may include significant impacts such as surface flooding, erosion, blockages, storm

sewer backups, poor quality effluent, damage to the natural environment, etc. Further investment and planning will also be needed to accommodate advances in new technology and climate change.

The 20 Year Wastewater Financial Plan demonstrates an existing commitment to continue renewing infrastructure as it approaches the end of its useful life. Overall, London's Wastewater Stormwater System is in good shape which allows it to continue providing high quality, and reliable Conveyance and Management services supply to Londoners. This is a positive legacy left by previous generations of staff and decision makers and one we strive to continue.

For over a century, under the Public Utilities Commission and then the City of London, there has been consistent investment in renewing Wastewater Stormwater infrastructure and expanding our system in a sustainable way. Our challenge moving forward is how we protect this legacy to ensure future generations can benefit from an excellent Wastewater Stormwater system.

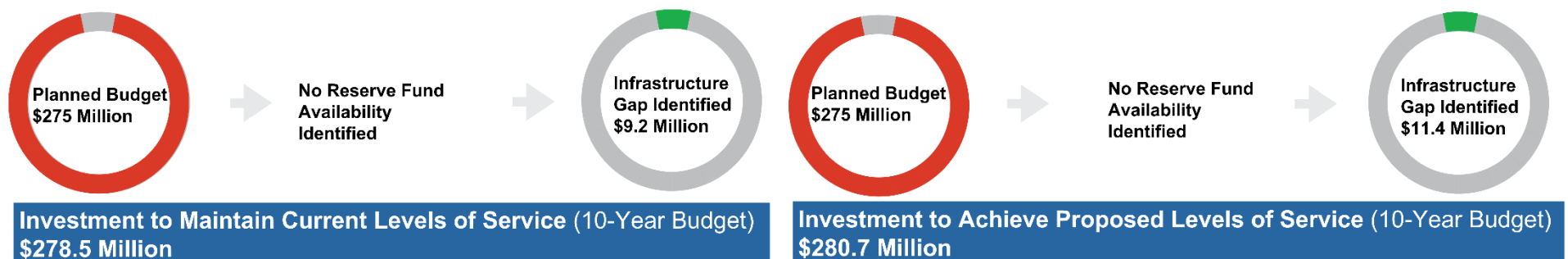



Figure 6.12 Visualization of Maintain Current and Achieve Proposed LOS Infrastructure Gaps (Wastewater – Stormwater Services)

Table 6.14 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Wastewater – Stormwater Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS ²⁰	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ²¹
Conveyance	5,583	Good	None identified	None identified	0.3%	1.0% to 1.3%
Management	753	Very Good	\$9.2	\$11.4	1.4%	1.7% to 2.0%
Stormwater	6,336		\$9.2	\$11.4	0.4%	1.1% to 1.4%

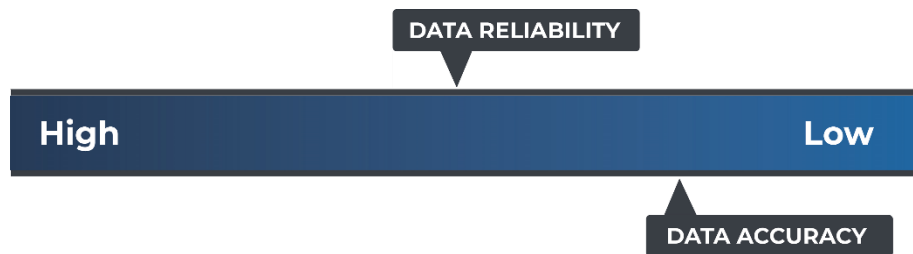


Figure 6.13 Accuracy Reliability Scale (Wastewater – Stormwater Services)

Accuracy and Reliability Commentary

Data reliability is rated as moderate. Inventory has been compiled via various existing sources including GIS and internal Stormwater Service Area data. Valuation of sewermain is based on external expert opinion which factors recent tender prices which factors width of sewermain and depth which the sewermain is installed, and restoration costs. Stormwater Management condition, investment forecast, and replacement value is split between TCA data (Stormwater Management Facilities), engineering estimates (Green Stormwater

Management Facilities, oil/grit separators, and majority of Open Conveyance) and a combination of external expert opinion and engineering analysis (dykes, erosion control structures, minor culverts). Condition and investment forecasts for Storm Sewers (approximately 88% of replacement value) are based on regular condition assessments. Open Conveyance municipal drains have not completed formal assessment. However condition and investment forecasts are based on age and expected useful life estimates from engineering analysis and external opinion, which may vary from actuals. Accuracy is rated as moderate to low, as sewermain forecasts not completely integrated with engineering estimates and Management assets not formalized to the same level as sewermain.

²⁰ This projected infrastructure gap is reduced by the forecasted reserve fund drawdown availability over the next decade.

²¹ Source: Canadian Report Card Recommended Annual Reinvestment Rate.



Section 7. Transportation and Mobility

Asset Information	Transportation
Replacement Value	\$4,762 million
10 year Maintain Current Levels of Service Infrastructure Gap	\$677 million
10 year Achieved Proposed Levels of Service Infrastructure Gap	\$994 million

Quick Facts
3,746 Lane Kilometers of Roads
1,597 Kilometers of Sidewalks
104 Bridges
91 Minor and Major Culverts
59 Noise Walls
37,941 Streetlights



7.1: State of Local Infrastructure

Roads, Structures and Traffic

Transportation and Mobility (referred to as 'Transportation Services' or 'Transportation') infrastructure is a crucial part of daily life that is often taken for granted. When somebody leaves their home, they use a Transportation and Mobility service. Safe streets, cycling facilities and structures support business, create employment, provide social opportunities, and create markets. When transportation infrastructure is deficient, congestion escalates, the frequency of collisions increases, wear and tear on vehicles worsens, emergency response deteriorates, the environment is negatively impacted, business suffers, and opportunities are lost.

The importance of an efficient multi-modal transportation network is essential to building a strong economy and improving the quality of life for our citizens. The City contributes to the local economy and quality of life by supporting the safe and efficient movement of people and goods using transportation infrastructure, while managing the growing cost of transportation.

Traffic assets are used to support reliable, efficient, and safe transportation through pedestrian and vehicular (including cycling) traffic control systems, appropriate lighting, signage, and pavement markings.

7.1.1: Asset Inventory and Valuation

Roads and Structures

Table 7.1 summarizes the asset inventory and valuation for the Roads and Structures assets. The value of the City's extensive roadways and structures network is over \$4.3 Billion. The Roads and Structures section includes assets ranging from roads, sidewalks, cycling facilities, vehicular and pedestrian bridges, to other City assets on right-of-way lands. Assets

associated with Parking are addressed separately in this report. Two provincial freeways, Highways 401 and 402 pass through London but fall under the ownership and control of the Province. Similarly, rail and air transportation infrastructure are not owned or managed by the City of London.

Roadways or streets are classified by their role and function as identified in the London Plan and Transportation Master Plan. These classifications include Neighbourhood Street, Neighbourhood Connector, Civic Boulevard, Urban Throughfare, Rapid Transit Boulevard, Rural Throughfare, Rural Connector, Expressway, Main Street, and Ramps. These street classifications are adopted for asset management purposes. Roadways include road base (typically granular materials), drainage, asphalt, curb and gutter, concrete islands, street furniture, etc.

Assets falling under the Structures category are classified based on purpose. Bridges and Major or Minor Culverts are vehicle crossing structures; Footbridges are major pedestrian crossings at highways, railways, or waterways. Footbridges, serving as essential links across the Thames River, railway lines, and major roadways, are prominently featured in the chapter on Transportation and Mobility. Meanwhile, the Parks chapter encompasses the other 24 footbridges, highlighting their management and operation by the Parks services. Pedestrian Tunnels are underground structures that support pedestrian movement under roadways; Noise Walls are vertical structures used to attenuate traffic noise from major routes; and Major Retaining Walls are engineered structures used to stabilize large embankments. Bridges, Footbridges, Major Culverts and Pedestrian Tunnels are inspected in accordance with Provincial Legislation (Ontario Reg. 104/97 Public Transportation and

Highway Improvement Act) and are maintained as needs dictate within budget allowances. Major Retaining Walls and Noise Walls are assessed and renewed on a planned basis (every 2

and 5 years respectively) according to the findings of engineering reviews and studies.

Table 7.1 Inventory and Valuation (Roadways and Structure Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Roadways	Expressway	67	Lane-km	\$75,802
	Rural Throughfare	196	Lane-km	\$177,037
	Rural Connector	138	Lane-km	\$105,474
	Civic Boulevard	591	Lane-km	\$571,612
	Urban Throughfare	257	Lane-km	\$260,204
	Main Street	46	Lane-km	\$44,375
	Neighbourhood Street	1,725	Lane-km	\$1,385,374
	Neighbourhood Connector	610	Lane-km	\$603,191
	Rapid Transit Boulevard	109	Lane-km	\$99,952
	Interchange Ramps	7	Lane-km	\$7,435
	Sidewalks	1,597	km	\$279,525
	Cycling Facilities - In-Boulevard Multiuse Pathway ²²	46	km	\$4,787
Structures	Bridges	104	Each	\$545,309
	Footbridges	7	Each	\$22,695
	Minor Culverts (between 1.8m to 3m span)	37	Each	\$20,322
	Major Culverts (greater than and equal to 3m span)	54	Each	\$69,909
	Pedestrian Tunnels	6	Each	\$7,708
	Major Retaining Walls	18	Each	\$18,401
	Noise Walls	59	Each	\$68,009
Table				\$4,367,121

²² This inventory covers only the In-Boulevard Multiuse Pathway Cycling Facilities Type (46 km) as all other types (140 km) are covered in other asset types in the Transportation section.

Traffic Assets

Table 7.2 summarizes the asset inventory and valuation for the Traffic assets. To meet transportation needs, the City owns and operates an extensive inventory of static, electrical, and electronic Traffic infrastructure valued at over \$394 million. Assets range from street lighting units, vehicular and pedestrian signals, to regulatory and informative signage, and road line markings.

Traffic infrastructure is broken down into three categories: Street Lighting, Signals, and Traffic Signage. Maintenance and upkeep of Lighting and Signals assets are contracted out to a third party. However, design and operating activities are undertaken

Table 7.2 Inventory and Valuation (Traffic Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Traffic	Streetlights	37,941	Each	\$176,426
	Traffic Signs	9,052	Each	\$2,174
	Signals	413	Each	\$215,970
Total				\$394,570

7.1.2: Age Summary

Roadway Assets

Figure 7.1 shows the Roadways average asset age as a proportion of the average useful life by asset. As stated by Statistics Canada concerning useful lives of roads in urban municipalities, the average useful life is 45 years for all types of roads except for the highways in which the estimated useful life is 25 years and represents the construction of all necessary granulars and surface treatment (asphalt or concrete) that comprise a road structure. The average age for roads was calculated using the Pavement Management System last reconstruction date, while the sidewalks age is not assessed and cycling facilities have been estimated using expert opinion.

by City staff. The contracts and Provincial standards govern asset performance and the timing of work. The City also maintains road signage and line markings. Major and minor regulatory signage is governed by the Highway Traffic Act, and local bylaws, respectively. Guidance or Information signs are posted according to City policy and as defined in the Ontario Traffic Manual.

Lighting is a significant consumer of energy. The City managed to convert 60% of the Streetlights to LED or low energy fixtures and the target is to transform 100% of the Streetlights to be energy efficient in the future. The City is also likely to pursue traffic efficiencies through newer and smarter technology.

The design life for most asphalt pavements is 15-20 years, and they must be rehabilitated or replaced 2 or 3 times within the estimated useful life of the roadway base. Utilizing pavement preservation treatments (rout and seal, recycled asphalt) and pavement rehabilitation methods (mill and pave, mat replacement) at the appropriate intervals can achieve and extend the average useful life of a roadway. As shown in Figure 7.1, all roadway assets have not passed their Estimated Useful Life; however, a road asset network with an average age nearing its expected useful life signals concern, as it implies nearly half the assets are beyond their estimated useful lives. Ideally, this average age should be half the estimated useful life.



Figure 7.1 Average Age and Expected Useful Life (Roadway Services)

Structures Assets

Figure 7.2 shows the Structures average asset age as a proportion of the average useful life by asset. The average age for all structures was calculated using the estimated construction date available in the City's Bridge Management System (BMS). The average age of all types of Structures are in an acceptable range compared to their respective asset type except for the minor and major culverts. An average age nearing their expected useful life signals concern, as it implies nearly half the assets are beyond their estimated useful lives. Ideally, this average age should be half the estimated useful life. Similar to roadways, Structures typically require ongoing maintenance and major rehabilitations in order to achieve their

average useful life expectancy. Major bridge rehabilitations would be expected to occur at about the structures' age of 25 years, 50 years, and 75 years if funding allowed. Many the City's structures are nearing the 50-year threshold for major rehabilitation, though it should be noted that due to low historical funding levels, some of these structures were not rehabilitated at the 25-year mark and will likely require more significant and costly repair work. Proper bridge preservation and planned rehabilitation keeps structures in Good condition, delays and reduces bridge deterioration, restores the function of the existing structure, and can extend the useful life of a structure beyond the averages noted below.

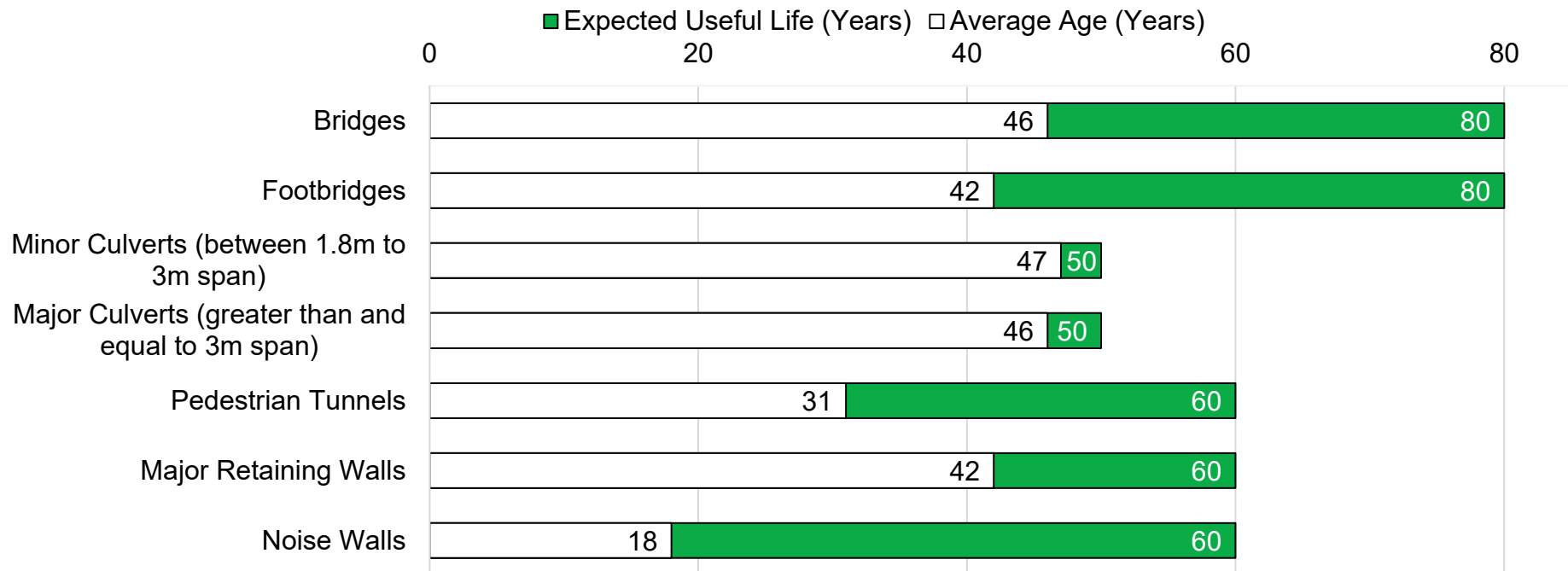


Figure 7.2 Average Age and Expected Useful Life (Structures Assets)

Traffic Assets

Figure 7.3 shows Traffic assets' average asset age as a proportion of the average useful life by asset. The average ages for Signals have been calculated using the acquisition date and/or the last major re-build of each Signal. The average ages of Signage and Streetlights have been estimated using the asset condition distribution illustrated in Figure 7.7. As shown,

the average age of Signals is approaching the end of the Estimated Useful Life (EUL). An average age nearing their expected useful life signals concern, as it implies nearly half the assets are beyond their estimated useful lives. Ideally, this average age should be half the estimated useful life. A plan is underway to replace 21 Signals per year to reduce the average Estimated Useful Life.

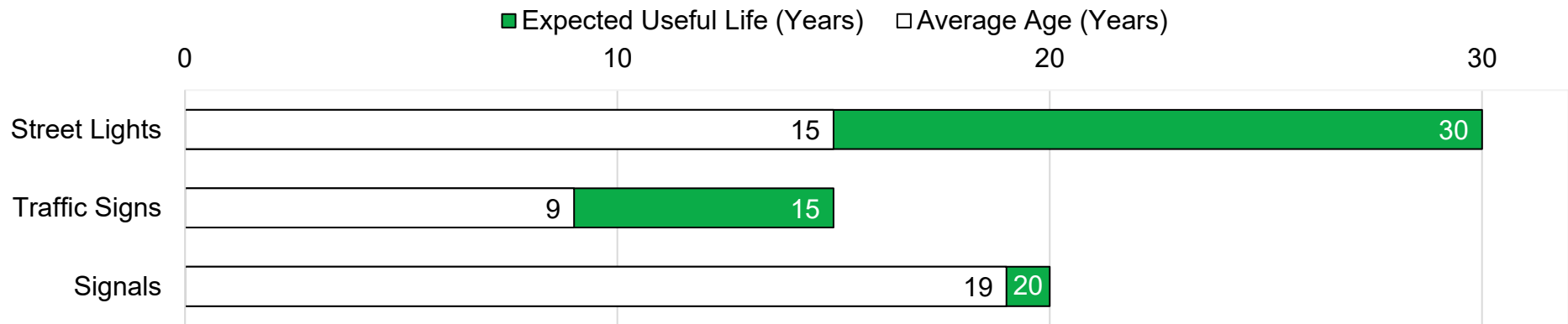


Figure 7.3 Average Age and Expected Useful Life (Traffic Assets)

7.1.3: Asset Condition

Figure 7.4 illustrates the Condition distribution of the City's Transportation assets. 77% of the City's Transportation services assets (Roadways, Structures, and Traffic) are in Fair to Very

Good condition, with the remainder approaching the end of their expected useful lives, indicating a need for investment in the short to medium term.

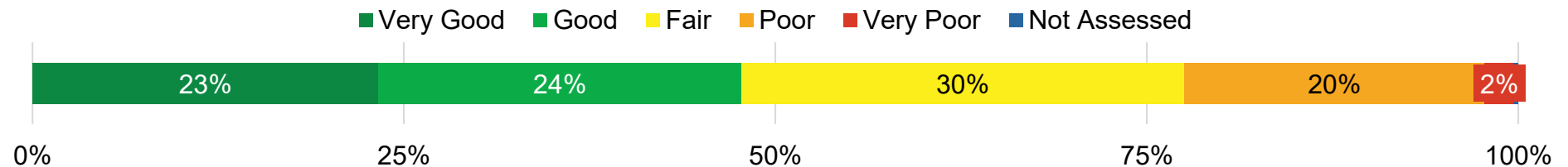


Figure 7.4 Overall Condition (Transportation Services)

Roads and Structures Assets

Figure 7.5 and Figure 7.6 illustrate the condition of each Asset Type in the Roadways and Structures asset portfolio. The condition of London's Roads, Sidewalks and Cycling Facilities are evaluated on a regular basis using varying condition assessment techniques. One quarter of the City's Paved Roads are assessed on a rotating annual cycle based on evaluating the curb lanes of a 4-lane road, or a single lane on a 2-lane road, using a combination of visual rating with surface distress and longitudinal profile (wheel path roughness) data collection. Visual rating is used for curb type and condition. Results are analyzed and used to establish the pavement performance rating or each road segment in the City known as the Pavement Quality Index (PQI).

Road sections that are at an optimal time for specific rehabilitation treatments are placed on a list for rehabilitation. The highest priority roads are repaired dependent on budget availability with efforts made to coordinate road needs with other infrastructure lifecycle renewal projects to maximize the economies for all users. The roads that are not repaired join the list for future budgets. Staff and public observations also result in spot repairs and rout and sealing as needed (i.e., potholes and cracks). In London, gravel roads generally represent a small portion of the road network and are visually inspected and repaired as required. Sidewalks are annually reviewed and rated visually to identify trip hazards and major deficiencies. This rating is used to identify the overall condition of each segment. Sidewalk repairs are made based on the assessment results or feedback from the public and staff. Temporary sidewalk repairs are made quickly until full repairs can be made. Visual observations and public feedback are the primary triggers for repair for any remaining road assets. Cycling lanes, in most cases, are evaluated during the roads regular assessment and

included in the Pavement Quality Index wherever they exist, except for in-boulevard multi-use-pathways. These facilities are assessed separately using expert opinion.

The city road network can be also classified into ten categories based on traffic volume and characteristics. Road classes are managed to a different network average PQI targets that range from 55 to 70. Road assets are generally maintained on a lifecycle basis through the selection of the optimal treatment based on cost, their current condition, projected deterioration, and available budget. Treatments range from patching and sealing to resurfacing or total reconstruction and are selected based on lifecycle costs of maintaining the road segment within its target state. Most of the network, within the following classifications: Neighbourhood Street, Neighbourhood Connector, Civic Boulevard, Urban Throughfare, Main Streets, Rural Connector, Rural Throughfare and Rapid Transit Boulevards are rated in fair condition with approximately 24% of each road class being in Poor condition and requiring near-term rehabilitation. Expressways are rated in Very Good condition because Veteran's Memorial Parkway between Hwy 401 and Oxford St has recently been repaved. However, Highbury Ave South between the South Branch of the Thames River and Hwy 401) is in Fair condition and given the age of this concrete pavement and the volume of traffic using this corridor it requires reconstruction in the near-term. Overall ramps are in Fair condition, with 43% in Fair Condition, requiring near term rehabilitation.

City sidewalks are managed proactively to address trip hazards and safety concerns. Sidewalks are reviewed annually, and areas with major issues are scheduled for immediate repair. Sidewalks are also evaluated and renewed as part of neighbourhood renewal and redevelopment activities, where replacement of assets is coordinated with other construction

works. Overall, sidewalks are primarily in Very Good condition indicating that they are free of trip hazards and major damage.

City owned Bridges, Footbridges, Pedestrian Tunnels and Major Culverts are managed in accordance with Provincial Bridge Legislation and Guidelines. Assets are managed using the City's Bridge Management Rating System based on biennial field inspections by qualified experts to identify structural issues and concerns. Deficiencies are noted and combined with other service requirements in planning corrective action. 33% of the City bridges and all the City's footbridges are in Fair to Good condition. Approximately 82% of the Major culverts and all the City's Pedestrian Tunnels assets are in Fair to Good condition. The condition assessment study indicates that there is 15% of structures assets are in Poor or Very Poor condition; indicating that some structures will require rehabilitation in the short term with most of the structures requiring rehabilitation in the medium term or long term.

Noise Walls and Major Retaining Walls are managed to address any safety concerns. All retaining walls must be maintained in a stable condition. Any portion showing signs of deterioration, deflection or settlement should be monitored, repaired, reinforced, or replaced. Assets are monitored by City crews and evaluated regularly (every 5 years and 2 years, respectively) using engineering studies. Needs are prioritized based on urgency and addressed as needed through capital renewal. Noise Walls are currently in Good condition, indicating that they are free of significant defects. 61% of the Major Retaining Walls are in Fair condition indicating that that they are operational and free of urgent deficiencies while approximately 39% of them in Poor condition requiring rehabilitation in the short term.

Traffic Assets

Figure 7.7 illustrates the condition distribution of the three Traffic asset sub-types: Traffic signs, Traffic Signals, and Streetlights. Traffic Signs are in an average of Good condition, while approximately 68% of the Traffic signals are in Fair to Very Good condition. There is 32% of the Traffic Signals in Poor to Very Poor condition which requires short-term rehabilitation or replacements. The streetlights are on average in Fair condition with approximately 49% in Poor to Very Poor condition which requires short to medium term rehabilitations or replacements.

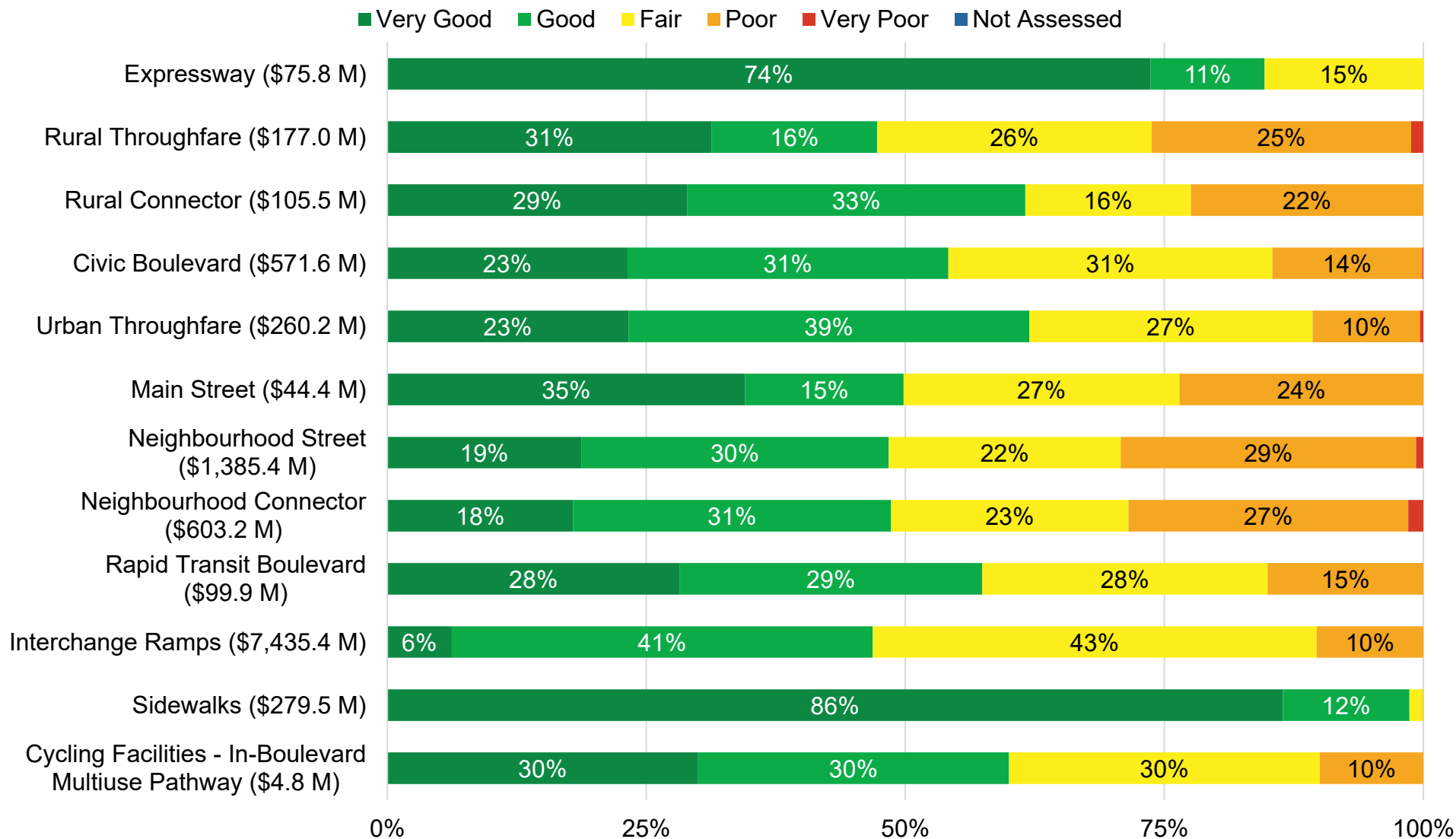


Figure 7.5 Asset Condition Detail (Roadways)

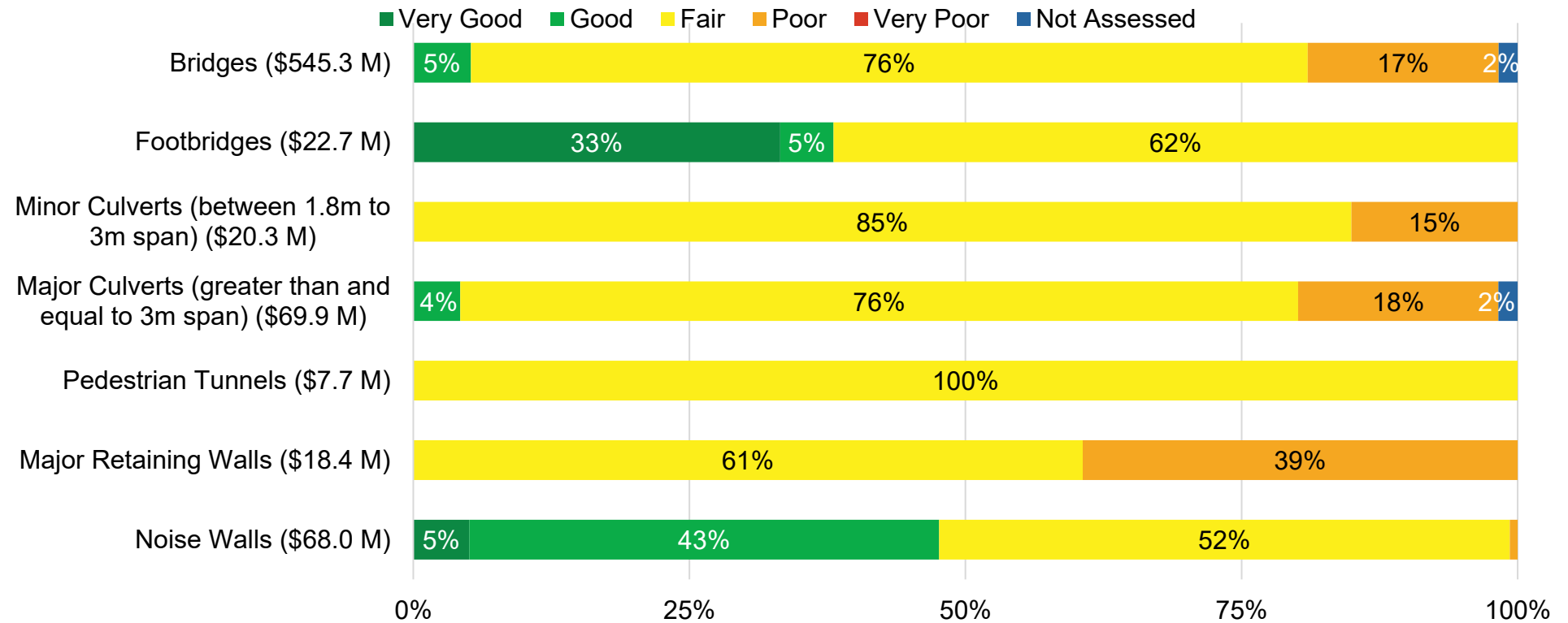


Figure 7.6 Asset Condition Detail (Structures)

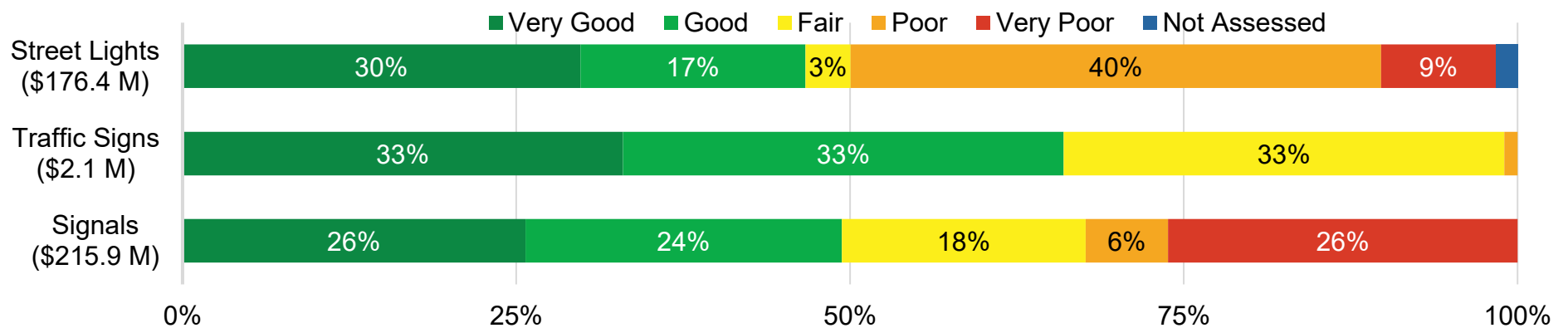


Figure 7.7 Asset Condition Detail (Traffic)

7.2: Levels of Service

O. Reg 588/17 Requirements

O. Reg. 588/17 requires legislated community levels of service for core assets. Community levels of service use qualitative descriptions to describe the scope or quality of service delivered by an asset category. Examples of legislated community levels of service include a map showing the different levels of road class pavement conditions or images that illustrate the different condition of bridges and how this would affect use of the bridges. O.Reg. 588/17 also requires legislated technical levels of service for core assets. Technical levels of service use

metrics to measure the scope or quality of service being delivered by an asset category. Examples of technical levels of service include average surface condition for paved roads based on the Pavement Condition Index Value or the average bridge conditions based on Bridge Condition Index value.

Table 7.3 lists the performance measures that are included in the O.Reg. 588/17 requirements for Roads and Structures assets. References are provided to show where O. Reg 588/17 requirements have been attained.

Table 7.3 O. Reg 588/17 Levels of Service (Roads and Structures Assets)

Customer Level of Service	Technical Level of Service
Description or images that illustrate the different levels of road class pavement condition. (Table 7.5)	Average surface condition (e.g., excellent, good, fair or poor) for unpaved roads. (Table 7.4)
Description or images of the condition of bridges and how this would affect use of the bridges. (Table 7.6)	For bridges in the municipality, average bridge condition index value. (Table 7.4)
Description or images of the condition of culverts and how this would affect use of the culverts. (Table 7.7)	For structural culverts in the municipality, average bridge condition index value. (Table 7.4)
Description, which may include maps, of the road network in the municipality and its level of connectivity. (Figure 7.8 and Figure 7.9)	Average surface condition for paved roads. (Table 7.4)
Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists). (Table 7.4)	<p>Number of lane-kilometres of arterial roads as a proportion of square kilometres of land area of the municipality. (Table 7.4)</p> <p>Number of lane-kilometres of collector roads and local roads as a proportion of square kilometres of land area of the municipality. (Table 7.4)</p> <p>Number of lane-kilometres of local roads as a proportion of square kilometres of land area of the municipality. (Table 7.4)</p> <p>Percentage of bridges in the municipality with loading or dimensional restrictions. (Table 7.4)</p>

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for Levels of Service (LOS) performance measures linked to Customer Values of Accessible, Scope, Cost Efficient, Environmental Stewardship/Sustainability, Reliability, Quality, and Safety. For O. Reg 588/17 requirements, the LOS are assessed as O.Reg. 588/17 Levels of Service Metrics as seen Table 7.4 to Table 7.7.

Direct and Related LOS

After review with Transportation, Planning and Design, LOS considered most representative of Transportation's services and able to be costed over a 10-year projected period (calendar

years 2022 through 2031) are documented as 'direct LOS' and are listed in Table 7.8.

LOS that have a causal relationship with direct LOS are documented in Table 7.9 as Related LOS but cannot be as readily costed to Transportation's services. O. Reg LOS also have components of either Direct LOS or Related LOS but for simplicity, O. Reg. LOS are summarized in Table 7.4.

Metrics

Table 7.10 listed metrics that are useful information, especially when considered in conjunction with O. Reg., Direct LOS, and Related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or easily costed to services Transportation assets provide.














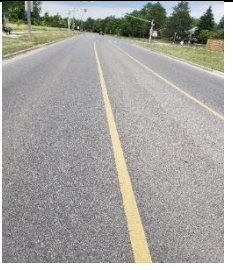




7.2.1: O.Reg. 588/17 Levels of Service (Transportation Services)

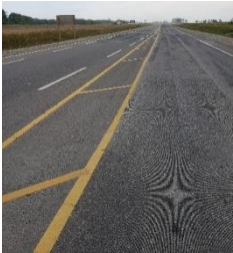







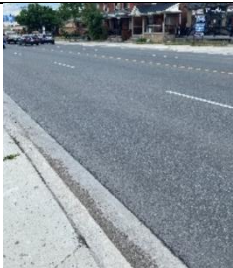









Table 7.4 O.Reg. 588/17 Levels of Service (Transportation Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Scope	Customer	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	The City of London bridges have been designed in accordance with the standard and requirements of the Bridge Design Code at the time of construction. The bridges have been designed to carry the design loads appropriate for the intended use.	Not Applicable
Scope	Customer	Maps of the road network in the municipality and its level of connectivity.	(Figure 7.8 and Figure 7.9)	Not Applicable
Scope	Technical	Number of lane-kilometres of arterial roads (Class 1 and 2) as a proportion of square kilometres of land area of the municipality.	2.17	Maintain current
Scope	Technical	Number of lane-kilometres of collector roads (Class 3 and 4) as a proportion of square kilometres of land area of the municipality.	2.07	Maintain current
Scope	Technical	Number of lane-kilometres of local roads	4.613	Maintain current

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)		Proposed LOS (2022 to 2031)	
		(Class 5 and 6) as a proportion of square kilometres of land area of the municipality.				
Scope	Technical	Percentage of bridges in the municipality with loading or dimensional restrictions.	2%		Maintain current	
Quality	Customer	Images indicate how condition of pavement affect use.	Table 7.5		Not Applicable	
Quality	Customer	Images indicate how condition of bridges affect use.	Table 7.6		Not Applicable	
Quality	Customer	Images indicate how condition of culverts affect use.	Table 7.7		Not Applicable	
Quality	Technical	Average surface condition (e.g., excellent, good, fair, or poor) for paved roads.	Fair (59 PQI)		Good (65 PQI)	
Quality	Technical	Average surface condition (e.g., excellent, good, fair, or poor) for unpaved roads.	Fair		Maintain current	
Quality	Technical	Average bridge condition index value for bridges.	6.34		Maintain current	
Quality	Technical	Average bridge condition index value for structural culverts.	6.41		Maintain current	

Table 7.5 Images of Pavement Quality Index Inspections Compared to Asset Management Condition Rating

Asset	Very Good Condition 1	Good Condition 2	Fair Condition 3	Poor Condition 4	Very Poor Condition 5
Expressway				N/A	N/A
Rural Throughfare					
Rural Connector					
Civic Boulevard					

State of Local Infrastructure	Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset	Very Good Condition 1	Good Condition 2	Fair Condition 3	Poor Condition 4	Very Poor Condition 5
Expressway				N/A	N/A
Urban Throughfare					
Main Street					
Neighbourhood Street					


















State of Local Infrastructure	Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset	Very Good Condition 1	Good Condition 2	Fair Condition 3	Poor Condition 4	Very Poor Condition 5
Expressway				N/A	N/A
Neighbourhood Connector					
Rapid Transit Boulevard					
Interchange Ramps				N/A	

Table 7.6 Images of Bridge Inspections Compared to Asset Management Condition Rating







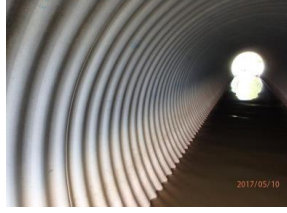



Asset	Very Good Condition 1	Good Condition 2	Fair Condition 3	Poor Condition 4	Very Poor Condition 5
Bridges					

Table 7.7 Images of Culvert Inspections Compared to Asset Management Condition Rating

Asset	Very Good Condition 1	Good Condition 2	Fair Condition 3	Poor Condition 4	Very Poor Condition 5
Culverts					

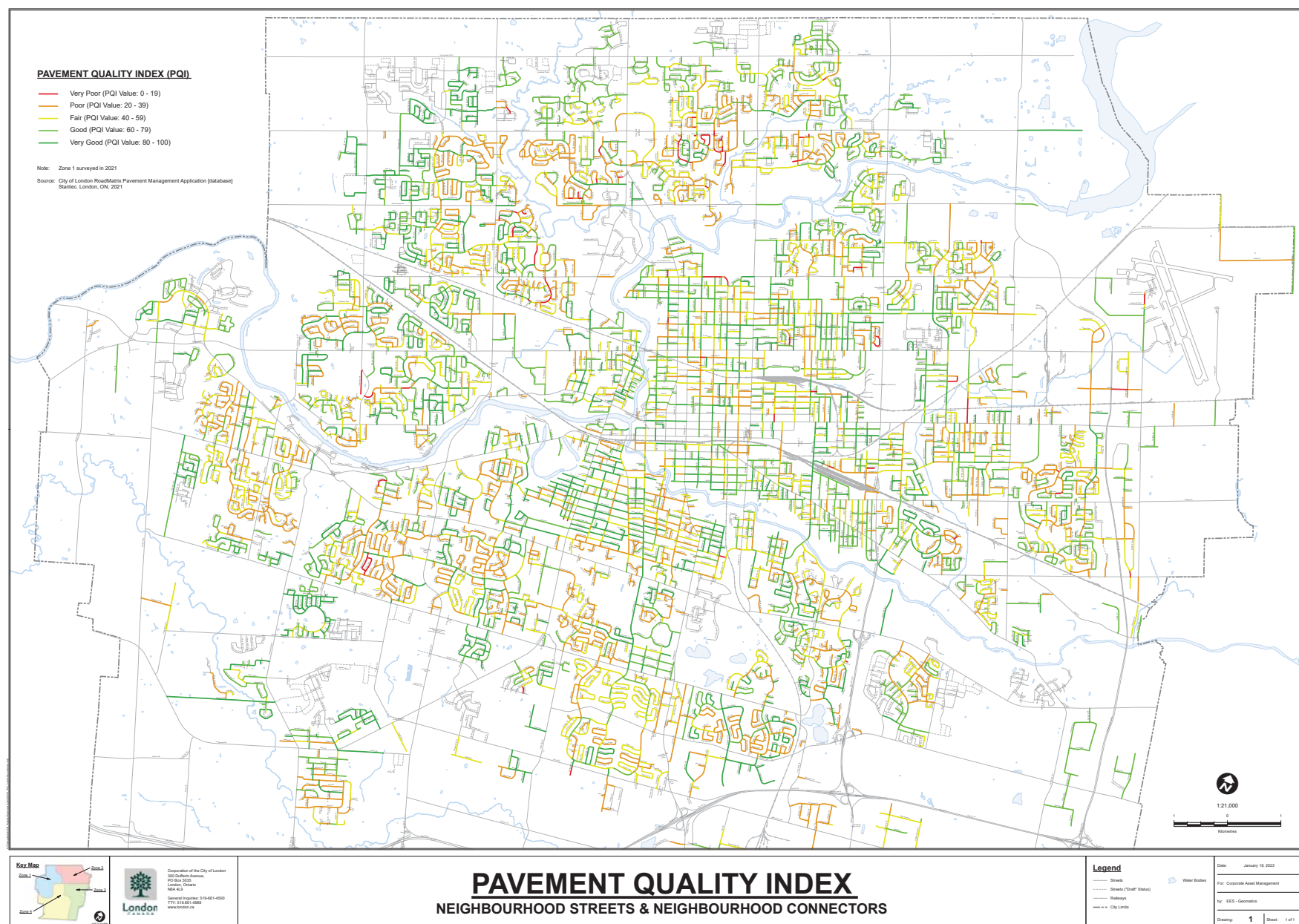


Figure 7.8 Road Network and its Level of Connectivity Map (Neighbourhood Streets and Connectors)

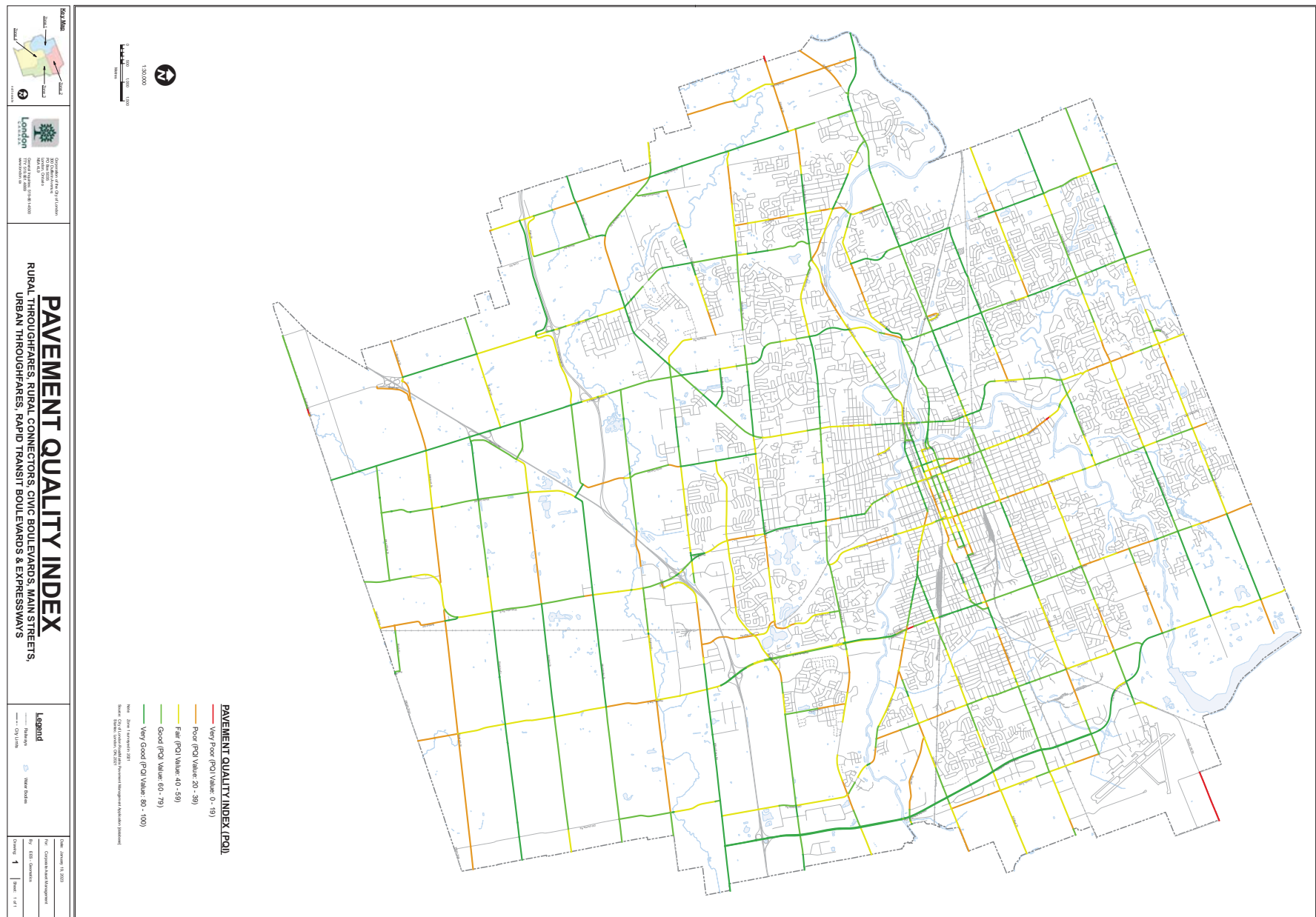


Figure 7.9 Road Network and its Level of Connectivity Map (Other Road Types)

7.2.2: Direct Levels of Service

Table 7.8 Direct Levels of Service (Transportation Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Scope	Technical	Number of meters of bike lanes constructed annually (Strat Plan - Row 177)	8,460	Maintain current
Scope	Technical	Percentage of linear bike facility (i.e., bike lanes) completed vs. total in cycling master plan	47.5%	Maintain current
Cost Efficiency	Technical	Transportation Overall Reinvestment Rate	0.9%	2.3%
Environmental Stewardship	Technical	Percentage of streetlights that are energy efficient	100%	Maintain current
Reliability	Customer / Council	Percentage of Transportation assets (Roadways, Structures and Traffic Assets as a weighted average based on replacement cost) in Fair or better condition	77.5%	Maintain current
Reliability	Customer / Council	Percentage of Structures in Poor or Very Poor Condition	165.7%	0%
Safety	Technical	Annual percentage reduction in injury and fatality collisions (Strat Plan, Row 216)	31.0%	6%
Safety	Customer / Council	Percentage compliance with Minimum Maintenance Standards	100%	Maintain current
Safety	Customer / Council	Percentage decrease in neighbourhood streets without streetlights (not including rural)	0.0%	Maintain current

7.2.3: Related Levels of Service

Table 7.9 Related Levels of Service (Transportation Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Traffic Annual Average Reinvestment Rate	2.1%
Cost Efficiency	Technical	Roadways Annual Average Reinvestment Rate	0.8%
Cost Efficiency	Technical	Structures Annual Average Reinvestment Rate	0.9%
Reliability	Customer/ Council	Percentage of paved lane km where the condition is rated as Good to Very Good	56.0%
Reliability	Technical	Percentage of roads in Poor or Very Poor condition	21.7%
Reliability	Technical	Percentage of sidewalk segments in Poor or Very Poor condition	0%
Reliability	Customer/ Council	Percentage of signage assets in Poor or Very Poor condition	1.0%
Reliability	Customer/ Council	Percentage of signals assets in Poor or Very Poor condition	32.0%
Reliability	Customer/ Council	Percentage of street light assets in Poor or Very Poor condition	48.3%
Scope	Technical	Number of bridges and culverts with reduced load limits	1

7.2.4: Other Measures

Table 7.10 Metrics – Other Dashboard Measures (Transportation Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Operating budget for Transportation services (Roadway, Structure, Street Lighting and Traffic Signals)	\$56,034,231
Cost Efficiency	Customer/ Council	Operating cost to provide transportation services (Roadway, Structure, Street Lighting and Traffic Signals) (\$/household)	\$320.82
Environmental Stewardship	Customer/ Council	Volume of salt tons applied to road/lane km	10.40
Environmental Stewardship	Technical	Volume of salt applied to road/lane km (just km that are salted, not all km in city)	23.30
Environmental Stewardship	Technical	Percentage reduction in the afternoon peak Travel Time Index (ratio of off-peak to peak travel times on busy roads) (Strat Plan - Row 209)	6.8%
Quality	Customer/ Council	Percentage of residents satisfied with road service	48%

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Customer Value	Focus	Service Performance Measure			2021 Performance	
Reliability	Technical	Percentage of Permit of Approved Works (PAW) site inspections			90%	
Reliability	Technical	Percentage of identified trip hazard repaired/replaced vs painted			80%	
Reliability	Technical	Percentage compliance of winter maintenance (sand, salt and plowing) with Policies, road patrol and maintenance standards)			100%	
Reliability	Technical	Percentage compliance of Spring/Summer maintenance (sweeping and debris removal) with policies, road patrol and maintenance standards			100%	
Reliability	Technical	Percentage of Arterials road segments that did not meet the desired condition			53.0%	
Reliability	Technical	Percentage of Primary Collectors road segments that did not meet the desired condition			53.0%	
Reliability	Technical	Percentage of Expressway road segments that did not meet the desired condition			1.7%	
Reliability	Technical	Percentage of Freeway road segments that did not meet the desired condition			80.0%	
Reliability	Technical	Percentage of Secondary Collectors road segments that did not meet the desired condition			53.0%	
Reliability	Technical	Percentage of Local road segments that did not meet the desired condition			45.0%	
Safety	Technical	Sign Reflectivity Testing - Percentage Pass			> 98% Pass	
Safety	Technical	Percentage compliance with Bridge Inspection Standard			100%	
Safety	Technical	Percentage of Signage with visibility that meets (check)			100%	
Safety	Technical	Percentage of street light repairs that meet or exceed municipal road maintenance timeline standards			100%	
Safety	Technical	Percentage of street light repairs that do not meet municipal road maintenance timeline standards			0.0%	
Safety	Technical	Percentage of traffic signal repairs that do not meet municipal road maintenance timeline standards			0.0%	
Safety	Technical	Percentage of traffic signal repairs that meet or exceed municipal road maintenance timeline standards			100%	

7.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant

recommendations, available budget, and trial and error through scenarios and pilot programs.

7.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current levels of service while striving to optimize costs and risks. Table 7.11 specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Asset management practices or planned actions employed by cities can entail certain specific risks. Many types of risks such as health and safety, financial, environmental, etc. are summarized in Table 7.12 classified by each lifecycle activity. The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 7.11 Current Asset Management Practices or Planned Actions (Transportation Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> Public involvement practices such as spring cleanup. The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, and other emergency planning, which may trigger asset investment needs. Public transit incentives, encourage water conservation and energy from policy, procedures, public outreach, etc. Mobility Transportation Master Plan role to enhance the mobility across the City, several studies are conducted to improve road network.
Maintenance	<ul style="list-style-type: none"> Routine maintenance such as street sweeping, pothole patching, utility cut repairs, sidewalk levelling, etc. Snow and ice removal maintenance. Meet Provincial Minimum Maintenance Standards. Scheduled preventative maintenance programs such as the rout and seal program to reduce water penetration/damage and debris accumulation. Annual pavement quality assessment program – 25% per year of the network reviewed annually, pavement quality 24-hour maintenance response capability. Pavement markings on major routes are reapplied semi-annually.

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
	<ul style="list-style-type: none"> The condition of the line markings vary throughout the year based on traffic, type of marking and time since reapplication. 'Report a Pot Hole' Program. Availability of Transportation Operations Public Service (TOPS). Scheduled inspection programs once every 2 years for structures. Reactive maintenance for significant portion of asset inventory. Maintenance of Lighting and Signals infrastructure is contracted out. 					
Renewal/ Rehabilitation	<ul style="list-style-type: none"> Roadways are maintained on a lifecycle basis through the selection of the optimal treatment based on their current condition and projected deterioration. Road renewal and rehabilitation treatments range from patching and crack sealing, to resurfacing, to total reconstruction, and are selected to minimize the lifecycle cost of operating each asset within its target state. Road sections that are at an optimal time for specific rehabilitation treatments are placed on a list for prioritization. Rehabilitation is dependent on budget availability. Biennial structure inspection program identifies major rehabilitation based on number of factors including overall condition of the structure and risk to the public safety, impact of disrupted service based on AADT or other criteria, and age of the structure and remaining service life expectations. 					
Replacement/ Construction	<ul style="list-style-type: none"> High traffic volumes and environmental factors accelerate the deterioration rate of the assets. Replacement activities are selected to minimize the lifecycle cost of operating and maintain asset target state. Road sections that are at an optimal time for replacement are placed on a list for prioritization, coordinated with other assets lifecycle renewal needs, and constructed pending budget availability. Structure replacement is based on structure age, assumed life span, and the result of condition surveys. 					
Disposal	<ul style="list-style-type: none"> Decommissioning obsolete assets is carried in as needed while striving to reduce costs to the City through auction or resale where possible. This may include unopened road allowances. Roadway disposals are infrequent and generally related to rerouting. Should a section of a road be permanently closed, the section can be deconstructed, and the land sold or repurposed. Structures disposals are infrequent. Should a structure be permanently closed, the section can be deconstructed. 					
Service Improvement	<ul style="list-style-type: none"> These can include technologies such as pavement material alternatives. New and improved materials and pavement design processes. 					
Growth	<ul style="list-style-type: none"> The Transportation Master Plan and upcoming Mobility Master Plan identify the long term policies, programs and projects for the city's mobility network. Undertake Environmental Assessments. Capital growth projects and analysis in conjunction with Development Charge service area (where applicable with regulatory and municipal policy), or as a part of Assessment Growth Policy (where applicable with municipal policy). Assumption of subdivisions, commercial and industrial extensions, local improvements, etc. Capital growth projects-road extensions and expansions, and additional lanes. 					

Table 7.12 Risks Associated with Asset Management Practices or Planned Actions (Transportation Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> • During rehabilitation work, extra costs to minimize road user disruption as roads become more congested. • Streetscaping enhancements can increase costs of project implementation and redirect dollars from maintaining existing assets. • Cycling facilities design standards and practices will increase operating budgets. • Ten (10) to twenty (20) year planning horizon for long lifecycle assets (like bridges) may be short sighted. The City budget does not allow us work on the structures in Poor condition that require work in the next 0-5 years and as a result, more money is spent on maintenance. Delaying rehab beyond the recommended time to complete the work increases Lifecycle Costs, increases disruptions to traffic and increases the cost of rehab or may warrant replacement instead of rehab. • Requirement to meet current design code requirements.
Maintenance	<ul style="list-style-type: none"> • Completing planned maintenance activities while managing the need to execute reactive maintenance activities. • Incorrectly planned maintenance activities can lead to premature asset failure. • Sufficient resources available to complete a series of unplanned, urgent work requests that are submitted in close succession. • Overscheduling preventative maintenance can lead to excessive maintenance and additional costs with no benefit.
Renewal/Rehabilitation	<ul style="list-style-type: none"> • Incorrect assumptions regarding improved expected useful life after rehabilitation.
Replacement/Construction	<ul style="list-style-type: none"> • Cost over-runs during large, complex design and construction projects.
Disposal	<ul style="list-style-type: none"> • Disposal incorrectly performed or cost overruns resulting from increase disposal need compared to initial estimates.
Service Improvement	<ul style="list-style-type: none"> • Service improvement is either not required or incorrectly assessed.
Growth	<ul style="list-style-type: none"> • Incorrect growth assessments may result in overabundance of assets or insufficient funding to maintain new asset. • Incorrect asset size will cost more money and may cause operational challenges (too large asset) or may result in the need to prematurely expand the asset (too small asset).

7.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable in addition to maintaining the overall average condition of all assets in Transportation. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the

forecasted change in the condition profile of each asset type. Figure 7.10 shows the projection of the condition of the Transportation assets based on three mentioned scenarios. The projected condition with current budget, maintain current LOS and achieving proposed LOS condition projection. The figure also shows planned budget, the required investments to maintain the current LOS and Investments to achieve proposed LOS It demonstrates how the current budget will lead to a decrease in the overall condition of Transportation assets.

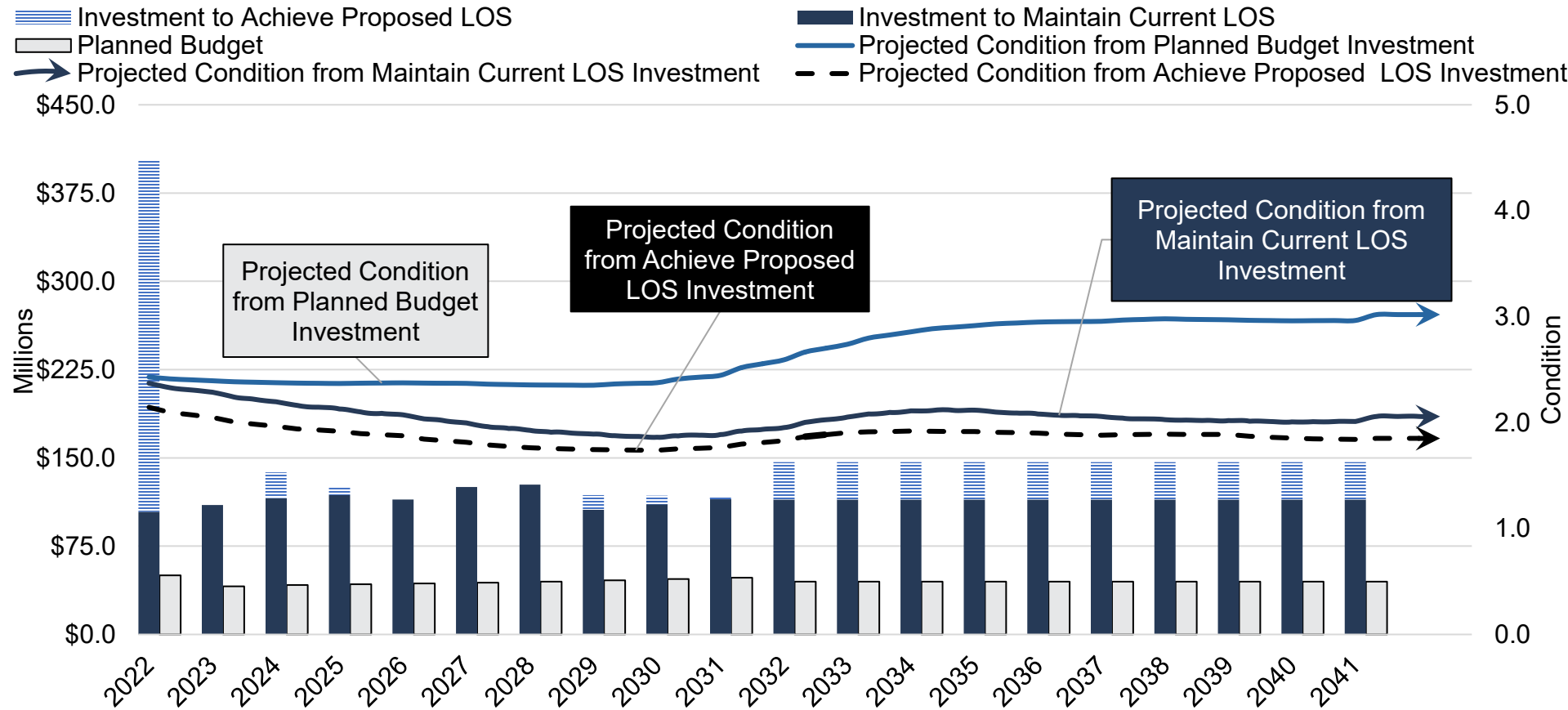


Figure 7.10 Projected Service State of Three Funding Scenarios (Transportation Services)

A. Scenario One: Planned Budget Condition Profile

The Transportation average annual activity and planned funding is summarized in Table 7.13. The condition profile expected from the current budget is forecasted by using the same logic related to condition deterioration rates that helps forecast and analyze the decline in an asset's condition, performance, and functionality over time and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. However, there is an allocated budget for each asset type, Roadways, Structures, and Traffic. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. Figure 7.11 presents the expected condition profile for the next 20 years based in the current budgets for Transportation assets. This scenario indicates the condition

profile trending to most assets ranging from Fair, Poor, and Very Poor Condition.

Current funding for operating budgets is presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years. Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget.

Growth activities are considered analyzed using the 2021 Development Charges Background Study. This includes a review of major upcoming projects such as Southdale Road improvements Adelaide Street grade separation, operations centre in the north of London, reconstruction of several road intersections, etc. All number in tables are rounded to nearest thousand.

Table 7.13 Scenario One - Average Annual Planned Budget (\$Thousands) (Transportation Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	54,741	56,562
Renewal, Replacement, Rehabilitation, and Disposal	39,396	44,908
Service Improvement	6,247	750
Growth Activities	64,279	54,926

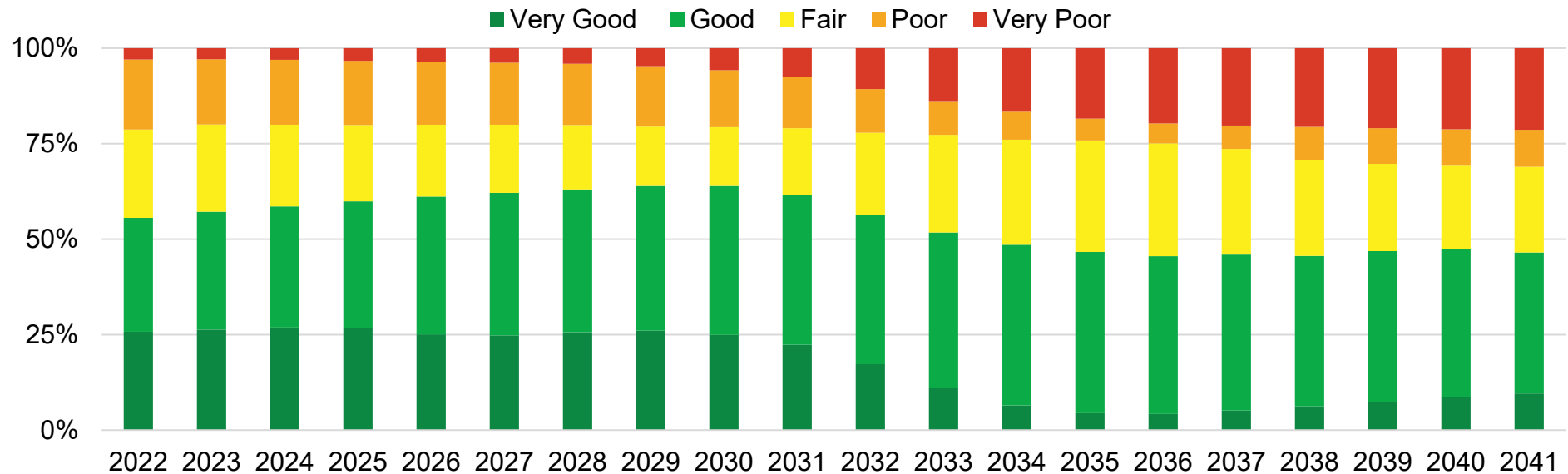


Figure 7.11 Projected 20-year Planned Budget Condition Profile (Transportation Services)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

Table 7.14 summarizes the cost to maintain current levels of service. The approach to establishing the optimal budget is to forecast the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition

profile into the future. The variables in the analysis are adjusted until the forecasted condition profile maintains the current condition profile over the next 20 years. Figure 7.12 presents the expected condition profile for the next 20 years based on investment required for maintain current LOS for Transportation assets. This scenario indicates the condition profile trending to most assets being in Good and Very Good Condition.

Table 7.14 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Transportation Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	56,562	None identified	56,562	None identified
Renewal, Replacement, Rehabilitation, Disposal	44,908	2,000	114,660	67,752
Service Improvement	750	None identified	750	None identified
Growth Activities	54,926	None identified	54,926	None identified

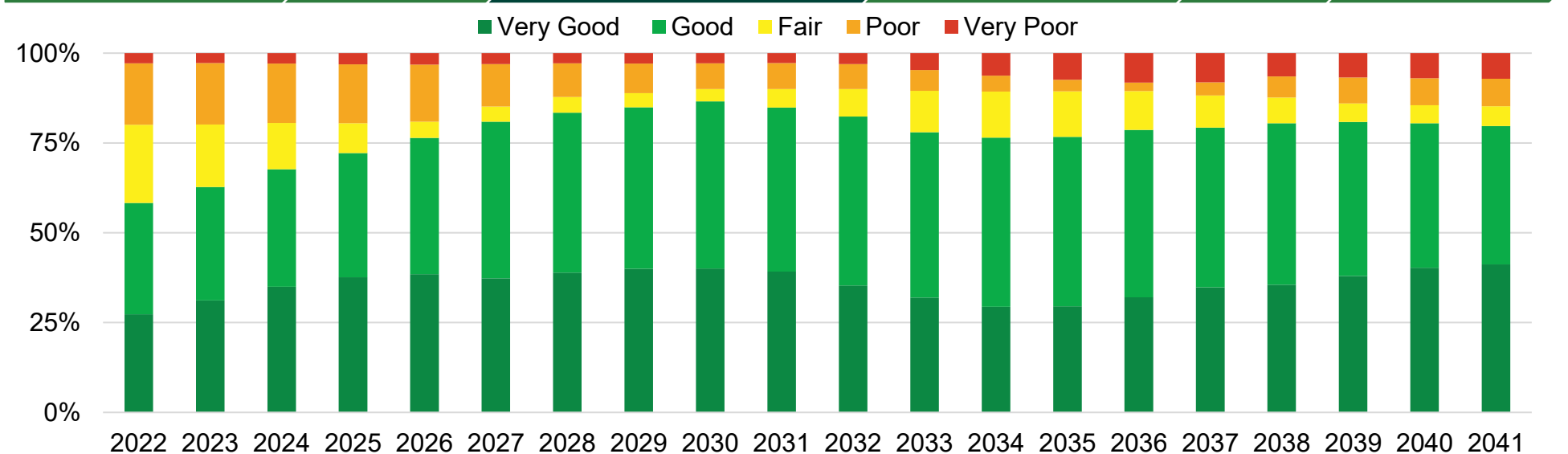


Figure 7.12 Projected 20-year Maintain Current LOS Condition Profile (Transportation Services)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

Table 7.15 summarizes the cost to achieve the proposed levels of service. The approach to establishing the required budget to achieve the proposed current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the expectation of the City’s staff involved with the management

of the assets. The future lifecycle activities that are required to achieve the desired condition profile are then used to establish the annual investment to achieve the proposed LOS condition profile. Figure 7.13 presents the expected condition profile for the next 20 years based on investment required for achieve the proposed LOS for Transportation assets. This scenario indicates the condition profile trending to most assets being in Good and Very Good Condition with 50% of the assets in Very Good Condition.

Table 7.15 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Transportation Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP ²³	Incremental Cost to Achieve Proposed LOS	Achieve Proposed LOS Infrastructure Gap ²⁴
Operating Budget	56,562	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	44,908	2,000	None identified	31,702	99,455
Service Improvement	750	None identified	None identified	None identified	None identified
Growth Activities	54,926	None identified	None identified	None identified	None identified

To achieve the proposed LOS as described related to Transportation assets, some changes to the strategy for Roadways, Structures, and Traffic lifecycle activities will be required, which may trigger changes in funding requirements. To meet proposed levels of service related to assets condition, the City will require increased investment primarily in rehabilitation and replacement activities. If funding to implement the lifecycle activities required for proposed levels of service is not sufficient, the City will focus on maintaining activities funding

current levels of service. The City will manage risks associated with postponing Transportation lifecycle renewal actions. Risks including safety concerns, deterioration of service quality, and potential financial impacts, etc. need to be managed through continuous inspections and condition assessment processes, risk assessment and prioritization of lifecycle activities, better coordination with other services such as Water and Wastewater, and contingency planning.

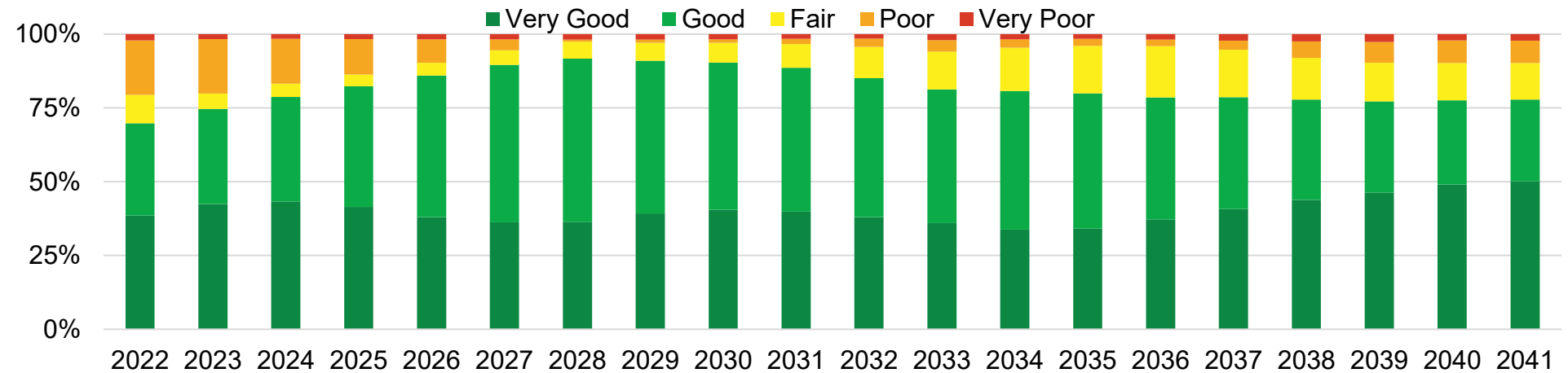


Figure 7.13 Projected 20-year Achieve Proposed LOS Condition Profile (Transportation Services) (Transportation Services)

²³Incremental investment to achieve proposed LOS excludes CEAP costs.

²⁴Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

7.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 7.16 and illustrated in Figure 7.14, Figure 7.15, and Figure 7.16 for each asset type (Roadways, Structures, and Traffic assets). The analysis is related to the lifecycle rehabilitation or replacement lifecycle activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities.

Transportation assets (Roadways, Structures and Traffic) have a \$58 million current infrastructure gap growing to a 10-year maintain current LOS gap of \$677 million. Trends presented are primarily driven by the Roadways, which accounts for roughly

87% of this deficit. The achieve proposed LOS 10-year infrastructure gap approximates \$994 million. Trends presented are also primarily driven by the Roadways, which accounts for roughly 77% of this deficit. Additionally, construction costs have risen in the past few years which led to a rise in the current and future lifecycle renewals costs while budget has not risen in the same rate.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

Table 7.16 Average Annual Budget and Gap Analysis (\$Thousands) (Transportation Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Roadways	30,083	570	89,570	None Identified	17,592	58,917	76,536
Structures	6,671	1,450	11,285	None Identified	9,035	3,199	12,219
Traffic	8,154	15	13,805	None Identified	5,075	5,636	10,700
Total	44,908	2,000	114,660	None Identified	31,702	67,752	99,455

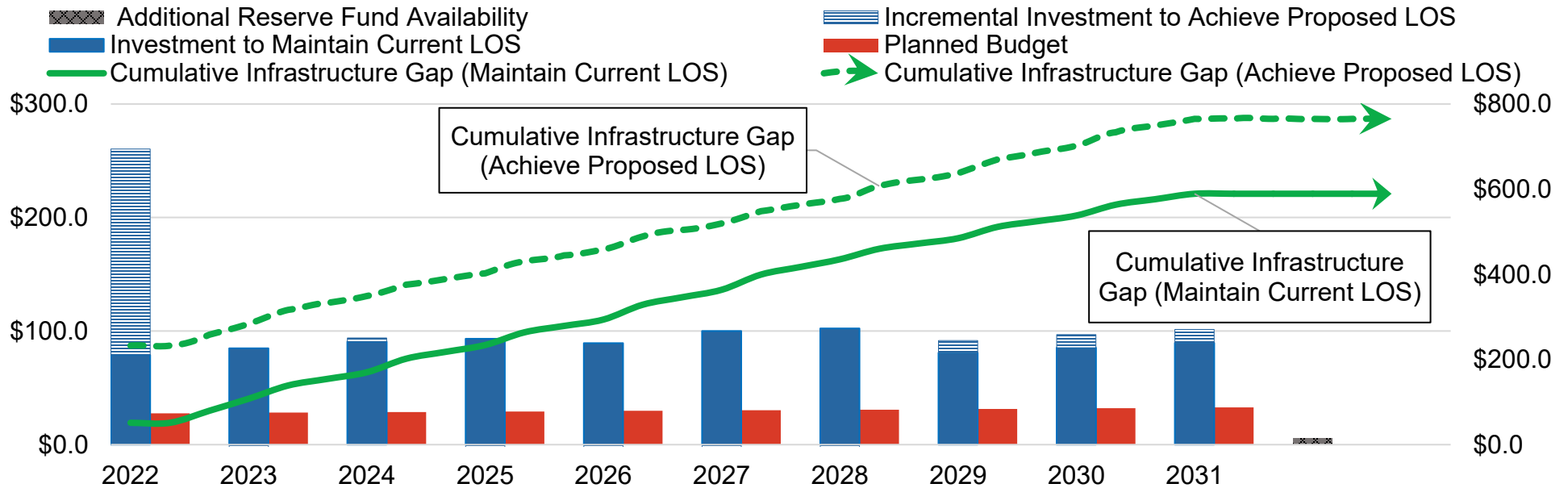


Figure 7.14 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Roadways)

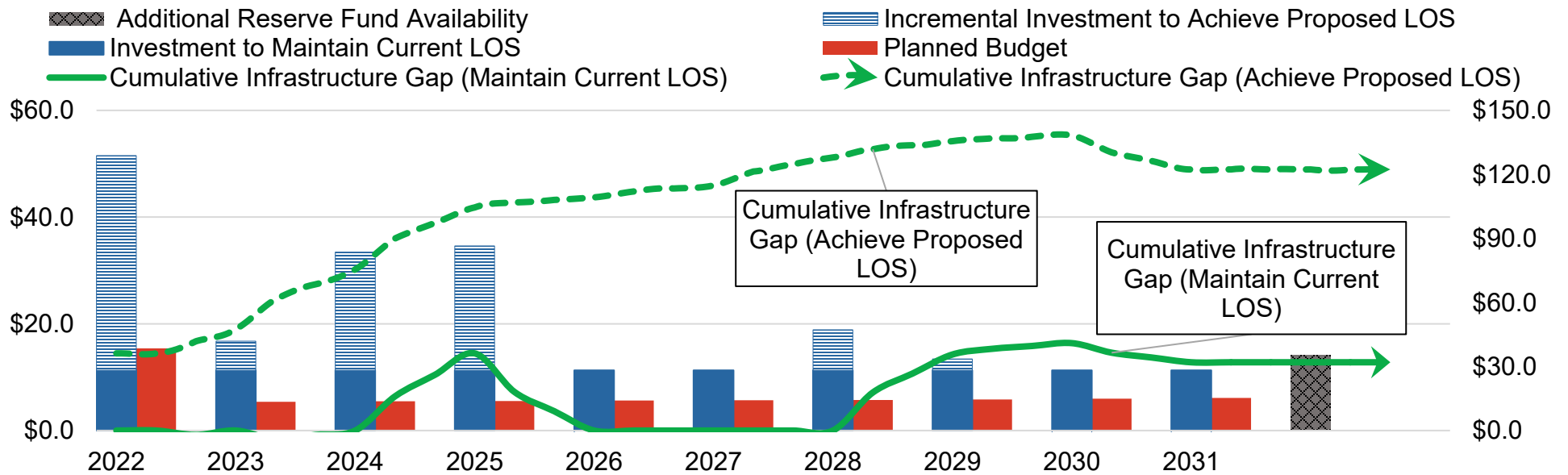


Figure 7.15 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Structures)

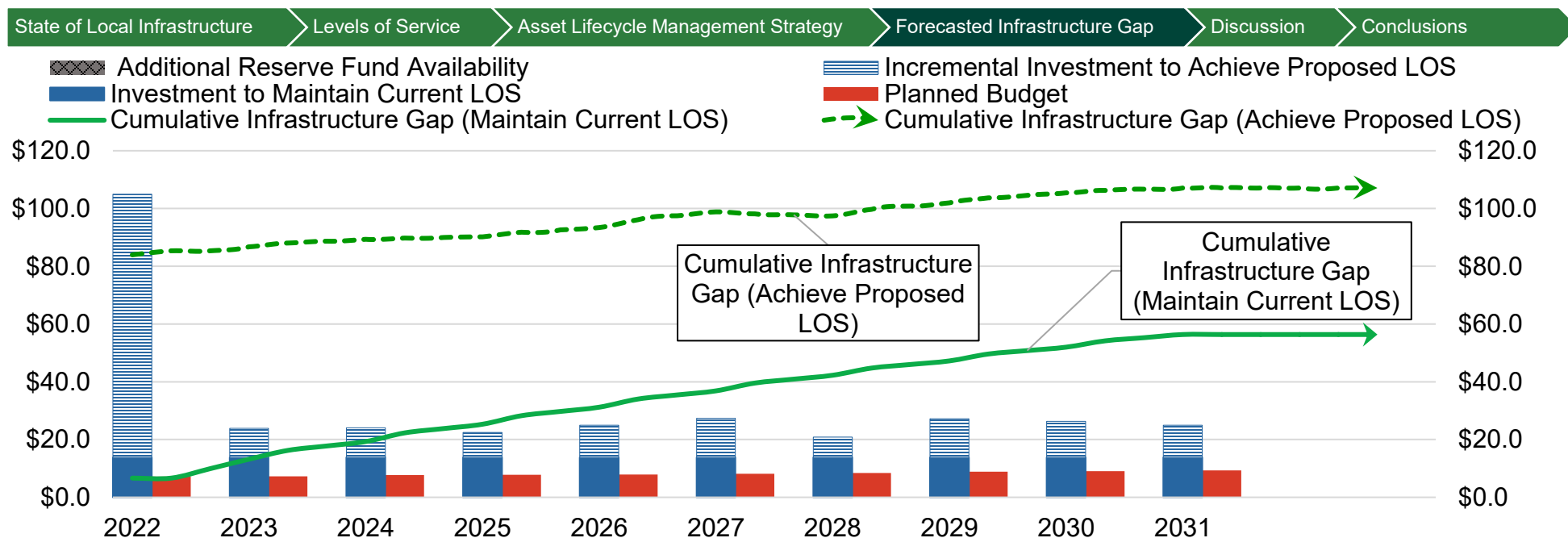


Figure 7.16 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Traffic)

Evaluating the base needs forecast for Roadways Assets (Roads, Sidewalks and Cycling Facilities) shows that given current investment, the 10-year infrastructure gap to maintain current LOS approximates \$589 million. These base needs represent the costs to renew and maintain the serviceability of existing infrastructure, and do not account for growth or improvements. Arterial roads including collectors, freeways, and expressways, while still under funded, make up approximately 54% of the projected needs over the next 10 years for the roadways' assets. Overall, the gap continues to increase, projecting a general decline in the condition of roads in the City of London. The analysis also shows that given current investment, the 10-year infrastructure gap to achieve proposed LOS for Roadways assets approximates \$765 million.

Evaluating the base needs forecast for Structures Assets (Bridges, Culverts, Footbridges, Pedestrian Tunnels, Retaining

Walls and Noise Walls) shows that the 10-year infrastructure gap to maintain current LOS is identified as \$32 million. The total required investment represents the costs to renew and maintain the serviceability of existing infrastructure and do not account for growth or service enhancements. Trends presented are primarily driven by the current available funding levels. The analysis also shows that given current investment, the 10-year infrastructure gap to achieve proposed LOS for Structure assets approximates \$122 million.

Evaluating the base needs forecast for Traffic Assets (Street Lighting, Signals and Signs) shows that given current investment, the 10-year infrastructure gap to maintain current LOS approximates \$56.2 million. Base needs represent the costs to renew and maintain existing infrastructure, and do not account for growth or the expansion of service to include new service or incorporate new technology. This infrastructure gap is

driven primarily by the continued use of infrastructure that has surpassed the end of its estimated useful life; over 48% of Streetlighting and 32% of Signals were rated to be in Poor or Very Poor condition. This results in either a significant amount of work to be accomplished over the next 10 years or an alternate solution found through further investigation, especially about the estimated useful life of Lighting and Signal assets. Better condition information on Lighting and Signals assets would improve the accuracy of this finding. The condition assessment for Streetlights is primarily based on factors that drives the likelihood of failure and Traffic Signals condition is based on their age. The analysis also shows that given current investment, the 10-year infrastructure gap to achieve proposed LOS for Traffic assets approximates \$107 million.

7.5: Discussion

7.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Transportation assets condition comparison is provided in Figure 7.17. The 2019 CAM Plan replacement value was \$2.46 billion and increased to \$4.76 billion due to inflation and constructing or assuming new assets. The 2019 CAM Plan assets showed a greater percentage of assets in Poor and Very Poor conditions. Furthermore, due to the rise in construction and restoration costs of infrastructure, the infrastructure gap is expected to increase in the next 10 years, causing an anticipated deterioration in the overall condition of Transportation Assets. More budget is required to maintain the current LOS.

The cumulative 10-year forecasted infrastructure gap from the 2019 CAM Plan was \$223 million. The 2023 maintain current LOS 10 year forecasted infrastructure gap increased to \$677 million. In 2019, Transportation infrastructure Gap accounted for

approximately 39% of the City's 10-year projected infrastructure gap. In 2023, Transportation infrastructure gap accounts for approximately 72% of the City's 10-year maintain current LOS infrastructure gap. Despite the City progress towards addressing the Transportation infrastructure gap through increased investment in this area and better coordination with Water and Wastewater projects, the efforts have not led to a positive impact as now 78% of Transportation infrastructure now rates in a condition of Fair or better; versus 80% in 2019. Yet, the coordination with Rapid Transit, Water, and Wastewater construction may sometimes lead to road construction in areas which were not necessarily the top priorities of Transportation service areas which puts burden on Transportation budget without significant road network performance enhancements. Sustained increased funding for Transportation assets' needs is required to reduce the infrastructure gap.

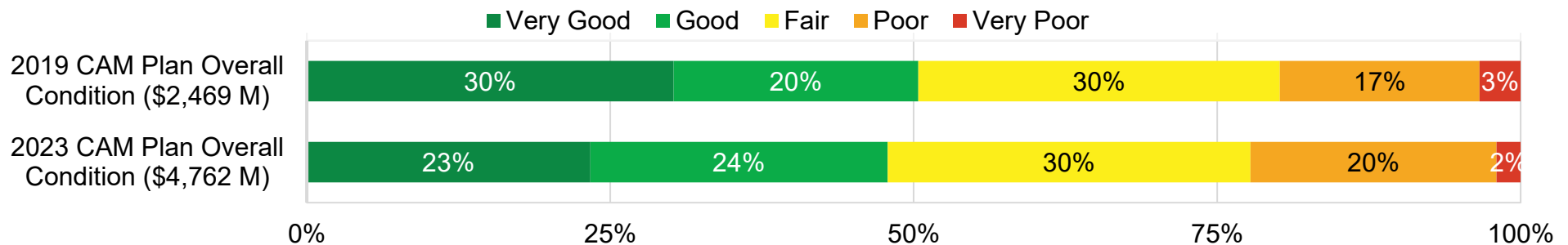


Figure 7.17 2019 CAM Plan to 2023 CAM Plan Condition Summary (Transportation Services)

7.5.2: Lifecycle Management Scenarios

The Lifecycle Management section included three scenarios. Scenario One planned budget poses some limitations on the City's ability to thoroughly maintain the assets within the Transportation and Mobility portfolio. As the budget remains stagnant, this leads to a gradual deterioration in their condition. This decline might not be immediate but, over time, it becomes more visible to the public and causing operating problems, increasing the operating and maintenance costs, and potentially leading to higher repair or replacement costs in the future.

Scenario Two maintain current LOS funding is higher than what is currently allocated, illustrating the financial strain of maintaining a healthy asset portfolio. This scenario acknowledges the need for continual investment in assets to maintain their current state, eliminating the degradation seen in the first scenario. However, while it prevents further decline, it does not enhance the condition of the assets over the next 20 years.

Scenario Three achieve proposed LOS funding is higher than both the current budget and the one needed to maintain the assets' existing state. The advantages of this approach are evident in improved levels of service and buildings condition, extended asset lifespans, and potential cost savings in the long run. Nevertheless, this scenario shows the financial challenge the City faces to achieve the proposed levels of service.

These three scenarios show different results depending on the level of funding for the assets life cycle renewal actions. The choices made will have implications for the Transportation and Mobility asset condition and their performances.

7.5.3: Current and Future Challenges

Roadways Assets

Transportation infrastructure serves a variety of needs from active mobility by walking and cycling, to transit or personal vehicle. Additionally, it supports the economy by enabling the efficient movement of goods and services. An increased transportation infrastructure gap can lower levels of service that are realized in a few ways including pavement potholes, bridge load reductions and uneven sidewalks, illegible signs, less reliable streetlights and traffic signals, and other distresses. This can result in:

- Lower levels of customer satisfaction.
- Lower levels of road safety.
- Challenges to personal mobility, particularly for the less mobile and disabled.
- Increased liability and claims.
- Longer times to commute to work and school.
- Impacts to quality of life.

The life expectancy of asphalt pavement is 25-45 years. This is shortened when utility cuts occur. The anticipated time to rehab a local street is now 36 years, almost double the life expectancy of the asphalt.

In extreme cases when pavement conditions deteriorate to Very Poor conditions, road closures may be necessary. Recent examples are Dufferin Ave west of Adelaide and Pack Road. Major roadways carrying heavy traffic volumes result in significant congestion and delays for motorists during times of construction and repair. While this work can be planned during off peak and night time hours, there is a cost premium associated with this approach.

The rise in road construction costs has significantly contributed to an increase infrastructure gap in recent years. A confluence

of factors, including escalating raw material prices, labor costs, and stringent environmental regulations, has driven up the overall cost of road lifecycle activities.

Structures Assets

Structures form a vital aspect of the City's transportation network creating the connecting links across the various rivers, creeks, and tributaries, as well as over/under the various rail lines that transect our City. Maintaining these assets in good, safe condition is important to the prosperity and mobility of our citizens.

Between the late 1940's and the early 1990's, the City constructed 155 of its 204 structures or 76% of our inventory. These structures now range in age from 30 to 80 years. Along with the additional 6% of the inventory that is older than 75 years and 8% of the assets exceeded their estimated average useful life, most of our inventory has reached half of its useful life. The design life of a bridge or footbridge is 80 years, and the design life of a culvert or pedestrian tunnel is 50 and 60 years respectively. With regular routine inspection, regular maintenance and ongoing repairs, the design useful life of these structures can be extended. Regular maintenance includes clearing deck drains and expansion joints, spot deck delamination repairs, and expansion joint replacements. While regular repairs are understood to be major rehabilitations which should be done approximately every 25 years. These rehabilitations typically include repairs to all necessary elements including the abutments, piers, girders, deck, and parapet walls to improve condition, prevent and reduce further deterioration, extend the service life of a structure, and ensure the safety of the travelling public.

Structures are expensive for the City to maintain. Replacement costs for a bridge run on average \$5,400/m², with major

rehabilitation work running on average \$2,500/m² depending on the size of the structure and the scope of the required work. These figures do not include allowances for service improvements such as widening for bike lanes or geometric improvements, nor do these figures include costs for engineering, environmental assessments or temporary support works necessary to complete the work; all of which are typical requirements for a major structural rehabilitation. These extras result in the above costs being increased by approximately 50%, or \$7,950/m² and \$6,600/m², respectively. Additionally, costs of structures rehabilitation rises if the structure crosses water, rail, or if it is considered a heritage structure.

Funding levels have been increasing over the last decade; however, the funding levels are inadequate to fully address the needs of the City's structures that are 50-70 old and reaching the end of their expected useful life. As a result, the need for emergency, temporary repairs (as well as closures) are becoming more prevalent. These emergency repairs normally require unplanned lane closures and result in significant traffic delays, disruption and/or detours. Examples of the City's inventory of aging structures and recent required emergency repairs include:

- Kensington Bridge (Riverside Drive into Dundas Street over the North Branch of the Thames River) has had lane closures in 2018 and 2019 to complete localized deck repairs. Further repairs may still be required in future years as this bridge is not currently scheduled for a major rehabilitation until 2028.
- Riverside Drive Bridge over CN Rail has had many deck delamination repairs over the past 5 years, and the end of the girders supporting the deck are starting to show

evidence of deterioration. The City completed minor rehabilitation in 2019 which will address these immediate needs, providing 10 to 15 years of service life before a major rehabilitation is required.

- J. W, Carson Bridge (Clarke Road over North Branch of the Thames River) has had two weekend closures in 2018 and a four week closure in the spring of 2019 to complete deck repairs. Further repairs may still be required in future years as this bridge is not currently scheduled for replacement until 2033 as part of a future widening project.
- Similarly aging structures such as Queens Ave Bridge, Dundas Street E over Pottersburg Creek, Boler Road Bridge, will require increased monitoring and more frequent repairs as they continue to age, until a major rehabilitation or replacement can be scheduled.

Structure projects are complex, multi-faceted, multi-year projects involving diverse interests and environmental considerations. Bridge rehabilitation and reconstruction projects typically require environmental reviews and approvals for water crossings, navigable waters, assessments for the impact to the environment and Species at Risk (SARS) and appropriate mitigation measures, railway approvals and flagging when working near railways. If the structure is over 40 years old, it has to be evaluated for cultural heritage considerations under city and provincial requirements. Often existing servicing (watermain, and/or sanitary sewers) and utilities (Bell, Hydro, etc.) are suspended below or attached to the side of a structure. Depending on the scope of work required on the structure, all these issues require additional effort to coordinate and work around during design and construction. While some structures are small, two-lane bridges spanning a small creek, many

others spanning the Thames River (i.e., Guy Lombardo on Wonderland Road;) or the rail lines (i.e., Field Marshall Wolseley Bridge over CP Rail on Quebec Street; approx.) need a significant commitment to fund a major rehabilitation or replacement.

With current budget allocations and the time, it takes to complete the environmental assessments, detailed design and construction work required, multiple years of budget allocation are required to fund any one project.

Another aspect of Transportation Structures' rehabilitations or replacements that needs to be identified are the impacts to mobility during construction. These structures provide a connecting link over or under a natural or manmade barrier. When it is necessary to close the structure to complete the work it often results in significant detours for vehicle drivers to find another route to traverse the barrier (river or rail line). In some areas of the city these detours can result in increased travel times and inconvenience. For pedestrians, cyclists and transit, these detours may be challenging or excessive. However, the cost of a temporary pedestrian/cyclist crossing can add more than \$1M to the cost of the project. On already tight budgets, these temporary costs, if not included result in significant disruption to the active transportation corridors within the City.

Transportation Structures that bridge natural and manmade barriers within our City form the links between communities, support convenient and connected mobility choices, create beautiful places and spaces, and with our heritage structures acknowledge the City's history. Continued strong investment in these assets is necessary to create a safe and accessible City that promotes a connected and vibrant community.

Traffic Assets

Ensuring the accuracy and currency of the traffic asset inventory is crucial for efficient asset management. However, managing a considerable number of assets spread across a wide area presents challenges. To address this, conducting routine inspections and condition assessments utilizing visual inspections, sensors, or data analytics can aid in prioritizing maintenance and replacement tasks.

Nevertheless, for the City, which possesses a significant number of traffic assets, prioritizing maintenance, rehabilitation, and replacements becomes particularly complex, especially when financial resources are limited.

7.6: Conclusions

Valued at approximately \$4.76 Billion, the City's Roadways, Structures, and Traffic infrastructure assets are currently in overall Fair condition provided traffic congestion is not considered. Funding shortfalls in all asset groups will result in a

degradation of Roadways, Structures, and Traffic assets over the next decade, particularly for the City's main roadways. The infrastructure gap will become visible to Londoners through rough roads, potholes, increased vehicle damage claims, reduced safety, poor pedestrian facilities and increased operating costs, bridge load restrictions, potential closures, Civic Administration intends to deal with the infrastructure gap through long term strategic planning and continued efforts to lobby senior levels of government for infrastructure funding. As seen in Figure 7.18, the 10-year infrastructure gap to maintain current LOS approximates \$677 million, derived mainly by the Roadways which composes about 91% of the Infrastructure Gap. The 10-year infrastructure gap to achieve the proposed LOS approximates \$994 million. Table 7.17 presents the summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment rates for Transportation Assets.

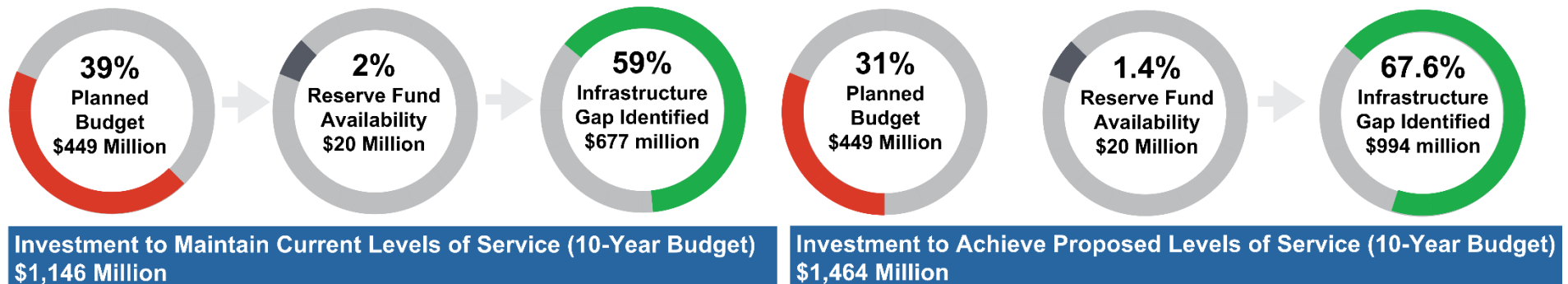



Figure 7.18 Visualization of Maintain Current and Achieve Proposed LOS Infrastructure Gaps (Transportation Services)

Table 7.17 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Transportation)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS ²⁵	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ²⁶
Roadways	\$3,615	Good	\$589	\$765.3	0.8%	2.5% to 3.0%
Structures	\$752	Fair	\$32	\$122.2	0.9%	1.5% to 2.7%
Traffic	\$395	Fair	\$56	\$107.0	2.1%	3.5% to 4.8%
Transportation	\$4,762		\$677	\$994.5	0.9%	2.3% to 3.0%

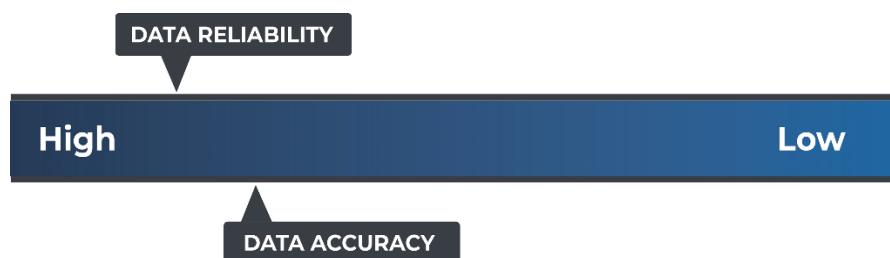


Figure 7.19 Accuracy Reliability Scale (Transportation Services)
Roadways and Structures Data Reliability and Accuracy

Data reliability is rated as moderately high to high. The confirmation of inventory and pavement conditions has been achieved through resources such as RoadMatrix for roadways, GIS for sidewalks, and technical reports for bridges and structures. There is, however, a lack of information on road base, curb, and gutter or boulevard considerations that are rated moderate.

Valuations have been determined using RoadMatrix for Roadways, GIS for Sidewalks, and engineering reports for Bridges and Structures. Investment forecasts for roadways and structures are derived from technical evaluations, estimations, and/or consultant reports.

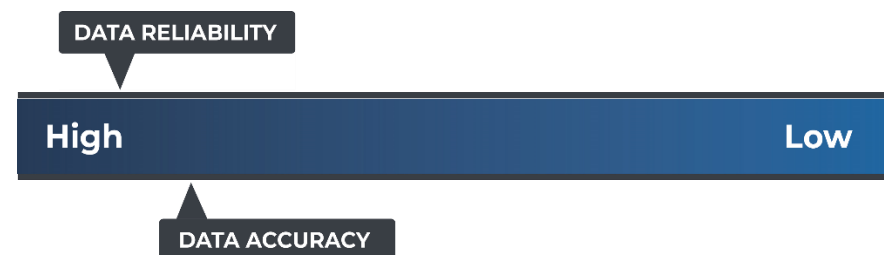


Figure 7.20 Accuracy Reliability Scale (Roadways and Structures)
Traffic Data Reliability and Accuracy

Data reliability is rated as moderate. Inventory has been derived from Traffic service area tracking information and confirmed using GIS. Valuation is based on service area information. Condition ratings for Signals (~44% of replacement value)

²⁵This projected infrastructure gap is reduced by the forecasted reserve fund drawdown availability over the next decade.

²⁶ Source: Roadways investment based on maintain current LOS and achieve proposed LOS (upper range aligns with Canadian Infrastructure Report Card). Structures and Traffic reinvestment based on maintain current LOS and achieve proposed LOS.

based on age. Condition ratings for lighting (~55% of replacement value) based on drivers leading to consequences of failure. Condition ratings for Signs (~1% of replacement value) are based on reflectivity testing results. Investment forecasts are based on age and expected useful life estimates. Accuracy is rated as moderate to low, as forecasts are based on theoretical expected useful lives and are not supported by solid engineering estimates.

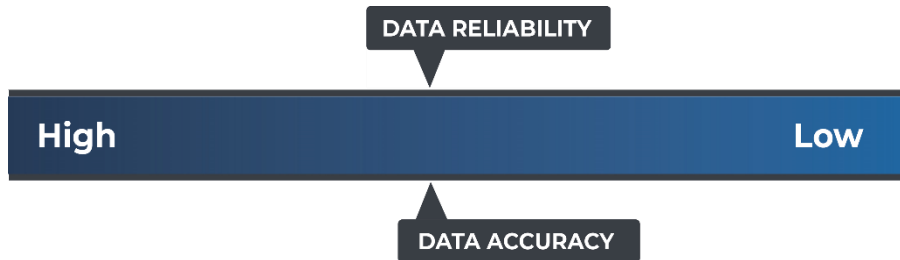


Figure 7.21 Accuracy Reliability Scale (Traffic)



Section 8. Parking

Asset Information	Parking
Replacement Value	\$7.1 million
10-year Maintain Current Levels of Service Infrastructure Gap	None Identified
10-year Achieved Proposed Levels of Service Infrastructure Gap	None Identified

Quick Facts
95 Pay Stations
1,439 Surface Lot Stalls
737 Parking Meters



8.1: State of Local Infrastructure

Parking in the City of London is a complex business not unlike most other municipalities. The City owns both parking lots and on-street parking stalls; some of which are user pay and some of which are free for public use. There is significant competition in the downtown area, where private user-pay parking facilities outnumber municipal lots and garages significantly. The City of London, as a non-profit corporation, provides controlled rate parking to citizens and visitors through convenient short-term on-street parking and long-term off-street parking. This supply supports businesses, commercial and institutional facilities, and entertainment venues. This involves balancing the general need to provide access to convenient parking, while ensuring traffic flows, emergency vehicles access and available accessibility parking for permitted users. A significant task for the City is ensuring compliance with Parking rules that exist to protect the public interest.

8.1.1: Asset Inventory and Valuation

To meet London's parking needs, the City owns and maintains an inventory of 1,219 on-street and 1,132 off-street parking stalls, along with other supporting infrastructure including enforcement assets. Table 8.1 lists asset inventory and replacement valued at approximately \$7.1 Million. The parking asset base is made up of a mixture of infrastructure (pavement, curbs, etc.²⁷) land, and equipment (meters and pay stations). In addition, the City also manages several private parking lots, contributing an additional 307 parking stalls to the total count of off-street parking spaces owned and managed, which now amounts to a total of 1,439 stalls. City crews operate and maintain functioning meters, though obsolete, as well as updated pay stations. Basic inspections are performed daily in conjunction with the collection of payments. Issues are flagged and combined with call-centre inquiries into a reactive works list. Lots are maintained through contracts with external providers for routine maintenance like snow, litter, and minor repairs.

Table 8.1 Inventory and Valuation (Parking Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Parking	Pay Stations	95	Each	\$1,246
	Pay Station Shelters	21	Each	\$102
	Parking Meters	737	Each	\$155
	Surface Lots	12	Each	\$5,266
	Stalls in Surface Lots (Both Managed and Owned)	1,439	Each	
	Light Poles	82	Each	\$328
Total				\$7,097

²⁷ On-street infrastructure replacement value captured in Transportation Section.

8.1.2: Age Summary

Figure 8.1 shows the Parking assets average asset age as a proportion of the average useful life by asset type. The average ages for the assets were calculated based on a refined database. As shown in the figure, generally all asset types are

within their average industry standard useful life. Parking Meters have all been replaced recently in 2020 where it shows an age of 1 year for all the assets in this category.

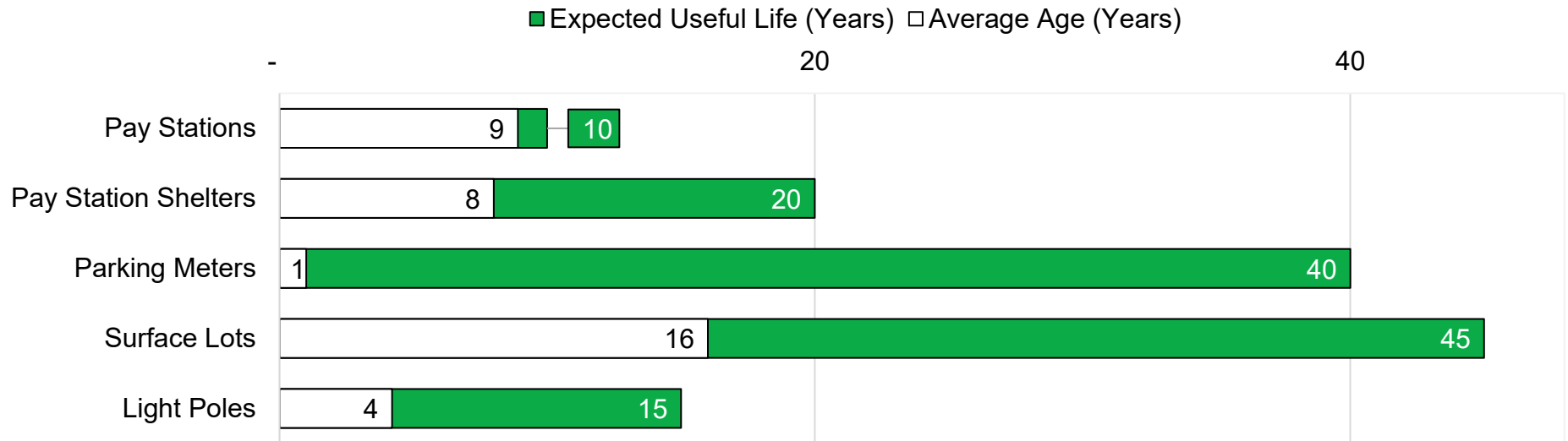


Figure 8.1 Average Age and Expected Useful Life (Parking Services)

8.1.3: Asset Condition

Figure 8.2 shows the condition distribution of all the Parking assets.

As seen in the figure, 83% of all assets are in Fair to Good condition, with 49% in Good condition.

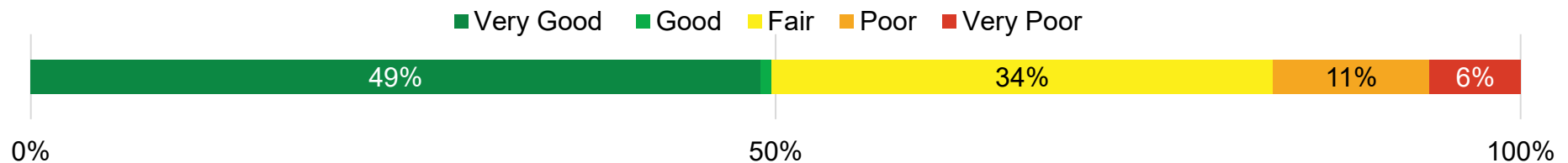


Figure 8.2 Overall Condition (Parking Services)

Figure 8.3 shows the Pay Stations asset group is in Poor condition with 95% in Poor to Very Poor condition. This assessment is determined by considering the estimated useful life of the stations. Additionally, Figure 8.1 reveals that the pay stations have reached an average age that is approaching the end of their estimated useful life. This information has been corroborated by the Parking Services Staff, and as a result, the procurement of new pay stations is currently underway within the Parking Services and there is a capital project to replace all the Pay Station in 2023-2024. The Pay Station Shelters asset group are mostly in Fair to Very Good condition, with the

majority (67%) in Very Good condition. Condition is determined based on the estimated useful life of the shelters. The Parking Meter assets are replaced in 2021 through a program that got approved in 2020. The Current Parking meters are generally in Very Good condition. Surface lots are generally in Fair to Good condition, The Parking service has completed a condition study for surface lots and addressed any concerns that were raised. The service has completed several rehabilitation projects for the owned parking lots. The Lighting Poles are generally in Fair to Very Good condition, with the majority (68%) in Good and Very Good condition.

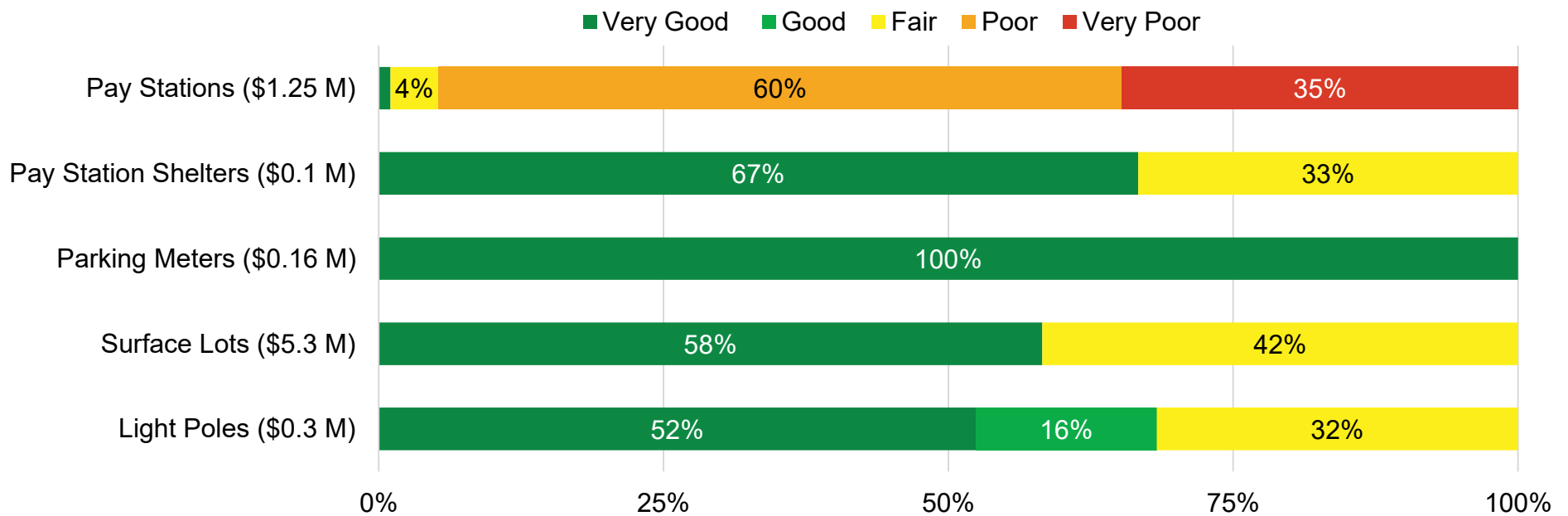


Figure 8.3 Asset Condition Detail (Parking Services)

8.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for Levels of Service (LOS) performance measures linked to Customer Values of Accessible, Cost Efficiency, Quality, and Reliability. Supporting measurements are classified as Metrics.

Direct and Related LOS

After review with Parking, LOS considered most representative of Parking services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'direct LOS' and are listed in Table 8.2. LOS

8.2.1: Direct Levels of Service

Table 8.2 Direct Levels of Service (Parking Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed Target (2022 to 2031)
Accessible	Customer	Percentage of spaces that are FADS/AODA compliant	100%	100%
Cost Efficiency	Customer	Parking Reinvestment Rate	2.6%	2.6%
Reliability	Customer	Percentage of Parking Assets in Fair to Very Good Condition	83.4%	100%
Reliability	Technical	Percentage of time when parking meters are operating	65%	100%
Reliability	Technical	Percentage of time when pay stations are operating	85%	100%

8.2.2: Related Levels of Service

Table 8.3 Related Levels of Service (Parking Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Gross Parking Revenue Collected per Off-Street Surface Space	\$952,507
Cost Efficiency	Technical	Gross Parking Revenue Collected per On-Street Space	\$693,592
Cost Efficiency	Customer/Council	Revenue per parking space (\$/parking space)	\$0
Reliability	Technical	Percentage of Parking lighting poles Poor and Very Poor condition	0%
Reliability	Technical	% of pay stations mechanism below the target quality level	95%
Reliability	Technical	Percentage of Parking lots Poor and Very Poor condition	0%
Reliability	Technical	Percentage of parking meter above the target condition	100%
Reliability	Technical	Percentage of pay stations above the target condition	5%

that have a causal relationship with direct LOS are documented in Table 8.3 as Related LOS but cannot be as readily costed to Parking services.

Metrics

Table 8.4 listed metrics that can are useful information, especially when considered in conjunction with Direct LOS, and Related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Parking provides.

8.2.3: Other Measures

Table 8.4 Metrics – Other Dashboard Measures (Parking Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Accessibility	Technical	# of accessible spaces	2,658
Accessibility	Technical	Percentage of off-street payment terminals that are FADS/AODA compliant	100%
Accessibility	Technical	% of on-street payment terminals that are FADS/AODA compliant	100%
Cost Efficiency	Technical	Operating budget for parking services	\$3,319,851 ²⁸
Cost Efficiency	Customer/Council	Cost per space (2,658 spaces)	\$1,249 ²⁸
Reliability	Customer/Council	Percentage of residents satisfied with Parking services	49%
Reliability	Customer/Council	Percentage of time when payment stations are operating	85%
Scope	Technical	# of on-street parking spaces	1,219
Scope	Technical	# of parking spaces	2,658
Scope	Technical	# of parking spaces in all parking lot	1,439

8.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City uses a strategy to maintain current levels of service while striving to optimize costs and risks. This strategy involves applying a combination of activities throughout the lifecycle of the Parking assets. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master plans such as the Mobility Master Plan, while continuing to prepare for growth and introduce service improvements. The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan (CEAP), which may trigger asset investment needs.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across other service areas, such as Transportation, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and

redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the Parking assets are selected, reviewed, and modified based on options considered through continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs. The following tables list the activities selected and regularly applied throughout the lifecycle of the Parking assets.

8.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current levels of service while striving to optimize costs and risks. Table 8.5 lists specific asset management practices or planned actions the City conducts for each lifecycle activity.

²⁸ The Parking capital and operating budgets are supported by non-tax revenues.

Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections. Table 8.6 lists risks related to these practices.

The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 8.5 Current Asset Management Practices or Planned Actions (Parking Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> • Parking determines their capital projects through business cases and the annual budget process. • The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, and other emergency planning, which may trigger asset investment needs.
Maintenance	<ul style="list-style-type: none"> • Parking service completed a condition study for surface lots, and it is the basis for maintenance of the parking lots. • Parking meters and shelters maintenance is both scheduled and reactive based on responding to observations by staff and feedback from the public. and replacement of surface lots.
Renewal/ Rehabilitation	<ul style="list-style-type: none"> • Parking service completed a condition study for surface lots, and it is the basis for rehabilitation of surface lots. Historically they have not been rehabilitated. • Parking meters are recently replaced in 2021. • Shelters are replaced when required.
Replacement/ Construction	<ul style="list-style-type: none"> • Parking service completed a condition study for surface lots, and it is the basis for resurfacing and replacement of surface lots. Generally, specific components are replaced. For example, the parking pay station mechanism within the parking pay station would be replaced when at end of useful life.
Disposal	<ul style="list-style-type: none"> • Disposal of an entire lot would be uncommon; rehabilitation strategies would ensure proper disposal of old materials.
Service Improvement	<ul style="list-style-type: none"> • Parking meter technology is continuously evolving, and best practices need to be reviewed to ensure the City complies with regulations and the service levels are met or exceeded.
Growth	<ul style="list-style-type: none"> • Downtown Parking Strategy implementation. Capital growth projects are identified by Development Charges (subject to <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i> requirements and City of London policy), or as a part of Assessment Growth Policy (where applicable with municipal policy).

Table 8.6 Risks Associated with Asset Management Practices or Planned Actions (Parking Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> • Lack of a realization of the benefit from the activity (i.e., the life is not extended or the cost of managing an asset increases rather than decreases). • Pay stations will be at risk if the technology is not in compliance with PCI legislation as per planned in 2020. • On-street parking rates cannot be increased until new parking meter timing mechanisms are installed, and the existing technology is currently not supported by any vendor.
Maintenance	<ul style="list-style-type: none"> • Completing planned maintenance activities, while managing the need to execute reactive maintenance activities. • Incorrectly planned maintenance activities can lead to premature asset failure. • Poor maintenance can result in the parking meters being out of order, which leads to customer frustration, loss of meter and ticket revenue. • Poor lot maintenance can result in customer dissatisfaction, loss in revenue and/or injury.
Renewal/Rehabilitation	<ul style="list-style-type: none"> • Refer to Appendix A.
Replacement/Construction	<ul style="list-style-type: none"> • Failure to replace technology will lead to loss in potential revenue and potential failure of meter functionality.
Disposal	<ul style="list-style-type: none"> • Disposal of an entire parking lot would result in loss of annual revenue and/or available parking to serve a specific area.
Service Improvement	<ul style="list-style-type: none"> • Failure to maintain services would result in loss of revenue and the inability to maintain service levels.
Growth	<ul style="list-style-type: none"> • Incorrect growth assessments may result in overabundance of Parking assets in a particular area and insufficient assets in another.

8.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable in addition to maintain the overall average condition of all assets in Parking Services. Staff then consider the optimal blend of each lifecycle

activity to achieve the lowest lifecycle cost management strategy that balances costs and with the forecasted change in the condition profile of each asset type. Figure 8.4 shows the projection of the condition of the Parking Services assets based on the two mentioned scenarios. It shows that the current budget is sufficient to address all the required needs and maintain the overall condition of the asset portfolio in a Good condition. There is no identified proposed LOS to be achieved.

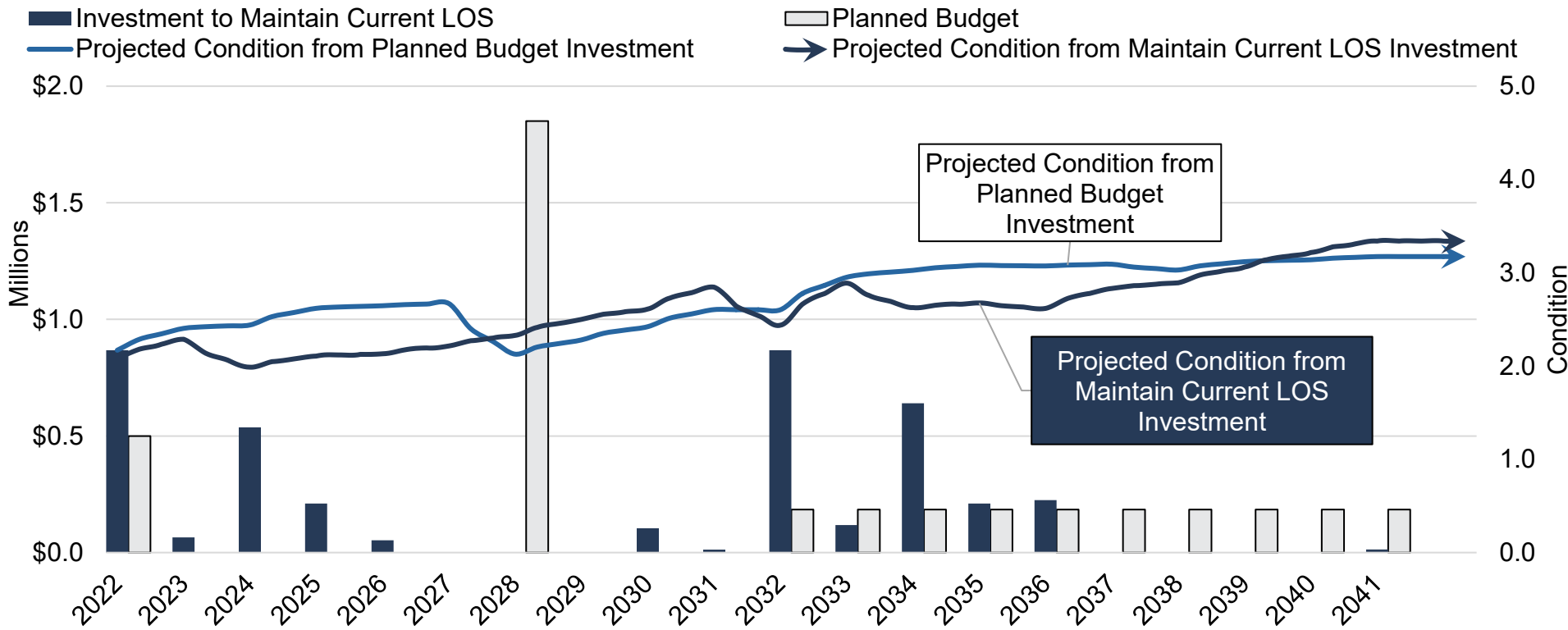


Figure 8.4 Projected Service State of Two Funding Scenarios (Parking Services)

A. Scenario One: Planned Budget Condition Profile

The Parking Services average annual activity and planned funding is summarized in Table 8.7. The condition profile expected from the current budget is forecasted by using the same logic related to condition degradation rates and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. In scenario one, any such insufficiencies are not quantified in terms of an infrastructure gap.

Figure 8.5 presents the expected condition profile for the next 20 years based in the current budgets for Parking assets. This

scenario indicates the condition profile trending to most assets being in Good to Poor condition.

Current funding for operating budget and capital budgets are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are typically analyzed using planned expenditures identified through a review of the capital budget; however, there are no identified service improvement activities or budget.

There are no Growth activities in the 2021 Development Charges Background Study Update for Parking services. All number in tables are rounded to nearest thousand.

Table 8.7 Scenario One - Average Annual Planned Budget (\$Thousands) (Parking Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	3,186	3,339
Renewal, Replacement, Rehabilitation, Disposal	495	185
Service Improvement	None identified	None identified
Growth Activities	None identified	None identified

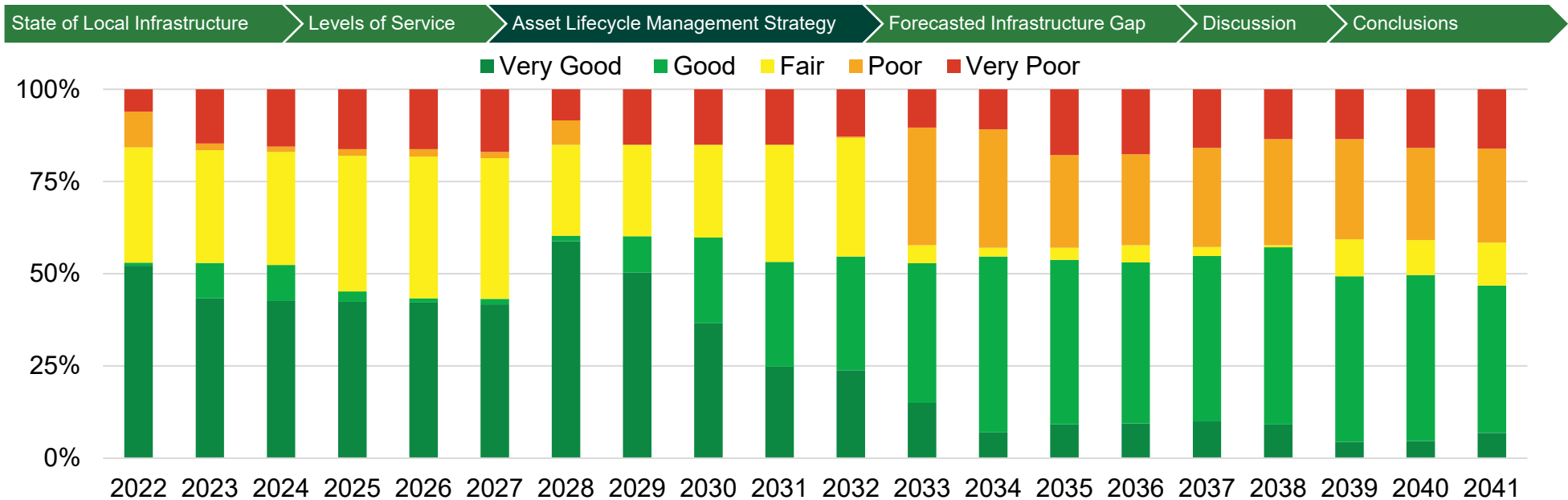


Figure 8.5 Projected 20-year Planned Budget Condition Profile (Parking Services)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

The approach to establishing the maintain current levels of service budget is to forecast the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted

condition profile meets the current condition profile for these assets. Figure 8.6 presents the expected condition profile for the next 20 years based on maintain current LOS costing for Parking assets shown in Table 8.8. Like scenario one, this scenario indicates the condition profile trending to most assets, in Good to Poor condition. However, this scenario has fewer assets in Very Poor condition.

Table 8.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Parking Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	3,339	None identified	3,339	None identified
Renewal, Replacement, Rehabilitation, Disposal	185	None identified	185	None identified
Service Improvement	None identified	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified

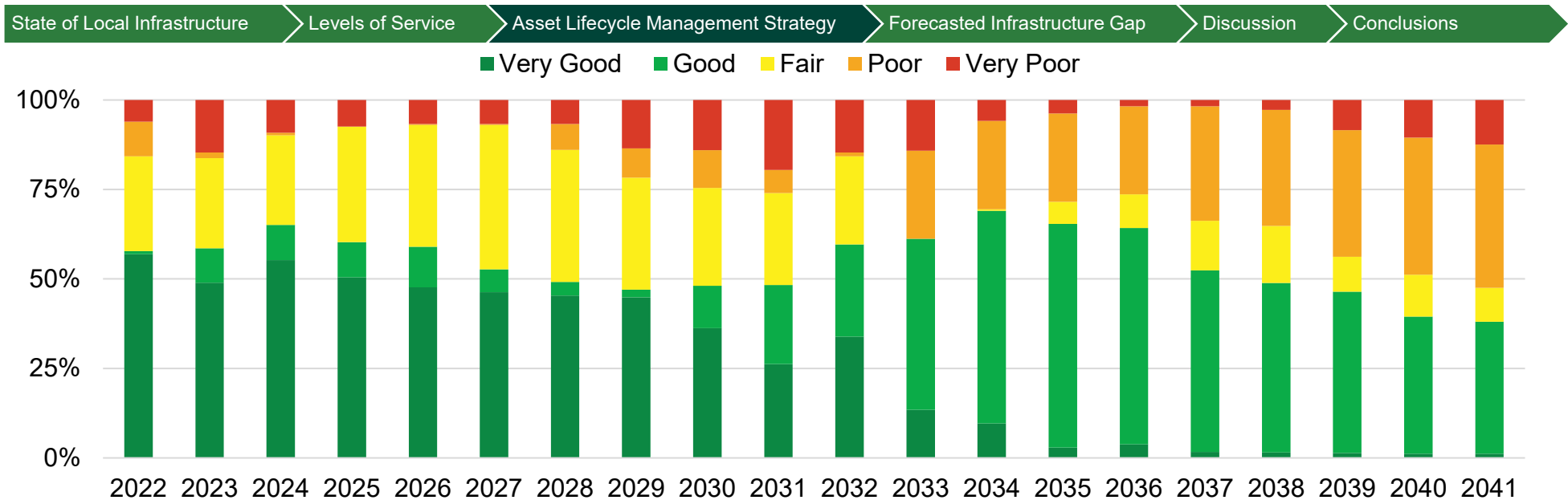


Figure 8.6 Projected 20-year Maintain Current LOS Condition Profile (Parking Services)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

There have been no identified needs to achieve proposed Parking levels of service. Table 8.9 reiterates this.

Table 8.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Parking Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ²⁹	Achieve Proposed LOS Infrastructure Gap ³⁰
Operating Budget	3,339	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	185	None identified	None identified	None identified	None Identified
Service Improvement	None identified	None identified	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified	None identified

²⁹Incremental investment to achieve proposed LOS excludes CEAP costs.

³⁰Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

8.4: Forecasted Infrastructure Gap

The outcomes of scenarios two and three are summarized below in Table 8.10 and illustrated in Figure 8.7. The analysis is related to the lifecycle rehabilitation or replacement activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities. Additionally, no service improvement or growth needs were identified for Parking, noting that if growth needs were identified the 2023 CAM Plan does not assess them for infrastructure gaps.

Based on this analysis, Parking is projected to not have a maintain current LOS infrastructure gap as overall approved budget is available to address needs over the 10-year planning period. And there are no achieve proposed LOS identified that could potentially create a funding gap.

At this point there are no preliminary estimates for CEAP funding needs in Parking.

Table 8.10 Average Annual Budget and Gap Analysis (\$Thousands) (Parking Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Parking	185	None identified	185	None identified	None identified	None identified	None identified

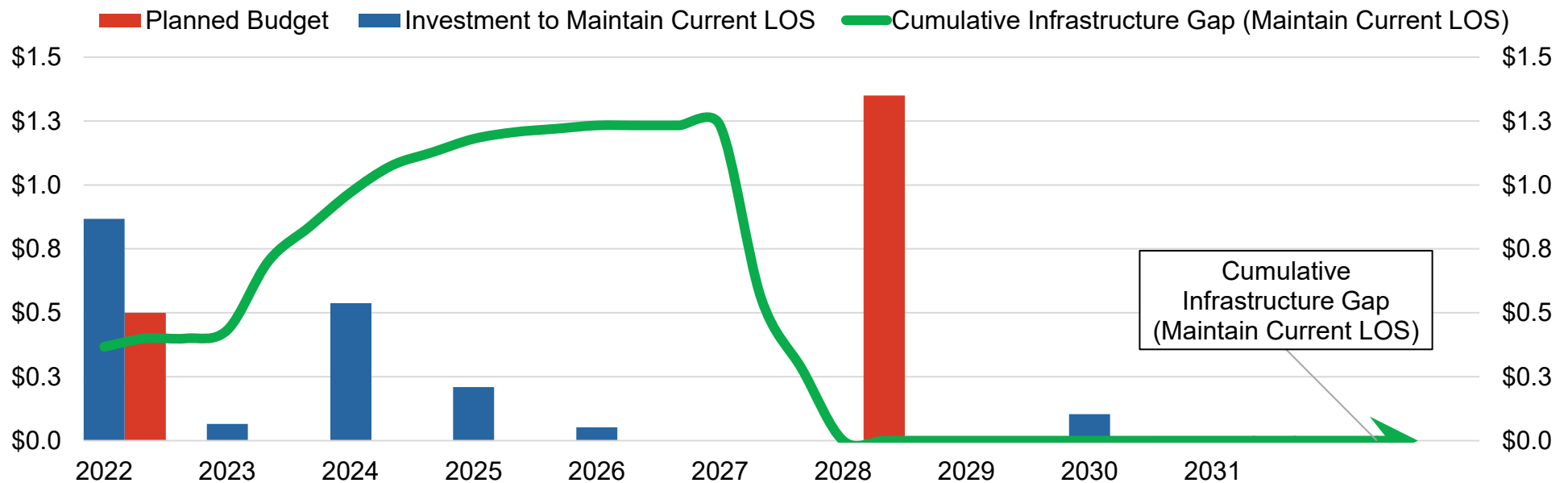


Figure 8.7 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Parking Service)

8.5: Discussion

8.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 CAM Plan to 2023 CAM Plan Parking assets condition comparison is provided in Figure 8.8. Parking Services replacement value increased from \$5.6 million to \$7.1 million primarily due to an increase in stalls in surface lots (parking spaces) and new light poles as well as inflationary pressures. Recent market pressures that are contributing to inflation

include supply chain shocks commencing during the COVID-19 pandemic, interest rate increases and skilled labour shortages. The 2019 CAM Plan anticipated assets to deteriorate resulting from a 10-year gap of approximately \$0.41 million. However, annual funding increased from \$153,000 to approximately \$185,000, which resulted in an overall condition enhancement. This results in the 2023 CAM Plan having no identified 10-year maintain current LOS infrastructure gap for Parking Services.

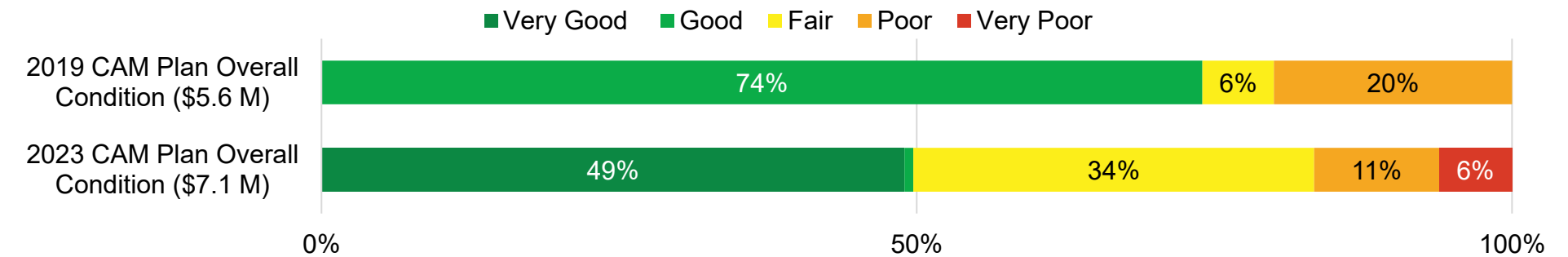


Figure 8.8 2019 CAM Plan to 2023 CAM Plan Condition Summary (Parking Services)

8.5.2: Lifecycle Management Scenarios

The lifecycle Management section included three scenarios – planned budget, maintain current LOS, and achieve proposed LOS. These three scenarios show different results depending on the level of funding for the assets lifecycle renewal and service improvement actions. If an infrastructure gap exists, the choices made will have an implication for Parking asset conditions and performance (LOS).

Scenario One planned budget identifies the City’s capacity to effectively manage Parking’s infrastructure assets by determining the asset condition profile using existing planned funding (Council approved funding). It does not assess planned funding for potential infrastructure gaps.

Scenario Two maintain current LOS, identifies if a 10-year infrastructure gap between the funding requirement to maintain current LOS and the planned budget exists. Based on this assessment, it is concluded that existing planned budgets provide adequate funding to maintain Parking Services assets in an acceptable condition profile for the current LOS. The disparity lies in the yearly allocation over the next 10-years. This discrepancy will result in an infrastructure gap within the first 5 years, which is anticipated to be addressed by the year 2028. During this period, there is a potential for the condition of the assets to deteriorate, which might be visible to the public and potentially lead to some operational issues such as pay station malfunctions. This, in turn, would escalate operating and

maintenance expenses, potentially leading to higher costs for repairs or replacements in the future and losses of revenues. In the second scenario, the calculations are focused on preventing a decline in the asset condition to a Very Poor state. This scenario acknowledges the need for continual investment in assets to maintain their current state, eliminating the degradation seen in the first scenario. It prevents further decline and enhances the condition of the assets.

Scenario Three achieve proposed LOS reflects the required budget to achieve the proposed LOS, if any. At the point of the 2023 CAM Plan publication, there are no achieve proposed LOS requirements above the current LOS being provided. Through the CAM Plan annual update process, LOS will be monitored and update to reflect changes in LOS expectations, if any.

8.5.3: Current and Future Challenges

The 10-year Parking planned budget is sufficient to uphold the current LOS and no achieve proposed LOS have been identified. However, the planned budget allocation to replace the parking pay stations (Master meters) is scheduled for 2028, which per the CAM Plan analysis implies that the Parking pay stations are likely to experience deterioration until they can be replaced in 2028 when the funding becomes available. If this situation remains unaltered there is an expectation of potential decreased revenues and service complaints. Also, loss of parking space usage would negatively impact businesses, residents, and other community partners. Thus, it is important that the funding plans for Parking Services be aligned with the

estimated requirements as best as possible to preserve its sustainability and service levels.

8.6: Conclusions

Valued at approximately \$7.1 Million, the City's Parking Services assets are overall in Good condition, indicating that there has been sufficient investment in sustaining these assets to maintain current LOS. Planned budget is deemed sufficient to maintain current LOS, noting the CAM Plan analysis recommends advancing the parking pay stations replacement prior to 2028 to avoid potential service interruption and/or lost revenue.

Figure 8.9 illustrates that there is no infrastructure gap over the next decade for maintaining current LOS. Table 8.11 presents the summary of the State of Local Infrastructure, Infrastructure Gap, and Reinvestment Rates for Parking Services assets.

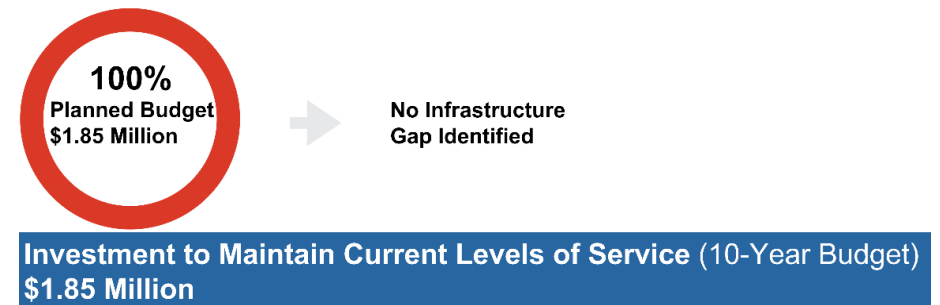



Figure 8.9 Visualization of Maintain Current LOS Infrastructure Gap (Parking Services)

Table 8.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Parking Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ³¹
Parking	\$7.1		None identified	None identified	2.6%	2.1% to 2.6%

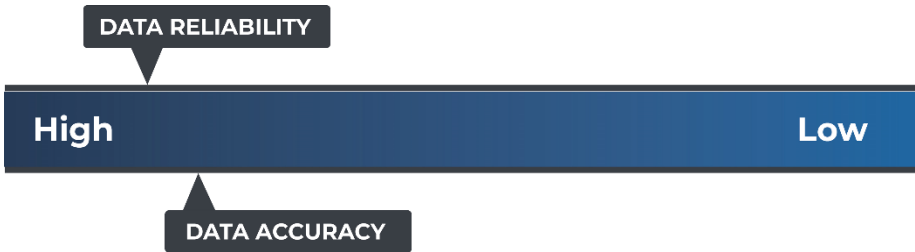


Figure 8.10 Accuracy Reliability Scale (Parking Services)

Accuracy and Reliability Commentary

Data reliability is rated as moderate to high. Inventory has been collected from service inventories and confirmed by City staff. Valuation is based on known replacement costs. Investment forecasts are based on condition and Expected Useful Life of the assets. Accuracy is rated as moderate to high, as most forecasts are supported by unit rates and medium-term replacement plans. Collaboration and planning with Transportation occurs when investment in surface lots and repaving is required.

³¹ Source: Reinvestment rate based on average expected useful lives to the required reinvestment rate to maintain current LOS.



London
CANADA

Section 9. Corporate Facilities

Asset Information	Corporate Facilities
Replacement Value	\$324 million
10 year Maintain Current Levels of Service Infrastructure Gap	\$9.9 million
10 year Achieved Proposed Levels of Service Infrastructure Gap	\$24.9 million

Quick Facts
4 Administration Buildings
25 Main Centres



9.1: State of Local Infrastructure

The City of London owns and operates hundreds of facilities as part of its built environment. These facilities are used to provide the wide range of services offered by London. They support service delivery by providing safe and efficient work and meeting places for use by City of London staff, Council, Boards and Commissions, and members of the public. The Facilities Division manages and maintains these assets, allowing them to meet the City's functional requirements, and building and safety codes, while operating in a safe and efficient manner. The majority of facilities inventory include buildings which are individually used for the service they provide like recreational arenas and are budgeted within their service area. For this report, their inventory has been included in their specific service area section, while this section deals with the remainder and provides a summary of the Corporate Facilities assets. This section of the facilities inventory pertains to the Corporate Facilities category of facility assets. Corporate Facilities include general service facilities such as administrative buildings (e.g.,

City Hall, Admin buildings, etc.) and operations centers (e.g., A. J. Tyler, Exeter Road, etc.) that are used by several different service areas.

9.1.1: Asset Inventory and Valuation

Table 9.1 summarizes the Corporate Facilities assets inventory and replacement values. The City of London owns and operates a collection of office, administrative, mechanical, and storage facilities valued at approximately \$324 million located throughout the City of London. The administrative buildings provide space for staff workstations, equipment, and material; provide modern and effective meeting places; and support the City in delivering front-line and administrative services. Main Centres and Other focus on maintenance and provide garages, workshops, storage, and operations administration. Some administrative buildings have heritage status like the J. Allyn Taylor building but are grouped with administrative buildings for the purpose of this inventory.

Table 9.1 Inventory and Valuation (Corporate Facilities Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Corporate Facilities	Administrative Buildings	4	Each	\$143,393
	Main Centres	25	Each	\$180,927
	Other	18	Each	
Total				\$324,320

9.1.2: Age Summary

Figure 9.1 shows the Corporate Facilities average asset age as a proportion of the average useful life by asset type. In most of the cases, the average ages for all facilities were calculated using the recorded construction date in the VFA (Facilities Management software), otherwise the City GIS and/or other databases were also used as a source of information in case information was not available. Overall assets have exceeded their average industry standard useful life. This leads to an increase in the operation and maintenance cost of these

facilities. It is important to note that 40 years was selected as the expected useful life based on the non-structural components of buildings which have the longest expected service life. In practice the many components that comprise a building are slated for renewal based upon a combination of factors including age, condition, consequence of failure, likelihood of failure etc. and the practical expected life is largely indefinite while the building continues to serve its intended/required purpose in its given geographic location.

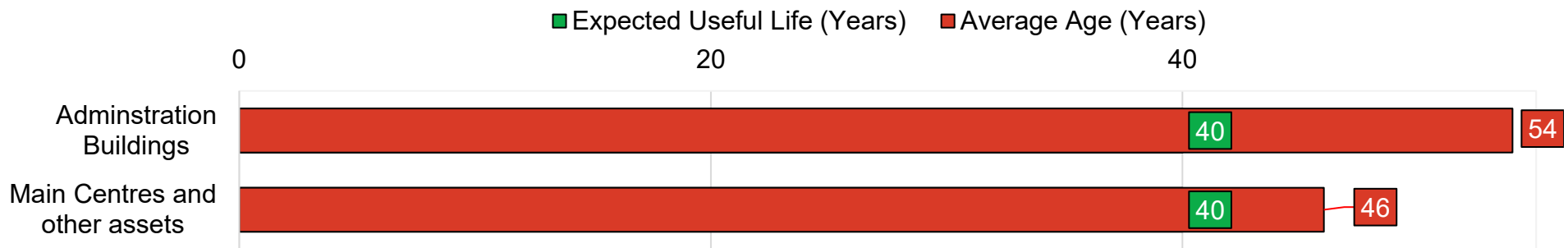


Figure 9.1 Average Age and Expected Useful Life (Corporate Facilities Services)

9.1.3: Asset Condition

Figure 9.2 presents the condition distribution of all Corporate Facilities assets. The conditions of Corporate Facilities assets are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) that reflects the overall condition of the facilities and their sub-components (building envelope, mechanical and electrical systems, etc.). These assessments are used as a primary source in identifying the repair, rehabilitation, and/or replacement strategies for each asset.

Approximately 75% of the City's Corporate Facilities assets are in Fair to Very Good condition, with the remainder assessed as in Poor or Very Poor condition, indicating a need for investment in the short to medium term. During the CAM Plan development, it was noticed that some facilities data in the City's databases was not recently updated. This data was reviewed and refined by Facilities division staff based on their expert opinion. This strategy proved effective for most of the buildings that were reviewed.

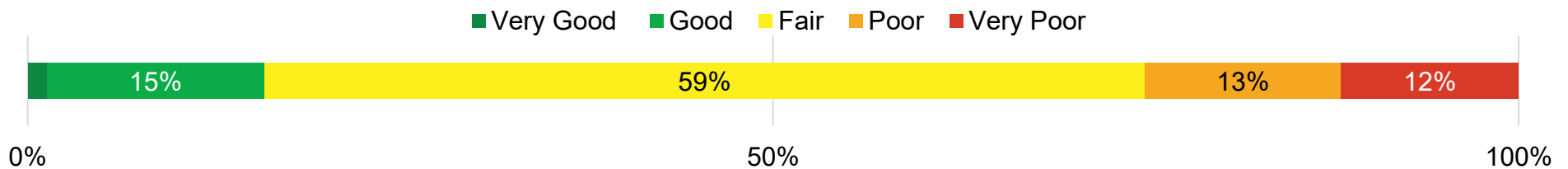


Figure 9.2 Overall Condition (Corporate Facilities Services)

Figure 9.3 lists Administration Buildings are shown to be in Fair to Poor condition, which is largely driven by significant short-term investments required at City Hall and within its adjacent Parking Facility.

Similarly, around 27% of Main Centres and Others/Site Work are listed in Poor to Very Poor condition, indicating significant investment will be required to maintain the safety and functionality of these facilities in the short term.

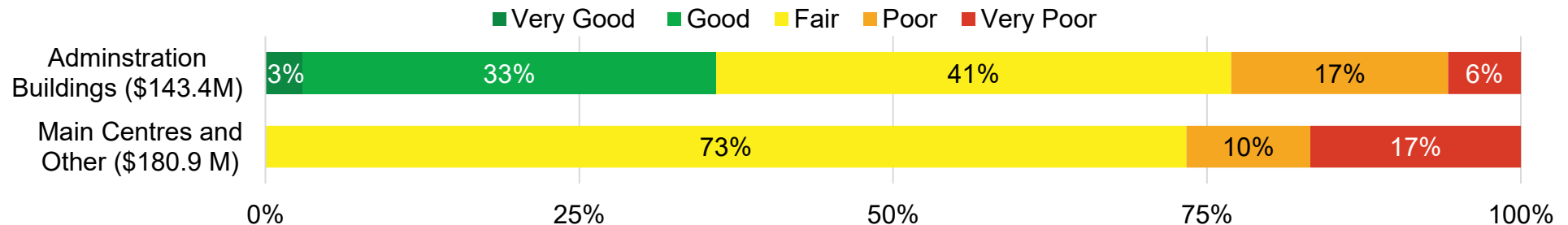


Figure 9.3 Asset Condition Detail (Corporate Facilities Services)

9.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan is striving for Levels of Service (LOS) performance measures linked to Customer Values of Accessible, Cost Efficiency, Customer Satisfaction, Environmental Stewardship, Reliability, Safety, and Scope.

Direct and Related LOS

After review with Corporate Facilities, LOS considered most representative of Corporate Facilities Services and able to be costed over a 10-year projected period (calendar years 2022

through 2031) are documented as 'direct LOS' and are listed in Table 9.2. LOS that have a causal relationship with direct LOS are documented in Table 9.3 as related LOS but cannot be as readily costed to Corporate Facilities Services.

Metrics

Lastly, Table 9.4 listed metrics that contain useful information, especially when considered in conjunction with direct LOS, and related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Corporate Facilities provides.

9.2.1: Direct Levels of Service

Table 9.2 Direct Levels of Service (Corporate Facilities Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed Target (2022 to 2031)
Cost Efficiency	Technical	Corporate Facilities reinvestment rate	1.6%	2.5%
Environmental Stewardship	Technical	Annual electric energy consumption kilowatt-hour per square foot	7.43 KWH/sf	Reduce
		Annual natural gas consumption cubic meters per square foot	0.86 m3/sf	Reduce
		Annual water consumption cubic meters per square foot	0.041 m3/sf	Reduce
Reliability	Customer/ Council	Percentage of Corporate Facility assets (Defined Administration, and Operation facilities) in fair or better condition	74.9%	Maintain current

9.2.2: Related Levels of Service

Table 9.3 Related Levels of Service (Corporate Facilities Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Reliability	Technical	Percentage of Administration Facilities in Poor to Very Poor condition	23.1%
Reliability	Technical	Percentage of Operation Facilities in Poor to Very Poor condition	26.6%

9.2.3: Other Measures

Table 9.4 Metrics – Other Dashboard Measures (Corporate Facilities Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Corporate Facilities Operating Budget	\$17,488,044
Cost Efficiency	Customer/ Council	Operating cost to provide service (cost per household)	\$100.13
Safety	Customer/ Council	Number of incidents in facilities per 10,000 square feet	0.063

9.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs.

The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, which may trigger asset investment needs.

9.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current LOS while striving to optimize costs and risks. Table 9.5 lists specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections.

Asset management practices or planned actions employed by cities can entail certain specific risks. Many types of risks such as health and safety, financial, environmental, etc. are summarized in Table 9.6 classified by each lifecycle activity.

The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 9.5 Current Asset Management Practices or Planned Actions (Corporate Facilities Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> Corporate Facilities are maintained and renewed through the Facilities group and their use of VFA software (supplied through Gordian), which combined with comprehensive condition assessments and Facilities experience, determines the lifecycle management needs of a facility. Needs include the direct care of the building envelope, mechanical and electrical systems, etc.
Maintenance	<ul style="list-style-type: none"> A work order system and online interface exists for City employees to generate requests of Facilities.
Renewal/Rehabilitation	<ul style="list-style-type: none"> Corporate Facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (splits into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA) determine the cost and timing of renewal requirements.

State of Local Infrastructure	Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions				
Replacement/ Construction	<ul style="list-style-type: none"> Corporate Facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (splits into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA) determine the cost and timing of replacement requirements. 				
Disposal	<ul style="list-style-type: none"> Appropriate and proper disposal occur when assets are replaced or renewed. 				
Service Improvement	<ul style="list-style-type: none"> Consultation with public and users of Corporate Facilities would determine service improvement needs. 				
Growth	<ul style="list-style-type: none"> Capital growth projects are identified by Development Charges (subject to provincial legislation requirements and City of London policy), or as a part of Assessment Growth Policy (where applicable with municipal policy). 				

Table 9.6 Risks Associated with Asset Management Practices or Planned Actions (Corporate Facilities Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Refer to Appendix A.
Maintenance	Completing planned maintenance activities while managing the need to execute reactive maintenance activities. Incorrectly planned maintenance activities can lead to premature asset failure. Enough resources available to complete a series of unplanned, urgent work requests that are submitted in close succession.
Renewal/ Rehabilitation	Refer to Appendix A.
Replacement/ Construction	Cost over-runs during large, complex design and construction projects.
Disposal	Refer to Appendix A.
Service Improvement	Refer to Appendix A.
Growth	Incorrect growth assessments may result in overabundance of Corporate Facilities assets.

9.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the forecasted change in the condition profile of each asset type. Figure 9.4 shows the projection of the condition of the Corporate Facilities assets based on three scenarios. The projected condition with current budget, maintain current LOS and achieving proposed LOS condition projection.

The figure also shows planned budget, the required investments to maintain the current LOS and Investments to achieve proposed LOS, which include a Facilities 'green premium' estimate. These are considered the first, but not comprehensive, investments in the City's Climate Order of Magnitude and Climate Emergency Action Plan implementation.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

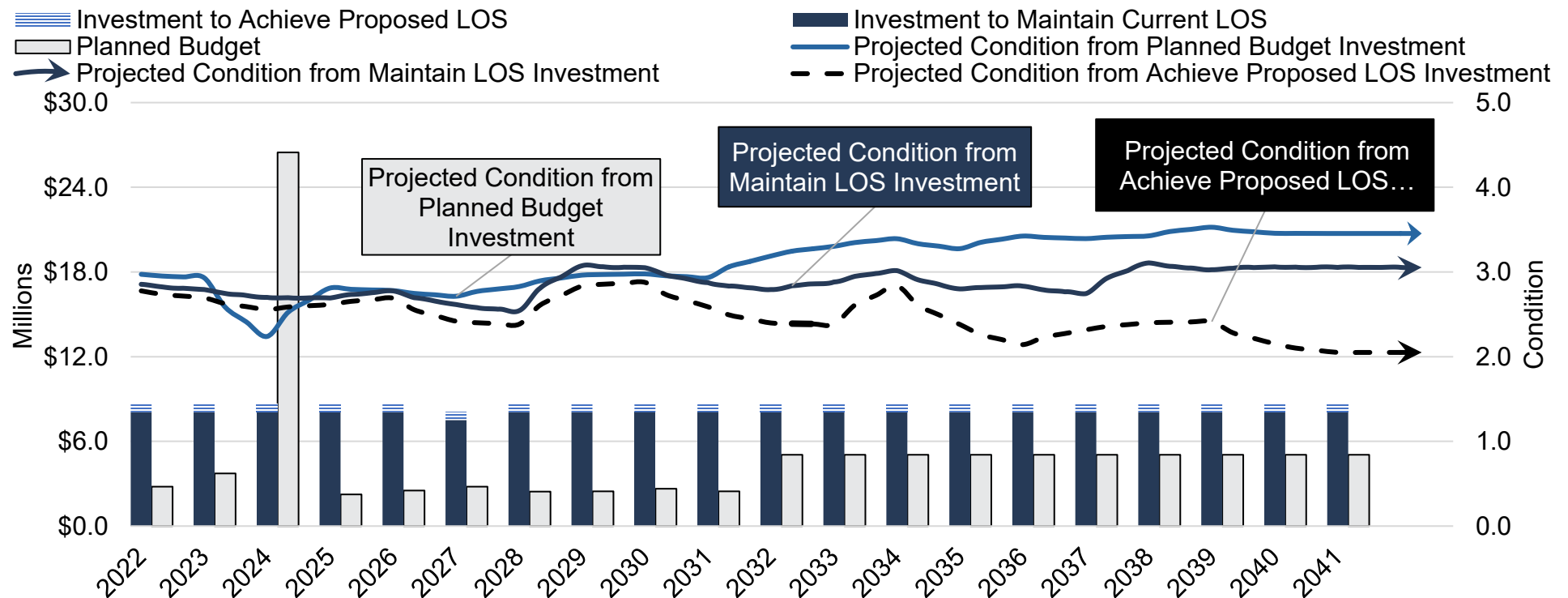


Figure 9.4 Projected Service State of Three Funding Scenarios (Corporate Facilities Services)

A. Scenario One: Planned Budget Condition Profile

The Corporate Facilities average annual activity and planned funding is summarized in Table 9.7. The condition profile expected from the planned budget is forecasted by using the same logic related to condition degradation rates and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a poor or very poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. Figure 9.5 presents the expected condition profile for the next 20 years based in the current budgets for Corporate Facilities assets. This scenario indicates the condition profile trending to most assets ranging from Fair, Poor, to Very Poor condition. Current funding for operating budget and capital

budgets are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years. Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget. Select service improvement budgets are factored in funding gap analysis and analysis and commented on below. Growth activities are analyzed using the 2021 Development Charges Background Study Update. Growth projects primarily relate to Operation Centres (North) which includes but not limited to Administrative and Garage Building, salt storage building, vehicle wash and fueling station, and associated land purchase.

All number in tables are rounded to nearest thousand.

Table 9.7 Scenario One – Average Annual Planned Budget (\$Thousands) (Corporate Facilities Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	17,140	17,661
Renewal, Replacement, Rehabilitation, Disposal	2,509	2,639
Service Improvement	6,575	15,745
Growth Activities	None identified	2,148

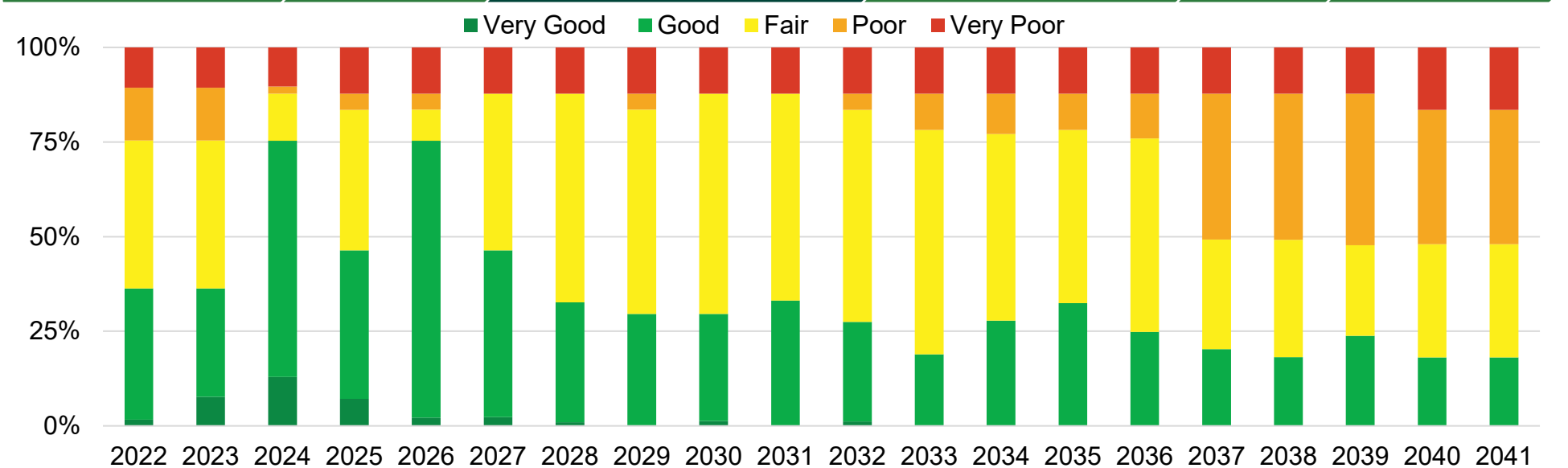


Figure 9.5 Projected 20-year Planned Budget Condition Profile (Corporate Facilities Services)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

The cost to maintain current LOS are summarized in Table 9.8. This scenario forecasts the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are

adjusted until the forecasted condition profile meets the current condition profile for these assets. Figure 9.6 presents the expected condition profile for the next 20 years based on investment required for maintain current LOS for Corporate Facilities assets. This scenario indicates the condition profile trending to most assets being in Good and Poor condition.

Table 9.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Corporate Facilities Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	17,661	None identified	5,531	None identified
Renewal, Replacement, Rehabilitation, Disposal	5,052	2,000	8,041	989
Service Improvement				
Growth Activities	2,148	None identified	2,148	None identified

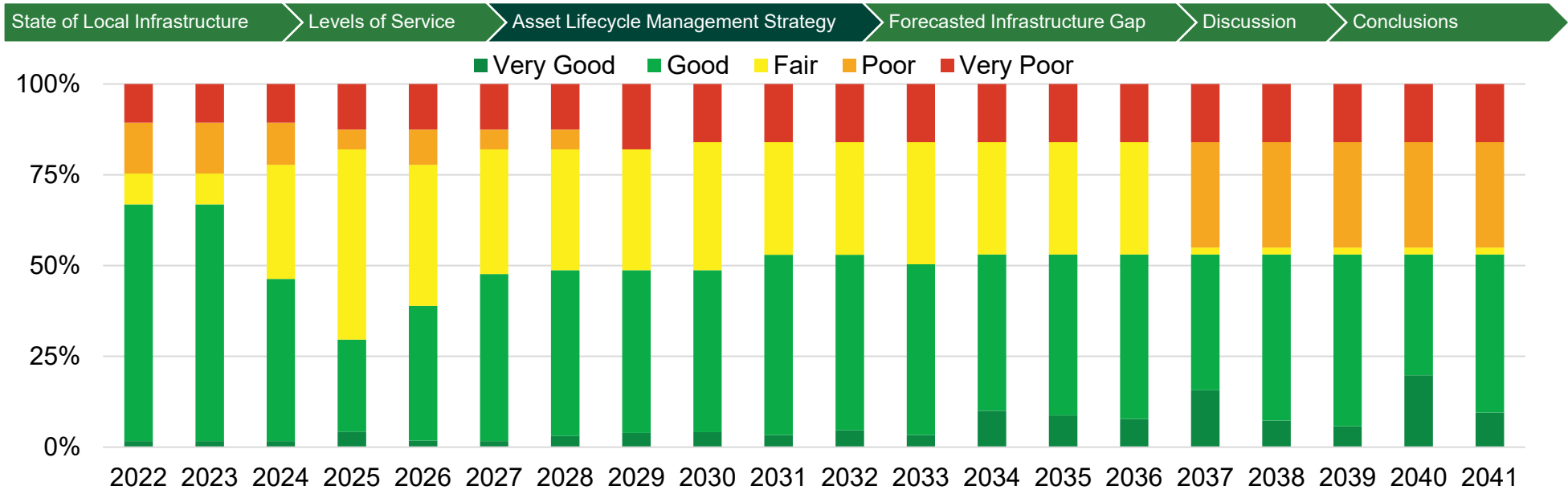


Figure 9.6 Projected 20-year Maintain Current LOS Condition Profile (Corporate Facilities Services)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

The cost to achieve proposed LOS are summarized in Table 9.9. This scenario forecasts the lifecycle activities that are required to achieve the proposed LOS. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the expectation of the City’s staff involved with the management of the assets. The future lifecycle activities that are required to achieve the desired condition profile are then used to establish the average annual investment to achieve the proposed LOS condition profile.

Figure 9.7 presents the expected condition profile for the next 20 years based on investment required for achieving proposed LOS for Corporate Facilities assets. This scenario indicates the condition profile trending to good and fair condition.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

Table 9.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Corporate Facilities Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ³²	Achieve Proposed LOS Infrastructure Gap ³³
Operating Budget	17,661	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	5,052	2,000	902	601	2,492
Service Improvement					
Growth Activities	2,148	None identified	None identified	None identified	None identified

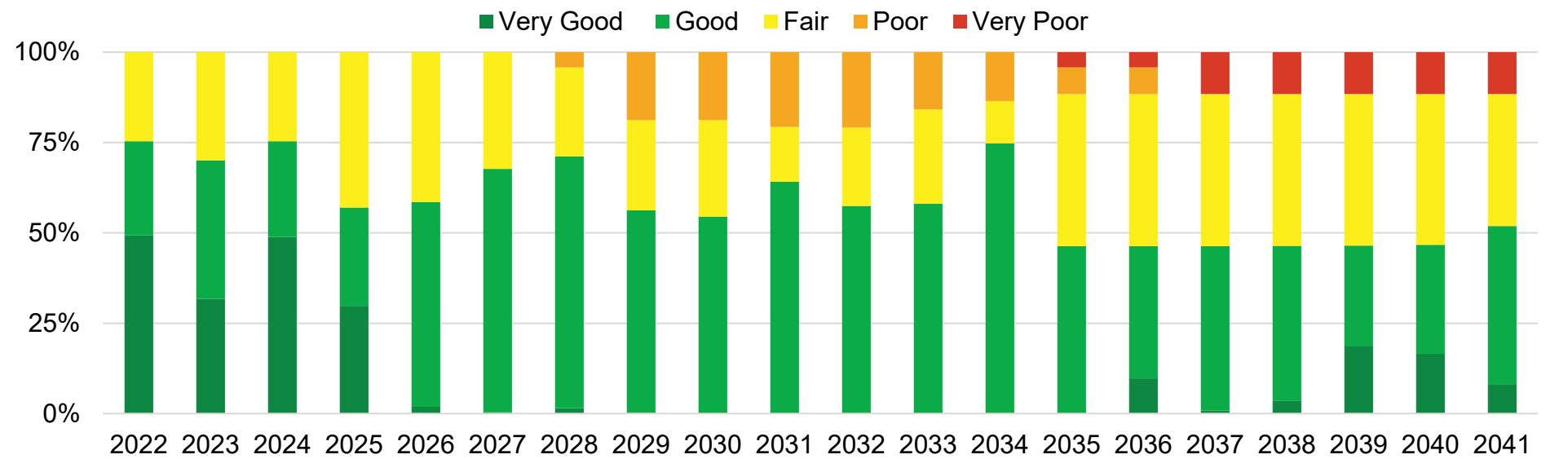


Figure 9.7 Projected 20-year Achieve Proposed LOS Condition Profile (Corporate Facilities Services)

If funding for proposed LOS is not sufficient, the City will:

1. Continue lifecycle activities to maintain current LOS,
2. Carry out the Climate Emergency Action Plan within current funding scope. A green initiative life cycle renewal activity may be otherwise not feasible (examples include boiler and energy efficient windows). The facility asset
- would otherwise be functional but not addressing green initiative strategic needs, and/or
3. Per the Master Plan, initiate construction for new facilities where growth funding can be leveraged or based on priority.

³²Incremental investment to achieve proposed LOS excludes CEAP costs.
³³Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

9.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 9.10 and illustrated in Figure 9.8. The analysis is related to the lifecycle rehabilitation or replacement lifecycle activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

The 10-year maintain current LOS infrastructure gap is expected to be approximately \$9.9 million.

Achieving proposed LOS infrastructure gap is expected to be approximately \$24.9 million over a 10-year period. Investment to

achieve proposed LOS is to address all needs relating to Facilities. The City Hall portion of these needs has planned budgeting available via the Master Accommodation Plan (MAP) budget. The 2023 CAM Plan assumes this funding will be available to address needs within the 10-year timeframe in the CAM plan.

The preliminary estimate for CEAP funding in Facilities includes incorporating 'green premium' into lifecycle management needs. This means that instead of simply replacing existing infrastructure with a similar one like for like', there will be an increased focus on incorporating green infrastructure replacements whenever feasible.

Table 9.10 Average Annual Budget and Gap Analysis (\$Thousands) (Corporate Facilities Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Corporate Facilities	5,052	2,000	8,041	902	601	989	2,492

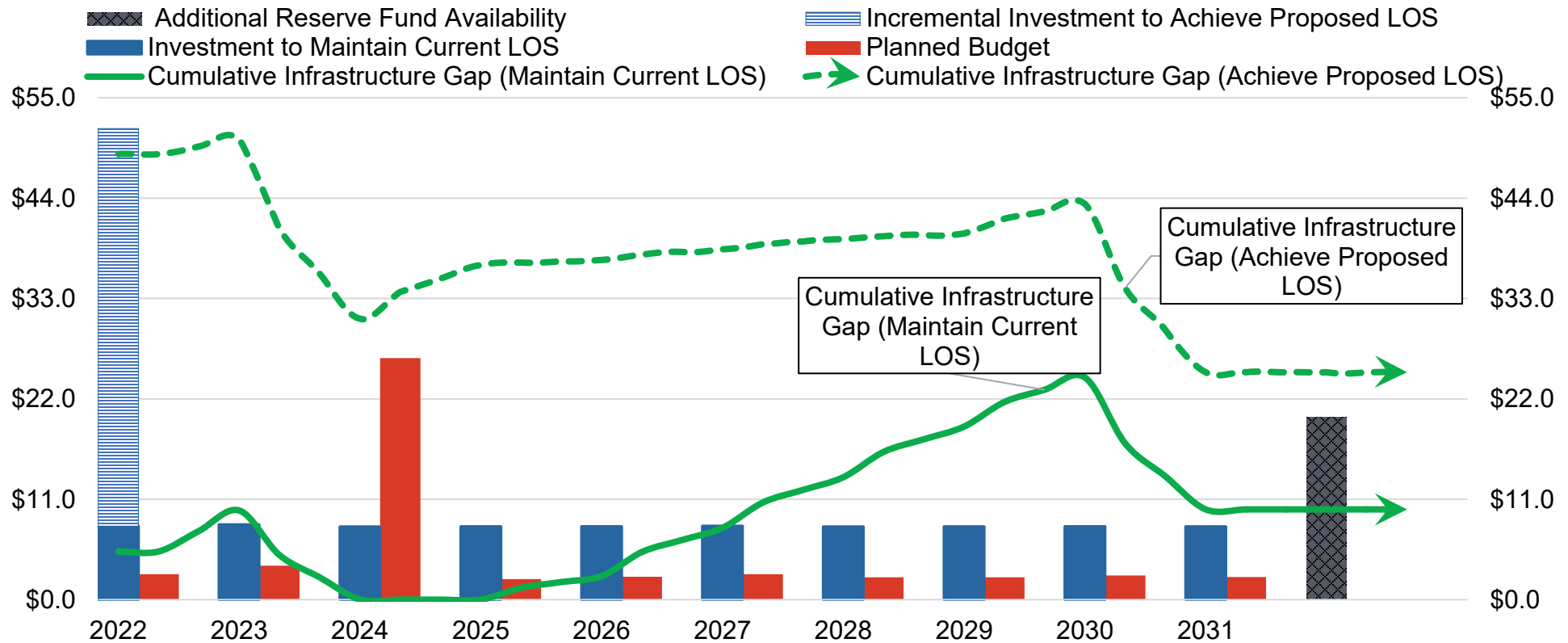


Figure 9.8 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Corporate Facilities Services)

The estimates for the Corporate Facilities infrastructure gap are based on Facilities data collected in the City's VFA software.

The 10-year maintain current LOS infrastructure gap is evenly distributed (by replacement value) across the Corporate Facilities' asset portfolio. The projected infrastructure gap is reduced by the forecasted reserve fund drawdown availability. Achieving proposed LOS comprises primarily of Operations Centres needs, and there is a preliminary estimate of increased 'green premium' allocations for replacing assets that have a green component.

If forecasted reserve fund balances are not achieved this will significantly increase the Corporate Facilities infrastructure gap.

Furthermore, it is noted that risk assessment and consequence of failure is not explicitly addressed for Corporate Facilities assets in this CAM Plan analysis. Once a risk assessment methodology is embedded in asset management analysis, it may have a material impact on needs identified for Corporate Facilities infrastructure gap.

9.5: Discussion

9.5.1: Comparing 2019 and 2023 Asset Management Plans

Figure 9.9 provides the 2019 to 2023 Corporate Facilities condition comparison. Corporate Facilities Replacement value indicated in the 2019 CAM Plan was \$244.6 million; it increased to \$324.36 million due to inflation, constructing new assets, and the recent increase in the construction cost in the region. Recent market pressures that are contributing to this include inflation and supply chain shocks commencing during the COVID-19 pandemic, interest rate increases and skilled labour shortages. The 2019 CAM Plan anticipated asset to deteriorate due to limited funding; this can be seen today, where the condition profile has changed to have more assets in Poor and Very Poor condition while also having more assets in Good and

Very Good condition. The 10-year infrastructure gap from the 2019 CAM Plan was calculated as \$32.3 million. The Corporate Facilities maintain current LOS infrastructure gap is approximately \$9.9 million. This decrease is primarily driven by the assumption that Master Accommodation Plan (MAP) funding would be sufficient to address needs as identified in the City's VFA software. If this funding is reallocated, then the Corporate Facilities' infrastructure gap would increase. The 2019 CAM Plan considered the entire facilities' backlog lifecycle requirements and included them in the initial year's needs. The 2023 CAM Plan equally spreads these investments over a decade.

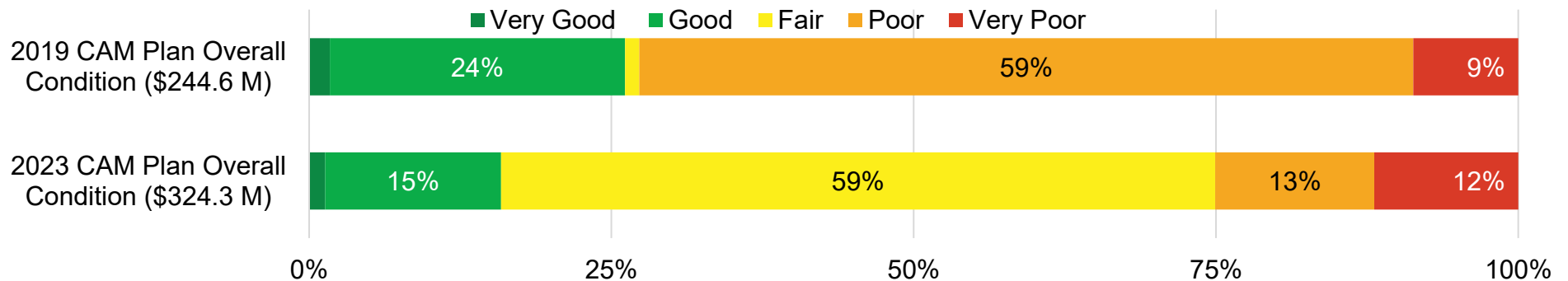


Figure 9.9 2019 CAM Plan to 2023 CAM Plan Condition Summary (Corporate Facilities Services)

9.5.2: Lifecycle Management Scenarios

The lifecycle management section included three scenarios. Scenario One planned budget which imposes significant constraints on the City's capacity to effectively maintain the buildings in the portfolio. As the budget remains stagnant, this leads to a gradual deterioration in their condition. This decline might not be immediate but, over time, it becomes more visible to the public and causing operating problems, increasing the

operating and maintenance costs, and potentially leading to higher repair or replacement costs in the future.

Scenario Two maintain current LOS funding is higher than what is currently allocated, illustrating the financial strain of maintaining a healthy asset portfolio. This scenario acknowledges the need for continual investment in assets to

maintain their current state, eliminating the degradation seen in the first scenario. However, while it prevents further decline, it does not enhance the condition of the assets.

Scenario Three achieve proposed LOS funding is higher than both the current budget and the one needed to maintain the assets' existing state. The advantages of this approach are evident in improved levels of service and buildings condition, extended asset lifespans, and potential cost savings in the long run. Nevertheless, this scenario shows the financial challenge the City faces to achieve the proposed LOS.

These three scenarios show different results depending on the level of funding for the assets life cycle renewal actions. The choices made will have an implication for the Corporate Facilities buildings' condition and their performance.

9.5.3: Current and Future Challenges

Current challenges primarily relate to cost pressures for Facilities and adapting lifecycle management strategies to align with Strategic Plan and CEAP targets. Future challenges include how this corporate service will meet service standards for structures that have a both public facing and internal corporate facing use. This dual purpose need is represented through the use of City Hall. It must function as an employee space while meeting standards of citizens and councillors, but what this will envision is not finalized as the City emerges from the impact of the COVID19 pandemic.

This chapter focuses solely on Corporate Facilities, but similar challenges are being replicated across the portfolio that the City's facilities staff must contend with. This includes both directly owned assets which have their separate chapter in the CAM Plan (examples include the Facilities portion of Parks, Recreation, London Fire Department, certain Cultural assets, Long Term Care) and some agencies, boards, and commissions

that in process of developing their own asset management plans. The issues outlined in this chapter must be considered with other chapters that have a Facilities component to have context of the challenges this corporate service encounters.

9.6: Conclusions

Valued at over \$324 Million, the City's Corporate Facilities assets are overall in Poor to Fair condition, indicating that there has been insufficient investment in sustaining these assets to maintain the current levels of service and achieving proposed LOS. Figure 9.10 illustrates the infrastructure gap as a proportion to the required investment over the next decade. Table 9.11 presents the summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment rates for Corporate Facilities Services assets.

Maintaining current investment will result in a \$9.9 Million infrastructure gap, and achieving proposed LOS gap is approximately \$24.9 million. This could result in degradation of the service delivered to citizens. Further investment is needed to address the future lifecycle needs of the current Corporate Facilities assets.

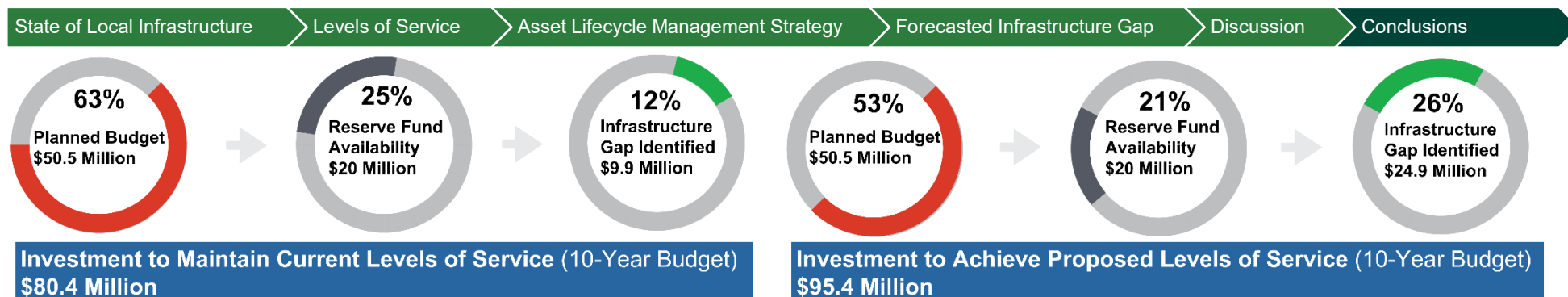


Figure 9.10 Visualization of Maintain Current and Achieve Proposed LOS Infrastructure Gaps (Corporate Facilities Services)

Table 9.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Corporate Facilities Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ³⁴
Corporate Facilities	\$324.3		\$9.9	\$24.9	1.6%	2.5% to 2.7%

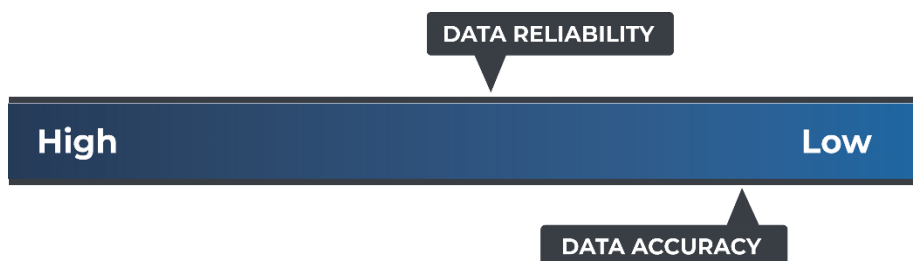


Figure 9.11 Accuracy Reliability Scale (Corporate Facilities Services)

Accuracy and Reliability Commentary

Data reliability is rated as moderate. Valuation is based on Facilities VFA information and corroborated with Altus standard costs for London area facilities. Staffing and COVID19 pressures resulted in Facilities focusing on the most critical operation aspects since the pandemic inception. Facilities is undergoing a phased approach of comprehensively reviewing, updating, and maintaining VFA data. This process is not complete at time of CAM Plan release thus data reliability is assessed as moderate and data accuracy as moderate to low.

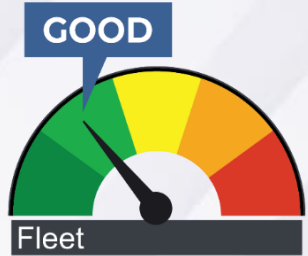
³⁴ Source: The recommended reinvestment rate ranges from the required investments to maintain current LOS and to achieve proposed LOS.



Section 10. Fleet

Asset Information	Fleet
Replacement Value	\$70.9 Million
10 year Maintain Current Levels of Service Infrastructure Gap	None identified
10 year Achieved Proposed Levels of Service Infrastructure Gap	\$8.9 Million

Quick Facts
271 Light Vehicles
147 Heavy Vehicles



10.1: State of Local Infrastructure

Fleet vehicles and equipment are managed by Fleet Services. A safe, reliable, and right sized municipal fleet is a key aspect to service delivery for over 50 municipal program areas to provide their services to Londoners. Fleet Services manages over 1,361 vehicle and equipment assets that range significantly in both complexity and value. Rolling stock assets include both on-road and off-road vehicles and equipment such as Waste Collection Trucks, Graders, Backhoes and Tandem Dump Trucks, down to over 271 light passenger vehicles like cars, vans, SUV's and pick-up trucks. The remaining assets are a mix of both rolling stock and non-rolling stock that include turf mowers, trailers, ice re-surfacers, farm tractors, and gas-powered tools and equipment. Fleet Services provides all the licensing, registration and insurance of the vehicles and maintains a preventative maintenance program that meets or exceeds the Ministry of Transportation regulatory requirements.

10.1.1: Asset Inventory and Valuation

Table 10.1 shows the current value of Fleet vehicles and equipment is approximately \$70.9 Million. The City of London owns a significant portion of the Fleet assets and manages lease and rental agreements for over 150 additional vehicles and equipment during peak seasonal demand periods, it being noted leased and rental agreement vehicles and equipment are excluded from the asset inventory. The core services provided by Fleet Services is Fleet Administration (Asset management, analytics, budget), Fleet Planning (procurement and remarketing), Fleet Maintenance (service and repairs), and refueling services (tanks, key readers, dispensing equipment). Fleet Services assigns equipment and vehicle assets to service areas and recovers the operating and capital costs through the internal rental rate charges.

Table 10.1 Inventory and Valuation (Fleet Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Light Vehicle	Cars, Mini Vans, SUV's, Pick-ups	271	Each	\$10,408
Medium Vehicle	350,450 Series Utility Trucks, Small Ariel	16	Each	\$1,101
Heavy Vehicle	Packers, Dump Truck, Street Sweepers, Flushers, Tanker Trailers	147	Each	\$38,109
Light Equipment	Trailers, Plow Blades, Line Painters, Trailer Tool Boxes	108	Each	\$711
Light Equipment (Off Road)	Job Trailers, farm Tractors, Trackless Attachments, Mowers lesser than 72 inches	647	Each	\$4,556
Medium Equipment	Snow Plow Blades and Wings, Float Trailers	42	Each	\$2,979
Medium Equipment (Off Road)	Trackless S/W machines, Mowers greater than 72 inches	107	Each	\$8,643
Heavy Equipment	Sander - Rear Discharge	9	Each	\$765
Heavy Equipment (Off Road)	Greater than 40-foot Aerial Lift units, Front End Loaders, Snow Blower, Road Graders	14	Each	\$3,592
Total				\$70,864

Fleet has extended some of their services to other municipal programs including Libraries, Tourism London, and London-Middlesex Emergency Medical Services (LMEMS) on a full cost recovery basis to help maximize the use of municipal services, infrastructure and minimize other municipal programs service delivery costs. The Fleet report section deals only with the assets of core City services and not the assets of Fire, Police and Transit. It does include vehicles owned by the City and leased to Agencies, Boards and Commissions. It does not include seasonal and long-term rentals.

10.1.2: Age Summary

Figure 10.1 shows the Fleet assets (Vehicles and Equipment) average asset age as a proportion of the average useful life by asset type. The average ages for all Vehicles and Equipment were calculated using the recorded acquisition date in the Fleet databases. In general, all asset types are within their average industry standard useful life.

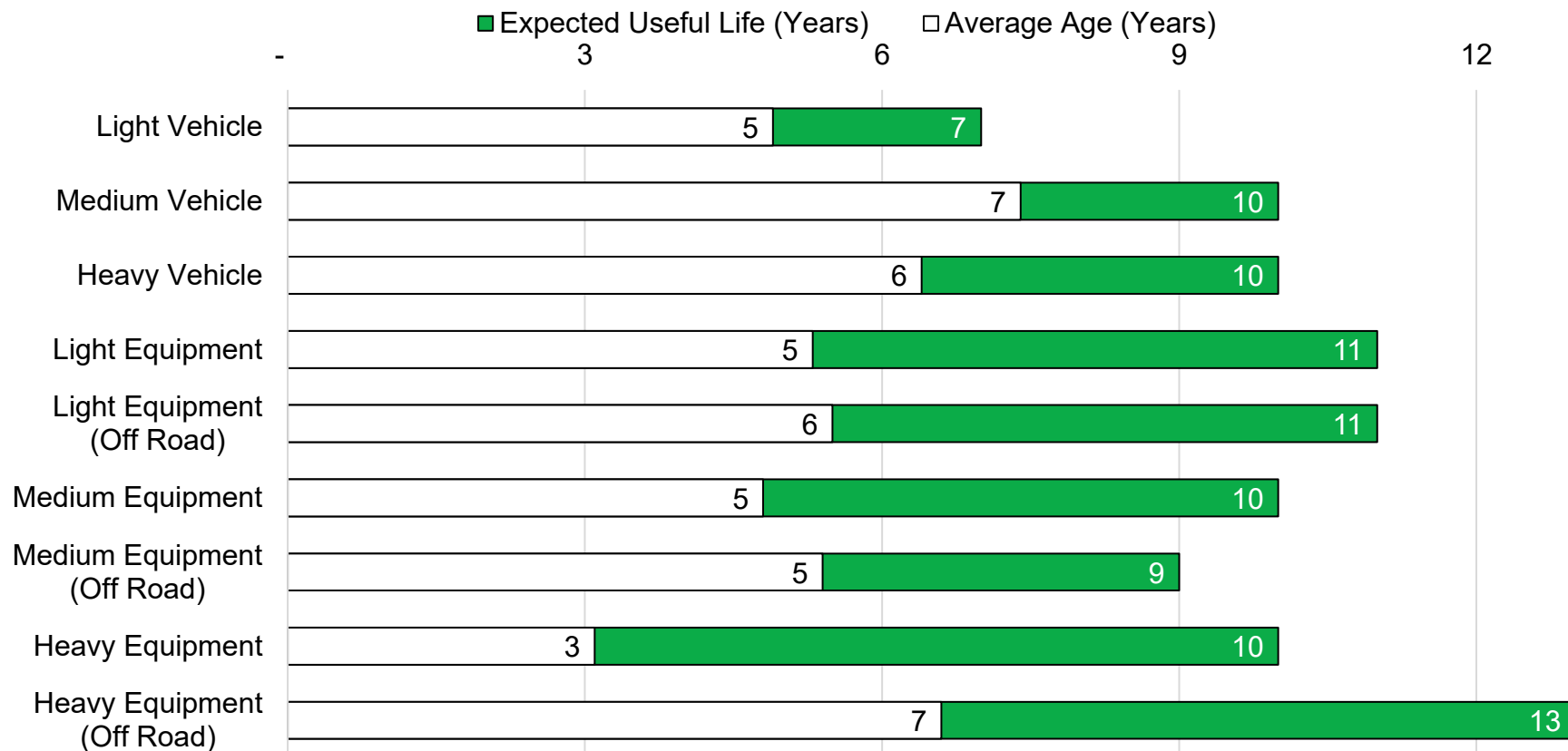


Figure 10.1 Average Age and Expected Useful Life (Fleet Services)

10.1.3: Asset Condition

Figure 10.2 presents the condition distribution of all the vehicles and equipment assets owned by the Fleet Service. It shows that approximately 87% of the assets are in Fair to Very Good condition. Assets are maintained in safe, serviceable condition,

with replacement occurring on a planned basis as assets reach their optimum lifecycle stage or their best economic resale time. Retired assets are sold off and the associated proceeds used to offset the purchase of new ones.

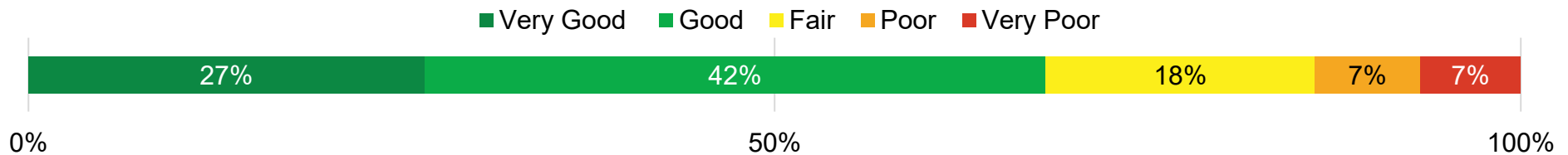


Figure 10.2 Overall Condition (Fleet Services)

Vehicles represent the biggest value of Fleet assets. They range from standard cars and trucks (Light Vehicles) to utility work trucks (Medium Vehicles), to tandem dump trucks, garbage packers and sewer cleaning units (Heavy Vehicles). As seen in Table 10.3, large portions of the City's vehicle fleet are shown as being in Very Good to Fair condition. Sound maintenance practices allow Fleet services to extend the lives of these assets and maintain their serviceability throughout their lifecycle. Additionally, when, and where appropriate the City is

updating Fleet assets to take advantage of hybrid and emerging technologies. Equipment ranges from trailers and large manual tools (Light Equipment) to snow plow attachments and mowers (Medium Equipment), to front end loaders and road graders (Heavy Equipment). Fleet staff maintains these assets in a safe condition and keeps them operational as they age. The condition of most of the heavy equipment is in Good condition, while the Off Road Heavy Equipment is distributed through Very Good, Good and Fair condition.

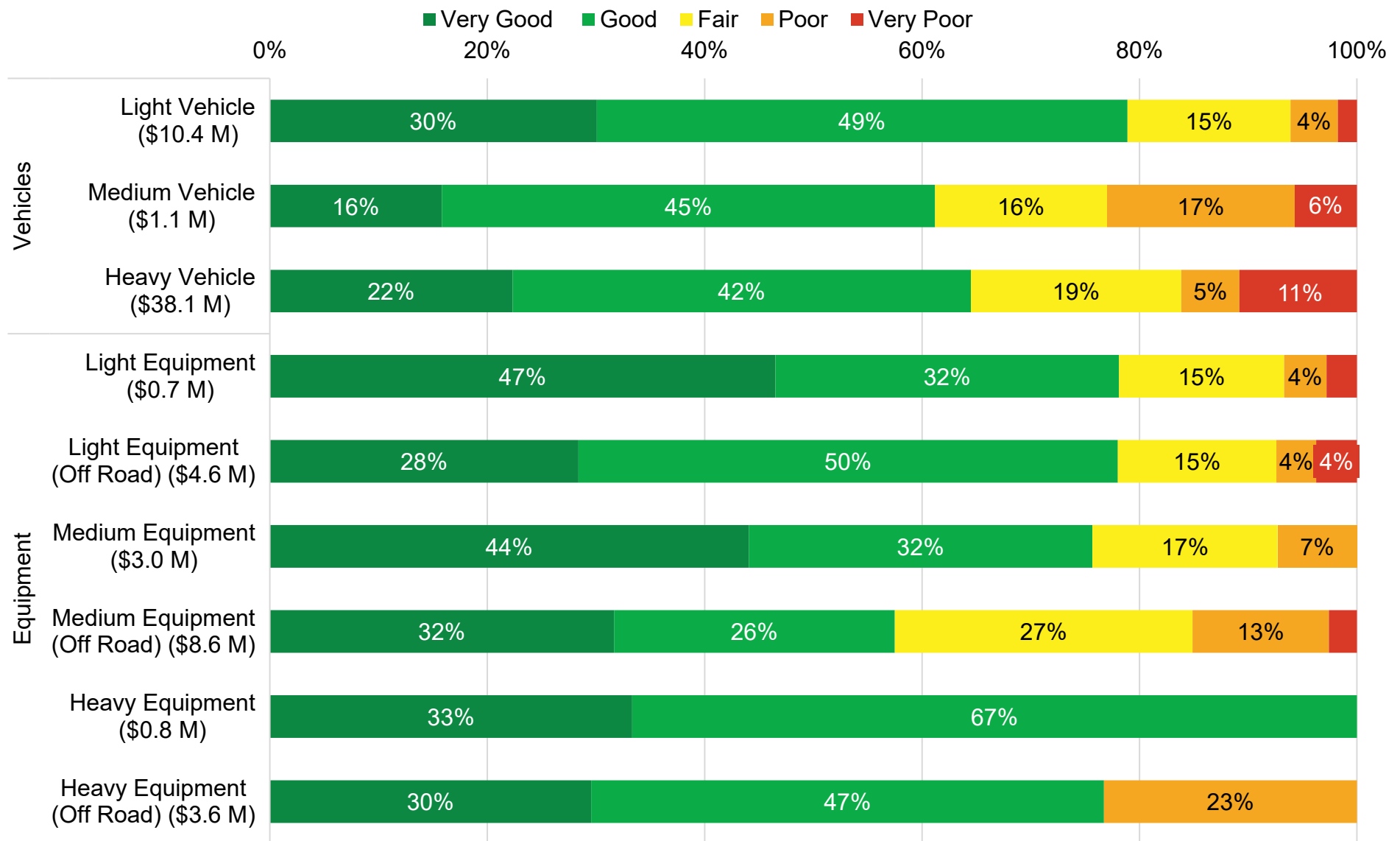


Figure 10.3 Asset Condition Detail (Fleet Services)

10.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan is striving for levels of service (LOS) performance measures linked to Customer Values of Accessible, Cost Efficiency, Customer Satisfaction, Environmental Stewardship, Reliability, Safety, and Scope.

Direct and Related LOS

After review with Fleet, LOS considered most representative of Fleet Services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as ‘direct LOS’ and are listed in Table 10.2.

LOS that have a causal relationship with direct LOS are documented in Table 10.3 as related LOS but cannot be as readily costed to Fleet Services.

Metrics

Table 10.4 listed metrics that can are useful information, especially when considered in conjunction with direct LOS, and related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Fleet provides.

10.2.1: Direct Levels of Service

Table 10.2 Direct Levels of Service (Fleet Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed Target (2022 to 2031)
Cost Efficiency	Customer/ Council	Fleet reinvestment rate	9.4%	10.9%
Environmental Stewardship	Customer/ Council	Annual greenhouse gas emissions.	6,829 tonnes/year	Reduce ³⁵
Reliability	Customer/ Council	Percentage of fleet within optimum service life	88.3%	Maintain current
Reliability	Customer/ Council	Percentage of regulated MTO maintenance inspections completed	100%	Maintain current

10.2.2: Related Levels of Service

Table 10.3 Related Levels of Service (Fleet Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Reliability	Technical	Number of failures by failure code	187
Reliability	Technical	Percent of fleet past optimum service life	11.7%

³⁵ Reference CEAP targets in Area of Focus 7, section (8)

10.2.3: Other Measures

Table 10.4 Metrics – Other Dashboard Measures (Fleet Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Operating dollars budget for Fleet Services	\$12,374,204
Cost Efficiency	Customer/Council	Annual operating cost to provide service (\$/household)	\$70.85
Cost Efficiency	Technical	Cost per kilometer	\$1.12
Cost Efficiency	Technical	Percentage of vehicles not recovering 100% of replacement cost between recovery and salvage	2.9%
Cost Efficiency	Technical	Annual Average Reserve Fund Contribution Ratio	0.76
Cost Efficiency	Technical	Percentage of unaccounted/indirect/unallocated capital contribution	<1%
Customer Satisfaction	Customer/Council	Percentage of fleet meeting quality targets	84%
Reliability	Customer/Council	Number of complaints due to uncleanliness or appearance of vehicles	5
Reliability	Technical	Number of complaints due to body condition of vehicles	3
Reliability	Technical	Percentage of light preventive maintenance activities completed on time	96.0%
Reliability	Technical	Percentage of medium preventive maintenance activities completed on time	98.0%
Reliability	Technical	Percentage of full preventive maintenance activities completed on time	100%
Reliability	Technical	Percentage of repair hours spent on unscheduled repairs and service not PM related.	46.7%
Reliability	Technical	Number of missed planned inspections	33
Safety	Customer/Council	Percentage of A, B, and C preventive maintenance complete per requirements	98.0%

10.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and

pilot programs. The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, which may trigger asset investment needs.

10.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current LOS while striving to optimize costs and risks. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections. Table 10.5 lists specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections.

Asset management practices or planned actions employed by cities can entail certain specific risks. Table 10.6 classifies risks by each lifecycle activity. The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 10.5 Current Asset Management Practices or Planned Actions (Fleet Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> • Lifecycle Management Reviews – Condition Assessment at End of Life. • Annual review and benchmarking of Lifecycles. • Test extending lifecycle to review impact. • Cost review on Assets past lifecycle.
Maintenance	<ul style="list-style-type: none"> • Carrying out regular preventive maintenance of all vehicles. • Reactive maintenance for circumstances that cannot be easily mitigated (vehicle accidents requiring immediate repair, faster than anticipated vehicle breakdown). • Tracking all failures as incidents to continue to improve. Target is to minimize unplanned non-standardized work. • Empowering staff to make decisions regarding elective repairs to ensure continuity of service and fewer breakdowns while in service.

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
Renewal/ Rehabilitation	<ul style="list-style-type: none"> Regular preventative maintenance programs assist in determining renewals/rehabilitations required. Major overhauls or reconditioning fleet assets are very costly and generally do not add enough extended life to add value. Review opportunities to repurpose add on equipment, attachments and outfitting past the lifecycle of the parent asset. 					
Replacement/ Construction	<ul style="list-style-type: none"> Optimal asset lifecycle assessed to determine timing of replacement that minimizes maintenance/repair work and maximize salvage value. Notice to all shop supervisors and manager of end-of-life assets to help with service and repair decisions to mitigate non value added expenditures. 					
Disposal	<ul style="list-style-type: none"> Optimal lifecycle analysis results in salvage value. Salvage amount can vary but an average of 15% of replacement value is consistently achieved. Fleet planning to stagger sales of similar assets at auction to ensure maximum returns and not over flooding resale market. Fleet planning to target peak season for certain items to hit auction when demand is high. (i.e., snow plow equipment – Sept-Nov.) 					
Service Improvement	<ul style="list-style-type: none"> Extended warranties and service agreements. RFP procurement practices to acquire higher quality assets with longer lifecycles. 					
Growth	<ul style="list-style-type: none"> Currently provide several shared services to our other public service providers. (Fire, Police, EMS, Libraries, and Tourism). Some shared services include Fuel, vendor agreements for parts and service. Reviewing business plans to offer fleet mechanical shop services to other public services, boards, and commissions. Capital growth projects are identified by Development Charges and the service area using the fleet asset (subject to More Homes Build Faster Act, 2022, Development Charges Act, 1997 requirements, such as fleet asset expecting to last less than 7 years not being eligible for Development Charge funding). The service area would finance the fleet asset, and Fleet would then be responsible for acquisition and maintenance of the growth asset. 					

Table 10.6 Risks Associated with Asset Management Practices or Planned Actions (Fleet Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> Extending useful life past optimum can increase the risk of critical failure of major components. Assets beyond optimum life have reduced salvage and remarketing value. Assets beyond optimum age can have significantly higher maintenance costs.
Maintenance	Refer to Appendix A.
Renewal/Rehabilitation	Refer to Appendix A.
Replacement/Construction	<ul style="list-style-type: none"> Minimizing service and repair at end of life increases the chance of failures.
Disposal	<ul style="list-style-type: none"> Timing for replacements has an operational impact. Delaying or holding inventory requires storage and can adversely affect the function and value of the retiring asset.
Service Improvement	Refer to Appendix A.
Growth	Refer to Appendix A.

10.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the forecasted change in the condition profile of each asset type. Figure 10.4 shows the projection of the condition of the Fleet assets based on three scenarios. The projected condition with current budget, maintain current LOS and achieving proposed LOS condition projection. The figure also shows planned budget, the required investments to

maintain the current LOS and Investments to achieve proposed LOS, which include a Fleet ‘green premium’ estimate. These are considered the first, but not comprehensive, investments in the City’s Climate Order of Magnitude and Climate Emergency Action Plan implementation. The incremental investment for proposed LOS is limited to the potential replacement to electric vehicle units and the related estimated capital costs.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

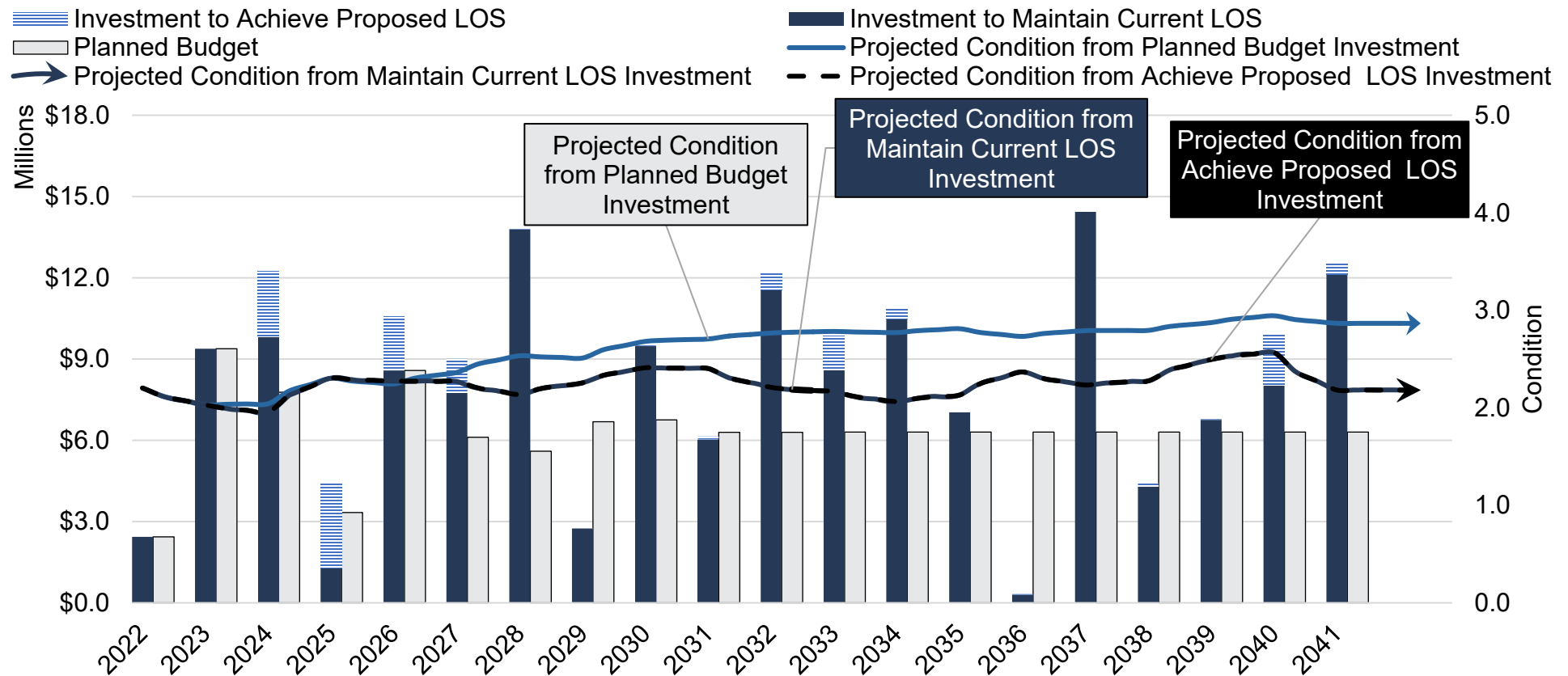


Figure 10.4 Projected Service State of Three Funding Scenarios (Fleet Services)

A. Scenario One: Planned Budget Condition Profile

The Fleet average annual activity and planned funding is summarized in Table 10.7. The condition profile expected from the planned budget is forecasted by using the same logic related to condition degradation rates and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or

Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. Figure 10.5 presents the expected condition profile for the next 20 years based in the current budgets for Fleet assets. This scenario indicates the condition profile trending to assets ranging from Very Good to Very Poor condition.

Current funding for operating budget and capital budgets are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of

2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget. It is noted Waste Management’s, New and Emerging Solid Waste Technologies capital budget SW6050, helps fund the packers with the one-time transition to Compressed Natural Gas (CNG) at the point of initial purchase. It is further noted that underlying funding of City internal rental rate structure for packers will have

to be adjusted for when the CNG packers are purchased/operational (approximately 9 years’ service life, on average, per CNG vehicle).

Service improvement planned funding lists estimated amounts to replace existing packers with CNG.

Growth activities are analyzed using the 2021 Development Charges Background Study Update. No growth projects are identified. All number in tables are rounded to nearest thousand.

Table 10.7 Scenario One – Average Annual Planned Budget (\$Thousands) (Fleet Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	12,314	12,553
Renewal, Replacement, Rehabilitation, Disposal	4,638	6,355
Service Improvement10F10F	None identified	336
Growth Activities	None identified	None identified
Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding

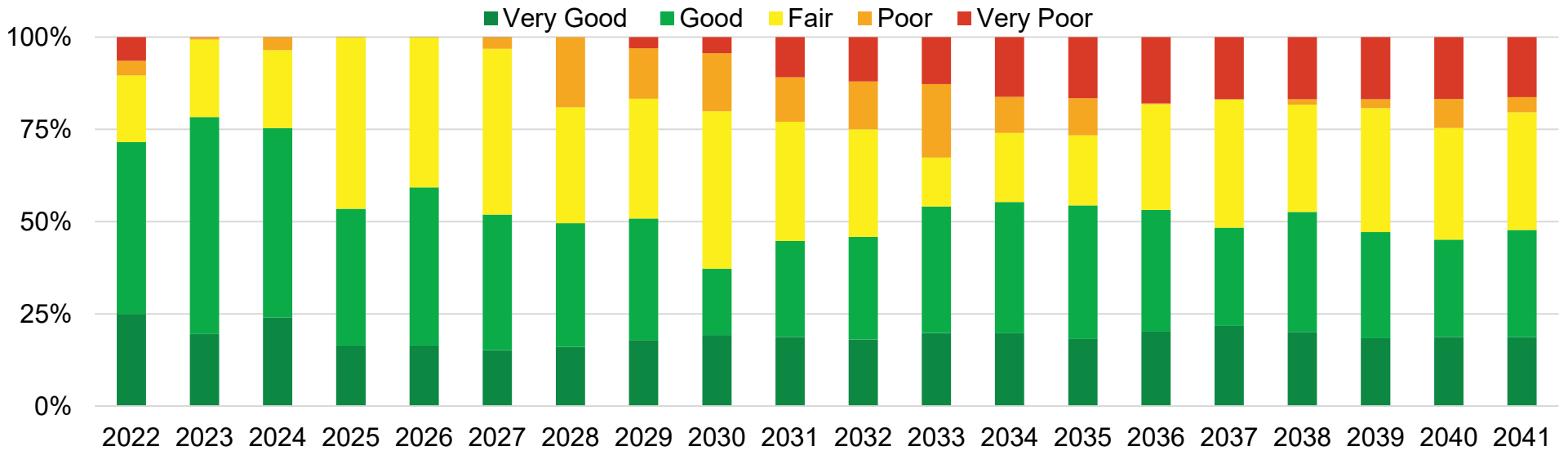


Figure 10.5 Projected 20-year Planned Budget Condition Profile (Fleet Services)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

The cost to maintain current LOS are summarized in Table 10.8. This scenario forecasts the lifecycle activities that are required to maintain the current performance of the direct LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the current condition profile for these assets.

Like scenario one, the renewal and replacement planned funding also includes capital budgets from Waste Management's, New and Emerging Solid Waste Technologies

capital budget SW6050. This budget funds any initial purchase costs above original planned budget for packers with CNG enhancements. Future replacements will require annual rental rate contributions from Waste Management service area to be adjusted to cover revised packer replacement cycle costs. As of time of writing this has not yet occurred.

Figure 10.6 presents the expected condition profile for the next 20-years based on investment required for maintain current LOS for Fleet assets. This scenario indicates the condition profile trending to most assets being in Very Good to Fair condition.

Table 10.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Fleet Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	12,553	None identified	12,553	None identified
Renewal, Replacement, Rehabilitation, Disposal	6,691	1,042	7,733	None identified
Service Improvement				
Growth Activities	None Identified	None identified	None Identified	None identified

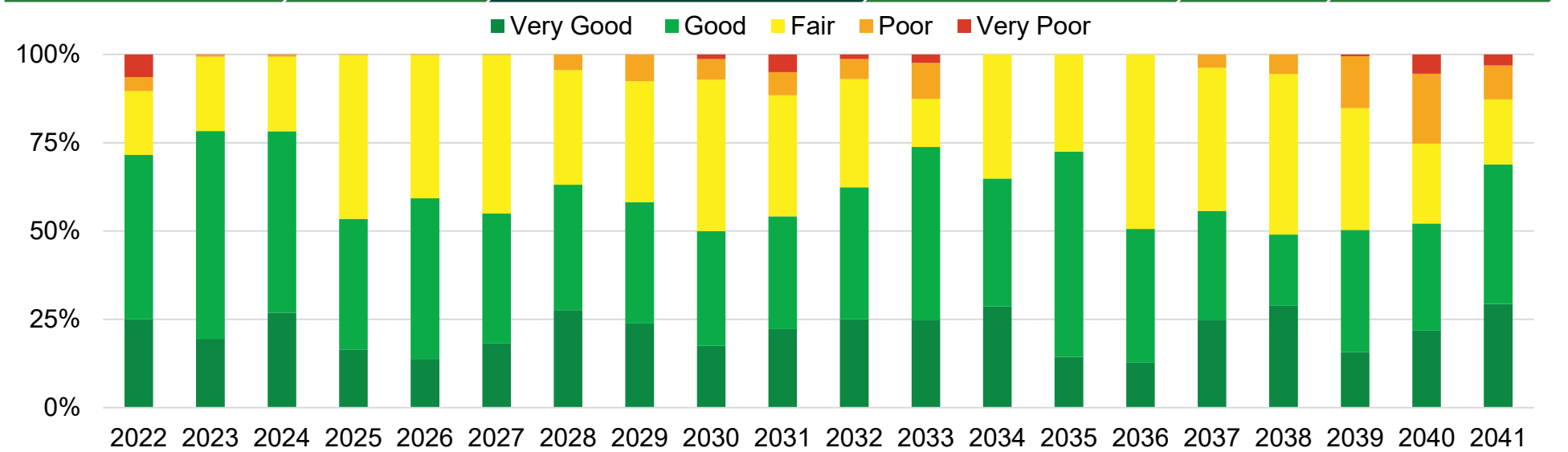


Figure 10.6 Projected 20-year Maintain Current LOS Condition Profile (Fleet Services)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

The cost to achieve proposed LOS are summarized in Table 10.9. This scenario forecasts the lifecycle activities that are required to achieve the proposed LOS. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the expectation of the City’s staff involved with the management of the assets. The future lifecycle and/or service improvement activities that are required to achieve the desired condition profile are then used to establish the average annual investment to achieve the proposed LOS condition profile. Figure 10.7 presents the expected condition profile for the next 20 years based on investment required for achieving proposed LOS for Fleet assets. This scenario indicates the condition profile trending to most assets being in Very Good to Fair condition.

This profile is identical to the maintain current LOS profile. Investing in the proposed LOS provides benefits related to meeting the requirements of the Climate Emergency Action Plan (CEAP), which go beyond the scope of a condition profile. An assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented here align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets. It also includes preliminary assessments of funding beyond 2027 as the Fleet assets reach the end of their useful life and are replaced. For example, if a CEAP expenditure were to occur in 2024 with an asset expected useful life of seven years, an additional CEAP investment would be necessary in 2031.

Table 10.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Fleet Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ³⁶	Achieve Proposed LOS Infrastructure Gap ³⁷
Operating Budget	12,553	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	6,691	1,042	899	None identified	899
Service Improvement					
Growth Activities	None identified	None identified	None identified	None identified	None identified

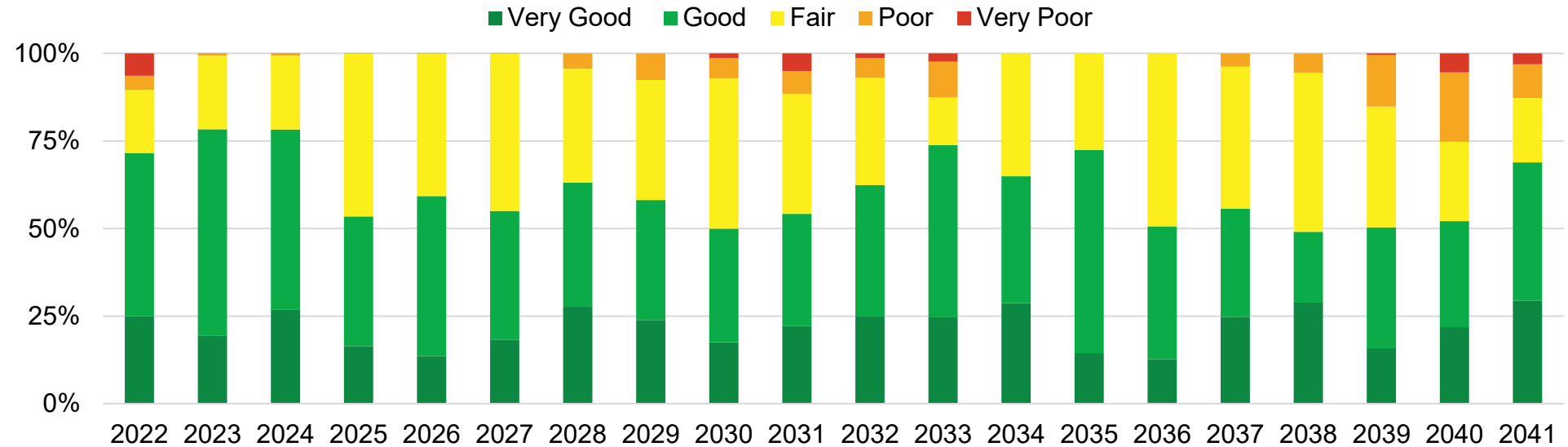


Figure 10.7 Projected 20-year Achieved Proposed LOS Condition Profile (Fleet Services)

- If funding for proposed LOS is not sufficient, the City will:
1. Continue lifecycle activities to maintain current LOS; and

2. Carry out the Climate Emergency Action Plan within current funding scope i.e., maintain existing green fleet with limited or no additions.

³⁶Incremental investment to achieve proposed LOS excludes CEAP costs.

³⁷Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

10.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 10.10 and illustrated in Figure 10.8. The analysis documented above is related to the lifecycle rehabilitation or replacement and service improvement activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas (except packer upgrades to CNG), and service improvement (further implementation of CEAP).

The maintain current LOS infrastructure gap is expected to be nil over a 10-year period. Achieving proposed LOS infrastructure gap is expected to be approximately \$8.9 million over a 10-year period. Investment to achieve proposed LOS is to address preliminary CEAP costs. The incremental investment for proposed LOS is limited to the potential replacement to electric vehicle units and the related estimated capital costs.

The preliminary estimate for CEAP funding incorporates the conversion to electrical vehicle into lifecycle management

needs. This means that instead of simply replacing existing infrastructure with a similar one like-for-like', there will be an increased focus on incorporating green infrastructure replacements whenever feasible. It also factors the additional CEAP replacements if they are within the 10-year period of analysis. For example, if a CEAP expenditure were to occur in 2024 with an asset expected useful life of seven years, an additional CEAP investment would be necessary in 2031.

The renewal and replacement planned funding also includes capital budgets from Waste Management's, New and Emerging Solid Waste Technologies SW6050. This budget funds any initial purchase costs above original planned funding for packers with CNG enhancements. Any future replacements would require annual internal rental rate contributions from Waste Management service area for packers to be adjusted to cover replacement cycles. It is also noted needs represent the costs to renew and maintain the serviceability of existing assets as well as preliminary CEAP quantification, and do not account for growth and the expansion of service to new areas.

Table 10.10 Average Annual Budget and Gap Analysis (\$Thousands) (Fleet Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Fleet	6,691	1,042	7,733	899	None identified	None identified	899

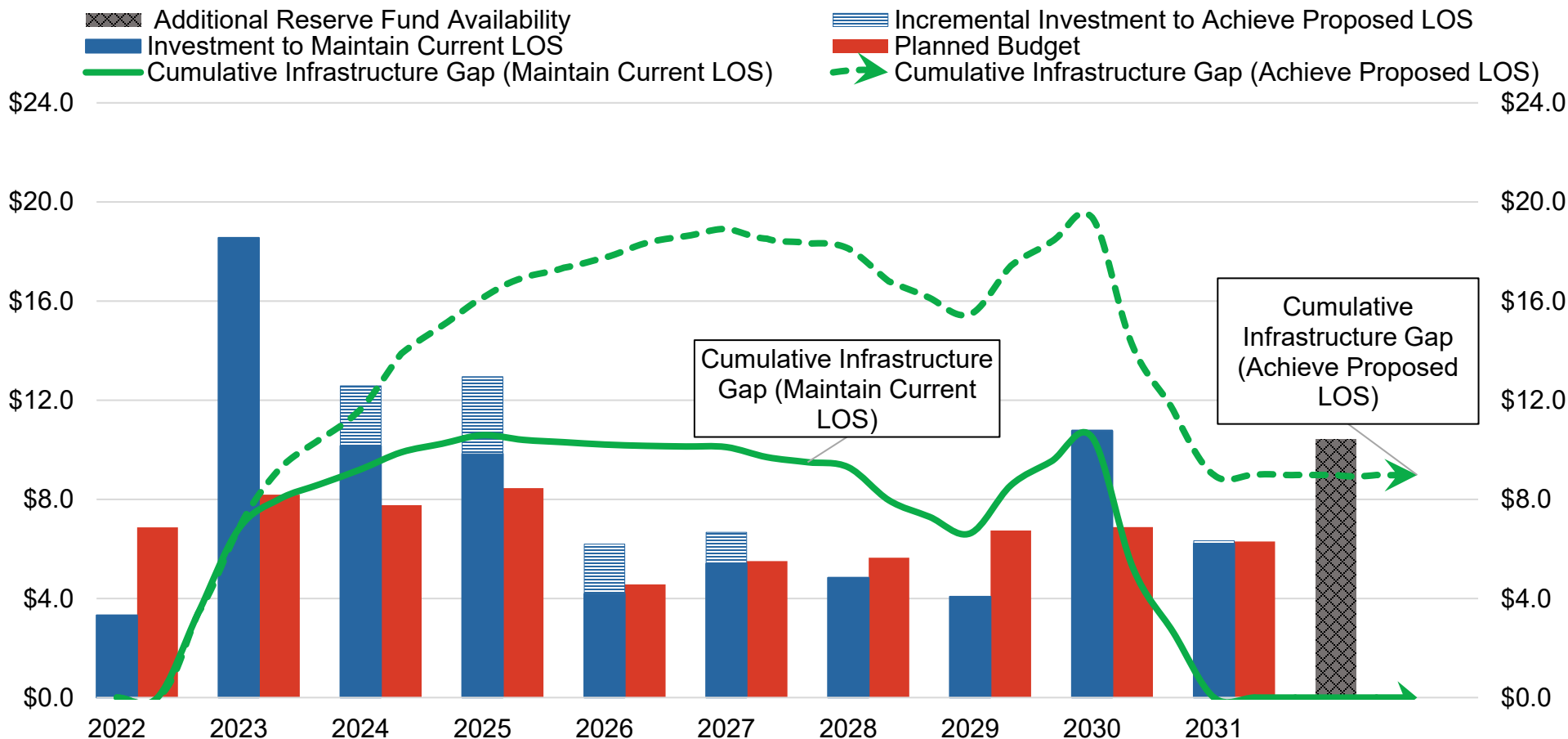


Figure 10.8 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Fleet Services)

There is an infrastructure gap for Fleet to achieve proposed LOS. It is noted that while Fleet reserve fund balances are sufficient for maintain LOS, there is no additional reserve fund availability to finance CEAP initiatives.

risk assessment methodology is embedded in asset management analysis, it may have a material impact on needs identified for Fleet infrastructure gap.

If forecasted reserve fund balances are not achieved this will increase Fleet’s infrastructure gap. Furthermore, it is noted that risk assessment and consequence of failure is not explicitly addressed for Fleet assets in this CAM Plan analysis. Once a

10.5: Discussion

10.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Fleet condition comparison is provided in Figure 10.9. Fleet Services' 2019 CAM Plan replacement value was \$57.4 million and has been updated for the 2023 CAM Plan to be \$70.9 million. The change resulted from rapidly increasing costs during the pandemic, and to factor additional replacement value with upgrading packers to CNG. The change in condition profile is attributed to integration of internal expert opinion and mechanic commentary on vehicle life when compared to age-based condition analysis. No cumulative 10-year infrastructure gap from the 2019 CAM Plan was identified. The 2023 CAM Plan also identifies no gap to maintain current LOS for Fleet assets and a \$8.9 million achieving proposed LOS gap. The achieving proposed LOS gap is attributed to CEAP investments. While Fleet has sound planning and budgeting founded on a good understanding of the needs of the City's internal customers, and Fleet has also taken steps to increase utilization

and reduce the number of units by offering shared vehicle solutions across service areas. There is still strong likelihood that the Fleet internal rental rate structure with other City service areas needs to be updated or the reserve fund Fleet relies on to finance their requirements will go to zero beyond the 10-year period of analysis. As part of multi-year budget preparations Fleet is comprehensively reviewing the internal rental rate structure. If the structure is updated, the expectation is that there will be sufficient funding to maintain adequate reserve fund balances to continue to allow Fleet assets to be well maintained, and allowing sustained operations while the lives of equipment and vehicles are optimized. Otherwise, deferring replacements significantly beyond the identified optimum lifecycles increases maintenance costs and risk of failure, reduces salvage values, and quite often increases the purchase price of the replacement.

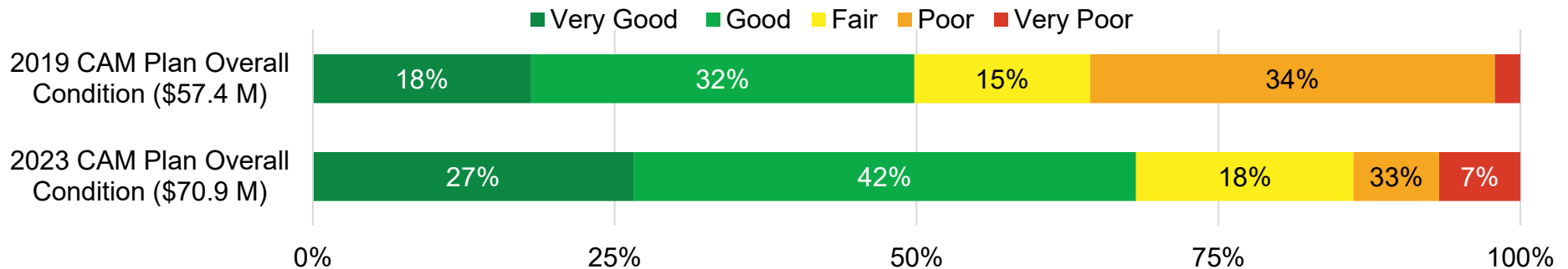


Figure 10.9 2019 CAM Plan to 2023 CAM Plan Condition Summary (Fleet Services)

10.5.2: Lifecycle Management Scenarios

The lifecycle management section included three scenarios – planned budget, maintain current LOS, and achieve proposed LOS.

Scenario One planned budget is identified to have constraints on the City's capacity to effectively maintain Fleet's infrastructure. This leads to a deterioration in their condition. This decline might not be immediate but, over time, it becomes more visible to the public and causing operating problems, increasing the operating and maintenance costs, and potentially leading to higher repair or replacement costs in the future.

Scenario Two maintain current LOS funding is greater than what is currently allocated for Fleet assets, illustrating the financial strain of maintaining a healthy asset portfolio. This scenario acknowledges the need for continual investment in assets to maintain their current state, eliminating the degradation seen in the first scenario. It prevents further decline and enhances the condition of the assets.

Scenario Three achieve proposed LOS represents preliminary identification of CEAP initiatives. This level of funding is greater than both the planned budget and the one needed to maintain current LOS. The advantages of this approach are alignment with CEAP, improved LOS and asset condition, and potential long term cost savings. This preliminary CEAP assessment shows the financial challenge the City faces to achieve the proposed LOS.

These three scenarios show different results depending on the level of funding for the assets lifecycle renewal and service improvement actions. The choices made will have an implication for Fleet asset condition, performance and CEAP implementation.

10.5.3: Current and Future Challenges

Pandemic and Supply Chain Issues

The pandemic and ongoing supply chain issues have resulted in the vehicles required for both garbage collection and the upcoming Green Bin program being substantially delayed. The CAM Plan does not quantify excess maintenance and operating dollars to keep existing packers in service beyond expected useful life, but any further delays will accumulate further maintenance costs while not providing the required LOS. If other vehicles and equipment continue the pattern of recent price surges, then timely replacements will be in jeopardy.

CEAP

A review of Fleet finances indicates no reserve fund availability to finance CEAP costs. Data indicates Fleet's funding model cannot absorb these cost pressures and must seek additional funding sources to begin preliminary CEAP investments. It is also noted that these investments are focused on assets that existing power grids can handle. Examples include Light Vehicles (Such as Cargo trucks, F150, Ford Escape, etc.) and handheld equipment. Corporate-level analysis and review must be completed to assess what investments are required to have an appropriate infrastructure to implement CEAP targets. These potential investments may be beyond the scope of assets listed in this chapter, but this information is critical to assess to what extent CEAP can be implemented within Fleet. It is also noted that even if required power grids are in place, there may not be Fleet assets that can be readily upgraded to a comparable EV unit. An example is with Heavy Vehicles - currently there are not readily available examples of a comparable EV unit available.

10.6: Conclusion

Valued at over \$70 Million, the City's Fleet Services assets are overall in Good condition, indicating that historically there has been sufficient investment in sustaining these assets to maintain the current LOS. However, achieving proposed LOS will require additional investments, with preliminary calculations at approximately \$8.9 million over 10-years. Not obtaining this funding jeopardizes the ability to implement CEAP targets. It is also noted that if supply chain issues and rising costs continue,

the timely replacement of Fleet assets will be in jeopardy and could result in degradation of the service ultimate delivered to citizens. Figure 10.10 illustrates the infrastructure gap as a proportion to the required investment over the next decade showing the distribution of the different types of assets contributing to the gap. Table 10.11 presents the summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment rates for Fleet Services assets.

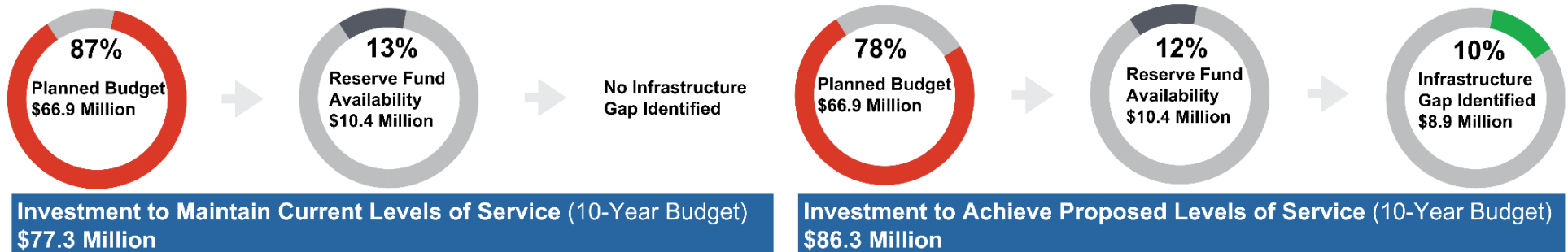


Figure 10.10 Visualization of Maintain Current and Achieved Proposed LOS Infrastructure Gap (Fleet Services)

Table 10.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Fleet Services)


Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS ³⁸	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ³⁹
Fleet	\$70.9		None identified	\$8.9	9.4%	10.9% to 12.2%



Figure 10.11 Accuracy Reliability Scale (Fleet Services)

Accuracy and Reliability Commentary

Data reliability is rated as high. Valuation is estimated internally based on market rates. Condition and investment forecasts are based on age and expected useful life estimates of the vehicles and equipment provided by Fleet Services. Accuracy is rated as moderate to high, as forecasts are split between internal assessments of the vehicles and equipment age. Condition assessments are split between internal expert opinion and age-based calculations.

³⁸ This projected infrastructure gap is reduced by the forecasted reserve fund drawdown availability over the next decade.
³⁹ Source: Reinvestment rates based on investment to maintain current LOS and achieve proposed LOS.



Section 11. Information Technology Service (ITS)

Asset Information	ITS
Replacement Value	\$39.7 million
10 year Maintain Current Levels of Service Infrastructure Gap	None Identified
10 year Achieved Proposed Levels of Service Infrastructure Gap	None Identified

Quick Facts
2,700 Desktop/Laptop
10 kilometers of ITS Fibre Network
1,850 Cell Phone



11.1: State of Local Infrastructure

With approximately \$28.5 Billion dollars' worth of assets directly owned by the City of London, it would not be possible to effectively use and manage assets and their information without the tools offered through technology. Information and data are strategic business assets. The City of London Information Technology Services (ITS) is responsible for the technology tools used to ensure the safety and protection of the Corporation of the City of London's data, information, and computer systems. ITS is an internal technology service provider that supports City Service Areas in delivering their services to the public. ITS provides information technology and other technology services to the Corporation, as well over twenty boards, commissions, and municipal corporation. The ITS assets include hardware, software, information, and data which they maintain for their use and the use of both internal and external customers.

11.1.1: Asset Inventory and Valuation

Table 11.1 summarizes ITS' asset inventory and their replacement values. To support service delivery, the City owns and maintains a large information technology infrastructure currently valued at approximately \$39.7 Million. Through ITS, the City is responsible for maintaining this infrastructure in a condition that ensures continuity of service. IT assets include leased and owned assets, both of which have been included in this report. It is noted there are few leased assets as the City transitioned to owning user devices. These include IT infrastructure, enterprise applications, end user devices and applications needed to deliver internal and external services. End user devices are directly owned by the City, which is consistent with the 2019 Asset Management Plan. Like most municipal corporations, the value, condition, and gap with respect to the City's soft assets of 'data' and 'information' are not currently assessed nor is any methodology readily available to undertake such an assessment.

Table 11.1 Inventory and Valuation (ITS)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
IT Infrastructure	Network, Access Points, Switches, Routers	Various	Each	\$2,400
	Storage System, Backup System	2	Each	\$2,050
	Servers, Blade Enclosures	40	Each	\$1,100
	F5 Load Balancers	2	Each	\$160
	Phone Systems	1	Each	\$1,700
	ITS Fibre Network	10	Km.	\$11,000
Applications and Software	Enterprise Applications	200	Each	\$14,987
	Enterprise Software	4	Each	
End User Devices and Applications	Desktops, Laptops, Etc.	2,700	Each	\$4,000
	Cellphones, iPads, Etc.	1,850	Each	\$1,700
	New Council Chambers and Committee Room IT Equipment	Various	Each	\$600
Total				\$39,697

11.1.2: Age Summary

Figure 11.1 shows the ITS average age and useful life by asset. Asset age has been established using internal expert opinion. Reliance on internal expert opinion used as a single listing for all ITS was not readily available. ITS does have a service management tool named 'ISM' which assisted in estimating the average asset ages.

IT Infrastructure age is based upon internal expert opinion. It indicates the IT Infrastructure age is approximately three to four years old. The exceptions are the network, access points, switches, and routers which are approximately seven years old. Fibre Optic networks, which are longer lasting assets, have an average age of 14 years. It is noted that ITS has budgeted over the next 10 years investments to address IT Infrastructure needs.

Applications and Software installation dates are documented and known for major application and software. For example, the

J.D. Edwards accounting software is approximately 24 years old. What is less readily available is assessing the impact on age of Enterprise Applications when upgrades/renewals have regularly occurred and have revised the original application structure. Data does not lend to traditional age assessment profiles and thus are not listed. In absence of age profile predictions for Applications and Software, ITS mitigates this by assessing asset condition and having detailed analysis for assessing expected capital needs. End User Devices and Applications include computer hardware that is used daily across the Corporation by every service area.

The City directly owns End User Devices and Applications. There is detailed data listings tracking the age of newer assets (assets approximately 7 years old or less); however, for older assets it is not as readily available.

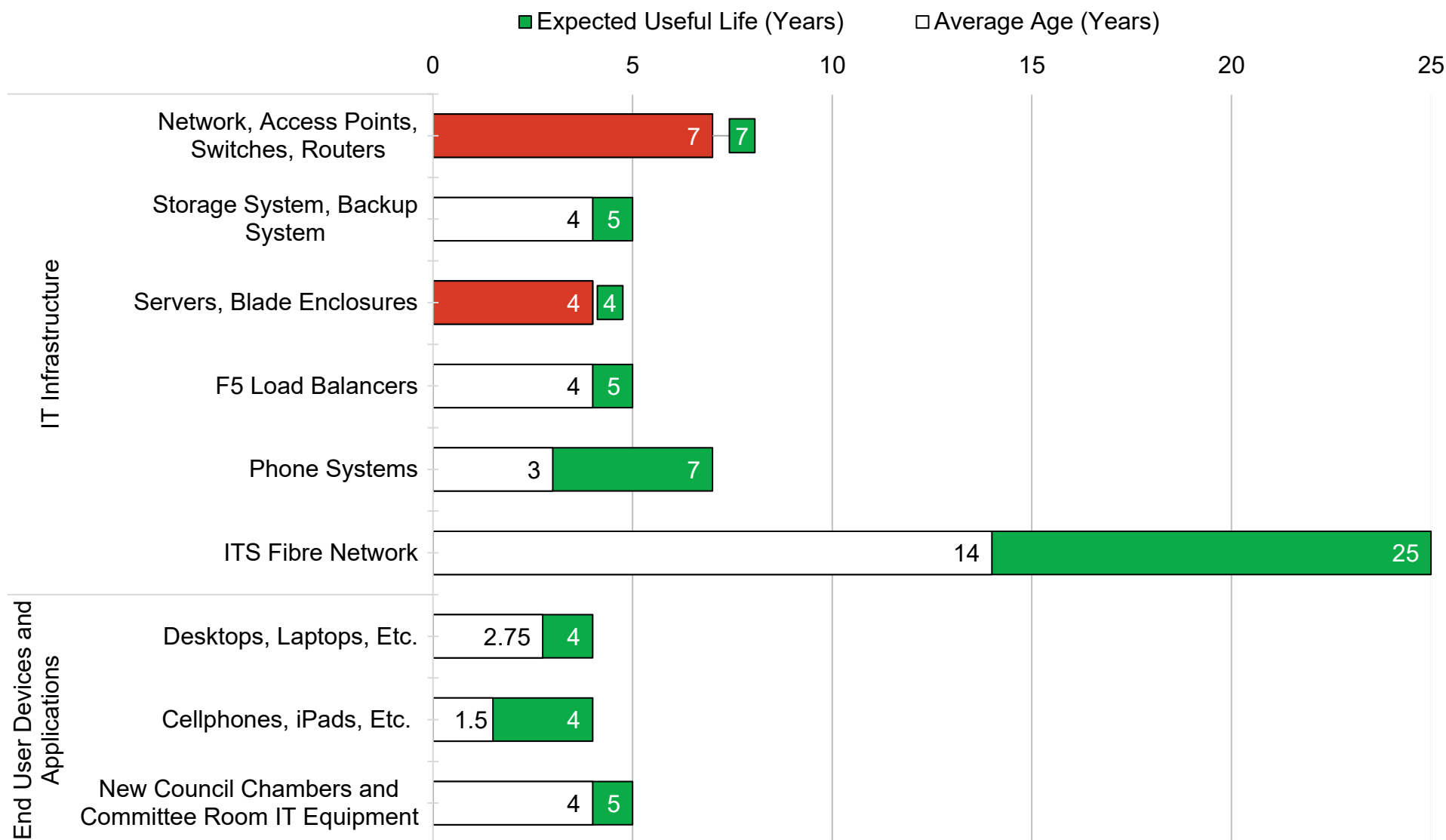


Figure 11.1 Average Age and Expected Useful Life (ITS)

11.1.3: Asset Condition

As outlined in Figure 11.2, the overall condition of the ITS assets is Good to Very Good. Unlike most other types of assets owned by the City, many ITS assets such as desktops and printers, have a short estimated useful life of 4 years. Condition was evaluated based on expert opinion and industry standards.

Technology asset concerns are captured on a proactive basis through alerting applications. It also occurs through routine maintenance program executions or problems reported by the user to the internal IT Helpdesk. Over 98% of IT Infrastructure is in Fair to Very Good condition.

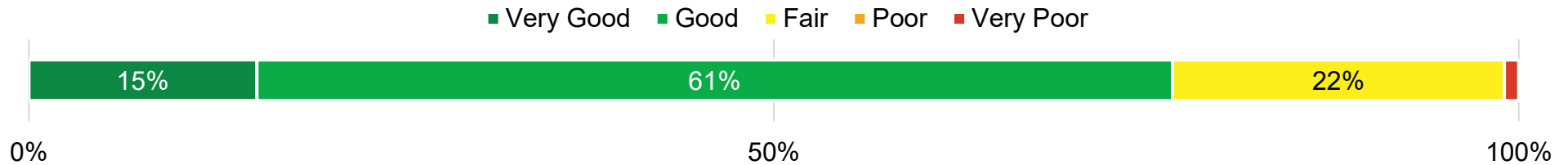


Figure 11.2 Overall Condition (ITS)

Figure 11.3 shows ITS' condition distribution of each asset type. As seen in the figures, Asset conditions have been established using data from internal expert opinion. The IT Infrastructure primarily consists of a fibre optic network and the assets required to support the transmission and retention of data. Asset condition is assessed as Fair to Very Good. The exception is the Corporation network and access points which has a portion in Very Poor condition. It is noted that ITS has budgeted over the next 10 years investments to address IT Infrastructure needs and a project is in execution to address the network and

access points needs. Applications and Software consist of various applications that service areas require to operate effectively. Such examples include the J.D. Edwards accounting software and the City of London website. Most of these applications are assessed in Good to Fair condition. End User Devices and Applications consist of computer hardware (desktop computers, cell phones, and IT equipment for Council Chambers and Committee Rooms). Given that the users of these assets would notify ITS if they were not functioning, the condition is assessed as Good to Very Good.

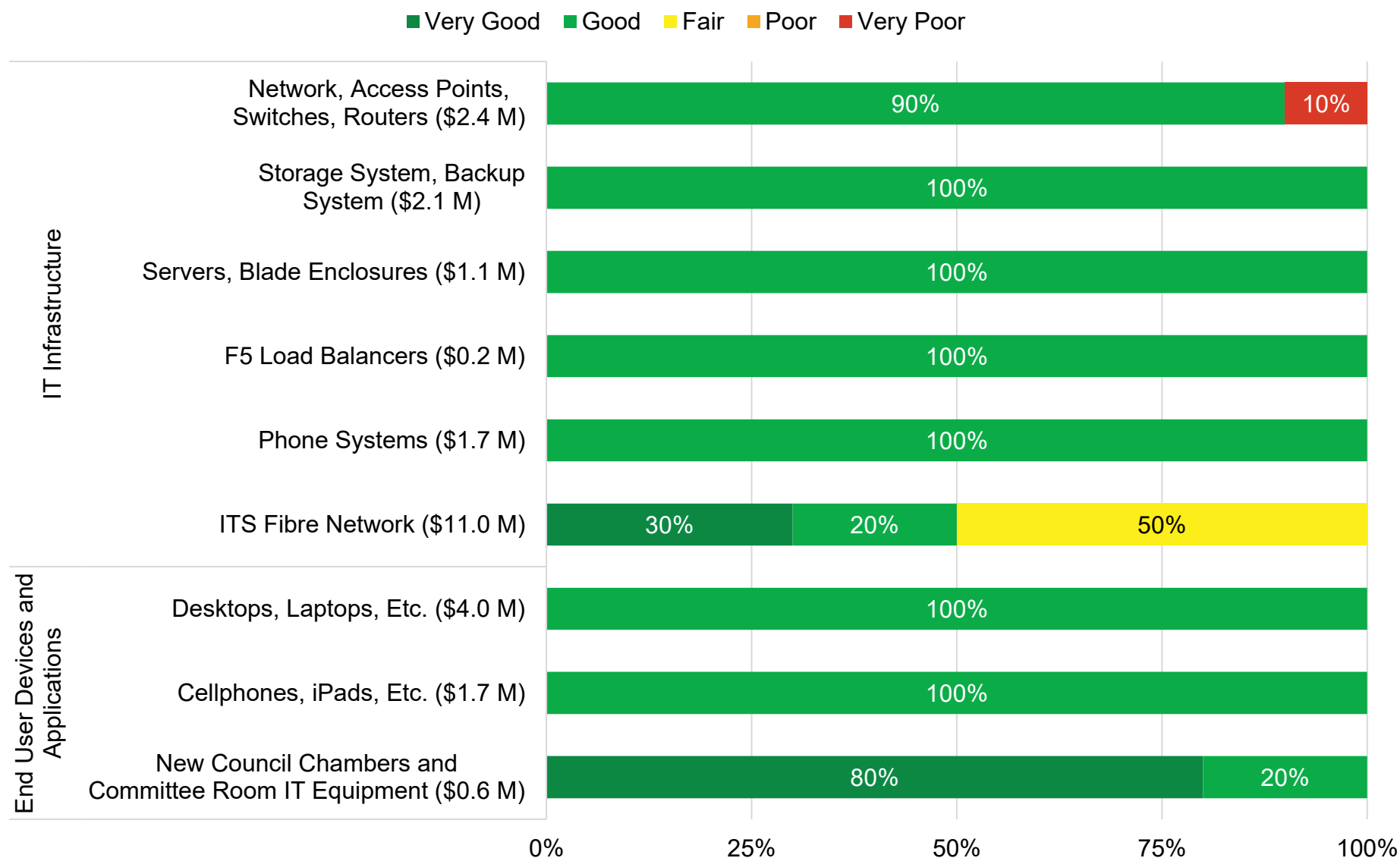


Figure 11.3 Asset Condition Detail (ITS)

11.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for Levels of Service (LOS) performance measures linked to Customer Values of Accessible, Scope, Cost Efficient, Environmental Stewardship/Sustainability, Reliability, Quality, and Safety.

Direct and Related LOS

After review with ITS, LOS considered most representative of ITS and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as ‘Direct

LOS’ and are listed in Table 11.2. LOS that have a causal relationship with direct LOS are documented in Table 11.3 as related LOS but cannot be as readily costed to ITS Services.

Metrics

Table 11.4 listed metrics are useful information, especially when considered in conjunction with Direct LOS, and Related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services ITS assets provide.

11.2.1: Direct Levels of Service

Table 11.2 Direct Levels of Service (ITS)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Cost Efficiency	Customer/Council	ITS Reinvestment Rate	10.6%	10.6%
Reliability	Customer/Council	Percentage of ITS assets in Fair or better condition	94.2%	Maintain current
Reliability	Technical	Number of technical service requests and incidents successfully completed (ES)	21,442	Maintain current
Reliability	Technical	Percentage of availability of City of London core computing environment	99.97%	Maintain current
Reliability	Customer/Council	Percentage of ITS customers satisfied	96.0%	Maintain current
Reliability	Technical	Task In/out ratio	0.97	Maintain current
Reliability	Technical	Task acceptance (hours)	1.15	Maintain current
Reliability	Technical	Task duration (hours)	4.44	Maintain current

11.2.2: Related Levels of Service

Table 11.3 Related Levels of Service (ITS)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	IT Infrastructure Reinvestment Rate	10.3%
Cost Efficiency	Technical	Applications and Software Reinvestment Rate	5.9%
Cost Efficiency	Technical	End User Devices and Applications Reinvestment Rate	22.4%
Reliability	Technical	Percentage of IT Infrastructure assets in Poor or Very Poor condition	1.3%

11.2.3: Other Measures

Table 11.4 Metrics – Other Dashboard Measures (ITS)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Operating budget for ITS services	\$18,386,902
Cost Efficiency	Customer/Council	Annual operating cost to provide service (Dollar amount per household)	\$105.27

11.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant

recommendations, available budget, and trial and error through scenarios and pilot programs.

11.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current LOS while striving to optimize costs and risks. Table 11.5 lists specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections. Asset management practices or planned actions employed by cities can entail certain specific risks.

Many types of risks such as health and safety, financial, environmental, etc. are summarized in Table 11.6 classified by each lifecycle activity. The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 11.5 Current Asset Management Practices or Planned Actions (ITS)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<p>IT Infrastructure and End User Devices and Applications</p> <ul style="list-style-type: none"> Monitor and track age and amount of time the asset considered a priority as to when the asset should be replaced. <p>Applications and Software</p> <ul style="list-style-type: none"> Focus is to ensure that asset is considered 'in support' to mitigate potential malware/cyber-attacks and ensure asset is operating efficiently for individuals using the asset
Maintenance	<p>IT Infrastructure, Applications and Software, End User Devices and Applications</p> <ul style="list-style-type: none"> Users of City hardware and software assets provide asset concerns on proactive basis through alerting applications and preventative maintenance. Concerns are also addressed through routine maintenance programs reported by the user to the IT Helpdesk.
Renewal/Rehabilitation	<p>IT Infrastructure and Applications</p> <ul style="list-style-type: none"> Rehabilitation programs exist for City's directly owned cable network. Proactive rehabilitation of City software programs also exist and would be referred to as 'supported' software. <p>End User Devices and Applications</p> <ul style="list-style-type: none"> Generally not rehabilitated.
Replacement/Construction	<p>IT Infrastructure</p> <ul style="list-style-type: none"> Scheduled replacement programs in place. Replacement programs exist for City's directly owned cable network. Coordination occurs with Utility Coordination Committee for fibre optic network installation. <p>Applications</p> <ul style="list-style-type: none"> When applications no longer receive support from ITS, generally would be replaced with new application. <p>End User Devices and Applications</p> <ul style="list-style-type: none"> Replaced when asset reaches end of useful life or unexpected event occurs with asset.
Disposal	<ul style="list-style-type: none"> Assets rarely disposed – they are often sold through vendors. Laptops hard drives are wiped of data using appropriate procedures, and are typically disposed on www.govdeals.ca for a nominal amount.
Service Improvement	<ul style="list-style-type: none"> Service improvements projects are identified and financed by service areas using IT assets. IT would then be responsible for acquisition and maintenance of the service improvement asset.
Growth	<ul style="list-style-type: none"> Capital growth projects are identified by of Assessment Growth Policy (where applicable with municipal policy), or, Development Charges and the service area using the IT asset (subject to subject to <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i> criteria, such as equipment expecting to last less than 7 years not being eligible for Development Charge funding). The service area would finance the IT asset, and IT would then be responsible for acquisition and maintenance of the growth asset.

Table 11.6 Risks Associated with Asset Management Practices or Planned Actions (ITS)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> Inability to mitigate malware/cyber attacks resulting from deteriorated and non-supported asset. Financial risk – ITS industry shift to relying on capital dollars to rely on operating licenses financed through operating budget.
Maintenance	Refer to Appendix A. Overview of Service Area Sections.
Renewal/ Rehabilitation	Refer to Appendix A. Overview of Service Area Sections.
Replacement/ Construction	Refer to Appendix A. Overview of Service Area Sections.
Disposal	Refer to Appendix A. Overview of Service Area Sections.
Service Improvement	Refer to Appendix A. Overview of Service Area Sections.
Growth	Incorrect growth assessments may result in overabundance of ITS assets in a particular area and insufficient assets in another.

11.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is not available for the ITS service area. Data exists for these assets but not easily integrated into condition profile assessments. Shorter-lived assets common with ITS does not lend to traditional linear assessment profiles. In absence of condition profile predictions, ITS mitigates this by having detailed analysis for assessing expected capital needs.

Given the short expected useful life of ITS assets and Applications and Software assets not lending well for condition projections, the City of London does not project ITS asset condition. However information and commentary are provided on ITS assets based on three scenarios. The first is projected condition with current budget. The second scenario is the required investments to maintain the current LOS. The final

scenario comments on investments required to achieve proposed LOS.

A. Scenario One: Planned Budget

ITS average annual activity and planned funding is summarized in Table 11.7. The condition profile expected from the current budget is not readily available.

Current funding for operating budgets is presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget. No service improvement budgets relating to ITS were identified. There are no ITS growth budgets identified. All number in tables are rounded to the nearest thousand.

Table 11.7 Scenario One – Average Annual Planned Budget (\$Thousands) (ITS)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	17,853	18,769
Renewal, Replacement, Rehabilitation, Disposal	3,132	4,194
Service Improvement	None identified	None identified
Growth Activities	None identified	None identified

B. Scenario Two: Maintain Current Levels of Service

The cost to maintain current LOS are summarized in Table 11.8. The condition profile expected from the maintain current LOS is not readily available.

Table 11.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (ITS)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	18,769	None identified	18,769	None identified
Renewal, Replacement, Rehabilitation, Disposal	4,194	None identified	4,194	None identified
Service Improvement	None identified	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified

C. Scenario Three: Achieve Proposed Levels of Service

The cost to achieve proposed LOS are summarized in Table 11.9. The condition profile expected from the achieve proposed LOS is not readily available. There have been no identified needs to achieve proposed ITS LOS

Table 11.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (ITS)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁴⁰	Achieve Proposed LOS Infrastructure Gap ⁴¹
Operating Budget	18,769	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	4,194	None identified	None identified	None identified	None identified
Service Improvement	None identified	None identified	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified	None identified

⁴⁰Incremental investment to achieve proposed LOS excludes CEAP costs.
⁴¹Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

11.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 11.10 and illustrated in Figure 11.4. The analysis documented is related to the lifecycle rehabilitation, renewal, or replacement activities, and service improvement activities. Disposal activities are considered inherent with asset renewal/rehab/replacement activities.

ITS's cumulative maintain current LOS and achieve proposed LOS is expected to be nil.

The funding needs in investment to maintain current LOS and investment to achieve proposed LOS columns represent the costs to renew, maintain, replace, and improve the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

Table 11.10 Average Annual Budget and Gap Analysis (\$Thousands) (ITS)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
IT Infrastructure	1,893	None identified	1,893	None identified	None identified	None identified	None identified
Applications and Software	888	None identified	888	None identified	None identified	None identified	None identified
End User Devices and Applications	1,413	None identified	1,413	None identified	None identified	None identified	None identified
Total	4,194	None identified	4,194	None identified	None identified	None identified	None identified

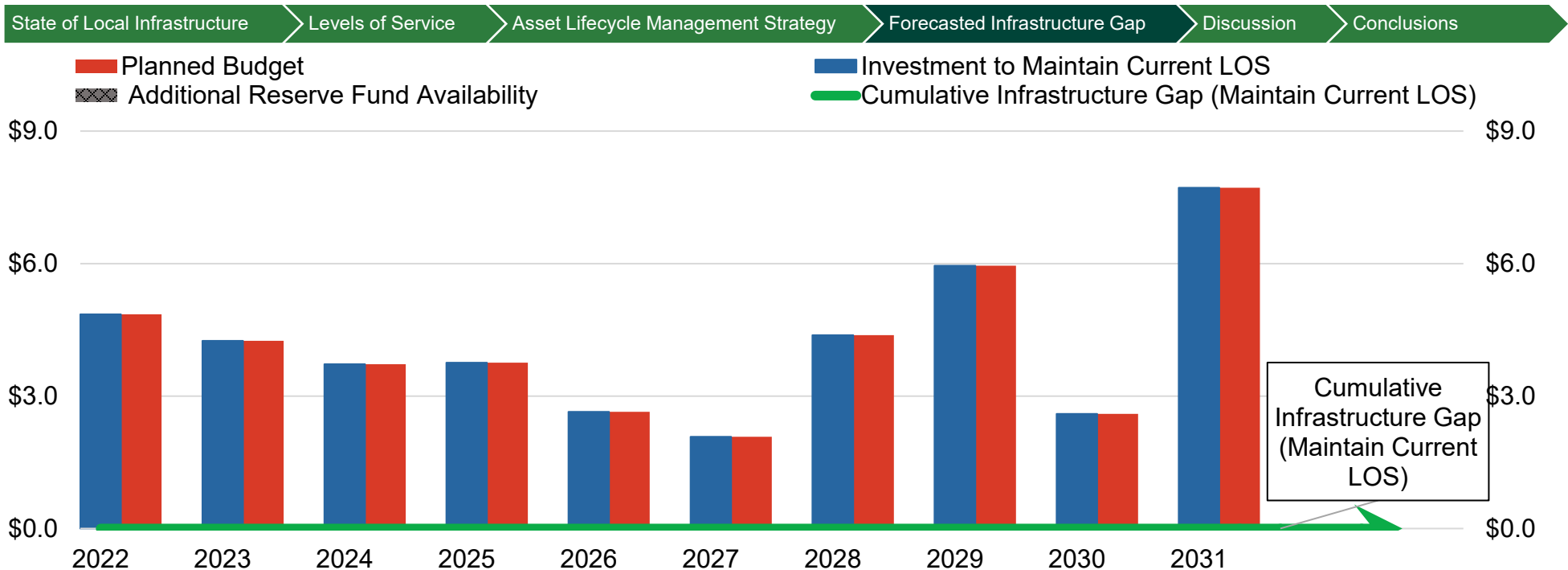


Figure 11.4 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (ITS)

An analysis of the required investment versus planned budget, shows that ITS will experience no funding gap over the next 10 years. Planned expenditures for regular fibre network renewals, end user devices with planned software applications replacements, and less frequent but capital-intensive storage and server backup projects, drive ITS requirements. The short lifecycle of these assets necessitates constant review of assumptions, investment needs, and renewal requirements. Total required investment represents the average annual costs to renew and maintain the existing assets so services can continue to be delivered. The forecast does not account for any costs to improve service, accommodate growth, or expand service to new areas or customers. ITS assets are strongly impacted by rapid technology changes and pricing structures implemented through vendors. This alters projected capital and

operating budgets needs frequently over a 10-year period of analysis. The accuracy and reliability of the projection is subject to annual revisions and updates as further information is provided. In the City of London, individual service areas own specialized software exclusive to their service which may not currently be part of the software assets managed by ITS. This local software inventory is not budgeted by ITS, unlike the Applications and Software such as J.D. Edwards and Kronos for which ITS incorporates maintenance and renewals in its budget. Over the next ten years ITS is not expected to have a funding gap. ITS has a reserve fund available that may be available if any annual variances occur.

11.5: Discussion

11.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 ITS condition comparison is provided in Figure 11.5.

The 2019 CAM Plan condition data used a variety of relevant information including and professional internal opinion. The 2023 CAM Plan continued these processes.

The change in condition profile is attributed mainly to corporate phone systems updated after the 2019 CAM Plan completion and End User Devices typically being in Good condition. The cumulative 10-year infrastructure gap for the 2023 CAM Plan and 2019 CAM Plan was nil.

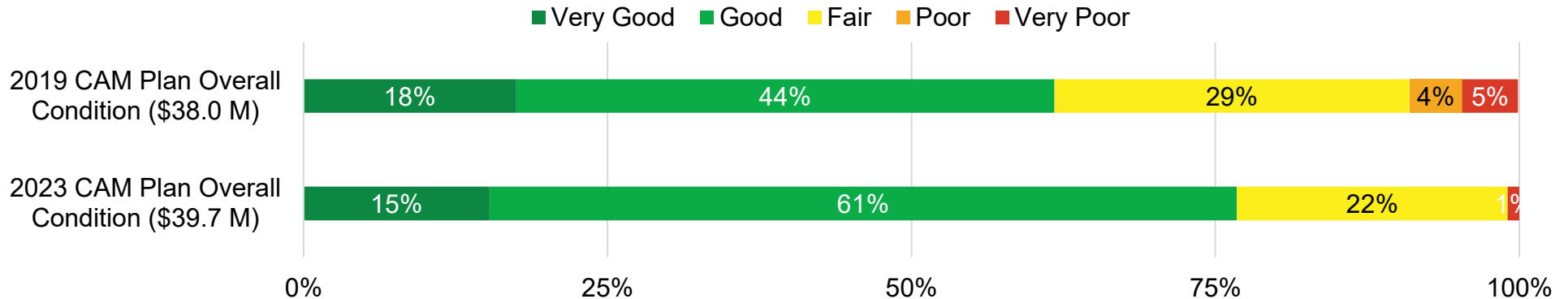


Figure 11.5 2019 CAM Plan to 2023 CAM Plan Condition Summary (ITS)

11.5.2: Current and Future Challenges

The City's IT assets are overall in Fair to Very Good condition. To ensure the condition distribution remains in this condition range, a robust capital budgeting and planning process is in place. Given the forecasted network and application renewals, with short expected useful life inherent in IT infrastructure, this indicates that adequate future funding will result in no gap by the end of this decade. Failure to implement current plans could result in localized reductions to service such as increased maintenance costs, inability to adapt to changing technology,


decreased productivity, inconvenience to staff, loss of data and communications, etc. To assist in identifying service reductions and inventory, ITS has hardware infrastructure HEAT System to track and address hardware infrastructure data. Consistent with asset management of any service area, current challenges primarily relate to assessing enterprise application software costs, budgeting accurately for annual licensing fees, and timely implementation of technology updates while minimizing disruption to City employees.

11.6: Conclusions

Valued at roughly \$39.7 million, the City's ITS assets are overall in Fair to Very Good condition, indicating that they are meeting

the City's immediate needs. Figure 11.6 and Table 11.11 summarize key ITS data.

Table 11.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (ITS)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁴²
IT Infrastructure	\$18.4	Good	None Identified	None Identified	10.3%	10.3%
Applications and Software	\$15.0	Not Assessed	None Identified	None Identified	5.9%	5.9%
End User Devices and Applications	\$6.3	Good	None Identified	None Identified	22.4%	22.4%
Total	\$39.7		None Identified	None Identified	10.6%	10.6%



No Infrastructure Gap Identified

Investment to Maintain Current Levels of Service (10-Year Budget)
\$41.9 Million

Figure 11.6 Visualization of Maintain Current LOS Infrastructure Gap (ITS)

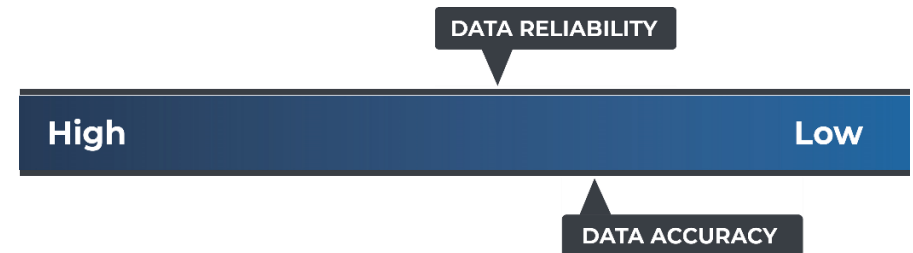


Figure 11.7 Accuracy Reliability Scale (ITS)

Accuracy and Reliability Commentary

Data reliability and accuracy is rated as moderate. Detailed Inventory exists for computer hardware information that is approximately three years of age or less. As older inventory is replaced, eventually detailed information will exist for all hardware. Valuation, condition, and investment forecasts for all technology assets are based on expert opinion.

⁴² Source: Reinvestment rates based on investment to maintain current LOS.



Section 12. Culture Services

Asset Information	Culture Services
Replacement Value	\$122.5 million
10 year Maintain Current Levels of Service Infrastructure Gap	\$1.0 million
10 year Achieved Proposed Levels of Service Infrastructure Gap	\$12.2 million

Quick Facts
14 Municipally Owned Heritage Properties
49 Public Art and Monuments
54 Plaques and Interpretive Signs



12.1: State of Local Infrastructure

Culture Services are different than other facilities owned by City of London in that each facility may have a different management approach unique to its cultural heritage value or restrictive covenants that may apply. Culture Services and the Planning and Development division manage these facilities in consultation with the Facilities Division, and contracts with third parties. Public Art and Monuments are identified as part of Business Improvement Area (BIA) planning documents and community improvement plans in neighbourhoods across the City of London; they are identified as part of larger City capital projects such as Community Centres; and are identified in development agreements. Civic art collections are inventoried by Clerks through Past Perfect software; however, some corporate art collections are not yet captured.

There are additional Public Art and monuments that are not reflected in this inventory maintained through the City's 10-year Capital Lifecycle Public Art and Monument Program. This may be because these assets are being maintained by others (Holy Roller Tank by the First Hussars Community group), are periodically found in the community on public land (Lambeth Cairn), or new public art and monuments are being created on an annual basis (Indigenous Tree Carvings at 122 Baseline Road).

12.1.1: Asset Inventory and Valuation

The City of London owns and operates a collection of Culture services assets valued at approximately \$122.5 Million. Table 12.1 summarizes the Culture Services assets inventory and replacement values. The Culture Services include several cultural sites, contributing to local tourism, learning, and public

enjoyment, as well as plaques and interpretive signage. Some administrative buildings are also heritage designation, such as the J. Allyn Taylor building, but are grouped with Corporate Facilities for the purpose of this CAM Plan.

Culture Services include Municipally Owned Heritage Properties such as Eldon House Museum, Elsie Perrin Williams Estate, Flint Cottage; one arts and entertainment venue (Centennial Hall); public art and monuments, and plaques and interpretive signage. The City's Facilities Division provides maintenance services on behalf of the responsible service areas for most of these facilities in compliance with provincial regulations and safety standards, as well as major capital projects. The City's Planning and Development Department is responsible for conserving most of these buildings in compliance with provincial legislation, such as the Ontario Heritage Act. Licensees and tenants are responsible for use of the building, minor maintenance expenses, and delivery of the service they provide. Generally, the terms are specified in agreements or contracts. Site Work includes those improvements around Municipally Owned Heritage Properties, like gardens and lighting.

Culture Services excludes buildings fully under the control of Agencies, Boards, and Commissions such as Museum London and the RBC Place. Note that while Eldon House is considered a Board, the Eldon House building itself is owned by the City of London, thus, it is included.

These Culture Services define the character of London and distinguish London from other cities and make London a more attractive place for people to visit, live, or invest.

Table 12.1 Inventory and Valuation (Culture Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Culture Services	Arts and Entertainment	1	Each	\$18,002
	Municipally Owned Heritage Properties	14	Each	\$96,184
	Public Art and Monuments	49	Each	\$6,007
	Plaques and Interpretive Signage	54	Each	\$146
	Site Work	8	Each	\$2,189
Total				\$122,528

12.1.2: Age Summary

Figure 12.1 shows the Culture Services assets average age compared to the estimated useful life by asset type. In most of the cases, the average ages for all facilities were calculated using the recorded construction date in the VFA (Facilities Management software). As shown in the figure, most assets have exceeded their industry standard useful life. It is important to note that 50 years was selected as the estimated useful life based on the non-structural components of buildings which have the longest expected service life. The practical expected life is largely indefinite while the building continues to serve its

intended/required purpose in its given geographic location. In practice the many components that comprise of a building are slated for renewal based upon a combination of factors including age, condition, consequence of failure, likelihood of failure, etc. Although the industry standards estimate 40 years of useful life for a building facility, the estimated useful life is not applicable to Municipally Owned Heritage Properties as the City is the steward for these facilities and must conserve these properties for current and future generations.

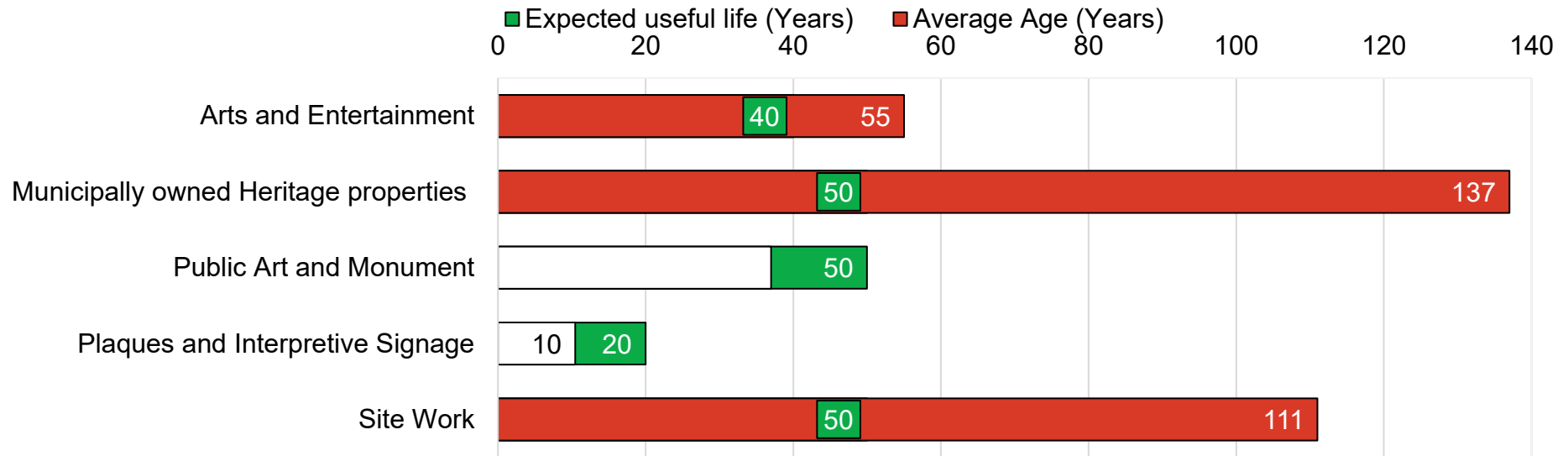


Figure 12.1 Average Age and Expected Useful Life (Culture Services)

12.1.3: Asset Condition

As seen in Figure 12.2, 82% of Culture Services assets are in Fair to Very Good condition indicating that they are meeting current requirements, but many are starting to show signs of

deterioration with 18% of them in Poor to Very Poor condition indicating investment will be required to maintain these valuable assets in Good condition.

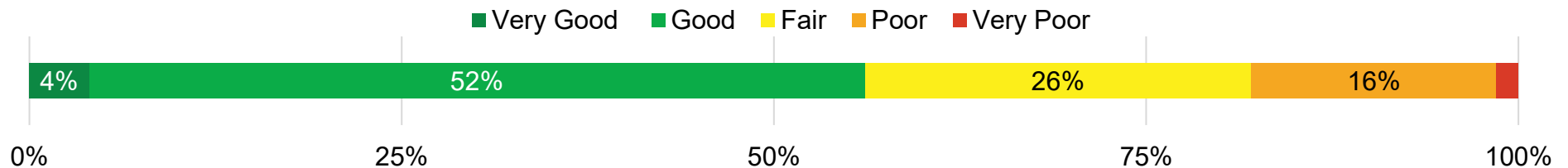


Figure 12.2 Overall Condition (Culture Services)

This can be attributed to capital planning over past decades but requires continued investment to maintain Good or Very Good condition of Culture Services assets. It is important to note that not all potential deficiencies are visible as the focus of the facilities condition rating system can be heavily influenced by back-of-house type equipment (mechanical and electrical) which

is not visible to the average user. As a result, while the interior finishes in occupied spaces and many other things that can affect the perceived overall condition may be in Fair, Good or even Very Good condition, a given facility may have a lower-than-expected FCI value due to back-of-house type deficiencies. Barring investment recommended through the

condition assessment program and Heritage Condition Reports, Culture Services will continue to deteriorate, and could experience intermittent closures for maintenance and repair. Centennial Hall has been the subject of much discussion concerning the need for a replacement.

Figure 12.3 presents the current condition profile for each Culture Services asset. The condition of Municipally Owned Heritage Properties is regularly evaluated through comprehensive Heritage Condition Report, which establish and update an industry-standard facility condition index (FCI) that reflects the overall condition of the Municipally Owned Heritage Properties and their sub-components (building envelope, mechanical and electrical systems, etc.). The Heritage Condition Reports are used to develop the 10-year Capital

Lifecycle Plan for Municipally Owned Heritage Properties. The FCI was also used to assess the condition of the public art and monuments to create an overall condition for each asset. Condition Assessment Reports are prepared and reviewed on an annual basis by the consultant services of a professionally accredited Conservator “Conservation of Sculptures and Monuments” (CSMO) to develop the City’s Public Art and Monument 10-year Capital Lifecycle Plan. These assessments are used to develop the repair and conservation strategies needed for Culture Services. During the CAM Plan development, it was noticed that some facilities data in the City’s databases was not recently updated. This data was reviewed and refined by Facilities division staff based on their expert opinion. This strategy proved effective for most of the buildings that were reviewed.

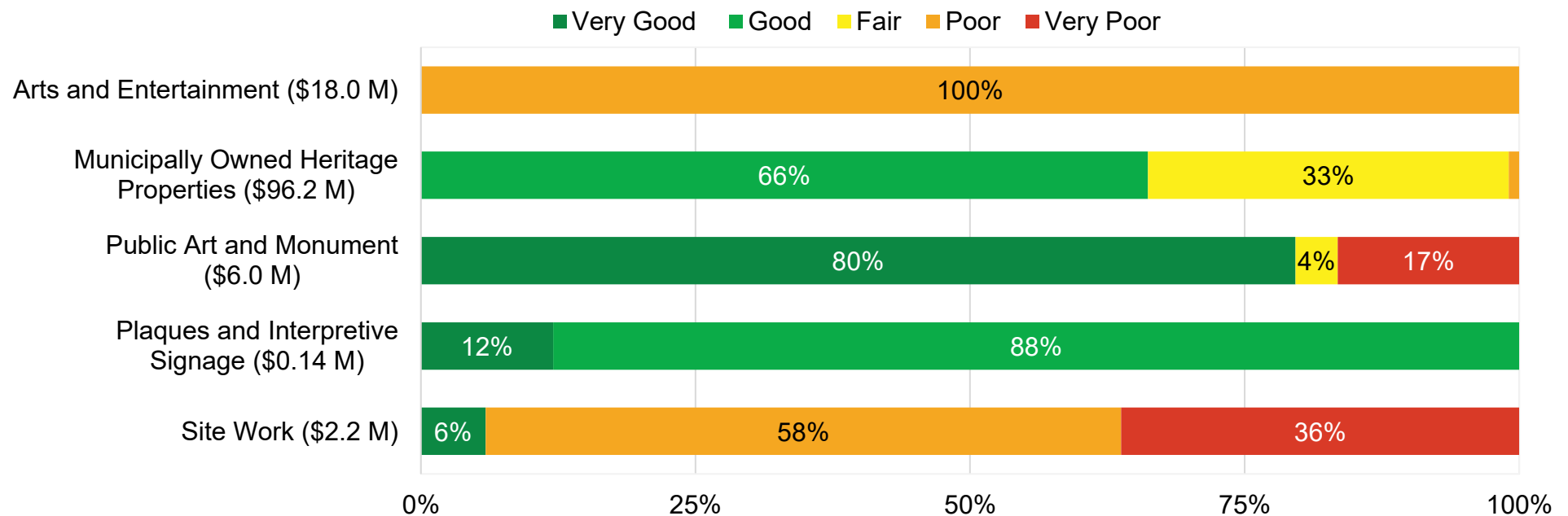


Figure 12.3 Asset Condition Detail (Culture Services)

12.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for Levels of Service (LOS) performance measures linked to Customer Values of Cost Efficiency, Reliability, Environmental Stewardship. Supporting measurements are classified as Metrics.

Direct and Related LOS

After review with Culture Services, LOS considered most representative of Culture services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'direct LOS' and are listed in Table 12.2.

12.2.1: Direct Levels of Service

Table 12.2 Direct Levels of Service (Culture Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed Target (2022 to 2031)
Cost Efficiency	Technical	Culture Services Reinvestment Rate	0.8%	0.9%
Environmental Stewardship	Technical	Annual electric energy consumption per square foot	1.22 KWH/sf	Reduce
	Technical	Annual natural gas consumption per square foot	0.136 m3/sf	Reduce
	Technical	Annual water consumption per square foot	0.0021 m3/sf	Reduce
Reliability	Customer / Council	Percentage of Culture Services assets in Fair or better condition	82.1%	Maintain current
Cost Efficiency	Technical	Culture Services Reinvestment Rate	0.8%	0.9%

12.2.2: Related Levels of Service

Table 12.3 Related Levels of Service (Culture Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Reliability	Technical	Percentage of Culture Services assets in Poor and Very Poor Condition	17.9%

12.2.3: Other Measures

Table 12.4 Metrics – Other Dashboard Measures (Culture Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Culture Services Operating Budget	\$3,849,511
Cost Efficiency	Technical	Operating cost to provide service (cost per household)	\$22.04

LOS metrics that have a causal relationship with direct LOS are documented in Table 12.3 but cannot be as readily costed to Culture Services, these measures are referred to as 'related LOS'.

Metrics

Lastly, Table 12.4 listed metrics are useful information, especially when considered in conjunction with direct LOS, and related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Culture Services provides.

12.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs.

The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, which may trigger asset investment needs.

12.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to preserve the Culture services assets, maintain current levels of service while striving to optimize costs and risks. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections.

Table 12.5 specific asset management practices or planned actions the City conducts for each lifecycle activity. Table 12.6 lists risks related to these practices.

The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 12.5 Current Asset Management Practices or Planned Actions (Culture services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> Public Art and Monuments are the responsibility of Culture Services, and the City is ultimately the owner, but the artists always have moral copyright rights that may be included under an Agreement signed when the Artwork is created, for example: <ul style="list-style-type: none"> Copyright and City's Right to Reproduce – the City may move Artwork to a different location for "maintenance and safety reasons". License to Modify - The Artists are entitled first right to restore and/or repair their art or monument. Facilities Division assists Culture Services with the lifecycle renewal of the public art or monument. Condition Assessments of Public Art and Monuments are completed by the City's Single Source Consultant Conservator and the assessment results inform the renewal plan on an ongoing basis. Facilities Division secures the Conservator and contractors to complete the renewal scope on behalf of Culture Services.

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
	<ul style="list-style-type: none"> The conservation of Heritage assets is overseen by Planning and Development, in accordance with any applicable heritage designations, restrictive covenants, or charitable purposes trusts. Heritage Condition Reports for Heritage assets are prepared to identify the ongoing capital and lifecycle requirements to conserve the heritage values, attributes, and the integrity of each asset. Heritage Condition Reports examine the long-term conservation of a cultural heritage resource and determine how best to retain its significance for future generations by recommending a conservation strategy and annual lifecycle renewal projects. Heritage Condition Report for Heritage assets are to be reviewed and implemented annually. Facilities Division assists with the lifecycle renewal of Heritage assets. Facilities Division retains the restoration specialists and contractors to complete the renewal scope on behalf of Planning and Development. The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, and other emergency planning, which may trigger asset investment needs. 					
Maintenance	<ul style="list-style-type: none"> Heritage assets are maintained through the Facilities group and their use of VFA, which combined with the Heritage Condition Report and Facilities experience, determines the lifecycle management needs of a facility. The lifecycle renewal projects identified in the Heritage Condition Reports for Heritage assets are reviewed and implemented annually. Regularly scheduled inspections, maintenance and/or repairs for Public Art and Monuments and Heritage assets follow the same intake process as Corporate Facilities work – via the Ask Facilities customer relationship management software and recorded in the work order system. Occupants or licensees are responsible for low value maintenance work in some Heritage assets. Public Art and Monuments are part of the City’s Capital 10-year Capital Lifecycle Maintenance Program. The City must consult with the artists about restoration and repair, as artists have the first right to restore and/or repair their own Public Art or Monument. Artists provide a maintenance plan for their Public Art or Monument when the ownership is transferred to the City. 					
Renewal/ Rehabilitation	<ul style="list-style-type: none"> Municipally Owned Heritage Properties are regularly assessed by the Culture services staff and supported by specialized third party to identify the required lifecycle renewal actions on the short and medium term. Long term, required investments are reviewed against the Heritage Building Reports, the expertise of Facilities, and computer software programs used by Facilities (VFA) to determine the cost and timing of renewal requirements. Restoration and Repair – The City must consult with the artists about restoration and repair, as-artists have the first right to restore and/or repair their own Public Art or Monument. Artists provide a maintenance plan for their Public Art or Monument when the ownership is transferred to the City. Public Art and Monument assets are evaluated by conservation and restoration specialists in a similar way to the process for Corporate Facilities. The results of these assessments inform the renewal actions that form the 10-year Capital lifecycle renewal plan for these assets. 					

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
Replacement /Construction	<ul style="list-style-type: none"> Heritage assets are maintained through the Facilities group and their use of VFA which, combined with the Heritage Condition Reports and Facilities experience, determines the lifecycle management needs of a facility. Municipally Owned Heritage Properties are regularly assessed by the Culture services staff and supported by specialized third party to identify the required lifecycle replacement actions on the short and medium term. On the long term, required properties systems and elements replacements are reviewed against the Heritage Building Reports, the expertise of Facilities, and computer software programs used by Facilities (VFA) to determine the cost and timing of renewal requirements. Restoration and Repair – Artists provide a maintenance plan for their Public Art or Monument when the ownership is transferred to the City. The City must consult with the artists about restoration and repair, the Artists are entitled first right to restore and/or repair their art or monument Public Art and Monument assets are evaluated by the City’s Single Source Consultant Conservator who creates Condition Assessments for each cultural asset. The results of these assessments inform the renewal actions that form the 10-year Capital lifecycle renewal plan for these assets. Temporary public art such as murals have a lifespan and removal is eventually required. Heritage assets are to be conserved for the next generation. Whenever possible/applicable, and after a thorough assessment, the City should actively encourage and support appropriate forms of adaptive reuse when necessary to conserve the Municipally Owned Heritage Properties. The assessment should consider that some municipally owned heritage properties have restrictive covenants or are charitable purpose trusts which would limit potential consideration of adaptive reuse. 					
Disposal	<ul style="list-style-type: none"> Generally Public Art and Monuments and Heritage assets are rarely deaccessioned. Any form of deaccessioning including disposal would be completed appropriately and properly in compliance with The City’s Procurement Policy. Culture Services has worked with Legal Services to create Collection Guidelines which include de-accessioning Public Art and Monuments processes. Heritage assets are not intended to be disposed. The City is the long-term steward for these Heritage assets and must conserve these properties for current and future generations. 					
Service Improvement	<ul style="list-style-type: none"> New Public Art and Monuments may be commissioned as part of new developments. New Monuments are commissioned from time-to-time to commemorate historically significant events and people. Public Art and Monuments may require improvements included with each Condition Assessment to ensure their lifespan is extended. Assets typically become Heritage assets by virtue of their cultural heritage value or interest. There are municipally owned heritage designated properties that are not considered to be “Heritage assets”. <p>Tenants and uses for vacant Heritage assets should be actively pursued.</p>					

State of Local Infrastructure	Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions				
Growth	<ul style="list-style-type: none"> Capital growth projects are identified by Development Charges (where applicable with regulatory and municipal policy), or as a part of Assessment Growth Policy (where applicable with municipal policy). Culture Services traditionally does not have growth operating or capital budgets. 				

Table 12.6 Risks Associated with Asset Management Practices or Planned Actions (Culture Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Refer to Appendix A. Overview of Service Area Sections.
Maintenance	<p>Refer to Appendix A. Overview of Service Area Sections.</p> <ul style="list-style-type: none"> Risk considerations related to maintenance: Enough resources available to complete a series of unplanned, urgent work requests that are submitted in close succession. Unexpected weathering of public art/monuments.
Renewal/Rehabilitation	Refer to Appendix A. Overview of Service Area Sections.
Replacement/Construction	<p>Refer to Appendix A. Overview of Service Area Sections.</p> <ul style="list-style-type: none"> Identifying locations for new or relocated Public Art pieces in the downtown area. Long-term funding sources and locations for new Public Art pieces that commissioned as part of new developments.
Disposal	Refer to Appendix A. Overview of Service Area Sections.
Service Improvement	<p>Refer to Appendix A. Overview of Service Area Sections.</p> <ul style="list-style-type: none"> Long-term funding sources and location for new Public Art pieces and Monuments that are commissioned.
Growth	<p>Refer to Appendix A. Overview of Service Area Sections.</p> <ul style="list-style-type: none"> Long-term funding sources and location for new Public Art pieces and Monuments that commissioned. Risk of not enough funding to maintain new artworks.

12.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable in addition to maintain the overall average condition of all assets in Culture Services. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the forecasted change in the condition profile of each asset type. Figure 12.4 shows the projection of the condition of the Culture Services assets based on the three mentioned scenarios. It shows how the current budget will lead to a drop in the overall condition of Culture Services assets. The approved budget is adequate to uphold the existing state of the assets, although condition deterioration is anticipated in the Arts and Entertainment assets.

The City's strategy involves addressing only critical health and safety-related lifecycle activities until a decision is made regarding whether the building will be sold or disposed of, resulting in potential deterioration. The figure also shows the required investments to maintain the current LOS and finally it also shows the required investments to achieve the proposed LOS which include a Facilities 'green premium' estimate. These are considered the first, but not comprehensive, investments in the City's Climate Order of Magnitude and Climate Emergency Action Plan implementation.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

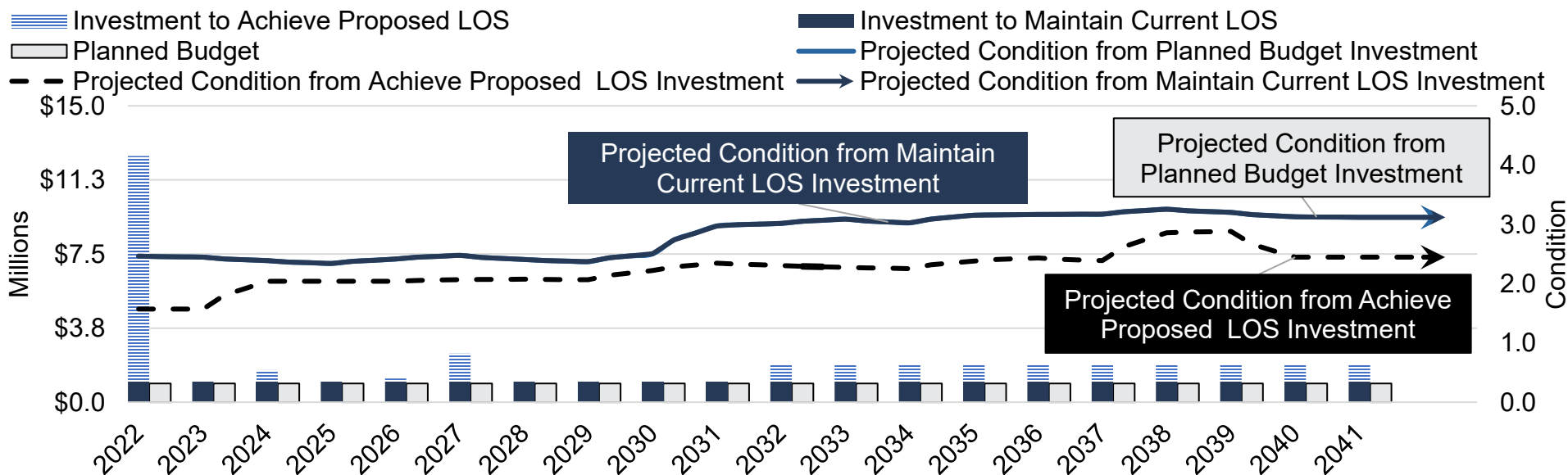


Figure 12.4 Projected Service State of Three Funding Scenarios (Culture Services)

A. Scenario One: Planned Budget Condition Profile

The Culture Services average annual activity and planned funding is summarized in Table 12.7. The condition profile expected from the current budget is forecasted by using the same logic related to condition degradation rates and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. Figure 12.5 presents the expected condition profile for the next 20 years based in the current budgets for Culture Services assets. This scenario indicates the condition profile trending to most assets ranging from Fair to Very Poor condition. Current funding for operating budget and capital budgets are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are

the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are typically analyzed using planned expenditures identified through a review of the capital budget; however, there are no identified service improvement activities or budget.

Current funding for operating budgets is presented as the average of the budgeted 2020 and 2021 fiscal years. Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget.

Growth activities are analyzed using the 2021 DC Background Study. Culture Services traditionally does not have growth operating and capital budgets, and the 2021 DC Background Study has not identified any growth projects with Culture Services assets.

All number in tables are rounded to nearest thousand.

Table 12.7 Scenario One - Average Annual Planned Budget (\$Thousands) (Culture Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	3,859	3,875
Renewal, Replacement, Rehabilitation, Disposal	921	942
Service Improvement	None identified	None identified
Growth Activities	None identified	None identified

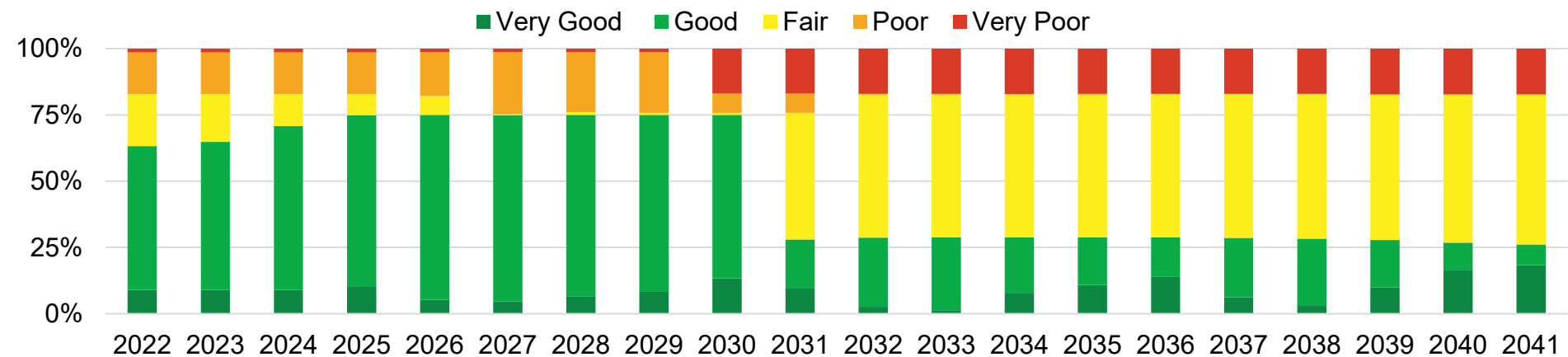


Figure 12.5 Projected 20-year Planned Budget Condition Profile (Culture Services)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

The Culture Services average annual activity and planned funding is summarized in Table 12.8. The approach to establishing the maintain current LOS budget is to forecast the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the current condition profile for these assets. The budget required to maintain current LOS is the same as the approved budget although condition

deterioration is anticipated in the Arts and Entertainment assets. The City's strategy involves addressing only critical health and safety-related lifecycle activities until a decision is made regarding whether the building will be sold or disposed of, resulting in potential deterioration. Figure 12.6 illustrates the expected condition profile for the next 20 years based on maintain current LOS costing for Culture Services assets. It is noteworthy that this projection is like the projected condition profile stemming from the current approved budget. The identification of the gap is primarily attributed to the additional project management investment identified by corporate facilities to maintain current LOS.

Table 12.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Culture Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	3,875	None identified	3,875	None identified
Renewal, Replacement, Rehabilitation, Disposal	942	None identified	1,044	102
Service Improvement	None identified	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified

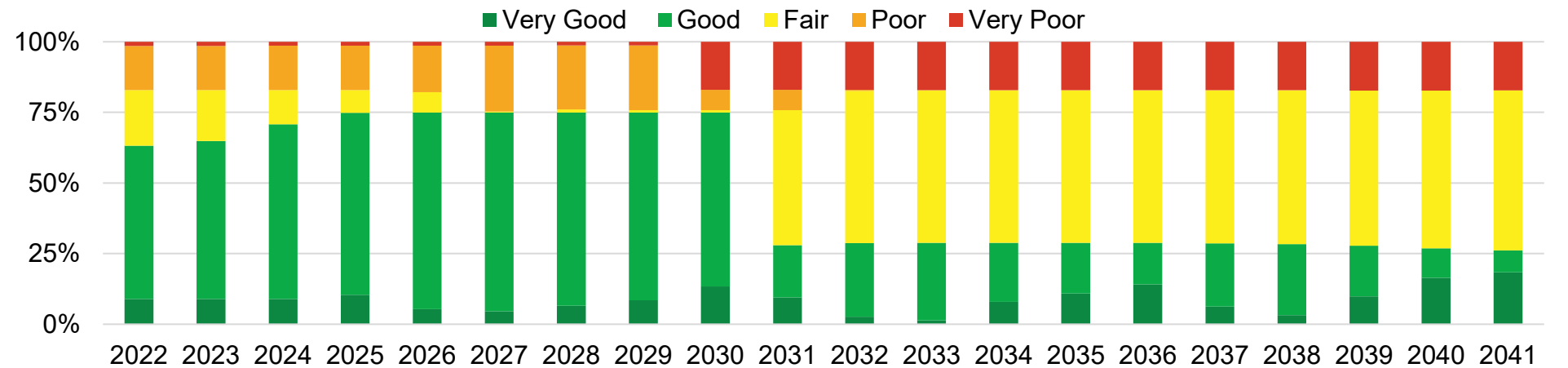


Figure 12.6 Projected 20-year Maintain Current LOS Condition Profile (Culture Services)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

The cost to achieve proposed LOS are summarized in Table 12.9. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the expectation of the City's staff involved with the management of the assets. The future lifecycle activities that are required to achieve the desired condition profile are then used to establish the average annual investments. Figure 12.7 shows the condition profile of assets changing over the next 20 years with

funding to achieve proposed LOS. This scenario indicates the condition profile trending to most assets being in Good and Very Good Condition.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

Table 12.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Culture Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁴³	Achieve Proposed LOS Infrastructure Gap ⁴⁴
Operating Budget	3,875	None identified	None identified	3,875	None identified
Renewal, Replacement, Rehabilitation, Disposal	942	None identified	234	885	1,221
Service Improvement	None identified	None identified	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified	None identified

⁴³Incremental investment to achieve proposed LOS excludes CEAP costs.

⁴⁴Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

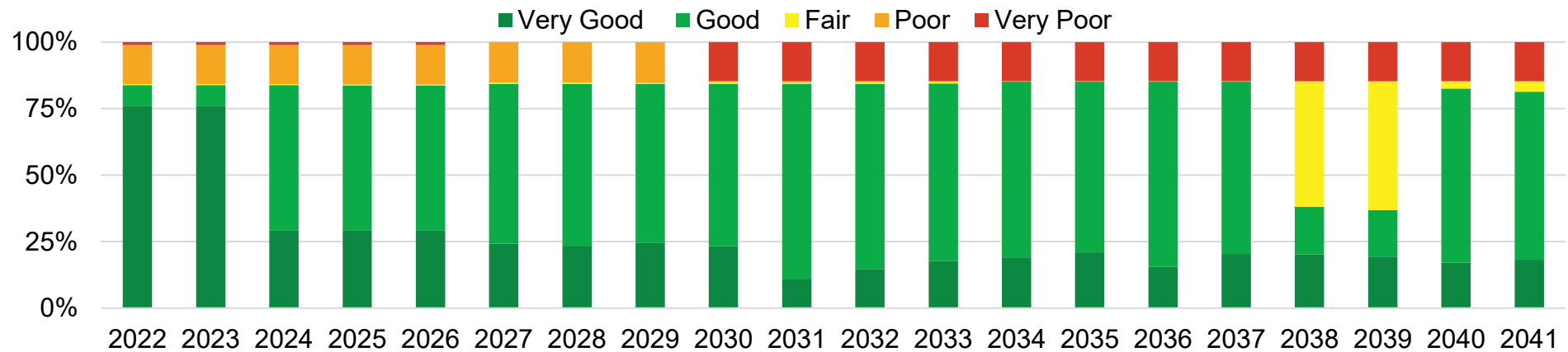


Figure 12.7 Projected 20-year Achieve Proposed LOS Condition Profile (Culture Services)

To meet the proposed Culture Services levels of service as described, some changes to the strategy for lifecycle activities will be required, which will trigger changes in funding requirements.

If funding for proposed levels of service is not sufficient, the City will:

1. Continue lifecycle activities to maintain current levels of service,
2. Carry out CEAP within current funding scope. A green initiative life cycle renewal activity may be otherwise not feasible (examples include boiler and energy efficient windows). The facility asset would otherwise be functional but not addressing green initiative strategic needs, and/or
3. Carry out the construction for provision of new facilities where growth funding can be leveraged or based on priority (as per the Master Plan).

12.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 12.10 and illustrated in Figure 12.8. The analysis is related to the lifecycle rehabilitation or replacement lifecycle activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities and in the case of Municipally Owned Heritage Properties, disposal is not an option.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

The 10-year maintain current LOS infrastructure gap is expected to be approximately \$1.0 million. It is primarily

attributed to the additional project management investment identified by corporate facilities to maintain current LOS. Achieving proposed LOS infrastructure gap is expected to be approximately \$12.2 million over a 10-year investment period. It addresses all needs relating to Culture Services, and the preliminary identification of CEAP initiatives.

The preliminary estimate for CEAP funding in Facilities includes incorporating 'green premium' into lifecycle management needs. This means that instead of simply replacing existing infrastructure with a similar one like for like', there will be an increased focus on incorporating green infrastructure replacements whenever feasible.

Table 12.10 Average Annual Budget and Gap Analysis (\$Thousands) (Culture Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Culture Services	942	None identified	1,044	234	885	102	1,221

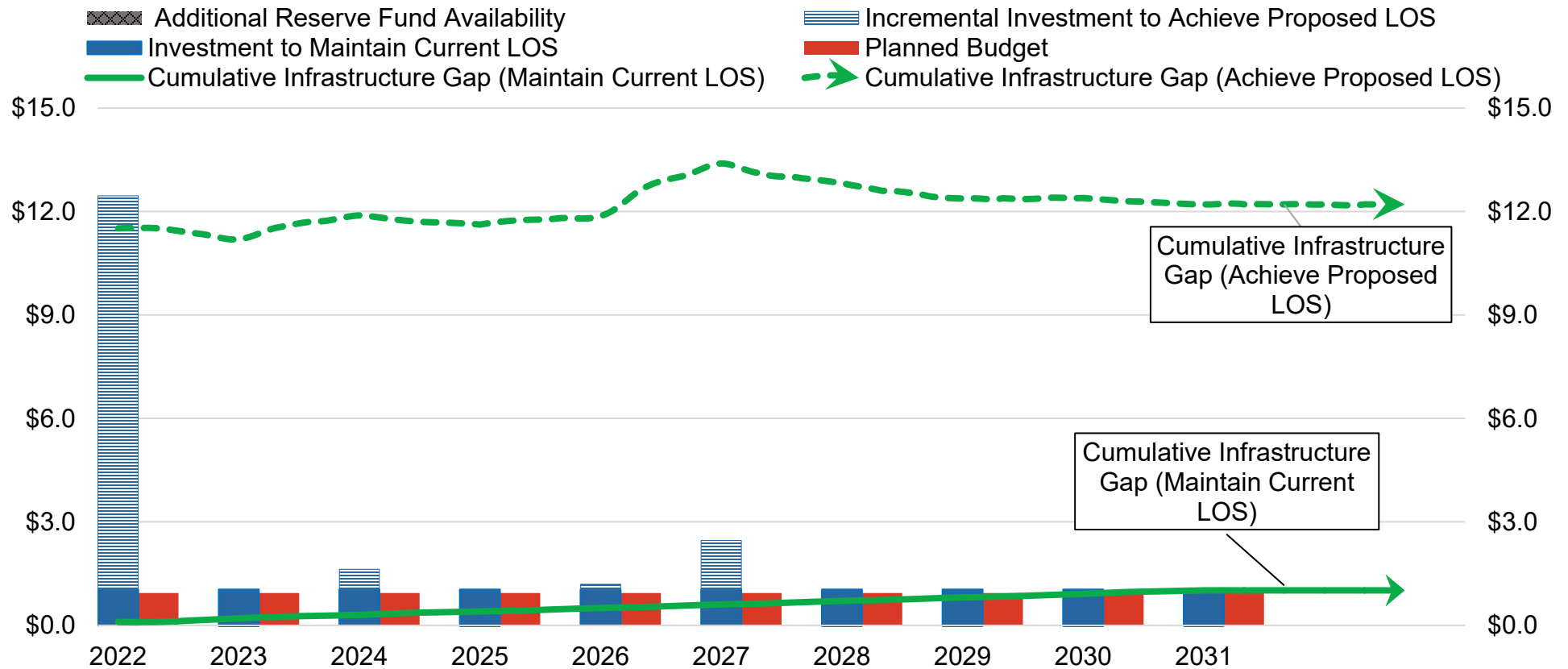


Figure 12.8 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Culture Services)

12.5: Discussion

12.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Culture services condition comparison is provided in Figure 12.9. The replacement value increase of \$91.0 million to \$122.5 million is attribute to inflation. Inflation drivers include recent market pressures and supply chain shocks commencing during the COVID-19 pandemic, interest rate increases and skilled labour shortages.

The 2019 CAM Plan anticipated assets would deteriorate due to the limited funding; however, there has been an increase in the allocated funding to address this infrastructure gap. This led to the ability to maintain the Culture services asset portfolio in a Good condition. The 2019 CAM Plan 10-year infrastructure gap

was \$19.5 million. The Culture Services 10-year maintain current LOS gap is now approximately \$1.0 million. The change is attributed to increased annual funding from \$908,000 to \$942,000, and Culture Services conducted an asset inventory and continuous asset condition monitoring over the past few years which helped to accurately define their needs for the Municipally owned Heritage properties and the Public Art and Monuments. It is also noted the City's strategy involves addressing only critical health and safety-related lifecycle activities for Art and Entertainment asset until a decision is made regarding whether the centennial hall building will be sold or disposed.

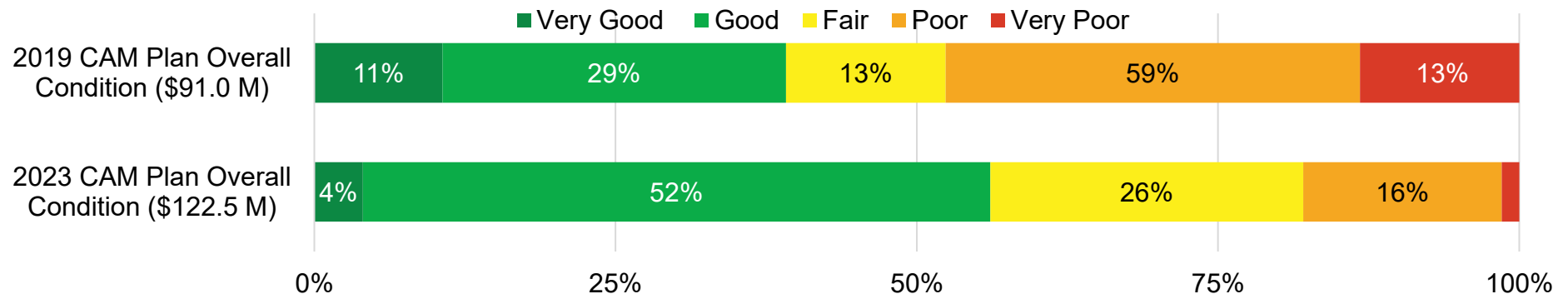


Figure 12.9 2019 CAM Plan to 2023 CAM Plan Condition Summary (Culture Services)

12.5.2: Lifecycle Management Scenarios

The lifecycle Management section included three scenarios. Scenario One planned budget imposes some constraints on the City's capacity to effectively maintain the buildings in the portfolio. As the budget remains stagnant, this leads to a gradual deterioration in Arts and Entertainment assets.

This decline might not be immediate but, over time, it becomes more visible to the public and causing operating problems, increasing the operating and maintenance costs, and potentially leading to higher repair or replacement costs in the future.

Scenario Two maintain current LOS is determined by Culture Services. The City's strategy involves addressing only critical

health and safety-related lifecycle activities until a decision is made regarding whether the building will be sold or disposed of, resulting in potential deterioration. This scenario acknowledges the need for continual investment in assets to maintain their current state, addressing the requirements to keep the state of assets in a steady condition. However, it prevents further decline, it does not enhance the condition of the assets.

Scenario Three achieve proposed LOS funding is higher than both the current budget and the one needed to maintain the assets' existing state. The advantages of this approach are evident in improved LOS and buildings condition, extended asset lifespans, and potential cost savings in the long run. Nevertheless, this scenario shows the financial challenge the City faces to achieve the proposed LOS.

These three scenarios show different results depending on the level of funding for the assets life cycle renewal actions. The choices made will have implications for the Culture Services' asset condition and their performance.

12.5.3: Current and Future Challenges

Current challenges primarily relate to cost pressures for Facilities and adapting lifecycle management strategies to align with Strategic Plan and CEAP targets. Future challenges include how Culture services will preserve the heritage aspect of structures while maintaining its public facing purpose.

This chapter focuses solely on Culture Services, but similar challenges are being replicated across the portfolio that the City's facilities staff must contend with. This includes both directly owned assets which have their separate chapter in the CAM Plan (examples include the Facilities portion of Parks, Recreation and Sport, London Fire Department, Corporate Facilities, and Long Term Care) and some agencies, boards, and commissions that in process of developing their own asset

management plans. The issues outlined in this chapter must be considered with other chapters that have a Facilities component to have context of the challenges the corporate service component that Culture services encounters.

12.6: Conclusions

Valued at over \$122 Million, the City's Culture Services assets are overall in Fair condition, indicating that there has been sufficient investment in sustaining these assets and maintain current LOS. However, due to the extra required budget for managing CEAP initiatives and projects and the required investments to achieve proposed LOS, maintain current LOS investment will result in a \$1.0 Million infrastructure gap, and achieving proposed LOS gap is approximately \$12.2 million. This could result in degradation of the service delivered to citizens, or an inability to deliver on CEAP initiatives. Further investment is needed to address the future lifecycle needs of the current Culture Services assets.

Figure 12.10 illustrates the infrastructure gap as a proportion to the required investment over the next decade for maintaining current LOS and achieving proposed LOS. Table 12.11 presents the summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates for Culture Services assets.

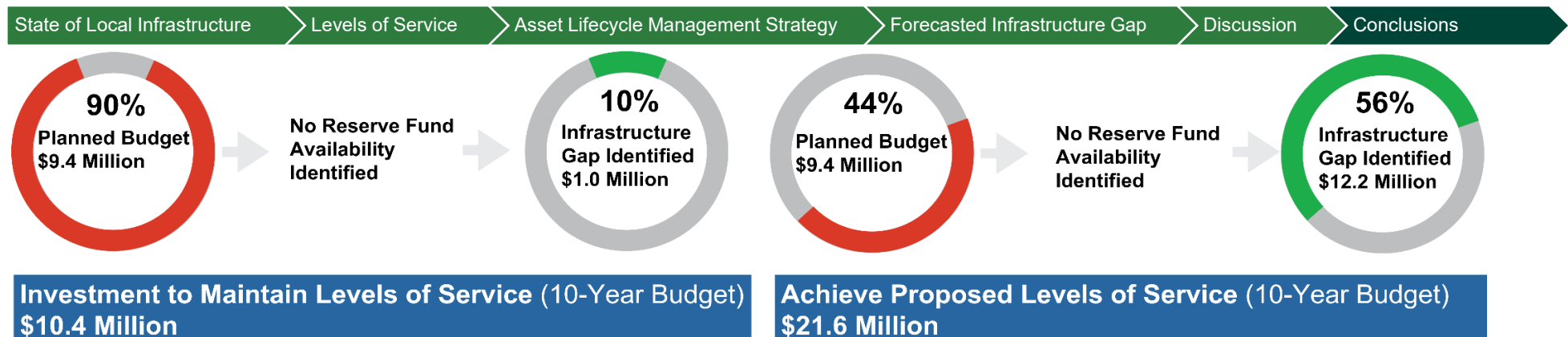


Figure 12.10 Visualization of Maintain Current and Achieve Proposed LOS Infrastructure Gaps (Culture Services)

Table 12.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Culture Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁴⁵
Culture	\$122.5		\$1.0	\$12.2	0.8%	0.9% to 2.1%



Figure 12.11 Accuracy Reliability Scale (Culture Services)

Accuracy and Reliability Commentary

Data reliability is rated as moderate. Valuation of building type assets is based on Facilities VFA information and corroborated with Altus standard costs for London area facilities. Staffing and COVID19 pressures resulted in Facilities focusing on the most

critical operation aspects since the pandemic inception. Facilities is undergoing a phased approach of comprehensively reviewing, updating, and maintaining VFA data. This process is not complete at time of CAM Plan release thus data reliability is assessed as moderate and data accuracy as moderate to low. The other asset types are based on data collected from the available databases and condition is either based on expert opinion or age-based condition. A more objective condition assessment is required to enhance the data accuracy and reliability.

⁴⁵ Source: Ranges from the reinvestment rate required to maintain current LOS to the reinvestment rate calculated using the weighted average expected useful life.

Section 13. Waste Management

Asset Information	Waste Management
Replacement Value	\$136 million
10 year Maintain Current Levels of Service Infrastructure Gap	None identified
10 year Achieved Proposed Levels of Service Infrastructure Gap	None identified

Quick Facts
Three (3) Environmental Depots
142 Hectares of On-Site W12A Land and On-Site Buffer



13.1: State of Local Infrastructure

The City contributes to the health of the environment and its citizens through appropriate collection and management of garbage, recyclables, yard waste, household special waste, and other designated waste materials. This involves providing pick-up and drop-off services within London, processing and creating products of value from compostable recyclable/reusable/recoverable materials; and disposing of garbage in an environmentally responsible manner, including the ongoing monitoring and management of closed landfills and other sites producing methane.

Waste Management (noting this service area was referred to in the 2019 CAM Plan as 'Solid Waste') assets are managed and maintained to meet provincially issued system and facility operating permits, as well as City of London technical targets for performance. The City owns and operates an array of Waste Management disposal and diversion assets valued at over \$136 Million. These range from public waste and recycling bins, drop off depots, Material Recovery Facility (MRF); and one active Landfill (W12A) and many closed landfill sites. Note that the City of London's fleet of garbage trucks are not included in the Waste Management inventory but rather are addressed under the Fleet section of this report. Fleet Services manages and

maintains the trucks while Waste Management operates these trucks.

13.1.1: Asset Inventory and Valuation

Table 13.1 summarizes Waste Management's asset inventory and their replacement values. Waste Management assets are broken into thirteen categories for which the condition was evaluated based on expert opinion from staff (both Waste Management and Facilities), condition assessment reporting for MRF equipment, and the City's facilities asset management software VFA. Waste Management is responsible for maintaining these assets in serviceable condition between replacement cycles, ensuring compliance with Provincial regulations and maintaining the continuity of Waste Management services to the citizens of London and other customers. This inventory is broken into two categories: Waste Management Diversion and Waste Management Disposal. Additionally, note that administrative, maintenance and storage buildings associated with Waste Management Diversion are maintained by the City's Facilities group, and as mentioned above Waste Management fleet and associated equipment is provided and serviced by Fleet Services and are dealt with in the Fleet section.

Table 13.1 Inventory and Valuation (Waste Management Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Diversion	Material Recovery Facility	1	Each	\$25,429
	Material Recovery Facility Equipment	84	Mix	\$12,137
	Enviro Depots	3	Each	\$3,866
	Household Special Waste Depot	1	Each	\$903
Disposal	Containers	2,918	Each	\$4,584
	W12A Buildings (Including Site Works and Equipment)	4	Each	\$12,036
	W12A SWM Ponds	4	Each	\$2,096
	W12A Leachate Collection System ⁴⁶	101.9	Hectare	\$41,687
	W12A Landfill Gas Collection System ⁴⁷	59	Hectare	\$7,678
	W12A Land and On-Site buffer	142	Hectare	\$7,136
	W12A Off-Site Buffer Lands	302.9	Hectare	\$15,224
	Closed Landfill with Equipment locations ⁴⁸ (active mechanical systems)	2	Each	\$3,666
	Closed landfill locations (locations with judgment of waste location)	15	Each	
	Closed landfill locations (Naturally occurring methane locations)	35	Each	
Total				\$136,442

⁴⁶ The size of the Leachate Collection system reflects the area of capture as documented through the City's Tangible Capital Asset (TCA) information.

⁴⁷ The size of the Gas Collection system reflects the area of capture through analysis of the City's 2021 Landfill Annual Report and internal expert review.

⁴⁸ This represents the value of leachate and gas collection active equipment at closed landfill sites. The value of land at these sites has been captured in the Land chapter of this report.

13.1.2: Age Summary

Table 13.1 shows the Waste Management average asset age as a proportion of the average useful life by asset. Asset age has been established using data from Waste Management's W12A annual status report, Facilities database (VFA software), Tangible Capital Asset database, and consultants' reports. Land age and expected useful life are considered not practically assessed thus not applicable to list.

Waste Management Diversion infrastructure is approximately one-quarter to halfway through its expected useful life. The material recovery facility (MRF) and equipment was constructed in 2011. The estimated useful life of MRF Equipment reflects that because of less than anticipated capacity, equipment is expected to last longer than similar equipment used at full capacity as documented through the original equipment supplier's inspection report.

Enviro Depots are nearing the end of their expected useful life. Oxford Street has been recently reconstructed, while the Enviro Depot portion of the W12A landfill is approximately 35 to 40 years old. Clarke Road Enviro Depot is nearing the end of its useful life. The Household Special Waste (HSW) Depot is approximately 22 years old.

It is important to note that 40 years was selected as the expected useful life for facilities, based on the non-structural

components of buildings which have the longest expected service life. In practice the many components that comprise a building are slated for renewal based upon a combination of factors including age, condition, consequence of failure, likelihood of failure etc. and the practical expected life is largely indefinite while the building continues to serve its intended/required purpose in its given geographic location.

Waste Management Disposal installation dates are regularly documented and maintained through the Tangible Capital Asset database, and historical land information reported annually in the W12A Annual Status Report. Most Disposal assets are a third through their expected useful life. The W12A land and on-site buffer land age is unknown, but it was dedicated as disposal land in 1975. The present rate of consumption indicates the current number of landfill cells excluding the proposed expansion of the W12A landfill which is currently in progress will be full by the end of 2024 or in the first quarter of 2025.

The W12A buildings ages range from fifteen to approximately over 40 years of age, however the W12A sitework is relatively newer. The Closed Landfill Equipment ages are known where there are active mechanical systems installed; these systems are on average around 20 years old.

■ Expected Useful Life (Years) □ Average Age (Years)

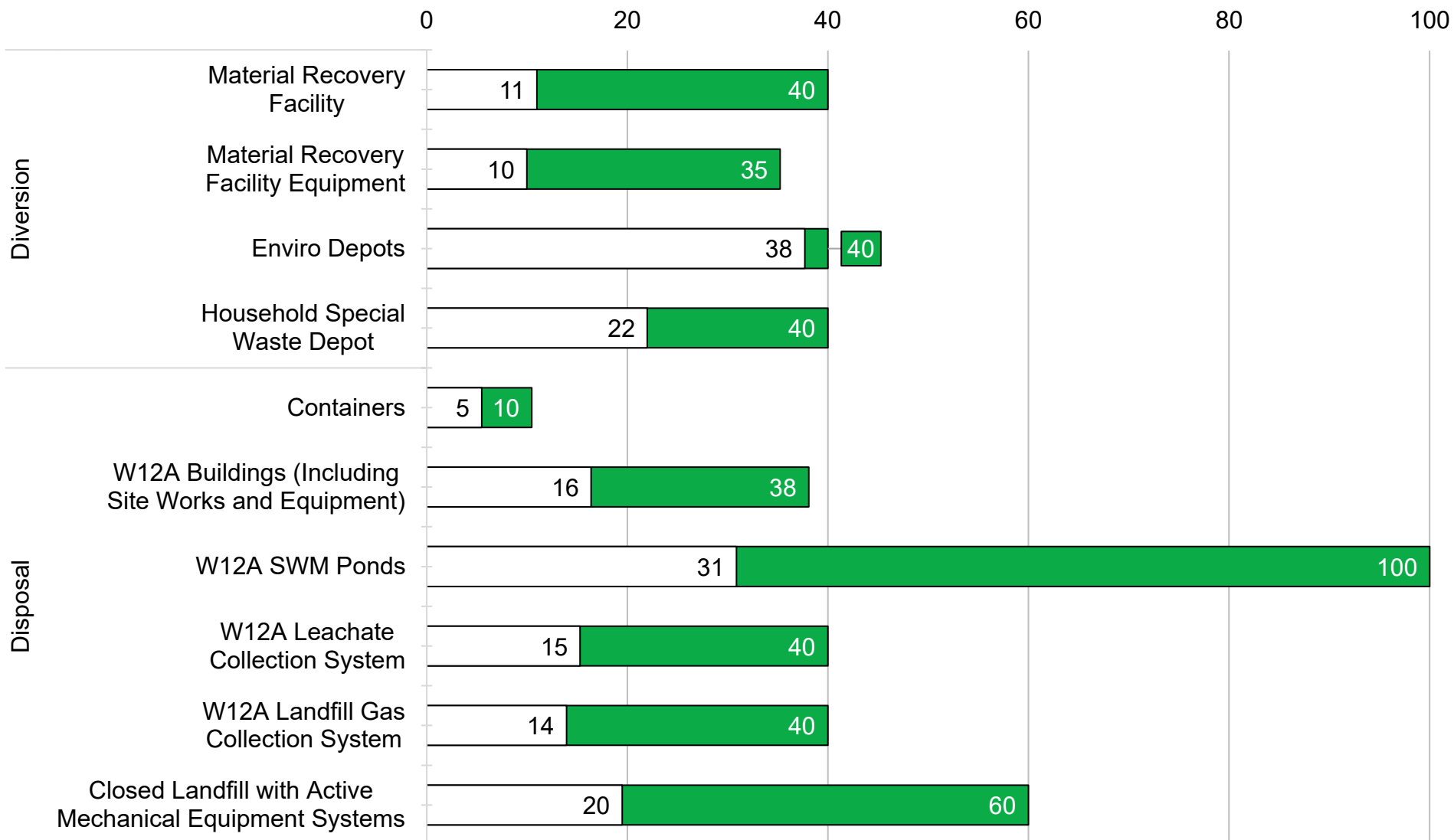


Figure 13.1 Average Age and Expected Useful Life (Waste Management Services)

13.1.3: Asset Condition

As outlined in Figure 13.2, Waste Management has approximately 91% of assets in Fair, to Very Good condition. Note that land is not included in the condition assessment. The remainder is approaching the end of their expected useful lives, indicating a need for investment in the short to medium term. As

explained later in this chapter, there are proposed investments relating to landfill expansions, such as engineering controls relating to leachate and gas collection, that regardless of asset condition would require investment to manage expanded landfill capacity.

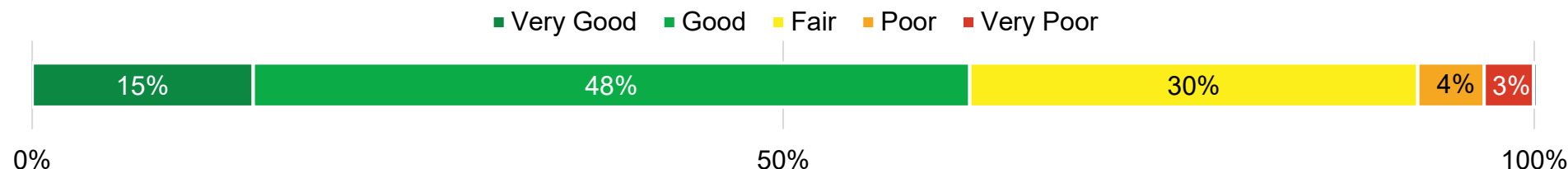


Figure 13.2 Overall Condition (Waste Management Services)

Figure 13.3 show Waste Management's condition distribution of each asset type. As seen in the figures, many Waste Management assets are in Fair to Good condition, indicating that they are meeting current needs but certain assets may require attention.

Asset conditions have been established using data from consultant's reports, Facilities capital planning software VFA database information, and internal expert opinion.

The **MRF and MRF Equipment** are in Good to Fair condition. This facility was newly constructed in 2011 and is operated and maintained by an outside contractor (currently operated by the same contractor that was responsible for the design and construction of the facility). Planned and reactive maintenance of the facility is the responsibility of the MRF operator in the current contract. Recent regulation changes shift blue box recycling costs to industries that produce packaging materials. As a result, subsequent MRF operation contracts will require the City to fund major repairs and/or equipment replacement, which is not financially feasible. To address these changes, tentative

plans are that Municipal equipment for sorting and bundling recyclables at the MRF will be sold and the MRF will be leased. As of time of this CAM Plan the assets are under City ownership, and as annual updates occur, data will reflect if assets are owned by the City and expected lifecycle needs over 10 years.

Enviro Depots and HSW Depot consist of depots where residents can drop off waste and/or recyclables. Facilities are currently serviceable, but demand is increasing and stretching the capabilities of the existing facilities, from a visitor flow perspective. The condition of the Enviro Depots infrastructure is in Good to Fair condition while the HSW is in Poor condition.

Waste Management **Collection Equipment (Containers)** consists of disposal bins, steel bulk containers, plastic bulk containers, semi inground containers, and bus stop litter bins. Expert opinion of the count and condition of the bins is relied upon, and they are estimated to be in Fair condition on average. The containers are maintained in serviceable condition, with

replacement occurring on a planned basis as assets reach the end of their useful lives.

The **W12A Landfill** consists of several assets including landfill cells, buildings, leachate and landfill gas collection systems, and stormwater management ponds. This facility operates within its Operation Plan. Based on projected use, the landfill cells excluding the proposed expansion of the W12A landfill which is currently in progress will be full by the end of 2024 or in the first quarter of 2025, at which point it will require an expansion (or other long term disposal solution) to provide the city with the space needed to meet its future needs. Any expansion or examination of alternatives will be undertaken as per the requirements of an individual Environmental Assessment. This process is underway and nearly complete.

The **W12A Buildings (Incl. Site Works and Equipment)** are generally in Fair condition. This includes the roads, curbs and landscaping as well as the administration, maintenance, scale house, and covered buildings.

W12A Stormwater Management Ponds and site drainage infrastructure collect and treat surface runoff from snow and rain that impact the site. These assets are in Good to Very Good condition and are capable of meeting current and future needs. Maintenance occurs on a planned basis, with investments identified through regular inspections.

The **W12A Leachate Collection System** collects and conveys leachate for treatment. It includes the leachate pumping station at the W12A location. This system is also generally in Very Good to Fair condition and capable of meeting the current City's

needs and is expanded as new disposal cells are constructed. The **Landfill Gas Collection System** collects and conveys landfill gas to the on-site landfill gas flare for destruction. The system is overall in Good and Fair condition with some mechanical repairs and equipment upgrades required in the future. It is capable of meeting current needs. However, proposed investments relating to landfill expansions, such as engineering controls relating to leachate and gas collection, that regardless of asset condition would require investment to manage expanded landfill capacity.

The **W12A Land and On-Site Buffer** and **W12A Off-Site Buffer** lands are not rated on a condition scale. Buffer land is comprised of City owned land adjacent or near the W12A Landfill that has been acquired to provide an appropriate buffer from existing operations and to provide buffering for possible future landfill expansion and resource recovery facilities. It is expected that additional land will be acquired for these purposes over the next several years. Land around W12A and the Resource Recovery Area is purchased in accordance with the City's W12A Land Strategy.

Closed Landfills have generally been converted to parkland or other passive uses. Some sites have engineering controls (e.g. leachate collection systems, landfill gas collection systems and monitoring wells). The condition of the Closed Landfill Equipment on average is Fair (pending information from technicians). The equipment is maintained in serviceable condition, with replacement occurring on a planned basis as assets reach the end of their useful lives or as identified through regular inspections.

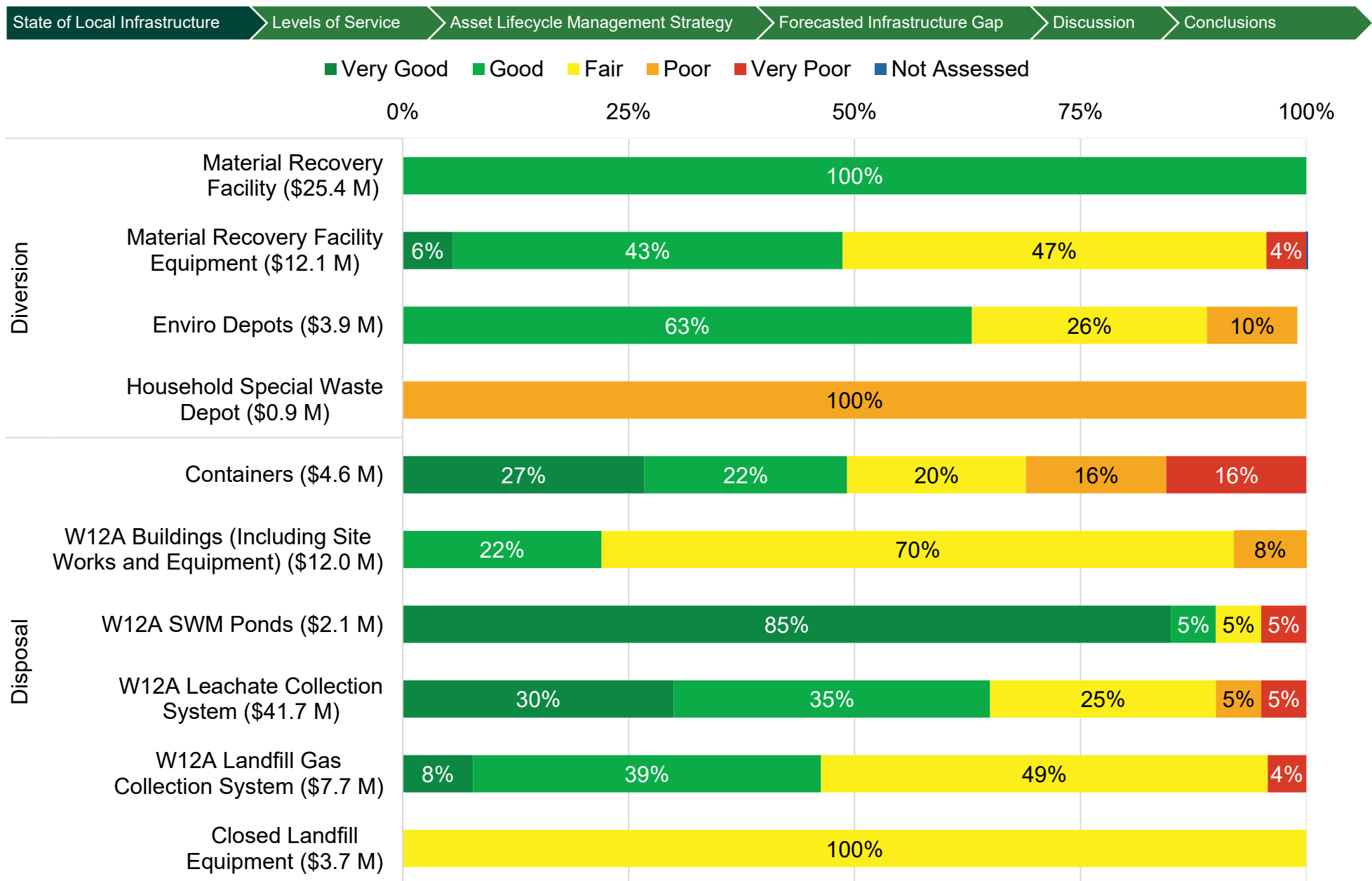


Figure 13.3 Asset Condition Detail (Waste Management Services)

13.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for Levels of Service (LOS) performance measures linked to Customer Values of Accessible, Scope, Cost Efficient, Environmental Stewardship/Sustainability, Reliability, Quality, and Safety.

Direct and Related LOS

After review with Waste Management, LOS considered most representative of Waste Management and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'Direct LOS' and are listed in Table

13.2. LOS that have a causal relationship with direct LOS are documented in Table 13.3 as related LOS but cannot be as readily costed to Waste Management Services.

Metrics

Table 13.4 listed metrics are useful information, especially when considered in conjunction with Direct LOS, and Related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Waste Management assets provide.

13.2.1: Direct Levels of Service

Table 13.2 Direct Levels of Service (Waste Management Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Cost Efficiency	Customer	Waste Management Overall Reinvestment Rate	3.8%	4.1%
Environmental Stewardship	Customer	Percentage of facilities operating within Environmental Compliance Approval ("ECA") requirements	100%	Maintain current
	Technical	Collection of household hazardous waste (tonnes)	443	Maintain current
	Technical	Landfill odour complaints as reported by Province	12	Maintain current
	Customer	Percentage residential waste diversion	45%	60% at end of 2024
	Technical	Ministry of the Environment, Conservation and Parks Compliance (number of orders per year)	0	Maintain current (noting new landfill site required)
	Technical	Greenhouse Gas Percentage Reduction	73%	85%
Reliability	Customer	Percentage of Waste Management assets in Fair or better condition	92.2%	Maintain current (based within Environmental Compliance Approval)
	Customer	Percentage of non-hazardous Waste Management rejected	0%	Maintain current

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Reliability	Customer/Council	Pickup household streams on scheduled days (Green Bin, Household Garbage, Household Recycling)	Greater than 99%	Maintain
Safety	Technical	Percentage of equipment at facilities that meets Health and Safety standards	100%	Maintain

13.2.2: Related Levels of Service

Table 13.3 Related Levels of Service (Waste Management Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Accessible	Technical	Pickup household garbage on scheduled day	Greater than 99%
Accessible	Technical	Pickup household recycling on scheduled day	Greater than 99%
Cost Efficiency	Technical	Waste Management Diversion Reinvestment Rate	1.7%
Cost Efficiency	Technical	Waste Management Disposal Reinvestment Rate	4.8%
Environmental Stewardship	Technical	Methane Destruction	7,860
Quality	Technical	Percentage of time that the landfill gas flare is operational	92%
Reliability	Technical	Percentage of Closed Landfills with engineering controls inspected per year	100%
Reliability	Technical	Landfill open for business on scheduled days	100%
Reliability	Technical	Percentage of Diversion infrastructure assets in Poor or Very Poor condition	4.3%
Reliability	Technical	Percentage of Disposal infrastructure assets in Poor or Very Poor condition	9.7%

13.2.3: Other Measures

Table 13.4 Metrics – Other Dashboard Measures (Waste Management Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Operating budget for Waste Management services (Garbage Recycling and Composting)	\$34,580,596
Cost Efficiency	Customer/Council	Cost to provide service (\$/serviced households)	\$197.99
Customer Satisfaction	Customer/Council	Percentage of community satisfied with Waste Management collection services (recycling and garbage collection).	73% Collection, 82% Recycling
Reliability	Technical	Number of serviced customers of the HSW Depot	13,000
Reliability	Technical	Small Vehicle Drop-off Material received at W12A landfill (Tonnes)	19,800

13.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through cost risk benefit analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant

recommendations, available budget, and trial and error through scenarios and pilot programs.

The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, which may trigger asset investment needs.

13.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current LOS while striving to optimize costs and risks. Table 13.5 lists specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections.

Asset management practices or planned actions employed by cities can entail certain specific risks. Many types of risks such as health and safety, financial, environmental, etc. are summarized in Table 13.6 classified by each lifecycle activity. The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 13.5 Current Asset Management Practices or Planned Actions (Waste Management Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Waste Management Diversion and Disposal <ul style="list-style-type: none"> Use of continuous improvement processes and conservation of Waste Management and associated infrastructures assets through policy, procedures, and public outreach, etc.
Maintenance	Maintenance and renewal of the garbage collection fleet is managed by the Fleet service.
Renewal/Rehabilitation	Waste Management Diversion <ul style="list-style-type: none"> Routine rehabilitation activities are based on field observations against attributes determined by staff, including mechanic inspection reports. Waste Management Disposal <ul style="list-style-type: none"> Rehabilitation is generally not considered an option. Facilities-related assets are regularly evaluated through comprehensive condition assessments, which establishes and updates an industry-standard Facility Condition Index (FCI) score that reflects accurately the overall condition of the facilities (split into components of building envelope, mechanical and electrical systems, etc.). These

Asset Activity	Specific Asset Management Practices or Planned Actions
	condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA), determine the cost and timing of rehabilitation requirements.
Replacement/ Construction	Waste Management Disposal <ul style="list-style-type: none"> Equipment and structure assets ideally are used until the end of their useful life. When unexpected structural events occur, assets will be replaced but would be in lieu of other planned infrastructure replacements. Waste Management Diversion <ul style="list-style-type: none"> Facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that reflects accurately the overall condition of the facilities (split into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA), determine the cost and timing of replacement requirements.
Disposal	Waste Management Disposal Fleet manages disposal of City owned vehicles and other equipment (e.g. portable generators, lawn mowers etc.)
Service Improvement	Waste Management Diversion and Disposal <ul style="list-style-type: none"> The nature of the landfilling business is that it takes many years to garner approval for the creation or expansion of a site. Approval for a new site or expansion of an existing site is obtained through the <i>Environmental Assessment Act</i>. The permanent nature of the land use requires a diligent assessment of alternatives.
Growth	<ul style="list-style-type: none"> Capital growth projects are identified by Development Charges and Waste Management (where applicable with regulatory and municipal policy), or from Assessment Growth Policy (where applicable with municipal policy). Waste Management Diversion and Disposal <ul style="list-style-type: none"> Growth projects identification is limited for the Waste Management service. This is a result of the Development Charts Act rendering landfill sites and service, and provision of facilities and service for the incineration of waste to be ineligible for development charges. Waste Diversion growth projects are eligible services for receipt of development charge funding.

Table 13.6 Risks Associated with Asset Management Practices or Planned Actions (Waste Management Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Refer to Appendix A.
Maintenance	Refer to Appendix A.
Renewal/ Rehabilitation	Refer to Appendix A.
Replacement/ Construction	Cost over-runs during large, complex design and construction projects.
Disposal	Refer to Appendix A.
Service Improvement	Refer to Appendix A.
Growth	Incorrect growth assessments may result in overabundance or insufficient Waste Management assets. Growth not completely funded through Development Charges and inhibited by insufficient funding.

13.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is not available for the Waste Management service area. Data exists for these assets but not easily integrated into condition profile assessments. Land (Whether On-Site, Off-Site, or Closed Landfill locations) and certain equipment (Closed Landfill equipment) do not lend well to traditional linear assessment profiles and are not practically assessed or easily inspected. In absence of condition profile predictions, Waste Management mitigates this by having detailed analysis for assessing expected capital needs.

The City of London does not project Waste Management asset conditions. However, information and commentary are provided on Waste Management assets based on three scenarios. The first is average annual planned budget. The second scenario is the required investments to maintain current LOS. The final scenario comments on investments required to achieve proposed LOS.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP)

Table 13.7 Scenario One – Average Annual Planned Budget (\$Thousands) (Waste Management Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	33,190	39,258
Renewal, Replacement, Rehabilitation, Disposal	3,405	1,392
Service Improvement	17,763	3,806
Growth Activities	None identified	2,000

and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

A. Scenario One: Planned Budget

The condition profile expected from the current budget is not readily available. Waste Management average annual activity and planned funding is summarized in Table 13.7. Current funding for operating budget and capital budgets are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget.

Growth activities are analyzed using the 2021 Development Charges Background Study Update. Major upcoming projects relate to the Organic Waste Diversion Facility.

B. Scenario Two: Maintain Current Levels of Service

The cost to maintain current LOS are summarized in Table 13.8. Waste Diversion needs relate to Household Special Waste and Enviro Depots, and Waste Disposal needs relate to W12A

facilities, Containers, and maintaining Landfill Gas Collection systems. The condition profile expected from the maintain current LOS is not readily available.

Table 13.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Waste Management Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	39,258	None identified	39,258	None identified
Renewal, Replacement, Rehabilitation, Disposal	5,198	329	5,527	None identified
Service Improvement				
Growth Activities	2,000	None identified	2,000	None identified

C. Scenario Three: Achieve Proposed Levels of Service

The cost to achieve proposed LOS are summarized in Table 13.9.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

The condition profile expected from the achieve proposed LOS is not readily available. Proposed LOS needs relate to expansion of long term disposal (landfill site). The existing system will not meet required engineering controls relating to leachate and landfill gas collection. While there are capital budgets approved, the costs were developed prior to supply chain issues. City staff has preliminary estimates of increased costs, which is reflected in this asset management plan. These costs are being refined further with the support of engineering consultants and may result in increased costs associated with this project.

To meet the proposed Waste Management LOS as described, some changes to the strategy for lifecycle activities will be required, which will trigger changes in funding requirements.

If funding for proposed LOS is not sufficient, the City will:

1. Continue lifecycle activities to maintain current LOS;
2. Prioritize investments with critical engineering controls;
3. Carry out the Climate Emergency Action Plan within current funding scope. The repercussions are insufficient landfill size to meet London's needs and inability to delivery on the Green Bin Program. It would most likely result in an inability to meet 60% residential diversion targets by 2024 (as outlined in the infrastructure gap chart in Figure 13.4); and/or
4. Carry out the construction for provision of new facilities where growth funding can be leveraged or based on priority (as per the Master Plan).

Table 13.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Waste Management Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁴⁹	Achieve Proposed LOS Infrastructure Gap ⁵⁰
Operating Budget	39,258	None identified	None Identified	None Identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	5,198	1,160	None Identified	831	None identified
Service Improvement					
Growth Activities	2,000	None identified	None Identified	None Identified	None identified

13.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 13.8 and illustrated in Figure 13.4. The analysis documented is related to the lifecycle rehabilitation, renewal, or replacement activities, and service improvement activities. Disposal activities are considered inherent with asset renewal/rehab/replacement activities.

The cumulative maintain LOS and achieve proposed LOS infrastructure gaps for Waste Management assets would be \$nil over the next decade, assuming the identified reserve fund availability is sustained over the next decade. The funding needs in investment to maintain current LOS and investment to

achieve proposed LOS columns represent the costs to renew, maintain, replace, and improve the serviceability of existing assets, and do not account for growth and the expansion of service to new areas, excepting the landfill expansion commented on in this chapter.

Service improvement budgets relating to SW6080 Long Term Disposal Capacity, and SW6010 Garbage and Recycling service improvement budgets are included as part of analysis given they are required to meet City targets regarding landfill expansion.

Table 13.10 Average Annual Budget and Gap Analysis (\$Thousands) (Waste Management Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Investment to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Diversion	708	191	899	None identified	None identified	None identified	None identified
Disposal	4,490	969	4,628	None identified	831	None identified	None identified
Total	5,198	1,160	5,527	None identified	831	None identified	None identified

⁴⁹Incremental investment to achieve proposed LOS excludes CEAP costs.
⁵⁰Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

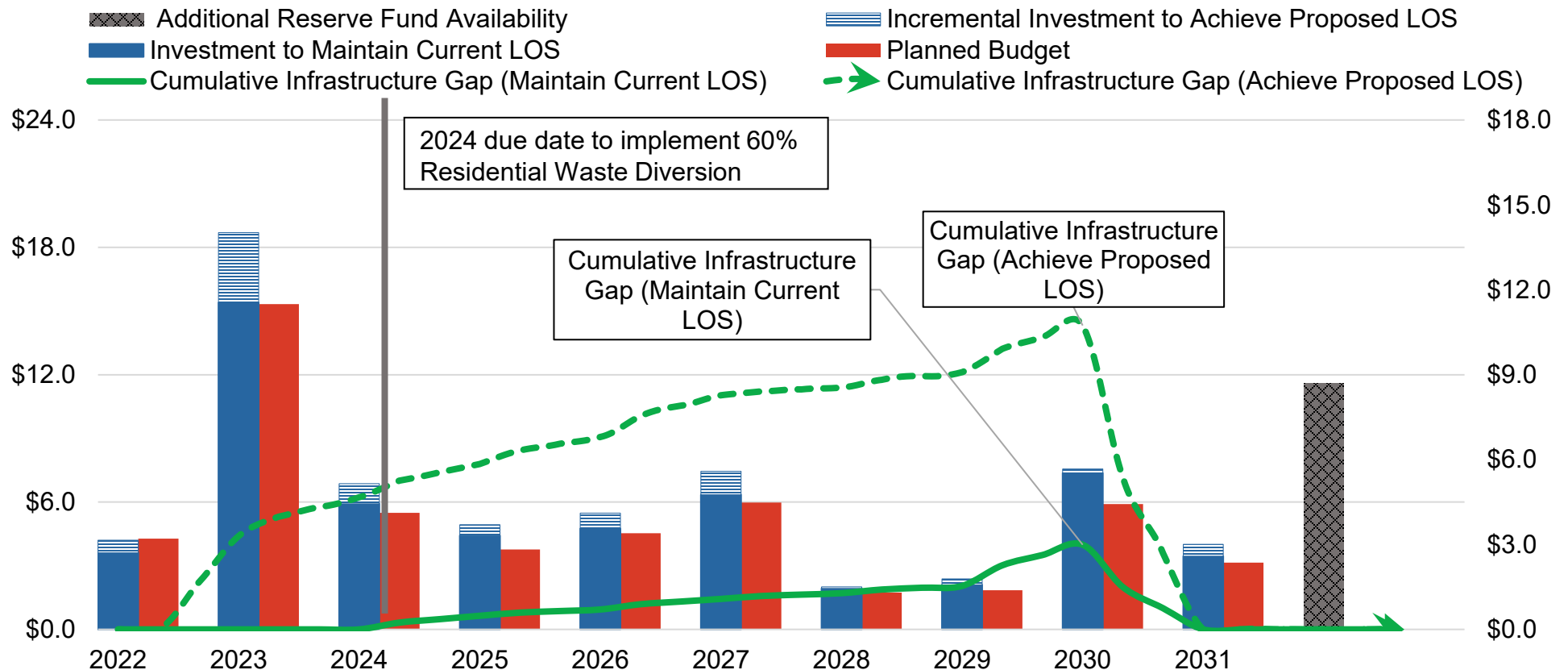


Figure 13.4 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Waste Management Services)

Recent provincially directed changes increased household waste diversion rates from 45% to required 60% by originally the end of 2022 but has been adjusted to 2024 (as highlighted in Figure 13.4). The City landfill is also expecting to approximately double in size⁵¹ and the full impact of costing to achieve continues to be monitored as cost increases that occurred throughout the pandemic have not yet been fully

quantified and reflected in capital budgeting. However, cost estimates best known at the time of the CAM Plan are presented. These cost pressures and infrastructure gap of nil assumes that that forecasted reserve fund balances are achieved and that the reserve fund amounts are available for lifecycle activities.

⁵¹ <https://www.ontario.ca/page/w12a-landfill-expansion-project>,
<https://getinvolved.london.ca/whywastedisposal>

13.5: Discussion

13.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Waste Management condition comparison is provided in Figure 13.5. The 2019 CAM Plan condition data (noting this service area was previously referred to as ‘Solid Waste’) used a variety of relevant information including and professional internal opinion. The 2023 CAM Plan continued these processes. Replacement value increased from \$85 million to \$136 million because of facilities and land value cost increases.

The profiles are considered similar in nature. The cumulative 10-year infrastructure gap for the 2023 CAM Plan is \$nil and 2019 CAM Plan was approximately \$46 million. The 2023 CAM Plan has a higher expected reserve fund availability. In contrast, the 2019 CAM Plan accounted for a portion of the proposed Resource Recovery Facilities as having a lifecycle management component. The Development Charges plan was still in draft format when the 2019 CAM Plan was being finalized, and current data reflect the Organic Waste Diversion Facility is classified as a growth project.

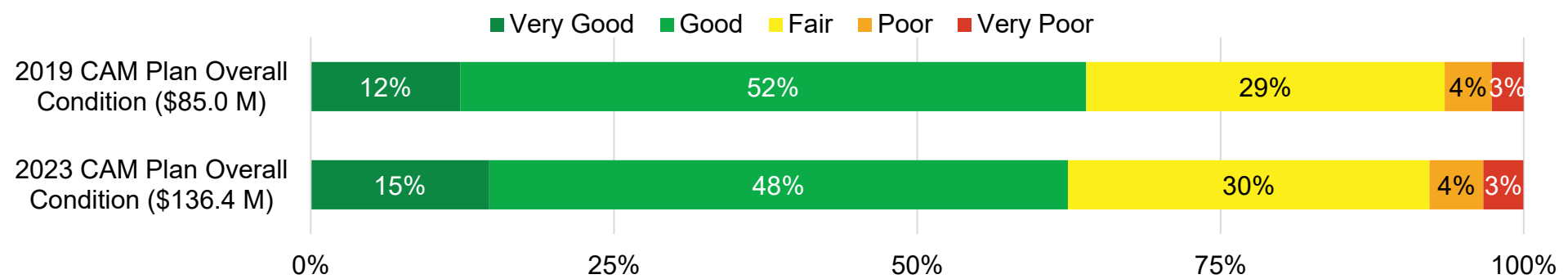


Figure 13.5 2019 CAM Plan to 2023 CAM Plan Condition Summary (Waste Management Services)

13.5.2: Current and Future Challenges

Pandemic and Supply Chain Issues

As commented further in the Fleet chapter (Section 10), the pandemic and ongoing supply chain issues have resulted in the vehicles required for both garbage collection and the upcoming Green Bin program being substantially delayed.

Landfill Expansion

Landfill cells, excluding the proposed expansion of the W12A landfill which is currently in progress, will be full by the end of 2024 or in the first quarter of 2025. As these cells are filled, they are capped and new cells are established to accommodate

waste. Over the past fifteen years, the City has made significant efforts to reduce the amount of waste entering its landfill. While it has managed to divert 45% of household waste produced, this is still short of the current Provincial target of 60%. The provincial target of 60% was adopted in 2017 and reconfirmed in 2018 with the intent of being reached by the end of 2024. However, the landfill is expected to double and therefore extend its life to 2049. The full impact of this costing continues to be monitored as cost increases that occurred throughout the pandemic have not yet been fully quantified and reflected in capital budgeting.

13.6: Conclusions

Management diversion and disposal assets are overall in Good condition. Investments in waste diversion have helped to extend the life of the current landfill to approximately the end of 2024 or early 2025. Additional investment will be needed to meet the

Province's long-term household waste reduction targets and provide landfill service beyond 2024. Figure 13.6 and Table 13.11 summarizes key Waste Management data.

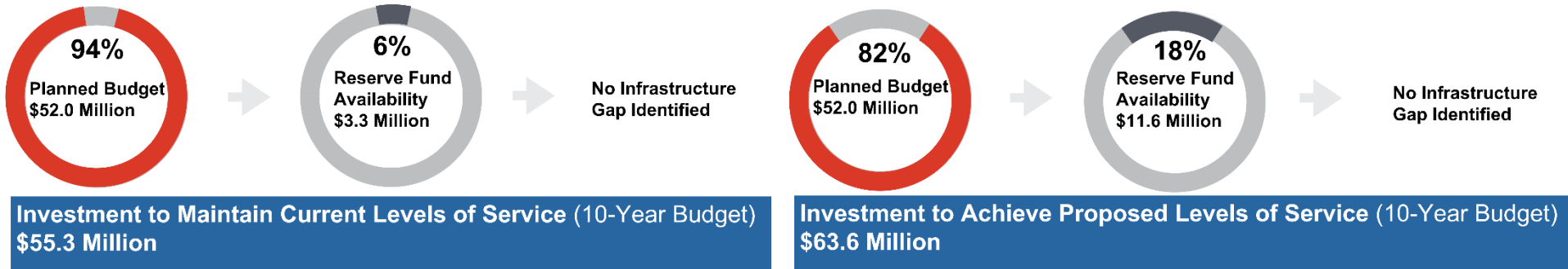



Figure 13.6 Visualization of Maintain Current and Achieve Proposed LOS Infrastructure Gaps (Waste Management Services)

Table 13.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Waste Management Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁵²
Diversion	\$42.3	Good	None identified	None identified	1.7%	1.7% to 2.6%
Disposal	\$94.1	Good	None identified	None identified	4.8%	5.1% to 5.6%
Waste Management	\$136.4		None identified	None identified	3.8%	3.1% to 4.1%

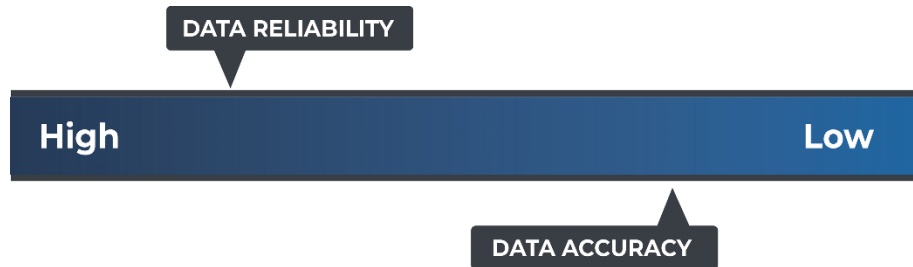


Figure 13.7 Accuracy Reliability Scale (Waste Management Services)

Accuracy and Reliability Commentary

Data reliability is rated as moderate to high - Inventory has been verified through TCA, internal Waste Management inventory records, and where applicable, GIS data, Facilities VFA software, and annual disclosure reports from Waste Management (W12A Annual Report). Valuation for Diversion and Disposal assets is based on the combination of external costing estimates (Altus for W12A facilities) and internal service area information. Material recovery facility equipment condition and investment forecasts based on external opinion. W12A condition and investment forecasts are based on Facility VFA data. Condition and investment forecasts for all other assets are based on expert opinion, which may vary from actuals. Accuracy is rated as moderate to low as forecasts are based on internal capital projections. In general condition ratings are not supported by engineering studies.

⁵² Source: Diversion reinvestment rate based on current reinvestment rate and expected useful life. Disposal reinvestment rate based on investment required to maintain current LOS and achieve proposed LOS.

Section 14. Recreation and Sport

Asset Information	Recreation and Sport
Replacement Value	\$533.6 million
10-year Maintain Current Levels of Service Infrastructure Gap	\$75.1 million
10-year Achieved Proposed Levels of Service Infrastructure Gap	\$96.7 million

Quick Facts
10 Arenas
14 Community Centres
4 Indoor Pools
11 Outdoor Community Pools
72 Holes of Golf



14.1: State of Local Infrastructure

Recreation and Sport assets help ‘make London one of the greatest places to live, work, play and visit’. The City aims to provide affordable, accessible, high quality recreation opportunities and facilities that promote a safe, healthy, and fun lifestyle. Recreation and Sport Services play a significant role in community building through the facilitation of active and passive activities, opportunities for structured and spontaneous play, strengthening of neighbourhood connections and more.

Recreation and Sport Services are delivered by Neighbourhood and Communitywide Service area and includes indoor activities like the services offered in arenas and indoor pools, community centres, seniors’ centres, as well as important outdoor facilities like outdoor pools, spray pads, golf courses and Storybook Gardens.

The Parks and Recreation Master Plan was completed in 2019. It updated the overall vision, direction, and guidance for planning and making decisions about parks, recreation programs, sport services, and facilities. It is informed by public input and is aligned to local, provincial, and national policies, strategies, best practices, trends, demographics, and growth forecasts. The Master Plan has a timeframe of ten years (2019 to 2028) and includes a longer-term outlook for major capital projects to 2039. The Plan identifies broad needs and strategies and contains a series of recommendations that will assist the City and the community to achieve the vision and goals. The information and individuals involved in the Parks and Recreation Master Plan also informed the Recreation and Sport CAM Plan section.

14.1.1: Asset Inventory and Valuation

Table 14.1 summarizes the Recreation and Sport Services inventory and replacement values. The replacement value of the

City of London’s recreation facilities is \$533.6 million. These facilities enable a wide range of recreational and competitive year-round activities including recreation and leadership programs, membership based activities, indoor tennis, roller-skating, skating, hockey, swimming and diving, various community based meetings, events, rentals, Golfing, and special attractions.

Nearly half of the value of Recreation and Sport assets can be attributed to Arenas, which include 10 arena facilities and 3 outdoor ice rinks. Arenas serve organized sports leagues by providing opportunities to participate in ringette, hockey, figure skating, special events, ball hockey, inline hockey, and lacrosse. Arenas also serve participants in public recreational skating, pick-up shinny hockey, senior’s skates and tots skates. Arenas are used as dry pads in summer months providing space for camps, ball hockey, etc.

London’s residents, ranging from infants to seniors, frequently use a variety of aquatic facilities. The city proudly offers 4 indoor pools and 36 outdoor aquatic amenities, which include wading pools, spray pads, and outdoor swimming pools. Additionally, there are other aquatic facilities that are owned and managed by other organizations in which the City is in joint venture agreements with, such as the indoor pools at the Startech.com Community Center in Bostwick and at Stoney Creek. These facilities support community-based recreation and learn-to-swim programs, as well as training and competition for local, provincial, and national levels.

The City’s 14 community centers and two (2) seniors centres provide accessible, quality, welcoming spaces for community recreation and leadership programs, activities, rentals/events and neighbourhood gatherings in support of strong

neighbourhoods. Some of the community centers are shared with arenas in the same recreation building.

The City of London owns and operates 72 holes of golf - the 9-hole Hickory Course located at Thames Valley GC, the Parkside 9 at Fanshawe Golf Course and three 18-hole golf courses (Thames Valley, Fanshawe Traditional, and Fanshawe Quarry). These courses include two clubhouses, and several maintenance buildings providing affordable golf opportunities to residents and visitors.

The Recreation service manages one of London’s biggest children’s attractions; composed of 14 facilities, the famous Storybook Gardens, a village of imagination offering year-round activities for the children of London and visitors to our great city.

Parks and Recreation and Sport services shares 40 sites, in which, for this Asset Management Plan, all the values and projected needs of the assets included in these sites are split between parks and recreation services.

Table 14.1 Inventory and Valuation (Recreation and Sport Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Arena and Equipment	Arena	10 ⁵³	Each	\$212,197
	Outdoor Ice Rink	3	Each	\$1,573
Aquatics and Equipment	Outdoor Community Pool	11	Each	\$23,312
	Spray Pads	18	Each	\$8,216
	Wading Pool	7	Each	\$3,220
	Indoor Pool	4	Each	\$71,867
Community Centre and Equipment	Community Centre	14	Each	\$126,787
	Indoor Tennis Court	1	Each	\$21,076
Golf	Clubhouse	2	Each	\$12,912
	Courses (18-holes)	4	Each	\$5,918
	Service Building	5	Each	\$6,338
	Washroom and Concession	1	Each	\$416
Recreation Site Work	Site Work (Parks Shared)	40	Each	\$5,113
	Site Work (Recreation)	22	Each	\$11,867
Attractions	Storybook Gardens	1	Each	\$7,559
Senior Centre and Equipment	Senior Centre	2	Each	\$15,239
Total				\$533,610

⁵³ Glen Cairn Arena is not included as it has been closed and decommissioned.

14.1.2: Age Summary

Figure 14.1 and Figure 14.2 show the Recreation average asset age as a proportion of the average useful life by asset type. In most of the cases, the average ages for all facilities were calculated using the recorded construction date in the VFA (Facilities Management software), otherwise the City GIS databases were also used as another source in case of information was not available. Most of the asset types average ages have exceeded their average industry standard useful life. This leads to an increase in the operation and maintenance cost

of these facilities. It is important to note that 40 years was selected as the expected useful life based on the non-structural components of buildings which have the longest expected service life. In practice, the many components that comprise a building are slated for renewal based upon a combination of factors including age, condition, consequence of failure, likelihood of failure etc. and the practical expected life is largely indefinite while the building continues to serve its intended/required purpose in its given geographic location.

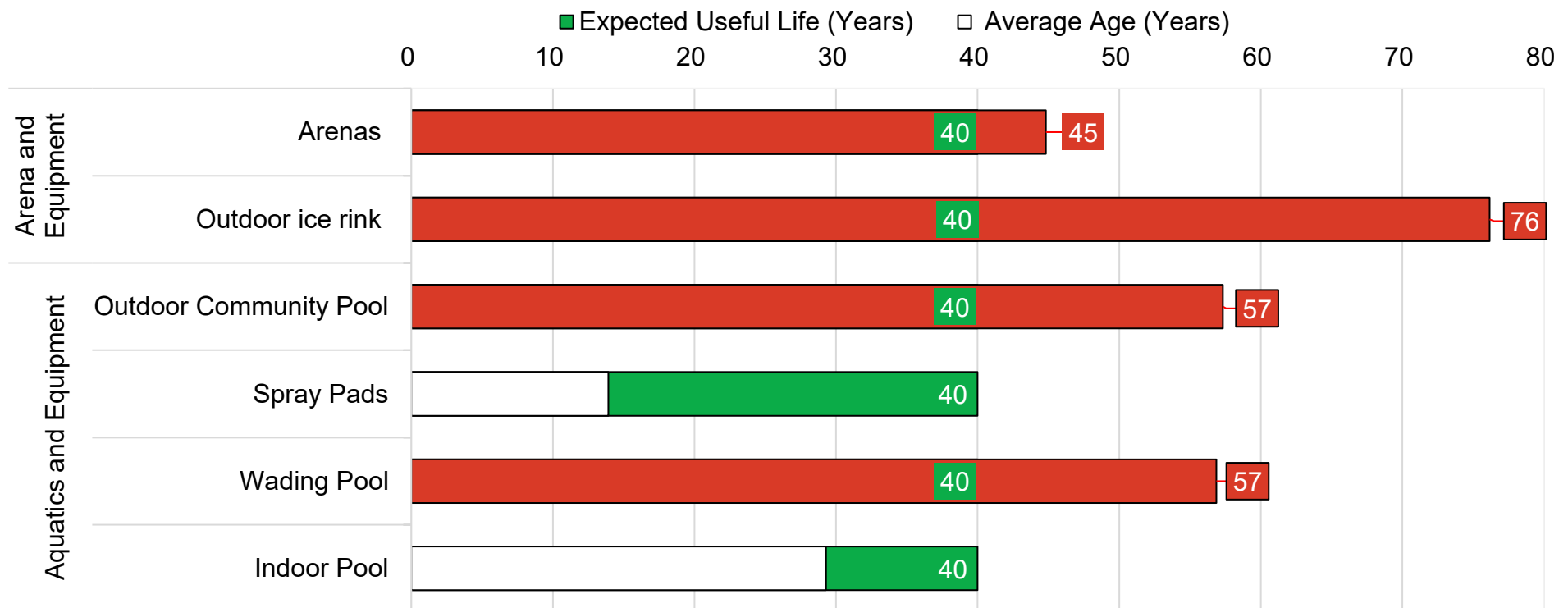


Figure 14.1 Average Age and Expected Useful Life (Arenas and Aquatics)



Figure 14.2 Average Age and Expected Useful Life (Community Centres, Golf, Attractions, Senior Centres, and Site Work)

14.1.3: Asset Condition

Figure 14.3 list nearly 79% of the city's recreation services assets (arenas, aquatics, community centres, etc.) are in Fair to Very Good condition, with the remainder assessed as Poor or Very Poor condition, indicating a need for investment in the short to medium term.

The Recreation Facilities have about 21% of their inventory in Poor to Very Poor condition. This means that some Recreation Facilities reflect signs of wear and deterioration; however, they operate reliably, meeting current and short to mid-term needs.

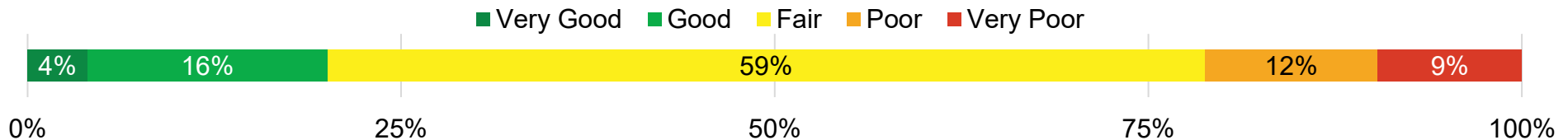


Figure 14.3 Overall Condition (Recreation and Sport Services)

The condition of the Recreation and Sport facilities is regularly evaluated through comprehensive condition assessments using an industry-standard Facility Condition Index (FCI) that accurately reflects the overall condition of the facilities (building envelope, mechanical and electrical systems, etc.). Similar programs do not exist for the equipment inside the facilities. However, the equipment is a minor component of the total Recreation and Sport asset value albeit critical to the function of the facility and services provided. The lifecycle renewals of Recreation and Sport equipment involves diligent monitoring, proactive problem identification, and responsive action. This process is carried out through a combination of regular inspections, staff observations, and valuable feedback from the public. The Facility Condition Index is also not used for golf courses, just the clubhouses and other associated services buildings.

Figure 14.4 and Figure 14.5 lists more detailed condition information. A significant portion of Aquatics facilities fall within the Very Poor to Fair condition. This result is driven by the existence of several older wading pools in Fair condition and a select number of outdoor community pools in Fair to Very Poor

condition. In some cases and depending on multiple factors such as technical concerns and community preferences, the City may decide to replace a wading pool with a spray pad. Indoor community pools are mostly in Fair condition, while spray pads are noted as generally being in Good to Very Good condition. The condition of some aquatics building assets indicates short term investments are required.

Golf courses are generally maintained in Good to Very Good condition as required for playability as shown in Figure 14.5. Golf buildings, including clubhouses and other on course facilities like washrooms, concessions, and maintenance buildings, have less priority than the golf courses and are predominantly in Fair to Very Poor condition. The condition of some Golf building assets indicates short term investments are required. The allocation of Recreation and Sport assets by replacement value is provided for context when assessing condition values of recreation assets in the following graphs. For example, an asset may have a great amount of replacement value in Very Good or Very Poor condition, but in the context of the entire service it could represent a small amount of the replacement value. During the CAM Plan development, it was

noticed that some facilities data in the City’s databases was not recently updated. This data was reviewed and refined by Facilities division staff based on their expert opinion. This

strategy proved effective for most of the buildings that were reviewed.

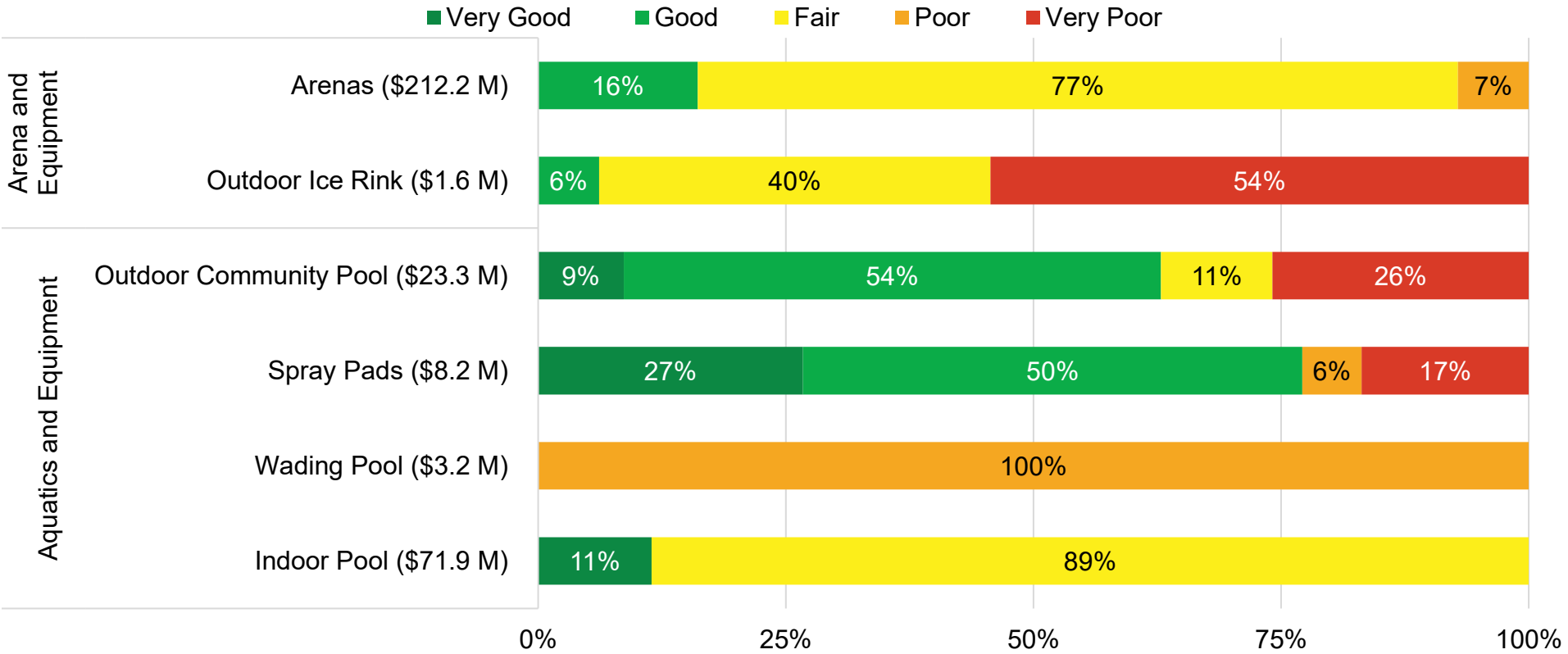


Figure 14.4 Asset Condition Detail for Arenas and Equipment and Aquatics and Equipment (Recreation and Sport Services)

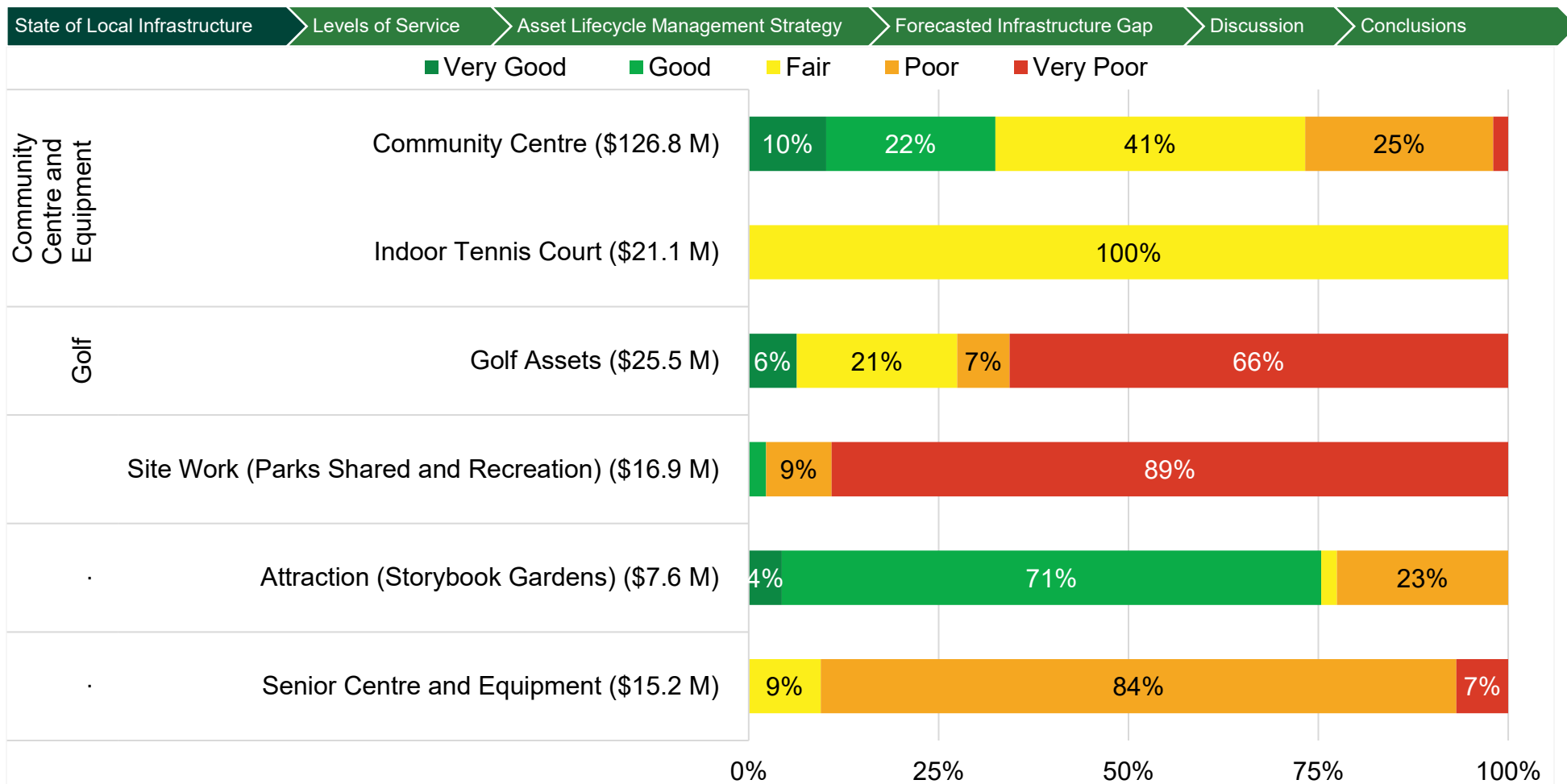


Figure 14.5 Asset Condition Detail for Community Centres, Golf, Recreation Site Work, Attraction, and Senior Centres (Recreation and Sport Services)

14.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for Levels of Service (LOS) performance measures linked to Customer Values of Accessible, Cost Efficiency, Customer Satisfaction, Environmental Stewardship, Reliability, Safety, and Scope.

Direct and Related LOS

After review with Recreation and Sport Services, the LOS measures considered most representative of Recreation and Sport Services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'direct LOS' listed in Table 14.2.

14.2.1: Direct Levels of Service

Table 14.2 Direct Levels of Service (Recreation and Sport Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Accessible	Technical	Percentage of facilities/amenities that are FADS compliant	99.5%	100%
Cost Efficiency	Technical	Overall Recreation and Sport Services Reinvestment rate	0.8%	2.5%
Environmental Stewardship	Technical	Annual electric energy consumption per square foot	6.10 KWH/sf	Reduce
Environmental Stewardship	Technical	Annual natural gas consumption per square foot	0.601 m3/sf	Reduce
Environmental Stewardship	Technical	Annual water consumption per square foot	0.129 m3/sf	Reduce
Quality	Technical	Percentage of provision targets met for Recreation and Sport Services	To be determined ⁵⁴	100%
Reliability	Customer/Council	Percentage of assets in Fair or better condition	78.8%	Maintain current
Safety	Technical	Percentage facilities with security cameras	82%	Maintain current

LOS measures that have a causal relationship with direct LOS are documented in Table 14.3 as Related LOS but cannot be as readily costed to Recreation and Sport Services.

Metrics

Lastly, Table 14.4 listed metrics that are useful information, especially when considered in conjunction with Direct LOS, and Related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Recreation and Sport provides.

⁵⁴ These measures will be established as part of the next Parks and Recreation master plan.

14.2.2: Related Levels of Service

Table 14.3 Related Levels of Service (Recreation and Sport Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Accessible	Technical	Percentage of Aquatics facilities that are FADS compliant	100%
		Percentage of Arena facilities that are FADS compliant	100%
		Percentage of Community and Senior facilities that are FADS compliant	100%
		Percentage of Golf Amenities that are FADS compliant	100%
		Percentage of Storybook Gardens amenities that are FADS compliant	64%
Cost Efficiency	Technical	Senior Centre Reinvestment Rate	1.0%
		Golf Reinvestment Rate	0.6%
		Recreation and Sport Services Reinvestment Rate (Arenas, Aquatics, Community Centres, and Storybook Gardens)	0.8%
Environmental Stewardship	Technical	Annual electric energy consumption per square foot for Aquatic Facilities	8.22 KWH/sf
		Annual natural gas consumption per square foot for Aquatic Facilities	0.86 m3/sf
		Annual water consumption per square foot for Aquatic Facilities	0.31 m3/sf
Environmental Stewardship	Technical	Annual electric energy consumption per square foot for Arenas	6.67 KWH/sf
		Annual natural gas consumption per square foot for Arenas	0.63 m3/sf
		Annual water consumption per square foot for Arenas	0.02 m3/sf
Environmental Stewardship	Technical	Annual electric energy consumption per square foot for Senior and Community Centers	2.79 KWH/sf
		Annual natural gas consumption per square foot for Senior and Community Centers	0.36 m3/sf
		Annual water consumption per square foot for Senior and Community Centers	0.005 m3/sf
Environmental Stewardship	Technical	Annual electric energy consumption per square foot for Golf Facilities	20.17 KWH/sf
		Annual natural gas consumption per square foot for Golf Facilities	0.15 m3/sf
		Annual water consumption per square foot for Golf Facilities	0.05 m3/sf
Environmental Stewardship	Technical	Annual electric energy consumption per square foot - Storybook Gardens Facilities	25.92 KWH/sf
		Annual natural gas consumption per square foot for Storybook Gardens Facilities	0.041 m3/sf
		Annual water consumption per square foot for Storybook Gardens Facilities	0.0468 m3/sf
Quality	Technical	Percentage of level of service quality rating at Poor to Very Poor - Aquatics facilities	5%
		Percentage of Indoor Community Pool level of service quality level of Poor to Very Poor	0%
		Percentage of Spray Pad level of service quality level of Poor to Very Poor	0%

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Customer Value	Focus	Service Performance Measure			2021 Performance	
		Percentage of Wading pools level of service quality level of Poor to Very Poor			43%	
Quality	Technical	Average level of service quality rating for Aquatics facilities (Rating of 1 is 'Very Good', 2 is 'Good', 3 is 'Fair', 4 is 'Poor', 5 is 'Very Poor')			1.98	
		Average Indoor Community Pool level of service quality rating			1.18	
		Average Spray Pad level of service quality rating			2.31	
		Average Wading Pool level of service quality rating			3.42	
		Average Outdoor Community Pool level of service quality rating			2.69	
Quality	Technical	Percentage of Outdoor Community Pool level of service quality level of Poor to Very Poor.			18%	
		Provision target met for Aquatics			To be determined ⁵⁵	
		Average level of service quality rating for Arenas' rating			2.18	
Quality	Technical	Percentage of level of service quality rating at poor to very poor for Arenas			0%	
		Provision target met for Arenas			To be determined ⁵⁵	
		Percentage of level of service quality rating at Poor to Very Poor for Community/Senior Centres			0%	
Quality	Technical	Percentage Community Centre quality level Poor to Very Poor rating			0%	
		Percentage Senior Centre quality level Poor to Very Poor rating			0%	
		Average level of service quality rating for Community/Senior Centres rating			2.37	
		Provision target met for Community/Senior Centers			To be determined ⁵⁵	
		Average Community Centre level of service quality rating			2.38	
Quality	Technical	Percentage of level of service quality rating at Poor to Very Poor for Golf facilities			0%	
		Percentage of Golf course level of service quality rating at Poor to Very Poor			0%	
		Average level of service quality rating for Golf facilities			2.86	
		Average Golf course level of service quality rating			2.78	
Quality	Technical	Percentage of level of service quality rating at Poor to Very Poor for Storybook Gardens			0%	
		Average level of service quality rating for Storybook Gardens			3.32	
Reliability	Technical	Number of unplanned closures/use restrictions per year for Aquatics Facilities			0	
		Number of unplanned amenity closures/use restrictions per year excluding weather-based disruptions for Storybook Gardens			COVID impact of rides closed, limited park capacity.	
		Number of unplanned closures/use restrictions per year for Arenas Facilities			0	

⁵⁵ These measures will be established as part of the next Parks and Recreation master plan.

State of Local Infrastructure		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Customer Value	Focus	Service Performance Measure				2021 Performance
		Number of unplanned Golf course closures/use restrictions per year excluding weather-based disruptions				0
Safety	Technical	Percentage of Aquatics facilities with security cameras				50%
		Percentage of Arenas facilities with security cameras				70%
		Percentage of Community/Senior Centers with security cameras				75%
		Percentage of Golf facilities with security cameras				100%
		Percentage of Storybook Garden facilities with security cameras				100%

14.2.3: Other Measures

Table 14.4 Metrics – Other Dashboard Measures (Recreation and Sport Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Operating budget for Aquatics services	\$5,098,271
		Operating budget for Arena services	\$8,429,173
		Operating budget for Community and Senior Centre services	\$3,579,490
		Operating budget for Golf services	\$3,695,630
Cost Efficiency	Customer/Council	Cost to provide Recreation and Sport Services (\$/serviced households)	\$222.15
	Technical	Operating budget for Recreation services (excluding Golf and Senior Centres)	\$38,579,490
	Technical	Operating budget for Storybook Gardens services	\$2,024,065
Customer Satisfaction	Customer/Council	Percentage of survey respondents satisfied with their experience	80.0%
Quality	Customer/Council	Percentage of Indoor Community Pools level of service quality rating system ranked Fair to Very Good	100%
		Percentage of Outdoor Community Pools quality rating system ranked Fair to Very Good	82%
		Percentage of Spray Pad level of service quality rating system ranked Fair to Very Good	100%
		Percentage of Wading Pool level of service quality rating system ranked Fair to Very Good	57%
		Percentage of level of service quality rating at Fair to Very Good for Aquatics facilities	95%
Quality	Customer/Council	Percentage of level of service quality rating at Fair to Very Good for Arenas	100%
		Percentage of Community Centre level of service quality rating at Fair to Very Good	100%
		Percentage of Senior Centre level of service quality rating at Fair to Very Good	100%
Quality	Customer/Council	Percentage of level of service quality rating at Fair to Very Good for Community/Senior Centres	100%
Quality	Customer/Council	Percentage of Golf course level of service quality rating at Fair to Very Good	100%

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Quality	Customer/Council	Percentage of level of service quality rating at Fair to Very Good for Golf facilities	100%
Quality	Customer/Council	Percentage of level of service quality rating at Fair to Very Good for Storybook Gardens	100%
Safety	Customer/Council	Number of reported incidents requiring lifeguard intervention per 10,000 users for Aquatics facilities	16.75
Safety	Technical	Number of reported major incidents per 10,000 users in Community and Senior centers	0
Safety	Technical	Meet legislative requirements for pesticide use at Golf facilities	0
Safety	Technical	Number of reported major incidents per 10,000 users in Storybook Gardens Facilities	0

14.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain levels of service while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training,

professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs.

14.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current levels of service while striving to optimize costs and risks. Table 14.5 lists specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Asset management practices or planned actions employed by cities can entail certain specific risks. Many types of risks such as health and safety, financial, environmental, etc. are summarized in Table 14.6 classified by each lifecycle activity.

The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 14.5 Current Asset Management Practices or Planned Actions (Recreation and Sport Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> • The Parks and Recreation Master Plan helps set overall strategy for the service area. By developing, implementing, and updating a formalized, documented master plan for the service area and the assets required to provide these services helps to lower overall asset lifecycle costs. • Recreation and Sport asset management decisions are made using criteria from the Planning Act, policy, the Official Plan, bylaws, Ontario Recreation Facilities Association (ORFA), Canadian Parks and Recreation Association (CPRA), Parks and Recreation Ontario (PRO) and are guided by design standards and Master Plans. • The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, and other emergency planning, which may trigger asset investment needs.
Maintenance	<ul style="list-style-type: none"> • A work order system and online interface exists for Recreation and Sport City employees to generate requests of Facilities. • Recreation and Sport Facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (splits into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA), determine the cost and timing of replacement requirements. • Equipment is monitored by staff observations and public feedback and problems are addressed when needed.
Renewal/Rehabilitation	<ul style="list-style-type: none"> • Recreation and Sport Facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (splits into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA) determine the cost and timing of renewal requirements. • Equipment rehabilitation is not performed in a systematic format and available for only certain assets (Arena scoreboards for example).
Replacement/Construction	<ul style="list-style-type: none"> • Condition assessment data described under the 'Rehabilitation' lifecycle activity is also fundamental in replacement activities. Combined with comprehensive condition assessments and facilities experience, this data determines the lifecycle management needs of a facility. Recreation and Sport Services provide input to Facilities to ensure the appropriate level of service is met for supporting London's resident recreation programming and community gathering. The lifecycle management needs include the direct care of the building envelope, mechanical and electrical systems, etc. • Equipment is inspected by Facilities staff and replacements are performed when required.
Disposal	<ul style="list-style-type: none"> • Decommissioning obsolete assets is carried in as needed while striving to reduce costs to the City through auction or resale where possible. • Appropriate and proper disposal occurs when assets are replaced or renewed.

Asset Activity	Specific Asset Management Practices or Planned Actions
Service Improvement	<ul style="list-style-type: none"> • Consultation with public and users of Recreation and Sport Facilities, and in conjunction with Facilities service would determine service improvement needs.
Growth	<ul style="list-style-type: none"> • Capital growth projects are identified by Development Charges and Recreation (subject to <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i>, requirements and City of London policy) or as a part of Assessment Growth Policy (where applicable with Municipal Policy). Consultation with public and users of recreation facilities would determine growth needs.

Table 14.6 Risks Associated with Asset Management Practices or Planned Actions (Recreation and Sport Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Refer to Appendix A.
Maintenance	<ul style="list-style-type: none"> • Completing planned maintenance activities while managing the need to execute reactive maintenance activities. Incorrectly planned maintenance activities can lead to premature asset failure. • Enough resources available to complete a series of unplanned, urgent work requests that are submitted in close succession.
Renewal/ Rehab	Refer to Appendix A.
Replacement/ Construction	Cost over-runs during large, complex design and construction projects.
Disposal	Refer to Appendix A.
Service Improvement	Refer to Appendix A.
Growth	Incorrect growth assessments may result in overabundance of Recreation and Sport assets.

14.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable in addition to maintain the overall average condition of all assets in Recreation and Sport assets. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the

forecasted change in the condition profile of each asset type. Figure 14.6 shows the projection of the condition of the Recreation and Sport assets based on the three mentioned scenarios. The figure also shows planned budget, the required investments to maintain the current LOS and Investments to Achieve Proposed LOS, which include a pumping station investment. These are considered the first, but not comprehensive, investments in the City's Climate Order of Magnitude and Climate Emergency Action Plan implementation.

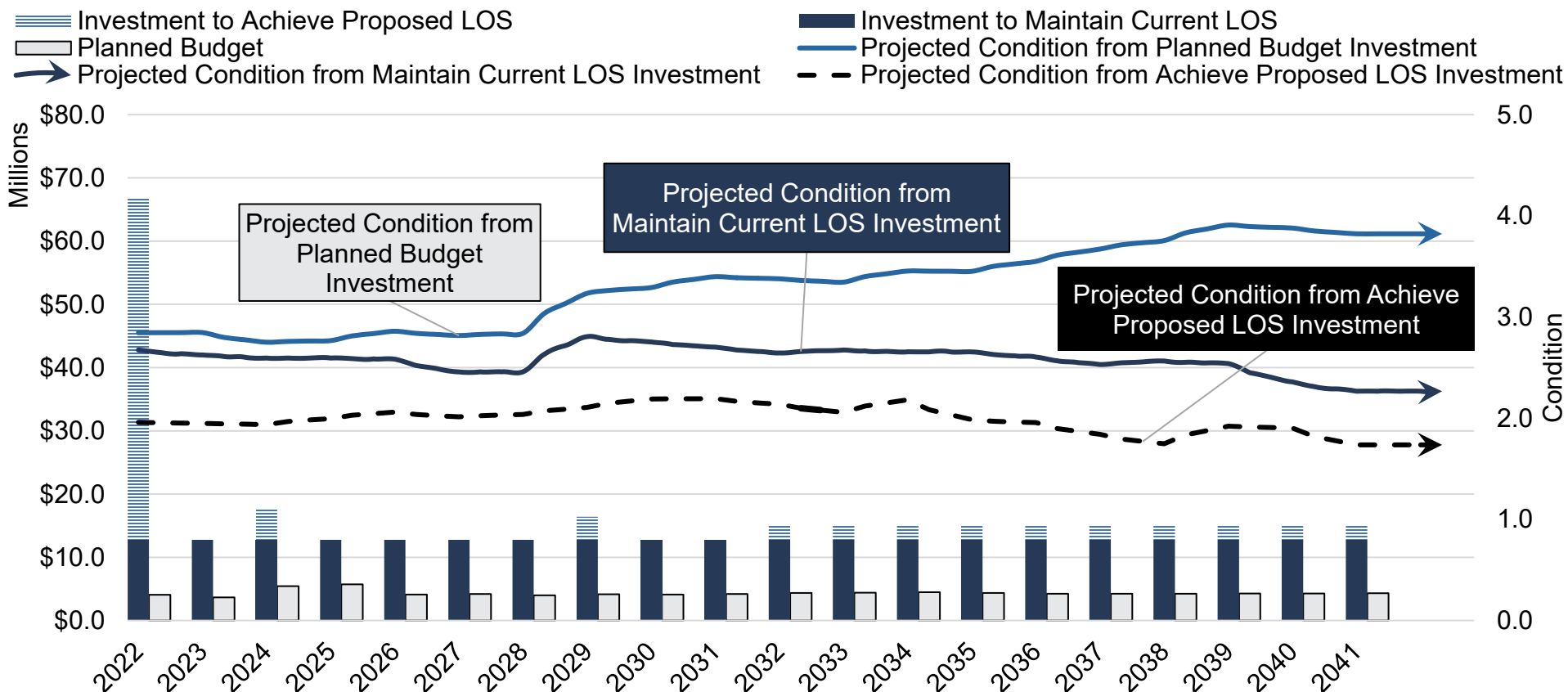


Figure 14.6 Projected Service State of Three Funding Scenarios (Recreation and Sport Services)

A. Scenario One: Planned Budget Condition Profile

Table 14.7 summarizes the Recreation and Sport Average Annual Activity and Planned Funding. The condition profile expected from the current budget is forecasted by using the same logic related to condition degradation rates and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. Table 14.7 presents the expected condition profile for the next 20 years based on the current budgets for Recreation and Sport assets. This scenario indicates the

condition profile trending to an overall Poor condition with most of the assets in Very Poor condition. Current funding for operating budget and capital budgets are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget.

Growth activities are analyzed using the 2021 Development Charges Background Study Update.

All numbers in tables are rounded to nearest thousand.

Table 14.7 Scenario One - Average Annual Planned Budget (\$Thousands) (Recreation and Sport Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	37,921	40,145
Renewal, Replacement, Rehabilitation, Disposal	3,991	4,361
Service Improvement	1,803	110
Growth Activities	2,325	6,882

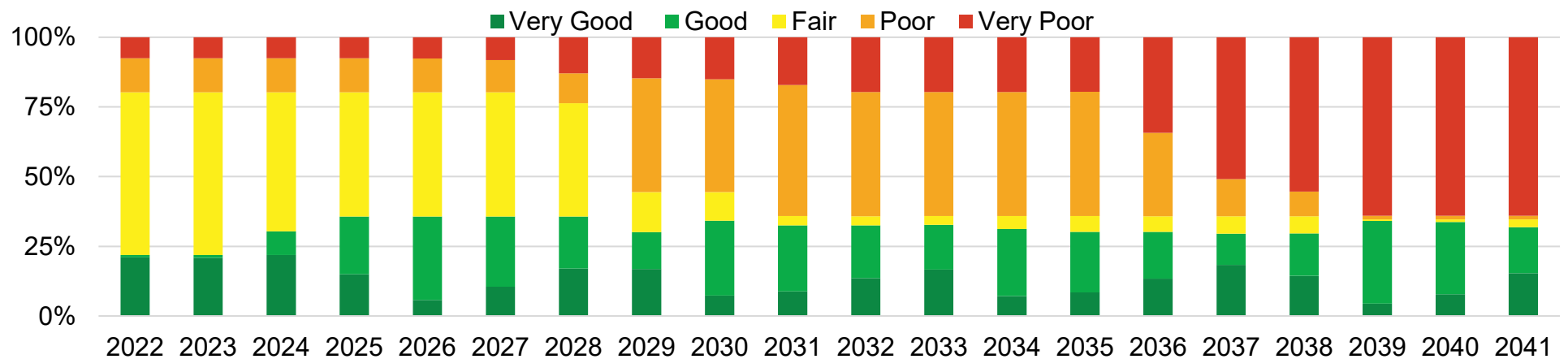


Figure 14.7 Projected 20-year Planned Budget Condition Profile (Recreation and Sport Services)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

Table 14.8 summarizes the cost to maintain Recreation and Sport levels of service. The approach to establishing the maintain levels of service budget is to forecast the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The

variables in the analysis are adjusted until the forecasted condition profile meets the current condition profile for these assets. Figure 14.8 presents the expected condition profile for the next 20 years based on investment required for maintain levels of service for Recreation and Sport assets. This scenario indicates the condition profile trending to an overall of Good condition with most of the assets in Fair to Very Good condition.

Table 14.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Recreation and Sport Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	40,145	None identified	40,145	None identified
Renewal, Replacement, Rehabilitation, Disposal	4,361	1,500	13,104	7,243
Service Improvement	110	None identified	None identified	None identified
Growth Activities	6,882	None identified	None identified	None identified

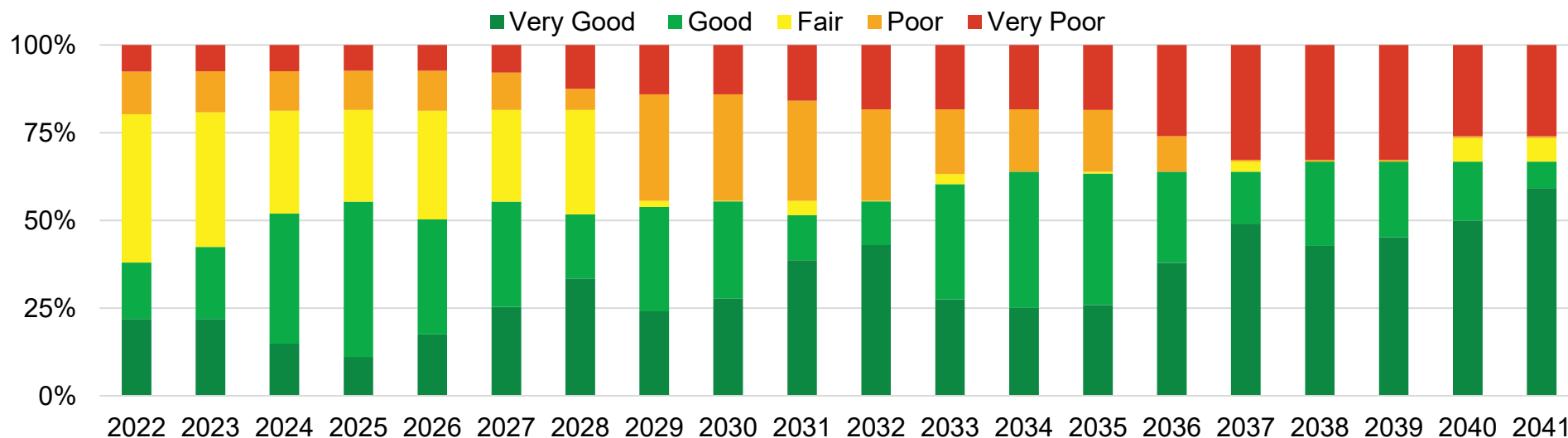


Figure 14.8 Projected 20-year Maintain Current LOS Condition Profile (Recreation and Sport Services)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

The cost to achieve the proposed LOS condition profile shown in Table 14.9. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the expectation of the City's staff involved with the management of the assets. The future lifecycle activities that are required to achieve the desired condition profile are then used to establish the average annual investment to achieve the proposed LOS condition profile. Figure 14.9 shows the condition profile of assets changing over the next 20

years with funding to achieve proposed levels of service. This scenario indicates the condition profile trending to Very Good condition with most of the assets in Good to Very Good condition.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed levels of service. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

Table 14.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Culture Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁵⁶	Achieve Proposed LOS Infrastructure Gap ⁵⁷
Operating Budget	40,145	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	4,361	1,500	1,421	2,504	11,168
Service Improvement	110	None identified	None identified	None identified	None identified
Growth Activities	6,882	None identified	None identified	None identified	None identified

⁵⁶Incremental investment to achieve proposed LOS excludes CEAP costs.

⁵⁷Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

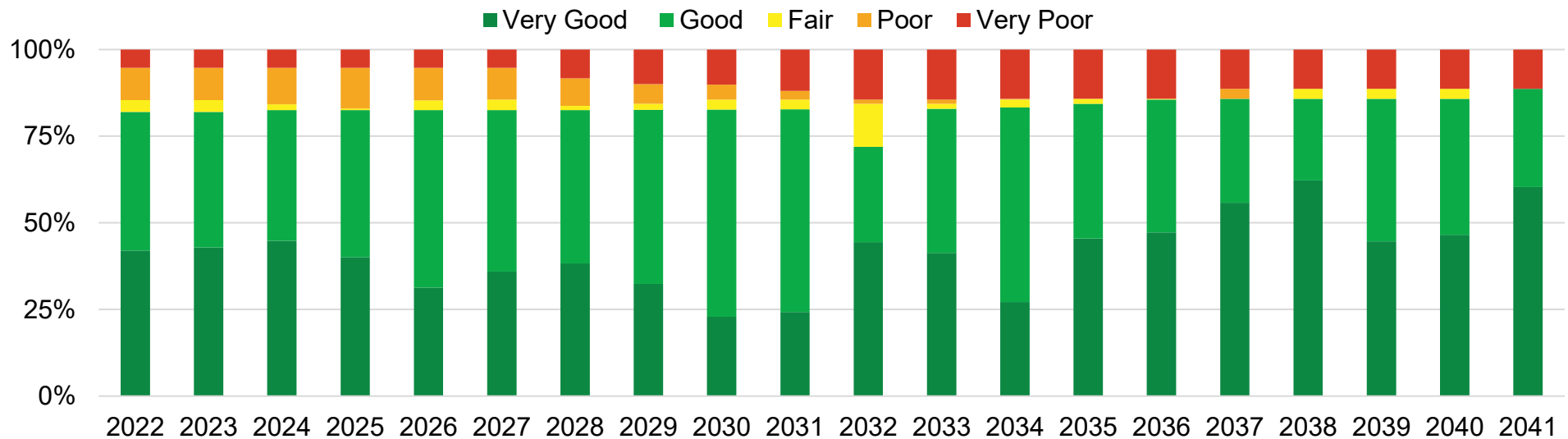


Figure 14.9 Projected 20-year Achieve Proposed LOS Condition Profile (Recreation and Sport Services)

To meet the proposed Recreation and Sport Levels of Service as described, some changes to the strategy for lifecycle activities will be required, which will trigger changes in funding requirements. If funding for proposed LOS is not sufficient, the City will:

1. Continue lifecycle activities to maintain current levels of service,

2. Carry out the Climate Emergency Action Plan within current funding scope. A green initiative life cycle renewal activity may be otherwise not feasible (examples include boiler and energy efficient windows). The facility asset would otherwise be functional but not addressing green initiative strategic needs, and/or
3. Carry out the construction for provision of new facilities where growth funding can be leveraged or based on priority (as per the Master Plan).

14.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 14.10 and illustrated in Figure 14.10. The analysis is related to the lifecycle rehabilitation or replacement lifecycle activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

The 10-year maintain current LOS Infrastructure Gap for Recreation and Sport Services is expected to be approximately \$72.4 million.

The 10-year achieve proposed LOS infrastructure gap is approximately \$111.6 million. This estimation is based on the costs associated with addressing all the needs related to Recreation and Sport services.

The preliminary estimate for CEAP funding in Recreation and Sport facilities includes incorporating 'green premium' into lifecycle management needs. This means that instead of simply replacing existing infrastructure with a similar one 'like for like', there will be an increased focus on incorporating green infrastructure replacements whenever feasible.

Table 14.10 Average Annual Budget and Gap Analysis (\$Thousands) (Recreation and Sport Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Recreation (other than Senior Centres and Golf)	4,056	1,460	12,126	1,368	2,300	6,610	10,278
Senior Centres	155	40	379	53	97	184	334
Golf	150	None identified	599	None identified	107	449	556
Total	4,361	1,500	13,104	1,421	2,504	7,243	11,168

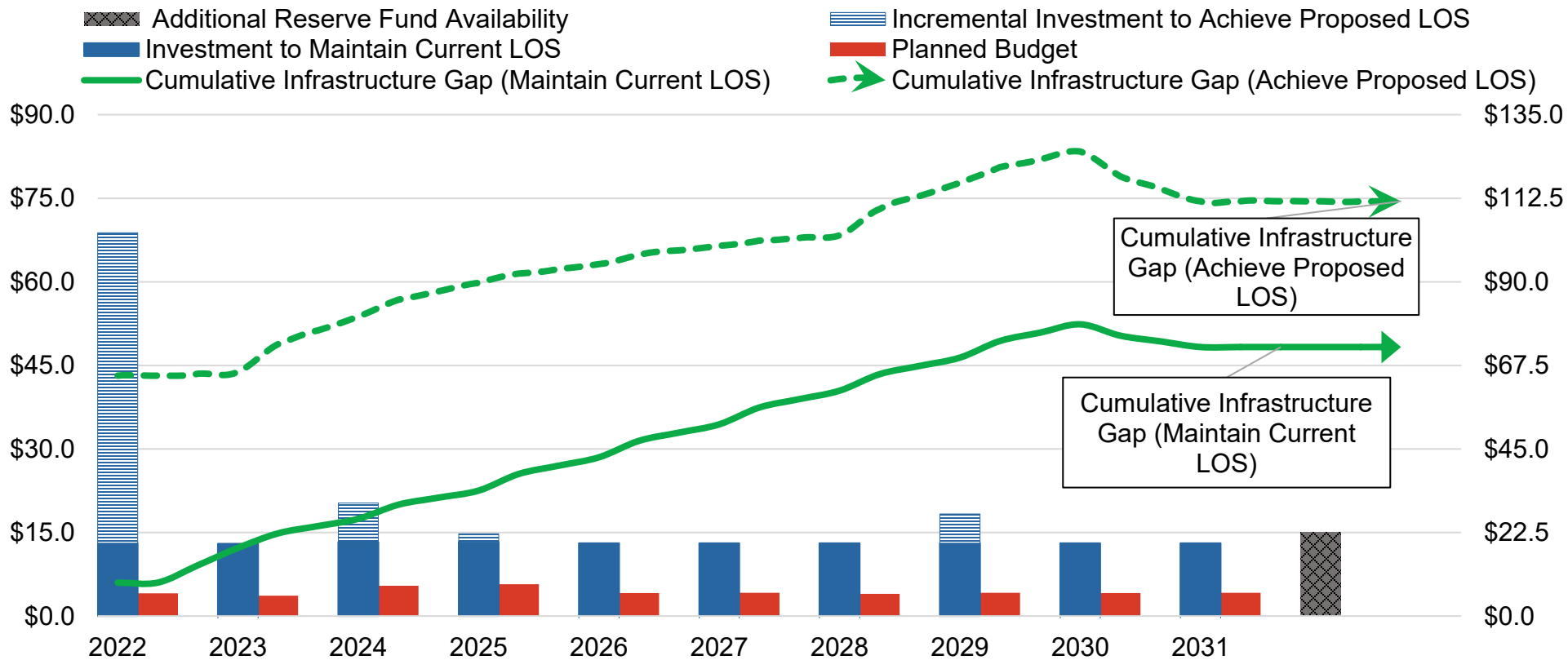


Figure 14.10 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Recreation and Sport Services)

14.5: Discussion

14.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Recreation and Sport Services condition comparison is listed in Figure 14.11. The 2019 CAM Plan replacement value was \$372.2 million, which increased to \$533.6 million. The increase is due to constructing new assets, and the recent increase in the construction cost in the region. Recent market pressures that are contributing to this include inflation and supply chain shocks commencing during the COVID-19 pandemic, interest rate increases and skilled labour shortages. The 2019 CAM Plan indicated that the assets would deteriorate due to inadequate funding. However, due to the prioritization of investment and lifecycle renewal actions for more critical requirements approach adopted by the Recreation and Sport services and Facilities division, a greater number of assets are in a Fair state in the 2023 CAM Plan compared to the 2019. The analysis indicates a decrease in the number of

assets in both Good to Very Good condition and Poor to Very Poor condition by 2023.

The 2019 CAM Plan cumulative 10-year projected infrastructure was \$106.5 million. The 2023 CAM Plan maintain levels of service 10-year infrastructure gap approximates \$75.1 million. This is resulting from a change in calculating requirements. The 2019 CAM Plan considered the entire backlog lifecycle requirements and included them in the initial year's needs. The 2023 CAM Plan equally spreads these investments over a decade. Furthermore, some assets like Glen Cairn Arena, which the city decided to decommission and dispose of reduced the required investments and hence reduced the infrastructure gap. Certain assets, including the T-Block and Junior Achievement buildings, were relocated to a different portfolio, now falling under the Corporate Facilities portfolio, reducing the pressure on Recreation and Sport Service's needs.

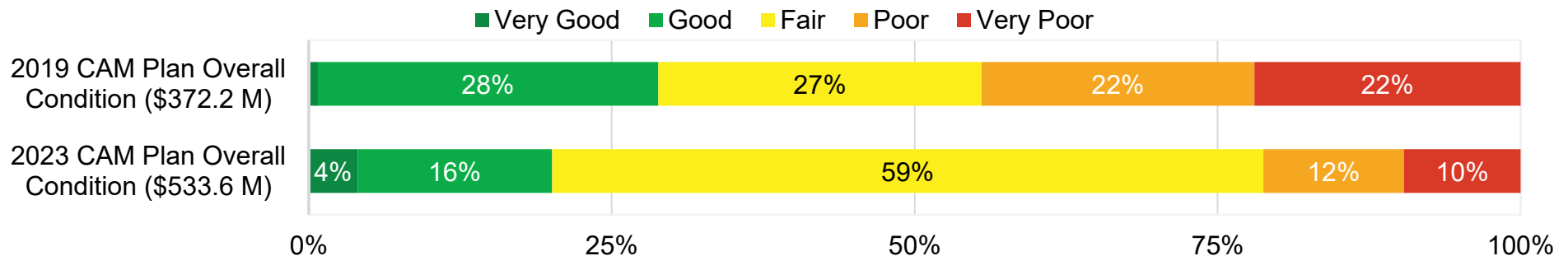


Figure 14.11 2019 CAM Plan to 2023 CAM Plan Condition Summary (Recreation and Sport Services)

14.5.2: Lifecycle Management Scenarios

The Lifecycle Management section included three scenarios. In the first scenario, the current approved budget which poses some limitations on the City's ability to thoroughly maintain the assets within the Recreation and Sport portfolio. As the budget remains stagnant, this leads to a gradual deterioration in their condition. This decline might not be immediate but, over time, it becomes more visible to the public and causing operating problems, increasing the operating and maintenance costs, and potentially leading to higher repair or replacement costs in the future.

In the second scenario, the required budget to maintain current LOS is determined. This level of funding is higher than what is currently allocated, illustrating the financial strain of maintaining a healthy asset portfolio. This scenario acknowledges the need for continual investment in assets to maintain their current state, eliminating the degradation seen in the first scenario. However, while it prevents further decline, it does not enhance the condition of the assets over the next 20 years.

The third scenario reflects the required budget to achieve the proposed LOS. This level of funding is higher than both the current budget and the one needed to maintain the assets' existing state. The advantages of this approach are evident in improved LOS and buildings condition, extended asset lifespans, and potential cost savings in the long run. Nevertheless, this scenario shows the financial challenge the City faces to achieve the proposed levels of service.

These three scenarios show different results depending on the level of funding for the assets life cycle renewal actions. The choices made will have implications for the Recreation and Sport facilities condition and their performances.

14.5.3: Current and Future Challenges

Like most Canadian municipalities, City of London owns and maintains aging facilities as many were built in the late 1960s or 1970s through Centennial-era or lottery-funded grant programs. This aging portfolio leads to the need of substantial capital investments to maintain their condition and operational functionality. These could include replacing many buildings' elements such as roofs, and repairing and updating mechanical, electrical, and plumbing systems. Additionally, many of these facilities contain outmoded designs and features that are not barrier-free or able to meet contemporary needs. Regarding sustainability considerations, many buildings may not be energy efficient which means more capital renewal projects may be needed to include updates that improve building accessibility and energy efficiency.

City of London has addressed infrastructure renewal through proactive planning and strategic investments in existing, replacement, and new facilities. The City continues to evaluate opportunities to optimize existing Recreation facilities and orient them to community needs. Decisions regarding facility renewal and repurposing can be complex and met with substantial community interest.

Current challenges primarily relate to cost pressures for Recreation and Sport facilities and adapting lifecycle management strategies to align with Strategic Plan and CEAP targets. Future challenges include how this corporate service will meet service standards for structures while meeting standards of citizens and councillors, but what this will envision is not finalized as the City emerges from the impact of the COVID19 pandemic.

This chapter focuses solely on Recreation, but similar challenges are being replicated across the portfolio that the City's facilities staff must contend with. This includes both directly owned assets which have their separate chapter in the CAM Plan (examples include the Facilities portion of Parks, Corporate Facilities, London Fire Department, certain Culture assets, Long Term Care) and some agencies, boards, and commissions that are in process of developing their own asset management plans. The issues outlined in this chapter must be considered with other chapters that have a Facilities component to have context of the challenges this corporate service encounters.

14.6: Conclusions

Valued at nearly \$533.6 million, the City's Recreation assets are overall in Fair condition, indicating that sufficient investments are necessary to maintain the assets at the required levels of service. Maintaining current investment will result in a \$75.1 million infrastructure gap. This could result in degradation of the service delivered to citizens. Further investment is needed to address the future lifecycle needs of the current Recreation and Sport assets.

Figure 14.12 illustrates the infrastructure gap as a proportion of the required investment over the next decade, showing the distribution of the different types of assets contributing the gap. Table 14.11 presents the summary of the state of infrastructure, infrastructure gap, and reinvestment rates for recreation assets.

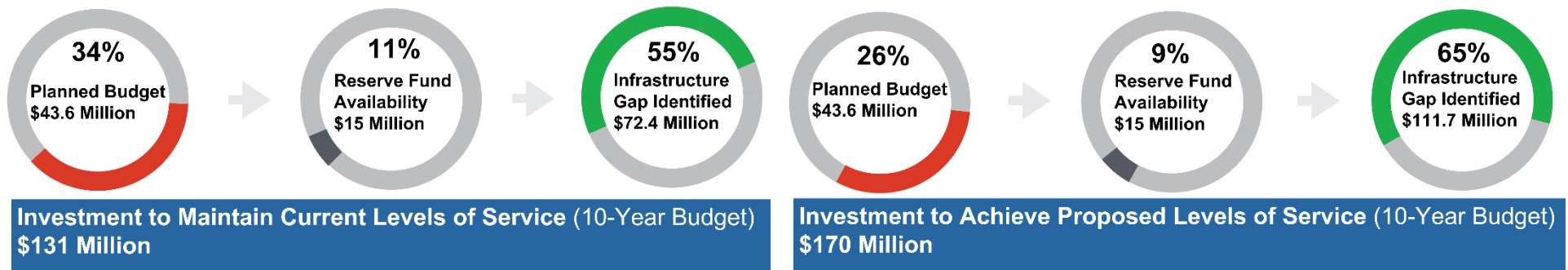



Figure 14.12 Visualization of Maintain Current and Achieve Proposed LOS Infrastructure Gaps (Recreation and Sport Services)

Table 14.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Recreation and Sport Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁵⁸
Recreation (other than Senior Centres and Golf)	\$492.8	Fair	\$66.1	\$102.8	0.8%	2.5% to 3.2%
Senior Centres	\$15.2	Poor	\$1.8	\$3.3	1.0%	2.5% to 3.5%
Golf	\$25.6	Poor	\$4.5	\$5.6	0.6%	2.3% to 2.8%
Total	\$533.6		\$72.4	\$111.7	0.8%	2.5% to 3.2%

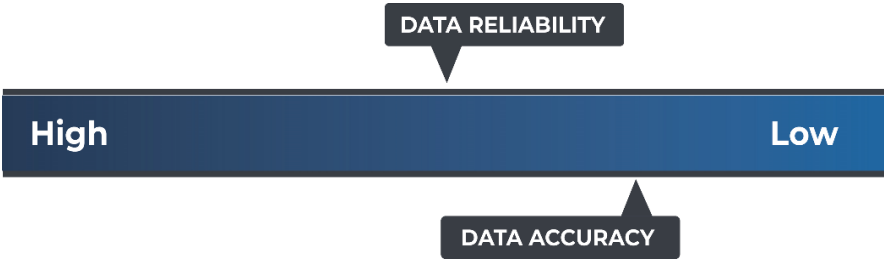


Figure 14.13 Accuracy Reliability Scale (Recreation and Sport Services)

Accuracy and Reliability Commentary

Figure 14.13 rates data reliability is rated as moderate. Valuation is based on Facilities VFA information and corroborated with Altus standard costs for London area facilities. Staffing and COVID19 pressures resulted in Facilities focusing on the most critical operation aspects since the pandemic inception. Facilities is undergoing a phased approach of comprehensively reviewing, updating, and maintaining VFA data. This process is not complete at time of CAM Plan release thus data reliability is assessed as moderate and data accuracy as moderate to low.

⁵⁸ Source: Facilities rates based on maintain current LOS and achieve proposed LOS investments.



Section 15. Parks

Asset Information	Parks
Replacement Value	\$236 Million
10 year Maintain Current Levels of Service Infrastructure Gap	\$65.7 Million
10 year Achieved Proposed Levels of Service Infrastructure Gap	\$87.5 Million

Quick Facts
139 km of multi-use pathways
45 km of Thames Valley Parkway
183 Play structures and exercise stations
13 Skateboarding Facilities
Over 200 Sport Fields



15.1: State of Local Infrastructure

Parks assets help ‘engage residents and visitors of all ages and abilities’, in accordance with the Parks and Recreation Strategic Master Plan (June 2019). Parks services are intended to improve quality of life for Londoners and contribute to City outcomes as helping create healthy and safe neighbourhoods and improve mental health. In this way downstream costs and impacts (such as crime, reliance on the social safety net, and poverty) are deterred and positive outcomes (such as increased literacy rates, improved health and physical activity levels, and enhanced quality of life) are strengthened.’ Parks is the section of Parks, Recreation and Neighbourhood Services that primarily deals with outdoors activities and natural areas.

15.1.1: Asset Inventory and Valuation

As listed in Table 15.1, the City’s Parks service area is responsible for operating and maintaining a network of parks, paths and facilities valued at over \$235 Million not including land. Parks provide a range of amenities that include a large network of trails and pathways, gardens and natural areas, a variety of sports fields and playground equipment, and a variety of public facilities including ‘arguably’ the oldest baseball field in the world, entertainment venues, public concessions, and washrooms. The true asset value of the natural areas and open space is difficult to assess. For this report, the ‘natural areas and open space’ value is assumed to consist largely of land which is reported separately in the Land section and trees which are reported in the Forestry section.

Note that administrative, maintenance and storage buildings are maintained by the City’s Facilities group. Fleet and associated equipment is provided and serviced by Fleet Management

Services and are dealt with in the Fleet section. Land is also excluded from this asset pool and dealt with in the Land section. Also note that ‘Site Work’, includes parking spaces and lighting surrounding Facilities are shared with Recreation facilities. For the purposes of this report, Site Work replacement value is split equally between Parks and Recreation. Lighting surrounding the Park is not captured in this listing.

Parks infrastructure is broken into four categories: Parks Linear Assets, Parks Amenity Assets, Parks Facility Assets and Other Assets. The City owns and maintains approximately 250 kilometres of **Parks Linear Assets**, consisting of multi-use pathways (including the Thames Valley Parkway), park roads, and hiking trails.

The **Parks Amenity Assets** allow the citizens of London to participate in and enjoy a wide range of sports and outdoor activities. These include a collection of over 748 sport fields and playgrounds such as football, basketball, baseball, soccer, skateboarding, tennis, children’s playgrounds, manicured public gardens and off-leash dog parks. Recent additions include a cricket pitch, volleyball courts, and exercise stations. The City also owns and operates 50 Parks Facilities (structures), including Bandshells such as Victoria Parks bandshell, Pavilions, Shelters, a Stadium, Washrooms, Concessions, and Parks Site Work (which includes all site development work such as paved roads, parking, electrical work, stormwater, pedestrian paving, signage, exterior stair, etc.). Other Assets include miscellaneous accessory equipment. This includes benches, trash receptacles, lighting, barbeques, and signage.

Table 15.1 Inventory and Valuation (Parks Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Parks Linear	Thames Valley Parkway (Including Footbridges)	45	Km	\$37,244
	Multi-use Pathways (Including Footbridges)	139	Km	\$73,082
	Park Road	1	Km	\$1,165
	Trail	65	Km	\$3,458
Parks Amenity	Adult Exercise Station	10	Each	\$353
	Baseball Diamond	71	Each	\$6,040
	Basketball Court	55	Each	\$2,281
	Beach Volleyball Court	14	Each	\$493
	Community Garden	17	Each	\$1,498
	Cricket Pitch	2	Each	\$470
	Disc Golf	8	Each	\$235
	Football Field	2	Each	\$4,230
	Multi Use Pad	14	Each	\$1,349
	Off-leash Park	6	Each	\$1,058
	Pickleball Court	7	Each	\$471
	Play Structure	173	Each	\$30,521
	Skateboard Park	13	Each	\$5,875
	Soccer Field	136	Each	\$6,380
	Swing Set	157	Each	\$1,264
	Tennis Court	55	Each	\$6,582
Park Facility	Bandshells	3	Each	\$7,596
	Building, Clubhouse	6	Each	\$5,622
	Pavilions	1	Each	\$936
	Shelters	3	Each	\$294
	Stadium	1	Each	\$10,687
	Washroom	29	Each	\$15,122
	Concession	7	Each	\$4,809
	Facilities Site Work	40	Each	\$5,113
Other	Other Parks Tangible Assets	Mix	Mix	\$1,916
Total				\$236,144

15.1.2: Age Summary

Figure 15.1 and Figure 15.2 show the Parks average asset age as a proportion of the average useful life by asset. Asset ages have been established using data from the City's Geomatics (GIS) database, Facilities database (VFA software), and Tangible Capital Asset database and internal expert opinion.

Parks Linear infrastructure is approximately half through its expected useful life. Pathway installation and rehabilitation dates have been regularly tracked since the last Asset Management Plan; however, approximately 75% of linear assets have unknown installation/rehabilitation dates. Internal expert opinion is that the average pathway age is approximately 15 years.

Parks Amenity installation dates are regularly documented and maintained through the GIS database. They indicate that Park Amenity assets are more than halfway through their expected useful life.

Parks Facility data exists in the Facilities database VFA and also in GIS databases. It indicates that Shelters and Clubhouses ages exceeded their expected useful life. It is important to note that 40 years was selected as the expected useful life based on the non-structural components of buildings which have the longest expected service life. In practice, the many components that comprise a building are slated for renewal based upon a combination of factors including age, condition, consequence of failure, likelihood of failure etc. and the practical expected life is largely indefinite while the building continues to serve its intended/required purpose in its given geographic location.

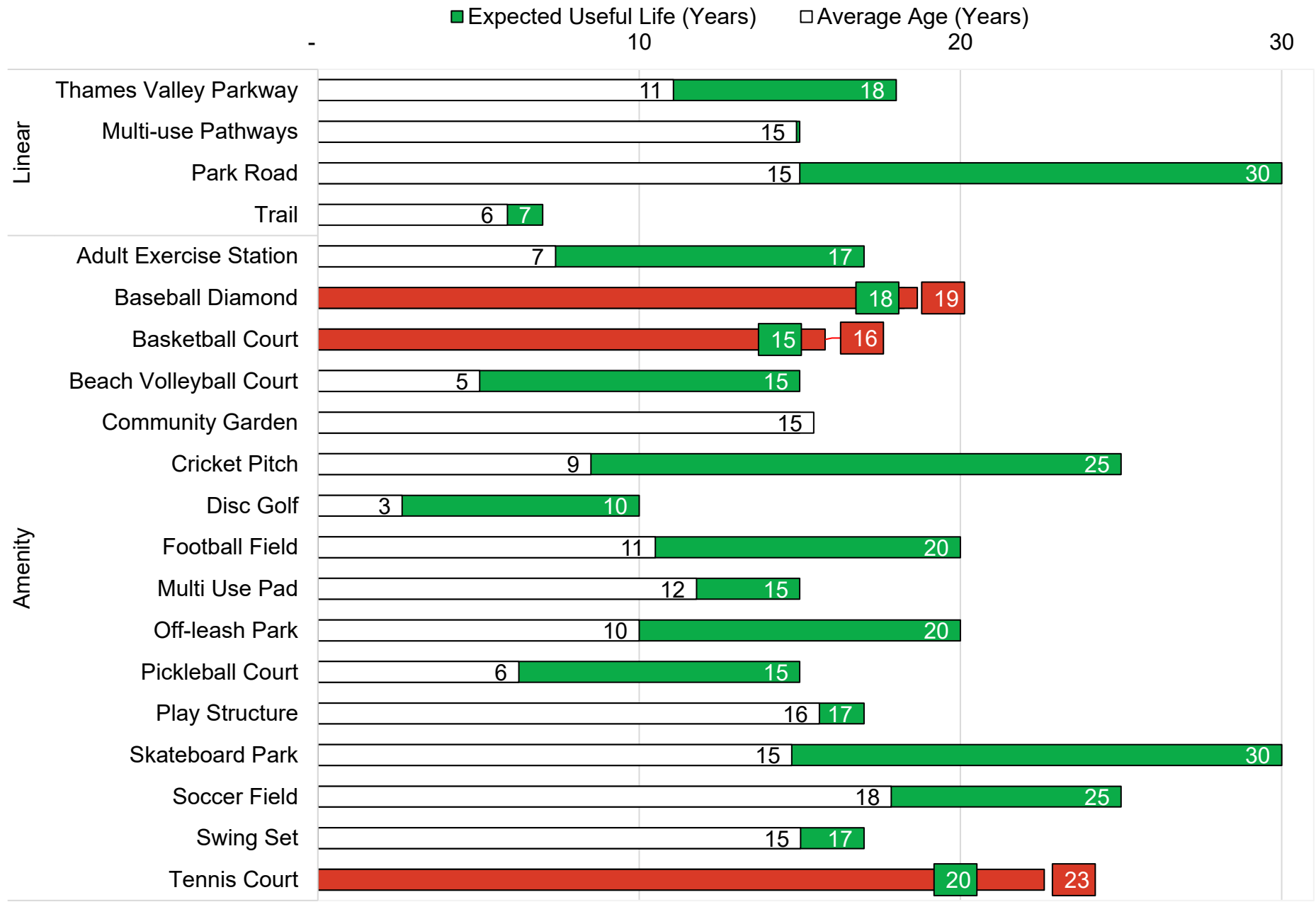


Figure 15.1 Average Age and Expected Useful Life (Parks Services)

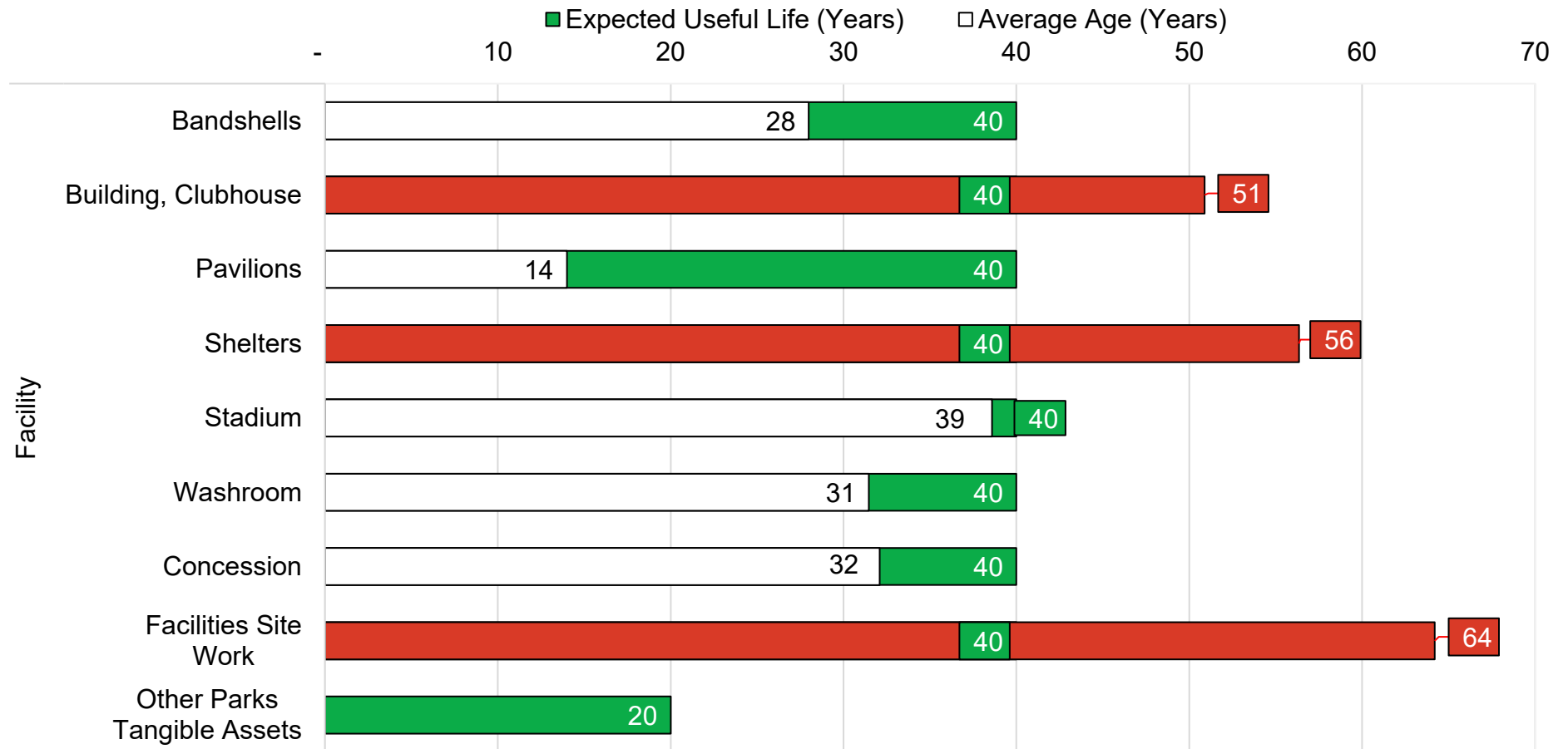


Figure 15.2 Average Age and Expected Useful Life (Parks Services Continued)

15.1.3: Asset Condition

Figure 15.3 presents the condition distribution of all Parks assets. The Parks service area has approximately 70% of assets in Fair to Very Good condition. The remainder is approaching the end of their expected useful lives, indicating a need for

investment in the short to medium term. The City's Parks assets are overall in Fair to Good condition, indicating that they are meeting current needs but are aging and may require attention.

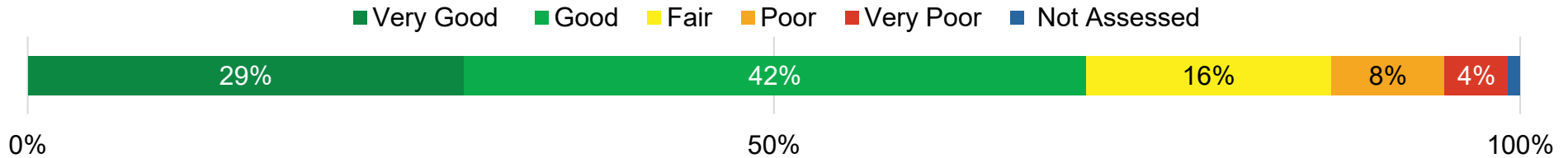


Figure 15.3 Overall Condition (Parks Services)

Figure 15.4 illustrates the condition of various categories within Parks. It is noteworthy that 78% of Park facilities are categorized from Fair to Very Good, highlighting a medium-term need for intervention with the remaining assets. Similarly, a substantial 88% of Linear Pathways assets fall within the Fair to Very Good spectrum, on the contrary with amenities, where only

36% meet this standard. This disparity underscores the short and medium-term necessity for lifecycle renewals for the amenities. As a part of data enhancement initiatives, the City is devising a strategy to better evaluate the condition of Parks equipment, which will further contribute to the effective maintenance and enhancement of these assets.

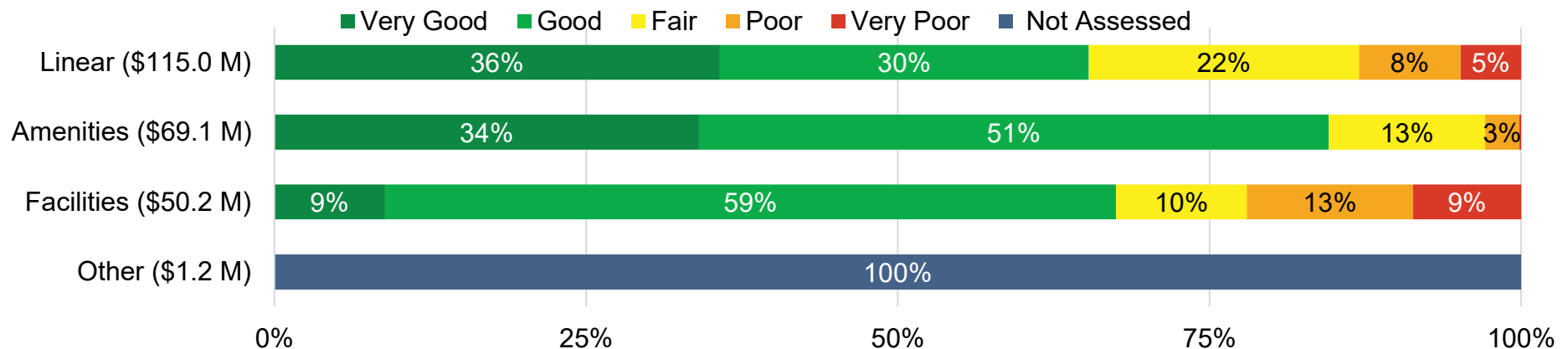


Figure 15.4 Asset Level Condition (Parks Services)

Parks does not currently have computerized asset management or maintenance management capability although work has been initiated to implement a computerized maintenance management system. Most data on asset condition is formally collected and recorded but is not frequent. All significant safety issues are addressed immediately. Maintenance issues, along with concerns identified by staff and the public are prioritized and addressed based on needs. Other assets are informally evaluated and needs addressed reactively.

Maintenance issues, along with concerns identified by staff and the public are prioritized and addressed based on needs. Other assets are informally evaluated, and needs are addressed reactively.

Asset conditions have been established using data from condition models and visual assessments completed by Parks staff with assistance from Corporate Asset Management section, VFA database information, the City's Geomatic (GIS) database, and internal expert opinion. Figure 15.5 and Figure 15.6 list detailed condition information.

Parks Linear Assets including roadways, trails, and multi-use pathways, are in Fair to Very Good condition, based on expert opinion from staff. Paved roads are evaluated as part of the City's pavement management program, with issues identified and prioritized for replacement under the Parks capital program.

Trails and pathways, while not formally evaluated, are assessed for safety and trip hazards as part of normal maintenance activities indicating that surfaces are functional and show few signs of deterioration or reduced service. Known issues are prioritized and addressed reactively through operations or capital projects.

Park Amenity Assets have created a formal asset management assessment methodology that has been performed twice. They are evaluated regularly for safety, with urgent issues flagged and targeted for resolution by operations staff. Over 36% of Park Amenity Assets are assessed to be in Fair to Very Good condition based on their age, indicating that they are functional, but subject to superficial deterioration and intermittent closures for maintenance and repair actions. Parks would benefit greatly from frequent condition assessments and monitoring system to help manage these key assets.

Park Facilities are evaluated through the City's facility assessment program, with issues resolved operationally or as part of capital improvements. Overall, Park Facilities are noted as being in Fair Condition showing 82% in Fair to Very Good condition, indicating that some assets require major rehabilitations and/or replacements in the short term. Other Assets are not assessed given a comprehensive database does not exist for these assets. Assessments would occur as part of City regular maintenance activities.

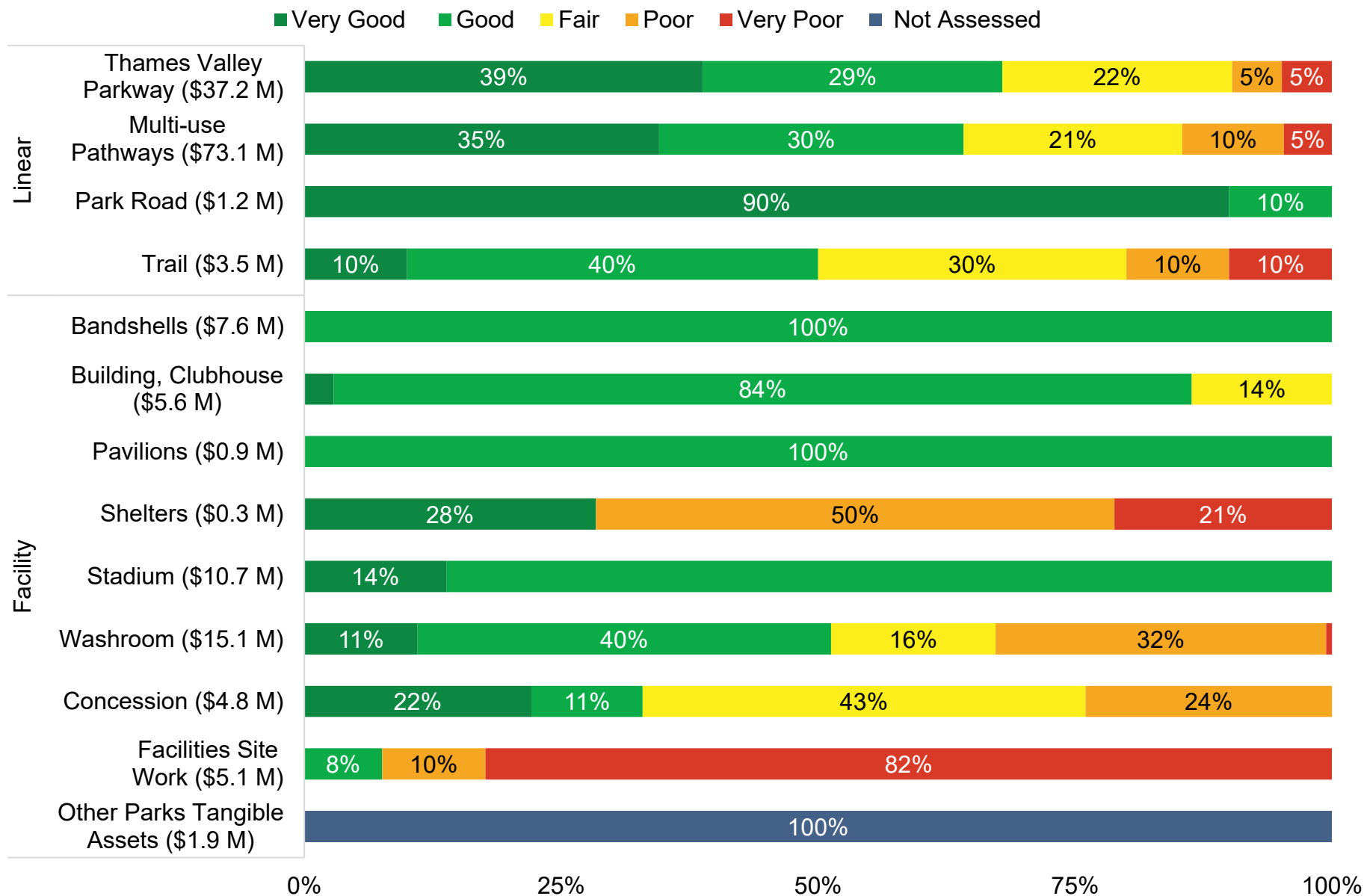


Figure 15.5 Asset Condition Detail for Linear, Facilities, and Other (Parks Services)

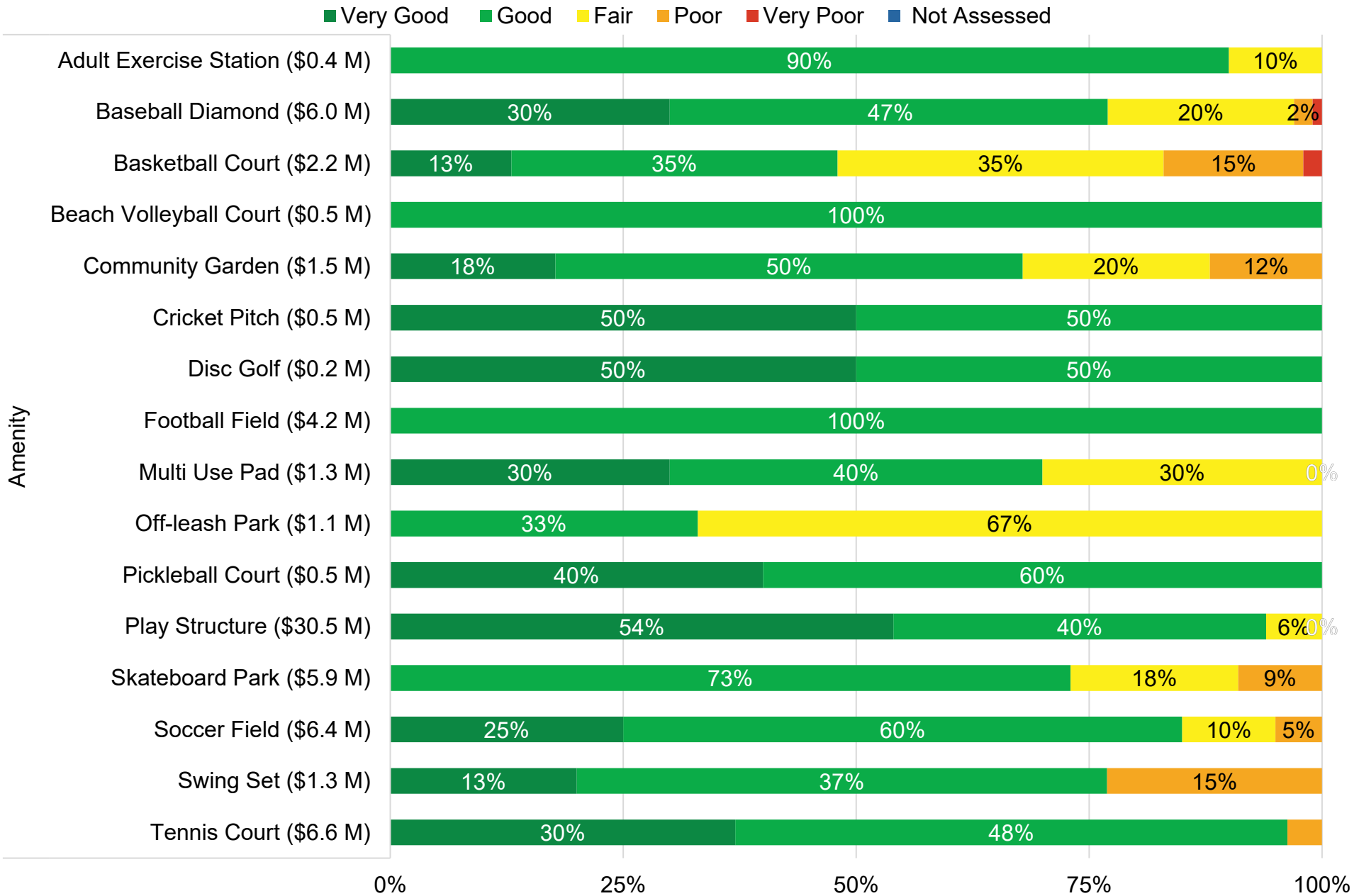


Figure 15.6 Asset Condition Detail for Amenities (Parks Services)

15.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan is striving for levels of service (LOS) performance measures linked to Customer Values of Accessible, Cost Efficiency, Customer Satisfaction, Environmental Stewardship, Reliability, Safety, and Scope.

Direct and Related LOS

After review with Parks, LOS considered most representative of Parks services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as

15.2.1: Direct Levels of Service

Table 15.2 Direct Levels of Service (Parks Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Accessible	Technical	Percentage of Parks amenities that are Accessibility compliant	100%	100%
Cost Efficiency	Technical	Parks Overall Reinvestment Rate	2.2%	5.2%
Environmental Stewardship	Customer/Council	Percentage of Natural Parkland in Municipality per total parkland	70%	>70%
	Technical	Annual electric energy consumption per square foot	12.33 KWH/sf	Reduce
	Technical	Annual natural gas consumption per square foot	1.33 m3/sf	Reduce
	Technical	Annual water consumption per square foot	1.44 m3/sf	Reduce
Reliability	Customer	Percentage of Park assets in Fair or better condition	87.3%	Maintain current
Scope	Technical	Number of kilometres of multi-use asphalt pathways	185	205
Scope	Technical	Percentage of population greater than 800-meter walk to a Neighbourhood Park	97.98%	Maintain current
Scope	Technical	Percentage of population greater than 2 kms walk to a District, Regional or City-Wide Park	94.54%	Maintain current
Scope	Technical	Percentage of provision targets met for each park asset type	88%	>90% in urban growth boundary
Scope	Technical	Maintained Municipality Parkland Hectares per 100,000 Population	242	230

‘direct LOS’ and are listed in Table 15.2. LOS that have a causal relationship with direct LOS are documented in Table 15.3 as related LOS but cannot be as readily costed to Parks services.

Metrics

Table 15.4 lists metrics that can are useful information, especially when considered in conjunction with direct LOS, and related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Parks provides.

15.2.2: Related Levels of Service

Table 15.3 Related Levels of Service (Parks Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Accessible	Customer/Council	Percentage of New Parks amenities that are Accessibility compliant	100%
Cost Efficiency	Technical	Parks Amenity Reinvestment Rate	3.3%
Cost Efficiency	Technical	Parks Facility Reinvestment Rate	1.7%
Cost Efficiency	Technical	Parks Linear Reinvestment Rate	1.8%
Cost Efficiency	Technical	Parks Other assets Reinvestment Rate	2.0%
Scope	Technical	Provision target met for adult exercise equipment	67% ⁵⁹
Scope	Technical	Provision target met for ball diamonds for youth	86% ⁵⁹
Scope	Technical	Provision target met for ball diamonds for adults	86% ⁵⁹
Scope	Technical	Provision target met for basketball courts	78%
Scope	Technical	Provision target met for community gardens	90% ⁵⁹
Scope	Technical	Provision target met for cricket pitches	50% ⁵⁹
Scope	Technical	Provision target met for fieldhouses	75% ⁵⁹
Scope	Technical	Provision target met for multi-use courts	To be determined ⁶⁰
Scope	Technical	Provision target met for off-leash dog parks	86% ⁵⁹
Scope	Technical	Provision target met for outdoor ice rinks	To be determined ⁶⁰
Scope	Technical	Provision target met for outdoor volleyball courts	To be determined ⁶⁰
Scope	Technical	Provision target met for pickleball courts	35% ⁵⁹
Scope	Technical	Provision target met for playgrounds.	89%
Scope	Technical	Provision target met for rectangular sports fields	92%
Scope	Technical	Provision target met for skate parks	86% ⁵⁹
Scope	Technical	Provision target met for tennis courts	86%

⁵⁹ Values in 2021 performance are subject to refinement, change and verification under future Parks and Master Plan updates.

⁶⁰ These measures will be established as part of the next Parks and Recreation Master Plan.

15.2.3: Other Measures

Table 15.4 Metrics – Other Dashboard Measures (Parks Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Operating budget for Parks services (Parks and Horticulture, Parks, Natural Areas Planning and Design budgets)	\$9,486,696
Cost Efficiency	Customer/ Council	Annual operating cost to provide Parks service (\$/household)	\$54.32
Quality	Customer/ Council	Percentage of Parks' visitor survey respondents rating overall somewhat to very satisfied with experience	91%
Reliability	Technical	Number of unplanned park amenities closures/use restrictions per year excluding weather based disruptions	1
Reliability	Technical	Number of unplanned pathway closures/use restrictions per year excluding weather based disruptions	<2%
Reliability	Technical	Number of unplanned sports fields closures/use restrictions per year excluding weather based disruptions	0
Reliability	Customer/ Council	Percentage of time parks are consistently open and available	>98%
Safety	Customer/ Council	Number of reported major incidents	2
Safety	Technical	Percentage playgrounds achieving CSA compliance based on monthly inspections	100%

15.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant

recommendations, and trial and error through scenarios and pilot programs.

The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan (CEAP), which may trigger asset investment needs.

15.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current LOS while striving to optimize costs and risks. Table 15.5 summarizes specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Asset management practices or planned actions employed by cities can entail certain specific risks. Many types of risks such as health and safety, financial, environmental, etc. are summarized in Table 15.6 classified by each lifecycle activity. The cost of these identified lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap sections.

Table 15.5 Current Asset Management Practices or Planned Actions (Parks Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Parks Linear, Parks Amenity, Parks Facility, and Parks Other Assets <ul style="list-style-type: none"> • Encouragement of conservation of Parks and associated infrastructures assets through policy, procedures, public outreach, etc. • Continue researching and implementing park infrastructure in conformance with Provincial, Federal, and Municipal policies. • Review the capital and operating costs of the City's Commemorative Program for trees and benches bi-annually to ensure donor fees are sufficient to maintain the Program.
Maintenance	Parks Linear <ul style="list-style-type: none"> • Parks linear (pathways) is monitored and problems addressed when triggered by staff observations, anticipated lifecycle timing, and public feedback. • Smaller wooden structures, such as boardwalks, require an enhanced inspection and maintenance program to extend their lifespan.

State of Infrastructure Report		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
	<ul style="list-style-type: none"> Coordinate condition assessment reports of existing infrastructure, as needed. For example, Thames Valley Parkway condition assessment. <p>Parks Amenity</p> <ul style="list-style-type: none"> A work order system and online interface exists for Parks City employees to generate requests of Facilities. Equipment and park structures are monitored, and problems addressed when triggered by staff observations and public feedback. The approach to asset management for the living portion of Parks assets is somewhat unique because it entails living assets, grass, trees, etc. The product can be qualitative and not easily measured. Typically, maintenance is undertaken based on available resources, routine schedules like grass cutting, and field observations. Coordinate condition assessment reports of existing infrastructure as needed. For example, playground assessment report. <p>Parks Facility</p> <ul style="list-style-type: none"> Parks Facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (splits into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA), determine the cost and timing of replacement requirements. A work order system and online interface exists for Parks City employees to generate requests of Facilities. <p>Parks Other</p> <ul style="list-style-type: none"> Ecological monitoring, which can include invasive species management, public access, and bylaw enforcement to ensure park infrastructure is being utilized as planned and that it is sustainable with respect to surrounding natural heritage system. 					
Renewal/ Rehabilitation	<p>Parks Linear</p> <ul style="list-style-type: none"> Pathways are generally rehabilitated – it is considered the most effective and proactive method to manage assets that are continuously used by City residents. <p>Parks Amenity</p> <ul style="list-style-type: none"> Equipment and structures rehabilitation is generally not considered an option. The lifecycle activity is regular maintenance and the decision to replace the asset. <p>Parks Facilities</p> <ul style="list-style-type: none"> Parks facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (splits into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA), determine the cost and timing of replacement requirements. 					

Asset Activity	Specific Asset Management Practices or Planned Actions
	Parks Other <ul style="list-style-type: none"> Rehabilitation is generally not considered an option.
Replacement/Construction	Park Linear <ul style="list-style-type: none"> Considered not feasible for the ‘entire system’ to be replaced (250+ km), instead replace larger sections as one unit (1-2 km). Parks Amenity <ul style="list-style-type: none"> Equipment and structure assets ideally are used to end of useful life. When unexpected events occur, assets will be replaced but would be in lieu of other planned infrastructure replacements. Parks Facilities <ul style="list-style-type: none"> Parks Facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (splits into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA), determine the cost and timing of replacement requirements. Parks Other <ul style="list-style-type: none"> Other assets ideally are used to end of useful life. When unexpected events occur, assets will be replaced but would be in lieu of other planned infrastructure replacements.
Disposal	Park Linear <ul style="list-style-type: none"> Disposal is done as efficiently as possible. For example, asphalt is recycled into ‘recycled asphalt granular’. Park Facilities <ul style="list-style-type: none"> Refer to Appendix A. Parks Amenity <ul style="list-style-type: none"> Amenities would be recycled and the Ministry of Environment guides disposal of earth and fill.
Service Improvement	Park Linear, Amenity, Facility, and Other <ul style="list-style-type: none"> Consultation with public and users of Parks assets; and, in conjunction with Facilities and/or Transportation would determine service improvement needs.
Growth	Parks – All <ul style="list-style-type: none"> Capital growth projects are identified by Development Charges and the Parks and recreation master plan (subject to <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i> requirements and City of London policy), or as a part of Assessment Growth Policy (where applicable with municipal policy). Growth needs are known, based upon parks and recreation master plan, bike master plan, etc. City staff plan for that accordingly within new growth areas. Consultation does happen associated with master plans, but not necessarily on each individual growth-related project. Collaboration could occur with Transportation for input into pathways and footbridges.

Table 15.6 Risks Associated with Asset Management Practices or Planned Actions (Parks Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Refer to Appendix A.
Maintenance	<ul style="list-style-type: none"> Completing planned maintenance activities while managing the need to execute reactive maintenance activities. Incorrectly planned maintenance activities can lead to premature asset failure.
Renewal/ Rehabilitation	<ul style="list-style-type: none"> Incorrect assumptions regarding improved expected useful life after rehabilitating a pathway.
Replacement/ Construction	Refer to Appendix A.
Disposal	Refer to Appendix A.
Service Improvement	Refer to Appendix A.
Growth	<ul style="list-style-type: none"> Incorrect growth assessments may result in overabundance or insufficient Parks assets. Growth not completely funded through Development Charges and inhibited by insufficient funding.

15.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs with the forecasted change in the condition profile of each asset type. Figure 15.7 shows the projection of the condition of the Parks assets based on three scenarios. The projected condition with planned budget, maintain current LOS and achieve proposed LOS are forecasted. The figure also shows

planned budget, the required investments to maintain the current LOS and investments to achieve proposed LOS, which include a Facilities 'green premium' estimate. These are considered the first, but not comprehensive, investments in the City's Climate Order of Magnitude and CEAP implementation.

The assessment is underway to determine the cost associated with implementing the CEAP and achieving the proposed LOS. The costs presented in the 2023 CAM Plan align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

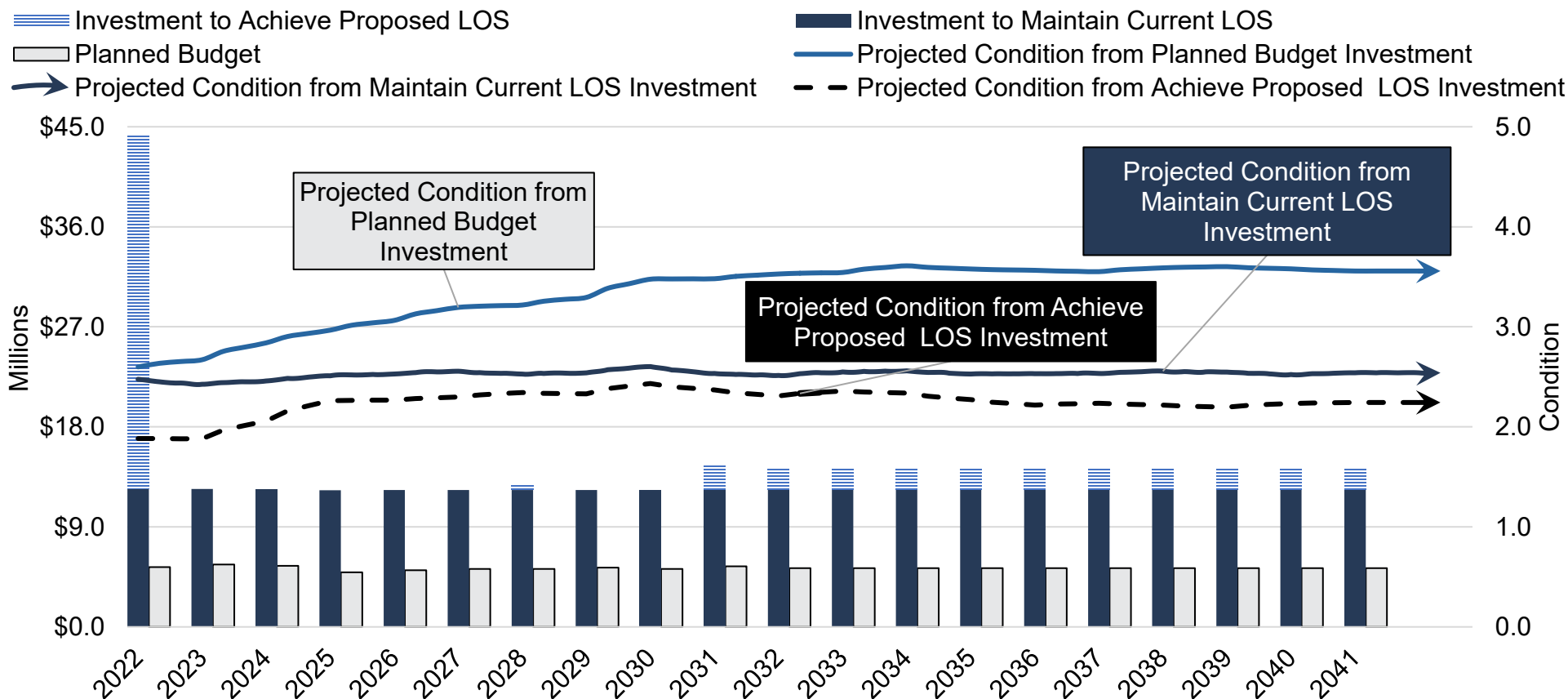


Figure 15.7 Projected Service State of Three Funding Scenarios (Parks Services)

A. Scenario One: Planned Budget Condition Profile

The Parks average annual activity and planned funding is summarized in Table 15.7. The condition profile expected from the planned budget is forecasted by using the same logic related to condition degradation rates and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or

Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. Figure 15.8 presents the expected condition profile for the next 20 years based in the planned budgets for Parks assets. This scenario indicates the condition profile trend is moving towards primarily Very Poor condition. Average annual activity for operating budget and capital budgets are presented as the average of the 2020 and 2021 fiscal years. Planned funding operating budgets

are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget.

Growth activities are analyzed using the 2021 Development Charges Background Study Update. Major upcoming projects

include new District Parks, Neighbourhood Parks, Urban Parks, Sports Parks, Major Open Spaces, Fieldhouses, Pedestrian Bridges, and Thames Valley Parkway.

All number in tables are rounded to nearest thousand.

Table 15.7 Scenario One – Average Annual Planned Budget (\$Thousands) (Parks Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	9,384	9,539
Renewal, Replacement, Rehabilitation, Disposal	4,665	5,292
Service Improvement	725	4,901
Growth Activities	8,167	470

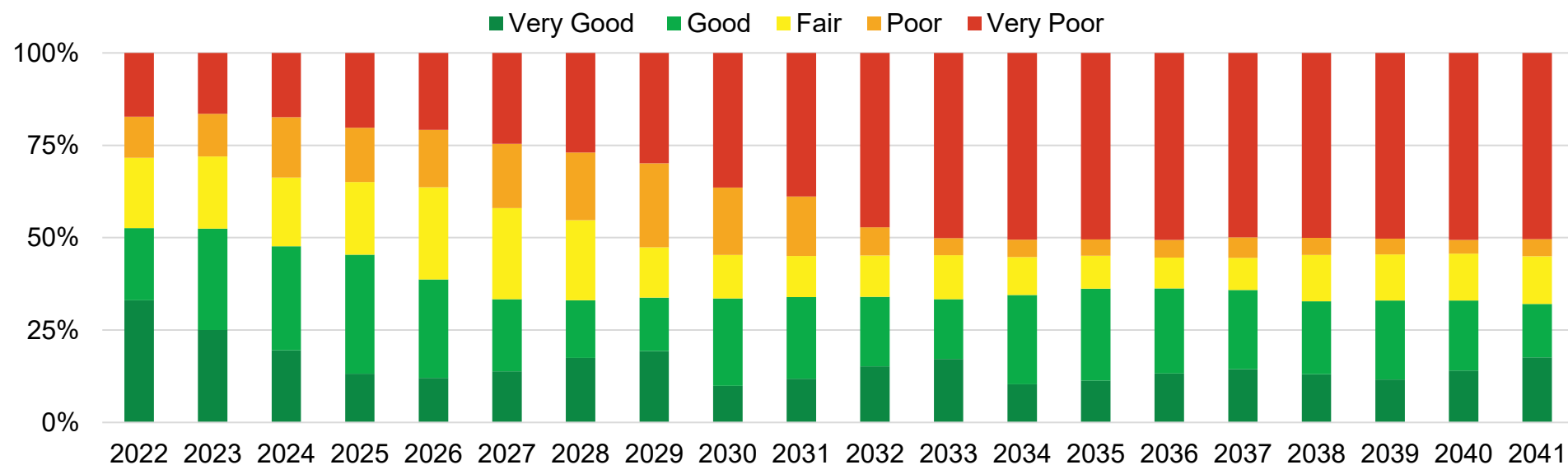


Figure 15.8 Projected 20-year Planned Budget Condition Profile (Parks Services)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

The cost to maintain current LOS are summarized in Table 15.8. This scenario forecasts the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the current

condition profile for these assets. Figure 15.9 presents the expected condition profile for the next 20 years based on investment required for maintain current LOS for Parks assets. This scenario indicates the condition profile trend is being maintained throughout the years of analysis. To maintain the current condition of the Parks assets, a higher than the planned budget investment is required resulting in an identified maintain current LOS infrastructure gap of \$6.6 million.

Table 15.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Parks Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	9,539	None identified	9,539	None identified
Renewal, Replacement, Rehabilitation, Disposal	5,292	482	12,345	6,572
Service Improvement	4,901	None identified	4,901	None identified
Growth Activities	470	None identified	470	None identified

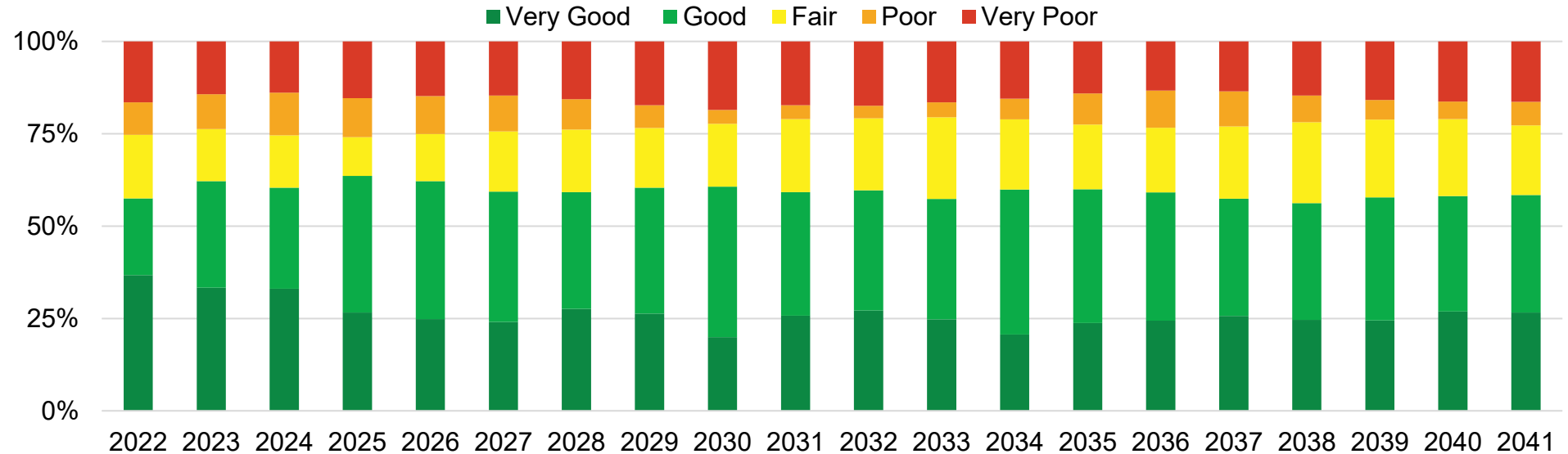


Figure 15.9 Projected 20-year Maintain Current LOS Condition Profile (Parks Services)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

The cost to achieve proposed LOS are summarized in Table 15.9. This scenario forecasts the lifecycle activities that are required to achieve the proposed LOS. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the expectation of the City's staff involved with the management of the assets. The future lifecycle activities that are required to achieve the desired condition profile are then used to establish the average annual investment to achieve the proposed LOS condition profile.

Figure 15.10 presents the expected condition profile for the next 20 years based on investments required to achieve the proposed LOS for Parks assets. This scenario indicates the condition profile trending to most assets being in Very Good to Good condition.

The assessment is underway to determine the cost associated with implementing CEAP and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet GHG emission targets.

Table 15.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Parks Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁶¹	Achieve Proposed LOS Infrastructure Gap ⁶²
Operating Budget	9,539	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	5,292	481.5	301	1,872	8,745
Service Improvement	4,901	None identified	None identified	None identified	None identified
Growth Activities	470	None identified	None identified	None identified	None identified

⁶¹Incremental investment to achieve proposed LOS excludes CEAP costs.

⁶²Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

If funding for proposed LOS is not sufficient, the City will:

1. Continue lifecycle activities to per planned budget and/or maintain current LOS.
2. Carry out the CEAP within current funding scope. A green initiative lifecycle renewal activity may be otherwise not

feasible. (examples include boiler and energy efficient windows).

3. Carry out the construction for provision of new facilities where growth funding can be leveraged or based on priority (as per the Master Plan)

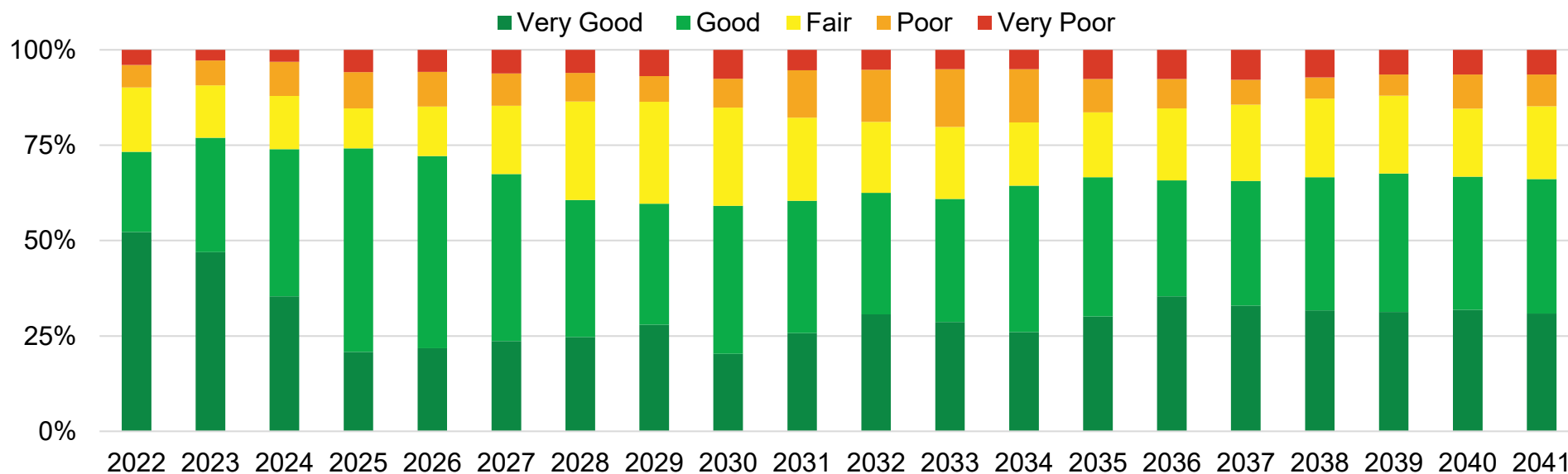


Figure 15.10 Projected 20-year Achieve Proposed LOS Condition Profile (Parks Services)

15.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 15.10 and illustrated in Figure 15.11. The analysis is related to the lifecycle rehabilitation or replacement activities. Disposal is not identified separately as it is inherent in asset renewal, rehabilitation, or replacement activities.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

The 10-year maintain current LOS infrastructure gap approximates \$65.7 million. Trends are primarily driven from linear and amenity type Parks assets.

The 10-year achieve proposed LOS infrastructure approximates \$87.4 million. Investment to achieve proposed LOS addresses all service level target needs relating to Parks services. The preliminary estimate for CEAP funding is captured in this infrastructure gap and includes incorporating 'green premium' into Parks facilities lifecycle management needs. This means that instead of simply replacing existing infrastructure with a similar one 'like for like', there will be an increased focus on incorporating 'green for like' infrastructure replacements whenever feasible.

Table 15.10 Average Annual Budget and Gap Analysis (\$Thousands) (Parks Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Linear	2,121	324	7,242	None identified	None identified	4,797	4,797
Amenity	2,258	36	3,702	None identified	1,827	1,408	3,235
Facility	875	121	1,305	301	45	309	655
Other	38	0.5	96	None identified	None identified	58	58
Parks	5,292	481.5	12,345	301	1,872	6,572	8,745

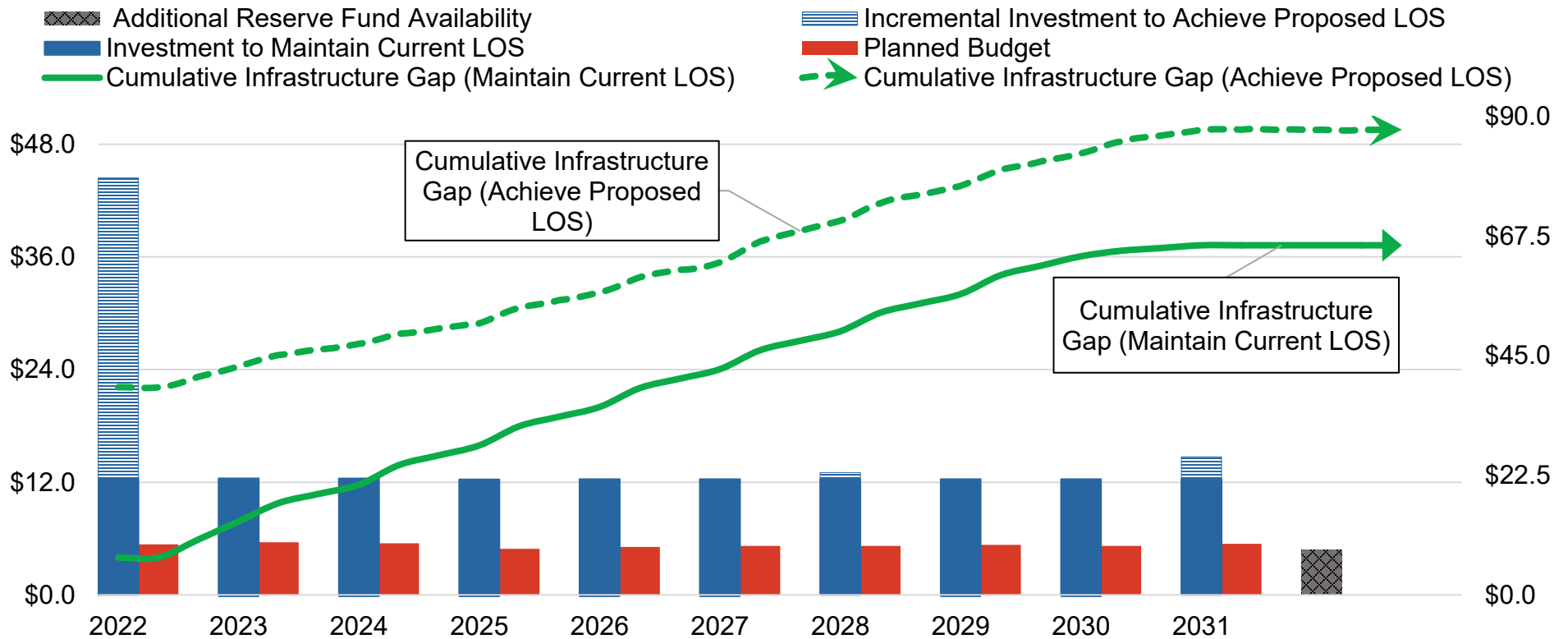


Figure 15.11 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Parks Services)

The estimates for the Parks infrastructure gap are based on anticipated useful lives and replacement values derived from expert opinion. Frequent condition assessments would lead to better information for planning the lifecycle renewal needs for parks and pathways. Historically Parks has relied on field observations as the trigger for work but is now in the process of developing computerized maintenance management and asset management processes which can be expected to provide more robust information regarding their infrastructure gap.

Parks maintain current LOS infrastructure gap is largely driven by the needs of the Thames Valley Parkway, multi-use pathway

systems and park amenities. There is a projected annual shortfall of \$6.2 million for capital maintenance and renewal of the Thames Valley Parkway, multi-use pathway system and park amenities based on estimated useful life and current condition profiles.

The achieve proposed LOS requires a budget greater than both the planned budget and the amount required for maintaining the current LOS. This approach offers clear benefits, including enhanced LOS, improved pathways, amenities, and facilities condition, longer asset lifespans, and potential long-term cost savings. However, as noted above implementing this plan will result in an infrastructure gap of \$87.5 million. This gap is

primarily influenced by the linear pathways and Amenities, which account for approximately 91% of the total infrastructure gap in achieving the proposed LOS.

Furthermore, it is noted that risk assessments and consequence of failure are not explicitly addressed for Parks assets in this CAM Plan analysis. Once a risk assessment methodology is embedded in asset management analysis, it may have a material impact on needs identified for Parks.

15.5: Discussion

15.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Parks condition comparison is provided in Figure 15.12. Replacement value increased from \$187 million in the 2019 CAM Plan to approximately \$236 million. The increase is attributed to the construction of new assets, and recent increases in regional construction costs. Recent market pressures that are contributing to this include inflation caused by supply chain shocks commencing during the COVID-19 pandemic, interest rate increases, skilled labour shortages, excess demand, etc.

The 2019 CAM Plan predicted that Parks' assets would deteriorate due to inadequate funding. A Quality Rating System (QRS) was used to compute these predictions for the condition assessment of Parks' amenities; however, due to changes in methodology, now using age as a proxy for condition assessment and subsequently reviewed by Park staff, and when required adjusted based on expert opinion, it has been observed that a greater number of assets are in a Fair to Very Good condition in the 2023 CAM Plan.

The 2019 CAM Plan cumulative 10-year infrastructure gap was estimated at \$31.3 million. However, the existing gap in the Parks infrastructure to maintain the current LOS stands at approximately \$65.7 million. The increase is attributed to increasing Parks assets lifecycle activities cost, such as Pathways, Amenities, Field Houses with washroom and concessions. If these costs continue to increase, infrastructure funding shortfalls will increase. The 2019 CAM Plan considered the entire facilities' backlog lifecycle requirements and included them in the initial year's needs. The 2023 CAM Plan equally spreads these investments over a decade.

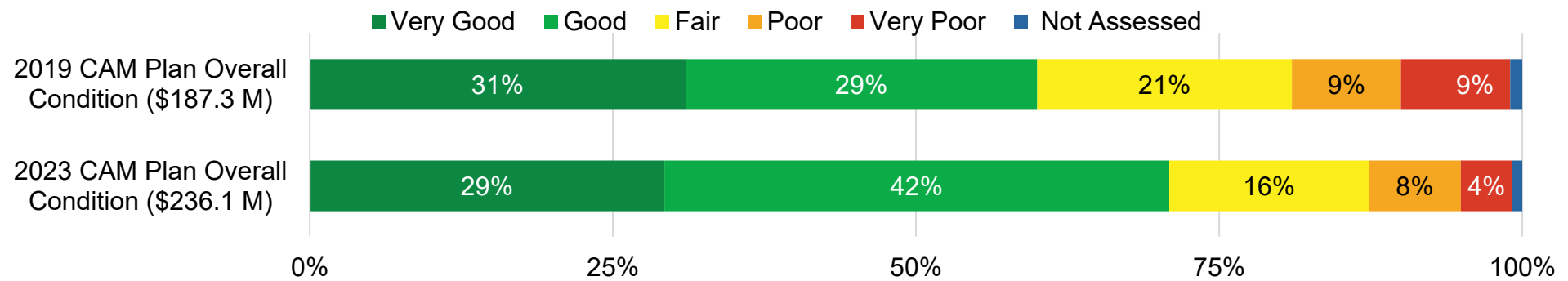


Figure 15.12 2019 CAM Plan to 2023 CAM Plan Condition Summary (Parks Services)

15.5.2: Lifecycle Management Scenarios

The lifecycle management section included three scenarios. Scenario One planned budget concluded the planned budget imposes significant constraints on the City's capacity to effectively maintain the buildings in the portfolio. As the budget remains constrained, this leads to a gradual deterioration in asset condition. This decline might not be immediate but, over time, it becomes more visible to the public and causes operating problems, such as increasing the operating and capital costs.

Scenario Two maintain current LOS is presented. This level of funding is higher than what is in the planned budget, illustrating the financial strain of maintaining a healthy asset portfolio. This scenario acknowledges the need for continual investment in assets to maintain their current state, eliminating the degradation seen in the first scenario. However, while it prevents further decline, it does not enhance the condition of the assets.

Scenario Three achieve proposed LOS funding is higher than both the planned budget and the one needed to maintain current LOS. These needs include a preliminary identification of CEAP initiatives. The advantages of the achieve proposed LOS approach are alignment with CEAP, improved service levels, asset conditions, extended asset lifespans, and potential long term cost savings.

These three scenarios show different results depending on the level of funding for the assets lifecycle renewal actions. The choices made will have an implication for Parks asset condition and performance.

15.5.3: Current and Future Challenges

Parks infrastructure is highly desired by residents. It supports healthy/active lifestyles, community building efforts, social

inclusion, quality public spaces and civic pride, and helps protect natural heritage features. Continued and increased investment in Parks infrastructure is needed in order to maintain accepted LOS and to ensure public safety and accessibility. Without addressing the infrastructure gap, decisions will need to be made on reducing service standards and removing amenities from parks, such as playgrounds.

As Parks owns and manages park facilities, current challenges include adapting lifecycle management strategies to align with Strategic Plan and CEAP targets. Future challenges include how this service will meet these standards for structures while handling inflation and supply chain issues as the City emerges from the impacts of the COVID19 pandemic.

This chapter focuses solely on Parks, but similar challenges are being replicated across the portfolio of City facilities. This includes both directly owned facility assets which have their separate sections in the CAM Plan (examples include the Facilities portion of Recreation and Sport, London Fire Department, certain Cultural Services assets, Long Term Care, and Corporate Facilities) and some agencies, boards, and commissions that are in process of developing their own asset management plans. The issues outlined in this section must be considered with others that have a facilities component.

Additionally, re-prioritization of investment goals, through the Parks and Recreation Master Plan could help reduce the infrastructure funding gaps, but this may be at the expense of other priority investments. Previous infrastructure replacements, such as playgrounds have been accomplished by funding infusions from senior government. If this funding is discontinued, infrastructure gaps for Parks assets will increase.

15.6: Conclusions

Valued at over \$236 million, the City's Parks assets are overall in Very Good to Good condition, indicating that they are meeting the City's immediate needs. Failure to address the infrastructure gap could result in localized reductions to service, such as visual signs of deterioration, potential closure of amenities, high maintenance costs or global service reductions such as fewer parks per capita, reductions to operating hours, etc. Additional effort in the evaluation of asset condition and long-term

investment requirements is needed to verify these findings. Figure 15.13 illustrates the infrastructure gap as a proportion to the required investment over the next 10-years for maintaining current LOS and achieving proposed LOS. Table 15.11 presents the summary of the State of Local Infrastructure, Infrastructure Gap, and Reinvestment Rates for Parks Services assets.

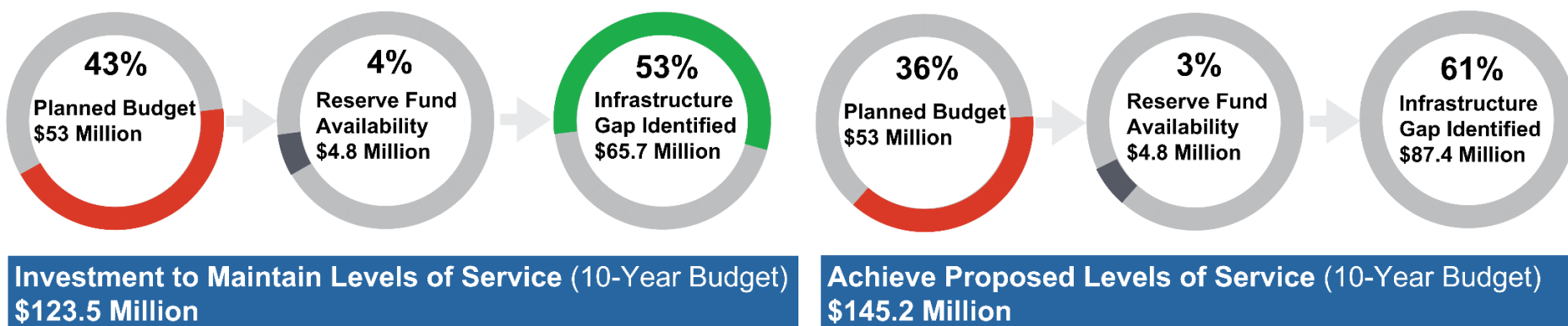



Figure 15.13 Visualization of Maintain Current and Achieve Proposed LOS Infrastructure Gaps (Parks Services)

Table 15.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Parks Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS ⁶³	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁶⁴
Linear	\$115.0	Good	\$48.0	\$47.9	1.8%	6.3%
Amenity	\$69.1	Good	\$14.1	\$32.3	3.3%	5.4% to 8.0%
Facility	\$50.1	Fair	\$3.1	\$6.6	1.7%	2.6% to 3.3%
Other	\$1.9	Not Assessed	\$0.6	\$0.6	2.0%	5.0%
Parks	\$236.1		\$65.7	\$87.4	2.2%	5.2% to 6.1%

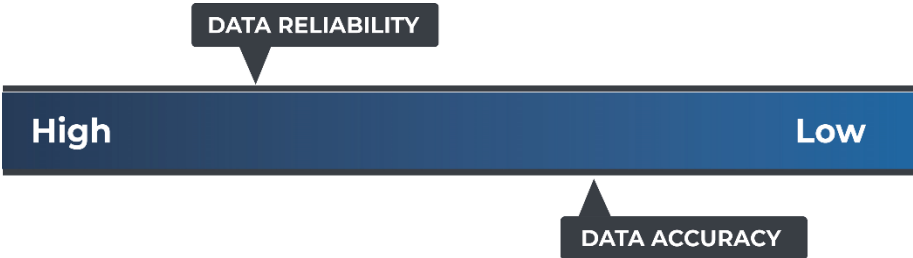


Figure 15.14 Accuracy Reliability Scale (Parks Services)

Accuracy and Reliability Commentary

Data reliability is rated as medium to low. Although inventory has been verified through GIS (for linear assets and structures), and Facilities VFA information for Park Facilities, records are not kept of all parks’ equipment. Valuation is based on internal expert opinion estimated replacement costs, and TCA information. Parks has developed a quality rating system; however, it is not performed periodically and systematically. Facilities data reliability is rated as moderate. Valuation is based on Facilities VFA information and corroborated with Altus standard costs for London area facilities. Staffing and COVID19 pressures resulted in Facilities focusing on the most critical operation aspects since the pandemic inception. Facilities is undergoing a phased approach of comprehensively reviewing, updating, and maintaining VFA data. This process is not complete at time of CAM Plan release thus data reliability is assessed as moderate and data accuracy as moderate to low.

⁶³ This projected infrastructure gap is reduced by the forecasted reserve fund drawdown availability over the next decade.

⁶⁴ Source: Reinvestment rates ranges are calculated based on the expected useful life, the required investments to maintain current LOS, and the required investments to achieve proposed LOS.

Section 16. Forestry

Asset Information	Forestry
Replacement Value	\$443.1 million
10 year Maintain Current Levels of Service Infrastructure Gap	None identified
10 year Achieved Proposed Levels of Service Infrastructure Gap	\$9.0 million

Quick Facts
1,270 hectares of Woodlands
192,000 street trees or manicured park trees



16.1: State of Local Infrastructure

The City of London takes pride in being known as “The Forest City.” Our urban forest is recognized both as an asset and a vital component of our green infrastructure, natural heritage system and our quality of life. Unlike our other assets, trees are living and increase in value with age for most of their lifecycle. The condition of a tree relates primarily to its health unlike other assets which focus on age and ‘wear and tear.’ Our urban forest is at risk from insect, disease, weather damage and development pressures. In the past, there has been a reactive approach to managing these issues. The development of proactive and timely asset management practices is critical to sustain a healthy urban forest.

16.1.1: Asset Inventory and Valuation

Table 16.1 summarizes Forestry’s asset inventory and their replacement values. The current value of the urban forest owned by the City is approximately \$443 million. The inventory does not include privately owned trees. It also does not include trees outside Urban Growth Boundary (UGB) as it is not tracked within City databases. Trees associated with other service areas (Long Term Care, Fire) and rural roads are also not being quantified by Forestry Operations. Management and operation of the City’s urban forest is under the expert care and custody of the Forestry section of the Environment and Infrastructure Division. The Forestry inventory is divided into three categories of trees:

- i. **Street trees:** include street trees within road allowance.
- ii. **Manicured park trees:** include trees in manicured portions of parks.
- iii. **Woodlands Trees:** include trees in woodlands or wooded portions of parks.

Trees in woodlands have an estimated inventory based on 1,242 trees/hectare. This factor was adopted from a 2008 UFORE (Urban Forest Effects) analysis which studied total tree species across London whether private or public. Internal opinion assessed this metric is still representative for 2023 CAM Plan inventory amounts.

The woodlands replacement cost is approximately \$86,250/hectare, which is a method that factors in costs for planning, preparation, modest soil restoration, plant propagation, and planting.

An initial inventory of urban road allowance trees as well as those found in portions of manicured parks was completed in 2002. Updates to the early inventory, with the most recent updates occurring in 2019 and 2020, are reflected in this report. Further work is needed to improve the integrity of this continually changing inventory. Reporting capability for various inventory attributes are being improved. Inventory data assessments since the 2019 CAM Plan have been incorporated in updating tree counts and condition.

Replacement values for trees are treated differently than for typical City assets because trees grow. Tree replacement strategies depend on if they relate to routine or maintenance reasons (typically relating to public safety) or non-routine (new construction typically). Routine trees replacements are typically replaced on a one for one basis. For non-routine reasons (new construction and exploring alternates to tree removal), the City shall wherever possible plant one tree for each 10-centimeter increment of tree diameter that was to be removed, as close as possible to the original location. This CAM Plan reports replacement value assuming one tree replacement for each 10 cm of tree diameter.

The environmental and other benefits of trees increase exponentially with size, age, and health. This relationship is shown in Figure 16.1 modified from the UFORE analysis. A tree that is 50 centimeters in diameter provides more than twice as many environmental benefits (such as amount of pollution removed from the air, amount of oxygen released into the air, etc.) than a tree 25 centimeters in diameter. If the recommendation for planting an equivalent diameter of trunk

compared to the tree that had to be removed, the net impact is more trees should be planted than removed which with time should increase the inventory. Current practices do not replace all tree losses. An Urban Forest Strategy and implementation plan has been developed which will set tree cover canopy targets and which will govern the management of trees and wooded areas for the next 20 year.

Table 16.1 Inventory and Valuation (Forestry Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Street trees	Street trees within road allowance	146,454	Each	\$236,267
Manicured park trees	Trees in manicured portions of parks (1,566 hectares)	46,338	Each	\$97,278
Woodlands Trees	Trees in woodlands or wooded portions of parks (approximately 1,270 hectares)	1,577,840	Each	\$109,538
Total				\$443,083

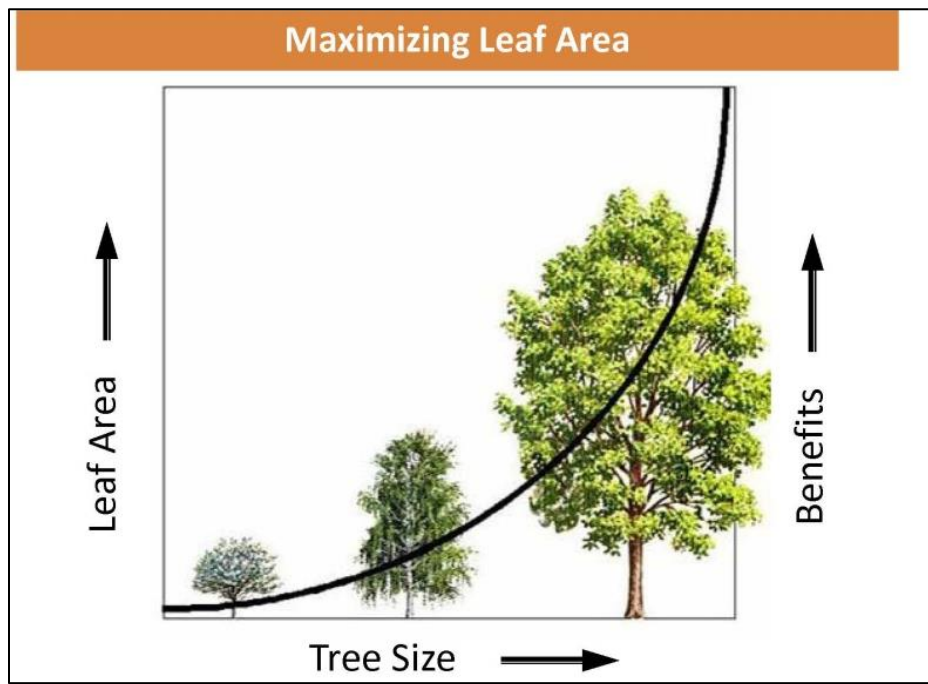


Figure 16.1 Incremental Benefit of Mature Trees

16.1.2: Age summary

Figure 16.2 lists age information can be implied from diameter at breast height (DBH) estimates. Trees over 100 cm DBH are considered mature. However, there are confounding factors of trees grown in an urban environment do not have ideal growing conditions. Reliance on the growth factors without adjusting for harsher environment could lead to tree age being considered younger than actual age. A growth factor adjustment is required to increase reliability of age calculations. Data is not readily available to quantify Street Trees and Manicured Park Trees age.

UFORE 2008 study indicates that 66% of Woodland trees were considered young, 25% were mid-age and less than 10% were considered older or mature in age. This suggests that Woodland trees age approximates 38 years.

The City's knowledge of which street trees we own is constantly improving, with new technology and better-quality control to identify property lines and co-owned trees. An example is

Forestry using data collected from a work order system implemented the past decade. Data indicates that on average, Forestry Operations has removed around 1,500 trees annually, most being removed for reasons of public safety. Only a very few trees might be removed without a work order, perhaps in the clear up after a storm or road accident, for example. Based on these numbers, the average lifecycle renewal rate is around 120 years for any city tree not in a woodland. This average lifecycle renewal rate may change if, for example, a catastrophic event occurs (e.g. tornado) resulting in mass tree removals in a short timeframe, or if we fail to regenerate or plant sufficient replacement trees over time resulting in a diminished inventory. Another reason for reduced life expectancy would be a greater likelihood a construction project would occur and result in a tree removal. This greater likelihood of removal is the reason why street tree expected useful life is lesser than manicured park tree life cycle.

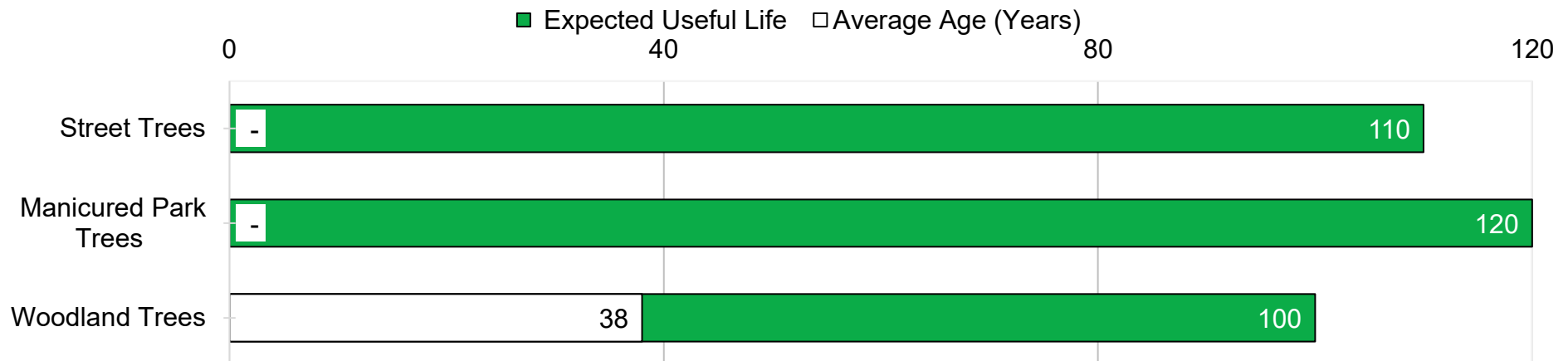


Figure 16.2 Average Age and Expected Useful Life (Forestry Services)

16.1.3: Asset Condition

As outlined in Figure 16.3, Forestry has approximately 83% of assets in Fair to Very Good condition. The remainder is either deceased or nearing being deceased, indicating a need for investment in the short to medium term. The City's Forestry

assets are overall in Fair to Good condition, indicating that they are meeting current needs but there is increased likelihood of tree mortality.

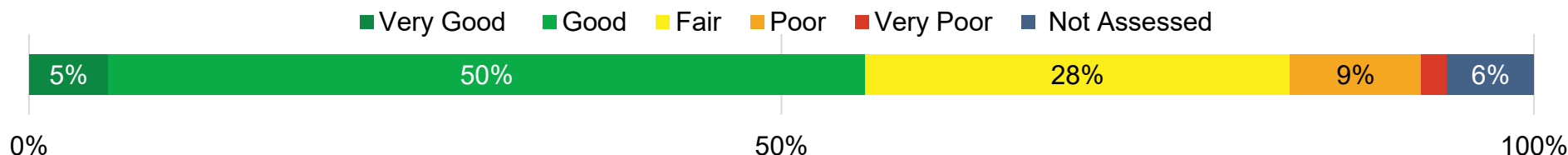


Figure 16.3 Overall Condition (Forestry Services)

Figure 16.4 shows Forestry's condition distribution of each asset type. As seen in the figures, many Forestry assets are in Fair to Good condition, indicating that they are meeting current needs, but certain assets may require attention.

The condition ratings for street trees and manicured portions of parks trees are derived from the 2002 tree inventory which is maintained in the City's geomatics (GIS) databases, in which updates have occurred including a comprehensive review in 2019 and 2020. The condition ratings for trees in woodlands and wooded portions of parks are derived from a quality rating system methodology that Forestry prepared with assistance from Corporate Asset Management. In general, the condition of the trees is decreasing with respect to the older trees and some species such as ash which had been devastated by Emerald Ash Borer. It did negatively impact tree canopy, but best understanding is this threat is receding, and replacing ash with other trees has mitigated damage. New concerns are emerging issues of buckthorn being the most common. Monitoring is happening regarding oak wilt and the Asian Longhorn Beetle, noting they have not been discovered to date.

Removal of larger trees from boulevards is often due to ongoing replacement of aging infrastructure, increased urban intensification and development pressure, poor historical maintenance practices and environmental factors such as storms and old age. Manicured park trees are often impacted by the level of use and management practices while woodland trees are impacted more by environmental factors such as invasive species, disease, and adjacent development.

Trees that die or are removed in woodlands are often not replanted allowing invasive species such as buckthorn to take up the space. The current failure to replant will result in a future forest with less tree canopy cover due to fewer and smaller trees. The number of trees in boulevards and on private property is also being reduced as development occurs. New lots typically have smaller dimensions with little topsoil to replace the historical number of trees and ultimate size at maturity.

Urban trees within the road allowance are watered in their first year and optimally trimmed on average every 10 years with younger and older trees trimmed more often. However, recent changes have resulted in trim cycles being mandated at 5-year trim cycles. Boulevard trees are currently on an average The

remaining inventory of trees is not on a planned trimming cycle but is reactive to staff observations of potential hazards and comments or complaints from the public. There are currently no other routine programs for pests, insects, diseases, or other maintenance activities, such as watering or fertilizing.

Street trees and manicured parks trees including roadways, trails, and multi-use pathways, are in Fair to Very Good condition, based on expert opinion from staff and documentation from the GIS listing. Known issues are prioritized and addressed reactively through operations or capital projects.

Since the 2019 CAM Plan, Woodlands and wooded portions of parks have continued formal asset management assessment methodologies. They are evaluated regularly for safety, with urgent issues flagged and targeted for resolution by operations staff. Approximately 70% are assessed to be in Fair or Poor condition, indicating that they are functional, but subject to superficial to extensive deterioration. Approximately 20% of woodlands have not yet been assessed. Forestry would benefit greatly from frequent condition assessments and monitoring system to help manage these key assets.

Forestry is aware of the issues with regenerating urban woodlands. Current efforts around this may include updating park by-laws and design standards to allow for non-conventional systems and features in a park where there is a silvicultural need. Examples include but not limited to adding deer fencing, tree shelters, coarse woody debris, geotextiles, trail markers, and other visual indicators to direct foot traffic.

Forestry does not currently have computerized asset management or maintenance management capability although work has been initiated to implement a computerized maintenance management system. Most data on the asset condition is formally collected and recorded, but is not frequent. All significant safety issues are addressed immediately. Maintenance issues, along with concerns identified by staff and the public are prioritized and addressed based on needs. Other assets are informally evaluated and needs addressed reactively. Forestry data collections prepared in 2019 informed the 2023 CAM Plan condition information. This evolving process will continue to inform decision making in future asset management and budgeting work.

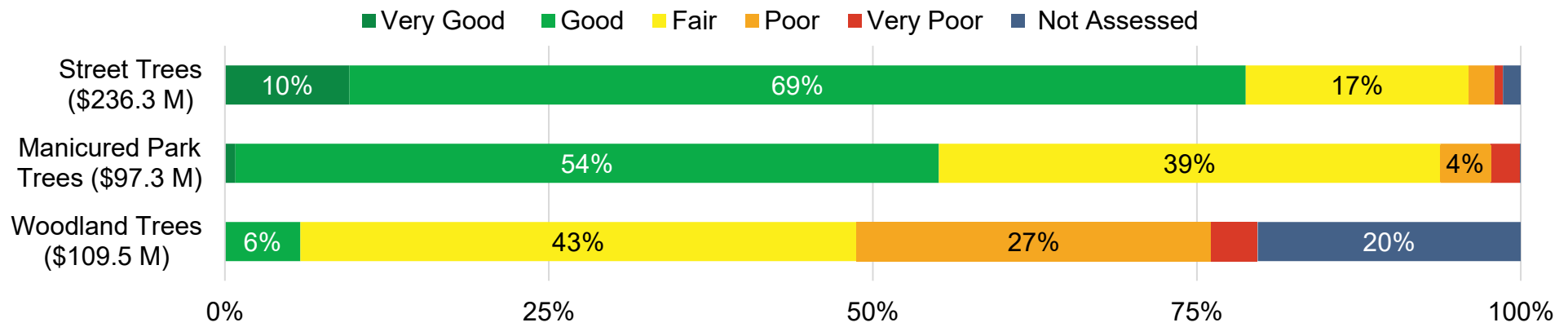


Figure 16.4 Asset Condition Detail (Forestry Services)

16.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for Levels of Service (LOS) performance measures linked to Customer Values of Accessible, Scope, Cost Efficient, Environmental Stewardship/Sustainability, Reliability, Quality, and Safety.

Direct and Related LOS

After review with Forestry, levels of service (LOS) considered most representative of Forestry and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'Direct LOS' and are listed in Table 16.2. LOS

16.2.1: Direct Levels of Service

Table 16.2 Direct Levels of Service (Forestry Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Accessible	Technical	Percentage of kilometers of sidewalks (and paths) with tree cover	25.3%	28% (noting this is a 2035 target)
Accessible	Council	Number of Right of Way trees per residential household	83.9%	>1
Cost Efficiency	Council	Forestry Overall Reinvestment Rate	0.7%	1.1%
Quality	Council	Percentage of Forestry (Street Trees and Woodlands) in Fair or better condition	83.8%	Maintain current

16.2.2: Related Levels of Service

Table 16.3 Related Levels of Service (Forestry Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Woodland Tree Reinvestment Rate	1.5%
Cost Efficiency	Technical	Street Tree and Manicured Park Tree Reinvestment Rate	0.4%
Environmental Stewardship	Technical	Percentage of city covered by tree canopy in Urban Growth Boundary	26.6%
Quality	Technical	Percentage of City Owned Street Trees in Poor or Very Poor condition	2.7%
Quality	Technical	Percentage of City Owned Trees in Manicured Park Tree in Poor or Very Poor condition	6.2%
Quality	Technical	Percentage of Woodlands quality level in Poor or Very Poor condition	31.0%
Quality	Technical	Average Woodland Tree level of service quality rating	2.5

that have a causal relationship with direct LOS are documented in Table 16.3 as related LOS but cannot be as readily costed to Forestry Services.

Metrics

Table 16.4 listed metrics are useful information, especially when considered in conjunction with Direct LOS, and Related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Forestry assets provide.

16.2.3: Other Measures

Table 16.4 Metrics – Other Dashboard Measures (Forestry Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Operating budget for Forestry services	\$5,570,808
Cost Efficiency	Technical	Annual operating cost to provide Forestry and Urban Forestry service (\$/household)	\$31.90
Customer Satisfaction	Council	Percentage of community satisfied with Forestry services	75%
Reliability	Technical	Number of street trees planted per year	5,144
Reliability	Technical	Number of street trees removed per year	1,355
Safety	Technical	Biologically optimal frequency of trimming trees or planned urban forest maintenance	10-year cycle including rural roads
Safety	Technical	Frequency or percent of trees inspected per year	11,319 (10,308 trimmed, 1,011 inspected)

16.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through cost risk benefit analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant

recommendations, available budget, and trial and error through scenarios and pilot programs.

The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, which may trigger asset investment needs.

16.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current LOS while striving to optimize costs and risks. Table 16.5 lists specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections.

Asset management practices or planned actions employed by cities can entail certain specific risks. A summary is provided in Table 16.6. The cost of these identified Lifecycle activities is

summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 16.5 Current Asset Management Practices or Planned Actions (Forestry Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Street Trees, Manicured Park Trees <ul style="list-style-type: none"> Implementation of Urban Forestry Strategy approved by Council in 2014 Encouragement of conservation of Urban Forestry, Parks, and associated infrastructures assets through policy, procedures, public outreach, etc. Maintaining the existing urban forest for reduce loss of maturing forest and increase/redirect planting budget to support this. Mitigate maintenance cost by reducing loss and therefore, decreasing need for planting as the ‘easy fix’. Adopting an increased awareness in London for tree injury/damage via construction management. Altering perception to view at the urban forest as a valuable asset and not a renewable resource.
Maintenance	Street Trees, Manicured Park Trees <ul style="list-style-type: none"> The approach to asset management for the living assets is somewhat unique because it entails living assets, grass, trees, etc. The product can be qualitative and not easily measured. City manages its trees through planning and maintenance activities including trimming, removals, plantings, treatment, and watering based on available resources. Monitored and problems addressed when triggered by staff observations and public feedback. Woodland Trees. The approach to asset management for living assets is somewhat unique because it entails living assets, grass, trees, etc. The product can be qualitative and not easily measured. City manages its trees through planning and maintenance activities including trimming, removals, plantings, treatment, and watering based on available resources. Watering is now a maintenance activity for new trees. Monitored and problems addressed when triggered by staff observations and public feedback.
Renewal/Rehabilitation	Street Trees, Manicured Park Trees <ul style="list-style-type: none"> Certain activities can be performed to extend lives of mature and veteran heritage trees that have suffered from compaction by footsteps: <ul style="list-style-type: none"> Deep root fertigation. Propping and cabling. Mycorrhizal inoculation. Root barriers/deflectors can be retroactively installed in certain instances. Woodland Trees <ul style="list-style-type: none"> Rehabilitating a tree may not be a practical or relevant activity – typically a tree is either maintained or

Asset Activity	Specific Asset Management Practices or Planned Actions
	replaced.
Replacement/ Construction	<p>Street Trees, Manicured Park Trees</p> <ul style="list-style-type: none"> Planned plantings for non-Woodland trees. Use of underground technologies to provide protected rooting zones in conjunction with utilities, sidewalks, and, in some technologies, roads. <p>Woodland Trees</p> <ul style="list-style-type: none"> There are no planned plantings for Woodland trees.
Disposal	<p>Street Trees, Manicured Park Trees</p> <ul style="list-style-type: none"> When tree removal is considered necessary, disposal activities include - tree brush and wood removal, stump removal, site restoration to prepare for replacement. <p>Woodland Trees</p> <p>Typically, Woodland trees would be left in situ (original location) when they are deceased, however, exceptions could occur if deemed a hazard. These exceptions assess if the tree would strike a target such as a planned, managed, and well-used path, trail, or a house, etc. In the future, policy may be revised to not always cutting down dead or damaged trees.</p>
Service Improvement	<p>Street Trees, Manicured Park Trees</p> <ul style="list-style-type: none"> Consultation with public and users of Forestry and Parks, and in conjunction with Planning and/or Transportation would determine service improvement needs.
Growth	<p>Overall Actions</p> <ul style="list-style-type: none"> Capital growth projects and analysis in conjunction with Development Charge service area (where applicable with regulatory and municipal policy, such as <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i>), or as a part of Assessment Growth Policy (where applicable with municipal policy). <p>Street Trees, Manicured Park Trees</p> <ul style="list-style-type: none"> Consultation with public and users of Urban Forestry and Parks would determine growth needs. Street trees inventory could grow because of assumption of subdivisions, commercial and industrial extensions, local improvements, etc. Collaboration could occur with Transportation for input into streets and road allowances. <p>Woodland Trees</p> <ul style="list-style-type: none"> Growth occurs when Open Space Parkland would be reclassified into urban forestry and increase inventory.

Table 16.6 Risks Associated with Asset Management Practices or Planned Actions (Forestry Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> Infrastructure renewal with annual road replacement damage and tree loss is a major contributing factor to tree health/condition. Implementing the Urban Forestry Strategy can be impacted by cost pressures, resulting in undesirable outcomes. Market pressure of many North American cities implementing Urban Forestry Strategies, thus limiting supply or increasing costs. Provincial market may choose to focus on residential market. Invasive species – new pests, diseases as well as invasive plants. Climate change mitigation - excessive urban heat, alternative energy (e.g. solar) could impact how and where trees are planted, or not. Quicker non-tree alternatives may be chosen (e.g. sail cloth structures to provide immediate summer shade in Parks). Changes in legislation – an example includes <i>Migratory Bird Convention Act</i>. Currently the official breeding season for birds starts April 1 but that is expected to be brought forward, which may impact service delivery.
Maintenance	A listing applicable to all services listed in Appendix A.
Renewal/ Rehabilitation	A listing applicable to all services listed in Appendix A.
Replacement/ Construction	Homeowners declining to replace tree planting, which reduces tree canopy cover related to Urban Forestry Strategy.
Disposal	A listing applicable to all services listed in Appendix A.
Service Improvement	A listing applicable to all services listed in Appendix A.
Growth	Incorrect growth assessments may result in overabundance of Forestry assets in a particular area and insufficient assets in another.

16.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is not readily available for the Forestry service area. These assets are living and expected to improve in condition over time, which is opposite from traditional infrastructure assets. In addition, these living assets aren't necessarily disposed at their expected useful life, but removed resulting from ongoing replacement of aging infrastructure, increased urban intensification and development pressure, poor historical maintenance practices and environmental factors such as storms. Manicured park trees are often impacted by the level of use and management practices while woodland trees are impacted more by environmental factors such as invasive species, disease, and adjacent development. Incorporating these criteria into a representative condition profile is not currently possible.

A. Scenario One: Planned Budget

Table 16.7 Scenario One – Average Annual Planned Budget (\$Thousands) (Forestry Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	5,359	5,531
Renewal, Replacement, Rehabilitation, Disposal	791	791
Service Improvement	1,700	2,113
Growth Activities	374	101

Forestry average annual activity and planned funding is summarized in Table 16.7. The condition profile expected from the current budget is not readily available.

Current funding for operating budget and capital budgets are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget. Select service improvement budgets are factored in funding gap analysis and analysis and commented on below.

Growth activities are analyzed using the 2021 Development Charges Background Study Update. Major upcoming projects include Urban Forestry Studies and Woodland Parks.

All number in tables are rounded to nearest thousand.

B. Scenario Two: Maintain Current Levels of Service

The cost to maintain current LOS are summarized in Table 16.8. The condition profile expected from the maintain current LOS is

not readily available. Costs to maintain LOS should be achieved if additional reserve fund drawdowns occur.

Table 16.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Forestry Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	5,531	None identified	5,531	None identified
Renewal, Replacement, Rehabilitation, Disposal	2,904	163	3,067	None identified
Service Improvement				
Growth Activities	101	None identified	101	None identified

C. Scenario Three: Achieve Proposed Levels of Service

The cost to achieve proposed LOS are summarized in Table 16.9. Costs to achieve proposed LOS will result in an infrastructure gap.

To achieve the proposed Forestry LOS, some changes to the strategy for lifecycle activities will be required, which will trigger

changes in funding requirements. If funding for proposed levels of service is not sufficient, the City will:

1. Continue lifecycle activities to maintain current levels of service; and/or
2. Prioritize lifecycle renewal activities to address invasive species.

Table 16.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Forestry Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁶⁵	Achieve Proposed LOS Infrastructure Gap ⁶⁶
Operating Budget	5,531	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	2,904	200	None identified	940	902
Service Improvement					
Growth Activities	101	None identified	None identified	None identified	None identified

⁶⁵Incremental investment to achieve proposed LOS excludes CEAP costs.

⁶⁶Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

16.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 16.10 and illustrated in Figure 16.5. The analysis documented is related to the lifecycle rehabilitation, renewal, or replacement activities, and service improvement activities. Disposal activities are considered inherent with asset renewal/rehab/replacement activities.

Forestry's cumulative maintain LOS is expected to be nil, assuming that reserve funds are available to address needs.

Achieve proposed LOS infrastructure gap approximates \$9.0 million over the 10-year period, assuming the identified reserve fund availability is sustained over the next decade. Proposed

LOS identified to Woodlands relate to best practices to address woodlands invasive species infestation but would create additional funding gaps.

The funding needs in investment to maintain current LOS and investment to achieve proposed LOS columns represent the costs to renew, maintain, replace, and improve the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

Service improvement budgets relating to UF2047 Urban Forestry Strategy are included as part of analysis.

Table 16.10 Average Annual Budget and Gap Analysis (\$Thousands) (Forestry Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Investment to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Street Trees and Manicured Park Trees	636	200	1,188	None identified	None identified	352	352
Woodlands	2,268	None identified	1,878	None identified	940	None identified	550
Total	2,904	200	3,067	None identified	940	None identified	902

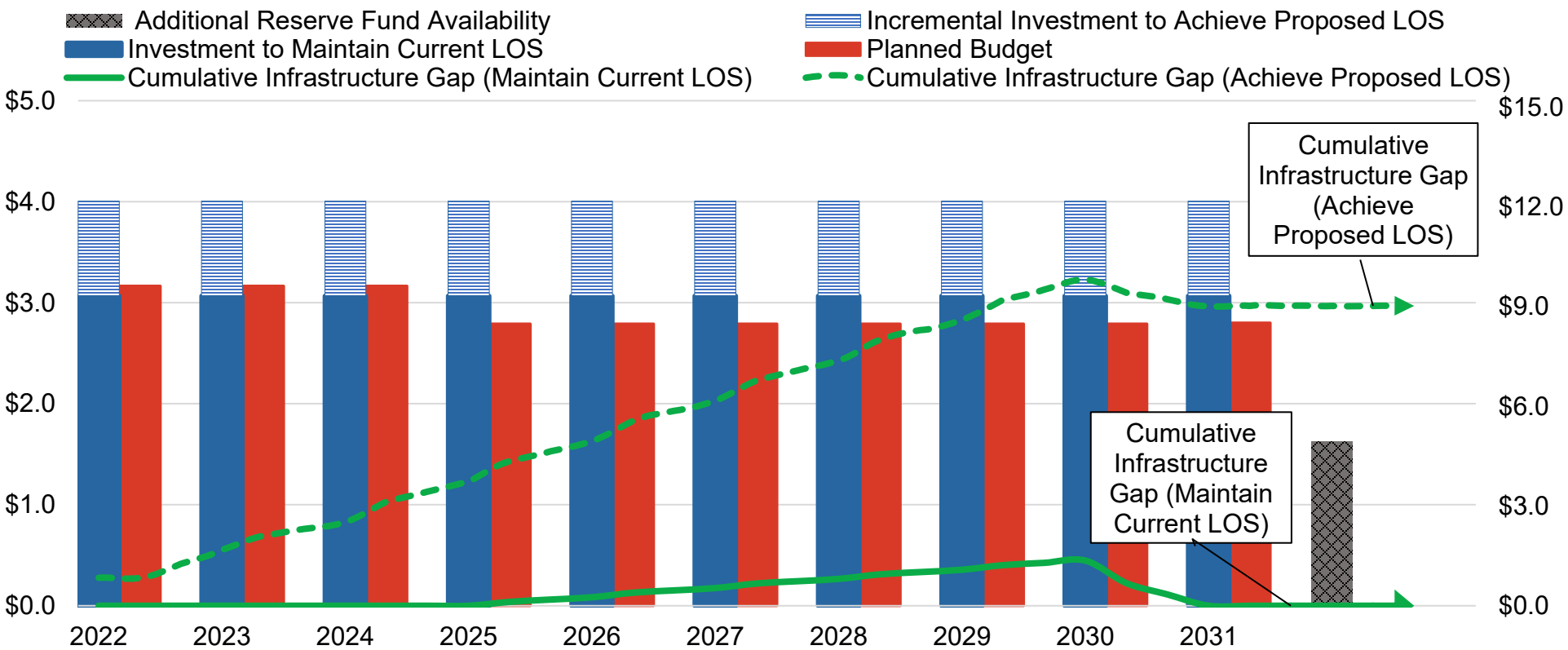


Figure 16.5 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Forestry Services)

Forestry does not have an infrastructure gap relating to maintaining current LOS, assuming that reserve funds can be directed to address needs. The 10-year achieve proposed LOS is quantified at approximately \$9.0 million. Historically trees were not considered as infrastructure assets and renewal plans were minimal. The area has a long history of underfunding and loss of inventory. Today renewal plans for woodlands and wooded portions of parks are continuing recognition in the budget process. The infrastructure gap to achieve proposed LOS primarily relates to Woodland Trees. Historically Woodland management has little infrastructure funding as it does not have

a detailed inventory to assist in identifying infrastructure needs. The City relies on woodlands to regenerate, however that can be challenging when considering encroachment and factors like buckthorn. The consideration of trees as infrastructure is a major step forward in preserving the health of this asset group. Often the replacement of street trees occurs in conjunction with the replacement of other assets. The existence of a good tree does not prevent a new road or development from being built or a broken water pipe from being repaired. Efforts are made to replace the impacted tree as part of the project. More attention is also being paid to the tree as an important part of the

infrastructure. This is evidenced by treed center islands. Although there is some positive news, independent tree removals and replacements will result from other environmental, age, health, insect, and disease factors that are not associated with and paid for within a project. Non-project tree replacements may be funded through separate capital budgets but are currently not sufficient to cover all the losses. In the end, the overall trend is a reduction in tree inventory in London as evidenced by the gap results.

16.5: Discussion

16.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Forestry condition comparison is provided in Figure 16.6. The 2019 CAM Plan relied on internal expert opinion for Urban Forestry assets and quality rating methodologies for Woodlands. These assessments have been expanded but are still infrequent and still being implemented as part of regular operations.

The Urban Forestry service replacement value increased from approximated \$402 million in the 2019 CAM Plan to \$443 million in the 2023 CAM Plan. The increase is attributed to inflation-adjusted woodlands replacement value and increased costs to the supply, delivery, and planting of trees. If these costs continue to increase, infrastructure funding shortfalls will increase. The change in condition profile is attributed mainly to expanding the scope of detailed quality rating system for Woodland tree assets based on internal expert opinion and updates to the street tree inventory listing maintained in GIS.

The 10-year infrastructure gap has decreased from approximately \$22.92 Million in the 2019 CAM Plan to no gap to maintain current LOS. However, achieve proposed LOS needs indicate a 10-year gap of \$9.0 million. The achieve proposed LOS funding gap increase is attributed to increased Woodland needs.

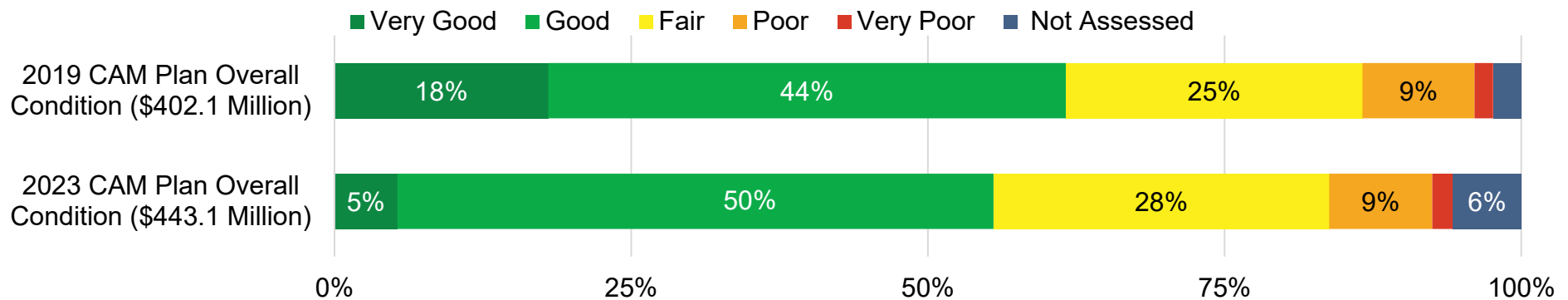


Figure 16.6 2019 CAM Plan to 2023 CAM Plan Condition Summary (Forestry Services)

16.5.2: Current and Future Challenges

Street Trees - Challenges and mitigation actions resulting from City Growth

When widening roads in an urban corridor to accommodate growth, it can be challenging to replace trees on a 1:1 basis in the same location where they were removed, because there is often less real estate available that is suitable to support tree survival.

Of the planned growth widening projects, Rapid Transit (RT) construction has the most significant impact on trees. Tree removal impacts the Downtown Loop, East London Link and Wellington Gateway projects. To offset reductions in trees along the main RT corridors, the RT project team worked with Parks and Forestry to identify tree planting locations nearby the corridor in parks, open spaces, and adjoining side street boulevards to help soften the first-last mile to transit. A consultant arborist has been hired to design a planting plan for 600-700 trees to be installed in spaces nearby along the Wellington and East Link corridors.

The City is striving to replace these trees in a 1:1 ratio (relative to tree diameter) in affected areas, however BRT design specifications will likely result in alternative Street Tree planting strategies as coordinated between Transportation, Forestry, and Realty services. If capacity is not available, other alternative strategies include:

- Planting outside the urban growth boundary; or
- Considering land opportunities such as creating woodlots.

Tree Canopy Cover

While there is sufficient funding to maintain current LOS, Forestry estimates that at minimum 3,000 trees need to be planted a year to maintain its commitment to contribute to 2065 tree canopy cover. While the time frame is outside the scope of the CAM Plan, this goal is considered feasible if planting on City and private lands occurs. This partnering will be a key component of the upcoming 2023-2026 Tree Planting Strategy.

Other Challenges

Current challenges primarily relate to continue the implementation of the Council-approved Urban Forestry Strategy in 2014. Other challenges include developing comprehensive woodlands and street tree asset management listings; performing regular condition assessments; assessing representative condition ratings; and increasing street trees costs.

Trim cycles for Street Trees are being reduced from 10 years to a mandated 5 years. This will place pressure on operating costs as the transition to halving the trim cycle occurs.

Other current challenges of coordinating and communicating with other City projects are being addressed through the recent reorganization of Forestry under Environment and Infrastructure Service Area. One impact of the coordination is to have trees considered early and planned around in City road infrastructure renewals and replacement projects, the warranted sidewalk program, and other activities.

The intent is to minimize unneeded tree removal; however, there will be cases where trees must be removed as the costs of or lost opportunity in avoiding the tree may be deemed excessive. The refined data collections and service coordination will allow the tree asset value to be part of the possible removal

decision. There then may be a better outcome, if a tree is worth more than the costs of changing the design, layout, etc. to avoid harming it.

Market forces are a current challenge as well. For the past 10 years, many tree nurseries chose to focus on the residential market (perennial plants, garden ornaments, statues, chiminea, etc.) which limited the supply of trees. An increase in demand is not expected to suddenly reverse the 10-year trend.

Compounding this challenge is that many North American cities are adopting strategies like London’s Urban Forestry Strategy. Fulfilling bids to provide trees at current prices has been difficult.

Trees outside Urban Growth Boundary (UGB) are not tracked within City databases. Trees associated with other service areas (Dearness, Fire) and rural roads not being quantified by Forestry Operations. Updating information and quantifying any funding gaps to have a complete assessment of all City-owned forestry will be a difficult and long-term project.

Other future challenges include altering perceptions and increasing awareness in London. The challenge is to view at the urban forest as a valuable asset and not a renewable resource, increasing awareness in London for tree injury/damage via construction management.

Maintaining the existing urban forest to reduce the loss of maturing forest and increase/redirect planting budget to support this initiative can result in maintenance cost mitigation and therefore, decreasing need for planting as the ‘easy fix’.

The provincial tree seed facility in Angus, Ontario – from where almost all the nurseries and conservation groups receive their native trees – announced its closure and has begun the process of closing the facility. The impact of this closure is not quantified currently, but the expectation is for prices to increase as more places compete for a dwindling supply. Shortfalls may continue because of supply problems.

16.6: Conclusions

Valued at approximately \$443 Million, the City's Forestry assets are overall in Fair to Good condition. Data regarding the City's tree inventory and condition is progressing, but recurring incremental condition assessments and studies need to be conducted. Reorganizing Forestry to increase coordination with other City infrastructure projects will minimize unneeded tree removal. However, cost pressures will result from street tree trims cycles are being mandated to 5 years compared to previous target of 10 years.

In addition, there is the continued risk of invasive species impacting Woodlands and is not yet to be completely realized and quantified. It is anticipated that the condition of wooded areas will continue to be reduced as more consistent condition assessments become available. While there is sufficient funding to maintain current LOS, Forestry estimates that commitment to

contribute to 2065 tree canopy cover can be achieved if planting on City and private lands occurs.

The maintain current LOS funding and gap means that under current funding plans, the number of trees in London is expected to continue to reduce along with the benefits they provide for air and water quality, habitat, and recreational uses. The City continues to implement the 2014 Urban Forest Strategy and will continue identifying tree cover targets as well as policies, guidelines and practices that will govern the management of the urban forest for the next twenty years reversing current trends. It is critical that the City invest the necessary resources to implement the strategies if current trends are to be reversed. Figure 16.7 and Table 16.11 summarize key Forestry data.

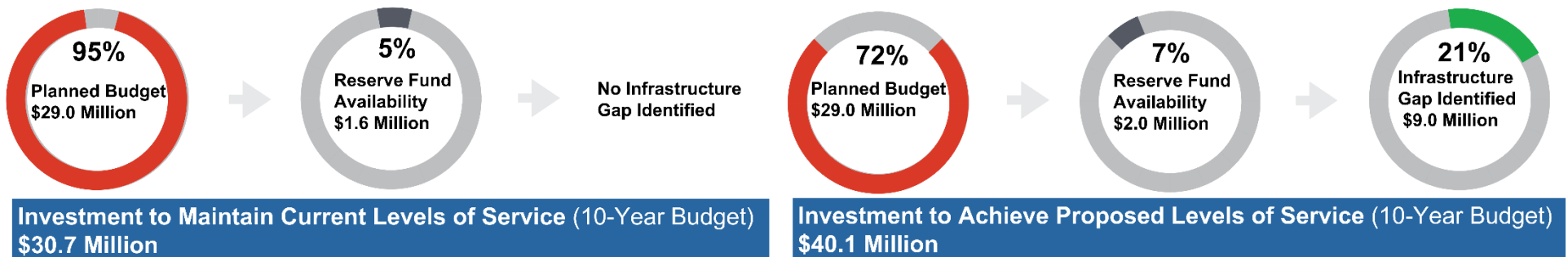



Figure 16.7 Visualization of Maintain Current and Achieved Proposed LOS Infrastructure Gaps (Forestry Services)

Table 16.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Forestry Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS ⁶⁷	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁶⁸
Street trees and Manicured park trees	\$333.5	Good	None identified	\$3.5	0.4%	0.8% to 0.9%
Woodlands Trees	\$109.5	Fair	None identified	\$5.5	1.5%	1.7% to 2.6%
Total	\$443.0		None identified	\$9.0	0.7%	1.1% to 1.3%

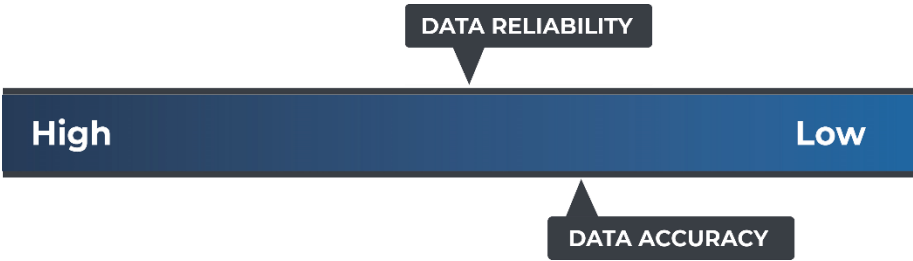


Figure 16.8 Accuracy Reliability Scale (Forestry Services)

Accuracy and Reliability Commentary

Forestry Data Reliability and Accuracy Data reliability is rated as moderate. Woodland Inventory in GIS has tracked size (in hectares) of Woodlands and the number of trees can be estimated using industry standards from a 2008 UFORE (Urban Forest Effects) analysis. Third party studies in conjunction with internal opinion assessment have been relied upon for Woodland valuations, but data is not recent. Valuation for Street Trees is estimated by using a dollar value per tree using recent tendered costs. An estimate of Street tree condition was performed in a study in 2002 and was most recently updated in 2019. subsequently updated based on average rate of tree degradation based on age or illness. Condition and investment forecasts are therefore based on estimates and expert opinion. Accuracy is therefore rated as moderate to low as forecasts are not supported by recent data, detailed studies and estimates.

⁶⁷ This projected infrastructure gap is reduced by the forecasted reserve fund drawdown availability over the next decade.

⁶⁸ Source: Trees reinvestment rates based on expected useful life. Woodlands rates based on investment required to maintain current LOS and achieve proposed LOS.



Section 17. Emergency Management and Security Services

Asset Information	Emergency Management and Security Services
Replacement Value	\$9.1 million
10-year Maintain Current Levels of Service Infrastructure Gap	None identified
10-year Achieved Proposed Levels of Service Infrastructure Gap	None identified

Quick Facts
Communication Systems, Operation Equipment, and Public Safety Programs



17.1: State of Local Infrastructure

The Emergency Management and Security Services section serves the Corporation and all citizens by contributing to a safe and secure environment through a commitment to prevention, preparedness, and response. Emergency Management and Security Services support all Service Areas, Agencies, Boards, and Commissions, on an as needed and request for service basis. The service has two branches that focus on providing a safe environment for the City's staff and public. Physical Asset Protection and Fire Life Safety focuses on protection of our physical assets. This branch is responsible for all facility protection systems, as well as physical security audits and design, the fire safety program, and the Downtown Camera Program. Incident Management and investigation covers all aspects of incident management. Responsibilities include incident response, guard services, threat assessment, prevention programs, event security planning and executive protection.

17.1.1: Asset Inventory and Valuation

Table 17.1 summarizes the Emergency Management and Security Services' asset inventory and their replacement values. The Emergency Management and Security services owns and operates three different asset types that includes five different asset groups with a total replacement value of approximately \$9.1M. The One Voice Communication System includes infrastructure such as radio towers and communication systems hardware, such as microwave radios and antennas, in addition to the associated software. The security operation equipment includes fire systems and security cameras, as well as the downtown public safety program. On the other hand, the Emergency Operation Centre includes all equipment and furniture essential to managing an emergency and providing any strategic guidance to acquire and authorize extraordinary resources required to mitigate an incident.

Table 17.1 Inventory and Valuation (Emergency Management and Security Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
One Voice Communication System	Infrastructure	Mix	Each	\$363
	Communication system, hardware, software, etc.	Mix	Each	\$6,035
Emergency Operation Centre	Emergency Operation Equipment	Mix	Each	\$1,946
Security Operation Equipment	Security operation equipment (examples include fire systems, security cameras)	Mix	Each	\$653
	Public Safety Program	Mix	Each	\$132
Total				\$9,129

17.1.2: Age Summary

Figure 17.1 shows the Emergency Management and Security Services average asset age as a proportion of the average useful life by asset type. The average age for the assets was calculated based on the acquisition/installation dates from the

service area databases. As shown in the figure, all asset types but the Public Safety Program assets are within their average industry standard useful life.

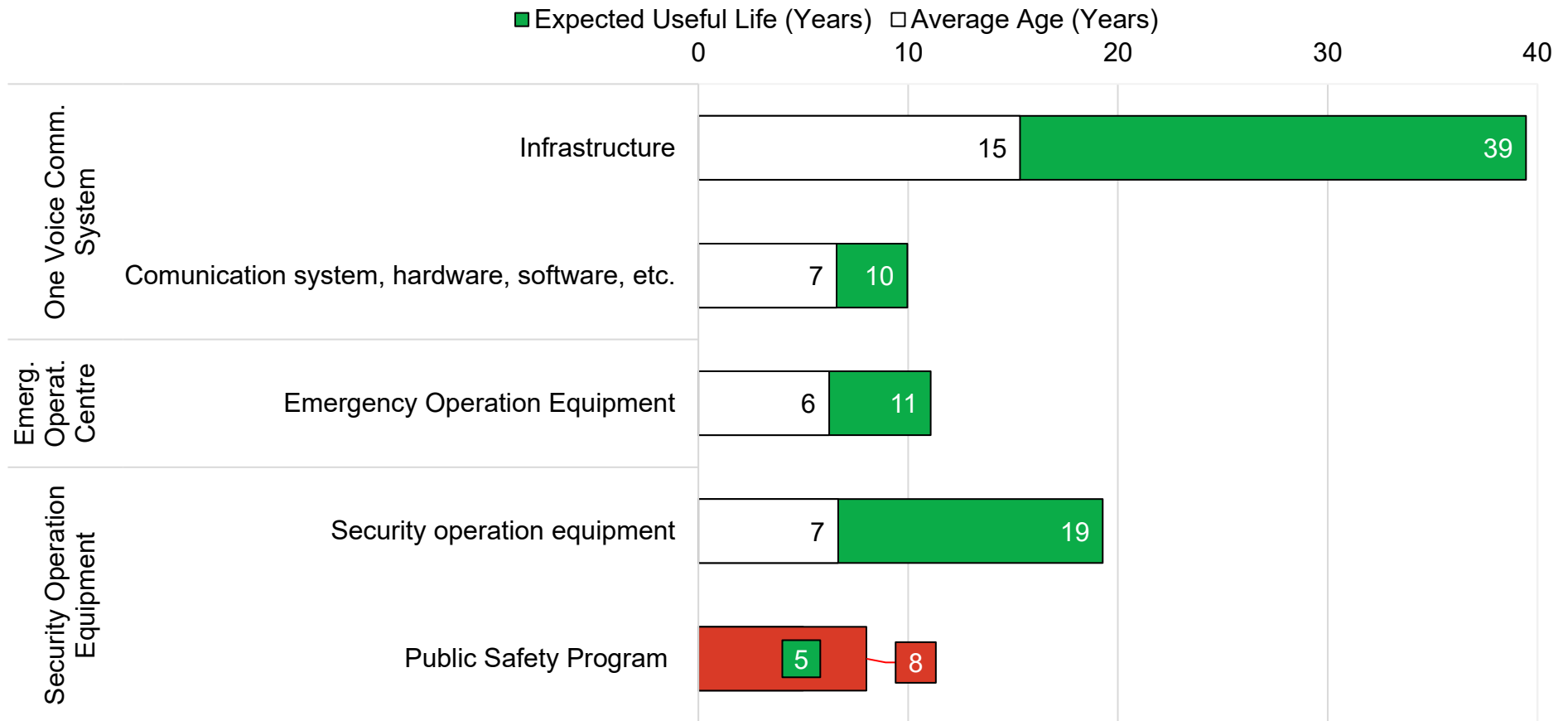


Figure 17.1 Average Age and Expected Useful Life (Emergency Management and Security Services)

17.1.3: Asset Condition

Figure 17.2 shows the condition distribution of all the Emergency Management and Security Services assets. As illustrated in the figure, 97% of all assets are in Good to Very

Good condition, with the remaining 2% and 1% in Fair and Poor condition respectively.

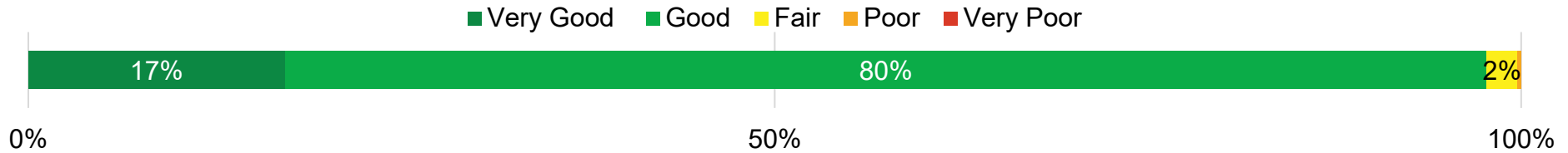


Figure 17.2 Overall Condition (Emergency Management and Security Services)

Figure 17.3 shows the condition distribution of each asset type within the Emergency Management and Security Service Area. As seen in the figure, most of the asset types are in Good to

Very Good condition; however, 10% of the Emergency Operation Equipment assets are in Fair condition, requiring near to medium term asset replacements.

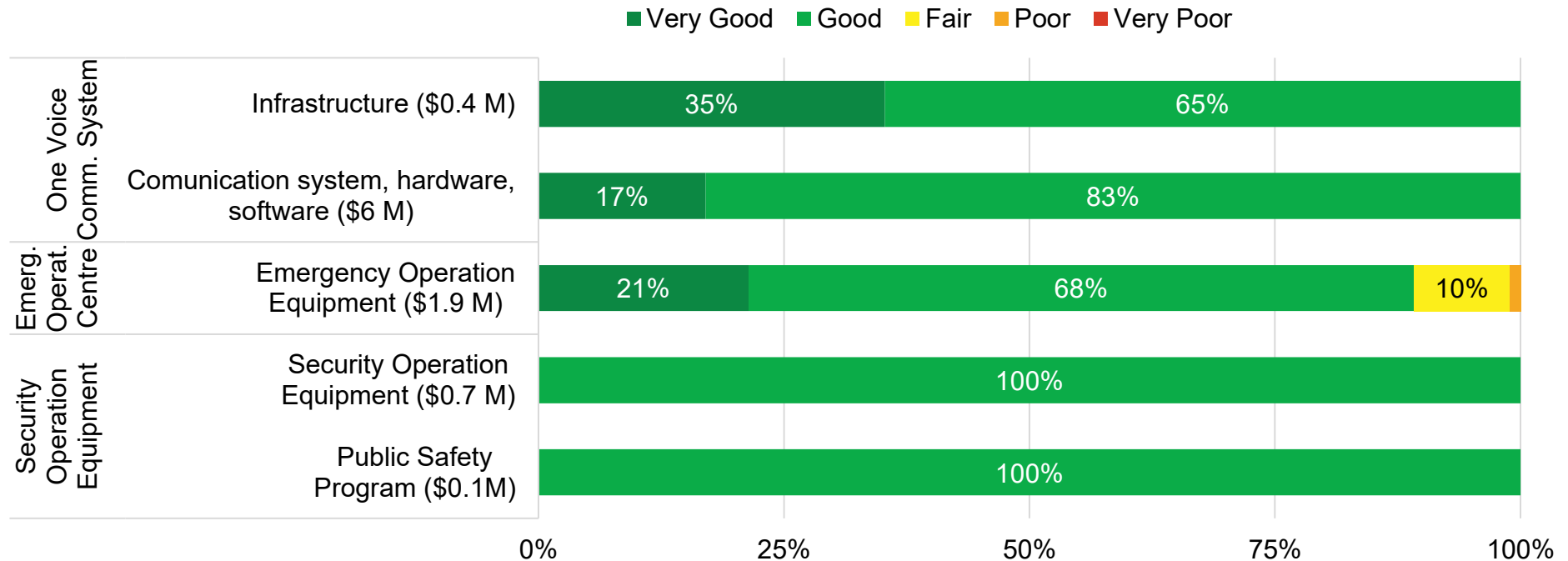


Figure 17.3 Asset Condition Detail (Emergency Management and Security Services)

17.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for Levels of Service (LOS) performance measures linked to Customer Values of Cost Efficiency, Customer Satisfaction, Reliability, Safety, and Scope.

Direct and Related LOS

After review with EMSS levels of service (LOS) considered most representative of EMSS' services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'direct LOS' and are listed in Table 17.2.

17.2.1: Direct Levels of Service

Table 17.2 Direct Levels of Service (Emergency Management and Security Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed LOS (2022 to 2031)
Cost Efficiency	Technical	Emergency Management and Security Services Reinvestment Rate	11.2%	11.2%
Customer Satisfaction	Customer/Council	Percentage of customer service requests completed	100%	100%
Reliability	Technical	Number of primary and alternate Emergency Operating Centres (EOC)	1 Primary and 1 Alternate EOC	1 Primary and 1 Alternate EOC
Reliability	Customer/Council	Percentage of Emergency Management and Security Services in Fair to Very Good condition	99.8%	100%
Safety	Technical	Compliance with Provincial Emergency Management and Civil Protection Act	100%	100%
Safety	Technical	Percentage of facilities that meet security standards (100% functional at all times)	100%	100%

LOS that have a causal relationship with direct LOS are documented in Table 17.3 as Related LOS but cannot be as readily costed to EMSS' services.

Metrics

Lastly, Table 17.4 list metrics that can are useful information, especially when considered in conjunction with Direct LOS, and Related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services EMSS provide.

17.2.2: Related Levels of Service

Table 17.3 Related Levels of Service (Emergency Management and Security Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Reliability	Technical	Percentage of Emergency Management and Security Services assets in Poor or Very Poor condition	0.2%
Safety	Technical	Percentage City owned 'Vulnerable' facilities with security cameras	100%
Safety	Customer/ Council	Annual number of public education/presentations sessions (in hours)	70 hours
Scope	Technical	Annual number of trainings, courses, exercises, and preparedness (in hours)	161 hours

17.2.3: Other Measures

Table 17.4 Metrics – Other Dashboard Measures (Emergency Management and Security Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Operating budget for Security Services and Emergency Management services	\$3,386,971
Cost Efficiency	Customer/ Council	Annual operating cost to provide service (\$/household)	\$19.39
Customer Satisfaction	Customer/ Council	Percentage of residents satisfied with the Emergency Management and Security Services Program	84%
Reliability	Technical	Percentage of time when camera systems are available and operating properly	100%
Reliability	Technical	Percentage of time when alarm systems are available and operating properly	100%
Reliability	Customer/ Council	Percentage of incidents that are successfully closed	100%
Reliability	Customer/ Council	Uptime of the Emergency Communication System	99.999%
Safety	Technical	Ontario Fire Code - A fire safety plan	100%
Safety	Technical	Ontario Fire Code - A working fire alarm system	100%
Scope	Technical	Number of Security Services customer service requests received	364,100

17.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City uses a strategy to maintain current LOS while striving to optimize costs and risks. This strategy involves applying a combination of activities throughout the lifecycle of the Emergency Management and Security Services assets. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and also regular investments in Plans such as the Core Area Action Plan and Corporate Energy Conservation and Demand Management Plan (CDM), while continuing to prepare for growth and introduce service improvements. The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, which may trigger asset investment needs.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across other service areas, such as Fire Department which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the Emergency Management and Security Services assets are selected, reviewed, and modified based on options considered through continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs. The following tables list the activities selected and regularly applied throughout the lifecycle of the Emergency Management and Security Services assets.

17.3.1: Current Levels of Service Lifecycle Activities, Practices or Planned Activities

The City uses a strategy of asset lifecycle activities to maintain current LOS while striving to optimize costs and risks. Table 17.5 specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A.

Table 17.6 classifies by each lifecycle activity risks related to these practices. The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 17.5 Current Asset Management Practices or Planned Actions (Emergency Management and Security Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Emergency Management and Security Services has refined inventory listings to track inventory, condition, and approximate replacement value. Assistance from internal divisions (i.e., Facilities, Fire etc.) and external experts is obtained with complex infrastructure, such as communications towers. Soft strategies (i.e., Council Policies) to mitigate adverse effects of high rises on communication system. The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, and other emergency planning, which may trigger asset investment needs.
Maintenance	One Voice Communication System – For One Voice infrastructure the requests are made through Police service area A work order system and online interface exists for City employees to generate requests of Facilities (The Communications system requests would go through London Police or through the vendor).

State of Infrastructure Report		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
	<ul style="list-style-type: none"> Structural analysis of towers occurs every 5 years, maintenance work as required. Technologists do regular checks. Facilities advised if any City owned assets (i.e., shelters) need repair. 7-year SLA with Vendor with annual preventative maintenance and required upgrades (software) and obsolescence protection <p>Emergency Operation Equipment – A work order system and online interface exists for City employees to generate requests of Facilities.</p> <p>Security Operation Equipment – conduct regular preventive maintenance.</p>					
Renewal/ Rehabilitation	<p>One Voice Communication System – Vendor determines end of life and end of service dates for Communication System but are given 5-year window from EOL to EOS, have planned out lifecycle of current equipment up to 2031.</p> <p>Emergency Operation Equipment – Generally little to nil rehabilitation expected; equipment typically replaced when not functional.</p> <p>Security Operation Equipment – Generally little to nil rehabilitation expected; equipment typically replaced when not functional.</p>					
Replacement/ Construction	<p>One Voice Communication System – Replacement activities determined with consultant assistance and with consultation of users and operators of the One Voice Communication System.</p> <ul style="list-style-type: none"> Replacement activities have been identified up to 2031, (i.e., replacement of one tower by 2 new towers) <p>Security Operation Centre – Replaced when asset is at the end of its useful life.</p> <p>Emergency Operation Equipment – Replaced when asset is at end of useful life.</p>					
Disposal	Appropriate and proper disposal occur when assets are replaced via related vendors.					
Service Improvement	<p>One Voice Communication System – Assessments are ongoing to determine the required needs for the Communication System, and what service improvements would be required.</p> <ul style="list-style-type: none"> Inclusion of new technologies to optimize system (i.e., simulcast) <p>Security Operation Equipment – Typically service improvements are not identified. If they are required, this service improvement need is the baseline required replacement and is considered a lifecycle replacement need.</p> <p>Emergency Operation Equipment – Typically service improvements are not identified. If they are required, this service improvement need is the baseline required replacement and is considered a lifecycle replacement need.</p>					
Growth	<ul style="list-style-type: none"> Additional tower will be built in Northwest sector of the City to improve coverage. Working to mitigate effects of intensification on radio system (potential involvement of consultant). Capital growth projects focused on capital growth are recognized via Development Charges and Emergency Management and Security Services (subject to the stipulations of <i>More Homes Build Faster Act, 2022</i>, 					

Asset Activity	Specific Asset Management Practices or Planned Actions
	<i>Development Charges Act, 1997</i> requirements and City of London policy), or under the purview of the Assessment Growth Policy (as relevant within the boundaries of municipal policy).

Table 17.6 Risks Associated with Asset Management Practices or Planned Actions (Emergency Management and Security Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Refer to Appendix A <ul style="list-style-type: none"> Legislative Changes
Maintenance	<ul style="list-style-type: none"> Completing planned maintenance activities, while managing the need to execute reactive maintenance activities. Incorrectly planned maintenance activities can lead to premature asset failure. Deliberate service disruption, i.e., sabotage or terrorist strike.
Renewal/ Rehabilitation	Refer to Appendix A.
Replacement/ Construction	Refer to Appendix A.
Disposal	Refer to Appendix A.
Service Improvement	Refer to Appendix A. <ul style="list-style-type: none"> Technology changes
Growth	Refer to Appendix A. <ul style="list-style-type: none"> Growth directly impacts asset (i.e., infill blocks line of sight)

17.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable in addition to maintain the overall average condition of all assets in Emergency Management and Security Services. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the forecasted change in the condition profile of

each asset type. However, while data exists for these assets, but they are not easily integrated into condition profile assessments Instead, information and commentary is provided are provided by EMSS assets based on three scenarios. The first is comments on current budget. The second scenario is the required investments to maintain the current LOS. The final scenario comments on investments required to achieve proposed LOS.

A. Scenario One: Planned Budget

The EMSS Services average annual activity and planned funding is summarized in Table 17.7. This scenario presents the budget constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity.

Current funding for operating budget and capital budgets are presented as the average of the budgeted 2020 and 2021 fiscal

years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years. Service Improvement activities are typically analyzed using planned expenditures identified through a review of the capital budget; however, there are no identified service improvement activities or budget.

There are no Growth activities in the 2021 Development Charges Background Study Update for Emergency Management and Security Services. All number in tables are rounded to nearest thousand.

Table 17.7 Scenario One - Average Annual Planned Budget (\$Thousands) (Emergency Management and Security Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	3,295	3,451
Renewal, Replacement, Rehabilitation, Disposal	1,100	1,021
Service Improvement	None identified	None identified
Growth Activities	None identified	None identified

B. Scenario Two: Maintain Current Levels of Service

Table 17.8 presents the investments required to maintain current LOS costing for Emergency Management and Security Services. The approach to establishing the maintain current LOS budget is to forecast the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets,

the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the current condition profile for these assets.

Table 17.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Emergency Management and Security Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	3,295	3,451
Renewal, Replacement, Rehabilitation, Disposal	1,100	1,021
Service Improvement	None identified	None identified
Growth Activities	None identified	None identified

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

There have been no identified needs to achieve proposed EMSS levels of service, Table 17.9 reiterates this.

Table 17.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Emergency Management and Security Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁶⁹	Achieve Proposed LOS Infrastructure Gap ⁷⁰
Operating Budget	3,451	None identified	None identified	None Identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	1,021	None identified	None identified	None Identified	None identified
Service Improvement	None identified	None identified	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified	None identified

⁶⁹Incremental investment to achieve proposed LOS excludes CEAP costs.

⁷⁰Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

17.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 17.10 and illustrated in Figure 17.4. The analysis is related to the lifecycle rehabilitation or replacement lifecycle activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities and in the case of heritage buildings, disposal is not an option. EMSS is projected to not

have an infrastructure gap and approved budget is available to address needs. There are no proposed levels of service identified that would create additional funding gaps. Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

Table 17.10 Average Annual Budget and Gap Analysis (\$Thousands) (Emergency Management and Security Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
EMSS	1,021	None identified	962	None identified	None identified	None identified	None identified

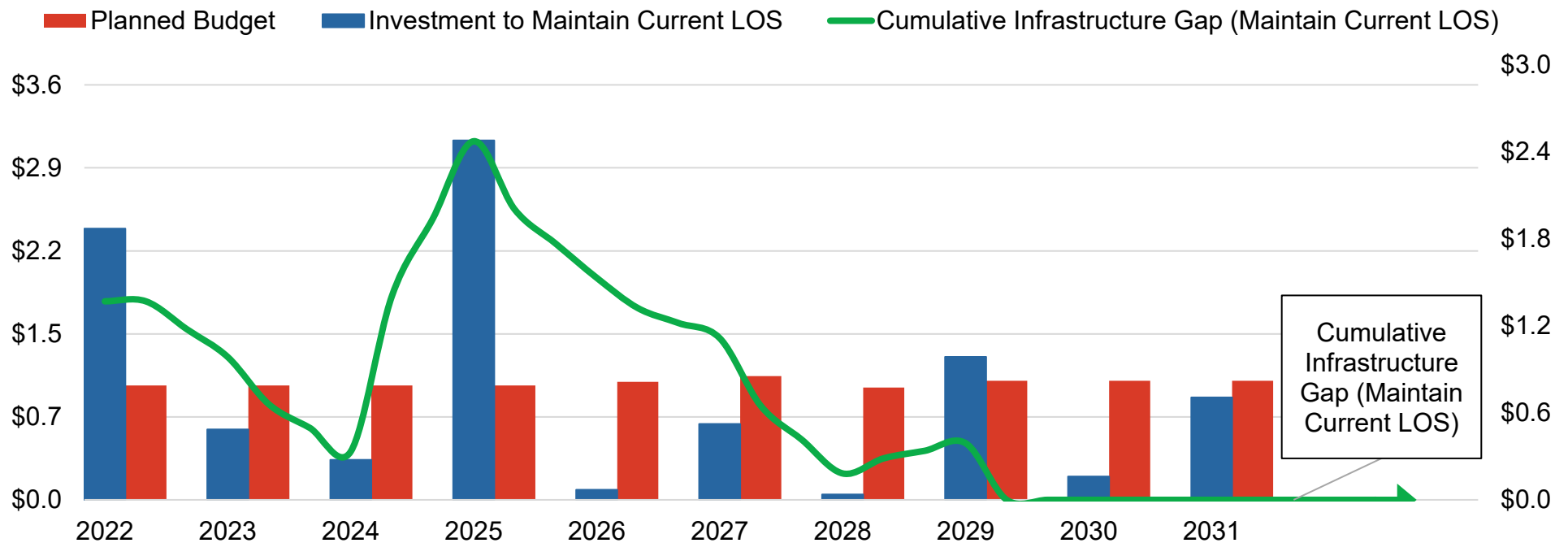


Figure 17.4 Maintain Current LOS Cumulative Infrastructure Gap (Millions) (Emergency Management and Security Services)

17.5: Discussion

17.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 EMSS assets condition comparison is provided in Figure 17.5. The increase in replacement value from \$8.8 million to \$9.1 million is attributable to inflation and supply chain shocks commencing during the COVID-19 pandemic, interest rate increases and skilled labour shortages. The 2019 CAM Plan projected an expected deterioration in assets due to an approximately \$6.4 million infrastructure gap over 10 years.

Nonetheless, this was mitigated by incrementing the annual funding allocation from about \$711,000 to \$1,020,000. Additionally, reassessing the condition of the assets in the portfolio, the year of acquisition, and fine-tuning the needed investments resulted in a positive outcome. As a result, the asset portfolio of EMSS is now in a Good condition and there is no identified infrastructure gap for EMSS projected for the forthcoming decade.

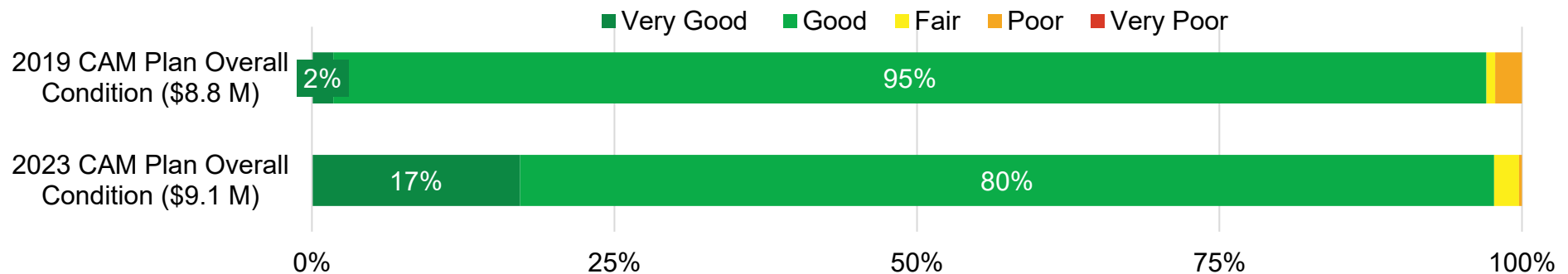


Figure 17.5 2019 CAM Plan to 2023 CAM Plan Condition Summary (Emergency Management and Security Services)

17.5.2: Current and Future Challenges

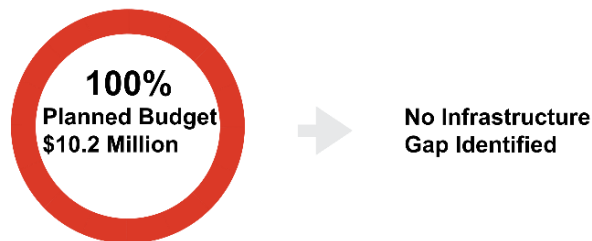
The lifecycle Management section included three scenarios. Scenario One planned budget presents the current level of planned expenditures for Emergency Management and Security Services assets. This total budget is sufficient to maintain current LOS. No CEAP or other achieve proposed LOS investments are identified. In line with the plan to maintain current LOS, the construction of a new communication radio tower is scheduled in 2024. This tower will replace the current aging structure, ensuring continued reliability in communication services.

The service area is also planning to build additional tower(s) to address Assessment Growth in the Northwest part of the City. The currently allocated funding for the upcoming ten years is adequate to maintain current LOS. However, there is a need for the EMSS to balance its requirements for the forthcoming decades. It is critical to pinpoint the most crucial needs and plan lifecycle activities accordingly. This is to prevent any potential risk of failure and ensure that these requirements align with the approved equal budget amount.

17.6: Conclusion

Valued at over \$9.1 Million, the City's Emergency Management and Security Services assets are overall in Good condition, indicating that there has been sufficient investment in sustaining these assets to maintain current LOS. No infrastructure gap is identified to maintain current LOS. Nonetheless, it is essential for the EMSS to balance its projected requirements for the

upcoming years. Identifying the most critical needs and planning lifecycle actions accordingly is of utmost importance. This strategy aims to mitigate any possible risks of failure and guarantees that these requirements correspond to the approved budget allocation. Figure 17.6 and Table 17.11 summarize key Emergency Management and Security Services data.



Investment to Maintain Current Levels of Service (10-Year Budget)
\$9.6 Million

Figure 17.6 Visualization of Maintain Current LOS Infrastructure Gap (Emergency Management and Security Services)

Table 17.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Emergency Management and Security Services)


Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁷¹
Emergency Management and Security Services	\$9.1		None Identified	None Identified	11.2%	8.4% to 11.2%



Figure 17.7 Accuracy Reliability Scale (Emergency Management and Security Services)

Accuracy and Reliability Commentary

As seen in Figure 17.7, data reliability and accuracy are rated as moderate to high. Valuation, condition, and investment forecasts for all technology assets are based on expert opinion. Emergency Management and Security Services databases have been enhanced in this CAM Plan; thus, the data reliability and accuracy are better than that previous CAM Plan 2019. EMSS needs to work with CAM to objectively assess the condition and future requirements of the assets and not to base it on asset lifecycles.

⁷¹ Source: Low end reinvestment rate is based on expected useful life and upper end is based on the budget to maintain current LOS.

Section 18. Fire Department

Asset Information	Fire
Replacement Value	\$176.0 Million
10-year Maintain Current Levels of Service Infrastructure Gap	\$41.7 Million
10-year Achieved Proposed Levels of Service Infrastructure Gap	\$47.5 Million

Quick Facts
14 Fire Stations
48 Emergency Vehicles



18.1: State of Local Infrastructure

As a principled approach to delivering effective and efficient fire protection services, the London Fire Department (LFD or 'Fire Department') executes the Office of the Fire Marshal's Three Lines of Defence to prevent and mitigate fire loss, injury, and death, and to promote firefighter safety within the community. The Three Lines of Defence or the 'Three Es' are:

- **Public Fire Safety Education** - The best way to stop fires is to proactively teach people about fire safety. These teaching programs educate the public on the dangers of fire, provide information to prevent fire, and provide the tools to ensure safe evacuation in the instance that a fire occurs.
- **Fire Safety Standards and Enforcement** - Enforcement of the Fire Protection and Prevention Act, 1997, to ensure that London is a fire safe community and comply with the Ontario Fire Code at time of inspection. LFD is legislatively responsible for conducting fire safety inspections, plan reviews, and fire investigations to ensure public safety.
- **Emergency Response** - When the first two lines of defense fail the London Fire Department will respond to calls for service for emergency and non-emergency calls.

LFD services primarily focus on two sections of Council's 2023-2027 Strategic Plan. These are, "Wellbeing and Safety", and "Well-Run City". In 2022, LFD responded to approximately 13,000 calls (emergency and non-emergency) pertaining to structure fires, carbon monoxide alarm with symptoms to individuals, medical assistance calls with EMS such as cardiac arrest, motor vehicle collisions, water rescues, open air burn complaints, smoke alarms sounding with no signs of smoke or fire, and public assistance calls. Furthermore, LFD also has

mutual and automatic aid agreements with some neighbouring municipalities. To support these services the City maintains an array of facilities, vehicles, and equipment, valued at over \$175 Million. These assets range from specialized stations and training facilities, a myriad of fire and rescue vehicles, specialized equipment, and emergency apparel, to more common assets such as passenger vehicles (cars, vans, pickup trucks and trailers). Because of the specialized nature of its emergency response vehicles, Fire is responsible for maintaining their own fleet and equipment.

18.1.1: Asset Inventory and Valuation

LFD inventory includes two Asset Types: Fire Stations and Facilities and Vehicles and Equipment. Each asset type has several assets in which they are grouped according to their characteristics. Table 18.1 summarizes the LFD owned assets inventory and their replacement value. In addition to a large fleet of fire trucks and other vehicles, trailers and specialized firefighter equipment needed by the department for emergency response, LFD owns 14 fire stations (with a fifteenth in development), and several other facilities that are used for services or training. The assets replacement values have been identified using different City databases including JD Edwards, VFA Capital Planning software, and internal expert opinion.

Stations and Facilities

LFD is comprised of 14 fire stations located strategically throughout the City. Administrative headquarters, Fire Prevention and Public Education, and Dispatch and Communications are located at Headquarters in conjunction with Fire Station 1 on Horton Street. A training centre with a classroom a training tower and a storage garage is located at Station 9 on Wellington Road. Station 2, on Florence Street, has

the Apparatus Division adjacent to it. The triple bay, double deep garage facility is used to repair and maintain the large fleet of fire trucks and other vehicles, trailers, and specialized firefighter equipment needed by the department for emergency response. Table 18.1 summarizes the Fire department owned assets inventory and their replacement value.

Vehicles and Equipment

Fire Vehicles and Heavy Equipment are comprised of a variety of Primary Response Vehicles such as Engines, Pumper Rescues, Quints, Aerial Ladders, Aerial Platforms, Tankers, and a Rescue Truck. Also included are specialized Technical Rescue, Hazardous Material and Water/Ice Rescue units. Secondary Response Vehicles include pickup trucks, for

Command Vehicles and deployment of specialized equipment, as well as Spare Apparatus. These Spare Apparatus are used for training and are brought into primary use when the main apparatus is undergoing maintenance. Non-emergency utility vehicles consist of standard cars, trucks, and vans for administrative, service, inspection, investigation, and public education use.

Fire Fighting Apparel and Light Equipment is made up of uniforms and a vast array of specialized personal protective, firefighting, and rescue equipment.

Communication Equipment and Software is made up of a vast array of specialized emergency communication infrastructure, tools, software, and equipment.

Table 18.1 Inventory and Valuation (Fire Department)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Stations and Facilities	Fire Station	14	Each	\$90,453
	Training Tower	1	Each	\$2,377
	Training Building	2	Each	\$8,114
	Storage Garage	1	Each	\$125
	Fueling Station	1	Each	\$7
	Fire Station sites	15	Each	\$3,204
Vehicles and Equipment	Emergency Vehicles	48	Each	\$54,115
	Non-Emergency Vehicles and Equipment	45	Each	\$2,590
	Fire Fighting Apparel and Light Equipment	A mix	Each	\$10,004
	Communication Equipment and Software	A mix	Each	\$5,000
Total				\$175,989

18.1.2: Age Summary

Figure 18.1 shows the London Fire Department average asset age as a proportion of the average useful life by asset type. In most cases, the average age for all facilities and equipment was calculated using the recorded construction date in VFA (Facilities Management) software. City GIS and/or other databases such as Tangible Capital Assets (TCA) database were also used as a source of information. As shown in Figure 18.1, in general all asset types are within their final third or quarter of expected useful life. There are two instances (Training Tower and Fueling Station) which the asset's age is exceeding its expected useful life.

It is important to note that 40 years was selected as the expected useful life based on the non-structural components of buildings which have the longest expected service life. In practice the many components that comprise a building are slated for renewal based upon a combination of factors including age, condition, consequence of failure, likelihood of failure etc. and the practical expected life is largely indefinite while the building continues to serve the practical expected life is largely indefinite while the building continues to serve its intended/required purpose in its given geographic location.

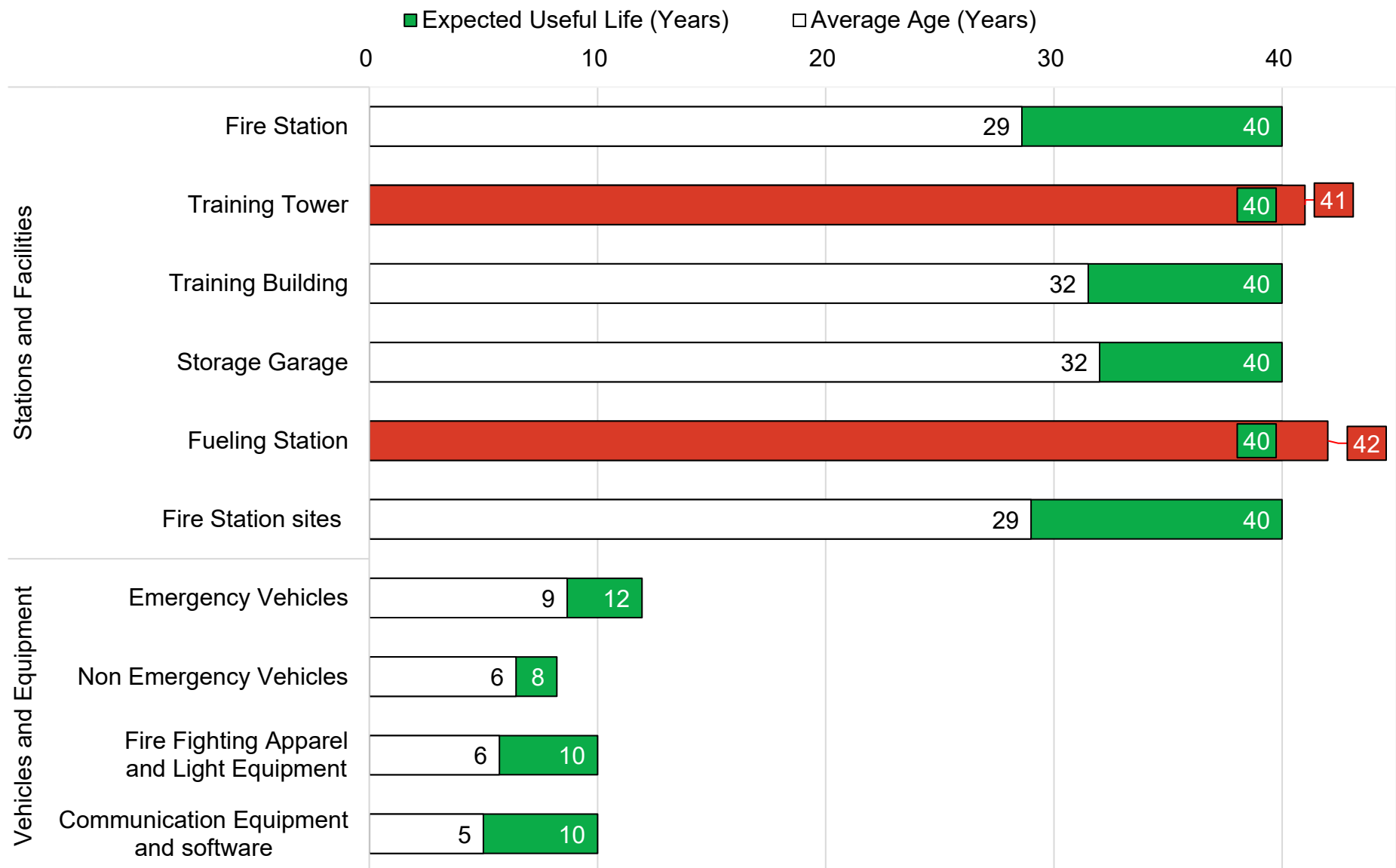


Figure 18.1 Average Age and Expected Useful Life (Fire Department)

18.1.3: Asset Condition

Figure 18.2 presents the condition distribution of all LFD assets. As shown, 68% of the assets are in Fair to Very Good condition and approximately 32% are in Poor to Very Poor condition. Assets are evaluated on a rotating basis using a standard approach and rating system. Deficiencies are identified and scheduled for resolution through capital and operating investments. Care is taken to maintain mission critical assets impacting the delivery of front-line service.

Equipment and vehicle assets are managed centrally by the Apparatus Division of the London Fire Department. Under its current maintenance program, every front-line fire and rescue vehicle is inspected and maintained at least monthly, with a goal that any issues are addressed before they occur. Further to these quick inspections, every vehicle undergoes a more comprehensive inspection every six (6) months, as well as annually. The latter is a requirement by the Ministry of Transportation. At present, the condition of these assets is tied

to age and expected useful life and not a full assessment of the actual condition of the assets.

Replacement dates and maintenance regimes are set when equipment and vehicle assets are brought into inventory. Assets are maintained in serviceable condition, with replacement occurring on a planned basis as assets reach the end of their useful life. Where practical, retired vehicles are sold off and the associated proceeds used to offset the purchase of new vehicles.

Equipment may be traded during replacement to achieve cost efficiencies and accomplish convenient disposal at the same time. However, the trend of vehicle sales is minimal sale proceeds.

In some cases, retired vehicles and equipment are not decommissioned but rather used by the Training Division or held by the Apparatus Division as back up or for parts. This practice is described as allocating assets to 'spare'.

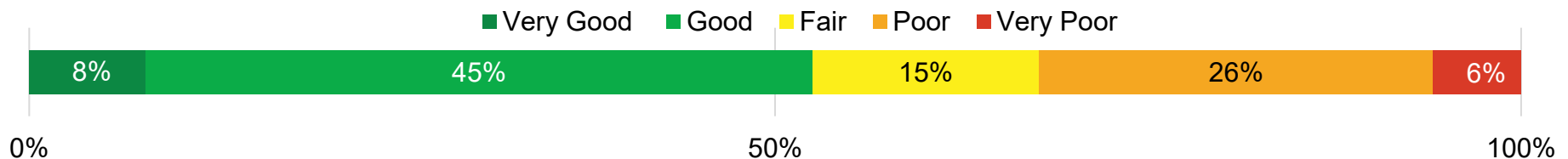


Figure 18.2 Overall Condition (Fire Department)

Stations and Facilities (Buildings) have significant portions in Poor to Very Poor condition as seen in Figure 18.3. Investment needs are identified and prioritized based on service impact and addressed operationally and through capital renewal. The ratings presented represent the physical condition of the building and not a representation of the functionality required to satisfy Fire Department's requirements (i.e. size, location, ability

to accommodate certain types of crews or equipment). An industry standard Facility Condition Index (FCI) was used to calculate the condition of the stations and facilities in which it considers the capital needs for repairs and renewals in proportion to the replacement value of the building. During the CAM Plan development, it was noticed that some facilities data in the City's databases was not recently updated. This data was

reviewed and refined by Facilities division staff based on their expert opinion. This strategy proved effective for most of the buildings that were reviewed.

Emergency Vehicles and Equipment condition is distributed through all condition ranges, with the majority in Fair to Poor condition. Figure 18.3 presents the condition of the Emergency (Front Line) Vehicles based on age and expected useful life estimates for each unit, and not yet on formal condition assessment or maintenance review records. However, Fire Fleet recently underwent a process assessment with a consultant and LFD is enhancing internal controls, policies and procedures relating to Fire Fleet operations. They are transitioning to tracking Fire Fleet Key Performance Indicators (KPI). These KPIs align with CAM methodology of tracking Direct and Related Levels of Service (see following pages for outlined Levels of Service). Given their critical nature, Emergency Vehicle assets are rigorously maintained to support the reliable delivery of front-line service. They receive daily, monthly and more rigorous biannual and annual inspections. Historically LFD has followed approximately 17-year lifespan for front line Emergency Vehicles, before they would transition as a spare for three years. Mechanical staff and crews are observing that fire trucks require more and more repairs, particularly after the 13-year mark. In addition, the recently approved LFD Fire Master Plan Action Plan outlines how The Insurance Board of Canada and the Fire Underwriters Survey recommends all front-run vehicles be replaced on a 15-year cycle for larger cities. Therefore, LFD proposed alignment of Emergency Vehicle 12 years of front-line unit estimated life (FUEL), and 3 years End of Lifecycle (ELC) as a spare vehicle. This is anticipated to enhance the overall condition of the assets, reduce staff and repair costs in the long run and allow Apparatus mechanics to

focus better on preventative maintenance. However, there will be a transition period where vehicles initially purchase with an expected FUEL greater than 12 years will still follow their originally expected lifecycle of approximately 17 years. This transition period may last eight to ten years as it is impractical to replace all Emergency Vehicles en bloc to align with the new expected useful life of 12 years.

Non-Emergency Vehicles condition is generally in either Very Good or Very Poor condition as seen in Figure 18.3. The estimated useful life of these assets range from 7 to 10 years given the general nature of the vehicles (such as SUVs or Trucks).

Fire Fighting Apparel and Light Equipment condition is distributed on all condition ranges based solely on age and expected useful life. As with Front Line Vehicles and Equipment, these assets are rigorously tested and maintained to support the reliable delivery of front-line service. Assets no longer capable of meeting these requirements are tagged out of service and flagged for replacement. Assets due for replacement per regulation are removed from service and replaced. The department has a capital plan for replacement of this equipment on a cyclical basis.

Communication Equipment and Software condition is distributed on all condition ranges based solely on expert opinion as detailed inventory is not currently available. LFD is currently working on developing a detailed inventory for the emergency communication equipment.

This assessment of Fire's assets relies heavily on age and estimated useful life. It is not a standardized formal conditional assessment. Further investigation is needed to determine the condition of Fire's asset base with greater accuracy.

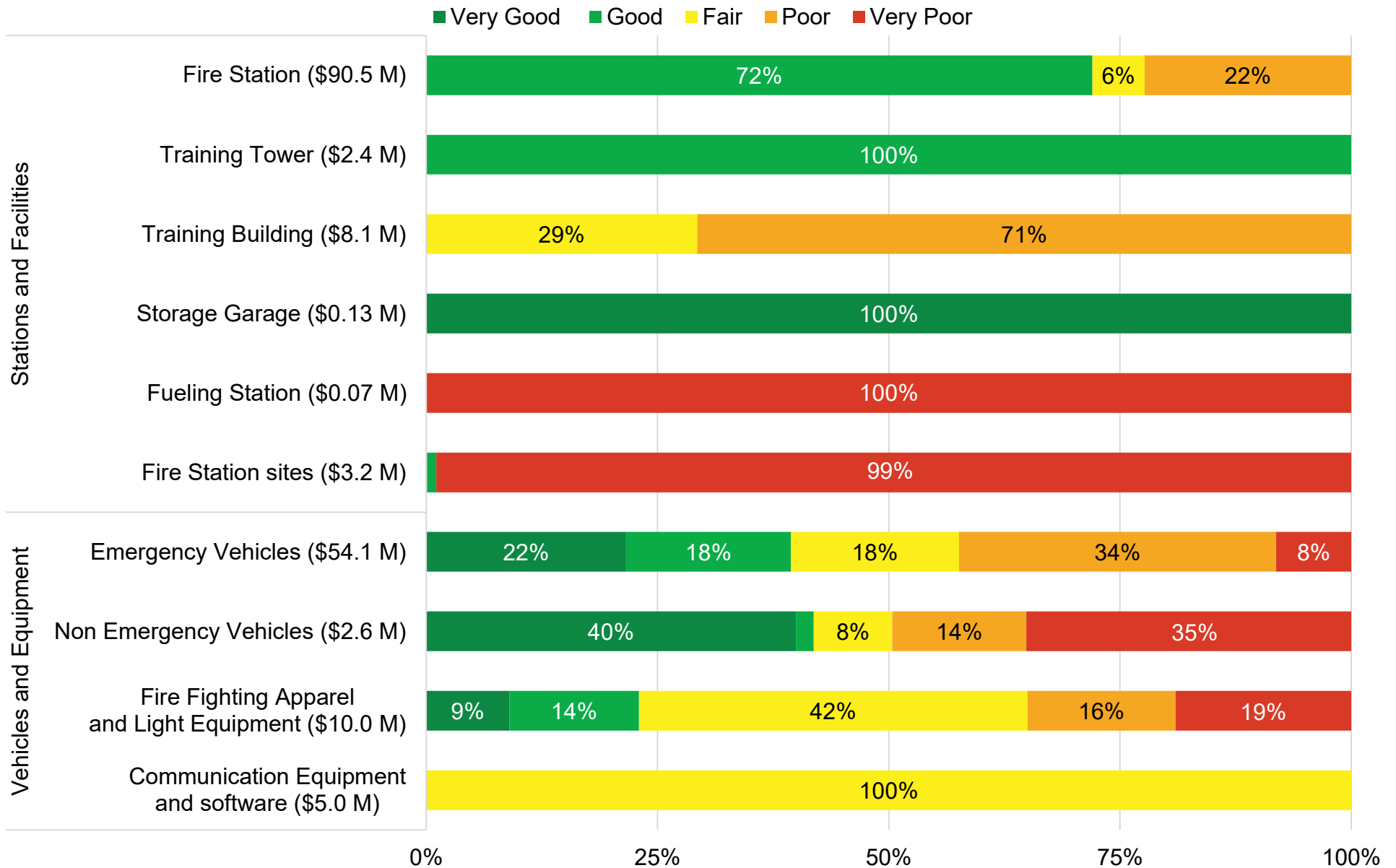


Figure 18.3 Asset Condition Detail (Fire Department)

18.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan is striving for levels of service (LOS) performance measures linked to Customer Values of Accessible, Cost Efficiency, Customer Satisfaction, Environmental Stewardship, Reliability, Safety, and Scope.

Direct and Related LOS

After review with Fire, LOS considered most representative of Fire Department and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'direct LOS' and are listed in Table 18.2.

18.2.1: Direct Levels of Service

Table 18.2 Direct Levels of Service (Fire Department)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed Target (2022 to 2031)
Cost Efficiency	Customer/ Council	London Fire Department Reinvestment Rate	2.1%	3.5%
Environmental Stewardship	Technical	Annual electric energy consumption per square foot	10.66 KWH/sf	Reduce
Environmental Stewardship	Technical	Annual natural gas consumption per square foot	1.254 m3/sf	Reduce
Environmental Stewardship	Customer/ Council	Annual water consumption per square foot	0.052 m3/sf	Reduce
Reliability	Customer/ Council	Percentage of Fire assets in Fair or better condition	68%	Maintain current

LOS that have a causal relationship with direct LOS are documented in Table 18.3 as related LOS but cannot be as readily costed to Fire Department.

Metrics

Lastly, Table 18.4 listed metrics that can be useful information, especially when considered in conjunction with direct LOS, and related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Fire provides.

18.2.2: Related Levels of Service

Table 18.3 Related Levels of Service (Fire Department)

Customer Value	Focus	Service Performance Measure	2021 Performance
Cost Efficiency	Technical	Fire stations and Facilities reinvestment rate	0.8%
Cost Efficiency	Technical	Emergency Vehicles reinvestment rate	2.6%
Cost Efficiency	Technical	Non-emergency Vehicles and Equipment reinvestment rate	8.1%
Reliability	Technical	Percentage of Fire stations and Facilities in Poor or Very Poor condition	27.9%
Reliability	Technical	Percentage of Emergency Vehicles in Poor or Very Poor condition	42.4%
Reliability	Technical	Percentage of Non-emergency Vehicles and Equipment in Poor or Very Poor Condition	27.2%
Reliability	Technical	Total number of calls to Fire stations	11,165 (9,103 Emergency, 2,062 Non-Emergency)

18.2.3: Other Measures

Table 18.4 Metrics – Other Dashboard Measures (Fire Department)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Operating dollars budget for London Fire Department (Fire and Rescue and Fire Prevention)	\$67,012,824
Cost Efficiency	Customer/ Council	Annual operating cost to provide service (\$/household)	\$383.68
Customer Satisfaction	Customer/ Council	Percentage of community satisfied with London Fire Department	84%
Environmental Stewardship	Customer/ Council	Percentage of environmentally friendly foam used	100%
Reliability	Technical	Average age of frontline fleet	8.6
Reliability	Technical	Readiness to respond to all types of emergencies	100%
Reliability	Technical	Percentage of time when equipment is available and operating properly	100%
Safety	Technical	Number of Non-Emergency Incidents	2,062
Safety	Technical	Number of fire apparatus/vehicles (frontline fleet)	48
Safety	Technical	Ratio of apparatus/vehicles in service versus required	1.0

18.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs.

The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan, which may trigger asset investment needs.

18.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current levels of service while striving to optimize costs and risks. Table 18.5 lists specific asset management practices or planned actions the City conducts for each lifecycle activity.

Generic lifecycle activities are described in Appendix A.

Overview of Service Area Sections.

Asset management practices or planned actions employed by cities can entail certain specific risks. Many types of risks such as health and safety, financial, environmental, etc. are summarized in Table 18.6 classified by each lifecycle activity. The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 18.5 Current Asset Management Practices or Planned Actions (Fire Department)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> • Fire assets are rigorously maintained to support the reliable delivery of front line service. They receive monthly and more rigorous biannual and annual inspections. • Fire facilities are maintained and renewed through the Facilities group and their use of VFA software (supplied through VFA), which combined with comprehensive condition assessments and Facilities experience, determines the lifecycle management needs of a facility. • The lifecycle management needs include the direct care of the building envelope, mechanical and electrical systems, etc. • Fire manages their assets based on a ten year capital budget plan that defines the investments needed to support ongoing facility improvements. Single purpose Fire Engines and dedicated Rescue Units are being replaced over the long term with multi-purpose vehicles capable of providing more operational flexibility, resiliency and depth of coverage; resulting in a change of the configuration of the Fire fleet through attrition. • Fire leadership networks with peers through conferences and committees to learn from other's experience.
Maintenance	<ul style="list-style-type: none"> • Fire Facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (splits into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA), the cost and timing of replacement requirements. • A work order system and online interface exists for Fire admin to generate requests of Facilities. • Fire vehicles and equipment are monitored and problems addressed when triggered by staff/fleet observations. • Tender and RFP specifications are modified based on experience from usage of vehicles and equipment, to minimize recurrence of the issues, where possible.
Renewal/Rehabilitation	<ul style="list-style-type: none"> • Fire Facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (splits into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities personnel, and computer software programs used by Facilities (VFA) personnel, the cost and timing of replacement requirements. • Equipment is generally not considered a rehabilitation option. The lifecycle activity is regular maintenance and the decision to replace the asset. • Fire vehicles are rehabilitated/replaced by their own Apparatus Division.
Replacement/Construction	<ul style="list-style-type: none"> • Fire Facilities are regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the

Asset Activity	Specific Asset Management Practices or Planned Actions
	<p>facilities (splits into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA), the cost and timing of replacement requirements.</p> <ul style="list-style-type: none"> Vehicle and equipment assets ideally are used to end of useful life. When unexpected events occurs then the asset would have to be immediately replaced.
Disposal	<ul style="list-style-type: none"> Fire would coordinate to ensure buildings are disposed or transitioned to other uses.
Service Improvement	Refer to Appendix A.
Growth	<ul style="list-style-type: none"> Capital growth projects are identified by Development Charges (subject to <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i> requirements and City of London policy), or as a part of Assessment Growth Policy (where applicable with municipal policy).

Table 18.6 Risks Associated with Asset Management Practices or Planned Actions (Fire Department)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> Lack of a realization of the benefit from the activity (i.e. the life is not extended or the cost of managing an asset increases rather than decreases). Improper usage or illegal buildings may result in higher risk of fire or loss in the event of fire for citizens and the Fire department.
Maintenance	Refer to Appendix A.
Renewal/ Rehabilitation	Refer to Appendix A.
Replacement/ Construction	Refer to Appendix A.
Disposal	Refer to Appendix A.
Service Improvement	Refer to Appendix A.
Growth	<ul style="list-style-type: none"> Incorrect growth assessments may result in overabundance or under abundance of Fire Stations and Facilities assets.

18.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the forecasted change in the condition profile of each asset type. Figure 18.4 shows the projection of the condition of the Fire assets based on three scenarios. The projected condition with current budget, maintain current LOS and achieving proposed LOS condition projection. The figure

also shows planned budget, the required investments to maintain the current LOS and Investments to achieve proposed LOS, which include a Facilities ‘green premium’ estimate. These are considered the first, but not comprehensive, investments in the City’s Climate Order of Magnitude and Climate Emergency Action Plan implementation.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

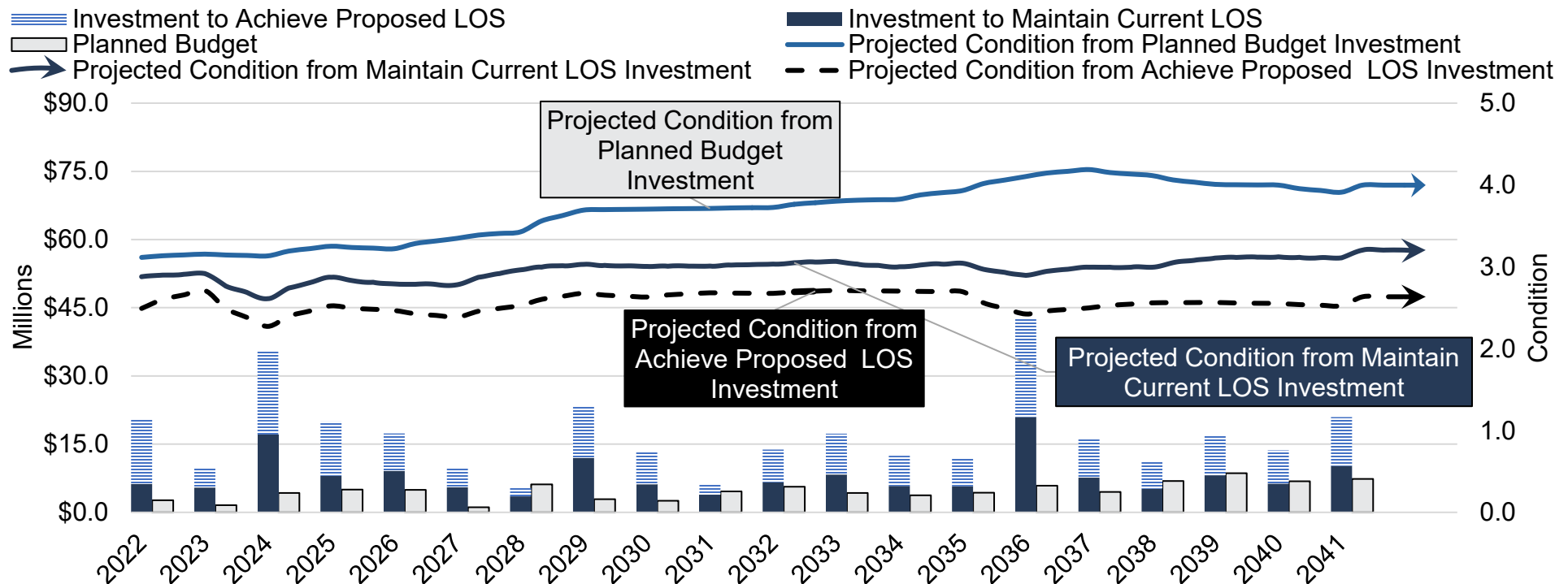


Figure 18.4 Projected Service State of Three Funding Scenarios (Fire Department)

A. Scenario One: Planned Budget Condition Profile

The Fire average annual activity and planned funding is summarized in Table 18.7. The condition profile expected from the planned budget is forecasted by using the same logic related to condition degradation rates and appropriate condition triggers for rehabilitation/replacement activities, but the budget is constrained to the current level of planned expenditures. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity. Figure 18.5 presents the expected condition profile for the next 20 years based in the current budgets for Fire assets. This scenario

indicates the condition profile trending to assets ranging from Very Good to Very Poor condition.

Current funding for operating budget and capital budgets are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years.

Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget. Growth activities are analyzed using the 2021 Development Charges Background Study Update. Major upcoming projects relate to building and outfitting Fire Station 15.

Table 18.7 Scenario One – Average Annual Planned Budget (\$Thousands) (Fire Department)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	66,352	69,234
Renewal, Replacement, Rehabilitation, Disposal	2,192	3,645
Service Improvement	100	1,100
Growth Activities	100	598

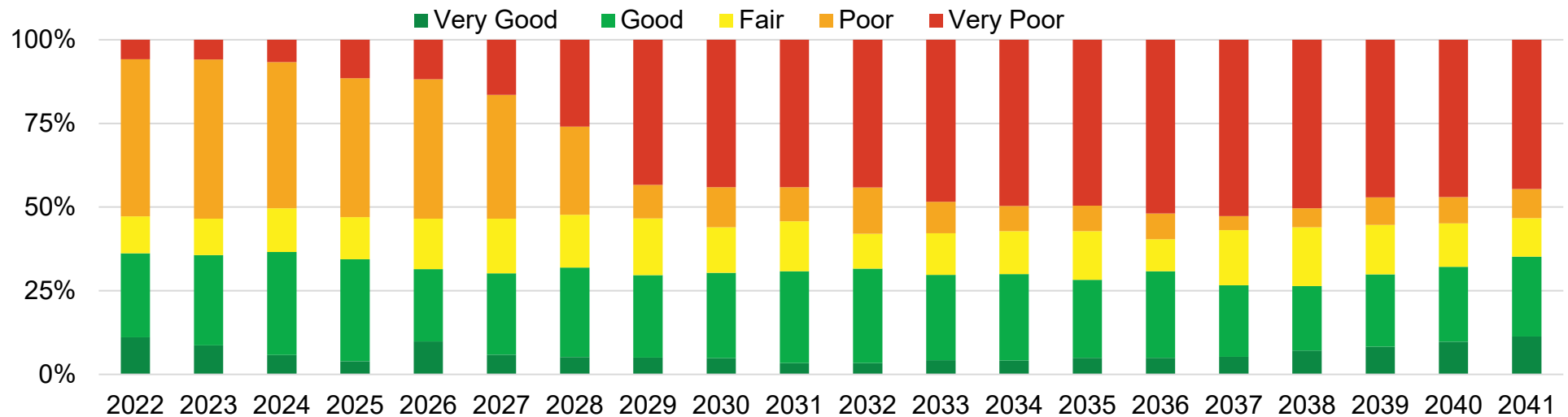


Figure 18.5 Projected 20-year Planned Budget Condition Profile (Fire Department)

B. Scenario Two: Maintain Current Level of Service Condition Profile

The cost to maintain current LOS are summarized in Table 18.8. This scenario forecasts the lifecycle activities that are required to maintain the current performance of the LOS metrics. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are

adjusted until the forecasted condition profile meets the current condition profile for these assets. Figure 18.6 presents the expected condition profile for the next 20 years based on investment required for maintain current LOS for Fire assets. This scenario indicates the condition profile trending to most assets being in Very Good to Fair condition.

Table 18.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Fire Department)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	69,234	None identified	69,234	None identified
Renewal, Replacement, Rehabilitation, Disposal	3,645	200	8,028	4,183
Service Improvement	1,100	None identified	1,100	None identified
Growth Activities	598	None identified	598	None identified

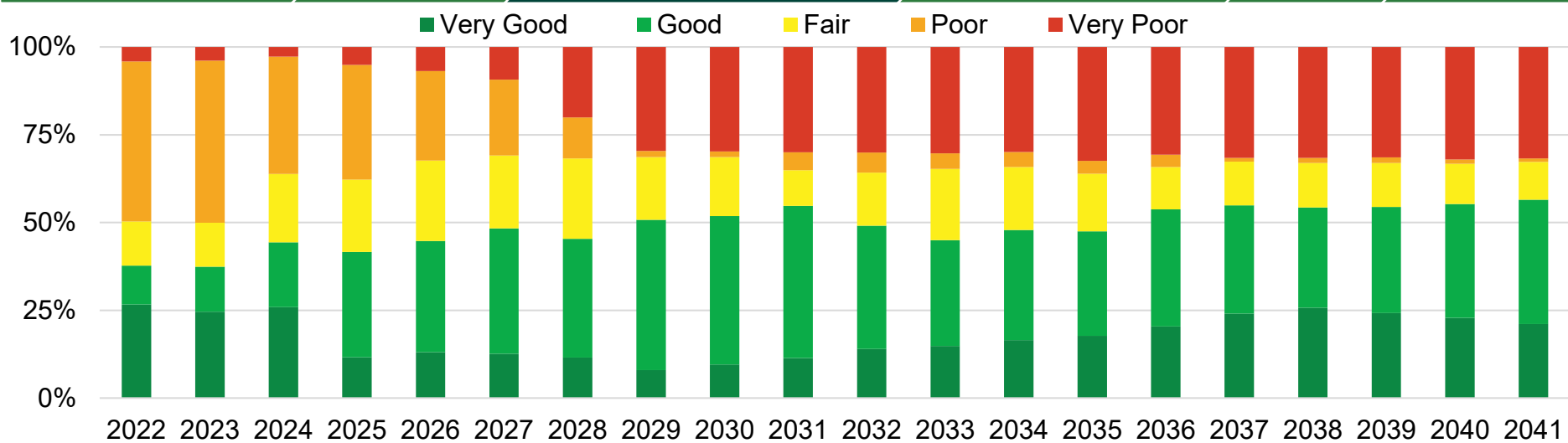


Figure 18.6 Projected 20-year Maintain Current LOS Condition Profile (Fire Department)

C. Scenario Three: Achieve Proposed Level of Service Condition Profile

The cost to achieve proposed LOS are summarized in Table 18.9. This scenario forecasts the lifecycle activities that are required to achieve the proposed LOS. The analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the expectation of the City’s staff involved with the management of the assets. The future lifecycle activities that are required to achieve the desired condition profile are then used to establish the average annual investment to achieve the proposed LOS condition profile.

Figure 8.7 presents the expected condition profile for the next 20 years based on investment required for achieving proposed LOS for Fire assets. This scenario indicates the condition profile trending to nearly all assets being in Very Good to Fair condition.

The assessment is underway to determine the cost associated with implementing the Climate Emergency Action Plan (CEAP) and achieving the proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

Table 18.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Fire Department)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁷²	Achieve Proposed LOS Infrastructure Gap ⁷³
Operating Budget	69,234	None identified	None identified	69,234	None identified
Renewal, Replacement, Rehabilitation, Disposal	3,645	200	274	297	4,754
Service Improvement	1,100	None identified	None identified	1,100	None identified
Growth Activities	598	None identified	None identified	598	None identified

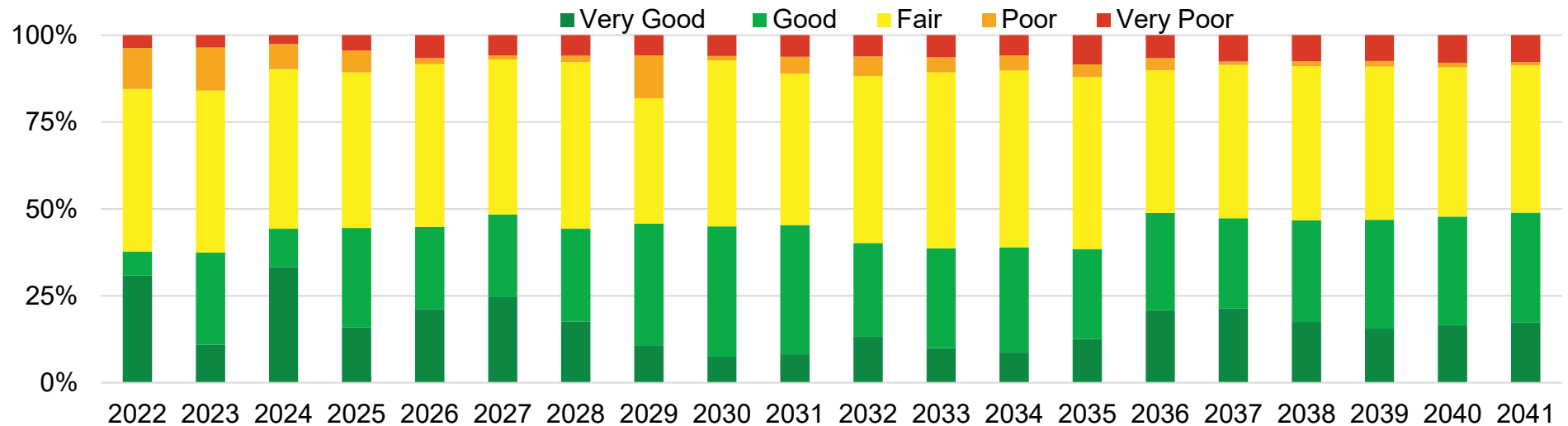


Figure 18.7 Projected 20-year Achieved Proposed LOS Condition Profile (Fire Department)

If funding for proposed levels of service is not sufficient, the City will:

- 1) Continue lifecycle activities to maintain current levels of service;
- 2) Carry out the Climate Emergency Action Plan within current funding scope. A green initiative life cycle

- 3) Carry out the construction for provision of new facilities where growth funding can be leveraged or based on priority (as per the Master Plan).
renewal activity may be otherwise not feasible. The pumping station asset would otherwise be functional but not addressing green initiative strategic needs;

⁷²Incremental investment to achieve proposed LOS excludes CEAP costs.

⁷³Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

18.4: Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 18.10 and illustrated in Figure 18.8. The analysis documented above is related to the lifecycle rehabilitation or replacement lifecycle activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

The maintain current LOS infrastructure gap is expected to be approximately \$41.8 million over a 10-year period. Trends are primarily driven from Emergency Vehicles and Stations/Facilities

needs. Achieving proposed LOS infrastructure gap is expected to be approximately \$47.5 million over a 10-year period. Investment to achieve proposed LOS is to address all needs relating to Facilities. The needs listed for Emergency and Non-Emergency Vehicles are identical to maintain current LOS.

The preliminary estimate for CEAP funding in Facilities includes incorporating 'green premium' into lifecycle management needs. This means that instead of simply replacing existing infrastructure with a similar one like for like', there will be an increased focus on incorporating green infrastructure replacements whenever feasible.

Table 18.10 Average Annual Budget and Gap Analysis (\$Thousands) (Fire Department)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Stations and Facilities	795	80	2,559	274	297	1,684	2,255
Emergency Vehicles	1,419	105	3,726	None identified	None identified	2,202	2,202
Non-emergency vehicles, Equipment, and software	1,431	15	1,743	None identified	None identified	297	297
Fire	3,645	200	8,028	274	297	4,183	4,754

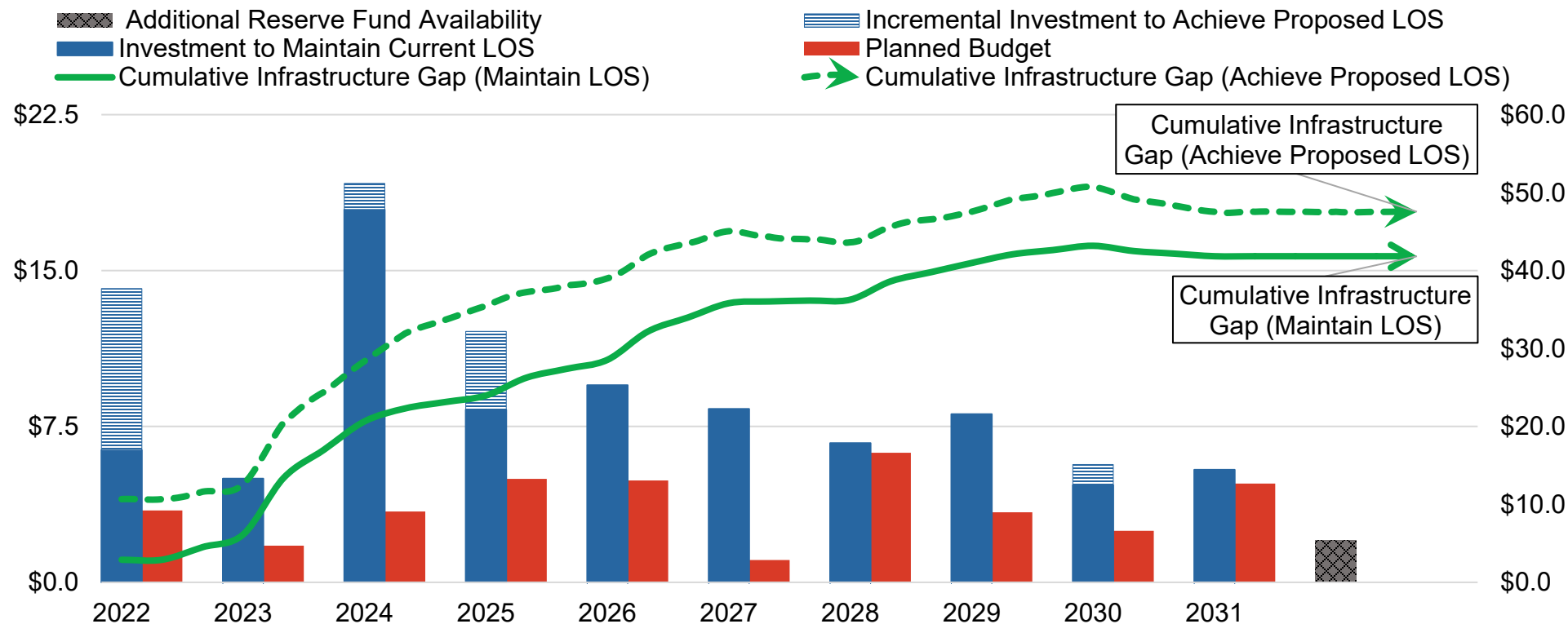


Figure 18.8 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Fire Department)

The estimates for the Fire infrastructure gap are based on anticipated useful lives and replacement values derived from expert opinion, and Facilities data collected in the City’s VFA software.

Evaluating Fire’s maintain current LOS infrastructure gap over the next decade is largely driven by the Emergency Vehicle needs. The recently adopted Fire Master Plan Action Plan is phasing out previous vehicle expected useful life to generally 12 years (in line with industry best practices). When combined with Emergency Vehicle cost pressures it accounts for over half of the maintain current LOS gap needs. Facilities are also experiencing cost pressures, as consistent with Facilities across

the City. Non-Emergency Vehicles have also experienced cost pressures, but the quantum is smaller given they comprise less than 2% of replacement value.

If forecasted reserve fund balances are not achieved this will significantly increase Fire’s infrastructure gap. Furthermore, it is noted that risk assessment and consequence of failure is not explicitly addressed for Fire assets in this CAM Plan analysis. Once a risk assessment methodology is embedded in asset management analysis, it may have a material impact on needs identified for Fire infrastructure gap.

18.5: Discussion

18.5.1: Comparing 2019 and 2023 Asset Management Plans

The 2019 to 2023 Fire condition comparison is provided in Figure 18.9. The 2019 CAM Plan condition data used VFA database information and detailed vehicle listings. The 2023 CAM Plan continued this trend, noting that given frequent recurring cost pressures with Vehicles, and a recently completed Fire Fleet audit and Fire Master Plan Action Plan, resulted in asset listings aligned with recent Fire strategic updates.

The change in condition profile is attributed to a greater percentage of Facilities in Good condition. The cumulative 10-year infrastructure gap from the 2019 CAM Plan was

approximately \$28.5 million. Currently there is a \$41.8 million maintain current LOS gap identified for Fire assets and a \$47.6 million achieving proposed LOS gap. The gap increase is primarily attributed to cost pressures identified with Emergency Vehicles and Facilities. For example, Emergency Vehicle replacement values were \$17.9 million in 2019 CAM Plan and now approximate \$54 million. Stations and Facilities were approximately \$63 million and now are approximately \$104 million. The 2019 CAM Plan considered the entire facilities backlog lifecycle requirements and included them in the initial year's needs. The 2023 CAM Plan equally spreads these investments over a decade.

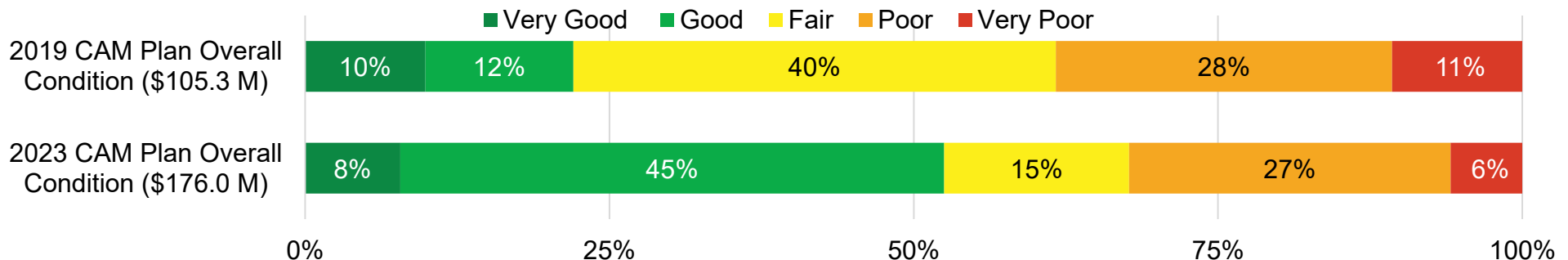


Figure 18.9 2019 CAM Plan to 2023 CAM Plan Condition Summary (Fire Department)

18.5.2: Lifecycle Management Scenarios

The lifecycle Management section included three scenarios – planned Budget, maintain current LOS, and achieve proposed LOS.

Scenario One planned budget is identified to have constraints on the City's capacity to effectively maintain Fire's infrastructure. This leads to a deterioration in their condition. This decline might not be immediate but, over time, it becomes more visible

to the public and causing operating problems, increasing the operating and maintenance costs, and potentially leading to higher repair or replacement costs in the future.

Scenario Two maintain current LOS funding is greater than what is currently allocated for Fire assets, illustrating the financial strain of maintaining a healthy asset portfolio. This scenario acknowledges the need for continual investment in assets to

maintain their current state, eliminating the degradation seen in the first scenario. It prevents further decline and enhances the condition of the assets.

Scenario Three reflects the required budget to achieve proposed LOS. Achieving proposed LOS relates to Lifecycle needs of Fire's Stations and Facilities. These needs are a preliminary identification of Climate Emergency Action Plan (CEAP) initiatives and needs to address all identified Facilities requirements. This level of funding is greater than both the current budget and the one needed to maintain the assets' existing state. The advantages of this approach are alignment with CEAP, improved LOS and asset condition, extended asset lifespans, and potential long term cost savings. This preliminary CEAP assessment shows the financial challenge the City faces to achieve the proposed LOS.

These three scenarios show different results depending on the level of funding for the assets life cycle renewal actions. The choices made will have an implication for Fire asset condition and performance.

18.5.3: Current and Future Challenges

Current challenges primarily relate to cost pressures for Emergency Vehicles and Facilities, adjusted Vehicle expected useful life to align with recently approved Fire Master Plan Action Plan and implementing recommendations from recent Fire Fleet audits. Implementing Fire Fleet audit recommendations will inform future condition ratings and LOS measures. Fleet assets are continuously monitored in part to be aware of evolving Fleet costs. A VFA database review will inform future CAM Plan updates. Phasing Fleet vehicles that are relying on expected useful lives in effect prior to the Fire Master Plan Action Plan adjustment will take time and allows a

balanced approach of managing cost increases with replacing this critical infrastructure.

Other challenges primarily relate to cost pressures for Facilities and adapting lifecycle management strategies to align with Strategic Plan and CEAP targets. Future challenges include how the Facilities' corporate service will meet service standards.

This chapter focuses solely on Fire Stations/Facilities, but similar challenges are being replicated across the portfolio that the City's facilities staff must contend with. This includes both directly owned assets which have their separate chapter in the CAM Plan (examples include the Facilities portion of Parks, Recreation, Corporate Facilities, certain Cultural assets, Long Term Care) and some agencies, boards, and commissions that in process of developing their own asset management plans. The issues outlined in this chapter must be considered with other chapters that have a Facilities component to have context of the challenges this corporate service encounters.

18.6: Conclusions

Valued at over \$175 Million, the City's London Fire Department assets are overall in Fair condition, indicating that there has been insufficient investment in sustaining these assets to maintain the current LOS and achieving proposed LOS. Maintaining current LOS investment will result in a \$41.7 million infrastructure gap, and achieving proposed LOS gap is approximately \$47.5 million. This could result in degradation of the service delivered to citizens. Further investment is needed to address the future lifecycle needs of the current London Fire

Department assets. Figure 18.10 illustrates the infrastructure gap as a proportion to the required investment over the next decade showing the distribution of the different types of assets contributing to the gap.

Table 18.11 presents the summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment rates for London Fire Department assets.

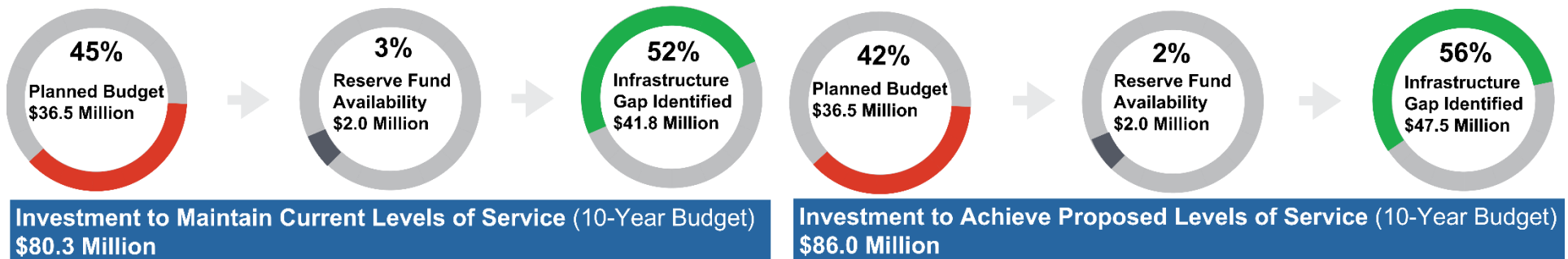



Figure 18.10 Visualization of Maintain Current and Achieve Proposed LOS Infrastructure Gaps (Fire Department)

Table 18.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Fire Department)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS ⁷⁴	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁷⁵
Stations and Facilities	\$104.3	Fair	\$16.8	\$22.5	0.8%	2.5 to 3.0%
Emergency Vehicles	\$54.1	Fair	\$22.0	\$22.0	2.6%	8.3%
Non Emergency Vehicles and Equipment	\$17.6	Fair	\$3.0	\$3.0	8.1%	10.3%
Fire	\$176.0		\$41.8	\$47.5	2.1%	3.5% to 4.1%

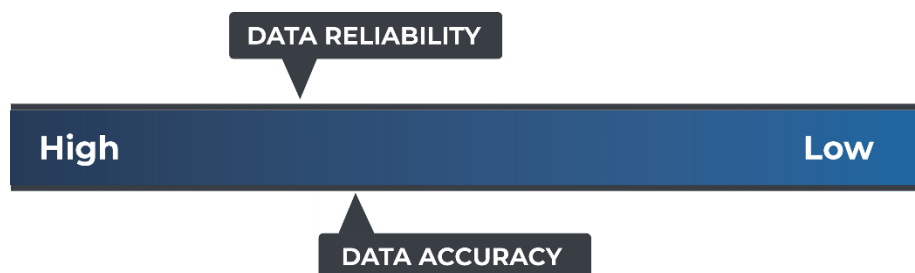


Figure 18.11 Accuracy Reliability Scale (Fire Department)

Accuracy and Reliability Commentary

Data reliability is rated as moderate to high. Emergency and Non-Emergency Vehicles have been verified with Fire internal listings. Equipment inventory has been verified through TCA information. Stations and Facilities inventory has been acquired through Facilities VFA database. Valuation is based on internal assessment opinion, TCA information and Facilities VFA, Altus standard costs for London area facilities. Condition and investment forecasts for Stations (approximately 60% of replacement value) are based on regular station condition assessment. Vehicle and Equipment assets have not been formally assessed; however, condition and forecasts are based on age and expected useful life estimates, which may vary from actuals. Accuracy is rated as moderate, as forecasts for vehicles and equipment (approximately 40% of replacement value) are based on internal assessment of vehicle costs and are not supported by engineering estimates.

⁷⁴ This projected infrastructure gap is reduced by the forecasted reserve fund drawdown availability over the next decade.

⁷⁵ Source: Facilities low end reinvestment rate based on Canadian Report Card Recommended Annual Reinvestment Rate. Other reinvestment rates based on expected useful life.

Section 19. Municipal Housing Development

Asset Information	Municipal Housing Development
Replacement Value	\$21.2 million
10-year Maintain Current Levels of Service Infrastructure Gap	None identified
10-year Achieved Proposed Levels of Service Infrastructure Gap	None identified

Quick Facts
1 Apartment Building



19.1: State of Local Infrastructure

The Municipal Housing Development (MHD) centralizes the knowledge, skills, expertise, and tools required to support affordable housing development within the city and under the City's Service Manager role for community housing throughout London and Middlesex. The prime focus for MHD is to transform to a proactive and adaptive housing provider. In support of this visions, MHD engages in a full range of services including operations, development, new financial instruments, land acquisition and sale and housing affordability consultation with all partners and sectors.

MHD works with private, non-profit, and governments to enable and advance the development and retention of housing that is affordable in London and Middlesex. MHD often acts as a connector to help bring the resources, plans, and funding together to assist the community in making these important and much needed developments a reality. The City currently owns properties with a total replacement value of more than \$21.2M. This includes the property located in 122 Base Line RD W. and a total of 3 more lands under development and detailed in the following section.

The Municipal Housing Development Division oversees and implements initiatives that increase the supply of affordable housing, works to facilitate new and regenerate existing affordable housing developments, as well as monitors and evaluates business contracts and service agreements related to affordable municipal housing. MHD contributes towards the alleviation of affordable housing pressures in the community by encouraging the creation of new affordable housing. MHD's specialized role is:

- Building new affordable housing inventory.
- Creating policies and tools that support more affordable development.
- Supporting partners committed to community-based housing solutions.
- Maximizing every dollar invested in affordable housing development.
- Seizing opportunities that position affordable housing as part of strong integrated communities.
- Develop and sustains relationships within the local community and affordable housing sector.
- Align the City's planning and development policies with local plans for affordable housing.
- MHD's activities are also aligned with the local 'Housing Stability for All' action plan. This includes:
 - Increase to affordable housing stock.
 - Advanced specialized housing development.
 - Activate surplus and other strategic plans to advance developments inclusive of new affordable housing.
 - Advance sustainable strategic plan(s) for LMCH regeneration and other community housing partners.

19.1.1: Housing Development Corporation Wind Down

In 2022, the City began the process of transitioning the former Housing Development Corporation (HDC) into the new Municipal Housing Development team. These wind-down activities will effectively remove the HDC as an active corporation and remove any contractual obligations to cease operations. Between 2019 and 2021, Council directed Civic Administration to undertake all the administrative acts and

develop a transition plan to guide the actions associated with real assets (land and buildings) along with all other contractual obligations and resources. The activities associated with this wind-down of the corporation are anticipated to be completed in 2023 and will result in additional properties added to the City's overall asset registry.

19.1.2: Asset Inventory and Valuation

The City of London owns and operates at 122 Base Line Road West property, which has a current replacement value of about \$18.1 million. The services provided at the facility are centered around assisting tenants with various levels of trauma or factors that have contributed to living unsheltered. These services may include personal support such as the provision of nutritious meals and snacks, therapeutic, recreational, social and spiritual services, medical services, some nursing services.

Table 19.1 summarizes the City assets inventory and current replacement value. The subject site is located approximately 650 metres west of Wharnccliffe Road South, on Base Line Road West. The subject site is approximately 0.62 hectares (1.52 acres) in size and is currently vacant.

This site is a 4-storey (13 metres) "T-shaped" apartment building which will include 61 residential units (100 units per hectare on a property 0.62 hectares in size).

- Universal Accessibility principles applied to site and building design.
- Site Amenities for Tenant use include:
 - front and rear yard leisure seating areas
 - active recreation areas/open greenspace
 - outdoor bicycle storage/pavilion
- Building Amenities for Tenant use include:
 - secured bicycle storage with charging stations for personal mobility equipment

- multi-purpose room with kitchenette
- accessible laundry room and washroom
- second floor terrace overlooking the rear yard
- program rooms
- Residential Unit Configurations consist of:
 - 41 One-Bedroom Units (+/- 53 m2 / 570 ft2)
 - 16 Two-Bedroom Units (+/- 64 m2 / 689 ft2)
 - 4 Three-Bedroom Units (+/- 85 m2 / 915 ft2)

Other Assets

The City is moving forward with plans to provide vulnerable and priority populations in London access to permanent, safe and affordable housing opportunities. Other projects to increase supply of affordable housing in various stages of development approvals and construction that were owned by the HDC or City prior to the end of 2021 are listed below.

403 Thompson Road

In March 2021, Council approved the land use permissions required to build a four-storey, 44-unit affordable rental apartment building. The building construction was completed as of February 2023, and ready for move-in and occupancy. Thompson is a four-storey brick building, including one elevator, three (3) offices for building management and/or tenant support services, a multipurpose amenity room with a full kitchen for residents, guests, programs and support services, an accessible common-use washroom and laundry room, and 34 indoor bicycle parking spaces on the ground floor level. An additional multipurpose amenity room is also available on the second, third and fourth floors for other supportive housing related needs. The Supportive Housing Model pilot project at 403 Thompson Road will provide on-site care 24 hours per day/7 days per week, including mental health, addiction, and nursing services coordinated with food security services (one meal per day), housing stability supports for tenant related concerns, and

assistance with activities of daily living Each tenant will have varying levels of acuity and needs for personalized care, it is through this full-time on-site and collaborative support model that all levels of acuity can receive a high-level of care.

18 Elm Street (former Holy Cross Elementary School)

The former HDC owns the land and has recently awarded a for a prime consultant to design and build an apartment building. The Project provides for 42 affordable rental housing units consisting of one, two, three, and four-bedroom unit and provide for a small-scale community facility to deliver wraparound tenant services and supports with a future childcare centre. Through an Indigenous partner, rents will be established at not more than 80% of the median market rent for the London area support local Indigenous people looking for housing. It is anticipated that the lands will be transferred to the Ontario Aboriginal Housing Services prior to the end of 2023, thereby removing the property from the City and HDC's assets.

1958 Duluth Crescent (former St. Robert Elementary School)

This site is proposed to be an infill development project on the former St. Robert Catholic Elementary School site, with the vision to develop a new mixed-use, mixed-density residential community, with the opportunity for market rate and affordable

housing. This is currently owned by the HDC and will transition to the City through the development and/or wind-down process.

345 Sylvan Street

The Project provides for 42 units of new affordable housing in London. Using the same combination of prefabricated, panelized modular systems used to construct phase 1 and 2 of Supportive Housing Model pilot projects, EllisDon prepared the final design and Building Permit drawings, as the design-build services provider. The 3-storey brick building design includes two elevators providing barrier-free access to all floor levels, 3 main floor offices for building management and/or tenant support services providers, a multipurpose amenity room with a full kitchen for residents, guests, programs and support services, an accessible common-use washroom and laundry room situated directly off the main floor lobby space, and 33 indoor bicycle parking spaces.

The Project also provides for exterior amenities, including a pavilion, leisure seating areas, active and passive recreation areas, open greenspaces, and surface parking for 21 vehicles (including 4 barrier-free parking spaces). This property is not part of the inventory as it was not included by December 31, 2023.

Table 19.1 Inventory and Valuation (MHD Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (\$Thousands)
Municipal Housing Development	Apartment Building 122 Base Line Road W	1 Building of 61 units	Each	18,146
Land	Land, Building for future development	4	Each	3,077
Total				21,223

19.1.3: Age Summary

Figure 19.1 shows the age of the single building included in the Municipal Housing Development. The expected useful life of 40 years is based on the non-structural components of buildings which have the longest expected service life. In practice, the building is composed of many components that are slated for

renewal based upon a combination of factors including age, condition, consequence of failure, likelihood of failure etc. The practical expected life is largely indefinite while the building continues to serve its intended purpose in its geographic location.

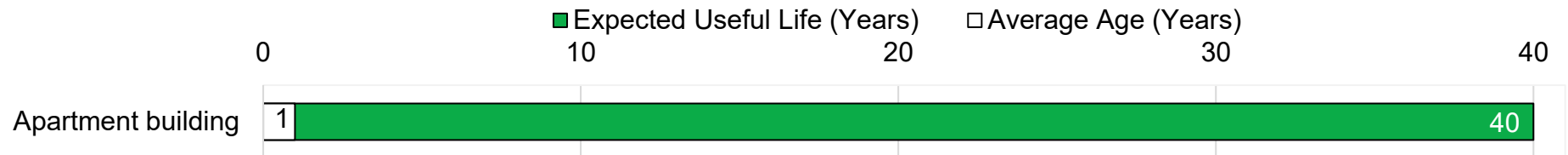


Figure 19.1 Average Age and Expected Useful Life (MHD Service)

19.1.4: Asset Condition

The building is operated by London and Middlesex Community Housing (LMCH). They also provide maintenance, repair, and rehabilitation services on behalf of MHD. Constructed in 2021,

the building and its components are in a Very Good condition as seen in Figure 19.2.

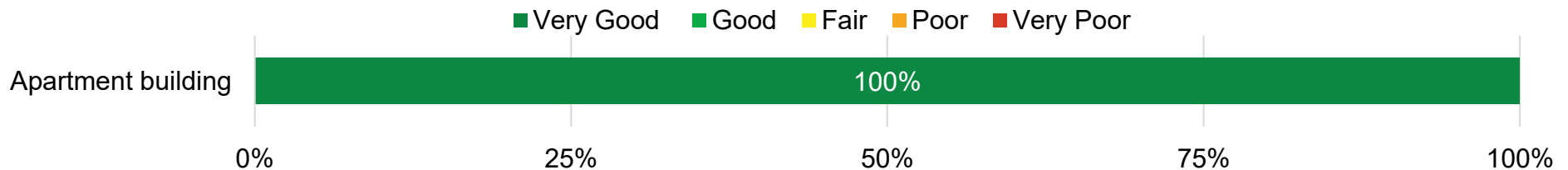


Figure 19.2 Overall Condition (MHD Services)

19.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for levels of service (LOS) performance measures linked to Customer Values of Accessible, Cost Efficiency, Environmental Stewardship, and Reliability.

Direct LOS

After review with MHD, LOS considered most representative of municipal housing services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as ‘direct LOS’ and are listed in Table 19.2.

19.2.1: Direct Levels of Service

Table 19.2 Direct Levels of Service (MHD Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed Target (2022 to 2031)
Accessible	Technical	Percentage of MHD facilities that are FADS compliant	100%	100%
Cost Efficiency	Customer/ Council	MHD Reinvestment Rate	0%	1.7%
Reliability	Customer/ Council	Percentage of municipal housing overall condition in Fair to Very Good condition	100%	100%
Reliability	Technical	75% of work orders are completed within categorical maximum response times	100%	100%
Scope	Customer/ Council	Occupancy rate	97%	At least 97%
Scope	Customer/ Council	Number of affordable housing units available	100	3,000

19.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs.

19.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current levels of service while striving to optimize costs and risks. Table 19.3 lists specific asset Lifecycle management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections.

Table 19.4 lists risks related to these practices. The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 19.3 Current asset Management Practices or Planned Actions (MHD Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> • Development and adherence to an AMP so that assets are most effectively managed and capital work is prudently selected. • Stabilize the tenant base through significant social intervention, supports, programming and partnerships and, in due time, positioning the asset to adopt a mixed income model.
Maintenance	<ul style="list-style-type: none"> • Complete regularly scheduled maintenance activities, respond to unexpected events and failures as required. • Building KPI inspection program to identify issues. • Completion of work orders. • Responding to unexpected asset component failure.
Renewal/Rehabilitation	<ul style="list-style-type: none"> • Asset Life Extension: Extend the life of assets as much as possible through significant treatments. Continue these treatments only as long as they are cost effective (i.e., cost of rehabilitation is not in excess of cost of replacement). • Review major building component on a regular basis to ensure that rehabilitation can be deployed rather than the

State of Infrastructure Report		Levels of Service	Asset Lifecycle Management Strategy	Forecasted Infrastructure Gap	Discussion	Conclusions
Asset Activity	Specific Asset Management Practices or Planned Actions					
	asset deteriorating to the point that rehabilitation is no longer an option. <ul style="list-style-type: none"> • Provide appropriate levels of project management to all capital projects to ensure that capital work adheres to contractual specification with all deficiencies corrected before project close out. 					
Replacement/ Construction	<ul style="list-style-type: none"> • Where existing requirements have no remaining useful life, and/or are a high priority requirement with a high-risk score, the asset or system is replaced. • Complete thorough analysis of construction and operating costs and benefit to ensure prudent selection of project design and specifications. • Review major building components before replacement to ensure that replacement is necessary and appropriate. 					
Disposal	<ul style="list-style-type: none"> • Research and Due Diligence: Complete thorough analysis of carrying costs, housing benefit, cost of alternative housing, and cost of disposal prior to any final disposal decision. • Salvage Value Maximization: Where cost effective and executable, salvage all remaining value from assets prior to their disposal. • Disposal Activities are inherent in replacing assets and are administered by contractors or Facilities personnel. 					
Service Improvement	<ul style="list-style-type: none"> • Evaluate all potential service improvements and prioritize based on alignment with corporate goals, prevalence of needs, benefits, costs, and operational impacts. 					
Growth	<ul style="list-style-type: none"> • Capital growth projects are identified by Development Charges (subject to <i>More Homes Build Faster Act, 2022, Development Charges Act, 1997</i> requirements and City of London policy), or as a part of Assessment Growth Policy (where applicable with municipal policy). 					

Table 19.4 Risks Associated with Asset Management Practices or Planned Actions (MHD Services)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> • Lack of a realization of the benefit from the activity (i.e., the life is not extended or the cost of managing an asset increases rather than decreases). • Lowers the costs of existing operations and may provide additional capacity but does not extend the service life of assets. • Plans/Reports/Recommendations. • Asset management plans or proposed network solutions not followed. • Inadequate Funding. • Poor Quality asset information. • Planning Assumptions incorrect. • Regulatory requirements, standards, criteria change or do not exist. • Economic fluctuations, inflation, downturns, revenue and use reduces/increases. • Occurrence of Climate Change/Adverse Weather/Unforeseen events and emergencies, resulting in funds being diverted to assets that were not originally planned.

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
	<ul style="list-style-type: none"> Growth projections not as planned. Service Provision Changes.
Maintenance	<ul style="list-style-type: none"> Completing planned maintenance activities while managing the need to execute reactive maintenance activities. Incorrectly planned maintenance activities can lead to premature asset failure. Enough resources available to complete a series of unplanned, urgent work requests that are submitted in close succession. Overscheduling preventative maintenance can lead to excessive maintenance and additional costs with no actual benefits.
Renewal/Rehabilitation	<ul style="list-style-type: none"> Incorrect assumptions regarding improved expected useful life after rehabilitation.
Replacement/Construction	<ul style="list-style-type: none"> Cost over-runs during large, complex design and construction projects.
Disposal	<ul style="list-style-type: none"> 'Disposal incorrectly performed or cost overruns resulting from increase disposal requirements compared to initial estimates.
Service Improvement	<ul style="list-style-type: none"> Service improvement is either not required or incorrectly assessed.
Growth	<ul style="list-style-type: none"> Incorrect growth assessments may result in overabundance of assets. Risk of insufficient funding to maintain new asset. Incorrect asset size will cost more money and may cause operational challenges (too large asset) or may result in the need to prematurely expand the asset (too small asset).

19.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is not readily available for the Municipal Housing service area. The capital budget has not yet been established and detailed information to create condition profile assessments is not readily available. The following section presents three scenarios; the first scenario shows the approved planned budget, the second scenario shows the required investment to maintain the current LOS, and the third scenario shows the required investment to achieve the proposed LOS.

Although MHD's assets are recently built and in a Very Good state the second and third scenarios do not have any readily available outcomes given there is an ongoing process to develop a detailed inventory of the constructed assets and their internal systems. This process also should propose a capital plan as a bases for identifying the requirements over the next 10

years. The outcomes of this process should be available in the next comprehensive update of the CAM Plan.

A. Scenario One: Planned Budget

The MHD average annual activity and planned funding is summarized in Table 19.5. The condition profile expected from the current budget is not readily available. Current funding for operating budget and capital budget are presented as the average of the budgeted 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years.

The capital lifecycle renewal budget is yet to be identified. Service Improvement activities are analyzed using planned expenditures identified through a review of the capital budget which are mainly dedicated to the purchasing new lands and build 3,000 affordable housing units.

No growth activities have been identified.

Table 19.5 Scenario One - Average Annual Planned Budget (\$Thousands) (MHD Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	8,732	9,600
Renewal, Replacement, Rehabilitation, Disposal	None identified	None identified
Service Improvement	None identified	7,800
Growth Activities	None identified	None identified

B. Scenario Two: Maintain Current Levels of Service

The cost to maintain current LOS are summarized in Table 19.6. The condition profile expected from the maintain current LOS is not readily available. The required recommended investment is typically based on either the reinvestment rate modeled for a relevant building type as a multi-storey residential building, or

based on the recommended capital plan, noting this is still an ongoing process.

Note that service improvement budget availability is directed to the roadmap to build 3,000 affordable housing units.

Table 19.6 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (MHD Service)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	9,600	None identified	9,600	None identified
Renewal, Replacement, Rehabilitation, Disposal	None identified	None identified	None identified	None identified
Service Improvement	7,800	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified

C. Scenario Three: Achieve Proposed Levels of Service

The cost to achieve proposed levels of service are summarized in Table 19.7. The condition profile expected from the achieve proposed levels of service is not readily available.

Note that service improvement budget availability is directed to the roadmap to build 3,000 affordable housing units.

Table 19.7 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (MHD Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁷⁶	Achieve Proposed LOS Infrastructure Gap ⁷⁷
Operating Budget	9,600	None identified	None identified	None identified	None identified
Renewal, Replacement, Rehabilitation, Disposal	None identified	None identified	None identified	None identified	None identified
Service Improvement	7,800	None identified	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified	None identified

⁷⁶Incremental investment to achieve proposed LOS excludes CEAP costs.

⁷⁷Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

19.4: Forecasted Infrastructure Gap

While the constructed buildings are still in a Very Good condition, the capital lifecycle budget is yet to be identified. Hence, as listed in Table 19.8 there are no identified infrastructure gaps to maintain the current LOS or achieve

proposed LOS. A capital plan identifying the required capital investment needs to be developed to identify the requirements over the next 10 years.

Table 19.8 Average Annual Budget and Gap Analysis (\$Thousands) (MHD Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
MHD	None identified	Not identified	None identified	Not identified	None identified	Not identified	Not identified

19.5: Discussion

19.5.1: Current and Future Challenges


For the City of London to succeed in delivering on the Roadmap to 3,000 Units, a broad partnership model must be leveraged that includes participation by the local for-profit development industry, non-profit and community housing partners along with support from upper levels of government. Broad engagement of internal and external stakeholders will help guide City-staff towards shovel-ready projects and build knowledge on the challenges experienced in our local housing sector to align funding for affordable housing projects.

19.6: Conclusions

Table 19.9 presents the summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment rates for Corporate Facilities Services assets. MHD is actively working on its plans to provide permanent, safe, and affordable housing opportunities to vulnerable and priority populations in London.

They have also outlined additional projects to increase the supply of affordable housing, including locations at 403 Thompson Road, 18 Elm Street, 1958 Duluth Crescent, and 345 Sylvan Street.

Table 19.9 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (MHD Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁷⁸
Municipal Housing Development	\$21.2		None identified	None identified	0%	1.7% to 2.5%

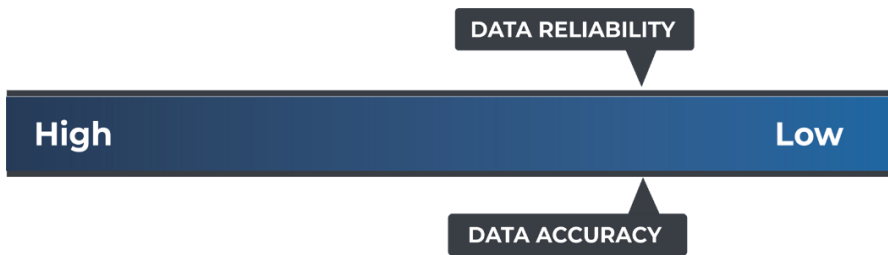


Figure 19.3 Accuracy Reliability Scale (MHD Services)

Accuracy and Reliability Commentary

The values included in the plan is based on the expert opinion. A capital plan to identify the required investment over the next 10 years is in process. The outcomes of this process should be available in the next comprehensive update of the CAM Plan.

⁷⁸ Source: Based on Canadian Infrastructure Report Card Recommended Annual Reinvestment Rate.



Section 20. Long Term Care

Asset Information	Long Term Care
Replacement Value	\$75.6 million
10-year Maintain Current Levels of Service Infrastructure Gap	\$10.8 million
10-year Achieved Proposed Levels of Service Infrastructure Gap	\$12.2 million

Quick Facts
1 Long Term Care Facility



20.1: State of Local Infrastructure

Dearness Home is a long-term care home, owned and operated by the City of London. Dearness Home provides long term care services to 243 residents from the London-Middlesex area by providing respite, medical, nursing, personal, therapeutic, and social work services. Dearness Home promotes the well-being of individuals and families by providing a safe, secure, comfortable, and caring community in which to live.

The assortment of services offered by Dearness is second to none. The needs of residents for long-term care in private or standard rooms are met in one of the nine (9) Resident Home

Areas. Dedicated staff and volunteers make residents' physical, emotional, social, and spiritual needs their first concern.

20.1.1: Asset Inventory and Valuation

Table 20.1 summarizes the Long-Term Care assets inventory and current replacement value. The City of London owns and operates the Dearness Home facilities and equipment that have a current replacement value of about \$75.6 million. The services provided at the facility involves primary care and personal support, including provision of nutritious meals and snacks; therapeutic, recreational, social, and spiritual services; medical services; nursing services; and supportive therapies.

Table 20.1 Inventory and Valuation (Long Term Care Services)

Asset Type	Asset	Inventory	Unit	Replacement Value (Thousands)
Long Term Care Facilities and Equipment	Dearness Building and Site work	1	Each	\$71,743
	Food Services, Nursing Equipment, Recreation Services, and other Building Equipment	Mix	Each	\$3,888
Total				\$75,631

20.1.2: Age Summary

Figure 20.1 shows the Long-Term Care assets’ (Facilities and Equipment) average asset age as a proportion of the average useful life, by asset type. The average ages for the Facility and associated Site Work were calculated using the construction date, while all equipment ages were calculated using available information of recorded acquisition date or were based on expert opinion. As shown in Figure 20.1, in general all asset types are approximately halfway within their average industry standard useful life. It is important to note that 40 years was

selected as the expected useful life based on the non-structural components of buildings which have the longest expected service life. In practice, the building is composed of many components that are slated for renewal based upon a combination of factors including age, condition, consequence of failure, likelihood of failure etc. The practical expected life is largely indefinite while the building continues to serve its intended purpose in its geographic location.

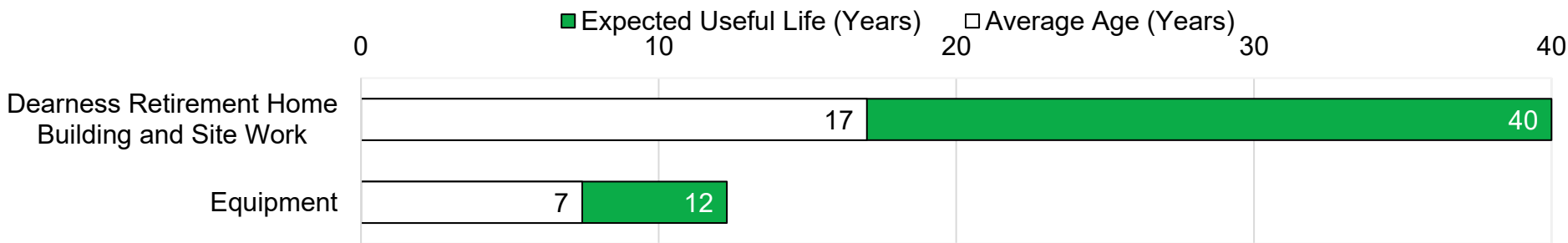


Figure 20.1 Average Age and Expected Useful Life (Long Term Care Services)

20.1.3: Asset Condition

As seen in Figure 20.2, 96% of Long-Term Care owned assets are in Fair condition. The condition is mainly driven by the Facility condition given its replacement value of \$72 million. Reflecting on the fact that the facility was built in 2005, the original structure and major components of the building are now in Fair condition. Figure 20.3 shows the condition distribution by

asset type. As seen in the figure, 61% of equipment is rated Fair to Very Good condition. Generally, the City’s Facilities Division provides maintenance, repair, and rehabilitation services on behalf of Long-Term Care service area, while the Long-Term Care service area is responsible for use of the facility and delivery of the service.

■ Very Good ■ Good ■ Fair ■ Poor ■ Very Poor

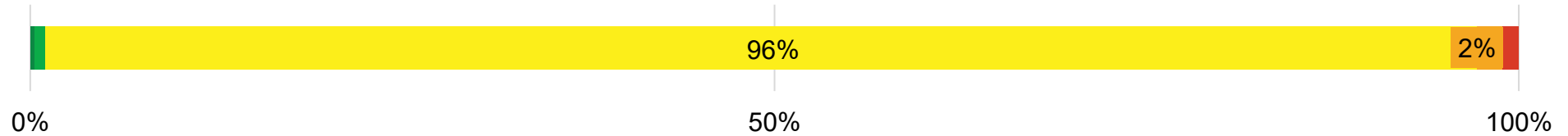


Figure 20.2 Overall Condition (Long Term Care Services)

However, Long Term Care services has greater involvement in maintaining the facility compared to a typical other service areas as immediate action is required to comply with the Fixing Long-Term Care Act 2021, provincial regulations, and safety standards.

The condition of the building is regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score

that accurately reflects the overall condition of the facilities (split into building envelope, mechanical and electrical systems, etc.).

Long Term Care has a database of all types of equipment and assets such as beds, lifts, nursing, and recreation related assets, etc. The database contains an inventory of units and replacement values in addition to other information such as estimated condition and expected useful life for each unit.

■ Very Good ■ Good ■ Fair ■ Poor ■ Very Poor

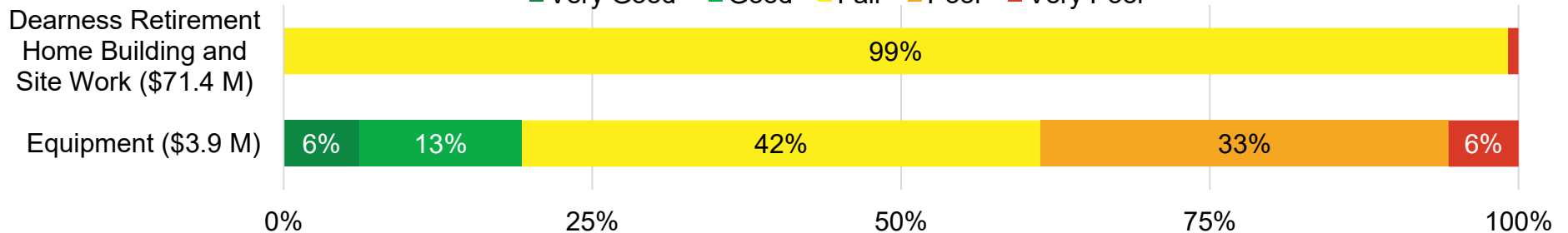


Figure 20.3 Asset Condition Detail (Long Term Care Services)

20.2: Levels of Service

Direct LOS, Related LOS, and Metrics

The 2023 CAM Plan striving for LOS performance measures linked to Customer Values of Accessible, Cost Efficiency, Customer Satisfaction, Environmental Stewardship, Reliability, Safety, and Scope.

Direct and Related LOS

After review with Long Term Care Services, the LOS measures considered most representative of Long Term Care services and able to be costed over a 10-year projected period (calendar years 2022 through 2031) are documented as 'direct LOS' listed in Table 20.2.

20.2.1: Direct Levels of Service

Table 20.2 Direct Levels of Service (Long Term Care Services)

Customer Value	Focus	Service Performance Measure	Current LOS (2021 Performance)	Proposed Target (2022 to 2031)
Accessible	Technical	Percentage of Dearness Home facilities that are FADS compliant	100%	100%
Cost Efficiency	Customer/ Council	Dearness Home Reinvestment Rate	0.8%	2.3%
Environmental Stewardship	Technical	Annual electric energy consumption per square foot	18.59 KWH/sf	Reduce
	Technical	Annual natural gas consumption per square foot	2.868 m3/sf	Reduce
	Technical	Annual water consumption per square foot	0.256 m3/sf	Reduce
Reliability	Customer/ Council	Percentage of Dearness Home overall condition in Fair to Very Good condition	97.2%	Maintain Current
Scope	Customer/ Council	Occupancy rate	93%	>97%

LOS measures that have a causal relationship with direct LOS are documented in Table 20.3 as Related LOS but cannot be as readily costed to Long Term Care services.

Metrics

Table 20.4 listed metrics that are useful information, especially when considered in conjunction with Direct LOS, and Related LOS. However, they are considered lagging indicators that do not readily provide strategic insight or can be easily costed to services Long Term Care provides.

20.2.2: Related Levels of Service

Table 20.3 Related Levels of Service (Long Term Care Services)

Customer Value	Focus	Service Performance Measure	2021 Performance
Accessible	Technical	Percentage of entrances that are FADS compliant	100%
Accessible	Technical	Percentage of washrooms that are FADS compliant	100%
Cost Efficiency	Technical	Equipment Reinvestment Rate	2.6%
Cost Efficiency	Technical	Facilities related Reinvestment Rate	0.8%
Environmental Stewardship	Technical	Annual water consumption per resident client day	212.76 m3/resident
Reliability	Technical	Percentage of Long Term Care facilities in Poor to Very Poor condition	0.8%
Reliability	Technical	Percentage of Long Term Care equipment in Poor to Very Poor condition	38.7%
Safety	Technical	Number of issues with Ministry observations relating to Assets	0
Safety	Technical	Number of outstanding safety improvements required at facility per 100 square feet	0

20.2.3: Other Measures

Table 20.4 Metrics – Other Dashboard Measures (Long Term Care Services)

Customer Value	Focus	Other Dashboard Measure	2021 Performance
Cost Efficiency	Technical	Operating budget	\$24,216,784
Cost Efficiency	Technical	Cost to provide service (cost per resident)	\$99,192
Customer Satisfaction	Customer/Council	Percentage of clients who are satisfied with the adult day program	100%
Customer Satisfaction	Customer/Council	Percentage of long term care residents who rate the home as a good or excellent place to live	86%
Safety	Technical	Percentage of facility components annually inspected	100%

20.3: Asset Lifecycle Management Strategy – Maintaining Current and Achieving Proposed Levels of Service

The City employs a combination of lifecycle activities to maintain current LOS while striving to optimize costs based on defined risk. This strategy includes activities for maintenance, rehabilitation, replacement, and disposal, and regular investments in master planning studies, while continuing to prepare for growth and introduce service improvements.

When feasible, the City also strives to further optimize these lifecycle activities by coordinating and synchronizing work across multiple assets or asset categories, which can result in cost and service efficiencies. With significant asset investments, the City also strives to optimize asset use and redundant capacity, often achieved through risk benefit cost analyses and cost effectiveness analyses.

This strategy is not static. Lifecycle activities the City chooses to apply to the City assets are selected, reviewed, and modified based on continual industry benchmarking, staff training, professional networking, online reviews, consultant recommendations, and trial and error through scenarios and pilot programs.

The City also invests in climate change adaptation and mitigation planning through the Climate Emergency Action Plan (CEAP), which may trigger asset investment needs.

20.3.1: Current Levels of Service Lifecycle Activities - Practices or Planned Actions

The City uses a strategy of asset lifecycle activities to maintain current levels of service while striving to optimize costs and risks. Table 20.5 presents specific asset management practices or planned actions the City conducts for each lifecycle activity. Generic lifecycle activities are described in Appendix A. Overview of Service Area Sections.

Table 20.6 classifies by each lifecycle activity risks related to these practices. The cost of these identified Lifecycle activities is summarized in the Lifecycle Management Strategies and Infrastructure Gap section.

Table 20.5 Current Asset Management Practices or Planned Actions (Long Term Care Services)

Asset Activity	Specific Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	<ul style="list-style-type: none"> Refer to Appendix A.
Maintenance	<ul style="list-style-type: none"> Dearness Home has greater involvement in maintaining the facility compared to other service areas as immediate action is required to comply with the <i>Fixing Long-Term Care Act, 2021</i>, Provincial regulations and safety standards. Scheduled preventative maintenance programs for most assets.
Renewal/ Rehabilitation	<ul style="list-style-type: none"> Dearness Home is regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (split into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of the Facilities service area, and computer software programs used by Facilities (VFA) determine the cost and timing of renewal requirements. Some assets are evaluated, and rehabilitation is considered prior to purchasing new (i.e., janitorial equipment). But many do have a lifecycle that does not allow for rehabilitation (i.e., Mattresses).
Replacement/ Construction	<ul style="list-style-type: none"> The condition of the Dearness buildings is regularly evaluated through comprehensive condition assessments, which establish and update an industry-standard Facility Condition Index (FCI) score that accurately reflects the overall condition of the facilities (split into components of building envelope, mechanical and electrical systems, etc.). These condition assessments, the expertise of Facilities, and computer software programs used by Facilities (VFA), determine the cost and timing of replacement requirements. Dearness has developed inventory listings documenting replacement value, condition and expected useful life.
Disposal	<ul style="list-style-type: none"> Dearness disposes of assets in compliance with required safety standards and regulations. Disposal Activities are inherent in replacing assets and are administered by contractors or Facilities personnel.
Service Improvement	<ul style="list-style-type: none"> Dearness identifies service improvements through customer feedback surveys and develops business cases outlining the need for the service improvement.
Growth	<ul style="list-style-type: none"> Capital growth projects are identified by Development Charges (subject to <i>More Homes Build Faster Act, 2022</i>, <i>Development Charges Act, 1997</i> requirements and City of London policy), or as a part of Assessment Growth Policy (where applicable with municipal policy).

Table 20.6 Risks Associated with Asset Management Practices or Planned Actions (Long Term Care Service)

Asset Activity	Specific Risks Associated with Asset Management Practices or Planned Actions
Non-Infrastructure Solutions	Refer to Appendix A.
Maintenance	Refer to Appendix A.
Renewal/ Rehab	Refer to Appendix A.
Replacement/ Construction	Refer to Appendix A.
Disposal	Refer to Appendix A.
Service Improvement	Refer to Appendix A.
Growth	Refer to Appendix A.

20.3.2: Lifecycle Management Strategies – Planned Budget, Maintain Current LOS, Achieve Proposed LOS

General Approach

The general approach to forecasting the cost of the lifecycle activities that are required to maintain the current performance of the LOS metrics is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable in addition to maintaining the overall average condition of all assets in Long Term care portfolio. Data exists for these assets but not easily integrated into condition profile assessments. For example, the Equipment is generally short lived and not readily lend to long term condition profiles. There is only one structure in the Long Term Care portfolio, which suggests a projected condition profile to be redundant, especially when compared to many facilities assessed in other service chapters (Corporate Facilities, Recreation, Parks, and London Fire Department as examples). Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances costs and with the forecasted change in the condition profile of each asset type.

The following section presents this analysis using three scenarios; the first scenario shows the approved planned budget, the second scenario shows the required investment to maintain current LOS, and the third scenario shows the required investment to achieve proposed LOS.

This third scenario is inclusive of initial assessment to determine the cost associated with implementing the CEAP and achieving the associated proposed LOS. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets.

A. Scenario One: Planned Budget

The Long-Term Care average annual activity and planned funding is summarized in Table 20.7.

As noted above, the condition profile expected from the current budget is not readily available.

Average annual activity for operating and capital budgets are presented as the average of the 2020 and 2021 fiscal years. Planned funding operating budgets are the average of 2022 and 2023 fiscal years. Planned funding capital budgets are the average of 2022-2031 fiscal years. Service Improvement activities are analyzed using planned expenditures identified through a review of the 202-2031 capital budget. Growth activities are analyzed using the 2021 Development Charges Background Study Update. All number in tables are rounded to nearest thousand.

Scenario one does not assess planned funding for potential infrastructure gaps; its presentation is intended to provide an

overview of existing budgets, which carry forward into scenario two and three for identification of potential infrastructure gaps.

Table 20.7 Scenario One - Average Annual Planned Budget (\$Thousands) (Long Term Care Services)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	23,992	24,404
Renewal, Replacement, Rehabilitation, Disposal	500	536
Service Improvement	1,120	None identified
Growth Activities	None identified	None identified

B. Scenario Two: Maintain Current Levels of Service

The cost to maintain LOS for Long Term Care assets are summarized in Table 20.8. This scenario forecasts the lifecycle activities that are required to maintain current performance of the LOS metrics. The forecast for Long Term Care facility required investments is calculated based on the modeled and verified requirements recommended by Corporate Facilities. As noted above, the condition profile expected from the maintain current LOS analysis is not readily available. However, per Table 20.8 a 10-year infrastructure gap of approximately \$10.8 million is forecasted if Long Term Care is to maintain current LOS.

Table 20.8 Scenario Two - Average Annual Cost to Maintain Current LOS (\$Thousands) (Long Term Care Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	24,404	None identified	24,404	None identified
Renewal, Replacement, Rehabilitation, Disposal	536	100	1,718	1,082
Service Improvement	None identified	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified

C. Scenario Two: Maintain Current Levels of Service

The cost to achieve proposed LOS are summarized in Table 20.9. This scenario forecasts the lifecycle activities that are required to achieve proposed performance of the LOS metrics. The forecast for Long Term Care facility required investments is calculated based on the modeled and verified requirements recommended by Corporate Facilities. As noted above, the condition profile expected from the achieve proposed LOS lifecycle management strategies is not readily available.

Additionally, this Achieve Proposed LOS forecast includes preliminary cost estimates associated with implementing the CEAP. The costs presented align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission target.

Per Table 20.9 a 10-year infrastructure gap of approximately \$12.2 million is forecasted if Long Term Care is to achieve proposed LOS.

Table 20.9 Scenario Three - Average Annual Cost to Achieve Proposed LOS (\$Thousands) (Long Term Care Services)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS ⁷⁹	Achieve Proposed LOS Infrastructure Gap ⁸⁰
Operating Budget	24,404	None identified	None identified	24,404	None identified
Renewal, Replacement, Rehabilitation, Disposal	536	100	185	None Identified	1,221
Service Improvement	None identified	None identified	None identified	None identified	None identified
Growth Activities	None identified	None identified	None identified	None identified	None identified

To meet the proposed Long Term Care LOS as described, some changes to the strategy for lifecycle activities will be required, which will trigger changes in funding requirements. If funding for proposed LOS is not sufficient, the City will:

1. Continue lifecycle activities to maintain current levels of service.
2. Carry out the Climate Emergency Action Plan within current funding scope. A green initiative life cycle renewal activity may be otherwise not feasible (examples include boiler and energy efficient windows). The facility asset would otherwise be functionable but not addressing green initiative strategic needs.

20.4: Forecasted Infrastructure Gap

The outcomes of scenarios two and three are summarized below in Table 20.10 and illustrated in Figure 20.4. The analysis is related to the lifecycle rehabilitation or replacement activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities. Additionally, no service

improvement or growth needs were identified for Long Term Care, noting that if growth needs were identified the 2023 CAM Plan does not assess them for infrastructure gaps.

The 10-year maintain current LOS infrastructure gap is calculated at \$10.8 million. Corporate Facilities, on behalf of Long Term Care staff, completed a full review and refined Long Term Care building (Dearness Home) recommended requirements against completed projects in the work order system.

The 10-year achieve proposed LOS infrastructure gap is to address all needs relating to Long Term Care services and is calculated at approximately \$12.2 million. The preliminary estimate for CEAP funding in the Dearness Home includes incorporating 'green premium' into lifecycle management needs. This means that instead of simply replacing existing infrastructure with a similar one 'like for like', there will be an increased focus on incorporating 'green for like' infrastructure replacements, whenever feasible.

⁷⁹Incremental investment to achieve proposed LOS excludes CEAP costs.

⁸⁰Infrastructure gap to achieve proposed LOS is inclusive of maintain current LOS infrastructure gap, incremental cost to achieve CEAP, and incremental investment to achieve proposed LOS.

Table 20.10 Average Annual Budget and Gap Analysis (\$Thousands) (Long Term Care Services)

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Long Term Care	536	100	1,718	185	None Identified	1,082	1,221

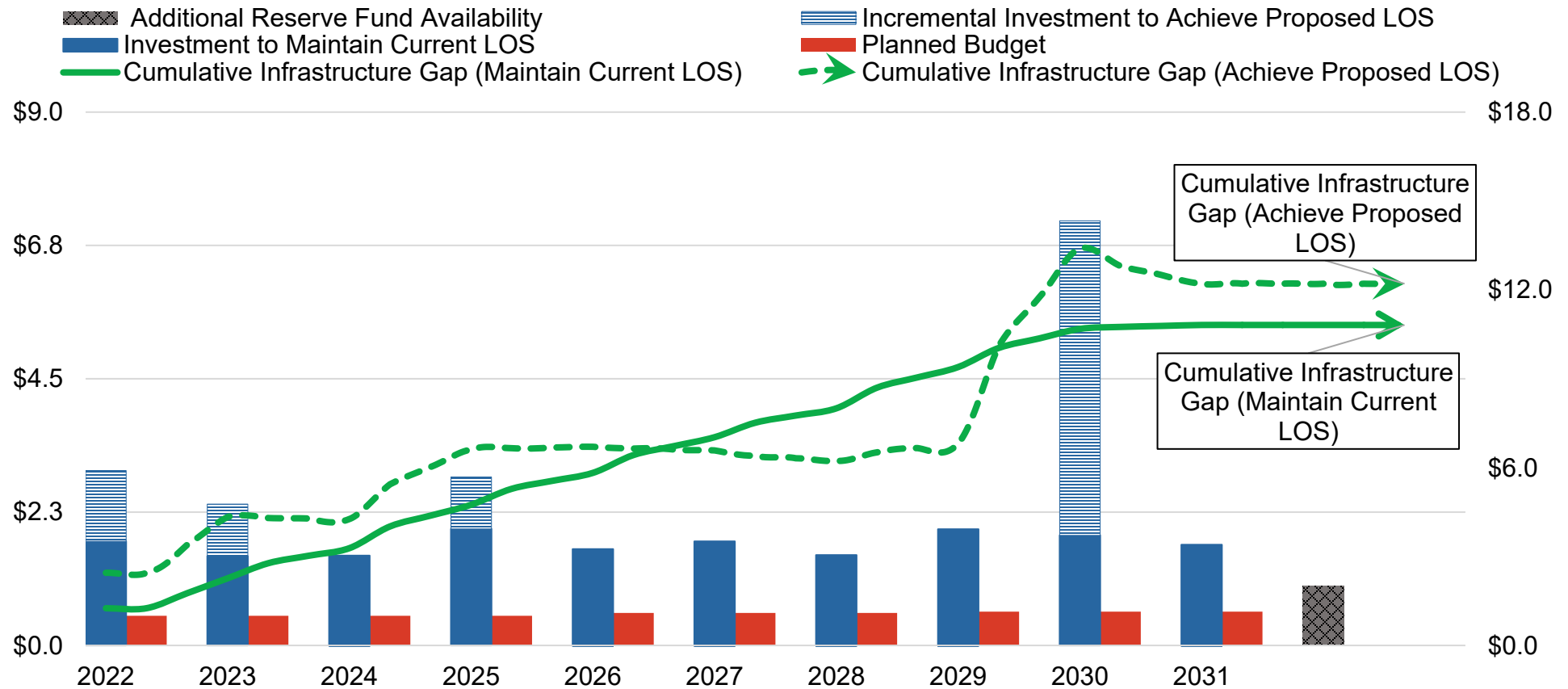


Figure 20.4 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Long Term Care Services)

20.5: Discussion

20.5.1: Comparing 2019 and 2023 Asset Management Plans

The Long Term 2019 CAM Plan to 2023 CAM Plan overall condition comparison is provided in Figure 20.5. The analysis indicates a significant increase in the percentage of assets in Fair condition and a commensurate decrease in the percentage of assets in Good condition in 2023.

Long Term Care Services replacement value increased from \$64.6 million to \$75.6 million due to inflation. Recent market pressures that are contributing to this include supply chain shocks commencing during the COVID-19 pandemic, and skilled labour shortages. The 2019 CAM Plan anticipated assets would deteriorate due to inadequate funding resulting in an estimated \$11.6 million 10-year infrastructure gap to maintain current LOS, and per the conditions presented below this projection was realized. The 2023 CAM Plan maintain current LOS 10-year infrastructure gap is approximately \$10.8 million, which is slightly less than the 2019 amount. The lower infrastructure gap amount results from a change in methodology

for calculating the necessary investments to maintain the current LOS. Moreover, the Corporate Facilities, on behalf of the Long Term Care staff, thoroughly reviewed and refined the suggested requirements for the Dearness Home building. This was done by comparing these requirements against completed projects within the Facilities work order system.

New to the 2023 CAM Plan is the presentation of the achieve proposed LOS infrastructure gap; for Long Term Care this is forecasted to be \$12.2 million by 2031. The investments required to achieve the proposed LOS included more requirements identified by Facilities division to enhance the condition of the Dearness home to good condition and the extra estimated incremental cost to achieve CEAP. The 2019 CAM Plan considered the entire facilities' backlog lifecycle requirements and included them in the initial year's needs. The 2023 CAM Plan equally spreads these investments over a decade.

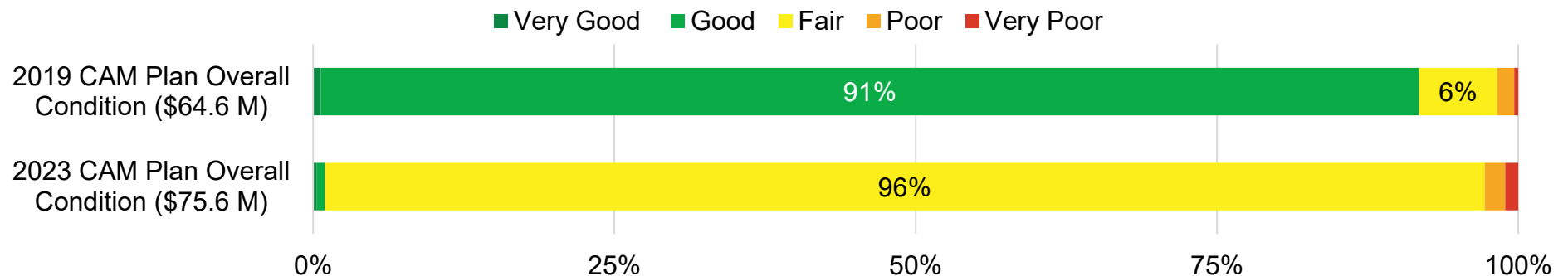


Figure 20.5 2019 CAM Plan to 2023 CAM Plan Condition Summary (Long Term Care Services)

20.5.2: Current and Future Challenges

Current and future challenges primarily relate to cost pressures at the Dearness Home and adapting lifecycle management strategies to align with CEAP targets. Challenges also include how unique facility needs for Long Term Care can integrate into all City facilities planning. For example, this chapter focuses solely on the Dearness Home, but similar challenges are being replicated across the portfolio that the City's facilities staff must contend with. This includes both directly owned assets which have their separate chapters in the CAM Plan (examples include the facilities portion of Parks, Recreation and Sport, London Fire Department, certain Cultural Services assets, and Corporate Facilities) and some agencies, boards, and commissions that are in the process of developing their own asset management plans.

Additionally, per the 2023 CAM Plan analysis, Long Term Care needs for equipment have increased the gap as the planned budget is projected to be insufficient to address identified needs. A further analysis of this infrastructure gap will be completed

through the CAM Program annual data improvement process. This review will develop recommendations for a more systematic planned approach to lifecycle management and budgeting of Long Term Care equipment.

20.6: Conclusions

Valued at nearly \$75.6 Million, the City's Long Term Care assets are overall in Fair condition. Maintaining current LOS and achieving proposed LOS required investments will result in cumulative infrastructure gaps of \$10.8 million and \$12.2 million respectively. This could result in degradation of the service delivered to Dearness Home residents. Further investment is needed to address the future lifecycle needs of the current Long Term Care assets for both LOS options. Figure 20.6 illustrates the infrastructure gaps for the maintain current LOS and achieving proposed LOS. Table 20.11 presents the summary of the state of local infrastructure, infrastructure gaps, and reinvestment rates for Long Term Care asset.

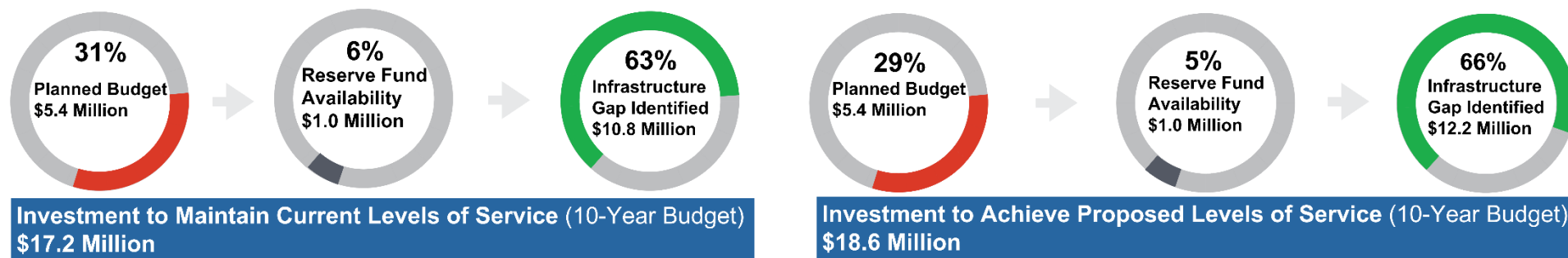



Figure 20.6 Visualization of Maintain Current and Achieve Proposed LOS Infrastructure Gaps (Long Term Care Services)

Table 20.11 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Long Term Care Services)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate ⁸¹
Long Term Care	\$75.6		\$10.8	\$12.2	0.8%	2.3% to 2.5%

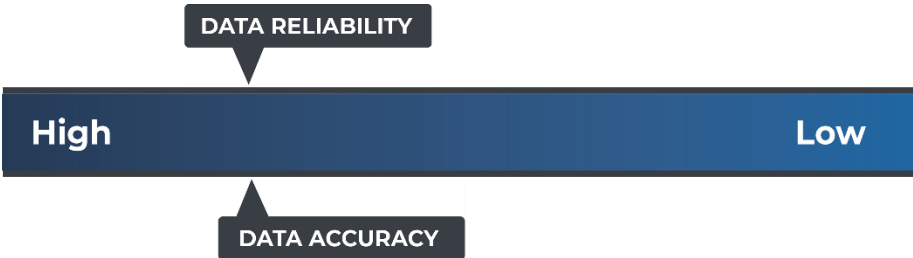


Figure 20.7 Accuracy Reliability Scale (Long Term Care Services)

Accuracy and Reliability Commentary

Data reliability is rated as moderate to high. Long Term Care completed equipment inventory listing for the asset management plan. Valuation is based on a combination of Facilities VFA, Risk Management, industry standards, and internal assessment opinion. Facility condition and investment forecasts for the facility are based on regular condition assessment. Accuracy is rated as moderate to high, as forecasts are based on the facility condition assessments and Facilities division refinement. With respect to Dearnness equipment, reliability and accuracy are moderate to high as inventories are recently updated and a thorough inventory exercise is completed. As a result, this assessment has been averaged at moderate to high for both asset sub-types. Facilities is undergoing a phased approach of comprehensively reviewing, updating, and maintaining VFA data. This process is not complete at time of CAM Plan release thus data reliability is assessed as moderate and data accuracy as moderate to low.

⁸¹ Source: The recommended reinvestment rate ranges from the required investments to maintain current LOS and to achieve proposed LOS.

Section 21. Land

Asset Information	Land
Replacement Value	\$759.2 million



21.1: State of Local Infrastructure

We acknowledge that the City of London resides on the traditional lands of the Anishinaabeg, Haudenosaunee, Lūnaapéewak and Attawandaron. We acknowledge all the treaties that are specific to this area: the Two Row Wampum Belt Treaty of the Haudenosaunee Confederacy/Silver Covenant Chain; the Beaver Hunting Grounds of the Haudenosaunee NANFAN Treaty of 1701; the McKee Treaty of 1790, the London Township Treaty of 1796, the Huron Tract Treaty of 1827, with the Anishinaabeg, and the Dish with One Spoon Covenant Wampum of the Anishnaabek and Haudenosaunee. This land continues to be home to diverse Indigenous people (First Nations, Métis and Inuit) whom we recognize as contemporary stewards of the land and vital

contributors to society. As representatives of the people of the City of London, we are grateful to have the opportunity to work and live in this territory.

21.1.1: Asset Inventory and Valuation

The Corporation of the City of London directly owns and manages an estimated 6,033 hectares of land. The value of the core lands amounts to over \$759 million. Most of this land is permanently held in the public trust to provide public services and will never be marketable. The general exception is industrial land, which the City prepares for market to encourage economic development. Table 21.1 summarizes the asset inventory for Land.

Table 21.1 Inventory and Valuation (Land)

Asset Type	Asset ⁸²	Inventory	Unit	Replacement Value (Thousands)
Land	Park Land – Parks	1,313	Hectares	\$76,599
	Park Land – Natural Areas	1,406	Hectares	
	Road Allowance	1,823	Hectares	\$387,946
	General Government	531	Hectares	\$113,090
	Closed Landfill and Natural Methane Areas	333	Hectares	\$70,773
	Land Held for Sale ⁸³	274	Hectares	\$35,473
	Stormwater ⁸⁴	326	Hectares	\$69,405
	Unassumed Land (Stormwater, Natural Area, Park)	27	Hectares	\$5,954
Total	N/A	6,033		\$759,240

⁸² Includes unassumed lands which become City property upon registration unlike constructed works which remain the responsibility of the developer until assumed. Parks and Natural Areas - Parkland Dedication By-Law CP-9 Update for January 1, 2022. TCA inflation adjusted price per hectare of \$202,801.

⁸³ In accordance with Canadian GAAP Industrial Lands are assets held for sale in an inventory on the Statement of Financial Position and not listed in London's Tangible Capital Assets. Includes Industrial Land (Serviced and Unserviced) and Other Land Held For Sale. Replacement value is based on financial statement information as at December 31, 2021.

⁸⁴ Based on GIS listings and Stormwater service data on municipal drain land areas.

The responsibility for land lies in the hands of the primary service group using the land. An example of this is Park Services who are responsible for the land used for parks and natural areas. The largest landholder of the City of London is, in fact, Parks services. Land in parks and natural areas, is Park's biggest asset. The City of London has parks that cover over 2,600 hectares of land. Natural areas include environmentally significant areas, open spaces, woods and wetlands.

Transportation (Roads) is the second biggest Landholder through the land used for roads commonly described as the road allowance. The General Government category covers all the remaining 'facilities' type of assets like City Hall, the fire halls, operations facilities, etc. The exception is recreation facilities which are part of the landholdings of Parks Services. Closed landfills and natural methane areas are separated into their own category because of their unique nature that limits the range to which they can be developed. London generally uses long closed landfill lands for activities like parks and golf courses. Other activities can be considered but may need to employ engineered measures to deal with any remaining landfill and methane impacts. The Stormwater category relates to land used for stormwater management facilities which primarily consist of storm ponds and a listing of municipal drains. The ponds can be viewed as a natural amenity and often offer recreational opportunities like bird watching areas. There is no automated central land data registry in the City beyond the information available in the TCA database and GeoDatabase. The City also does not have a database on easements. Detailed ownership information can be obtained, by performing a title search at the Land Registry Office, Service Ontario, or online using Teraview or Geowarehouse. There is opportunity to simplify and consolidate the City owned land records for use in decision making. Although Land constitutes a major asset to the

City, its value and condition cannot be viewed in a similar fashion to other assets like buildings or equipment. Land has an unlimited life and cannot be "consumed". Land has value but no lifecycle, and it is not amortized. Land is not assessed in asset terms of Very Good, Good, Fair, Poor or Very Poor condition. Currently land is assessed for real market value and understood with respect to zoning its characteristics, like hazard or table land. As such, land cannot be considered in the standard context of this report as reflected for our other asset types and their associated infrastructure gaps.

There are needs for additional lands to serve the public. Land is needed to address existing deficiencies in services, including roads infrastructure, growth, protection of natural assets and the advancement of new and better services. Land needs are appropriately driven by capital service project needs and location.



Section 22. Infrastructure Gap Financing Strategies

Asset Information	Amount
Total Replacement Value	\$28.5 billion
Cumulative 10-Year Maintain Current Levels of Service Infrastructure Gap	\$946.1 million
Cumulative 10-Year Achieve Proposed Levels of Service Infrastructure Gap	\$1,378.1 million
10-Year Maintain Current Levels of Service Infrastructure Gap Percentage of Replacement Value	3.32%
10-Year Achieve Proposed Levels of Service Infrastructure Gap Percentage of Replacement Value	4.84%

22.1: Infrastructure Gap Financing Strategies Introduction

At present, Canada lacks a defined standard or guidance for assessing the acceptability of municipal infrastructure gaps. Nevertheless, the fundamental objective of Corporate Asset Management (CAM) is that the City's actions are collectively anticipated to tackle the growth in the projected infrastructure gap.

The infrastructure gap financing strategies supports this objective by setting out the approach to ensuring that appropriate funds are available to support the delivery of infrastructure dependent services, which is consistent with the outcomes and expected results of the City's 2023-2027 Strategic Plan. These processes are meant to strengthen current budgeting processes by reinforcing a long-term perspective on the impact of providing various asset-related levels of service (LOS) and the required investments versus the affordability to the community. This is done by demonstrating the 10-year average annual tax/rate supported budget increases necessary to achieve Council approved infrastructure supported LOS while providing for infrastructure asset sustainability (acceptable condition and risk) and financial intergenerational equity.

Within the financing strategy, tax/rate supported funding requirements are presented in terms of their annual percentage impact to property tax and utility rate levies. This practice is applied because it transparently communicates the long-term tax/rate supported budget increases required to achieve infrastructure and financial sustainability, and approved LOS. However, it is important to note that realized property tax and utility rate impacts are subject to source of financing recommendations presented through the multi-year budgeting process, which are deliberated and approved by Council. As

such the final financing strategy pace (short-term versus long-term), realized budget increases (permanent versus one-time and tax/rate supported versus non-tax/rate supported), and LOS delivered is contingent on the budget process which assesses, among others, the availability of appropriate sources of financing weighted against tax/rate payer affordability, and service delivery requirements.

The infrastructure gap financing strategies presented in the 2023 CAM Plan are primarily predicated on the revenues and expenses contained in the 2022 Annual Budget Update. The focus of the financing strategies is on lifecycle renewal and select service improvement capital budget requirements; service improvement is inclusive of preliminary capital costing for Climate Emergency Action Plan (CEAP) initiatives contained within the 2023-2027 Strategic Plan. Financing for growth is also presented but not analyzed for identification of infrastructure gaps associated with the *More Homes Built Faster Act, 2022* (formerly referred to as "Bill 23"), or the cost to maintain current LOS and achieve proposed LOS. Potential *More Homes Built Faster Act, 2022*, funding and infrastructure gaps along with associated financing strategies will be presented as part of future Multi-Year Budget (MYB). Potential growth maintain current LOS and achieve proposed LOS infrastructure gaps and associated financing strategies will be presented through future Development Charges Background Studies and/or CAM Plans.

To communicate and rationalize the infrastructure gap financing strategies, this section is organized as follows:

- 1) Summary of 10-year maintain current LOS and achieve proposed LOS infrastructure gaps identified through the 2023 CAM Plan;

- 2) Overview of Council approved financial policies associated with infrastructure gap funding;
- 3) Summary of Council's direction on the 2024-2027 MYB average annual tax levy increase range and relationship to infrastructure gap financing strategies; and
- 4) Explanation of infrastructure gap financing approaches and presentation of optional infrastructure gap strategies (tax/rate impacts).

The section concludes with a summary of year-to-date (2023 and prior) Council approved permanent and one-time infrastructure gap investments along with an Ontario cross jurisdictional review of other municipal infrastructure gap financing strategies.

22.1.1: Infrastructure Gap Summary

The infrastructure gaps are a dollar amount based on the difference between:

- a) the amount of money that needs to be spent on City-owned assets required to provide services to Londoners, and
- b) the amount of funding presently identified in budgets and reserve funds over a 10-year period (2022-2031).

In other words, what London plans to spend versus what the assets need. Ideally, the infrastructure gaps decline over time as greater investments are made to replace older infrastructure, to improve the condition of infrastructure and to minimize the risks associated with failing assets.

Infrastructure gap estimates are based on year-end 2021 asset data, 2022 annual budget update approved and forecasted budgets over the next 10-years (2022-2031) as well as maintain current LOS and achieve proposed LOS data captured through the 2023 CAM Plan process. For further explanation of maintain current LOS and achieve proposed LOS refer to Appendix A of the CAM Plan titled Overview of Service Area Sections.

For assets in scope of the 2023 CAM Plan, over the 10-year period of 2022-2031, the City forecasts capital spending more than \$1.9 billion to address all lifecycle renewal, growth, and service improvement needs. This level of investment will result in maintain current LOS and achieve proposed LOS 10-year infrastructure gaps of approximately \$946 million and \$1.4 billion respectively (see Figure 22.1), noting the achieved proposed LOS infrastructure gap is inclusive of the maintain current LOS infrastructure gap amount. These infrastructure gaps present the City-wide position, which is inclusive of Tax Supported, Water, and Wastewater service area assets.

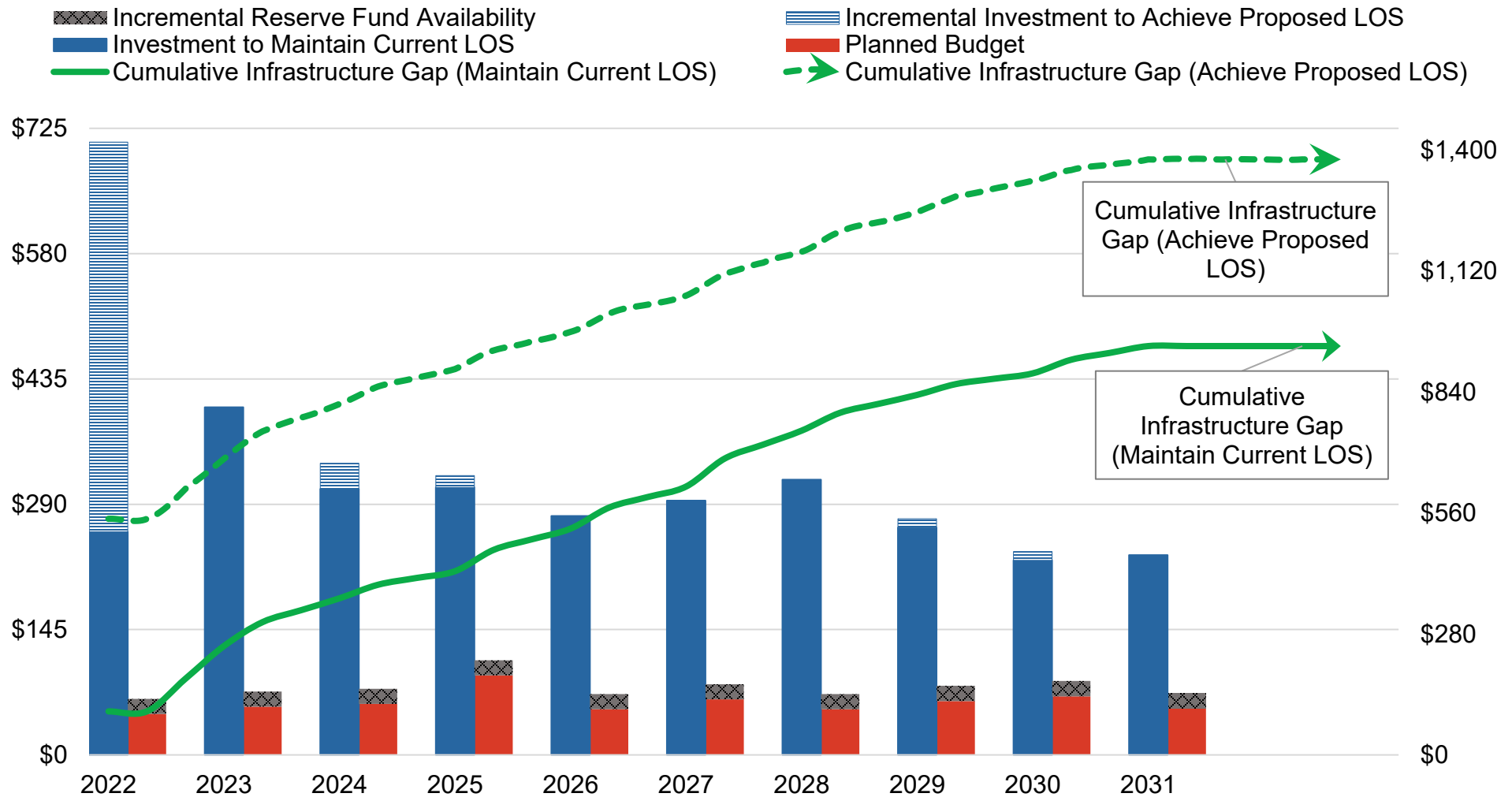


Figure 22.1 10-Year Planned Budget, Investment to Maintain Current LOS and Achieve Proposed LOS, Cumulative Infrastructure Gaps (millions) (All Infrastructure within CAM Plan Scope)

To provide additional context to these infrastructure gaps, the 2023 CAM Plan maintain current LOS gap is compared to the infrastructure gaps presented in the 2014 and 2019 CAM Plans (see Table 22.1 below). Comparison of achieve proposed LOS infrastructure gaps is not provided as it was not quantified in the 2014 and 2019 CAM Plan. This analysis highlights that since the 2014 CAM Plan the infrastructure gap has increased on a dollar-per-dollar basis of planned budget and reserve fund availability while conversely, it has decreased as a percentage of replacement value. This indicates that budget increases are being outpaced by escalation of asset replacement values, noting above average inflationary pressures that have been experienced as Canada's economy has emerged from the pandemic. Also, that in the face of such replacement value increases proactive asset management activities have enabled

the City to control and reduce the ratio of infrastructure gap to replacement value realized since 2014.

Table 22.2 provides a service area breakdown of the 2023 CAM Plan contributors to total replacement value and maintain current LOS and achieve proposed LOS infrastructure gaps for the 10-year planning period of 2022-2031. The highest contributors to the 2023 CAM Plan infrastructure gaps are Transportation (Roads, Structures, and Traffic), Recreation, Parks, Wastewater (Sanitary and Stormwater), Fire, Corporate Facilities, and Long-Term Care service areas. It is noteworthy that the City has many service areas that do not have identified infrastructure gaps, emphasizing the diverse landscape of infrastructure needs across the city.

Table 22.1 CAM Plan 2014, 2019 and 2023 10-Year Infrastructure Gap Comparisons (\$Millions)

Summary	Replacement Value	Total Planned Budget and Reserve Fund Availability	10-Year Infrastructure Gap ⁸⁵	Infrastructure Gap as a Percentage of Planned Budget and Reserve Fund Availability	Infrastructure Gap as a Percentage of Replacement Value
CAM Plan 2023	28,465.1	1,934.0	946.1	48.9%	3.32%
CAM Plan 2019	20,106.1	1,423.8	568.8	39.9%	2.83%
CAM Plan 2014	10,925.0	1,090.3	466.1	42.7%	4.27%

*Subject to rounding.

⁸⁵ The 2023 CAM Plan 10-year infrastructure gap represents the maintain current LOS infrastructure gap as achieve proposed LOS infrastructure gaps were not assessed as part of the 2019 CAM Plan.

Table 22.2 Asset Replacement Value, Maintain Current and Achieve Proposed LOS 10-Year Infrastructure Gaps (\$Thousands)

Service Area	Replacement Value	Maintain Current LOS 10-Year Infrastructure Gap	Achieve Proposed LOS 10-Year Infrastructure Gap
Water	7,653,185	None Identified	None Identified
Wastewater (Sanitary)	6,759,752	57,685	58,185
Wastewater (Stormwater)	6,335,485	9,158	11,358
Transportation and Mobility (Roadways, Structures, Traffic)	4,761,691	677,525	994,527
Parking	7,097	None Identified	None Identified
Corporate Facilities	324,320	9,887	24,919
Fleet	70,864	None Identified	8,983
Information Technology	39,697	None Identified	None Identified
Culture Services	122,528	1,016	12,209
Waste Management	136,442	None Identified	None Identified
Recreation and Sport	533,610	72,430	111,679
Parks	236,144	65,719	87,448
Forestry	443,083	None Identified	9,024
Emergency Management and Security Services	9,129	None Identified	None Identified
London Fire Department	175,989	41,836	47,542
Municipal Housing Development	21,223	None Identified	None Identified
Long Term Care	75,631	10,815	12,208
Land	759,240	Not Applicable	Not Applicable
Total	28,465,110	946,071	1,378,082

*Subject to Rounding.

The analysis identifies that the Tax Supported assets have significant infrastructure gaps over the next 10-years as it relates to both maintain current LOS and achieve proposed LOS. While Wastewater assets have moderate infrastructure gaps primarily due to maintain current LOS cost pressures, and Water assets have no identified infrastructure gaps. This indicates Tax Supported and Wastewater assets planned investments in lifecycle renewal and select service improvements as of the 2022 Annual Budget Update do not sufficiently address the needs of the infrastructure assets. As a result, risk of asset failures can potentially increase along with a corresponding drop in the levels of customer satisfaction with both service quality and quantity. As such the 2023 CAM Plan infrastructure gap financing strategies are intended to recommend actions to mitigate the infrastructure gaps, which in turn supports the City's efforts to develop the 2024-2027 MYB that will ultimately implement the 2023-2027 Strategic Plan. This is a complex activity. However, collectively the actions of the City are expected to meaningfully address the growing infrastructure gaps, maintain and/or improve asset conditions, and ultimately achieve Council's approved LOS over the long-term.

22.1.2: Multi-Year Budget Infrastructure Gap Financing

Prior to moving further into the financing strategies, the following high-level descriptions and nature of each type of infrastructure gap is provided along with an explanation of how these infrastructure gaps are potentially funded through the MYB budget process.

Descriptions and MYB funding of each infrastructure gap type:

- **Maintain Current LOS Infrastructure Gap** – represents the required increase in capital financing costs to maintain existing service levels (MESL) of infrastructure

supported services. These capital financing cost increases are funded, as best as possible, through the MESL average annual tax levy increase presented to Council. Should a portion of this infrastructure gap not be funded through the MESL average annual tax levy increase, the remaining amount will be brought forward as part of the infrastructure gap MYB additional investment business case.

- **Achieve Proposed LOS Infrastructure Gap** – represents the required increase in capital financing to enhance and/or expand service levels of infrastructure supported services. Unlike some additional investments which are purely one-time in nature, additional investments to achieve proposed LOS are permanent in nature as they are required to support enhanced lifecycle renewal and, if necessary, initial service improvements costs. These capital financing increases are funded, as best as possible, through the MYB additional investment business case average annual tax levy increase presented to Council.

22.1.3: CAM Plan Key Financial Policies

The development of the infrastructure gap financing strategies is guided by several of the City's financial policies. This alignment ensures the infrastructure gap financing strategies maintain London's financial stewardship over public assets and funds, and incrementally supports the ongoing achievement of Moody's Investor Services Aaa credit rating; London has been awarded the Aaa credit rating for 47 consecutive years.

For the purposes of the CAM Plan, the following financial policies are highlighted solely as they relate to the infrastructure gap financing strategies:

CAM Policy – Through this Policy, CAM Plan cycle and infrastructure gap funding considerations are aligned with Strategic Plan and MYB cycles (4-year cycles), and financial staff lead and/or support financing strategy development to help determine pace, timing, and appropriate sources of financing for infrastructure gap mitigation.

MYB Policy – This Policy supports the financing strategy as it sets the operating and capital budget development and approvals framework, which among others, is inclusive of alignment of Council's Strategic Plan longer-term goals and objectives with long-term funding requirements as well as providing greater certainty to tax/rate payers regarding the future direction of taxes/rates and the timing of implementation of the Strategic Plan.

Capital Budget and Financing Policy – Guides the financing strategy by providing the framework that ensures infrastructure gaps are financed in a manner that places a priority on maintaining long-term financial sustainability, which includes classification of the capital budget into three streams titled lifecycle renewal (LCR), growth, and service improvement along with priority ordering of sources of financing options for each capital budget classification and costing requirement for budget development.

Reserve and Reserve Fund Policy – This Policy establishes the objective that reserve and reserve fund balances shall be maintained at appropriate levels whereby the generation of citizens who benefit from an investment are also responsible for financing it to the greatest extent possible. This principle is referred to as intergenerational equity and supports the infrastructure gap financing strategies by setting the goal of maintaining adequate reserves and reserve funds balances to,

among others, renew and replace major infrastructure assets in scope of the CAM Plan.

Capital Asset Renewal and Replacement Reserve Fund (CARR RF) By-law – The purpose of CARR RFs is to fund lifecycle renewal (major repair and maintenance) and replacement (including disposition) costs of existing and newly acquired City-owned infrastructure assets contained within the CAM Plan, to ensure these infrastructure assets do not deteriorate over time and continue to meet the LOS specified. The establishment of these funds is critical to the infrastructure gap financing strategies as they provide a clear line-of-sight to capital funding beyond what is contained in the 10-year capital plan, and where approved infrastructure gap financing will be invested i.e., service area specific reserve funds.

Debt Management Policy – Similar to the Reserve and Reserve Fund Policy and CARR RF Policy, this Policy is grounded in the principle of intergenerational equity with the goal that debt financing be structured in a way that is fair and equitable to those who pay and those who benefit from infrastructure assets over time. This requirement reinforces the above policies and guides the development of the infrastructure gap financing strategies, which are aimed at increasing our non-debt capital financing to mitigate service delivery risks, maintain an appropriate credit rating, and provide for intergeneration equity i.e., debt financing is only considered after all other funding options have been applied and exhausted.

Assessment Growth Policy – This Policy is considered in the development of the Tax Supported infrastructure gap financing strategies in two ways:

- First the Policy provides funding for capital asset lifecycle renewal and replacement needs of newly constructed or assumed growth assets. Thus, the financing strategies

are built on the premise these new assets will not impact the infrastructure gap over the 10-year CAM Plan period.

- Secondly, the Policy states if annual assessment growth funding exceeds the accumulated growth costs then 50% of the balance available will be applied on a one-time basis to mitigate growth in the infrastructure gap. This one-time source of financing provides short-term capital financing which temporarily reduces tax levy pressures associated with the infrastructure gaps and allows the City to take a long-term approach to infrastructure gap mitigation.

Surplus/Deficit Policy – This Policy is considered in the development of the infrastructure gap financing strategies as it provides a one-time source of financing for infrastructure gap mitigation when an operating budget surplus is realized. As stated above, this allows the City to take a long-term approach to infrastructure gap mitigation. Per the Policy, this one-time source of financing is applied as follows:

- In a year of surplus, after priority consideration is given to operating budget contingency reserves and the Unfunded Liability Reserve Fund balances, remaining surplus shall be allocated to tax and rate supported capital reserve funds in accordance with the following proportions:
- Tax supported budget – 25% of any operating surplus shall be contributed to the Infrastructure Gap Reserve Fund,
- Water rate supported budget – 50% of any operating surplus shall be contributed to the Waterworks Reserve Fund⁸⁶, and
- Wastewater rate supported budget – 50% of any operating surplus shall be contributed to the Sewage Works Reserve Fund⁸⁷.

⁸⁶ Among others, the Waterworks Reserve Fund supports infrastructure gap financing, if any.

22.2: 2024-2027 MYB Average Annual Tax/Rate Levy Increases

22.2.1: Tax Supported Budget

The Strategic Priorities and Policy Committee, at its April 18, 2023, meeting, received the report titled 2024-2027 Multi-Year Budget. The purpose of this report, among others, was to formally kick-off the 2024-2027 MYB process and seek Council's direction on the desired average annual tax levy increase to support budget planning and development. Council direction on the average annual tax levy increase was sought based on two budget considerations, these are:

- The required average annual tax levy increase to support MESL, and
- The required average annual tax levy increase to support prioritized additional investments.

As it relates to MESL, the report highlights that since 2021 the operating and capital budgets have realized inflationary pressures well beyond the inflationary increases built into the 2020-2023 MYB; this is inflationary levels not experienced in Canada over 20 years.

To recognize the 2020-2023 inflationary pressures and the forecasted inflation for 2024-2027, Council resolved that the MESL portion of the operating budget, which as previously explained includes capital financing costs, encompass an average annual tax levy increase of 2.9% to 3.9%.

Regarding additional investments the report highlights the 2023-2027 Strategic Plan includes several strategies that require additional funding to implement, it being noted many strategies can be implemented within MESL budgets and/or have other

⁸⁷ Among others, the Sewage Works Reserve Fund supports infrastructure gap financing, if any.

non-tax sources funding. Where alternative funding sources are not available, Council direction on the average annual tax levy increase to support additional investments was requested. For this decision point, Council resolved that the prioritized additional investment portion of the 2024-2027 MYB and associated average annual tax levy increase be tabled at 0.5%, and that Civic Administration bring forward additional investments beyond this level of taxation for consideration only.

The direction on average annual tax levy increases guides the infrastructure gap financing strategies development as follows:

- 2023 CAM Plan infrastructure gap financing strategies have been conservatively modeled assuming a 2024 and beyond average annual tax levy increase of 3.0%.
- The MESL direction, average annual tax levy increase of 2.9% to 3.9%, guides the financing strategies for addressing the maintain current LOS infrastructure gaps. This process allows Civic Administration to balance the capital financing cost increases necessary to finance maintain current LOS infrastructure gaps with that of other operating budget cost driver pressures and helps to determine recommended pace and timing of infrastructure gap funding increases. Maintain current LOS infrastructure gap funding increases beyond what can be accommodated in the MESL average annual tax levy increases form part of the 2024-2027 MYB additional investment business case regarding infrastructure gap funding.
- The prioritized additional investment direction, average annual tax levy increase of 0.5% and remaining additional investments brought forward as for consideration only, guides the infrastructure gap financing strategies for addressing maintain current LOS infrastructure gaps not financed within the MESL portion of the 2024-2027 MYB

and all achieve proposed LOS infrastructure gaps. It does this by helping Civic Administration to consider what portion of the prioritized additional investments should be recommended to fund these remaining infrastructure gaps, and what portion, if any, of these gaps should be presented for Council consideration only. When making recommendations Civic Administration factors in, among others, service delivery risks, taxpayer affordability (numerous 2023-2027 Strategic Plan priorities), and the potential for one-time funding sources based on financial policies (examples Assessment Growth Policy and Surplus/Deficit Policy).

These three uses demonstrate how this Council direction is beneficial to the infrastructure gap financing strategies planning process. However, as noted throughout this financing strategy and 2023 CAM Plan, final sources of financing recommendations and associated tax levy increases are dependent on Civic Administration's budget development, and ultimately Council deliberation and approval.

22.2.2: Wastewater Rate Supported Budget

To model the infrastructure gap financing strategies for Wastewater, the 2023 CAM Plan uses an average annual utility rate increase of 2.5%. This rate of increase is consistent with Wastewater's utility rate increases for 2020, 2022, and 2023. Similar to the Tax Supported budget, should Wastewater maintain current LOS and achieve proposed LOS infrastructure gaps exceed what can be accommodated within tabled 2024-2027 MYB MESL utility rate increases, an additional investment business case will be brought forward for Council's consideration.

22.3: Optional Infrastructure Gap Financing Strategies

22.3.1: Approach for Infrastructure Gap Financing Strategies

This section discusses the optional approaches for infrastructure gap financing strategies that could be used to mitigate or eliminate the infrastructure gaps in the long-term. All options require either an increase in investment in infrastructure LCR and service improvement, or a reduction in the services or LOS the City provides. The reduction of service and LOS is not always a desirable position to promote and for the most expensive and critical tax supported infrastructure like roads and facilities, may not be a viable option due to regulatory/legislative requirements. As such this analysis explores the tax and rate levy impacts of increasing investments in infrastructure while acknowledging that choosing to reduce service or seeking additional service efficiencies may also be available to manage affordability.

Additionally, sources of financing to address infrastructure needs are not limited to tax/rate supported sources, through continued pursuit of non-tax/rate supported sources of financing (user fees, transfers from other levels of governments, etc.) the City can offset some of the required funding. Thus, the Tax Supported and Wastewater financing strategies presented assume an 80/20 and 90/10 tax/rate supported versus non-tax/rate supported sources of financing split, respectively. These sources of financing splits are consistent with the 2022-2031 LCR and service improvement capital plans.

In this context, both the maintain current LOS and achieve proposed LOS infrastructure gap financing strategies and recommendations are summarized as follows:

a) Approach One – Mitigate Growth of the Infrastructure Gaps

Mitigating growth of the infrastructure gaps requires determining the average annual tax/rate levy increases necessary to ensure infrastructure gap financial sustainability is achieved. Infrastructure gap financial sustainability is achieved when the 10-year average annual infrastructure gap less available annual funding is equal to zero. This is not the same as eliminating the gaps, because the tax/rate levy increases do not address the accumulation of infrastructure needs, also referred to as backlog.

b) Approach Two – Eliminate the Infrastructure Gaps

Eliminating or closing the infrastructure gaps requires determining the average annual tax/rate levy increases necessary to address both the 10-year average annual infrastructure gaps and the accumulated backlog of infrastructure needs. The accumulated backlog is equal to the year-over-year infrastructure funding deficit, noting the longer it takes to achieve infrastructure gap financial sustainability the larger this amount becomes and the greater the risks.

Maintaining controlled infrastructure gaps is likely indicative of prudent financial management, therefore, the elimination approach using permanent tax increases is likely an indication of overinvestment and is presented here for information. The challenge with the mitigation approach is balancing the pros and cons of slower and faster tax/rate levy increases; pros and cons include:

- Slower increases have less of an affordability impact on the community and can more easily be accommodated by the

City's staff and local consulting/contracting capacity to deliver more capital projects. However, the accumulation of deferred expenditures is much greater, and the service levels provided by the infrastructure systems may fail to meet the community's expectations as assets are operating in a condition state below their target for a longer period of time.

- Faster increases close the annual funding gaps sooner. This limits the magnitude of the accumulation of continued underinvestment, and reduces the risks posed from continuing to operate infrastructure systems with assets that are below their ideal condition state. However, faster tax/rate levy increases have a larger impact on the affordability to the community and are more challenging for the local contracting/consulting capacity to accommodate.

The concept of maintaining healthy infrastructure gaps and the pros and cons to slower or faster average annual tax/rate levy increases result in the optional and recommended financing strategies presented taking a longer-term approach to mitigation

and elimination of the 2023 CAM Plan infrastructure gaps identified.

To help understand the difference between the two approaches, Figure 22.2 provides a visualization graphic to illustrate the tax/rate levy increases necessary to mitigation and elimination of the infrastructure gap. At the mid-point of the figure, where the red line representing tax/rate levy increase intersects with the average annual infrastructure gap, mitigation is realized. The tax/rate levy increases above the intersecting point represent the additional tax/rate levy increases to eliminate the accumulated backlog.

The next step in the financing strategy is to examine optional average annual tax/rate levy increases necessary to either mitigate or eliminate the infrastructure gaps over select timeframes. Each Tax supported and Wastewater rate supported option is built on the 80/20 and 90/10 tax/rate supported versus non-tax/rate supported sources of financing split found in the 2022-2031 capital plan, respectively.

■ Cumulative Infrastructure Gap Backlog ■ Infrastructure Gap Levy Increases ■ 10-Year Average Infrastructure Gap

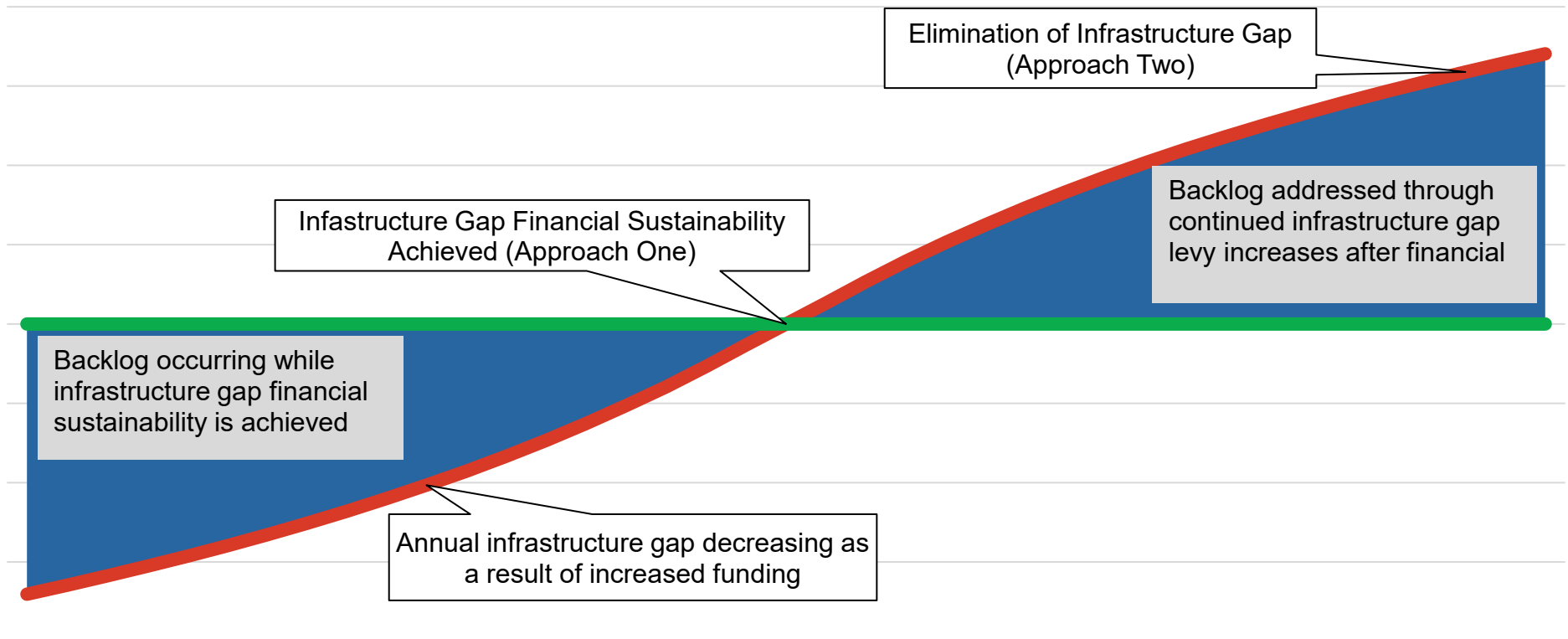


Figure 22.2 Illustration of Infrastructure Gap Mitigation Versus Elimination Approaches

22.3.2: Optional Mitigation Approach Financing Strategies

Table 22.3 summarizes the Tax supported and Table 22.4 summarizes the Wastewater rate supported maintain current LOS and achieve proposed LOS optional infrastructure gap mitigation financing strategies (tax/rate increases and timeframes) required to achieve infrastructure gap financial sustainability (10-year average annual infrastructure gap less

available annual funding is equal to zero). Each option commences in the first year of the 2024-2027 MYB.

Table 22.3 Tax Supported Infrastructure Gap Mitigation Average Annual Tax Levy Increases and Timeframes

Year Financial Sustainability Realized	Maintain Current LOS Average Annual Tax Levy Impact	Achieve Proposed LOS Average Annual Tax Levy Impact
2033 (Year 10)	0.78%	1.11%
2045 (Year 22)	0.36%	0.48%
2050 (Year 27)	0.30%	0.39%
2075 (Year 52)	0.16%	0.19%
2100 (Year 77)	0.11%	0.13%

*Subject to rounding.

Table 22.4 Wastewater Rate Supported Gap Mitigation Average Annual Rate Increases and Timeframes

Year Financial Sustainability Realized	Maintain Current LOS Average Annual Rate Levy Impact	Achieve Proposed LOS Average Annual Rate Levy Impact
2033 (Year 10)	0.45%	0.47%
2045 (Year 22)	0.22%	0.22%
2050 (Year 27) ⁸⁸	0.18%	0.18%
2075 (Year 52)	0.10%	0.10%
2100 (Year 77)	0.07%	0.07%

*Subject to rounding.

22.3.3: Optional Elimination Approach Financing Strategies

Table 22.5 summarizes the Tax supported and Table 22.6 summarizes the Wastewater rate supported maintain current LOS and achieve proposed LOS optional infrastructure gap elimination financing strategies (tax/rate increases and

timeframes) required to achieve infrastructure gap financial sustainability (10-year average annual infrastructure gap less available annual funding is equal to zero) and eliminate the accumulated backlog. Each option commences in the first year of the 2024-2027 MYB.

Table 22.5 Tax Supported Infrastructure Gap Elimination Average Annual Tax Levy Increases and Timeframes

Year Financial Sustainability and Accumulated Backlog Realized	Maintain Current LOS Average Annual Tax Levy Impact	Achieve Proposed LOS Average Annual Tax Levy Impact
2033 (Year 10)	5.27%	6.65%
2045 (Year 22)	2.53%	3.01%
2050 (Year 27)	2.05%	2.40%
2075 (Year 52)	0.99%	1.13%
2100 (Year 77)	0.63%	0.71%

*Subject to rounding.

Table 22.6 Wastewater Rate Supported Gap Elimination Average Annual Rate Increases and Timeframes

Year Financial Sustainability and Accumulate Backlog Realized	Maintain Current LOS Average Annual Rate Levy Impact	Achieve Proposed LOS Average Annual Rate Levy Impact
2033 (Year 10)	3.30%	3.39%
2045 (Year 22)	1.77%	1.80%
2050 (Year 27) ⁸⁹	1.46%	1.49%
2075 (Year 52)	0.75%	0.76%
2100 (Year 77)	0.49%	0.49%

*Subject to rounding.

⁸⁸ For the years 2050, 2075, and 2100 the Wastewater rate impacts are identical for mitigation of both the maintain current LOS and achieve proposed LOS infrastructure gaps due to rounding and because the difference between the two gaps is immateriality.

⁸⁹ For the years 2050, 2075, and 2100 the wastewater rate impacts are identical for mitigation of both the maintain current LOS and achieve proposed LOS infrastructure gaps due to rounding and because the difference between the two gaps is immateriality.

22.4: Historical Infrastructure Gap Funding Mitigation

The 2014 and 2019 CAM Plans were the first times the City's infrastructure gaps were quantified. Leading up to and through the results of these CAM Plans, having financial tools to quantify the infrastructure gap and inform decision making gained significant support from Municipal Council.

As a result, Municipal Council included strategic areas of focus in the 2015-2019, 2019-2023, and 2023-2027 Strategic Plans to further invest in achieving robust and sustainable infrastructure, and proactive financial management. These strategies included managing the City's infrastructure gaps and making sure the City's finances were well planned to prevent burdening future rate payers, respectively. This led to Council approval of enhanced funding and policy decisions to achieve the strategic areas of focus objectives.

This dedication aligns with the Province of Ontario's goals as outlined in O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure.

To provide an overview of key strategies and initiatives implemented the remainder of this section is presented as follows:

- Summary of financial management processes implemented to support infrastructure gap mitigation and monitoring.
- Overview of historical infrastructure gap funding approvals.
- Comparison of 2014, 2019, and 2023 10-year infrastructure gaps to replacement values.

22.4.1: Summary of Infrastructure Gap Financial Management Processes

Recognizing that managing the infrastructure gap requires an organized long-term approach, Civic Administration with the

support of Council has implemented, among others, the following financial management processes:

- **Asset Management Decision Optimization** – The City is currently using Brightly Software Inc. (formerly Assetic software) to assist with optimized prediction models and decision support tools for long-term planning of infrastructure assets. These tools enable the City to optimize service level outcomes and capital expenditure requirements using industry-specific algorithms that predict the future behaviour of assets given available funding levels, replacement, and renewal criteria, and enable scenario comparison to aid decision making.
- **Wastewater Treatment Operations (WTO) Appraisal** – WTO and CAM collaborated on issuing a request-for-proposal that gave comprehensive information on treatment plant replacement values, condition, risk, and investment projections. Internal and/or external professional assessment such as this ensure the CAM Plan data is accurate and the capital budgets are positioned to achieve sustainable and affordable infrastructure over the long-term.
- **Infrastructure Current and Proposed Levels of Service (LOS)** – Per O. Reg. 588/17 requirements, the 2023 CAM Plan represents the City's first iteration of measuring and monitoring the degree to which infrastructure systems are meeting LOS objectives laid out for them, and what level of funding is necessary to continue delivering both current and proposed LOS.
- **Capital Asset Renewal and Replacement Reserve Funds (CARR RFs)** – This category of reserve funds was strategically amended in 2020 to align each CARR RF with its corresponding CAM Plan service area. This linkage improves the accuracy of CAM Plan service area specific

infrastructure gaps, provides for transparent allocation of approved infrastructure gap funding increases, and enhances the monitoring and accountability over subsequent fund spending.

- **Capital Budget Responsibility and Budget Appendix (RBA)** – This process improvement requires divisions responsible for the construction and/or procurement of assets where, post construction, the asset created requires ongoing support from other City service areas, to complete an RBA form which documents the long-term responsibilities and capital and operating funding requirements prior to budget approval. This ensures the efficient transition of new and/or improved capital assets into service delivery and for the consideration of the full costs of asset development and operations prior to budget approval.
- **Permanent Funding Process Improvements** – Existing operating and capital budgetary processes related to maintain existing service levels (MESL), additional investments, and assessment growth have been updated to take into account CAM Plan results. Examples of this are:
 - MESL capital budget development, within available funding, strives to reflect CAM Plan maintain current LOS infrastructure needs.
 - In year one of each MYB, additional investment business case reflecting infrastructure needs beyond the affordability of the MESL portion of the budget is brought forward for Council's consideration. Noting these funding requests take a long-term approach to infrastructure gap management and seek to mitigate not eliminate the gap presented.
 - Annually an assessment growth business case requesting capital funding to establish LCR savings plans for newly constructed and/or assumed growth budget

assets is completed. These funding requests avoid escalation of existing infrastructure gaps by providing for the full cost of rehabilitation or replacement of new growth assets based on CAM Plan recommended reinvestment rates.

- **One-Time Funding Process Improvements** – Recognizing that mitigating the infrastructure gap requires a long-term strategic approach to maintain tax/rate payer affordability and achieve intergenerational equity; the Surplus/Deficit Policy and Assessment Growth Policy were amended to provide one-time infrastructure gap funding in a year of surplus.

22.4.2: Overview of Historical Infrastructure Gap Funding Approvals

Since 2016, leveraging the financial management processes highlighted above, with Council's support the City has made significant strides increasing the amount of funding available for mitigating identified infrastructure gaps as well as avoiding escalation of existing infrastructure gaps. Through these varying forms of funding increases, the City is taking a thorough and balanced approach to achieving asset and financial sustainability (mitigation approach to infrastructure gap management), and intergenerational equity (preventing and/or minimizing the potential burden on future rate payers).

The following two segments provide a brief overview of the life-to-date (2016-2023) funding approved for both mitigation of identified infrastructure gaps and avoidance of infrastructure gap escalation.

Mitigation of Identified Infrastructure Gaps

As it relates to mitigating existing infrastructure gaps and achieve long-term asset and financial sustainability, Table 22.7 summarizes the Council approved permanent and one-time

funding increases secured through the MYB additional investment business case, assessment growth business case, and operating budget surplus and assessment growth surplus allocation processes.

Avoidance of Infrastructure Gap Escalation

Since 2020, through the Assessment Growth Policy and supporting processes, Council has supported the permanent avoidance of \$20.5 million in infrastructure gap escalation due to newly constructed and assumed growth assets associated with the Development Charges Background Study and related growth capital budgets. Table 22.8 summarizes the life-to-date annual funding approvals that support this infrastructure gap escalation avoidance.

Table 22.7 Summary of Historical Permanent and One-Time Infrastructure Gap Mitigation Funding Approvals (\$Thousands)

Budget	Funding Type	2016-2023 Approved Funding	2023 Annualized Funding ⁹⁰
Tax	Permanent	51,457.9	12,815.0
Tax	One-Time	11,882.7	N/A
Water ⁹¹	One-Time	4,211.7	N/A
Wastewater ⁹²	One-Time	5,862.2	N/A

*Subject to rounding.

Table 22.8 Summary of Historical Assessment Growth Avoidance of Infrastructure Gap Escalation Funding Approvals (\$Thousands)

Budget	2020-2023 Approved Funding	2023 Annualized Funding ⁹³
Tax	20,491.0	7,717.2

*Subject to rounding.

⁹⁰ The 2023 annualized funding column represents the permanent funding contained within the City's MESL portion of the tax supported budget specifically approved for LCR financing of 2022 and prior newly constructed and assumed growth assets. This funding ensures newly constructed and assumed growth assets do not increase the existing infrastructure gaps.

⁹¹ Permanent Water capital financing cost increases contained within MESL portion of approved budgets; thus, above table is solely inclusive of historical one-time operating budget surplus allocations approved for infrastructure gap mitigation.

⁹² Permanent Wastewater capital financing cost increases contained within MESL portion of approved budgets; thus, above table is solely inclusive of historical one-time operating budget surplus allocations approved for infrastructure gap mitigation.

⁹³ The 2023 annualized funding column represents the permanent funding contained within the City's MESL portion of the tax supported budget specifically approved for LCR financing of 2022 and prior newly constructed and assumed growth assets. This funding ensures newly constructed and assumed growth assets do not increase the existing infrastructure gaps.

22.4.3: Infrastructure Gap 2019 to 2023

Figure 22.3 illustrates the projected 10-year infrastructure gaps for the 2019 CAM Plan, 2023 CAM Plan infrastructure gaps. The 2023 CAM Plan infrastructure gaps (both Maintain Current LOS and Achieve Proposed LOS) are presented. Given the City of London is adapting to O. Reg 588/17 requirements of presenting a maintain current LOS and achieving proposed LOS, it is noted the maintain current LOS gap is at a similar amount to earlier projections, despite inflation pressures noted throughout the CAM Plan. However, the achieved proposed LOS is greater than original projections because of cost pressures to maintain Roadways at a Pavement Quality Index (PQI) at 65, having preliminary assessments of CEAP impacts, and addressing all Facilities requirements as identified in the VFA database. Finally, given the recent detailed appraisal report of the City's Wastewater treatment plants there is greater accuracy and reliability in identifying Wastewater Sanitary's funding needs.

Data Quality - The City continues refining accuracy and reliability of information regarding asset inventory, replacement values, and Direct and Related levels of service. This information, in addition to asset conditions and useful life, are the main drivers to better forecast the lifecycle activities costs in the future.

Asset Management Decisions Optimization - The City continues using brightly software to assist with optimized prediction models and decision support tools for long-term planning of infrastructure assets. The tools enable the City to optimize service level outcomes and capital expenditure using industry-specific algorithms that predict the future behaviour of assets given available funding levels, replacement, and renewal criteria, and enable scenario comparison to aid decision making. While the models cannot yet be applied to every service, use of this software is another step in providing a clearer understanding of lifecycle needs and the impact if optimal funding is not received.

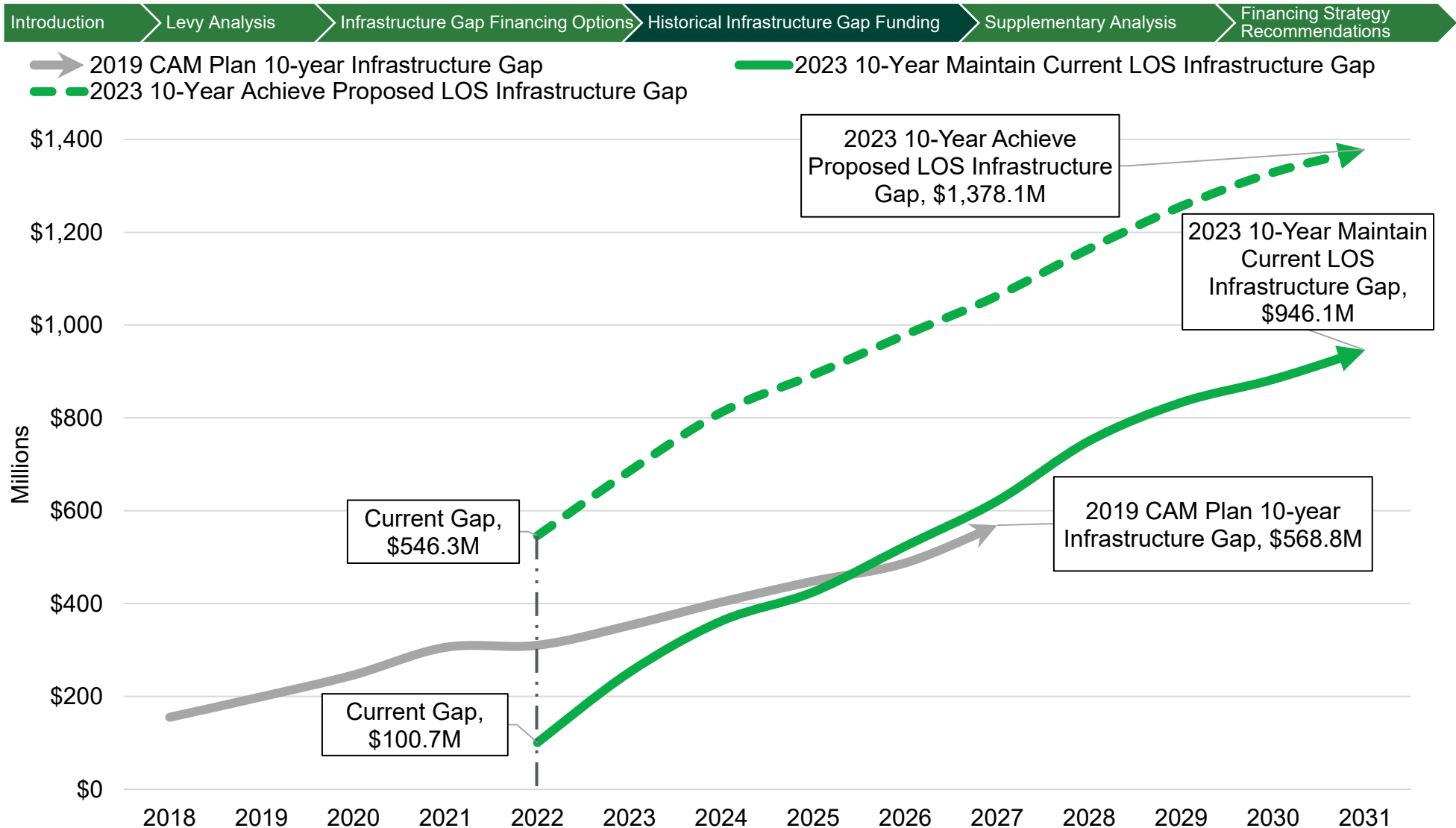


Figure 22.3 Infrastructure Gap Comparison

22.5: Supplementary Analysis (Comparable Municipalities)

Many municipalities across Ontario are in a similar position as the City of London: asset management processes have identified an infrastructure funding gap, and staff are considering solutions to mitigate those gaps. Despite best efforts on the technical side of asset management, the refinement of optimal asset lifecycle management strategies have not been able to close all infrastructure gaps by reducing the 'need'. Inevitably, revenue increases are determined to be one of the practical solutions to address remaining funding gaps. A common approach taken by Ontario municipalities is to create a revenue source that can have direct 'line of sight' from the revenue to the infrastructure rehabilitation or replacement activities. This line of sight provides transparency to

stakeholders to demonstrate how the new revenues are used for infrastructure projects and not added to general revenue to fund other programs/projects. The term 'Infrastructure Levy' is typically used to refer to these type of dedicated revenue sources. Table 22.9 provides perspective from Ontario municipalities that have implemented 'Infrastructure Levies' to address their infrastructure funding gaps. As noted in Section 22.4.2:, London has taken various measures to increase funding associated with infrastructure gaps. However, London has strategically decided not to use a separate 'Infrastructure Levy' due to the high level of financial accountability and transparency delivered through existing budget presentation, approval, and monitoring practices and processes.

Table 22.9 Comparable Municipal Entity Infrastructure Levy Research

Municipal Entity	Infrastructure Levy Percentage	Year Levy implemented
Windsor	1.16%	2020
Guelph	0.5%	2018
Waterloo	1.0%	2020
Hamilton	0.5%- phase in approach 2023-2033 for increase to 1.12%	2010; 2024 with proposed change to reach 1.12% levy
Oakville	1.0%	1996
Burlington	1.25% - 2022, 1.60% – 2023 (Proposed)	2005
Kingston	1.0%	1999

22.6: General Infrastructure Gap Financing Strategies Recommendations

Explore opportunities to address the infrastructure gap through various financing strategies.

- i. Continue to pursue funding from non-tax/rate sources of financing (external funding) to address the infrastructure gaps.
- ii. Consistent with Council's 2023-2027 Strategic Plan and the actions taken as part the 2020-2023 MYB additional investment business case #4 parts A and B, the CAM Section will submit additional investment business cases through the 2024-2027 MYB process. These potential business cases will seek Council approval of infrastructure gap funding beyond which is contained in the Tax Supported and Wastewater maintain existing service levels (MESL) portions of the 2024-2027 MYB in-line with the 2023 CAM Plan maintain current LOS infrastructure gap results. Such business cases will consider the following criteria when providing an average annual tax/rate levy increase recommendation:
 - Mitigating growth of the maintain current LOS cumulative 10-year infrastructure gap;
 - Infrastructure gap financial sustainability is targeted between 22-years (2045) to 27-years (2050), which could result in average annual tax/rate increases of 0.36% to 0.30% (Tax Supported), noting final tax/rate levy recommendations are subject to 2024-2027 MYB development and will take into account numerous 2023-2027 Strategic Plan priorities and affordability of Municipal taxation on the community;
 - This infrastructure gap financial sustainability target comes with an associated risk of funding shortfalls or an increased risk of reduced services/asset failures, and the residual risk of the unaddressed infrastructure gaps (cumulative backlog) may be tolerable; and
- Update the Water and Wastewater 20-year financial plans, addressing the infrastructure gap identified in Wastewater budget as best as possible.
- iii. Where new Tax Supported tangible capital assets are added to the City's asset base due to growth, the CAM Section will submit an assessment growth business case equivalent to the recommended annual reinvestment rates for the added asset category. Approved funding will be allocated to the corresponding Capital Asset Renewal and Replacement Reserve Funds (CARR RF) to ensure that the asset(s) going forward will have a funding source available in the future to replace or to incur major lifecycle repairs.
- iv. Similarly for any service improvement additional investment business cases brought forward through the 2024-2027 MYB process to enhance or add new tangible capital assets, the CAM Section along with service area staff shall identify additional CARR RF contributions necessary based on the recommended annual reinvestment rates for the added asset category. Approved funding will be allocated to the corresponding CARR RF to ensure that the asset(s) going forward will have a funding source available in the future to replace or to incur major lifecycle repairs.
- v. Continue to utilize one-time funding made available through the application of the Surplus/Deficit Policy and Assessment Growth Policy to reducing the risks associated with existing infrastructure gaps or infrastructure gap backlogs.

- vi. Per the CARR RF By-law and as a result of new municipal infrastructure associated with Municipal Housing Development (MHD), the 2023 CAM Plan recommends the creation of a new CARR RF referred to as the Municipal Housing Development Renewal Reserve Fund. This Fund will provide a clear line-of-sight to the primary tax supported and non-tax supported (user fee contributions, if any) sources of financing for lifecycle renewal capital works associated with MHD assets.

Section 23. Conclusion and Recommendations



23.1: Conclusions

The Corporation of the City of London's ("City of London" or "City") infrastructure systems are the backbone of our community. They support a range of municipal services that enable the quality-of-life experience by residents, businesses, and other community partners/participants. The CAM Plan is a strategic document that describes the state of London's assets and the approach to managing assets over their lifecycle to achieve approved levels of service (LOS) at the lowest lifecycle costs. This document is the third CAM Plan produced through the City's Corporate Asset Management (CAM) Program. It builds on the 2019 CAM Plan by leveraging new and improved asset data/information from each service area, as well as using new tools and techniques. The use of updated asset data has resulted in several changes between the first CAM Plan and this third CAM Plan, which are detailed in the following section. Over time, each successive CAM Plan will be more consistent with the previous iterations to increase the ability in identifying trends to inform decision-making.

This CAM Plan is a tactical outcome of the CAM Program, setting out the current plan for the City to manage its \$28.5 billion worth of infrastructure under the direct ownership and control of the City of London. The overall condition of the City's assets is rated as Good. Good condition indicates that the infrastructure is adequate for now with some elements showing general signs of deterioration that require attention. The assets that are of concern to the City are the smaller fraction of assets listed in Poor or Very Poor condition. Based on the existing City planned budgets, the 10-year maintain current LOS infrastructure gap is approximately \$946 million and the 10-year achieve proposed LOS infrastructure gap is approximately \$1,378 million. The City proposed strategies to mitigate the annual growth of the infrastructure gap. The strategies are to balance the impact on the affordability of City taxation on the community while attaining financial sustainability of the infrastructure gap.

23.2: 2019 CAM Plan Recommendation Progress

Table 23.1 2019 CAM Plan Recommendations and Progress Reporting

Number	Recommendation	Progress and Status
1.	Continue to align the Corporate Asset Management Plan with the Corporate Strategic Plan.	2023 CAM Plan reflects best practices currently in place and has been developed to support proactive management of the Corporation's infrastructure to conform to the 2023-2027 Strategic Plan City of London. The City's CAM Section continues to align the CAM Plan future updates with current and future Strategic Plans.
2.	Continue to advance the Corporate Asset Management Program.	<p>The CAM Program has completed five of its seven units and continues to develop templates and procedures to fully implement the CAM Program for all service areas.</p> <p>Unit six – Pilot Trials, specifically centered around the Transportation, and Parks and Recreation service areas. The work is progressing well, and essential modules such as condition, inventory, LOS, and risk management have been successfully completed. The next critical step in the pilot trials is to develop the lifecycle management module. Once this phase is finalized, it will mark the completion of the procedural frameworks necessary to facilitate and guide standardized asset management practices citywide.</p> <p>Unit Seven of the CAM program aims to further implement the lessons learned from the initial six units across all service areas within the scope of the program.</p>
3.	Enhance the Corporate Asset Management Plan.	<p>CAM Program enhancement continues to form the basis of the approach while exercising flexibility to achieve effective results.</p> <p>The CAM Section collaborates closely with City service areas to ensure comprehensive asset databases and identifies areas for improvement. For instance, conducting a wastewater treatment plant condition assessment, collecting inventory data and assessing conditions for small diameter culverts, improving the data collection approach for bridges and structures, and issuing RFPs to collect and enhance inventory and condition data for Environmental Significant Areas (ESA).</p> <p>The CAM Program plays a vital role in evaluating trade-offs between service levels, cost, and risk for the City's natural and built infrastructures. In the development of the 2023 CAM Plan, the City has taken significant strides to integrate climate change considerations into lifecycle management strategies. Coordination between Corporate Asset Management and Climate Change Planning enables cost-efficient climate change mitigation and adaptation, balancing investments for sustainable service delivery.</p> <p>To ensure compliance with Phase 3 of O. Reg 588/17, the City has undertaken the task of identifying preliminary proposed Levels of Service (LOS) across assets within the scope of the CAM Plan. By establishing clear and appropriate LOS, the City can prioritize and optimize its</p>

Number	Recommendation	Progress and Status
		resources, allowing for efficient maintenance and operation of assets, while also meeting the needs and expectations of its residents.
4.	Monitor the Progress of the Corporate Asset Management Plan.	<p>The CAM Plan's Annual Report Card was introduced in 2020 and 2021 to evaluate core services and services with significant infrastructure gaps. This Report Card serves as a valuable tool for tracking and updating key LOS metrics based on predefined customer values. It enables both the Council and the Public to stay well-informed about the City's progress and overall performance.</p> <p>A comprehensive update on the infrastructure gap is provided in the 2023 CAM Plan, with subsequent full updates scheduled every four years to align with the City of London's multi-year budgeting process. This approach ensures that the CAM Plan remains a vital resource during budget deliberations, allowing for informed decision-making regarding infrastructure investments and asset management priorities.</p>
5.	Explore opportunities to incorporate the corporate asset management practices to the Boards and Agencies of the City as appropriate.	<p>In the spring of 2021, the CAM Section successfully completed an Asset Management Maturity Assessment of Agencies, Boards, and Commissions (ABCs). This comprehensive report evaluated all ABCs and provided a roadmap for each entity to implement effective asset management practices.</p> <p>The CAM Section has actively collaborated with London Middlesex Community Housing (LMCH) to develop their first Asset Management Plan. By offering a range of tools, templates, and regular advice, the CAM Section has facilitated the transfer of Asset Management best practices and expertise to LMCH's staff. The LMCH Asset Management Plan was completed in August 2020.</p> <p>The CAM Section has established Service Level Agreements with various ABCs, outlining key activities and deliverables for each entity. Asset management plan support has already commenced with the following entities: London Public Library, London Police Service, Museum London, and RBC Place. For other ABCs, support will begin in the fall of 2023.</p> <p>By actively engaging with different entities and fostering a collaborative approach, the CAM Program is making significant strides in enhancing asset management practices throughout the City of London.</p>
6.	Engage the Public and Community Partners in the Asset Management Process.	The CAM Section has taken proactive steps to collaborate with partners from internal ABCs, with the aim of enhancing the coordination of asset management practices citywide. By fostering stronger partnerships and knowledge-sharing among different entities, the City can

Number	Recommendation	Progress and Status
		<p>optimize its asset management strategies and improve overall service delivery to the community.</p> <p>In addition to local collaborations, the CAM Section has initiated partnerships with external organizations like the Canadian Network of Asset Managers (CNAM) and Asset Management Ontario (AMONTARIO). Together, they are working towards creating valuable resources that will educate the public and raise awareness about the importance of asset management processes. These educational efforts will contribute to building a more informed and engaged community, fostering support for the City's asset management initiatives.</p> <p>The City of London has actively engaged the community through a variety of means, including an educational video hosted on the City's YouTube channel (https://youtu.be/bESZY72ne-s) and a participatory platform on the City's "Get Involved" website (https://getinvolved.london.ca/). The latter allows the public to offer valuable insights, ideas, and feedback on plans, projects, and services that are significant to them.</p> <p>These engagement activities have encompassed the sharing of personal experiences by the public, as well as customer satisfaction surveys that provide measurable feedback. This feedback can be evaluated against LOS metrics and used to quantify information about a specific service. The outcome of these evaluations is presented in the LOS tables, which are included in each service area chapter in the CAM Plan. The public also has the opportunity to give feedback on a variety of projects, which serve as guiding factors in the development of the City's services master plans, such as the Mobility Master Plan. The CAM Section uses the insights and information derived from these master plans as a resource when developing CAM Plans.</p>

Number	Recommendation	Progress and Status
7.	Continue to explore opportunities to address the infrastructure gap through various financial strategies.	<p>Through the Tax Supported Budget 2020-2023 Multi-Year Budget (MYB) additional investment business case #4 parts A and B, Council approved an average annual tax levy increase of 0.10% towards mitigating the 2019 CAM Plan Tax Supported infrastructure gap. Over the past 4 years this represents a cumulative investment of \$7.3 million.</p> <p>Building on these actions taken, as needed, the CAM Section will submit additional investment business cases through the 2024-2027 MYB process to achieve financial sustainability of the 2023 CAM Plan identified infrastructure gaps for the Tax Supported, Water, and Wastewater budgets.</p> <p>Where new Tax Supported tangible capital assets are added to the City's asset base due to growth, the CAM Section submits an assessment growth business case equivalent to the recommended annual reinvestment rates for the added asset category. This municipal best practice ensures new and/or expanded assets due to a growing City do not add to existing infrastructure gaps.</p>

23.3: 2019 to 2023 CAM Plan Comparisons

A comparison to the 2019 CAM Plan information shows some noteworthy changes that are generally grouped into three areas: 1. Replacement value; 2. Asset Condition; and 3. Infrastructure Gap.

Replacement Value

The replacement values of all service areas have increased to reflect changes that have been observed in the industry and economy. The replacement values used in the CAM Plan will continue to be refined based on the actual costs observed from capital projects. Figure 23.1 indicates the comparison of 2019 to 2023 CAM Plans showing that the total replacement values of the City directly owned assets increased from \$20.1 billion to \$28.5 billion.

Asset Condition

A comparison of the 2019 CAM Plan condition profile against the 2023 CAM Plan condition profile for all services is shown in Figure 23.1. Figure 23.2 shows the 2023 CAM Plan condition profile by service. The condition profile has slightly improved for all service(s) areas, with a slightly smaller proportion in Poor and Very Poor condition, and a larger proportion in Very Good and Good condition. This change is attributed to a larger amount of real condition data being used in the CAM Plan analysis, as opposed to condition assumptions based on asset age and service life. In addition, the City has allocated extra funding to its capital budget which has significantly improved the overall condition.

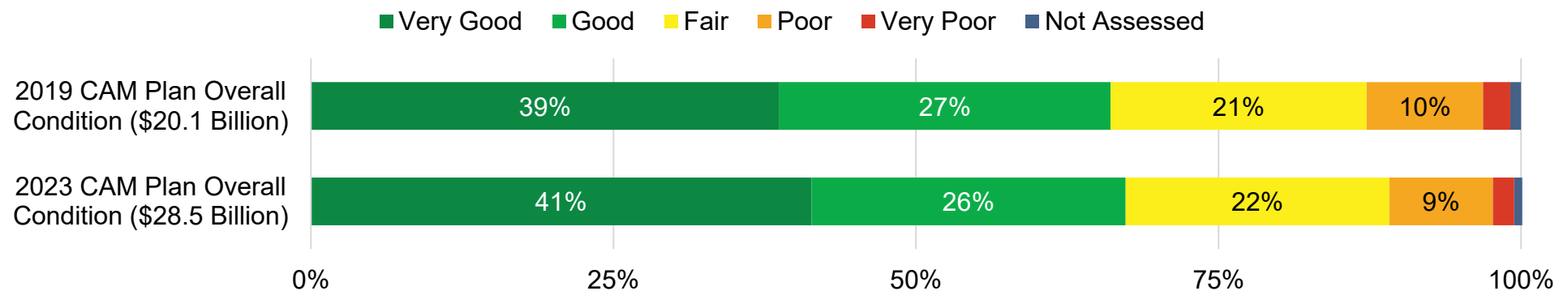


Figure 23.1 2019 CAM Plan to 2023 CAM Plan Condition Summary (City of London Overall Assets)

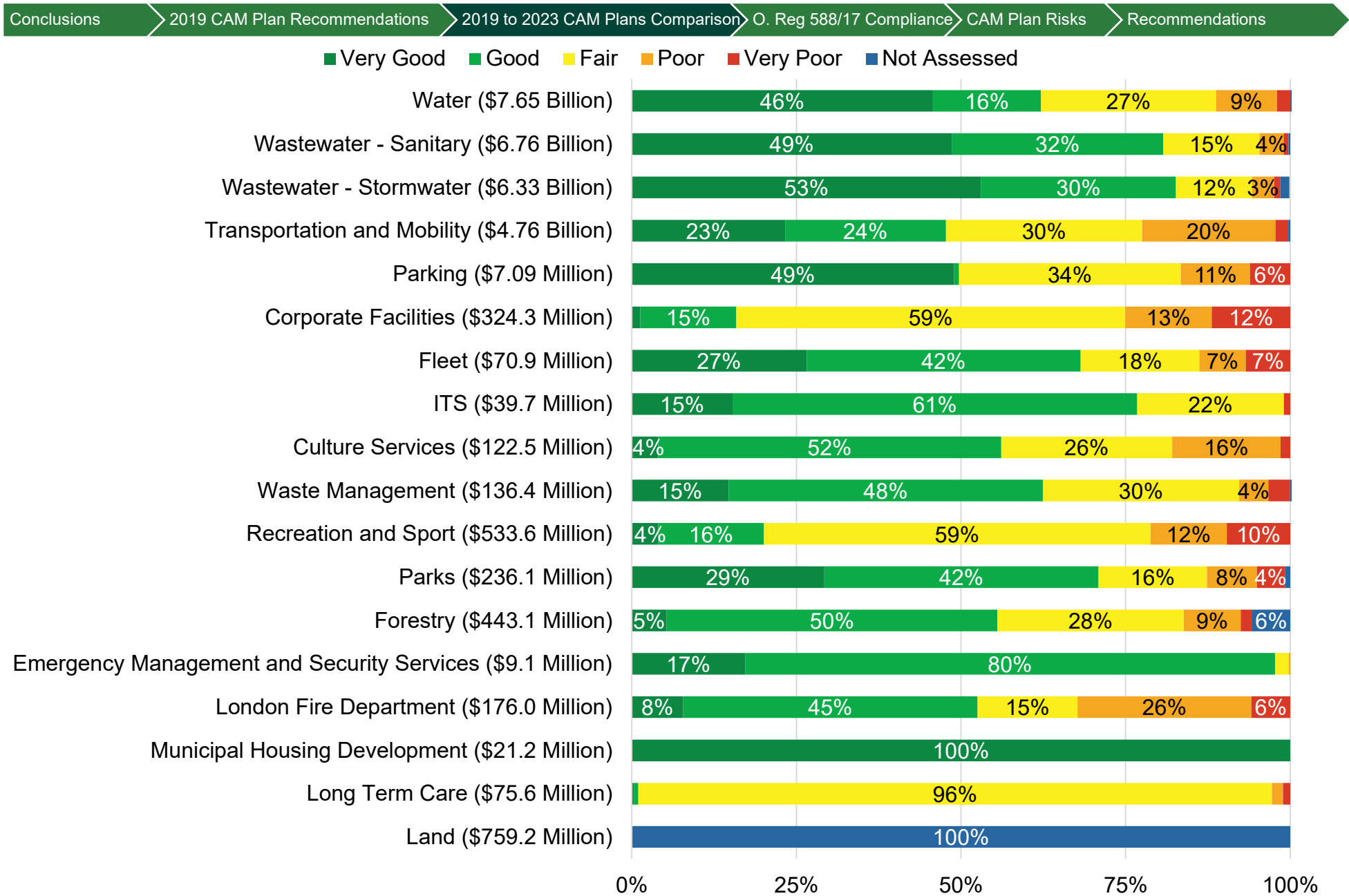


Figure 23.2 2023 CAM Plan Overall Asset Condition (By Service Area)

Infrastructure Gap

To align with O. Reg 588/17, the City is now disclosing two infrastructure gaps: maintain current LOS and achieve proposed LOS. The 10-year maintain current LOS (considered the most relevant gap to compare to previous reported amounts) has increased from a total of \$568.8 million within the 2019 CAM Plan to \$946.1 million within the 2023 CAM Plan. The 10-year achieve proposed LOS infrastructure gap is \$1,378.1 million. Transportation has the largest increase of \$454 million, while other services such as Sanitary, Stormwater, Recreation and Sport, Parks, and Fire encompass the other top contributors to

the overall infrastructure gap. Figure 23.3 illustrates each service area contributing to the maintain current and achieve proposed LOS infrastructure gaps. The increasing funding gap is attributed to inflationary impacts, and improved asset inventory and condition data, which has been used to establish the funding needs. Changes to the infrastructure gap analysis were expected in the early stages of the CAM Program implementation, as the City develops a robust and comprehensive asset inventory with supporting condition/performance data. Table 23.2 and Table 23.3 summarize the infrastructure gap and condition comparisons for the 2019 and 2023 CAM Plans, respectively.

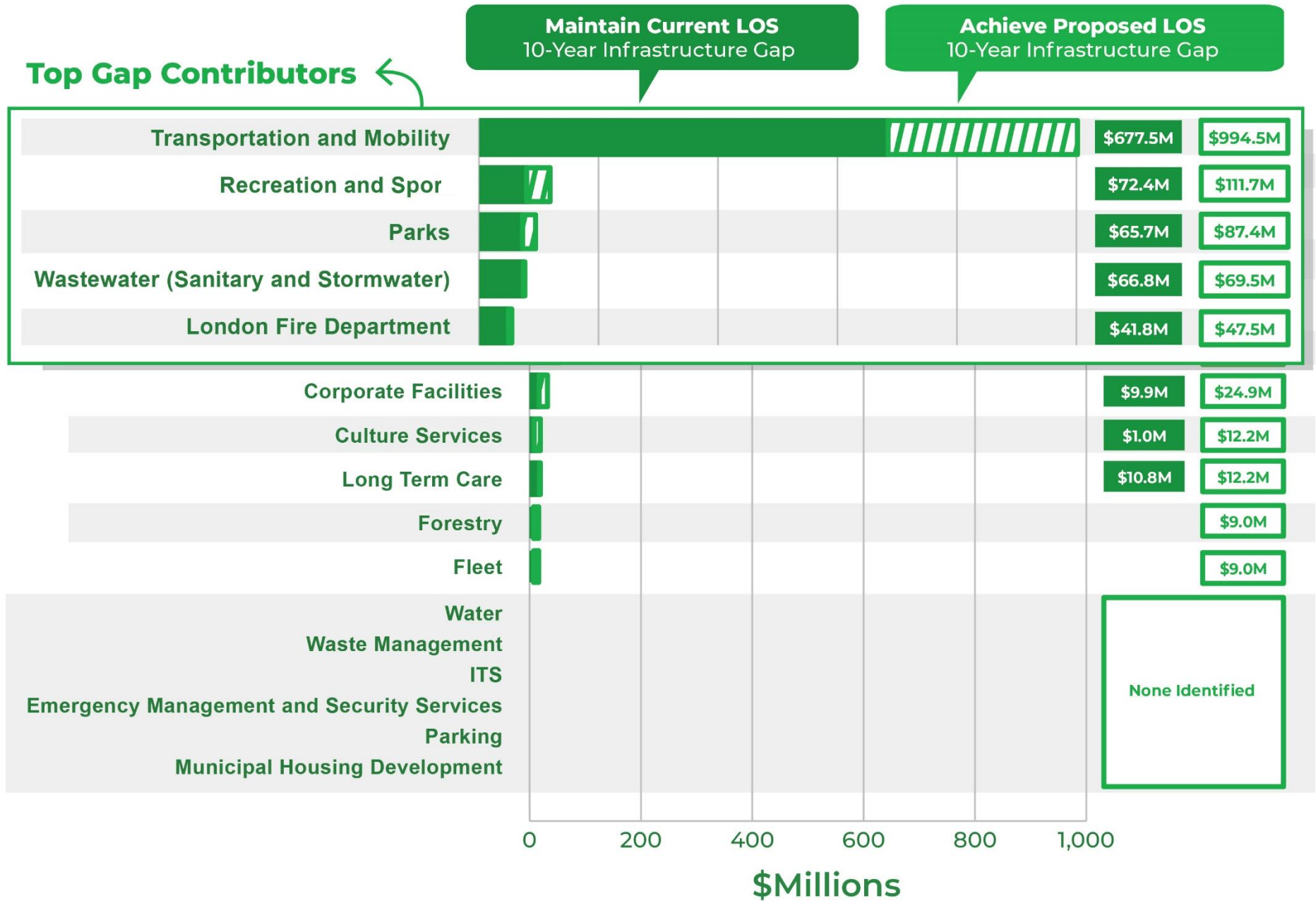


Figure 23.3 Service Area 10-Year Infrastructure Gap Contribution (Maintain Current and Achieved Proposed LOS)

Table 23.2 2019 to 2023 CAM Plan Comparisons (\$Thousands)

Service	2019 Replacement Value	2023 Replacement Value	2019 10-Year Gap	2023 10-Year Gap (Maintain Current)	2023 10-Year Gap (Achieve Proposed)
Water	5,868,709	7,653,185	None Identified	None Identified	None Identified
Wastewater (Sanitary)	5,047,641	6,759,752	36,280	57,685	58,185
Wastewater (Stormwater)	4,408,474	6,335,485	3,746	9,158	11,358
Transportation and Mobility (Roadways, Structures, Traffic)	2,468,946	4,761,691	223,049	677,525	994,527
Parking	5,579	7,097	411	None Identified	None Identified
Corporate Facilities	244,605	324,320	32,036	9,887	24,919
Fleet	57,368	70,864	None Identified	None Identified	8,983
Information Technology	38,010	39,697	None Identified	None Identified	None Identified
Culture Services	91,028	122,528	19,530	1,016	12,209
Waste Management	85,004	136,442	46,544	None Identified	None Identified
Recreation and Sport	372,286	533,610	106,478	72,430	111,679
Parks	187,308	236,144	31,330	65,719	87,448
Forestry	402,114	443,083	22,920	None Identified	9,024
Emergency Management and Security Services	8,812	9,129	6,364	None Identified	None Identified
London Fire Department	105,277	175,989	28,484	41,836	47,542
Municipal Housing Development	Not Applicable	21,223	Not Applicable	None Identified	None Identified
Long Term Care	64,637	75,631	11,623	10,815	12,208
Land	650,272	759,240	Not Applicable	Not Applicable	Not Applicable
Total	20,106,070	28,465,110	568,795	946,071	1,378,082

Table 23.3 2019 to 2023 CAM Plan Condition Comparison

Service	2019 CAM Plan Overall Condition	2023 CAM Plan Overall Condition	Trend
Water	Good	Good	Constant
Wastewater (Sanitary)	Good	Good	Constant
Wastewater (Stormwater)	Good	Good	Constant
Transportation and Mobility (Roadways, Structures, Traffic)	Good	Fair	Deteriorated
Parking	Good	Good	Constant
Corporate Facilities	Poor	Fair	Improved
Fleet	Fair	Good	Improved
Information Technology	Good	Good	Constant
Culture Services	Fair	Fair	Constant
Waste Management	Good	Good	Constant
Recreation and Sport	Fair	Fair	Constant
Parks	Very Good	Good	Deteriorated
Forestry	Good	Good	Constant
Emergency Management and Security Services	Good	Good	Constant
London Fire Department	Fair	Fair	Constant
Municipal Housing Development	Not Assessed	Very Good	Not Applicable
Long Term Care	Good	Fair	Deteriorated
Land	Not Assessed	Not Assessed	Not Applicable
Total	Good	Good	Constant

23.4: City of London O. Reg 588/17 Compliance

O. Reg 588/17 has a phased approach with three timelines of July 1, 2021, July 1, 2024, and July 1, 2025 (2024 and 2025 timelines adjusted by one year given the impact of COVID19 pandemic). The July 1, 2021 and July 1, 2024 timelines are where 'Core' assets (water, wastewater, stormwater, road and bridges) and all City infrastructure assets, respectively will have an asset management plan documenting maintain current LOS and financial strategies to fund these expenditures. The final deadline (2025) is to document achieve proposed LOS and financial strategies to fund these expenditures.

For directly owned City infrastructure assets, this CAM Plan is compliant with the July 1, 2021, July 1, 2024, and July 1, 2025

Regulation requirements. The 2023 CAM Plan has a scope of all directly owned assets by the City of London.

O. Reg 588/17 has defined a municipal infrastructure asset as directly owned by a municipality or included on the consolidated financial statements of a municipality (excluding joint municipal water board). As noted above, the CAM Section in collaboration with the City's ABCs will have these remaining asset management plans completed by July 1, 2024, or earlier.

23.5: Risk Associated with the CAM Plan

There are several risks associated with the CAM Plan. Table 23.4 identifies the potential impacts and mitigating actions associated with each risk.

Table 23.4 Risks Associated with the CAM Plan and Strategy

Identified Risk	Potential Impacts	Mitigating Actions
Plan is not followed	<ul style="list-style-type: none"> • Less than optimal investments • Potential to shorten useful life • Failure to deliver service • Prioritization process fails and services impact 	<ul style="list-style-type: none"> • Monitor and review • Implement quality asset management processes
Failed infrastructure	<ul style="list-style-type: none"> • Failure to deliver service • Damage to asset and neighbouring equipment and property (private or public) • Injury, death - staff and public • Customers unable to carry on their business • Non-compliance with regulation • Litigation and damage to environment • Additional unplanned costs and Asset Loss • Negative social impacts, etc. 	<ul style="list-style-type: none"> • Repair/replace • Increase investment/ available funding • Innovative technology • Non-infrastructure solutions • Reduce or stop delivering service
Inadequate funding	<ul style="list-style-type: none"> • Increased risk of failure and service reductions • Rising maintenance costs • Prematurely shortens useful life if not maintained • Asset loss increase burden on future generations 	<ul style="list-style-type: none"> • Reduce or stop delivering service • Find additional non-tax/rate sources of financing • Increase investment / available funding per Council approved policies • Update planning

Identified Risk	Potential Impacts	Mitigating Actions
	<ul style="list-style-type: none"> Defeat planning efforts Plans become redundant Lost opportunities Unpredicted future impacts 	<ul style="list-style-type: none"> Discard efforts on past planning Avoid escalation of infrastructure gaps due to growth through Assessment Growth Policy
Poor quality asset information	<ul style="list-style-type: none"> Inefficient maintenance program Poor prioritization/projections Poor decision-making Improper investments Inability to deliver service 	<ul style="list-style-type: none"> Invest in data systems and condition assessment Determine appropriate level of service and risk metrics and ratings
Planning assumptions incorrect	<ul style="list-style-type: none"> Defeat planning efforts 	<ul style="list-style-type: none"> Monitor Plan, update, and correct projections
Regulatory requirements, standards, criteria change or do not exist	<ul style="list-style-type: none"> Non-compliance Mandatory investments and schedule Disruption to planning efforts Investment due to regulation reduces available funding for others Additional costs 	<ul style="list-style-type: none"> Lobby against additional expenditures Lobby for additional transfer funding Reduce or stop delivering service Find additional sources of funding Increase investment/ available funding
Economic fluctuations, inflation, downturns, revenue, and use reduces/increases	<ul style="list-style-type: none"> Reduced/increased needs Less than optimal expense maintaining oversized/undersized infrastructure 	<ul style="list-style-type: none"> Change, create, or stop delivering service
Occurrence of climate change/ adverse weather/unforeseen events and emergencies, resulting in funds being diverted to assets that were not originally planned	<ul style="list-style-type: none"> Additional unplanned costs Damage and loss of assets Defeat planning efforts Lost opportunities Unpredicted future impacts 	<ul style="list-style-type: none"> Deferral of planned renewals Assess/increase insurance coverage Increase/develop reserve funds Develop contingency/emergency plans
Growth projections not as planned	<ul style="list-style-type: none"> Infrastructure oversized or undersized inefficient use of available service 	<ul style="list-style-type: none"> Defer or advance capital projects related to growth and update plans
Service provision changes	<ul style="list-style-type: none"> Plan either does not address or contains redundancies 	<ul style="list-style-type: none"> Amend the CAM Plan

23.6: Recommendations

The City's CAM Program is founded on the principle of continual improvement. Its implementation follows the CAM Strategy to enable line-of-sight from the CAM Plan tactical decisions and CAM processes to the CAM Policy principles and commitments. This will increase the quality of data/information and the tools and techniques that are used in decision-making. The increased quality will lead to greater confidence in the analysis documented and decisions formed through the CAM Plan. The following recommendations will ensure that the CAM Plan continues to help the City manage its \$28.5 billion asset portfolio to provide affordable and sustainable service delivery to its citizens and keep compliant with the regulatory requirements.

1) Strengthen the Corporate Asset Management Plan

- i. Aligning the CAM Plan with the City's 2023-2027 Strategic Plan and MYB.
- ii. Continue improving the CAM Plan and prepare for the next CAM Plan in 2026/2027. This will include working with staff in each service area to:
 - Ensure asset inventories are comprehensive and contain accurate condition and performance data.
 - Operationalize advanced performance measures by collecting and analyzing new asset data.
 - Analyze more complex asset lifecycle strategies to understand the optimal mix of each lifecycle activity to achieve the proposed LOS at the lowest lifecycle cost while mitigating the risk of failure.
 - Ensure compliance with regulatory requirements.
- iii. Annual reviewing of CAM Plan progress. The annual progress review will address the City's progress in implementing the CAM Plan and describe any factors impeding the ability to implement the CAM Plan (with

associated strategies to mitigate impeding factors) and align with the 2023-2027 Strategic Plan outcome and expected results. Annual review of the progress of the CAM Plan will enable more robust trending of performance measures over time.

2) Explore opportunities to address the infrastructure gap through various financing strategies

- i. Continue to pursue funding from non-tax/rate sources of financing (external funding) to address the infrastructure gaps.
- ii. Consistent with Council's 2023-2027 Strategic Plan and the actions taken as part the 2020-2023 MYB additional investment business case #4 parts A and B, as needed the CAM Section will submit additional investment business cases through the 2024-2027 MYB process. These potential business cases will seek Council approval of infrastructure gap funding beyond which is contained in the Tax Supported and Wastewater maintain existing service levels (MESL) portions of the 2024-2027 MYB in-line with the 2023 CAM Plan maintain current LOS infrastructure gap results. Such business cases will consider the following criteria when providing an average annual tax/rate levy increase recommendation:
 - Mitigating growth of the maintain current LOS cumulative 10-year infrastructure gap;
 - Infrastructure gap financial sustainability is targeted between 22-years (2045) to 27-years (2050), which could result in average annual tax/rate increases of 0.36% to 0.30% (Tax Supported), noting final tax/rate levy recommendations are subject to 2024-2027 MYB development and will take into account numerous 2023-

2027 Strategic Plan priorities and affordability of Municipal taxation on the community;

- This infrastructure gap financial sustainability target comes with an associated risk of funding shortfalls or an increased risk of reduced services/asset failures, and the residual risk of the unaddressed infrastructure gaps (cumulative backlog) may be tolerable; and
 - Update the Water and Wastewater 20-year financial plans, addressing the infrastructure gap identified in Wastewater budget as best as possible.
- iii. Where new Tax Supported tangible capital assets are added to the City's asset base due to growth, the CAM Section will submit an assessment growth business case equivalent to the recommended annual reinvestment rates for the added asset category. Approved funding will be allocated to the corresponding Capital Asset Renewal and Replacement Reserve Funds (CARR RF) to ensure that the asset(s) going forward will have a funding source available in the future to replace or to incur major lifecycle repairs.
 - iv. Similarly for any service improvement additional investment business cases brought forward through the 2024-2027 MYB process to enhance or add new tangible capital assets, the CAM Section along with service area staff shall identify additional CARR RF contributions necessary based on the recommended annual reinvestment rates for the added asset category. Approved funding will be allocated to the corresponding CARR RF to ensure that the asset(s) going forward will have a funding source available in the future to replace or to incur major lifecycle repairs.
 - v. Continue to utilize one-time funding made available through the application of the Surplus/Deficit Policy and

Assessment Growth Policy to reducing the risks associated with existing infrastructure gaps or infrastructure gap backlogs.

- vi. Per the CARR RF By-law and as a result of new municipal infrastructure associated with Municipal Housing Development (MHD), the 2023 CAM Plan recommends the creation of a new CARR RF referred to as the Municipal Housing Development Renewal Reserve Fund. This Fund will provide a clear line-of-sight to the primary tax supported and non-tax supported (user fee contributions, if any) sources of financing for lifecycle renewal capital works associated with MHD assets.

3) **Progress the Corporate Asset Management Program**

- i. The CAM Program standardizes asset management practices across the Corporation, connecting technical asset lifecycle strategies to customer-focused performance measures that quantify the LOS being provided to the community in each service area; and
- ii. Engaging the public and community partners in the CAM Program

4) **Extend CAM practices to the City's Agencies, Boards, and Commissions (ABC)**

- i. Through the establishment of Service Level Agreements and ensure all ABC asset management plans are completed and compliant with Ontario regulatory requirements.



Appendix A. Overview of Service Area Sections



A1. Introduction

This section describes the methodology used to determine the findings of this Corporate Asset Management Plan (CAM Plan). This CAM Plan was developed using the best currently available data collected by the City. Whenever available, information on assets such as inventory and condition was obtained from the various service areas databases and asset management software. Otherwise, data was collected from the 2021 Tangible Capital Asset (TCA) report, a requirement under the PSAB 3150 legislation. In some cases, expert opinion from staff was obtained to fill gaps in the information particularly with respect to current condition of some assets.

City owned infrastructure information was grouped and analyzed to establish a clear picture of the current state of the local infrastructure operated and maintained by each service area.

A2. Structure of the Corporate Asset Management Plan

The CAM Plan is structured to provide consistency to the public and City partners who are engaged with the document. The structure and description of the CAM Plan sections is provided below and illustrated in Figure A.1.

1. An Introductory Section outlining the City's Vision, Mission, and Values. It also provides an overview of the CAM Program, Ontario regulations for Asset Management Planning, the CAM Plan scope, etc.
2. CAM Pressures outlining the capital financing pressures that influence the results of the CAM Plan both now and into the future.
3. A series of separate service area sections covering:
 - State of Local Infrastructure (assets)
 - Levels of Service (LOS)
 - Asset Lifecycle Management Strategies
 - Forecasted Infrastructure Gaps
 - Discussion
 - Conclusions
4. An Infrastructure Gap Financing Strategies section setting out the approaches to ensuring that the appropriate funds are available and provides multiple alternatives.
5. A Conclusion and Recommendations section aggregates the CAM Plan findings into an overall picture and provide recommendations.

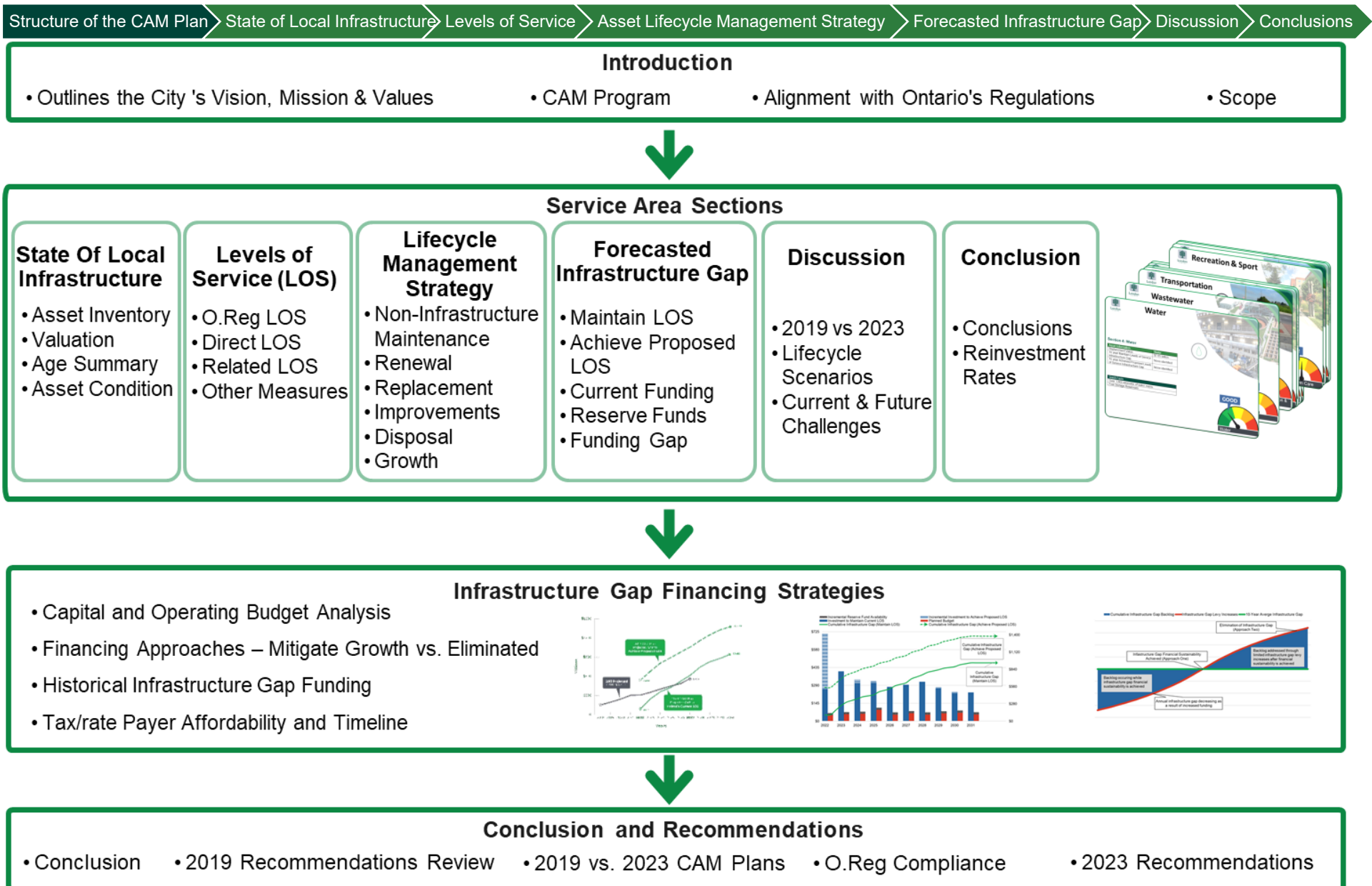


Figure A.1 CAM Plan Structure

A3. State of Local Infrastructure

The State of Local Infrastructure for each service area includes the following information:

1. A summary of the inventory of assets that support the service areas, including quantities and replacement values. This CAM Plan relies on the use of databases such as GIS, RoadMatrix, and Bridge Management Systems to establish an inventory of major asset groups controlled by each service area. Where possible, information is verified using independent inventory information stored in GIS, work management systems, and other service area data sources.
2. An estimate of the replacement value of the assets. Not all of the City's assets are replaced (i.e., some are continually rehabilitated), but a replacement value estimate provides a foundational benchmark to understand the magnitude of the infrastructure that supports each service area.
3. A summary of the average age and an age distribution as a proportion of estimated useful life of the assets that support the service areas. It also outlines key assumptions used when accurate age data is not available.

An overview of the current proportional condition profile of each service areas asset inventory (i.e., percent of assets in Very Good through to Very Poor condition, or Not Assessed, weighted by replacement value). The condition of each asset group was evaluated to represent the current 'health' of the

City's infrastructure. A five-point rating scale was used to align with that employed by the National Infrastructure Report Card produced by the Canadian Society for Civil Engineering (CSCE), the Canadian Public Works Association (CPWA), the Canadian Construction Association (CCA) and the Federation of Canadian Municipalities (FCM). In addition to providing a sound basis for assessment, this will allow for high-level benchmarking against the values presented in this document. The ratings scale ranges from 1 to 5, as described in Table A.1. , reflecting each asset group's physical condition. A description of the data sources used to populate the State of Local Infrastructure information, including any relevant condition assessment policies and practices. In the process of conducting condition assessments, the overall condition assessment of an asset—whether categorized as an asset type or asset sub-type—is methodically determined through a weighted average approach. Specifically, this weighted average is calculated in relation to the replacement value of each constitutive sub-component.

The condition of the assets was determined using one of the three methods below based on data availability and accuracy:

1. Existing condition rating systems (e.g., Pavement Quality Index, Facility Condition Index, etc.)
2. Estimated based on age and the remaining estimated useful life of the asset.
3. Estimated based on expert opinion, in the absence of 1) or 2) above, or where there was low confidence that age and useful life appropriately represented the asset.

Table A.1 Condition and Scale Definitions

Grade	Summary	Definition
1	Very Good Fit for the future	The infrastructure in the system or network is generally in very good condition, typically new or recently rehabilitated. A few elements show general signs of deterioration that require attention.
2	Good Adequate for now	The infrastructure in the system or network is in good condition; some elements show general signs of deterioration that require attention. A few elements exhibit significant deficiencies.
3	Fair Requires attention	The infrastructure in the system or network is in fair condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies.
4	Poor At risk	The infrastructure in the system or network is in poor condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration.
5	Very Poor Unfit for sustained service	The infrastructure in the system or network is in unacceptable condition with widespread signs of advanced deterioration. Many components in the system exhibit signs of imminent failure, which is affecting service.
-	Not Assessed	This category is reserved for assets where data is either missing, not updated, or cannot be considered reliable. Flagging this data helps the departments identify where gaps in information exist and allows them to develop assessment plans to improve future data.

A4. Levels of Service

Figure A.2 presents the service level hierarchy. This structure is anchored by the City's Strategic Plan, encompassing its vision, mission, and values. These foundational elements shape the customer values, which in turn guide the establishment of overarching corporate LOS objectives. Informed by these objectives, CAM Section collaborates with various service areas to formulate key metrics, ensuring effective service delivery assessment.

This section of the CAM Plan details the LOS and the corresponding performance metrics for each service area. LOS tables for individual service areas are formulated and sustained

through discussions with staff that contribute to the delivery of the respective service.

LOS metrics are organized in a hierarchical manner. At the forefront are the Direct LOS metrics, which serve as the primary benchmarks. From these, we can readily determine the cost to maintain current LOS and the cost required to achieve proposed LOS. Next in line are the Related LOS metrics. These are closely tied to the Direct LOS metrics due to their primarily formal relationship. However, pinpointing their associated costs can be more intricate. At the base of this hierarchy lie other metrics as lagging indicators. These metrics have useful information, especially when considered in conjunction with O.

Reg.588/17, Direct LOS, and Related LOS metrics. Additionally, it is important to highlight that O.Reg.588/17 mandates certain LOS measures for core assets.

Each service area section also discusses any external trends or issues that may affect expected LOS or our ability to meet them (e.g., new accessibility standards, climate change impacts).

The structure of all the LOS tables is the same for each service area. Major components of the tables are: (1) Customer Values, (2) Customer/Council or Technical focused performance measures, (3) Service Performance Measure, (4) 2021 Performance, and when applicable, (5) Proposed Target by 2031. For the O.Reg. 588/17 mandated and Direct LOS metrics, the following section explains in detail the tables content and their description.

Overview Of LOS Tables

The LOS tables are structured as follows:

1. **Customer Value:** a phrase that describes attributes of the service being provided, e.g., cost efficient, safe, reliable, etc. These descriptions cover all aspects of the service and aim to be easy for the customer/public to understand and recognize. This enables staff to develop a holistic perspective on all aspects of a service area that is valued by our community, and to develop the performance metrics accordingly.
2. **Focus:** Identifying whether the metric is a Customer/Council or Technical performance measure.
 - Customer/Council performance measures are quantifiable metrics expressed in non-technical terms that describe the general public's understanding of services being provided by infrastructure systems. Customer performance measures are typically related to the service that is provided by the overall system supporting the service

delivery, rather than the specific assets. It should be noted that Customer/Council performance measures can also be referred to as 'Community', 'Corporate' or 'Strategic' performance measures.

- Technical performance measures are quantifiable metrics applied against assets and overall systems that connect highly technical subject-matter specific considerations to the Customer/Council performance measure(s). The following points describe the main categories of Technical performance measures:
 - Legislated/regulated – performance measures that the municipality is legislated to achieve, such as Wastewater quality targets.
 - Service delivery best practices – performance measures that are based on meeting the City's service delivery objectives.
 - Industry standards – performance measures that are based on industry standards for how infrastructure is designed and/or managed.
- 3. **Service Performance Measure:** A description of qualitative or quantitative service performance measures used to assess and track the services London provides. These measures provide a structured way for service areas to identify benchmarks, track progress, identify areas of improvement, and ensure that services align with customer values and Strategic Plan objectives. The current and target performance is identified/calculated for all metrics for which data is available.
- 4. **2021 Performance:** Includes the performance of each metric as of end of year 2021. It shows the aggregated measures represented in values, rates, percentages, pictures, maps, or linguistic description.

5. **Proposed Target:** The only metrics that have proposed targets are the O.Reg. 588/17 and Direct LOS metrics. These metrics define the LOS that the City aims to provide.

Further to each service area LOS section, Appendix B includes the following LOS considerations:

1. **Corporate LOS Objectives:** A short sentence that describes the outputs of the Customer Value and the kind of service that will be provided to residents. There may be one or multiple LOS statements written for each Customer Value (service attribute). For example, the service statement for water is “efficiently providing safe, high quality and reliable water services with adequate pressure and flow”. A list of all

Corporate LOS Objectives and their drivers for each service area is included in Appendix B.

2. **Trending Performance:** We strive to maintain consistency in our LOS tables. This approach enables us to perform trend analysis over time, understand the intricate dynamics of asset management, and understand how changes in our lifecycle management strategy or adjustments in expenditure levels impact our LOS metrics. It resonates with the principles of precision, adaptability, and strategic alignment, essential for effective lifecycle management and expenditure optimization.

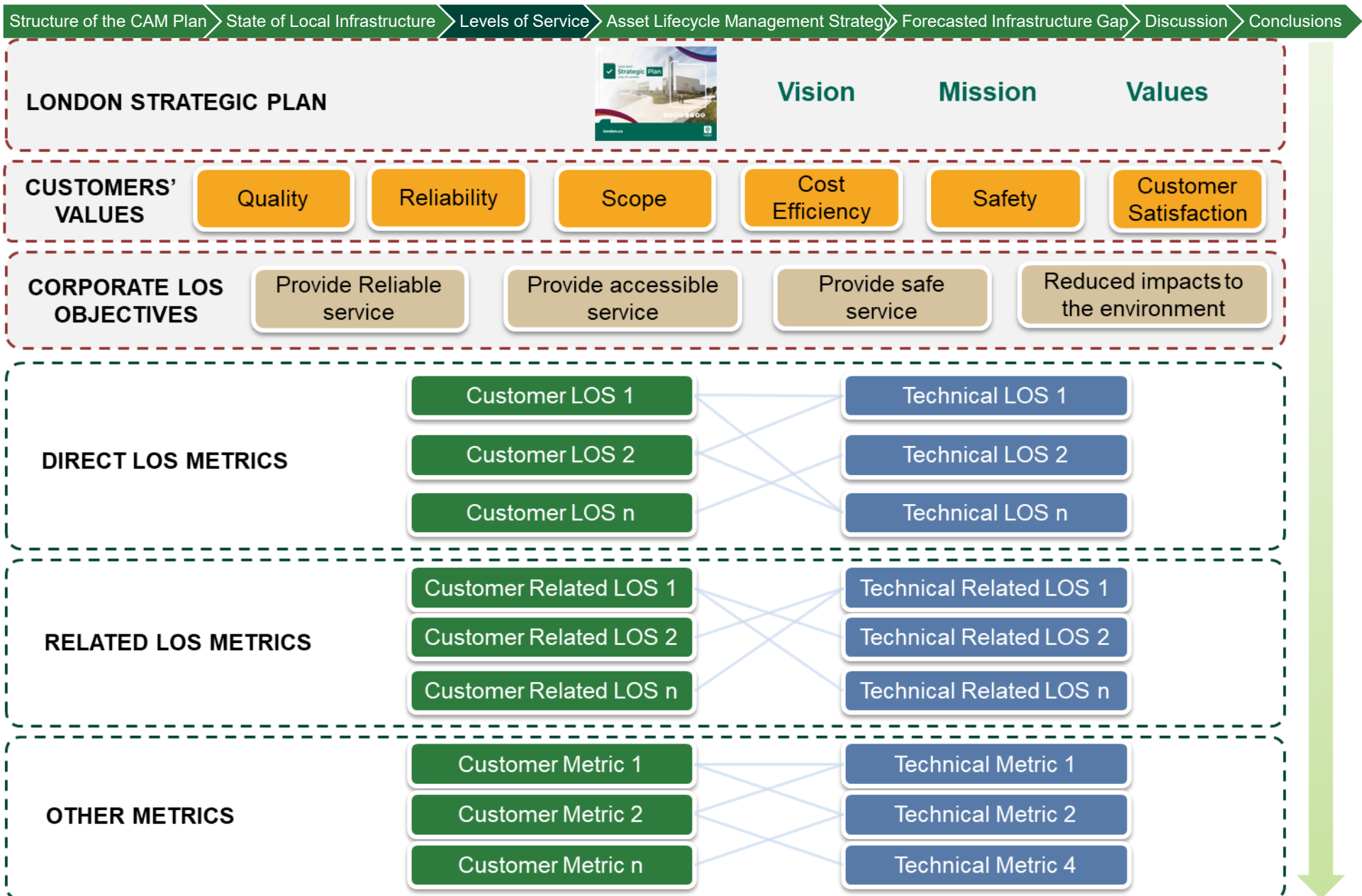


Figure A.2 Levels of Service Hierarchy

A5. Asset Lifecycle Management Strategy

The asset lifecycle management strategies are the set of planned actions that will enable the assets to provide the approved LOS in a sustainable way, while managing risk, at the lowest lifecycle cost possible. This part of the CAM Plan describes the asset lifecycle activities applied to the assets. This includes the typical practices and actions, and risks associated with each asset activity. From here 3 scenarios that model and forecast the condition profile of the asset portfolio based on current planned funding, the required budget to maintain current LOS, and the required budget to achieve proposed LOS are provided. The approach of this section is further explained:

1. The asset lifecycle management activities are the range of actions funded through the operating or capital budget that

are practiced on the assets. Asset lifecycle activities are grouped into the categories contained in Table A.2. The table describe each asset lifecycle activity and provides examples.

2. Table A.3 outlines the typical asset management practices and planned actions associated with each lifecycle activity but is not intended as a comprehensive list.
3. Each service area section then documents the risks associated with each lifecycle activity. Table A.4 provides typical examples of the generic risks associated with asset management practices or planned actions, but it not intended as a comprehensive list.
4. Finally, when applicable, this section presents 3 modeled condition profile scenarios; (1) Planned Funding; (2) Maintain Current LOS; and (3) Achieve Proposed LOS.

Table A.2 Typical Asset Lifecycle Activities

Lifecycle Activity	Description	Examples
Non-infrastructure Solutions	Actions or policies that can lower costs or extend useful lives.	Better integrated infrastructure planning and land use planning, demand management, process optimization, etc.
Maintenance	Including regularly scheduled inspection, maintenance, or more significant repair and activities associated with unexpected events.	Sewer spot repairs, fixing potholes.
Renewal/Rehab	Significant repairs designed to extend the life of the asset.	Structural lining of sewers, road resurfacing.
Replacement/Construction	Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehab is no longer an option.	Vehicles replacement, road reconstruction.
Disposal	Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	Salvage of equipment.
Service Improvement	Planned activities to improve asset capacity, quality, and system reliability.	New recreation centre to service new subdivision.
Growth	Planned activities required to extend services to previously unserved areas or expand services to meet growth demands.	Better integrated infrastructure and land use planning, demand management, process optimization, etc.

Table A.3 Asset Lifecycle Activities Actions and Examples

Activities	Generic Asset Management Practices or Planned Actions
Non-infrastructure Solutions	<ul style="list-style-type: none"> • Development controls and approvals. • Financial and Planning strategies to control costs. • Developing computerized maintenance management system. • Updating and applying design standards. • Ongoing search for additional funding. • Operational improvements. • Improvements to employee capabilities, communications, training, etc. • Public involvement practices including awareness training, posters, and website. • Changes to LOS. • Developing Corporate Asset Management program.
Maintenance	<ul style="list-style-type: none"> • Maintenance also triggered by the public 'inspection' through phone and web interface available for public reports/complaints. • Scheduled preventative maintenance programs for most assets. • Scheduled inspection programs for key assets.
Renewal/Rehab	<ul style="list-style-type: none"> • Adopt the latest technology that maintains the current LOS.
Replacement/ Construction	<ul style="list-style-type: none"> • Adopt the latest technology that maintains the current LOS.
Disposal	<ul style="list-style-type: none"> • Dispose of assets under the applicable regulation and environmental standards.
Service Improvement	<ul style="list-style-type: none"> • Adopt the latest technology that enhances the current LOS.
Growth	<ul style="list-style-type: none"> • Undertake Environmental Assessments. • Assumption of subdivisions, commercial and industrial extensions, local improvements, etc.

Table A.4 Generic Risks Associated and Examples of Asset Lifecycle Activities

Activities	Generic Risk Associated with Asset Management Practices or Planned Actions
Non-infrastructure Solutions	<ul style="list-style-type: none"> • Lack of a realization of the benefit from the activity (i.e., the life is not extended or the cost of managing an asset increases rather than decreases). • Lowers the costs of existing operations and may provide additional capacity but does not extend the service life of assets. • Plans/Reports/Recommendations. • Asset management plans or proposed network solutions not followed. • Inadequate Funding. • Poor Quality asset information. • Planning Assumptions incorrect. • Regulatory requirements, standards, criteria change or do not exist. • Economic fluctuations, inflation, downturns, revenue and use reduces/increases. • Occurrence of Climate Change/Adverse Weather/Unforeseen events and emergencies, resulting in funds being diverted to assets that were not originally planned. • Growth projections not as planned or service provision changes.
Maintenance	<ul style="list-style-type: none"> • 'Completing planned maintenance activities while managing the need to execute reactive maintenance activities. • Incorrectly planned maintenance activities can lead to premature asset failure. • Enough resources available to complete a series of unplanned, urgent work requests that are submitted in close succession. • Overscheduling preventative maintenance can lead to excessive maintenance and additional costs with no actual benefits.
Renewal/ Rehab	<ul style="list-style-type: none"> • Incorrect assumptions regarding improved expected useful life after rehabilitation.
Replacement/ Construction	<ul style="list-style-type: none"> • Cost over-runs during large, complex design and construction projects.
Disposal	<ul style="list-style-type: none"> • Disposal incorrectly performed or cost overruns resulting from increase disposal requirements compared to initial estimates.
Service Improvement	<ul style="list-style-type: none"> • Service improvement is either not required or incorrectly assessed.
Growth	<ul style="list-style-type: none"> • Incorrect growth assessments may result in overabundance of assets. • Risk of insufficient funding to maintain new asset. • Incorrect asset size will cost more money and may cause operational challenges (too large asset) or may result in the need to prematurely expand the asset (too small asset).

The general approach to forecasting the cost of the lifecycle activities that are required to maintain current LOS is to ensure that the proportion of assets in Poor or Very Poor condition remains relatively stable in addition to maintaining the overall average condition of all assets in each service area. Staff then consider the optimal blend of each lifecycle activity to achieve the lowest lifecycle cost management strategy that balances

costs with the forecasted change in the condition profile of each asset. Figure A.3 shows the projection of the condition of the infrastructure assets based on the 3 mentioned scenarios. It demonstrates how the Planned Budget may lead to a drop in the overall condition of the assets. Figure A.3 also shows the required investments to maintain current LOS and achieve proposed LOS.

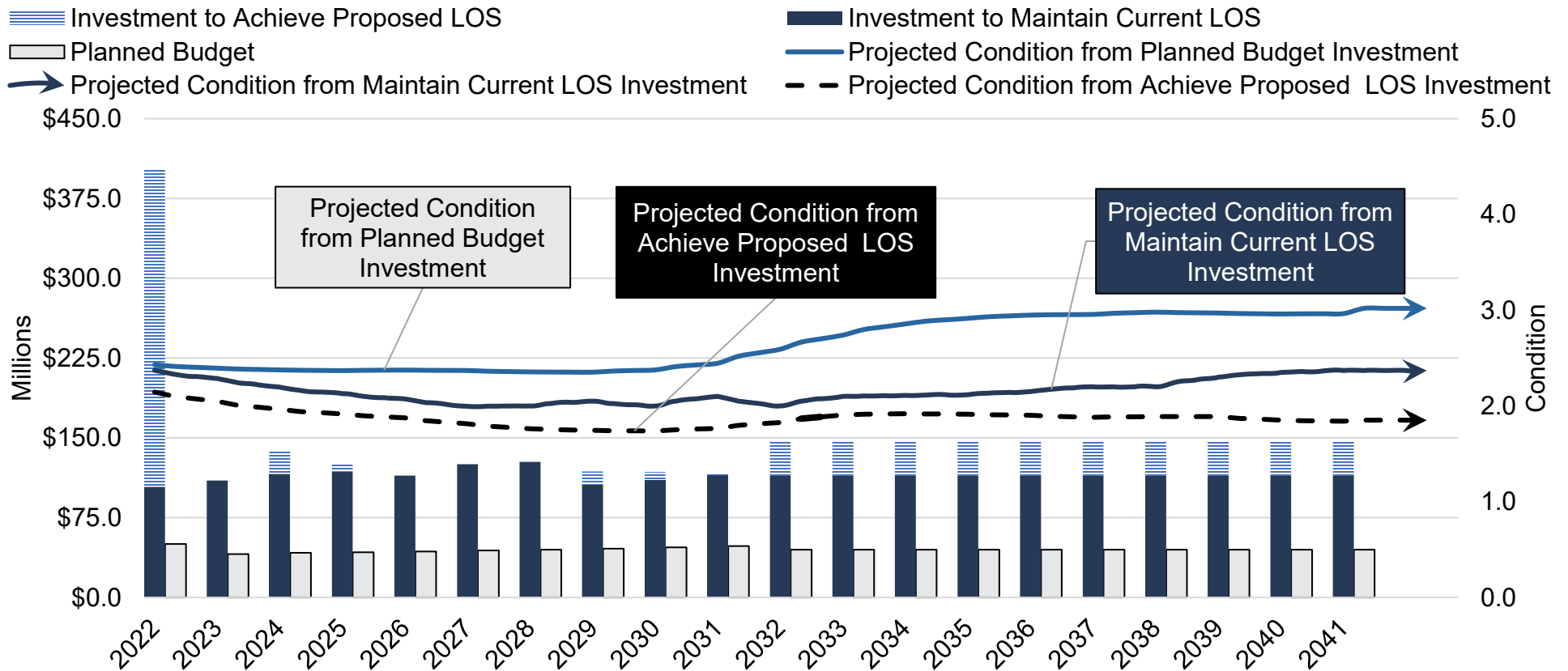


Figure A.3 Projected Service State of Three Funding Scenarios (Example)

A. Scenario One: Planned Funding Condition Profile

Each service area chapter includes the modelled condition profile based on the planned funding as seen in Figure A.4. The graph shows the condition profile of assets changing over the next 20-years. The average annual lifecycle management activity and planned funding is summarized in a table. The typical table structure and description is presented in Table A.5. The condition profile expected from the planned funding is forecasted by using the same logic related to condition deterioration rates that helps forecast and analyze the decline in

an asset's condition, performance, and functionality over time. Although appropriate condition triggers exist for rehabilitation or replacement activities, budget constraints limit expenditures to the level outlined in the 2022 Annual Budget Update. If there is insufficient budget in any particular year to complete a rehabilitation or replacement activity on an asset that has reached its condition trigger, then the asset remains in a Poor or Very Poor condition state until there is sufficient budget in a future year to complete the lifecycle activity.

Table A.5 Scenario One - General Approach of Average Annual Planned Funding (\$Thousands)

Activity Type	Average Annual Activity for 2020 and 2021	Planned Funding
Operating Budget	Value equal to average of 2020 and 2021 budgets contained in 2022 Annual Budget Update.	Value equal to average of 2022 and 2023 budgets contained in 2022 Annual Budget Update.
Renewal, Replacement, Rehabilitation, and Disposal	Value equal to average of 2020 and 2021 budgets contained in 2022 Annual Budget Update.	Value equal to average of 2022 Annual Budget Update capital budget amounts for 2022 to 2031.
Service Improvement	Value equal to average of 2020 and 2021 budgets contained in 2022 Annual Budget Update.	Value equal to average of 2022 Annual Budget Update capital budget amounts for 2022 to 2031.
Growth	Value equal to average of 2020 and 2021 budgets contained in 2022 Annual Budget Update.	Value equal to average of 2022 Annual Budget Update capital budget amounts for 2022 to 2031.

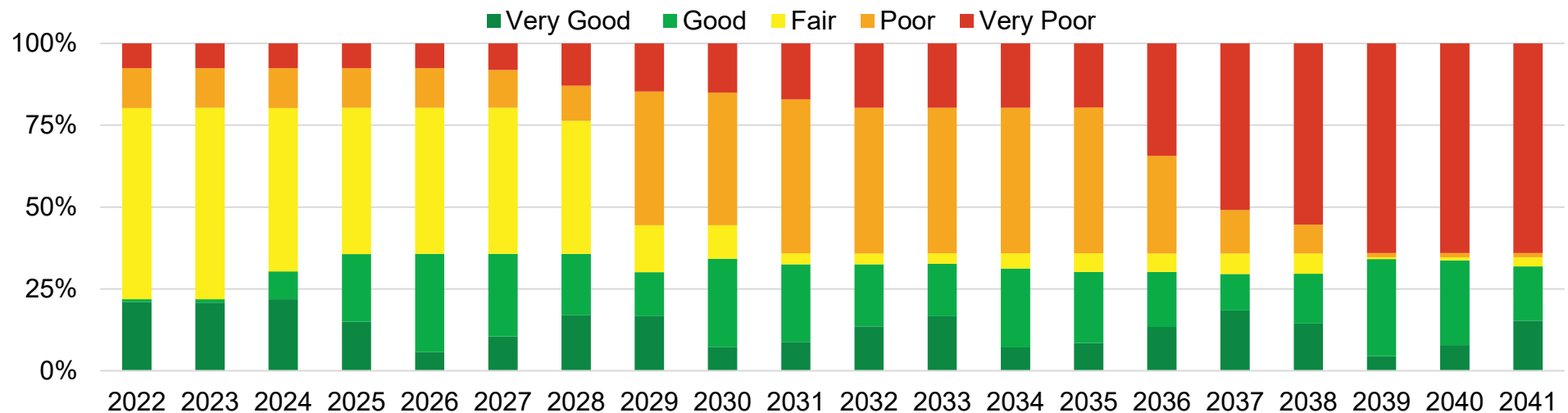


Figure A.4 Projected 20-year Planned Budget Condition Profile (Example)

B. Scenario Two: Maintain Current Levels of Service Condition Profile

The modelled condition profile is based on the maintain current LOS budget as seen in the example in Figure A.5. The graph shows the condition profile of assets changing over the next 20 years. The average annual life cycle management activity and planned funding is summarized in a table. The typical table structure and description is presented in Table A.6. The approach to establishing the maintain current LOS budget is to forecast the lifecycle activities that are required to maintain the current performance (2021 fiscal year) of the LOS metrics. The

analysis considers the current condition of assets, the rate that the condition is expected to degrade, and appropriate condition triggers for rehabilitation/replacement activities to forecast the condition profile into the future. The variables in the analysis are adjusted until the forecasted condition profile meets the current condition profile for these assets. Figure A.5 shows maintaining the overall condition projection of the portfolio with different annual condition distribution.

Table A.6 Scenario Two – General Approach of Average Annual Cost to Maintain Current Levels of Service (\$Thousands)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Cost to Maintain Current LOS	Maintain Current LOS Infrastructure Gap
Operating Budget	Same as Scenario One	N/A	Equal to Planned Funding.	N/A
Renewal, Replacement, Rehabilitation, Disposal	Same as Scenario One	Value equal to applicable CARR RF uncommitted balance as of applicable year-end and analysis of 10-year projected balances.	Value equal to average of 2022 to 2031 financing needs to maintain current LOS per CAM Plan calculations.	Value equal to “Cost to Maintain Current LOS”, less “Planned Funding” and “Additional Reserve Fund Drawdown”.
Service Improvement	Same as Scenario One	N/A	Equal to Planned Funding.	N/A
Growth	Same as Scenario One	N/A	Equal to Planned Funding.	N/A

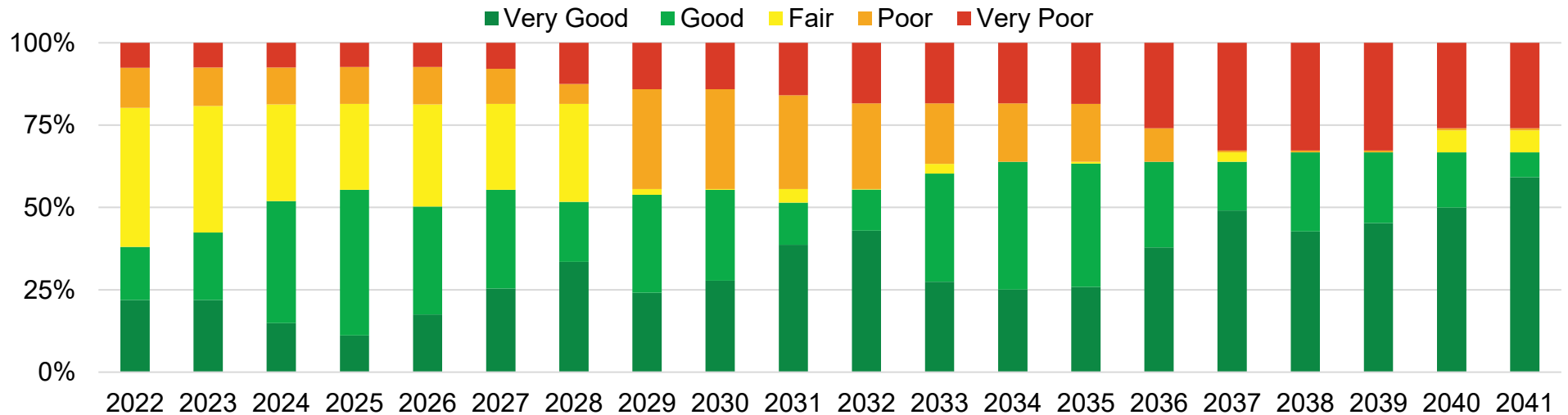


Figure A.5 Projected 20-year Maintain Current LOS Condition Profile (Example)

C. Scenario Three: Achieve Proposed Levels of Service Condition Profile

When applicable, the service area chapters may have a modelled condition profile based on the achieve proposed LOS requirements as seen in the example in Figure A.6. The graph shows the condition profile of assets changing over the next 20-years. The average annual lifecycle management activity and planned funding is summarized in a table. The typical table structure and description is presented in Table A.7. The variables in the analysis are adjusted until the forecasted condition profile meets the expectation of the City's staff involved with the management of the assets. The future lifecycle activities that are required to achieve the desired condition profile are then used to establish the average annual investment to achieve proposed LOS.

If a Climate Emergency Action Plan (CEAP) component is identified, investing in the achieve proposed LOS provides benefits related to meeting CEAP requirements, which go beyond the scope of a condition profile. An assessment is underway to determine the cost associated with implementing the CEAP and achieving the proposed LOS. The costs presented in the 2023 CAM Plan service area sections align with the 2023-2027 Strategic Plan and encompass the comprehensive measures required to meet the greenhouse gas (GHG) emission targets and complete 'green for like' asset replacements.

Table A.7 Scenario Three - General Approach of Average Annual Cost to Achieve Proposed Levels of Service (\$Thousands)

Activity Type	Planned Funding	Additional Reserve Fund Drawdown	Incremental Cost to Achieve CEAP	Incremental Cost to Achieve Proposed LOS	Achieve Proposed LOS Infrastructure Gap
Operating Budget	Same as Scenario One and Two	Same as Scenario Two	N/A	Same as Scenario Two	Same as Scenario Two
Renewal, Replacement, Rehabilitation, Disposal	Same as Scenario One and Two	Same as Scenario Two	As identified with service area and aligning with 2023-2027 Strategic Plan	Value equals average 2022 to 2031 financing needs to achieve "Proposed LOS" per CAM Plan calculations. This amount is the incremental portion greater than 'Cost to Maintain Current LOS' in Scenario One.	Value equal to "Cost to Maintain Current LOS", "Incremental Cost to Achieve Proposed LOS" plus "Incremental Cost to Achieve CEAP", less "Planned Funding" and "Additional Reserve Fund Drawdown".
Service Improvement	Same as Scenario One and Two	Same as Scenario Two	N/A	Same as Scenario Two	Same as Scenario Two
Growth	Same as Scenario One and Two	Same as Scenario Two	N/A	Same as Scenario Two	Same as Scenario Two

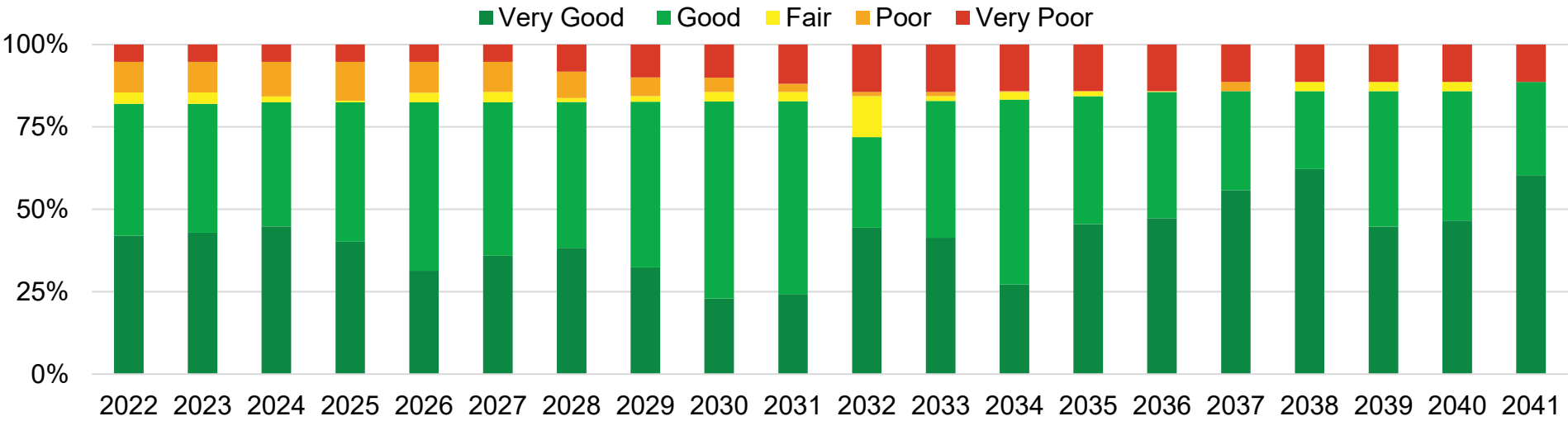


Figure A.6 Projected 20-year Achieve Proposed LOS Condition Profile (Example)

A6. Forecasted Infrastructure Gap

In this part of each service area section, the infrastructure gaps are summarized in a table and illustrated in a chart(s). The analysis is related to the lifecycle rehabilitation or replacement activities. Disposal is not identified separately as it is inherent in asset renewal/rehab/replacement activities.

Base needs represent the costs to renew and maintain the serviceability of existing assets, and do not account for growth and the expansion of service to new areas.

In addition to the first scenario of conducting the analysis based on the planned budget, two extra scenarios are considered. The second scenario is based on the investment required to maintain current LOS, and the third scenario is based on the investment required to achieve proposed LOS. Comparing those required investments to the planned budget, two infrastructure gaps were computed. The first one is the cumulative infrastructure gap to maintain current LOS and the second is the cumulative infrastructure gap to achieve proposed

LOS. This estimation is based on the costs associated with addressing all the asset needs related to each service area. The preliminary estimate for CEAP funding, if any, includes incorporating a 'green premium' into lifecycle management activities. This means that instead of simply replacing existing infrastructure with a similar one 'like for like', there will be an increased focus on incorporating 'green for like' infrastructure replacements whenever feasible.

Table A.8 shows the structure and description of the typical funding gap summary included in each service area section. It also shows the calculation steps for calculating the breakdown and totals of the planned budget, reserve fund availability, investments to maintain current LOS, investment to achieve proposed LOS, infrastructure gap to maintain current LOS, and the infrastructure gap to achieve proposed LOS.

Table A.8 Typical Funding Gap Analysis Approach

Asset Type	Planned Budget	Reserve Fund Availability	Investment to Maintain Current LOS	Incremental Cost to Achieve CEAP	Incremental Investment to Achieve Proposed LOS	Infrastructure Gap to Maintain Current LOS	Infrastructure Gap to Achieve Proposed LOS
Asset Type 1	A	D	G	K	N	$G - (A+D)$	$(G+K+N) - (A+D)$
Asset Type 2	B	E	H	L	P	$H - (B+E)$	$(H+L+P) - (B+E)$
Total	$C=A+B$	$F=D+E$	$J=G+H$	$M=K+L$	$Q=N+P$	$J - (C+F)$	$(J+M+Q) - (C+F)$

Figure A.7 shows the annual required investments, the City's planned budget, additional reserve fund availability, and the resultant infrastructure funding gaps over the next decade; noting that any planned investments beyond 2022 are only forecasts that have not been approved and are subject to budget approval in their respective years via the City of London multi-year budget processes. The chart highlights whether the past maintenance, rehabilitation, and replacement of these assets have been sufficient (the current gaps), and whether projected planned investments are consistent with the anticipated infrastructure needs over the next decade.

The chart displays the following information:

- The total Planned Budget red bars represent the amount of investment the City currently forecasts spending on lifecycle renewal of its infrastructure (left axis).
- The Additional Reserve Fund Availability grey hatched bar represents the "savings" the City has accumulated to help offset investments required for infrastructure (left axis).
- The total Required Investment blue bars represent the projected investments required to maintain current LOS for our existing assets (left axis).
- The total Required Investment blue hatched bars represent the projected investments required to achieve proposed LOS for our existing assets (left axis).
- The Cumulative Infrastructure Gap (Maintain Current LOS) green line is the sum of the differences between the total required investment to maintain current LOS and the total planned budget (blue bar minus red bar – right axis).
- The Cumulative Infrastructure Gap (Achieve proposed LOS) green dotted line is the sum of the differences between the total required investment to achieve proposed LOS and the total planned budget (blue hatched bar minus red bar – right axis).

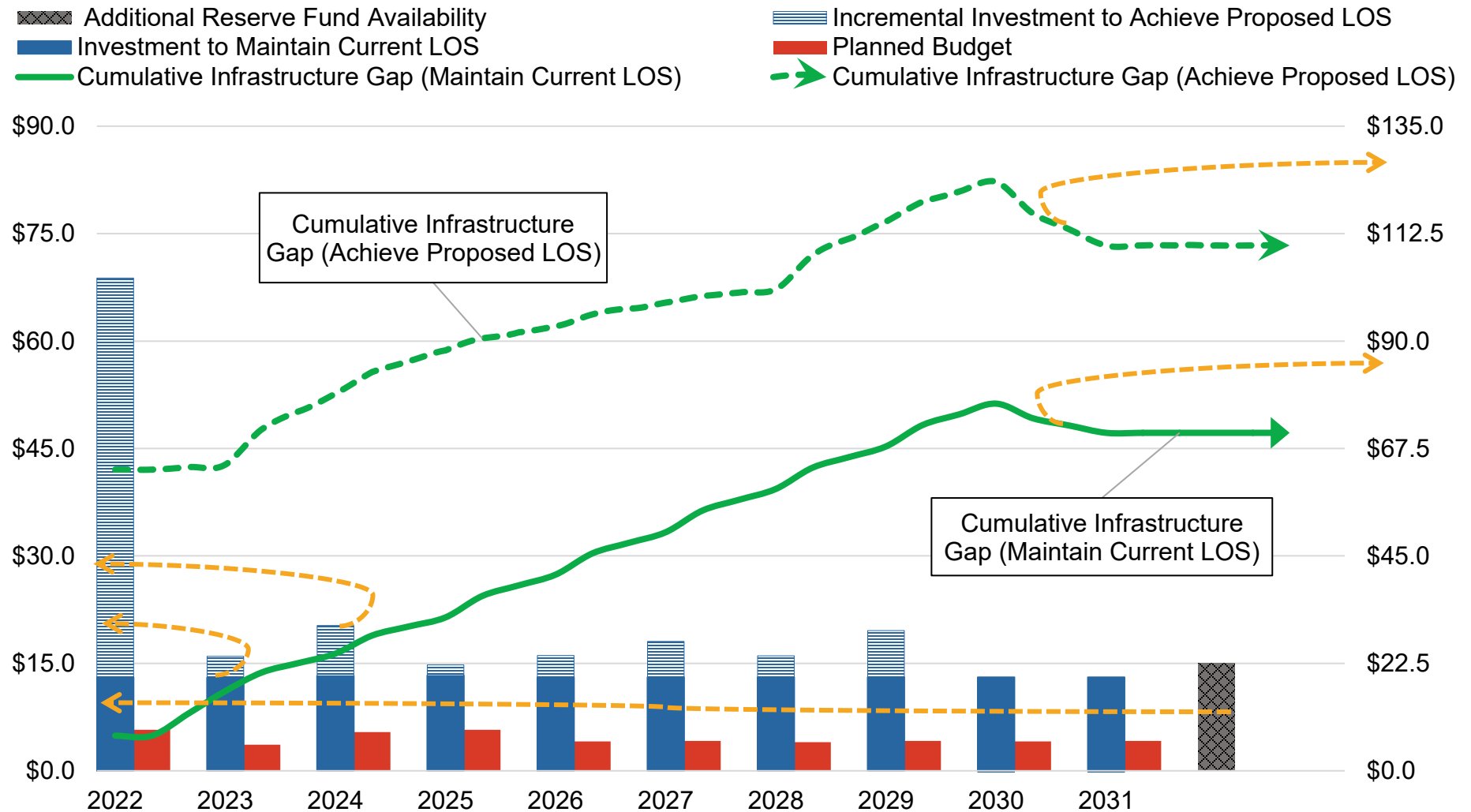


Figure A.7 Maintain Current and Achieve Proposed LOS Cumulative Infrastructure Gap (millions) (Example)

A7. Discussion

This part discusses the current and future challenges of the service area, addressing its infrastructure gap, and draws a comparison to the 2019 CAM Plan. Figure A.8 presents a comparative analysis of the condition profile from 2019 to 2023

CAM Plan. Notable changes are categorized into three main sub-sections: (1) Replacement Value; (2) Asset Condition; and (3) Funding Gap.

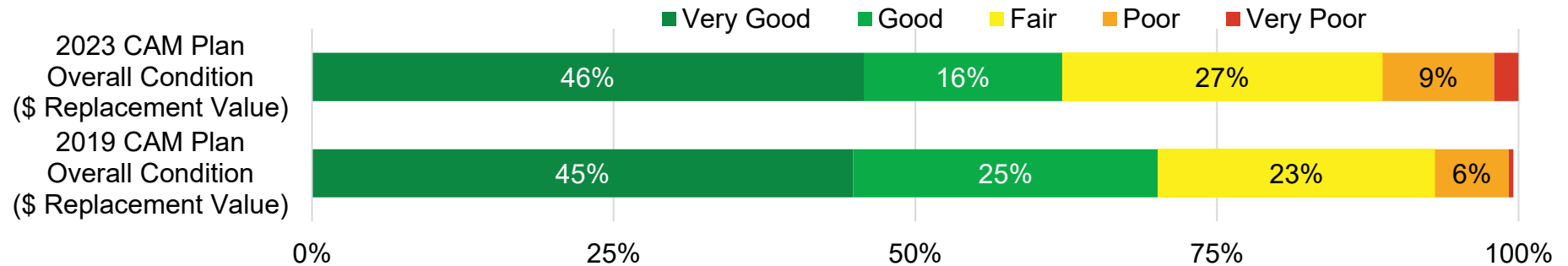


Figure A.8 2019 CAM Plan to 2023 CAM Plan Condition Summary (Example)

A8. Conclusion

Figure A.9 provides visual example of the 10-year infrastructure gaps to maintain current LOS and to achieve proposed LOS. Table A.9 shows an example of the typical table in the conclusion of each chapter. It includes the state of infrastructure

information, infrastructure funding gap(s), and compares the current annual reinvestment rates to recommended annual reinvestment rates.

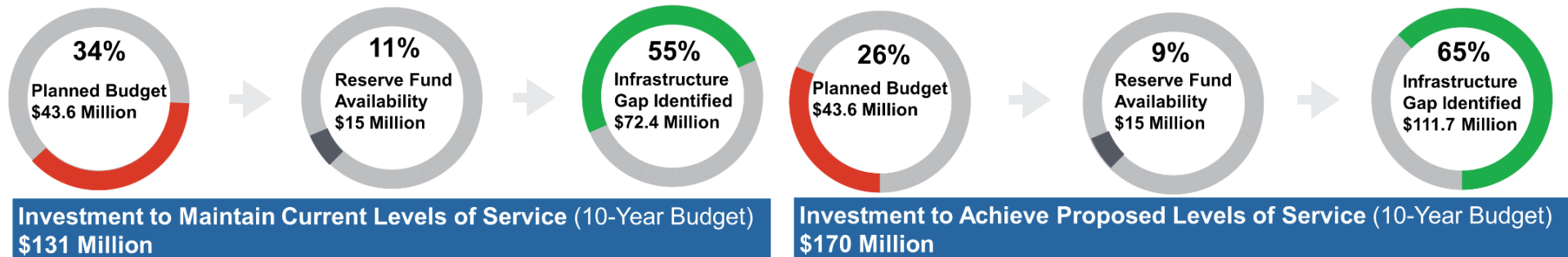



Figure A.9 Cumulative 10 Year Infrastructure Gap (Example)

Table A.9 Summary of the State of Infrastructure, Infrastructure Gap, and Reinvestment Rates (Millions) (Example)

Asset Type	Replacement Value	Current Condition	Infrastructure Gap Maintain Current LOS	Infrastructure Gap Achieve Proposed LOS	Current Annual Reinvestment Rate	Recommended Annual Reinvestment Rate
Type 1	\$100	Good	\$58	\$68	0.4%	1.0% to 1.5%
Type 2	\$50	Fair	\$15	\$22	4.9%	4.0% to 6%
Type 3	\$25	Fair	\$7	\$10	1.7%	2.1% to 2.5%
Total	\$175		\$80	\$100	0.5%	1.0% to 1.5%

Data Reliability and Accuracy

To facilitate interpretation, a Data Accuracy and Reliability rating is included in the conclusion section of each service area

section. The data rating scales are defined below in Table A.10 and a typical scale is illustrated in Figure A.10.

Table A.10 Reliability and Accuracy Scale and Definitions

Measure	Description	High	Moderate	Low
Reliability	Can be trusted to be accurate or to provide a correct result	Based upon sound records, procedures, or analyses that have been acceptably documented, and are recognized as the best method of assessment.	Based upon known reasonable procedures, or analyses that have been acceptably documented.	Based upon expert verbal opinion or cursory inspections/ observations.
Accuracy	Probable difference between a recorded parameter and its true value	+/- 1%	+/- 20%	+/- 50%

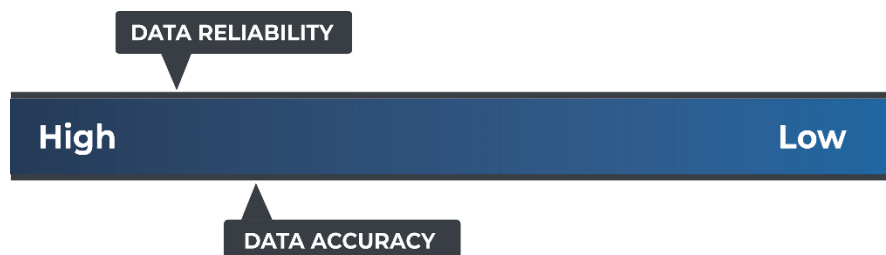


Figure A.10 Accuracy Reliability Scale (Example)



Appendix B. Levels of Service Line of Sight



B1. Customer Value Definition

Table B.1 lists the Customer Values that influence the design, implementation, and delivery of the services provided along with their corresponding definitions.

Table B.1 2023 CAM Plan Customer Values Definition

Customer Value	Corporate Definition and Description
Accessible	The service is accessible by the community, not exclusive, it is inclusive to those who wish to/may use the service to the greatest extent possible, regardless of age, ability, etc. Includes metrics related to asset accessibility and legislated requirements. For example, Accessibility for Ontarians with Disabilities Act (AODA).
Cost Efficiency	Presents service area budgets, and where possible measures financial performance in terms of providing the maximum service outcomes (more output for less cost) out of the available operating and capital budgets. Examples include annual cost to provide the service, asset lifecycle budget as a percentage of current replacement value.
Customer Satisfaction	The service is satisfactory/meeting expectations from the perspective of a customer or community. Includes a diversity of metrics that cover the performance of a service based on customer experiences. Metrics consist of descriptions from customer surveys and the like. Example includes percentage of customers satisfied with assets or service delivery.
Environmental Stewardship	The service is provided in a means that considers, controls, or reduces impacts to the environment. Includes metrics related to the assessment of service provision based on environmental stewardship and sustainability practices. Examples include percentage of streetlights with LED or low energy consumption fixtures, annual natural gas consumption per square foot, number, or type of Low Impact Development (LID) technologies implemented (rain gardens and bioswales), etc.
Quality	The service is meeting its performance objectives based on plans and practices (intended use/delivery). Includes metrics related to the assessment of the quality of the services provided, such measuring the quality of the service on a technical basis using a multi-criteria quality rating system.
Reliability	The service is fit for its purpose. Includes metrics related to the reliability of services such as condition of assets, or number of unplanned amenity closures/use restrictions per year.
Safety	As best as possible, the service safeguards against known dangers and risks. Covers performance assessments of services related to safety and compliancy with legislation, codes, and/or internal policies/practices. Includes metrics regulated/legislated by a governing body (Federal or Provincial governments, etc.) related to the specific service or asset. Examples include percentage of legislated Ministry of Transportation (MTO) safety inspections met, percentage of facility components annually inspected, etc.
Scope	The service is extended to/covers a defined range, or description of the range of service provided through municipal infrastructure assets. Includes, among other measures, maps of the user groups or areas of the municipality that are connected to the municipal water system, or have fire flow access, availability of municipal services, etc.

B2. Levels of Service Drivers and Corporate Levels of Service Objectives

This section presents the hierarchy of service drivers, enlists the spectrum of customer values, and outlines the corporate-level service objectives relevant to each distinct service area. Table B.2 shows the interconnection between the service levels and the underlying drivers, which may encompass strategic documents, regulations, guidelines, or plans. These drivers, thus, provide the foundation for the identification of customer values and the formulation of corporate-level service objectives. The following is the list of the general drivers that influenced the levels of service across all service areas:

- Strategic Plan 2023-207

- CAM Policy and Strategy
- The London Plan (Official Plan)
- Multi-Year Budget and Annual Updates (Financial Plans)
- O. Reg. 588/17
- Climate Emergency Action Plan (CEAP)
- Corporate Energy Conservation and Demand Management Plan
- 2020-2023 Business Plan
- Accessibility for Ontarians with Disabilities Act (AODA)
- 2021 Development Charges Background Study Update

Table B.2 Summary of Service Areas, Relevant Customer Values, Corporate LOS Objectives, and LOS Drivers

Service Area	Customer Values	Corporate LOS Objectives	LOS Drivers
Water	<ul style="list-style-type: none"> • Cost Efficiency • Customer Satisfaction • Environmental Stewardship • Safety • Reliability • Scope 	<ul style="list-style-type: none"> • Provide water services in an efficient manner. • Provide services that align with customer expectations and are deemed satisfactory from the customer's perspective. • Provide a water service that is environmentally conscious. • Water system provides safe potable drinking water. • Water system supports community fire protection. • Provide water services with minimal interruptions. • Provide adequate water services to the community. 	<ul style="list-style-type: none"> • Legislation (Financial Plan). • Water System Annual and Summary Reports and Financial Plan.
Wastewater - Sanitary	<ul style="list-style-type: none"> • Cost Efficiency • Customer Satisfaction • Environmental Stewardship 	<ul style="list-style-type: none"> • Provide wastewater services in an efficient manner. • Provide services that align with customer expectations and are deemed satisfactory from the customer's perspective. 	<ul style="list-style-type: none"> • Wastewater Treatment Operations Master Plan. • Combined sewer separation program. • Master Servicing Plan.

Service Area	Customer Values	Corporate LOS Objectives	LOS Drivers
	<ul style="list-style-type: none"> Reliability Scope 	<ul style="list-style-type: none"> Provide wastewater services that have minimal impacts on the environment. Provide wastewater services with minimal interruptions. Provide sanitary services with minimal impact to customer. Provide adequate wastewater services to the community. 	<ul style="list-style-type: none"> Core Area Servicing Study (Water, Sanitary, Storm).
Wastewater - Stormwater	<ul style="list-style-type: none"> Cost Efficiency Customer Satisfaction Environmental Stewardship Reliability Scope 	<ul style="list-style-type: none"> Provide stormwater services in an efficient manner. Provide services that align with customer expectations and are deemed satisfactory from the customer's perspective. Provide stormwater services that protect the environment. Provide stormwater services with minimal impact to the community. Provide stormwater services that protect the community. Provide adequate wastewater services to the community. 	<ul style="list-style-type: none"> Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA). LID Ministry Bulletin. CA Floodplain Updates. Coordination with Rapid Transit and Infrastructure Renewal. Erosion Studies and Waterways Studies. Master Servicing Plan. Core Area Servicing Study (Water, Sanitary, Storm). Wastewater Treatment Operations Master Plan.
Transportation	<ul style="list-style-type: none"> Cost Efficiency Environmental Stewardship Quality Reliability Safety Scope 	<ul style="list-style-type: none"> Provide a cost-efficient transportation network for all modes. Provide a transportation network that is environmentally conscious. Provide quality Transportation services. Provide reliable transportation services. Provide safe and legislation compliant Transportation services. Provide a transportation network with a reasonable level of connectivity. 	<ul style="list-style-type: none"> Urban Design Guidelines. Mobility Master Plan (draft). O.Reg.239/02 Minimum Maintenance Standards. O.Reg. 104/97 Standards for Bridges. Complete Streets Design Manual. Coordination with other Services (Water, Wastewater, etc.). Rapid Transit Master Plan. CAV Connected and Automated Vehicle Plan.

Service Area	Customer Values	Corporate LOS Objectives	LOS Drivers
Parking	<ul style="list-style-type: none"> • Accessible • Cost Efficiency • Reliability • Scope 	<ul style="list-style-type: none"> • Provide a FADS/AODA compliant parking service. • Provide parking services in a cost-efficient manner. • Provide reliable parking services. • Provide the appropriate number of parking spaces. 	<ul style="list-style-type: none"> • Downtown Parking Strategy.
Corporate Facilities	<ul style="list-style-type: none"> • Cost Efficiency • Environmental Stewardship • Reliability • Safety 	<ul style="list-style-type: none"> • Provide corporate facilities services in a cost-efficient manner. • Provide facilities that are energy efficient and environmentally conscious. • Provide facilities at the right design standard and in acceptable condition. • Provide facilities management services to ensure that facilities are safe. 	<ul style="list-style-type: none"> • Legislation: <ul style="list-style-type: none"> – Technical Standards and Safety Authority (TSSA). – Ministry of Natural Resources and Forestry (MNR). – Electrical Safety Authority (ESA). – Occupational Health and Safety Act (OHSA). • Master Accommodation Plan. • Service Area Master Plans. • Priority of work influenced by external funding constraints. • Operations Master Plan (Operations Centres).
Fleet	<ul style="list-style-type: none"> • Cost Efficiency • Customer Satisfaction • Environmental Stewardship • Reliability • Safety 	<ul style="list-style-type: none"> • Provide fleet services in a cost-efficient manner. • Providing fleet services at the appropriate quality • Provide vehicles and equipment with minimal greenhouse gas emissions. • Provide reliable vehicles and equipment. • Provide safe vehicles and equipment. 	<ul style="list-style-type: none"> • Green Fleet Strategy.
Information Technology	<ul style="list-style-type: none"> • Cost Efficiency • Reliability 	<ul style="list-style-type: none"> • Providing IT services in a cost-efficient manner • Providing reliable IT services 	<ul style="list-style-type: none"> • Legislation. • Technology Investment Strategy.
Culture	<ul style="list-style-type: none"> • Cost Efficiency • Environmental Stewardship • Reliability 	<ul style="list-style-type: none"> • Provide culture services in a cost-efficient manner. • Provide culture services that are energy efficient and environmentally conscious. 	<ul style="list-style-type: none"> • CAM Strategy. • Cultural prosperity plan. • UNESCO 4-year action plan. • <i>Ontario Heritage Act R.S.O. 1990</i>

Service Area	Customer Values	Corporate LOS Objectives	LOS Drivers
		<ul style="list-style-type: none"> Provide culture services at the right design standard and in acceptable condition. 	
Waste Management	<ul style="list-style-type: none"> Accessible Reliability Cost Efficiency Customer Satisfaction Environmental Stewardship Quality Safety 	<ul style="list-style-type: none"> Provide consistent Waste Management collection service to Public. Provide reliable Waste Management Recycling, Collection, and Disposal services. Provide Waste Management services in a cost-efficient manner. Providing Waste Management services at the appropriate quality. Provide Waste Management services that have minimal impacts on the environment. Provide safe Waste Management Recycling, Collection, and Disposal services and facilities that meet Health and Safety Standards. 	<ul style="list-style-type: none"> Legislation. 60% Waste Diversion Action Plan. Environmental Assessment.
Recreation and Sport	<ul style="list-style-type: none"> Accessible Cost Efficiency Customer Satisfaction Environmental Stewardship Quality Reliability Safety 	<ul style="list-style-type: none"> Provide adequate accessibility to facilities. Provide recreation services in a cost-efficient manner. Provide services that align with customer expectations and are deemed satisfactory from the customer's perspective. Provide recreation services that are energy efficient and environmentally conscious. Provide recreation services through quality facilities. Provide reliable recreation services. Provide safe Recreation Services. 	<ul style="list-style-type: none"> Planning Act R.S.O. 1990 (parkland acquisition). Parks and Recreation Master Plan. Cycling / Mobility Master Plan (AT and paths outside of Right-of-Way). Legislation.
Parks	<ul style="list-style-type: none"> Accessible Cost Efficiency Environmental Stewardship Quality Reliability Safety 	<ul style="list-style-type: none"> Provide adequate accessibility to parks. Provide park services in a cost-efficient manner. Provide parks services with environmental considerations. Provide quality parks services. Provide reliable parks services. Ensure that Parks are safe for visitors. 	<ul style="list-style-type: none"> Cycling Master Plan (Mobility Master Plan). Invasive Species Management Strategy. Provincial Policy Statements – how parkland is acquired.

Service Area	Customer Values	Corporate LOS Objectives	LOS Drivers
	<ul style="list-style-type: none"> Scope 	<ul style="list-style-type: none"> Provide park services across the municipality. 	<ul style="list-style-type: none"> Environmental management guidelines.
Forestry	<ul style="list-style-type: none"> Accessible Cost Efficiency Customer Satisfaction Environmental Stewardship Quality Reliability Safety 	<ul style="list-style-type: none"> Provide adequate pedestrian accessibility to Forestry. Provide Forestry service in a cost-efficient manner. Provide services that align with customer expectations and are deemed satisfactory from the customer's perspective. Provide Forestry services that have minimal impacts on the environment. Provide quality forestry services. Provide Forestry at the right design standard. Provide Street Trees and Trees in Manicured Parks in acceptable condition. Provide Forestry services with minimal interruptions. Provide Forestry network that is safe for drivers, pedestrians and cyclists. 	<ul style="list-style-type: none"> 2017 Tree Planting Strategy. 2008 The Urban Forest Effects (UFORE).
Emergency Management and Security Services	<ul style="list-style-type: none"> Cost Efficiency Customer Satisfaction Reliability Safety Scope 	<ul style="list-style-type: none"> Provide Emergency Management and Security Services in a cost-effective manner. Provide adequate Emergency Management and Security Services to the community. Provide Emergency Management and Security Services that meet all legislative and regulation requirements. Provide Emergency Management and Security Services to ensure that facilities are safe. Provide Emergency Management and Security Services that educate the public on how to prevent and effectively respond to emergencies. Provide adequate Emergency Management and Security Services to the community. 	<ul style="list-style-type: none"> Emergency Management and Civil Protection ACT. Fire Code. Core Area Action Plan.

Service Area	Customer Values	Corporate LOS Objectives	LOS Drivers
Fire Department	<ul style="list-style-type: none"> • Cost Efficiency • Customer Satisfaction • Environmental Stewardship • Reliability • Safety 	<ul style="list-style-type: none"> • Provide Fire rescue and prevention service in a cost-efficient manner. • Delivering effective and efficient fire rescue and prevention education services. • Provide services that align with customer expectations and are deemed satisfactory from the customer's perspective. • Provide fire services that protect the environment. • Provide the appropriate amount of rescue services and ensuring firefighters are well prepared. • Provide effective fire and rescue services to the community. 	<ul style="list-style-type: none"> • <i>Fire Protection and Prevention Act, 1997.</i> • Fire Master Plan Action Plan. • Deloitte Fire Fleet Audit.
Municipal Housing Development	<ul style="list-style-type: none"> • Accessible • Cost Efficiency • Reliability • Scope 	<ul style="list-style-type: none"> • Provide accessible municipal housing facilities to the residence. • Provide Municipal Housing Development service in a cost-efficient manner. • Provide reliable Municipal Housing Development service. • Provide adequate quantity of municipal housing units with high occupancy rate. 	Ontario's Housing Supply Action Plan 2022-2023.
Long Term Care	<ul style="list-style-type: none"> • Accessible • Cost Efficiency • Customer Satisfaction • Environmental Stewardship • Reliability • Safety • Scope 	<ul style="list-style-type: none"> • Provide long-term care services in facilities that are FADS compliant. • Provide long-term care services in a cost-efficient manner. • Provide long term care services that meet clients and residents' needs. • Provide long term care facilities that are energy efficient and environmentally conscious. • Provide reliable long-term care services. • Provide safe long-term care facilities. • Provide Long Term care beds with high occupancy rate. 	<ul style="list-style-type: none"> • Legislations (<i>Fixing Long Term Care Act, 2021</i>).



Appendix C. Operating and Capital Budget Analysis



C1. Budget Introduction

The City has three primary budgets. They include:

- Property Tax Supported Budget (referred to as Tax Supported),
- Water Rate Supported Budget (referred to as Water), and
- Wastewater and Treatment Rate Supported Budget (referred to as Wastewater).

These budgets each have operating and capital components:

- The operating budget is where property taxes and utility rates are collected and used to support the day-to-day operations that provide services to the community. Operating budgets consist of a 4-year budget approval period, and include expenditures such as staff salaries, energy bills, supplies, and capital financing costs (inclusive of capital levy, reserves/reserve fund contributions, and debt servicing costs).
- The capital budget is used to plan and fund large expenditures including design, construction, rehabilitation and/or replacement as well as disposition costs of infrastructure assets with long life spans. Capital budgets consist of 4-year budget approval period plus an additional 6-year budget forecast period.

Tax/rate supported capital budgets are linked to operating budgets and associated revenues through capital levy, reserve fund contributions, and debt servicing costs (principal and interest payments), which are commonly referred to as capital financing costs. To demonstrate these relationships, Figure C.1 provides a high-level illustration of the Tax Supported budget revenues, and operating and capital expenditures with an

emphasis on how these capital financing costs are connected to each component of the budget.

Capital levy is the mechanism the City uses to allocate a portion of current year operating revenues, from property taxes and utility rates, to use as a current year source of financing within the capital budget. Capital reserve fund contributions and debt servicing costs within the operating budget are used to support capital budget needs and manage fluctuations over the 10-year duration of the City's capital plan with the aim of achieving intergenerational equity.

The appropriate use of reserve funds and debt contribute towards achieving intergenerational equity as follows:

- Reserve funds are a savings mechanism for, among others, lifecycle rehabilitation and/or replacement and moderate service improvement costs of infrastructure assets, which allows cyclical capital costs to be evenly distributed (smoothed) to match the consumption of assets by current ratepayers. This results in future ratepayers not being burdened with capital financing costs for which they do not benefit from.
- Debt financing of new growth and significant service improvement capital assets allow the capital financing cost impacts (principal and interest) to be realized in the future when the asset is operational/providing service. This results in current ratepayers not being burdened with capital costs for which they do not benefit from.

With the high-level budget architecture established, the remaining segments of Appendix C will summarize how these operating and capital budget components are used in the development of the infrastructure gap financing strategies.

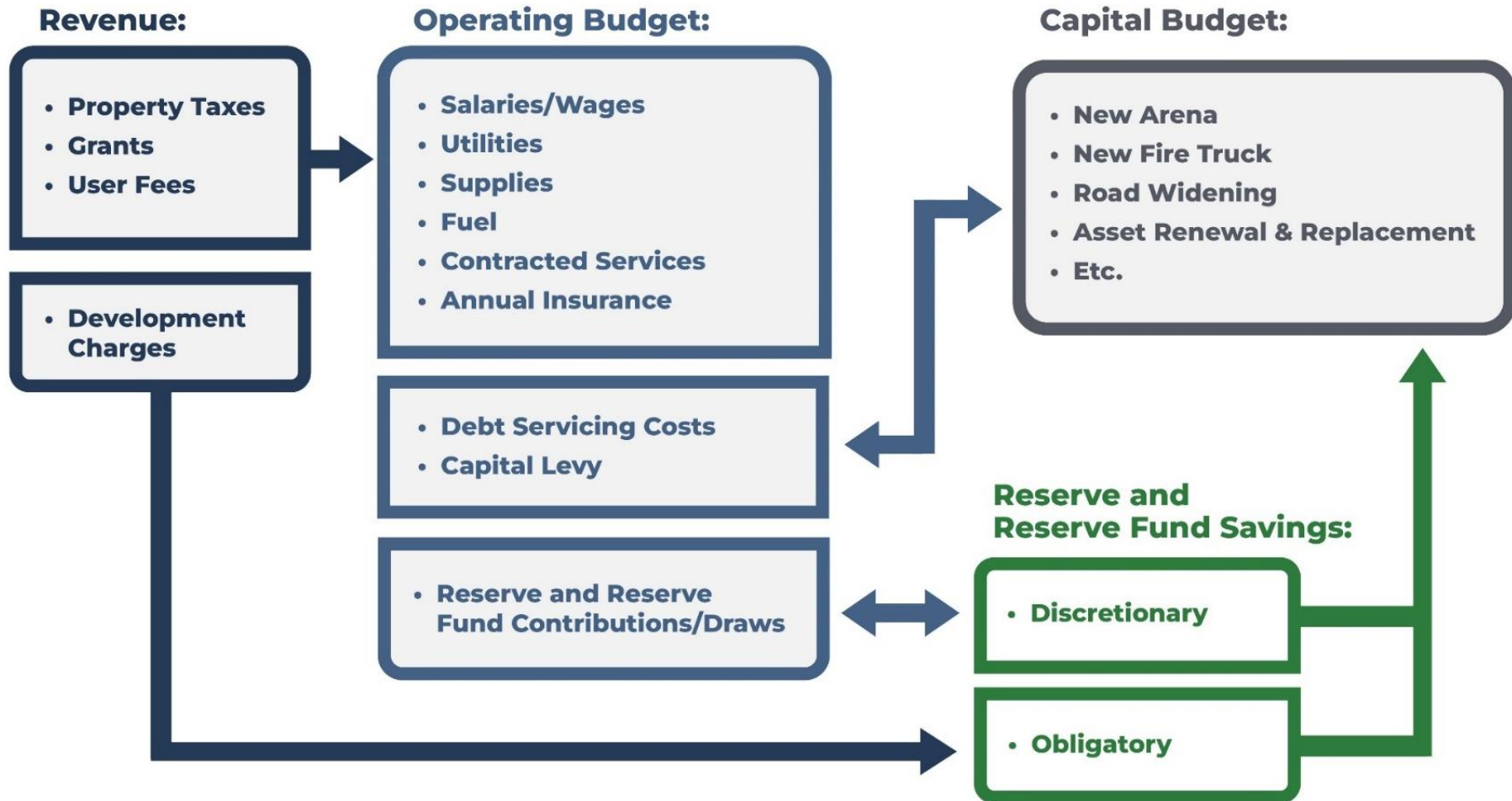


Figure C.1 Illustration of Tax Supported Budget Relationships

C2. Operating Budget Analysis

Over the 2020-2023 Multi-Year Budget (MYB), the City's operating budgets increased on an annual basis to reflect maintain existing service levels (MESL) and additional investment funding requirements approved by Council; for the Tax Supported budget the 2019 CAM Plan identified infrastructure gap formed part of the overall budget increases.

Collectively these funding increases maintain and improve the quality and quantity of services provided. In percentages, Table C.1 identifies the tax/rate supported budget increases over the past 4-years, and the amount of increases attributable to infrastructure gap mitigation, inclusive of 2021 to 2023 annual budget update amendments, if any.

Table C.1 2020-2023 MYB Tax and Rate Supported Budget and Infrastructure Gap Funding Increases

Budget	Type of Budget Increase	2020	2021	2022	2023	2020-2023 Average
Tax Supported	Net Budget Increases	4.4%	3.4%	2.8%	3.1%	3.4%
Tax Supported	Infrastructure Gap Funding Increases ⁹⁴	0.21%	0.04%	0.10%	0.04%	0.10%
Water Rate Supported	Rate Increases	2.5%	2.5%	2.5%	2.5%	2.5%
Water Rate Supported	Infrastructure Gap Funding Increases	None identified	None identified	None identified	None identified	None identified
Wastewater Rate Supported	Rate Increases	2.5%	5.2%	2.5%	2.5%	3.2%
Wastewater Rate Supported	Infrastructure Gap Funding Increases ⁹⁵	None identified	None identified	None identified	None identified	None identified

*Subject to rounding.

As it relates to the Tax Supported budget infrastructure gap funding increases noted above, these realized funding increases came in below initially requested and approved funding for the 2020-2023 MYB additional investment business case number 4 titled City of London Infrastructure Gap. Initially

approved funding increases were revised through the 2021, 2022, and 2023 annual budget update amendment process to accommodate pandemic related pressures. Table C.2 summarizes the Tax Supported infrastructure gap funding request, initial approval, and subsequent amendments.

⁹⁴ The Tax Supported infrastructure gap funding increases represent the property tax levy increases attributable to the 2020-2023 MYB additional investment business case number 4 parts A and B funding approvals, including annual budget update amendments of the same.

⁹⁵ Although the 2019 CAM Plan identified a Wastewater infrastructure gap, no rate increases above the target MESL rate increase was necessary to mitigate the reported infrastructure gap.

Table C.2 Summary of 2020-2023 MYB Tax Supported Infrastructure Gap Additional Investment Tax Levy Increases

Tax Supported Budget Infrastructure Gap	2020	2021	2022	2023	2020-2023 Average
Requested Additional Investment	0.33%	0.33%	0.33%	0.33%	0.33%
Initial Approved Additional Investment	0.21%	0.12%	0.19%	0.11%	0.15%
Amended/Final Additional Investment	0.21%	0.04%	0.10%	0.04%	0.10%

*Subject to rounding.

Next, an important part of understanding tax/rate supported operating budget increases is that the total operating expenditures of each budget are funded through both tax/rate revenues and non-tax/rate revenues. Because of this important distinction, operating budget increases are mainly communicated from the perspective of the tax/rate revenues portion of the budget increase, which is commonly referred to as

the “net budget” increase. This is why optional infrastructure gap financing strategies are quoted based on the percentage increase to property taxes and utility rates (net budget increases). Figure C.2 summarize each budgets gross operating expenditures financed by either tax/rate supported or non-tax/rate support revenue sources.

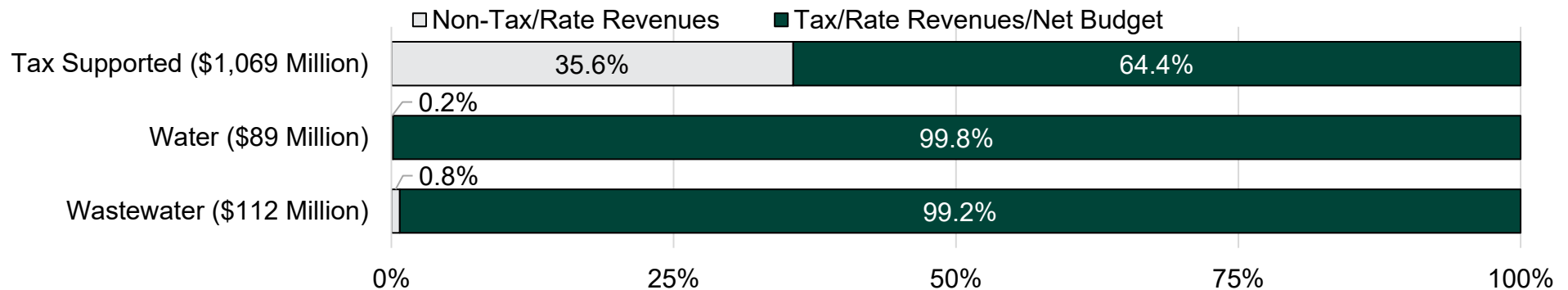


Figure C.2 Tax/Rate and Non-Tax/Rate Percentages of Gross Operating Budget

As explained in the budget introduction, within the gross operating expenditures of each budget there are capital financing cost considerations such as capital levy, reserve fund contributions, and debt servicing costs. These capital financing costs are entirely funded from tax/rate revenues. For comparative purposes and to demonstrate the materiality of asset replacement values, Figure C.3 analyzes capital levy and Capital Asset Renewal and Replacement Reserve Funds

(CARR RF) contributions, the primary sources of financing for lifecycle renewal (LCR) and service improvement, as a percentage of the Tax Supported, Water, and Wastewater asset replacement values. Debt servicing costs have been excluded as they primarily relate to growth capital budgets for which no infrastructure gaps have been identified. Should a future CAM Plan identify a growth capital budget infrastructure gap, debt servicing costs will then form part of the analysis.

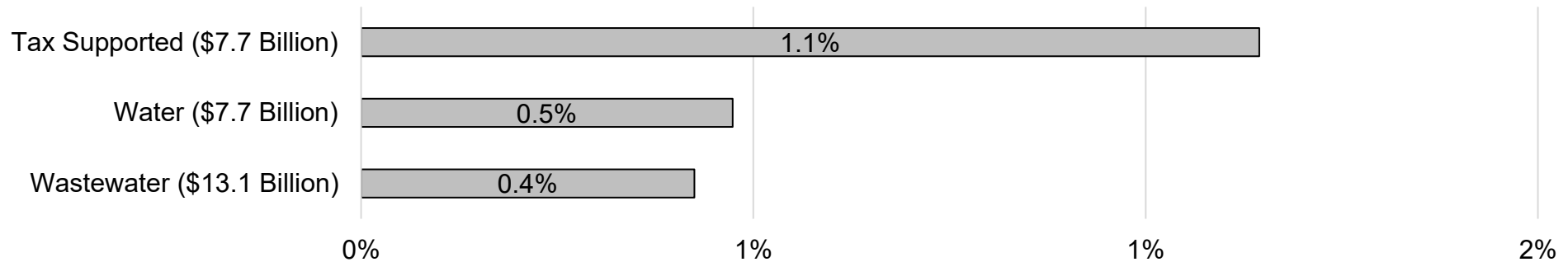


Figure C.3 2020-2023 Average Annual Capital Levy and CARR RF Contributions Percentage of Replacement Value

The analysis highlights 2020-2023 average annual capital levy and CARR RF contributions for all three budgets represent a small portion of the replacement values. This reality is primarily due to the overall long-term nature of municipal infrastructure assets, while noting the existence of infrastructure gaps suggests the level of annual funding must be increased. Also, the analysis demonstrates that although Wastewater assets represent the majority of the City's total asset replacement value, and Water and Tax Supported replacement values are approximately equal, the Tax Supported assets receive a higher rate of reinvestment. This is due to differences in asset profiles and associated useful lives (deterioration). For example, most Water and Wastewater assets are underground and have a long-term useful life, whereas most Tax Supported assets are above ground with highly variable useful lives (range from short-term to long-term).

It is Civic Administration's recommendation that infrastructure gap funding increases come in the form of additional CARR RF contributions due to improved line-of-sight and accountability over subsequent service area allocations and future spending monitoring.

CARR RF Contributions

In their current form, CARR RFs were created through the September 8, 2020, Corporate Services Committee, Capital Asset Renewal and Replacement Reserve Fund Rationalization Report. As highlighted in the policies reviewed above and in the Committee report, these reserve funds support the City's LCR capital plan and to a lesser extent the service improvement capital plan and are a significant part of the 'pay-as-you-go' financing strategy that funds the maintenance, renewal, and replacement of the City's existing infrastructure assets. This means that within the LCR capital plan the City is committed to paying for tax/rate supported capital expenditures with current year operating funding (capital levy) and savings held in reserve funds (CARR RFs). This financing strategy allows the City to avoid the use of debt for these infrastructure costs, and supports the principle of intergenerational equity.

In the approved operating budgets for 2023 each service area CARR RF has an annual contribution that plays a critical role in the service areas capital plan. Table C.3 summarizes these 2023 contributions as they form a critical consideration in optional infrastructure gap financing strategies.

Table C.3 Tax/Rate Supported CARR RF Contributions (\$Thousands)

Budget	Reserve Fund Title ⁹⁶	2023 Contribution
Tax Supported	Transportation Renewal	14,367
Tax Supported	Parking Facilities Renewal	875
Tax Supported	City Facilities Renewal	7,061
Tax Supported	Fleet Vehicle and Equipment Renewal	4,232
Tax Supported	Technology Services Renewal	2,955
Tax Supported	Public Art Renewal	190
Tax Supported	Solid Waste Renewal	3,006
Tax Supported	Recreation Renewal	3,860
Tax Supported	Parks Renewal	2,071
Tax Supported	Urban Forestry Renewal	384
Tax Supported	Corporate Security and Emergency Management Renewal	21
Tax Supported	Fire Facilities, Vehicle and Equipment Renewal	2,391
Tax Supported	Dearness Home Renewal	500
Tax Supported	Capital Infrastructure Gap ⁹⁷	1,090
Water Rate Supported	Water Works Renewal	15,969
Wastewater Rate Supported	Sewage Works Renewal	39,697

*Subject to rounding.

⁹⁶ Refer to recommendations section regarding direction concerning the creation of a Municipal Housing Development Reserve Fund.

⁹⁷ The Capital Infrastructure Gap Reserve Fund is utilized as a contingency fund to support unforeseen capital costs for assets within CAM Plan scope.

C3. Capital Budget Analysis

The capital budget is primarily used to study, design, construct, and renewal and replace infrastructure assets that form the backbone of the provision of almost all City services. The projects funded through the capital budget are separated into three classifications:

- 1) Lifecycle Renewal (LCR) – projects to rehabilitate or replace existing infrastructure assets that have reached a point which they provide inadequate service levels to residents, this is inclusive of financing disposition costs;
- 2) Growth – projects to build new or expand existing infrastructure assets to provide services to new and/or expanded developments across the City; and
- 3) Service Improvement – projects to build new or expand existing infrastructure assets to improve the service levels provided to the community.

These classifications help to present the capital budget in a meaningful but straightforward manner to the public and are key to explaining the infrastructure gaps that may exist within the City's asset portfolio.

Over the course of a MYB, initial budget adoption and subsequent annual budget updates, the capital budget is maintained to present the rolling 10-year expenditure and sources of financing requirements. This extended period is provided not only because the Municipal Act legislates municipalities to do so, but because municipal infrastructure assets have long life spans with cyclical needs and varying sources of financing. This necessitates a longer-term planning horizon to ensure strong stewardship of the assets and associated financing. This timeframe mirrors the requirements of O. Reg. 588/17 and allows the CAM Plan to formulate accurate long-term infrastructure gap estimates that help guide the development of MYB MESL and additional investment capital financing needs.

Based on the approved 2022 annual budget update 10-year capital plans (2022-2031), Figure C.4 shows the percentage of each budgets 10-year capital plan by capital budget classification (LCR, growth, and service improvement). By service area and classification, this budget information is compared to the 2023 CAM Plan requirements to determine if infrastructure gaps exist.

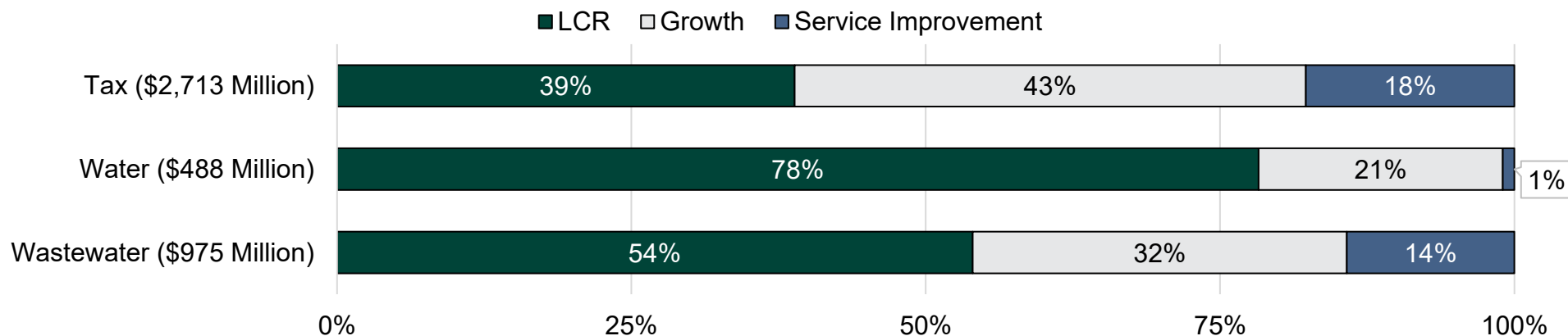


Figure C.4 2022 Annual Budget Update 10-Year Capital Plan by Capital Budget Classification

As demonstrated in Figure C.4, the Tax Supported budget contains most the City's capital spending, and on average across all three budgets spending is most intensive in LCR.

It is important to adequately finance existing assets as they form the largest component of the City's service delivery infrastructure and capital plan. Thus, representing the broadest potential impact to service delivery fulfillment, and asset and financial sustainability. This importance is carried forward into the development of the infrastructure gap financing strategies recommendations concerning pace and timing of infrastructure gap funding presented in optional infrastructure gap financing strategies.

2022-2031 Capital Budget Sources of Financing

The Capital Budget and Financing Policy establishes the priority order funding framework to ensure capital investments are budgeted with a consistent approach and financed in a manner to ensure a funding mix that places an emphasis on maintaining long-term financial sustainability. The Policy's capital budget sources of financing requirements are summarized as follows:

- LCR – non-tax/rate supported funding sources like senior government grants are used first while tax/rate supported capital levy is the second option for funding lifecycle renewal capital projects. Tax/rate supported reserves and reserve funds are the third option, with tax/rate supported debt financing as the last option if absolutely necessary;
- Growth – non-tax/rate supported funding sources like development charges and senior government grants are used first (provided any grants must be considered before establishing the growth/non-growth split of the capital project) while tax/rate supported capital levy is the second option after consideration has been first given to LCR capital projects. Tax/rate supported reserves and reserve funds are the third option, with tax/rate supported debt financing as the last option if necessary; and
- Service Improvement – non-tax/rate supported funding sources like senior government grants are used first while tax/rate supported capital levy is the second option after consideration has been first given to LCR capital projects. Tax/rate supported reserves and reserve funds

are the third option, with tax/rate supported debt financing as the last option if necessary.

These requirements are factored into the optional infrastructure gap financing strategies based on tax/rate supported and non-tax/rate supported sources of financing splits contained in the 2022-2031 capital plan, which are summarized in Figure C.5 below. This approach ensures the infrastructure gap financing

strategies do not unduly burden tax/rate payers with unnecessary tax/rate increases and guides Civic Administration's planning and monitoring of non-tax/rate supported capital sources of financing. Should long-term trends in tax/rate versus non-tax/rate supported funding splits change, future CAM Plans will proactively recommend amendments to the infrastructure gap financing strategies to ensure community affordability.

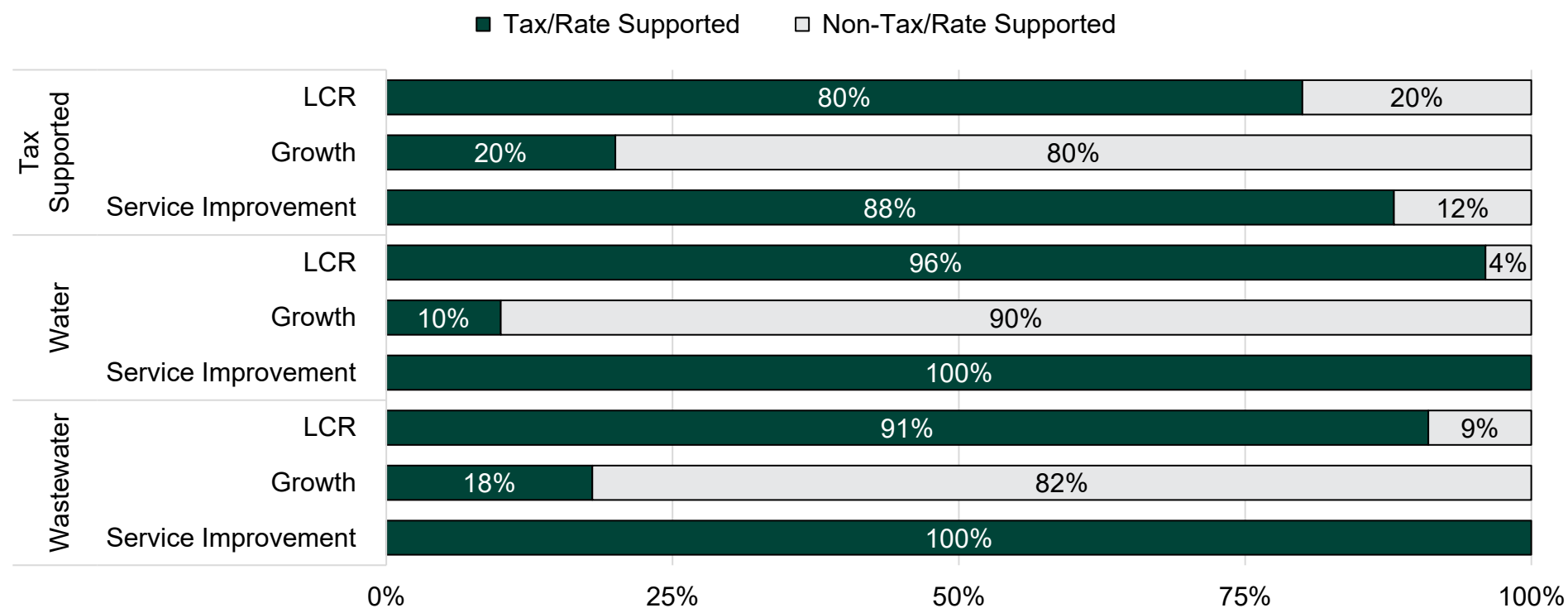


Figure C.5 2022-2031 Capital Plan by Capital Budget Classification and Sources of Financing

Based on these 2022-2031 sources of financing splits, the Tax supported and Wastewater maintain current LOS and achieve proposed LOS infrastructure gap financing strategies are structured as follows:

- Tax Supported Budget – financing strategy will seek to fund 20% of the gap through non-tax supported sources of financing and the remaining 80% through tax supported sources of financing; and

- Wastewater Rate Supported Budget – financing strategy will seek to fund 10% of the gap through non-rate supported sources of financing and the remaining 90% through rate supported sources of financing.

Furthermore, the recommended tax/rate supported source of financing is increased CARR RF contributions as these funds directly align to the service area infrastructure gaps identified in the 2023 CAM Plan and allow for the transparent allocation of approved funding based on short- and long-term needs.



Appendix D. O.Reg.588/17 Asset Management Plan Requirements

D1. O.Reg.588/17 Asset Management Plan Requirements

Table D1.-1 O.Reg.588/17 July 1, 2024 Requirements

O.Reg.588/17 Section	Requirement	Mapping to CAM Plan
0	Summary of assets in each category	Service Sections - #.1.1
5.(2) 3.	Replacement cost of assets in each category	Service Sections - #.1.1
5.(2) 3.	Average age of assets in each category	Service Sections - #.1.2
5.(2) 3.	Condition of assets in each category	Service Sections - #.1.3
5.(2) 3.	Description of municipality's approach to assessing condition of assets in each category	Service Sections - #.1.3
5.(2) 1.	Current levels of service, with core asset LOS determined in accordance with tables	Service Sections - #.2
5.(2) 2.	Current performance measures of assets in each category based on metrics established by the municipality (e.g. measures for energy usage, operating efficiency, etc.)	Service Sections - #.2
5.(2) 4.	Lifecycle activities needed to maintain current levels of service for 10 years	Service Sections - #.3
5.(2) 4.	Costs of providing lifecycle activities needed to maintain current LOS, based on assessment of lifecycle, options, risks, lower cost	Service Sections - #.3
5.(2) 4.	Link or description of assessment of current LOS lifecycle, options, risks, lower cost	Service Sections - #.3
0	Summary of assets in each category	Service Sections - #.1.1
5.(2) 3.	Replacement cost of assets in each category	Service Sections - #.1.1
5.(2) 3.	Average age of assets in each category	Service Sections - #.1.2
5.(2) 3.	Condition of assets in each category	Service Sections - #.1.3
5.(2) 3.	Description of municipality's approach to assessing condition of assets in each category	Service Sections - #.1.3
5.(2) 5.	For population <25K, description of population or economic forecast assumptions, and how these connect to lifecycle cost projections for current LOS	Not Applicable
5.(2) 6.i.	For population 25K or more, population and employment forecasts	Not listed in GGH area
5.(2) 6.ii.	For population 25K or more, lower tier in GGH, Sched 7 or portion of upper tier growth plan forecast, or assumptions	Not Applicable
5.(2) 6.iii.	For population 25K or more, upper/single tier outside GGH, population and employment forecasts in OP, or assumptions	Section 3.2.5
5.(2) 6.iv.	For population 25K or more, lower tier outside GGH, portion of upper tier growth plan forecast	Not Applicable
5.(2) 6.vi.	For population 25K or more, capital and significant operating costs for each of 10 years, to maintain LOS to accommodate increase in demand cause by growth	Service Sections - #.3.2
7.(1)	Date of review and update of AMP - within 5 years	Include once finalized

O.Reg.588/17 Section	Requirement	Mapping to CAM Plan
8.	Endorsement of AMP by executive lead	Include once finalized
8.	Approval of AMP by Council resolution	Include once finalized
9.(1)	Date of Council review of AM progress - before July 1 every year	Include once finalized
9.(2)	Annual Council review includes progress, factors impeding implementation, strategy to address factors	Include once finalized
10	Website availability of policy and AMP, copy provided if requested	Include once finalized
5.(2) 3.	Description of how all background information and reports will be made available to the public (reports and info from which AMP content is developed)	Section 2.3.2

Table D1-2 O.Reg.588/17 July 1, 2025 Requirements

O.Reg.588/17 Section	Requirement	Mapping to CAM Plan
6.(1) 1.	Proposed levels of service, with core asset LOS determined in accordance with tables, for each of 10 years	Service Sections - #.3
6.(1) 2.	Explanation of why proposed LOS are appropriate, based on options, delta, achievability, affordability	Service Sections - #.3
6.(1) 2.	Link or description of assessment of proposed LOS options, delta, achievability, affordability	Service Sections - #.2, #.3, and #.5
6.(1) 3.	Proposed performance measures of assets based on metrics established by the municipality (e.g. measures for energy usage, operating efficiency, etc.)	Service Sections - #.3
6.(1) 4.	Lifecycle management strategy: Identification of lifecycle activities needed to provide proposed levels of service for a 10-year period, based on assessment of full lifecycle, options, risks, lowest cost	Service Sections - #.3
6.(1) 4. i.	Link or description of assessment of proposed LOS lifecycle, options, risks, lower cost	Service Sections - #.3
6.(1) 4. ii.	An estimate of annual costs for undertaking identified lifecycle activities over a 10-year period.	Service Sections - #.3
6.(1) 4. iii.	Projections for annual funding to be available to undertake identified lifecycle activities over a 10-year period	Service Sections - #.4
6.(1) 4. iii.	Explanation of the options examined to maximize the funding projected to be available	Service Sections - #.4
6.(1) 4. iv.	Identification of funding shortfalls for lifecycle activities over a 10-year period	Service Sections - #.3
6.(1) 4. iv.	Identification of lifecycle activities that will be undertaken if there is a shortfall	Service Sections - #.3.2.C
6.(1) 4. iv.	Explanation of how risks associated with not undertaking any of the lifecycle activities will be	Service Sections -

O.Reg.588/17 Section	Requirement	Mapping to CAM Plan
	managed.	#.3.2.C
6.(1) 5.	For population <25K, description of population or economic forecast assumptions, and how these connect to lifecycle cost projections for proposed LOS	Not Applicable
6.(1) 6.	For population 25K or more, capital and significant operating costs for each of 10 years, to achieve proposed LOS to accommodate increase in demand caused by growth	Service Sections - #.3.2.C
6.(1) 6. ii.	For population 25K or more, funding projected to be available, by source, due to growth	Service Sections - #.3
6.(1) 6. iii.	For population 25K or more, overview of the risks associated with implementation of the AMP	Service Sections - #.3.1 and Appendix A
6.(1) 7.	Explanation of other key assumptions	Section 2.6

*Service Section include Sections 4 to 21

Glossary

Definitions

Achieve Proposed Levels of Service: is defined as the strategic initiatives undertaken by an organization to modify its service levels represented in a new proposed standard of service provision. This could involve modifying the condition, scope, or accessibility of the services beyond their current levels, based on strategic goals (e.g., Regulation Requirements, Master Plans or Council Strategic Plan Targets). The achievement of these proposed service levels may require changes in frequency and/or scope of asset lifecycle activities.

Asset: Non-financial assets having physical substance that are acquired, constructed, or developed and:

- are held for use in the production or supply of goods and services for rental to others, for administrative purposes or for the development, construction, maintenance or repair of other tangible asset;
- have useful economic lives extending beyond an accounting period;
- are to be used on a continuing basis; and
- are not for resale in the ordinary course of operations.

For the City, capital assets have the following characteristics:

- Beneficial ownership and control clearly rests with the City, and
- The asset is utilized to achieve City plans, objectives, and services with the intention of being used on a continuous basis and is not intended for sale in the ordinary course of business.

Asset Management: is an integrated approach, involving all organization departments, to effectively manage existing and new assets to deliver services to customers. The intent is to

maximize benefits, reduce risks and provide satisfactory levels of service to the community in a sustainable manner.

CAM Plan: The City's Corporate Asset Management Plan which combines multi-disciplinary management techniques (technical and financial) over the life-cycle of municipal infrastructure assets to provide a specific level of service in the most cost effective manner and manage risks associated with municipal infrastructure assets. This typically includes plans to invest, design, construct, acquire, operate, maintain, renew, replace, and decommission assets.

CAM Program: A set of interrelated or interacting components of the City that establishes asset management policies and objectives and the processes needed to achieve those objectives. An asset management program also includes the organization structure, roles, responsibilities, business processes, plans, and operations of the Corporation's Asset Management practices.

Capitalization Threshold: The threshold represents the minimum cost an individual asset must have before it is to be recorded as a capital asset on the statement of financial position.

City: The Corporation of the City of London.

Community Partners: Entities such as Conservation Authorities, Emergency Medical Services' organizations, or utility companies where implementation of their mandate or corporate objectives would have an impact on municipal infrastructure assets and it is expected the City would be coordinating with them.

Consequence of Failure: A measure of the direct and indirect impacts on the city in the event of an asset failure.

Contingency Funding: Funding available for municipal infrastructure assets to address unforeseeable circumstances.

Core Municipal Infrastructure Asset: Defined by O.Reg 588/17, any municipal infrastructure asset that is a, Water asset that relates to the collection, production, treatment, storage, supply or distribution of drinking water; Wastewater asset that relates to the collection, transmission, treatment or disposal of wastewater, including any wastewater asset that from time to time manages stormwater; Stormwater management asset that relates to the collection, transmission, treatment, retention, infiltration, control or disposal of stormwater; Road; or Bridge or culvert.

Critical Asset: An asset for which the financial, business, or service level consequences of failure are sufficiently severe to justify proactive inspection, rehabilitation, or replacement, and is considered a municipal infrastructure asset.

Customer: Any person or entity who uses the municipal infrastructure asset or service, is affected by it or has an interest in it either now or in the future.

Direct Levels of Service: Levels of service that are most representative of a municipal service and can be costed over a 10-year projected period.

Green Infrastructure Asset: Defined by O.Reg. 588/17, means an infrastructure asset consisting of natural or human-made elements that provide ecological and hydrological functions and processes and includes natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces and green roofs.

Infrastructure Asset: All or part of physical structures and associated facilities that form the foundation of development, and by or through which a public service is provided to the city, such as highways, bridges, bicycle paths, drinking water systems, social housing, hospitals, courthouses, and schools, as well as any other thing by or through which a public service is provided to the city.

Joint Municipal Water Board: Defined by O.Reg. 588/17, means a joint board established in accordance with a transfer order made under the Municipal Water and Sewage Transfer Act, 1997. Level of Service: The statement that describes the output or objectives the City intends to deliver to its customers.

Maintain Current Levels of Service: is defined as the persistent efforts of an organization to manage its assets through comprehensive lifecycle activities and effectively allocating necessary financial resources with the aim of consistently delivering its services at the current established service levels.

Metrics: Information that supplements levels of service (whether direct, related, or required under Ontario Regulation 588/17). Considered useful but a lagging indicator, meaning they do not readily provide strategic insight or can be easily costed to a municipal service.

Municipal Infrastructure Asset: An infrastructure asset (core and non-core municipal infrastructure assets), including a green infrastructure asset, directly owned by a municipality or included on the consolidated financial statements of a municipality, but does not include an infrastructure asset that is managed by a joint municipal water board.

Public: Residential, commercial, industrial, and institutional partners, and any other party that rely on City owned municipal infrastructure assets.

Related Levels of Service: Levels of service that have a causal relationship with direct levels of service but cannot be easily costed over 10-year projected period.

Replacement Value: The cost the City would incur to completely replace a municipal infrastructure asset, at a selected point in time, at which a similar level of service would be provided. This definition can also be referred to as 'Replacement Cost'.

Tangible Capital Assets (TCA): A legislative reporting requirement specified by Section PS 3150 in the Public Sector Accounting Board Handbook to identify asset inventories, additions, disposals, and amortization on an annual basis.

Acronyms

ABC: Agencies, Boards, and Commissions

AM: Asset Management

AMP: Asset Management Plan

AODA: Accessibility for Ontarians with Disabilities Act

BOD: Biological Oxygen Demand

CAM: Corporate Asset Management

CAM Plan: Corporate Asset Management Plan

CARR RF: Capital Asset Renewal and Replacement Reserve Funds

CCA: Canadian Construction Association

CCTV: Closed Circuit Television

CEAP: Climate Emergency Action Plan

CL: Capital Levy

CPWA: Canadian Public Works Association

CSCE: Canadian Society for Civil Engineering

DC: Development Charges

EMSS: Emergency Management and Security Services

ESA: Environmentally Significant Area

FCI: Facilities Condition Index

FCM: Federation of Canadian Municipalities

GHG: Green House Gases

GIS: Geographic Information System

IT: Information Technology

ITS: Information Technology Services

kW/ML: Kilowatt per Megaliter

LCR: Lifecycle Renewal

LOS: Levels of Service

LID: Low Impact Development

MESL: Maintain Existing Service Levels

m3/sf: Cubic Meters per Square Foot

MHD: Municipal Housing Development

MYB: Multi-Year Budget

O. Reg.: Ontario Regulation

PQI: Pavement Quality Index

RF: Reserve Fund

RV: Replacement Value

SWM: Stormwater Management

SWMF: Stormwater Management Facilities

TCA: Tangible Capital Asset

UCC: Utility Coordination Committee

VFA: Facilities Management Software

For more information visit **london.ca/CAM** or contact
Corporate Asset Management Phone: **519-661-CITY (2489)** Email: **CAM@london.ca**

