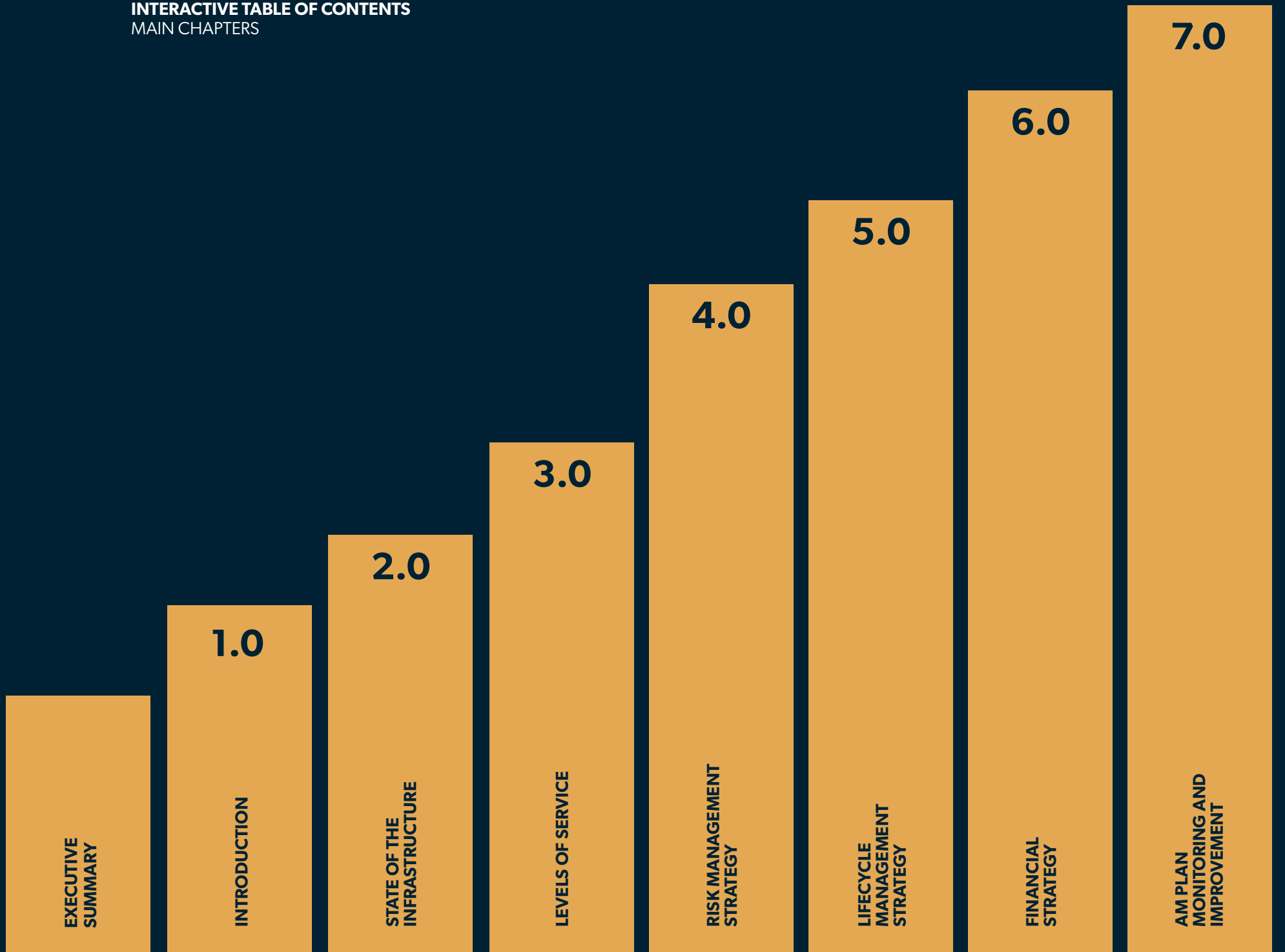
2022 ASSET MANAGEMENT PLAN

orangeville.ca/assetmanagement

Orangeville
Historic Charm Dynamic Future

INTERACTIVE TABLE OF CONTENTS
MAIN CHAPTERS



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ISLAND LAKE
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Executive Summary

Introduction

The Town of Orangeville is an inclusive community that relies on a wide range of assets to deliver a variety of services to its residents, businesses, and visitors. As these assets age and demands on the infrastructure increase, the Town manages the challenge of ensuring the needs of the community are effectively met with the limited resources available. The 2022 Asset Management (AM) Plan describes the actions required for the Town to manage its core portfolio of assets in a way that supports current service levels while managing risks and costs. It establishes transparency and prudent financial management of the Town's limited resources to deliver services, and therefore directly supports three priorities from Orangeville Forward, the Town's Strategic Plan:

- Municipal Services
- Strong Governance
- Sustainable Infrastructure

ISLAND LAKE
CONSERVATION AREA

The Town's goals and objectives of transparent and responsible decision making align with Ontario Regulation (O.Reg.) 588/17 Asset Management Planning for Municipal Infrastructure, which requires municipalities to demonstrate financial sustainability through the AM Plan by identifying the forecasted expenditures to maintain current services levels. This AM Plan fulfils year 2022 requirements for core assets, which is defined as any municipal infrastructure asset that is a road, bridge or culvert, water asset, wastewater asset, or stormwater asset. This AM Plan also covers road-related assets such as sidewalks, streetlights, traffic signals, and traffic signs, which are categorized with roads, bridges, and culverts under the Transportation service.

State of the Infrastructure

The Town's first step in developing the AM Plan is understanding the assets that it owns. As shown in Table ES-1, the estimated replacement value of the Town's core assets is $967.5 million, with transportation assets accounting for 38.7% of the core asset portfolio.

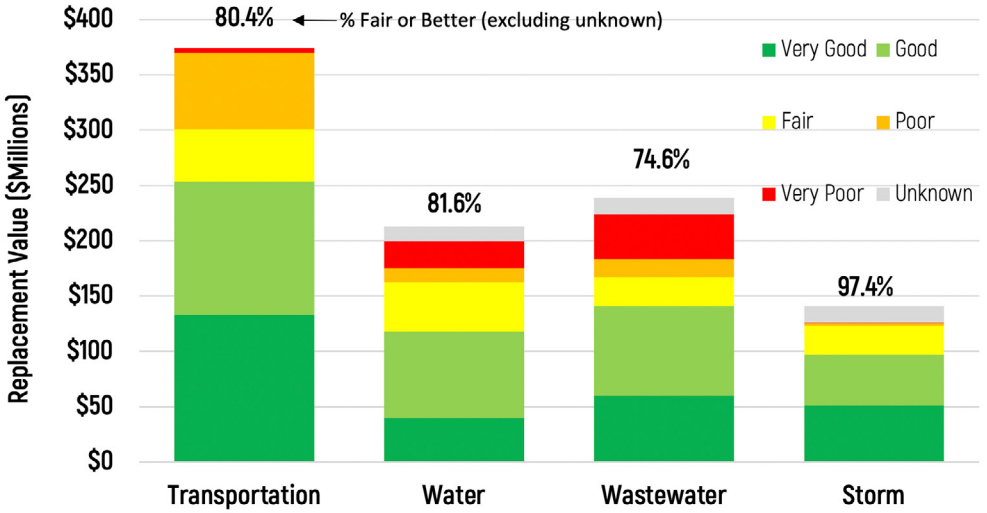
Table ES-1: Replacement Value of Town Core Assets ($M)

Service	Replacement Value	Percentage of Total
Transportation	$374.6	38.7%
Water	$213.2	22.0%
Wastewater	$238.7	24.7%
Storm	$141.1	14.6%
Total	$967.5	100.0%

The Town's core assets are generally in good condition, as shown in the condition distribution in Figure ES-1. 81.6% of the Town's assets are estimated to be in Fair condition or better. Understanding an asset's current condition informs the timing of required lifecycle activities to maintain reliability service levels, with assets in Very Poor condition generally overdue for rehabilitation or replacement.

Water and Wastewater assets currently have a higher proportion of assets in Very Poor condition based on age and estimated service life. These estimates will be improved in accuracy as the Town continues to implement its inspection programs that document observed condition, such as CCTV inspections of sanitary sewers and condition assessments of process equipment at water and wastewater treatment facilities.

Figure ES-1: Condition Overview – All Services



Levels of Service

Levels of Service (LOS) builds on the State of Infrastructure by defining the performance that the Town's assets are intended to deliver over their service lives. LOS measures include those defined by O.Reg.588/17, as well as measures defined by the Town to support achievement of the Town's higher level strategic objectives and sustainable infrastructure goals. In general, the LOS measures can be classified into the following three categories. O.Reg. 588/17 measures for core assets generally focus on Capacity & Use and Reliability LOS.

- Capacity & Use LOS demonstrate if services have enough capacity and are accessible to the customers.
- Functional LOS demonstrate if services meet the community's needs and meet their intended or required purpose.
- Reliability LOS demonstrate if services are reliable and responsive to customers. These LOS measures focus on ensuring that assets are kept in a state of good repair.

Through its Climate Change Adaptation Plan, the Town has recognized the urgency to begin adaptation planning and implementation to build capacity to address projected local climate impacts, as these impacts will have a significant impact on the Town's ability to maintain service levels. The Town has developed infrastructure-related action items to address potential risks due to climate change, and these initiatives will help the Town better understand its service levels related to flooding prevention and resiliency.

Risk Management Strategy

A key asset management principle for the Town is to manage risk while meeting service levels and minimizing lifecycle costs. Understanding the risk exposure from each asset informs prioritization of lifecycle strategies across asset classes and service areas. To understand the current risk exposure of its assets, the Town's preliminary risk strategy estimates the reliability-related risk exposure of its assets, determined from the multiplication of two factors:

Risk Exposure = Consequence of Failure x Probability of Failure

Consequence of Failure, or criticality, is evaluated based on an asset failure's impact on service delivery, health and safety, the environment, the Town's financial position, and the Town's reputation. Probability of failure (PoF) is the likelihood that an asset failure may occur, and is based on the estimated condition of the asset.

For this AM Plan, the Town completed a high-level risk assessment focused on its linear assets (road and road-related assets, bridges and culverts, watermains, water meters, sanitary sewers, storm sewers, and stormwater culverts). $13.6 million (1.7%) of the Town's linear assets are currently in the Very High risk category. These assets consist of larger diameter sanitary sewers and watermains that have reached their end-of-life based on their age. The Town mitigates this risk through its renewal of sewers and watermains, as part of its Lifecycle Management Strategy.

Climate change will likely increase the Town's risk exposure, imposing even greater costs on the Town. The planned initiatives from the Climate Change Adaptation Plan will help identify both current and future potential flooding issues so that additional needed lifecycle strategies can be identified and planned to mitigate capacity-related flood risks to the community.

Lifecycle Management Strategy

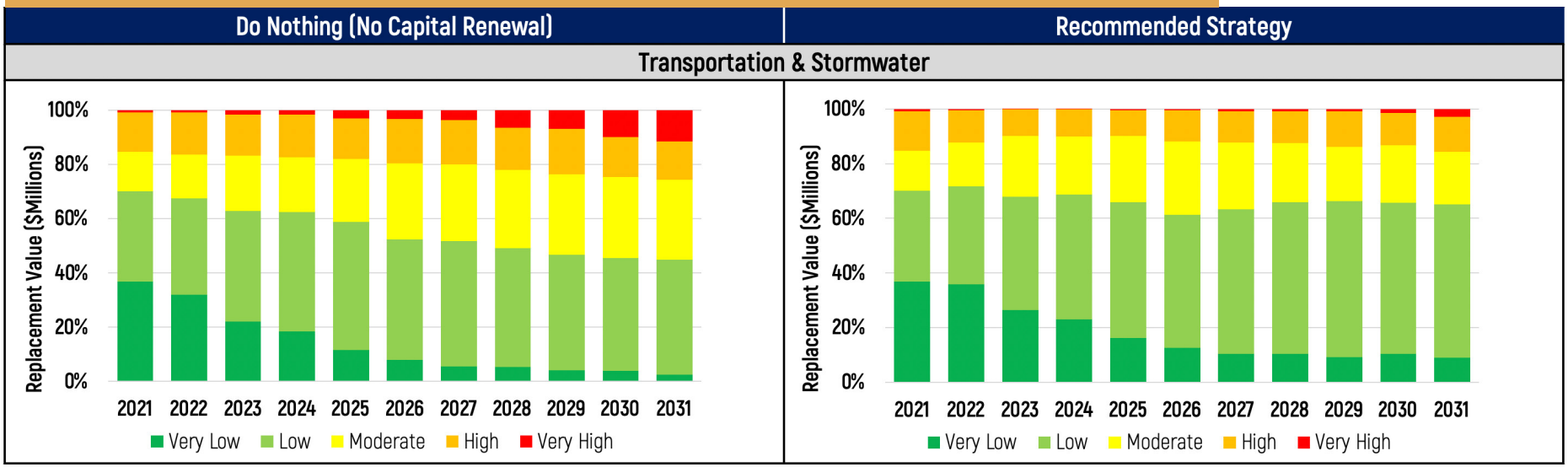
Asset lifecycle management strategies are the planned activities that enable assets to provide service levels in a sustainable way, while managing risks. Lifecycle strategies include new infrastructure assets to meet capacity needs, asset upgrades to meet functional needs, and repairing and renewing existing assets to maintain asset reliability.

The Town performs a wide range of inspections, cleaning, flushing, and repair activities to ensure that its infrastructure continues to perform reliably. These operations and maintenance (O&M) activities are funded through the Town's Operating Budget. Lifecycle activities also include rehabilitation and replacement activities funded through the Capital Budget, such as road reconstructions and pipe replacements that mitigate risks to acceptable levels. Rehabilitation strategies prior to replacements also extend asset service lives and are used to lower overall lifecycle costs.

The forecasted cost for renewal is divided into two forecasts to separate the property tax, reserves, and debt funding for transportation and stormwater assets from the user rates funding for water and wastewater assets. For transportation

and stormwater, the average annual renewal need is estimated at an average of **$7.2 million** per year over the next 10 years. For water and wastewater assets, the estimated average annual renewal need is **$6.5 million** per year. If the Town does not invest in renewing its infrastructure, there is a significant deterioration in asset condition over time. The recommended strategy ensures that the Town's core assets are maintained and renewed in a state of good repair, as shown in Figure ES-2.

Figure ES-2: Asset Condition Forecast Comparison – Do Nothing versus Recommended Strategy



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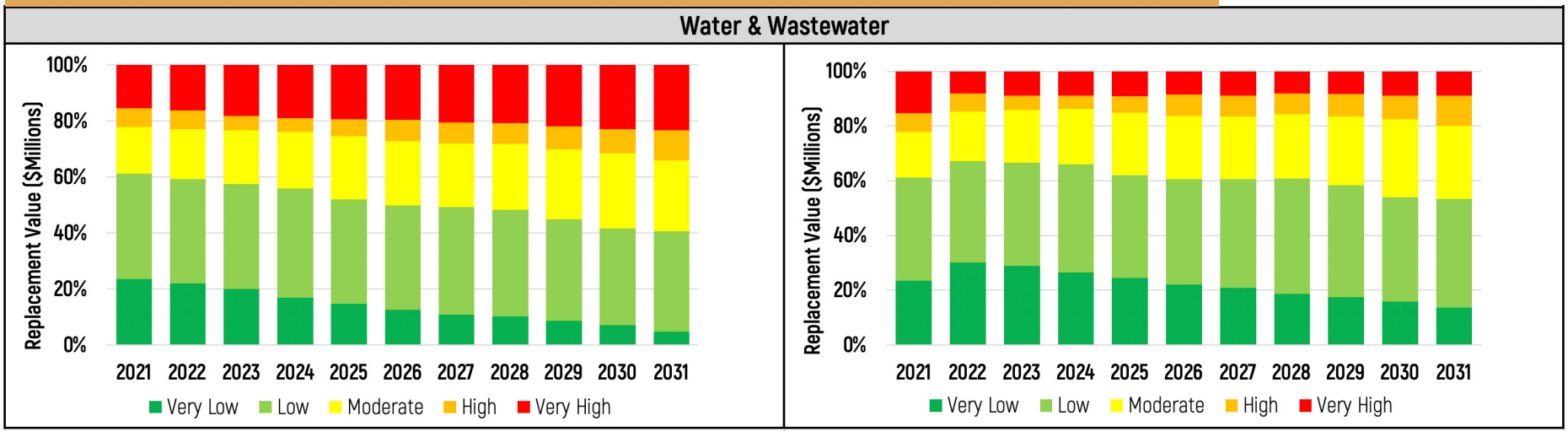


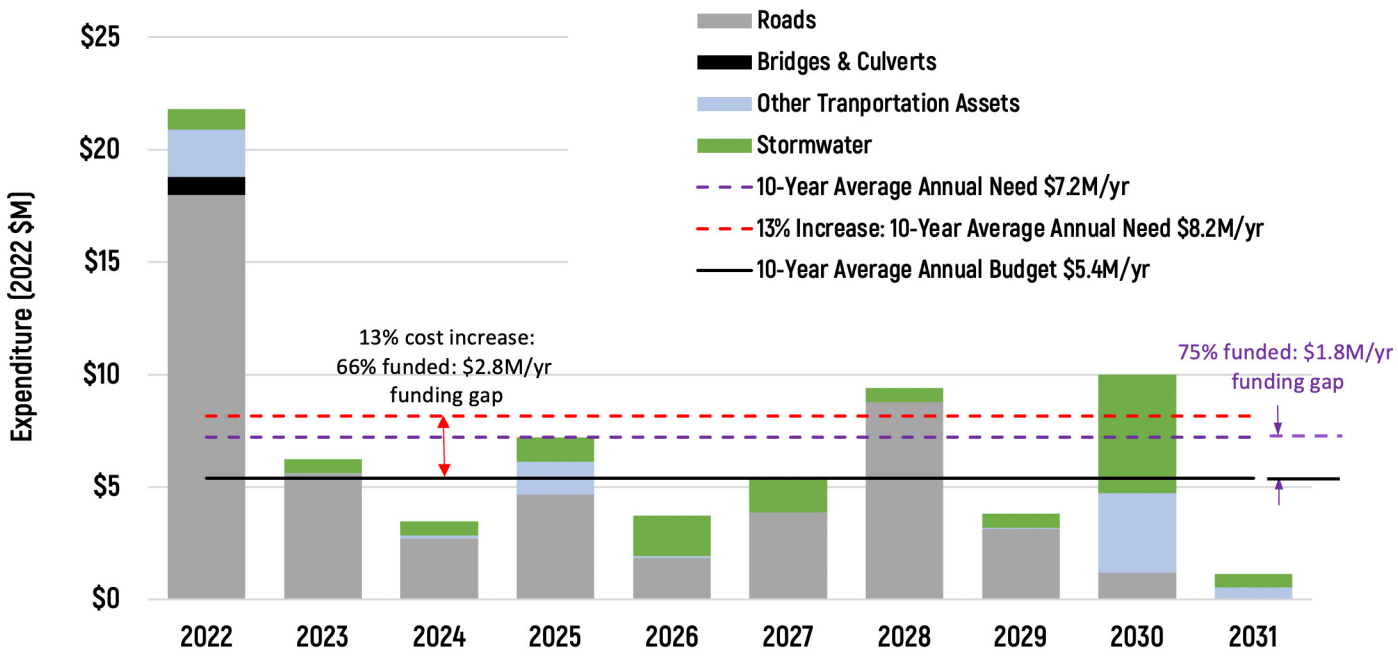
ICE FISHING AT ISLAND LAKE CONSERVATION AREA

Financial Strategy

The financial strategy is informed by the preceding sections of the AM Plan: the value and condition of the assets, the current levels of service, the risks to service delivery, and the lifecycle activities needed to reduce the risks to acceptable levels. The Financing strategy considers how the Town will fund the recommended asset lifecycle strategies, and the affordability of maintaining current service levels.

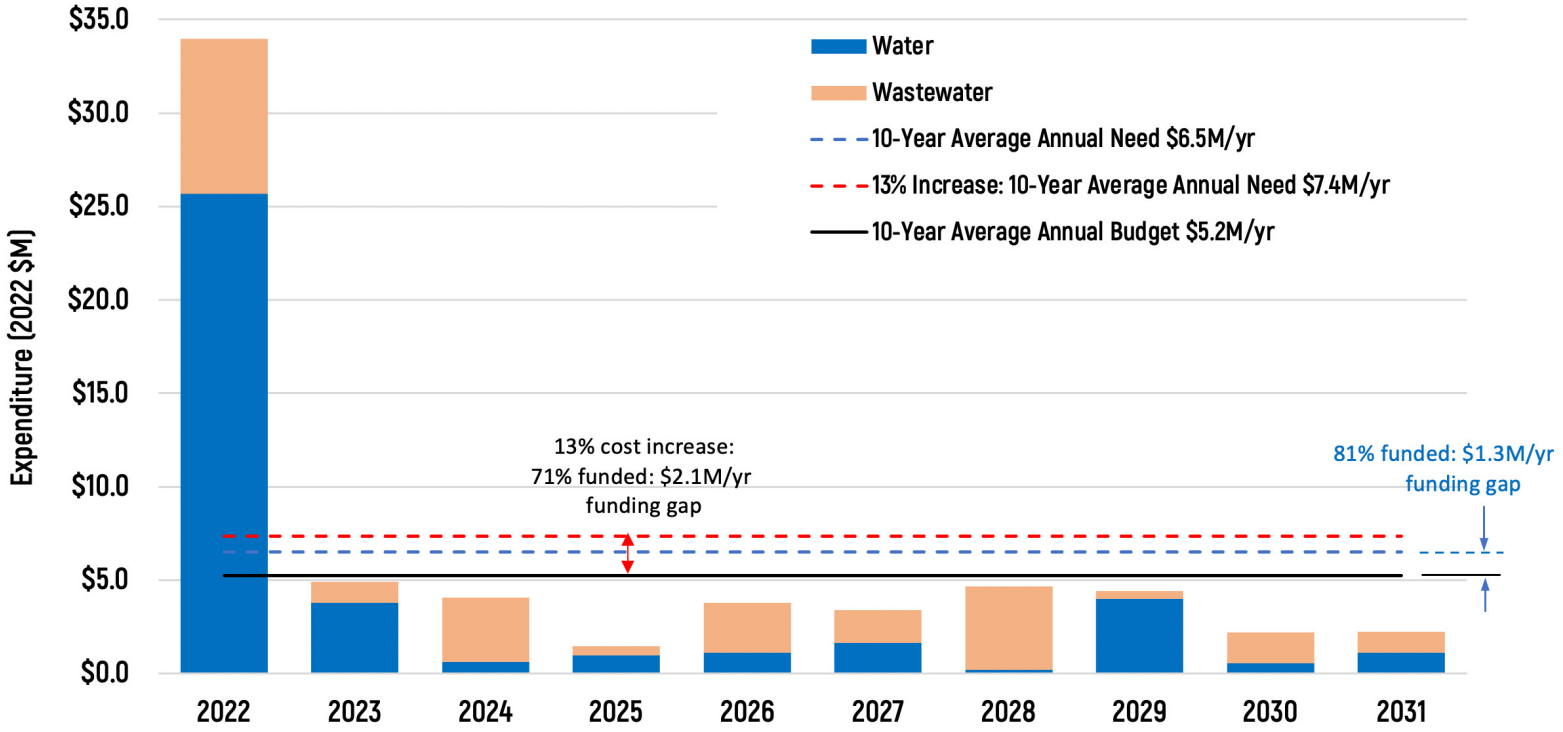
For transportation and stormwater, which primarily relies on **property tax, reserves, and debt**, the total funding available over the next 10 years is $53.9 million, or **$5.4 million** averaged annually. This results in an estimated average annual funding gap of **$1.8 million** per year compared to the estimated **$7.2 million** per year need, and indicates that the asset portfolio for these assets is approximately **75% funded** based on currently available data (refer to Figure ES-3). Figure ES-3 also considers the potential impact of rising costs due to the current and uncertain economic environment. Assuming a 13% increase in 2022 pricing, the average annual gap increases to **$2.8 million** per year.

Figure ES-3: Capital Renewal Funding Gap – Transportation & Stormwater



For water and wastewater assets, the average annual funding available for renewal is **$5.2 million** per year, resulting in an estimated annual funding gap of **$1.3 million** per year over the next ten years compared to the estimated **$6.5 million** per year need (approximately 81% funded based on currently available data). Assuming a 13% price increase in 2022, the estimated funding gap would increase to **$2.1 million** per year.

Figure ES-4: Capital Renewal Funding Gap – Water & Wastewater



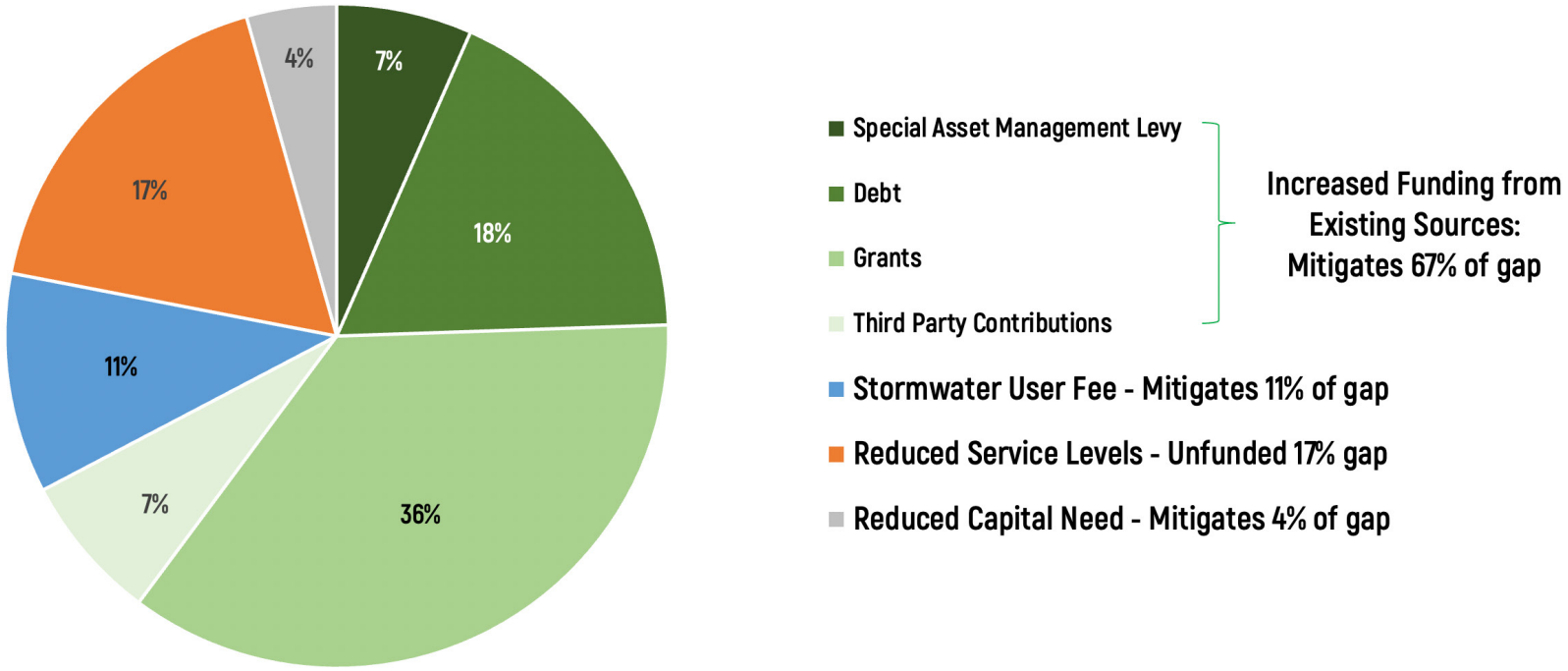
The Town's goals and objectives of transparent and responsible decision-making aligns with O.Reg. 588/17, which requires municipalities to demonstrate financial sustainability through the AM. This AM Plan is proactive in setting the stage for meeting O.Reg. 588/17 requirements for year 2025 by identifying the potential funding shortfalls above. This proactive approach enables the Town to start the needed discussions on the affordability of current service levels such that it will be able to determine the appropriate service levels for the Town by year 2025 that effectively balances the associated costs and risks.

Climate change impacts are adding significant pressures to the existing funding gaps, and municipalities generally do not have enough funding sources to address both the infrastructure gap and climate change risks. To overcome the lack of resources available, some peer municipalities have started to implement user fees for stormwater management. To manage the risks of the funding shortfall, this AM Plan suggests four main categories of options to be considered:

- **Increased Funding from Existing Sources**: Special Asset Management Levy (Property Taxes), Debt, Grants, and Third Party Contributions
- **Stormwater User Fee (New Source)**: user fees for stormwater management, which can range from a simple flat fee to a more complex impervious area measurement by property.
- **Reduced Capital Need**: Additional data collection on the condition of the assets through inspection programs to increase the accuracy of estimated needs; also new and less expensive renewal technologies to extend asset life and lower overall lifecycle costs.
- **Reduced Service Levels**: deferring capital renewal projects on lower risk assets.

The Town can consider elements of each approach to close or accept the funding gap. A preliminary financial strategy is outlined in Figure ES-5 for addressing the higher $2.8 million per year estimated gap for transportation and stormwater assets over the next 10 years. For water and wastewater assets, similar mitigation options will be considered as part of the Town's next iteration of the Water and Wastewater Rates study.

Figure ES-5: Preliminary Financial Strategy – Transportation and Stormwater



Monitoring and Improvement

Improvements for continuing to increase the accuracy of the AM Plan include a more granular inventory of water and wastewater vertical assets and continued implementation of inspection programs such as CCTV sewer inspections, water and wastewater process equipment inspections, and surveys on stormwater ponds. The next AM Plan should also consider the recommendations from on-going and future projects such as various initiatives from the Town's Climate Change Adaptation Plan and upcoming Master Plans.

These and other improvements will continue to refine the 10-year forecasted needs for core assets. The Town will also have a more holistic understanding of overall needs and the funding shortfall when non-core assets are included in the next AM Plan. Development of AM Plans is an iterative process that includes improving data, processes, systems, staff skills, and organizational culture over time, and the Town will continue to work on these initiatives to support the Town's financial sustainability goals and provide continued service delivery to the community.

JOHN STREET BRIDGE REHABILITATION

1.0 Introduction

EVERY KID'S PARK SPLASHPAD, ORANGEVILLE

1.0 Introduction

The AM Plan directly supports three priorities from Orangeville Forward, the Town's Strategic Plan:

1. Municipal Services
2. Strong Governance
3. Sustainable Infrastructure

1.0 Introduction

The Town of Orangeville (the Town) provides a range of services to its residents, businesses and visitors, including core services that include local roads, bridges and culverts, stormwater management, water treatment and distribution, and wastewater collection and treatment.

As infrastructure ages and demands on the infrastructure increase, the Town manages the challenge of ensuring the needs of the community are effectively met with the limited resources available. This Asset Management Plan (AM Plan) seeks to address that concern by providing a framework for prioritizing Asset Management (AM) efforts and providing direction for effective management of the Town's assets to best achieve expected goals and objectives. As an integrated Plan, it considers the lifecycles and needs of the infrastructure assets within the AM Plan's scope, providing a sustainable and holistic view of the Town's asset portfolios. Development of AM Plans is an iterative process that requires improving processes, data, systems, and staff skills over time to continuously increase confidence in the outputs and forecasts of the AM Plan.

The AM Plan directly supports three priorities from Orangeville Forward, the Town's Strategic Plan:

- **Municipal Services**
- **Strong Governance**
- **Sustainable Infrastructure**

1.1 Purpose of the Plan

The 2022 AM Plan describes the actions required to manage the Town's "core" portfolio of assets in a way that supports established service levels, while managing risks and costs. It establishes transparency and prudent financial management of limited resources. The Town's core assets include roads, bridges and culverts, stormwater management infrastructure, and water and wastewater systems. This AM Plan also includes sidewalks and other transportation assets considered an integral part of the roadway. The 2022 AM Plan focuses on the 10-year period from 2022 to 2031 and provides a framework for continuously improving the Town's AM practices.

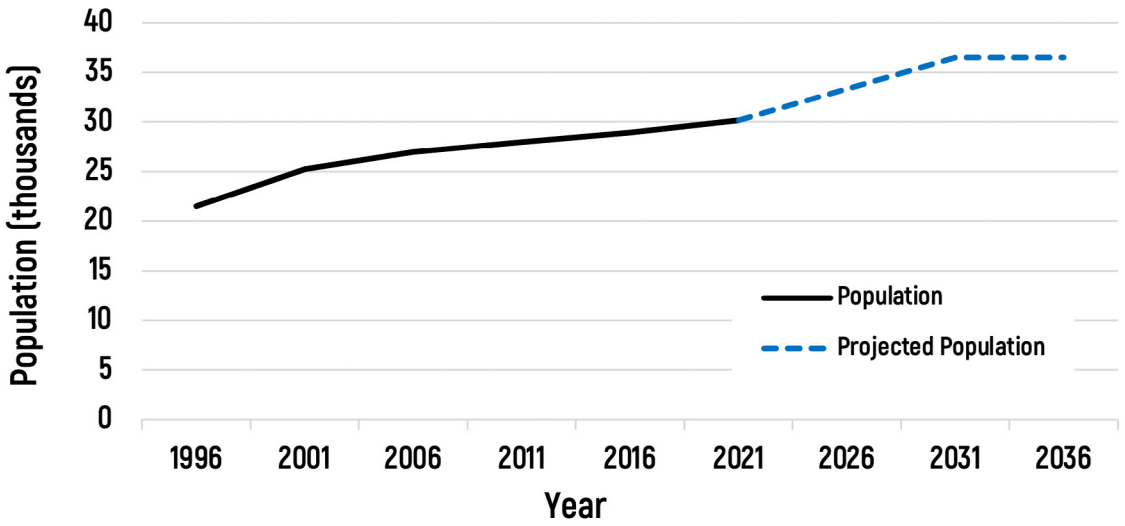
1.2 Alignment with Regulatory Requirements

This AM Plan fulfils the Phase 1 requirements of Ontario Regulation (O.Reg.) 588/17 Asset Management Planning for Municipal Infrastructure for AM Plans for core assets. Specifically, this AM Plan establishes current Levels of Service (LOS) and recommends actions and financial strategies to maintain current service levels within a manageable level of risk over the next 10 years. For details on how this AM Plan complies with content requirements defined by O.Reg. 588/17, refer to Section 7.

1.3 Growth at the Town

The Town monitors trends in its population to ensure that its impacts on service levels are well understood and strategies are developed to address additional demands due to growth and changes in demographics. Per the Town's Official Plan, its population is expected to increase to 36,490 in 2031, as shown in Figure 1-1. Employment was at 14,681 in 2011 and is expected to reach 14,740 jobs by 2031.

Figure 1-1: Town Population History and Forecast to 2031



1.4 Relationship with Other Municipal Documents

The AM Plan provides a framework to validate the Town's budgeting processes and assists in prioritizing work activities, including capital projects, based on risk while supporting the Town's strategic priorities. AM Planning is a key tactical (medium term) planning activity that relies on input from strategic planning activities and informs shorter-term decision making. The AM Plan is intended to be read with other Town planning documents, including the following:

- Town Official Plan
- Orangeville Forward Strategic Plan, including progress updates
- 2021 Annual Report for Water Works
- CTC (Credit Valley – Toronto and Region – Central Lake Ontario) Source Protection Plan
- Corporate Climate Change Adaptation Plan (2021)
- Operating and Capital Budgets

1.5 Scope

This AM Plan includes all core assets owned by the Town and for which asset data was available, and provides recommendations for the period 2022-2031, inclusive. Where data gaps were encountered, recommendations for closing data gaps are provided. These recommendations will enable the Town to continually improve its AM planning capabilities. All values are estimated in 2022 dollars.

1.6 Asset Hierarchy and Data Sources

The AM Plan discusses the Town's assets by the service areas the assets support. Table 1-1 summarizes the service areas and their link to associated assets. It also summarizes the main data sources used for the asset inventory, replacement cost, and condition data.

Table 1-1: Asset Hierarchy and Data Sources

Service	Asset Category	Inventory Source	Replacement Cost	Condition
Transportation	Roads	Road Needs Study and Town Staff Inventory (MS Excel)	Unit Construction Costs	PCI based on Road Needs Study
	Bridges & Culverts	OSIM Report	OSIM Report or inflated historical Citywide cost	BCI based on OSIM Reports
	Traffic Signals	Town Staff Inventory (MS Excel)	Unit Construction Costs	Age-based
	Sidewalks	Town Staff Inventory (MS Excel)	Unit Construction Costs	Age-based
	Streetlights	GIS Inventory	Unit Construction Costs	Age-based
	Traffic Signs	GIS Inventory	Unit Construction Costs	GIS condition attribute
Water	Watermains	GIS Inventory	Unit Construction Costs	Age-based
	Meters	Town Staff Inventory (MS Excel)	Unit Construction Costs	Age-based
	Wells	Citywide	Inflated historical cost	Age-based
	Reservoir & High Lift Station	Citywide	Inflated historical cost	Age-based
	Observation Well	GIS Inventory	Unit Construction Costs	Not assessed
	Sampling Station	GIS Inventory	Unit Construction Costs	Not assessed

Table 1-1: Asset Hierarchy and Data Sources

Service	Asset Category	Inventory Source	Replacement Cost	Condition
Wastewater	Sanitary Sewers	GIS Inventory	Unit Construction Costs	Age-based
	Pumping Station	Citywide	Inflated historical cost	Age-based
	WPCP	Citywide & Town Staff Inventory (MS Excel)	Inflated historical cost	Age-based
Stormwater	Storm Sewers	GIS Inventory	Unit Construction Costs	Age-based
	Stormwater Ponds	Citywide	Inflated historical cost	Age-based

PUBLIC WORKS VEHICLE

1.7 Organization of the Document

The AM Plan is organized to meet the requirements of Ontario Regulation 588/17 (Current Levels of Service) and the Province's "Guide for Municipal Asset Management Plans". The contents of this AM Plan follow the recommended elements of a detailed AM Plan:

Executive Summary

Summarizes key findings and recommendations of the AM Plan.

Chapter 1 – Introduction:

Outlines scope, background information, relationship to other Municipal documents and plans, and applicable legislation

Chapter 2 – State of the Infrastructure:

Summarizes the inventory, condition and remaining life of the assets in the inventory by service and asset type

Chapter 3 – Levels of Service:

Defines levels of service through performance indicators and targets, and outlines current performance

Chapter 4 – Risk Management Strategy:

Defines the framework for identifying critical assets and quantifying risk to enable prioritization of lifecycle activities

Chapter 5 – Lifecycle Management Strategy:

Summarizes the asset management strategies (i.e., planned actions) that will enable the assets to provide the required levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost

Chapter 6 – Expenditure Forecasts and Financing Plan:

Summarizes the financial planning and budgeting associated with asset management planning

Chapter 7 – AM Plan Monitoring and Improvement:

Summarizes the next steps including monitoring of AM Plan implementation progress, and improving future iterations of the AM Plan.

2.0 State of the Infrastructure

INDIGENOUS CROSSWALK, ORANGEVILLE

2.0 State of the Infrastructure

The Town's portfolio of core assets has an estimated replacement value of $967.5 million (2022$). Transportation assets account for 38.7% of the core asset portfolio.

2.0 State of the Infrastructure

2.1 Overview

The Town provides a range of services to its residents, businesses and visitors, including core services that rely on Town roads, bridges and culverts, stormwater infrastructure, water treatment and distribution assets, and wastewater collection and treatment assets. Understanding the assets it owns is the starting point for a municipality to develop a plan for managing them. The replacement value of an asset represents the expected cost to replace an asset to the same functional standard with a 'like for like' new version based on current market conditions and construction standards. Replacement value estimates assume that replacements are conducted as part of planned and bundled capital projects where applicable, rather than as individual unplanned replacements, which would typically be more costly. Table 2-1 provides a breakdown of the replacement value of assets by service area.documented LOS be understood.

Table 2-1: Replacement Value of Town Core Assets ($M)

Service	Replacement Value	Percentage of Total
Transportation	$374.6	38.7%
Water	$213.2	22.0%
Wastewater	$238.7	24.7%
Storm	$141.1	14.6%
Total	$967.5	100.0%

Understanding an asset's remaining life and current condition informs the timing of required lifecycle activities to maintain quality and reliability-related service levels. Observed condition provides a higher degree of confidence in the state of the assets than an age-based analysis and is used in this AM Plan where such data is available. When observed condition data is not availabe, the remaining life is determined by estimating a useful life for each asset and comparing this value to its age. The observed condition, or age-based condition, is then expressed on a Very Good to Very Poor rating scale as defined in Table 2-2, aligned with the International Infrastructure Management Manual's (IIMM) 5-point condition scale.

The Town's portfolio of core assets has an estimated replacement value of $967.5 million (2022$). Transportation assets account for 38.7% of the core asset portfolio.

Table 2-2: Condition Grading Criteria

Condition Grade	Condition Criteria
Very Good	Asset is physically sound and is performing its function as originally intended. Required maintenance costs are well within standards & norms. Typically, asset is new or recently rehabilitated.
Good	Asset is physically sound and is performing its function as originally intended. Required maintenance costs are within acceptable standards and norms but are increasing. Typically, asset has been used for some time but is within mid-stage of its expected life.
Fair	Asset is showing signs of deterioration and is performing at a lower level than originally intended. Some components of the asset are becoming physically deficient. Required maintenance costs exceed acceptable standards and norms and are increasing. Typically, asset has been used for a long time and is within the later stage of its expected life.
Poor	Asset is showing significant signs of deterioration and is performing to a much lower level than originally intended. A major portion of the asset is physically deficient. Required maintenance costs significantly exceed acceptable standards and norms. Typically, asset is approaching the end of its expected life.
Very Poor	Asset is physically unsound and/or not performing as originally intended. Asset has higher probability of failure or failure is imminent. Maintenance costs are unacceptable, and rehabilitation is not cost effective. Replacement / major refurbishment is required.

For this AM plan, condition assessment data was incorporated where available, specifically for:

- Roads, based on the 2020 Road Needs Study Report
- Bridges and Culverts, based on the 2021 OSIM Inspection Reports

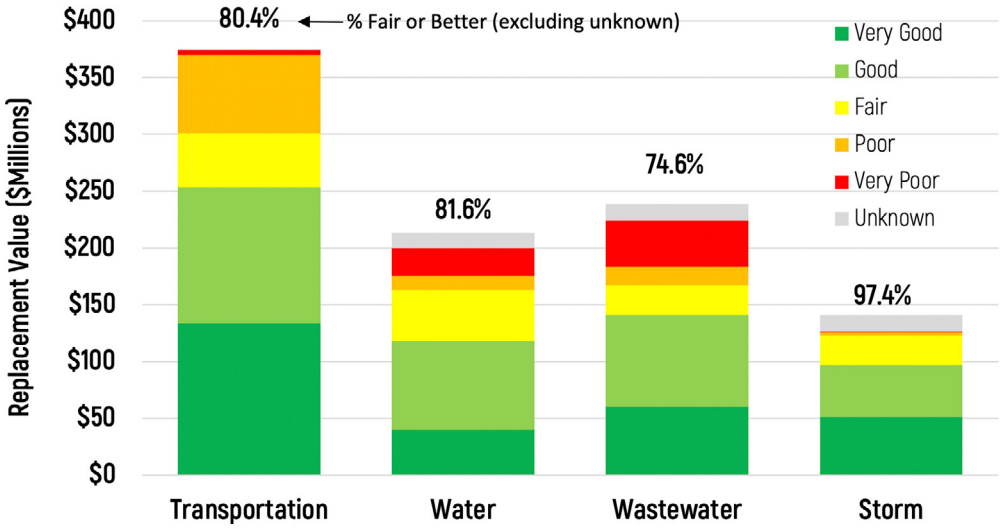
For the remaining assets, condition was estimated based on age and estimated service life. Table 2-3 summarizes how the five-point scores from Very Good to Very Poor were determined from the available asset data, including remaining useful life and the other condition scoring systems, such as Pavement Condition Index (PCI) and Bridge Condition Index (BCI). Condition scores were adjusted based on staff input, as required. Adjustments were made primarily to reflect renewals and repairs completed since the time of the condition assessments.

Table 2-3: Conversion Table for Condition Grades

Condition Grade	% Remaining Useful Life (all asset types)	Pavement Condition Index (roads only)	Bridge Condition Index (bridges & culverts only)	Signs
Very Good	>75 – 100%	90 to 100	85 to 100	Good
Good	>50 – 75%	80 to 89	70 to 84	-
Fair	>25 – 50%	70 to 79	60 to 69	Fair
Poor	>0 – 25%	50 to 69	40 to 59	-
Very Poor	<= 0%	0 to 50	0 to 39	Poor

The condition distribution of the Town's core assets is shown in Figure 2-1. 81.6% of the Town's assets are estimated to be in Fair condition or better and conversely, 18.4% of assets are estimated in Poor or Very Poor condition. Assets in Very Poor condition are overdue or due in the current year (2022) for rehabilitation or replacement. 4.5% ($43.9 million) of assets were not assessed for condition mainly due to missing installation dates for some of the watermains and sanitary and storm sewers.

Figure 2-1: Condition Overview by Services



2.2 Transportation

Transportation assets include roads, bridges and culverts, traffic signals, sidewalks, streetlights, and traffic signs. By value, roads account for $304.6M (79.3%) of the $374.6M estimated replacement value of the Town's transportation assets. Table 2-4 below shows a detailed breakdown of the quantity and estimated replacement value of each asset type within the Town's Transportation asset portfolio. A breakdown of arterial, collector, and local roads is provided in the Levels of Service discussion in Table 3-1 in Section 3.5.1. Most Town roads are urbanized, with approximately 85% of the road network length classified as urban versus 15% categorized as rural roads.

For streetlights, there is a shared responsibility of poles with Orangeville Hydro. The Town owns 100% of the luminaires and it is assumed it owns approximately 70% of the streetlight poles, with the remaining poles owned by Orangeville Hydro. The streetlight replacement value in Table 2-4 represents the Town's portion of asset ownership.

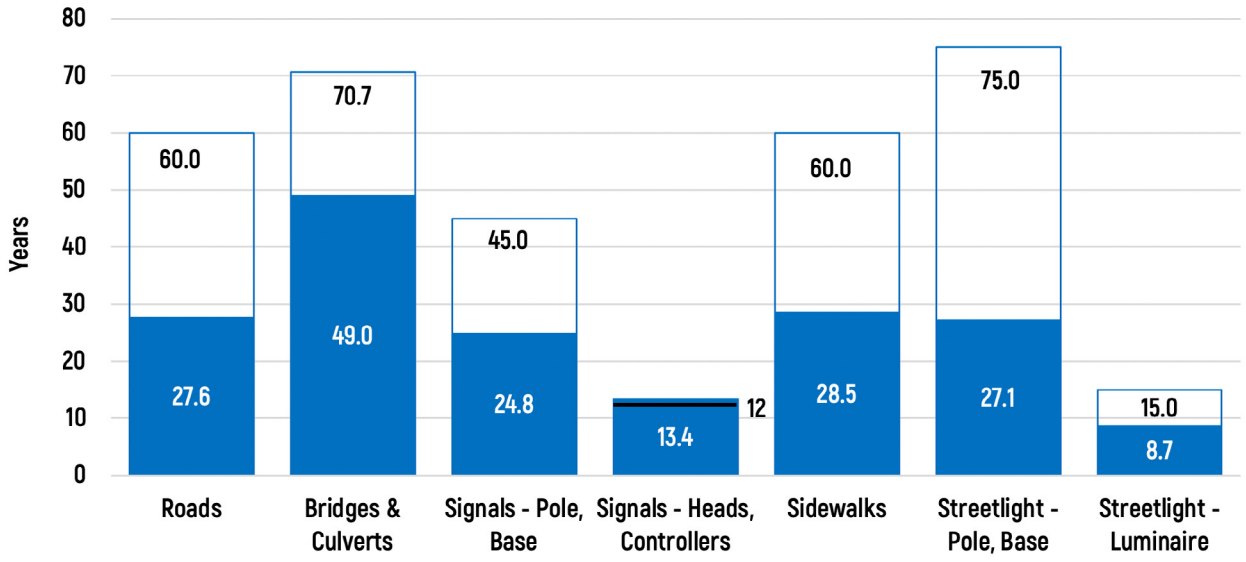
Table 2-4: Inventory of Transportation Assets

Asset Category	Quantity	Unit	Replacement Value ($M)
Roads	122.3	centreline km	$304.6
Bridges & Culverts	15	assets	$15.5
Traffic Signals	24	assets	$5.5
Sidewalks	136.5	km	$32.8
Streetlights	2648	assets	$15.8
Traffic Signs	1839	assets	$0.3
Total			$374.6

2.2.1 Age

The average age and estimated service life of the Town's transportation assets, weighted by replacement value, is summarized in Figure 2-2. On average, the Town's road and sidewalk assets are approaching mid-life, bridges and culverts are past mid-life. For the age analysis, signals are separated for the heads and controllers from the pole and base to show their differing service lives. Similarly, luminaires are separated from the pole and base for streetlight. Signs are replaced regularly as needed through the Operating Budget and their installation dates are not tracked.

Figure 2-2: Average Age – Transportation Assets



2.2.2 Condition

A 2020 Road Needs Study was conducted in 2020 to identify deficiencies in the network and prepare rehabilitation strategies to maintain and upgrade the system. An overall PCI was calculated for each road segment to represent the road condition based on a survey of the number and types of distresses on the pavement. Descriptions for each of the PCI rating categories is provided in Table 2-5.

Table 2-5: Road Pavement Condition Description

Condition Grade	PCI	Road Condition Description
Very Good	90 to 100	The road segment is relatively new, or recently reconstructed. There are no visible cracks and no structural issues. The ride is smooth.
Good	80 to 89	The road segment is starting to exhibit few, if any, signs of surface deterioration, random cracks, and rutting. The ride is relatively smooth.
Fair	70 to 79	The road segment is exhibiting signs of surface deterioration, random cracks, rutting, and some patching of surface defects. The ride is becoming rough.
Poor	50 to 69	The road segment shows signs of deterioration, cracks, rutting, and patching of surface defects that occurs over 50 percent of the surface. Some structural issues are starting to show. The ride is uncomfortable.
Very Poor	0 to 49	The road segment is reaching the end of its useful life. There are significant structural issues with large visible cracks, rutting and patching surface defects that occurs over 75 percent of the surface. The road is difficult to drive at the posted speed limit.

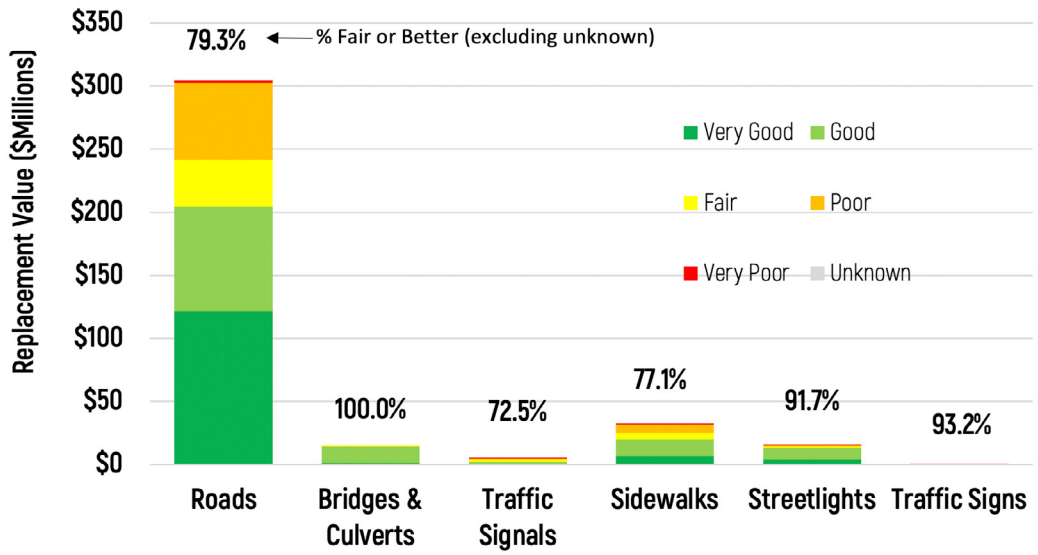
Table 2-6: Bridge and Culvert Condition Description

Condition Grade	BCI	Bridge / Culvert Condition Description
Very Good	85 to 100	Structure condition is as constructed, with no visible deterioration
Good	70 to 84	Minor defects are visible, but these do not affect overall performance and would not normally trigger remedial action. E.g., Light corrosion, light scaling, narrow cracks in concrete.
Fair	60 to 69	Medium defects are visible and may trigger preventive maintenance and remedial action. E.g., Medium corrosion with up to 5% section loss, medium cracks in concrete.
Poor	40 to 59	Medium defects are visible, requiring. E.g., Medium corrosion with up to 10% section loss, medium cracks in concrete.
Very Poor	0 to 39	Severe defects are visible, affecting the overall performance of the structure. E.g., severe corrosion with over 10% section loss, spalling, delamination.

In accordance with O.Reg. 104/97: Standards for Bridges, the Town conducts detailed Ontario Structure Inspection Manual (OSIM) inspections of its municipal structures every two years. An overall Bridge Condition Index (BCI) is calculated from the inspection data and informs the rehabilitation and reconstruction program. Descriptions for each of the BCI rating categories is provided in Table 2-6.

Sign condition data is tracked in the GIS geodatabase on a 3-point condition scale of good, fair, and poor. The asset condition for other transportation assets (sidewalks, signals, and streetlights) is estimated based on age and service life. The condition distribution of the Town's Transportation assets is summarized in Figure 2-3. The figure shows the relative replacement value by asset category, and the proportion of assets by condition grade. Roads are generally in good condition, with 79.3% of road assets in fair or better condition. All bridges and structural culverts are in fair or better condition. The condition for sidewalks was estimated based on age by assuming the installation year was the same as the associated road's construction year.

Figure 2-3: Condition Overview – Transportation



Based on this analysis, sidewalks are generally in good condition. The sign condition profile is not easily visible in Figure 2-3 but 93.2% of signs were estimated to be in fair or better condition.

2.3 Stormwater

Assets that support stormwater management include storm sewers, stormwater management ponds, and stormwater culverts. Appurtenances such as maintenance holes and catchbasins are included in the replacement value of storm sewers. Table 2-7 shows the estimated replacement value of the Town's stormwater management system as $141.1 million, and includes a breakdown of the inventory by asset category. Storm sewers, including maintenance holes and catchbasins, represent 84.2% ($118.9 million) of the portfolio by replacement value. Most storm sewers are concrete, and the diameter is documented for approximately 80% of sewers. For the remaining sewers, a median size of 375mm is assumed for estimating their replacement value. For storm culverts, some assets are pooled or grouped by location in the Citywide inventory and therefore an itemized quantity is not provided. The Town is also currently developing its inventory of ditches, which is currently estimated at 15km.

Table 2-7: Inventory of Stormwater Assets

Asset Category	Quantity	Unit	Replacement Value ($M)
Storm Sewers	124	km	$118.9
Stormwater Management Ponds	22	ponds	$17.6
Stormwater Culverts	-	Pooled	$4.7
Total			$141.1

2.3.1 Age

The average age and estimated service life of the Town's stormwater assets, weighted by replacement value, is summarized in Figure 2-4. On average, the Town's storm sewers and stormwater management ponds are approaching mid-life. For stormwater management ponds, the estimated useful life of 50 years represents the expected lifecycle of pond infrastructure and not the expected frequency for pond cleanout. Stormwater culverts are, on average, past mid-life.

Figure 2-4: Average Age – Stormwater Assets

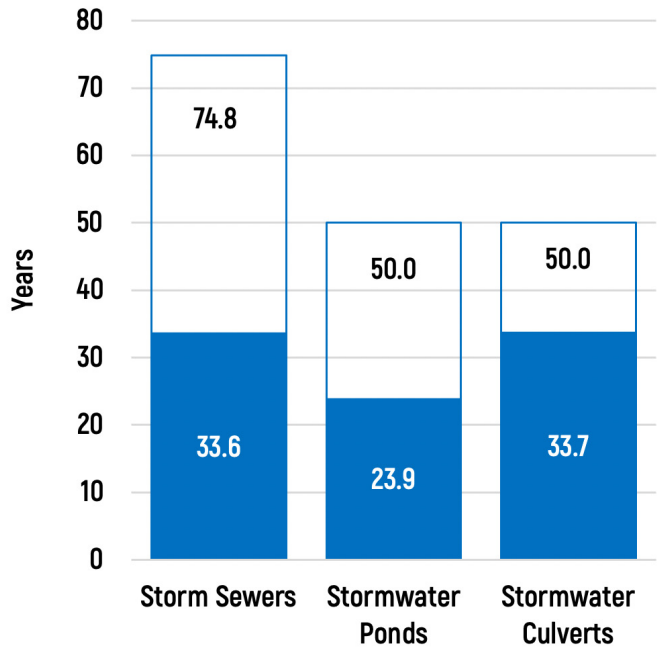
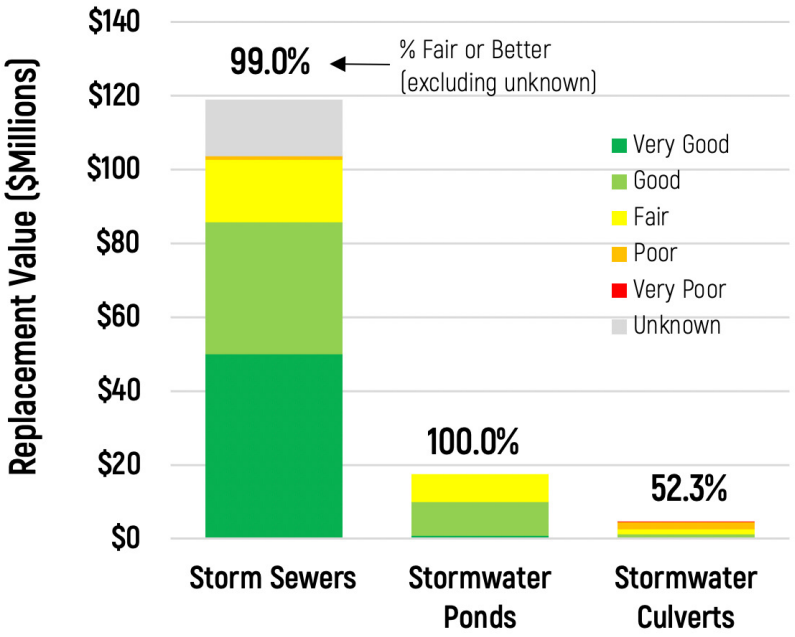


Figure 2-5: Condition Distribution – Stormwater Assets



2.3.2 Condition

The condition for stormwater infrastructure is based on age and the estimated service lives of each asset. Storm sewers are almost all in fair or better condition based on their age, though 12.8% of storm sewer condition is not estimated due to missing installation year data. For stormwater management ponds, the condition estimate in this AM Plan is focused on the physical age of the infrastructure. In the future, the Town will be considering performing bathymetric surveys for sediment levels to understand the cleanout requirements and the condition of the pond from the operating perspective. The bathymetric surveys will assist the Town in meeting Environmental Compliance Approvals for the stormwater network. The condition estimate will also be improved as the Town develops a more granular inventory of the individual assets comprising each pond rather than evaluating the pond as a whole asset. Further discussion on improvement recommendations is provided in Section 7.

2.4 Water

Water services is supported by linear and vertical infrastructure to treat and distribute water to residents and businesses. Assets include watermains, water meters, wells, reservoirs and high lift stations, observation wells, and sampling stations. Hydrants and valves are included in the replacement value of watermains. Table 2-8 shows the $213.2 million estimated replacement value of the Town's water infrastructure and includes a breakdown of the inventory by asset category. Watermains, including hydrants and valves, represent 74.4% ($158.5) of the portfolio by replacement value. The majority of watermains are PVC material and between 150 and 300mm in diameter. The Town has nine well facilities, consisting of six locations with a single well and three locations that have two wells on each site, for a total of 9 facilities and 12 wells.

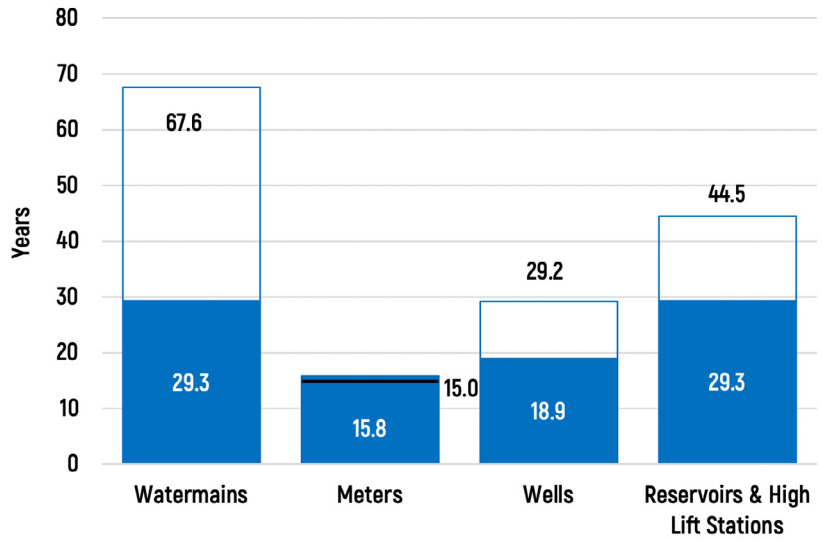
Table 2-8: Inventory of Water Assets

Asset Category	Quantity	Unit	Replacement Value ($M)
Watermains	127.3	km	$158.5
Meters	9847	assets	$2.6
Wells	9	facilities	$26.8
Reservoirs & High Lift Stations	4	stations	$23.3
Observation Wells	70	assets	$1.8
Sampling Stations	34	assets	$0.2
Total			$213.2

2.4.1 Age

The average age and estimated service life of the Town's water assets, weighted by replacement value, is summarized in Figure 2-6. On average, the Town's watermains are estimated at 43% of their service life, while wells and reservoirs and high lift stations are past mid-life. Water meters are, on average, past their 15-year estimated life. Installation year data for observations wells and sampling stations was not available and is therefore not reported in Figure 2-6.

Figure 2-6: Average Age – Water Assets

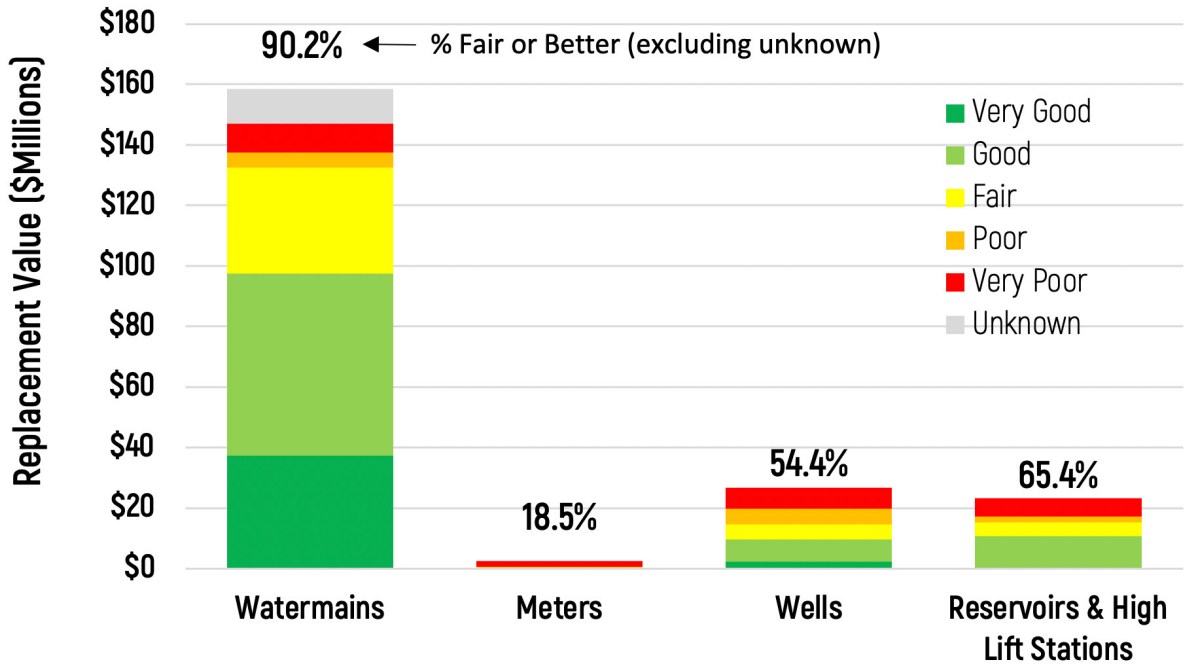


2.4.2 Condition

The condition for water infrastructure in this AM Plan is based on age and the estimated service lives of each asset. 90.2% of watermains that have installation year data are in fair or better condition based on their age. The Town plans to improve its understanding of the condition of its watermains by implementing a district metering program which involves the establishment of District Metering Areas (DMAs) to proactively identify leaks and water losses before they appear at the surface.

As indicated in Section 2.4.1, water meters are generally past end-of-life and are due for replacement. The Town has a major replacement program underway (refer to Section 5.2.2.2 for more details). With the age-based condition analysis, wells and reservoirs and high lift stations have a moderate portion of assets estimated to be in Very Poor condition. A significant portion of the Very Poor reservoir & high lift station assets is comprised of the Standpipe, which will be undergoing a major rehabilitation in 2022. The accuracy of the condition estimates will be improved as the Town develops a more granular inventory for its vertical infrastructure that separates out in more detail the costs and expected service lives for individual assets. Installation years should also be tracked for observation wells and sampling stations. Section 7 further discusses these improvement recommendations.

Figure 2-7: Condition Distribution – Water Assets



2.5 Wastewater

Wastewater services is supported by linear and vertical infrastructure to collect and treat wastewater from residents and businesses. Assets include sanitary sewers, pumping stations, and the Water Pollution Control Plant (WPCP). 4.9km of pressurized sewers are included in the overall sanitary sewer portfolio. Table 2-9 shows the $238.7 million estimated replacement value of the Town's wastewater infrastructure and includes a breakdown of the inventory by asset category. Sanitary sewers, including maintenance holes, represent 71.9% ($171.6) of the portfolio by replacement value. The majority of sewers are 200 to 300mm in diameter and are PVC material. There is also a significant percentage of sewers that are asbestos cement (19.0%) or unknown material (15.1%), which have a shorter estimated service life.

The WPCP inventory is still under development and the $46.3 million replacement value is slightly understated, as some of the costs for the 2017 and 2018 upgrade work is being aligned with the improved granularity of the inventory and will be included in the next update of the AM Plan. This valuation does not impact the forecasting in Section 5 as these newly upgraded assets are not expected to require replacement in the next 10 years.

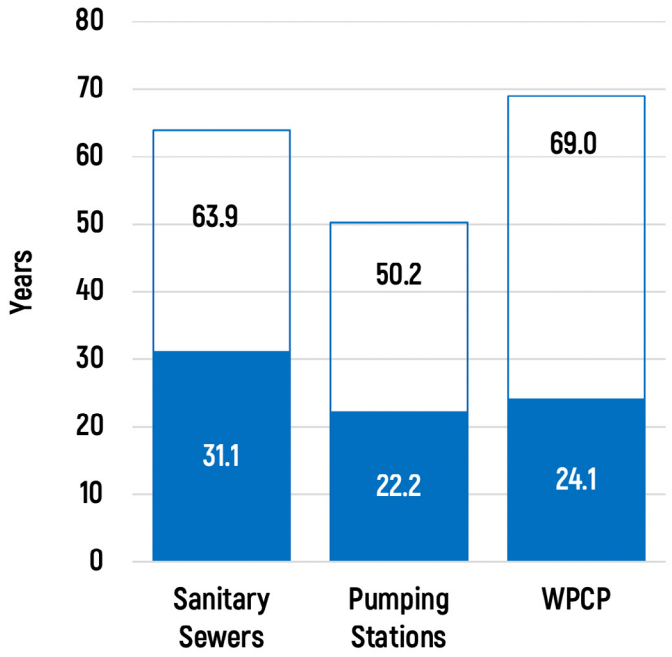
Table 2-9: Inventory of Wastewater Assets

Asset Category	Quantity	Unit	Replacement Value ($M)
Sanitary Sewers	121.1	km	$171.6
Pumping Station	4	stations	$20.7
WPCP	1	plant	$46.3
Total			$238.7

2.5.1 Age

The average age and estimated service life of the Town's wastewater assets, weighted by replacement value, is summarized in Figure 2-8. On average, the Town's sanitary sewers are at mid-life while pumping stations and the WPCP are at 44% and 35% of their estimated service lives, respectively. The estimated average service life of 69 years for the WPCP is influenced by the longer life of larger value structural assets that have 75 to 100 year estimated service lives. Most of the mechanical and electrical assets within the WPCP have an estimated service life ranging from 15 to 30 years.

Figure 2-8: Average Age – Wastewater Assets

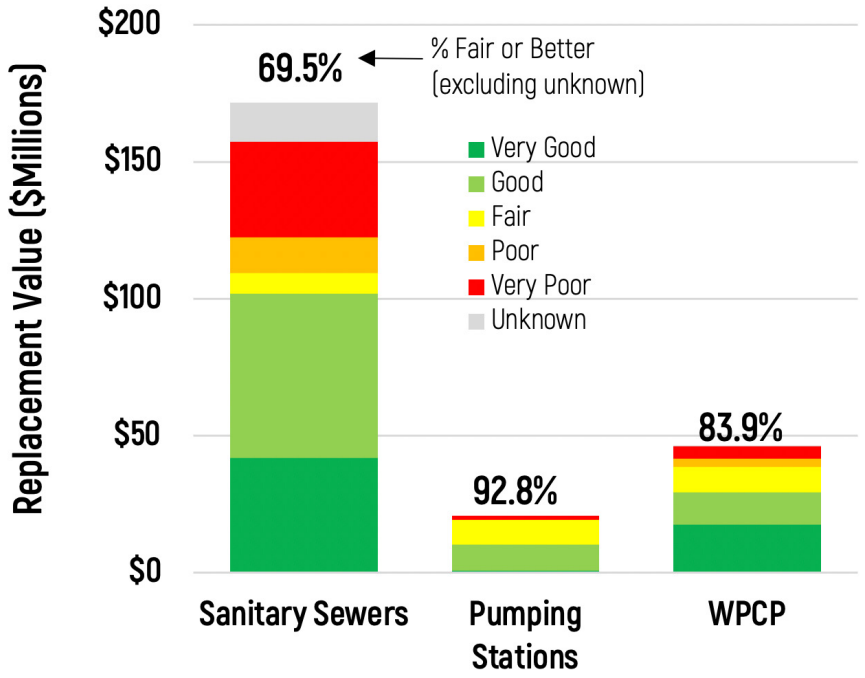


2.5.2 Condition

The condition for wastewater infrastructure in this AM Plan is based on age and the estimated service lives of each asset. 69.5% of sanitary sewers that have installation year data are in fair or better condition based on their age. The Town has initiated a sanitary sewer CCTV inspection program that, when complete, will provide the AM Plan with much more current and accurate condition data than the age-based assessment. CCTV inspections enable the Town to monitor aging sewers and identify problems such as cracks, breaks, sags, and obstructions.

Pumping stations and the WPCP are generally in good condition based on age. Similar to the vertical water facilities, the accuracy of these estimates will be improved as the Town develops a more granular inventory that breaks down in more detail the costs and expected service lives for individual assets. The WPCP underwent significant upgrades in 2017 and 2018, and the WPCP inventory is currently being improved with some added details already incorporated into this AM Plan. Once all upgraded assets are fully costed, these assets would add to the value of Very Good assets in Figure 2-9. In 2022, the Town is also conducting condition assessments on three major process areas within the WPCP to increase its understanding of the condition profile of key infrastructure. Further discussion on improvement recommendations is provided in Section 7.

Figure 2-9: Condition Distribution – Wastewater Assets



3.0
Levels of Service

STORM DRAIN, ORANGEVILLE

3.0
Levels of Service

Developing, monitoring, and reporting on LOS are all integral parts of an overall performance management program which is aimed at improving service delivery and demonstrating accountability to the Town's stakeholders.

3.0 Levels of Service

3.1 Understanding Levels of Service

In the State of Infrastructure Section, the value and condition of the Town's infrastructure assets were discussed. This chapter, Levels of Service (LOS), builds on the previous chapter by defining the performance the Town's assets are intended to deliver over their useful lives. For example, the Town's network of roads is expected to be maintained such that residents can drive throughout the Town while experiencing an expected road smoothness or performance level. LOS are statements that describe the outputs and objectives the Town intends to deliver to its residents, businesses, and other stakeholders.

In general, LOS are guided by a combination of customer expectations, legislative requirements, and internal guidelines, policies, and procedures, and affordability. Effective asset management requires that LOS be formalized and supported through a framework of performance measures, targets, and timeframes to achieve targets, and that the costs to deliver the documented LOS be understood.

Developing, monitoring, and reporting on LOS are all integral parts of an overall performance management program which is aimed at improving service delivery and demonstrating accountability to the Town's stakeholders.

3.2 Line of Sight

Figure 3-1 shows the LOS framework and line of sight from high-level Corporate initiatives to detailed asset-specific Technical LOS. Corporate commitments, along with legislated LOS drive the definition of more specific Community LOS that describe the services that the assets need to deliver to the Town's residents. Community LOS can be categorized as relating to one of the following service attributes:

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

Community LOS are translated into Technical LOS that define asset performance levels, which in turn define asset needs and drive the required lifecycle activities to mitigate risk. As shown in Figure 3-1:

- Capacity & Use LOS drive Growth needs
- Function LOS drive Upgrade needs
- Quality LOS drive Renewal, Operations and Maintenance needs
- Affordability LOS drive Financial Sustainability needs.

Lifecycle management activities balance the cost of service with the risk to meeting service levels. This Line of Sight establishes the connection of how the day-to-day management of Town assets contributes to the success of achieving corporate strategic goals.

CENTRE STREET BRIDGE REHABILITATION

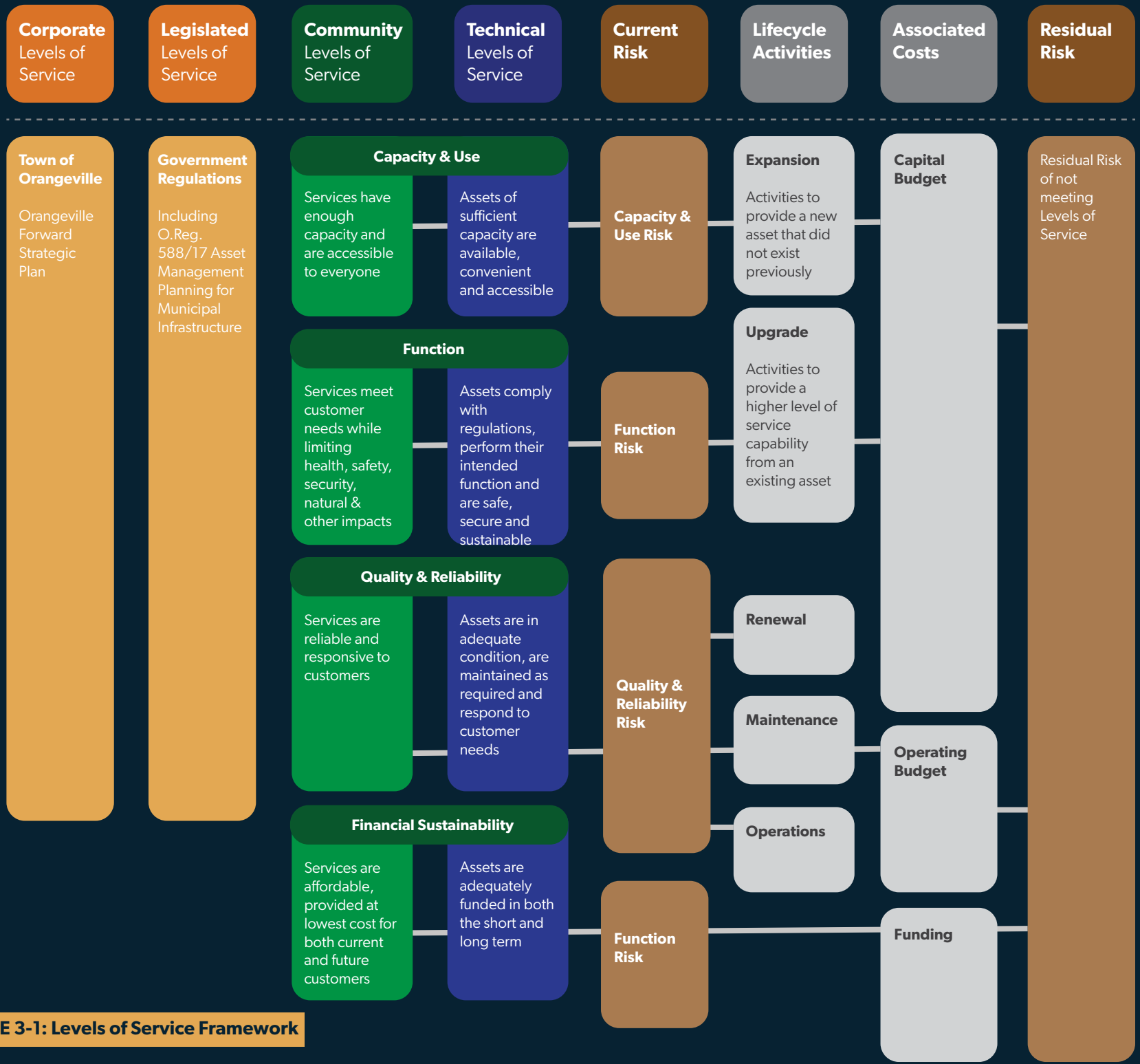


FIGURE 3-1: Levels of Service Framework

3.3 Corporate Levels of Service

The Corporate, or Strategic LOS establish service levels that describe the main vision or objective of service delivery at the Town. Orangeville Forward, the Town's Strategic Plan, defines a common vision for the municipality, identifying priority areas and providing Council and staff with a framework for decision-making. Orangeville Council identified five key priorities during the plan's development to drive the municipality forward over several years. The five Strategic Plan priorities, shown in Figure 3-2 set a framework for the objectives and actions to be pursued in order to maintain and grow Orangeville as a safe, prosperous, and healthy community, and to ensure decisions set a course for the desired future.

In particular, the priorities for Strong Governance and Sustainable Infrastructure have a direct influence on driving transparent asset management processes at the Town. These processes foster fiscal responsibility and help keep town services functional by effectively maintaining infrastructure.

Figure 3-2

3.4 Legislated Levels of Service

Legislated requirements define the standards according to which the Town is legally obligated to provide services to the community, and these standards typically relate to asset safety and reliability. For example, for water, there are applicable drinking water regulations such as the Safe Drinking Water Act; for wastewater, the Water Pollution Control Plant must be operated in compliance with the Environmental Compliance Approval; for Transportation assets, roads maintenance is proposed to meet the Minimum Maintenance Standards and bridges are regulated to be inspected every two years.

3.5 Community and Technical Levels of Service

The Community and Technical LOS discussed in this AM Plan are focused on those required by O.Reg. 588/17, as well as a summary of the percentage of assets in fair or better condition across all asset types. As discussed in Section 3.2, these asset performance measures support achievement of the Town's higher level strategic objectives and sustainable infrastructure goals.

3.5.1 Transportation

Table 3-1 summarizes Community and Technical LOS related to transportation assets. Technical LOS are focused on condition-related Quality measures. Transportation assets are generally performing well, with the majority of assets in fair or better condition.

Table 3-1: Levels of Service – Transportation

Community Levels of Service	Technical Levels of Service	
	Description	2021 Performance
Capacity and Use LOS		
Description of the road network and its level of connectivity*: The Town manages an extensive network of roads that serve a variety of purposes including local access and regional travel. The Town is serviced by a network comprised of regional roads, and the Town's system of arterial, collector, and local roadways. The majority of these roads are local and Town-owned, and provide connections to and within neighbourhoods, commercial sites, and industrial lands. Refer to Figure 3-3 for a map of the road network.	Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality*	Arterial: 0.41 (6.4 km / 15.61 sq.km.) Collector: 5.72 (89.3 km / 15.61 sq.km.) Local: 10.8 (168.6 km / 15.61 sq.km.)
Description of the traffic that is supported by municipal bridges*: The Town's bridges and major culverts have been designed in accordance with the Bridge Design Code current at the time of construction to carry heavy transport vehicles, motor vehicles, emergency vehicles, cyclists, and pedestrians.	Percentage of bridges in the municipality with loading or dimensional restrictions*	None

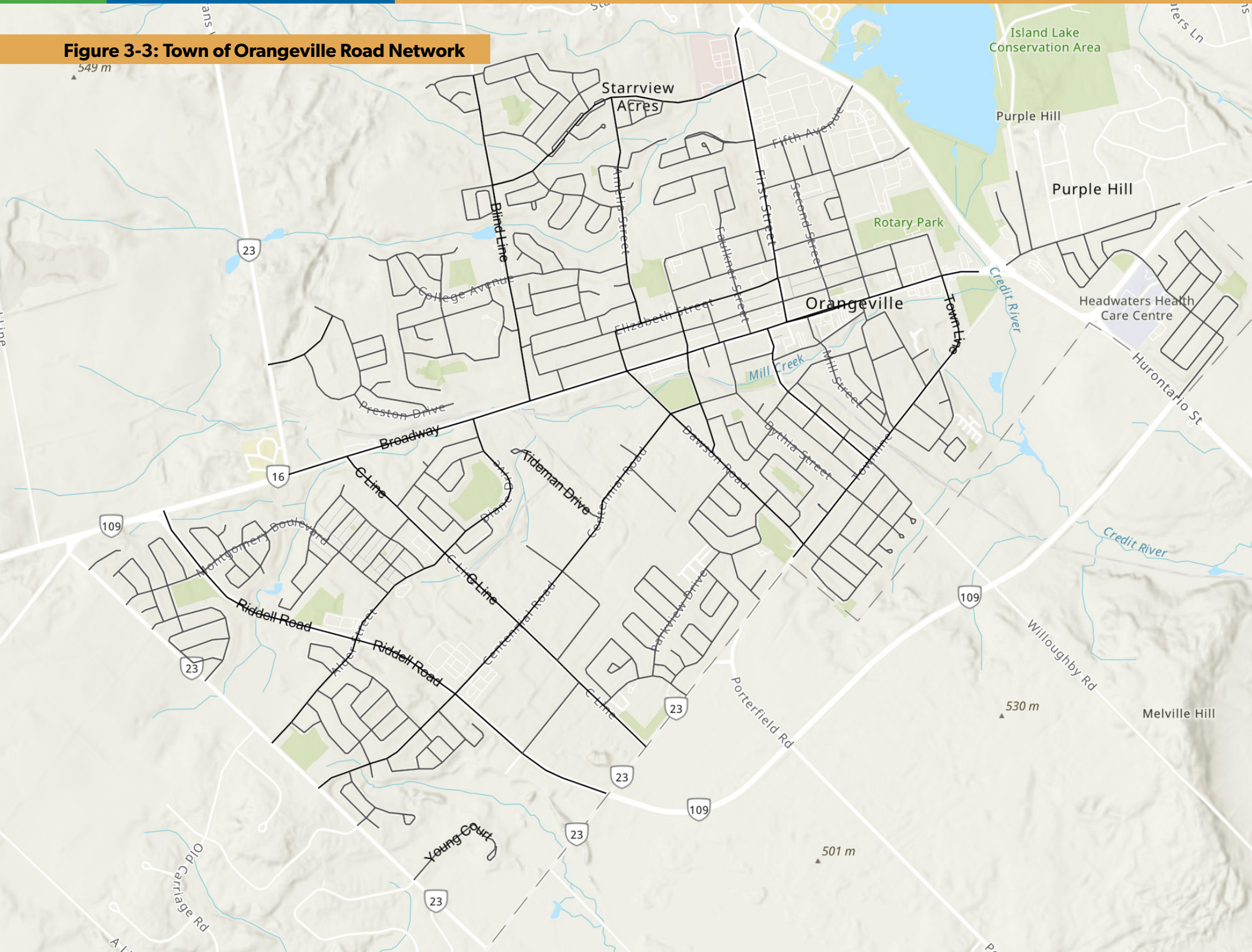
* O.Reg. 588/17 LOS reporting requirement.

Table 3-1: Levels of Service – Transportation

Community Levels of Service	Technical Levels of Service		
	Description		2021 Performance
Quality LOS			
Description/images that illustrate the different levels of road class pavement condition*: Refer to table 2-5	For paved roads in the municipality, the average pavement condition index value*		82.9 (Good condition)
	For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor) *		No unpaved roads (just one unmaintained)
Description/images of the condition of bridges/culverts and how this would affect use of the bridges*: Refer to Table 2-6	For bridges in the municipality, the average bridge condition index value*		76.3 (Good condition)
	For structural culverts in the municipality, the average bridge condition index value*		76.5 (Good condition)
Assets are maintained in a state of good repair	Percentage of assets in Fair or Better Condition	Roads	80%
		Bridges & Culverts	100%
		Traffic Signals	35%
		Sidewalks	77%
		Streetlights	92%
		Signs	93%

* O.Reg. 588/17 LOS reporting requirement.

Figure 3-3: Town of Orangeville Road Network



3.5.2 Stormwater Service

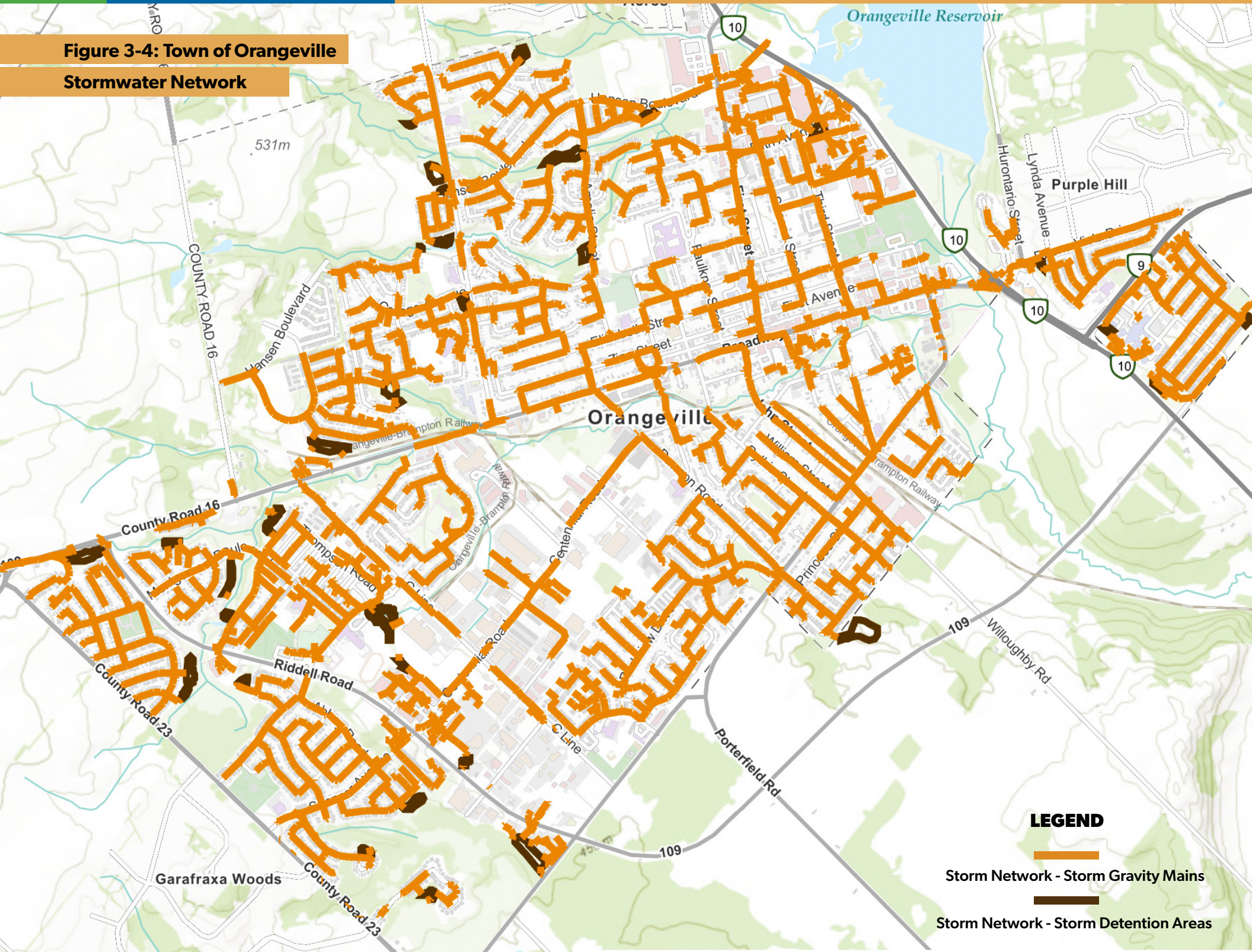
Table 3-2 summarizes Community and Technical LOS related to stormwater assets. O.Reg. 588/17 service measures are mainly focused on flood resiliency. In this AM Plan, the percentage of properties resilient to a 100-year storm was based on floodplain mapping provided by the Conservation Authorities. The network is assumed to be 100% resilient based on Town design standards which require stormwater infrastructure to be designed for a 10-year storm.

Table 3-2: Levels of Service – Stormwater

Community Levels of Service	Technical Levels of Service		
	Description		2021 Performance
Capacity and Use LOS			
Description of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal stormwater management system*: The Town operates stormwater ponds, storm sewers and catch basins to store, direct, and control stormwater runoff. This system improves water quality of runoff into the local waterways and helps prevent flooding and erosion. The Town continues to work on understanding the increasing impacts of climate change and building its flood resiliency through improvements to its built infrastructure. Refer to Figure 3-4 for a map of the stormwater network.	Percentage of properties in municipality resilient to a 100-year storm*		Approximately 99.2% of the total properties
	Percentage of the municipal stormwater management system resilient to a 5-year storm*		100%
Quality LOS			
Assets are maintained in a state of good repair	Percentage of assets in Fair or Better Condition	Storm Sewers	99%
		Stormwater Management Ponds	100%
		Small Culverts	52%

* O.Reg. 588/17 LOS reporting requirement.

Figure 3-4: Town of Orangeville Stormwater Network



3.5.3 Water Service

Table 3-3 summarizes Community and Technical LOS related to water assets. Service disruptions due to watermain breaks are minimized by performing live repairs where possible. In 2021, though there were 11 breaks, two live repairs were performed such that no residents were impacted for those two breaks. The lower performance level of meters and reservoirs in terms of assets in fair or better condition supports the State of Infrastructure discussion for these assets in Section 2.4.

Table 3-3: Levels of Service – Water

Community Levels of Service	Technical Levels of Service	
	Description	2021 Performance
Capacity and Use LOS		
Description of the user groups or areas of the municipality that are connected to the municipal water system*: There are 12 wells that provide water to the Town at nine different locations in and around Orangeville. These wells pump water to nearby water treatment facilities and then into the distribution system, with surplus water stored in four water storage reservoirs. Water is distributed to residents through the 127km watermain network, servicing almost all properties within the Town. Refer to Figure 3-5 for a map of the water network.	Percentage of properties connected to the municipal water system*	99%
Description of the user groups or areas of the municipality that have fire flow*: Fire hydrants are located throughout the community and provide Orangeville Fire with access to water during fire emergencies. The Town has approximately 1100 hydrants servicing both residential and non-residential areas. Almost all properties are located within 90m of a fire hydrant.	Percentage of properties where fire flow is available*.	99.9% (Based on properties within 90m of hydrant)

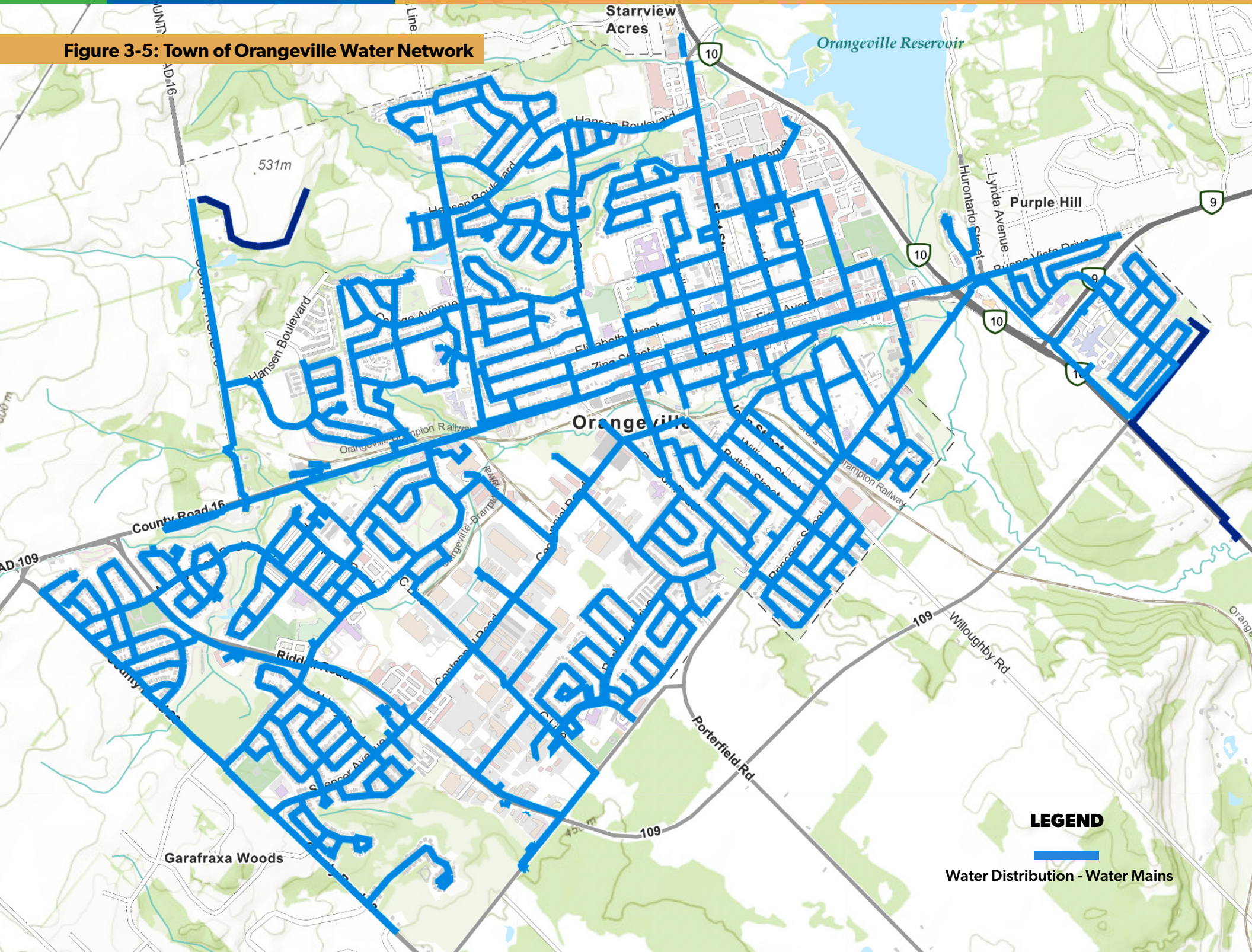
* O.Reg. 588/17 LOS reporting requirement.

Table 3-3: Levels of Service – Water

Community Levels of Service	Technical Levels of Service		
	Description		2021 Performance
Quality LOS			
Description of boil water advisories and service interruptions*: The Town of Orangeville's Quality Management System formalizes an Operational Plan as part of its efforts to ensure that clean, safe and reliable drinking water is supplied to all customers served by the Town. The Wellington-Dufferin-Guelph Health Unit may issue a boil water advisory or other drinking water advisory it if believes that the water from the drinking water system is unsafe for human consumption, and this may be issued for all or a portion of the drinking water system. Other service disruptions are typically caused by watermain breaks and are tracked by the Town and fixed as efficiently as possible to minimize impacts to the community.	The number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system*		Zero
	The number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system*		48 connection-days (one connection-day per ~215 properties)
Assets are maintained in a state of good repair	Percentage of assets in Fair or Better Condition	Watermains (incl. appurtenances)	90%
		Meters	19%
		Wells	54%
		Reservoir & High Lift Station	65%

* O.Reg. 588/17 LOS reporting requirement.

Figure 3-5: Town of Orangeville Water Network



3.5.4 Wastewater Service

Table 3-4 summarizes Community and Technical LOS related to wastewater assets. Backups are indicative of potential issues, and in 2021, the Town only had three wastewater backups that were identified as within Town responsibility.

Table 3-4: Levels of Service – Wastewater

Community Levels of Service	Technical Levels of Service	
	Description	2021 Performance
Capacity and Use LOS		
Description of the user groups or areas of the municipality that are connected to the municipal wastewater system*: Almost all properties have their wastewater collected through the Town's 115 km network of sanitary sewers. The system transports sewage and wastewater to the water pollution control plant for treatment. Refer to Figure 3-6 for a map of the wastewater network.	Percentage of properties connected to the municipal wastewater system*	99%
Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes*: Surface water and groundwater can enter the sewage collection system and can cause surcharging, basement flooding, sewer bypasses, and reduced treatment efficiency at the plant. Inflow may occur through major defects in roof drains, foundation drains, manholes, and pipes. Infiltration occurs when the groundwater level rises above the elevation of the collection system, and can occur at damaged service connections, joints, and pipes.	The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system*	3 connection-days (one connection-day per ~3435 properties). Note: estimated one-day duration per backup
Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described above*: To reduce the potential for inflow and infiltration, the Town maintains its assets in a state of good repair through rehabilitation and repair work. The Town also plans to conduct CCTV inspections to improve its understanding of defects that may exist in the sewer collection network.		

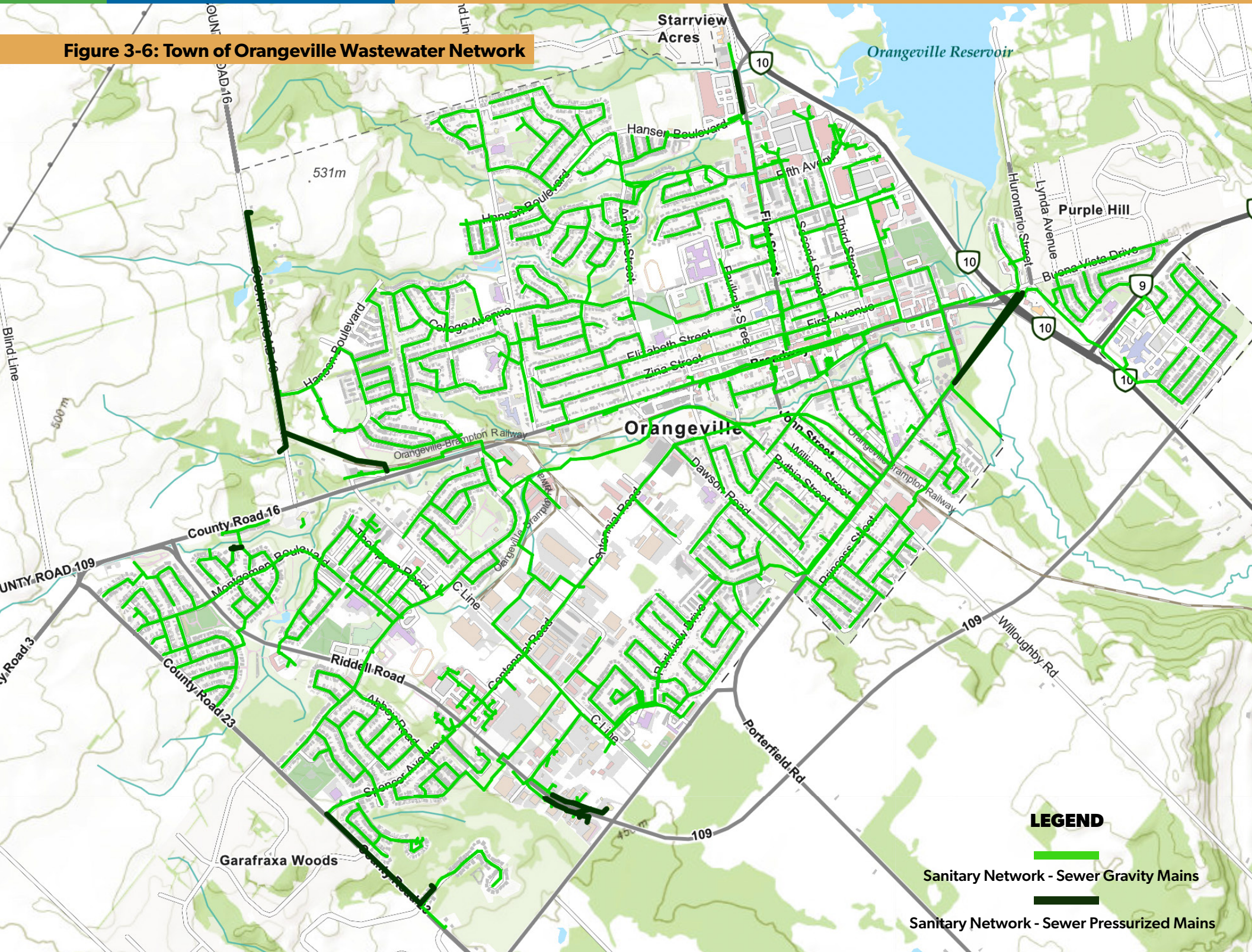
* O.Reg. 588/17 LOS reporting requirement.

Table 3-4: Levels of Service – Wastewater

Community Levels of Service	Technical Levels of Service		
	Description		2021 Performance
Quality LOS			
Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system*: The Water Pollution Control Plant is a pre-denitrification activated sludge facility with a design capacity of 17,500 m3/day. It is operated according to its Environmental Compliance Approval which specifies effluent objectives for various parameters including Total Suspended Solids, Total Phosphorous, Total Ammonia Nitrogen, Total Nitrogen, E.Coli, and pH.	The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system*		(One violation)
Assets are maintained in a state of good repair	Percentage of assets in	Sanitary Sewers	70%
	Fair or Better Condition	Pumping Stations	93%
		Water Pollution Control Plant	84%

O.Reg. 588/17 LOS reporting requirement

Figure 3-6: Town of Orangeville Wastewater Network



3.6 External Trends and Issues Affecting Levels of Service

The Town's ability to maintain current service levels may be impacted by external trends and factors. Future updates to the AMP will consider such factors as they occur and incorporate them into the reporting and setting of appropriate service levels.

- Demographic Factors: Population and employment changes can impact the intensity and frequency of infrastructure use, resulting in the need for additional infrastructure or more frequent asset renewal strategies.
- Social and Economic Factors: Increases in environmentally conscious behaviour and attitudes among residents and businesses can lead to infrastructure that lasts longer and is more efficient. From an economic perspective, higher costs due to increases to the cost of materials and energy can reduce the ability to maintain the same level of service.
- Technological Factors: Changes in technology or asset construction, operation, or maintenance methods may lead to the replacement of obsolete equipment or materials, helping to achieve higher quality service levels and better cost efficiencies over the asset lifecycle.
- Regulatory Factors: As a lower-tier municipality, the Town is subject to various policies, programs, and legislative decisions issued by other levels of government (i.e. federal, provincial, and regional), and such legislative changes can impact the Town's strategic direction and demand for services. Specific asset-related legislation such as Environmental Compliance Approvals can also impact the required performance levels of assets.

- Environmental Factors: As part of its Climate Change Adaptation Plan, the Town has identified potential impacts due to climate change and developed in-frastructure-related action items to address these impacts. These initiatives will help identify both current and future potential flooding issues so that lifecycle strategies can be identified and planned to mitigate risks to the community. Service levels related to flooding prevention and resiliency will therefore be better understood as these initiatives are completed by the Town

The Town has recognized the urgency to begin adaptation planning and implementation to build capacity to address the projected local climate impacts. Through strategic planning and implementation, the Town will work to ensure the delivery of its services remain environmentally, economically, and socially responsible, despite changes in the climate.

WINTER AT KAY CEE PARK, ORANGEVILLE

4.0

Risk Management Strategy

WATER FACILITY, ORANGEVILLE

4.0
Risk Management Strategy

4.0 Levels of Service

4.1 Overview

A key asset management principle for the Town is to meet service levels and manage risk, while minimizing lifecycle costs. The relative importance of the assets to support service delivery, referred to as asset criticality, is a key driver in the selection of the most appropriate asset management strategy for each asset. Critical assets include assets that are key contributors to performance and have the highest consequences of failure to provide required service levels.

Risk events, such as an asset's failure in capacity, function, or reliability, are events that may compromise the delivery of the Town's strategic priorities. Lifecycle activities are used to manage the risk of failure by reducing the likelihood of asset failure to acceptable levels. The impact of asset failure on the Town's ability to meet its strategic priorities informs the type and timing of lifecycle activities.

The Town's preliminary risk strategy estimates the risk exposure of its assets to inform prioritization of projects across asset classes and service areas. Risk exposure is the multiplication of two factors:

RISK EXPOSURE = CONSEQUENCE OF FAILURE X PROBABILITY OF FAILURE

The criticality or consequence of failure (CoF) is the direct and indirect impact on the Town if an asset failure were to occur, and the probability of failure (PoF) is the likelihood that an asset failure may occur.

4.2 Consequence of Failure

The focus in this section is on asset criticality or consequence of failure which reflects the importance of an asset to the Town's delivery of services. The following impacts of a potential asset failure are considered:

Financial: damages to Town infrastructure or private property, loss of Town revenue, and fines.

Health and Safety: the ability to meet health and safety related regulatory requirements, as well as the degree and extent of potential injury, ranging from negligible injuries to loss of life. Service Delivery: covers of the number of customers affected by service disruption, the type of service lost (essential versus non-essential), and length of service disruption.

Reputational: consists of negative media, and or reduced trust / confidence in the Town.

Environmental: acknowledges the length and extent of damages to the natural environment.

Table 4-1 summarizes the above listed impacts against an asset criticality rating scale from 1 to 5, with a higher score reflecting a higher consequence of failure.

DAWSON ROAD CONSTRUCTION

Table 4-1: Asset Criticality (Consequence of Failure) Rating Scale

Consequence Categories (Triple Bottom Line)		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Extreme
Economic	Financial	Insignificant financial impact. Absorbed in normal business operation.	Low financial impact. Absorbed in normal business operation.	Moderate financial impact. Notable change to operating budget.	Significant financial impact requiring additional funding.	Significant financial impact requiring additional current and future expenditures.
Social	Health & Safety	Potential for minor injury or affects to health with no medical attention needed.	Minor injury or a few isolated cases affected health with minor short-term medical attention required.	Potential for moderate injury or affects to health. May affect many individuals and / or hospitalization may be required for a short period of time.	Potential for serious injury or affects to health such as long-term disability. Emergency hospitalization required for one or more individuals.	Potential for death or multiple deaths with probable permanent damage; or Emergency and long-term hospitalization required for several individuals.
	Service Delivery	Negligible service impact	Some customers affected but adverse impact is low and for a short period of time.	A notable number of people adversely affected for a short period of time.	Significant number of customers adversely affected for a short period of time, or a smaller number of customers affected for a long period. Or loss of essential service for short period of time.	Majority of customers adversely affected, or loss of services for a very long period of time. Or loss of essential service for moderate or long periods of time.
	Reputational	No Media Exposure	Minor public concern that can be handled within normal business operation.	Moderate public concern, with media release likely required.	Involvement of Provincial government but no legal issues.	Provincial (or Federal) involvement and possible legal issues.
Environmental	Environment	Negligible impact to natural environment.	Minor recoverable impact to natural environment.	Some environmental damage, with short term impacts.	Medium to long-term environmental damage requiring immediate intervention.	Significant environmental damages with long-term effects.

The above criticality profiles enable risk to be incorporated into the development of the asset management strategies. More critical assets are prioritized for expansion, inspection, cleaning, maintenance, and renewal, depending on their current and forecasted performance.

4.3 Risk to Levels of Service

Asset risk may be associated to one or more aspects of failure across the levels of service attributes discussed in Section 3.2:

- **Capacity and Use**: Asset may have failed to provide sufficient capacity in terms of availability, convenience, or accessibility
- **Function**: Asset may have failed to comply with regulations, perform its intended function, or is no longer considered sustainable due to factors such as obsolescence
- **Quality/Reliability**: Asset may have failed due to deteriorated physical condition.

4.3.1 Risk to Capacity LOS

As indicated in Section 1.3, over the past few years, the Town has experienced steady growth, and carefully plans for continued growth to provide and preserve a welcoming environment for residents, businesses and visitors. The Town mitigates capacity-related risks by assessing the need for additional infrastructure and planning for additional infrastructure assumed by the Town through developments. Additional infrastructure needs are assessed through studies such as the 2019 Development Charges Background Study and service area plans such as the Town's planned Transportation Study currently scheduled for 2024. Projects to address known capacity issues are currently scheduled in the Town's 10-year Capital Budget, such as Townline road widening south of Broadway. For water services, a new 5,300 m3 elevated water storage facility in the Northwest Sector is planned for 2025. These and other lifecycle activities to address capacity service levels are discussed further in Section 5.2.1.

4.3.2 Risk to Function LOS

The Town also plans for service improvements to functional service levels while balancing these risks against capacity and reliability-related needs. New services or service enhancements

currently planned over the next 10 years include realignment of Third Street and Fourth Avenue to eliminate the existing offset intersections, which can cause traffic confusion and undue delays. Some projects address multiple service levels, such as Blindline upgrades, which involves upgrading the road to a full 3-lane as well as urbanizing the section from Hansen Boulevard to the corporate limits with a curb, sidewalk, and storm sewer. Town upgrade projects that address risks to asset functional service levels are discussed further in Section 5.2.1.

4.3.3 Risk to Service Reliability

The Reliability Level of Service refers to maintaining Town assets in a state of good repair to reduce the incidence of unplanned service interruptions due to poor asset condition. Depending on the asset, unplanned failures can have wide-ranging consequences including service disruption, damage to surrounding infrastructure and property, risks to public safety, and environmental impacts. Probability of Failure is estimated based on the condition of the asset from Section 2 (State of Infrastructure), as shown in Table 4-2.

Table 4-2: Probability of Failure Ratings for Reliability

PoF Rating	PoF Description	Corresponding Asset Condition
1	Rare	Very Good
2	Unlikely	Good
3	Moderate	Fair
4	Probably	Poor
5	Almost Certain	Very Poor

CoF is estimated based on the expected impact of an asset failure using the rating scale provided in Table 4-1. For this AM Plan, a high-level assessment was completed on the Town's linear assets by assigning CoF ratings to groups of assets, categorized based on attributes such as road class (arterial, collector, local).

After estimating asset criticality and probability of failure, the results were plotted on a risk map (Figure 4-1) to show a visual representation of risk exposure across the Town's assets. Colours on the map denote various levels of risk and help to prioritize the Town's resources, time, and effort for renewal activities.

- **Very High** risks in the light red zone are significant to the Town and therefore should be actively managed and monitored in a more comprehensive and/or immediate manner than other risks (i.e., prioritized).
- **High and Medium** risks in the orange (high) or green (medium) zones should also be actively managed or be identified for potential mitigation soon.
- **Low and Very Low** risks that appear in the light blue (low) or grey (very low) zones are acceptable without significant mitigation strategies being implemented, although monitoring may still be beneficial.

Current Reliability Risk: For this AM Plan, the Town completed a high-level risk assessment focused on its linear assets (road and road-related assets, structures, watermains, water meters, sanitary sewers, storm sewers, and stormwater culverts). As shown in Figure 4-1, $13.6 million (1.7%) of the Town's linear assets are currently in the Very High risk category. These assets consist of larger diameter sanitary sewers (400mm and greater) and watermains (250mm and greater) that have reached or past their end-of-life based on their age. The Town mitigates this risk through its renewal of sewers and watermains, discussed further in Section 5.2.2.2. The Town's CCTV inspection program also addresses risk by enabling the Town to refine the sewer risk estimates. Actual observed condition improves the accuracy of the probability of failure assessment.

Figure 4-1: Current Reliability Risk – Linear Assets (by Asset Replacement Value in 2022 $M)

PoF						Risk Category	Replacement Value	%
5	$1.9	$16.3	$18.9	$13.6	$0.0	Very High	$13.6	1.7%
4	$0.6	$27.8	$47.3	$14.6	$0.0	High	$33.5	4.2%
3	$0.5	**$37.6**	$59.3	$11.0	$0.0	Moderate	$74.7	9.5%
2	$1.3	$123.4	**$124.0**	$28.8	$0.0	Low	$279.7	35.5%
1	$0.1	$173.7	$75.2	$12.7	$0.4	Very Low	$387.5	49.1%
	1	2	3	4	5	**Total**	**$789.0**	**100.0%**
			CoF					

Vertical assets such as wells, reservoirs and high lift stations, pumping stations, and the WPCP were assigned preliminary CoF ratings at the facility level, as summarized in Table 4-3, but not assessed for risk. As the Town develops a more granular inventory at each of its water and wastewater facilities, a similar risk assessment to the linear assets in Figure 4-1 can be performed on those assets. Currently, the Citywide inventory maintains vertical assets in grouped categories, such as all mechanical equipment at a given pumping station. A more detailed breakdown of the mechanical equipment such as individual pumps and HVAC equipment at the facility will enable a risk analysis at the asset level that recognizes the difference in criticality based on the asset type, in addition to the criticality of the facility itself. Based on the high-level criticality assessment, the Town should generally prioritize work on assets that affect service delivery at the WPCP, Buena Vista Pumping Station, South Sector Reservoir, West Sector Reservoir, and Well 5. These facilities are critical and extreme impacts on the Town may occur if the facility is out of service due to an asset failure.

Table 4-3: Consequence of Failure Ratings for Reliability (Vertical Assets)

Facility	CoF
Water Facility	
Dudgeon Reservoir & High Lift Station	4
South Sector Reservoir & High Lift Station	5
West Sector Reservoir	5
Commerce Road Standpipe	4
Well 2	3
Well 5/5A	5
Well 6	4
Well 7	4
Well 8B/8C	3
Well 9A/9B	4
Well 10	4
Well 11	4
Well 12	4
Wastewater Facility	
WPCP	5
First Street Pumping Station	3
Buena Vista Pumping Station	5
Sandringham Pumping Station	4
Young Road Pumping Station	4

4.4 Climate Change Risk Considerations

Climate change risks pose an additional challenge to managing Town assets and maintaining service levels. Climate change events can play a role in increasing the probability of an asset failure, as well as increasing the consequence of failure or impact on social, economic, and environmental factors due to the potential magnitude of an extreme weather event. Therefore, climate change considerations increase the Town's risk exposure and the proportion of assets in the high and very high risk categories that will need to be addressed through various recovery strategies. Examples of increased asset risk due to climate change is described below for each of the core service areas:

- **Transportation**: Erosion and embankment failures can damage roads and bridges, and roads may experience an increased frequency and severity of pavement cracking and rutting resulting in reduced reliability service levels.

- **Stormwater Service**: More intense and frequent storm events may lead to a higher probability of sewer capacity failure and therefore more frequent flooding events causing damages to Town infrastructure and private properties.

- **Water Service**: Source water quality may be reduced due to increased flooding events, affecting functional service levels related to drinking water quality and treatment processes.

- **Wastewater Service**: Extreme weather events can increase inflow and infiltration leading to a higher probability of sewer capacity failure, resulting in backups and damages due to flooding.

Impacts on lifecycle strategies due to climate change are discussed further in Section 5.3.

5.0 Lifecycle Management Strategy

HANSEN BLVD. BRIDGE-LOWER MONORA CREEK CROSSING

5.0
Lifecycle Management Strategy

5.0 Lifecycle Management Strategy

5.1 Overview

To achieve its program objectives and maintain service levels, the Town builds new infrastructure assets to meet capacity needs, upgrades assets to meet functional needs, and manages existing assets to meet reliability needs – all with limited funds. Asset lifecycle management strategies are planned activities that enable assets to provide the service levels in a sustainable way, while managing risk at the lowest lifecycle cost. Asset lifecycle management strategies are typically organized into the categories listed in Table 5-1, and are driven by the levels of services defined in Section 3, and the associated risk discussed in Section 4.

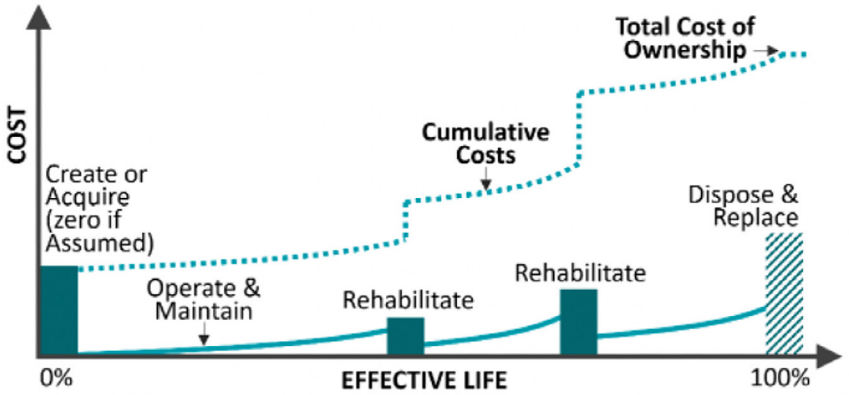
Table 5-1: Asset Lifecycle Management Categories

Lifecycle Management Category	Description	Examples of Associated Activities
Operate	Regular activities to provide services	inspections, cleaning, energy usage
Maintain	Activities to retain asset condition to enable it to provide service for its planned life	repairs, component replacements
Renew	Activities that return the original service capability of an asset	minor or major rehabilitations, asset replacement
Upgrade	Activities to provide a higher level of service capability from an existing asset to achieve better fit for purpose or meet regulatory requirements	energy efficiency improvements, water treatment process improvements, road urbanization
Grow	Activities to provide a new asset that did not exist previously or an expansion to an existing asset	new asset construction, expansion of existing asset such as road widening

In addition to the above asset strategies, non-asset solutions are also considered which are actions or policies that can lower costs, lower demands, or also extend asset life. For example, integrated infrastructure planning between services enables cost savings by bundling road, watermain, and sewer work into one project. The Town also educates the public on steps to reduce water contamination and reduce water consumption, which reduces stresses on Town infrastructure.

The Town reviews the costs of potential lifecycle activities to determine the lowest lifecycle cost strategy while still meeting service levels. The total cost of ownership is the sum of lifecycle activity costs to sustain an asset over its lifecycle. (See Figure 5-1 for a conceptual lifecycle cost model). Sufficient investment of the right type of asset intervention at the right time minimizes the total cost of ownership for each asset and mitigates other potential risks such as interruption to service delivery or failure that causes damage to other nearby infrastructure. Operations, maintenance, and renewal activities are timed to reduce the risk of service failure from deterioration in asset condition and all contribute to the total cost of ownership.

Figure 5-1: Conceptual Lifecycle Cost Model



5.2 Lifecycle Management Needs

The Town uses its understanding of risks associated with different service levels to inform the timing and level of investments needed in infrastructure assets. The Town plans for additional assets as required to provide sufficient service capacity and manages the upgrade, operations, maintenance, and renewal of assets to meet defined service levels, including legislated and other corporate requirements.

This section of the AM Plan outlines the Town's expansion and upgrade strategies to support capacity and functional service levels, and the operations, maintenance, and renewal activities to support reliability service levels. The additional impacts due to climate change are discussed in Section 5.3.

5.2.1 Capital Growth and Upgrade Needs

The Town carefully plans for growth and service improvements based on community needs, and has key initiatives planned over the next 10 years. Year 1 to 5 growth needs are understood with more certainty. The scope for years 6 to 10 will be supplemented with additional projects pending recommendations from upcoming studies such as the Transportation Study. The growth and upgrade portion of planned projects in the 10-year Capital Budget is estimated to cost a total of $13.8 million, or $1.38 million averaged annually over the next 10 years, as summarized Figure 5-2.

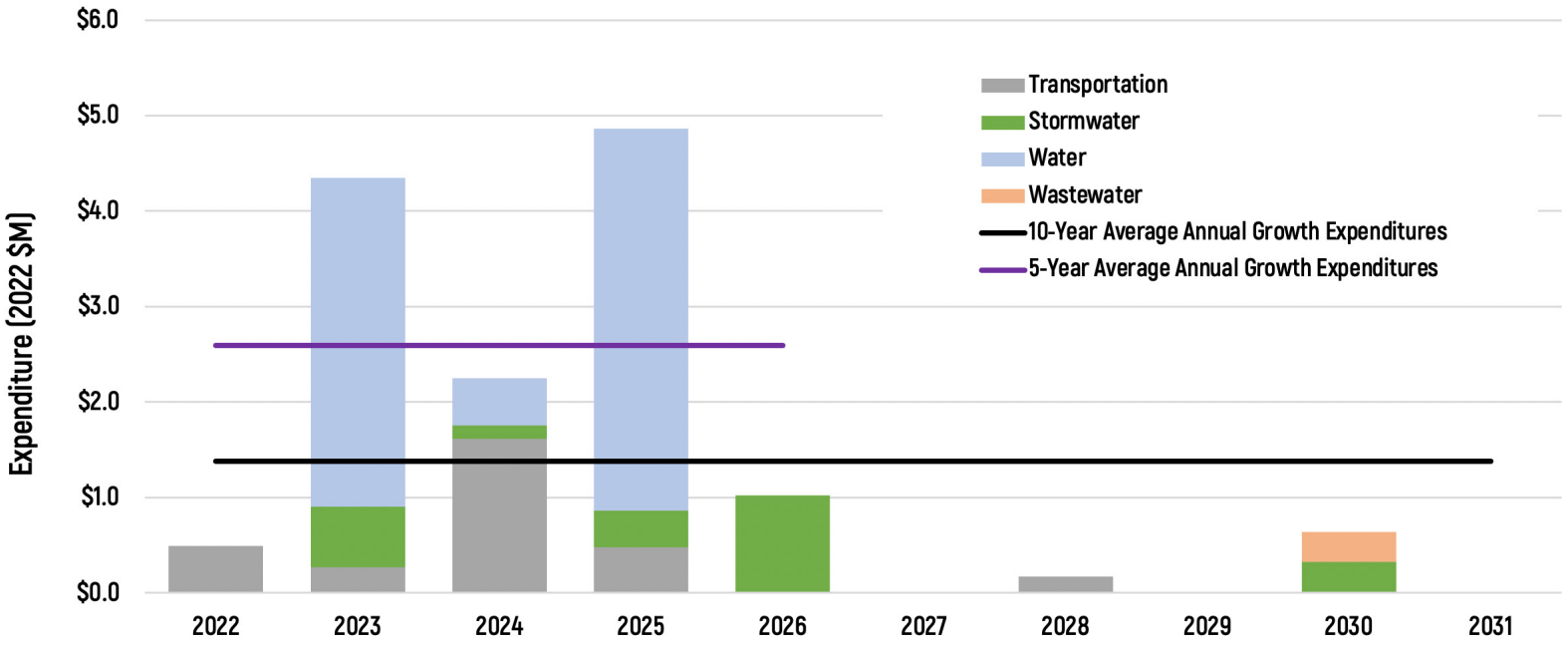
As indicated in Section 4.3.1 and Section 4.3.2, transportation projects to address known capacity and functional issues include Townline road widening south of Broadway and realignment of Third Street and Fourth Avenue intersection. The Blindline urbanization road project addresses multiple levels of service, with $480,000 estimated to be associated with capacity issues, and the remaining $2.27 million associated with renewal. The $480,000 portion that is funded through development charges is the portion included in Figure 5-2. The Town is also adding traffic signals at County Road 16 and Hansen Boulevard, as well as at Hansen Boulevard and Parkinson.

For stormwater, the Town has several projects planned for stormwater pond retrofits and stream erosion control and protection that benefit both existing customers as well as future development. The growth portion is included in Figure 5-2. These projects include:

- Lower Monora Creek Stream Retrofit and Protection Works
- Lower Monora Creek Stormwater Management Pond Retrofits
- Mill Creek Flood and Erosion Control Projects

The major growth expenditures for water assets over the next 10 years includes a new well for $2.9 million in 2023 and a new elevated water storage facility (Northwest Sector) for $4 million in 2025. For wastewater services, a trunk sewer capacity increase is planned on Bredin Parkway in 2030.

Figure 5-2: Growth & Upgrade Needs – 2022 to 2031



5.2.2 Capital Renewal Needs

Renewal efforts focus on rehabilitation and replacement activities to enable the Town to meet its quality and reliability service levels. The renewal activities forecasted in this AM Plan maintain asset condition over the next 10 years. Over time, as the Town refines the asset management strategies through tracking of actual condition, costs, and benefits of the strategies, the Town will improve its understanding of the deterioration rates and the lowest lifecycle cost for each asset type. Where appropriate, the Town considers coordinating multiple activities across asset areas through project bundling to reduce total costs.

Rehabilitation activities extend the life of an asset and reduce its risk of failure. These activities and associated benefits are deemed more cost effective than allowing the asset to reach its

end of life. An example of a rehabilitation activity is resurfacing of a road, which will improve the condition and extend its life such that the overall lifecycle cost is minimized.

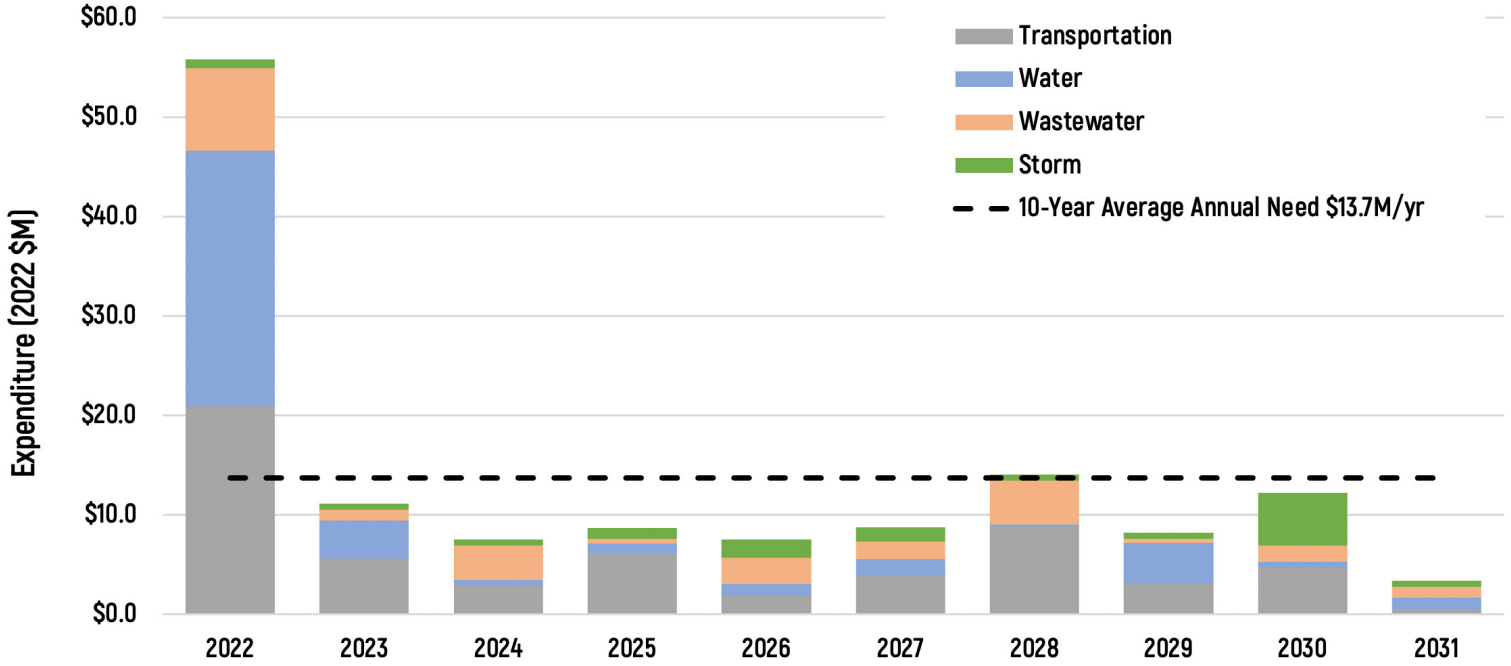
At a certain point in an asset's lifecycle, it is no longer cost-effective to rehabilitate the asset, and replacement is required. The Town has identified estimated service lives for each of its assets. These replacement intervals are developed to minimize lifecycle costs while considering service levels and the associated risk. The renewal forecast considers the asset's current condition or age, the planned rehabilitation and replacement activities, as well as the recommended strategies from the following specific studies:

Road Needs Study (2020) – This study identified the need and recommended timing for road improvements, rehabilitation, reconstruction, and associated costs. The recommendations have been updated by Town staff to reflect work and updated information since the 2020 assessment.

2021 OSIM Inspection Reports – As indicated in Section 2.2.2, bridge and culvert inspections are completed every two years. In addition to determining a BCI for each asset, the report provides timing for bridge and structural culvert rehabilitations and replacements over the next 10 years. After the OSIM inspections, the Town had a more thorough inspection performed on Structure 9 John St. bridge, resulting in a major rehabilitation planned for capital work (currently a 2022 capital project). Structure 10 C-Line Box Culvert also has a major rehabilitation planned for 2022 in the Capital Budget based on OSIM report and the Town's own review of the structure.

Figure 5-3 shows the renewal needs over the next 10 years for the Town's core assets. The average renewal need is estimated at $13.7 million per year for the period 2022-2031.

Figure 5-3: 10-Year Capital Renewal Needs Forecast



The renewal needs forecast is described in more detail in the following two subsections to align with the funding gap discussion in Section 6.3.2.

5.2.2.1 Transportation and Stormwater Capital Renewal Needs

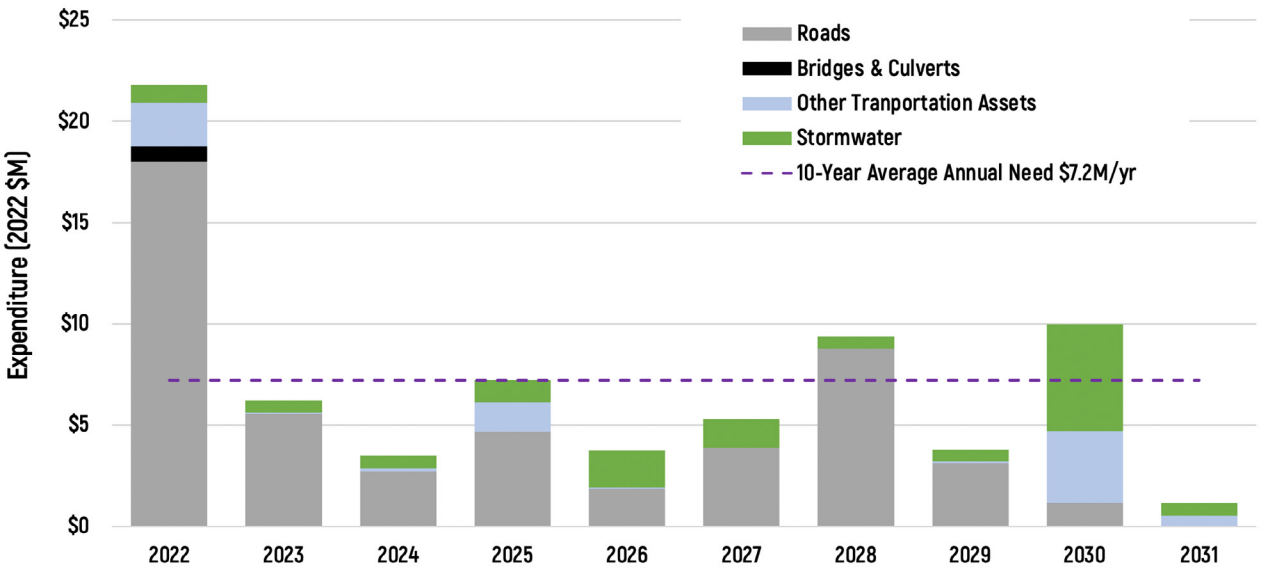
The average annual renewal needs for transportation and stormwater assets is estimated at $7.2 million per year, as shown in Figure 5-4. Road renewal comprises most of the forecast needs at $5.0 million per year, with half of the needs for resurfacing and half for road reconstructions. The two bridge

and culvert rehabilitations (John St. Bridge and C-Line Box Culvert) are forecasted in 2022. The OSIM reports also noted two stream diversion recommendations for Structures 11 and 13 but no costs or other information was provided in the report and are therefore not included in this forecast. For other transportation assets, in 2030, there is a significant expenditure for LED streetlight replacement to replace those that were installed in 2015 as part of the original LED upgrade.

Forecasted capital renewal needs for stormwater assets consist of an estimated average annual investment for sediment removal for ponds of $414,000 per year. This amount is based on an estimated cost of $400,000 to dredge one pond each year, which would enable the Town to remove sediment on a 15-year interval for its 15 wet ponds, as well as clean out its 7 dry ponds every 15 years (at an approximate cost of $30,000 per pond). As indicated in Section 2.3.2, bathymetric surveys for sediment levels will enable the Town to understand the cleanout requirements and more specific timing requirements. Additional stormwater needs are based on the Capital Budget which outlines various stream or creek restoration and erosion control projects, as well as the construction of additional or expansions to existing ponds. These new or larger stormwater ponds are included as part of the renewal rather than growth needs as they are being implemented to address historical growth not related to new development.

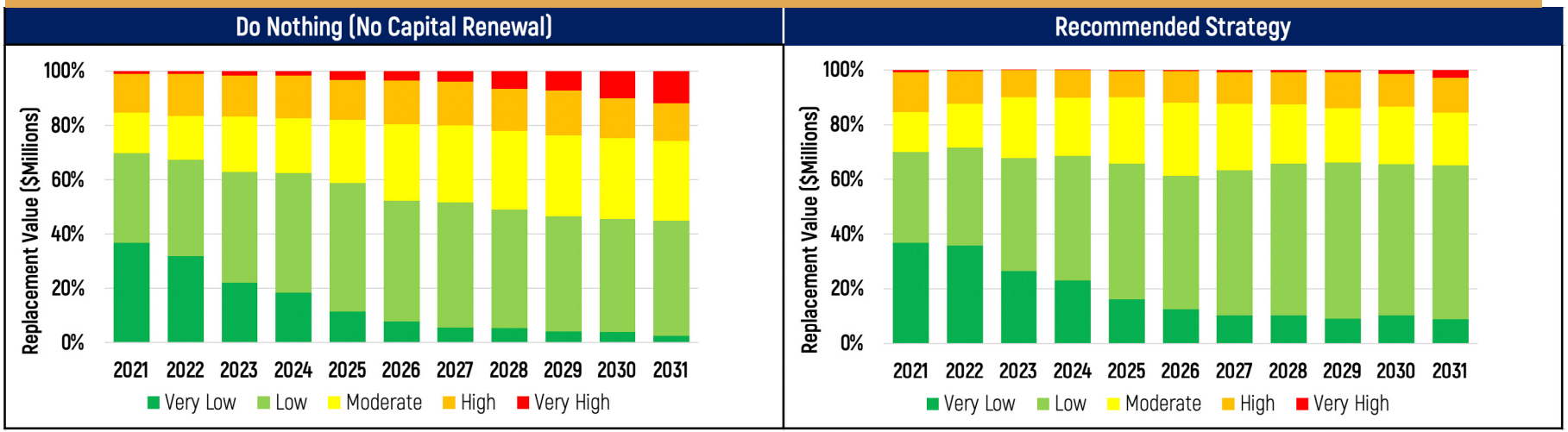
The non-growth portion of these stream restorations and pond projects total $5.2 million over the 10 years ($0.52 million per year) and are included in the forecasted needs in Figure 5-4.

Figure 5-4: 10-Year Capital Renewal Needs Forecast – Transportation & Stormwater



The recommended strategy associated with the average $7.2 million per year in expenditures supports the Town's ability to achieve its service levels while balancing risk and minimizing lifecycle costs. If the Town does not invest in renewing its infrastructure, there is a significant deterioration in asset condition over time. The recommended strategy ensures that transportation and stormwater assets are maintained and renewed in a state of good repair, as shown in Figure 5-5.

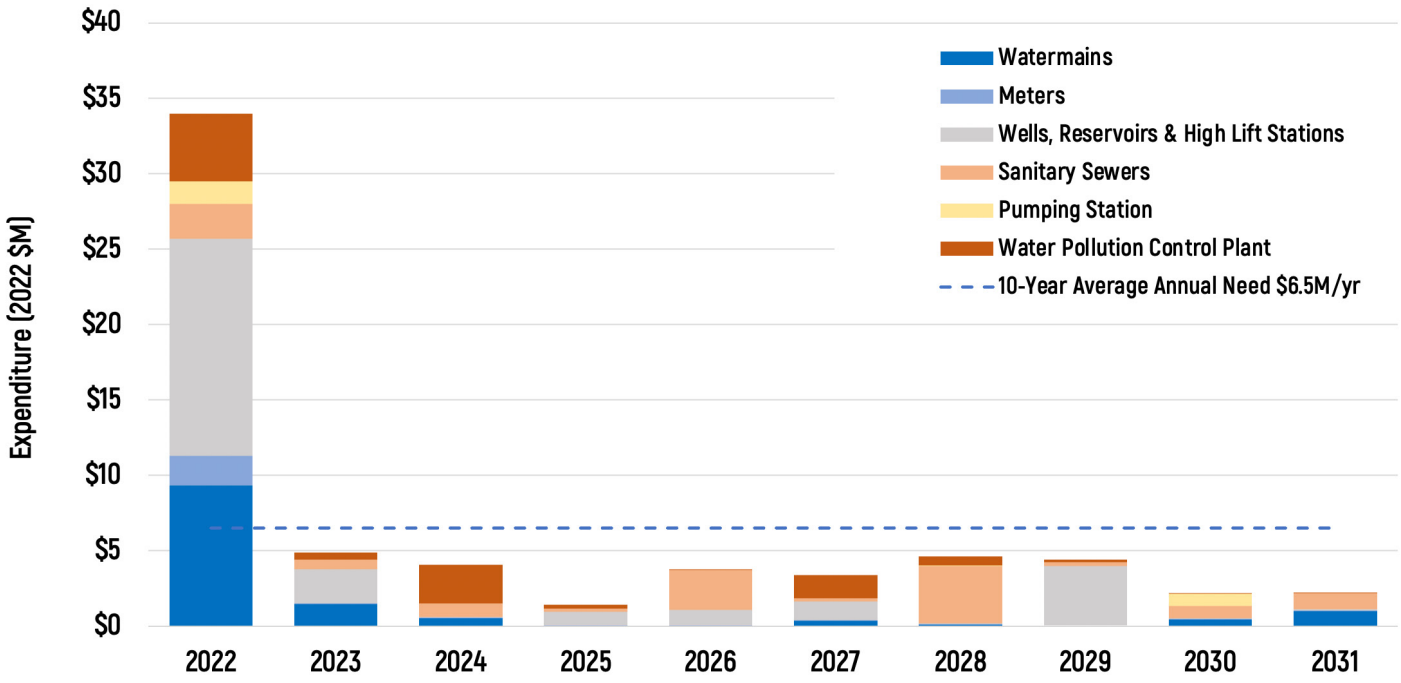
Figure 5-5: Condition Forecast Comparison - Do Nothing versus Recommended Strategy – Transportation & Stormwater



5.2.2.2 Water and Wastewater Capital Renewal Needs

The average annual renewal needs for water and wastewater assets to maintain reliability service levels is estimated at $6.5 million per year, as shown in Figure 5-6.

Figure 5-6: 10-Year Capital Renewal Needs Forecast – Water & Wastewater



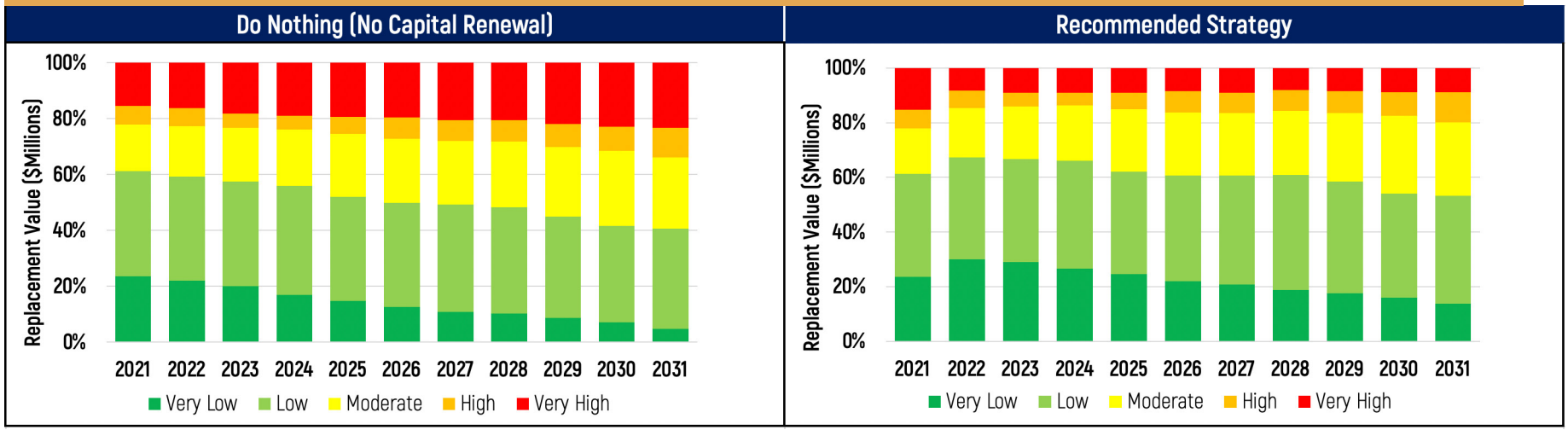
As discussed in Section 2.4.1, water meters are on average at end-of-life and in 2022, the Town anticipates moving forward with the procurement of the new water meters. The Town also performs major renewal projects on vertical infrastructure to extend asset life. The age-based analysis in the State of Infrastructure (Section 2.4.2) shows that a moderate portion of well and reservoir assets are at or approaching end-of-life and require replacement. The Commerce Road Standpipe was originally built in 1964 and is the Town's oldest water facility. A major renewal is due and design work for its rehabilitation is underway. Various asset replacements are required at the Water Pollution Control Plant and pumping stations over the next 10 years as assets reach the end of their estimated service lives. Most mechanical and electrical equipment at the water and wastewater facilities are expected to have a lifecycle of 20 to 30 years.

For water assets, there is a backlog of watermains estimated to need replacement in 2022 based on their age, consisting mainly of cast iron and ductile iron pipes that have a shorter estimated service life. For sanitary sewers, there is an even greater backlog of end-of-life asbestos cement and vitrified clay pipes that are assumed to have an estimated service life of 45 years. These sewers are estimated to be in Very Poor condition based on their age and represent 22% of the sanitary sewer inventory ($34.7 million). As indicated in the risk assessment from Section 4.3.3, these sanitary sewers also comprise a significant share of the Very High risk assets. Proposing a forecast that immediately clears this backlog would increase service levels. As the focus of this AM Plan is to forecast needs for current service levels, a reasonable forecast was developed that assumed deferral of pipe replacement from 45 years to 55 years and deferral of pipes less than 400mm in diameter as these sewers were identified as lower criticality. This approach ensures that critical sewers that are currently estimated at end-of-life will be addressed within the 10-year forecast. The estimated service life for plastic pipes which are expected to last 75 years did not require adjustment.

The recommended strategy associated with the average $6.5 million per year in expenditures supports the Town's ability to achieve its service levels while balancing risk and minimizing lifecycle costs. Like the investment required in transportation and stormwater assets, if the Town does not invest in renewing its water and wastewater infrastructure, there is a significant deterioration in asset condition over time.

The recommended strategy ensures that water and wastewater assets are maintained and renewed to maintain current service levels as shown in Figure 5-7. The portion in Very Poor condition that remains in the 10-year forecast consist mainly of the less critical sewers of asbestos cement and vitrified clay material. The Town's CCTV inspection will be able to confirm actual condition state of the sewers and refine this forecast.

Figure 5-7: Asset Condition Forecast Comparison – Do Nothing versus Recommended Strategy – Water & Wastewater



5.2.3 Operations and Maintenance Needs

The Town supports asset reliability service levels through operations and maintenance (O&M) work. The distinction between renewals (capital programs) and operations and maintenance (operating expenses) is defined by the Town's accounting policies and standard operating procedures. O&M activities ensure the asset continues to deliver defined levels of services, while renewal activities discussed in Section 5.2.2 extend the service life of the asset.

Renewals and O&M are strongly linked. O&M strategies can accelerate or delay the need for renewals, and if renewals are deferred, O&M expenditures will often have to increase to ensure that assets are kept in a state of good repair. Table 5-2 summarizes the Town's main asset-related O&M activities.

Table 5-2: Main Operations and Maintenance Activities

Asset Category	Operations & Maintenance
Transportation	
Roads	Winter Control per MMS Road Patrol per MMS Sweeping Condition assessment (Road Needs Study) Crack sealing Repair potholes Washout repairs Repairs to medians and shoulders
Bridges & Culverts	OSIM inspections every two years Cleaning Repairs based on OSIM inspections
Traffic Signals	Repairs or replacements of signal components based on semi-annual inspections; other maintenance as needed
Sidewalks	Inspections Winter control Repair panels, grinding, slab jacking
Streetlights	Replacements of lights as needed
Traffic Signs	Repairs and sign replacements based on annual inspections of Regulatory and Warning signs

Table 5-2: Main Operations and Maintenance Activities

Asset Category	Operations & Maintenance
Stormwater	
Storm Sewers	Sewer flushing Catchbasin cleaning Street sweeping Spot repairs Catchbasin repairs
Stormwater Ponds	Inspections Cleaning outfalls Removing vegetation overgrowth and debris Repairs to pond components
Water	
Watermains	Leak detection program Directional Flushing Hydrant flushing and maintenance Isolation Valve Exercising Spot repairs
Wells, Reservoirs & High Lift Stations	Step Testing at Wells, which may include video inspection Reservoir integrity inspection Diesel Generator checks and maintenance Repairs on equipment and facilities Facility utilities costs (natural gas, hydro) Chemicals

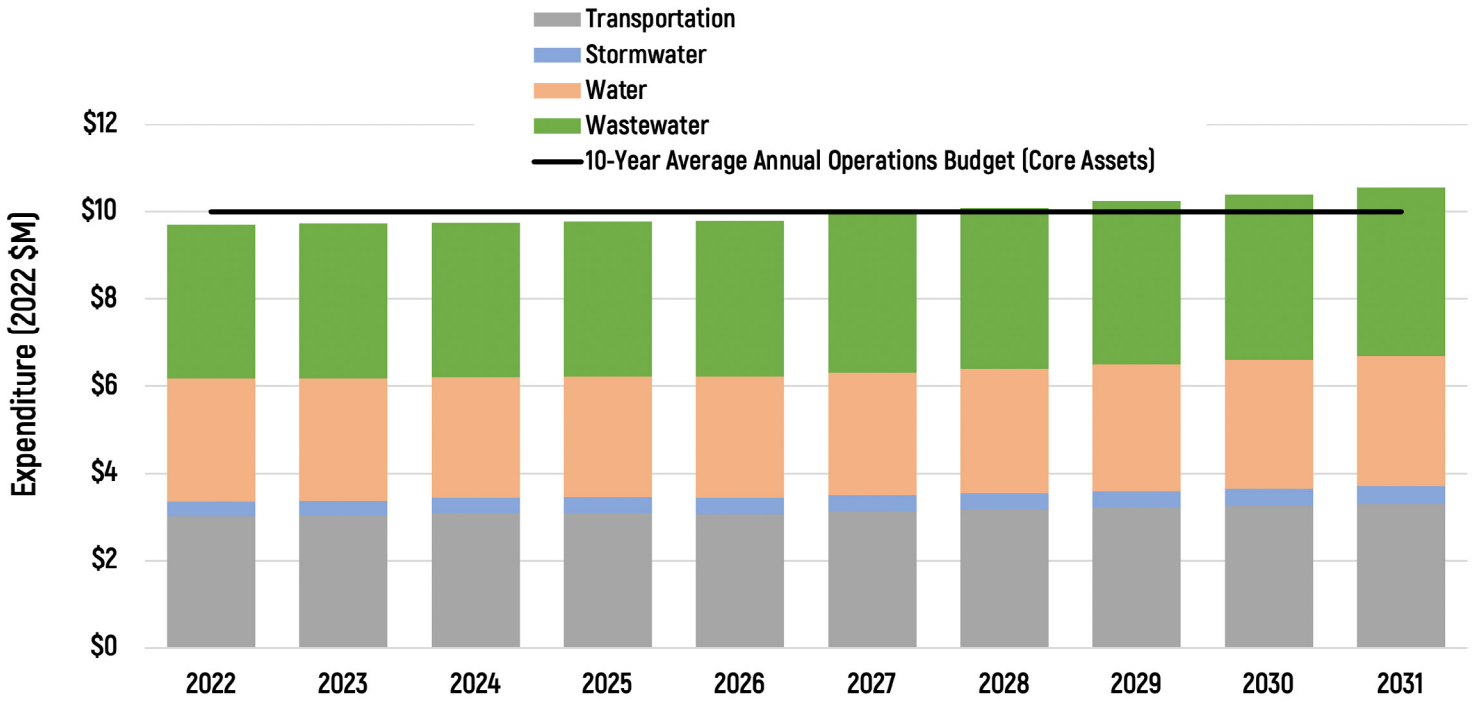
Table 5-2: Main Operations and Maintenance Activities

Asset Category	Operations & Maintenance
Wastewater	
Sanitary Sewers	Sewer flushing Maintenance holes inspections CCTV inspections Spot repairs Maintenance hole repairs
Pumping Stations	Inspections Pit flushing Maintenance of pumps, other equipment, and facility Diesel Generator checks and maintenance
WPCP	Daily equipment inspections Sewage sampling Maintenance of all process equipment and facility including clarifiers, bioreactor, digestor, tertiary treatment, chemical systems Diesel Generator checks and maintenance

Figure 5-8 summarizes the forecasted operations and maintenance expenditures related to core asset activities for the period 2022-2031, at an annual average of $10.0 million. A nominal growth rate of 1.5% is forecasted from years 2027 to 2031 reflecting increasing needs as the Town's asset portfolio grows. In general, Figure 5-8 is focused on activities for core assets, and does not include fleet or other non-core assets, as well as administrative expenses such as office supplies and insurance.

Some accounts within the operating budget are increasing significantly in cost and should be considered in future updates based on additional analysis. These pressures on the operating budget are discussed further in Section 6.3.3. This forecast also does not include the significant potential cost increases due to the pandemic and current economic environment. The Town will monitor price increases and adjust future forecasts as necessary.

Figure 5-8: Operations and Maintenance Needs Forecast ($M)



5.3 Climate Change Strategies

As indicated in Section 4.4, climate change can have significant implications on Town infrastructure that increase the overall risk exposure to the Town. In its Climate Change Adaptation Plan, the Town has identified initiatives that will help identify both current and future potential flooding issues so that lifecycle strategies can be identified and planned to mitigate these risks to the community. The Climate Change Adaptation Plan was developed based on the International Council for Local Environmental Initiatives (ICLEI) Canada's Building Adaptive and Resilient Communities (BARC) Program. Climate impact statements were reviewed and validated with localized climate change projections, and 53 actions were developed in response to the higher risk impact statements.

The Town is progressing on the actions outlined in the Climate Change Adaptation Plan such as detailing the scope of work for hydraulic modelling to develop a Flood Mitigation Plan, starting an inflow and infiltration study, and developing an inspection program for stormwater infrastructure. The outcomes of these projects could result in several additional needs to increase the resilience of Town infrastructure to climate change impacts, including upsizing of pipes, fixing inflow and infiltration areas, the use of low impact development technologies, and other adaptation strategies. The Town recognizes that though these actions will require additional costs that will need to be incorporated into future forecasts, the long-term cost of not acting is greater than the planned investments being made today.

6.0 Financial Strategy

CLOSE UP OF MULTI-COLOURED FABRIC

6.0
Financial Strategy

6.1 Overview

The financial strategy is informed by the preceding sections of the Asset Management Plan: the value and condition of the assets, the current levels of service, the risks to service delivery, and the lifecycle activities needed to reduce the risks to acceptable levels. The Financing strategy considers how the Town will fund the planned asset management actions to meet the current service levels.

A municipality is in a financially sustainable position if it:

- Provides a level of service commensurate with willingness and ability to pay
- Can adjust service levels in response to changes in economic conditions
- Can adjust its implementation plans in response to changes in the rate of growth
- Has sufficient reserves and/or debt capacity to replace infrastructure when it needs to be replaced to keep its infrastructure in a state of good repair.

The key challenge to financial sustainability is the discrepancy between level of service decisions and fiscal capacity. Additional challenges include changes in the cost of infrastructure investments and unforeseen impacts to funding. In advance of the 2025 O.Reg. 588/17 requirements, this section of the AM Plan compares the annual funding projected to be available to undertake the recommended lifecycle activities to the needs forecasted in Section 5.2 to provide a preliminary funding shortfall estimate for capital renewal. Continuous improvements in data will refine forecasts and a more comprehensive outlook will be available when the Town includes all assets, including non-Core assets in the next AM Plan.

6.2 Funding Sources

Through the Town's annual budget process, capital project and operating activity expenditure information is gathered from each service area, including investment needs, trends, and priorities to enable preparation of the capital and annual operating plans. Once the expenditure plans are finalized, a financing plan is developed which includes several key sources of funding as outlined in the table below.

Table 6-1: Key Sources of Funding and Financing

Funding Source	Description
Property Tax	Town property owners pay an annual tax to the County
Debt	Long term borrowing, to be paid for by future taxpayers
Canada Community Building Fund (formerly Federal Gas Tax)	A long-term grant agreement with the Association of Municipalities of Ontario (AMO), that provides a portion of the Federal gas tax revenues to municipalities for revitalization of infrastructure that achieves positive environmental results
OCIF	Ontario Community Infrastructure Fund for small, rural and northern communities to develop and renew their infrastructure
Grants	Project specific grants / subsidies
User Fees	Funds collected for the use of Town services or infrastructure (e.g., water/wastewater rates)
Development Charges	Fees collected from developers to help pay for the cost of infrastructure required to provide municipal services to new development
Third Party Contributions	Donations from an individual or group outside of the Town

In addition to the above sources, capital reserves are established as a source of pay-as-you-go funding for the Town's capital program. Funding for these reserves is obtained through annual contributions. These annual reserve contributions sustain reserve balances at appropriate levels to address infrastructure replacement costs in the future and inherent uncertainties in capital funding needs. Reserve contributions are evaluated annually to ensure adequate funds are raised to meet future capital requirements and to smooth out the impact on the annual operating budget. The Town also minimizes impacts on residents through maximizing other revenue sources such as grants.

6.3 Financial Sustainability

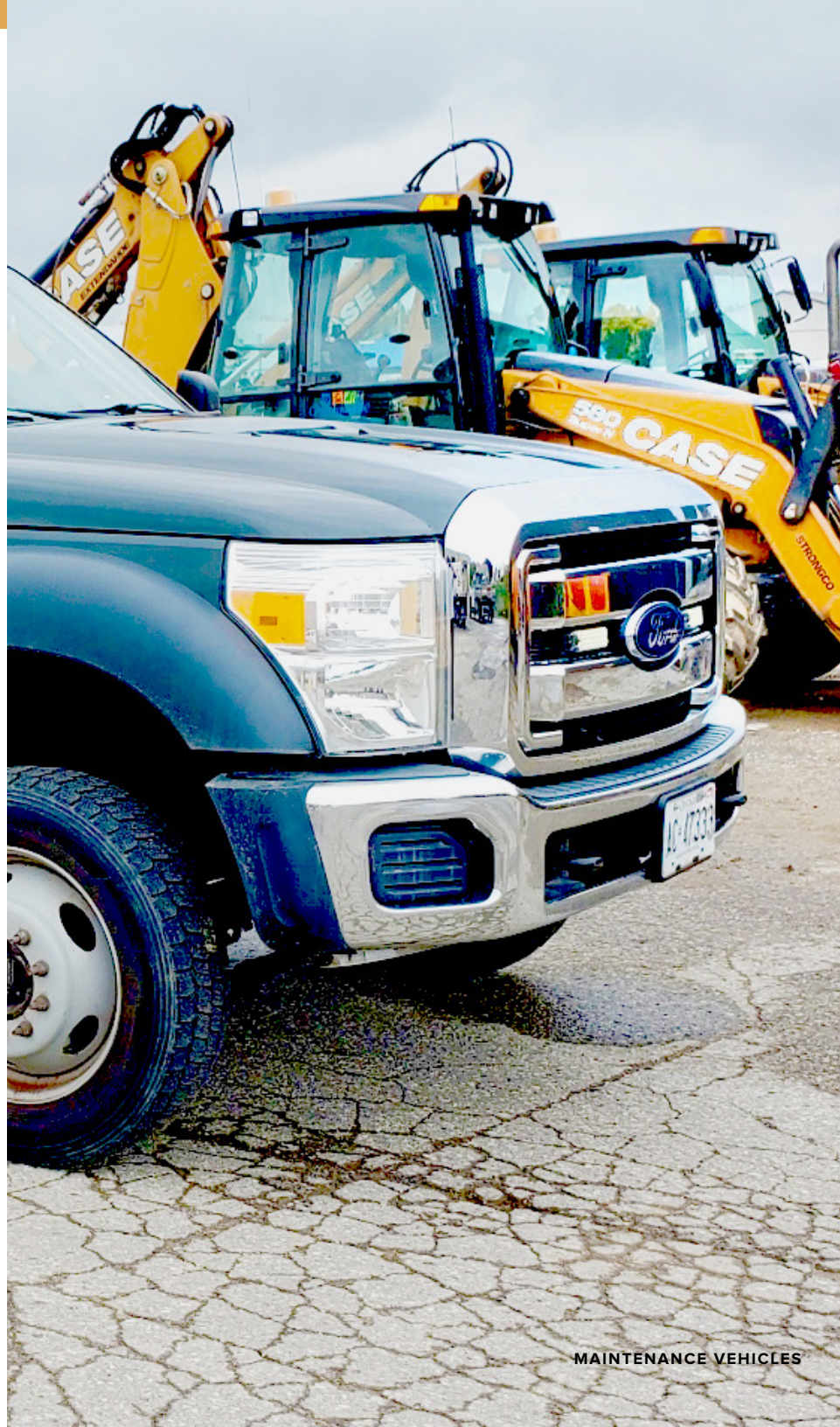
6.3.1 Financial Sustainability for Capital Growth and Upgrade

The Town's needs for capital growth and upgrades are estimated in Section 5.2.1 at $13.8 million over the 10 year period, based on the development charge portion of the Town's 10-Year Capital Budget. Therefore, there is no funding shortfall assuming these development charges cover the Town's growth needs over the next 10 years. The growth forecast should be updated as studies such as the Transportation Study and Master Plans are completed.

6.3.2 Financial Sustainability for Renewal

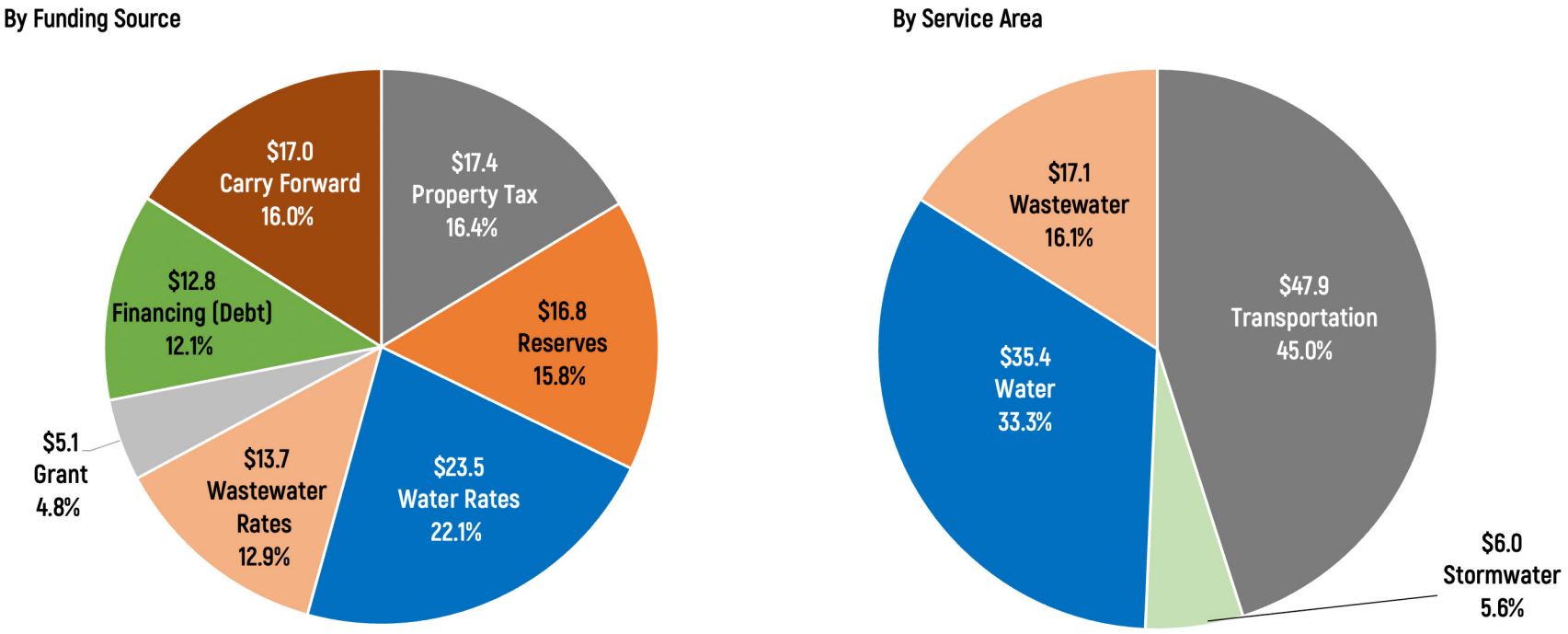
This section compares the planned capital funding available for renewal (not development charges) in the Town's 10-Year Capital Budget against the forecast needs for the recommended capital lifecycle activities (Section 5.2.1) to determine if there is a funding shortfall in the Capital Budget to maintain current service levels for core assets.

The estimated 10-year funding available from the Capital Budget for renewal is estimated to be $106.4 million, as shown in Figure 6-1 by funding source and service area. A significant portion of the funding for projects carried forward to 2022 were water and wastewater projects.



MAINTENANCE VEHICLES

Figure 6-1: 10-Year Total Capital Renewal Funding Available ($M), 2022 to 2031



For **transportation and stormwater**, which primarily relies on **property tax, reserves, and debt**, the total funding available is **$53.9 million**, or an average annual budget of **$5.4 million**.

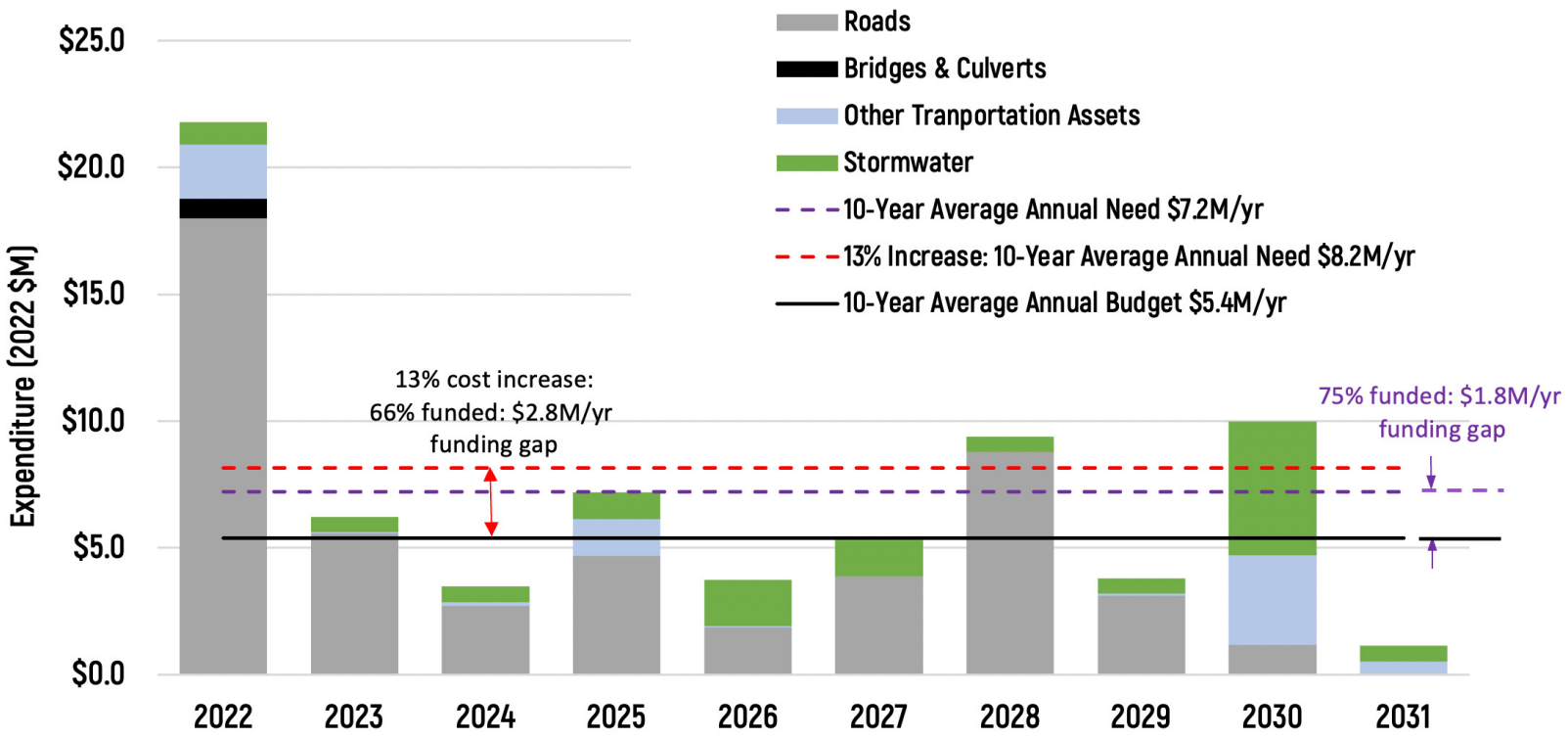
For **water and wastewater**, which relies on **user rates**, the total available funding for renewal over 10 years is estimated at **$52.5 million**, or an average annual budget of **$5.2 million**.

6.3.2.1 Transportation and Stormwater

Figure 6-2 shows the forecasted average annual need over the next ten years of **$7.2 million** per year (dashed purple line) and the average annual funding of **$5.4 million** per year (black line). This results in an estimated average annual funding gap of **$1.8 million** per year over the next ten years and indicates that the asset portfolio for these assets is approximately **75% funded** based on currently available data. Figure 6-2 also considers the potential impact of rising costs due to the current and uncertain economic environment. Assuming a 13% increase in 2022 pricing, the average annual gap increases to $2.8 million per year. Even over the short term, it is difficult to predict the trends and magnitude of inflation that may occur; however, a plateau in the cost increases in 3 to 4 years may be expected. The 13% scenario presented in this AM Plan is in 2022 dollars and reflects the increased pricing that may occur by the end of 2022.

C LINE BOX CULVERT REHABILITATION

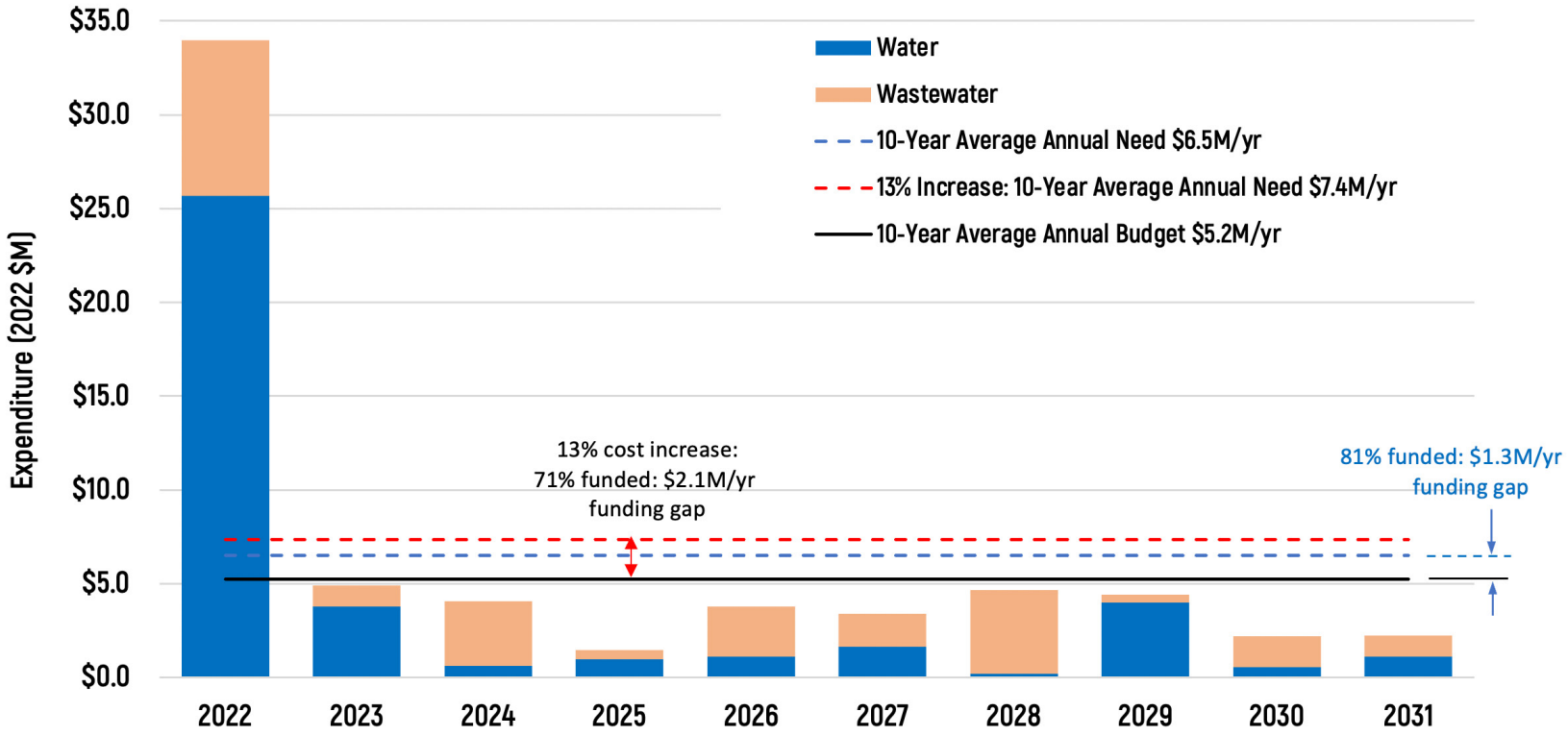
Figure 6-2: Capital Renewal Funding Gap – Transportation & Stormwater



6.3.2.2 Water and Wastewater

Figure 6-3 shows the forecasted average annual need over the next ten years of **$6.5 million** per year (dashed purple line) and the average annual funding of **$5.2 million** per year (black line). This results in an estimated average annual funding gap of **$1.3 million** per year over the next ten years and indicates that the asset portfolio for these assets is approximately **81% funded** based on currently available data. Similar to the transportation and stormwater analysis, Figure 6-3 considers the potential impact of rising costs due to the current economic environment. Assuming a 13% increase in 2022 pricing, the average annual gap increases to $2.1 million per year.

Figure 6-3: Capital Renewal Funding Gap – Water and Wastewater



6.3.3 Financial Sustainability for Operations and Maintenance

As indicated in Section 5.2.3, this AM Plan estimates an average spend of $10.0 million per year on asset-related operations and maintenance activities on core assets only. The Town anticipates additional pressures on the operating budget from climate change, such as increased maintenance activities including mud jacking for sidewalk settlement issues and pothole repairs on roads. Data is still in the early stages for understanding the financial impact of climate change events on these activities. For sanitary sewers, funding may need to be increased for the Town to implement a regular CCTV and flushing program based on a set cycle of inspection. For stormwater, flushing for storm

sewers also is an activity that may be currently underfunded in the budget. The Town expects to be constructing and assuming low impact development assets which will need additional O&M funding not currently considered in the Operating Budget.

6.3.4 Forecast and Funding Gap Limitations

The forecasts and funding gap estimates are based on currently available data. The Town has already made significant achievements in building its GIS inventory and carrying out regular condition assessments and digitizing the data for assets such as roads and structures. As the Town continues to improve on data collection and implement additional condition assessment protocols such as the CCTV sewer inspections, district metering program for understanding watermain leaks, and the WPCP condition assessments for various process areas, the forecast and funding gap estimates will also improve. The Town will also have a more holistic understanding of needs and the funding shortfall when non-core assets are included in the next AM Plan, such as fleet, information technology, facilities, and parks.

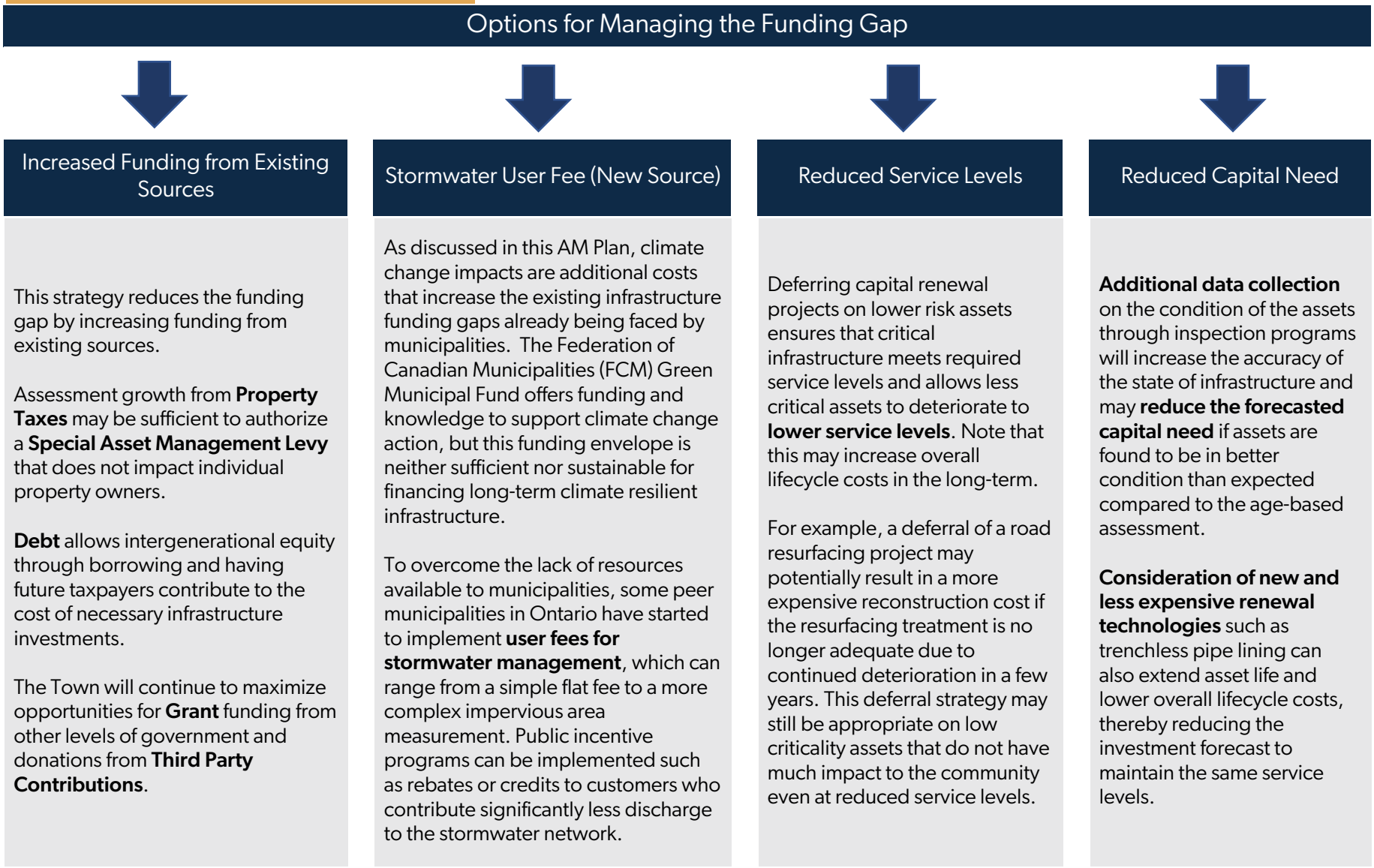
6.3.5 Strategies to Manage the Funding Gap

As indicated in the Introduction (Section 1), the AM Plan directly supports the Town's Strategic Plan, Orangeville Forward, and key strategic priorities: municipal services, strong governance, and sustainable infrastructure. The Town's goals and objectives of transparent and responsible decision making aligns with O.Reg. 588/17 which requires municipalities to demonstrate financial sustainability through the AM Plan by identifying the forecasted expenditures to maintain current services levels.

Section 6 of this AM Plan is proactive in setting the stage for meeting O.Reg. 588/17 requirements for year 2025 by identifying potential funding shortfalls and options with which the Town may manage the risks associated with the shortfall. This proactive approach enables the Town to start the needed discussions on the affordability of current service levels such that it will be able to determine the appropriate service levels for the Town that effectively balances the associated costs and risks.

Based on currently available data, there are estimated funding gaps for renewing the Town's assets, and as described in this AM Plan, climate change impacts are only adding to this gap and municipalities generally do not have enough funding sources to address both the infrastructure gap and climate change risks. To manage the risks of the funding shortfall, this AM Plan suggests four main categories of options to be considered, including a new stormwater user fee, summarized in Figure 6-4.

Figure 6-4: Managing the Funding Gap

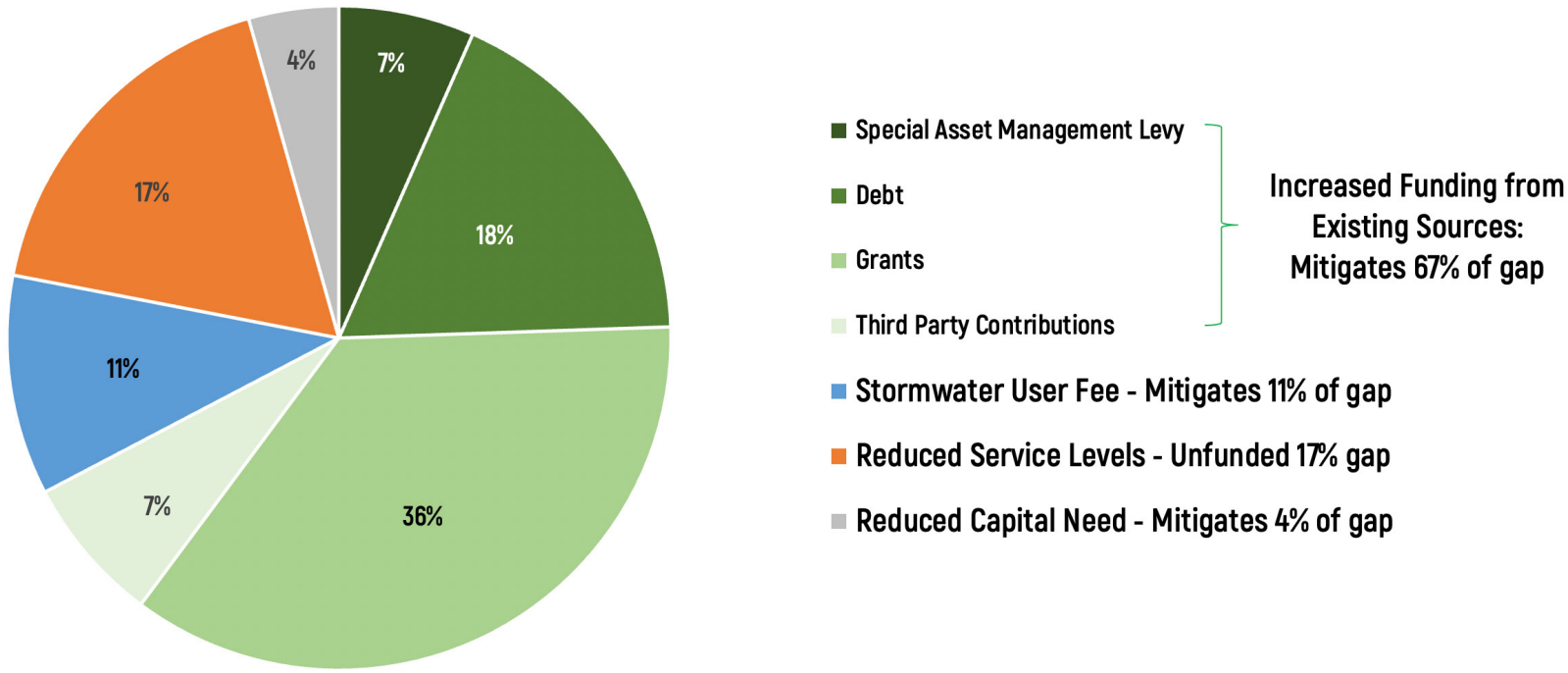


The Town can consider elements of each approach to close or accept the funding gap. A preliminary financial strategy is outlined in Figure 6-5 for addressing the $2.8 million per year estimated gap for transportation and stormwater assets over the next 10 years. 67% ($1.9 million/yr) of the $2.8 million annual gap is mitigated through increases in existing funding sources, including a Special Asset Management Levy, debt, grants, and third party contributions. The Town plans on continuing to maximize funding from grants to minimize financial impacts on residents and businesses. This AM Plan plays an integral part in supporting the continued grant funding from other levels of government.

For the remainder of the $2.8 million gap, 11% is estimated to be mitigated through the implementation of a stormwater user fee, and another 4% reduction in the gap by implementing newer technologies for asset renewal that lower lifecycle costs. In this scenario, 17% remains unfunded and results in deferring projects and accepting lower service levels on lower criticality assets.

DUDGEON RESERVOIR

Figure 6-5: Preliminary Financial Strategy – Transportation and Stormwater



The above preliminary funding strategy demonstrates the Town's proactive approach in starting the discussion on managing the risks due to the estimated funding gap. As indicated in Section 6.3.4, the Town will also have a more holistic understanding of needs and the funding shortfall when non-core assets are included in the next AM Plan. For water and wastewater, similar mitigation options will be considered as part of the Town's next iteration of the Water and Wastewater Rates study.

7.0
AM Plan Monitoring & Improvement

INSTALLING McCANNELL AVENUE GUARD RAIL

7.0
AM Plan Monitoring & Improvement

7.1 Overview

Development of AM Plans is an iterative process that includes improving data, processes, systems, staff skills, and organizational culture over time. This section provides an overview of the compliance of this AM Plan with Ontario Regulation 588/17 for current levels of service and recommends improvements to the Town's asset management practices.

WASTEWATER TREATMENT FACILITY

Table 7-1: O.Reg. 588/17 Compliance Status and Other Opportunities

AM Plan Section	O.Reg. 588/17 Compliance (Current LOS)
State of Local Infrastructure	**Compliance:** For each asset category, the AM Plan provides a summary of the assets, the replacement cost of the assets, the average age of the assets, the condition of the assets, and the approach to assessing condition of assets. **General Improvements:** • Continue to improve knowledge of asset replacement costs and current condition of the assets. Target efforts on highest risk assets and assets with unknown condition. **Specific improvements:** • Continue to improve GIS datasets and improve installation year data for watermains, sanitary sewers, and storm sewers, and consider obtaining this data for any observation wells and sampling stations. • For vertical infrastructure, develop a more granular inventory than currently residing in Citywide, which currently generally categorizes mechanical, electrical, instrumentation, structural as grouped assets for each facility. Each asset should have an installation date, replacement value, and estimated service life, and key attribute data such as size that can assist with unit costing and assigning asset criticality scores. Less critical assets that have the same estimated service life may be grouped together. For the building portion of the facilities, consider developing the inventory to Uniformat II standard, which is typically used during building condition assessments. This improvement has been started for the WPCP as part of development of this AM Plan. • Develop a more granular inventory for pond components that will require eventual renewal, with replacement value and installation date information. • Continue to carry out CCTV inspections and use the data to better understand the current condition of the sanitary sewer network. • Continue to carry out condition assessments of vertical infrastructure such as the WPCP where several processes are being assessed this year. • Perform bathymetric surveys to inform sediment removal requirements for stormwater management ponds

Table 7-1: O.Reg. 588/17 Compliance Status and Other Opportunities

AM Plan Section	O.Reg. 588/17 Compliance (Current LOS)
Levels of Service	**Compliance:** For each asset category, the AM Plan reports the current LOS performance. For core assets, the 2022 AM provides the qualitative community descriptions and technical metrics as required by O.Reg. 588/17, and the current performance. **General Improvements:** • For 2025 O.Reg. 588/17, develop Proposed LOS (target performance for each measure over each of the next 10 years) **Specific improvements:** • Gain further understanding of resiliency of properties and system to 100-year and 5-year storms for O.Reg. 588/17 stormwater technical measures. This analysis will be supported by future actions identified in the Town's Climate Change Adaptation Plan, including developing a Flood Mitigation Plan.
Lifecycle Management Strategy	**Compliance:** The AM Plan provides the population and employment forecasts as set out in Schedule 3 to the 2017 Growth Plan. For each asset category, the AM Plan provides the lifecycle activities that would need to be undertaken to maintain the current LOS for each of the next 10 years, based on risk and lowest lifecycle cost analyses. **General Improvements:** • Continue to optimize the lifecycle activities by searching out and testing various operations, maintenance and renewal activity and timing options, and then evaluating the benefits against the costs of each option over time to determine the lowest cost option for the required benefits. **Specific improvements:** • Improve understanding of growth and upgrade needs by incorporating recommendations from future studies, such as the Transportation Study and future Master Plans

Table 7-1: O.Reg. 588/17 Compliance Status and Other Opportunities

AM Plan Section	O.Reg. 588/17 Compliance (Current LOS)
	• Investigate the need mentioned in the OSIM report regarding stream diversion around Structures 11 and 13 • Review and incorporate additional strategies as applicable from Climate Change Adaptation Plan initiatives as they are completed
Financial Strategy	Compliance: The AM Plan provides the estimated 10-year capital expenditures and significant operating costs required to maintain the current levels of service to accommodate projected increases in demand caused by growth as set out in Schedule 3 to the 2017 Growth Plan. For each asset category, the AM Plan provides the costs of providing the lifecycle activities that would need to be undertaken to maintain the current LOS for each of the next 10 years.
	General Improvements:
	• Update Operating budget forecast as impact of on-going pressures, such as the pandemic and increasing costs are better understood. Also monitor the current stresses on the budget indicated in Section 6.3.3 and review need for additional funding as required. • Incorporate costs of additional projects into the needs forecast from studies such as the inflow and infiltration study, Climate Change Adaptation Plan, and Transportation Study once the recommendations and associated scope and costs are understood • Continue to maximize funding sources such as grants to mitigate funding shortfalls • Prepare 10-year operating and capital plans and budgets as required by O.Reg. 588/17 for AM Plans for Proposed LOS (due by July 1, 2025), and evaluate the funding shortfall to the Proposed LOS

7.2 Monitoring and Review Procedures

The AM Plan will be updated every five years to ensure it reports an updated snapshot of the Town's asset portfolio and its associated value, age, and condition. It will ensure that the Town has an updated 10-year outlook including the proposed service levels by year 2025, the costs of the associated lifecycle strategies and an assessment of funding shortfalls. Per O.Reg. 588/17, the Town will conduct an annual review of its asset management progress in implementing this AM Plan and will discuss strategies to address any factors impeding its implementation.

STAFF AT WASTEWATER TREATMENT FACILITY

Acknowledgements

Staff Acknowledgement

We would like to acknowledge the efforts and dedication of the staff across the organization for all their effort, time and support they put into accumulating the data and to help develop this Asset Management Plan for core infrastructure assets. The process of assembling this Plan required significant effort and co-ordination across different service areas and we thank everyone involved in the process for their hard work. We are also sincerely thankful to the global management team and Town Council for their continued support throughout the development of the Plan.

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CRESSVIEW LAKES

2022 ASSET MANAGEMENT PLAN

orangeville.ca/assetmanagement

Orangeville
Historic Charm Dynamic Future