Asset Management Plan

Township of Malahide

A proud tradition, a bright future.

Township of Malahide
87 John Street South, Aylmer On
www.malahide.ca

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Table of Contents

Definitions, Abbreviations, and Acronyms 4

1. INTRODUCTION 5

1.1. Overview 5

1.2. Legislative Context 6

1.3. Plan Development 6

1.4. State of Local Infrastructure and Levels of Service 7

1.5. Lifecycle Management 7

1.6. Funding Strategy 8

1.7. Growth 8

1.8. Maintenance and Integration 8

2. ROAD NETWORK 10

2.1. State of Local Infrastructure and Levels of Service 10

2.1.1. Asset Class Summary 10

2.1.2. Condition 11

2.1.3. Current Levels of Service 12

2.2. Lifecycle Activities 14

2.2.1. Lifecycle Activities 14

2.2.2. Degradation Profiles 14

2.2.3. Design Criteria 15

2.2.4. Expected Lifecycle and Associated Risk 16

2.3. Funding Strategy 18

2.3.1. Annual Cost Forecast 18

2.3.2. Funding Strategy 18

2.3.3. Network Service Level Forecast 19

3. BRIDGES AND STRUCTURAL CULVERTS 20

3.1 State of Local Infrastructure and Levels of Service 20

3.1.1. Asset Class Summary 20

3.1.2. Condition 21

3.1.3. Current Levels of Service 21

3.2. Lifecycle Management 23

3.2.1. Lifecycle Activities 23

3.2.2. Degradation Profiles 23

3.2.3. Decision Criteria 24

3.2.4. Expected Lifecycle and Associated Risk 24

3.3. Funding Strategy 26

3.3.1. Annual Cost Forecast 26

3.3.2. Funding Strategy 27

3.3.3. Network Service Level Forecast 27

4. WATER DISTRIBUTION SYSTEM 28

4.1. State of Local Infrastructure and Service Levels 28

4.1.1. Asset Class Summary 28

4.1.2. Condition 29
4.1.3. Current Levels of Service 29
4.2. Lifecycle Management 31
4.2.1. Lifecycle Activities 31
4.2.2. Degradation Profile 31
4.2.3. Decision Criteria 32
4.2.4. Expected Lifecycle and Associated Risk 32
4.3. Funding Strategy 35
4.3.1. Annual Cost Forecast 35
4.3.2. Funding Strategy 36
4.3.3. Network Service Level Forecast 36
5. WASTEWATER COLLECTION SYSTEM 37
5.1. State of Local Infrastructure and Service Levels 37
5.1.1. Asset Class Summary 37
5.1.2. Condition 38
5.1.3. Current Levels of Service 38
5.2. Lifecycle Management 40
5.2.1. Lifecycle Activities 40
5.2.2. Degradation Profile 40
5.2.3. Decision Criteria 41
5.2.4. Expected Lifecycle and Associated Risk 41
5.3. Funding Strategy 44
5.3.1. Annual Cost Forecast 44
5.3.2. Funding Strategy 44
5.3.3. Network Service Level Forecast 45
6. OVERALL FUNDING STRATEGY 46
6.1. Funding Sources 46
6.2. Funding Shortfall 46
6.3. Tax Levy Impact 46
6.4. User Fee Impact – Water and Wastewater 47
7. RECOMMENDATIONS 48
7.1. Current Considerations 48
7.2. Future Improvements 48
Appendix A Financing Strategy Tables – Tax Levy 1
Appendix B Financing Strategy Tables – Water Distribution System 1
Appendix C Financing Strategy Tables – Wastewater Collection System 1

Definitions, Abbreviations, and Acronyms

CL	Centreline
BCI	Bridge Condition Index
EUL	Estimated Useful Life
GTF	Federal Gas Tax Fund
G/S	Gravel
HCB	High-Class Bituminous
HVAC	Heating, Ventilation, and Air Conditioning
IJPA	Infrastructure for Jobs and Prosperity Act
KPI	Key Performance Indicator
LCB	Low-Class Bituminous
LOS	Levels of Service
MMS	Minimum Maintenance Standards
OCIF	Ontario Community Infrastructure Fund
OSIM	Ontario Structure Inspection Manual
SCADA	Supervisory Control and Data Acquisition System
ULR	Useful Life Remaining

1. INTRODUCTION

1.1. Overview

The main objective of an asset management plan is to use a municipality's best available information to develop a comprehensive long-term plan for capital assets. In addition, the plan should provide a sufficiently documented framework that will enable continuous improvement and updates of the plan, to ensure its relevancy over the long-term. Watson & Associates Economists Ltd. (Watson) was retained by the Township of Malahide (Township) in 2018 to update the Township's 2013 Asset Management Plan (dated November 29, 2013). In 2021, Township Staff undertook an update of the Watson plan (dated February 20, 2019), and with this update, it is the intent to move the Township's asset management practices towards compliance with Ontario Regulation 588/17.

Due July 1, 2022, O. Reg. 588/17 requires municipal asset management plans to be updated for core assets only (roads, bridges and culverts, and water and wastewater assets). The update should include updated asset inventories, current levels of service, lifecycle activities, and funding strategies. The next update, due July 1, 2024, will require the same update for all capitalized assets. This plan will be a tool for Township staff and Council to use during various decision-making processes, including the annual budgeting and future capital grant applications. This plan will serve as a road map for sustainable infrastructure planning going forward.

The following assets are included in this asset management plan:

<u>Funding Source - Tax Levy</u>

- Roads;
- Bridges and structural culverts;
- Streetlights and sidewalks;
- Guiderails;
- Fleet;
- Facilities (buildings, parks, and cemeteries); and
- Equipment.

<u>Funding Source - User Fees</u>

- Water distribution system; and
- Wastewater collection system.

The Township's goals and objectives with respect to asset management are identified in the Township's Strategic Asset Management Policy. A major theme within that policy is for the Township's physical assets to be managed in a manner that will support the sustainable provision of municipal services to Township residents. Through the implementation of the asset management plan, the Township's practice should evolve to provide services at levels proposed within this document. Moreover, infrastructure and other capital assets should be maintained at condition levels that provide a safe and functional environment for its residents. Therefore, the asset management plan, and the progress with respect to its implementation, will be evaluated based on the Township's ability to meet these goals and objectives.

1.2. Legislative Context

Asset management planning in Ontario has evolved significantly over the past decade. Before 2009, capital assets were recorded by municipalities as expenditures in the year of acquisition or construction. The long-term issue with this approach was the lack of a capital asset inventory, both in the municipality's accounting system and financial statements. As a result of revisions to section 3150 of the Public Sector Accounting Board handbook, effective for the 2009 fiscal year, municipalities were required to capitalize tangible capital assets, thus creating an inventory of assets.

In 2012, the province launched the Municipal Infrastructure Strategy. As part of that initiative, municipalities and local service boards seeking provincial funding were required to demonstrate how any proposed project fits within a detailed asset management plan. In addition, asset management plans encompassing all municipal assets needed to be prepared by the end of 2016 to meet Federal Gas Tax agreement requirements. To assist in defining the components of an asset management plan, the Province produced a document entitled Building Together: Guide for Municipal Asset Management Plans. This guide documented the components, information, and analysis that were required to be included in municipal asset management plans under this initiative. The province's Infrastructure for Jobs and Prosperity Act, 2015 (IJPA) was proclaimed on May 1, 2016. This legislation detailed principles for evidence-based and sustainable long-term infrastructure planning. IJPA also gave the province the authority to guide municipal asset management planning by way of regulation.

In late 2017, the province introduced O. Reg. 588/17 under IJPA. The intent of O. Reg. 588/17 is to establish a standard format for municipal asset management plans. Specifically, the regulations require that asset management plans be developed that define the current and proposed levels of service, identify the lifecycle activities that would be undertaken to achieve these levels of service, and provide a financial strategy to support the levels of service and lifecycle activities. This plan has been developed to address the requirements of O. Reg. 588/17 utilizing the best information available to the Township at this time.

1.3. Plan Development

The asset management plan was developed using a program that leverages the Township's asset management principles as identified within its strategic asset management policy, capital asset database information, and staff input in identifying current and proposed levels of service, as informed by the Council, as well as proposed asset management strategies.

The development of the Township's asset management plan is based on the steps summarized below:

1. Compile available information pertaining to the Township's capital assets (to be included in the plan) including attributes such as size/material type, useful life, age, accounting valuation and current valuation. Update current valuation, where required, using benchmark costing data or applicable inflationary indices.

2. Define and assess the state of local infrastructure through current asset conditions, based on a combination of Township staff input, existing asset reports, and an asset age-based condition analysis.

3. Define and document current levels of service, as well as proposed levels of service, based on discussions with Township Council and staff, and consideration of various background reports.

4. Develop an asset management strategy that provides the activities required to sustain the levels of service discussed above. The strategy summarizes these activities in the forecast of annual capital and operating expenditures required to achieve these level of service outcomes.

5. Develop a funding strategy to support the lifecycle management strategy. The funding strategy informs how the capital and operating expenses arising from the asset management strategy will be funded over the forecast period, and may be accommodated in the annual budget process.

6. Document the comprehensive Asset Management Plan in a formal report to inform future decision-making and to communicate planning to municipal stakeholders.

7. Make the Asset Management Plan and all relevant background information and reports available to the public. The Asset Management Plan, Strategic Asset Management Policy, and relevant reports to Council will be available on the Township's website, in addition to all background information made available upon request.

1.4. State of Local Infrastructure and Levels of Service

This is an analysis of the Township's assets, the current service levels provided by those assets, and the service levels the Township intends to deliver into the future.

O. Reg. 588/17 requires that for each asset category included in the asset management plan, the following information must be identified:

- Summary of the assets;
- Replacement cost of the assets;
- Average age of the assets (it is noted that the Regulation specifically requires average age to be determined by assessing the age of asset components);
- Information available on condition of assets; and
- Approach to condition assessments (based on recognized and generally accepted good engineering practices where appropriate)

Asset management plans must identify the current levels of service being provided for each asset category. For core municipal infrastructure assets (Bridges and Culverts, Roads, Wastewater, and Water), both the qualitative descriptions pertaining to community levels of service, and metrics pertaining to technical levels of service, are prescribed by O. Reg. 588/17. For all other infrastructure assets, each municipality is required to establish its own measures for levels of service.

1.5. Lifecycle Management

Lifecycle management strategies are required to maintain the current and proposed levels of service. A lifecycle management strategy identifies the recommended lifecycle activities required to achieve desired levels of service. Lifecycle activities are the specified actions that can be performed on assets in order to increase service level and extend service life. These actions can be carried out on a planned schedule in a prescriptive manner, or through a reactionary approach where the treatments are only carried out when specified conditions are met. O. Reg. 588/17 requires that all potential lifecycle activity options be presented, with the aim of analyzing these options in search of identifying the set of lifecycle activities that can be undertaken at the lowest cost to maintain current levels of service or to provide proposed levels of service.

Asset management plans must include a 10-year capital plan that forecasts the lifecycle activities resulting from the lifecycle management strategy. What follows are the lifecycle management strategies for all asset classes contained within this asset management plan, with each section focusing on an individual asset category. Although a considerable amount of effort has been spent on developing lifecycle management strategies informed by observed asset conditions, there are still some assets for which the lifecycle management strategy is age-based. The expenditure forecasts resulting from the lifecycle management strategies for each asset category are also included and have been developed for a 20-year forecast period.

1.6. Funding Strategy

A funding strategy should sustainably fund the lifecycle management strategies of an asset. The funding strategy contained herein focuses on examining how the Township can fund the lifecycle activities required to maintain its assets at the current and/or proposed levels of service. The strategies presented are a suggested approach which should be examined and re-evaluated during the annual budgeting processes to ensure the sustainability of the Township's financial position as it relates to its assets.

O. Reg. 588/17 requires a 10-year capital plan that forecasts the costs of implementing the lifecycle management strategy and the lifecycle activities required therein. The funding strategy in this asset management plan has been developed for a 20-year forecast period, where adequate data allowed, to enable the Township to evaluate the sustainability of its assets over a longer-term horizon. The funding strategy forecast (including both expenditure and revenue sources) was prepared consistent with the Township's departmental budget structure so that it can be used in conjunction with the annual budget process. Various financing options, including reserve funds, debt, and grants were considered. The recommended financing strategy identifies rehabilitation and replacement activities required over the forecast period.

1.7. Growth

For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, assumptions need to be made regarding future changes in population and how those changes will affect asset lifecycle activities required to maintain current levels of service. The 2021 population estimate of the Township of Malahide, as reported by Statistics Canada, was 10,201. This represents an increase of 0.7% from the previous year's estimate. Assuming that growth remains at this level for the next ten years, the current lifecycle activities outlined in this report will remain sufficient to maintain the current levels of service.

1.8. Maintenance and Integration

It should be noted, that while this report covers a forecast period of 20 years, the full lifecycle of the Township's assets were considered in the calculations. In this context, the asset management plan should be updated as the strategic priorities and capital needs of the Township change. This can be accomplished in conjunction with specific legislative requirements (i.e. 5-year review of asset management plan under Infrastructure for Jobs and Prosperity Act), as well as the Township's annual budget process.

Further integration into other Township financial/planning documents would assist in ensuring the ongoing accuracy of the asset management plan, as well as the integrated financial/planning documents. The asset management plan has been developed to allow linkages to a number of strategic documents,

as identified in the Township's Strategic Asset Management Policy. Township staff have the tools available to perform updates to the asset management plan as necessary.

In the future, the asset management plan will continue to be updated by Township staff to more closely integrate with other studies and reports pertaining to Township assets. For example, the strategies identified in this asset management plan should be updated to include the biennial OSIM and Road Needs Study reports.

When updating the asset management plan, it should be noted that the state of local infrastructure, proposed levels of service, lifecycle management strategy, and funding strategy are integrated and impact each other. For example, the funding strategy outlines how the asset management strategy will be funded. The lifecycle management strategy illustrates the costs required to maintain expected levels of service at a sustainable level. The proposed levels of service component summarizes and links each service area to specific assets contained in the state of local infrastructure section and thus determines how these assets will be used to provide expected service levels.

2. ROAD NETWORK

2.1. State of Local Infrastructure and Levels of Service

2.1.1. Asset Class Summary

The Township currently owns and manages 273 centreline kilometres of road assets with a 2021 replacement value totaling approximately $130.6 million. The replacement value has been estimated based on replacement costs from the Township's 2021 State of the Infrastructure and Asset Management Plan for Roads report as prepared by 4 Roads Management Services (dated February 02, 2022). The road network consists of roads with various surface types, including high-class bituminous (HCB), low-class bituminous (LCB), and gravel (G/S). These assets reside in urban, semi-urban, and rural roadside environments. Table 2-1 and Table 2-2 provide a breakdown of the road network by surface type and roadside environment.

The entirety of the road network, on average, was 22 years old in 2021. There are relatively few HCB (4%) roads in the network, which are on average younger than the other surface types. The majority of the road network consist of LCB roads (76%), with the remainder of the network consisting of gravel roads (20%). In the context of roadside environment, the majority of the network is comprised of rural roads (94%).

Figure 2-1 maps the road network by surface material in order to visualize the Township's current circumstances.

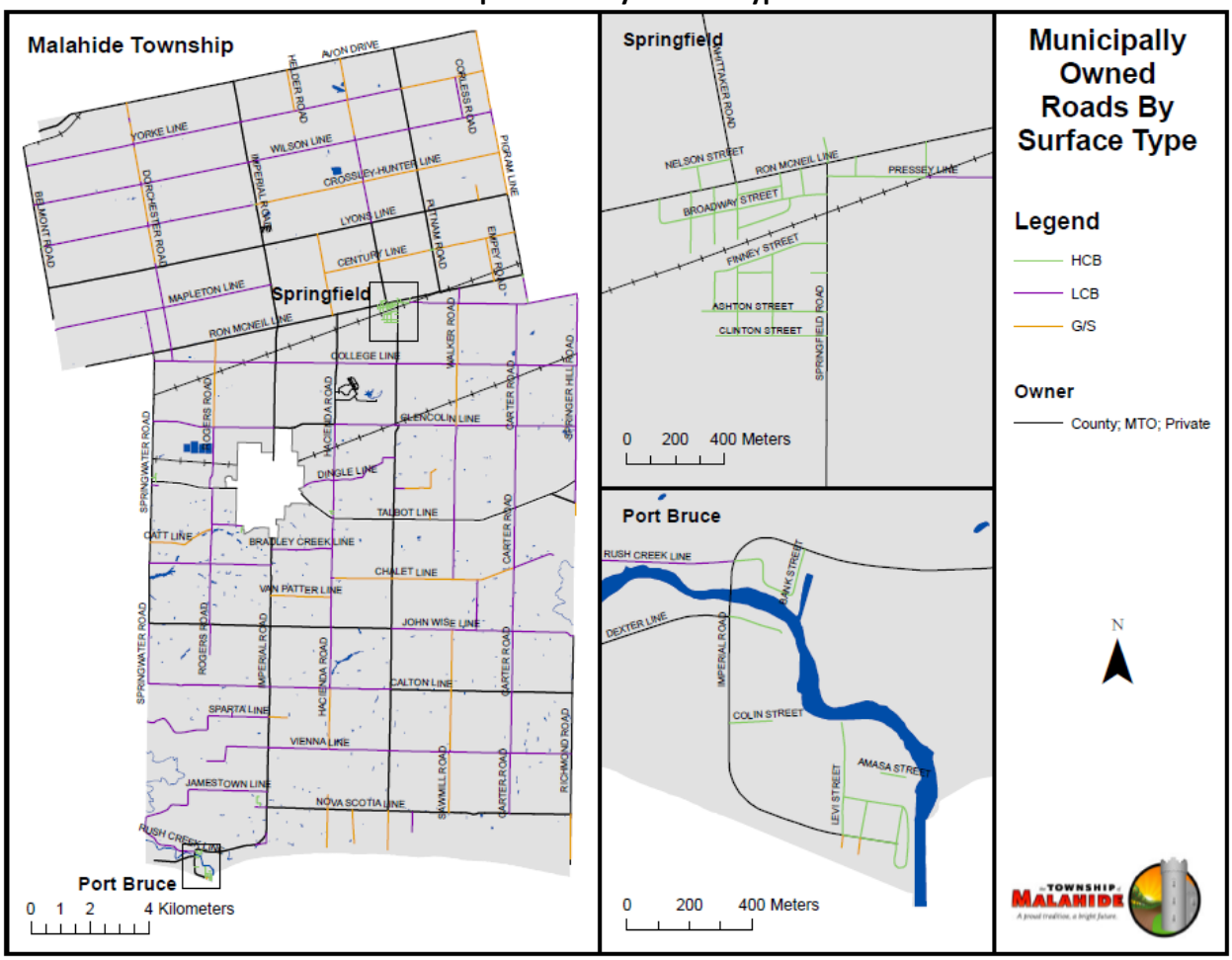
Table 2-1
Road Network – surface Type

Surface Type	Centreline Kilometers	Percentage (%) of Total Centerline Kilometers	Average Age	Replacement Cost (2021 $)
HCB	11	4%	17	$6,869,034
LCB	206	76%	22	$102,152,730
G/S	56	20%	30	$21,662,945
TOTAL	273	100%	22	$130,684,709

Table 2-2
Road Network – Roadside Environment

Roadside Environment	Centreline Kilometers	Percentage (%) of Total Centerline Kilometers	Average Age	Replacement Cost (2021 $)
Urban	2	1%	7	$2,188,046
Semi-Urban	14	5%	21	$6,506,027
Rural	257	94%	23	$121,990,636
TOTAL	273	100%	22	$130,684,709

Figure 2-1
Map – Roads by Surface Type



2.1.2. Condition

While asset age may provide some limited context to the functional state of an asset, an assessed physical condition is a better measure of where an asset is in its lifecycle. Physical condition therefore provides a more accurate estimate of an asset's remaining service life. The Township's 2021 State of the Infrastructure and Asset Management Plan for Roads report provides a physical condition rating for each road segment in the network. This physical condition rating is provided on a scale of 0-100, with 100 being a perfect condition and 0 indicating an asset at the end of its service life.

To better communicate the condition of the road network, these numeric condition ratings have been segmented into qualitative condition states. Table 2-3 summarizes the various physical condition ratings and the condition state they represent for road assets.

Table 2-3
Road Condition States Defined with Respect to Physical Condition

Physical Condition	Condition State
100-91	Brand New
90-81	Very Good
80-71	Good
70-51	Fair
50-34	Poor
33-1	Very Poor
0	End of Life

Table 2-4 examines the average condition of the road network by surface type, which is weighted based on centreline kilometres. Adjustments to the physical condition are performed annually based on the lifecycle degradation profiles developed in the Township's 2021 State of the Infrastructure and Asset Management Plan for Roads report, or set to known values when capital improvements are completed (i.e. rehabilitation or replacement activities being performed). The physical condition ratings utilized in this plan are from mid-2021 and represent the most up-to-date information available to the Township at this time.

As illustrated in Table 2-4, high-class and low-class bituminous roads are in a "Good" condition state on average, while gravel roads are in a "Fair" condition state. Assessed across the entire road network, all road segments are at an average physical condition rating of 71, or currently in a "Good" condition state.

Table 2-4
Road Condition Analysis

Surface Type	Centreline Kilometers	Physical Condition (Weighted Average)	Average Condition State
HCB	11	74	Good
LCB	206	74	Good
G/S	56	56	Fair
TOTAL	273	71	Good

2.1.3. Current Levels of Service

The level of service currently provided by the Township's road network is, in part, a result of the state of local infrastructure identified above. A levels of service analysis defines the current levels of service and enables the Township to periodically evaluate these service level objectives. The Township's strategic service objective is to provide a safe and reliable road network to connect the Municipality's residents and businesses. Road assets have prescribed levels of service reporting requirements under O. Reg. 588/17. These requirements include levels of service reporting from two different levels, i.e. community levels of service and technical levels of service. Community levels of service objectives describe service levels in terms that residents understand and reflect their scope and quality expectations of the road network. Technical levels of service describe the scope and quality of Township roads through performance measures that can be quantified, evaluated, and detail how effectively a municipality provides services. Table 2-5 presents the current levels of service measures as mandated by O. Reg. 588/17.

Table 2-5
Roads Current Levels of Service – O.Reg. 588/17

SCOPE	SERVICE OBJECTIVES	COMMUNITY EXPECTATIONS	TECHNICAL PERFORMANCE MEASURES	CURRENT LEVEL OF SERVICE
SAFETY	To ensure that the Municipality's road network is safe by keeping pavement and gravel surfaces in fair condition or better.	Roads throughout the community are in fair condition or better.	Average Network Pavement Condition Index (PCI) Value for paved roads:*	**"Good"**
			Average Network Surface Condition for unpaved roads:*	**"Fair"**
RELIABILITY	To ensure that Municipality's road network is reliable by minimizing the number of road closures, both planned and unplanned.	Minimal number of annual unplanned road closures, both planned and unplanned, throughout the community.	Total number of road closures:	**17**
			Percentage of closures planned:	**60%**
			Percentage of closures unplanned:	**40%**
INTER-CONNECTIVITY	To ensure that Municipality's road network provides good connectivity between and throughout all areas of the community.	Minimal number of properties without municipal road access throughout the community.	Total number of lane-kilometres as a proportion of square kilometres of land area of the community:*	**1.33 KM**
			Total number of lane-kilometres by road class as a proportion of square kilometres of land area of the community:*	
			Arterial (MMS 1 to 2):	**0.00 KM/KM^2**
			Collector (MMS 3 to 4):	**1.02 KM/KM^2**
			Local (MMS 5 to 6):	**0.37 KM/KM^2**

* mandated by O. Reg. 588/17

2.2. Lifecycle Activities

2.2.1. Lifecycle Activities

This section will detail the lifecycle activities as documented in the Township's 2021 State of the Infrastructure and Asset Management Plan for Roads report and through discussions amongst Township staff.

The lifecycle activities that the Township currently employs in the management of its roads include:

- Reconstruction – REC (LCB/HCB roads);
- Reconstruction – RSS (reconstruction including storm sewers, HCB roads);
- Resurfacing – R1 (50mm depth, HCB roads);
- Resurfacing – R2 (100mm depth, HCB roads);
- Single Surface Treatment – SST (LCB roads) and
- Single Surface Treatment – SST+ (includes padding & geometric correction, LCB roads).

Table 2-6 details the costs associated with undertaking these lifecycle activities, by surface type. The costs are presented on a cost per center lane kilometre basis as identified in the Township's 2021 State of the Infrastructure and Asset Management Plan for Roads report.

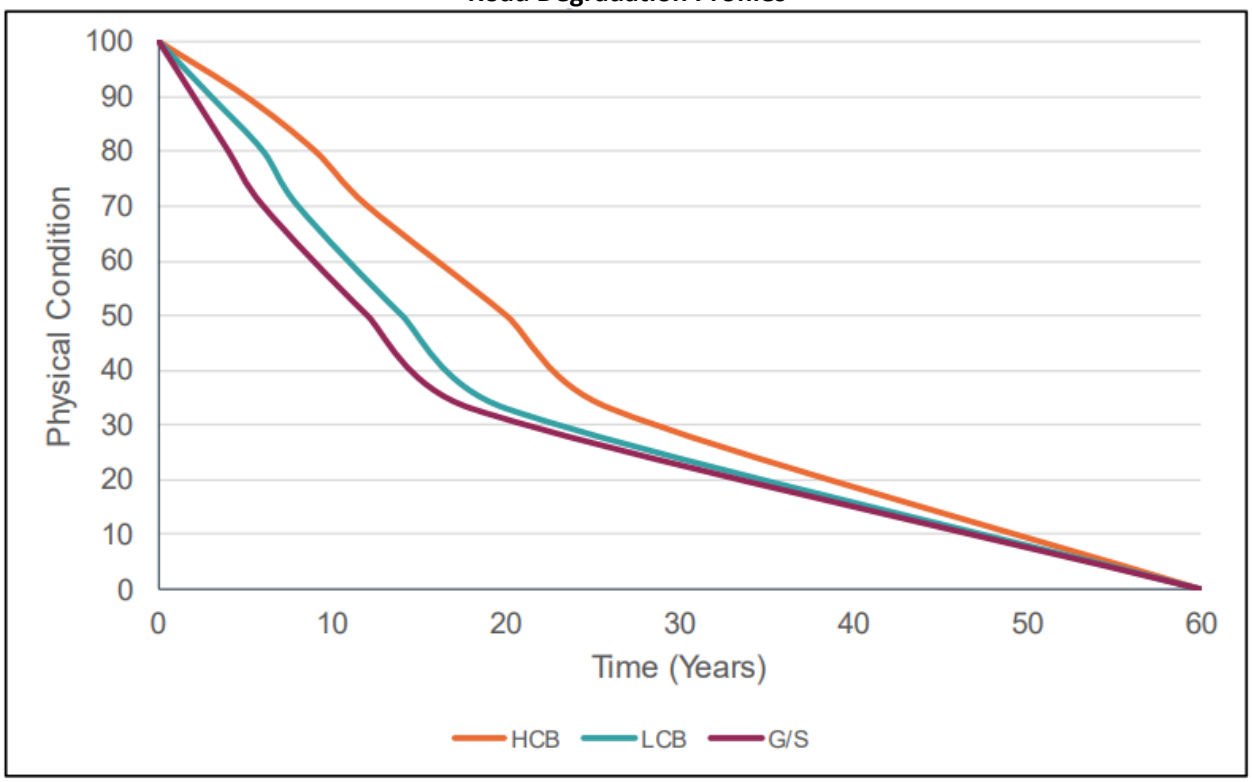
Table 2-6
Average Road Treatment Costs by Surface Type (per cl-km)

Treatment	Surface Type	Cost/cl-km
Resurfacing - R1	HCB	$127,638
Resurfacing - R2	HCB	$249,497
Single Surface Treatment - SST	LCB	$31,301
Single Surface Treatment - SST+	LCB	$126,733
Reconstruction - REC	HCB/LCB	$345,038
Reconstruction - RSS	HCB	$1,382,149

2.2.2. Degradation Profiles

Assets deteriorate over time, eventually reaching a point where they have no remaining service life left. However, the path each asset takes in reaching its end of life differs, even for assets of the same type. A condition rating identifies where along the path any particular asset lays, or in other words, how long an asset has left before it reaches its end of life. Therefore, condition and service life are linked, and can be plotted graphically to visually represent the degradation curve of an asset. Figure 2-2 presents the degradation profile of roads (by surface type) that have been developed based on the Township's 2021 State of the Infrastructure and Asset Management Plan for Roads report. Through the process of conducting regular road condition inspections, the Township will be able to further refine these degradation profiles.

Figure 2-2
Road Degradation Profiles



2.2.3. Design Criteria

Table 2-7 presents the decision criteria—developed by referencing the 2021 State of the Infrastructure and Asset Management Plan for Roads report and through discussions amongst Township staff—for triggering a specific road treatment. When all the decision criteria for a given road asset are met, the corresponding treatment is eligible to be applied. When a treatment is applied, the physical condition of the asset is improved by the amount specified in the "Gain to Condition" column, but not to exceed the amount listed in the "Maximum Condition Threshold" column.

Table 2-7
Roads Treatment Decision Criteria

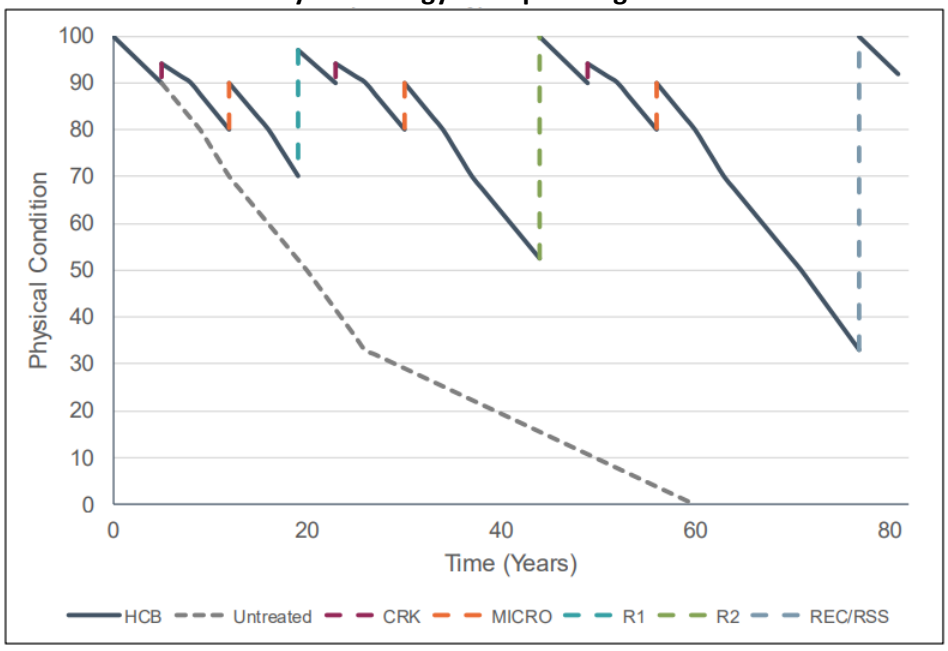
Treatment	Surface Type	Roadside Environment	Condition Range	# of Times Treatment Prev. Applied	Gain to Condition	Maximum Condition Threshold
R1	HCB	Any	71-55	0	+97	97
R2		Any	54-35	0	+100	100
SST	LCB	Any	77-53	0	+97	97
SST+		Any	52-37	0	+100	100
REC	HCB/LCB	Semi-Urban/Rural	34-0	N/A	+100	100
RSS	HCB	Urban	34-0	N/A	+100	100

2.2.4. Expected Lifecycle and Associated Risk

Combining the treatments, degradation profiles, and decision criteria presented herein results in a complete lifecycle management strategy. Figure 2-3, Figure 3-4, and Figure 2-5 present an illustrative example of the expected lifecycle of HCB, LCB, and gravel roads, respectively. The dashed, vertical lines represent points of intervention in the representative road's expected life. The lifecycle path of the asset is represented by the solid lines, following the degradation profiles presented above. Finally, the grey, dotted line demonstrates the expected lifecycle of a road segment were it to not receive any treatments over the course of its service life.

For an HCB road, based on the decision criteria outlined in Table 2-7, one R1 and one R2 resurfacing treatments would be performed on a road segment before a full reconstruction takes place. Further, between the resurfacing cycles, crack sealing and microsurfacing treatments would be carried out as an efficient means of improving the service levels provided. R1, R2, SST, and SST+ treatments previously applied are reset to 0 upon any Reconstruction treatment.

Figure 2-3
Lifecycle Strategy Example – High-Class Bituminous Roads (HCB)



DEFINITIONS

CRK - Crack Sealing

MICRO - Microsurfacing

R1 - Basic Resurfacing (50mm)

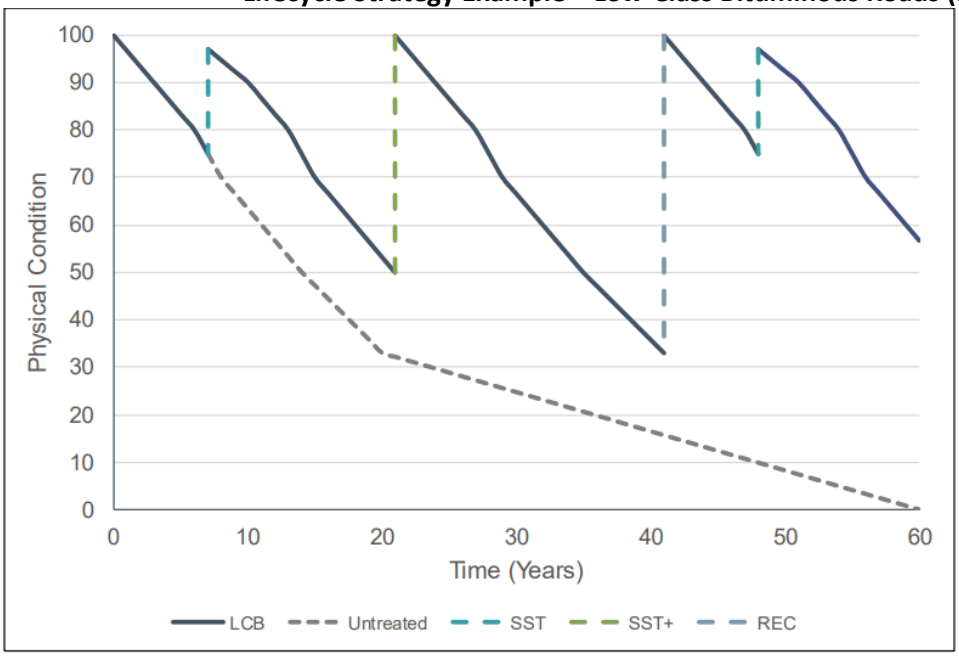
R2 - Basic Resurfacing (100mm)

REC - Rural Reconstruction

RSS - Reconstruction with Storm Sewers

Based on the decision criteria outlined in Table 2-7 for LCB roads, one SST and one SST+ single surface treatment would be performed on a road segment before a full reconstruction took place.

Figure 2-4
Lifecycle Strategy Example – Low-Class Bituminous Roads (LCB)



DEFINITIONS

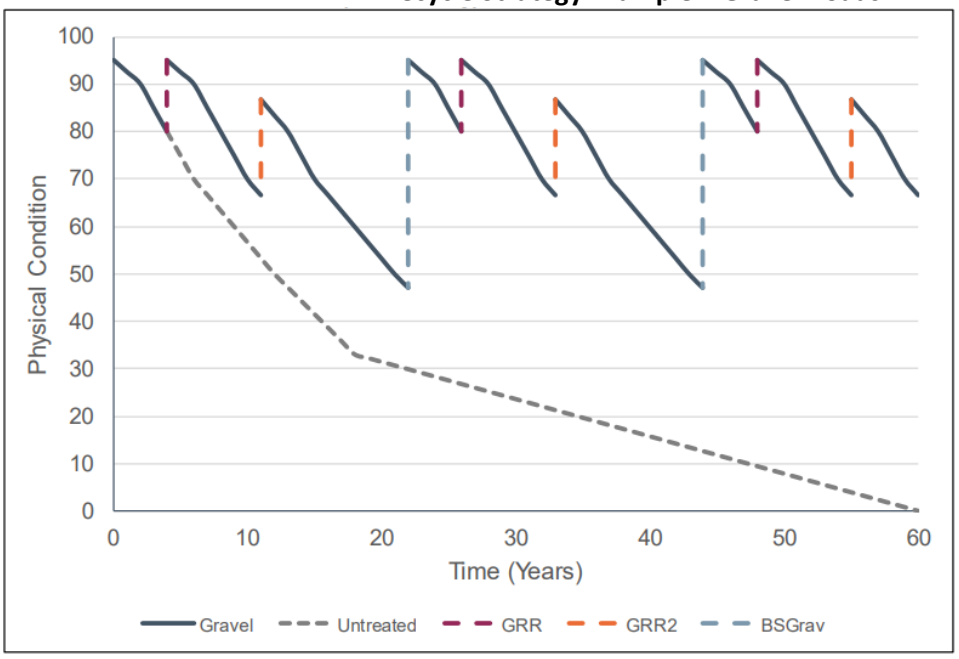
SST - Single Surface Treatment

SST+ - Single Surface Treatment plus Edge Padding, Base Repair, Ditching, or Berm Removal

REC - Rural Reconstruction

Finally, based on the decision criteria outlined in Table 2-7 for gravel roads, one GRR and one GRR2 gravel resurfacing treatment would be performed on a road segment before a BSGrav treatment took place. Treatment of gravel roads will not be considered a capital program and will instead be included in operational programs.

Figure 2-5
Lifecycle Strategy Example – Gravel Roads



DEFINITIONS

GRR - 75mm of Granular A

GRR2 – 150mm of Granular A

BSGrav – Base and Surface

The lifecycle strategies presented above would allow for the proposed levels of service introduced in Section 2.1.3 to be met for almost all roads. Currently, the way the reconstruction treatments have been defined, MMS class 3 roads would fall below the minimum condition score of 50 for a portion of their lifecycle. The only MMS class 3 roads are LCB roads, which make up 6.1% of the network, based on centreline kilometres.

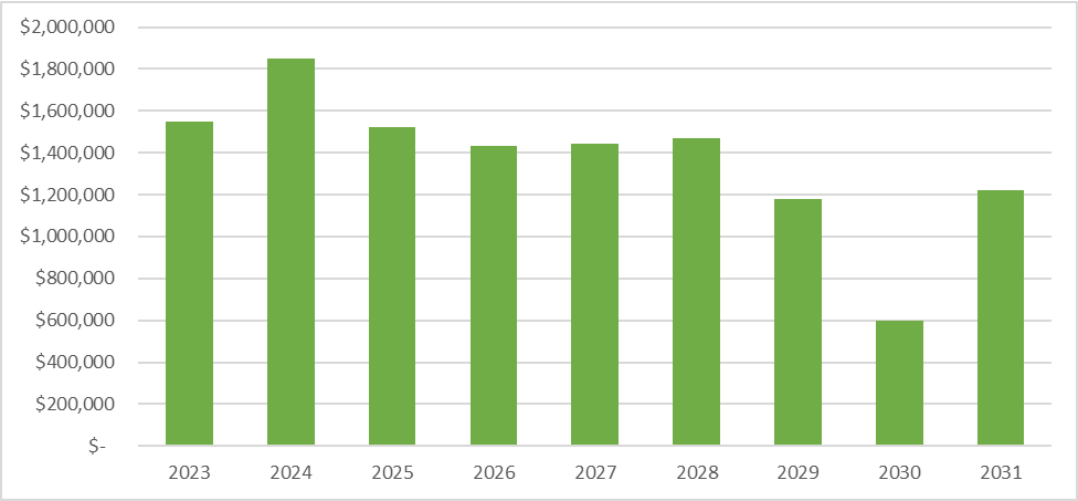
2.3. Funding Strategy

2.3.1. Annual Cost Forecast

Figure 2-6 presents the 20-year expenditure forecast that results from following the lifecycle management strategy detailed above. This forecast illustrates the annual expenditures without any consideration to budgetary constraints. Over the 10-year forecast period, the average annual expenditures would be approximately $1.3 million, following the work plan as outlined in the Township's 2021 State of the Infrastructure and Asset Management Plan for Roads report. In recent years, increases and decreases in fuel, asphalt, and salt have been disproportionate to the Consumer Price Index. As such, consideration should be given to annual adjustments in road funding, which are more reflective of the actual experience. Therefore, the intent will be for funding to be adjusted annually to accommodate inflation and the forecast will only be for a 10-year period in order to be presented as accurately as possible.

Table A-1 in Appendix A: Funding Strategy Tables – Tax Levy, presents the capital expenditure forecast for each tax levy-based asset class over the 2023- 2041 forecast period. This expenditure forecast is based on the current lifecycle activities identified this plan.

Figure 2-6
Road Lifecycle Management Strategy – Funding Requirements

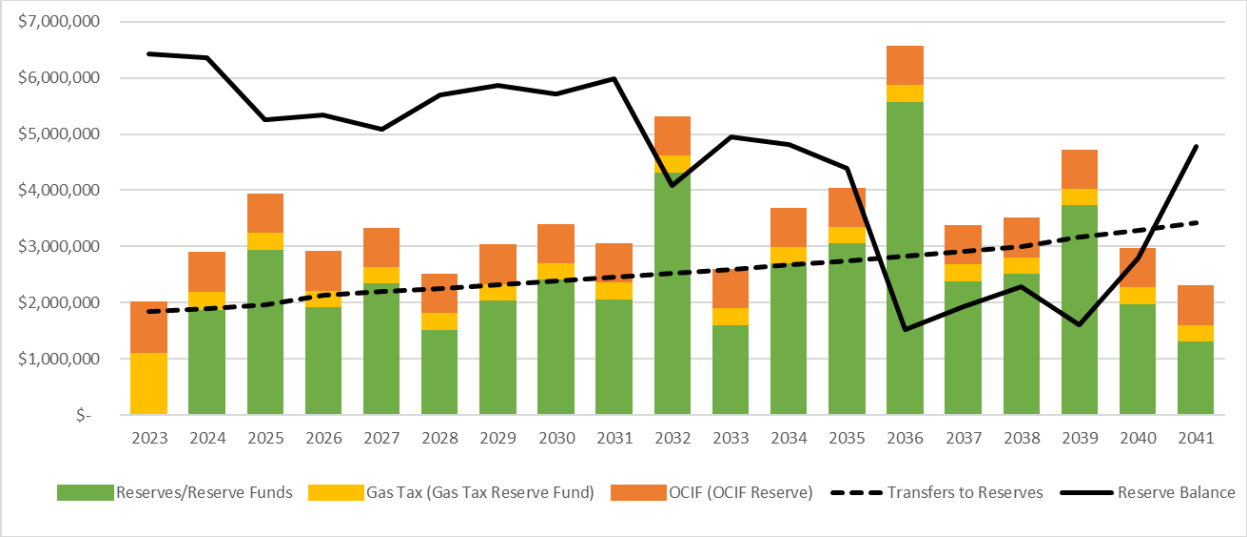


2.3.2. Funding Strategy

Figure 2-7 presents the 20-year funding strategy for all forecasted, tax levy-based, capital expenditures, including the expenditure forecast detailed above. The lifecycle rehabilitation and renewal activities planned for road assets are projected to cost, on average, approximately $1.3 million per year over the forecast period. The funding strategy for these costs is to finance from reserves. There will be a 3% annual increase to the transfer to reserves from operating for the reserve balance to sufficiently fund the forecasted expenditures.

Table A-3 in Appendix A: Funding Strategy Tables – Tax Levy, presents the funding strategy for road assets over the 2023-2041 forecast period. This funding forecast is based on the current lifecycle activities identified this plan.

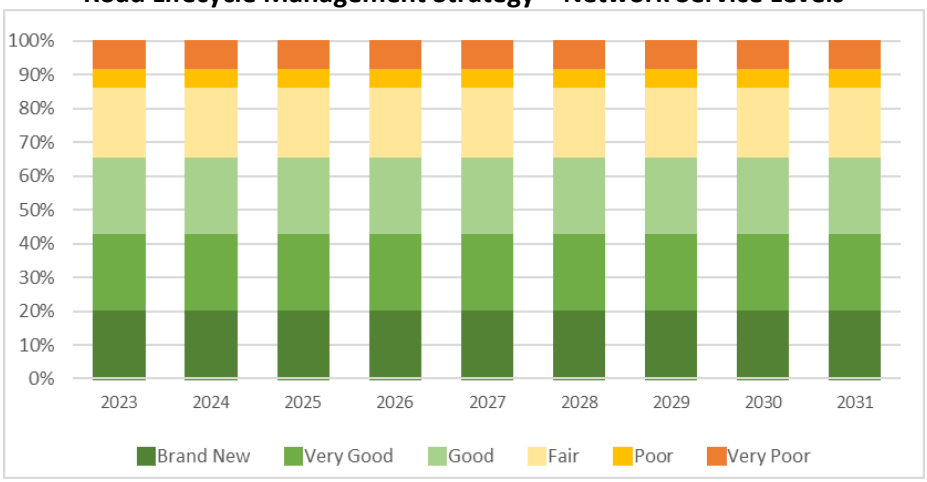
Figure 2-7
Capital Budget Funding Strategy – Tax Levy



2.3.3. Network Service Level Forecast

Figure 2-8 demonstrates the roads network service levels over the forecast period as a result of implementing this lifecycle management funding strategy. This funding strategy will enable the Township to move towards a sustainable position of maintaining the current levels of service for roads assets.

Figure 2-8
Road Lifecycle Management Strategy – Network Service Levels



3. BRIDGES AND STRUCTURAL CULVERTS

3.1 State of Local Infrastructure and Levels of Service

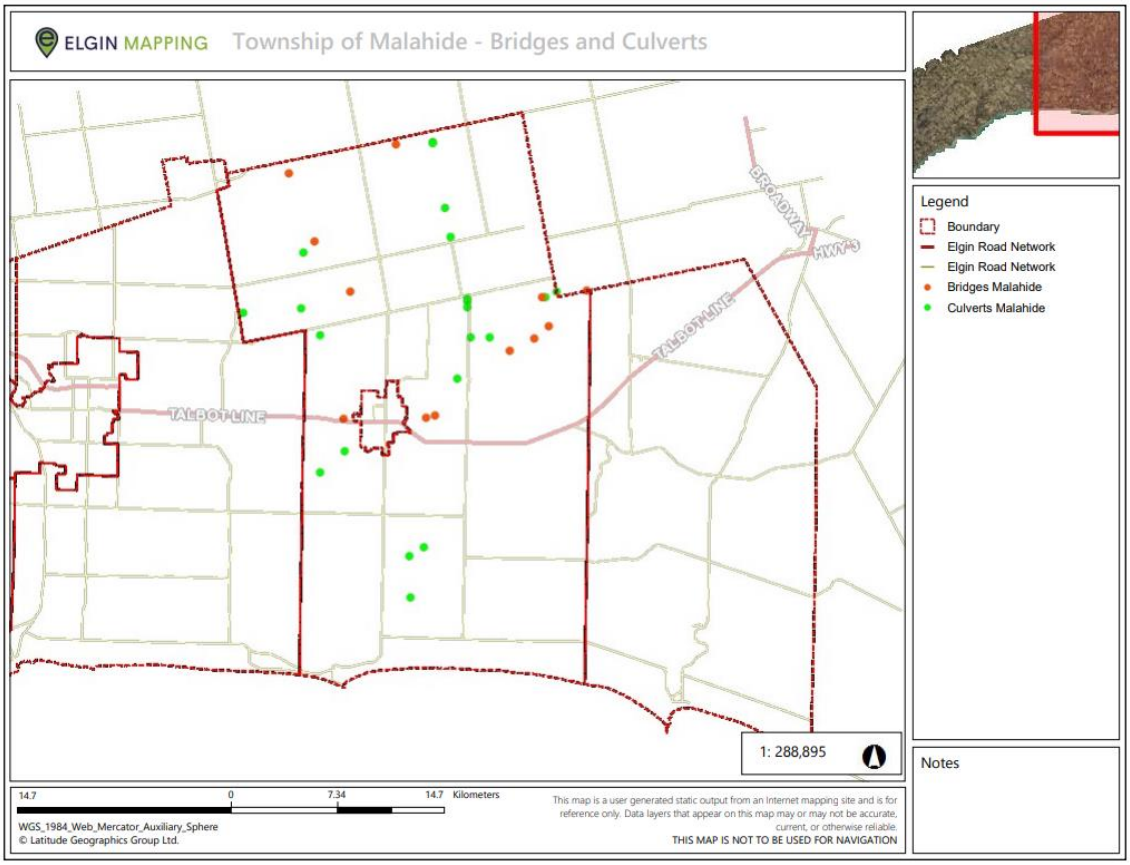
3.1.1. Asset Class Summary

The Township currently owns and manages 12 bridges and 21 structural culverts, with a 2020 total replacement value totaling approximately $43.8 million. The replacement value has been estimated based on replacement costs from the Township's 2020 Bridge and Culvert Inspection (OSIM) report as prepared by MEDA Engineering & Technical Services (dated October 05, 2020). Table 3-1 provides a summary of count, age, and replacement value for the current bridge and culvert network. The average age of the Township's 21 culverts averages 36 years, while the average age of the 12 bridges is 23 years. Figure 3-1 maps the bridge and culvert network to visualize the Township's current asset distribution.

Table 3-1
Bridge and Culvert Infrastructure Summary

Type	Quantity	Average Age	Replacement Cost (2020 $)
Bridges	12	23	$22,227,402
Culverts	21	36	$21,654,067
TOTAL	33	31	$43,881,469

Figure 3-1
Map – Bridges and Culverts



3.1.2. Condition

The Township's 2020 Ontario Structure Inspection Manual (OSIM) report assessed the condition of the bridge and culvert network, applying a bridge condition index (BCI) for assets. A BCI score is provided on a numeric scale of 0-100, and is a measure of the overall condition of the structure based on an evaluation of individual components. To better communicate the condition of the bridge and culvert network, the numeric condition ratings have been segmented into qualitative condition states as summarized in Table 3-2.

Table 3-2
Bridge and Culvert condition States Defined with Respect to BCI

BCI	Condition State
100-91	Brand New
90-81	Very Good
80-71	Good
70-61	Fair
60-36	Poor
35-1	Very Poor
0	End of Life

Table 3-3 examines the average condition rating of the bridge and culvert network. The condition of the structures comes from the Township's 2020 OSIM report. On average, bridges and culverts are in a "Good" condition state. Assessed for the entire bridge and culvert network, all structures provide an average BCI of 74, representing a "Good" condition state. The lowest observed condition in the bridge network is "Fair", and for culverts is "Poor".

Table 3-3
Bridge and Culvert Condition Analysis

Type	Quantity	Average BCI	Lowest Observed BCI	Average Condition State
Bridge	12	78	68	Good
Culvert	21	71	51	Good
TOTAL	31	74	51	Good

3.1.3. Current Levels of Service

The level of service currently provided by the Township's bridge and culvert network is, in part, a result of the state of local infrastructure identified above. A level of service analysis defines the current levels of service and enables the Township to periodically evaluate these service level objectives. The Township's strategic service objective is to provide safe and reliable bridge and culvert assets to connect residents and businesses. Bridges and culverts are utilized by all levels of vehicles, i.e. passenger vehicles, emergency vehicles, pedestrians, cyclists, slow-moving vehicles, heavy transport vehicles, etc., and allow the passage of drainage throughout the Township.

Bridge and culvert assets have prescribed levels of service reporting requirements under O. Reg. 588/17. These requirements include levels of service reporting from two different levels, i.e. community levels of service and technical levels of service. Community levels of service objectives describe service levels in terms that residents understand and reflect their scope and quality expectations of the bridge and culvert network. Technical levels of service describe the scope and quality of Township bridges and culverts

through performance measures that can be quantified, evaluated, and detail how effectively a municipality provides services. The Township has also set performance measures for levels of service beyond the requirements under regulation. Performance measures have been categorized within three main service objectives, i.e. safety, reliability, and interconnectivity. Table 3-4 presents the current levels of service as mandated by O. Reg. 588/17 and as set by the Township.

Table 3-4
2020 Bridge and Culvert Current Levels of Service

SCOPE	SERVICE OBJECTIVES	COMMUNITY EXPECTATIONS	TECHNICAL PERFORMANCE MEASURES	CURRENT LEVEL OF SERVICE
SAFETY	To ensure bridge and culvert assets are safe by keeping them in good condition or better and by ensuring that all structures meet the requirements of Ontario Regulation 104/97: Standards for Bridges.	Bridges and culverts throughout the community are in good condition or better.	Average Bridge Condition Index (BCI) value for bridge structures:* Average Bridge Condition Index (BCI) value for structural culverts:*	**"Good"** **"Good"**
RELIABILITY	To ensure bridge and culvert assets are reliable by minimizing the number of structures with dimensional, weight, seasonal, or traffic restrictions, as well as the number of structure closures, both planned and unplanned.	Minimal number of bridge and culvert assets with dimensional, weight, and/or traffic restrictions throughout the community. Minimal number of annual unplanned bridge closures, both planned and unplanned, throughout the community.	Bridge and culvert assets with dimensional restrictions:* Bridge and culvert assets with weight restrictions:* Bridge and culvert assets with traffic-use restrictions:* Bridge and culvert assets with seasonal restrictions: Bridge and culvert closures:	**0%** **0%** **0%** **100%** **0 Planned** **0 Unplanned**
INTER-CONNECTIVITY	To ensure bridge and culvert assets provide good connectivity between and throughout all areas of the community.	Minimal number of properties without municipal bridge or culvert access over watercourses, rail lines, or other features throughout the community.	Municipal right-of-way crossings serviced by a bridge or culvert asset:	**100%**

* mandated by O. Reg. 588/17

3.2. Lifecycle Management

3.2.1. Lifecycle Activities

This section will detail the lifecycle activities (capital treatments) as set forth in the 2020 OSIM report. The treatments that the Township currently employs in the management of its bridges and culverts include:

- Bridge:
  - Rehabilitation;
    - Standard;
    - Including jacking of the deck;
  - Reconstruction;
- Culvert:
  - Reconstruction.

Table 3-5 details the costs for the lifecycle activities listed above. These costs are presented as a percentage of estimated replacement cost for the entire bridge, which are derived from averages present in the 2020 OSIM report. The "Rehabilitation – Includes Jacking the Deck" treatment is a flag from the 2020 OSIM report, where this treatment is only performed if the recommended rehabilitation treatment for a bridge required jacking of the deck. As this is a costly endeavour, the percent of replacement cost attributed to this treatment is greater than standard rehabilitations. After completing a rehabilitation treatment that includes jacking of the deck, or a reconstruction, this flag is removed, and all subsequent rehabilitations will be standard rehabilitations, until such a time as it is deemed that a jacking of the deck treatment would be necessary again.

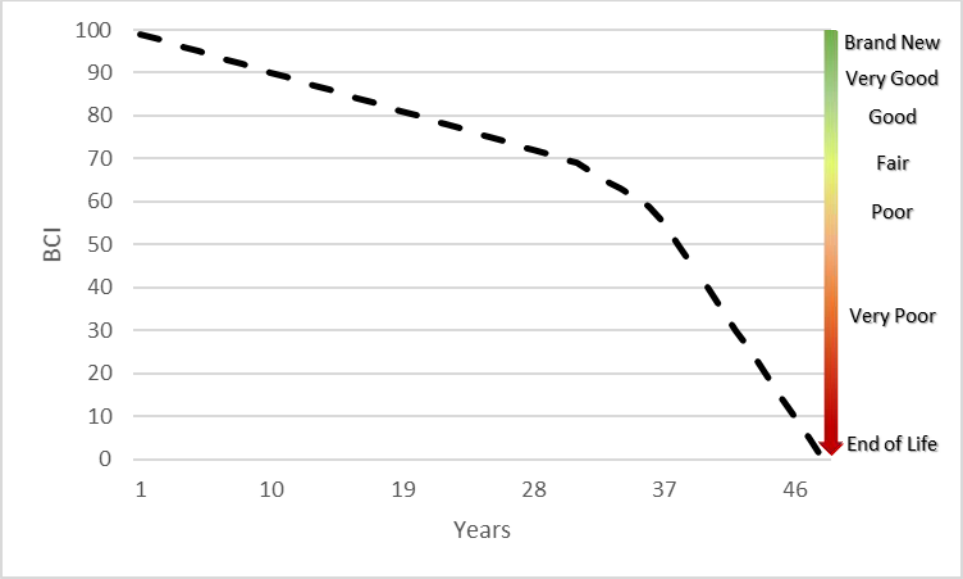
Table 3-5
Bridge and Culvert Treatment Costs as Percent of Total Replacement

Treatment	Applies To	% of Replacement Cost
Rehabilitation – Standard	Bridge	22%
Rehabilitation – Includes Jacking the Deck	Bridge	43%
Reconstruction	Bridge & Culvert	100%

3.2.2. Degradation Profiles

Assets deteriorate over time, eventually reaching a point where they have no remaining service life left. However, the path each asset takes in reaching its end of life differs, even for assets of the same type. A condition rating identifies where along the path any particular asset lays, or in other words, how long an asset has left before it reaches its end of life. Therefore, condition and service life are linked, and can be plotted graphically to visually represent the degradation curve of an asset. Figure 3-2 presents the degradation profile of bridges and culverts that has been developed based on information contained in the Township's 2020 OSIM report. Through the process of conducting the required bi-annual bridge and culvert inspections, the Township will be able to further refine the degradation profile associated with these assets.

Figure 3-2
Bridge & Culvert Degradation Profile



3.2.3. Decision Criteria

Table 3-6 presents the decision criteria, developed by referencing the 2020 OSIM report, for triggering specific bridge and culvert treatments. When the decision criteria for a given asset are met, the corresponding treatment is eligible to be applied. When a treatment is applied, the BCI of the asset is improved by the amount specified in the "Gain to Condition" column, but not to exceed the amount listed in the "Maximum Condition Threshold" column.

Table 3-6
Bridge and Culvert Treatment Decision Criteria

Asset Type	Treatment	BCI Range	Flag – Requires Jacking of Deck	Gain to Condition	Maximum Condition Threshold
Bridge	Rehabilitation – Incl. Jacking of Deck	45-36	True	+99	99
	Rehabilitation – Standard	45-36	False	+99	99
	Reconstruction	35-0	N/A	+100	100
Culvert	Reconstruction	35-0	N/A	+100	100

3.2.4. Expected Lifecycle and Associated Risk

Combining the treatments, degradation profiles, and decision criteria presented herein results in a complete lifecycle management strategy. Figure 3-3 and 3-4 present illustrative examples of the expected lifecycle for bridges and culverts, respectively. The dotted, vertical lines represent points of intervention in the representative asset's expected life. The lifecycle path of the asset is represented by the solid lines, following the degradation profile presented above. Finally, the red, dashed line demonstrates the expected lifecycle of an asset were it to not receive any treatments over the course of its service life.

The lifecycle strategy as defined for bridges is a preservation strategy, which means that an asset will only receive rehabilitation treatments and not be reconstructed, assuming the window of opportunity to conduct the rehabilitation treatments has not passed. In other words, as long as budgetary constraints never prevent a bridge rehabilitation from occurring as it becomes due, a bridge will never degrade to a point that it needs to be reconstructed. For example, a representative bridge will degrade from some BCI greater than 45, and upon reaching a BCI of 45, the bridge will be triggered for a rehabilitation, which in turn increases its BCI to 99. This process will loop ad infinitum until such a time as budgetary pressures prevent the rehabilitation from occurring. If the fiscal limits prevent the bridge from being treated for some time period that the bridge's BCI falls to 35 or below, only then will a reconstruction be triggered.

The lifecycle strategy for culverts is to reconstruct (replace) when the designated BCI is reached. While this strategy is simple—and may not appear to be significantly different from an age-based replacement strategy—because it is informed by the assessed condition this strategy results in more accurate forecasting. As the asset's condition is regularly re-assessed biennially, the timing of the eventual reconstruction could vary significantly from an age-based approach. For example, if the environment that the culvert resides in causes it to degrade quicker or slower than the expected average, and the assessed condition rating reflects this, then the eventual replacement will be triggered at a different time than an age-based approach.

In addition to the biennially scheduled OSIM inspections, an enhanced review will be conducted on structures as they approach the forecasted rehabilitation/reconstruction period. The enhanced review will consider the condition of individual structure components as well as environmental factors, traffic, and other risks. Reviewing these associated risks will ensure that the recommended rehabilitation or reconstruction period optimizes budget requirements and reflects all elements of the structure and the level of service it provides.

Figure 3-3
Lifecycle Strategy – Bridges

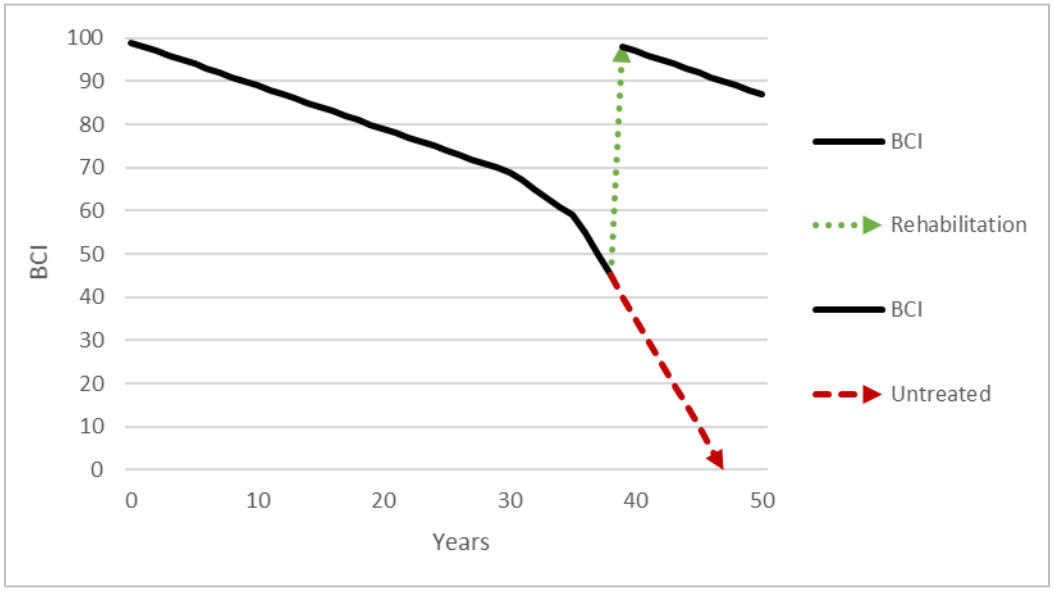
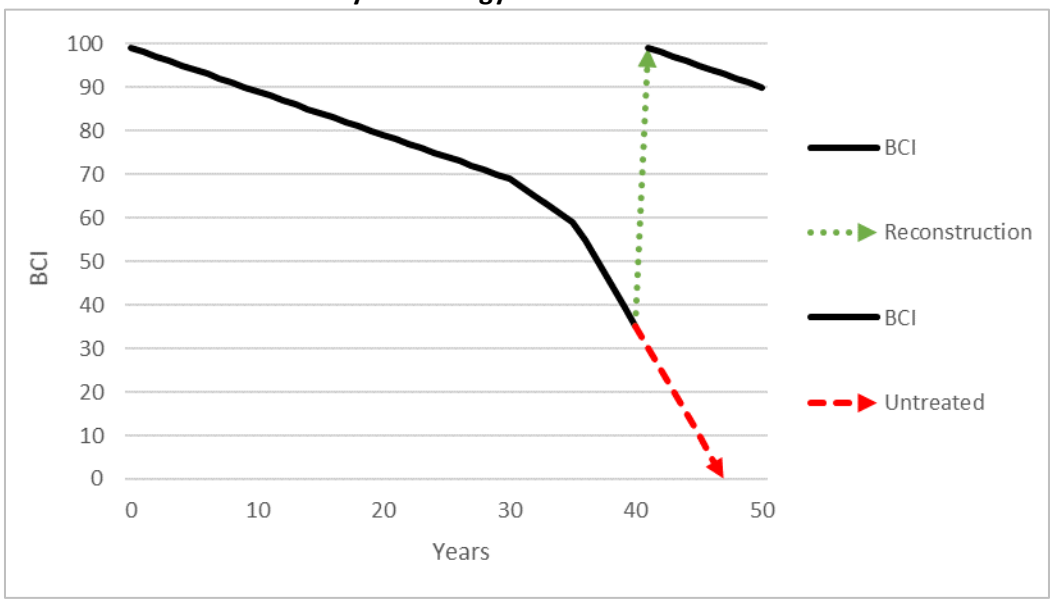


Figure 3-4
Lifecycle Strategy – Structural Culverts



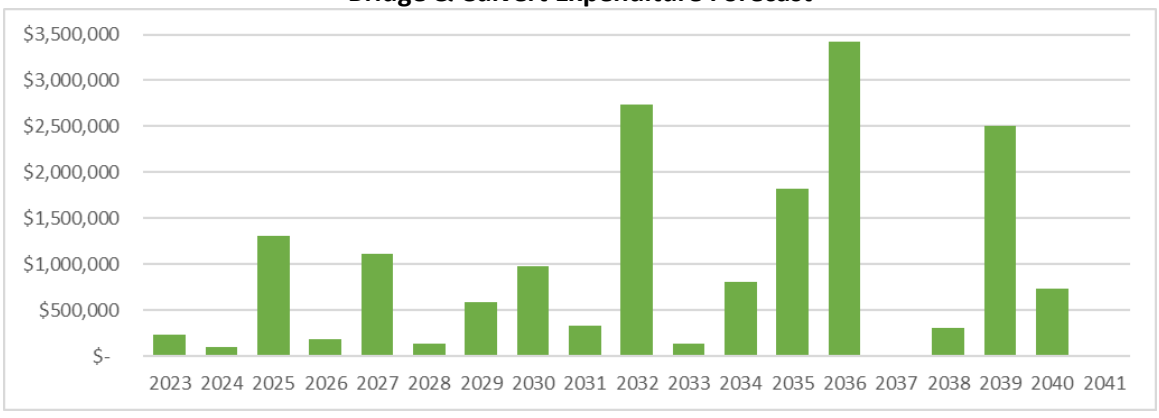
3.3. Funding Strategy

3.3.1. Annual Cost Forecast

Figure 3-5 presents the 20-year expenditure forecast that results from following the lifecycle management strategy detailed above. This forecast illustrates the annual expenditures without any consideration to budgetary constraints. Over the 20-year forecast period, the average annual expenditure would be approximately $840,613. The expenditure forecast includes a capital inflation factor of 3.5% annually, which aligns closely with the historical 20-year annual average rate of inflation as witnessed in Statistics Canada's Building Construction Price Index. The forecast also includes a 20% estimated cost for engineering, environmental assessments, and geotechnical studies, etc., for major projects.

Table A-2 in Appendix A: Funding Strategy Tables – Bridges & Culverts, presents the capital expenditure forecast for the bridge and culvert asset network over the 2023-2041 forecast period. This expenditure forecast is based on the current lifecycle activities identified this plan.

Figure 3-5
Bridge & Culvert Expenditure Forecast

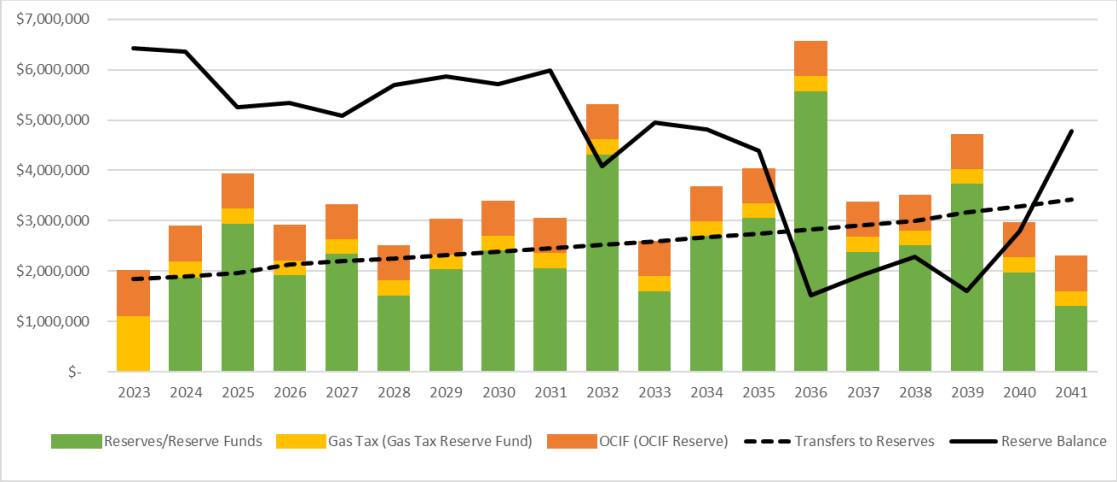


3.3.2. Funding Strategy

Figure 3-6 presents the 20-year funding strategy for all forecasted, tax levy-based, capital expenditures, including the expenditure forecast detailed above. The lifecycle rehabilitation and renewal activities planned for the bridge and culvert assets are projected to cost, on average, approximately $840,613 per year over the forecast period. The funding strategy for these costs is to finance from reserves. There will be a 3% annual increase to the transfer to reserves from operating for the reserve balance to sufficiently fund the forecasted expenditures.

Table A-3 in Appendix A: Funding Strategy Tables – Tax Levy, presents the funding strategy for bridge and culvert assets over the 2023-2041 forecast period. This funding forecast is based on the current lifecycle activities identified this plan.

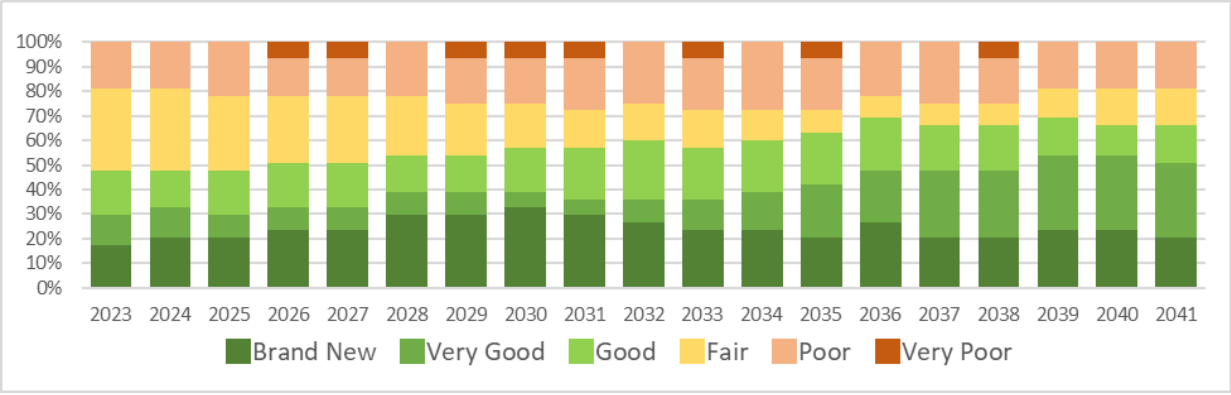
Figure 3-6
Capital Budget Funding Strategy – Tax Levy



3.3.3. Network Service Level Forecast

Figure 3-7 demonstrates the bridge and culvert network service levels over the forecast period as a result of implementing this lifecycle management funding strategy. This funding strategy will enable the Township to move towards a sustainable position of maintaining the current levels of service for bridge and culvert assets.

Figure 3-7
Bridge & Culvert Network Service Levels



4. WATER DISTRIBUTION SYSTEM

4.1. State of Local Infrastructure and Service Levels

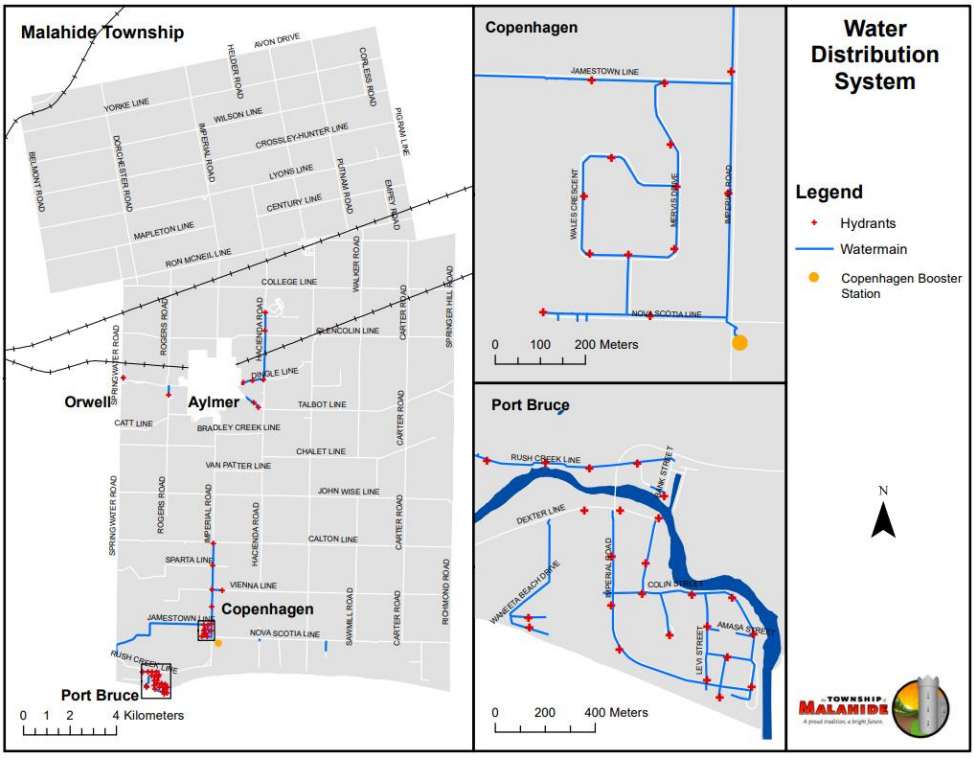
4.1.1. Asset Class Summary

The Township currently owns and manages 22.4 kilometres of water mains, 47 hydrants, 639 water meters, 1 booster station, 12 sample stations, and a Supervisory Control and Data Acquisition System (SCADA), with a 2021 total replacement value totaling approximately $17.8 million. The water provided from this system flows through one of three other systems: Port Burwell Area or Aylmer Area Secondary Water Supply Systems, or the Towns of Aylmer Water System, and is treated from the Elgin Primary Water System. Table 4-1 provides a summary of count, age, and replacement value for the current water distribution system assets. The average age of the Township's water distribution system is approximately 15 years. Figure 4-1 maps the water distribution system to visualize the Township's current asset network.

Table 4-1
Water Distribution System Infrastructure Summary

Type	Quantity	Average Age	Replacement Cost (2021 $)
Water Mains	22.4 km	25	$16,635,022
Hydrants	47 units	14	$376,000
Water Meters	639 units	12	$357,500
Booster Station	1	10	$274,637
Sample Stations	12	12	$89,616
SCADA	1	6	$34,231
		TOTAL	$17,767,006

Figure 4-1
Map – Malahide Water Distribution System



4.1.2. Condition

The Township Staff assessed the condition of the water distribution system, applying a condition state for the percentage of useful life remaining for assets. The percentage of useful life remaining is based on a predetermined useful life for water mains, hydrants, water meters, sample stations, for the booster station. To better communicate the condition of the water distribution system, the numeric condition ratings have been segmented into qualitative condition states as summarized in Table 4-2.

Table 4-2
Water Distribution System Condition States Defined with Respect to Useful Life

Useful Life Remaining (%)	Condition State
100-84	Brand New
83-67	Very Good
66-51	Good
50-34	Fair
33-18	Poor
17-1	Very Poor
0	End of Life

Table 4-3 examines the average condition rating of water distribution system. The condition of the assets comes from the percentage of useful life remaining. Assessed for the entire water distribution system, all assets provide an average percentage of useful life remaining of, representing a "Good" condition state. The lowest observed condition in the water distribution system is 0 "End of Life" in the category of water meters, as some are beyond the end of their useful life.

Table 4-3
Water Distribution System Condition Analysis

Type	Quantity	Average % of Useful Life Remaining (ULR)	Lowest Observed ULR	Average Condition State
Water Mains	22.4 km	75	44	Very Good
Hydrants	47	65	35	Good
Meters	639	52	0	Good
Booster Station	1	53	66	Good
Sample Stations	12	71	24	Very Good
SCADA	1	48	8	Fair
			TOTAL	Good

4.1.3. Current Levels of Service

The levels of service currently provided by the Township's water distribution system are a result of the state of local infrastructure identified above. A level of service analysis defines the current levels of service and enables the Township to periodically evaluate these service level objectives. The Township's strategic service objective is to provide safe and reliable water distribution system throughout the municipality.

Water distribution system assets have prescribed levels of service reporting requirements under O. Reg. 588/17. These requirements include levels of service reporting from two different levels, i.e. community levels of service and technical levels of service. Community levels of service objectives describe service levels in terms that customers understand and reflect their scope and quality expectations of the water

distribution system. Technical levels of service describe the scope and quality of Township water distribution mains, hydrants, and meters, through performance measures that can be quantified, evaluated, and detail how effectively a municipality provides services. The Township has also set performance measures for levels of service beyond the requirements under regulation. Performance measures have been categorized within three main service objectives, i.e. safety, reliability, and inclusivity. Table 4-4 presents the current levels of service as mandated by O. Reg. 588/17 and as set by the Township.

Table 4-4
2021 Water Distribution System Current Levels of Service

SCOPE	SERVICE OBJECTIVES	COMMUNITY EXPECTATIONS	TECHNICAL PERFORMANCE MEASURES	CURRENT LEVEL OF SERVICE
SAFETY	To ensure that Municipality's water system is safe by keeping water supply and distribution assets in good condition or better, and in compliance with the Safe Drinking Water Act, 2002.	Water assets throughout the community are in good condition or better.	Average watermain condition:* Average asset condition overall:*	**"Very Good"** **"Good"**
RELIABILITY	To ensure that the Municipality's water supply and distribution assets are reliable by minimizing watermain breaks and/or boil water advisories, and by ensuring minimum fire flow requirements.	Available fire flow coverage throughout the community, with minimal number of boil water advisories or service interruptions.	Percentage of total properties with available/adequate fire flow coverage:* Number of connection-days per year due to boil water advisories compared to the number of properties connected:* Number of connection-days per year due to watermain breaks compared to the number of properties connected:*	**18%** **0 Days per Year** **0 Days per Year**
INCLUSIVITY	To ensure that the Municipality's water supply and distribution service is inclusive by providing service to all properties throughout the community.	Minimal number of properties without municipal water service throughout the community.	Percentage of total number of properties connected to the community's water supply and distribution system:*	**26%**

* mandated by O. Reg. 588/17

4.2. Lifecycle Management

4.2.1. Lifecycle Activities

This section will detail the lifecycle activities (capital treatments) as prescribed by Township staff. The treatments that the Township currently employs in the management of its water distribution system include:

- Water Mains, and Hydrants:
  - Rehabilitation;
  - Replacement.
- Water Meters, and Sample Stations:
  - Replacement.
- Booster Station, and SCADA
  - Component Rehabilitation
  - Component Replacement

Table 4-5 details the costs for the lifecycle activities listed above. These costs are presented as a percentage of estimated replacement cost or as flat rates per treatment. Rehabilitation of a water main includes replacement of metallic fittings and service lines. Rehabilitation of a hydrant involves the replacement of internal components. Hydrants are inspected every two years by the Ontario Clean Water Agency (OCWA) who may make recommendations for such rehabilitations. The replacement of a water main, hydrant, or meter is the costliest treatment and therefore is only recommended after all other treatments have been exhausted.

Table 4-5
Water Distribution System Treatment Costs

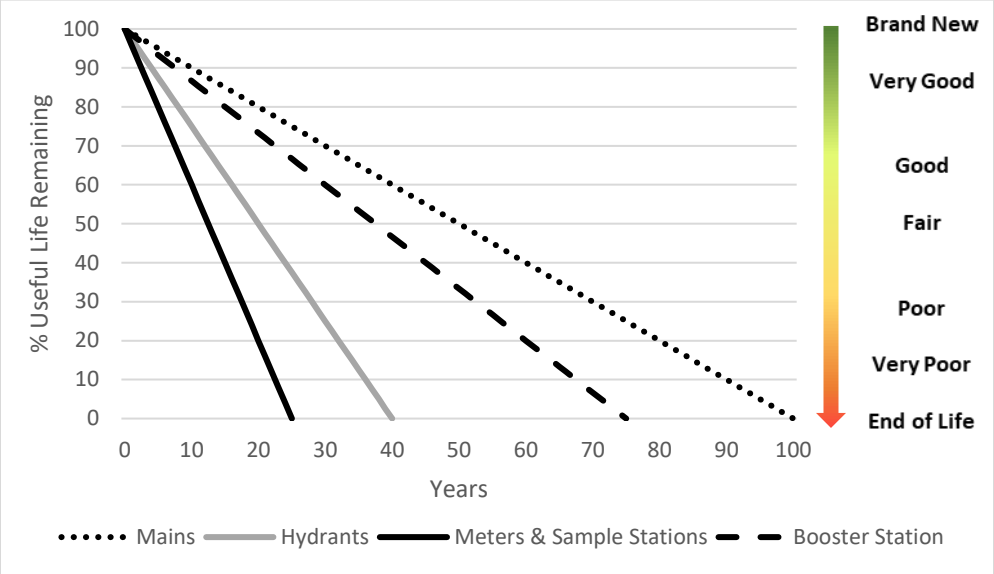
Treatment	Applies To	Cost (2021$)
Rehabilitation – Fittings Replacement	Water Mains	$15,000 per Service
Rehabilitation – Internal Rebuild	Hydrants	37% of Replacement Cost
Rehabilitation – Components	Booster Station	6% of Replacement Cost
Replacement	All	100% of Replacement Cost

4.2.2. Degradation Profile

Assets deteriorate over time, eventually reaching a point where they have no remaining service life left. However, the path each asset takes in reaching its end of life differs, even for assets of the same type. A condition rating identifies where along the path any particular asset lays, or in other words, how long an asset has left before it reaches its end of life. Therefore, condition and service life are linked, and can be plotted graphically to visually represent the degradation curve of an asset.

Figure 4-2 presents the degradation profile of the water distribution system that has been developed based on a straight-line approach per manufacturer recommendations. Through the process of conducting condition assessments, the Township will be able to collect data to further refine the degradation profile.

Figure 4-2
Water Distribution System - Degradation Profile



4.2.3. Decision Criteria

Table 4-6 presents the decision criteria—developed through discussions amongst Township staff—for triggering specific water distribution asset treatments. When the decision criteria for a given asset are met, the corresponding treatment is eligible to be applied. When a treatment is applied, the percentage of useful life remaining of the asset is improved by the amount specified in the "Gain to Condition" column, but not to exceed the amount listed in the "Maximum Condition Threshold" column.

Table 4-6
Water Distribution System Treatment Decision Criteria

Asset Type	Treatment	%ULR Range	Gain to Condition	Maximum Condition Threshold
Water Mains	Rehabilitation	60-50	+30	80
	Replacement	20-0	+100	100
Hydrants	Rehabilitation	20-10	+90	98
	Replacement	10-0	+100	100
Meters & Sample Stations	Replacement	0	+100	100
Booster Station	Structure Rehabilitation	60-50	+15	+78
	Component Replacement	20-0	+100	100
	Replacement	20-0	+100	100
SCADA	Component Replacement	20-0	+100	100

4.2.4. Expected Lifecycle and Associated Risk

Combining the treatments, degradation profiles, and decision criteria presented herein results in a complete lifecycle management strategy. Figure 4-3, 4-4, and 4-5 present illustrative examples of the expected lifecycles for water mains, hydrants, and meters and sample stations, respectively. Figure 4-6 presents the expected lifecycle for the component-based booster Station. The dotted, vertical lines

represent points of intervention in the representative asset's expected life. The lifecycle path of the asset is represented by the solid lines, following the degradation profile presented above. Finally, the red, dashed line demonstrates the expected lifecycle of an asset were it to not receive any treatments over the course of its service life.

The lifecycle strategy as defined for water mains and hydrants is a combination of a preservation and replacement strategy, which means that an asset will receive rehabilitation treatments before its eventual replacement. If budgetary constraints prevent a water main or hydrant rehabilitation from occurring as it becomes due, the asset will continue to degrade to a point that it needs to be replaced. For example, a PVC water main will degrade from some percentage of useful life remaining (ULR) greater than 60%, and upon reaching a ULR of 60%, the water main will be triggered for a rehabilitation, which in turn increases its ULR to 80%. Then the water main will continue to degrade from a ULR of 80% to a ULR of 20% at which time it will be triggered for replacement. If the rehabilitation does not occur, the water main will continue to degrade from the URL of 60% to the URL of 20% triggering a replacement approximately 20 years sooner. Water mains and hydrants are triggered for replacement at 20% useful life remaining to minimize the risk of failure which could cause a significant threat to public safety.

The lifecycle strategy for meters and sample stations is to replace them when they have failed. While this strategy is simple—and may not appear to be significantly different from an age-based replacement strategy—because it is informed by the failure of an asset this strategy results in less accurate forecasting. As the individual asset's condition is degraded over time, the timing of the eventual replacement could vary significantly from one asset to another due to unique internal and environmental factors. For example, if the environment in which a meter resides causes it to degrade faster or slower than the expected average, then the eventual replacement at the time of failure will be different than an average age-based approach. Water meter efficacy is monitored on a regular basis with a superficial review being done monthly and a more in-depth review being undertaken on a quarterly basis.

The lifecycle strategies for the booster station and SCADA will be to address individual components of the asset in a combination of preservation and replacement strategy. If budgetary constraints prevent a component rehabilitation from occurring as it becomes due, the asset will continue to degrade to a point that it needs to be replaced. Individual components will have specific rehabilitation treatment and replacement schedules. Ensuring these schedules are adhered to will result in the overall asset continuing to provide current levels of service and will minimize the risk of failure.

In addition to the age-based approach to condition assessments, enhanced reviews will be conducted on assets as they approach the forecasted treatment/replacement periods. The enhanced reviews will consider the condition of individual asset components as well as environmental factors, and other risks. Reviewing these associated risks will ensure that the recommended treatment or replacement period reflects all elements of the asset and the level of service it provides.

Figure 4-3
Lifecycle Strategy – Water Mains

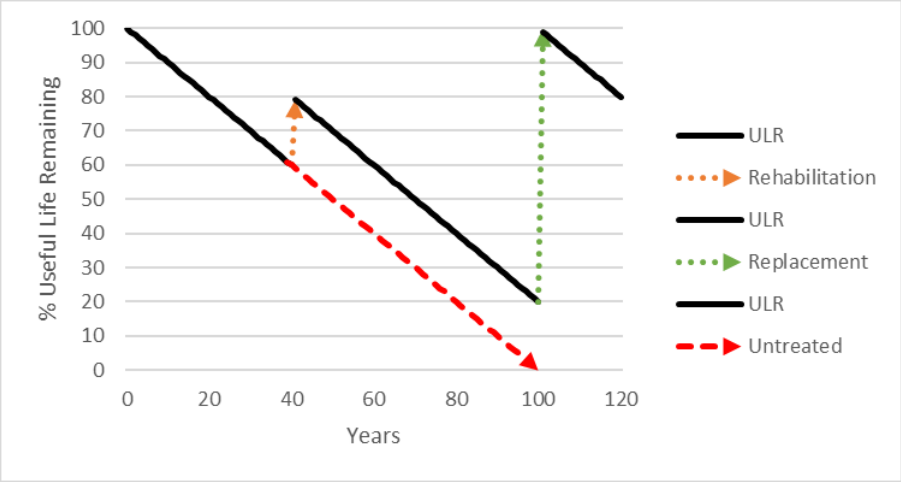


Figure 4-4
Lifecycle Strategy – Hydrants

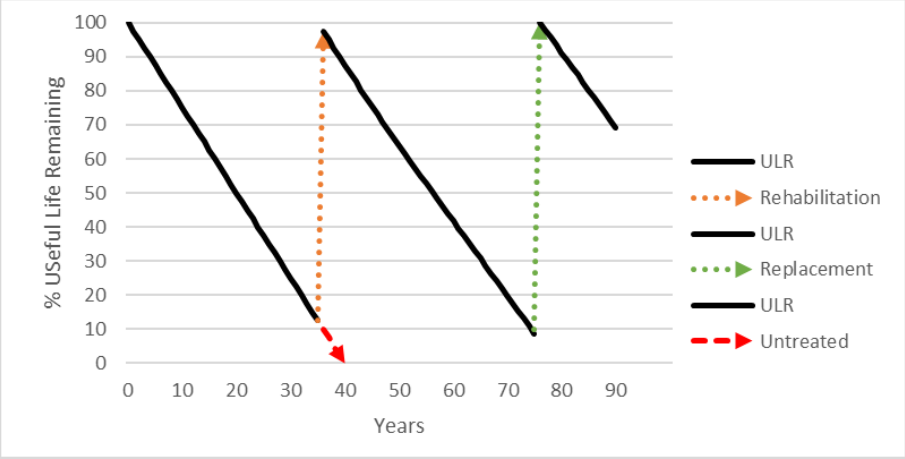


Figure 4-5
Lifecycle Strategy – Meters and Sample Stations

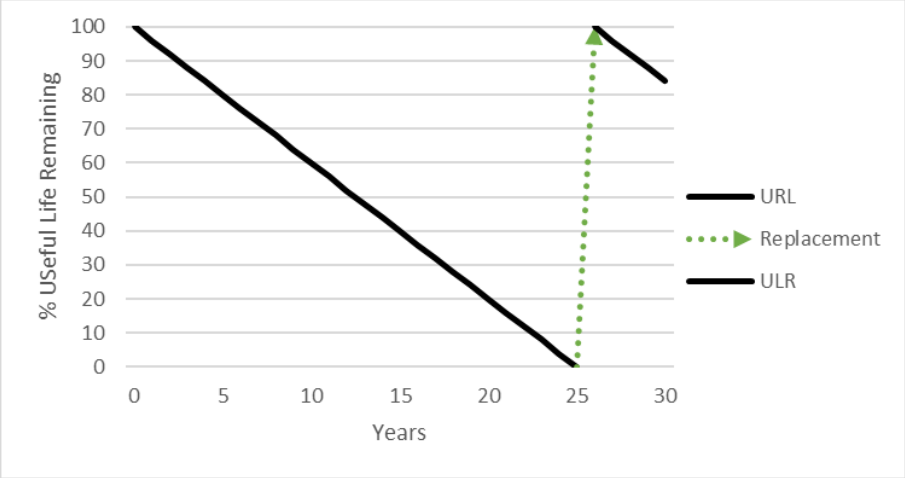
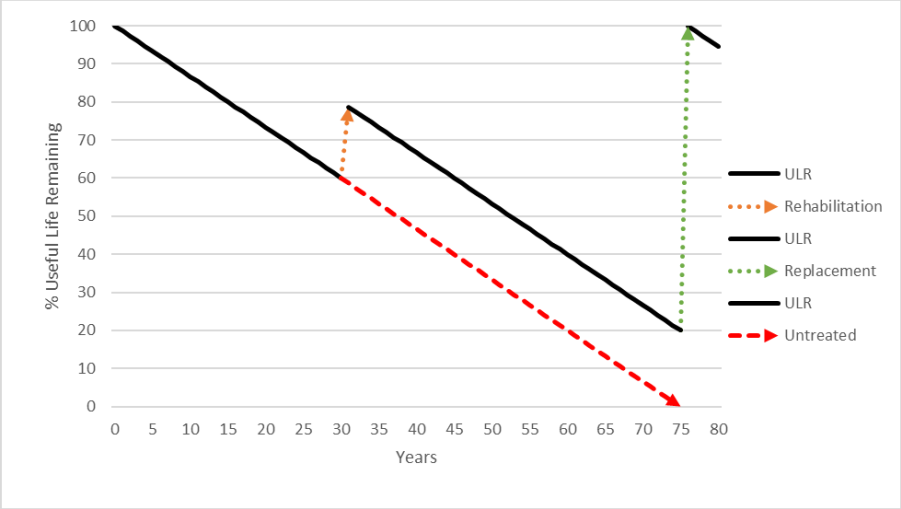


Figure 4-6
Lifecycle Strategy – Booster Station Structure



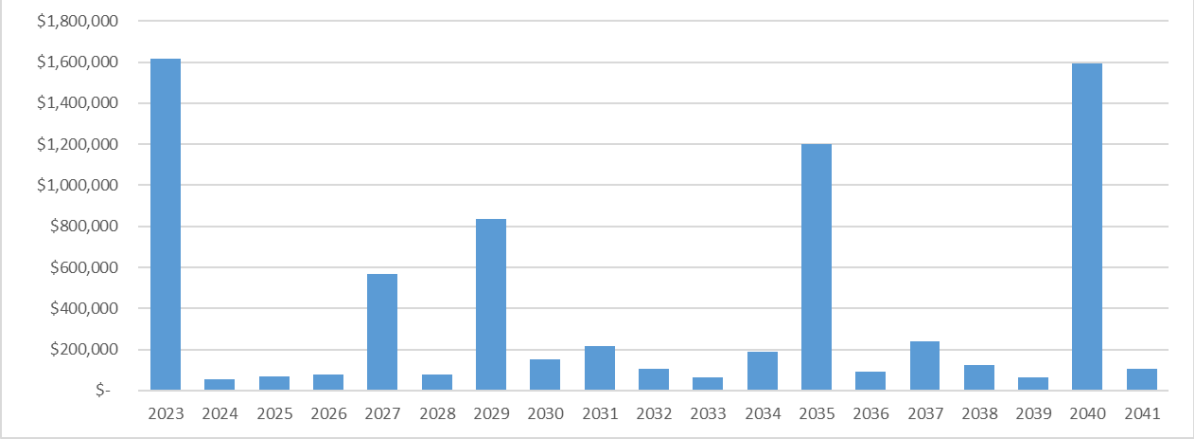
4.3. Funding Strategy

4.3.1. Annual Cost Forecast

Figure 4-7 presents the 20-year expenditure forecast that results from following the lifecycle management strategy detailed above. This forecast illustrates the annual expenditures without any consideration to budgetary constraints. Over the 20-year forecast period, the average annual expenditure would be approximately $360,123. The expenditure forecast includes a capital inflation factor of 3.5% annually, which aligns closely with the historical 20-year annual average rate of inflation as witnessed in Statistics Canada's Building Construction Price Index. The forecast also includes a 20% estimated cost for engineering, environmental assessments, and geotechnical studies, etc., for major projects.

Table B-1 in Appendix B: Funding Strategy Tables – Water Distribution System, presents the capital expenditure forecast for water distribution system assets over the 2023-2041 forecast period. This expenditure forecast is based on the current lifecycle activities identified this plan.

Figure 4-7
Water Distribution System Expenditure Forecast

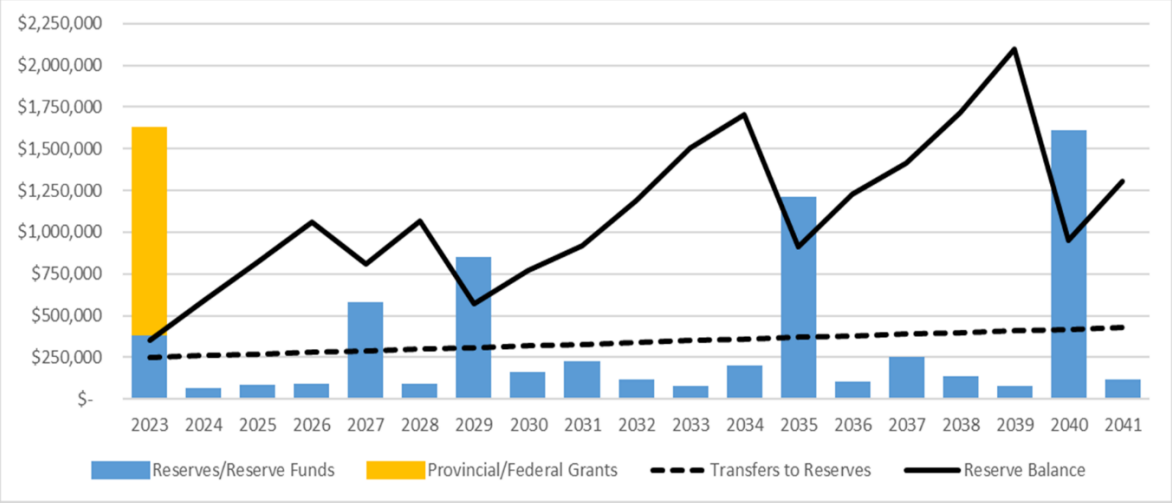


4.3.2. Funding Strategy

Figure 4-8 presents the 20-year funding strategy for the expenditure forecast detailed above. The lifecycle rehabilitation and renewal activities planned for the wastewater collection system are projected to cost, on average, approximately $360,123 per year over the forecast period. The funding strategy for these costs is to finance from reserves. There will be a $10,000 annual increase to the transfer to reserves from operating for the reserve balance to sufficiently fund the forecasted expenditures.

Table B-2 in Appendix B: Funding Strategy Tables – Water Distribution System, presents the funding strategy for water distribution system assets over the 2023-2041 forecast period. This funding forecast is based on the current lifecycle activities identified this plan.

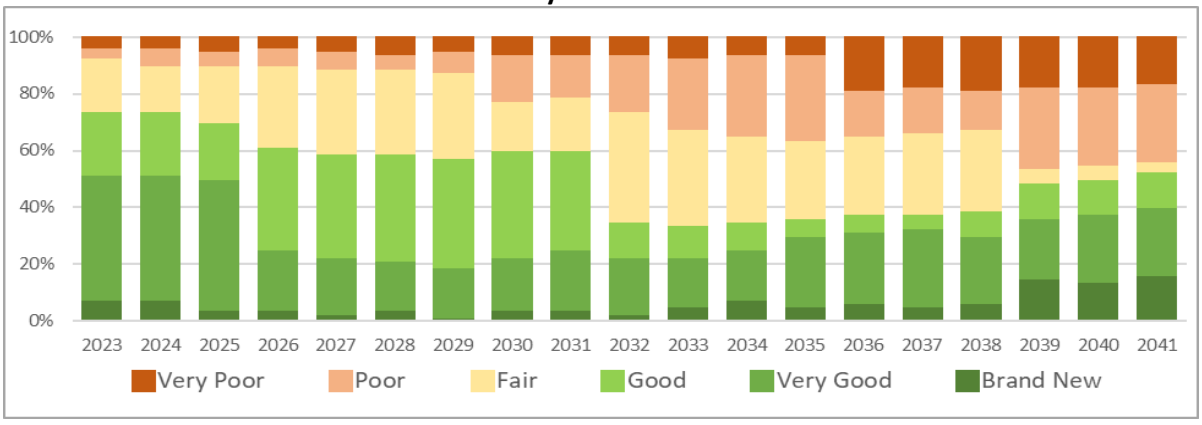
Figure 4-8
Water Distribution System Funding Strategy



4.3.3. Network Service Level Forecast

Figure 4-9 demonstrates the water distribution system network service levels over the forecast period as a result of implementing this lifecycle management funding strategy. This funding strategy will enable the Township to move towards a sustainable position of maintaining the current levels of service for water distribution assets.

Figure 4-9
Water Distribution System Network Service Levels



5. WASTEWATER COLLECTION SYSTEM

5.1. State of Local Infrastructure and Service Levels

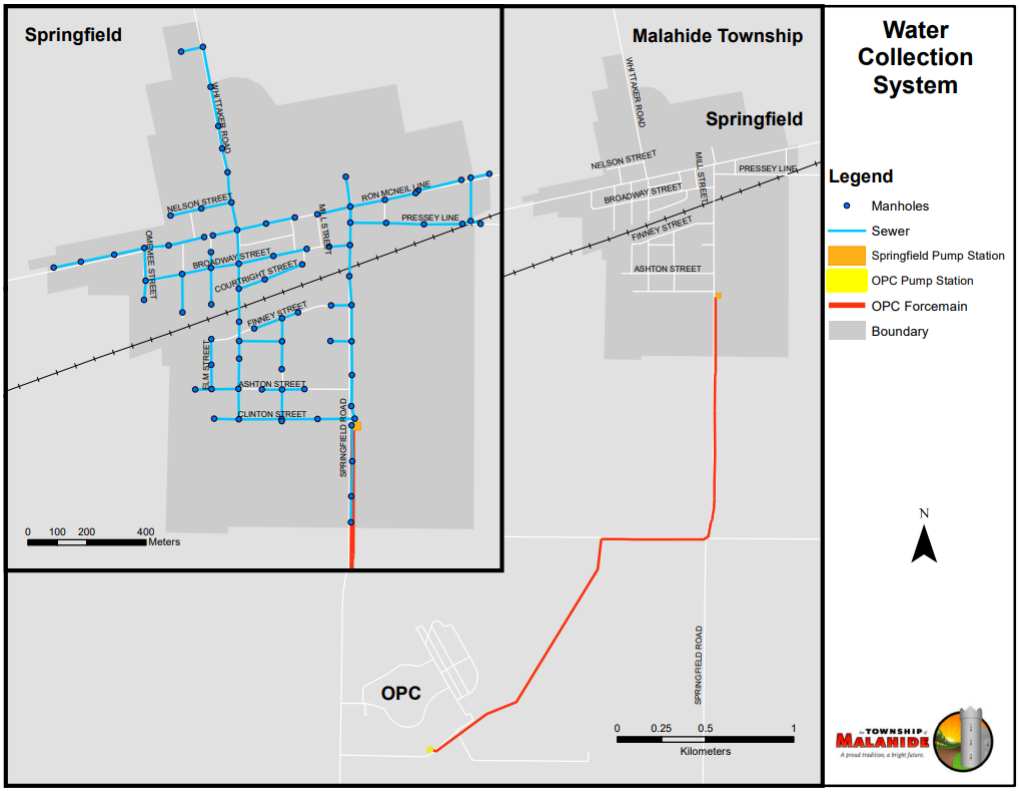
5.1.1. Asset Class Summary

The Township currently owns and manages 7.5 kilometres of wastewater collection mains, 3.6 Kilometres of wastewater force mains, 2 Pump Stations, and 80 manholes, with a 2021 total replacement value totaling approximately $10.9 million. The collected wastewater is pumped to a wastewater treatment facility owned by the Town of Aylmer. Table 5-1 provides a summary of count, age, and replacement value for the current wastewater collection system assets. The oldest average age of the Township's wastewater collection system belongs to the collection mains, averaging 22 years, while the youngest average age belongs to the pump stations, averaging 11 years. Figure 5-1 maps the wastewater collection system to visualize the Township's current asset network.

Table 5-1
Wastewater Collection System Infrastructure Summary

Type	Quantity	Average Age	Replacement Cost (2021 $)
Collection Mains	7.5 km	22	$4,507,920
Manholes	80 units	21	$960,000
Pump Stations	2 stations	11	$3,295,000
Force Main	3.6 km	20	$2,173,200
		TOTAL	$10,936,120

Figure 5-1
Wastewater Collection System Map



5.1.2. Condition

The Township Staff assessed the condition of the wastewater collection system, applying a condition state for the percentage of useful life remaining for assets. The percentage of useful life remaining is based on a predetermined useful life for collection mains, force mains, manholes, and the pump station components. To better communicate the condition of the wastewater collection system, the numeric condition ratings have been segmented into qualitative condition states as summarized in Table 5-2.

Table 5-2
Wastewater Collection System Condition States Defined with Respect to Useful Life

Useful Life Remaining (%)	Condition State
100-84	Brand New
83-67	Very Good
66-51	Good
50-34	Fair
33-18	Poor
17-1	Very Poor
0	End of Life

Table 5-3 examines the average condition rating of wastewater collection system. The condition of the assets comes from the percentage of useful life remaining. On average, the collection system is in a "Very Good" condition state. The lowest observed condition in the wastewater collection system is "Good" in the asset category of manholes.

Table 5-3
Wastewater Collection System Condition Analysis

Type	Quantity	Average % of Useful Life Remaining (ULR)	Lowest Observed URL	Average Condition State
Collection Mains	7.2 km	78	78	Very Good
Force Mains	3.6 km	80	80	Very Good
Pump Stations	2	90	80	Brand New
Manholes	80	58	58	Good
			TOTAL	Very Good

5.1.3. Current Levels of Service

The levels of service currently provided by the Township's wastewater collection system is, in part, a result of the state of local infrastructure identified above. A level of service analysis defines the current levels of service and enables the Township to periodically evaluate these service level objectives. The Township's strategic service objective is to provide safe and reliable wastewater collection system to collect, and transport wastewater throughout the municipality.

Wastewater collection system assets have prescribed levels of service reporting requirements under O. Reg. 588/17. These requirements include levels of service reporting from two different levels, i.e. community levels of service and technical levels of service. Community levels of service objectives describe service levels in terms that customers understand and reflect their scope and quality expectations of the wastewater collection system. Technical levels of service describe the scope and quality of Township collection mains, force mains, pump stations, and manholes, through performance measures that can be quantified, evaluated, and detail how effectively a municipality provides services.

The Township has also set performance measures for levels of service beyond the requirements under regulation. Performance measures have been categorized within three main service objectives, i.e. safety, reliability, and inclusivity. Table 5-4 presents the current levels of service as mandated by O. Reg. 588/17 and as set by the Township.

Table 5-4
2021 Wastewater Collection System Current Levels of Service

SCOPE	SERVICE OBJECTIVES	COMMUNITY EXPECTATIONS	TECHNICAL PERFORMANCE MEASURES	CURRENT LEVEL OF SERVICE
SAFETY	To ensure that Municipality's wastewater collection and conveyance assets are safe by keeping them in fair condition or better.	Wastewater assets throughout the community are in fair condition or better.	Average network pipe condition: Average pump station condition:	**"Very Good"** **"Brand New"**
RELIABILITY	To ensure that Municipality's wastewater collection and conveyance assets are reliable by minimizing the number of associated overflows, and/or basement back-ups.	Minimal number of sanitary overflows, and/or basement back-ups.	Total number of incidents and volume of combined sewer flows exceeding system capacity (overflows) compared to number of properties connected:* Total number of connection-days per year due to basement back-ups compared to number of properties connected:*	**0 Overflows** **0 Basement Back-ups**
INCLUSIVITY	To ensure that Municipality's wastewater collection, conveyance and treatment service is inclusive by providing service to all properties throughout the community.	Minimal number of properties without municipal wastewater collection services throughout the community.	Percentage of total number of properties connected to the community's wastewater system:*	**9% of Total Properties**

* mandated by O. Reg. 588/17

5.2. Lifecycle Management

5.2.1. Lifecycle Activities

This section will detail the lifecycle activities (capital treatments) as prescribed by Township staff. The treatments that the Township currently employs in the management of its wastewater collection system include:

- Collection Mains, Force Mains, and Manholes:
  - Replacement.
- Force Mains:
  - Replacement.
- Pump Stations:
  - Component Rehabilitation;
  - Component Replacement.

Table 5-5 details the costs for the lifecycle activities listed above. These costs are presented as a percentage of estimated replacement cost or as flat rates per treatment. Rehabilitation of the force main includes the replacement of the four air release valves. Rehabilitation of the components of a pump station include rebuilding and replacing pumps, pipes, electrical, valves, vents meters, generators, and structural components.

Table 5-5
Water Distribution System Treatment Costs

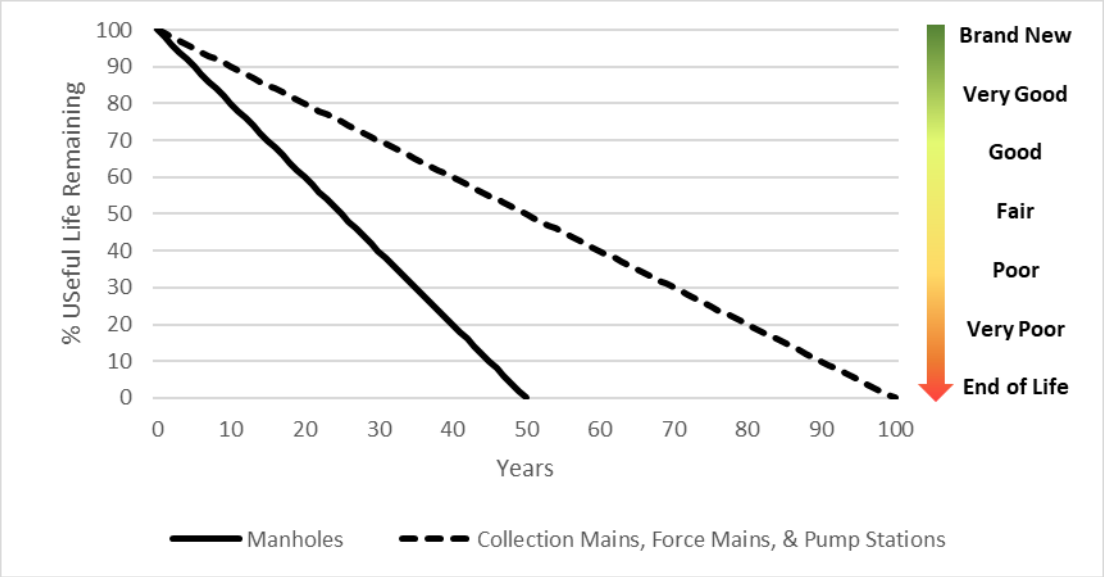
Treatment	Applies To	Cost (2021 $)
Rehabilitation – Electrical	Pump Stations	$100,000
Rehabilitation – Wet Well	Pump Stations	$50,000
Rehabilitation – Pumps	Pump Stations	$15,000 per pump
Replacement	All	100% of Replacement Cost

5.2.2. Degradation Profile

Assets deteriorate over time, eventually reaching a point where they have no remaining service life left. However, the path each asset takes in reaching its end of life differs, even for assets of the same type. A condition rating identifies where along the path any particular asset lays, or in other words, how long an asset has left before it reaches its end of life. Therefore, condition and service life are linked, and can be plotted graphically to visually represent the degradation curve of an asset.

Figure 5-2 presents the degradation profile of collection and force mains, pump stations, and manholes, that have been developed based on a straight-line approach per manufacturer recommendations. Through the process of conducting condition assessments, the Township will be able to collect data to further refine the degradation profile.

Figure 5-2
Collection and Force Main Degradation Profile



5.2.3. Decision Criteria

Table 5-6 presents the decision criteria—developed through discussions amongst Township staff—for triggering specific wastewater collection asset treatments. When the decision criteria for a given asset are met, the corresponding treatment is eligible to be applied. When a treatment is applied, the percentage of useful life remaining of the asset is improved by the amount specified in the "Gain to Condition" column, but not to exceed the amount listed in the "Maximum Condition Threshold" column.

Table 5-6
Wastewater Collection System Treatment Decision Criteria

Asset Type	Treatment	%ULR Range	Gain to Condition	Maximum Condition Threshold
Collection Mains	Replacement	20-0	+100	100
Force Mains	Replacement	20-0	+100	100
Manholes	Replacement	0	+100	100
Pump Stations	Structure Rehabilitation	60-50	+15	+78
	Component Replacement	20-0	+100	100
	Replacement	20-0	+100	100

5.2.4. Expected Lifecycle and Associated Risk

Combining the treatments, degradation profiles, and decision criteria presented herein results in a complete lifecycle management strategy. Figure 5-3 and 5-4 present illustrative examples of the expected lifecycles for wastewater collection mains and manholes, respectively. Figure 5-5 and 5-6 present the expected lifecycles for the component-based force main and pump stations. The dotted, vertical lines represent points of intervention in the representative asset's expected life. The lifecycle path of the asset is represented by the solid lines, following the degradation profile presented above. Finally, the red, dashed line demonstrates the expected lifecycle of an asset were it to not receive any treatments over the course of its service life.

The lifecycle strategy for wastewater collection mains and manholes is to replace them when they have failed. While this strategy is simple—and may not appear to be significantly different from an age-based replacement strategy—because it is informed by a condition assessment of an asset this strategy results in less accurate forecasting. As the individual asset's condition is degraded over time, the timing of the eventual replacement could vary significantly from one asset to another due to unique internal and environmental factors. For example, if the environment in which a collection main resides causes it to degrade faster or slower than the expected average, then the eventual replacement may be different than an average age-based approach. Collection main conditions are monitored on a regular basis with a flushing and camera review being done on a four-year basis.

The lifecycle strategies for the force mains, pump stations, and SCADA will be to address individual components of the asset in a combination of preservation and replacement strategy. If budgetary constraints prevent a component rehabilitation from occurring as it becomes due, the asset will continue to degrade to a point that it needs to be replaced. Individual components will have specific rehabilitation treatment and replacement schedules. Ensuring these schedules are adhered to will result in the overall asset continuing to provide current levels of service and will minimize the risk of failure.

In addition to the age-based approach to condition assessments, enhanced reviews will be conducted on assets as they approach the forecasted treatment/replacement periods. The enhanced reviews will consider the condition of individual asset components as well as environmental factors, and other risks. Reviewing these associated risks will ensure that the recommended treatment or replacement period reflects all elements of the asset and the level of service it provides.

Figure 5-3
Lifecycle Strategy – Wastewater Collection Mains

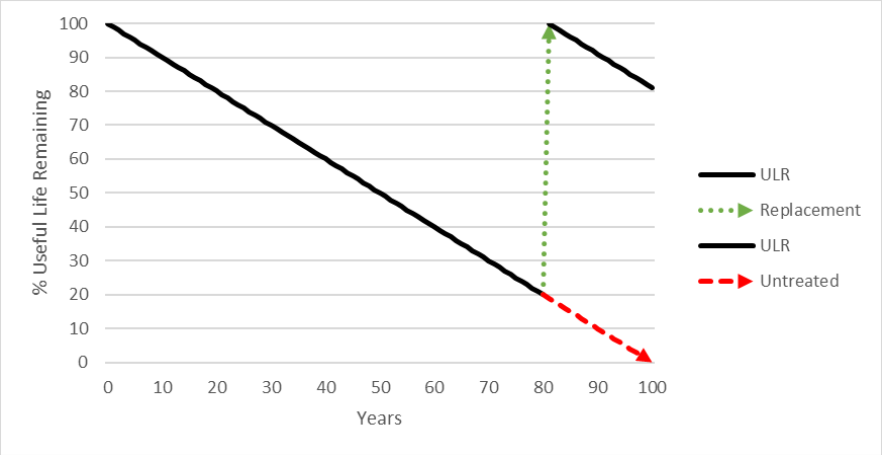


Figure 5-4
Lifecycle Strategy – Manholes

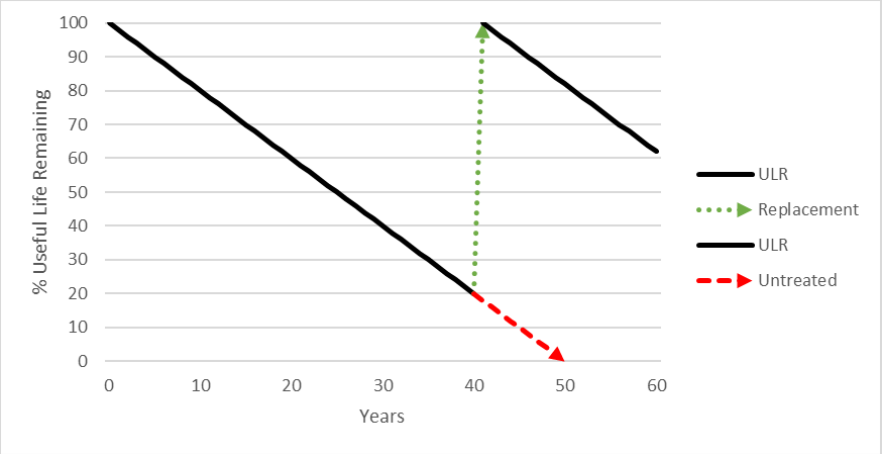


Figure 5-5
Lifecycle Strategy – Force Mains

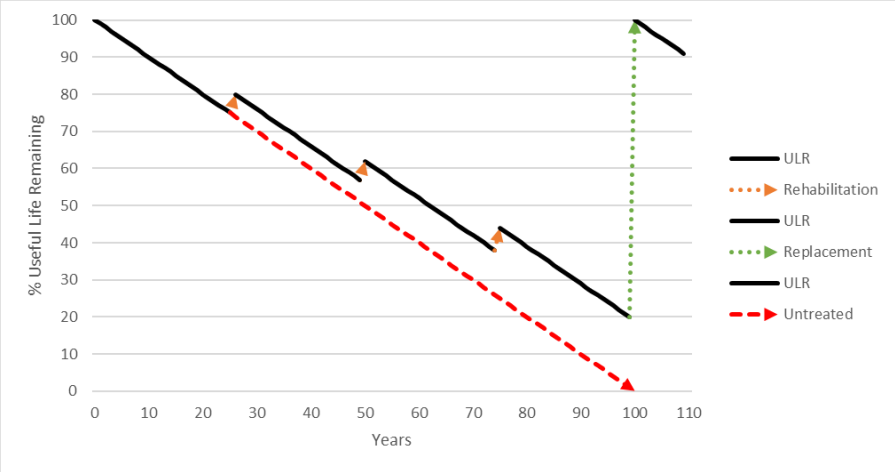
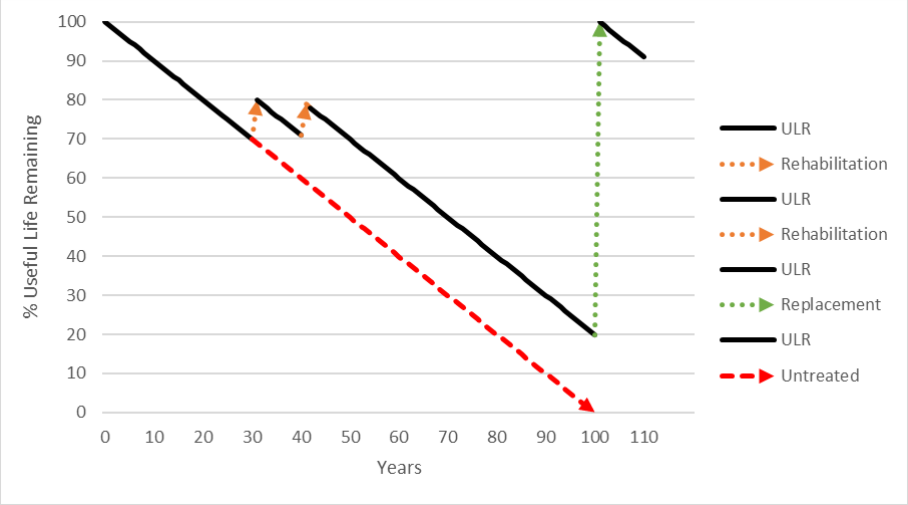


Figure 5-6
Lifecycle Strategy – Pump Stations



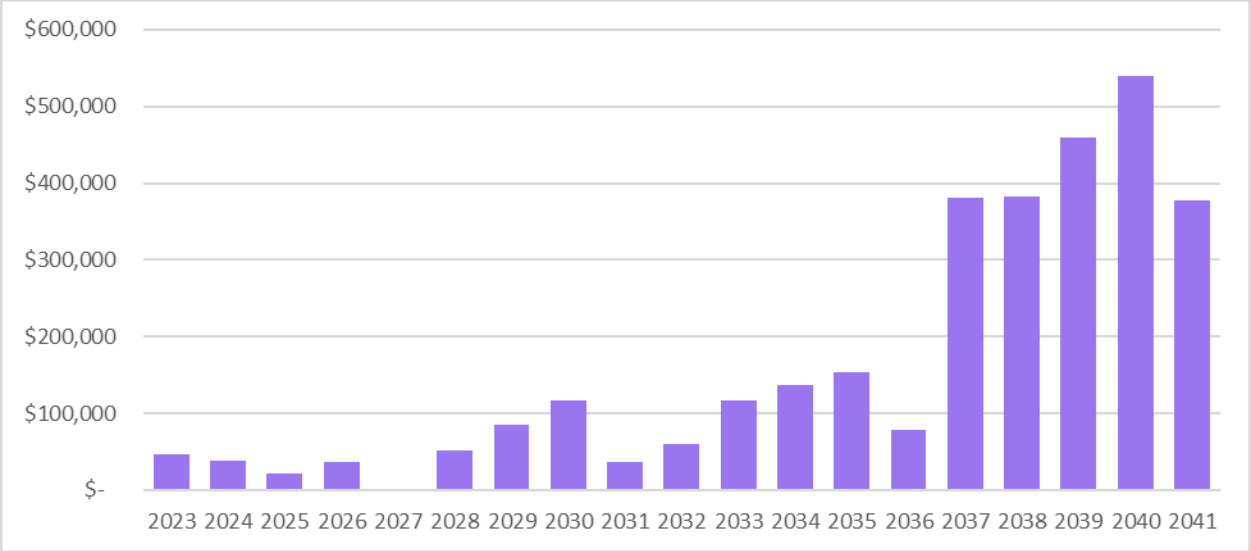
5.3. Funding Strategy

5.3.1. Annual Cost Forecast

Figure 5-7 presents the 20-year expenditure forecast that results from following the lifecycle management strategy detailed above. This forecast illustrates the annual expenditures without any consideration to budgetary constraints. Over the 20-year forecast period, the average annual expenditure would be approximately $153,000. The expenditure forecast includes a capital inflation factor of 3.5% annually, which aligns closely with the historical 20-year annual average rate of inflation as witnessed in Statistics Canada's Building Construction Price Index.

Table C-1 in Appendix C: Funding Strategy Tables – Wastewater Collection System, presents the capital expenditure forecast for wastewater collection system assets over the 2023- 2041 forecast period. This expenditure forecast is based on the current lifecycle activities identified this plan.

Figure 5-7
Wastewater Collection System Expenditure Forecast

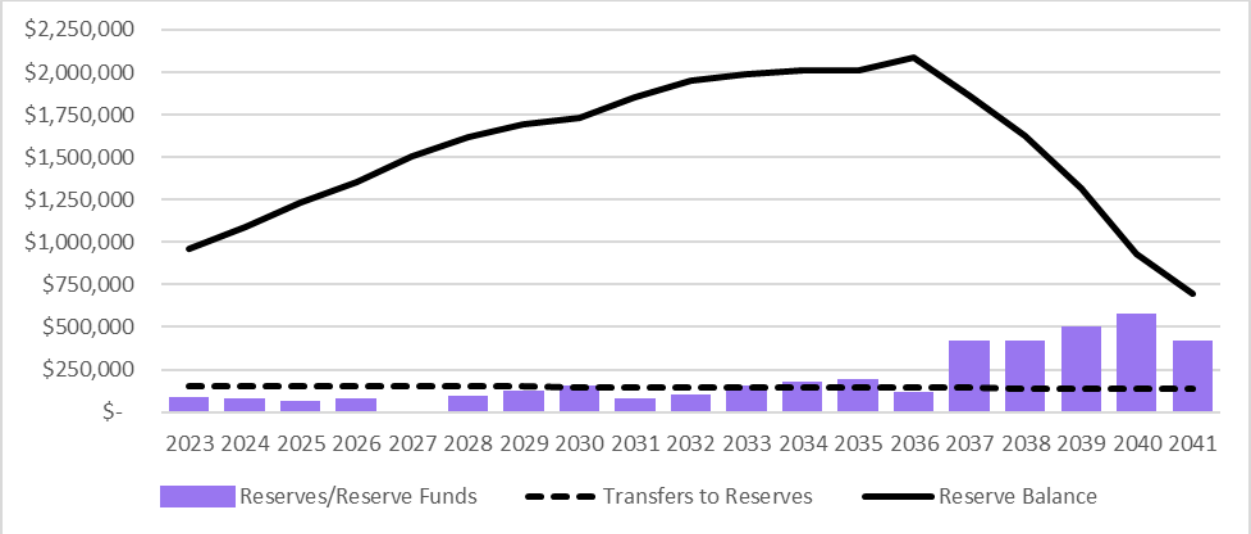


5.3.2. Funding Strategy

Figure 5-8 presents the 20-year funding strategy for the expenditure forecast detailed above. The lifecycle rehabilitation and renewal activities planned for the wastewater collection system are projected to cost, on average, approximately $153,000 per year over the forecast period. The funding strategy for these costs is to finance from reserves. There will be an annual decrease of $1000 to the transfer to reserves from operating as the reserve balance will sufficiently fund the forecasted expenditures.

Table C-2 in Appendix C: Funding Strategy Tables – Wastewater Collection System, presents the funding strategy for wastewater collection system assets over the 2023-2041 forecast period. This funding forecast is based on the current lifecycle activities identified this plan.

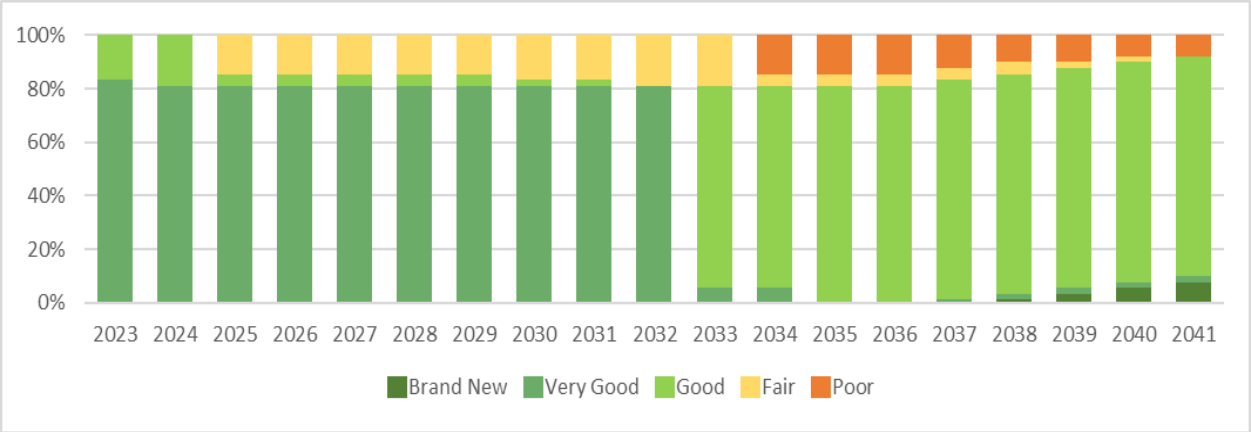
Figure 5-8
Wastewater Collection System Funding Strategy



5.3.3. Network Service Level Forecast

Figure 5-9 demonstrates the wastewater collection system network service levels over the forecast period as a result of implementing this lifecycle management funding strategy. This funding strategy will enable the Township to move towards a sustainable position of maintaining the current levels of service for wastewater assets.

Figure 5-9
Wastewater Collection System Network Service Levels



6. OVERALL FUNDING STRATEGY

6.1. Funding Sources

Table A-3 summarizes the recommended strategy to fund the asset lifecycle costs identified for taxy levy-based assets, and Table B-2 and C-2 summarize the recommended strategies to fund the asset lifecycle costs for water and wastewater-based assets, respectively. These funding forecasts were based on the funding sources identified in the Township's 2021 budget.

The lifecycle costs required to sustain established levels of service are being recovered through several methods:

- Ontario Community Infrastructure Fund (OCIF) formula-based funding is identified for years in which the funding amount is known (2019-2020). The 2020 level of OCIF funding is then maintained for the remaining years of the forecast, recognizing the OCIF as a stable and long-term funding source for capital projects.
- Gas tax funding has been shown as a stable and long-term funding source for eligible capital projects. Annual funding estimates are based on Township's 2019 budget for 2019-2021. The funding in subsequent years has been maintained at the 2021 level.
- Provincial/Federal grant funding has been included in the forecast for water works. This grant funding is included as a necessary source of funding to ensure the Township can complete these projects.
- Debt financing is not required, the financing strategy does not include debt financing over the forecast period.
- The Township will be dependent upon maintaining healthy capital reserves/reserve funds in order to provide the remainder of the required lifecycle funding over the forecast period. This will require the Township to proactively adjust amounts being transferred to these capital reserves during the annual budget process.

6.2. Funding Shortfall

This funding strategy has been developed to be fully funded, and therefore no funding shortfall has been identified. However, this means that if identified grants are not received at expected amounts then shortfalls may present themselves if service level expectations are maintained. In such an event, the difference could be made up through increases to the revenue streams over-and-above those presented hereafter.

6.3. Tax Levy Impact

While the annual funding requirement may fluctuate, it is important for the Township to implement a consistent, yet increasing, annual investment in capital so that the excess annual funds can accrue in capital reserve funds. Table A-3 presents a summary of the impacts on the tax levy as a result of this funding strategy. These impacts layer on assessment increases resulting from new assessment growth, assumed to be approximately 2% annually.

In order to fund the recommended asset lifecycle activities over the forecast period using the Township's own available funding sources (i.e. using taxation, Gas Tax funding, OCIF funding, and grants), an increase in the Township's taxation levy would be required approximately 3% annually for 2022-2041.

The taxation impacts identified above include inflationary adjustments to the Township's operating costs and revenues as identified in its 2021 budget (e.g. general operating inflation of 3.5% annually). However, if other funding sources become available (as mentioned above) or if maintenance practices allow for the deferral of capital works, then the impact on the Township's taxation levy would potentially decrease. Further detail on the Funding Strategy is presented in Appendix A.

6.4. User Fee Impact – Water and Wastewater

While the annual funding requirement may fluctuate, it is important for the Township to implement a consistent, yet increasing, annual investment in capital so that the excess annual funds can accrue in capital reserve funds. At the writing of this report, an in-depth analysis of user fees is underway by Watson & Associates Economists Ltd. who have been engaged by the Township in order to complete a rate study for the water distribution system and for the wastewater collection system. The forthcoming reports will guide the asset management plans for both systems, respectively.

7. RECOMMENDATIONS

7.1. Current Considerations

The following recommendations have been provided for consideration:

- That the Township of Malahide Asset Management Plan be received and approved by Council;
- That consideration of this Asset Management Plan be made as part of the annual budgeting process to ensure sufficient capital funds are available to fund the Asset Management Plan; and
- That this Asset Management plan be updated as needed over time to reflect the current priorities of the Township.

Substantial investment in capital will be required over the forecast period, and through the recommendations provided in the funding strategy, proactive steps would be taken to sustainably fund the Township's network of assets. Funding has been recommended to meet the annual lifecycle funding target, which identifies the long-term annual investment level necessary to meet the current levels of service. This funding takes the form of transfers to capital reserves, and is reflected in the sizeable positive balances reached in the final years of the forecast period.

7.2. Future Improvements

Areas of future enhancement to the Township's asset management plan have been noted, and a summary of these improvements has been listed below:

- Levels of Service - Images that illustrate the different condition states of assets can be helpful in communicating levels of service to stakeholders. A number of representative condition sample images could be provided for each Asset Class. The Township should seek to provide additional images in future iterations of this asset management plan.
- Bridges and Culverts: The analysis presented in this report with respect to the Township's bridges and culverts has been based on information contained in the Township's 2020 OSIM report. The next update to this plan should incorporate the findings of the Township's latest biennial 2022 OSIM report. In the next biennial 2024 OSIM RFP, there should be a requirement for the engineer to review non-structural culverts that don't qualify for the legislated inspection (less than 3m span) but which still represent a significant financial risk to the Township. There are large diameter culverts or culverts with a significant amount of overburden which should be inspected and shown on a replacement schedule. The replacement of these culverts (which, for the most part, are located at the bottom of ravines) may be financially challenging for the Township in the near future. A full inventory and inspection of all non-structural culverts should be completed so that a determination can be made to include specific culverts that represent a high financial risk and/or to include all non-structural culverts as a pooled asset in future plan revisions.
- Water and Wastewater Condition Assessments: The condition assessment of water and wastewater assets was largely based on age-based degradation models. Future improvements to these plans should include a more detailed condition review and inspection program. More detail regarding condition assessments is especially important for assets that have been

componentized. Componentized assets require an enhanced level of review of the costs of lifecycle activities required by individual components, not currently tracked separately.

- Age-Based Assets – Modified Remaining Useful Life: The lifecycle needs for a number of the Township's asset categories and are currently assessed based on asset age. In the future, it would be beneficial for the Township to assign a remaining useful life to these various assets, based on observed condition and performance. This would enable the Township to more accurately plan for required interventions, such as replacements, based on observed asset characteristics.

- Growth-Related Capital: This plan does not currently include the costs associated with the lifecycle activities and maintenance of expansionary capital. Future updates to this plan should incorporate the expected costs of the acquisition, rehabilitation, and replacement of these assets to more fully explore the sustainability of the Township's network of assets. Examining these growth-related capital needs and their impacts on the financing strategy will provide for a comprehensive assessment of the sustainability of the Township's overall asset management system.

Appendix A Financing Strategy Tables – Tax Levy

Table A-1
Roads Capital Expenditure Forecast

Roads Capital Budget Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031
DSTrehab (DST w 75mm Gran A)	$ 342,562	$ 1,028,970	$ 122,700	$ 735,166	$ 336,304	$ -	$ 151,928	$ -	$ -
DSTrehab2 (DST w 150mm Gran A)	$ 93,324	$ 237,933	$ 508,477	$ 267,401	$ -	$ -	$ 374,739	$ -	$ -
R1 (Basic Resurfacing 1 - 50mm)	$ -	$ 12,811	$ 15,573	$ -	$ 46,118	$ 44,255	$ -	$ 22,237	$ -
R2 (Basic Resurfacing 2 - 100mm)	$ -	$ -	$ -	$ 96,660	$ -	$ -	$ -	$ -	$ 62,173
REC (Reconstruction - Rural)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
RSS (Reconstruction with Storm Sewers)	$ 650,000	$ 350,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SST (Single Surface Treatment)	$ 236,819	$ 142,078	$ 817,334	$ 168,237	$ 1,013,038	$ 1,390,513	$ 595,602	$ 540,533	$ 1,112,958
SSTedge (Single Surface Treatment with Edge padding)	$ 154,666	$ 41,936	$ -	$ 129,381					
Roads Needs Study (New every 4, update between)	$ 8,000	$ -	$ 20,000	$ -	$ 8,000	$ -	$ 20,000	$ -	$ 8,000
Roads Safety Study	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Expenditures	**$ 1,510,371**	**$ 1,813,728**	**$ 1,484,084**	**$ 1,396,845**	**$ 1,403,460**	**$ 1,434,768**	**$ 1,142,269**	**$ 562,770**	**$ 1,183,131**

Table A-2
Bridge & Culvert Capital Expenditure Forecast

B&C Capital Budget Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
C-17 Vienna	$ -	$ -	$ 1,220,389	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B-3 Crossley Hunter	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 100,155	$ 1,101,700	$ -	$ -
B-7 Carter	$ 144,216	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
C-15 Hacienda	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,228,926	$ -	$ -	$ -	$ -	$ -
C-7 Pigram	$ -	$ -	$ -	$ -	$ -	$ 38,253	$ 420,783	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
C-4 Dorchester	$ -	$ -	$ -	$ 93,022	$ 1,023,247	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
C-12 Glencolin	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,527	$ 643,801	$ -
C-1 Whittaker Con 7 N	$ -	$ -	$ -	$ -	$ -	$ -	$ 79,949	$ 879,435	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
C-6 Mapleton	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 240,610	$ 2,646,707	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
C-11 College East	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 52,379	$ 576,173	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B-11 Hacienda	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 140,069	$ 1,540,757	$ -	$ -	$ -	$ -	$ -	$ -
B-12 Rogers South	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 120,675	$ 1,327,429	$ -	$ -	$ -	$ -	$ -
C-19 Finney	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 69,568	$ 765,248	$ -	$ -	$ -	$ -	$ -
C-21 Springwater	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 114,135	$ 1,255,488	$ -	$ -
OSIM Report	$ -	$ 10,000	$ -	$ 10,000	$ -	$ 10,000	$ -	$ 10,000	$ -	$ 10,000	$ -	$ 10,000	$ -	$ 10,000	$ -	$ 10,000	$ -	$ 10,000	$ -
Total Expenditures	**$ 144,216**	**$ 10,000**	**$ 1,220,389**	**$ 103,022**	**$ 1,023,247**	**$ 48,253**	**$ 500,732**	**$ 889,435**	**$ 240,610**	**$ 2,656,707**	**$ 52,379**	**$ 726,242**	**$ 1,731,000**	**$ 3,331,603**	**$ -**	**$ 224,290**	**$ 2,415,715**	**$ 653,801**	**$ -**

Table A-3
Tax Levy Funding Strategy

Capital Budget Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Roads (Reconstruction)	$ 1,510,371	$ 1,813,728	$ 1,484,084	$ 1,396,845	$ 1,403,460	$ 1,434,768	$ 1,142,269	$ 562,770	$ 1,183,131	$ 1,466,000	$ 1,466,000	$ 1,466,000	$ 1,466,000	$ 1,466,000	$ 1,466,000	$ 1,466,000	$ 1,466,000	$ 1,466,000	$ 1,466,000
Bridges & Culverts	$ 144,216	$ 10,000	$ 1,220,389	$ 103,022	$ 1,023,247	$ 48,253	$ 500,732	$ 889,435	$ 240,610	$ 2,656,707	$ 52,379	$ 726,242	$ 1,731,000	$ 3,331,603	$ -	$ 224,290	$ 2,415,715	$ 653,801	$ -
Non-Core Assets	$ 246,266	$ 955,679	$ 1,118,819	$ 1,297,059	$ 787,150	$ 914,372	$ 1,274,383	$ 1,833,577	$ 1,513,224	$ 1,070,803	$ 960,055	$ 1,379,229	$ 729,652	$ 1,655,916	$ 1,791,530	$ 1,699,382	$ 726,964	$ 731,266	$ 720,500
Total Expenditures	$ 1,900,853	$ 2,779,407	$ 3,823,292	$ 2,796,926	$ 3,213,857	$ 2,397,393	$ 2,917,384	$ 3,285,782	$ 2,936,965	$ 5,193,510	$ 2,478,434	$ 3,571,471	$ 3,926,652	$ 6,453,519	$ 3,257,530	$ 3,389,672	$ 4,608,679	$ 2,851,067	$ 2,186,500
Gas Tax (Gas Tax Reserve Fund)	$ 1,225,292	$ 334,531	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697
OCIF (OCIF Reserve)	$ 675,561	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384
Provincial/Federal Grants	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Debenture Requirements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Transfer from Capital Reserves	$ -	$ 1,981,492	$ 3,065,211	$ 2,038,845	$ 2,455,776	$ 1,639,312	$ 2,159,303	$ 2,527,701	$ 2,178,884	$ 4,435,429	$ 1,720,353	$ 2,813,390	$ 3,168,571	$ 5,695,438	$ 2,499,449	$ 2,631,591	$ 3,850,598	$ 2,092,986	$ 1,428,419
Total Capital Financing	$ 1,900,853	$ 2,779,407	$ 3,823,292	$ 2,796,926	$ 3,213,857	$ 2,397,393	$ 2,917,384	$ 3,285,782	$ 2,936,965	$ 5,193,510	$ 2,478,434	$ 3,571,471	$ 3,926,652	$ 6,453,519	$ 3,257,530	$ 3,389,672	$ 4,608,679	$ 2,851,067	$ 2,186,500
Total Capital Expenses less Financing	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Gas Tax Reserve Fund	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Opening Balance	$ 970,429	$ 39,834	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Transfer from Operating	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697
Transfer to Capital	$ 1,225,292	$ 334,531	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697	$ 294,697
Closing Balance	$ 39,834	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

OCIF Reserve	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Opening Balance	$ 212,177	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Transfer from Operating	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384
Transfer to Capital	$ 675,561	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384	$ 463,384
Closing Balance	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Tax Levy - Capital Related Reserves	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Opening Balance	$ 4,588,648	$ 6,432,988	$ 6,351,165	$ 5,251,338	$ 5,344,986	$ 5,082,163	$ 5,698,080	$ 5,858,148	$ 5,715,885	$ 5,990,488	$ 4,078,637	$ 4,954,055	$ 4,810,795	$ 4,388,944	$ 1,519,114	$ 1,926,527	$ 2,285,490	$ 1,605,721	$ 2,797,197
Transfer from Operating	$ 1,844,340	$ 1,899,670	$ 1,965,384	$ 2,132,493	$ 2,192,954	$ 2,255,228	$ 2,319,371	$ 2,385,438	$ 2,453,487	$ 2,523,578	$ 2,595,771	$ 2,670,130	$ 2,746,720	$ 2,825,608	$ 2,906,862	$ 2,990,554	$ 3,170,830	$ 3,284,461	$ 3,417,505
Transfer to Capital	$ -	$ 1,981,492	$ 3,065,211	$ 2,038,845	$ 2,455,776	$ 1,639,312	$ 2,159,303	$ 2,527,701	$ 2,178,884	$ 4,435,429	$ 1,720,353	$ 2,813,390	$ 3,168,571	$ 5,695,438	$ 2,499,449	$ 2,631,591	$ 3,850,598	$ 2,092,986	$ 1,428,419
Closing Balance	$6,432,988	$6,351,165	$5,251,338	$5,344,986	$5,082,163	$5,698,080	$5,858,148	$5,715,885	$5,990,488	$4,078,637	$4,954,055	$4,810,795	$4,388,944	$1,519,114	$1,926,527	$2,285,490	$1,605,721	$2,797,197	$4,786,283

Tax Levy - Operating Budget Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Net Operating Expenditures	$ 6,010,423	$ 6,220,788	$ 6,438,516	$ 6,663,864	$ 6,897,099	$ 7,138,497	$ 7,388,345	$ 7,646,937	$ 7,914,580	$ 8,191,590	$ 8,478,295	$ 8,775,036	$ 9,082,162	$ 9,400,038	$ 9,729,039	$ 10,069,555	$ 10,421,990	$ 10,786,759	$ 11,164,296
Transfers to Capital-Related Reserves	$ 1,844,340	$ 1,899,670	$ 1,956,660	$ 2,015,360	$ 2,075,821	$ 2,138,095	$ 2,202,238	$ 2,268,305	$ 2,336,354	$ 2,406,445	$ 2,478,638	$ 2,552,997	$ 2,629,587	$ 2,708,475	$ 2,789,729	$ 2,873,421	$ 2,959,624	$ 3,048,412	$ 3,139,865
Debt Re-Investment	$ -	$ -	$ 8,724	$ 117,133	$ 117,133	$ 117,133	$ 117,133	$ 117,133	$ 117,133	$ 117,133	$ 117,133	$ 117,133	$ 117,133	$ 117,133	$ 117,133	$ 117,133	$ 211,206	$ 236,049	$ 277,640
Existing Debt Payments	$ 318,099	$ 318,099	$ 309,375	$ 200,966	$ 200,966	$ 200,966	$ 200,966	$ 200,966	$ 200,966	$ 200,966	$ 200,966	$ 200,966	$ 200,966	$ 200,966	$ 200,966	$ 200,966	$ 106,893	$ 82,050	$ 40,459
New Debt Payments	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Net Impact on Taxation	$ 8,172,862	$ 8,438,557	$ 8,713,274	$ 8,997,322	$ 9,291,018	$ 9,594,691	$ 9,908,682	$ 10,233,341	$ 10,569,033	$ 10,916,134	$ 11,275,033	$ 11,646,132	$ 12,029,848	$ 12,426,612	$ 12,836,867	$ 13,261,075	$ 13,699,713	$ 14,153,271	$ 14,622,260
Prior Year Taxation Levy	$ 7,915,001	$ 8,172,862	$ 8,438,557	$ 8,713,274	$ 8,997,322	$ 9,291,018	$ 9,594,691	$ 9,908,682	$ 10,233,341	$ 10,569,033	$ 10,916,134	$ 11,275,033	$ 11,646,132	$ 12,029,848	$ 12,426,612	$ 12,836,867	$ 13,261,075	$ 13,699,713	$ 14,153,271
Add: Provision for Assessment Increase	$ 65,000	$ 66,300	$ 67,626	$ 68,979	$ 70,358	$ 71,765	$ 73,201	$ 74,665	$ 76,158	$ 77,681	$ 79,235	$ 80,819	$ 82,436	$ 84,084	$ 85,766	$ 87,481	$ 89,231	$ 91,016	$ 92,836
Current Year Taxation Levy at 0.0% Increase	$ 7,980,001	$ 8,239,162	$ 8,506,183	$ 8,782,253	$ 9,067,680	$ 9,362,784	$ 9,667,892	$ 9,983,346	$ 10,309,499	$ 10,646,714	$ 10,995,368	$ 11,355,852	$ 11,728,568	$ 12,113,933	$ 12,512,378	$ 12,924,349	$ 13,350,307	$ 13,790,728	$ 14,246,107
Additional Increase in Taxation Levy for the Year	$ 192,861	$ 199,395	$ 207,092	$ 215,069	$ 223,338	$ 231,908	$ 240,790	$ 249,995	$ 259,534	$ 269,420	$ 279,664	$ 290,280	$ 301,280	$ 312,679	$ 324,489	$ 336,727	$ 349,406	$ 362,543	$ 376,153
Total Taxation Levy	$ 8,172,862	$ 8,438,557	$ 8,713,274	$ 8,997,322	$ 9,291,018	$ 9,594,691	$ 9,908,682	$ 10,233,341	$ 10,569,033	$ 10,916,134	$ 11,275,033	$ 11,646,132	$ 12,029,848	$ 12,426,612	$ 12,836,867	$ 13,261,075	$ 13,699,713	$ 14,153,271	$ 14,622,260
Percentage Increase (Factoring in Assessment Growth)	**2.42%**	**2.42%**	**2.43%**	**2.45%**	**2.46%**	**2.48%**	**2.49%**	**2.50%**	**2.52%**	**2.53%**	**2.54%**	**2.56%**	**2.57%**	**2.58%**	**2.59%**	**2.61%**	**2.62%**	**2.63%**	**2.64%**

Appendix B Financing Strategy Tables – Water Distribution System

Table B-1
Water Distribution System Capital Expenditure Forecast

Water Capital Budget Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Water Mains - Talbot E - Replacement	$ 1,548,360	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Mains - Talbot E	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Mains - Nova Scotia W	$ -	$ -	$ -	$ -	$ 460,971	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Mains - Rush Creek Line East	$ -	$ -	$ -	$ -	$ 55,316	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Mains - Imperial-N.S. to Jtown	$ -	$ -	$ -	$ -	$ -	$ -	$ 434,547	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Mains - Jamestown 47870-49201	$ -	$ -	$ -	$ -	$ -	$ -	$ 316,034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Mains - Jamestown R.C-47870	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 81,774	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Mains - Granger	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 148,113	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Mains - Pede	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 46,919	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Mains - Dingle	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,068,338	$ -	$ -	$ -	$ -	$ -	$ -
Water Mains - Rogers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 130,049	$ -	$ -	$ -	$ -
Water Mains - Talbot E	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Meters - Replacement	$ 14,901	$ 15,422	$ 15,962	$ 16,521	$ 17,099	$ 17,697	$ 18,317	$ 18,958	$ 19,621	$ 20,308	$ 21,019	$ 21,755	$ 22,516	$ 23,304	$ 24,120	$ 24,964	$ 25,838	$ 26,742	$ 27,678
Meter Reading Equipment - Antenna (every 10 yrs)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Hydrants - Rehab	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,089	$ -	$ 8,760	$ 4,533	$ -	$ -	$ 5,026	$ -	$ 48,456	$ -	$ 17,303	$ 41,786
Copenhagen Booster Station - Structure (Electrical, Valves, Pipes, Building)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 40,000	$ -	$ -	$ -	$ -	$ -	$ 5,573	$ -
Copenhagen Booster Station - Pump Replacement (3 Pumps every 6 yrs)	$ 7,700	$ -	$ 8,300	$ 8,600	$ -	$ -	$ 9,500	$ -	$ 10,500	$ 10,500	$ -	$ -	$ 11,700	$ -	$ 12,500	$ 13,000	$ -	$ -	$ -
Copenhagen Booster Station - Pump Rebuild (3 Pumps every 3yrs)	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000
Copenhagen Booster Station - 3 PRVs Replace (every 5yrs)	$ 5,500	$ 5,000	$ -	$ 2,500	$ -	$ 5,500	$ 5,000	$ -	$ 2,500	$ -	$ 5,500	$ 5,000	$ -	$ 2,500	$ -	$ 5,500	$ 5,000	$ -	$ 2,500
SCADA PLC (every 12-15 yrs)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,199	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SCADA (every 6-8 yrs)	$ -	$ -	$ -	$ -	$ -	$ 21,425	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 28,213	$ -	$ -	$ -	$ -	$ -
SCADA PLC Cabinet Electrical (every 25-30 yrs)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -
Sample Station Replacement	$ 8,000	$ -	$ -	$ -	$ -	$ -	$ 19,668	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,848	$ -	$ -	$ -	$ -
4 PRVs Replace (every 5yrs)	$ -	$ -	$ 12,000	$ -	$ -	$ -	$ -	$ 12,000	$ -	$ -	$ -	$ -	$ 12,000	$ -	$ -	$ -	$ -	$ 12,000	$ -
Rate Study (every 10 yrs)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Condition Assessments (every 10 yrs)	$ -	$ -	$ -	$ 15,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Town of Aylmer Connection to Copenhagen	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,500,000	$ -
Total Expenditures	**$ 1,586,461**	**$ 22,422**	**$ 38,262**	**$ 44,621**	**$ 535,386**	**$ 46,622**	**$ 805,066**	**$ 118,821**	**$ 182,734**	**$ 71,568**	**$ 33,052**	**$ 157,872**	**$ 1,166,554**	**$ 61,043**	**$ 207,517**	**$ 93,920**	**$ 32,838**	**$ 1,563,618**	**$ 73,964**

Table B-2
Water Distribution System Funding Strategy

Capital Budget Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Total Expenditures	$ 1,586,461	$ 22,422	$ 38,262	$ 44,621	$ 535,386	$ 46,622	$ 805,066	$ 118,821	$ 182,734	$ 71,568	$ 33,052	$ 157,872	$ 1,166,554	$ 61,043	$ 207,517	$ 93,920	$ 32,838	$ 1,563,618	$ 73,964
Provincial/Federal Grants	$ 1,157,697	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Transfer from Capital Reserves	$ 428,764	$ 22,422	$ 38,262	$ 44,621	$ 535,386	$ 46,622	$ 805,066	$ 118,821	$ 182,734	$ 71,568	$ 33,052	$ 157,872	$ 1,166,554	$ 61,043	$ 207,517	$ 93,920	$ 32,838	$ 1,563,618	$ 73,964
Total Capital Financing	$ 1,586,461	$ 22,422	$ 38,262	$ 44,621	$ 535,386	$ 46,622	$ 805,066	$ 118,821	$ 182,734	$ 71,568	$ 33,052	$ 157,872	$ 1,166,554	$ 61,043	$ 207,517	$ 93,920	$ 32,838	$ 1,563,618	$ 73,964
Total Capital Expenses less Financing	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Water - Capital Related Reserves	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Opening Balance	$ 531,593	$ 352,829	$ 590,407	$ 822,145	$ 1,057,524	$ 812,139	$ 1,065,516	$ 570,450	$ 771,630	$ 918,895	$ 1,187,327	$ 1,504,275	$ 1,706,403	$ 909,848	$ 1,228,805	$ 1,411,289	$ 1,717,369	$ 2,094,531	$ 950,913
Transfer from Operating	$ 250,000	$ 260,000	$ 270,000	$ 280,000	$ 290,000	$ 300,000	$ 310,000	$ 320,000	$ 330,000	$ 340,000	$ 350,000	$ 360,000	$ 370,000	$ 380,000	$ 390,000	$ 400,000	$ 410,000	$ 420,000	$ 430,000
Transfer to Capital	$ 428,764	$ 22,422	$ 38,262	$ 44,621	$ 535,386	$ 46,622	$ 805,066	$ 118,821	$ 182,734	$ 71,568	$ 33,052	$ 157,872	$ 1,166,554	$ 61,043	$ 207,517	$ 93,920	$ 32,838	$ 1,563,618	$ 73,964
Closing Balance	$ 352,829	$ 590,407	$ 822,145	$ 1,057,524	$ 812,139	$ 1,065,516	$ 570,450	$ 771,630	$ 918,895	$ 1,187,327	$ 1,504,275	$ 1,706,403	$ 909,848	$ 1,228,805	$ 1,411,289	$ 1,717,369	$ 2,094,531	$ 950,913	$ 1,306,949

Water - Operating Budget Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Net Operating Expenditures	$ 769,383	$ 792,465	$ 816,239	$ 840,726	$ 865,948	$ 891,926	$ 918,684	$ 946,244	$ 974,632	$ 1,003,871	$ 1,033,987	$ 1,065,006	$ 1,096,957	$ 1,129,865	$ 1,163,761	$ 1,198,674	$ 1,234,634	$ 1,271,673	$ 1,309,823
Transfers to Capital-Related Reserves	$ 250,000	$ 260,000	$ 270,000	$ 280,000	$ 290,000	$ 300,000	$ 310,000	$ 320,000	$ 330,000	$ 340,000	$ 350,000	$ 360,000	$ 370,000	$ 380,000	$ 390,000	$ 400,000	$ 410,000	$ 420,000	$ 430,000
Total Net Impact on Revenue	$ 1,019,383	$ 1,052,465	$ 1,086,239	$ 1,120,726	$ 1,155,948	$ 1,191,926	$ 1,228,684	$ 1,266,244	$ 1,304,632	$ 1,343,871	$ 1,383,987	$ 1,425,006	$ 1,466,957	$ 1,509,865	$ 1,553,761	$ 1,598,674	$ 1,644,634	$ 1,691,673	$ 1,739,823
Prior Year Revenue	$ 985,400	$ 1,019,383	$ 1,052,465	$ 1,086,239	$ 1,120,726	$ 1,155,948	$ 1,191,926	$ 1,228,684	$ 1,266,244	$ 1,304,632	$ 1,343,871	$ 1,383,987	$ 1,425,006	$ 1,466,957	$ 1,509,865	$ 1,553,761	$ 1,598,674	$ 1,644,634	$ 1,691,673
Current Year Revenue at 0.0% Increase	$ 985,400	$ 1,019,383	$ 1,052,465	$ 1,086,239	$ 1,120,726	$ 1,155,948	$ 1,191,926	$ 1,228,684	$ 1,266,244	$ 1,304,632	$ 1,343,871	$ 1,383,987	$ 1,425,006	$ 1,466,957	$ 1,509,865	$ 1,553,761	$ 1,598,674	$ 1,644,634	$ 1,691,673
Additional Revenue Required	$ 33,983	$ 33,081	$ 33,774	$ 34,487	$ 35,222	$ 35,978	$ 36,758	$ 37,561	$ 38,387	$ 39,239	$ 40,116	$ 41,020	$ 41,950	$ 42,909	$ 43,896	$ 44,913	$ 45,960	$ 47,039	$ 48,150
Total Revenue	$ 1,019,383	$ 1,052,465	$ 1,086,239	$ 1,120,726	$ 1,155,948	$ 1,191,926	$ 1,228,684	$ 1,266,244	$ 1,304,632	$ 1,343,871	$ 1,383,987	$ 1,425,006	$ 1,466,957	$ 1,509,865	$ 1,553,761	$ 1,598,674	$ 1,644,634	$ 1,691,673	$ 1,739,823
Percentage Increase	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%

Appendix C Financing Strategy Tables – Wastewater Collection System

Table C-1
Wastewater Collection System Capital Expenditure Forecast

Wastewater Capital Budget Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Manholes (Replace or Reline)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 355,278	$ 355,278	$ 355,278	$ 355,278	$ 355,278
Springfield P.S. Roof & Electrical	$ -	$ -	$ -	$ -	$ -	$ -	$ 74,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Springfield P.S. HVAC/Exhaust & Wet Well Power Vent	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Springfield P.S. Pumps (Rebuild 10yr & Replace 20yr)	$ 30,000	$ -	$ -	$ 18,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 105,000	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ -	$ -
Springfield P.S. Discharge Flow Meter	$ -	$ 16,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Springfield P.S. Generator & Transfer Switch	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 125,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Springfield P.S. Level Monitoring Equipment & Transducer	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 14,000	$ -	$ -	$ -	$ -
Springfield P.S. Wet Well Pipe Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 93,000	$ -	$ -
Springfield P.S. One Time Expenses	$ 4,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
OPC P.S. HVAC/Exhaust & Wet Well Power Vent	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 16,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
OPC P.S. Pump (Rebuild 10yr & Replace 20yr)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 82,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 116,000	$ -
OPC P.S Level Monitoring Equipment & Radar	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 22,000	$ -	$ -	$ -	$ -	$ -	$ -
OPC P.S Wet Well Pipe Replacment & Lifting Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 47,000	$ -
OPC P.S. One Time Expenses	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SCADA PLC (every 12-15 yrs)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,000	$ -	$ -	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -
SCADA PLC Cabinet (every 25 yrs)	$ -	$ -	$ 4,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 81,000	$ -	$ -	$ -	$ -	$ -	$ -
SCADA (every 6-8 yrs)	$ -	$ -	$ -	$ -	$ -	$ 25,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 33,000	$ -	$ -	$ -	$ -	$ -
Rate Study	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Condition Assessments (every 10 yrs)	$ -	$ -	$ -	$ -	$ -	$ 15,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,000	$ -	$ -	$ -
Maximo Software (OCWA)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
MCC Inspections (every 10yr)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Force Main 4 Air Release Valves (every 5yrs)	$ -	$ -	$ 6,098	$ 6,311	$ -	$ -	$ -	$ 7,242	$ 7,496	$ -	$ -	$ -	$ 8,602	$ 8,903	$ -	$ -	$ -	$ 10,216	$ 10,574
Total Expenditures	**$ 34,000**	**$ 26,000**	**$ 10,098**	**$ 24,311**	**$ -**	**$ 40,500**	**$ 74,000**	**$ 105,742**	**$ 25,496**	**$ 48,500**	**$ 105,000**	**$ 125,000**	**$ 141,602**	**$ 66,903**	**$ 369,278**	**$ 370,278**	**$ 448,278**	**$ 528,494**	**$ 365,852**

Table C-2
Wastewater Collection System Funding Strategy

Capital Budget Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Total Expenditures	$ 34,000	$ 26,000	$ 10,098	$ 24,311	$ -	$ 40,500	$ 74,000	$ 105,742	$ 25,496	$ 48,500	$ 105,000	$ 125,000	$ 141,602	$ 66,903	$ 369,278	$ 370,278	$ 448,278	$ 528,494	$ 365,852
Provincial/Federal Grants	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Transfer from Capital Reserves	$ 34,000	$ 26,000	$ 10,098	$ 24,311	$ -	$ 40,500	$ 74,000	$ 105,742	$ 25,496	$ 48,500	$ 105,000	$ 125,000	$ 141,602	$ 66,903	$ 369,278	$ 370,278	$ 448,278	$ 528,494	$ 365,852
Total Funding	$ 34,000	$ 26,000	$ 10,098	$ 24,311	$ -	$ 40,500	$ 74,000	$ 105,742	$ 25,496	$ 48,500	$ 105,000	$ 125,000	$ 141,602	$ 66,903	$ 369,278	$ 370,278	$ 448,278	$ 528,494	$ 365,852
Total Capital Expenses Less Funding	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Capital Reserves Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Opening Balance	$ 838,248	$ 958,962	$ 1,086,676	$ 1,229,292	$ 1,356,695	$ 1,507,409	$ 1,616,623	$ 1,691,337	$ 1,733,308	$ 1,854,526	$ 1,951,740	$ 1,991,454	$ 2,010,168	$ 2,011,281	$ 2,086,092	$ 1,857,528	$ 1,626,964	$ 1,317,400	$ 926,620
Transfer from Operating	$ 154,714	$ 153,714	$ 152,714	$ 151,714	$ 150,714	$ 149,714	$ 148,714	$ 147,714	$ 146,714	$ 145,714	$ 144,714	$ 143,714	$ 142,714	$ 141,714	$ 140,714	$ 139,714	$ 138,714	$ 137,714	$ 136,714
Transfer to Capital	$ 34,000	$ 26,000	$ 10,098	$ 24,311	$ -	$ 40,500	$ 74,000	$ 105,742	$ 25,496	$ 48,500	$ 105,000	$ 125,000	$ 141,602	$ 66,903	$ 369,278	$ 370,278	$ 448,278	$ 528,494	$ 365,852
Closing Balance	$ 958,962	$ 1,086,676	$ 1,229,292	$ 1,356,695	$ 1,507,409	$ 1,616,623	$ 1,691,337	$ 1,733,308	$ 1,854,526	$ 1,951,740	$ 1,991,454	$ 2,010,168	$ 2,011,281	$ 2,086,092	$ 1,857,528	$ 1,626,964	$ 1,317,400	$ 926,620	$ 697,482

Operating Budget Forecast	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Net Operating Expenditures	$ 197,313	$ 203,232	$ 209,329	$ 215,609	$ 222,077	$ 228,740	$ 235,602	$ 242,670	$ 249,950	$ 257,449	$ 265,172	$ 273,127	$ 281,321	$ 289,761	$ 298,454	$ 307,407	$ 316,629	$ 326,128	$ 335,912
Transfers to Capital-Related Reserves	$ 154,714	$ 153,714	$ 152,714	$ 151,714	$ 150,714	$ 149,714	$ 148,714	$ 147,714	$ 146,714	$ 145,714	$ 144,714	$ 143,714	$ 142,714	$ 141,714	$ 140,714	$ 139,714	$ 138,714	$ 137,714	$ 136,714
Net Impact on Revenue	$ 352,027	$ 356,946	$ 362,043	$ 367,323	$ 372,791	$ 378,454	$ 384,316	$ 390,384	$ 396,664	$ 403,163	$ 409,886	$ 416,841	$ 424,035	$ 431,475	$ 439,168	$ 447,121	$ 455,343	$ 463,842	$ 472,626
Prior Year Revenue	$ 347,280	$ 352,027	$ 356,946	$ 362,043	$ 367,323	$ 372,791	$ 378,454	$ 384,316	$ 390,384	$ 396,664	$ 403,163	$ 409,886	$ 416,841	$ 424,035	$ 431,475	$ 439,168	$ 447,121	$ 455,343	$ 463,842
Current Year Revenue at 0.0% Use Fee Increase	$ 347,280	$ 352,027	$ 356,946	$ 362,043	$ 367,323	$ 372,791	$ 378,454	$ 384,316	$ 390,384	$ 396,664	$ 403,163	$ 409,886	$ 416,841	$ 424,035	$ 431,475	$ 439,168	$ 447,121	$ 455,343	$ 463,842
Additional Revenue Required	$ 4,747	$ 4,919	$ 5,097	$ 5,280	$ 5,468	$ 5,662	$ 5,862	$ 6,068	$ 6,280	$ 6,499	$ 6,723	$ 6,955	$ 7,194	$ 7,440	$ 7,693	$ 7,954	$ 8,222	$ 8,499	$ 8,784
Total Revenue	$ 352,027	$ 356,946	$ 362,043	$ 367,323	$ 372,791	$ 378,454	$ 384,316	$ 390,384	$ 396,664	$ 403,163	$ 409,886	$ 416,841	$ 424,035	$ 431,475	$ 439,168	$ 447,121	$ 455,343	$ 463,842	$ 472,626
Percentage Increase	1%	1%	1%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%