Municipality of

Trent Hills

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ASSET MANAGEMENT PLAN

2024

Table of Contents

Acronyms, Abbreviations, Definitions

Executive Summary

1.0 Introduction 1

1.1 Asset Management Overview 1
1.2 Overview of the AMP 3
1.2.1 Policy Alignment 4
1.2.2 Regulatory Alignment 5
1.3 State of Local Infrastructure 6
1.3.1 Asset Hierarchy 6
1.3.2 Asset Inventory 7
1.4 Levels of Service 7
1.4.1 LOS Workshop 8
1.4.2 Current LOS 9
1.5 Risk Assessment 9
1.5.1 Risk Workshop 10
1.5.2 Risk Methodology Approach 11
1.5.3 Calculation of Likelihood 11
1.5.4 Calculation of Consequence 12
1.5.5 Calculation of Risk 13
1.5.6 Limitation and Assumptions – Risk Assessment 15
1.6 Lifecycle Activities 15
1.7 Asset Management Strategy 15
1.8 Growth 18
1.9 Roadmap with Next Steps 21

1.9.1 Next Steps – Regulatory Compliance 21
1.9.2 Next Steps – Recommendations in AMP 2023 21

2.0 Roads and Traffic Network 23

2.1 Summary - Roads 23
2.1.1 State of Local Infrastructure 23
2.1.2 Condition 24
2.1.3 Current LOS 27
2.1.4 Current Performance 29
2.1.5 Risk Assessment 29
2.1.6 Lifecycle Activities 31
2.2 Asset Management Strategy 34
2.3 Summary – Traffic Infrastructure 35
2.3.1 State of Local Infrastructure – Traffic Infrastructure 36
2.3.2 Condition 37
2.3.3 Current LOS 38
2.3.4 Current Performance 39
2.3.5 Risk Assessment 40
2.3.6 Lifecycle Activities 41
2.4 Asset Management Strategy 43
2.4.1 Sidewalks/Boulevards 43
2.4.2 Streetlights and Traffic Signals 44

3.0 Bridges and Culverts 46

3.1 Summary 46
3.2 State of Local Infrastructure 46
3.2.1 Average Age 46
3.2.2 Replacement Cost 47

3.2.3 Expected Useful Life 47
3.3 Condition 47
3.4 Current LOS 51
3.5 Current Performance 53
3.6 Risk Assessment 54
3.7 Lifecycle Activities 55
3.8 Asset Management Strategy 58

4.0 Water 60

4.1 Summary 60
4.2 State of Local Infrastructure 61
4.2.1 Average Age 61
4.2.2 Replacement Costs 61
4.2.3 Expected Useful Life 61
4.3 Condition 62
4.4 Current LOS 63
4.5 Current Performance 66
4.6 Risk Assessment 67
4.7 Lifecycle Activities 68
4.8 Asset Management Strategy 70

5.0 Wastewater 72

5.1 Summary 72
5.2 State of Local Infrastructure 73
5.2.1 Average Age 73
5.2.2 Replacement Costs 73
5.2.3 Expected Useful Life 74
5.3 Condition 74
5.4 Current LOS 77
5.5 Current Performance 80

5.6 Risk Assessment 80
5.7 Lifecycle Activities 81
5.8 Asset Management Strategy 83

6.0 Storm Water 86

6.1 Summary 86
6.2 State of Local Infrastructure 87
6.2.1 Average Age 87
6.2.2 Replacement Costs 87
6.2.3 Expected Useful Life 88
6.3 Condition 88
6.4 Current LOS 91
6.5 Current Performance 93
6.6 Risk Assessment 93
6.7 Lifecycle Activities 94
6.8 Asset Management Strategy 96

7.0 Buildings 98

7.1 Summary 98
7.1.1 Parks and Recreation Buildings 98
7.1.2 Fire Protection Services 99
7.1.3 Administration and Heritage Services 99
7.1.4 Public Works 100
7.2 State of Local Infrastructure 100
7.2.1 Average Age 100
7.2.2 Replacement Cost 101
7.2.3 Expected Useful Life 102
7.3 Condition 102
7.4 Current LOS 103
7.5 Current Performance 105

7.6 Risk Assessment 106
7.7 Lifecycle Activities 107
7.8 Asset Management Strategy 110

8.0 Fleet 112

8.1 Summary 112
8.2 State of Local Infrastructure 113
8.2.1 Average Age 113
8.2.2 Replacement Costs 113
8.2.3 Expected Useful Life 113
8.3 Condition 114
8.4 Current LOS 115
8.5 Current Performance 116
8.6 Risk Assessment 117
8.7 Lifecycle Activities 118
8.8 Asset Management Strategy 120

9.0 Equipment and Machinery 121

9.1 Summary 121
9.2 State of Local Infrastructure 122
9.2.1 Average Age 122
9.2.2 Replacement Cost 122
9.2.3 Expected Useful Life 123
9.3 Condition 123
9.4 Current LOS 127
9.5 Current Performance 128
9.6 Risk Assessment 128
9.7 Lifecycle Activities 129
9.8 Asset Management Strategy 131

10.0 Land/Land Improvements 132

10.1 Summary 132
10.1.1 Condition 132
10.2 State of Local Infrastructure 133
10.2.1 Average Age 133
10.2.2 Replacement Costs 133
10.2.3 Expected Useful Life 134
10.3 Current LOS 134
10.4 Current Performance 135
10.5 Lifecycle Activities 135

11.0 IT Infrastructure 137

11.1 Summary 137
11.2 State of Local Infrastructure 138
11.2.1 Replacement Cost 138
11.2.2 Average Age 138
11.2.1 Expected Useful Life 138
11.3 Condition 138
11.4 Current LOS 141
11.5 Current Performance 142
11.6 Risk Assessment 143
11.7 Lifecycle Activities 144
11.8 Asset Management Strategy 146

12.0 Capital Financial Analysis 147

12.1 Non-Water & Wastewater Assets 147
12.1.1 Funding 147
12.1.2 Projected Lifestyle Costs 150
12.1.3 Financial Analysis 151
12.2 Water & Wastewater 153

12.2.1 Funding 153
12.2.2 Lifecycle Costs 154
12.3 Recommendations 157

Figures

Figure ES-1: Distribution of Replacement Costs xix
Figure ES-2: Asset Condition for all Assets xx
Figure ES-3: Levels of Service (Community LOS, Technical LOS and Performance) xxi
Figure ES-4: Risk Profile for all Assets xxii
Figure 1.1: Lifecycle Approach (Infraguide 2005) 2
Figure 1.2: Essential Questions of Asset Management 3
Figure 1.3: Levels of Service (Community LOS, Technical LOS and Performance) 8
Figure 1.4: Risk Heat Map 10
Figure 1.5: All Asset Risk Profile 14
Figure 1.6: Theoretical Deterioration of Assets and Lifecycle Activity Opportunities 17
Figure 2.1: Importance of Roads Based on Surface Type (km and Importance) 26
Figure 2.2: Summary of Road Condition Based on Surface Type 26
Figure 2.3: Risk Profile for Roads Assets 31
Figure 2.4: Risk Profile for Inventory Sidewalks Assets 40
Figure 3.1: Age Distribution of Bridges and Structural Culverts 47
Figure 3.2: Example of Poor Condition Bridge – Norham Mill Bridge 48
Figure 3.3: Example of Fair Condition Bridge – Bowen's Bridge 49
Figure 3.4: Example of Good Condition Bridge – Gummow Bridge 49
Figure 3.5: Example of Fair Condition Culvert – 2nd Concession East Box Culvert 50
Figure 3.6: Example of Good Condition Culvert – Platt Road Culvert 50
Figure 3.7: Bridge and Culvert Condition Ratings 51

Figure 3.8: Risk Profile for Bridges and Culverts Assets 55
Figure 4.1: Condition of Watermain Assets (Value and Importance) 63
Figure 4.2: Risk Profile for Water Assets 67
Figure 5.1: Condition Ratings by Wastewater Linear Type 76
Figure 5.2: Condition of All Wastewater Assets (Value and Importance) 76
Figure 5.3: Risk Profile for Wastewater Assets 81
Figure 6.1: Condition Ratings by Stormwater Main Type 90
Figure 6.2: Condition of Stormwater Assets (Value and Importance) 90
Figure 6.3: Risk Profile for Stormwater Assets 94
Figure 7.1: Condition of Buildings (Value) 103
Figure 7.2: Risk Profile for Buildings Assets 107
Figure 8.1: Asset Value and Condition of Fleet (Importance) 114
Figure 8.2: Asset Value and Condition of Fleet (Value) 115
Figure 8.3: Risk Profile for Fleet Assets 118
Figure 9.1: Condition of All Equipment (Value) 124
Figure 9.2: Condition of Fire Protection Services Equipment (Value and Importance) 125
Figure 9.3: Condition of Parks and Recreation Equipment (Value and Importance) 126
Figure 9.4: Condition of Public Works Equipment (Value and Importance) 126
Figure 9.5: Risk Profile for Equipment and Machinery Assets 129
Figure 11.1: Condition of IT Infrastructure (Value and Importance) 140
Figure 11.2: Condition of IT Infrastructure (Value and Importance) 140
Figure 11.3: Risk Profile for IT Assets 144
Figure 12.1: Forecasted Annual Capital Expenditures, 10-Year Annual Average, and Baseline Capital Funding Capacity (2023 to 2032) 152
Figure 12.2: Forecasted Annual Capital Expenditures and 10-Year Annual Average for Water and Wastewater Assets (2023 to 2032) 156

Tables

Table 1.1: Likelihood Factors 12
Table 1.2: Consequence Factors 13
Table 1.3: Expansion Projects to Accommodate Growth 20
Table 1.4: Growth Impacts to Lifecycle Activities 20
Table 2.1: Condition Rating Categories for Roads EUL: 100 years 25
Table 2.2: Community Level of Service 27
Table 2.3: Technical Level of Service 28
Table 2.4: Additional Level of Service Metrics 28
Table 2.5: Road Condition Ratings 29
Table 2.6: Summary of Traffic Infrastructure 36
Table 2.7: Traffic Network Condition Assessment Remaining Useful Life Rating System 38
Table 2.8: Community Level of Service 38
Table 2.9: Technical Level of Service 39
Table 3.1: Condition of Bridges/Culverts and How It Affects the Use 48
Table 3.2: Community Levels of Service 52
Table 3.3: Technical Levels of Service 53
Table 3.4: Additional Level of Service Metrics 53
Table 4.1: Condition Ratings and Age Range Years for Various Assets 62
Table 4.2: Community Levels of Service 64
Table 4.3: Technical Levels of Service 64
Table 4.4: Additional Level of Service Metrics 65
Table 5.1: Condition Ratings and Age Range Years for Various Assets 73
Table 5.2: Condition Rating, Age Range and Total Length for Wastewater Assets 75

Table 5.3: Community Level of Service 77
Table 5.4: Technical Level of Service 78
Table 5.5: Additional Level of Service Metrics 79
Table 6.1: Current State Summary of Stormwater Culverts 86
Table 6.2: Stormwater Mains Material Summary 87
Table 6.3: Condition Ratings and Total Lengths for Stormwater Culverts 89
Table 6.4: Community Levels of Service 91
Table 6.5: Technical Levels of Service 92
Table 6.6: Additional Level of Service Metrics 92
Table 7.1: Community Levels of Service – Buildings 104
Table 7.2: Technical Levels of Service – Buildings 104
Table 7.3: Technical Levels of Service – Buildings 105
Table 7.4: Current Performance Measures for Buildings 106
Table 8.1: Summary of Fleet 112
Table 8.2: Community Levels of Service – Fleet 116
Table 8.3: Technical Levels of Service – Fleet 116
Table 8.4: Current Performance Measures for Fleet 116
Table 9.1: Expected Useful Life for Equipment and Machinery Assets 123
Table 9.2: Condition Ratings and Age Range Years for Various Assets 123
Table 9.3: Community Levels of Service – Equipment and Machinery 127
Table 9.4: Technical Levels of Service – Equipment and Machinery 127
Table 9.5: Current Performance Measures for Equipment and Machinery 128
Table 10.1: Condition Ratings and Age Range Years for Various Assets 133
Table 10.2: Summary of Land Asset Type, Quantity, Average Condition and Age 133
Table 10.3: Community Levels of Service – Land and Land Improvements 134
Table 10.4: Technical Levels of Service – Land and Land Improvements 134

Table 11.1: Current State Summary of IT Infrastructure Assets 137
Table 11.2: Expected Useful Life for IT Assets 138
Table 11.3: Condition Ratings and Age Ranges for IT Assets 139
Table 11.4: Community Levels of Service – IT Infrastructure 141
Table 11.5: Technical Levels of Service – IT Infrastructure 141
Table 12.1: Currently Identified Capital Funding Sources 149
Table 12.2: Funding Sources Notes Summary (2024) 149
Table 12.3: Capital Expenditure Forecast 150
Table 12.4: Capital Funding for Water & Wastewater 154
Table 12.5: Capital Expenditure Forecast (Water & Wastewater) 155

Appendix (provided in separate document)

A Tables A1-A4

References

Acronyms and Abbreviations

AADT	average annual daily traffic
ALOS	Asset Level of Service
AM	Asset Management
AMP	Asset Management Plan
AODA	Accessibility for Ontarians with Disabilities Act
BCI	Bridge Condition Index
Bldg	Building
C	climate change factor
CDN	Canadian Dollars
CLOS	Community Level of Service
Corp	Corporation
CSA	Canadian Standards Association
CSP	Corrugated Steel Pipe
e.g.	exempli gratia (for example)
ES	Executive Summary
etc.	etcetera (and so forth)
FCM	Federation of Canadian Municipalities
HCB	High Class Bituminous
i.e.	id est (that is)
ID	identification
IT	Information Technology
km	kilometre
LCB	Low Class Bituminous
LED	light-emitting diode

LOS	Level of Service
Ltd.	Limited
m	metre
M	million
m^2	square metre
Maint	maintenance
Max	maximum
Min	minimum
MTO	Ontario Ministry of Transportation
N	North
N/A	Not Applicable
No.	number
O & M	Operations and Maintenance
O. Reg.	Ontario Regulation
OSIM	Ontario Structure Inspection Manual
PCI	Pavement Condition Index
PW	Public Works
Qty	quantity
Reconst	reconstruction
Rehab	rehabilitation
St	street
Sq	square

Executive Summary

The Municipality of Trent Hills engaged Dillon Consulting Limited as an asset management advisor to update its 2018 Asset Management Plan (AMP) in alignment with O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure and in accordance with the Municipality's Strategic Asset Management Policy.

The staff at the municipality provided key insights and information to inform the findings in the report. This AMP incorporates the assets owned by the Municipality of Trent Hills and its strategies based on known information at the time of writing the report. This plan is a based on data available as of December 2023.

Assets will continue to deteriorate, and investments will be required to improve the condition and extend the useful life of the infrastructure, to meet the "fit for purpose" measure of the assets in delivery of the services and meeting (or moving towards) the proposed LOS established by the Municipality.

Overview of the AMP

This introduction includes an overview of key asset management principles: State of Local Infrastructure, Levels of Service, Risk Assessment and Lifecycle Activities. The introduction concludes with a Roadmap with Next Steps.

The assets included in the AMP are:

- Roads and Traffic Infrastructure (**Section 2.0**)
- Bridges and Culverts (**Section 3.0**)
- Water (**Section 4.0**)
- Wastewater (**Section 5.0**)
- Storm Water (**Section 6.0**)
- Buildings (**Section 7.0**)
- Fleet (**Section 8.0**)
- Equipment and Machinery (**Section 9.0**)
- Land and Land Improvements (**Section 10.0**)
- IT Infrastructure (**Section 11.0**)
- Preliminary Capital Financial Analysis (**Section 12.0**)

Policy Alignment

The AMP update aligns with the Municipality's Strategic Asset Management Policy (Policy Number POL-FIN-008), which includes the asset management vision and strategic alignment.

Excerpts from the Policy are outlined below:

The Policy will support the Municipality in focusing its infrastructure effort on managing risks, addressing priorities, and meeting short and long-term needs within the bounds of possible funding.

The Municipality's vision is to proactively manage its assets to best serve the Municipality's objectives, including:

- Prioritizing the need for existing and future assets to effectively deliver services;
- Supporting sustainability and economic development;
- Maintaining prudent financial planning and decision making;
- Providing a consistent framework for implementing asset management throughout the organization; and
- Providing transparency and accountability and to demonstrate to stakeholders the legitimacy of decision-making processes which combine strategic plans, budgets, service levels and risks.

Strategic Alignment:

"Our vision to maintain a safe community with sustainable growth requires alignment of the many initiatives underway in our organization at any given time in order for it to be achieved. This alignment is necessary to properly consider whether the level of service provided by our existing and planned assets is congruent and supports our vision.

The Municipality of Trent Hills has developed and adopted a number of goals, policies and plans including a Strategic Plan, Official Plan, Emergency Management Plan, Multi-Year Accessibility Plan, Community Improvement Plan, Asset Management Plan, Debt Management Policy and various Master Plans. These plans and policies were designed to meet legislative requirements and work together to achieve the Municipality's mission of providing innovation and excellence in service delivery.

Asset management planning will not occur in isolation from other goals municipal goals, plans and policies."

Regulatory Alignment

The 2024 AMP is an update to the 2018 AMP which requires alignment with phase 3 of the new regulation, O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure. The regulation requires the following four phases of compliance:

1. By July 2019: Municipalities to have a strategic asset management policy.
2. By July 2022: All core assets to be covered in the asset management plan with current Level of Service (LOS). Core assets include water, wastewater, stormwater, roads, and bridges/culverts.
3. By July 2024: All assets owned by the municipality to be covered in the AMP. Non-core assets include buildings, fleet and equipment as well as green infrastructure assets.
4. By July 2025: Municipalities will have approved proposed LOS and the lifecycle management and financial strategy for 10-year period to achieve the proposed LOS.

This AMP includes the requirements for core and non-core assets and current levels of service. Next steps are the development of proposed (target) levels of service and the financing strategy to meet the proposed levels of service (phase 4).

Future updates will need to include green infrastructure assets (i.e. natural assets) owned by the Municipality and further assessment on infrastructure vulnerability to the impacts of climate change.

Roadmap with Next Steps

Next Steps – Regulatory Compliance

Annual Report to Council: As required by O. Reg. 588/17, municipalities will report to their Councils at least once per year on the current progress of asset management in the Municipality and any barriers to aligning operations with the AMP.

The future update would include more robust financial strategy with a funding strategy to meet Proposed level of Service which would meet phase 4 requirements of the Regulation.

Full Update of AMP: A full update of the AMP will be required within 5 years, i.e. by 2028.

Enhancements to the AMP: The inclusion of green infrastructure assets (i.e. green assets) owned by the Municipality and assessment of vulnerabilities caused by climate change on the performance of infrastructure.

Next Steps – Recommendations in AMP 2023

Continuous improvement regarding inventory data for traffic infrastructure, boulevards, sidewalks, and streetlight, is an ongoing goal for the Municipality. An update of the inventory for this asset category would allow for a more detailed assessment of the condition and lifecycle activities for these assets and ensure a more accurate long term investment analysis.

In future updates of this report a recommendation to the Municipality would be to implement a Building Condition Assessment program for all their Building assets. A full condition assessment (which would include the breakdown of each building and facility by overall components) of the entirety of the buildings owned by the Municipality would allow a more comprehensive cost breakdown for planning and maintenance activities and would ensure the whole of these asset categories has been captured. Given the complicated nature of assessing these buildings from a component standpoint and the time commitment needed in this assessment, it is recommended the Municipality has a third party to facilitate this work.

State of Local Infrastructure

Each section on the State of Local Infrastructure sets out the following:

- a summary of the assets in the category
- the replacement cost of the assets in the category
- the average age of the assets in the category, determined by assessing the average age of the components of the assets
- the information available on the condition of the assets in the category
- a description of the Municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.

The Municipality of Trent Hills owns infrastructure assets that provide services in the following asset categories: Roads and Traffic Infrastructure; Bridges and Culverts; Water; Wastewater; Stormwater; Buildings; Fleet; Equipment and Machinery; Land and Land Improvements; and IT Infrastructure.

Asset Hierarchy

The asset hierarchy defines the tiers of asset componentry. Each type of asset, both point and linear, can have its assets defined and inventoried at a high level, or with increased component detail.

For this Asset Management Plan (AMP), the analysis will focus on assets at the 'asset' level for the linear assets, with the expectation that the condition and replacement of the components and subcomponents will be consistent with the linear mains. This is predicated on the assumption that all other elements included in the system are required componentry that will be replaced in conjunction with the linear components and are expected to have similar lifespans and conditions as the linear components.

Buildings are considered complex assets. Complex assets are classified as assets which have various components which will be considered within the AMP. The components that will be included in the AMP are described in the buildings section of this report.

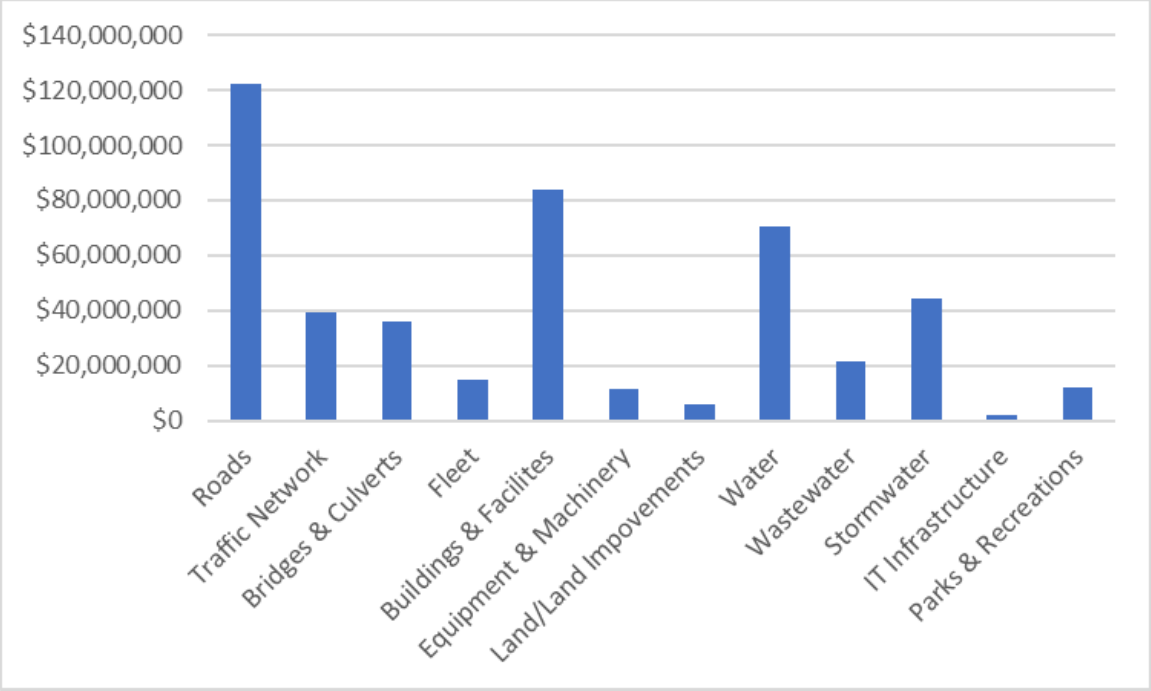
Asset Inventory

The inventory includes assets that are owned by the Municipality. The Municipality maintains a comprehensive database of asset information, including some assets which are GIS integrated. The majority of the inventory information was provided by the Municipality prior to initiation of the AMP update. Additional information was provided to the Consultants while the work was being completed. The AMP reflects the assets known as of December 2023.

Asset Replacement Costs

The total replacement cost for the Municipality of Trent Hill's infrastructure assets is $463.39 million (in 2023 dollars). The distribution of this replacement cost is shown in **Figure ES-1.**

Figure ES-1: Distribution of Replacement Costs

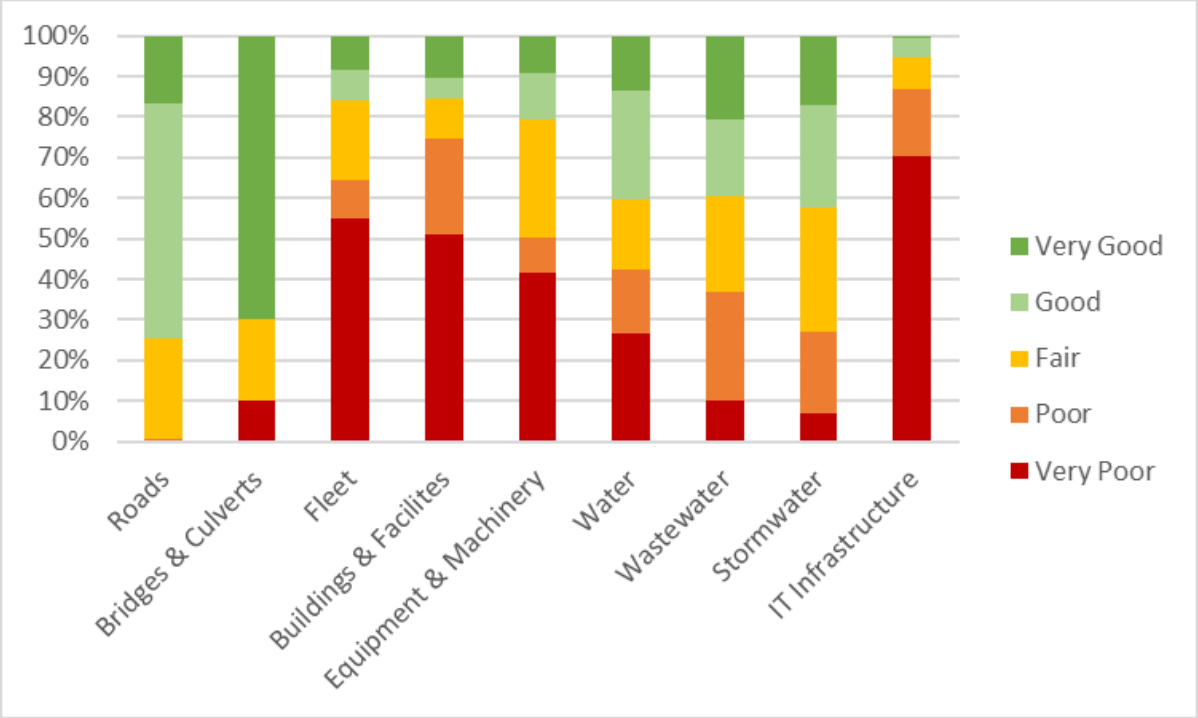


Details regarding estimation of asset replacement costs are provided within the respective asset sections.

Asset Condition Summary

A summary of the condition for each of the Municipality of Trent Hill's infrastructure assets is shown in **Figure ES-2**. On average, 18% of the Municipality's infrastructure assets have a condition rating of Very Good, 18% have a condition rating of Good, 20% have a condition rating of Fair, 14% have a condition rating of Poor, and 30% have a condition rating of Very Poor.

Figure ES-2: Asset Condition for all Assets



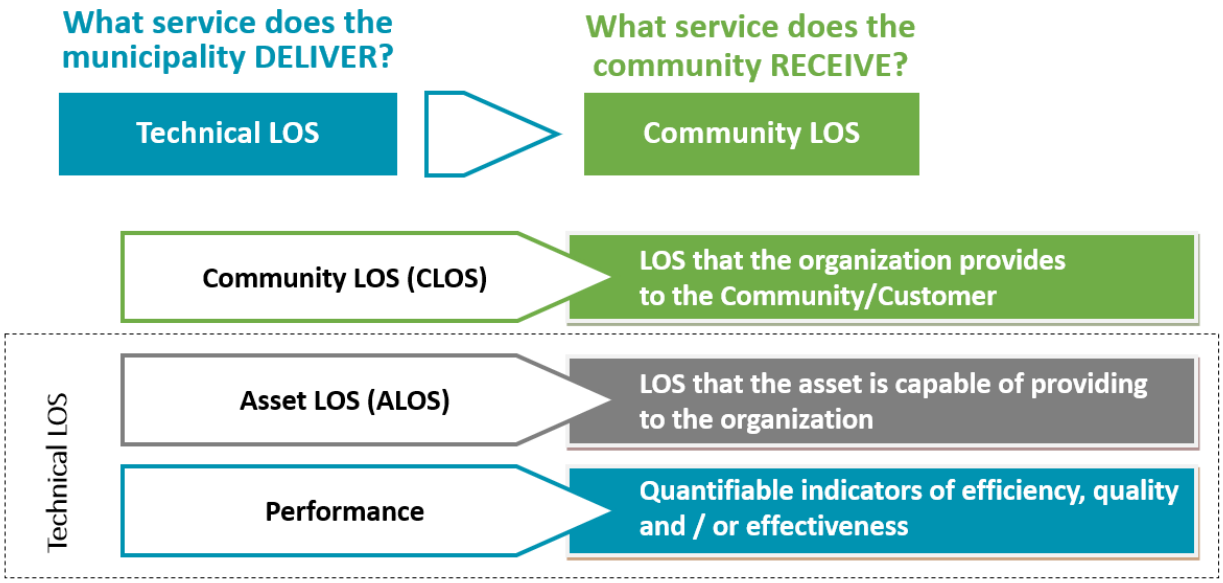
Levels of Service

The current and proposed levels of service are described in terms of community levels of service and technical metrics for each asset type. These descriptions are prescribed for core assets (including water, wastewater, stormwater, roads, and bridges and culverts) within Ontario Regulation (O.Reg.) 588/17.

Levels of Service (LOS) are presented in **Figure ES-3** and defined as follows:

- **Community LOS**: LOS that the organization provides to the community, intended to be customer-focused, providing a qualitative description of scope and quality.
- **Technical LOS**: LOS that the asset is capable of providing to the Municipality which is further measured by the performance of the asset, providing technical metrics that support the delivery of LOS.

Figure ES-3: Levels of Service (Community LOS, Technical LOS and Performance)

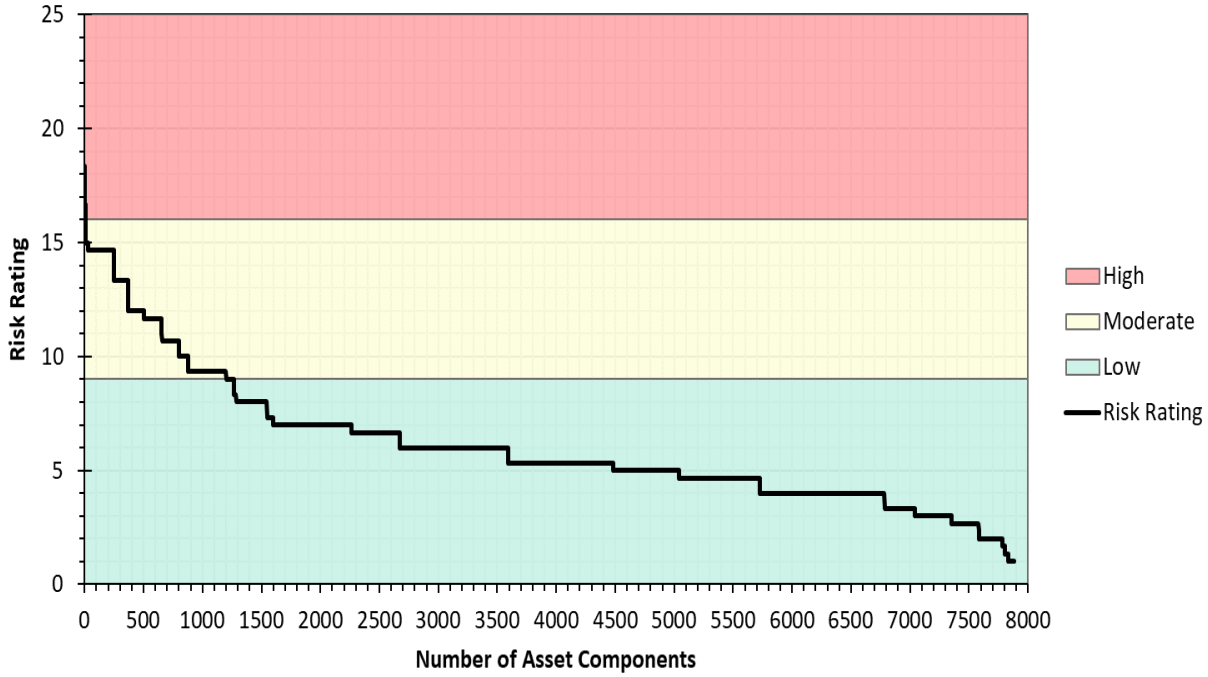


Through the AMP development, the Municipality sought to establish current levels of service (LOS) for core and non-core assets, in accordance with O. Reg. 588/17.

Asset Risk Profile

Of the approximate 7885 assets tracked within the Municipalities asset management data only six (6) are classified as a High-Risk rating and approximately 1193 as Moderate risk rating. These assets are considered high and moderate priorities for the implementation of lifecycle activities and possible replacement. The six (6) assets that were classified as high-risk were six storm linear assets that were constructed between the years of 1913 to 1972 on Trent Canal, Queen Street and Church Street. The remaining assets are considered Low risk rating.

Figure ES-4: Risk Profile for all Assets



The approach and methodology to risk assessment is presented in the following sections. A risk profile for each asset category is presented in the corresponding section for each asset class.

Acknowledgements

The consulting team would like to express our appreciation to the staff from various department and service areas for their cooperation and input to this update. We acknowledge their commitment and flexibility to contribute to this project despite the challenges brought into daily operations.

About this Report

Dillon Consulting Limited was retained by the Municipality of Trent Hills to conduct an update to their Asset Management Plan to meet the requirements of O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure and as amended by O. Reg. 193/21.

Consulting Team

- Darla Campbell, Project Manager
- Liza Guilbeau, Asset Management Coordinator
- Kaelee Oxford, LOS, Lifecycle/Asset Management Strategy
- Sierra Eskritt, Risk and AM Strategy and Analysis
- Jamie Mario, Financing Strategy

1.0 Introduction

The Municipality of Trent Hills is updating its 2018 Asset Management Plan (AMP) in alignment with the Municipality's Strategic Asset Management Corporate Policy (Policy Number POL-FIN-008) and O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure.

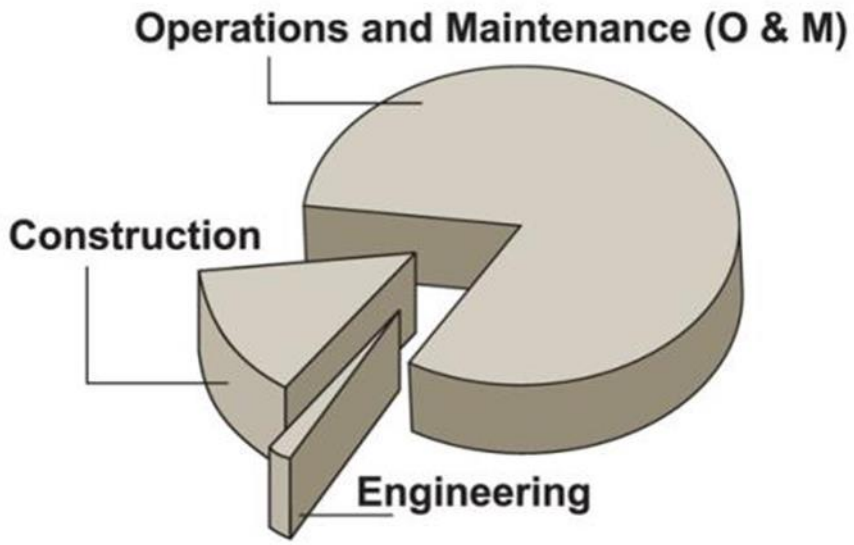
This AMP documents the Municipality's assets and strategies based on known information at the time of writing the report. It is a snapshot of a period in time, in this case, in 2023. Assets will continue to deteriorate, and investments will be required to improve the condition and extend the useful life of the infrastructure, to meet the "fit for purpose" measure of the assets in delivery of the services and meeting (or moving towards) the proposed levels of service established for the Municipality.

1.1 Asset Management Overview

Asset management is a process of making decisions regarding the creation, maintenance, renewal, rehabilitation, disposal, expansion, and procurement of infrastructure assets. The objective of asset management is to maximize the benefits of the assets, minimize risk and provide satisfactory levels of service to the public in a sustainable manner. It considers risks related to the lifecycle of the assets and requires a multi-disciplinary team of planning, finance, engineering, technology, maintenance, and operations.

Asset management considers the full lifecycle of the infrastructure, not just the initial cost for designing and constructing the asset (20% of lifecycle cost), but the operations and maintenance each and every year (estimated at 80% of lifecycle cost). See **Figure 1.1** below.

Figure 1.1: Lifecycle Approach (Infraguide 2005)

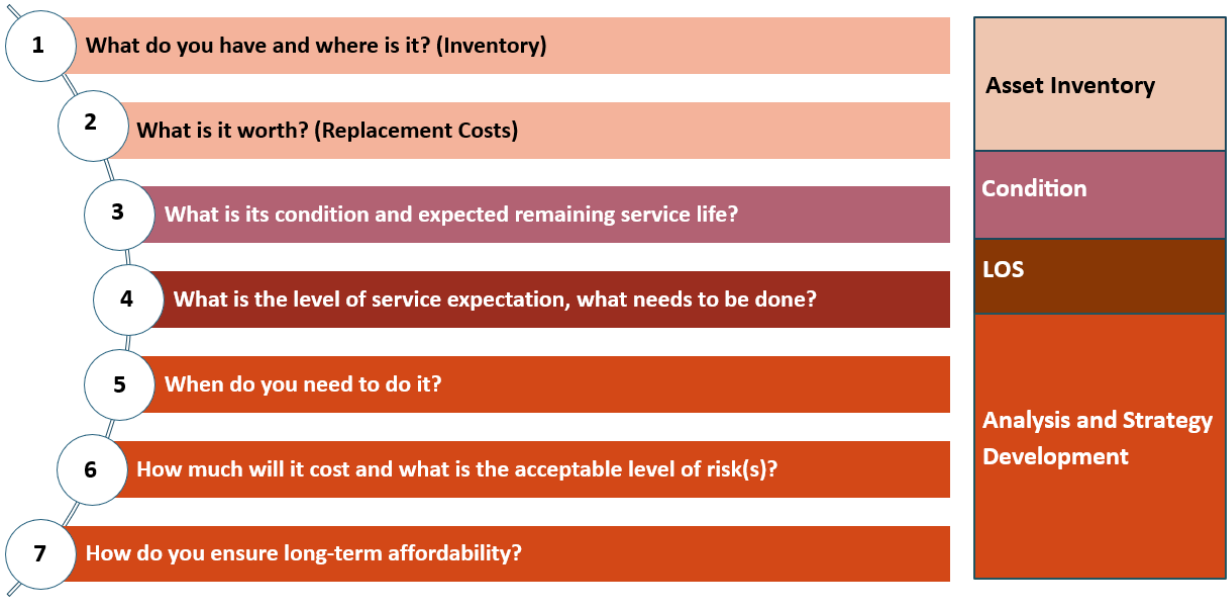


The essential questions for asset management, as described in the **InfraGuide: Managing Infrastructure Assets (Oct 2005),** are:

1. What do you have and where is it?
2. What is it worth?
3. What is its condition and expected remaining service life?
4. What is the level of service expectation, and what needs to be done?
5. When do you need to do it?
6. How much will it cost and what is the acceptable level of risk(s)?
7. How do you ensure long-term affordability?

These questions align to four aspects of asset management: asset inventory, condition, levels of service (LOS) and analysis and strategy development. See **Figure 1.2.**

Figure 1.2: Essential Questions of Asset Management



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The assets included in the AMP are:

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- Wastewater (**Section 5.0**)
- Storm Water (**Section 6.0**)
- Buildings (**Section 7.0**)
- Fleet (**Section 8.0**)
- Equipment and Machinery (**Section 9.0**)
- Land and Land Improvements (**Section 10.0**)
- IT Infrastructure (**Section 11.0**)
- Preliminary Capital Financial Analysis (**Section 12.0**)

Each asset category includes the following topics:

1. State of Local Infrastructure
2. Condition
3. Current Levels of Service
4. Current Performance
5. Risk Assessment
6. Lifecycle Activities
7. Asset Management Strategy

1.2.1 Policy Alignment

The AMP update aligns with the Municipality's Strategic Asset Management Policy (Policy Number POL-FIN-008), which includes the asset management vision and strategic alignment.

Excerpts from the Policy are outlined below:

The Policy will support the Municipality in focusing its infrastructure effort on managing risks, addressing priorities, and meeting short and long-term needs within the bounds of possible funding.

The Municipality's vision is to proactively manage its assets to best serve the Municipality's objectives, including:

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Strategic Alignment:

"Our vision to maintain a safe community with sustainable growth requires alignment of the many initiatives underway in our organization at any given time in order for it to be achieved. This alignment is necessary to properly consider whether the level of service provided by our existing and planned assets is congruent and supports our vision.

The Municipality of Trent Hills has developed and adopted a number of goals, policies and plans including a Strategic Plan, Official Plan, Emergency Management Plan, Multi-Year Accessibility Plan, Community Improvement Plan, Asset Management Plan, Debt Management Policy and various Master Plans. These plans and policies were designed to meet legislative requirements and work together to achieve the Municipality's mission of providing innovation and excellence in service delivery.

Asset management planning will not occur in isolation from other goals municipal goals, plans and policies."

1.2.2 Regulatory Alignment

The 2024 AMP is an update to the 2018 AMP which requires alignment with phase 3 of the new regulation, O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure. The regulation requires the following four phases of compliance:

1. By July 2019: Municipalities to have a strategic asset management policy.
2. By July 2022: All core assets to be covered in the asset management plan with current Level of Service (LOS). Core assets include water, wastewater, stormwater, roads, and bridges/culverts.
3. By July 2024: All assets owned by the municipality to be covered in the AMP. Non-core assets include buildings, fleet and equipment as well as green infrastructure assets.
4. By July 2025: Municipalities will have approved proposed LOS and the lifecycle management and financial strategy for 10-year period to achieve the proposed LOS.

This AMP includes the requirements for core assets and current levels of service. Next steps are the development of proposed (target) levels of service and the financing strategy to meet the proposed levels of service (phase 4).

Future updates will need to include green infrastructure assets (i.e. natural assets) owned by the Municipality and further assessment on infrastructure vulnerability to the impacts of climate change.

1.3 State of Local Infrastructure

Each section on the State of Local Infrastructure sets out the following:

- a summary of the assets in the category
- the replacement cost of the assets in the category
- the average age of the assets in the category, determined by assessing the average age of the components of the assets
- the information available on the condition of the assets in the category
- a description of the Municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.

The Municipality of Trent Hills owns infrastructure assets that provide services in the following asset categories: Roads and Traffic Infrastructure; Bridges and Culverts; Water; Wastewater; Stormwater; Buildings; Fleet; Equipment and Machinery; Land and Land Improvements; and IT Infrastructure.

1.3.1 Asset Hierarchy

The asset hierarchy defines the tiers of asset componentry. Each type of asset, both point and linear, can have its assets defined and inventoried at a high level, or with increased component detail.

For this Asset Management Plan (AMP), the analysis will focus on assets at the 'asset' level for the linear assets, with the expectation that the condition and replacement of the components and subcomponents will be consistent with the linear mains. This is predicated on the assumption that all other elements included in the system are required componentry that will be replaced in conjunction with the linear components and are expected to have similar lifespans and conditions as the linear components.

Buildings are considered complex assets. Complex assets are classified as assets which have various components which will be considered within the AMP. The components that will be included in the AMP are described in the buildings section of this report.

1.3.2 Asset Inventory

The inventory includes assets that are owned by the Municipality. The Municipality maintains a comprehensive database of asset information, including some assets which are GIS integrated. The majority of the inventory information was provided by the Municipality prior to initiation of the AMP update. Additional information was provided to the Consultants while the work was being completed. The AMP reflects the assets known as of December 2023.

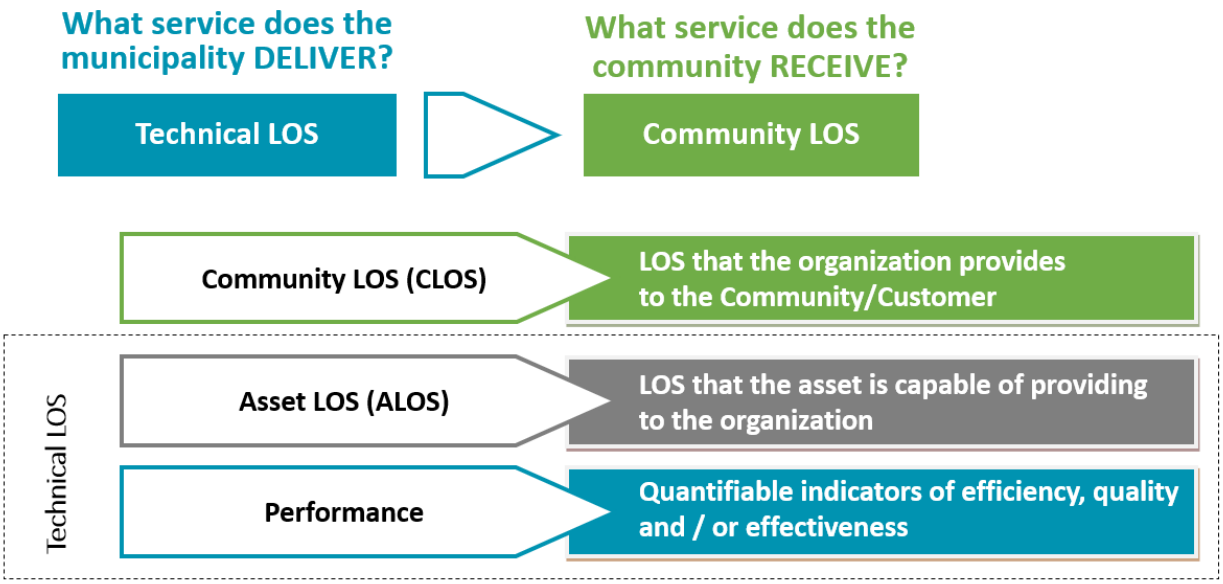
1.4 Levels of Service

The current and proposed levels of service are described in terms of community levels of service and technical metrics for each asset type. These descriptions are prescribed for core assets (including water, wastewater, stormwater, roads, and bridges and culverts) within Ontario Regulation (O.Reg.) 588/17.

Levels of Service (LOS) are presented in **Figure 1.3** and defined as follows:

- Community LOS: LOS that the organization provides to the community, intended to be customer-focused, providing a qualitative description of scope and quality.
- Technical LOS: LOS that the asset is capable of providing to the Municipality which is further measured by the performance of the asset, providing technical metrics that support the delivery of LOS.

Figure 1.3: Levels of Service (Community LOS, Technical LOS and Performance)



Through the AMP development, the Municipality sought to establish current levels of service (LOS), in accordance with O. Reg. 588/17. As part of this process, the Municipality undertook education and working sessions with internal stakeholders.

1.4.1 LOS Workshop

A workshop was held with senior staff from the Municipality, representing departments including finance, legislative service/IT, public works, building and planning, community services (parks and recreation), and fire/emergency services. The workshop was held January 31, 2024, though online delivery.

During the LOS of workshop, the concepts of Levels of Service were discussed, including definition of levels of service, impacts of changes to levels of service, and barriers to delivering the service.

The workshop included discussion regarding current Levels of Service at the Municipality, conducting individual group discussions to identify important parameters for defining service delivery, and local issues and efficiencies for delivery.

1.4.2 Current LOS

The current Levels of Service (LOS) is an established target for the Municipality's LOS and can be used to guide the Municipality in their current and future asset management. Current Levels of Service are a requirement for compliance with O. Reg. 588/17.

To establish the current Levels of Service, the Municipality sought input from municipal staff, and obtained approval from Council (for Core Assets) to understand the preferred levels of service targets.

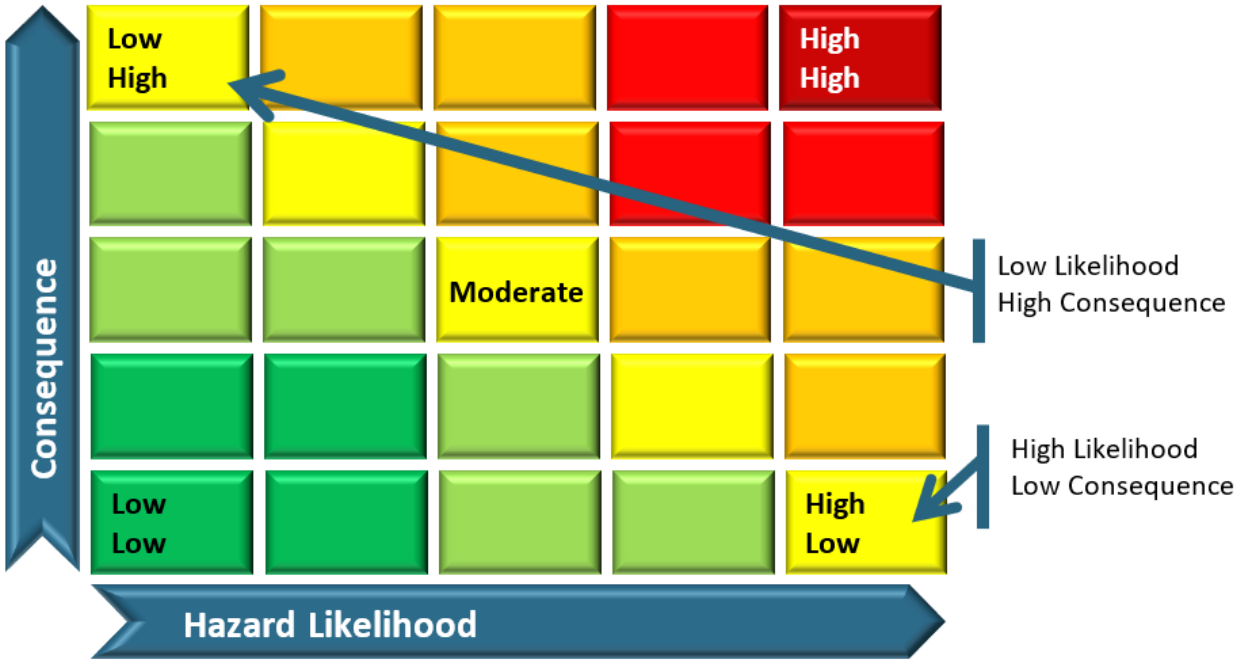
Direction received from Municipal staff indicated that the current Levels of Service were generally found to be sufficient, however there are some parameters that can be considered for improved LOS targets. Accordingly, the current Levels of Service targets for 2023 have been identified. Current Levels of Service are detailed for each asset category in the sections that follow.

1.5 Risk Assessment

In determining the lifecycle activities for each asset category and identifying the priority activities, the risks associated with the options are to be considered. The risk rating for each asset within the asset category generates a risk profile for the entire asset category.

The assets with the highest risk rating identify the priorities for the Municipality. As part of assessing risk, consider the factors that increase the likelihood of a hazard occurring (or non-delivery of service) and the consequence. **Figure 1.4** presents a risk "heat map" plotting likelihood and consequence.

Figure 1.4: Risk Heat Map



A priority rating has been developed based on the calculated risk rating and displayed in **Figure 1.4**. High risks are shown in the red zone (risk rating 17 to 25), Moderate risks are shown in the orange zone (risk ratings of 10 to 16) and Low risks are in the green and yellow zone (risk ratings of 1 to 9).

The approach and methodology to risk assessment is presented in following sections. A risk profile for each asset category is presented in the corresponding sections.

1.5.1 Risk Workshop

A workshop was held with senior staff from the Municipality, representing all departments including finance, legislative services/IT, public works, building and planning, community services (parks and recreation), and fire/emergency services. The workshop was held April 4, 2024, via online delivery.

The intention of the workshop was to engage with stakeholders and gather qualitative information regarding asset risk within the Municipality's assets.

During the workshop, the attendees discussed risk topics, as presented within this chapter. The process through which risk is determined was established, followed by examples that related specifically to Municipality infrastructure.

Discussion included broad discussion of risk related to assets at the Municipality, determining importance of assets and brainstorming potential hazard scenarios and mitigation.

Discussion occurred centring around the impacts of climate change on risk, and the level of risk imparted on the varying asset categories by the changing climate.

1.5.2 Risk Methodology Approach

Risk assessment was conducted for each of the asset categories within the AMP. The risk ratings for the assets follow the below risk methodology. Specific details and assumptions used in risk calculations by asset category are contained within their respective sections.

Risk is the likelihood and magnitude of a negative scenario (hazard) occurring that limits the ability of the asset to deliver the service. Risk is the consideration of asset failure and the consequence of the failure.

Risk = Likelihood X Consequence

Consequence considers the severity of the impact, vulnerability of the asset and exposure to the negative scenario.

Applying the methodology of a score of 1 to 5 for the hazard and the consequence, the maximum risk rating is 25 (high).

1.5.3 Calculation of Likelihood

The factors that contribute to the likelihood of failure include:

- A – Condition of the asset
- B – Performance (reliability)
- C – Vulnerability to climate change

See **Table 1.1** for description of these factors.

Table 1.1: Likelihood Factors

Factors	Low (1)	Moderate (3)	High (5)
A – Condition	Very Good (1)	Good (2); Fair (3)	Poor (4); Very Poor (5)
B – Performance	Always Reliable	Usually Reliable	Not Reliable
C – Climate Change	No or limited impact, quick recovery, or mitigation in place	Limited impact with slower recovery; mitigation plan not in place	Moderate or high impact; no or limited mitigation plan

By separating condition and performance as two separate factors, there is an opportunity to consider assets in poor condition that may still be performing well, compared to those that are not performing, as well as good condition assets that may not be reliable. The climate change factor brings into consideration assets that are vulnerable to climate change scenarios such as intense rainfall, increased temperatures, extreme weather, and drought. The climate change rating includes any mitigation activities in the scoring which reduces the risk and lowers the score.

Therefore, the likelihood of failure is (A + B + C)/3 (i.e. the average of the factors, assuming they are equally weighted).

1.5.4 Calculation of Consequence

In calculating consequence, the question to consider is: What increases the impact of non-delivery (or failure of the asset)?

There are two factors that contribute to the consequence which are:

- D – Impact or severity
- E – Importance of the asset in delivering service

Both impact and importance contribute to the consequence and will be multiplied by likelihood. The two ratings will be added together for the consequence maximum score of 5. Consequence will be D + E. See **Table 1.2** for description of consequence factors.

Table 1.2: Consequence Factors

Factors	Low	Moderate	High
D – Impact	Low or no impact (0)	Moderate impact (1)	High impact (2)
E – Importance of the asset in delivering service	Low importance (1)	Moderate importance (2)	High importance (3)

The impact ratings were established by considering these five possible areas of consequence (as discussed in the Risk Workshop) and determining an overall rating of high, moderate or low by taking an average for the impact of:

- Safety/Injury
- Financial Loss
- Reputation with Stakeholders
- Environmental Damage
- Loss of Service

The importance ratings for assets were established in consultation with municipal staff. The ratings established included assumptions and specific importance values for assets.

1.5.5 Calculation of Risk

The risk calculation for each of the assets is determined as follows:

Risk = Hazard X Consequence

Risk = (A + B + C)/3 x (D + E)

Where A = Condition

B = Performance

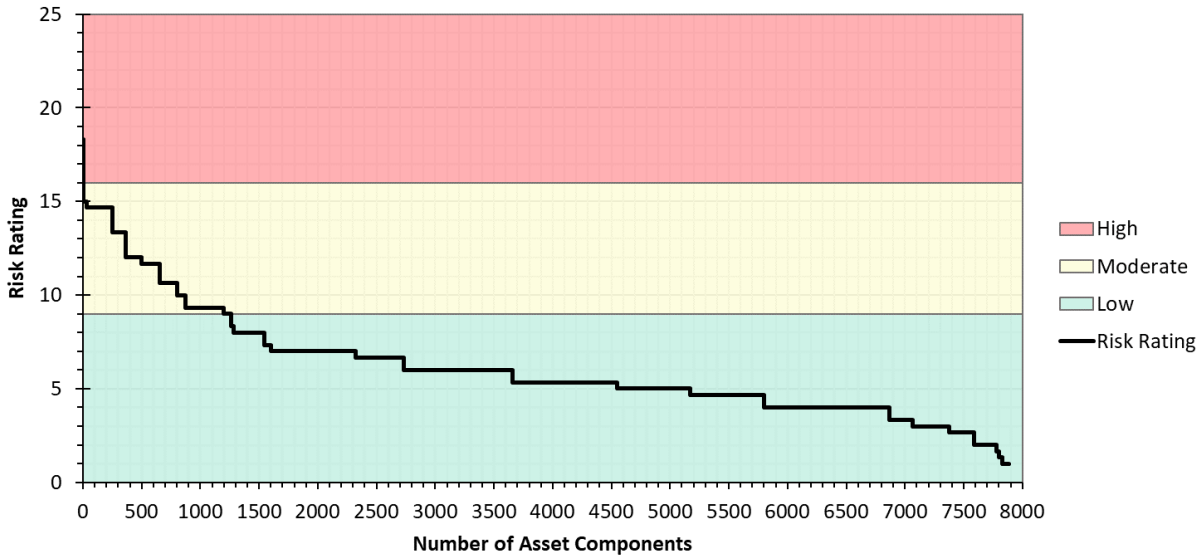
C = Climate Change

D = Impact

E = Importance of the asset

The Risk profile for all the assets can be found in **Figure 1.5.**

Figure 1.5: All Asset Risk Profile



Overall, there are 6 assets that are considered high risk. This represents 0.08% of the assets. An additional 15% of the assets are within the moderate range, and the majority of assets, 85%, are considered low risk.

Several other factors beyond risk are to be considered in identifying asset investment requirements and any associated projects. The Municipality must also consider:

- Coordination of projects of similar type or in shared locations
- Changes in community needs and service requirements
- Technological and regulatory changes
- Climate change
- Long and short term cost benefit of investment

1.5.5.1 Climate Change

In the Risk Workshop, Municipality staff considered the following climate change scenarios and identified low, moderate or high vulnerability for each asset category:

- Mean Annual Temperature
- Number of Hot Days (> 25 C)
- Heavy Snow Events
- Heavy Rain Events

- Extreme Weather Events
- Occurrence and Magnitude of Flooding

The climate change scenarios were broadly considered risks across most of the asset categories. Further discussion during the risk workshop identified some mitigation strategies for climate change hazards. Going forward, the impacts of climate change scenarios should continue to be evaluated to enhance resiliency and mitigation strategies for assets.

1.5.6 Limitation and Assumptions – Risk Assessment

Several key limitations and assumptions were made as part of the risk assessment process, which are summarized below:

1. Field condition assessment data was used as available to determine state of infrastructure and risk. In the absence of field condition assessment data, asset age and estimated useful life was used to approximate physical condition.
2. Performance of individual assets was assumed as "Always Reliable" unless otherwise indicated by municipal staff, reviewed reports or provided asset data.

1.6 Lifecycle Activities

The lifecycle activities include activities that can be undertaken over an asset's useful life. These activities, consistent with O.Reg. 588/17, are defined to include constructing, maintaining, renewing, operating and decommissioning of assets and all engineering and design work associated with these activities. Typical lifecycle activities have been outlined for each of the asset categories considered within this AMP.

1.7 Asset Management Strategy

The intent of the strategy is to provide guidance for the Municipality in the management of the assets to achieve the goals of the asset management plan. The strategy for each asset type was developed using current practices at the Municipality and recommendations for implementation of new or improved practices that may influence the lifecycle of the asset. The asset management strategy for each asset type includes consideration of the lifecycle activities for that asset type, and suggests an overall strategy for the management of the assets over the 10 year timeframe of the AMP.

The asset management strategy for the Municipality assets will employ the lifecycle activities to maximize the useful life and economy of each asset.

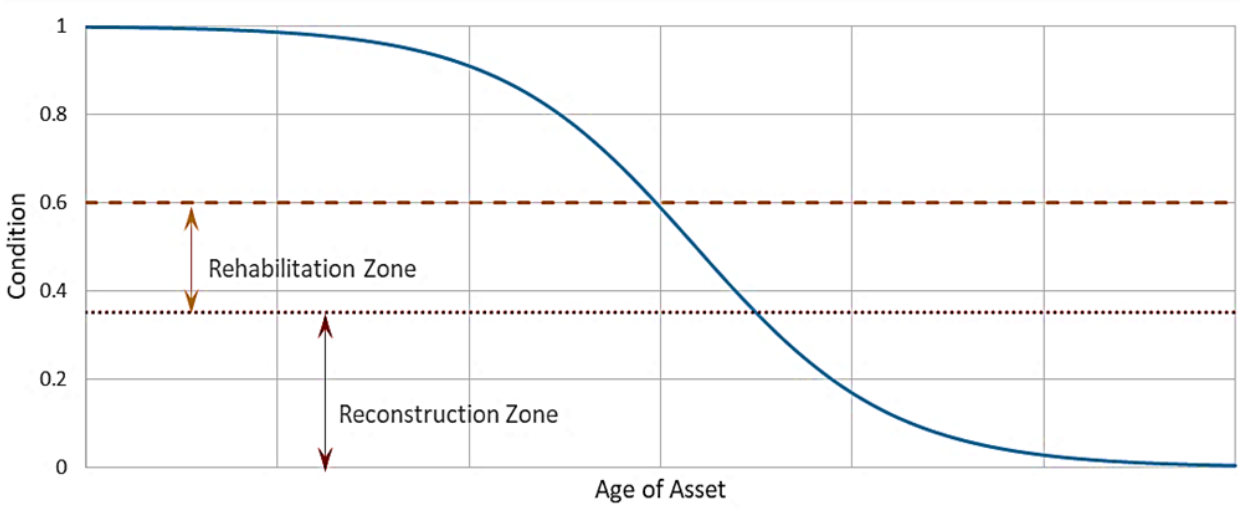
The primary indicator used in the development of a lifecycle strategy is the condition of each asset, as it can often be indicative of likelihood of failure of the asset, performance of the asset, and increased risk. The strategy should also consider other factors, such as:

- Importance of the asset
- Asset risk score
- Condition of adjacent sections (linear assets)
- Replacement requirements for adjacent infrastructure
- Expansion or enhancement requirements
- Maintenance frequency and type

These factors will change throughout the lifecycle of an asset, influenced by age of the asset, usage of the asset, continued development at the Municipality, and changing climate. These factors may impact the lifecycle of an asset, by changing the optimal solution for improving condition and extending the useful life of the asset. Consideration of these factors should be given when devising capital project outlooks and budgeting and updating of the asset management plan.

The assets will deteriorate on a non-linear basis, and the lifecycle activities can be implemented at varying stages within an asset's deterioration. **Figure 1.6** provides a visualization of the theoretical deterioration curve for an asset, and opportunity windows to conduct lifecycle activities within the expected useful life of an asset.

Figure 1.6: Theoretical Deterioration of Assets and Lifecycle Activity Opportunities



The opportunity windows (rehabilitation zone, reconstruction zone) will vary depending on the asset, and the acceptable condition of the asset.

In general, it is expected that lifecycle activities can be implemented according to the following:

- Non-Infrastructure Solutions include those activities that do not directly deal with the physical state of the assets but work to extend the assets useful life.
- Maintenance and Repair activities throughout the lifecycle of the asset. These activities can be recommended as part of routine programs or can be driven by assessment or complaints processes.
- Renewal or Rehabilitation works can be appropriately employed within the rehabilitation zone, where the condition intervention greater than maintenance is required, yet the asset has not reached the requirement for reconstruction.
- Reconstruction/Construction and decommissioning will most likely occur within the reconstruction zone where rehabilitation will be insufficient to address issues with the asset.
- Disposal Activities should be implemented when an asset has reached the end of its useful life or has degraded to such a state that it can no longer provide the level of service for which it is intended.

The utilization of the lifecycle activities should seek to optimize the lifecycle of the assets, therefore the strategy should be reviewed and updated with the AMP according to the changes in practices or goals of the Municipality and the management of the assets.

Prior to making selection and implementation of a lifecycle activity, the Municipality asset managers should understand the standard of construction of the asset. The applicability and effectiveness of a lifecycle activity may be impacted if the asset was not constructed properly at the outset of its lifecycle.

With establishment of the strategy, analysis was undertaken to assess the impact of investment on the assets, and recommendations for investment according to the goals of the asset management plan. The analysis used the inventory information, lifecycle activities, and strategy.

The following information was used in the analysis where available or applicable:

- Asset inventory information
- Lifecycle activities and strategy
- Current detailed assessment reporting and associated investment recommendations (such as Ontario Structural Inspection Manual (OSIM), Building Condition Assessments (BCA), etc.)
- Current and desired Levels of Service

1.8 Growth

Population and household data for the growth projections outlined here were obtained from the Official Plan as well as Statistics Canada Census data. Information is based on 2021 data from Statistic Canada and data from the Official Plan.

The Municipality of Trent Hills comprises 513.85 square kilometers. It also includes the communities of Campbellford, Warkworth, and Hastings. The population for the municipality is set out in the Statistics Canada Data as follows:

- The population reported in the 2021 Census data from Statistics Canada is 13,861.
- Municipal and local communities should plan to accommodate a population of 15,912 people for the year 2034, if an average population growth of 7.4% is used.

Key considerations for growth projections for the Municipality and its local communities include the following:

- Proximity to natural amenities also has an influence on housing demand in the municipality with seasonal housing growth an important planning consideration for many local municipalities.
- All local municipalities have been experiencing net out-commuting, largely due to job opportunities in the separated and outlining cities surrounding the Municipality. Out-commuting from the Municipality of Trent Hills residents is anticipated to continue over the Plan horizon.
- The extent of commuter-sheds relative to employment opportunities is an important consideration in the forecasts and represents a key determinant of the distribution of future population and housing growth within the Municipality.
- Servicing capacity may place limits on growth for many local areas.

There are several areas of growth that impact the services of the Municipality. They are:

- Increasing demand for Fire Protection and Emergency Services due to an aging population and conversions from seasonal to permanent residences due to population movement to more rural areas following the pandemic;
- Expansion of several roads in the Municipality due to significant growth in the area; and
- Greater demand for recreation activities due to increase in population and focus on healthier lifestyles for many Canadians.

Growth factors have been considered and five projects where growth is a driving factor have been identified by Trent Hills. Project description, proposed timing and estimated budget are presented in **Table 1.3** below. New financing, such as development charges and special government funding should be considered as part of any financial strategy for this plan to fund assets required for growth.

Table 1.3: Expansion Projects to Accommodate Growth

Project Description
Emergency Services Base – Already Construction
Replacement of Fire Station 2
Fire Station 3 – Additional Bay
Recreation and Wellness Centre
Trent Hills Works Depot

Each consideration and its impacts on the lifecycle of the assets is presented in **Table 1.4**.

Table 1.4: Growth Impacts to Lifecycle Activities

Asset Category	Growth Impact Assumptions	How Assumptions Relate to Lifecycle of the Assets
Roads	Increased traffic in connector roads to adjacent communities	Potential increase in road maintenance costs, capital expenditures (new roads), expansion requirements.
Bridges & Culverts	Increased usage of bridge crossings by vehicles in the area	Potential traffic volume delays and mitigation required. Load considerations and regularly scheduled maintenance checks.
Water and Wastewater	Increase in demand and usage with increase in population growth	Increased capital costs for purchase of additional lands to meet service needs. Potential increase in maintenance costs.
Fleet, Equipment, and IT Infrastructure	Increase in service demands – requiring increased operation or capacity at greater distances	Increased capital costs for purchase of additional assets to meet service needs. Increased operational costs in fleet maintenance and operational consumables.
Buildings	Increased facility usage. Changing service demands from aging population	Increase in capital expenditure for facility development in response to development. Increase in operating costs for facility services and maintenance.

Asset Category	Growth Impact Assumptions	How Assumptions Relate to Lifecycle of the Assets
Parks and Lands	Increase in service demands – requiring increased operation or capacity at greater distances	Increased capital costs for purchase of additional asset equipment to meet service needs. Increased operational costs in equipment maintenance and operational consumables.

1.9 Roadmap with Next Steps

1.9.1 Next Steps – Regulatory Compliance

Annual Report to Council: As required by O. Reg. 588/17, municipalities will report to their Councils at least once per year on the current progress of asset management in the Municipality and any barriers to aligning operations with the AMP.

The future update would include more robust financial strategy with a funding strategy to meet Proposed level of Service which would meet phase 4 requirements of the Regulation.

Full Update of AMP: A full update of the AMP will be required within 5 years, i.e. by 2028.

Enhancements to the AMP: The inclusion of green infrastructure assets (i.e. green assets) owned by the Municipality and assessment of vulnerabilities caused by climate change on the performance of infrastructure.

1.9.2 Next Steps – Recommendations in AMP 2023

Continuous improvement regarding inventory data for traffic infrastructure, boulevards, sidewalks, and streetlight, is an ongoing goal for the Municipality. An update of the inventory for this asset category would allow for a more detailed assessment of the condition and lifecycle activities for these assets and ensure a more accurate long term investment analysis.

In future updates of this report a recommendation to the Municipality would be to implement a Building Condition Assessment program for all their Building assets. A full condition assessment (which would include the breakdown of each building and facility

by overall components) of the entirety of the buildings owned by the Municipality would allow a more comprehensive cost breakdown for planning and maintenance activities and would ensure the whole of these asset categories has been captured. Given the complicated nature of assessing these buildings from a component standpoint and the time commitment needed in this assessment, it is recommended the Municipality has a third party to facilitate this work.

2.0 Roads and Traffic Network

2.1 Summary - Roads

The Municipality is responsible for 284 centreline kilometers of paved road (HCB and LCB) and 247 centerline kilometers of unpaved road. For an overall total of 531 centreline kilometers of roadway within the Municipality.

The information reported in this AMP and the subsequent analysis are based on the Municipality of Trent Hills 2022 Road Needs Study and improvements information completed in January of 2023 provided by the Municipality.

The roads are located across the Municipality. In some place's local municipal infrastructure (i.e., water and sewer) is located within the Municipalities roads rights-of-way.

The majority of road assets have two lanes, with the exception of approximately 4.26 km of unpaved roads which only have one lane.

2.1.1 State of Local Infrastructure

2.1.1.1 Average Age

The average age of the road assets is 12 years. In the municipality of Trent Hills, the oldest sections of road were installed in 1968 (age of 55 years, approximately 24 km) and the newest sections of road were replaced in 2021 (age of 2 years, approximately 125 km of road).

The age of 8 linear road assets were unknown and have been omitted.

2.1.1.2 Replacement Cost

The replacement costs for this AMP were based on the data provided in the Roads Needs Study done for the Municipality in 2022. This replacement cost was current as of 2022. That overall value has been inflated based on the Consumer Price Index (CPI) to reflect 2023 costs and a 15% Engineering Fee as well as a 15% Contingency Fee was added to the 2023 costs to arrive at a full road's replacement cost.

The replacement cost of the assets in the road category is estimated at $122.34 million.

2.1.1.3 Expected Useful Life

The Municipality maintains an expected useful life of 40 years for Asphalt base, Gravel base and Earth roadways. For the Asphalt Surface of their roadways, they maintain an expected useful life of 25 years, for surface treated roads the expected useful life is 5 years and for the Gravel surface roads they maintain a 3 year expected useful life.

2.1.2 Condition

The condition information for the road network reported in this AMP is based on the Municipality of Trent Hills 2022 Roads Needs Study.

The approach to assessing condition of roads is to hire a consulting firm to conduct a road needs study about every three to five years.

Pavement condition index (PCI) is a rating system that measures the condition of the roadway. It uses two components: a ride comfort rating (RCR) and a distress manifestation index (DMI). The DMI is a visual inspection that rates the road based on physical condition of, and/or damage to the road (pavement and shoulders).

The condition of the roads is organized into five categories from Very Good to Very Poor using the alignment of PCI scores as shown in the following **Table 2.1**.

Table 2.1: Condition Rating Categories for Roads EUL: 100 years

Condition	Pavement Condition Index (PCI)	Condition Category
Very Good	81-100	1
Good	61-80	2
Fair	41-60	3
Poor	21-40	4
Very Poor	0-20	5

The length weighted PCI condition rating for the road network is approximately 65 condition score, an overall Good rating (Condition Category 2). The length weighted PCI for the asphalt surface urban and rural roads is approximately 78 and 66 respectively.

Updated information provided by the Municipality indicated that selected roads had been resurfaced in 2023, this data has been added to the overall AMP and these roads were identified as in Very Good condition.

The majority of the road network by kilometres is in a Very Good to Fair condition with less than 0.6% by distance in Poor or Very Poor condition. The average age of roads in the network is 12 years.

Further, **Figure 2.1** presents the condition of the roads by importance (high, medium, or low) shown by colour. Importance is a factor in setting priorities for future lifecycle activities.

Figure 2.1: Importance of Roads Based on Surface Type (km and Importance)

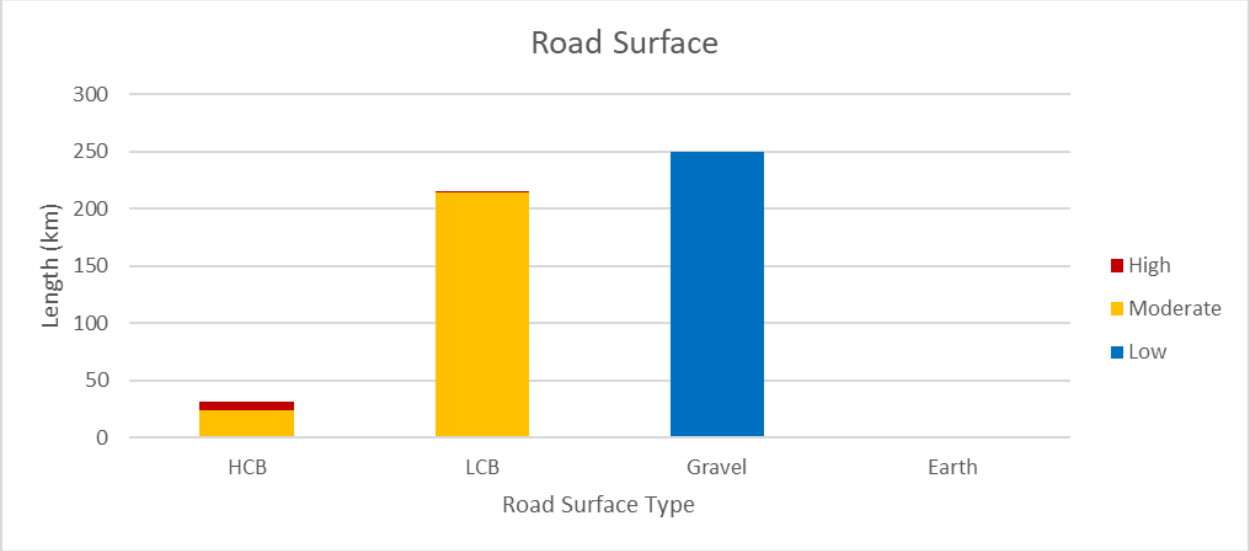
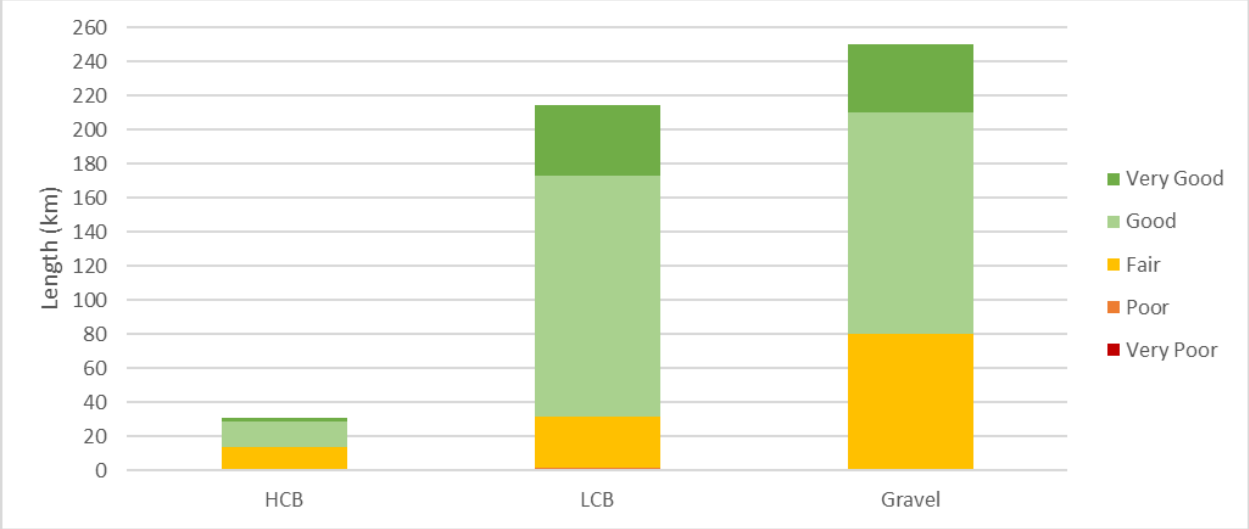


Figure 2.2 summarizes the condition of the road network based on kilometers of road in each condition category.

Figure 2.2: Summary of Road Condition Based on Surface Type



The length of 15 linear assets was not provided by the municipality and have been omitted from this report.

2.1.3 Current LOS

Levels of service for road assets are outlined in Table 4 of the regulation, O. Reg. 588/17. **Tables 2.2, 2.3 and 2.4** outline the Municipality's current community and technical levels of service for roads.

Table 2.2: Community Level of Service

LOS Parameter	LOS Statement	Community LOS O.Reg. 588/17 – Qualitative Descriptions
Scope	The roads in the Municipality are intended to serve local and through traffic in urban and rural settings, throughout the Municipality.	Description, which may include maps, of the road network in the Municipality and its level of connectivity.
Quality	Pavement condition was most recently assessed during completion as part of the Roads Needs Study in 2022. The road segment surfaces were assessed and provided a condition rating from 0 to 100, where lower ratings described road segments with the most structural distress. The rating was assumed to have followed MTO manual guidance.	Description or images that illustrate the different levels of road class pavement condition.

Table 2.3: Technical Level of Service

LOS Parameter	LOS Statement	Technical LOS O.Reg. 588/17 – Technical Metrics	2023 Performance
Scope	Connects properties to local amenities and to regional roads maintained by the County and the Province.	Number of lane-kilometres of arterial roads as a proportion of square kilometres of land area of the municipality	0.01617
		Number of lane-kilometres of collector roads as a proportion of square kilometres of land area of the municipality	0.22307
		Number of lane-kilometres of local roads as a proportion of square kilometres of land area of the municipality	1.837
Quality	Supports comfortable passage of vehicles and other transportation network users.	For paved roads in the municipality, the average pavement condition index value	71.8
		For unpaved roads in the municipality, the average surface condition	63

Table 2.4: Additional Level of Service Metrics

LOS Parameter	LOS Statement	Additional LOS	2023 Performance
Quality	Supports comfortable passage of vehicles and other transportation network users.	Centreline-kilometres of paved roads with a Pavement Condition Rating ≤ 40 is considered poor or very poor	0.85
		Centreline-kilometres of unpaved roads with a condition rating of ≤ 40 is considered poor or very poor	0
Safety	Seeks to minimize risks to users of	Percentage of identified minimum maintenance standard issues that are	100%

LOS Parameter	LOS Statement	Additional LOS	2023 Performance
	transportation infrastructure	addressed within the timeframe identified in the regulation (O. Reg. 239/02)	
Affordability /Financial Sustainability	Efficiently uses municipal resources to deliver transportation services, including seeking support from higher levels of government when available	Refer to **Appendix A – Table A4: Affordability Financial Sustainability for Transportation Assets**	

2.1.4 Current Performance

Asset performance measures were determined in consultation with the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. The performance measures for Roads, and their current values are shown in **Tables 2.3 and 2.4** above.

2.1.5 Risk Assessment

The risk assessment for roads assets was conducted using the following assumptions and criteria:

Condition: **Table 2.5** below provides details regarding the ratings from the Municipality's Roads Needs Study assessment and the corresponding rating used within the risk calculation.

Table 2.5: Road Condition Ratings

Condition Rating (PCI)	Corresponding Risk Condition Rating
81-100	1 – Very Good
61-80	2 – Good
41-60	3 – Fair
21-40	4 – Poor
0-20	5 – Very Poor

Performance: Assumed to be always reliable (value of 1)

Climate Change: Assumed a value of 1 (Low, No or limited impact, quick recovery, or mitigation in place)

Impact: Moderate impact (value of 1) assumed for all assets.

Importance: Importance was determined based on use and material of roads as directed by the municipality

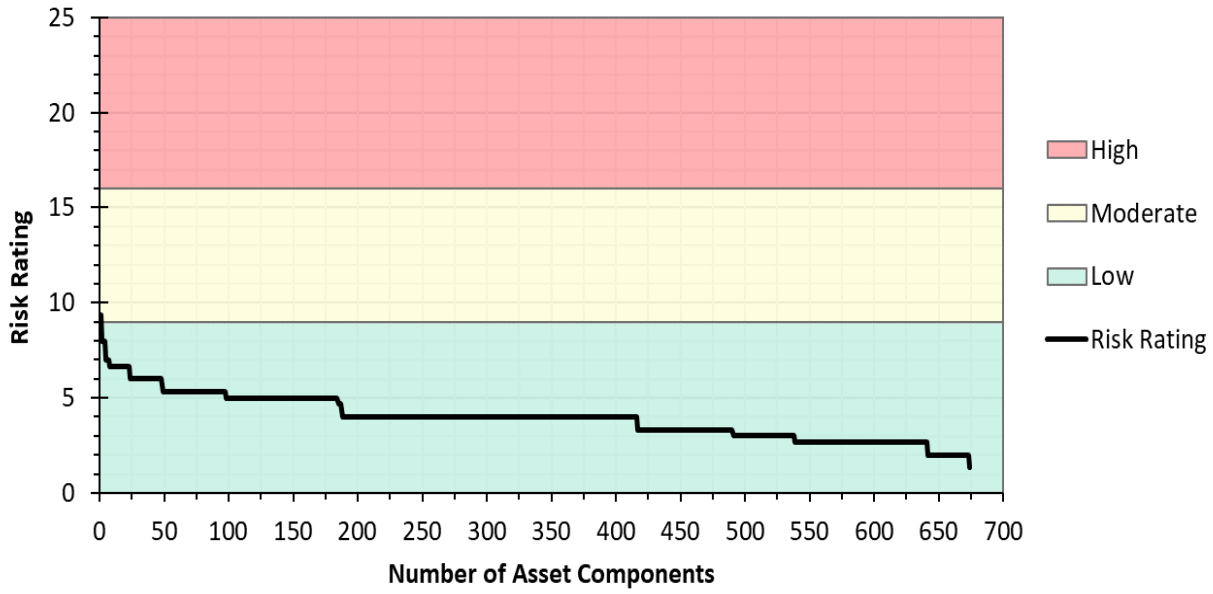
- High importance (value of 3) was assigned to snowplows routes and island exit routes (only road on and off the island), as provided by the Municipality.
- Moderate importance (value of 2) LCB or HCB asphalt roads.
- Low importance (value of 1) was assigned to gravel and earth roads.

The following roads were identified as having a high importance value:

- Second Street
- Albert Street East
- Alma Street
- Booth Street North
- Bridge Street North
- Bridge Street South
- Bridge Street West
- Canrobert Street North
- Church Avenue
- Cockburn Street
- Concession Street West
- Doxsee Avenue South
- Front Street South
- Garry Street
- Grand Road
- Harris Street
- High Street
- Industrial Drive
- Isabella Street
- Kent Street
- Main Street
- Major Street
- Maple Street
- Margaret Street
- Market Street
- Oak Street
- Old Hastings Road
- Oliver Road
- Percy Street
- Ranney George Drive
- River Street
- Saskatoon Avenue
- Seymour Quarry Drive
- Simpson Street North
- Simpson Street South
- Trent Drive

The risk profile for roads assets is shown in **Figure 2.3**.

Figure 2.3: Risk Profile for Roads Assets



2.1.6 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for road assets. The primary lifecycle activities include non-infrastructure solutions, maintenance activities, renewal/rehabilitation, replacement/ construction, disposal, and expansion/growth/service improvement activities. The lifecycle activities presented below are consistent with best practices for road asset management and maintenance.

2.1.7 Non-Infrastructure Solutions

Non-Infrastructure solutions for the road assets include those activities that do not directly deal with the physical state of the road but work to extend the assets useful life. The non-infrastructure activities can include policies, limiting traffic usage (by-laws, signage), planning reports, and monitoring/inspection of the assets. Inspection of the road assets can be completed by Municipality staff on an as-needed basis, or on a broader portion of the network conducted by a third party. The inspection program can include a combination of the effort types to suit the needs of the Municipality.

2.1.8 Maintenance Activities

Maintenance activities are undertaken on the assets throughout their useful life to maintain their operating condition and performance. There are a variety of maintenance activities available to undertake on road assets, including:

1. Ditch improvements (re-grading, grubbing/clearing)
2. Culvert Replacement/ditch inlets
3. Crack sealing
4. Microsurfacing
5. Single surface treatment
6. Double surface treatment
7. Gravel Resurfacing
8. Shave and Pave

Maintenance activities can include the full road surface or can be used to address localized repairs on the road surface.

The selection of the maintenance activity is dependent on a variety of factors, including road surface type (material, urban/rural classification), condition, road works history, importance rating, among others. These factors are evaluated using a Roads Needs Study conducted every three years to five years and road patrol inspections. The last Roads Needs Study was conducting in 2022, and the next is scheduled for 2025. Routine road patrols occur every 1 to 4 weeks and identify any sections of road that do not meet the minimum maintenance standards.

2.1.9 Renewal/Rehabilitation Activities

Renewal or rehabilitation of the road assets can be undertaken when maintenance works are no longer sufficient to address road surface deficiencies. These do not replace significant parts of the road but provide large improvements to condition and lifespan. These works can include:

- Resurfacing programs (single layer of overlay) conducted every 5 to 7 years
- Gravel resurfacing program conducted every 3 to 5 years

The timing for implementation of renewal/rehabilitation activities is determined based on consideration of the same factors discussed for maintenance works, currently evaluated by the Municipality as part of the Road Needs Study completed on a three-year basis.

When road surfaces are rehabilitated (resurfaced), within the Municipality's asset inventory the existing surface asset ID is retired, and a new surface is added to the same asset with a new acquisition date to accurately track expected useful life.

2.1.10 Replacement/Construction Activities

The initial lifecycle activity of a road asset is its construction. The road asset should be constructed to adhere to applicable requirements, codes, and design guidelines. Construction of new road assets is recommended to be in line with recommendations as part of growth, master planning, or other municipal strategies. Design of the road asset should consider the level of service expected to be provided by that particular road asset, such as the anticipated speed or volume of traffic. Varying factors in construction include: the road classification, surface type, and location.

Construction can also be the replacement of deteriorated assets. At the end of the useful life of an asset, it can be replaced for continuation of service provision. At the time of replacement, design should be undertaken to ensure design requirements are met, and adequate capacity is provided for current and future service delivery needs. Replacement of road assets is conducted as total reconstruction funding becomes available.

2.1.11 Disposal Activities

Disposal activities of the road assets includes removal of the road from service. A road may be removed by disposal of the asset components. Disposal activities should be conducted such that health and safety protocols are being followed, and spent materials are disposed of at an appropriate or approved facility.

2.1.12 Expansion/Growth/Service Improvement Activities

Expansion and growth of the Municipality are planned activities required to extend service to previously un-serviced areas and expanded based on the growing demands within the municipality. Expansion and growth of the road asset network owned by the Municipality is in response to new developments.

2.2 Asset Management Strategy

The asset management strategy for the road assets seeks to use the lifecycle activities in a manner that will achieve cost-effective and sustainable management of the road assets. The road assets will deteriorate on a non-linear basis, and the lifecycle activities can be implemented at varying stages within an asset's deterioration.

The condition and usage of the road assets is a key driver in the determination of lifecycle activities to use. The Municipality has previously assessed the condition of the road's assets in 2022. This condition assessment of the roads is completed on a scheduled basis wherein the entirety of the network is reviewed every three years. A variety of methods can be implemented for undertaking condition assessment of roads, including visual inspection and street scan technology, with the Municipality currently using visual inspection by a third-party consultant.

Maintenance works should be undertaken throughout the lifecycle of an asset. Selection of the appropriate maintenance activity will depend on the type of deterioration being experienced on the asset, and the condition of the asset. Some activities, such as crack sealing, are best utilized on a road segment that is generally in good condition. As the road segment continues to deteriorate, maintenance activities may become a less preferred option as it may become insufficient to address deficiencies. Maintenance activities can be undertaken on a road segment multiple times prior to the asset requiring rehabilitation activities, depending on the nature and extents of the maintenance works.

Renewal and rehabilitation activities should be undertaken on an asset when it has deteriorated past the point where maintenance activities would be adequate to address issues. Selection of the appropriate rehabilitation activity will depend on the road surface material, stage in lifecycle, and severity and type of deterioration.

At the point where a road asset has deteriorated such that maintenance and rehabilitation options will be inadequate to address issues, the road can be a candidate for reconstruction. While maintenance works will help to slightly improve the condition of the asset it is unlikely at this stage to significantly improve its condition as reconstruction would. In general, the current strategy for the road assets at the Municipality is to allow the road surface asset to deteriorate near to the end of its expected lifecycle and reconstruct the road surface when required. The road base has a much longer expected useful life than the road surface and is dealt with as required during road works.

As the Municipality reconstructs the roads, the cross section will vary depending on the location and classification of the road. The width of pavement (number of lanes, presence of on-street pavement), and type of active transportation (sidewalk, multi-use path) will be assessed on a case-by-case basis as roads are identified for reconstruction works. Reconstruction and rehabilitation works offers the Municipality an opportunity to integrate other improvements into the road works. This may include active transportation facilities, upgrade of drainage, street lighting, and changes to the road cross-section to accommodate growth demands.

2.3 Summary – Traffic Infrastructure

The Municipality owns and maintains several Traffic Network Infrastructure assets, which are assets associated with the road network including:

- Streetlights
- Decorative Lights
- Boulevards
- Sidewalks
- Traffic Signals

The traffic infrastructure assets are tracked by road segment. The following table outlines the traffic infrastructure assets currently owned and maintained by the Municipality.

Table 2.6: Summary of Traffic Infrastructure

	Streetlights	Decorative Lights	Boulevard (km)	Sidewalks (km)	Traffic Signals
Number of Assets	1246	188	44	50.3	1

The above number of assets were provided by the Municipality's staff. The breakdown of location, condition and asset ID was not supplied at the time of reporting, only the final inventory count was used in this assessment.

2.3.1 State of Local Infrastructure – Traffic Infrastructure

2.3.1.1 Average Age

The average age for the municipality's streetlights is 8 years old.

The average age for the Decorative Lights is 30 years old.

The average age for the Boulevards is 21 years.

The average age for the Sidewalks is 35 years.

The average age for the Traffic Signals is 10 years.

An average age for the Municipality's inventory for Streetlights, Decorative Lights and Boulevards was provided, however the inventory data does not contain the age breakdown for these asset classes.

Of the Municipalities 1246 streetlights, 1176 streetlights were all replaced and converted to LED in 2016. The remaining 70 streetlight do not have installation dates available at the time of reporting.

2.3.1.2 Replacement Cost

The total replacement costs for these assets were provided by the Municipality, an overall cost breakdown was not supplied at the time of reporting, only the final replacement cost was given and used for reporting.

The total replacement cost for all street light assets is $9.03 million.

The total replacement cost for all decorative lights is $1.29 million.

The total replacement cost for all boulevards is $5.92 million.

The total replacement cost for all sidewalks is $22.93 million.

The total replacement cost for all traffic signals is $150,000.

Based on recent tenders received by the Municipality, the Municipality identified a replacement cost $134,610 per kilometer for boulevard assets, $455,860 per kilometer for sidewalks assets and $150,000 per traffic signal. The total replacement costs for these three asset types were evaluated by multiplying the replacement cost provided by the Municipality by the quantity of the asset as provided by the Municipality in **Table 2.7**.

Based on acquisition dollars provided by the Municipality, replacement cost was assumed to be $7,250 per streetlight asset and $6,860 per decorative streetlight asset.

2.3.1.3 Expected Useful Life

The Municipality maintains an expected useful life of 40 years for sidewalks, boulevards, streetlights, and traffic signals. Decorative lights maintain an expected useful life of 20 years.

2.3.2 Condition

The expected useful life of the assets and a deterioration model based on remaining useful life could be used to predict the physical condition of the traffic infrastructure assets. In agreement with the Municipality, no condition assessment was carried out on these assets, many assets year of installation were unknown. The remaining useful life range could be attributed to each of the condition ratings.

Table 2.7: Traffic Network Condition Assessment Remaining Useful Life Rating System

Traffic Infrastructures	Condition Rating	Remaining Useful Life (Years)
Sidewalk Boulevards Streetlights Traffic Signals **EUL: 40 years**	Very Good	33 to 40
	Good	25 to 32
	Fair	17 to 24
	Poor	9 to 16
	Very Poor	0 to 8
Decorative Lights **EUL: 20 years**	Very Good	17 to 20
	Good	13 to 16
	Fair	9 to 12
	Poor	5 to 8
	Very Poor	0 to 4

Based on Municipal inventory, assets could not be evaluated as accurate lengths, quantities and age-based condition per asset were unknown and have been omitted.

2.3.3 Current LOS

Levels of service for transportation network assets are outlined in Table 4 of the regulation, O. Reg. 588/17. **Tables 2.8 and 2.9** outline the Municipality's current community and technical levels of service for transportation infrastructure.

Table 2.8: Community Level of Service

LOS Parameter	LOS Statement	Community LOS – Qualitative Descriptions
Scope	The sidewalks/boulevards in the Municipality are intended to serve local and through traffic in urban and rural settings, throughout the Municipality.	Description, which may include maps, of the sidewalk/boulevard network in the Municipality and its level of connectivity.

Table 2.9: Technical Level of Service

LOS Parameter	LOS Statement	Technical Levels of Service O.Reg. 588/17 – Technical Metrics	2023 Performance
Safety	Seeks to minimize risks to users of transportation infrastructure	Number of signs that fail retro-reflectivity test that were replaced	24
Safety	Seeks to minimize risks to users of transportation infrastructure	Number of sidewalk defects with gap > 3/4 inch (20 mm) that were addressed by grinding, panel replacement or painting	38
Affordability /Financial Sustainability	Efficiently uses municipal resources to deliver transportation services, including seeking support from higher levels of government when available	Refer to **Appendix A – Table A4: Affordability Financial Sustainability for Transportation Assets**	

2.3.4 Current Performance

Asset performance measures were determined in consultation with the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. The performance measures for Transportation Infrastructure, and their 2022 values are shown in **Table 2.9** above.

2.3.5 Risk Assessment

The risk assessment for the sidewalk assets was conducted using the following risk assumptions and criteria for the information provided by the Municipality:

Condition: Determined based on estimated condition (using deterioration curve)

Performance: Assumed to be always reliable (value of 1)

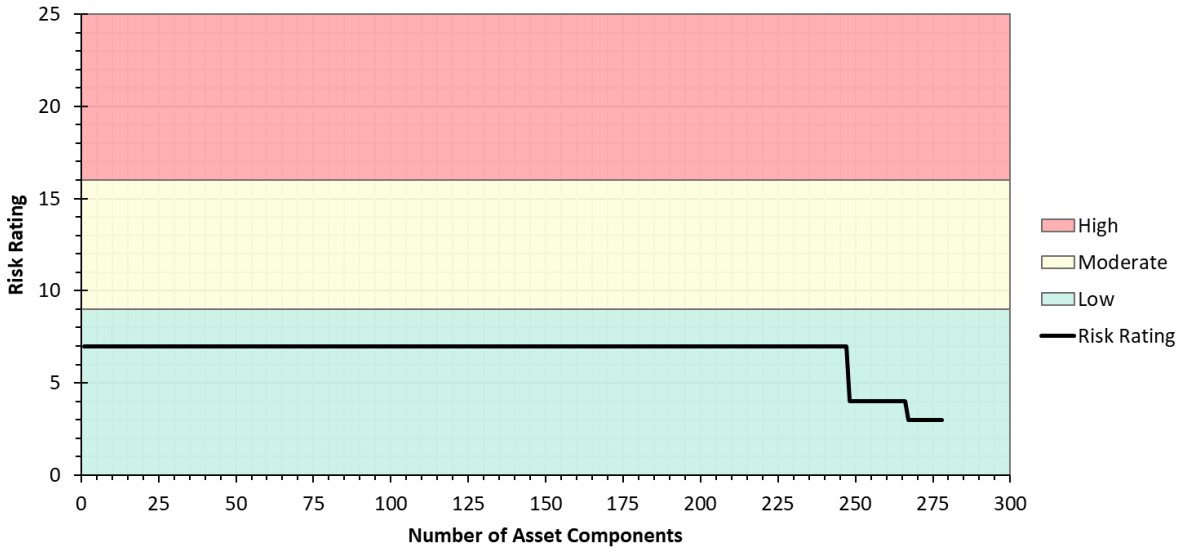
Climate Change: Assumed a value of 1 (No or limited impact, quick recovery or mitigation in place)

Impact: Moderate impact (value of 1) assumed for all assets.

Importance: Assumed moderate importance (value of 2)

The risk profile for inventory sidewalk assets is shown in **Figure 2.4**.

Figure 2.4: Risk Profile for Inventory Sidewalks Assets



The sidewalk inventory was not fully comprehensive of all assets owned by the Municipality. Sidewalk assets totaling 50.3 km was given as a final inventory number, **Figure 2.4** should only be used in accordance with the information provided.

2.3.6 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for traffic infrastructure assets. The primary lifecycle activities include non-infrastructure solutions, maintenance activities, renewal/rehabilitation, replacement/ construction, disposal, and expansion/growth/service improvement activities.

2.3.6.1 Non-Infrastructure Solutions

Sidewalks/Boulevards

Non-Infrastructure solutions for the sidewalk/boulevard assets include those activities that do not directly deal with the physical state of the sidewalk/boulevard but work to extend the assets useful life. The Municipality's inspection program and complaints received from residents, used in coordination with the maintenance activities, will identify actions to extend expected useful life.

2.3.6.2 Maintenance Activities

Sidewalks/Boulevards

Maintenance activities on sidewalks can be preventative or in response to a deteriorated condition and can be applied to address localized issues or through larger segments of sidewalk/boulevard.

Maintenance activities are identified through annual inspections and complaints, and in addition to condition can address safety or aesthetic concerns. Maintenance activities and inspections are undertaken according to best practices and applicable regulation (O. Reg. 239/02, for example). Maintenance activities can include the following activities:

- Repair of surface discontinuities
- Repair or replacement of deformed or cracked sections
- Repair or removal of surface encroachments
- Winter control activities (snow removal, salt or sand or surfaces)
- Root and foliage control

Where maintenance activities are required for surface issues, it is recommended that the investigation is undertaken to identify and address any underlying issues that have attributed to the surface issues, to mitigate against the issue reoccurring.

Streetlights and Traffic Signals

The maintenance activities should be undertaken according to manufacturer specifications and as required to address condition and performance issues that arise through regular usage. Maintenance activities should include regular inspections for condition and recording of maintenance activities undertaken. Maintenance activities can include (but are not limited to) replacement or changeout of fixture (lighting fixtures, bulbs, arms posts), in responses to damage, or end of lifecycle.

2.3.6.3 Replacement/Construction Activities

Sidewalks/Boulevards

The initial lifecycle activity of a sidewalk asset is its construction. The sidewalk asset should be constructed to adhere to applicable requirements, codes, and design guidelines, particularly AODA standards (which include provision for wider sidewalk assets, and requirements for tactile plates, (among other specifications). Design of the sidewalk asset should consider the level of service expected to be provided by that particular asset. Sidewalk construction is often completed as part of road reconstruction projects. Replacement activities for sidewalk and boulevard assets will follow the same requirements as construction activities.

Streetlights and Traffic Signals

Acquisition of a new streetlight and traffic signal asset should consider the location and intended usage of the asset. Acquisition should be undertaken based on an understanding of the requirements of the asset for providing service delivery and should follow municipal procurement procedures. The design of new assets should be consistent with jurisdictional design requirements, including provincial design guidelines and Municipal design specifications.

2.3.6.4 Disposal Activities

Sidewalks/Boulevards

Disposal activities include the removal of a sidewalk segment from service and can be implemented when a sidewalk segment has been determined to be no longer required. A sidewalk may be removed from service by removal and disposal of the asset components, or establishment of a barricade to prevent continued usage of the asset. Disposal activities should be conducted such that health and safety protocols are being followed, and spent materials are disposed of at an appropriate or approved facility. Disposal of a sidewalk asset can be done in conjunction with road works, as required.

Streetlights and Traffic Signals

Disposal activities for street light assets typically include the removal from service through disposal of the asset. Disposal activities should be conducted such that health and safety protocols are being followed, and out of service assets are disposed of at appropriate or approved facility.

2.3.6.5 Expansion/Growth/Service Improvement Activities

Expansion and growth of the Municipality are planned activities required to extend service to previously un-serviced areas and expanded based on the growing demands within the municipality. Expansion and growth of the traffic infrastructure asset network owned by the Municipality is in response to new developments.

2.4 Asset Management Strategy

2.4.1 Sidewalks/Boulevards

The strategy for the sidewalks will utilize the lifecycle activities to prolong the lifespan of the sidewalks, minimize safety risks to the users, and maintain overall condition and performance to the preferred service level. The Municipality recognizes the increased risk related to poor condition or performance of the sidewalk assets, as deteriorated assets can cause issues for the public at a potential cost risk to the Municipality. The strategy, therefore, must use sufficient inspection frequency to identify and mitigate any potential issues in a timely manner.

The Municipality's strategy for sidewalks will include routine inspections of the sidewalk and boulevard assets, for identification of deficiencies or locations of deteriorated assets. Through the inspection, the extent and severity of the issue will be identified and can be used to select the appropriate lifecycle activity to mitigate the issue and identify a timeframe through which works will be undertaken. Inspections will be conducted on a routine basis, and in response to complaints received by the public.

Following initial construction of the sidewalk, the majority of lifecycle activities will be maintenance, which will be informed by inspection and observation of condition and performance of the assets. Selection of the appropriate maintenance activity will depend on the type of deterioration being experienced on the asset, and the condition of the asset. A sidewalk asset may be replaced once maintenance works no longer provide sufficient means to improve the asset. Replacement can occur on localized or larger sections of sidewalk and can be done independent of or as part of adjacent roadworks. Where a sidewalk (localized or longer section) is replaced, it will be replaced to the existing standard unless determined otherwise by the Municipality.

If an asset has deteriorated to where it presents a hazard to public safety, the Municipality should remove the section of sidewalk from service until such time as the issue can be mitigated. Current construction practice for sidewalks in the Municipality varies, depending on road type (classification), and level of service required.

2.4.2 Streetlights and Traffic Signals

The asset management strategy for the streetlight and traffic signal assets seeks to use the lifecycle activities in a manner that will achieve cost-effective and sustainable management of the assets.

Throughout the lifecycle of the assets, routine maintenance should be conducted. As required, specific maintenance should be conducted, which is expected to be determined annually through inspection of condition and performance. As an asset ages and approaches the end of its useful life, it is expected that the risk and maintenance costs associated with the asset will increase.

There will be a point in the lifecycle where the risk and maintenance costs are such that replacement of the asset will be the preferred solution. This point will vary depending on the type of streetlight or traffic signal, the risk tolerance for that particular asset, and the type of service being provided. Replacement of the assets can be done in response to this and are also replaced during road reconstruction works.

The current strategy for management of the streetlight assets is generally to achieve the minimum maintenance standards, and to meet the Municipality-defined levels of service.

3.0 Bridges and Culverts

3.1 Summary

The Municipality has 34 bridges and 6 structural culverts (3 m in span and larger) totaling 40 structures.

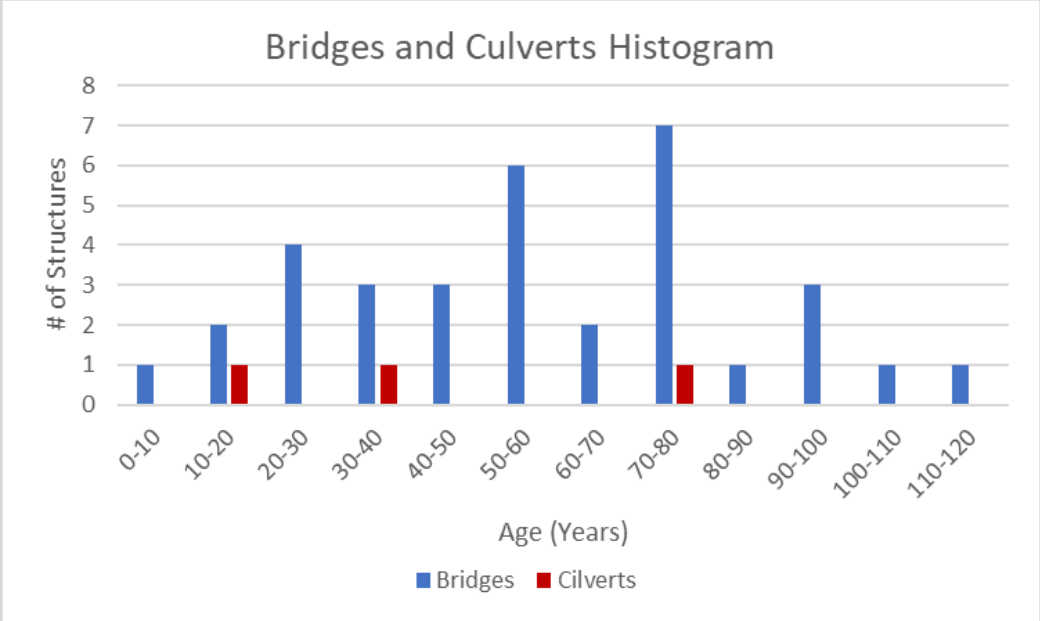
3.2 State of Local Infrastructure

3.2.1 Average Age

The average age of bridges is 57 years, whereas for structural culverts it is 43 years.

The age distribution of the bridge and culvert structures is shown in **Figure 3.1**.

Figure 3.1: Age Distribution of Bridges and Structural Culverts



Note that three structural culverts have unknown year of construction and have been omitted.

3.2.2 Replacement Cost

The replacement cost of the bridges and structural culverts is $36.14 million dollars. This value has been taken from the Bridge Management Study Report completed in 2022 and assumes that the Municipality would reconstruct their structure inventory using current geometric design standards, then inflated based on the Consumer Price Index (CPI) to costs to reflect today's dollars.

3.2.3 Expected Useful Life

The Municipality maintains an expected useful life of 50 years for culverts and for bridges maintains an expected useful life of 75 years.

3.3 Condition

The information reported in this AMP and the subsequent analysis are based on the current inventory information maintained by the Municipality, and the 2022 OSIM reports. OSIM assessments were most recently conducted for the Bridges and Structural

Culverts in 2022 by a third-party consulting firm and compiled in a Bridge Management Study Report.

The Bridge Condition Index (BCI) provides an indication of the general overall condition of the bridge or structural culvert (3 plus metre span). It consists of an inspection by a professional engineer pursuant to the Ontario Structural Inspection Manual of up to 55 structural elements.

Table 3.1 shows the condition of bridges and structural culverts and how this would affect the use of the bridges and culverts. The BCI is grouped into three condition categories of Good, Fair and Poor. Photos illustrating an example of the condition in each category for bridges are presented in **Figures Figure** 3.2 **to Figure** 3.4.

Table 3.1: Condition of Bridges/Culverts and How It Affects the Use

BCI Range	Condition Rating	Affect Usage
70-100	Good = 1	n/a
60-70	Fair = 3	n/a
<60	Poor = 5	Possible load restrictions

Figure 3.2: Example of Poor Condition Bridge – Norham Mill Bridge

Figure 3.3: Example of Fair Condition Bridge – Bowen's Bridge

Figure 3.4: Example of Good Condition Bridge – Gummow Bridge

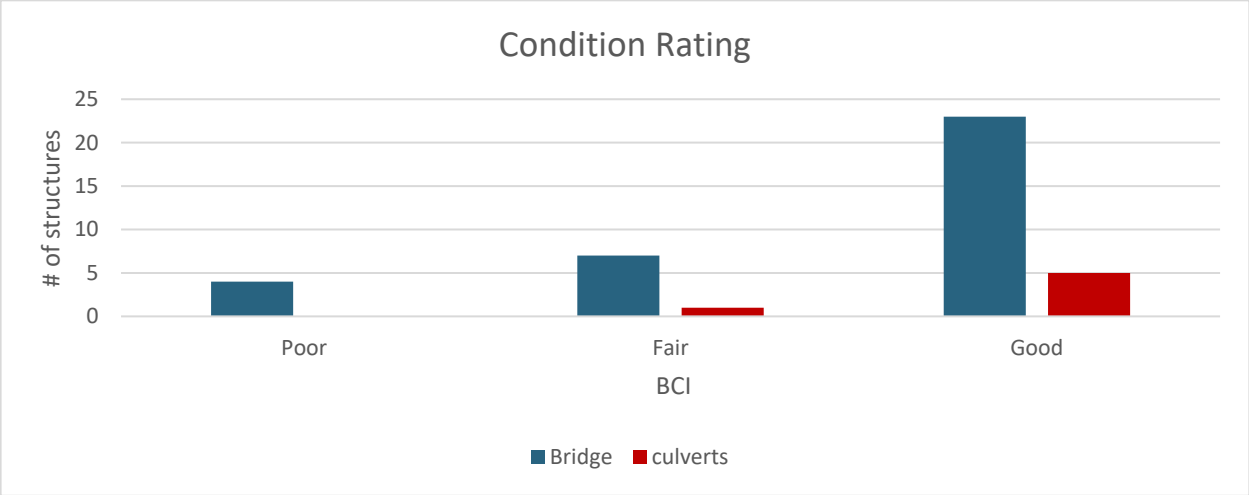
Photos illustrating the condition in each condition category for structural culverts are presented in **Figures Figure** 3.5 **to Figure** 3.6**.**

Figure 3.5: Example of Fair Condition Culvert – 2nd Concession East Box Culvert

Figure 3.6: Example of Good Condition Culvert – Platt Road Culvert

70% of the bridges and culverts owned by the municipality of Trent Hills are in good condition (BCI 70 to 100); with 20% in fair condition (BCI 60-70) and about 10% in poor condition (BCI 0-60). See **Figure 3.7** for the condition ratings of the bridges and structural culverts shown separately.

Figure 3.7: Bridge and Culvert Condition Ratings



The Municipality updates its bridges and culverts conditions every 2 years. It engages an independent engineering consultant to undertake the work and update the bridge management report with current BCI and a five to ten-year priority list of bridges and culverts for capital upgrades, improvements, or replacement. The consultant produces an OSIM report for the municipality.

3.4 Current LOS

Levels of service for bridges and culverts are outlined in Table 5 of the regulation, O.Reg. 588/17. The **Tables 3.2, 3.3 and 3.4** outline the Municipality's current community and technical levels of service for bridges and culverts.

Table 3.2: Community Levels of Service

LOS Parameter	LOS Statement	Community Levels of Service O.Reg. 588/17 – Qualitative Description
Scope	The Municipal roadway bridge and structural culvert network is designed to support various vehicle types, including: Heavy transport vehicles Motor vehicles Emergency vehicles Agricultural vehicles and equipment Pedestrians Cyclists.	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).
Quality	The condition of bridges and culverts are evaluated routinely according to the OSIM requirements. For full descriptions and samples images of bridge and culvert condition classifications refer to the 2022 OSIMs. Bridges and culverts in Good condition typically operate as designed and would not receive any additional restrictions or limitations beyond those designed. Bridges and culverts in Fair to Poor condition may receive load restrictions or be subject to closure as deterioration affects asset capacity to safely and reliably deliver the designed level of service. For photos illustrating the condition of bridge components in each category refer to the 2022 OSIMs. Also see **Figures Figure** 3.2 through **Figure** 3.6.	Description or images of the condition of bridges and how this would affect use of the bridges. Description or images of the condition of culverts and how this would affect use of the culverts.

Table 3.3: Technical Levels of Service

LOS Parameter	LOS Statement	Technical Levels of Service O. Reg. 588/17 – Technical Metrics	2023 Performance
Scope	Connects properties to local amenities and to regional roads maintained by the County and the Province	Percentage of bridges in the municipality with loading or dimensional restrictions	12.2%
Quality	Supports comfortable passage of vehicles and other transportation network users	For bridges in the municipality, the average bridge condition index value	68.6
Quality	Supports comfortable passage of vehicles and other transportation network users	For structural culverts in the Municipality, the average bridge condition index value.	75.6

Table 3.4: Additional Level of Service Metrics

LOS Parameter	Addition LOS metrics	LOS Statement
Affordability / Financial Sustainability	Efficiently uses municipal resources to deliver transportation services, including seeking support from higher levels of government when available	Refer to **Appendix A -Table A4: Affordability Financial Sustainability for Transportation Assets**

3.5 Current Performance

Asset performance measures were determined in consultation with the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. The performance measures for the bridges and culverts, and their 2022 values are shown in the **Tables 3.2, 3.3 and 3.4** above.

3.6 Risk Assessment

The risk assessment for bridge and culvert assets was conducted using the following assumptions and criteria:

Condition: Determined based on BCI ratings supplied by the Municipality from their OSIM Reports, please see **Table 3.1.**

Performance: Assumed to be always reliable (value of 1)

Climate Change: Assumed a value of 5 (Moderate or high impact; no or limited mitigation plan)

Impact: Assumed to all be high impact (value of 2).

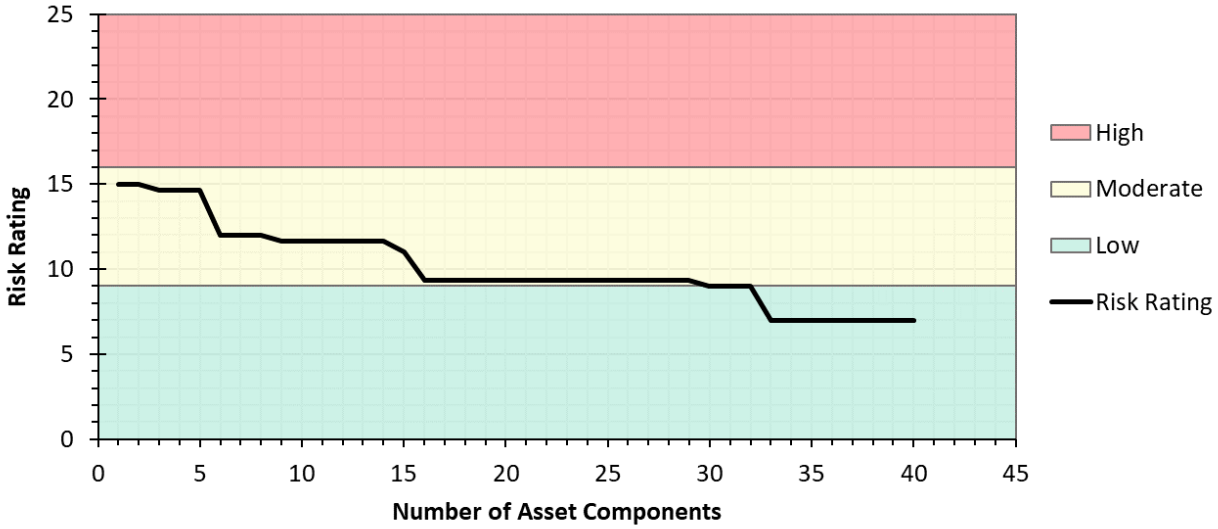
Importance: Importance for bridges is consistent with the importance values attributed to the road segments on which the bridges are located.

The Ferris Provincial Park walking bridge was identified low importance as it doesn't convey vehicular traffic.

In addition to the condition rating (BCI), other factors such as importance, impact of climate change and consequence of failure is considered in determining the risk rating for each bridge and culvert. The risk rating and the recommendations in the OSIM report are considered in planning maintenance, repairs, and replacement. For example, if a bridge or structural culvert has a rating of 70 or greater, then minimal maintenance is required within the next five years. In comparison, for bridges and structural culverts rated 50 or less, they require immediate maintenance/repairs within one year.

The risk profile for bridges and culverts assets is shown in **Figure 3.8.**

Figure 3.8: Risk Profile for Bridges and Culverts Assets



3.7 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for bridge and structural culvert assets. The primary lifecycle activities include non-infrastructure solutions, maintenance activities, renewal/rehabilitation, replacement/ construction, disposal, and expansion/growth/service improvement activities.

3.7.1.1 Non-Infrastructure Solutions

Non-Infrastructure solutions for the bridge and structural culverts assets include those activities that do not directly deal with the physical state of the bridge and structural culverts but work to extend the assets useful life. The Municipality's inspection program used during maintenance activities can include a combination of the effort types to suit the needs of the Municipality and can identify actions to extend expected useful life. The Municipality's inspection program (implemented as part of its maintenance activities) can be used to identify the recommended actions to extend an assets useful life, and can be undertaken in-house by the Municipality or by a third-party consultant depending on the frequency and needs of the Municipality.

Routine maintenance works are typically used to prolong the lifespan of assets and include both preventative and reactive activities designed to maintain the asset

condition and function. Preventative activities are implemented to provide a predictive response to deterioration or possible performance issues by managing the contributing factors prior to an event occurring.

Under O.Reg. 160/02: Standards for Bridges, the Municipality is required to complete one inspection of all bridges and structural culverts every two years to identify condition and produce a report outlining the recommended work for a 1-to-10-year period. The inspection uses the Ontario Structural Inspection Manual (OSIM) 2008 and is referred to as the OSIM or Bridge Inspection Report. The Municipality should continue the current biennial OSIM Bridge Inspections along the current schedule. The inspections should include all bridges and culverts with a single or combined span greater than 3 m.

3.7.1.2 Maintenance Activities

Bridge and structural culvert assets are long-lived assets with estimated useful lives of 75 years and 50 years, respectively. Throughout the lifecycle of these assets the majority of expected needs will be maintenance and repair work.

Reactive maintenance is conducted in response to a condition or performance issue and designed to correct the issue before it causes asset deterioration and possible deficiencies. The scale of maintenance activities varies widely and is dependent on a variety of factors including the age, asset utilization, environment, and design. Maintenance should be completed based on recommendations in current OSIM reports (conducted every two years) and industry best practices.

A general summary of bridge and structural culvert maintenance activities can include, but are not limited to:

- Cleaning, washing or flushing
- Railing system maintenance/safety barriers
- Painting of steel bridge components
- Bearing maintenance
- Pest control
- Deck drainage maintenance
- Erosion control
- Scaling of loose concrete and ACR Steel

3.7.1.3 Renewal/Rehabilitation Activities

Renewal and rehabilitation activities are driven by the identification and treatment of deficiencies to prevent the continued deterioration of the deficiency which may cause a reduction in asset condition, performance and LOS delivered.

Timing of repairs varies widely as they may be prescheduled based on estimated deterioration, in response to biennial condition reporting, or on an emergency basis. Repairs to bridges vary widely, are repaired in accordance with the OSIM's inspections and can be in relation to structural and deck surface components.

3.7.1.4 Construction/ Replacement Activities

The start of an asset's lifecycle is its construction. The bridge or structural culvert should be constructed to adhere with the requirements of the O.Reg. 160/02: Standards for Bridges, CSA S6 Canadian Highway Bridge Design Code, and any and all other applicable regional codes and requirements for the bridge and its use. Each bridge or structural culvert should be designed and constructed to provide the services for which it is intended.

Replacement of a structure is based on age, estimated lifespan and recommendations from condition assessments. Replacement can be used when an asset is nearing or has reached the end of its life, repairs are not technically feasible, estimated future repair costs are greater than replacement cost, or increases to capacity or LOS are required. Replacement activities are typically large in scale and involve completion through a capital project. Timing of replacement activities must consider the impact on adjacent infrastructure, the impact on near-by asset LOS and replacement or maintenance requirements of connected infrastructure.

3.7.1.5 Disposal Activities

Disposal activities for bridges and structural culverts can include the removal from service of a bridge or structural culvert, through:

- Closure of the asset from access
- Change in level of service of the asset to limit access (e.g., vehicular bridge)
- Deconstruction of the asset

Disposal activities should be implemented when a bridge or structural culvert has reached the end of its useful life or has degraded to such a state that it can no longer provide the level of service for which it is intended. Removal of a bridge or structural culvert from service or decrease in level of service should be undertaken only when the change in level of service is determined to be acceptable for the Municipality and residents.

Disposal activities should be conducted such that health and safety protocols are being followed, and spent materials are disposed of at appropriate or approved facility.

3.7.1.6 Expansion/Growth/Service Improvement Activities

Expansion and growth of the Municipality are planned activities required to extend services to previously un-serviced areas and expand based on the growing demands within the municipality. The addition of new bridges/culverts assets owned by the Municipality is based on new developments.

3.8 Asset Management Strategy

The asset management strategy for bridges and structural culverts is based on maintaining the structures in sufficient condition and performance to allow for continued access to crossings and adequate service delivery. The strategy considers the requirements set out by applicable regulations and builds on those to include the lifecycle activities summarized above.

Under O.Reg. 160/02: Standards for Bridges, the Municipality is required to complete one inspection of all bridges and structural culverts every two years to identify condition and produce a report outlining the recommended work for a 1-to-10-year period. The inspection uses the Ontario Structural Inspection Manual (OSIM) 2008 and is referred to as the OSIM report. The most recent condition assessment and study was completed in 2022, with the next scheduled assessment planned for 2024.

The Municipality's current strategy for maintaining the bridges includes procurement of OSIM reports at the required frequency, and completion of the maintenance, rehabilitation and reconstruction works according to the recommendations from the OSIM reports.

Inspections and OSIM reports will identify works to be done at each of the bridge structures – each inspection should recommend maintenance works, rehabilitation works, and reconstruction where necessary, as well as prioritization of the works and an estimation of the overall condition of the structure. It is therefore assumed that by following the results of the inspections/OSIMs, the Municipality will be following a strategy that prioritizes works as required to optimize the lifecycle of the bridge and structural culvert assets.

The strategy considers the requirements set out by applicable regulations and builds on those to include the lifecycle activities summarized above.

It is recommended that the Municipality use the OSIM reports to identify and forecast lifecycle activities for bridge and structural culvert assets. For detailed recommendations of asset management strategies refer to the most current OSIM inspection report.

Note that stormwater sewer and culvert assets that are located or are part of a municipal drain may require additional steps or processes for lifecycle management.

4.0 Water

4.1 Summary

The water network includes the linear water distribution mains and appurtenances, and water storage tower and equipment.

Water is treated and supplied from three (3) Water Treatment Plants, including 7,078km of watermain owned and maintained by the Municipality and serving residents.

The Municipality's water distribution system has three (3) Elevated Water Storage Towers, and one (1) booster pump station owned and operated by the Municipality.

The equipment for the water distribution system was evaluated as apart of the **Section 9.0 Equipment and Machinery** and the water distribution buildings were evaluated as apart of **Section 7.0 Buildings.**

4.2 State of Local Infrastructure

4.2.1 Average Age

The average age of all linear assets is 33 years.

The average age of all valves is 30 years.

The average age of all hydrants is 32 years.

The age of 7.4 m of linear assets and 10 hydrant valves were unknow and have been omitted.

4.2.2 Replacement Costs

The total replacement costs for these assets were determined using the Municipalities 2022-year end data sheets, which contain each asset acquisition costs (in dollars from the year of acquisition) and were then inflated based on the Consumer Price Index (CPI) to costs to reflect today's dollars.

The replacement cost for all watermain linear asset owned by the Municipality is $64.26 million.

The replacement cost for all valves owned by the Municipality is $2.69 million.

The replacement cost for all hydrants owned by the Municipality is $3.62 million.

The Municipality did not supply acquisition/replacement costs for 8.51 km of linear assets, 838 valves and 373 hydrants. As directed by the Municipality, based on data the Municipality provided an average cost was calculated and applied to assets with unknown acquisition/replacement costs (regardless of size). Inflated to 2023 dollars, a unit price of $1,023 per m was applied to linear assets, $3,118 each was applied to valves and $9,360 each was applied to hydrants.

4.2.3 Expected Useful Life

The Municipality maintains an expected useful life of 80 years for watermain linear assets.

The Municipality maintains an expected useful life of 50 years for watermain valves and an expected useful life of 75 years for fire hydrants.

4.3 Condition

The expected useful life of the assets and a deterioration model based on age was used to predict the physical condition of the water pipes, valves, and hydrants in the network. No condition assessment was carried out on the water distribution system appurtenances (i.e., valves, hydrants, etc.); however, during annual routine maintenance appurtenances are inspected for structural and operational deficiencies.

To provide additional context for the condition of the assets, **Table 4.1** shows the condition ratings and total length of assets.

Table 4.1: Condition Ratings and Age Range Years for Various Assets

Asset	Condition Rating	Remaining Useful Life (Years)	Total Length (m) / Quantities
Watermain (Linear) **EUL: 80 years**	Very Good	65 to 80	9,904
	Good	49 to 64	28,492
	Fair	33 to 48	14,553
	Poor	17 to 32	12,833
	Very Poor	0 to 16	4,990
Valves **EUL: 50 years**	Very Good	41 to 50	53
	Good	31 to 40	225
	Fair	21 to 30	255
	Poor	11 to 20	105
	Very Poor	0 to 10	214
Hydrants **EUL:75 years**	Very Good	61 to 75	70
	Good	46 to 60	160
	Fair	31 to 45	48
	Poor	16 to 30	88
	Very Poor	0 to 15	21

Figure 4.1: Condition of Watermain Assets (Value and Importance)

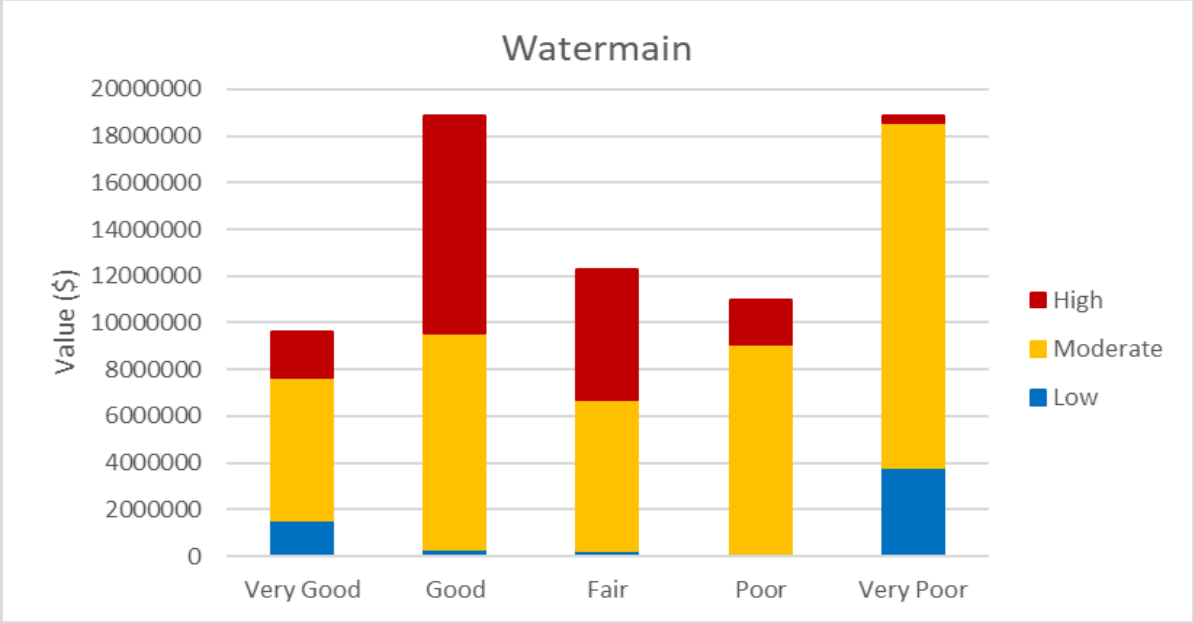


Figure 4.1 presents the condition and replacement values of all water assets. Approximately 40% of the replacement cost of all watermain assets are in Very Good (1) or Good (2) condition, approximately 17% are in Fair (3) and 43% Poor (4) condition or Very Poor (5).

The condition of 7.4 m of linear assets (replacement cost approximately $7,570) and 10 valves (replacement cost approximately $31,200) was unknown and were omitted.

4.4 Current LOS

Levels of service for water assets are outlined in Table 1 of the regulation, O. Reg. 588/17. The tables below outline the Municipality's current community and technical levels of service for water assets.

Table 4.2: Community Levels of Service

LOS Parameter	LOS Statement	Community Levels of Service O.Reg. 588/17 – Qualitative Description
Scope	The water distribution system provides water service to properties across the Municipality, in the communities of Campbellford, Hastings and Warkworth.	Description, which may include maps, of the user groups or areas of the Municipality that are connected to the municipal water system.
Scope	Water services are provided in the communities of Campbellford, Hastings and Warkworth.	Description, which may include maps, of the user groups or areas of the Municipality that have fire flow.
Reliability	Boil water advisories and service interruptions are tracked in the communities of Campbellford, Hastings and Warkworth.	Description of boil water advisories and service interruptions.

Table 4.3: Technical Levels of Service

LOS Parameter	LOS Statement	Technical Levels of Service O. Reg. 588/17 – Technical Metrics	2023 Performance
Scope	Water services are provided in the communities of Campbellford, Hastings and Warkworth	Percentage of properties connected to the municipal water system.	29%
Scope	Water services are provided in the communities of Campbellford, Hastings and Warkworth	Percentage of properties where fire flow is available.	31%
Reliability	Water services are provided with minimal unplanned service interruptions.	The number of connection-days per year where a boil water advisory notice is in place compared to the	0

LOS Parameter	LOS Statement	Technical Levels of Service O. Reg. 588/17 – Technical Metrics	2023 Performance
		total number of properties connected to the municipal water system.	
		The number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system.	0.0019

Table 4.4: Additional Level of Service Metrics

LOS Parameter	LOS Statement	Additional LOS Metrics	2023 Performance
Scope	Water services are provided in the communities of Campbellford, Hasting and Warkworth	Percentage of households connected to the municipal water system.	33%
Quality	The Municipality ensures a high quality drinking water supply through its Drinking Water Quality Management System and adherence to Provincial regulations.	Number of microbiological water samples taken and % that did not have exceedances relative to SDWA.	Treated samples 156 at 100% Distribution samples 468 at 100%
		Number of chemical water samples taken and % that did not have exceedances relative to SDWA.	Schedule 23 & 24 (Lead) 100% no exceedances

LOS Parameter	LOS Statement	Additional LOS Metrics	2023 Performance
		Number of confirmed odour complaints.	0
		Number of confirmed color complaints.	1
		Number of confirmed pressure complaints.	1
		Number of fire hydrants with adequate fire flow (and % of total fire hydrants).	365 99.2%
Capacity	The Municipality's asset management planning incorporates servicing needs of future population and employment growth	Additional connections that could be accommodated based on existing reserve capacity: Campbellford, Hastings, Warkworth	Campbellford: 3,815 Hastings: 1,390 Warkworth: 1,092

4.5 Current Performance

Asset performance measures were determined in consultation with the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. The performance measures for the water network, and their 2022 values are shown in **Tables 4.3 and 4.4** above.

4.6 Risk Assessment

The risk assessment for water linear assets was conducted using the following assumptions and criteria:

Condition: Determined based on estimated condition (using deterioration curve)

Performance: Assumed to be always reliable (value of 1)

Climate Change: Assumed a value of 1 (No or limited impact, quick recovery or mitigation in place)

Impact: Moderate impact (value of 1)

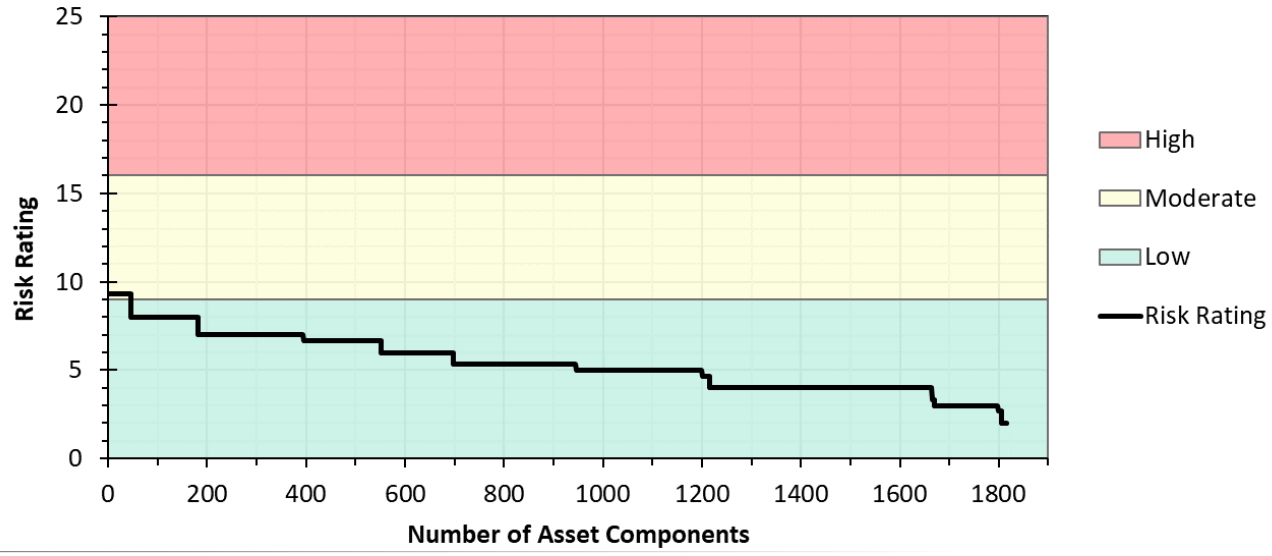
Importance: Impact was determined based on size and use of assets

- High importance was assigned to all hydrants and all valves and watermains with a larger diameter than 250 mm.
- Moderate importance was assigned to all valves and watermains with a diameter between 150 mm and 250 mm.
- Low importance was assigned to all valves and watermain with a diameter smaller than 150 mm.

The condition of 7.4 m of linear assets and 10 valves was unknown and were omitted.

The risk profile for water assets is shown in **Figure 4.2**.

Figure 4.2: Risk Profile for Water Assets



4.7 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for water assets. The lifecycle activities for water assets include non-infrastructure solutions, maintenance, renewal/rehabilitation, replacement/ construction, disposal, and expansion/growth/service improvement activities.

4.7.1.1 Non-Infrastructure Solutions

Non-infrastructure solutions for the watermain assets include those activities that do not directly deal with the physical state of the watermains but work to extend the asset's useful life. The non-infrastructure solutions can include policies, and monitoring/inspection of the assets. Condition assessment of watermain pipes is challenging to achieve. Non-infrastructure solutions can be used throughout the useful life of an asset.

4.7.1.2 Maintenance Activities

Maintenance activities are undertaken on the assets throughout their useful life to maintain their operating condition and performance. Maintenance works includes routine maintenance such as fire hydrant flushing and watermain flushing, currently undertaken by the Municipality twice annually, as well as a mainline and valve operation maintenance program. Maintenance works may also include minor repairs to assets, such as localized pipe or appurtenance repair. During maintenance works, a risk exists that a maintenance activity may be implemented that does not adequately mitigate a performance or condition issue, and additional costs are then required for further repair or replacement. It is recommended that reactive maintenance works (watermain repairs, etc.) be reviewed and tracked such that they can provide additional information to the Municipality regarding condition of the pipe segments (beyond the theoretical condition determined through age of pipe and deterioration rate).

4.7.1.3 Renewal/Rehabilitation Activities

Renewal of the watermain assets can include pipe lining (structural, semi-structural or non-structural lining). A lining can be used where the condition has deteriorated, however structurally the pipe segment is still sound. A lining can extend the useful life of an asset and improve performance.

A renewal activity specific to ductile iron pipes is the implementation of cathodic protection. This can act to prevent corrosion of the watermain, prolonging the lifespan. Risks associated with these renewal activities include the improper installation of the renewal works or continued/advanced deterioration of the original watermain such that the renewal works do not perform as expected. Rehabilitation of watermain assets is conducted as required, including the maintenance and repairs of fire hydrants and watermains.

4.7.1.4 Replacement/Construction Activities

Construction of new assets is recommended to be in line with recommendations as part of growth, master plan, or other municipal strategies. The design of the new assets should be consistent with jurisdictional design requirements, including provincial design guidelines and local requirements. New construction of assets will occur where no previous water servicing is available. The risk associated with new construction includes the high cost of brand-new assets relative to ability to recoup costs through user rates or development charges. Watermain replacements, whenever possible, are coordinated with replacement of road assets.

Construction can also be the replacement of deteriorated assets. At or near the end of the useful life of the watermain asset, the Municipality replaces the assets for continuation of service provision.
At the time of replacement, design should be undertaken to ensure jurisdictional design requirements are met, and adequate capacity is provided for current and growth usage projections.

4.7.1.5 Disposal Activities

Decommissioning of the watermain assets includes abandonment or replacement of the asset at the end of its useful life. Removal of the expended asset can provide additional space for new underground assets to be constructed within a right-of-way.

4.7.1.6 Expansion/Growth/Service Improvement Activities

Expansion and growth of the municipality are planned activities required to extend services to previously un-serviced areas and expand based on the growing demands within the Municipality. The addition of new watermain assets owned by the Municipality is based on new developments.

4.8 Asset Management Strategy

The asset management strategy for water linear assets (watermains) will maximize the lifecycle of the assets where appropriate, in consideration of specific needs of the Municipality and existing infrastructure.

The condition of an asset should be established to assist in decision making. Due to the difficulty in undertaking visual inspection of a watermain, the Municipality should estimate the expected condition of the pipes based on the age, deterioration rate, and tracking of maintenance activities completed for each segment. Throughout the lifecycle of the water linear assets, the Municipality flushes and cleans the watermains. When the condition of the asset has deteriorated such that an intervention is required it is recommended that maintenance be reviewed as the first opportunity to extend the useful life. Maintenance works can include localized repair works or relining of a pipe segment. Relining can be done on an individual pipe segment or for localized repairs. To access a watermain for relining purposes, excavation of the road is required therefore when considering relining as a lifecycle activity, the additional cost of road restoration and occupation of the traffic lane should be considered.

When the condition of the asset has degraded such that maintenance is no longer an appropriate activity, the segment can and should be reconstructed. The Municipality should follow best practices and local design guidelines when designing the reconstruction works. Reconstruction of the watermain linear assets will also include replacement of the componentry, such as services, valves, and hydrants within the limits of the right-of-way.

Assets at the end of their useful life should be decommissioned (e.g. abandoned in place or removed).

Current best practices suggest that that reconstruction and new construction works on the assets will be done using PVC material for all pipe diameters.

There is efficiency in conducting capital reconstruction works where adjacent asset types can be reconstructed simultaneously. Part of the Municipality's current strategy is to use capital works projects from other linear asset categories to locate and identify any upcoming capital works on adjacent linear infrastructure (such as road works, sewer or storm), and align the timing of the works such that there is efficiency in the design, construction and material costs associated with the project, and reduced disruption to service delivery. The capital works identified may be as a result of end-of-life replacements, growth, changes to standards, or others.

Water quality concerns will factor into the Municipality's strategy for managing the watermain assets. Where there is a concern in water quality due to a particular construction material or practice, the Municipality may prioritize correction of this issue and as a result modify the strategy (temporarily or on an on-going basis).

5.0 Wastewater

5.1 Summary

The wastewater network includes the linear collection and treatment mains and appurtenances. The municipality owns two wastewater treatment plants addressed in **Section 7.0 Buildings.**

The Municipality owns and operates a total of 53.86 km of linear sewer main and 577 maintenance holes. The pipe network ranges in size from 75 to 600 mm in diameter. The summary of sewer lengths by material type are shown in **Table 5.1**.

Table 5.1: Condition Ratings and Age Range Years for Various Assets

Material Type	Distance (m)
AC	15,291
CON	5,079
CSP	84
DI	763
HDPE	3,034
PVC	23,675
ST	148
VC	5,782

5.2 State of Local Infrastructure

5.2.1 Average Age

The average age of all linear assets is 36 years.

The average age of all maintenance holes is 37 years.

The age of the lagoon is 40 years.

The age of three (3) linear assets is unknown along Pellisisier Street South, Raglan Street South and Park Street and have been omitted.

5.2.2 Replacement Costs

The total replacement costs for these assets were determined using the Municipalities 2022-year end data sheets, which contain each asset acquisition costs (in dollars from the year of acquisition) and were then inflated based on the Consumer Price Index (CPI) to costs to reflect today's dollars.

The replacement cost for all wastewater linear asset owned by the Municipality is $18.17 million.

The replacement cost for all wastewater maintenance holes owned by the Municipality is $3.29 million dollars.

The replacement cost for the lagoon is $3,623.

The Municipality did not supply replacement costs for 51,582 m of linear assets, and 2 maintenance holes. As directed by the Municipality, based on data the Municipality provided an average cost was calculated and applied to assets with unknown acquisition/replacement costs (regardless of size). Inflated to 2023 dollars, a unit price of $339 per m was applied to linear assets, $5,698 each was applied to maintenance holes.

5.2.3 Expected Useful Life

The Municipality maintains an expected useful life of 80 years for wastewater linear assets.

The Municipality maintains an expected useful life of 75 years for wastewater maintenance holes.

The Municipality maintains an expected useful life of 100 years for the lagoon.

5.3 Condition

The expected useful life of the assets and a deterioration model based on age was used to predict the physical condition of the sanitary pipes, maintenance holes and the lagoon in the network. No condition assessment was carried out on the wastewater distribution, however during routine maintenance appurtenances are inspected for structural and operational deficiencies.

To provide additional context for the condition of the assets, **Table 5.2** shows the condition ratings and total length of assets.

The lagoon is in fair condition. This condition rating is based on the age of the asset and does not necessarily reflect its physical condition.

Table 5.2: Condition Rating, Age Range and Total Length for Wastewater Assets

Wastewater Assets	Condition Rating	Remaining Useful Life (Years)	Total Length (m) / Quantities
Sanitary Main (Linear) **EUL: 80 years**	Very Good	65 to 80	11,380
	Good	49 to 64	9,068
	Fair	33 to 48	12,643
	Poor	17 to 32	14,485
	Very Poor	0 to 16	6,154
Maintenance Holes **EUL: 75 years**	Very Good	61 to 75	80
	Good	46 to 60	149
	Fair	31 to 45	122
	Poor	16 to 30	190
	Very Poor	0 to 15	36
Lagoon **EUL: 100 years**	Very Good	81 to 100	0
	Good	61 to 80	0
	Fair	41 to 60	1
	Poor	21 to 40	0
	Very Poor	0 to 20	0

The condition ratings by sanitary main type can be seen in **Figure 5.1**. The condition rating of all wastewater assets can be seen in **Figure 5.2**.

Figure 5.1: Condition Ratings by Wastewater Linear Type

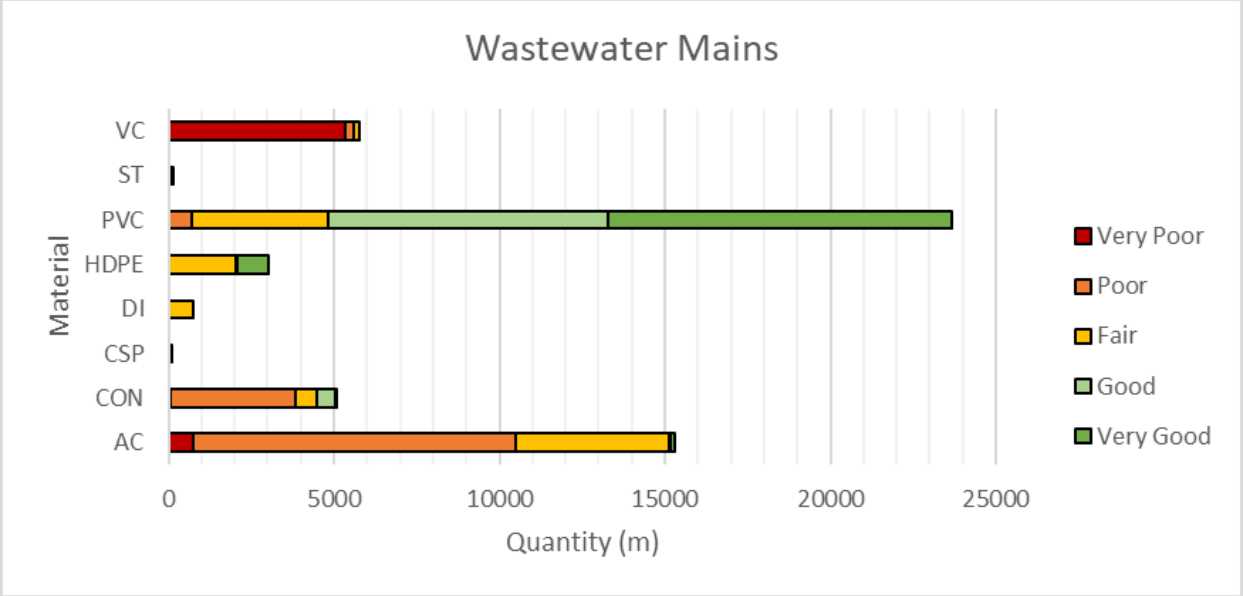


Figure 5.2: Condition of All Wastewater Assets (Value and Importance)

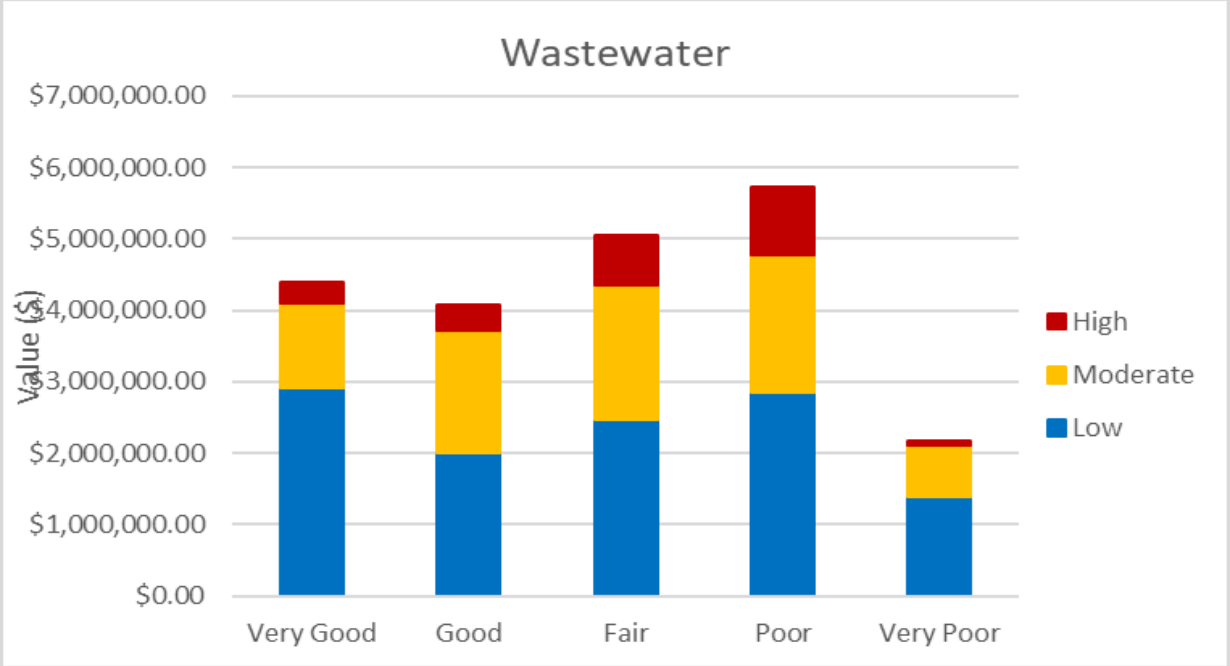


Figure 5.2 presents the condition and replacement values of all wastewater assets. Approximately 39% of the wastewater assets (in kilometers/quantity) are in Very Good (1) or Good (2) condition, approximately 22% are in Fair (3) and 39% Poor (2) condition or Very Poor (1).

The condition of 151.6 m of linear assets (replacement cost approximately $51,450) were unknown and were omitted.

5.4 Current LOS

Levels of service for wastewater assets are outlined in Table 2 of the regulation, O. Reg. 588/17. **Tables 5.3, 5.4, and 5.5** outline the Municipality's current community and technical levels of service for wastewater assets.

Table 5.3: Community Level of Service

LOS Parameter	LOS Statement	Community Levels of Service O.Reg. 588/17 – Qualitative Description
Scope	The Municipality provides wastewater collection and treatment services for properties, primarily located in the urban and semi-urban settings of Campbellford, Hastings and Warkworth.	Description, which may include maps, of the user groups or areas of the Municipality that are connected to the municipal wastewater system.
Reliability	Overflow and effluent mitigation measures.	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes.
		Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches.
		Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes.

LOS Parameter	LOS Statement	Community Levels of Service O.Reg. 588/17 – Qualitative Description
		Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3.
		Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.

Table 5.4: Technical Level of Service

LOS Parameter	LOS Statement	Technical Levels of Service O. Reg. 588/17 – Technical Metrics	2023 Performance
Scope	Wastewater services are provided in the communities of Campbellford, Hastings and Warkworth.	Percentage of properties connected to the municipal wastewater system.	25%
Reliability	The wastewater service operates reliably	The number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system.	0
	The wastewater service operates reliably	The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system.	0

	The wastewater service operates reliably	The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.	0.004

Table 5.5: Additional Level of Service Metrics

LOS Parameter	LOS Statement	Additional LOS Metrics	2023 Performance
Scope	Wastewater services are provided in the communities of Campbellford, Hastings and Warkworth.	Percentage of households connected to the municipal wastewater system.	28%
Reliability	The wastewater service operates reliably	% of sewers flushed and inspected in past 5 years	100%
	The wastewater service operates reliably	% of identified major repair needs completed during reporting period	87%
	The wastewater service operates reliably	Number of repair needs identified per km of pipe inspected	7.35
Capacity	The Municipality's asset management planning incorporates servicing needs of future population and employment growth.	Additional connections that could be accommodated within existing reserve capacity. Campbellford, Hastings, Warkworth	Campbellford: 1581 Hastings: 246 Warkworth: 172
	The Municipality's asset management planning incorporates servicing needs of future population and employment growth.	Number of sump pumps disconnected from municipal sewer system during reporting period.	6

	The Municipality's asset management planning incorporates servicing needs of future population and employment growth.	Amount invested into sealing and grouting program.	$175,192

5.5 Current Performance

Asset performance measures were determined in consultation with the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. The performance measures for Roads, and their 2022 values are shown **Tables 5.4 and 5.5** above.

5.6 Risk Assessment

The risk assessment for wastewater linear assets was conducted using the following assumptions and criteria:

Condition: Determined based on estimated condition (using deterioration curve)

Performance: Assumed to be always reliable (value of 1)

Climate Change: Assumed a value of 1 (No or limited impact, quick recovery or mitigation in place)

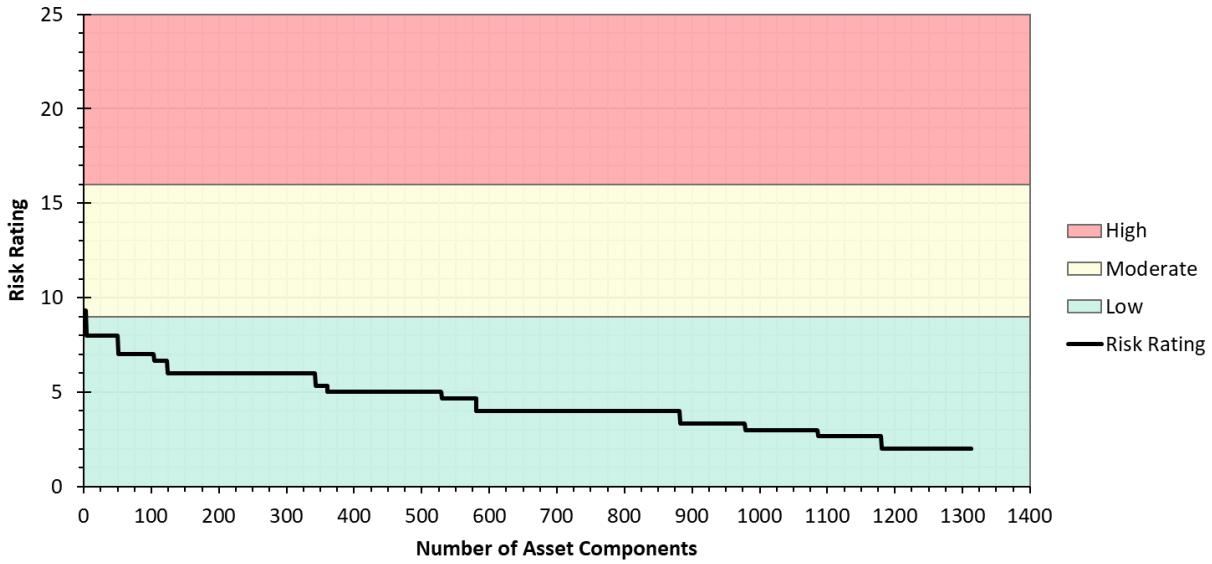
Impact: Moderate impact (value of 1)

Importance: Importance was determined based on size and use of assets

- High importance was assigned to all mains with a larger than diameter 450 mm.
- Moderate importance was assigned to all maintenance holes and mains with a diameter between 250 mm and 450 mm.
- Low importance was assigned to all valves and watermain with a diameter smaller than 250 mm.

The risk profile for wastewater assets is shown in **Figure 5.3**.

Figure 5.3: Risk Profile for Wastewater Assets



5.7 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for wastewater assets. The lifecycle activities for the wastewater assets include non-infrastructure solutions, maintenance, renewal/rehabilitation, replacement/ construction, decommissioning, and expansion/growth/service improvement activities.

5.7.1.1 Non-Infrastructure Solutions

Non-infrastructure solutions for the wastewater network include those activities that do not directly deal with the physical state of the pipe but work to extend the assets useful life. The non-infrastructure solutions can include policies, and monitoring/inspection of the assets. The inspection of sanitary sewer assets can be undertaken through a condition assessment program, recommended to be visual inspection through CCTV means. Usage of the camera technology has the risk of insufficient visual detail to make appropriate activity decisions.

5.7.1.2 Maintenance Activities

Maintenance activities are undertaken on the assets throughout their useful life to maintain their operating condition and performance. Maintenance activities includes routine maintenance such as flushing and cleaning, and minor repairs to assets. There exists the risk that a maintenance activity may be implemented that does not adequately mitigate a performance or condition issue, and additional costs are then required for further repair or replacement.

Maintenance activities also include condition assessment and inspection of the assets. The inspection of wastewater assets is undertaken through a visual inspection using CCTV every 5 years.

5.7.1.3 Renewal/Rehabilitation Activities

Renewal of the wastewater assets can include structural or non-structural lining. The collection systems is sealed and grouted every 5 years minimum or more often as condition of the infrastructure requires. Maintenance holes are also rehabilitated through grouting and sealing of the manhole structures, and parging as identified within the visual camera inspection. frame and grate replacement is done as required.

In addition, a lining can be used where the condition has deteriorated, however structurally the pipe segment is still sound. A lining can extend the useful life of an asset and improve performance. Risks associated with lining of a pipe include the improper installation of the pipe or continued deterioration of the original pipe such that the lining does not perform as expected.

5.7.1.4 Replacement/Construction Activities

Construction of new assets is recommended to be in line with recommendations as part of growth, master plan, or other municipal strategies. The design of the new assets should be consistent with jurisdictional design requirements, including provincial design guidelines and local requirements. New construction of assets will occur where no previous wastewater servicing is available. The risk associated with new construction includes the high cost of brand-new assets relative to ability to recoup costs through user rates or development charges. Sanitary sewer replacements, whenever possible, are coordinated with replacement of road assets.

Construction can be conducted for the replacement of deteriorated assets. At the end of the useful life of an asset, it can be replaced for continuation of service provision. At the time of replacement, design should be undertaken to ensure design requirements are met, and adequate capacity is provided for current and future requirements.

5.7.1.5 Disposal Activities

Decommissioning activities of the wastewater assets can include the disposal at the time of replacement or abandoning the pipe in place. The removal of the expended asset can provide additional space for new underground assets to be constructed within a right-of-way.

5.7.1.6 Expansion/Growth/Service Improvement Activities

Expansion and growth of the Municipality are planned activities required to extend services to previously un-serviced areas and expand based on the growing demands within the municipality. The addition of new sanitary sewer assets owned by the Municipality is based on new developments.

5.8 Asset Management Strategy

The asset management strategy for wastewater linear assets will maximize the lifecycle of the assets where appropriate, in consideration of specific needs of the Municipality and existing infrastructure.

Non-infrastructure solutions can be used through the lifecycle of an asset and can be tied to system management on a broad scale, or to assist in understanding specific components of the system.

The condition, a major factor in the asset management strategy, should be established to assist in decision making. The recommendation is to use visual inspection facilitated by CCTV inspection, from which a condition index can be determined for incorporation into and update of the AMP. A typical practice is to undertake assessment of 1/5 to 1/3 of the assets annually, such that each pipe gets reviewed on a 3-to-5-year basis. The cost for CCTV can vary depending on availability of services and providers. The timeframe for inspection of the assets can be adjusted to suit the budget available, or as required based on the rate of deterioration of the assets.

A schedule for completing condition assessment should be developed by the Municipality, with the assumption that a portion of the network will be reviewed annually.

The prioritization for completing reviews should consider location of the sewers, known issues, and current understanding of condition.

When the condition of the asset has degraded such that an intervention is required, it is recommended that maintenance be reviewed as the first opportunity to extend the useful life. Maintenance works can include localized repair work, relining, flushing or cleaning of the pipe.

Because of the non-intrusive nature of conducting relining, it can be done on an individual pipe segment at a time, or to localized repairs. Relining is an appropriate lifecycle activity when the condition of the pipe is sufficient to receive the liner, and that laterals are in adequate condition. Relining can be used only once in the asset's lifecycle

When the condition of the asset has degraded such that maintenance is no longer an appropriate activity, a pipe asset may be a candidate for relining. Because of the non-intrusive nature of conducting relining, it can be done on an individual pipe segment at a time, or for localized repairs.

As deterioration continues, the segment can become less reliable as likelihood of failure increases. The appropriate activity for the asset is to be reconstructed. The Municipality should follow best practices and local design guidelines when designing the reconstruction works.

At the end of the lifecycle of a wastewater linear asset, it can be decommissioned, removed or abandoned in place (where appropriate).

Current construction materials of the wastewater collection assets are varied, however best practice at the Municipality is that reconstruction and new construction works on the assets will be done using PVC material for pipes that are up to 600 mm in diameter, and concrete for pipes of 600 mm in diameter or larger (acknowledging that the specifics of the works and availability of material will influence the material used in each works project).

The Municipality considers other specific factors into the prioritization of the works on wastewater liner assets, in addition to those described above. Based on present knowledge of the wastewater system, the Municipality should consider the following:

- Wastewater collection needs based on growth
- Informed by growth and development studies, including master plans
- DC funding sources

There is efficiency in conducting capital reconstruction works where adjacent asset types can be reconstructed simultaneously. Part of the Municipality's current strategy is to use capital works projects from other linear asset categories to identify any upcoming capital works on adjacent linear infrastructure (such as road works, watermain or storm), and align the timing of the works such that there is efficiency in the design, construction and material costs associated with the project, and reduced disruption to service delivery.

6.0 Storm Water

6.1 Summary

Currently the Municipality owns 75,960 m of stormwater mains, 2164 m of 166 culverts with a diameter less than 3 meters, 627 maintenance holes and 784 catch basins. The Municipality does not have inventory information on 781 catch basins and have been omitted.

A summary of the 166 stormwater culverts, by culvert size can be found in **Table 6.1**.

Table 6.1: Current State Summary of Stormwater Culverts

Culvert Diameter	Total Number of Assets	Length of Culverts (m)	Total Replacement Cost	Average Remaining Lifespan
Less Than 1 metre	135	1,730	7.14 million	47
1 to 1.99 metres	17	260	900,000	Unknown
2 to 2.99 metres	1	19	53,000	Unknown
Rectangular Culverts	13	160	687,700	Unknown
Total	**166**	**2164**	**8.78 million**	Unknown

The stormwater mains are constructed of a variety of construction materials and types, as summarized in **Table 6.2**.

Table 6.2: Stormwater Mains Material Summary

Material	Length of Linear (m)
AC	105
CON	14,780
CSP	3,280
CST - Corrugated Steel	0
HDPE	6,620
HYB - Hybrid	0
PCC - Precast Concrete	0
PVC	5,495
ST	140
VC	0

6.2 State of Local Infrastructure

6.2.1 Average Age

The average age of the storm mains is 30 years old.

The average of the maintenance holes is 35 years old.

The average age of the storm culverts less than 3 meters diameter is 13 years old.

The age of 84 storm linear assets, and 160 storm culverts less than 3m in diameter were unknown and have been omitted.

6.2.2 Replacement Costs

The total replacement costs for the Stormwater assets were determined using the Municipalities 2022-year end data sheets, which contain each asset acquisition costs (in dollars from the year of acquisition) and were then inflated based on the Consumer Price Index (CPI) to costs to reflect today's dollars.

The replacement cost for all storm linear asset owned by the Municipality is $30.52 million.

The replacement cost for all storm maintenance holes and catch basins owned by the Municipality is $4.78 million.

The replacement cost for all the storm culverts owned by the Municipality is $8.78.

The Municipality did not supply replacement costs for 5,115 m of linear assets, 163 storm culverts and 2 maintenance holes. As directed by the Municipality, based on data the Municipality provided an average cost was calculated and applied to assets with unknown replacement costs (regardless of size). Inflated to 2023 dollars, a unit price of $519 per m was applied to linear assets, $52,897 each was applied to storm culverts and $7,636 each was applied to storm maintenance holes.

6.2.3 Expected Useful Life

The Municipality maintains an expected useful life of 80 years for storm water linear assets.

The Municipality maintains an expected useful life of 60 years for storm water maintenance holes, 35 years for catch basins and 60 years for culverts less than 3 meters in diameter.

6.3 Condition

The expected useful life of the assets and a deterioration model based on age was used to predict the physical condition of the storm pipes, maintenance holes, catch basins and culverts in the network. No condition assessment was carried out on the stormwater distribution, however during routine maintenance appurtenances are inspected for structural and operational deficiencies.

To provide additional context for the condition of the assets **Table 6.3** shows the condition ratings and total length of assets.

Table 6.3: Condition Ratings and Total Lengths for Stormwater Culverts

Stormwater Culvert	Condition Rating	Remaining Useful Life (Years)	Total Length (m) / Quantities
Storm Mains **EUL: 80 years**	Very Good	65 to 80	11512
	Good	49 to 64	20570
	Fair	33 to 48	21690
	Poor	17 to 32	15643
	Very Poor	0 to 16	4807
Maintenance Hole **EUL: 60 years**	Very Good	49 to 60	80
	Good	37 to 48	117
	Fair	25 to 36	109
	Poor	13 to 24	106
	Very Poor	0 to 12	215
Catch basin **EUL: 35 years**	Very Good	29 to 35	1
	Good	22 to 28	2
	Fair	15 to 21	0
	Poor	8 to 14	0
	Very Poor	0 to 7	0
Storm Culvert **EUL: 60 years**	Very Good	49 to 60	10
	Good	37 to 48	67
	Fair	25 to 36	0
	Poor	13 to 24	0
	Very Poor	0 to 12	0

The condition ratings by stormwater main type can be seen in **Figure 6.1**. The condition ratings of all stormwater can be seen in **Figure 6.2.**

Figure 6.1: Condition Ratings by Stormwater Main Type

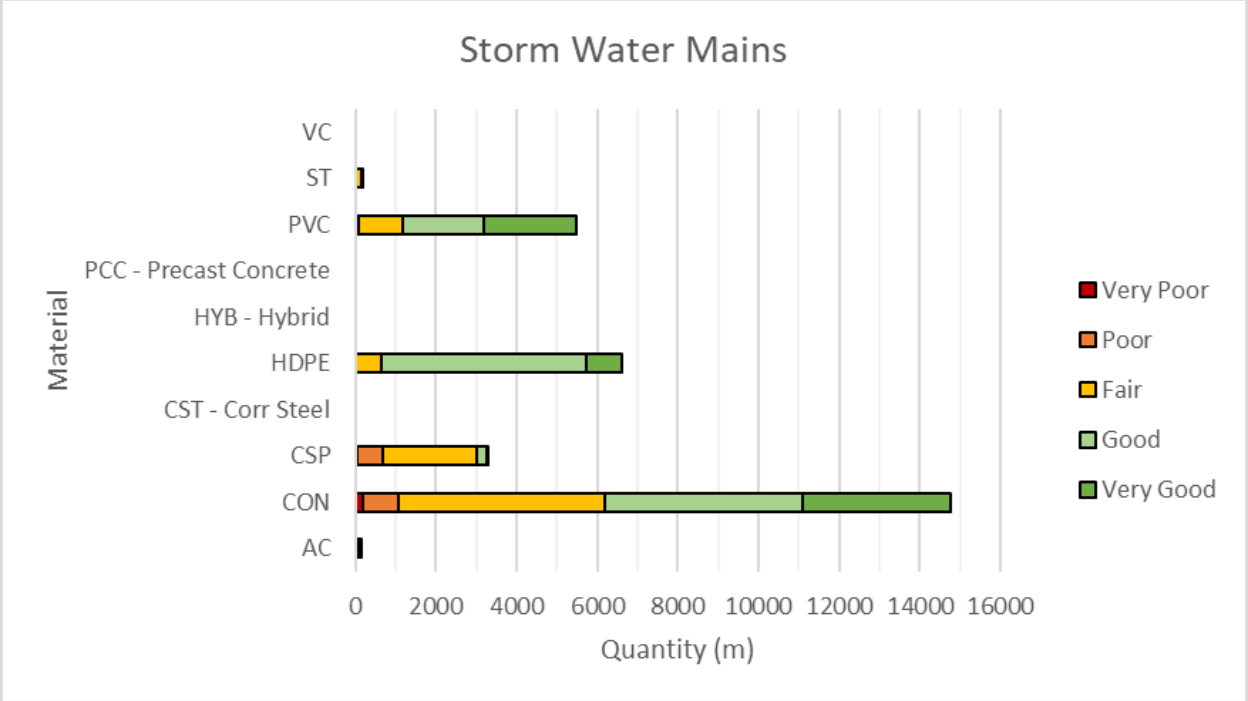


Figure 6.2: Condition of Stormwater Assets (Value and Importance)

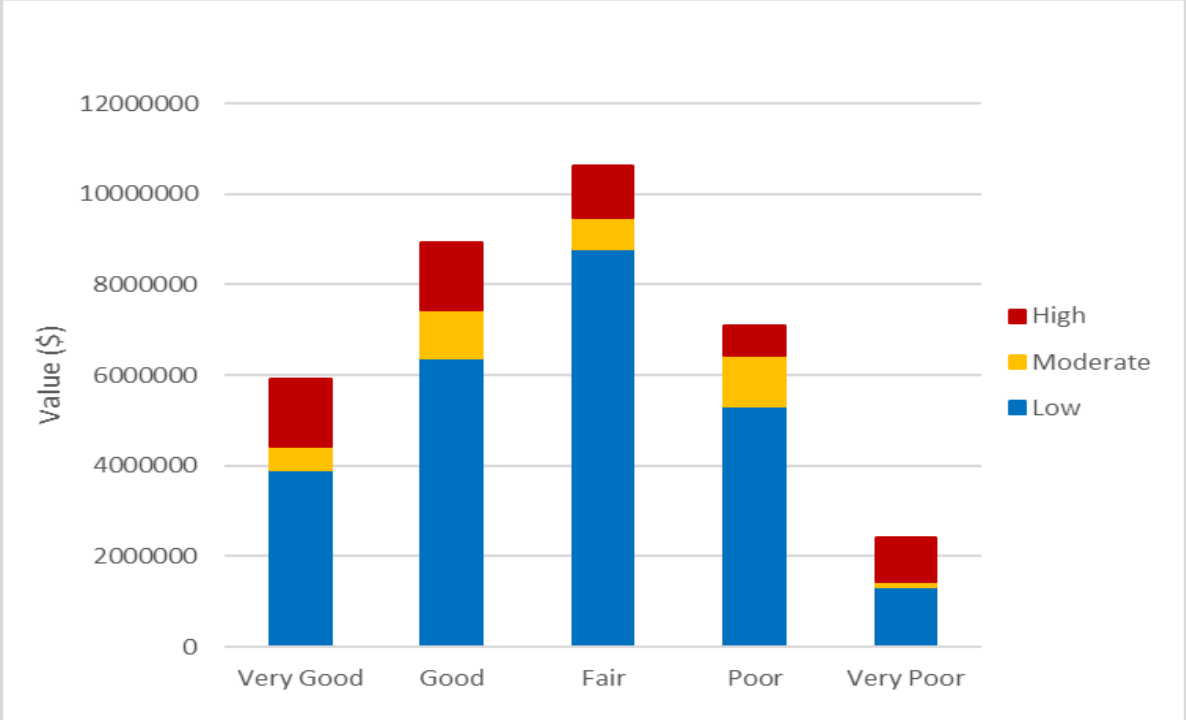


Figure 6.2 presents the condition and replacement values of all stormwater assets. Approximately 43% of the replacement cost of all stormwater assets are in Very Good (1) or Good (2) condition, approximately 30% are in Fair (3) and 27% Poor (4) condition or Very Poor (5).

The age of 84 storm linear assets, and 160 storm culverts less than 3 m in diameter were unknown, the age-based condition could not be evaluated and have been omitted.

6.4 Current LOS

Levels of service for stormwater assets are outlined in Table 3 of the regulation, O. Reg. 588/17. **Tables 6.4, 6.5 and 6.6** outline the Municipality's current community and technical levels of service for stormwater assets.

Table 6.4: Community Levels of Service

LOS Parameter	LOS Statement	Community Levels of Service O.Reg. 588/17 – Qualitative Description
Scope	The stormwater management system in the Municipality is developed of a pipe network and drains, which provide conveyance of stormwater to protect properties in the counties of Campbellford, Hastings and Warkworth.	Description, which may include maps, of the user groups or areas of the Municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.

Table 6.5: Technical Levels of Service

LOS Parameter	LOS Statement	Technical Levels of Service O.Reg. 588/17 – Technical Metrics	2023 Performance
Scope	The stormwater management system provides for the collection of urban stormwater within the Municipality in order to protect properties from flooding	Percentage of properties in municipality resilient to a 100-year storm.	50%
	The stormwater management system provides for the collection of urban stormwater within the Municipality in order to protect properties from flooding	Percentage of the municipal stormwater management system resilient to a 5-year storm.	75%

Table 6.6: Additional Level of Service Metrics

LOS Parameter	LOS Statement	Additional LOS Metrics	2023 Performance
Reliability	The Municipality seeks to ensure the reliable operation of its stormwater management system through regular monitoring and maintenance of its stormwater infrastructure.	The number of stormwater facility overflow events.	0
		Percentage of stormwater facility visually inspected during reporting period.	100%
		Percentage of stormwater facility inspected comprehensively within the past 5 years.	100%
		Percentage of stormwater catch basins visually inspected and cleaned within the past 4 years.	100%
		Percentage of oil/grit separators visually	100%

		inspected and cleaned annually.	
		Percentage of stormwater mains inspected with CCTV within the past 5 years.	10%

6.5 Current Performance

Asset performance measures were determined in consultation with the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. The performance measures for storm sewers, and their 2022 values are shown in the above **Tables 6.5 and 6.6.**

6.6 Risk Assessment

The risk assessment for the stormwater management assets was conducted considering both linear and pond assets. The assumptions for both types of assets was conducted using the following assumptions and criteria:

Condition: Determined based on estimated condition (using deterioration curve)

Performance: Assumed to be always reliable (value of 1)

Climate Change: Assumed a value of 5 (Moderate or high impact; no or limited mitigation plan)

Impact: High impact (value of 3) for assets of 750 mm diameter and larger

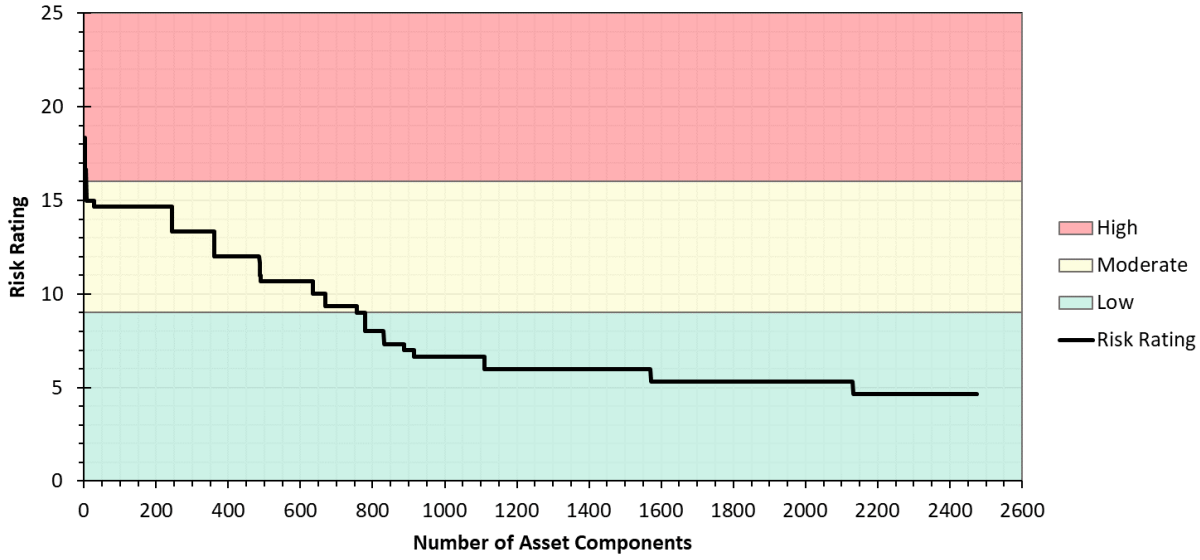
Moderate impact (value of 1) for all other assets

Importance: Importance was determined based on size and use of assets

- High importance was assigned to all culverts, all mains with a larger than diameter 900 mm.
- Moderate importance was assigned to all maintenance holes and mains with a diameter between 500 mm and 900 mm.
- Low importance was assigned to all remaining assets.

The risk profile for stormwater assets is shown in **Figure 6.3**.

Figure 6.3: Risk Profile for Stormwater Assets



6.7 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for stormwater assets. The lifecycle activities for the stormwater assets include non-infrastructure solutions, maintenance, renewal/rehabilitation, replacement/construction, disposal, and expansion/ growth/ service improvement activities.

6.7.1.1 Non-Infrastructure Solutions

Non-infrastructure solutions for the stormwater assets include those activities that do not directly deal with the physical state of the pipe but work to extend the assets useful life. The Non-infrastructure solutions can include policies, and monitoring/inspection of the assets. The inspection of storm sewer assets can be undertaken through a condition assessment program, recommended to be visual inspection through CCTV means.

6.7.1.2 Maintenance Activities

Maintenance activities are undertaken on the assets throughout their useful life to maintain their operating condition and performance. Maintenance works includes routine maintenance (flushing, cleaning), and minor repairs to assets. There exists the risk that a maintenance activity may be implemented that does not adequately mitigate

a performance or condition issue, and additional costs are then required for further repair or replacement.

6.7.1.3 Renewal/Rehabilitation Activities

Renewal of the storm sewer assets can include structural or non-structural lining. A lining can be used where the condition has deteriorated, however structurally the pipe segment is still sound. A lining can extend the useful life of an asset and improve performance. Risks associated with lining of a pipe include the improper installation of the pipe or continued deterioration of the original pipe such that the lining does not perform as expected.

6.7.1.4 Replacement/Construction Activities

Construction of new assets is recommended to be in line with recommendations as part of growth, master plan, or other municipal strategies. The design of the new assets should be consistent with jurisdictional design requirements, including provincial design guidelines, local and conservation authority requirements. New construction of assets will occur where no previous stormwater servicing is available. The risk associated with new construction includes the high cost of brand-new assets, and capacity for treatment and outlet of the stormwater flows.

Construction can also be the replacement of deteriorated assets. At the end of the useful life of an asset, it can be replaced for continuation of service provision. At the time of replacement, design should be undertaken to ensure design requirements are met, and adequate capacity is provided for current and future projections.

6.7.1.5 Disposal Activities

Disposal activities of the stormwater assets includes abandonment or replacement of the asset at the end of its useful life. While typically assets are abandoned in place, the removal of the expended asset can provide additional space for new underground assets to be constructed.

6.7.1.6 Expansion/Growth/Service Improvement Activities

Expansion and growth of the Municipality are planned activities required to extend services to previously un-serviced areas and expand based on the growing demands within the Municipality. The addition of new stormwater assets owned by the Municipality is based on new developments.

6.8 Asset Management Strategy

The asset management strategy for stormwater linear assets will maximize the lifecycle of the assets where appropriate, in consideration of specific needs of the Municipality and existing infrastructure.

The condition, a major factor in the asset management strategy, should be established to assist in decision making. The Municipality should establish and maintain a condition assessment program for the stormwater sewers. The recommendation is to use visual inspection facilitated by CCTV camera inspection. A typical practice is to undertake assessment of 1/5 to 1/3 of the assets annually, such that each pipe gets reviewed on a 3-to-5-year basis. The timeframe for inspection of the assets can be adjusted to suit the budget available, or as required based on the rate of deterioration of the assets.

The cost for CCTV inspections can vary depending on availability of services and providers.

When the condition of the asset has degraded such that, an intervention is required, it is recommended that maintenance be reviewed as the first opportunity to extend the useful life. Maintenance works can include localized repair work or relining of a pipe segment. Because of the non-intrusive nature of conducting relining, it can be done on an individual pipe segment at a time, or to localized repairs. Relining is an appropriate lifecycle activity when the condition of the pipe is sufficient to receive the liner, and that laterals are in adequate condition. Relining can be used only once in the asset's lifecycle.

When the condition of the asset has degraded such that maintenance is no longer an appropriate activity, the segment can and should be reconstructed. The Municipality should follow best practices and applicable design guidelines when designing the reconstruction works. Assets at the end of their useful life should be abandoned in place or removed.

There is efficiency in conducting capital reconstruction works where adjacent asset types can be reconstructed simultaneously. Part of the Municipality's current strategy is to use capital works projects from other linear asset categories to identify any upcoming capital works on adjacent linear infrastructure (such as road works, watermain or storm), and align the timing of the works such that there is efficiency in the design, construction and material costs associated with the project, and reduced disruption to service delivery.

Current best practices suggest that reconstruction and new construction works on the assets will be done using PVC material for pipes that are 400 mm in diameter or less, and concrete material for sizes larger than 400 mm diameter (acknowledging that the specifics of the works and availability of material will influence the material used in each works project).

Note that stormwater sewer and culvert assets that are located or are part of a municipal drain may require additional steps or processes for lifecycle management.

7.0 Buildings

7.1 Summary

The Municipality has buildings in the following categories:

- Parks and Recreation Buildings (including Monuments, Outdoor gathering areas, Outdoor and Indoor Sports Facilities, and Outdoor Equipment)
- Fire Protection Services
- Administration and Heritage Services
- Public Works (including Roads, Water, and Wastewater Services)

7.1.1 Parks and Recreation Buildings

Trent Hills owns and operates two Arena facilities throughout the Municipality used for Hockey, Skating and Community events. As well as a public sporting venue, the Hastings Field House, which contains a multi-purpose sports court, a 30mx90m Astro-Turf field, a 200m indoor track, an indoor golf range and exercise equipment.

The Municipality also owns and operates various parks for day use. The parks have picnic areas with sunshades and gazebo areas, as well as sports fields and a marina with boat launches for temporary use by boaters.

See **Appendix A – Table A3: Condition, Age and Expected Useful Life of Buildings** for age, condition and expected useful life for Parks and Recreation buildings.

7.1.2 Fire Protection Services

The category of Fire Protection services includes the following buildings:

Emergency Services Base, in Campbellford and built in 2020. The building contains three ambulance bays and four fire truck bays, as well as offices and changerooms for the paramedics and fire fighters. This is a shared services building; ownership is shared between the County of Northumberland and the Municipality of Trent Hills.

The Municipality has two other Fire stations assets within the Municipality. One fire station located in Hastings at 51 Victoria Street as well as a Building for fire services located at 24 Old Hastings Road in Warkworth.

See **Appendix A – Table A3: Condition, Age and Expected Useful Life of Buildings** for age, condition and expected useful life for Fire Protection buildings.

7.1.3 Administration and Heritage Services

The category of Buildings includes Administration and Heritage Services buildings. These buildings include:

The main administration building is located at 66 Front Street South in Campbellford. This building houses the majority of the management, administrative and support staff for the Municipality.

A prominent Heritage site within the Municipality is located at 113 Front Street N., Campbellford and contains the Heritage Centre and the Museum Barn. The Heritage Centre building was originally used as a Town Hall and over the years has been used as a Council Chambers, church, school, jail and community centre, since 1988 it has been home to the Campbellford-Seymour Heritage Society. The Heritage Centre building is approximately 165 years old, while the Museum Barn is approximately 168 years old.

The Municipality also has three Library branches. One located in each county of Hastings, Warkworth and Campbellford. The Warkworth location also houses the Performing Arts Centre.

See **Appendix A – Table A3: Condition, Age and Expected Useful Life of Buildings** for age, condition and expected useful life for Administration and Heritage Services.

7.1.4 Public Works

Public Works has four main Depot locations, with equipment, storage buildings, various outbuildings and sand and salt domes at each location.

- The Seymour depot yard is located in Campbellford and is the main location for maintenance and storage, the site includes a site office and two storage buildings
- The Alma depot yard is located in Campbellford
- The Hasting depot yard
- The Warkworth depot yard

Furthermore, the municipality has a Fleet Shop located on the same site as the Alma Depot in Campbellford for all the municipalities the vehicle maintenance needs.

The Municipality has three Water Treatment plant locations. One in each community of Hastings, Campbellford and Warkworth.

The Municipality has two Wastewater Treatment plant locations, one in each of the communities of Hastings and Campbellford and a lagoon system in Warkworth.

See **Appendix A – Table A3: Condition, Age and Expected Useful Life of Buildings** for age, condition and expected useful life for Public Works facilities.

7.2 State of Local Infrastructure

7.2.1 Average Age

The average age of all buildings, facilities and structures is 43 years.

- The average age of Parks buildings, structures and facilities is 24 years.
- The average age of Recreation buildings, structures and facilities is 25 years.

- The average age of Fire and Protective Services buildings, structures and facilities are 57 years.
- The average age of admin/heritage is 73 years.
- The average age of public works (road, water, wastewater, storm, bridges/culverts) is 37 years.

7.2.2 Replacement Cost

The total replacement costs for these assets were determined using the Municipality's 2022-year end data sheets, which contain each asset acquisition costs (in dollars from the year of acquisition) and were then inflated based on the Consumer Price Index (CPI) to costs to reflect today's dollars.

The replacement cost of all buildings owned by the Municipality is $95.16 million dollars.

The replacement cost of all Parks buildings, structures and facilities owned by the Municipality is $3.32 million dollars.

The replacement cost of all Recreation buildings, structures and facilities owned by the Municipality is $9.38 million dollars.

The replacement cost of all Fire and Protective Services buildings, structures and facilities owned by the Municipality is $11.3 million dollars.

The replacement cost of all admin/heritage buildings, structures and facilities owned by the Municipality is $9.89 million dollars.

The replacement cost of all Public Works buildings, structures and facilities owned by the Municipality is $61.26 million dollars.

The cost of building improvements was provided but not evaluated, the above replacement cost represents the total cost of the original buildings and building components.

7.2.3 Expected Useful Life

The Municipality maintains many types of buildings and as such there are a verity of expected useful lives to be tracked for each service area. The expected useful life information for each building is shown in **Appendix A – Table A3: Condition, Age and Expected Useful Life of Buildings**.

7.3 Condition

The condition information reported in this AMP is based on the asset age and where available the inspection data from the Municipality staff. The last Building Condition Assessment (BCA) completed by the Municipality was done in 2013 by a third-party consulting firm.

The Age based deterioration for the building asset utilizes the following rating system to determine the condition of buildings:

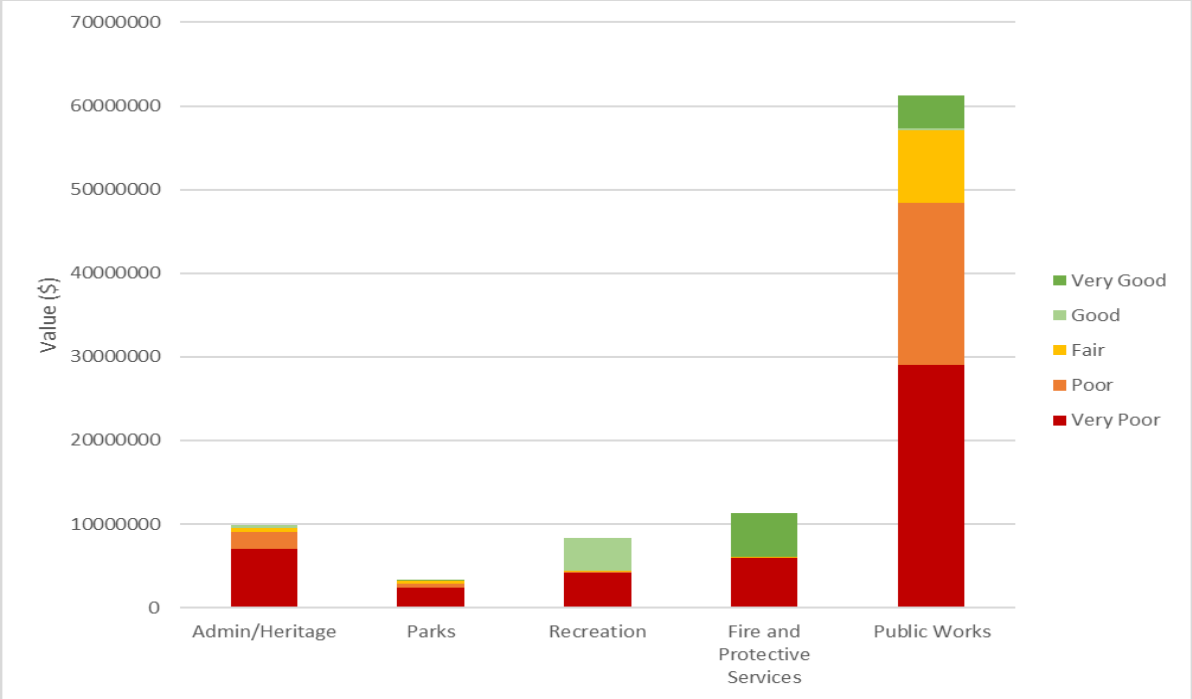
0 to 8 Years Old (Very Good)	Well maintained, meets all applicable building codes, accessible, new, or recently renovated, don't require significant improvements.
9 to 16 Years Old (Good)	Well maintained but requires improvements and/or renovations, often not fully accessible, meets minimum building codes.
17 to 24 Years Old (Fair)	Maintained but needs significant improvements and/or renovations, often not accessible or meeting today's building code levels.
25 to 32 Years Old (Poor)	Needs significant renovations or replacement.
33 to 40+ Years Old (Very Poor)	Needs replacement.

Due to the nature of the use of the Municipality's facilities and buildings, some buildings must be maintained and kept to a higher standard, such as Fire and Protective Services Building.

For this asset management plan, the Municipal staff reviewed the facilities data, assessed condition, and estimated remaining useful life. The Municipality provided

information from a report by the insurance company as to the replacement cost and condition of some of the buildings.Figure 7.1 presents the condition and replacement values for all buildings.

Figure 7.1: Condition of Buildings (Value)



Approximately two-thirds of the building assets are in Very Poor (5) or Poor (4) condition, about one-third are in Fair (3) and Good (2) condition or Very Good (1). This is due to the age of building and not necessarily due to condition.

7.4 Current LOS

Levels of service for building assets are not defined in the regulation, O. Reg. 588/17 as buildings are not considered core assets. As such, level of services will be developed based on the content of the regulation, in consultation with the Municipality. The tables below outline the Municipality's current community and technical levels of service for buildings.

Table 7.1: Community Levels of Service – Buildings

LOS Parameter	LOS Statement	Community Levels of Service - Qualitative Description
Scope	Total number of Municipal Buildings: 68	Building assets are diverse and serve the needs of the residents and operations of the Municipality

Table 7.2: Technical Levels of Service – Buildings

LOS Parameter	LOS Statement	Technical Levels of Service - Technical Metrics Description	2023 Performance
Quality	Facility Condition Rating **Poor Condition:** This means that the overall condition of the particular Building Element under review is either reached the end of its life expectancy or otherwise has prematurely deteriorated or has been physically damaged to the extend that it is not functional or sound. **Fair Condition:** This means that the overall condition of the particular Building Element under review is in satisfactory condition, functional and is wearing as expected. **Good Condition:** This means that the overall condition of the particular Building	Facility assets are diverse and serve the needs of the residents and operations of the Municipality	Poor: 1% Fair: 76% Good: 22%

	Element under review is fully functional, sound with no signs of premature deterioration.		

Table Notes:

Area of Municipality (513.85 km^2.) and population (13,861) sourced from census information.

Building Condition data taken from 2013 CCI Study and Condition rating estimate from Trent Hills' Staff.

Table 7.3: Technical Levels of Service – Buildings

Building Type	Number of Buildings	Buildings Per Capita
Corporate (Civic, Heritage, and Municipal Buildings)	10	1386.1
Fire Protection Services	3	4620.3
Roads (Public Works)	13	1066.2
Sanitary (Public Works)	10	1386.1
Water (Public Works)	11	1260.1
Recreation	14	990.1
Library	1	13861
Cemetery	1	13861
Cultural (Cenotaph, Memorial)	4	3465.3
Commercial Development	1	13861

7.5 Current Performance

Asset performance measures were determined in consultation with the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. Considering each building as a single asset, the performance measures and corresponding units established for buildings are shown in the **Table 7.4** below.

Table 7.4: Current Performance Measures for Buildings

Asset Performances Measure	Units
Energy usage (Natural Gas)	388,012.42 m^3 per year
Energy usage (Electricity)	3,846,836.41 kWh per year
Energy usage (Propane)	17,608.50 L per year

7.6 Risk Assessment

The risk assessment for building assets was conducted using the following assumptions and criteria:

Condition: Determined based on estimated condition (using deterioration curve)

Performance: Assumed to be always reliable (value of 1)

Climate Change: Assumed a value of 3 (Limited impact with slower recovery; mitigation plan not in place)

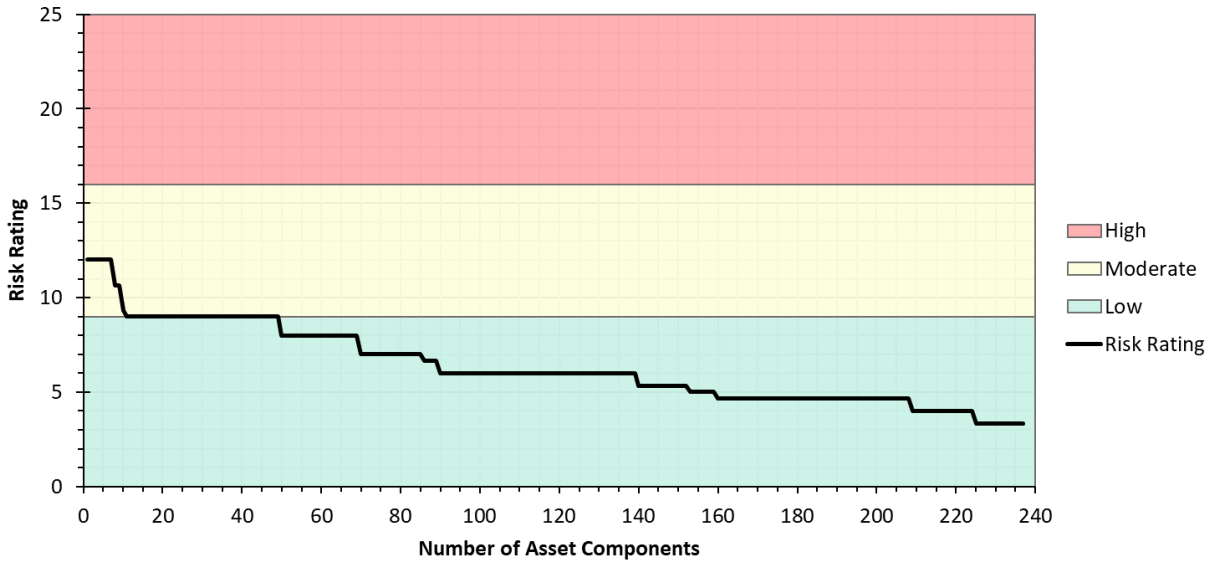
Impact: Moderate impact (value of 1)

Importance: Importance was determined based on use as directed by the municipality

- High importance (value of 3) for Fire Hall
- Moderate importance (value of 2) for public works buildings, which includes road, water and waste water
- Low importance (value of 1) for all other buildings

The risk profile for buildings assets is shown in **Figure 7.2**.

Figure 7.2: Risk Profile for Buildings Assets



7.7 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for building assets. Note that, as previously discussed, building assets refers to the entirety of the asset which is made up of varying component systems depending on the use of the building. The primary lifecycle activities include non-infrastructure solutions, maintenance activities, renewal/rehabilitation, replacement/ construction, disposal, and expansion/growth/service improvement activities.

7.7.1.1 Non-Infrastructure Solutions

Non-Infrastructure solutions for the building assets include those activities that do not directly deal with the physical state of the assets but work to extend the assets useful life. The Municipality has a Standard Operating Procedures for the care, maintenance and inspection of the building assets that create a standard that can extend useful lives of the assets.

7.7.1.2 Maintenance Activities

Throughout the full lifecycle of a building, the majority of the expected lifecycle activities to be undertaken will be maintenance. Maintenance activities can be used to improve the level of service of an asset (or component), or to maintain it.
Activities that fall under the maintenance category can be varied by response type and scale of maintenance requirements. Activities can be required through routine maintenance works, response to poor condition or performance, or on an emergency basis. In general, the expected types of maintenance activities within the lifecycle of a building include:

- **Preventative Maintenance:** This type of maintenance activity is undertaken to prevent failure or poor performance of a building asset component. Preventative maintenance works can be undertaken on an ad-hoc basis based on knowledge of condition or be undertaken according to a maintenance schedule. Manufacturer directives and condition assessments should assist in determining frequency of preventative maintenance activities.
- **Reactive Maintenance:** This type of maintenance activity is undertaken in response to an issue or fault in the building or component systems, on an as-needed basis. Scale of reactive maintenance works will be variable depending on the system and type of failure or decrease in level of service.
- **Major Maintenance (replacement):** This type of maintenance activity is undertaken in response to a component which is no longer able to provide adequate level of service. Major maintenance (replacement) will be undertaken for one or more components of a building asset. Major maintenance works can be preventative (in anticipation of end of service life of a component), or in response to a system failure.

Maintenance activities are based on monthly inspections, bi-annual inspections, and contractor inspections as required.

7.7.1.3 Renewal/Rehabilitation Activities

Renewal works can be used to update a building asset for modernization, to achieve compliance with updated codes and requirements, to expand on an existing building, or to renovate to suit changes to services provided. Renovation works can include:

- Addition of new components to an existing building asset
- New components can be added to an existing building with the existing building largely unchanged
- Updating of existing components
- Updating of existing components can prolong the expected lifespan of a building asset

These activities are conducted as funding allows through capital improvement that are budgeted by the Municipality. Prioritization of assets that are rehabilitated is based on facility age, asset condition, and energy efficiency indicators.

7.7.1.4 Replacement/Construction Activities

The start of a building asset lifecycle is its construction. The building should be constructed to adhere with the requirements of the Ontario Building code, and all other applicable regional codes and requirements for the building and its use. Each building should be designed and constructed to provide the services for which it is intended.

7.7.1.5 Disposal Activities

Disposal activities can include the removal from service of a building, or a portion of a building and components. Disposal activities should be conducted such that health and safety and environmental protocols are being followed, and spent materials are disposed of at appropriate or approved facility. Disposal activities can also include removal of the building from the Municipal building portfolio through sale of property, if it is no longer required for service delivery.

7.7.1.6 Expansion/Growth/Service Improvement Activities

The Municipality maintains an Official Plan that helps to identify future plans for expansion and growth that could impact management of the buildings owned by the Municipality. New sub-division applications and master plan documents to plan for future developments and upcoming infrastructure. The Municipality evaluates the capacity for extending services based on the community needs and the growth of the community.

7.8 Asset Management Strategy

The asset management strategy for building assets will maximize the lifecycle of the assets where appropriate, in consideration of specific needs of the Municipality and existing infrastructure.

The Municipality's asset management strategy for buildings relies on staff recommendations and building condition assessments to establish the current condition of the assets, and to establish recommended works and associated timeframes. The most recent building condition assessments were completed by a third-party consultant in 2013 and consisted of non-intrusive visual inspection of the buildings and componentry. The usage of such assessments for complex building assets can provide the Municipality reliable and repeatable condition information and projections for works that can be used for capital planning and asset management.

The Municipality should continue to procure detailed building condition assessments at a sufficient frequency to have ongoing understanding of the condition and required works at the building assets, suggested to be every 5 years. These reports can be used to inform a maintenance schedule and capital works schedule, and to understand forecasting of asset improvements. If it is not possible to complete assessment of all buildings on a routine basis, priority buildings for the condition assessment program are suggested to be identified by the presented risk assessment, condition, and performance measures. Buildings with high risk or poor condition/performance components should be prioritized in the condition assessment program. Where building assessments have not been conducted (on less complex building assets and structures), the Municipality could consider adding these to the scope of the building condition assessments or undertake simplified assessments on a regular basis through visual inspection by municipal staff.

Implementation of the lifecycle activities for the building assets will vary across the assets, according to the components, condition, and services provided.

Where routine maintenance schedules are in place currently, it is recommended to continue with the understanding that they are currently providing sufficient level of maintenance. Maintenance works can include preventative maintenance, reactive maintenance (in the event that there is an issue), or major maintenance which can include the replacement of a component.

Renewal works are required when routine maintenance is insufficient to address an issue. Renewal can include update of a building asset for modernization, to achieve compliance with updated codes and requirements, to expand on an existing building (in response to service delivery change to accommodate growth), or to renovate to suit changes to services provided.

Reconstruction works are undertaken when an asset has reached the end of its useful life. The Municipality should consider on a case-by-case basis if the asset is to be reconstructed to a similar level of service as was existing if modifications need to be made to support current and future service delivery. This could include changes to the facility to accommodate new service delivery, accommodate growth requirements, changes to square footage, or changes based on accessibility.

Management of building assets should also include climate change considerations in new construction, maintenance or renewal lifecycle activities. Assessment should be undertaken to understand vulnerability of building assets to a changing climate, which will inform lifecycle activity requirements, and potential changes to the way lifecycle activities are undertaken.

The Municipality should continuously audit asset data to ensure information is current. It is suggested that additional classifications be implemented to clearly identify the lifecycle activities implemented for building components.

8.0 Fleet

8.1 Summary

The Municipality owns and operates numerous vehicles used in delivering its services and programs. The largest user of the fleet is Public Works (Roads and Transportation Services) and Fire Protection Services (Fire and Protective Response Vehicles). Other users include Water/Water Treatment, and Parks and Recreation.

The vehicles included in the Municipalities fleet delivers services in:

- **Parks/Recreation**: vehicles required for administration services or to support parks and recreation assets.
- **Fire/Protection Services**: Emergency Response Vehicles.
- **Public Works:** snow removal, road repairs, water, and wastewater service vehicles.

The following **Table 8.1** outlines the fleet assets currently owned and maintained by the Municipality.

Table 8.1: Summary of Fleet

	Parks/Recreation	Fire	Public Works
Number of Vehicles	35	29	80

8.2 State of Local Infrastructure

8.2.1 Average Age

The average age of all fleet categories is 12 years.

The average age of Parks fleet assets is 12 years.

The average age of Recreation fleet assets is 15 years.

The average age of Fire and Protection services fleet assets is 13 years.

The average age of Public Works fleet assets is 12 years.

8.2.2 Replacement Costs

The total replacement costs for these assets were determined using the Municipality's 2022 year end data sheets, which contain each asset acquisition costs (in dollars from the year of acquisition) and were then inflated based on the Consumer Price Index (CPI) to costs to reflect today's dollars.

The total replacement cost of the fleet is $15.76 million.

The replacement cost for all Parks fleet assets is $380,540.

The replacement cost for all Recreation fleet assets is $560,580.

The replacement cost for all Fire and Protection services fleet assets is $4.51 million dollars.

The replacement cost for all Public Works fleet assets is $10.31 million dollars.

The replacement cost for seven assets (three fire fleet assets, three parks fleet assets and one public works asset) were not provided and were omitted from this evaluation.

8.2.3 Expected Useful Life

The Municipality maintains a wide range of vehicles and as such there are a variety of expected useful lives to be tracked for each service area. Each vehicle types expected useful life is shown in **Appendix A - Table A1: Condition Ranges for Expected Life Used for All Fleet Assets**.

8.3 Condition

The information reported in this AMP and the subsequent analysis are based on the current inventory information maintained by the Municipality.

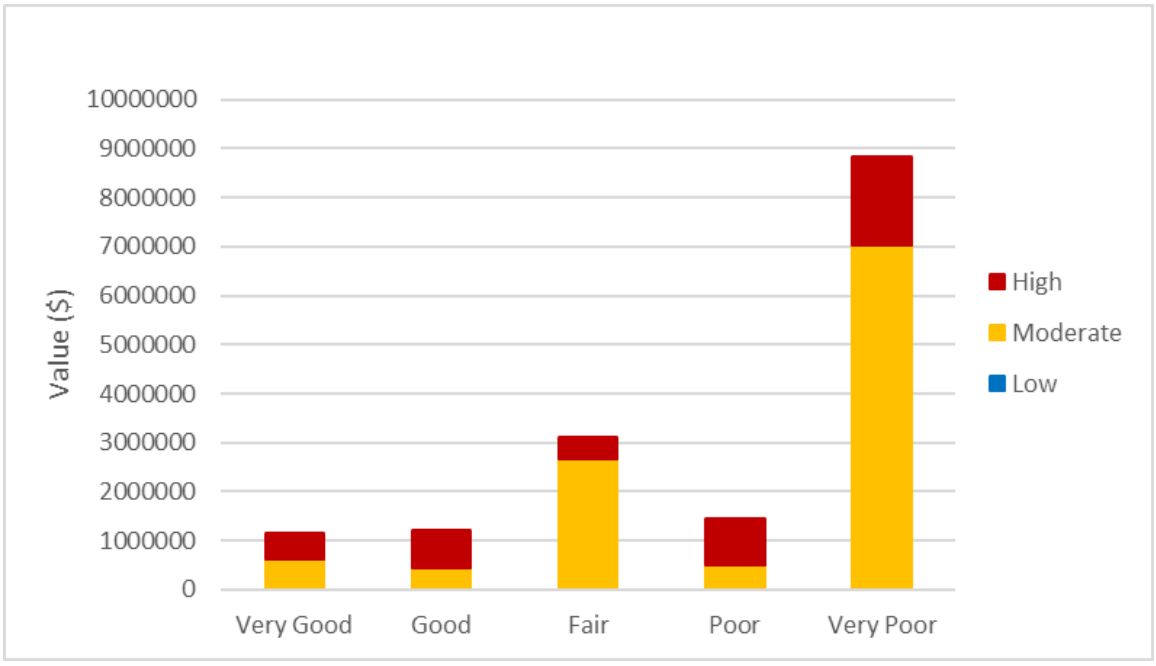
The condition for fleet was determined by the Municipality based on age and usage of the fleet.

The expected useful life of the assets and a deterioration model based on age and use was used to predict the physical condition of the fleet. No condition assessment was carried out on the vehicles. The condition based on age range is presented in **Appendix A - Table A1: Condition Ranges for Expected Life Used for All Fleet Assets**

All Fire and Protective fleet and assets are attempted to be maintained in "good" or better condition in order to deliver a reliable service when required. If not mechanically fit, and cannot be repaired in a timely manner, it is removed from the Fire and Protective services fleet.

Figure 8.1 presents the condition and replacement values for all the fleet assets.

Figure 8.1: Asset Value and Condition of Fleet (Importance)

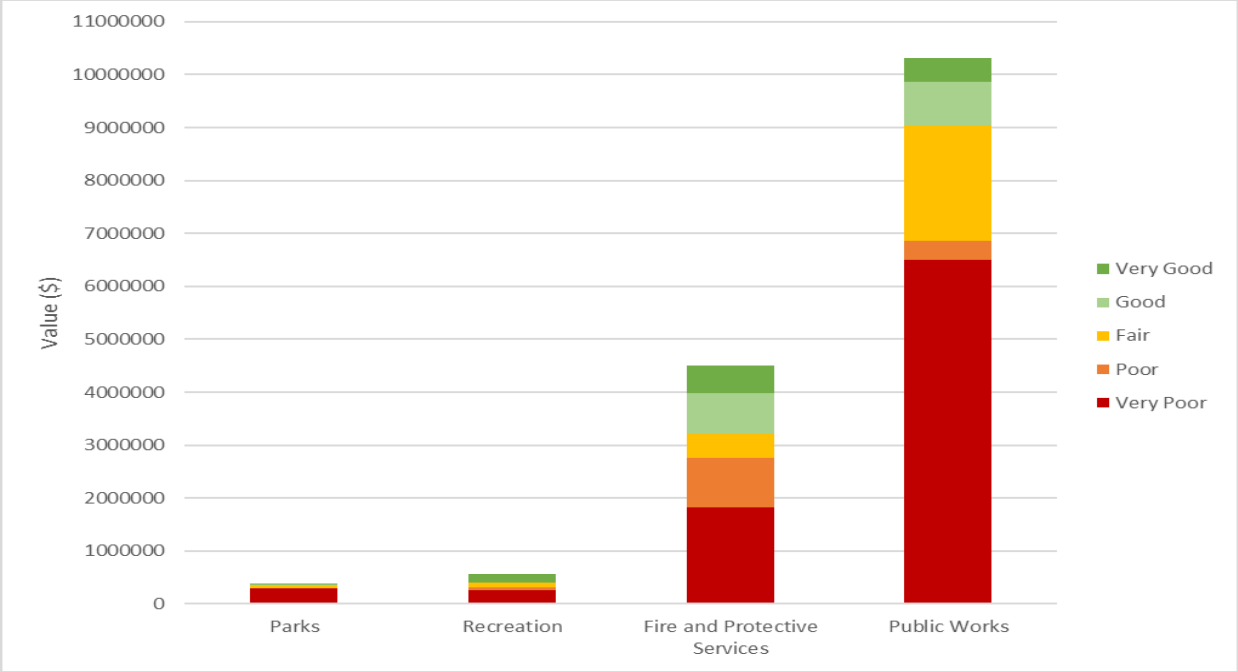


Approximately 16% of the fleet assets are in Good (2) or Very Good (1) condition, approximately 19% are in Fair (3) and 65% are in Very Poor (5) or Poor (4) condition.

Figure 8.2 presents the condition and replacement values for all the fleet assets broken down by service delivery areas.

The replacement cost for seven assets (three fire protection fleet assets, three parks fleet assets and one public works asset) were not provided and have been omitted. These assets have a condition of Very Poor.

Figure 8.2: Asset Value and Condition of Fleet (Value)



8.4 Current LOS

Levels of service for fleet assets are not defined in the regulation, O. Reg. 588/17 as fleet are not considered core assets. As such, level of services will be developed based on the content of the regulation, in consultation with the Municipality. The tables below outline the Municipality's current community and technical levels of service for fleet.

Table 8.2: Community Levels of Service – Fleet

LOS Parameter	LOS Statement	Community Levels of Service - Qualitative Description
Scope	Total number of Fleet Assets: 144	Fleet assets are diverse and serve the needs of the residents and operations of the Municipality

Table 8.3: Technical Levels of Service – Fleet

LOS Parameter	LOS Statement	Technical Levels of Service - Technical Metrics Description	2023 Performance
Quality	Age Based Condition Rating	Fleet assets are diverse and serve the needs of the residents and operations of the Municipality	Very Good: 8% Good: 8% Fair: 19% Poor: 10% Very Poor: 55% The average condition is very poor.

8.5 Current Performance

Asset performance measures were determined in consultation with the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. Considering each fleet as a single asset, the performance measures and corresponding units established for fleet are shown in **Table 8.4** below.

Table 8.4: Current Performance Measures for Fleet

Performance Metric	2023 Performance
Percentage of parks that is in Fair or better condition	25%
Percentage of recreation that is in Fair or better condition	36.4%
Percentage of fire protection that is in Fair or better condition	27.6%
Percentage of public works that is in Fair or better condition	41.3%

8.6 Risk Assessment

The risk assessment for the fleet assets was conducted using the following risk assumptions and criteria:

Condition: Determined based on estimated condition (using deterioration curve)

Performance: Assumed to be always reliable (value of 1)

Climate Change: Assumed a value of 1 (No or limited impact, quick recovery or mitigation in place)

Impact: High impact (value of 2) for fire protection services assets

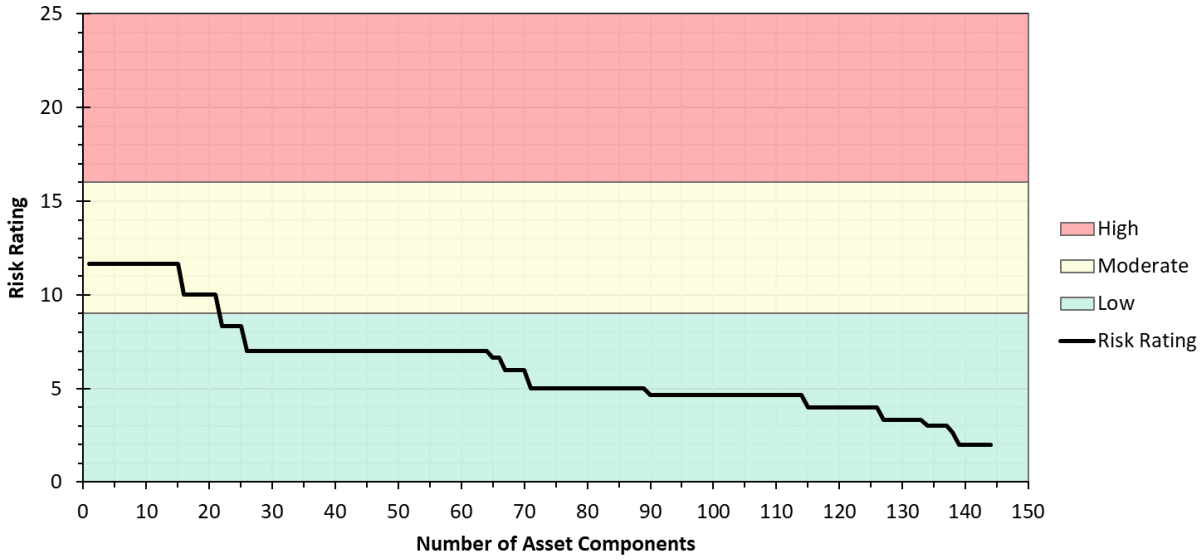
Moderate impact (value of 1) for all other assets

Importance: Importance was determined based on use as directed by the municipality

- High importance vehicles were assigned to fire protection services, as a failed vehicle is difficult to replace quickly and is integral to provide the services required for this asset category.
- Moderate importance was assigned to public works vehicles which include snow removal equipment, as a failed vehicle could be replaced, or another service provider could provide the service until the equipment was fixed.
- Low importance vehicles are all the other vehicles such as for program delivery and inspections. These are the easiest vehicles to replace quickly.

The risk profile for fleet assets is shown in **Figure 8.3**.

Figure 8.3: Risk Profile for Fleet Assets



8.7 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for fleet assets. The expected lifecycle activities to be used on the fleet assets include non-infrastructure solutions, maintenance activities, replacement, and decommissioning/disposal activities.

8.7.1.1 Non-Infrastructure Solutions

Non-Infrastructure solutions for the fleet assets include those activities that do not directly deal with the physical state of the fleet but work to extend the assets useful life. The Municipality's inspection program implemented as part of maintenance activities can include a combination of effort types to suit the needs of the Municipality and can identify actions to extend expected useful life.

8.7.1.2 Maintenance Activities

Maintenance activities will vary across the fleet assets due to the variability in type and usage of assets and should be undertaken according to manufacturer specifications and as required to address condition and performance issues that arise through regular usage. Maintenance activities should include regular inspections of vehicle for condition and recording of maintenance activities undertaken.

8.7.1.3 Replacement/ Acquisition Activities

Replacement and acquisition of a fleet asset should consider the intended usage of the asset. Acquisition should be undertaken based on an understanding of the requirements of the asset for providing service delivery and should follow Municipal procurement procedures. Acquisition of an asset could be as a new purchase, or purchase of a used asset. Acquisition of a new asset can provide the Municipality with an asset in Very Good condition; however, the condition of a used asset could vary.

Acquisition activities can also include direct replacement of existing fleet assets. When a fleet asset reaches the end of its useful life, the asset is found to be inadequate for providing proper service delivery, and the service delivery requirements are unchanged, the asset may be directly replaced.

The replacement of assets for fire and rescue may be treated differently due to the use and importance of fleet assets involved in this service delivery. Though the assets have an expected useful life of 25 years, the Municipality aims to schedule fire and rescue vehicles for replacement after 20 years to maintain a good condition rating and reliability of the assets.

8.7.1.4 Disposal Activities

Disposal activities can include the removal from service through disposal, sale of asset as fleet is deemed a surplus item, or transfer of an asset to a different department. Disposal activities should be conducted such that health and safety protocols are being followed, and out of service assets and asset parts are disposed of at appropriate or approved facility.

8.7.1.5 Expansion/Growth/Service Improvement Activities

Expansion, growth and service improvement activities are planned to extend services to previously un-or under-serviced areas to meet the growth demands within the Municipality. The Municipality evaluates their asset inventory on an annual basis to evaluate the need for additional fleet assets that may improve delivery.

8.8 Asset Management Strategy

The asset management strategy for the fleet assets would seek to maximize the useful lifespan of the assets, such that they can continue to be used in service delivery across the Municipality.

The Municipality's current strategy is driven by the age and performance of the assets. Fleet assets are purchased new, and replaced following the expected useful life, or when it no longer performs satisfactorily. At the end of its lifecycle, the usage is evaluated and if required it is replaced with a new version of the vehicle and disposed of.

The rating system for the condition of the fleet assets is based on age and should be documented such that routine inspection and assessment of the fleet assets can be conducted to understand more fully their current state. This can include visual assessment of the vehicles, tracking of maintenance logs, or logging of odometer readings.

Generally, if acquired new, the assets will begin their expected useful life in very good condition and performance. Throughout the lifecycle of the assets, routine maintenance should be conducted. As required, specific maintenance should be conducted. As an asset ages and approaches the end of its useful life, it is expected that the risk and maintenance costs associated with the asset will increase. There will be a point in the lifecycle where the risk and maintenance costs are such that replacement of the asset will be the preferred solution. This point will vary depending on the type of asset and can be impacted by factors such as build quality, and utilization. At the end of the lifecycle the Municipality should review the requirement for service delivery for the asset to determine if it requires replacement. It is assumed that the assets will be replaced like for like (directly replaced).

The Municipality should review usage of fleet assets to confirm if services are being provided adequately. The assets should also be routinely assessed and monitored for condition and performance, to inform any maintenance or replacement works required. The needs and monitoring of asset condition will fall within multiple departments at the Municipality, due to the varied range of service the assets provide.

The Municipality's strategy is to maintain the condition and performance of the fleet assets such that the level of service to the customer is likewise maintained.

9.0 Equipment and Machinery

9.1 Summary

The Municipality owns and maintains numerous types of equipment and machinery used in the delivery of its services. The largest equipment holder is Public Works (Water and Wastewater treatment system equipment, signs, generators, etc.) and Fire Protection Services, other users include Parks and Recreation and Administration.

The Municipality has over 35 various Public Works facilities that are both staffed and unstaffed buildings. The Public Works equipment and machinery is housed in the various buildings and storage facilities at the 4 main work yards and is maintained by the Public Works crews that utilize this equipment on a daily basis.

The Fire and Protection services equipment encompasses defibrillators, stretchers, PPE and other various equipment that is needed for the EMS staff to adequately do their work, this equipment is housed at the various Fire stations within the Municipality and maintained by the staff that uses it.

9.2 State of Local Infrastructure

9.2.1 Average Age

The average age of all equipment is 8 years.

- The average age of Parks equipment is 7 years.
- The average age of Recreation equipment is 10 years.
- The average age of Fire and Protective Services equipment is 8 years.
- The average age of Admin/Heritage equipment is 5 years.
- The average age of Public Works equipment is 9 years.

9.2.2 Replacement Cost

The total replacement costs for these assets were determined using the Municipalities 2022-year end data sheets, which contain each asset acquisition costs (in dollars from the year of acquisition) and were then inflated based on the Consumer Price Index (CPI) to costs to reflect today's dollars.

The replacement cost of all equipment owned by the Municipality is $12.78 million.

The replacement cost of all Parks equipment owned by the Municipality is $553,400.

The replacement cost of all Recreation equipment owned by the Municipality is $985,900.

The replacement cost of all Fire and Protective Services equipment owned by the Municipality is $1.87 million.

The replacement cost of all Admin/Heritage equipment owned by the Municipality is $1.24 million.

The replacement cost of all Public Works equipment owned by the Municipality is $8.13 million.

The costs of three assets (1996 single axle trailer, pontoon boat, and pontoon boat motor Yamaha 40 HP) were not provided by the Municipality and were omitted from this report.

9.2.3 Expected Useful Life

The Municipality maintains many different types of equipment and machinery and as such there are a variety of expected useful lives to be tracked for each service area. The expected useful life information for the Municipalities Equipment and Machinery is shown in **Table 9.1** below.

Table 9.1: Expected Useful Life for Equipment and Machinery Assets

Asset	Expected Useful Life (Years)
Books/Multi-Media Materials	7
Medical/Fire	7
Operational	10
Furniture and Fixtures	25
Miscellaneous	25

9.3 Condition

The condition information reported in this AMP and the subsequent analysis are based on the current inventory information maintained by the Municipality and the deterioration is based on an age regression curve.

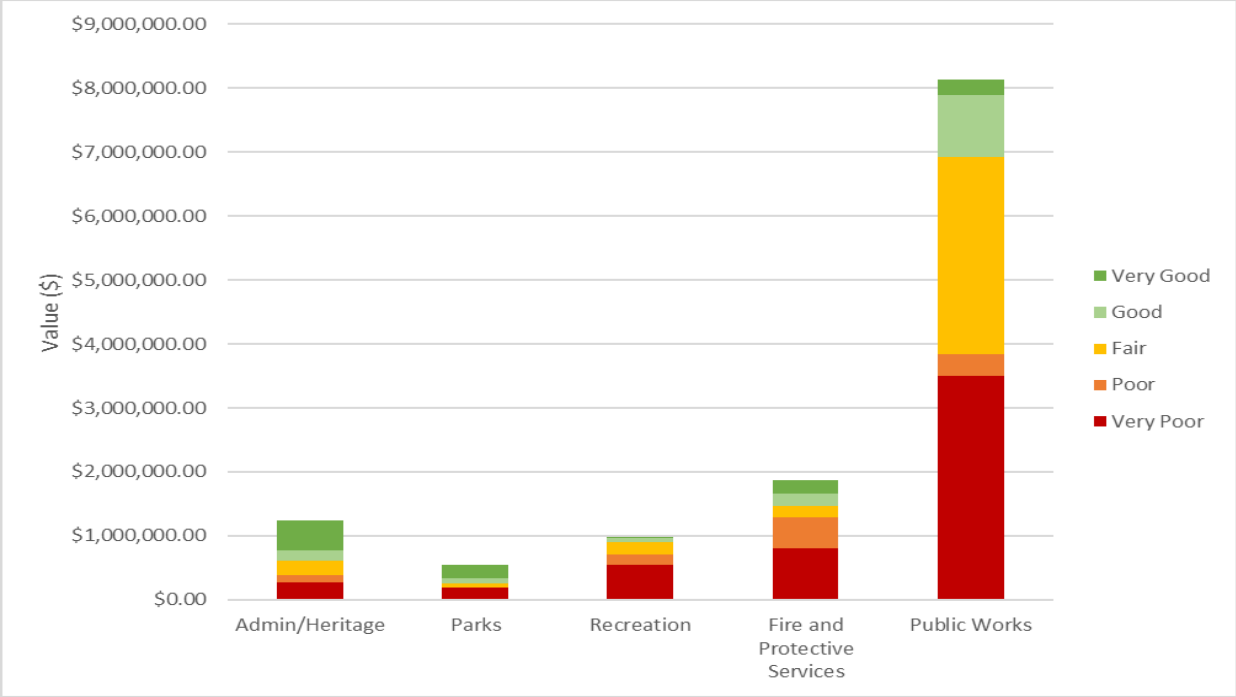
Table 9.2: Condition Ratings and Age Range Years for Various Assets

Asset	Condition Rating	Remaining Useful Life (Years)
Books/Multi-Media Materials Fire/Rescue **EUL: 7 years**	Very Good	7
	Good	5 to 6
	Fair	4
	Poor	2 to 3
	Very Poor	0 to 1
Operational **EUL: 10 years**	Very Good	9 to 10
	Good	7 to 8
	Fair	5 to 6
	Poor	3 to 4

Asset	Condition Rating	Remaining Useful Life (Years)
	Very Poor	0 to 2
Furniture and Fixtures Attachments **EUL: 25 years**	Very Good	21 to 25
	Good	16 to 20
	Fair	11 to 15
	Poor	6 to 10
	Very Poor	0 to 5

Figure 9.1 below presents the condition and replacement values for all equipment.

Figure 9.1: Condition of All Equipment (Value)



Approximately 20% of the replacement cost of all equipment assets are in Very Good (1) or Good (2) condition, approximately 29% are in Fair (3) and 51% Poor (4) condition or Very Poor (5).

Figure 9.2: Condition of Fire Protection Services Equipment (Value and Importance)

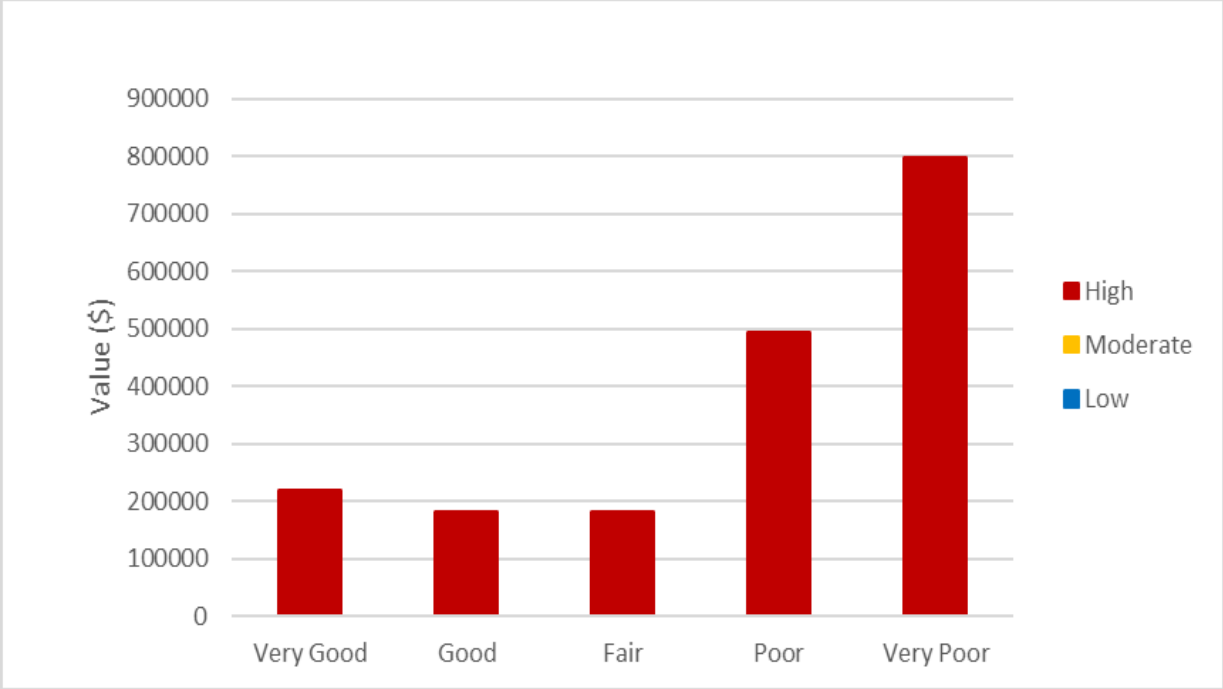
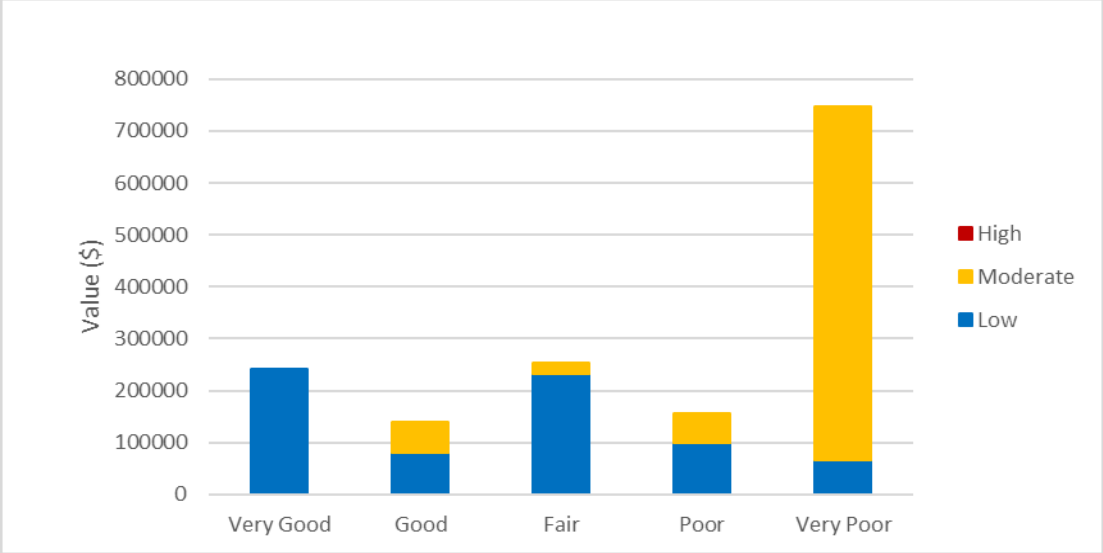


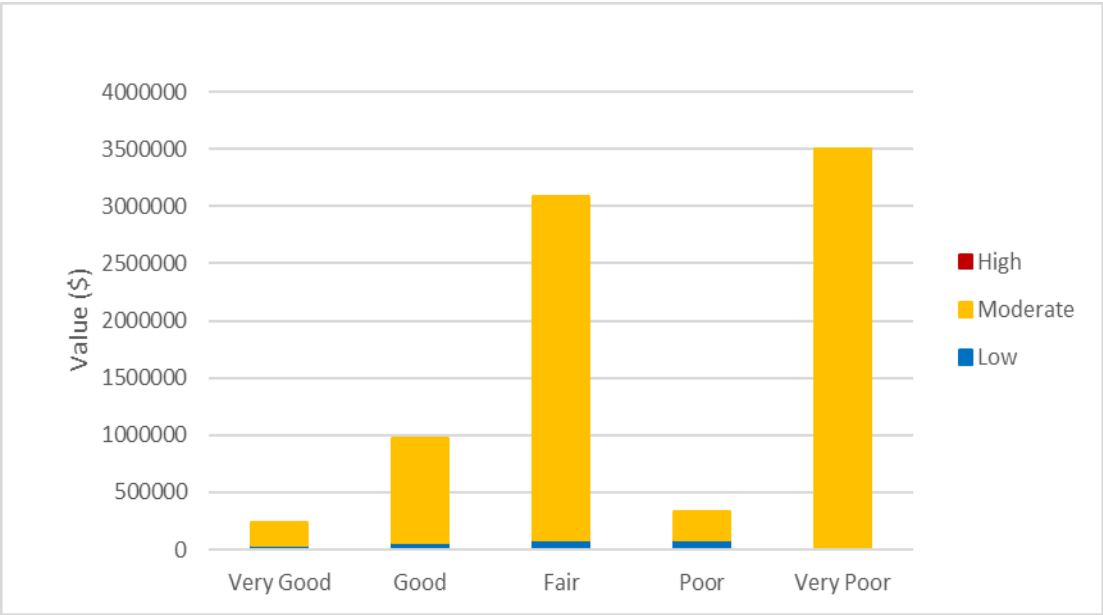
Figure 9.1 presents the condition and replacement values of all fire protection services equipment assets. Approximately 21% of the replacement cost of the fire protection equipment assets are in Very Good (1) or Good (2) condition, approximately 10% are in Fair (3) and 69% Poor (4) condition or Very Poor (5). The condition ratings are based on an age deterioration, which may give a higher-than-normal number of assets in poor or very poor conditions. Given the use of this equipment is for fire services, the equipment must be maintained at a higher standard than the equipment the Municipality maintains for non-emergency purposes. The importance of all fire protection assets is the same at high.

Figure 9.3: Condition of Parks and Recreation Equipment (Value and Importance)



The condition of assets in Parks and Recreation Equipment was based on an age deterioration. Approximately 25% of the replacement cost of the parks and recreations equipment assets are in Very Good (1) or Good (2) condition, approximately 16% are in Fair (3) and 59% Poor (4) condition or Very Poor (5). Given the mixture of assets within this category the range in condition is not unexpected, as the importance of these assets is also found to be a range from moderate to low importance.

Figure 9.4: Condition of Public Works Equipment (Value and Importance)



The condition of assets in Public Works Equipment was based on an age deterioration. Approximately 15% of the replacement cost of the public works equipment assets are in Very Good (1) or Good (2) condition, approximately 38% are in Fair (3) and 47% Poor (4) condition or Very Poor (5). As this asset category has a shorter expected useful life, the staff using the equipment will have good experience to report on condition as condition is tied closely to performance and reliability, therefore, for future updates it is recommended that the staff report on the condition of the equipment and machinery.

9.4 Current LOS

Levels of service for equipment and machinery assets are not defined in the regulation, O. Reg. 588/17 as equipment and machinery are not considered core assets. As such, level of services will be developed based on the content of the regulation, in consultation with the Municipality. The tables below outline the Municipality's current community and technical levels of service for equipment and machinery.

Table 9.3: Community Levels of Service – Equipment and Machinery

LOS Parameter	LOS Statement	Community Levels of Service - Qualitative Description
Scope	Total number of Equipment and Machinery Assets: 492	Equipment and Machinery assets are diverse and serve the needs of the residents and operations of the Municipality

Table 9.4: Technical Levels of Service – Equipment and Machinery

LOS Parameter	LOS Statement	Technical Levels of Service - Technical Metrics Description	2023 Performance
Quality	Age Based Condition Rating	Equipment and Machinery assets are diverse and serve the needs of the residents and operations of the Municipality	Very Good: 15% Good: 13% Fair: 21% Poor: 11% Very Poor: 40% The average condition is very poor.

9.5 Current Performance

Asset performance measures were determined in consultation with the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. Considering each equipment and machinery as a single asset, the performance measures and corresponding units established for equipment and machinery are shown in the **Table 9.5** below.

Table 9.5: Current Performance Measures for Equipment and Machinery

Performance Metric	2023 Performance
Percentage of admin/heritage that is in fair or better condition	76.7%
Percentage of parks that is in Fair or better condition	96.6%
Percentage of recreation that is in Fair or better condition	57.1%
Percentage of fire protection that is in Fair or better condition	20%
Percentage of public works that is in Fair or better condition	58%

9.6 Risk Assessment

The risk assessment for equipment assets was conducted using the following assumptions and criteria:

Condition: Determined based on estimated condition, using percentage of expected useful life remaining in line with the ratings set for vehicle assets.

Performance: Assumed to be always reliable (value of 1).

Climate Change: Assumed a value of 1 (No or limited impact, quick recovery or mitigation in place).

Impact: High impact (Value of 2) for fire services software systems and devices.

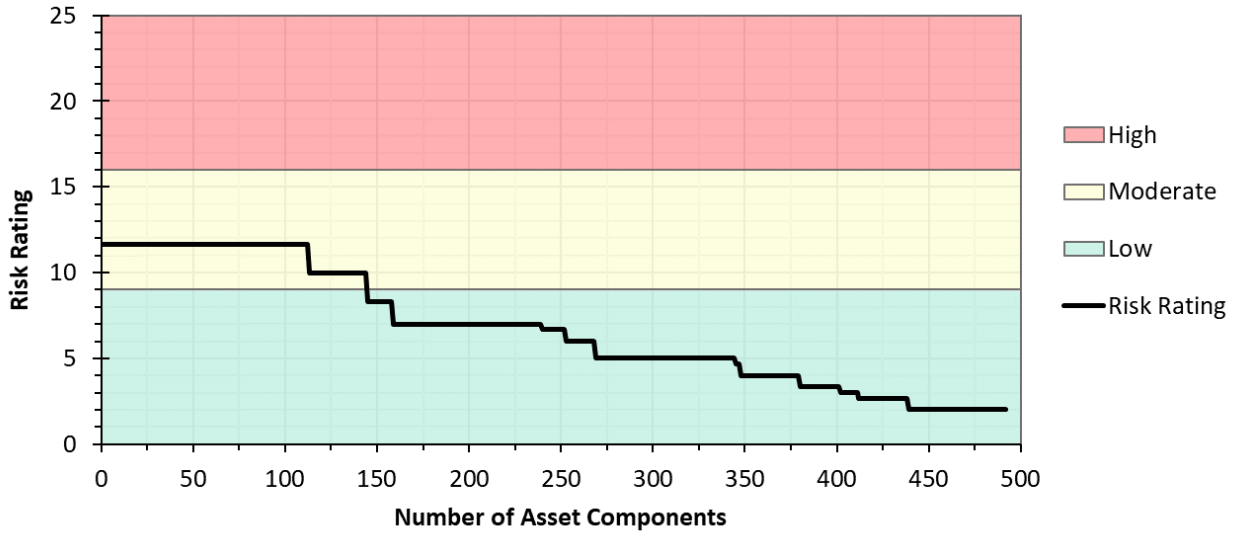
Moderate impacts (Value of 1) for all other assets

Importance: Importance was determined based on use and operational needs as directed by the municipality

- High importance (value of 3) for Fire Response Equipment;
- Moderate importance (value of 2) for Sander Plow and associated Equipment; and
- Low importance (value of 1) for all other equipment.

The risk profile for machinery and equipment assets is shown in **Figure 9.5**.

Figure 9.5: Risk Profile for Equipment and Machinery Assets



9.7 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for equipment and machinery assets. The expected lifecycle activities to be used on the equipment and machinery assets including acquisition, maintenance, operations and decommissioning/disposal. The Municipality circulates assets from high-activity duties/departments to lower-activity departments to extend the useful life.

9.7.1 Maintenance Activities

Maintenance activities will vary across the equipment and machinery assets due to the variability in the type and usage of assets. The maintenance activities should be undertaken according to manufacturer specifications and as required to address

condition and performance issues that arise through regular usage. Maintenance activities include regular monthly inspections for condition, an annual second part inspection and recording of maintenance activities undertaken.

9.7.2 Renewal/Rehabilitation Activities

Monthly inspections of major equipment and machinery are conducted to help identify deficiencies with equipment or prevent the continued deterioration of the deficiency which may cause a reduction in asset condition, performance and LOS delivered. Through the inspections described under maintenance activities, the Municipality is able to identify which assets are able to be renewed or rehabilitated, and extend the expected useful life, and which assets are required for replacement.

9.7.3 Replacement/Acquisition Activities

Replacement and acquisition of an equipment and machinery assets should consider the intended usage of the asset. The replacement should be undertaken based on an understanding of the requirements of the asset for providing service delivery and should follow the Municipality's procurement procedures. Replacement of an asset could be purchase of a new or a used asset. Replacement with purchase of a new asset can provide the Municipality with an asset in Very Good condition; however, the condition of a used asset could vary. When an equipment or machinery asset reaches the end of its useful life, the asset is found to be inadequate for providing proper service delivery, and the service delivery requirements are unchanged, the asset may be directly replaced.

9.7.4 Disposal Activities

Disposal activities includes the removal from service through the sale of asset once the asset has reached the end of it's expected useful life, transfer to another department, or disposal of the asset. Disposal activities should be conducted such that health and safety protocols are being followed, and out-of-service assets are disposed of at appropriate or approved facilities.

9.7.5 Expansion/Growth/Service Improvement Activities

Expansion, growth and service improvement activities are planned to extend services to previously un-or under-serviced areas to meet the growth demands within the

Municipality. The Municipality evaluates their asset inventory on an annual basis to evaluate the need for additional equipment or assets that may improve delivery, in particular the Fire Protection assets.

9.8 Asset Management Strategy

The asset management strategy for the equipment and machinery assets seeks to use the lifecycle activities in a manner that will achieve cost-effective and sustainable management of the assets. Within the Municipality's equipment and machinery assets, there are a variety of asset types which are involved in multiple aspects of service delivery such as Public Works, Fire Protection Services (which include fire protection response equipment), and Recreational and Cultural Services (which include the support of administration, parks and lands assets).

Generally, if acquired new, the assets will begin their expected useful life in Very Good condition and performance. Throughout the lifecycle of the assets, routine maintenance should be conducted. As required, specific maintenance should be conducted. As an asset ages and approaches the end of its useful life, it is expected that the risk and maintenance costs associated with the asset will increase. There will be a point in the lifecycle where the risk and maintenance costs are such that the replacement of the asset will be the preferred solution. This point will vary depending on the type of asset and the services delivered by each.

The Municipality should review the usage of equipment and machinery assets to confirm if services are being provided adequately. The assets should also be routinely assessed and monitored for condition and performance, to inform any maintenance, renewal, or replacement works required. The responsibility for assessing needs and monitoring of asset condition will fall within multiple departments at the Municipality, due to the varied range of services the assets provide.

10.0 Land/Land Improvements

10.1 Summary

The Land and Land Improvement asset category includes a variety of assets such as retaining walls, fencing, parking lots (from Municipal buildings and yards) and several unopened road allowances and vacant lands. Many of the assets included in the Land Improvements category are tied to site revitalizations of existing lands owned by the Municipality but that are not currently associated with specific assets.

The Municipality has over 327 Land assets. A summary of the asset types, quantity, average condition, and age is included in **Table 10.2** below**.** The Parks and Land assets are used by all departments across the Municipality.

10.1.1 Condition

The condition information reported in this AMP is based on the current inventory information maintained by the Municipality and the deterioration is based on an age regression curve.

Table 10.1: Condition Ratings and Age Range Years for Various Assets

Asset	Condition Rating	Remaining Useful Life (Years)
Vacant Land, Parking Lots, Road Allowances, Fencing and Retaining Walls **EUL: 100 years**	Very Good	90 to 100
	Good	65 to 89
	Fair	50 to 64
	Poor	25 to 49
	Very Poor	24 to 0

Table 10.2: Summary of Land Asset Type, Quantity, Average Condition and Age

Asset Type	Quantity	Average Condition	Average Age
Land	296	Very Good	13
Admin/Heritage Land	14	Very Good	16
Fire Protection Land	3	Very Good	16
Public Works Land	10	Very Good	15
Recreation Land	4	Very Good	16
Land Improvements	40	Very Good	10

10.2 State of Local Infrastructure

10.2.1 Average Age

Average age of the Parks and Land assets is 7.8 years.

10.2.2 Replacement Costs

The individual replacement costs for the Land and Land Improvements assets varies, depending on the type and location of the land. The total replacement costs for these assets were determined using the Municipalities 2022-year end data sheets, which contain each asset acquisition costs (in dollars from the year of acquisition) and were then inflated based on the Consumer Price Index (CPI) to costs to reflect today's dollars.

The replacement cost for all the Parks and Lands asset is $1.1 million.

10.2.3 Expected Useful Life

The expected useful life of the assets was provided by the Municipality from their Tangible Capital Asset Policy and is also based on tracking and useful life estimations. The useful life was summarized across all asset types and determined to be 100 years.

10.3 Current LOS

Levels of service for land assets are not defined in the regulation, O. Reg. 588/17 as land and land improvements are not considered core assets. As such, level of services will be developed based on the content of the regulation, in consultation with the Municipality. The tables below outline the Municipality's current community and technical levels of service for land and land improvements.

Table 10.3: Community Levels of Service – Land and Land Improvements

LOS Parameter	LOS Statement	Community Levels of Service - Qualitative Description
Scope	Total number of Land Improvements: 40	Land and Land Improvements assets are diverse and serve the needs of the residents and operations of the Municipality
	Total number of land improvements per capita: 346.5	

Table 10.4: Technical Levels of Service – Land and Land Improvements

LOS Parameter	LOS Statement	Technical Levels of Service - Technical Metrics Description	2023 Performance
Quality	Age based condition	Land and Land Improvements assets are diverse and serve the needs of the residents and operations of the Municipality	Very Good: 100% The average condition is very good.

In general, the Municipality should seek to maintain land for the desired service delivery and community access, as applicable.

10.4 Current Performance

Asset performance measures were determined in consultation with the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. A table with the total number of land improvement assets can be found in **Table 10.2** above.

The total number of land improvements per capita is 346.5.

10.5 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for land and land improvement assets. The primary lifecycle activities include non-infrastructure solutions, maintenance activities, renewal/rehabilitation, disposal, and expansion/growth/service improvement activities.

10.5.1.1 Non-Infrastructure Solutions

Non-Infrastructure solutions for the land and land improvements assets include those activities that do not directly deal with the physical state of the assets but work to extend the assets useful life. The Municipality has policies and by-laws that are updated as required regarding the disposition of a Municipal property.

10.5.1.2 Maintenance Activities

The Municipality inspects the land and land improvement assets to identify any issues that may require maintenance activities, although the Municipality does not typically undertake maintenance as priority is given to disposal of the properties through sale.

10.5.1.3 Renewal/Rehabilitation Activities

The majority of the lands owned by the Municipality are vacant lands that the Municipality allows to maintain a natural state and require no rehabilitation activities.

10.5.1.4 Disposal Activities

Disposal activities include the removal of the lands from the asset inventory, if it is deemed to be surplus and no longer required for service delivery, through sale of the property.

10.5.1.5 Expansion/Growth/Service Improvement Activities

The Municipality maintains an Official Plan that helps to identify future plans for expansion and growth, evaluated every 5 to 10 years by the Municipality. Based on the community needs and the growth evaluated by the Municipality through the Official Plan, the Municipality will purchase land as required.

11.0 IT Infrastructure

11.1 Summary

The Municipality owns IT infrastructure 494 assets, detailed in **Table 11.1** below.

Table 11.1: Current State Summary of IT Infrastructure Assets

Class Description	No. of Assets	Total Replacement Cost (2023)	Average Age	Expected Useful Life	Asset Age as a Proportion of Expected Useful Life
Hardware	214	$556,945	7	4	173%
Hardware – Computer	84	$150,370	5	4	123%
Hardware - Server	7	$57,855	7	6	114%
Software	30	$243,790	10	6	161%
Software - SCADA	16	$717,310	7	10	71%
Radio	142	$204,495	8	4	193%
Telephone	1	$29,195	7	10	70%
Total	**494**	**$1,989,965**	**7**	**5**	**165%**

Additional descriptions of the information presented in the above table are detailed below.

11.2 State of Local Infrastructure

11.2.1 Replacement Cost

The total replacement costs for the IT assets were determined using the Municipalities 2022-year end data sheets, which contain each asset acquisition costs (in dollars from the year of acquisition) and were then inflated based on the Consumer Price Index (CPI) to costs to reflect today's dollars.

The replacement cost for IT infrastructure owned by the Municipality is $1.99 million.

11.2.2 Average Age

The current inventory of assets has an average age of 7 years.

11.2.1 Expected Useful Life

The Municipality maintains various types of IT equipment and as such there are a variety of expected useful lives to be tracked for each service area. The expected useful life information for the It Assets are shown in **Table 11.2** below.

Table 11.2: Expected Useful Life for IT Assets

Asset	Expected Useful Life (Years)
Hardware	4
Hardware - Servers	6
Software	6
Software - SCADA	10
Telephone Network	10

11.3 Condition

The condition information reported in this AMP are based on the current inventory information maintained by the Municipality and the deterioration is based on an age regression curve.

The expected useful life of the assets and a deterioration model based on age was used to predict the physical condition of the IT assets. No condition assessment was carried out on the IT assets.

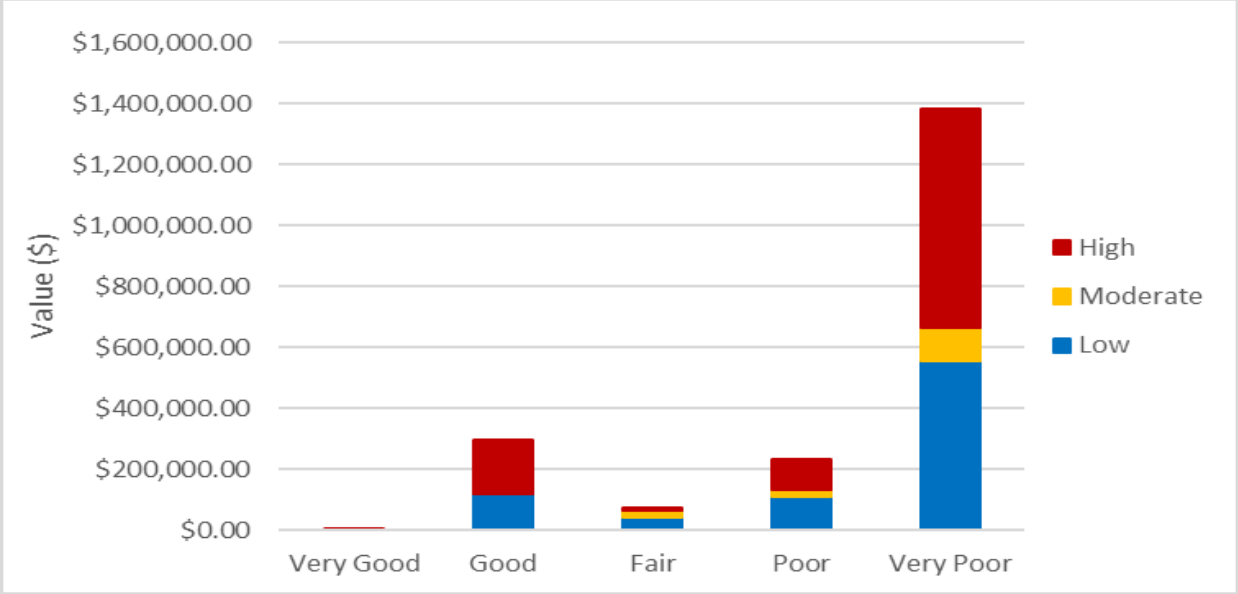
Table 11.3: Condition Ratings and Age Ranges for IT Assets

Asset	Condition Rating	Remaining Useful Life (Years)
Hardware Hardware – Computer Radio **EUL: 4 years**	Very Good	4
	Good	3
	Fair	3 to 2
	Poor	2
	Very Poor	0 to 1
Hardware – Server Software **EUL: 6 years**	Very Good	5 to 6
	Good	4 to 5
	Fair	3 to 4
	Poor	2
	Very Poor	0 to 1
Software – SCADA Telephone Network **EUL: 10 years**	Very Good	9 to 10
	Good	7 to 8
	Fair	5 to 6
	Poor	3 to 4
	Very Poor	0 to 2

IT assets have a shorter expected useful life, as compared to other types of equipment and machinery, the staff using the equipment will have good experience to report on the condition as condition is tied closely to performance and reliability.

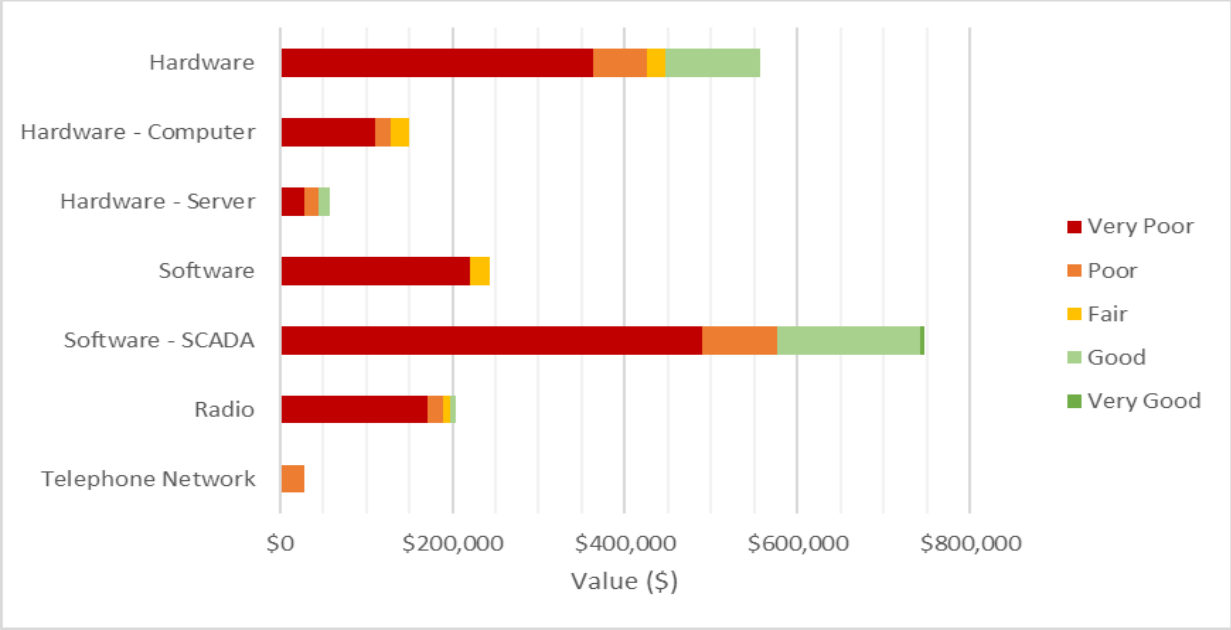
Figure 11.1 presents the condition and replacement values of IT assets.

Figure 11.1: Condition of IT Infrastructure (Value and Importance)



Approximately 5% of the replacement cost of the IT infrastructure assets are Good (2) or Very Good (1) condition, 8% are in Fair (3) and 87% are in Very Poor (5) or Poor (4) condition.

Figure 11.2: Condition of IT Infrastructure (Value and Importance)



11.4 Current LOS

Levels of service for IT Infrastructure assets are not defined in the regulation, O. Reg. 588/17 as IT Infrastructure is not considered a core asset. As such, level of services will be developed based on the content of the regulation, in consultation with the Municipality. Tables below outline the Municipality's current community and technical levels of service for IT.

The Municipalities IT Infrastructure are intended to serve both staff and the public by having a reliable and interconnected network for the public services that the organization provides. IT software and equipment also service the public directly through programs such as the website and the fire communication system in support of the provision of municipal fire services and public safety.

Table 11.4: Community Levels of Service – IT Infrastructure

LOS Parameter	LOS Statement	Community Levels of Service - Qualitative Description
Scope	Number of municipal facilities supported by IT: 6 (Fire protection services, general government, roads, water, wastewater, recreation)	IT assets are diverse and serve the needs of residents and the operations of the Municipality
	Number of municipal facilities	

Table 11.5: Technical Levels of Service – IT Infrastructure

LOS Parameter	LOS Statement	Technical Levels of Service - Technical Metrics Description	2023 Performance
Quality	Appropriate actions and interventions are taken to ensure the regular safe use of Information Technology	Laptop, Desktop, Surfaces in service 0 to 1 years/useful life	0/4
		Laptop, Desktop, Surfaces in service 2 years/useful life	8/4
		Laptop, Desktop, Surfaces in service 3 years/useful life	8/4

LOS Parameter	LOS Statement	Technical Levels of Service - Technical Metrics Description	2023 Performance
		Laptop, Desktop, Surfaces in service 4 years/useful life	4/4
		Laptop, Desktop, Surfaces in service 5+ years/useful life	24/4
		Servers in service 0 to 2 years or less/useful life	1/6
		Servers in service 3 to 4 years or less/useful life	1/6
		Servers in service 5 to 6 years or less/useful life	0/6
		Servers in service 7 years or less/useful life	0/6
		Servers in service 8+ years or less/useful life	4/6

11.5 Current Performance

Asset performance measures were determined by the Municipality, which provide relevant metrics against which the Municipality can gauge the performance of their assets. The performance for the IT Infrastructure assets is determined by the above performance measures established by the Municipality. It is based on actual performance in the most recent two years. The performance measures and established for IT Infrastructure are shown in the **Tables 11.4 and 11.5** above.

11.6 Risk Assessment

The risk assessment for equipment assets was conducted using the following assumptions and criteria:

Condition: Determined based on estimated condition, using percentage of expected useful life remaining in line with the ratings set for vehicle assets.

Performance: Assumed to be always reliable (value of 1).

Climate Change: Assumed a value of 1 (No or limited impact, quick recovery or mitigation in place).

Impact: High impact (Value of 2) for fire services software systems and devices.

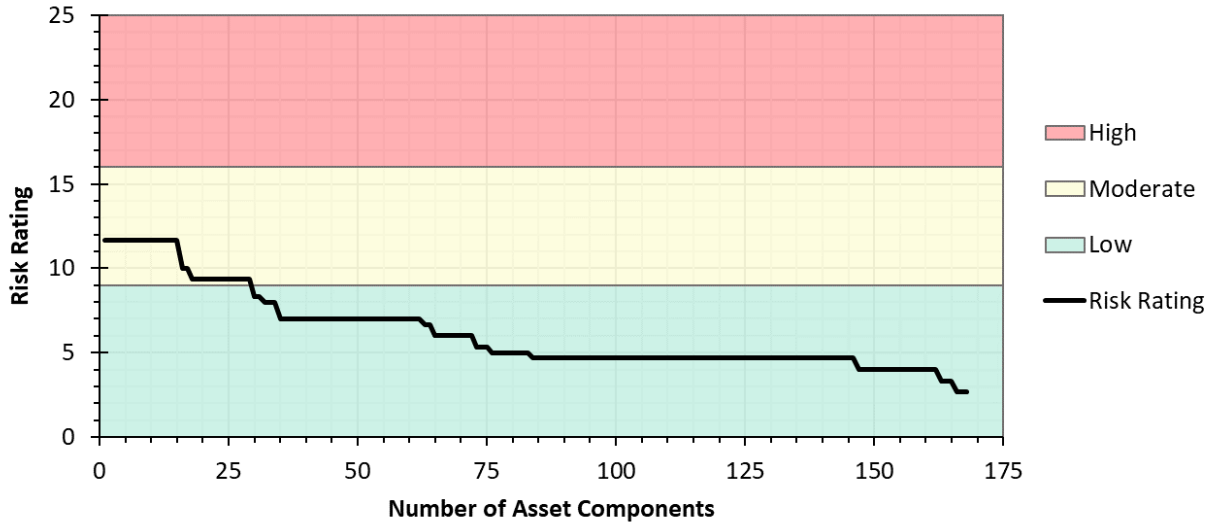
Moderate impacts (Value of 1) for all other assets

Importance*:* Importance was determined based on use and operational requirements as directed by the municipality

- High importance (value of 3) was assigned to all water, wastewater and fire services software systems and devices, as a failed asset is difficult to replace quickly or essential to the daily processes and procedures.
- Moderate importance (value of 2) was assigned to all computer hardware, as they are essential to the daily processes and procedures but have spare hardware to utilize in the short term; and
- Low importance (value of 1) was assigned to telephone networks and all remaining assets.

The risk profile for IT assets is shown in **Figure 11.3**.

Figure 11.3: Risk Profile for IT Assets



11.7 Lifecycle Activities

The following section describes the lifecycle activities that can be implemented within the asset management strategy for IT Infrastructure assets. The expected lifecycle activities to be used for the IT Infrastructure assets include non-infrastructure solutions, maintenance, renewal/rehabilitation, replacement, disposal, and expansion/growth/service improvement activities.

11.7.1.1 Non-Infrastructure Solutions

Non-infrastructure solutions for the IT Infrastructure assets include those activities that do not directly deal with the physical state of the assets but work to extend the asset's useful life. The non-infrastructure solutions can include policies, and monitoring/inspection of the assets. Software and firmware patches as they become available are installed on IT Infrastructure assets, this includes the SCADA software for the water and wastewater treatment facilities and can extend the useful life of the software. The municipality also purchases the extended warranty and service contracts for the IT Infrastructure assets to help maintain the assets average condition and avoid assets expiring before their expected useful life.

11.7.1.2 Maintenance Activities

Maintenance activities will vary across the IT Infrastructure assets due to the variability in the type and usage of assets. The maintenance activities should be undertaken according to manufacturer specifications and as required to address condition and performance issues that arise through regular usage. Maintenance activities include regular monthly inspections for condition and an annual inspection and recording of maintenance activities which were undertaken.

11.7.1.3 Renewal/Rehabilitation Activities

Yearly inspections of major IT Infrastructure assets are conducted to help identify deficiencies with equipment or prevent the continued deterioration of the deficiency which may cause a reduction in asset condition, performance and LOS delivered. Through this inspection, the Municipality is able to identify which assets are able to rehabilitate and extend the expected useful life, and which assets are required for replacement.

11.7.1.4 Replacement Activities

Replacement of an IT Infrastructure asset should consider the intended usage of the asset. The replacement should be undertaken based on an understanding of the requirements of the asset for providing service delivery and should follow the Municipality procurement procedures. Replacement of an asset could be as a new purchase or purchase of a used asset. Replacement of a new asset can provide the Municipality with an asset in Very Good condition; however, the condition of a used asset could vary.

11.7.1.5 Disposal Activities

Disposal activities are conducted by the removal from service through the sale of asset or disposal to an e-waste site once the asset has reached the end of its expected useful life. Disposal activities should be conducted such that health and safety protocols are being followed, and out-of-service assets are disposed of at appropriate or approved facilities.

11.7.1.6 Expansion/Growth/Service Improvement Activities

Expansion and growth of the municipality are planned activities required to extend services to previously un-serviced areas and expand based on the growing demands within the municipality. The Municipality evaluates their asset inventory on an annual basis to evaluate the need for additional IT Infrastructure or assets that may improve delivery.

11.8 Asset Management Strategy

The asset management strategy for the IT Infrastructure assets seeks to use the lifecycle activities in a manner that will achieve cost-effective and sustainable management of the assets. Within the Municipality's IT assets, there are a variety of asset types, which are involved in multiple aspects of service delivery, such as Public Works, Fire Services (which include fire response equipment), and Recreational and Cultural Services (which include the support of administration and parks and lands assets).

Generally, if acquired new, the assets will begin their expected useful life in Very Good condition and performance. Throughout the lifecycle of the assets, routine maintenance should be conducted. As required, specific maintenance should be conducted. As an asset ages and approaches the end of its useful life, it is expected that the risk and maintenance costs associated with the asset will increase. There will be a point in the lifecycle where the risk and maintenance costs are such that the replacement of the asset will be the preferred solution. This point will vary depending on the type of asset and the services delivered by each.

The Municipality should review the usage of IT Infrastructure assets to confirm if services are being provided adequately. The assets should also be routinely assessed and monitored for condition and performance, to inform any maintenance or replacement works required. The needs and monitoring of asset condition will fall within multiple departments at the Municipality, due to the varied range of services the assets provide.

12.0 Capital Financial Analysis

This chapter identifies the funding required to sustainably finance the lifecycle management strategies, including those presented in the previous sections and the capital replacement projections developed in the following section. This financial strategy should be examined and re-evaluated during the annual budgeting processes to ensure the sustainability of the Municipality's financial position as it relates to its assets.

O. Reg. 588/17 requires that municipalities have approved proposed LOS and the lifecycle management and financial strategy for 10-year period to achieve the proposed LOS by July, 2025. Various financing options, including reserves, reserve funds, debt, and grants can be considered during the process of developing the financial strategy.

12.1 Non-Water & Wastewater Assets

12.1.1 Funding

The Municipality of Trent Hills currently funds capital projects through grants, taxes, debt financing, capital reserves and reserve funds for eligible projects. At present, the Municipality carries debt to fund capital expenditures for a number of ongoing projects with the current percentage of legislated debt capacity at 49.63 % (based on 2022 Financial Information Return and Adjusted Net Debt Charges). The Municipality's debt management policy limits this percentage to a maximum target of 65% of legislated debt capacity therefore, the option to fund capital expenditures through debt will have to be monitored to ensure compliance with the policy within the horizon of this asset management plan.

For this analysis, forecasts are presented in current 2024-dollar values. This financial strategy should be examined during the annual budgeting processes to ensure the sustainability of the Municipality's financial position as it relates to its non-core assets.

Table 12.1 summarizes the current baseline funding that the Municipality has for capital investments, based on information gathered from the **2024 Municipal Budget – Capital Budget Summary**. This baseline capital funding capacity is not intended to reflect the Municipality's maximum available funding; rather, it is intended to represent the standard amount of funding the Municipality will typically have each year if they

maintain the status quo. This baseline funding may be subject to change; additional funding sources, such as additional project-specific and timing-specific grants are expected to supplement this baseline funding where needed.

Table 12.1: Currently Identified Capital Funding Sources

Funding Source	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Government Grants (OCIF, CCBF, ICIP)	$6,888,836	$6,427,362	$1,330,852	$1,330,852	$1,330,852	$1,330,852	$1,330,852	$1,330,852	$1,330,852	$1,330,852
Taxation	$1,755,187	$2,045,408	$2,106,770	$2,169,973	$2,235,073	$2,302,125	$2,371,188	$2,442,324	$2,515,594	$2,591,062
Total	$8,642,023	$8,472,770	$4,743,883	$4,807,086	$4,872,186	$4,939,238	$5,008,301	$5,079,437	$5,152,707	$5,228,175

Table 12.2: Funding Sources Notes Summary (2024)

Grants	2024	Capital or Operational Funding	Notes
CCBF	$426,914	Capital	Typically allocated for annual road resurfacing.
OCIF	$903,938	Capital	Typically allocated for capital roads, water, and wastewater projects.
ICIP	$3,790,249	Capital	Project-specific: Allocated for Recreational Center and will not be projected cross the 10-year timeline
OMPF	$3,245,300	Non - Capital	Operational Funding – Not utilized in projections
Taxation	$2,045,408	Capital	Taxation rates within the Community has historically increased at an annual rate of 3 – 6%. The projections in **Table 12.1** above assume a tax rate increase of 3% per year.

12.1.2 Projected Lifestyle Costs

Table 12.3 summarizes the 10-year forecast of capital expenditures required to achieve the capital asset lifecycle management strategy identified in the earlier sections of this plan.

Table 12.3: Capital Expenditure Forecast

Asset Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Roads & Traffic Infrastructure	$31,641,341	$12,211,341	$12,211,341	$12,211,341	$12,211,341	$10,097,341	$10,097,341	$10,097,341	$10,097,341	$10,097,341
Bridges & Culverts	$3,719,015	$1,424,413	$1,384,413	$1,484,413	$1,064,413	$1,454,413	$1,784,413	$1,664,413	$1,164,413	$1,704,413
Fleet	$1,998,515	$2,187,745	$1,534,518	$1,534,455	$1,924,542	$2,357,232	$2,066,650	$2,155,265	$2,603,589	$0
Buildings & Facilities	$39,823,956[1]	$3,204,061	$3,334,540	$2,924,902	$2,157,895	$2,314,015	$2,157,895	$2,157,895	$3,799,006	$2,173,032
Equipment & Machinery	$5,667,977	$1,205,820	$1,720,616	$1,439,635	$1,395,859	$1,443,128	$4,136,584	$2,430,711	$1,733,844	$1,927,273
Lands/Land Improvements	$5,685,265	$5,685,265	$5,685,265	$5,685,265	$5,685,265	$5,685,265	$5,685,265	$5,685,265	$5,685,265	$5,685,265
IT Infrastructure	$1,656,766	$449,919	$467,506	$539,590	$1,052,123	$449,919	$647,957	$467,478	$1,152,887	$478,965
Parks & Recreation	$6,549,219	$649,937	$919,267	$652,033	$678,313	$1,169,217	$929,807	$655,238	$836,478	$619,253
Stormwater	$1,573,802	$440,759	$429,805	$435,529	$453,438	$526,006	$466,978	$547,152	$429,805	$494,350
Totals	$98,315,855	$27,459,261	$27,687,270	$26,907,163	$26,623,188	$25,496,535	$27,972,888	$25,860,757	$27,502,628	$23,179,891

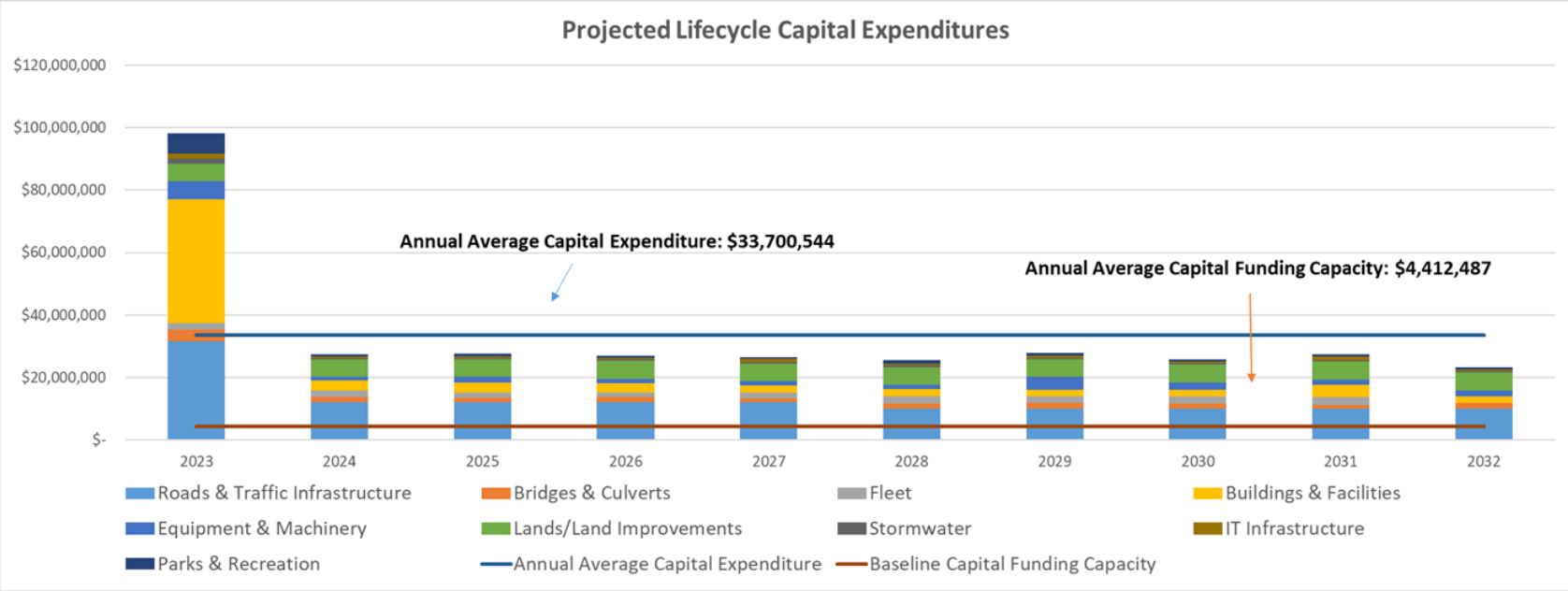
[1] This number is several orders of magnitude larger than the consecutive years due to the use of an age-based deterioration as the source of the condition data for all the Buildings. This has led to a backlog of potential building replacements all at once in 2023. It is the intention of the Municipality to conduct a Building Condition Assessment program to get a better understanding of the current building the conditions and update the lifecycle costs and replacement schedule for future reporting.

12.1.3 Financial Analysis

Figure 12.1 shows the lifecycle capital requirements compared to the baseline capital funding capacity over the 10-year period to assess if there are any anticipated funding gaps and assess if the proposed financial strategy allows the Municipality to adequately invest in its capital assets. The baseline capital funding capacity includes grants and taxation revenue (i.e., excluding reserves and debt financing).

The 10-year annual lifecycle cost average was estimated at $33.7 M. The baseline capital funding capacity, which is taken as the budgeted capital funding from the Municipality's 2023 and 2024 Capital Budgets, is an approximate $14.0 M. This $14.0 M is inclusive of grants, taxation revenue, reserves, and debt financing, and **is subject to change based on annual revisions to grant allocation, taxation rates, and debt repayment limits**. Under this scenario, there is an annual average shortfall of approximately **$20.6 M.**

Figure 12.1: Forecasted Annual Capital Expenditures, 10-Year Annual Average, and Baseline Capital Funding Capacity (2023 to 2032)



It is important to note that the lifecycle estimates used to develop **Figure 12.1** are characterized with potential gaps in replacement cost data. To note, not all assets had a replacement cost associated to them and these values had to be estimated based on assets of a similar type within the same group. This could cause the overall replacement cost of the asset group to be lower. This replacement cost is then used to calculate the lifecycle costing for each asset group and this could skew the overall lifecycle cost estimates. For example, incorporating more recent tenders and current construction costs for the Roads assets would provide a more accurate overall replacement cost for all the road assets and therefore a better year over year lifecycle cost projection to work with for future budgeting. The Municipality's approved 2023 and 2024 budgets have disclosed their budgeted capital expenses to be approximately within ranges of **$16 to $18 M**. The works projected in the scenario above over the 10-year timeline illustrate that there is a need to double existing capital funding to fully fund all the lifecycle activities identified.

12.2 Water & Wastewater

12.2.1 Funding

The Municipality of Trent Hills currently funds water and wastewater capital projects through user charges including service charges and consumptive rates, reserves, reserve funds, grants, and debt for program/service level improvements. This study is focused on the replacement of existing infrastructure and did not consider growth-related investments. This means that the Municipality will be dependent upon grants, debt financing, reserves, reserve funding and contributions from the operating budget to fund these lifecycle costs.

At present, the Municipality carries debt to fund capital expenditures for a number of ongoing projects with the current percentage of legislated debt capacity at 49.63 % (based on 2022 Financial Information Return and Adjusted Net Debt Charges). The Municipality's debt management policy limits this percentage to a maximum target of 65% of legislated debt capacity therefore, the option to fund capital expenditures through debt will have to be monitored to ensure compliance with the policy within the horizon of this asset management plan.

For this analysis, forecasts are presented in current 2024-dollar values. This financial strategy should be examined during the annual budgeting processes to ensure the sustainability of the Municipality's financial position as it relates to its non-core assets.

Table 12.4 summarizes the current baseline funding that the Municipality has for capital investments, based on information gathered from the **2024 Municipal Budget – Capital Budget Summary, 2023 Reserve Activity, and Financial Strategy Meetings**. This baseline capital funding capacity is not intended to reflect the Municipality's maximum available funding; rather, it is intended to represent the standard amount of funding the Municipality will typically have each year if they maintain the status quo. This baseline funding may be subject to change; additional funding sources, such as additional project-specific and timing-specific grants are expected to supplement this baseline funding where needed.

Table Notes:

1. Water 2024 Budget: Transfers to Reserves $311,760; Annual Provisional Capital: $696,000
2. Wastewater 2024 Budget: Transfers to Reserves $828,456; Annual Provisional Capital: $453,000

Table 12.4: Capital Funding for Water & Wastewater

Asset Category	2023	2024
Water – Transfer to Reserves and Capital	$927,742	$1,007,760[1]
Wastewater – Transfer to Reserves and Capital	$1,175,336	$1,281,456[2]
Water – Operational Surpluses	$0	n/a
Wastewater – Operational Surpluses	$128,575	n/a
Totals	$2,241,653	$2,289,216

12.2.2 Lifecycle Costs

Table 12.5 summarizes the 10-year forecast of capital expenditures required to achieve the capital asset lifecycle management strategy identified for water and wastewater assets. These capital expenditure estimates are sourced from the lifecycle models as well as the Municipality's 2020 Water and Wastewater Rate Study.

Table 12.5: Capital Expenditure Forecast (Water & Wastewater)

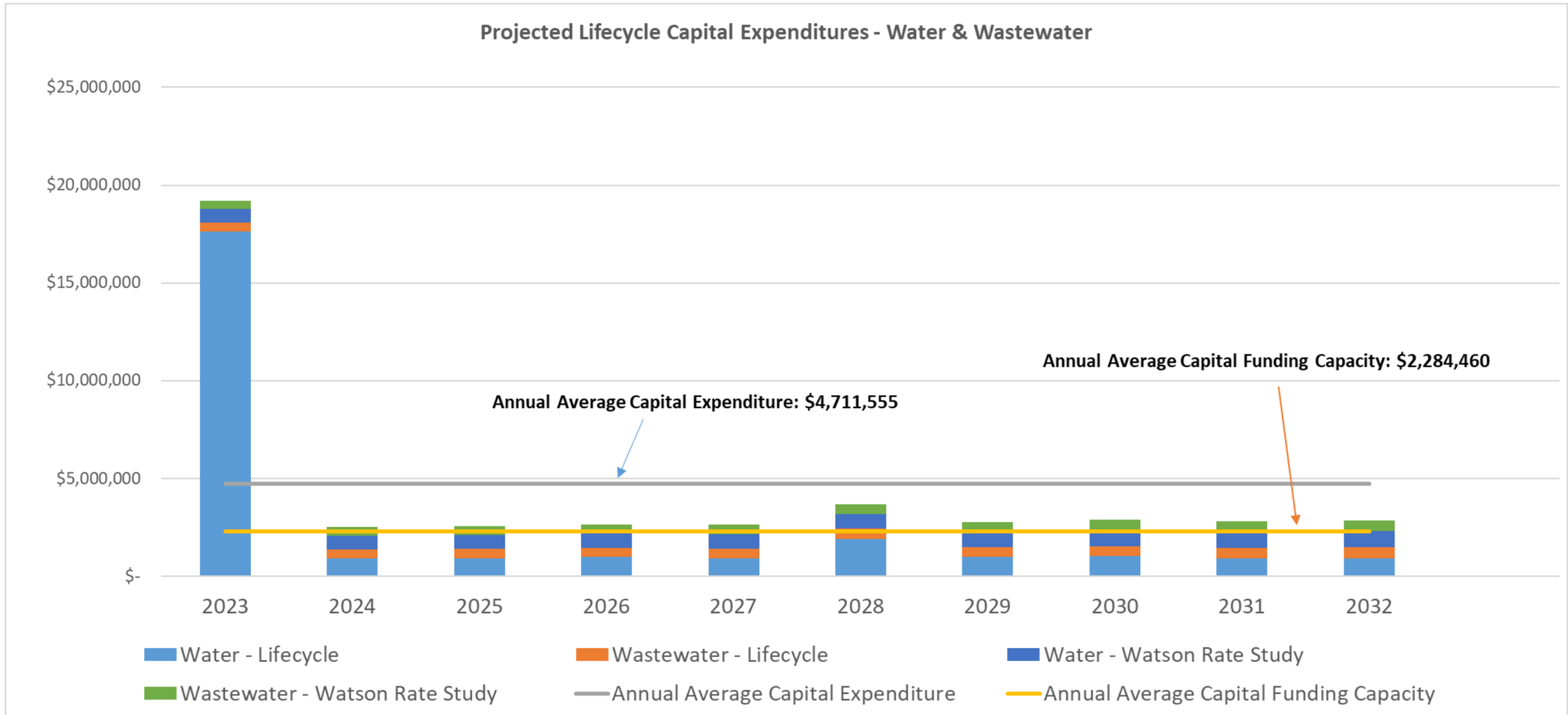
Asset Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Water - Lifecycle	$17,646,769	$914,685	$917,803	$977,045	$924,039	$1,916,193	$972,164	$1,020,705	$905,331	$924,039
Wastewater - Lifecycle	$2,012,384	$557,043	$560,274	$557,043	$662,058	$649,741	$563,332	$769,930	$568,936	$557,043
Water - Watson Rate Study	$679,000	$696,000	$713,000	$731,000	$749,000	$768,000	$787,000	$806,000	$825,000	$844,000
Wastewater - Watson Rate Study	$442,000	$453,000	$464,000	$475,000	$487,000	$500,000	$512,000	$524,000	$536,000	$548,000
Totals	**$21,292,840[2]**	**$2,673,739**	**$2,680,088**	**$2,736,099**	**$2,788,108**	**$3,767,945**	**$2,737,507**	**$2,992,646**	**$2,676,278**	**$2,683,093**

Figure 12.2 shows the water and wastewater lifecycle capital requirements compared to the baseline Capital funding capacity for over the 10-year period to assess if there are any anticipated funding gaps and assess if the proposed financial strategy allows the Municipality to adequately invest in its capital assets.

The 10-year annual lifecycle cost average was estimated at $4,711,555. The annual baseline capital funding capacity for water and wastewater assets was sourced from provided reserve transfer data related to the water and wastewater capital reserves. This annual baseline capital funding capacity is averaged at a total of $2,284,460 and is inclusive of budget reserve contributions and past operational surpluses. The actual amount available is subject to change based on annual revisions to budgeted reserve contributions, occurrences of operational surpluses or deficits, and debt repayment limits. Under this scenario, there is an annual average shortfall of approximately **$2,427,095**.

[2] This number is several orders of magnitude larger than the consecutive years due to the use of an age-based deterioration as the source of the condition data for all the Water and Wastewater assets. This has led to a backlog of potential replacements all at once in 2023. It is the intention of the Municipality to continue to assess segments of the water and wastewater system each year to get a better understanding of the current asset conditions and update the lifecycle costs and replacement schedule for future reporting.

Figure 12.2: Forecasted Annual Capital Expenditures and 10-Year Annual Average for Water and Wastewater Assets (2023 to 2032)



12.3 Recommendations

The first recommendation to highlight is for the Municipality of Trent Hills to invest resources into maintaining a comprehensive inventory of their existing assets and their current condition and performance data. With more accurate and up-to-date data, lifecycle cost projections would likely be more representative of actual costs. There are several financial strategies could be implemented by the Municipality to mitigate the funding shortfalls:

1. **Grants and Subsidies:** Government grants and subsidies should be used where possible as a supplemental source of capital funding to reduce reliance on user fees and infrastructure levies and potentially redirect portions of these fees to operating costs (where applicable).
2. **User Fees and Development Charges:** Adjust user fees and/or development charges to better align with the costs of providing services or maintaining key facilities. Over time, costs can increase due to inflation, rising material and labor costs, or enhanced service levels. Increasing fees helps municipalities cover these expenses without relying solely on taxes or other sources of revenue.
3. **Efficiency Improvements:** Efficiency improvements such as selection of components with longer useful lifespans, more energy efficient systems (e.g., LED replacements, variable frequency drives in pumps, etc.), and strategic planning of staff allocation can help the Municipality achieve operational budget surpluses.
4. **Capital Reserves:** It is important for the Municipality to allow capital reserves with annual budgeted contributions to build up healthy balances that can sustainably contribute to capital investments, recognizing that capital expenditures will fluctuate from year-to-year.
5. **Debt Financing:** The Municipality should continue to utilize debt financing to address anticipated funding shortfalls for the lifecycle activities projected. Responsible management of debt levels, coupled with adherence to established debt repayment limits, will help close the funding gap identified.
6. **Coordination of Strategic Interventions:** The business planning process may include additional considerations for synergies between asset investments. For instance, core service categories may coordinate on strategic maintenance plans for cross-category assets that display a service dependence (e.g., stormwater infrastructure and road infrastructure interventions may be bundled into a single contract; facility

component replacements may be coordinated to occur under one contract by deferring some replacements to align with more significant activities under a single contract or task).

The lifecycle investment strategy is predicated upon adequate operational and maintenance funding to achieve the expected asset longevity, and timely lifecycle replacements to maintain asset service. Inadequate funding can be expected to result in prolonged underperformance or premature failure. The resulting unplanned impacts to levels of service and/or risk is undesirable. The alternative is ongoing investment review, including level of service and risk monitoring, to revise the asset levels of service and risk metrics. Future asset management strategies may consider planned LOS target changes in response to asset service performance. Targeting a lower LOS can be a strategy to reduce capital expenditures by deferring some replacements and accepting additional risk in the asset portfolios. However, this strategy requires more comprehensive LOS and performance data to implement and is not presently recommended.

References

Municipality of Trent Hills Documents

Strategic Asset Management Policy (Policy Number POL-FIN-008) Enacted by Council March 19, 2019

Tangible Capital Assets Policy (POL-FIN-001) Amended January 1, 2019

Official Plan – Municipality of Trent Hills

Roads Needs Study, Updated 2022 Municipality of Trent Hills - GHD, January 2023

Bridge Management Study Report (2022 OSIM Inspection Reports) – HP Engineering Inc., December 2022

Asset Management Plan – Public Sector Digest INC. (PSD), July 2018

Municipality of Trent Hills Asset Management – Current Levels of Service Core Municipal Infrastructure Assets 2021 and 2022

Municipality of Trent Hills Asset Management – Current Levels of Service Core Municipal Infrastructure Assets 2022 and 2023

Development Charges Study – Watson & Associates Economists Ltd., June 2023

Water and Wastewater Rates Study – Municipality of Trent Hills– Watson & Associates Economists Ltd., January 2020