ASSET MANAGEMENT PLAN

2022

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Executive Summary

The Township of Admaston/Bromley (Township) is updating its 2018 Asset Management Plan (AMP) in alignment with the Asset Management Strategic Policy for the Township (By-Law No. 2019-24) and **O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure.**

Overview of the AMP

The Introduction (Chapter 1) presents an overview of key concepts of asset management such as the State of Local Infrastructure, Levels of Service, Risk Assessment and Lifecycle Activities, concluding with a section on Growth.

Chapters 2 through 5 each present one of the asset categories as shown in the table below and Chapter 6 presents the financial strategy.

Core Assets	Non-Core Assets
Roads (Chapter 2)	Facilities and Buildings (Chapter 4)
Stormwater (Chapter 3)	Fleet (Chapter 5)

Policy Alignment

The Asset Management Vision is to maintain a safe community with sustainable growth.

Strategic Alignment: Asset management planning will not occur in isolation from other Township's goals, plans and policies.

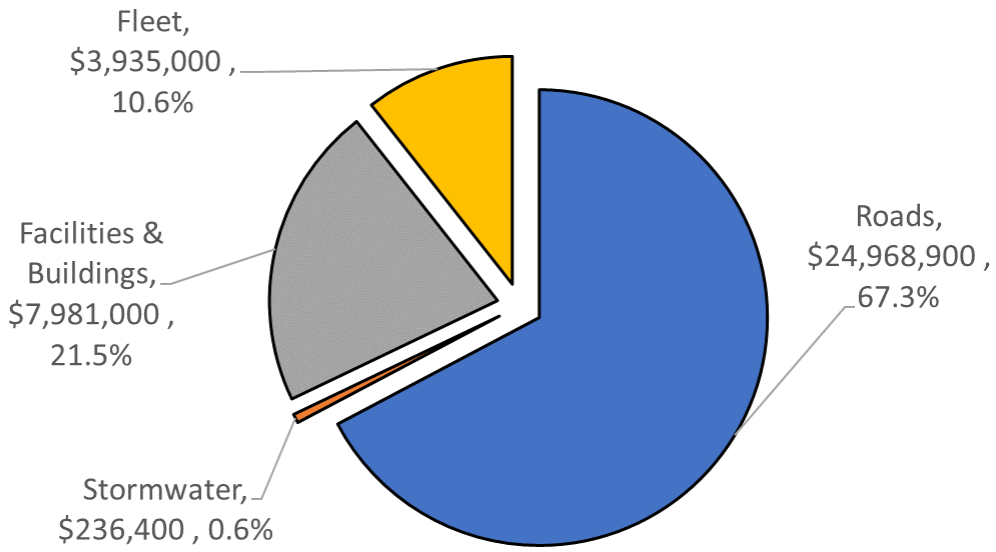
An integrated approach will be followed to successfully develop practical asset management plans that align with the overarching accountabilities and aspirations of our community.

Regulatory Alignment

The 2022 AMP update is aligned with the requirements of **O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure** and as amended by O. Reg. 193/21 which requires all core assets to be covered in the asset management plan with current Level of Service (LOS). Core assets include stormwater, and roads. This update also includes non-core assets: buildings, and fleet, as well, lifecycle management for 20-year period.

Current Replacement Value

The total replacement cost for all infrastructure assets owned by the Township of is $37.1 million (in 2022 dollars). The distribution of this replacement cost is shown in the figure below.



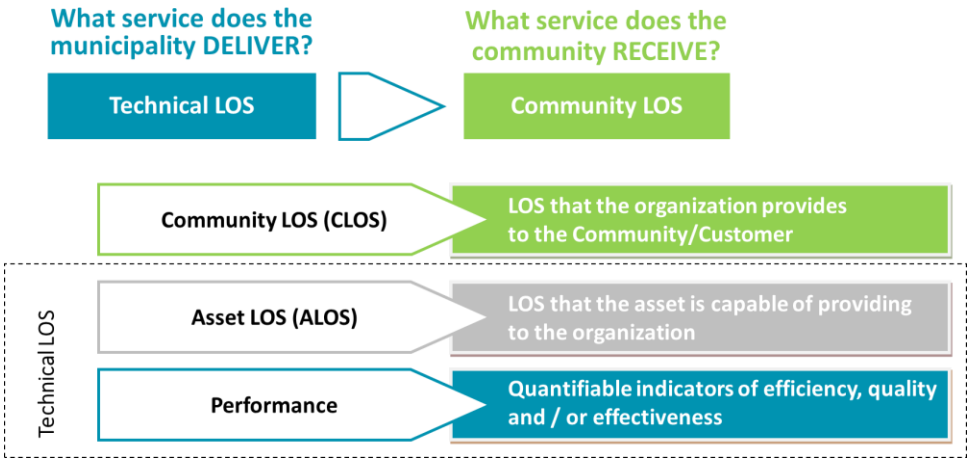
Condition Summary of Each Asset Category

The current condition of each of the asset categories is presented in the figure above. On average, 18% of the Township's infrastructure assets have a condition rating of Very Good, 40% have a condition rating of Good, 21% have a condition rating of Fair, 11% have a condition rating of Poor, and 10% have a condition rating of Very Poor.

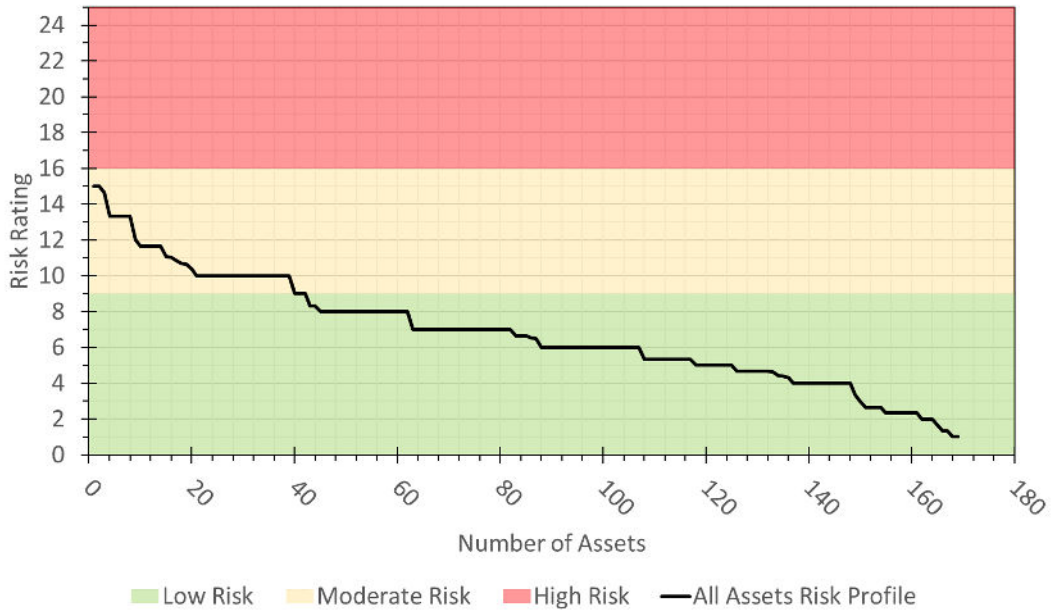
Levels of Service (LOS)

Levels of Service (LOS) are presented in the figure below 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; and
- **Technical LOS**: LOS that the asset is capable of providing to the Township which is further measured by the performance of the asset, providing technical metrics that support the delivery of LOS.



Risk Profile



Of the just under 170 assets tracked within the Township's asset management data, none are classified in the High risk range, with 39 in moderate and the remainder in low risk zone.

Acknowledgements

The consulting team would like to express our appreciation to the staff and Council 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 as a result of the global pandemic.

Project Team

- Jennifer Charkavi, CAO / Clerk
- Mitchell Ferguson, Deputy Clerk-Treasurer
- Public Works

About this Report

Dillon Consulting Limited was retained by the Township of Admaston/Bromley 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, Dillon Consulting Limited
- Kaelee Oxford, Technical Lead, Dillon Consulting Limited

1.0 Introduction

1.1 The Township of Admaston/Bromley

The Township of Admaston/Bromley (Township) is updating its 2018 Asset Management Plan (AMP) in alignment with the Asset Management Strategic Policy for the Township of Admaston/Bromley (By-Law No. 2019-24) and **O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure.**

The AMP documents the Township'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 2022. 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 Township.

1.1.1 Township of Admaston Bromley

The Township is a lower-tier municipality within the County of Renfrew. It is situated centrally within the County, with the Township of Whitewater Region and Horton Township to the east, the Township of Laurentian Valley to the north, the Townships of North Algona Wilberforce and Bonnechere Valley to the west, and the Township of Greater Madawaska to the south. The Bonnechere River roughly bisects the Township, and the Town of Renfrew is located immediately adjacent, to the south-west. Although considered a rural municipality, it has small areas of semi-urban population within the villages of Osceola and Douglas. According to the most current census information, it is home to approximately 2,995 residents, living in approximately 1,208 privately owned dwellings.

The Township recognizes that investment in infrastructure is vital, not only for economic growth, but also for maintaining both quality of life and safety for its residents.

1.1.2 Purpose of the Asset Management Plan

The Township of Admaston/Bromley's Asset Management Plan (the "Plan") will provide asset management information to guide decision making at the Township. The Plan is a summary document that provides a comprehensive reference for council, managers and staff. The Plan delivers a planned approach to the long-term management of assets, by providing strategies for optimizing future expenditures to achieve the community's proposed levels of service.

The plan will be reviewed regularly to provide assurance to council, staff, customers and other stakeholders that the roads the Township is responsible for are being managed efficiently and sustainably.

The purpose of the Plan is to strategize how the Township can best manage their service delivery and infrastructure to meet their stated goals in a cost effective manner.

This Plan is intended to complement the goals stated in other documents, including the Official Plan of the County of Renfrew. This would include:

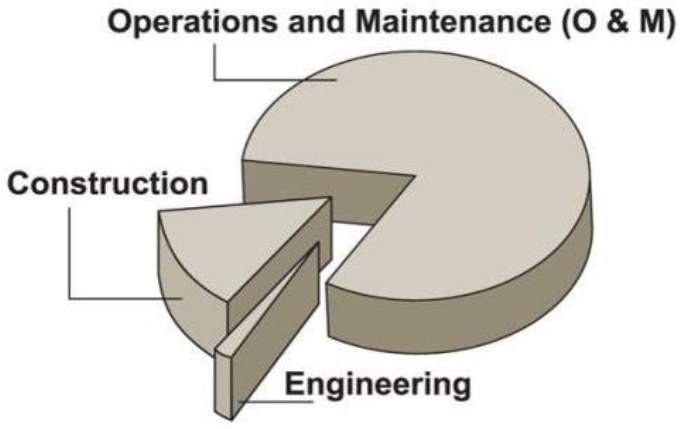
- To maintain and enhance the quality of the natural, built and human environments
- To strengthen and diversify the economic base, within municipal servicing limitations.

1.2 Asset Management Overview

Asset management is a process of making the best possible 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%), but the operations and maintenance each and every year (80%). See **Figure 1-1**.

Figure 1-1: Lifecycle Approach (Infraguide 2005)

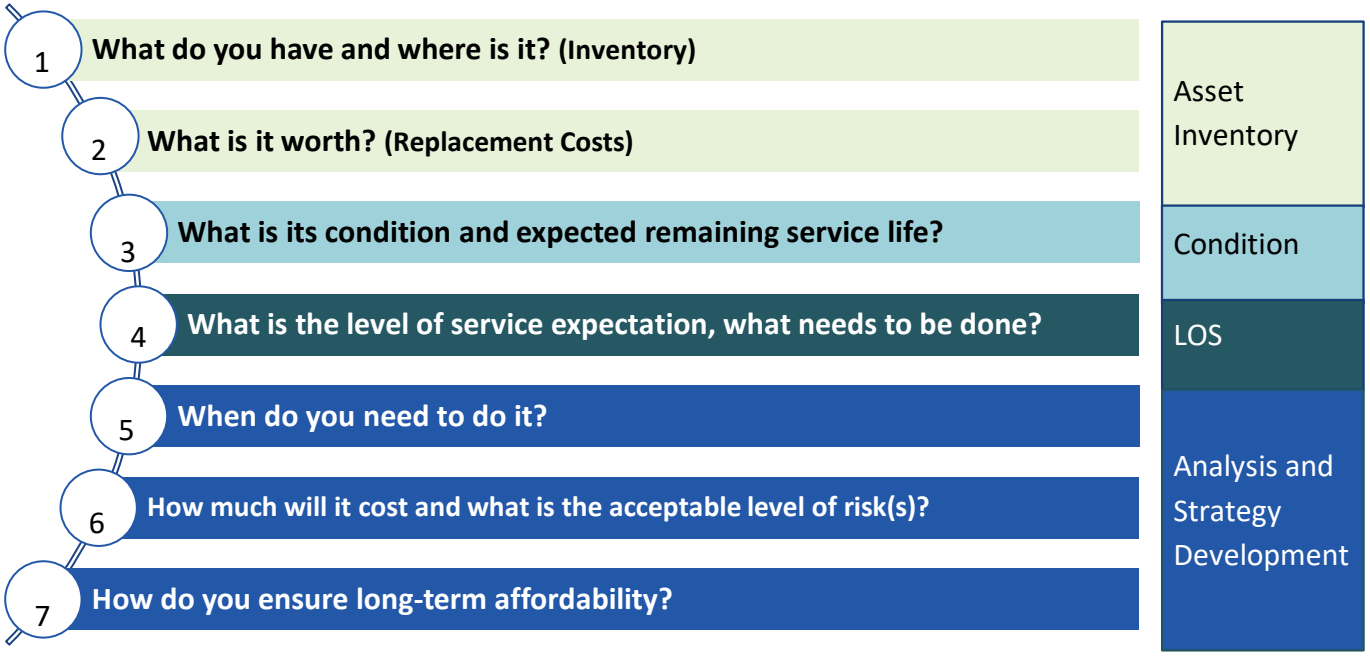


The essential questions for asset management, as described in the *InfraGuide: Managing Infrastructure Assets (Oct 2005)*, are:

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 seven essential questions align to four phases 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



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 section on Growth and a Roadmap with Next Steps.

This AMP includes the core assets and non-core assets owned by the Township, as presented in **Table 1-1**.

Table 1-1: Asset Categories Included in the AMP

Core Assets	Non-Core Assets
Roads (Chapter 2) Stormwater (Chapter 3)	Facilities and Buildings (Chapter 4) Fleet (Chapter 5)

Each asset category presents the following topics:

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

The financial strategy is presented in Chapter 6.

Policy Alignment

Asset Management Vision: 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**.

Strategic Alignment: Asset management planning will not occur in isolation from other Township's goals, plans and policies.

An **integrated approach** will be followed to successfully develop **practical asset management plans** that align with the overarching accountabilities and aspirations of our community. The elements of our asset management planning approach keep us mindful of the goals described in our Strategic Plan, Official Plan, and Purchasing Policy, as they influence our Asset Management Plan and 10 year Capital Plan.

Regulatory Alignment

The 2022 AMP is an update to the 2018 AMP which requires alignment with 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 meets phase 3 requirements for all asset categories except green infrastructure assets.

This AMP sets out proposed (target) levels of service and a financing strategy to meet the proposed levels of service for all core and non-core infrastructure assets. Once approved by Council, will move the County forward to phase 4 compliance.

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

Inclusive of all other assets owned by the Township, this AMP provides an overview of what is needed to continue to deliver the services required of the community in the future. The asset management plan identifies the required investments to maintain service delivery for the next 10 years. The plan will be updated on an ongoing basis with the availability of new information, and the regulation requires annual reporting to Council on the progress (and barriers) to implementing the AMP.

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; and

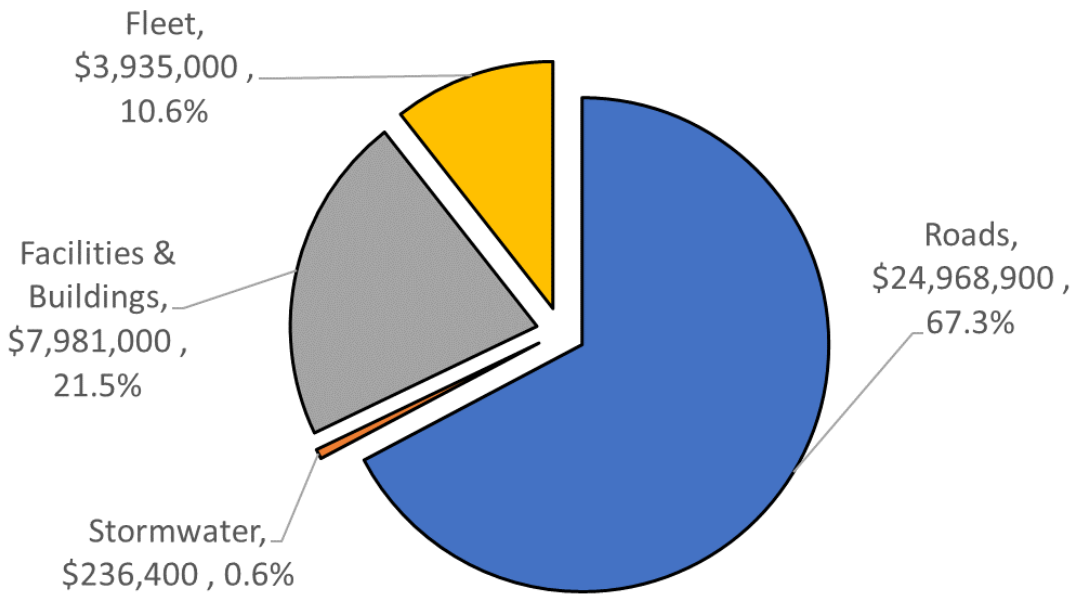
- a description of the Township's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.

The Township owns infrastructure assets that provide services in the following asset categories: Roads; Stormwater; Facilities and Buildings; and Fleet.

1.3.1 Asset Replacement Costs

The total replacement cost for the Township's infrastructure includes the known roads, stormwater infrastructure, buildings and facilities, and fleet. The replacement cost total is in 2022 dollars, and is $37.1 million. The distribution of this replacement cost is shown in **Figure 1-3**.

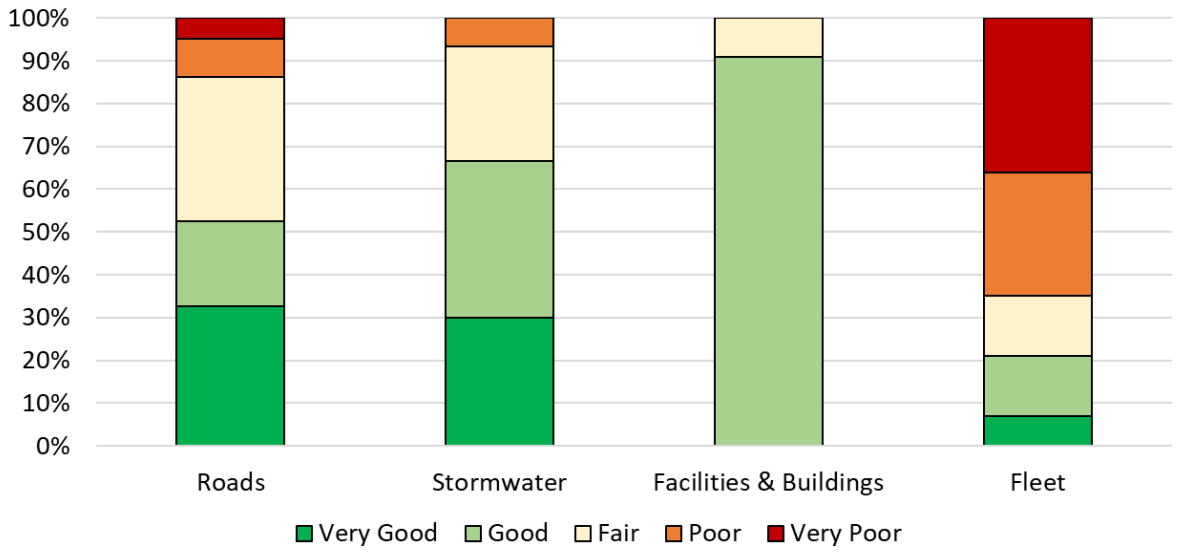
Figure 1-3: Distribution of Replacement Cost



1.3.2 Asset Condition Summary

A summary of the condition for each of the Township's infrastructure assets is shown in **Figure 1-4.** On average, 18% of the Township's infrastructure assets have a condition rating of Very Good, 40% have a condition rating of Good, 21% have a condition rating of Fair, 11% have a condition rating of Poor, and 10% have a condition rating of Very Poor.

Figure 1-4: Summary of Condition of All Infrastructure Assets



1.3.3 Asset Hierarchy

Each type of asset, both complex and linear, can have its assets defined and inventoried at a high level, or with increased component detail. The asset hierarchy defines the layers of asset componentry, and the "parent-child relationship" in the hierarchy. An example of the componentry for roads is shown in **Table 1-2.** The components of the assets have been defined with their asset category, components and subcomponents.

Table 1-2: Asset Hierarchy Example – Roads

Asset Category	Asset Component	Subcomponent
Roads	Road Base Road Surface	Shoulders Street lights

For this Asset Management Plan (AMP), the analysis will focus on assets at the 'component' level for the linear assets, with the expectation that the condition and replacement of the components and subcomponents will be consistent with the system.

For roads, the assumption is that all subcomponents included in the system will be replaced in conjunction with the asset linear components, and are expected to have similar lifespans and conditions as the linear components.

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

1.4 Condition Assessment Program

During development of the Plan, condition assessment was undertaken for the road and building assets. The processes and assumptions for these programs are described below. Results of the condition assessment have been incorporated into this report.

1.4.1 Road Condition

Dillon Consulting conducted a Road Needs Assessment for the Township in June of 2021. Dillon used the Total Pave app to assess both smoothness of the roads measuring International Roughness Index (IRI) (paved and unpaved roads) and condition of the paved roads with a Pavement Condition Index (PCI). The app is downloaded to a smart phone to conduct the assessment. To determine the IRI, the phone is mounted securely to the vehicle and is driven down the road at a steady speed with the IRI app running. To conduct the PCI assessment, the surveyor assesses sample sections of road segments, taking into account any potholes, crack, weathering, and other deformations in the paved surface. The app then takes these samples and calculates the PCI for road segments.

1.4.2 Building Condition

Asset inventory and background data were provided by the Township at project kick-off and through a series of data transfers. Condition data was collected through visual assessments of the facilities on August 27th and 28th, 2021. The purpose of the visual inspection is to identify the current condition of the asset and estimate the remaining useful life. The on-site visual inspections further identified any immediate repairs or actions to be taken to improve the current operation of the infrastructure. Recommendations for further, more detailed inspections (including testing) were noted in the inspection and reported in a technical memo to the municipality.

The assessment of facilities was organized by discipline and facility components or systems and sub-components, presented in.

UNIFORMAT II was used to classify all building components to a Level 3 or 4 classification based on the complexity of the system.

Table 1-3: Condition Assessment – Building Components and Disciplines

Discipline	Facility Components	Description of Sub-components
Architectural / Structural	Structure Building exterior Building interior	Includes roofing, foundations, stairs, finishes and accessibility
Mechanical / Electrical	Electrical systems Mechanical systems Fuel systems	Includes fire protection, HVAC, plumbing, electrical sub-panels, distribution and lighting
Site / Civil	Water and Wastewater services (wells and septic systems) Stormwater Parking areas Site developments	Includes site drainage, parking areas, driveways and lighting

The condition of each building element was scored using a five-point rating scale, which is in alignment with the Canadian Infrastructure Report Card where Very Good (1), Good (2), Fair (3), Poor (4) and Very Poor (5). The condition assessment rating utilized in this report is presented in **Table 1-4** which describes the condition rating for architectural/structural, mechanical, electrical, and siteworks.

Table 1-4: Condition Rating System

Condition	Condition Score	Description of Condition
Very Good	**1**	Like new, physical sound
Good	**2**	Minor superficial deterioration
Fair	**3**	Showing deterioration and wear
Poor	**4**	Major portion of the asset is deficient
Very Poor	**5**	Physically unsound and unreliable

Dillon staff utilized custom digital data collection forms and Survey123 by ESRI to collect all field data. Estimated condition, remaining useful life and recommendations were developed based on industry standards and the experience of the Dillon team. Replacement and recommendation costing was developed using RSMeans costing software for the Ottawa region, industry costing data and Dillon's experience with similar infrastructure in Ontario.

Recommendations were made where capital investment, replacement or renewal was identified for components due to deficiencies or lifecycle wear. Details as to the specific solution were not included and would be determined by the service provider (i.e.: repair foundation cracking). Timelines are provided in ranges as the exact timing of investment may vary based on variability in asset deterioration. The categories of recommendation timing are presented below and cover a 10-year time horizon.

- Immediate
- 1-2 years
- 2-3 years
- 3-5 years
- 5-10 years

The scope for the condition assessment included:

- Inspections are non-invasive and non-destructive, no opening of walls or ceiling tiles;
- No testing of systems;
- Not a code review. Any code issues identified during site investigations will be flagged to the Township;
- No confined space entry such as crawl spaces were inspected, visual inspection from access point only were completed if possible;
- Hazardous materials survey not included (asbestos, lead, PCB, etc.) and buildings expected to be free of these substances;
- Roof inspection was visual only, qualified roof inspector not included;
- Mechanical/electrical review was limited to the building M&E
- No opening and internal inspection of wells, septic systems or underground utilities; and,
- Assessment of components based on visual inspection from ground level, estimated age of components and typical useful life.

A document outlining the results of the building condition assessment has been developed under separate cover from this AMP.

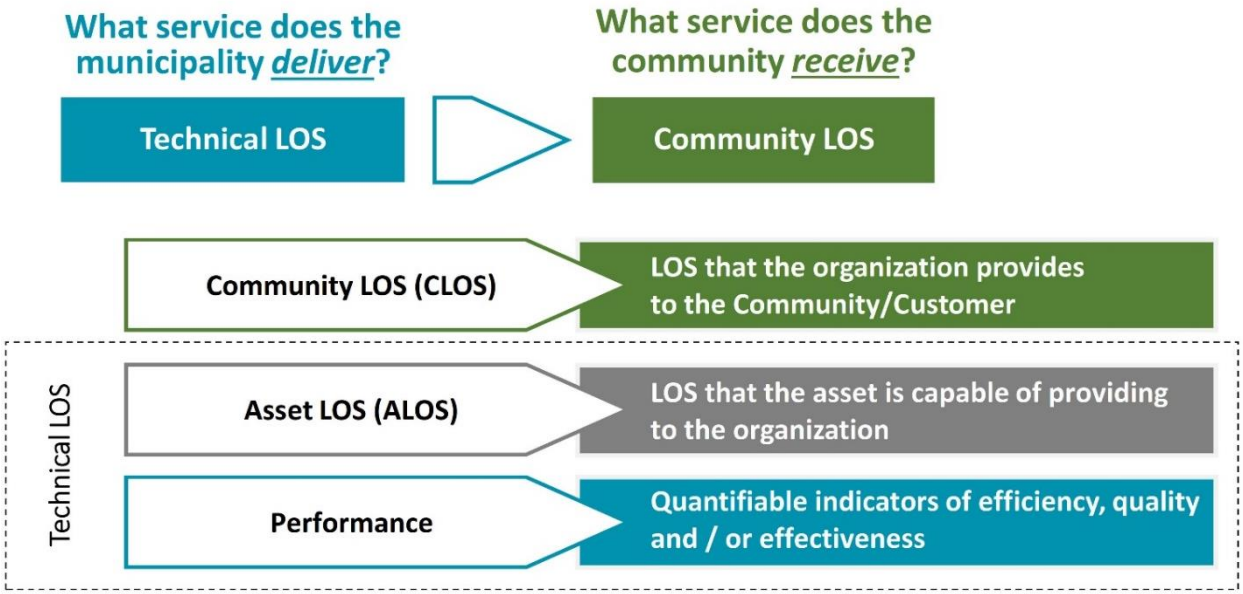
1.5 Levels of Service

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

Levels of Service (LOS) are presented in **Figure 1-5** 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; and
- **Technical LOS**: LOS that the asset is capable of providing to the Township which is further measured by the performance of the asset, providing technical metrics that support the delivery of LOS.

Figure 1-5: Levels of Service (Community LOS, Technical LOS and Performance)



For non-core assets (i.e. buildings and fleet), levels of service metrics are not provided in the regulation, however in consultation with the Township, appropriate and trackable measures were identified following the community and technical model.

Through the AMP development, the Township sought to establish current LOS, in accordance with O.Reg. 588/17. As part of this process, the Township participated in an education and working session with project staff stakeholders, and provided a survey for public feedback to understand level of service concepts, and gain understanding of public perception of the levels of service.

1.5.1 Level of Service Workshop

A workshop was held with project staff from the Township on May 18, 2021, via online videoconferencing 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 Township, conducting individual and group discussions to identify important parameters for defining service delivery, and local issues and efficiencies for delivery.

1.5.2 Levels of Service Survey

The Township recognizes the importance of including feedback from the community in the development of the AMP, and wanted to ensure that the Plan reflected the desires, needs and values of the community. The community was asked for their input from February 27 to March 21, 2022 using social media on the Township's Facebook and Twitter, on the Township website and through notices. This survey was completed by a total of 103 respondents.

Some of the main themes that emerged from the survey results are:

1. The community is generally satisfied with the programs and services provided by the municipality, but street/road maintenance need improvement.
2. The majority of the respondents would like to receive services from the Township at a 'family diner' level of service with medium cost.
3. Overall, majority of residents are willing to pay an increase or slight increase in taxes to maintain the current levels of service.
4. The services that should be prioritized are street and road maintenance, garbage and recycling and snow removal.

1.5.3 Proposed LOS

The proposed LOS is an established target for the Township's LOS, set to guide the Township in their current and future asset management. Proposed Levels of Service are a requirement for compliance with O. Reg. 588/17. The Proposed LOS established within this report is the target to be achieved in 10 years, the year 2031.

To establish the proposed Levels of Service, the Township established the current level of service, and sought input from staff, the public (through levels of service survey), and Council to understand the preferred levels of service targets.

Through the process, three scenarios were generally considered for proposed levels of service, each a considering a different level of investment to the infrastructure, and the corresponding impact it will have on the level of service being provided. The scenarios considered included the following:

- No change in funding – LOS would decrease over time
- Increase in funding – LOS would be maintained over time
- Greater increase in funding – LOS would increase over time (increase would vary depending on funding increase)

Direction received from Township staff indicated that the current Levels of Service were generally found to be sufficient. Proposed Levels of Service are summarized in **Table 1-5**.

Table 1-5: Proposed Levels of Service for 2031

Asset Service	LOS Parameter	LOS Measure	2022 LOS Delivered	Proposed LOS for 2031
Paved Roads	Quality	Average pavement condition index (PCI)	73	73
Stormwater	Quality	Resiliency to 5- and 100-year storms	Most properties (assumed)	Most properties
Buildings and Facilities	Quality	Average condition of facilities	Good to Fair (or 2.4 out of 5)	Good to Fair (or 2.4 out of 5)
Fleet	Quality	Average condition of fleet and equipment	Fair (or 3 out of 5)	Fair (or 3 out of 5)

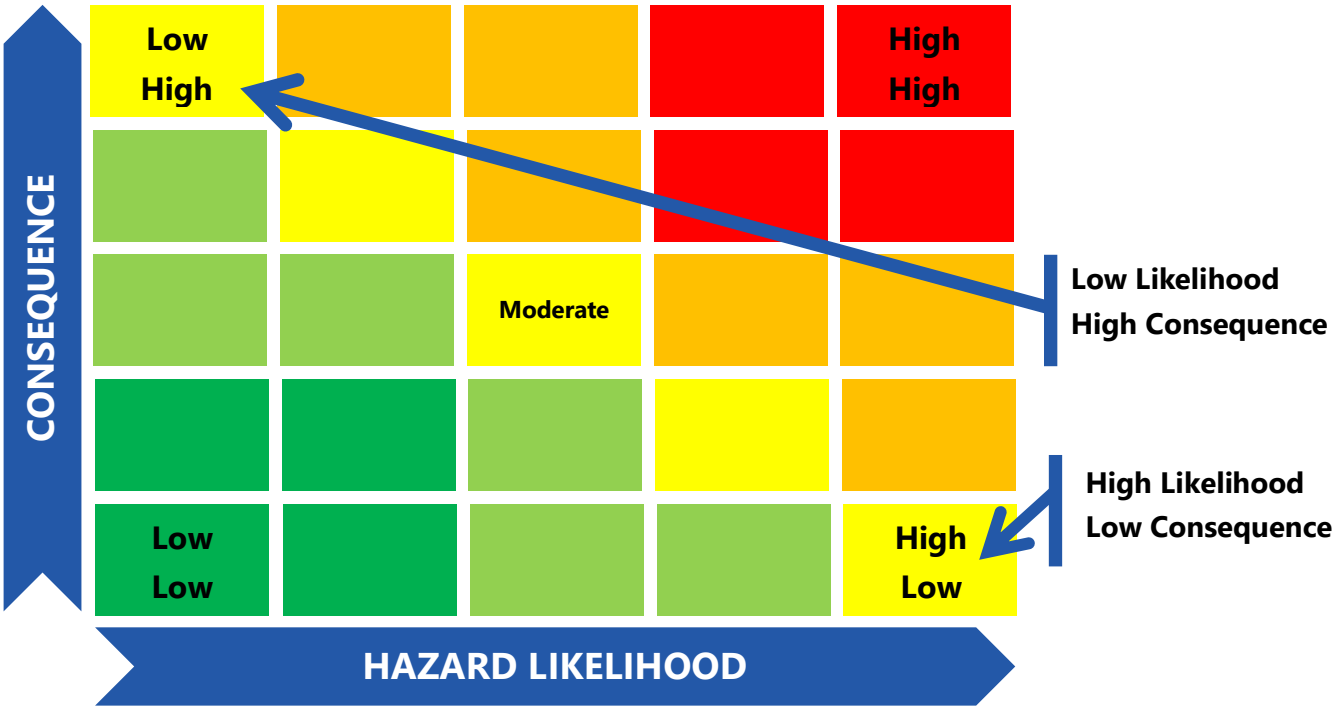
Note that the proposed LOS for stormwater is based on the resiliency requirement from O.Reg. 588/17, as individual assets are typically managed with the roads assets. The current LOS is based on assumption (detailed further in its respective section), however the proposed LOS can be confirmed with further study.

1.6 Risk

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.

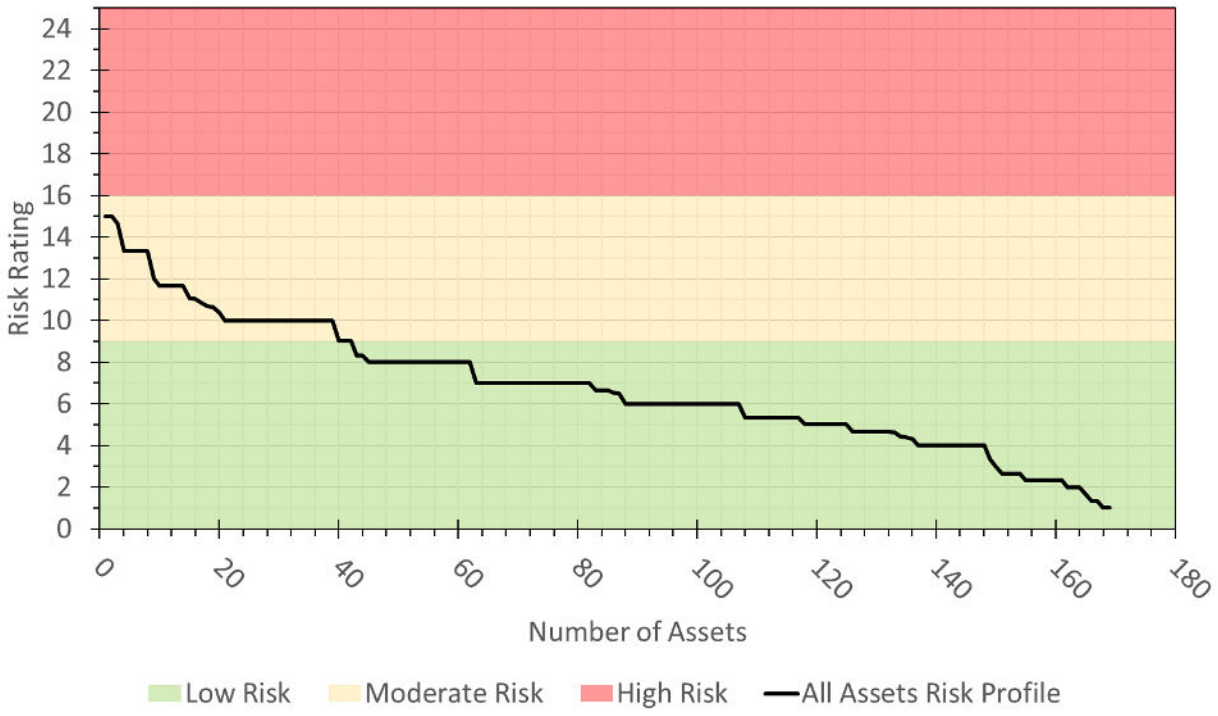
The assets with the highest risk rating identify the priorities for the Township. As part of assessing risk, consider the factors that increase the likelihood of a hazard occurring (or non-delivery of service) and the consequence. **Figure 1-6** presents a risk "heat map" plotting likelihood and consequence.

Figure 1-6: Risk Heat Map



A priority rating has been developed based on the calculated risk rating and displayed in **Figure 1-7**. 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).

Figure 1-7: Risk Profile for All Assets



Of the just under 170 assets tracked within the Township's asset management data, none are classified in the high risk range, with 39 in moderate and the remainder in low risk zone.

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.

1.6.1 Risk Workshop

A workshop was held with project staff from the Township on June 1, 2021, via online videoconferencing delivery.

The intention of the workshop was to engage with stakeholders, and gather qualitative information regarding asset risk within the Township'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 Township infrastructure. Discussion included broad discussion of risk related to assets at the Township, 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.

1.6.2 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).

1.6.3 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 1-6** for description of these factors.

Table 1-6: 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).

1.6.4 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 1-7** for description of consequence factors.

Table 1-7: 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.

1.6.5 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

Several other factors beyond risk are to be considered in identifying asset investment requirements and any associated projects. The Township 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

1.6.6 Climate Change

In the Risk Workshop, Township 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.

1.6.7 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 staff, reviewed reports or provided asset data.

1.7 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.

1.8 Asset Management Strategy

The following sections provide background information related to the development of the strategy, undertaking of the analysis and annual investment projections.

1.8.1 Asset Management Strategy

The intent of the strategy is to provide guidance for the Township in the management of the assets to achieve the goals of the asset management plan. The strategy for each asset type was devised using current practices at the Township 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 20 year timeframe of the AMP.

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

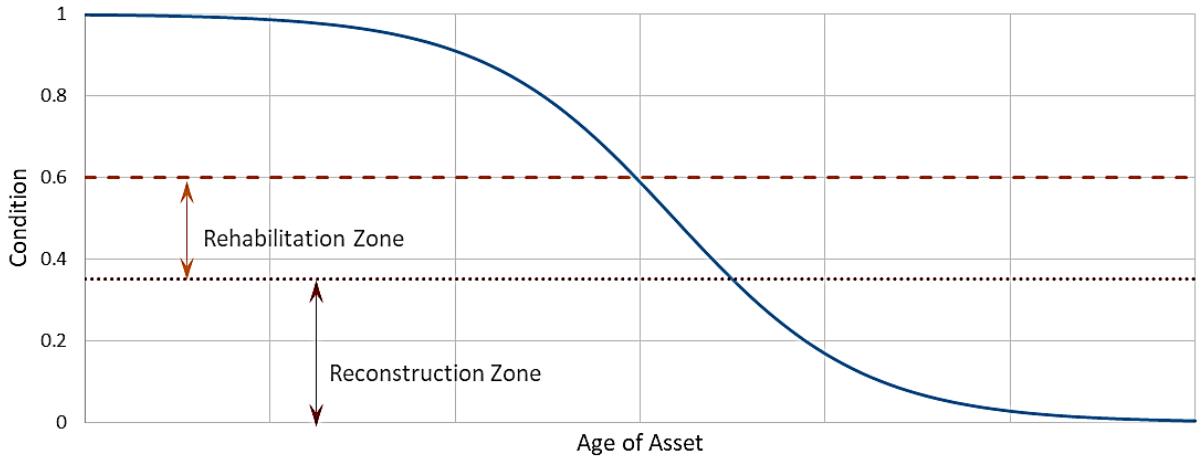
The primary indicator used in the development of a lifecycle strategy is the condition of each asset, as it can often be indicative of proximity to failure of the asset, performance of the asset, and increased risk. The strategy should also consider other factors, such as:

- Importance of the asset
- Asset risk score
- Condition of adjacent sections
- Replacement requirements for adjacent infrastructure
- Expansion requirements
- Maintenance frequency and type.

These factors will change throughout the lifecycle of an asset, influenced by age of the asset, continued development at the Township, and changing climate. The changing of these factors may impact the lifecycle of an asset, by changing the optimal solution for extending the lifecycle 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 assets deterioration. **Figure 1-8** 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 1-8: Theoretical Deterioration of Assets and Lifecycle Activity Opportunities



The opportunity windows (rehabilitation zone, construction zone) will vary depending on the asset, and the accepted condition level for the asset.

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

- Maintenance activities can be implemented 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; and
- Reconstruction and decommissioning will most likely occur within the reconstruction zone where rehabilitation will be insufficient to address issues with the asset.

The strategy should be reviewed and updated with the AMP according to the changes in practices or goals of the Township and the management of the assets.

Prior to making selection and implementation of a lifecycle activity, the Township 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
- Current and desired Levels of Service information

The analysis was undertaken using different methodologies for linear and vertical assets. Where possible, multiple scenarios were assessed to understand the investment level and overall condition of the assets for establishing feasibility of the goals of the asset management plan.

1.8.2 Growth

An important component in the asset management strategy across the asset categories is consideration of growth. Growth may impact how or when the Township chooses to implement the lifecycle activities.

Population and household data for the growth projections outlined within this chapter were obtained from the *County of Renfrew Official Plan, current to March 26, 2020,* and census data from Statistics Canada. It is noted within that the County of Renfrew Official Plan serves as the detailed official plan for the Township.

The Township comprises 524 square kilometres.

Population information for the Township is available from the Census Profile from the 2021 census, available from Statistics Canada. According to the census information, the Township had 2,995 residents in 2016, an increase of 2% from 2016. This included 1,305 occupied private dwellings.

As part of the County official plan, growth projections were undertaken, using the 2011 census as the base year for population. The projected growth included high and low projections, and are as shown in **Figure 1-9** below, excerpted from the Official Plan.

Figure 1-9: Growth Projections from County of Renfrew Official Plan

Municipality	Base Year Population 2011	% Share of County Growth (20 yr)		Projected Population 2016	2021	2026	2031	2036
Admaston Bromley	2844	0.6%	Low	2858	2873	2887	2901	2916
			High	2887	2930	2975	3020	3065

Within the County of Renfrew, there are four urban town locations, which are expected to incur the majority of growth within the County. These for urban town locations are all outside of the Township.

The County identified smart growth initiatives that will need to be achieved as part of the growth objectives. The initiatives are specific to the County and have not necessarily been identified for implementation at the Township level. The initiatives include:

- Improved telecommunication infrastructure;
- Upgrade or replacement of existing infrastructure (specifically water pollution control plants, water treatment plants, municipal airports, roads and bridges);
- Development of new infrastructure (specifically expansion of Highway 417);
- Development of economically-feasible and environmentally-responsible nutrient management and septage disposal systems;
- Development of brownfields;
- Development of the tourism sector; and
- Purchase of abandoned rail corridors.

The potential impact of growth on assets and lifecycle activities is summarized in **Table 1-8**.

Table 1-8: Lifecycle of Assets and Growth Assumptions

Asset Classifications	Growth Impact Assumptions	How Assumptions Relate to Lifecycle of the Assets
Roads	Noted focus on upgrade or replacement of existing roads infrastructure	Potential increase in road maintenance costs, capital expenditures (reconstruction of roads)
Storm Sewers	Increased service demands and expansion of network Increased storm volumes from urbanization	Potential increase in capital expenditures and maintenance costs due to increase in service network size and capacity
Buildings	Increased facility usage Changing service demands from aging population, general increase in population Changing service demands from increase in tourism sector	Increase in capital expenditure for facility development in response to growth Increase in operating costs for facility services and maintenance
Fleet	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
Equipment	Increased development will occur as a result of growth	Due to increased development, equipment required would be required to supply new facilities etc.

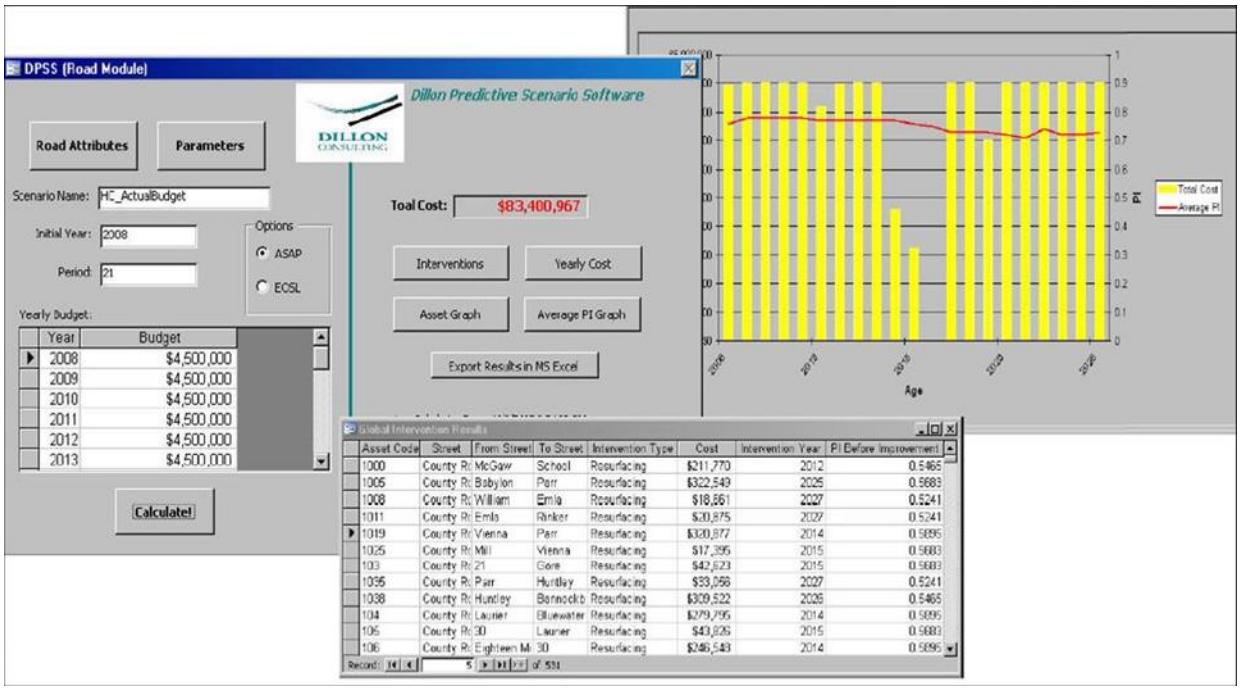
1.8.3 Analysis and Investment Projections

1.8.3.1 Linear Assets

For the preparation of a replacement and rehabilitation profile for linear assets, the Dillon Predictive Scenario Software (DPSS) was used. This tool is a Microsoft Access application that relies on an overall assessment of the infrastructure condition to produce investment scripts based on degradation curves, which are adjusted to the Township's particular operations and thresholds of acceptability.

The DPSS tool assesses the condition, and puts the Asset Manager in control of the lifecycle of assets. It also allows for planning as to where, when, how and how much to invest in the renewal and replacement of infrastructures for the coming year, or for the next 5, 10, 20 or 50 years. **Figure 1-10** provides a view of a screen capture of the DPSS analytical tool. The tool incorporates known asset information, deterioration data, and unit costs for rehabilitation of assets provided by the Town, to assess the network.

Figure 1-10: Dillon Predictive Scenario Software (DPSS)



Limitations of the program

The DPSS program operates within the bounds of assumptions and limitations in data inputs. The current operational limitations of the program that are relevant to this AMP include:

- The program cannot link adjacent asset segments. If an asset is broken into multiple adjacent components (such as a road from intersection to intersection), the program will view each inventory item as a single asset, and cannot connect projections for adjacent sections.
- The program cannot computer concurrent projections with multiple types of assets. Each instance of the program projects works for one asset category only.
- The prioritization of works in the outputs of the program are based on the condition of the asset.

1.8.3.2 Vertical Assets

The development of scenarios and capital expenditure projections for the vertical assets varied by asset type, due to the existing processes and the types of assets. A description of the process taken for each asset is described within their respective sections, however scenario development generally considered the following:

- Where available, existing reporting on assets was used to generate a prioritization of works. The projected works in this AMP were assumed to be consistent with recommendations in existing reports.
- Where prior information was not available, condition was assumed based on lifespan and age. Projection of works were estimated according to the expected lifespan of an asset. Due to the complexity of vertical assets, detailed assessment of maintenance and reconstruction works of the componentry was not undertaken. As such, individual component replacement costs and maintenance costs have not been projected as part of this AMP.

1.8.4 Limitations of the Asset Management Strategy

The strategy described in each of the asset category sections in this report reflects a typical process that can be implemented according to a number of factors, such as type of infrastructure, condition, importance, etc. The strategy will act as a guideline for the Township to use in asset management, however is not intended to be used as a step-by step plan. During the asset management process, there will be situations where deviation from the proposed strategy is appropriate, according to the specific conditions of the assets and circumstances of the works being undertaken.

As described above, many factors will influence the selection and timing for implementation of lifecycle activities within an asset's useful life.

1.8.5 Other Factors to Consider for Scenarios and Capital Projections

For the understanding and usage of the scenarios and capital projections within this AMP, the Township must also consider the following:

- The scenarios and capital projections conducted as part of this AMP were completed by asset category individually. As such, the results do not reflect efficiencies in completing works on adjacent infrastructure simultaneously.
- The scenarios and capital projections conducted as part of this AMP were completed by asset segment individually. As such, the results do not reflect efficiencies in completing works on consecutive asset segments simultaneously.

2.0 Roads

2.1 State of Local Infrastructure

The Township owns and maintains a network of paved and unpaved road assets. The network includes a total of 328 km of roads, of which 134 km is hard surfaces, and 193 km is unpaved. Approximately 50 km of the road network is not maintained during the winter months, the rest being maintained on a year round basis. The Township also maintains 17.5 km of boundary road through agreement with abutting municipalities.

The road network is made up predominantly of local roads, with all road assets being two-lane roads. A summary of the road network by surface type is presented in **Table 2-1**

Table 2-1: Summary of Linear Road Assets by Surface Type

Surface Type	Length of Road (km)
Gravel	193
Pavement	70
Surface Treatment	64

The length of roads can be further broken down by roadside environment, summarized in **Table 2-2.**

Table 2-2: Inventory of Roads by Environment

Environment	Length of Road (km)
Rural	297
Semi-rural	0.2
Semi-urban	16

A further 15 km of road have no roadside environment identified in the inventory.

The information reported in this AMP and the subsequent analysis are based on the current inventory maintained by the Township combined with PCI ratings assessed by Dillon in June of 2021.

2.1.1 Replacement Cost

The unit replacement costs for roads are based on recent tender information at the Township. The provided costs were inflated to represent current day dollars, and include contingency and engineering costs. Costs are as follows:

- Reconstruction (including pulverizing, granular base, shouldering, paving, line painting): $173,000/km
- Surface treatment: $9 /sq.m. (including double lift, pulverizing and granular costs)

The Township undertakes routine granular resurfacing at a cost of $14,500 per kilometer. This is based on a typical road width of 7m, and a 75mm (3 inch) depth of granulars applied.

The estimated replacement cost of the roads in the Township is $24,968,900.

2.1.2 Average Age

Average age of the assets is a way to report on the asset inventory and understand what the Township owns. In this case, the Township lacks readily available records on when the roads were originally built. Although the age can be used to provide guidance on when roads works should be undertaken, the Township's condition information can be used for this purpose, which is a preferred approach for identifying the required interventions to achieve levels of service.

2.1.3 Expected Useful Life

The expected useful life of the road assets is used to estimate the replacement schedule. The expected useful life values for road types within this report are as follows:

- Paved surfaces – 25 years
- Surface Treated surfaces – 15 years

These useful life values are under normal conditions. The Township can further refine these lifecycles with ongoing monitoring of road conditions. Each type of road classification was calculated based on PCI degradation curves.

2.1.4 Streetlights

Adjacent to the road network, the Township owns 52 streetlight assets. In 2018, all streetlight assets were upgraded to LED fixtures. Streetlights are typically reconstructed in conjunction with road reconstruction works.

2.2 Condition – Roads

Condition of the paved roads in the network was assessed in June 2021. The condition assessment was completed using an application, TotalPave, using the processes described in Section 1.3.1 to determine a PCI for each road section.

Since completion of the road condition survey, the Township undertook some road works, improving the PCI of some road segments.

Weighted by kilometres, this paved network has an average PCI of 73, an overall Fair rating. **Table 2-3** summarizes the condition of the paved roads by linear kilometer.

Table 2-3: Summary of Road Condition

Condition	Pavement Condition Index (PCI) Range	Linear km	Percentage of Total Road Network (by length)
Very Good	86-100	44.7	33%
Good	71-85	26.5	20%
Fair	56-70	45.5	34%
Poor	41-55	11.8	9%
Very Poor	1-40	6.6	5%

2.3 Current Levels of Service – Roads

Levels of service for road assets are outlined in Table 4 of the regulation, O. Reg. 588/17 **Table 2-4** and **Table 2-5** outline the Township's current community and technical levels of service for roads.

Table 2-4: Community Levels of Service - Road Assets

LOS Parameter	Community Levels of Service *O.Reg. 588/17* – Qualitative Description	Township Community LOS
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	The roads in the Township are intended to serve local and through traffic in semi-urban, semi-rural, and rural settings. Township roads provide connectivity between local communities, and between larger County managed roads including Highways 132 and 60.
Quality	Description or images that illustrate the different levels of road class pavement condition.	Road condition assessment undertaken in 2021 determined standard Pavement Condition Index (PCI) and International Roughness Index (IRI) values, using a combination of visual inspection and a smartphone-based system (TotalPave). TotalPave paved roadway assessment criteria is developed from the ASTM D6433-18- Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys. Road class pavement condition descriptions for the Township will be consistent with the ASTM.

Table 2-5: Technical Levels of Service - Road Assets

LOS Parameter	Technical Levels of Service O.Reg. 588/17 – Technical Metrics	Township Technical LOS
Scope	Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality.	• Arterial: 5.4km (0.01 km/sq.km.) • Collector: 0.0km • Local: 272.3km (0.52 km/sq.km.) *Note: land area of 520 square kilometers used.*
Quality	1. For paved roads in the municipality, the average pavement condition index value.2. For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).	1. PCI Paved roads: 73 2. Roads are re-graded on a regular basis by the Township, all unpaved roads were observed to be in Good condition

2.4 Current Performance – Roads

The Township has previously identified performance measures through which their roads assets can be measured, as part of development of the 2018 AMP. The performance measures fit within financial, quality and management categories. Additional quality measures have been added to build on performance definitions for the Township. The performance measures for Roads, and their current values are shown in **Table 2-6**.

Table 2-6: Road Performance Measures

Performance Category	Asset Performance Measure	Current Value
Financial	% annual (+) change in net book value of road assets	Reported annually in performance report.
Quality	% of roads with a net book value of 60% of original asset cost	Reported annually in performance report.
Management	% of capital rehabilitation projects completed on time and within budget	Reported annually in performance report.

Performance Category	Asset Performance Measure	Current Value
Quality	Roads with load restrictions	Vehicle loads are restricted to 5 Tonnes per axle on all Township roads.
Quality	Percentage of roads in fair or better condition	77%
Management	Staff time required to conduct roads maintenance	To be confirmed.
Quality	Staff time (hours) per road by maintenance activity	To be confirmed.

2.5 Risk Assessment – Roads

The risk ratings for the road assets followed the risk methodology and approach, presented in **Section 2.4**, and the assumptions and criteria listed below.

Condition: Determined based on results of roads condition survey, using Pavement Condition Index Rating

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

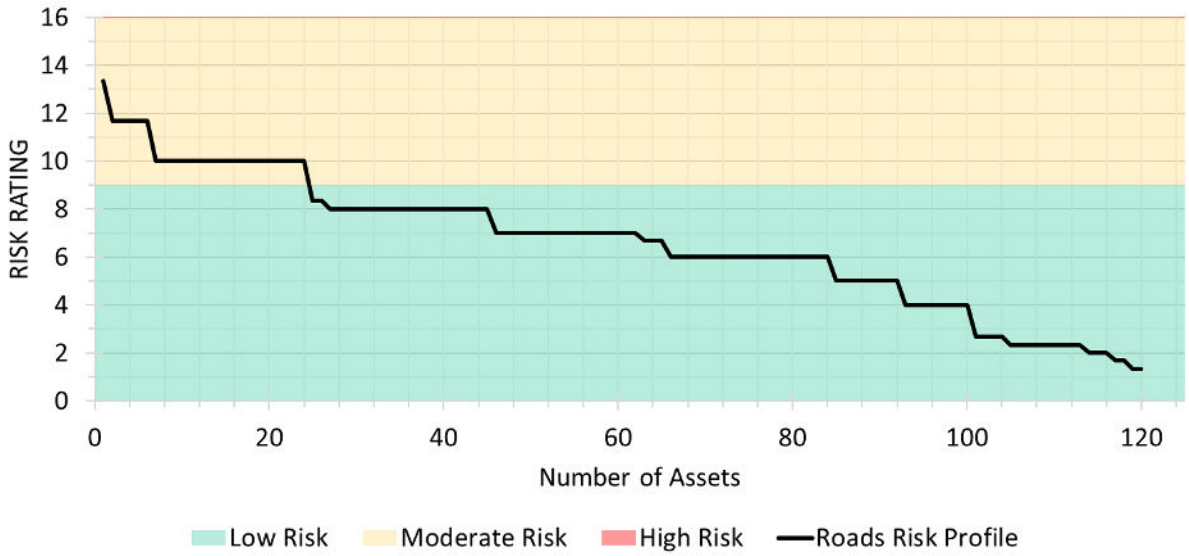
Climate Change: Assumed a value of 2 – assets are vulnerable to climate change impacts, but response and mitigation plan is in place (detours, internal and external response requirements to issues)

Impact: Low impact (value of 0) for roads with AADT values of 0-49
Moderate impact (value of 1) for roads with AADT of 50-399
High impact (value of 2) for roads with AADT 400 or greater

Importance: Low importance (value of 1) for roads with AADT values of 0-49
Moderate importance (value of 2) for roads with AADT of 50-399
High importance (value of 3) for roads with AADT 400 or greater

The risk assessment could be completed only for the paved road assets. The risk profile for these assets is shown in **Figure 2-1**.

Figure 2-1: Risk Profile for Paved Road Assets



The majority of assets are within the low risk range. Twenty-five assets, representing 34.9 km (25% of the paved road network) are in the moderate risk range, with the maximum risk value of 11.7. Note that risk assessment is undertaken for the paved road network only.

2.6 Lifecycle Activities – Roads

The following section describes the lifecycle activities that can be implemented within the asset management strategy for road assets. The primary lifecycle activities include construction, improvement, maintenance, and decommissioning/disposal. The lifecycle activities presented below were developed as part of the Township's 2014-2024 Asset Management Plan, and have been updated where appropriate to reflect current best practices for road asset management and maintenance.

2.6.1 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. 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 roadside environment (e.g., rural, urban).

2.6.2 Maintenance Activities

Maintenance activities are undertaken on the assets throughout their useful life to maintain their operating condition and performance. Maintenance activities can include the full road surface, or can be used to address localized repairs on the road surface. Maintenance activities include regularly scheduled inspections, maintenance, or more significant repair and activities associated with unexpected events. Maintenance activities for the Townships roads are undertaken by in house staff, using the Township's own equipment. This includes all routine maintenance for roads such as: pothole patching, shoulder grading, sign maintenance, winter maintenance, surface grading, replacement of small diameter culverts on unpaved roads and hand brushing.

The selection of the maintenance activity is dependent on a variety of factors, including road surface type (material, urban/rural classification), condition (surface and road base), road works history, importance, among others.

The typical maintenance activities undertaken by the Township are described below.

2.6.2.1 Gravelling

Gravelling is the upgrading of the surface course of existing gravel roads. These roads degrade over time, through the typical action of traffic, rain, snow, and snowplowing. Gravel is slowly removed from the road surface resulting in wash-boarding, potholes, road breakup/softening, washouts or other issues that significantly detract from the surface, riding quality, and safety of the roadway. Gravel roadways require ongoing maintenance to restore the correct crossfall of the roadway and also to ensure that water does not pool on the road surface.

2.6.2.2 Shouldering

Shoulders are important components of road infrastructure, protecting the edge of the road surface and supporting surface water drainage. Shoulders require ongoing maintenance (grading) to prevent the loss of lateral support, to prevent the deterioration or failure of the road edge, to eliminate distortions such as wash boarding, ruts and potholes, and to maintain roadside drainage patterns.

Shoulders should be inspected regularly and, ideally, graded once in any five year period for hardtop surfaces. Granular surface shoulders would ideally be addressed during the yearly grading program.

2.6.2.3 Ditching

Ditches are constructed to convey water from storm runoff to an adequate outlet. For rural and some semi-urban areas ditches are the sole method of conveying water and maintaining dry road granulars.

Ditches have a tendency to fill-in over time, primarily due to natural erosion and vegetation. Periodic maintenance is required in order to remove this accumulation and reinstate the designed ditch line. A properly designed and maintained ditch will continue to drain surface water away from the road surface and add to the life of the road.

The Township reviews and inspects ditching on a rotating five year schedule to determine works to be conducted to maintain the ditching, including culverts. The identified works are incorporated into the culvert inspection program.

2.6.2.4 Culverts

Preventative culvert maintenance will extend the life of the structure and ensure that it functions as designed. Culvert maintenance includes the removal of accumulated debris (e.g., logs, boulders, garbage, ice build-up) that prevents the efficient passage of water through the structure. Culvert maintenance may also include the reinforcement of eroding inlets and outlets. Culverts requiring continual regular maintenance should be considered for future reinstallation for the purpose of addressing the problem.

2.6.2.5 Crack Sealing

Crack sealing is recognized as an effective preventative maintenance activity that can extend the life of existing roads. It entails the mechanical removal (routing) of the crack and re-sealing of the surface. The effect is to prevent water from entering the road base and accelerating the deterioration of the road. The overall impact to the road is an approximate increase in lifespan of up to 5 years. It is recommended that crack sealing be implemented by the Township on selected roads to ensure that they obtain the maximum life from the road surface. If crack sealing cannot be implemented for a given road, it is likely that said road will experience an accelerated deterioration rate.

Crack sealing can only be implemented when single linear or short spider cracks are evident in the road surface. When the road has begun alligator cracking, crack sealing is no longer an effective strategy. For this reason is recommended that roads having condition ratings between 7 and 8 be reviewed for their suitability to apply crack sealing. It is anticipated that implementing a crack sealing program will be discussed with the Township in the coming years.

2.6.2.6 Other

This category refers to unscheduled or emergency maintenance items (i.e. road washouts, storm damage) that are not contemplated as part of scheduled maintenance works. Local staff and officials are likely to be the first responders to address these emergencies. These unscheduled items may result in an immediate decrease in service levels, and possibly health and safety consequences to service users. These items should be addressed as soon as possible.

2.6.3 Renewal Activities

Renewal activities are more comprehensive works that include an entire road surface or segment. These replace significant parts of the road but provide large improvements to condition and lifespan. These works can include:

- Resurfacing
- Partial depth reconstruction
- Paving of gravel roads
- Returning paved roads to gravel

Replacement (Reconstruction) activities are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option. In this situation, full depth reconstruction is an appropriate option to address the road.

2.6.4 Operating Activities

Operating activities can be undertaken throughout the lifecycle of the asset. Operating activities 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 operating activities can include non-infrastructure solutions (such as policies, limiting truck traffic, planning reports), and monitoring/ inspection of the assets. Inspection of the road assets can be completed internally (on an ad hoc or recurring basis), to larger programs conducted by third parties (such as visual inspection conducted in 2021). The inspection program can include a combination of the effort types to suit the needs of the Township.

2.6.5 Decommissioning Activities

Decommissioning activities are typically undertaken at the end of the lifecycle of an asset, however can be used prior to that stage due to other driving factors.

Decommissioning activities of the road assets includes removal of the road from service. A road may be removed by 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.

Decommissioning 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.

2.6.6 Non-Infrastructure Solutions

Non-infrastructure solutions are actions or policies that can lower costs or extend asset life.

The Township can obtain improved efficiencies through integrated infrastructure and land use planning. This strategy relies upon the coordination of municipal capital activities with other stakeholders to ensure that capital activity is not duplicated. Activities should be scheduled in an efficient and compact manner to obtain the maximum economies of scale. If a short 100m section of roadway is intended to be rehabilitated, and it is adjacent to a longer roadway, rehabilitation of both at the same time should be considered. Savings will result from a reduction in mobilization and small volume premium costs. Every capital expenditure has a mobilization cost, and dispatching resources to attend to a multitude of smaller capital works is not an efficient use of those resources. Small capital projects cannot take advantage of economies of scale, which results in increased costs and decreased value delivered.

The Township should encourage higher density development along existing roads.

2.6.6.1 Expansion Activities

Expansion activities are planned activities required to extend services to previously unserviced areas – or to upgrade services to meet growing demands. No expansion activities are planned over the 10 year planning period.

2.7 Asset Management Strategy – Roads

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 Township has a general strategy for their gravel and paved roads, including a generalized estimation of when repairs are reconstructions are expected to be required.

Paved roads are expected to undergo treatment according to the following:

- Total resurfacing to be done every 15 years

The Township had previously been targeting a program in which single surface treatment would be completed every 3-4 years, however this is not currently being implemented as a component of the strategy. The Township can re-evaluate the efficacy of the program and determine in future if this can be reincorporated into the strategy.

Unpaved roads are expected to undergo treatment according to the following:

- Application of granulars (75mm depth) on a 7 year cycle
- grading on an annual basis

Application of the strategy will vary according to a variety of factors, including the following:

- Actual condition and deterioration of the road asset. Factors can impact the actual deterioration rate of an asset from the theoretical such as improper construction, weather, usage of the road asset. This can be updated on an ongoing basis through recurring assessments.
- Works required on adjacent infrastructure. Where adjacent linear infrastructure requires replacement (buried infrastructure such as stormwater pipes or other utilities), road works may be undertaken in advance of the typical schedule as part of rehabilitation works.
- Works required on adjacent asset segments. Where adjacent segment(s) of road requires implementation of a lifecycle activity, there may be cost efficiencies in conducting the activities on multiple segments, even if it occurs ahead of the typical timeframe.

The age of the asset is the primary driver of roads asset management strategy for the Township. The Township currently maintains records of the roads in a spreadsheet-based database, updated on an ongoing basis, which can be improved by recording the latest date of construction and implementation of a lifecycle activity, such that the asset can be tracked through its lifecycle and maintenance activities completed.

The age of the asset can be an indicator of probable condition, however actual condition information from roads assessments can be valuable in proceeding through the strategy and identifying appropriate lifecycle activities.

An asset condition assessment program for roads can assess the assets on a regularly scheduled basis wherein the entirety of the network is reviewed in portions over a specified timeframe (for example 1/5 of the network in a 5 year timeframe), or all assets to be done in one assessment year, with assessment recurring every few years.

A variety of methods can be implemented for undertaking condition assessment of roads, including visual inspection, and usage of technological systems such as street scan technology. The assessment can be conducted in-house by Township staff or through acquisition of a third party assessment. The Township has most recently undertaken an assessment of all of the paved surfaces in the road network using a third-party technology.

In addition to the condition, prioritization and selection of a road asset for implementation of lifecycle activities can consider the following:

- Importance of the asset
- Asset risk score
- Condition of adjacent sections
- Replacement requirements for adjacent infrastructure (e.g. storm or roadworks)
- Upstream dependency and expansion requirements.

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. The Township undertakes regular minor maintenance activities to extend the useful life of the road assets.

Rehabilitation activities should be undertaken on an asset when it has deteriorated past the point where maintenance activities would be adequate to address condition issues. Selection of the appropriate rehabilitation activity will depend on the road surface material, stage in lifecycle, and severity and type of deterioration. Paved roads are candidates for rehabilitation works when they have deteriorated past a 60 PCI, or a condition description of fair or lower.

Crack sealing can only be implemented when single linear or short spider cracks are evident in the road surface. When the road has begun alligator cracking, crack sealing is no longer an effective strategy. For this reason is recommended that roads having ‘good’ condition ratings be reviewed for their suitability to apply crack sealing. It is anticipated that implementing a crack sealing program will be discussed with the Township in the coming years.

At the point where a road asset has deteriorated such that maintenance and rehabilitation options will be inadequate to address condition issues, the road can be a candidate for reconstruction. The PCI value at which the Township considers a road for reconstruction is 40 or less, or a condition description of 'very poor'. The depth of reconstruction (either surface or full depth including road base) will need to be identified. This distinction is made through a variety of factors, primarily the age of the asset and the history of lifecycle activities. A road candidate for rehabilitation will typically have progressed through the lifecycle activities as suggested in the above table. Reconstruction works will result in a road segment being at a very good condition rating.

Alternatively, at the end of the lifecycle of a paved road, the Township may choose to change the level of service of the particular road by changing its surface material from paved to gravel. This change in surface type would alter the lifecycle and investment requirements for the road segment. The Township has previously considered this activity for roads according to their average annual daily traffic (AADT), where it is less than 200. This activity can also be considered for roads with AADT up to 400.

Reconstruction and rehabilitation works offers the Township 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. The Township typically includes provision for ditching works and culvert installations as part of all road reconstruction or rehabilitation works.

The Township's typical prioritization method for conducting works to the road assets is by 'worst first', in which the poorest condition assets are prioritized for mitigation.

2.7.1 Scenario Analysis

To understand the needs and projected works on the paved road assets within a 20 year outlook, lifecycle activities were reviewed under varying budget values to understand the impact on overall network condition. In the analysis, reconstruction activities are recommended when a road has a condition rating of between 0 and 40, and rehabilitation works are between 40 and 50. Reconstruction of a segment will return the segment to a condition index of 100, while rehabilitation will only return a road to a condition index of 80. The budget scenarios were analyzed in three components, to include considerations for reconstruction only, layering in rehabilitation, and impacts for removal of low AADT sections.

Scenarios analyzed included: road reconstruction only (Scenarios 1, 2, 3a, 3b and 4); layering in rehabilitation (scenarios 5, 6a and 6b); and removal of low AADT roads (scenarios 7 and 8).

Road Reconstruction Only

1. Do Nothing – To assess how the condition of the assets changes if no lifecycle activities are implemented
2. Unlimited Funding Scenario – To determine backlog of works
3. 2013 Road Appraisal Study Cost
    a. Recommended budget found in 2013 study ($1,800,000)
    b. Recommended budget found in 2013 was inflated using the Bank of Canada Inflation Index to 2022 dollars ($2,230,000)
4. Reduce Current Condition (60) – Defining the budget to reduce condition (within an acceptable range)

Layering in Rehabilitation (10 year scenarios)

5. Unlimited Funding Scenario
6. Budgeted Scenarios
    a. Maintain Current Condition (73)
    b. Reduce Current Condition (60)

Removal of Low AADT Roads

7. Unlimited Funding Scenario
8. Maintain Current Condition (73)

A summary of the analysis is outlined in **Table 2-7** below.

Table 2-7: Analysis Results for Road Assets (20 Year Timeframe)

Scenario	Scenario Type	Budget Scenario	Average Annual Investment Over Timeframe	Total Investment over Timeframe	Average PI (End of Timeframe)
1	Recon Only	No Budget	$ -	$ -	0
2	Recon Only	Unlimited Budget	$2,335,783	$46,715,662	92
3a	Recon Only	2013 Budget	$1,356,123	$27,122,464	73
3b	Recon Only	2013 Budget Inflated to 2022	$1,815,685	$36,313,704	83
4	Recon Only	Reduction of Condition (to 0.6)	$704,507	$14,090,139	61
5	Recon and Rehab (10 years)	Unlimited Budget	$1,695,506	$16,955,063	74
6a	Recon and Rehab (10 years)	Maintain Current Condition	$1,053,901	$10,539,008	74
6b	Recon and Rehab (10 years)	Acceptable Condition (60)	$997,572	$9,975,720	60
7	Low AADT to Gravel	Unlimited Budget	$2,019,613	$40,392,254	92
8	Low AADT to Gravel	Maintain Current Condition (73)	$997,829	$19,956,575	72

Note that the analysis above is for a twenty year timeframe only, unless otherwise noted.

The annual value of the budget scenarios are maximum investment value per year.

The selection of an investment level for the roads strategy should consider the current and intended level of service, affordability, effectiveness of the scenario, and backlog of works.

Scenario 1 reviews the impact on average network condition if no works are conducted on the assets. The road assets are allowed to deteriorate to understand the impact on overall condition and level of service if no intervention were used. With no investment, after 16 years the roads have deteriorated to an average condition of 0, and remain for the remainder of the scenario.

Scenario 2 assumes an unlimited budget available for reconstruction of the road assets. In the first year of the scenario, $4.62M in reconstruction works were identified, indicating that there is a backlog of repairs required to improve the condition of the assets. The backlog includes any assets that are currently at a condition rating (PI) of 40 or less.

Scenario 3a reviewed the investment level recommended as part of the 2013 Road Appraisal, which has an annual investment value of $1.8M. At this investment level, by the end of the 20 year timeframe there has been approximately $27.2M total expenditure, with the available budget being utilized in nearly each year in the scenario. Within the scenario there is fluctuation in the PI, with it the average PI ranging between 83 and 86 in years 2030 to 2035. At the end of the scenario the average condition is improved to 73. This investment level is also representative of the funding that would be required to maintain the current condition.

Scenario 3b reviews the same investment level recommended as apart of the 2013 Roads Appraisal, but inflates the annual investment value to 2022 dollars using the consumer price index and the Bank of Canada inflation calculator, which has an annual investment value of $2.23M. At this investment level, by the end of the 20 year time frame there has been approximately $36.3M in total expenditure. At the end of the scenario the average condition is 83.

Scenario 4 reviewed the annual investment requirements when targeting a reduced condition rating of 61 over the analyzed timeframe. The investment value is approximately $0.9M annually, with most of the budget being used in every year of the 20 year timeframe. This allows the Township to understand the funding requirements for a road condition average that is less than the current condition but still within a best practice range.

Scenario 5 included rehabilitation works in addition to reconstruction. The scenario assumed an unlimited budget available for works. In the first year of the scenario, $6.9M of works were identified, indicating that there is a backlog of repairs required to improve the condition of the assets. The backlog is higher than indicated within the reconstruction-only scenario due to the inclusion of maintenance works on the roads in condition range of 40-50.

Scenario 6a included rehabilitation works in addition to construction, and reviewed the annual investment requirements when targeting the current condition rating over the analyzed timeframe. The average required annual investment is just over $1M, and the scenario achieves a condition rating of 74. Note that the unlimited budget achieves a very similar condition rating and expenditure, the difference being attributed to the constraints on the budget each year of the scenario.

Scenario 6b included rehabilitation works in addition to construction, and considered the budget that would be required if the condition were permitted to decrease from the current condition, while maintaining it at or above best practice condition range. This scenario targeted 60, and at the end of the timeframe achieved a 61. The average annual expenditure was reduced from the previous scenario, costing only

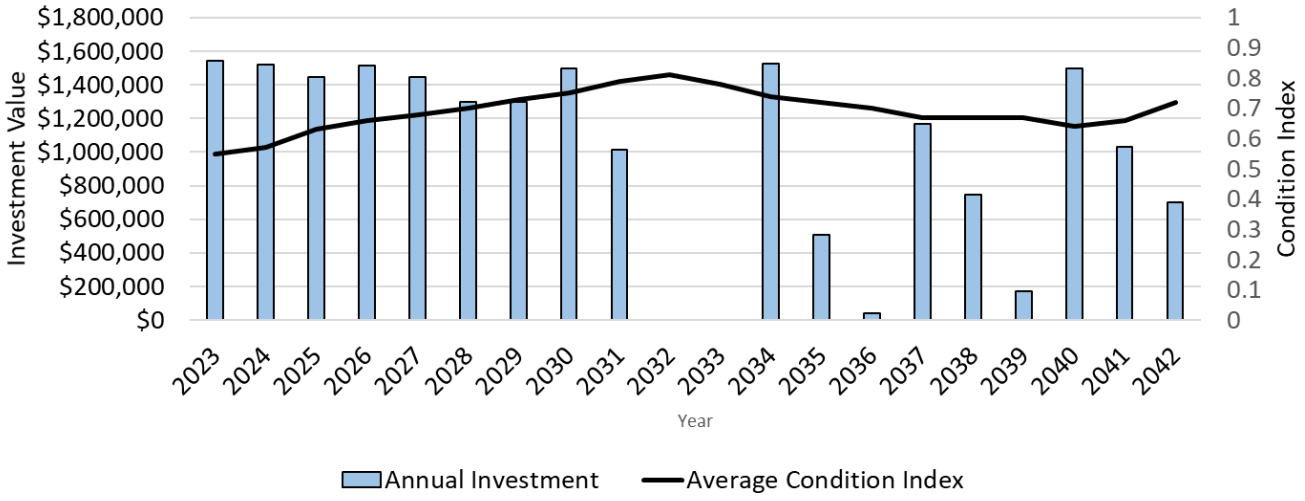
Scenario 7 included rehabilitation works in addition to construction, and does not include works on roads with AADT less than 200. The scenario assumed an unlimited budget available for works. In the first year of the scenario, $3.5M of works were identified, as a backlog of required repairs. At the end of the scenario, there is an improvement in average PI, up to 92.

Scenario 8 included rehabilitation works in addition to construction, and does not include works on roads with AADT less than 200. The scenario included annual investment requirements when targeting the current condition rating. The investment required was $1.6M, which was used each year of the scenario for the first 10 years and then reduces over the final 10 years. The total expenditure over 20 years is just under $20M with an average condition of 72 at the end of the timeframe.

In selecting the recommended investment level and strategy, the Township should consider its current and preferred level of service being provided. The LOS is represented in these scenarios as the average condition of the assets, and the surface type of the roads. The Township can adjust the level of service being provided by changing the overall condition of the assets or as suggested in the strategy, by changing the surface type of the roadways. If the Township's target is to maintain the current LOS, Scenario 8 would be the recommendation, however this would include the change in road surface type to gravel for the roads with low AADT. The annual cost for usage of this scenario is less than that which maintains the paved surfaced assets.

Based on the current level of service and previous strategy used by the Township for roads management, it is expected that the Township will proceed with Scenario 8, where the current condition average is maintained, with the low AADT roads being returned to gravel at the end of their lifespan. The annual expenditure and expected average condition rating for this scenario are shown in **Figure 2-2**.

Figure 2-2: Annual Expenditure and Condition Rating for Maintaining Current Condition (Scenario 8)



2.7.2 Gravel Roads

The Township's current strategy for management of the granular roads is consistent with the strategy set forth in the 2014-2024 AMP. The strategy includes application of granulars on a rotating 7 year cycle. The Township has 190 kilometres of gravel roads, which results in approximately 27 kilometers of roads undertaken each year.

The Township currently utilizes 10,000 tonnes of granulars per year, however the target is to expand this program to be 30,000 tonnes. The expected annual cost of application of the granulars is $389,000.

3.0 Stormwater

3.1 State of Local Infrastructure

Stormwater management in the Township is achieved through buried infrastructure, ditching, and overland flow, varying based on location through the Township. The stormwater management assets generally are located adjacent to road assets. Where development is more centralized within the hamlets of Douglas and Osceola there is a more urban-style system consisting of interconnected buried pipe infrastructure. In the rural areas, the stormwater management is achieved primarily through ditching and culverts. The topography of the Township allows for conveyance of flows away from properties quickly to larger systems or outlet points.

The Township's inventory of stormwater management assets includes catchbasins, culverts, and storm pipe, however is incomplete. Historical records are not available for the majority of existing assets, however the inventory has been updated with recently constructed assets and can continue to be updated as stormwater management assets are reconstructed or as additional information becomes available. A summary of the current inventory of stormwater assets is shown in **Table 3-1**.

Table 3-1: Inventory Summary for Stormwater Assets

Asset Type	Quantity	Average Age	Inventory Details
Storm pipe	1,052 m	unknown	972 m located in Douglas 80 m located in Osceola
Culverts	58 assets	8.4 years	26 Assets in Cobden Road 32 assets in Stone Road
Catchbasins	30 assets	unknown	26 in Douglas 4 on Micksburg Road in Osceola

Within the town of Douglas, there is approximately 1.6 kilometers of buried pipe infrastructure. The pipe assets connect to drainage system along Highway 60 right-of-way, which is not maintained by the Township. In 2010, some of the storm pipe and catchbasins were replaced. In 2018, road reconstruction occurred on Victoria, McHale, Church and Robertson Streets, during which buried storm pipe infrastructure was constructed, including just over 210 meters of pipe.

The rural culvert systems are typically constructed of corrugated steel pipe (CSP) or HDPE material types. The Township maintains a record of known culvert assets, in Cobden Road and Stone Road. This inventory includes 58 assets, with 26 Assets in Cobden Road and 32 assets in Stone Road. The installation dates for the known culverts range from 2004 to 2020, and diameters range from 300 mm to 1200 mm. It is not expected that this inventory is exhaustive of culverts within the Township.

The catchbasin inventory includes assets in Douglas and Osceola. In inventorying the catchbasins, the Township included an estimated cost, condition rating and year of replacement for each asset.

The Township's stormwater system currently does not include any of the following types of assets:

- lateral connections to properties.
- culvert structures 3 m in diameter and larger (responsibility of the County).

For future asset management purposes, it is recommended that the Township continue to establish and maintain an inventory related to the other stormwater infrastructure, including type, size, location of the infrastructure. While establishing the inventory, newly constructed assets should be added, and where possible existing infrastructure can be inventoried (noting that it is an estimation, such as measuring lengths of existing infrastructure).

3.1.1 Replacement Cost

Replacement costs for the stormwater infrastructure are typically estimated at time of required works as part of the road works projects, as stormwater replacements and works are typically incorporated within roads projects. Replacement of stormwater assets is typically undertaken as part of road works. If replacements continue to occur as part of larger works, there may be efficiencies in costing.

There are limitations in developing a replacement unit cost for valuations, due to the variability in construction conditions of the stormwater assets. In determining a replacement cost, the size, length, material and depth of the asset must be considered. As these factors vary significantly across the Township's stormwater assets (depending on location and topography), similarly the replacement costs will also be variable. Replacement costs should be reviewed on a case by case basis according to the requirements of the stormwater infrastructure, with this typically being undertaken by the Township in conjunction with adjacent road works projects.

As the Township continues to expand the stormwater database, replacement costs may be estimated and tracked based on recent tender information or typical material unit costs in the region. Estimating the replacement cost of all stormwater assets is not possible at this time due to the limitations in inventory.

3.1.1.1 Catchbasins

As part of the 2018 AMP, the Township projected a replacement cost of $7,000 per catchbasin. These values have been inflated to reflect a 2022 value, using an average of CPI inflation from 2018-2021 (value of 2.075%). It is assumed that the replacement cost for a catchbasin asset is $7,600. The current replacement cost for all catchbasin assets is $236,400.

3.1.2 Average Age

The rural system (ditching and culverts) have installation dates preceding amalgamation of the Township. Records of assets do not extend back this far, and therefore determination of the average age of assets is not possible. As assets are replaced, the Township can improve age based record keeping.

The Township has some records for the culverts on Cobden and Stone Roads constructed from 2004 onwards. Of these 58 assets, the average age is 8.4 years.

In 2009, 175 m of the storm sewer in Douglas were replaced including 9 catchbasins and 3 manholes, which would have an age of 14 years.

3.1.3 Expected Useful Life

The expected useful life of the stormwater assets can be used to estimate the replacement schedule and condition of the infrastructure. A summary of typical expected useful lives for materials used in stormwater assets is in **Table 3-2**. These represent typical values for the material, useful life of individual assets may vary depending on construction, ground conditions, and operations and maintenance activities for the asset.

Table 3-2: Expected Useful Life for Stormwater Pipe and Culvert Materials

Pipe Material Type	Expected Useful Life (years)
Concrete	90
CSP	25
HDPE	80
PVC	100

The ditching that forms part of the stormwater assets do not have an attributed expected useful life span, as they will continue to be useful as long as they are maintained to allow proper operation, and are sized adequately for the conveyance needs.

The expected useful life of catchbasins in the Township is approximately 40-50 years.

3.2 Condition – Stormwater

The Township has some programs in place presently for assessing the condition of the stormwater assets on a routine basis. Due to limitations associated with asset inventory (particularly as it relates to age of the assets), the condition of the assets without inspection information cannot be estimated at this time.

To continuously improve its inventory of stormwater assets, the Township can build on its existing inspection program to incorporate all stormwater assets on a routine inspection schedule according to best practice frequency. Condition can be estimated by visual inspection by Township staff, or through more formalized programs such as third party assessments, or video-based assessments such as CCTV or Zoom camera assessment.

The storm pipe assets do not presently have sufficient information available to estimate condition.

3.2.1 Culverts

The known inventory of culverts do not have condition assessment information available, however with the known age and expected useful life, the percentage of expected useful life remaining can be used as an indicator of approximate condition. The table below summarizes the useful life, condition rating estimate, and quantity of culverts within each range.

Table 3-3: Expected Useful Life for Stormwater Pipe and Culvert Materials

%age of Expected Useful Life Remaining	Associated Condition Rating	Associated Condition Description	Quantity of culverts
80 to 100%	1	Very Good	39 assets (67%)
60 to 80%	2	Good	2 assets (3%)
40 to 60%	3	Fair	5 assets (9%)
20 to 40%	4	Poor	12 assets (21%)
0 to 20%	5	Very Poor	0 assets (0%)

Overall, the average estimated condition of the known culvert inventory is 1.8, or good to very good.

3.2.2 Catchbasins

A condition assessment was undertaken for 30 catchbasin assets in 2018 as part of the AMP development. Each of the catchbasins was attributed a value on a scale of 1-10, where 10 represented the best case asset condition. For consistency with the condition ratings for other assets within this AMP, the condition rating was changed to a 1 to 5 scale (where 5 represents poorest condition). The average condition rating found in 2018 was 1.5 or good/very good.

The Township typically finds that a catchbasin will deteriorate from a condition score of 10 to a score of 2 in a timeframe of approximately 40-50 years.

Assuming an expected useful life of 50 years and a linear deterioration of the asset during the lifespan, the present day (2022) condition was estimated for the assets. The average condition rating for the 30 assets is 2, or good. The rating is consistent with the Township's current understanding of the catchbasin condition.

Catchbasin inspection is completed on an annual basis.

3.3 Current Levels of Service – Stormwater

Levels of service for stormwater assets are outlined in Table 3 of the regulation, *O.Reg. 588/17*. **Table 3-4** and **Table 3-5** outline the Township's current community and technical levels of service for stormwater assets.

Table 3-4: Community Levels of Service - Stormwater

LOS Parameter	Community Levels of Service O.Reg. 588/17 – Qualitative Description	Township Community LOS
Scope	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.	The stormwater management system in the Township is devised of a pipe network and drains, which provide conveyance of stormwater to protect properties. Stormwater assets are located alongside of the Township road network.

Table 3-5: Technical Levels of Service – Stormwater

LOS Parameter	Community Levels of Service O.Reg. 588/17 – Technical Metrics	Township Technical LOS
Scope	1. Percentage of properties in municipality resilient to a 100-year storm.	The Township does not have recorded flooding complaints. The percentage of properties in the Township that are resilient to a 100-year storm currently unknown. It is recommended that further studies be completed in the future in order to assess the LOS metric. Based on the topography and available outlet locations, it is expected that most properties will achieve resiliency to the 100-year storm.
	2. Percentage of the municipal stormwater management system resilient to a 5-year storm.	The Township does not have recorded flooding complaints. The percentage of the municipal stormwater management system resilient to a 5-year storm is currently unknown. It is recommended that further studies be completed in the future in order to assess the LOS metric. Based on the topography and available outlet locations, it is expected that most properties will achieve resiliency to the 5-year storm.

3.4 Current Performance – Stormwater

Asset performance can provide relevant metrics against which the Township can gauge the performance of their assets. The performance measures for stormwater, and their current values are shown in **Table 3-6.**

Table 3-6: Stormwater Performance Measures

Asset Performance Measure	Township Performance
Total operating costs for stormwater services	Not currently tracked by the Township
Percentage of the community with stormwater quality and quantity control	To be established
Inspection frequency of catch basins	Annually

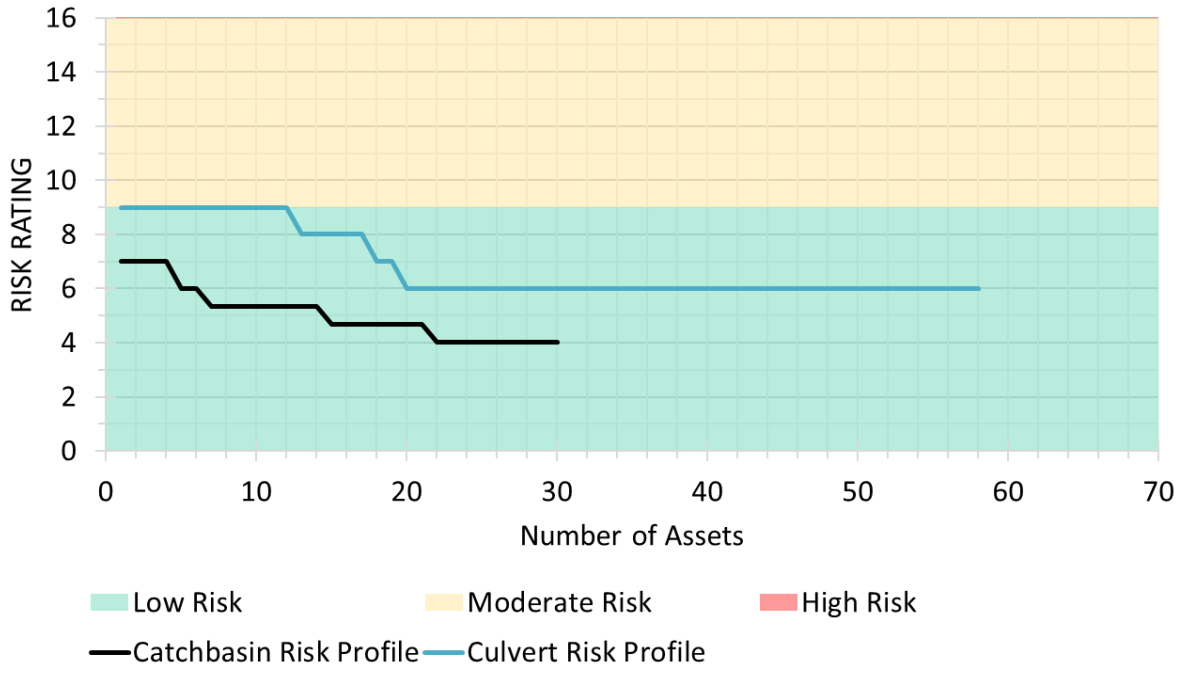
3.5 Risk Assessment – Stormwater

The risk ratings for the stormwater assets followed the risk methodology and approach, presented in **Section 1.3**, and the assumptions and criteria listed below.

Condition:	Determined based on estimated condition (using typical useful and age to calculate remaining life) and any known condition information included in data
Performance:	Assumed to be usually reliable (value of 2)
Climate Change:	Assumed a value of 3 – assets vulnerable to climate change, however sizing and topography of Township mitigate some flooding concerns. Currently undergoing work on stormwater assets to improve resiliency (cleaning, replacing, inventory).
Impact:	Moderate impact (value of 1)
Importance:	Moderate importance (value of 2) Low importance (value of 1) for Douglas Hamlet catchbasins

Due to the limitations in inventory, the risk assessment could be completed only for the catchbasin assets and known culvert inventory. The risk profile for these assets is shown in **Figure 3-1**.

Figure 3-1: Risk Profile for Stormwater Assets



All of the assets were within the Low Risk zone, with the highest catchbasin risk score at 7, and the highest culvert risk score at 9.

3.6 Lifecycle Activities – Stormwater

The lifecycle activities employed throughout the lifecycle of an asset will vary depending on the type of asset. The expected lifecycle activities to be used on the Township assets are as follows:

3.6.1 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 stormwater infrastructure is existing, or as part of road reconstruction works where existing infrastructure is being replaced. 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.

3.6.2 Maintenance Activities

Maintenance activities are undertaken on the assets throughout their useful life to maintain their operating condition and performance. Catchbasins are maintained through routine cleaning. 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.

3.6.3 Renewal Activities

Renewal of the stormwater assets pertains primarily to the pipe assets, and 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.

3.6.4 Operating Activities

Operating activities 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 operating activities can include non-infrastructure policies, and monitoring/ inspection of the assets. The inspection of stormwater assets can be undertaken through a condition assessment program, either through visual inspection or camera technology (CCTV or zoom camera) where appropriate. Usage of the zoom camera technology has the risk of insufficient visual detail to make appropriate activity decisions.

3.6.5 Decommissioning Activities

Decommissioning 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.

3.7 Asset Management Strategy – Stormwater

The asset management strategy for the storm sewers in the Township will employ the lifecycle activities to maximize the useful life and economy of each asset.

The current strategy at the Township is to target rehabilitation of the assets near the end of their useful life. The strategy does not currently focus on mid-lifecycle interventions, instead reconstructing as part of road reconstruction works. Stormwater works are typically not undertaken as individual works, and as such are sometimes replaced prior to reaching the point of failure as it coincides with required adjacent road works. The replacement of stormwater assets is primarily driven by the condition of the adjacent road asset, unless there is an independent trigger such as major performance issues.

The Township's intention is to continue to address stormwater assets in this method, combined with road works. The stormwater assets and requirements are considered a subcomponent and requirement when undertaking road works, including undertaking sizing exercises.

The typical strategy for replacement of existing assets is replacement of with the same size of asset (pipe or culvert). Change in service requirement at the particular location (change in topography or drainage patterns) may require a change in size of asset, however this will be determined during the design process as part of the road works project.

Similarly, existing infrastructure will typically be replaced with like material, including concrete, CSP or plastic material, depending on the particular application. Where conditions and best practices allow, the existing asset will be replaced with a like material. The Township can consider utilizing plastic pipe materials in favour of CSP due to its greater expected useful life, however conditions at the pipe location should be considered in selecting the appropriate material.

The condition should be monitored to continue to assist in decision making and potential early prioritization of works on the stormwater assets. The Township should establish/ maintain a condition assessment program for the storm sewers. The recommendation is to use visual inspection facilitated by Township staff, CCTV or Zoom 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.

Inspection of the culverts and ditching occurs on a 2 year cycle, however the Township is considering modifying the frequency to complete the inspections on a 5 year cycle. The inspection frequency can be adjusted as required based on the findings of inspection and degree of changes and needs assessed during the inspections. 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.

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 Township 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.

A summary of the pipe condition and associated lifecycle activity is provided in **Table 3-7**. Note that condition assessment should be undertaken on a routine basis throughout the lifecycle of the asset, and other factors should be considered when selecting a lifecycle activity.

Table 3-7: Storm Sewer Lifecycle Activities and Condition Ranges

Condition Range	Lifecycle Activity Category	Lifecycle Activity
1-0.60	Maintenance	Maintenance Works (cleaning, flushing) Manhole repairs Small pipe section repairs
0.60-0.35	Rehabilitation	Localized repairs Structural relining
0.35-0	Reconstruction	Pipe replacement or abandonment

Current best practices suggest that 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.

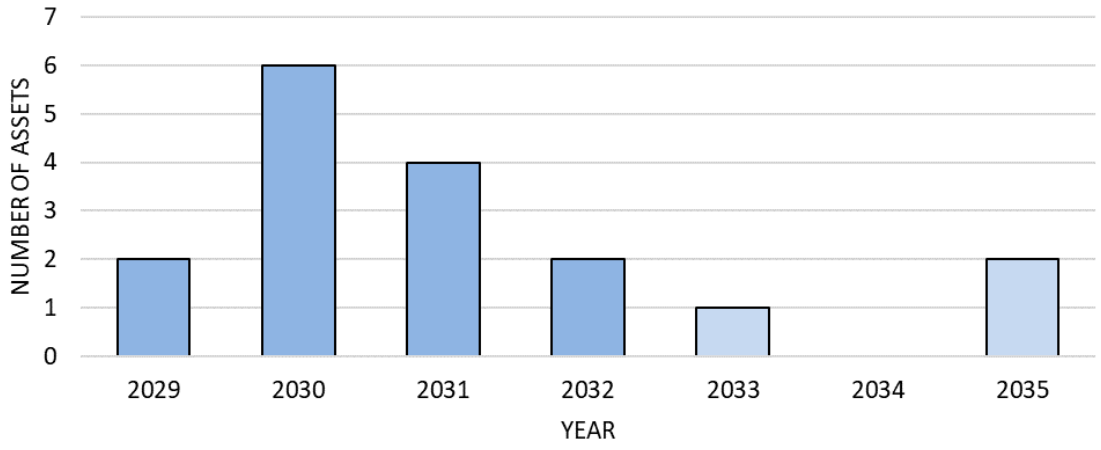
Note that storm sewer and culvert assets that are located or are part of a municipal drain may require additional steps or processes for lifecycle management.

3.7.1 Culverts

The lifecycle strategy for culverts should generally follow the description above. Replacement works are likely to occur in conjunction with road works.

Projections for culvert replacements were undertaken according to the estimated useful life and age of the assets. While it is expected that culvert replacements will occur as part of roads works projects, the Township should consider prioritization of condition works on the following assets and factor in the condition and replacement when scheduling future roads works. A summary of the quantity of culverts projected for replacement is shown in **Figure 3-2**.

Figure 3-2: Replacement Profile for Culvert Assets



The replacement costs for culverts, as previously discussed, is greatly variable depending on the size, location, depth and other factors at the culvert. Accordingly, as the condition information for culverts is ascertained, costs can be estimated.

The earliest projected replacement for the culvert assets occurs in 2029, with culverts coming to the end of their useful life within the following four years. The projection above is subject to change based on the field conditions of the assets. As condition is assessed on the existing assets, the projections above can be adjusted to reflect any variances in expected useful lives.

3.7.2 Catchbasins

The Township has a more full strategy specific to the catchbasin assets, which includes tracking of inventory, condition, and estimates for replacement and costs.

The condition of the catchbasins was assessed as part of the 2018 AMP. The assets were assigned a condition rating on a scale of 1 to 10 (where 10 is the best case) based on visual assessment of existing structural condition. The results of the condition assessments was used to forecast replacement needs., specifically identifying the assets with a condition rating of 3 or less to be replaced within a forecasted 5 year timeframe. The Township's current strategy is that each catchbasin is to be replaced before it deteriorates past a condition rating of 3.

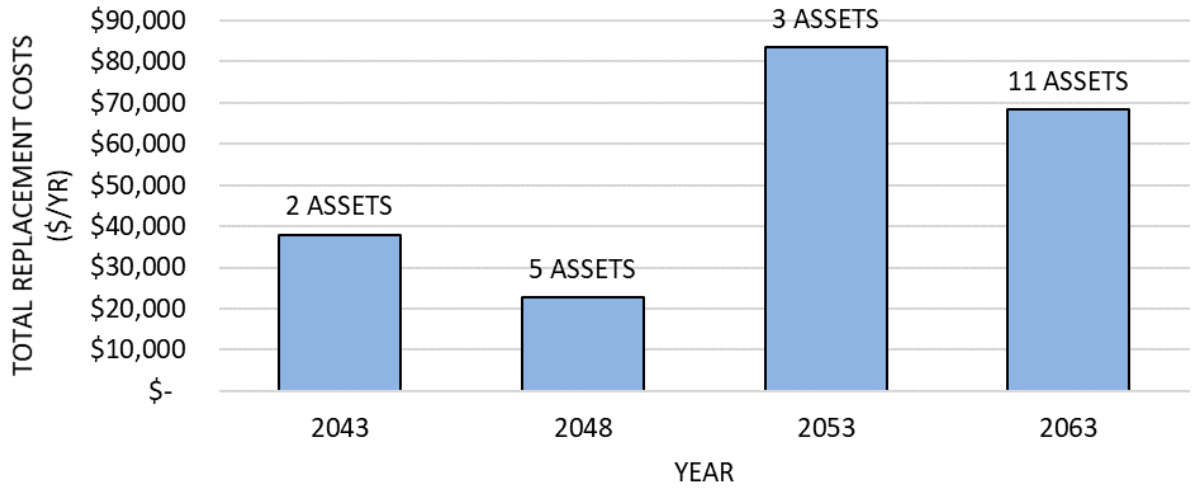
The Township should continue to monitor and assess the condition of the catchbasins on a regular basis to understand the rate of deterioration of the structures, and to continue to update the 5-year replacement forecast on an ongoing basis.

In addition to the condition assessment program and replacement forecasting, the Township also has a routine maintenance program in place for the catchbasins, including routine cleanouts. The per asset cost for this maintenance program (over a year timeframe) is $1,200.

Replacement of the catchbasins are recommended based on results of condition assessment undertaken by the Township. The Township has previously undertaken a review of condition, based on which an estimation of replacement schedule was developed. Initially developed in 2018, the schedule forecasted a 50 year replacement schedule, with replacements occurring on 2, 15, 20, 35 and 45 year timelines. Assuming the condition of the assets has degraded at the expected rate, the projected works schedule remains.

The works projection was updated to reflect 2022 unit costs, and is shown graphically in **Figure 3-3**.

Figure 3-3: Replacement Profile for Catchbasin Assets



The Township continuously monitors the condition of the catchbasins and refines the projections according to actual condition. The projections had identified two assets for replacement in 2022, however in field determination of condition by the Township which were determined in field to not be required.

The projection above is subject to change based on the field conditions of the assets. As condition is assessed on the existing assets, the projections above can be adjusted to reflect any variances in expected useful lives.

In years 2053 and 2063, larger investments are expected to be incurred to replace catchbasin assets. The Township can evaluate the preferred method of replacing those assets, considering any changes in projected condition, and available funding, perhaps extending or shortening useful life to spread out replacement across multiple years thereby reducing the peak investment in those particular years.

4.0 Facilities and Buildings

4.1 State of Local Infrastructure

Municipal buildings provide a variety of services for the Township. This asset category includes buildings that are both accessible and inaccessible to the public and aid in service delivery related to a number of municipal departments. The Township owns and maintains 11 municipal buildings, including the following building types:

- Offices
- Garages
- Salt Domes
- Recreation & Community Buildings
- Fire Hall

The municipal departments for which each of the buildings provides service is summarized in **Table 4-1**.

Table 4-1: Municipal Buildings by Department

Department	Number of Buildings
Office	2
Garages	2
Recreation & Community Buildings	2
Sand/Salt Domes	2
Landfill	1
Historical Building	1
School	1

Some building assets are located on similar sites such as multiple building assets located at the landfill, and at the Cobden Garage site.

A summary of the current state of building assets is in **Table 4-2**. This table provides detail regarding replacement cost and age of building assets, descriptions of which are included in the following sections.

Table 4-2: Building Asset Current State Summary

Building Asset	Total Area (sq.m.)	2022 Replacement Cost	Age (years)
ARC Building	55	$192,200	12
Barr Line Community Centre	242	$845,700	N/A
Cobden Road Garage	368	$1,286,100	N/A
Cobden Road Salt Dome	21	$600,000	N/A
Douglas Recreation Complex	223	$779,300	22
Fire Hall	187	$653,500	42
Municipal Office	420	$1,130,000	48
Osceola Historical Building	81	$283,100	165
Osceola Landfill Building	93	$325,000	N/A
Stone Road Garage	368	$1,286,100	48
Stone Road Salt Dome	21	$600,000	42

4.1.1 Replacement Cost

The Township maintains records of replacement costs for their buildings and facilities. To estimate the replacement cost of the buildings in current value, the costs were inflated by 3% since the date of the supplied cost.

The estimated total replacement cost for all of the Township's buildings is $7,981,000.

4.1.2 Average Age

The age of some buildings and facilities are tracked by the Township. The average age of the buildings with know years of construction is 54 years, including the Osceola Historical Building which has an age of 165 years, having been constructed in 1857. There are four buildings with an unknown construction year.

The Municipal Office underwent renovation in 2010, therefore some of the componentry in the asset will be less than its listed age of 48 years.

4.1.3 Expected Useful Life

The Township does not currently track the expected useful life of the buildings. The Township can track the expected useful life on a full asset level, or by componentry.

The Township does track condition, which may be used as an alternative to expected useful life in estimating the stage in and requirements of the assets lifecycle.

4.2 Current Levels of Service – Facilities and Buildings

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 have been devised based on the content of the regulation, in consultation with the Township. **Table 4-3,Table 4-4, and Table 4-5 Table 4-3**outline the Township's current community and technical levels of service for buildings.

Table 4-3: Community Levels of Service - Facility and Building Assets

LOS Parameter	Community Levels of Service – Qualitative Description	Township Community LOS
Scope	Description, which may include maps of buildings and facilities	The facility and building assets are located across the Township. A summary of building locations can be found in **Table 4-5**.
Quality	Overall condition rating of buildings and facilities	The overall average condition of the building assets is 2.4, or Good to Fair.
	Description of hours of operation and available services	• Fire Services are available 365 days a year, 24 hours a day, 7 days a week • Administrative offices are available during business hours Monday to Friday, 8:00 am to 4:00 pm • Roads facilities are accessible by staff only • Recreation facilities are available seasonally or rental basis.

Table 4-4: Technical Levels of Service - Facility and Building Assets

LOS Parameter	Technical Levels of Service – Technical Metric Description	Township Technical LOS
Scope	Number of facilities per capita	• Offices (1): 1 per 2,995 people • Garages (2): 1 per 1422 people • Sand/Salt Domes (2): 1 per 1422 people • Recreation & Community Buildings (4): 1 per 711 people • Fire Hall (1): 1 per 2844 people • Landfill Building (1): 1 per 2844 people
	Size of buildings (square footage)	Shown in **Table 4-5** below.
Quality	Compliance with legal/regulatory/local standards	The quality of Buildings and Facilities include the following legal, regulatory and local standards for the services provided: • Accessibility (AODA Standards) • Health and safety • Facilities on their own water system must be operated to meet MOE drinking water quality standards • Buildings must be in compliance with Ontario Building Code.

Table 4-5: Location and Size of Facility and Building Assets

Township Facility or Building	Location (Address)	Total Area (sq.m.)
ARC Building	182 Stone Road	55
Barr Line Community Centre	1766 Barr Line	242
Cobden Road Garage	1239 Cobden Road	368
Cobden Road Sand/Salt Dome	1239 Cobden Road	21
Douglas Recreation Complex	5366 Highway 60	223
Fire Hall	5226 Queen Street	187
Municipal Office	477 Stone Road	420
Osceola Historical Building	498 Micksburg Road	81
Osceola Landfill Building	166 Pit Road	93
Stone Road Garage	477 Stone Road	368
Stone Road Sand/ Salt Dome	477 Stone Road	21

4.3 Current Performance – Facilities and Buildings

The Township has previously identified performance measures through which their facilities and buildings assets can be measured, as part of development of the 2018 AMP. The performance measures fit within financial, quality and management categories. Additional quality measures have been added to build on performance definitions for the Township. The performance measures for Facilities and Buildings, and their current values are shown in **Table 4-6**.

Table 4-6: Facilities and Buildings Performance Measures

Performance Category	Asset Performance Measure	Current Value
Financial	% annual (+) change in net book value of municipal facilities	Reported annually in performance report
Quality	% of facilities at a condition rating of 6 or better	Reported annually in performance report
Management	% of rehabilitation projects completed on time and within budget	Reported annually in performance report
Quality	Communications connectivity at Township facilities	Township to set target value and track regularly

Performance ratings were also undertaken on individual building and facilities components and subcomponents as part of the condition assessment. The performance ratings considered reliability of the buildings, and are summarized in the following section.

4.4 Condition – Facilities and Buildings

The condition of the facilities and building assets were determined through condition assessments that took place during a site visit by a Dillon Consulting assessment team. Each buildings various components were assessed. The components can be broken up into three main building categories; mechanical/electrical, architectural/structural, and site/civil. Each component was given a condition rating and a performance rating. The condition rating measured the current condition of the component while the performance rating measured the reliability of the component. The overall condition of each facility was estimated by averaging the condition of each inspected component that make up each facility. The overall performance of each asset was also determined in the same manor. A condition descriptor and numerical value (on a scale from 1-5) were attributed for each of the assets' components based on the observed condition found during the assessments, according to the scale listed in **Table 4-7.**

Table 4-7: Condition Descriptors for Facility and Building Assets

Condition/Performance Descriptor	Condition/Performance Value
Very Good	1
Good	2
Fair	3
Poor	4
Very Poor	5

Using the method described above, the distribution of asset conditions shown in **Table 4-8** were found.

Table 4-8: Average Facility and Building Asset Conditions and Performance

Township Facility or Building	No. of Components	Current Average Performance	Current Average Condition
Municipal Office	96	1.1	2.1
Stone Road Garage	75	1.3	2.3
Stone Road Salt Dome	11	1.0	2.3
ARC Building	44	1.3	2.3
Fire Hall	78	1.2	2.3
Douglas Recreation Complex	72	1.3	2.4
Osceola Historical Building	25	1.2	2.8
Osceola Landfill Building Site Buildings: Main Landfill Building Landfill Weigh House	28	1.2	2.4
Cobden Road Garage Site Buildings: Main Garage Building Salt Storage Building Storage Building 1 Storage Building 2	53	1.1	2.4
Cobden Road Salt Dome	2	1.0	2.5
Barr Line Community Centre	68	1.2	2.2
Average	**50**	**1.2**	**2.4**

Note that some facilities have accessory buildings that make up the entire site. For these assets, Osceola Landfill Building and Cobden Road Garage, the total average condition and performance of all site features is provided.

The Township's facilities and buildings were found to have an average performance of 1.2 (Very Good to Good) and an average condition of 2.4 (Good to Fair).

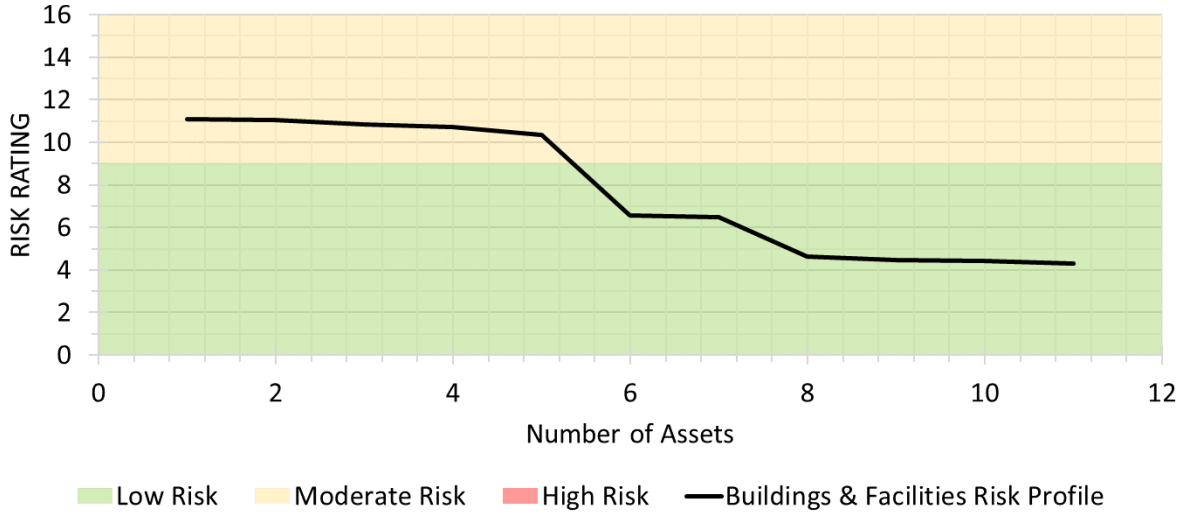
4.5 Risk Assessment – Facilities and Buildings

The risk ratings for the facility and building assets followed the risk methodology and approach, presented in **Section 1.3**, and the assumptions and criteria listed below.

Condition:	Determined based on results of field work
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) Mitigation plans being devised for these assets.
Impact:	High impact (value of 2) for Fire Hall, Township office, roads Garages, Landfill (Osceola)
	Moderate impact (value of 1) for all other facilities
Importance:	High importance (value of 3) for Fire Hall, Township Office, Roads Garages, Landfill (Osceola)
	Moderate importance (value of 2) for Transfer Sites (Stone Road & Douglas) and other buildings
	Low importance (value of 1) for Barr Line Community and recreation assets

The risk profile for facility and building assets is shown in **Figure 4-1**.

Figure 4-1: Risk Profile for Facility and Building Assets



Five of the assets fell within the moderate risk range, with the maximum risk score at 11 (for all 5 of the assets assets). The remaining 6 assets were within the low risk zone.

4.6 Lifecycle Activities – Facilities and Buildings

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 construction, maintenance, renewal, and decommissioning/ disposal.

4.6.1 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 any 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.

4.6.2 Maintenance Activities

Throughout the full lifecycle of a building, the majority of the expected lifecycle activities to be undertaken will be maintenance works. 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 ad-hoc 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.

4.6.3 Renewal 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.

4.6.4 Decommissioning/ 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 Township building portfolio through sale of property, if it is no longer required for service delivery.

4.7 Asset Management Strategy – Facilities and Buildings

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

The Township's asset management strategy for buildings relies on building condition assessments to establish the current state of the assets (including information such as age, condition and performance), and to establish recommended works and associated timeframes. Recent building condition assessments have been completed by a third party consultant and have consisted of non-intrusive visual inspection of the buildings and componentry. The usage of such assessments for complex building assets can provide the Township reliable and repeatable condition information and projections that can be used for capital planning and asset management.

The Township 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. Previous best practice recommended 10 years, however the recommended frequency has been increased to 5 years to account for understanding and addressing any impacts of climate change. 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 Township could consider adding these to the scope of the building condition assessments, or undertake simplified assessments on a regular basis through visual inspection by Township staff.

In general, the building assets were found to be in good condition and performing adequately to provide the intended services. The Township's strategy should maintain (or improve where appropriate) the condition and performance adequately to provide the intended services. An industry standard of 2% of the current portfolio replacement value is recommended as a minimum annual investment into capital projects for major maintenance (replacement) and renewal activities, however specific works recommendations within building condition reports will provide a more tailored understanding of the Township's recommended annual investment.

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

Routine maintenance schedules are assumed to be in place currently, and are recommended to continue assuming 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 Township 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 Township 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.

4.7.1 Current Projection of Works

The current building condition assessment provides a projection of maintenance and rehabilitation works to be undertaken to the assessed buildings. Completed in 2021, the assessments provide projections out to a maximum of 20 years including recommended works, timing of needs and identification of health and safety related issues. A summary of the quantity of works projected for the assessed buildings is **Table 4-9**.

Table 4-9: Summary of Works Projected for Buildings from Assessment by Timeframe

	Immediate	1 - 2 years	2 - 3 years	3 - 5 years	5 - 10 years	10 - 15 years	15 - 20 years	Unspecified
Barr Line Community Centre	11	6	0	2	1	1	1	4
Cobden Road Garage	10	9	0	3	2	2	0	0
Douglas Recreation Complex	10	8	1	0	2	1	1	6
Fire Hall	8	1	0	3	3	0	0	4
Osceola Historical Building	1	3	2	4	1	0	0	0
Osceola Landfill Building	3	2	0	0	0	0	0	0
Arc Building	6	0	0	0	1	2	0	3
Municipal Office	0	3	1	2	1	0	0	1
Stone Road Garage	13	0	0	0	0	2	0	3

Note that there were no works projected for the Cobden Road Salt Dome or the Stone Road Salt Dome.

Through assessment, some works were prioritized according to the importance of the works to health and safety. A summary of the immediate health and safety related priorities are shown in **Table 4-10.**

Table 4-10: Recommended Works Identified as Priorities for Health and Safety

Facility	Immediate H&S Priorities
Barr Line Community Centre	7
Cobden Road Garage	4
Douglas Recreation Complex	8
Fire Hall	6
Osceola Historical Building	1
Osceola Landfill Building	3
Arc Building	5
Municipal Office	0
Stone Road Garage	10

Estimated costs were attributed to each projected work across the buildings. The total across each timeframe for each building are summarized in **Table 4-11**.

Table 4-11: Summary of Costs for Projected Works on Buildings from Assessment by Timeframe

Facility	Immediate	1 - 2 years	2 - 3 years	3 - 5 years	5 - 10 years	10 - 15 years	15 - 20 years	Un-specified
ARC Building	$48,000	$0	$0	$0	$3,600	$108,000	$0	$0
Barr Line Community Centre	$130,800	$3,500	$0	$10,800	$2,400	$92,400	$36,000	$4,100
Cobden Road Garage	$11,000	$73,900	$0	$424,200	$15,500	$4,800	$0	$0
Douglas Recreation Complex	$61,900	$8,300	$14,400	$0	$48,000	$504,000	$117,600	$3,000
Fire Hall	$8,800	$2,900	$0	$5,400	$63,600	$0	$0	$1,600
Municipal Office	$21,700	$20,200	$9,600	$1,200	$1,500	$0	$0	$200
Osceola Historical Building	$2,400	$26,000	$24,000	$37,200	$2,400	$0	$0	$0
Osceola Landfill Building	$2,500	$3,200	$0	$0	$6,000	$0	$0	$0
Stone Road Garage	$30,000	$2,200	$0	$0	$0	$193,200	$0	$3,000
Total	**$317,100**	**$140,200**	**$48,000**	**$478,800**	**$143,000**	**$902,400**	**$153,600**	**$11,900**

The expenditure expected fluctuates between timeline categories – ranging from less than $50,000 to just over $900,000. The variation in these expenditures can be refined to assist in the affordability of the expenditures – prioritisation can be informed by continued condition assessment and monitoring of maintenance requirements and performance.

The average annual expenditure across the 20 year timeframe is just under $110,000.

4.7.2 Expenditure Based on Reinvestment

An alternative for estimating the annual expenditure for assets is through estimation using the recommended reinvestment rate and the replacement value of the assets. The 2016 infrastructure report card suggests a reinvestment rate of 1.7-2.5% annually for buildings and facilities. The current replacement cost for all of the building assets is $7,981,000, which suggests the reinvestment rates noted in **Table 4-12**.

Table 4-12: Reinvestment Rate for Buildings

Reinvestment Rate	Reinvestment Value
1.7%	$135,700
2.5%	$199,500

The reinvestment values are higher than the current projections found through the condition assessment. It is recommended that the buildings be maintained according to their condition and performance information, and the Township consider maintaining a budget based on the reinvestment value to allow for building of reserves to assist in future expenditures.

5.0 Fleet

The fleet asset category includes vehicles and equipment.

5.1 State of Local Infrastructure

State of Local Infrastructure A summary of road details by surface type can be seen in **Table 5-1**.

Table 5-1: Current State Summary of Fleet

Department	No. of Assets	Average Age	Replacement Cost	Average Amortization Period	Average % Remaining
Fire	4	20	$1,093,000	21.3	1.9%
Roads	23	11.9	$2,842,000	15.1	31.55

The roads assets include fleet and equipment, as required to maintain the roads assets. These assets include the following types:

- Graders
- Tractor
- Brush Chipper
- Trailer
- Sweeper
- Excavator
- Pickup Truck
- Generators
- Steamers
- Roller
- Mulcher
- Backhoe

The Township previously had a fleet asset for waste service delivery, however the asset was disposed of through sale by the Township in 2022. Waste hauling is outsourced to a third party.

5.1.1 Replacement Cost

The individual replacement costs per fleet asset varies due to the difference in types of fleet assets used and maintained by the Township. For an understanding of future replacement costs of the fleet assets the historical cost of each asset has been inflated by a value of 3%, compounded annually since the acquisition date for an expected present day cost.

The estimated replacement cost of the fleet and equipment assets in 2022 dollars is $3,935,000.

5.1.2 Average Age

The Township has 27 assets in its fleet and equipment, with an average age of 13 years, with the oldest having been acquired in 1986, and the newest in 2021.

5.1.3 Expected Useful Life

The expected useful life of the fleet assets is measured at the Township by the amortization period for the purchase of the asset, estimating the replacement year of the asset at the end of its amortization period. The useful life of the fleet assets is expected to vary across each asset based on the type, frequency of usage, etc.

Several assets are past their expected useful life (amortization period). Particularly, one of the fire vehicles, a Ford LTC, did not have an expected replacement year and is 17 years older than the original amortization period of 20 years.

While the amortization period may provide an adequate estimation of the life of an asset (and a period may be specifically selected based on how long an asset is expected to be useful), the Township may also consider tracking an expected useful life related strictly to condition and performance of an asset, without tying to the financial aspects. This may be determined by experience at the Township, as well as manufacturers recommendations.

Five vehicles are currently beyond their expected useful life. Of the vehicles not yet at past their year of replacement, the assets have an average 47% of their useful life remaining.

5.2 Condition – Fleet

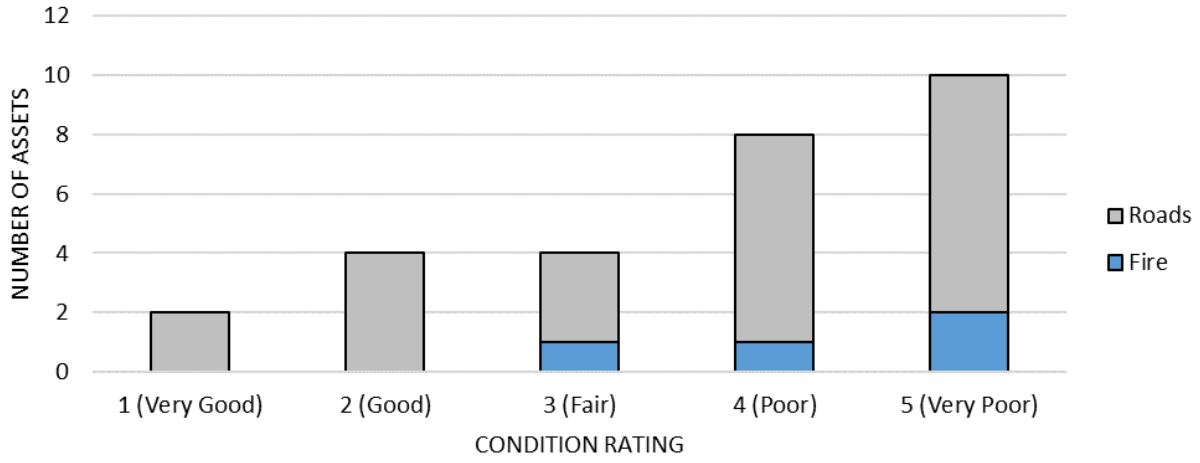
The condition of the fleet assets were estimated using the percentage of useful life remaining (found through comparison of the asset's age and expected useful life). A condition descriptor and numerical value (on a scale from 1-5) were attributed for each of the assets based on the percentage of useful life remaining, according to the scale listed in **Table 5-2.**

Table 5-2: Condition Descriptors for Fleet Assets

Useful Life Remaining	Condition Descriptor	Condition Rating Value
>= 80%	Very Good	1
60 – 79%	Good	2
40 – 59%	Fair	3
20 – 39%	Poor	4
<20%	Very Poor	5

Using these assumptions, the distribution of asset conditions shown in **Figure 5-1** were found.

Figure 5-1: Condition Distribution of Fleet Assets



The average fleet condition rating is 3, or approximately “Fair”.

The condition ratings discussed within this section are theoretical according to asset age, however the Township has opportunities to assess the actual condition going forward, which can refine the useful life remaining and therefore the replacement timing and funding requirements. The Township can use actual data for the fleet assets, such as odometer readings (assessed based on kilometerage ranges, perhaps specific to the type of vehicle and its purpose), or maintenance records (making note of fleet vehicles where frequent or major maintenance works have been required).

5.3 Current Levels of Service – Fleet

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 have been devised based on the content of the regulation, in consultation with the Township. **Table 5-3 to Table 5-5** outline the Township’s current community and technical levels of service for fleet.

Table 5-3: Community Levels of Service - Fleet Assets

LOS Parameter	Community Levels of Service – Qualitative Description	Township Community LOS
Scope	Description, which may include maps of locations where fleet and equipment are stored	Storage facilities for fleet assets are located across the Township. The storage location is dependent on the type of equipment. Storage locations include: • Stone Road Garage • Cobden Road Garage • Fire Hall • Osceola Landfill Building
Quality	Description of fleet and equipment condition (i.e. maintained in 'good' or better condition in order to provide reliability)	Average condition of 3 out 5, where 5 represents an asset in very poor condition.

Table 5-4: Technical Levels of Service - Fleet Assets

LOS Parameter	Technical Levels of Service – Technical Metric Description	Township Technical LOS
Scope	Provide breakdown of number of fleet by department providing service compared to the size of the community (geography or population)	The number of fleet assets is provided in **Table 5-5** below, by department and as compared to the size of the community.
Quality	Legal/regulatory/local standards	The fleet assets must adhere to applicable legal, regulatory and local standards, including: • Equipment in vehicle must meet Ontario Provincial Equipment Standards • Manufacturer's recommendations or maintenance and life expectancy on equipment • Fire assets based on call volume and kilometres travelled • Vehicle/equipment preventative maintenance program • Vehicle maintenance, safety Driver training, equipment functioning (negligence, risk management).

Table 5-5: Fleet Assets by Area and Population

Department	Number of Assets	Number of Vehicles per km^2	Number of Vehicles per Population
Fire	4	1 vehicle per 131 km^2	1 vehicle per 750 persons
Roads	23	1 vehicle per 28 km^2	1 vehicle per 125 persons

Note: area and population values used in the above are consistent with those presented in the Growth chapter.

5.4 Current Performance – Fleet

The Township has previously identified performance measures through which their roads assets can be measured, as part of development of the 2018 AMP. The performance measures fit within financial, quality and management categories. Additional quality measures have been added to build on performance definitions for the Township. The performance measures for Roads, and their current values are shown in Table .

Table 5-6: Fleet Performance Measures

Performance Category	Asset Performance Measure	Current Value
Financial	% annual (+) change in net book value of equipment	Reported annually in performance report
Quality	% of equipment with 60% remaining life	Reported annually in performance report
Management	% of capital plan purchases completed on time and within budget	Reported annually in performance report
Quality	Cost per instance of required repair and maintenance	To be tracked by the Township
Quality	Total operating cost throughout lifecycle of the asset	To be tracked by the Township
Quality	Downtime per vehicle throughout lifecycle of the asset	To be tracked by the Township

5.5 Risk Assessment – Fleet

The risk ratings for the fleet assets followed the risk methodology and approach, presented in **Section 1.3**, and the assumptions and criteria listed below.

Condition: Determined based on estimated condition (age-based deterioration)

Performance: Reliability rating tracked and provided by the Township (1-5 scale).

Climate Change: Assumed a value of 1 (Limited impact with slower recovery; mitigation plan not in place)

Impact: Assumed based on the Township's Usage ratings, according to:

- Low impact (value of 0) for usage ratings of 0, 1 where 1 represents "Used only a few times a year"
- Moderate impact (value of 1) for usage ratings 2, 3 where 3 represents "Used a few times a month"
- High impact (value of 2) for usage ratings 4, 5 where 5 represents "Used every day"

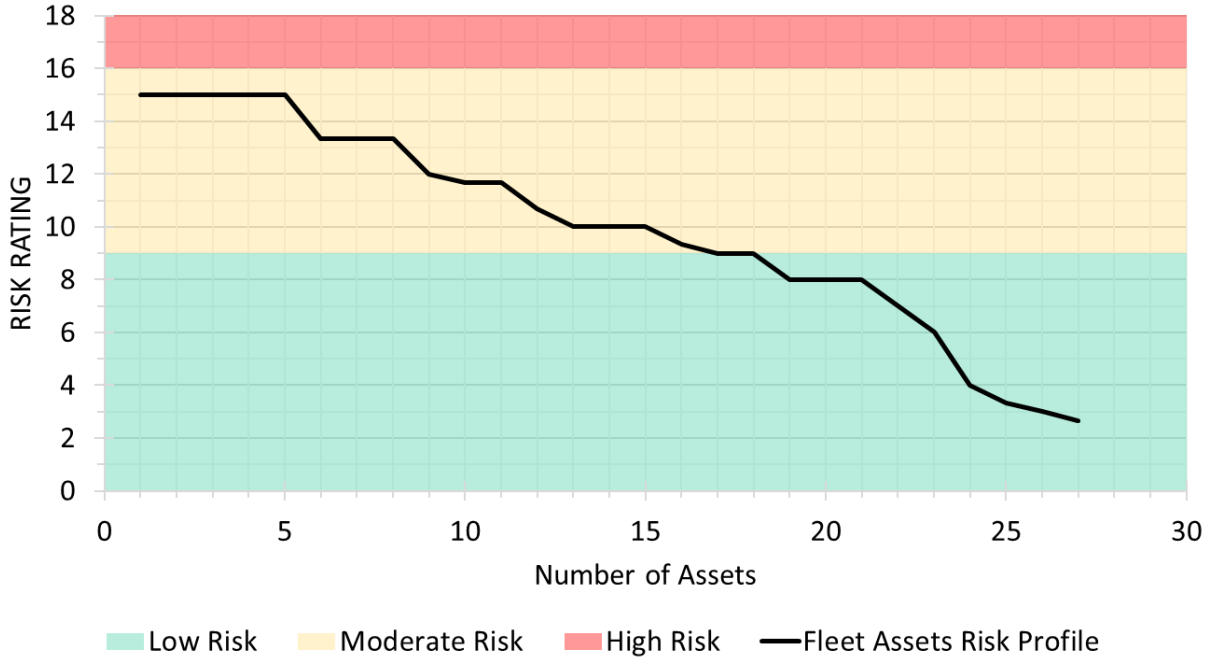
Where usage rating was not provided, a moderate impact (value of 1) was assumed.

Importance: Fleet importance by asset type is according to:

- High importance (value of 3) for Snowplows, grader, backhoe, fire fleet
- Moderate importance (value of 2) for compactor truck
- Low importance (value of 1) for ½ ton trucks without plow, all other vehicles and equipment.

The risk profile for fleet assets is shown in **Figure 5-2**.

Figure 5-2: Risk Profile for Fleet and Equipment Assets



Sixteen of the assets fell within the moderate risk range, with the maximum risk score at 15 (for 2 assets). The remaining 13 assets were within the low risk zone.

5.6 Lifecycle Activities – Fleet

In the lifecycle of a fleet asset, there are multiple activities that can be undertaken, depending on the asset attributes. The expected lifecycle activities to be used on the fleet assets include acquisition, maintenance, and operation and decommissioning/disposal.

5.6.1 Acquisition Activities

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 Township 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, and the asset is found to be adequate for providing service delivery required, the acquisition activity may be asset replacement.

5.6.2 Maintenance Activities

Maintenance activities will vary across the fleet assets due to the variability in 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 should include regular inspections of vehicle for condition, and recording of maintenance activities undertaken.

5.6.3 Decommissioning/Disposal Activities

Disposal activities can include the removal from service through disposal, sale of asset 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 are disposed of at appropriate or approved facility.

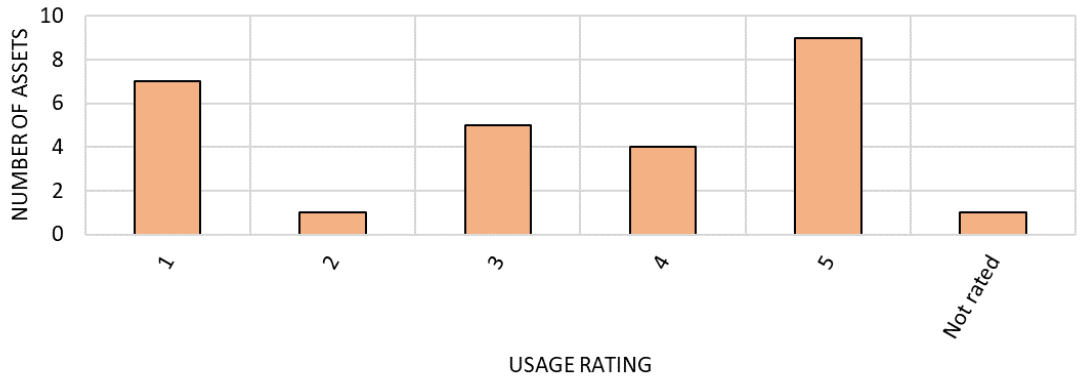
5.7 Asset Management Strategy – Fleet

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

Generally, if acquired new, the assets will begin their expected useful life in very good condition and performance. Acquisition of a new asset should be in replacement of an existing asset at the end of its lifecycle, or where service delivery has dictated the need for additional assets. Where an acquisition is to replace an existing asset, the Township can estimate the expenditure for asset replacement by inflating the historical cost.

When considering replacement of an asset, the Township should consider how the asset is currently being used, if there are any opportunities to share assets across departments, or to adjust inventory to achieve the same service delivery using fewer or different assets. This can achieve some cost savings in the lifecycle of the assets. The Township currently assesses the usage of the assets on a 1-5 scale, where 1 represents an asset used a few times a year (low usage), 3 represents an asset used a few times a month, and 5 is an asset that is used every day (high usage). The majority of assets are used every day, or a value of 5. The distribution of usage values of the assets is shown in **Figure 5-3**.

Figure 5-3: Usage of Fleet Assets (1 is low usage, 5 is high usage)

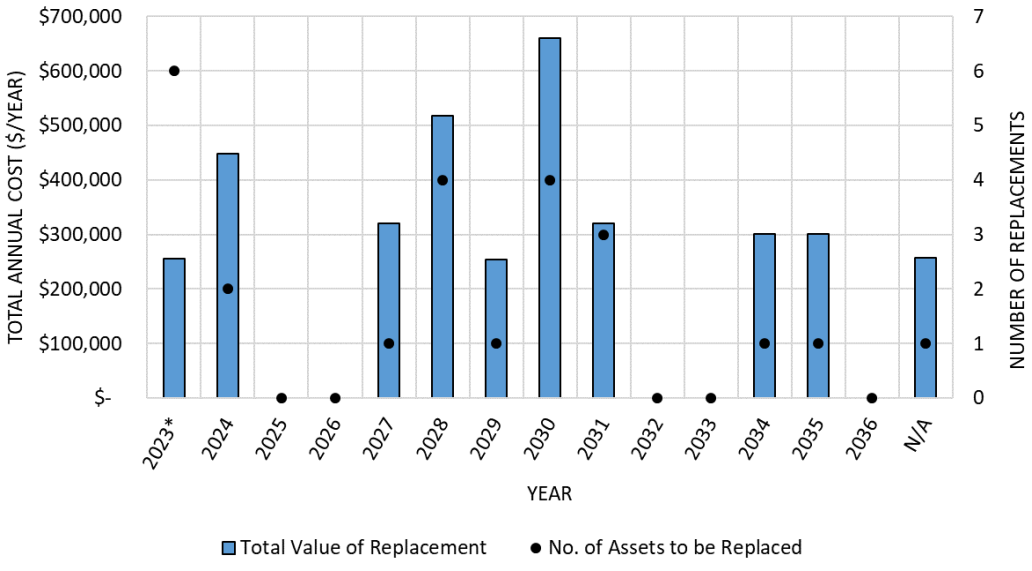


Throughout the lifecycle of the assets, routine maintenance should be conducted. As required, specific maintenance should be conducted. The selection of appropriate maintenance activity and the required timing can be identified through observation of condition of the assets (daily inspection, maintenance reports, etc.), or in response to an issue. 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 the services delivered by each.

The Township currently allocates $30,500 annually to address fleet maintenance costs (roads only).

The estimated annual replacement costs are shown in **Figure 5-4.**

Figure 5-4: Replacements for Fleet Assets



The average annual replacement value is approximately $235,000, with a maximum of just under $630,000 in 2030, and five years during which there are no expected replacements.

The total value of replacement for 2023 includes three assets which were slated for replacement in 2023 (at an approximate cost of $120,000), and three additional assets which were identified for replacement in 2018-2020 (at an approximate replacement cost of $133,000).

The replacement profile shown in the above figure is based on the amortization period of the assets, and does not include adjustments for condition. There are currently 8 fleet assets considered to be in 'very poor' condition. Of these 8, 4 were identified for replacement between 2018-2022 and are therefore represented in the total replacement value in the first year of the plan (2023), however the remaining 'very poor' assets are identified for replacement in 2023 and 2024. As the assets in poorest condition have already been identified at the beginning of the program, there is not major adjustments expected to the replacement profile to account for condition, however, ongoing condition assessment of the fleet assets can assist the Township in updating and adjusting this going forward.

The replacement profile and strategy for the fleet assets can be based on the amortization period, as per current practices at the Township, which can provide a theoretical replacement profile for the assets. The profile can be further refined by incorporating adjustments to the implementation timelines of lifecycle activities (maintenance, replacement, etc.) through consideration of (but not limited to):

- The risk score of the individual asset
- The usage rating, as tracked by the Township
- Actual condition information (odometer readings, physical inspections, maintenance, records, etc.)
- Performance of the asset, and ability of the asset to continue to provide the level of service required.

The needs and monitoring of asset condition will fall within each of the departments that use fleet assets.

6.0 Financial Strategy

This chapter identifies the funding required to sustainably finance the lifecycle management strategy presented in the previous sections.

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

This financial strategy should be examined and re-evaluated during the annual budgeting processes to ensure the sustainability of the County's financial position as it relates to its assets.

6.1 Funding Sources

The Township's current financial strategy is to fund capital expenditures from the following sources: government funding and grants, a portion of tax revenue, capital reserves, and debentures. The Township intends to continue following this financial strategy for the foreseeable future.

Table 6-1 summarizes the Township's baseline capital funding capacity for 2023, based on the funding sources that are anticipated to continue over the 10-year capital plan forecast. The baseline capital funding capacity identified is not intended to reflect the Township's maximum available funding; rather, it is intended to represent the standard amount of funding, excluding debentures, that the Township would have in a typical year if they maintain the status quo. Project- and timing-specific grants, subsidies, and debentures are expected to supplement this baseline funding where needed.

Table 6-1: Baseline Capital Funding Capacity for 2023

Funding Source	Amount
Taxation (portion allocated to Capital)	$163,000
Federal Gas Tax	$93,000
Ontario Community Infrastructure Fund (OCIF)	$500,000
Total	**$756,000**

The taxation portion of the baseline capital funding capacity has been projected to increase by 4.5% per year over the 10-year period, consistent with increases to the Township's overall tax levy in the past two years. The remainder of the baseline funding capacity has been projected to remain constant.

6.2 Capital Expenditures

Table 6-2 summarizes the 10-year forecast of capital expenditures required to achieve the capital asset lifecycle management strategy identified in the earlier sections of this report. The capital expenditure projections assume 5% inflation per year, which aligns with recent historical averages of Statistics Canada's Building Construction Price Index for the Ottawa-Gatineau census metropolitan area.

Table 6-2: Capital Expenditure Forecast

Capital Expenditures	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Roads	1,540,000	1,594,000	1,594,000	1,750,000	1,758,000	1,655,000	1,742,000	2,108,000	1,495,000	-
Buildings & Facilities	256,000	58,000	-	-	390,000	579,000	341,000	396,000	473,000	-
Fleet - Roads	-	413,000	-	-	-	82,000	-	532,000	-	-
Fleet - Fire	387,000	99,000	202,000	185,000	229,000	36,000	38,000	40,000	42,000	324,000
Total	**2,183,000**	**2,164,000**	**1,796,000**	**1,935,000**	**2,377,000**	**2,352,000**	**2,121,000**	**3,076,000**	**2,010,000**	**324,000**

6.3 Financial Analysis

6.3.1 Forecasted Capital Investment

The capital expenditure forecast can be 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 Township to appropriately invest in its capital assets.

The County's baseline capital funding capacity is not projected to be adequate to finance the forecasted capital expenditures over the next 10 years, as shown on **Figure 6-1**. The baseline funding capacity is only anticipated to cover 30 to 40% of the recommended capital expenditures in a given year. The average annual funding shortfall, after accounting for payments on existing debentures, is projected to be $1.4M, accumulating to a total shortfall of $14M at the end of the 10-year period. **Table 6-3** summarizes all of the financial projections.

Figure 6-1: Forecasted Capital Expenditures Relative to Baseline Capital Funding Capacity

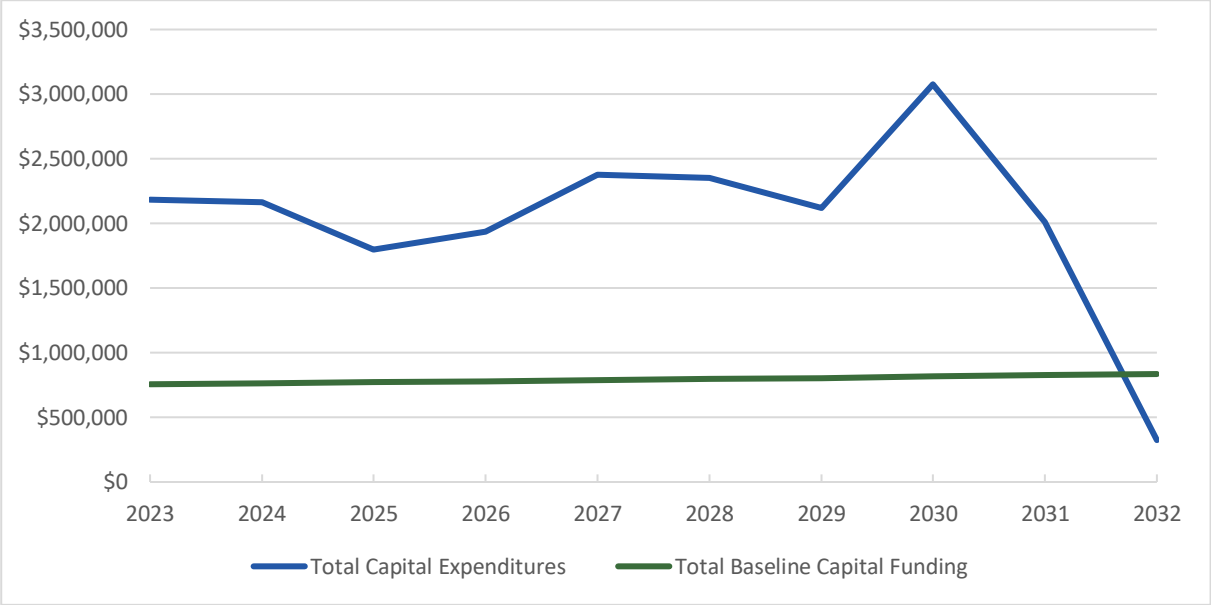


Table 6-3: Summary of Financial Projections

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Capital Expenditures	2,183,000	2,164,000	1,796,000	1,935,000	2,377,000	2,352,000	2,121,000	3,076,000	2,010,000	324,000
Baseline Capital Funding	756,000	763,000	771,000	779,000	787,000	796,000	805,000	815,000	825,000	835,000
Payments on Existing Debentures	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000
Annual Capital Funding Surplus (Shortfall)	-1,583,000	-1,557,000	-1,181,000	-1,312,000	-1,746,000	-1,712,000	-1,472,000	-2,417,000	-1,341,000	355,000
Cumulative Capital Funding Surplus (Shortfall)	-1,583,000	-3,140,000	-4,321,000	-5,633,000	-7,379,000	-9,091,000	-10,563,000	-12,980,000	-14,321,000	-13,966,000

A number of strategies could be implemented by the Township to mitigate the proposed capital funding shortfalls:

- Debentures: Debt financing has historically been used by the Township, and will continue to be an essential component of the financial strategy going forward. However, debt alone will not be adequate to fund the capital expenditures proposed in this report. Annual new debentures, starting at approximately $1.7M and growing each year by 5% to match inflation, would be required for the Township to cover the capital funding shortfall and make debt payments over the 10-year period. However, this would not comply with the provincially-mandated annual debt repayment limits of 25% of revenues. Taking on the proposed levels of debt would cause the Township to exceed these repayment limits within the next five years.
- Grants and subsidies: Government grants and subsidies should be used where possible as a supplemental source of capital funding, to reduce reliance on debt.
- Tax levy increases: Increasing the overall tax levy by more than the projected 4.5% per year, or increasing the portion of the tax levy allocated to capital, would reduce the capital funding shortfall. The Township's operating needs would need to be considered if changing the allocation of tax revenues to the capital budget. Alternatively, a dedicated capital levy could be introduced.
- Decreased LOS: Targeting a lower LOS than what was specified in this report would allow the Township to reduce capital expenditures.

Where possible, the Township should contribute to capital reserves to build up healthy balances that can sustainably fund capital investments, recognizing that capital expenditures will fluctuate from year-to-year.

6.3.2 Reinvestment Rates

Another useful perspective for evaluating the adequacy of an asset management financial strategy is reinvestment rates. The reinvestment rate is the annual capital investment as a percentage of the asset replacement value. While the projections presented earlier in this section have the benefit of highlighting years where there will be peaks in capital expenditure needs, reinvestment rates provide a simple annual target.

The 2016 Canadian Infrastructure Report Card found that rates of reinvestment are lower than targets recommended by asset management practitioners. The rate can vary based on factors such as the age of the infrastructure, the level of service and risk tolerance. The values provided are intended to be informative in nature. **Table 6-4** demonstrates the gap between current and target reinvestment levels, Canada-wide, for the asset categories that the Township owns. Insufficient reinvestment will result in a gradual decline of physical condition levels that will impact municipal service delivery over time.

Table 6-4: Target Reinvestment Rates vs 2016 Canadian Average Reinvestment Rate

Infrastructure Category	Lower Target Investment Rate	Upper Target Investment Rate	Canadian Average Reinvestment Rate (2016)
Stormwater (linear)	1.0%	1.3%	0.3%
Stormwater (non-linear)	1.7%	2.0%	1.3%
Roads and Sidewalks	2.0%	3.0%	1.1%
Buildings	1.7%	2.5%	1.7%
Sports and Recreation Facilities	1.7%	2.5%	1.3%

The total replacement cost for the Township's capital assets is estimated to be $37.1M (in 2023 dollars) (for the known assets listed in this plan). **Table 6-5** summarizes the equivalent reinvestment rate considering the projected capital expenditures, and considering the total baseline capital funding capacity considered in this report for comparison purposes.

Table 6-5: Reinvestment Rates (2023$)

	Average Annual Capital Expenditures	Reinvestment Rate
Projected Capital Expenditures	$1,668,000	4.5%
Baseline Capital Funding Capacity	$756,000	2.0%

7.0 Reference Documents

The following documents were used in development of the Plan:

1. Asset Management Strategic Policy (By-Law No. 2019-24)
2. Township of Admaston/Bromley Building Condition Assessment, prepared by Dillon Consulting Limited, August 2022
3. Township of Admaston/Bromley Roads Condition Assessment, prepared by Dillon Consulting Limited, August 2022
4. County of Renfrew Official Plan, adopted by County Council March 27, 2002
5. Community Improvement Plan, June 2019
6. 2021 Township of Admaston/Bromley Budget, May 2021
7. 2022 Township of Admaston/Bromley Budget May 2022