FINAL

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City of Sault Ste. Marie Roadway Appurtenances Asset Management Plan

June 2024

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1. Introduction

AECOM Canada Ltd. (AECOM) was retained by The City of Sault Ste. Marie (the "City") to develop an asset management plan to comply with the requirements of Ontario Regulation 588/17 (O. Reg. 588/17) in respect to its non-core municipal infrastructure assets. The scope of work for this investigation is outlined in AECOM's proposal dated May 25th, 2023, and subsequent project correspondence.

1.1 Background

Sault Ste. Marie is a city located on the St. Mary's River, north of the United States of America, bordering three of the Great Lakes with an estimated population of 72,051 (2021). The City provides a wide range of public services to their constituents, with the public expectation that these services function efficiently at a certain level. The provision of these services requires the management of the physical assets to meet desired service levels, manage risks, and provide long-term financial sustainability. These assets include, but are not limited to roads, bridges, sidewalks, wastewater assets, stormwater management assets, landfill, fleets, buildings, and parks.

In accordance with the terms of reference for this assignment, it is understood that the City is proceeding with an asset management plan to comply with the second phase of the regulatory requirements in respect to its non-core municipal infrastructure assets, in accordance with O. Reg. 588/17, by July 1st, 2024. The non-core assets to be covered in the scope, as defined by the regulation, include the City's protection services, solid waste, parks and cemetery, facilities, fleet, roadway appurtenances, and active transportation.

1.2 Objectives

The objective of this AMP is to deliver a financial and technical roadmap for managing the City's roadway appurtenances and to provide the means for the City to maximize value from its assets, at the lowest overall expense, while at the same time enhancing service levels for its residents. Furthermore, the objective of this AMP is to align with the guidelines laid out in the City's Strategic AM Policy and Section 5 of O. Reg. 588/17.

Organizations that implement good AM practices will benefit from improved business and financial performance, effective investment decisions, and better risk management. Stakeholders can expect lower total asset life cycle costs, higher asset performance, and confidence in sustained future performance.

1.3 Asset Management Provincial Requirements

The O. Reg. 588/17 came into effect in 2018 and stipulates specific AM requirements to be in place within Ontario municipalities by certain key dates (**Table 1-1**). The development of this AMP is one of the steps to guide the City towards meeting the July 1st, 2024 deadline.

Table 1-1: O. Reg. 588/17: AM Planning for Municipal Infrastructure

Description: A regulation made under the Infrastructure for Jobs and Prosperity Act, 2015, stating that every municipality shall prepare and update a Strategic AM Policy, and that every municipality shall prepare an AM Plan for its core infrastructure assets by July 1, 2022, and an AM Plan for all other infrastructure assets by July 1, 2024. The regulation outlines several requirements that each AM Plan must follow, such as including current and proposed level of service. Core municipal infrastructure assets include water, wastewater, stormwater, road, and bridge assets.	
Deadline Date	**Regulatory Requirement**
July 1st, 2019	All municipalities are required to prepare their first Strategic AM Policy.
July 1st, 2022	All municipalities are required to have an AM Plan for its entire core municipal infrastructure (i.e., water, wastewater, stormwater, roads, and bridges & culverts).
July 1st, 2024	All municipalities are required to have an AM Plan for infrastructure assets not included under their core assets.
July 1st, 2025	All AM Plans must include information about the LoS that the municipality proposes to provide, the lifecycle activities and associated costs needed to achieve those LoS, available funding, any funding shortfalls, and the risk of failing to meet the proposed LoS.

1.4 Scope

The following elements are included within the scope of this AMP:

- A summary of the asset inventory, including the replacement cost of the assets, the average age of the assets, the condition of the assets, and data gap analysis (**Section 2**).
- The City's level of service objectives, stakeholder identification, levels of service (LoS) framework, and future demand drivers (**Section 3**).
- Asset lifecycle management strategies and funding needs to maintain current LoS, minimize associated asset risks, and to optimize costs over the whole lifecycle of the asset (**Section 4** and **5**).

1.5 Relationship to Other Corporate Documents

This AMP is a tactical plan which links "top-down" strategic objectives with "bottom-up" operational activities. **Figure 1-1** demonstrates the line-of-sight between AM strategic objectives and tactical and operational AM elements, including the relationship this AMP has to the other plans in the City's hierarchy of documents.

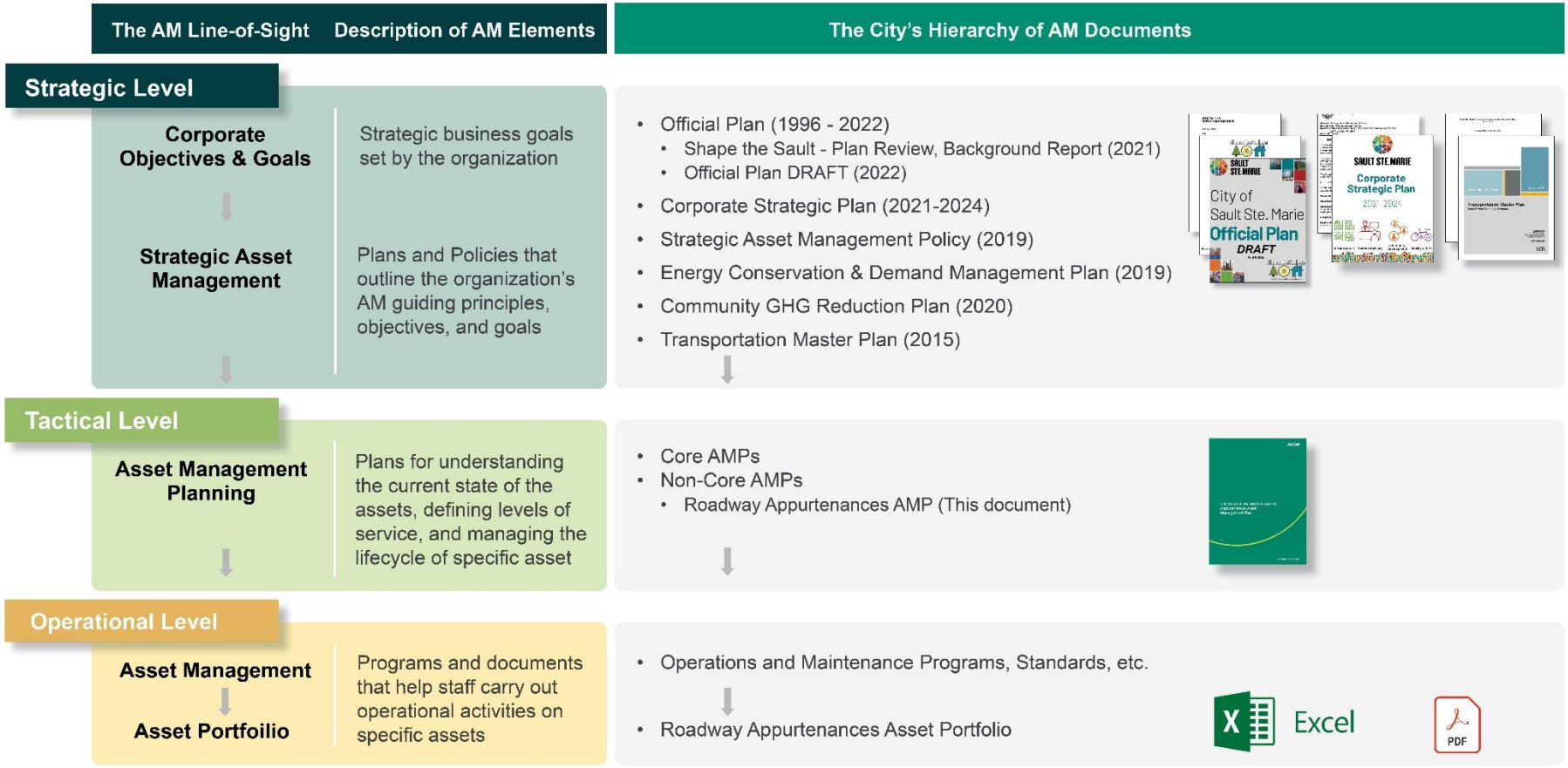

Figure 1-1: The City's Asset Management Line of Sight

2. State of Infrastructure

Roadway appurtenances encompass a diverse range of auxiliary elements crucial to the functionality and safety of roadways. The City's roadway appurtenances include traffic signals, signage, railway crossings, parking lots, and various supporting structures. The inventory of roadway appurtenances is a comprehensive catalog detailing the quantity, condition, and specifications of these components within the City. By analyzing the inventory and assessing the data gaps, this section facilitates informed decision-making and strategic resource allocation, providing essential insights into the maintenance needs and financial requirements.

2.1 Asset Hierarchy

To fulfill the requirements of O. Reg. 588/17 and to pave the way for robust long range asset management planning, the City necessitates a logically segmented asset breakdown structure (hierarchy) within the ambit of this AMP. Achieving this requires a sufficiently granular classification of roadway appurtenances, enabling the identification of individual assets due for renewal. Striking the right balance is also crucial, as there is a fine trade-off between ensuring adequate granularity to provide essential information and avoiding excessive granularity that could make the effort to collect and manage information more burdensome than the usefulness derived from it.

In **Figure 2-1**, the hierarchy of roadway appurtenances is illustrated, showcasing five main categories: traffic signals, traffic equipment, traffic signs, parking lots, and railway crossings. Each category is further broken down into subcategories. This asset hierarchy establishes a logical indexing of the City's roadway appurtenances, categorizing them into primary (parent) and secondary (child- and grandchild) assets. Such a structure forms the foundational framework for subsequent discussions and analysis, enabling the drill-down to a specific asset within the hierarchy to support maintenance planning or track costs at the asset level or higher levels.

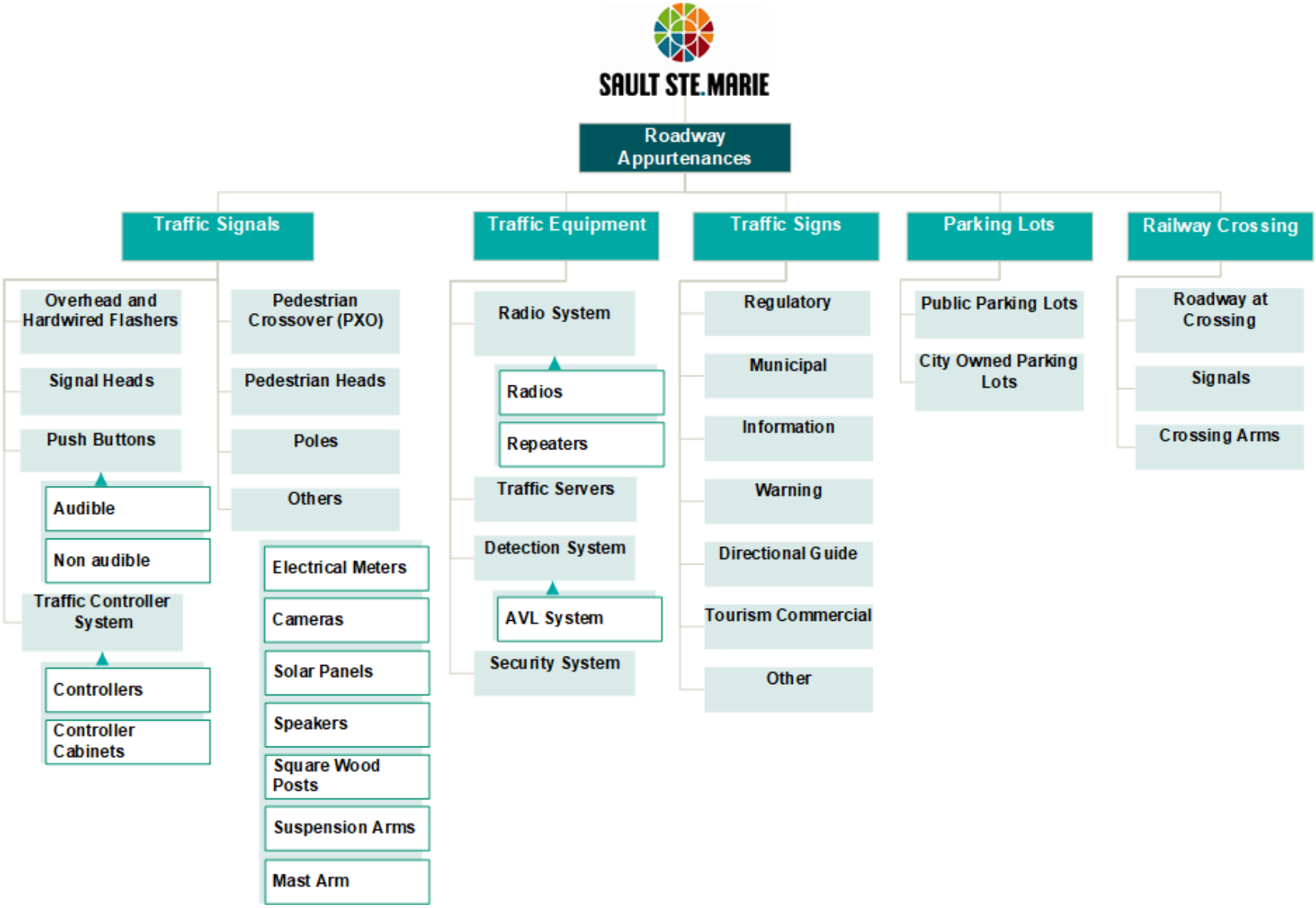

Figure 2-1: City of Sault Ste. Marie Roadway Appurtenances Asset Hierarchy

2.2 Current State of the Assets

2.2.1 Asset Inventory

Table 2-1 presents the summary of the City's roadway appurtenances inventory.

Table 2-1: Roadway Appurtenance Inventory Summary

Asset Group	Asset Category	Quantity	Unit
Roadway Appurtenances	Traffic Signals	2,381	Ea.
	Traffic Equipment	276	Ea.
	Traffic Signs	13,172	Ea.
	Railway Crossings	52	Ea.
	Parking Lots	46,932	m^2

2.2.2 Current Asset Replacement Value

The asset replacement value is the estimated cost that would be incurred to replace an existing asset with a new one of similar functionality, at current market prices or construction costs. This value represents the monetary amount required to reproduce or procure an asset equivalent to the one being assessed. Examining the distribution of asset replacement values allows the City to comprehend which asset categories hold the highest value for both the City and the public.

Table 2-2 presents the unit replacement cost and the total replacement value for distinct roadway appurtenance asset categories within the City. Notably, railway crossings constitute the most significant portion, accounting for a replacement value of approximately $12 million, followed by parking lots at $10 million, traffic signs and traffic signals at $8 million each, and traffic equipment at $0.7 million. The combined replacement value for all these categories amounts to approximately $39 million.

It is worth noting that the total replacement values have been marked up by 45%, out of which 15% accounts for engineering and project management cost and 30% for contingency cost.

Table 2-2: Current Replacement Value

Asset Group	Asset Category	Unit Replacement Cost ($/Unit)	Total Replacement Value (2024)
Roadway Appurtenances	Traffic Signals	$100 - $75,000 Ea.	$7,992,000
	Traffic Equipment	$1,058 - $18,057 Ea.	$776,000
	Traffic Signs	$400 - $15,000 Ea.	$8,809,000
	Railway Crossings	$150,000 Ea.	$12,102,000
	Parking Lots	$140 / m^2	$10,194,000
Total			**$39,873,000**

2.2.3 Age and Remaining Service Life

The asset age is based on the install year of the assets and the remaining service life (RSL) is estimated by considering both the age and the expected service life (ESL) in years. In practice, different assets will deteriorate at varying rates, and their deterioration may not necessarily follow a linear pattern over time. However, it is crucial to consider the level of effort required to predict failure in relation to the asset value. For highly valuable assets, more sophisticated

deterioration modeling may be justified. Conversely, for low-value assets, the cost of deterioration modeling might surpass the replacement cost of the asset. Moreover, the actual service life can vary significantly from the ESL. ESL is defined as the period over which an asset is available for use and able to provide the required LoS at an acceptable risk and serviceability (i.e., without unforeseen costs of disruption for maintenance and repair). In some instances, a variation in expected vs. actual service life is evident due to the following factors:

- **Operating Conditions and Demands:** Some assets are operated intermittently or even infrequently or are being operated at a lower demand than their designed capacity. Thus, the actual operating "age" of the asset is reduced.
- **Environment:** Some assets are exposed to very aggressive environmental conditions (e.g., corrosive chemicals), while other assets are in relatively benign conditions; thus, the deterioration of assets is affected differently.
- **Maintenance:** Assets are maintained through renewal or replacement of components, which prolongs the service life of the asset.
- **Technological Obsolescence:** Some assets can theoretically be maintained indefinitely, although considerations such as cost to maintain the asset, its energy efficiency, and the cost to upgrade to an updated technology that would result in cost savings are likely to render this approach uneconomical.

Figure 2-2 shows the weighted average asset age and RSL as a proportion of average ESL for traffic signs, the radio system, and the traffic controller system. However, due to the absence of installation date information for other asset subcategories, their average age and RSL are not presented in this AMP. It is recommended to collect installation date information for these assets and include it in the next iteration of the AMP.

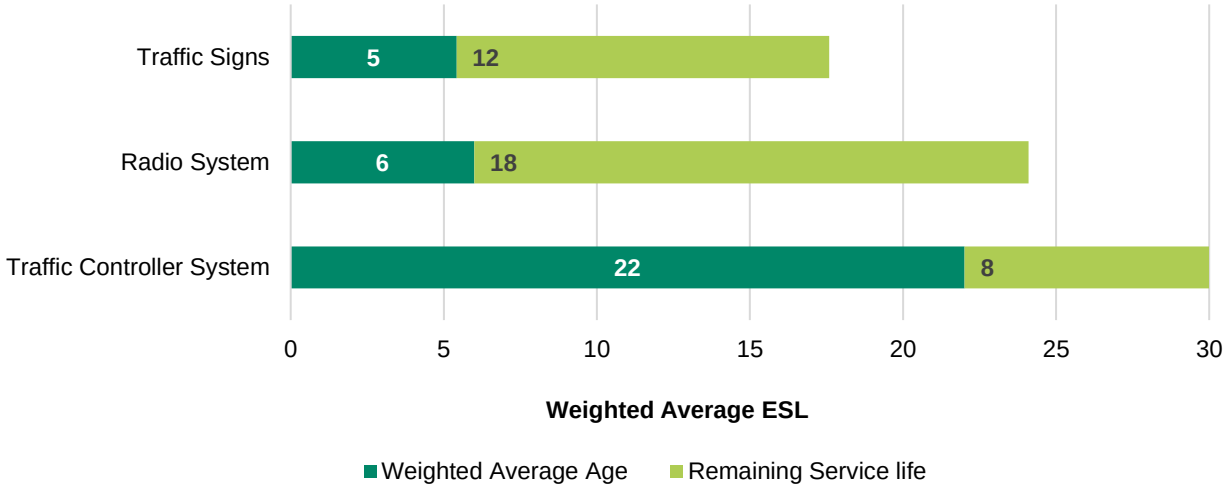

Figure 2-2: Roadway Appurtenance Weighted Average Age and Remaining Service Life

2.2.4 Asset Condition

Regular field condition assessments for traffic signs are conducted as mandated by the O. Reg. 239/02: Minimum Maintenance Standards for Municipal Highways under Municipal Act. For other asset categories that do not have field condition assessment results, the two-parameter Weibull distribution function was used to assess the current condition and to project the future condition of the City's roadway appurtenances. The Weibull distribution has been used extensively in reliability studies and lifetime prediction models in industries ranging from automotive to the oil & gas and provides a suitable distribution for this type of analysis.

The underlying premise of the Weibull-shaped deterioration is that while some assets fail prematurely due to severe conditions or improper installation, other assets are very long-lived and function well beyond their theoretical ESL. In order to perform a high order network-level analysis, it was assumed that assets would fail (and require replacement) within a deterioration envelope / curve approximated by a Weibull probability distribution. The two-parameter Weibull cumulative distribution has two parameters for scale and shape, as set out in Equation [1]:

$$f(x;\alpha,\beta) = e^{-\left(\frac{x}{\beta}\right)^{\alpha}} \quad [1]$$

Where: x = Age
α = Shape parameter (or slope)
β = Scale parameter

A set of Weibull cumulative distribution functions were leveraged to simulate a set of deterioration curves for assets with different ESLs as shown in **Figure 2-3**.

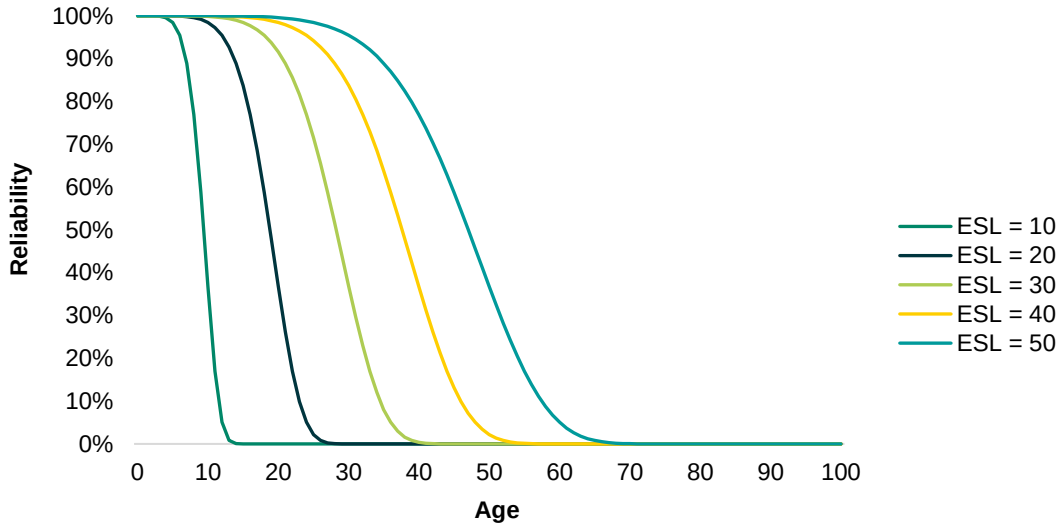

Figure 2-3: Asset Deterioration Curve Samples

Table 2-3 and **Figure 2-4** present the condition ratings of the City's roadway appurtenances with respective replacement values. As stated previously, a substantial number of roadway appurtenances lack installation date information. Therefore, a significant data gap exists for assets labelled as "Unknown" condition, representing 69% of the total replacement value. The known condition ratings span from "Very Good" to "Very Poor," with "Very Good" and "Good" collectively contributing 23% to the overall replacement value.

Table 2-3: Roadway Appurtenances Condition Summary

Rank	Condition Rating	Replacement Value	% of Replacement Value
1	Very Good	$2,777,000	8%
2	Good	$5,580,000	15%
3	Fair	$1,263,000	3%
4	Poor	$1,099,000	3%
5	Very Poor	$891,000	2%
6	Unknown	$25,516,000	69%

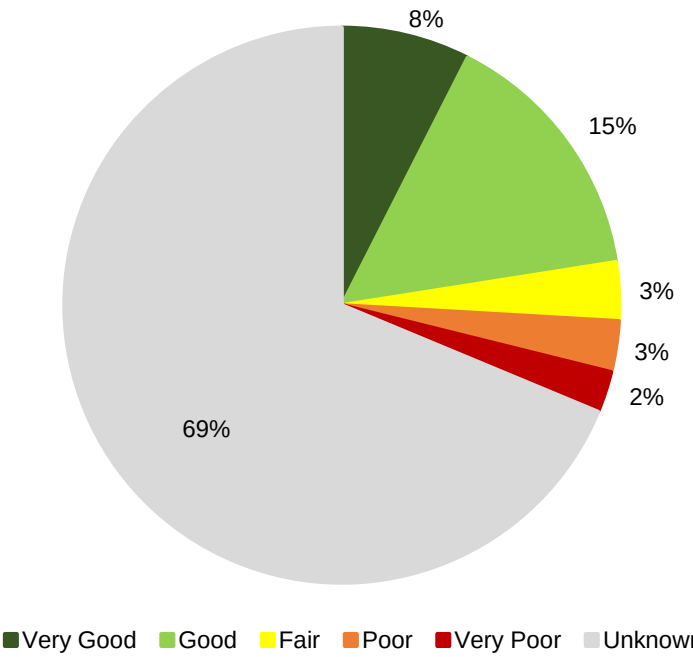

Figure 2-4: Roadway Appurtenances Asset Condition Weighted by Replacement Value

Figure 2-5 granulates the condition of the assets based on asset subcategories and their respective replacement values. It is important to note that, in this AMP, only the condition of the traffic controller system, traffic signs, and the radio system has been assessed. The data gap for other subcategories still requires attention and completion.

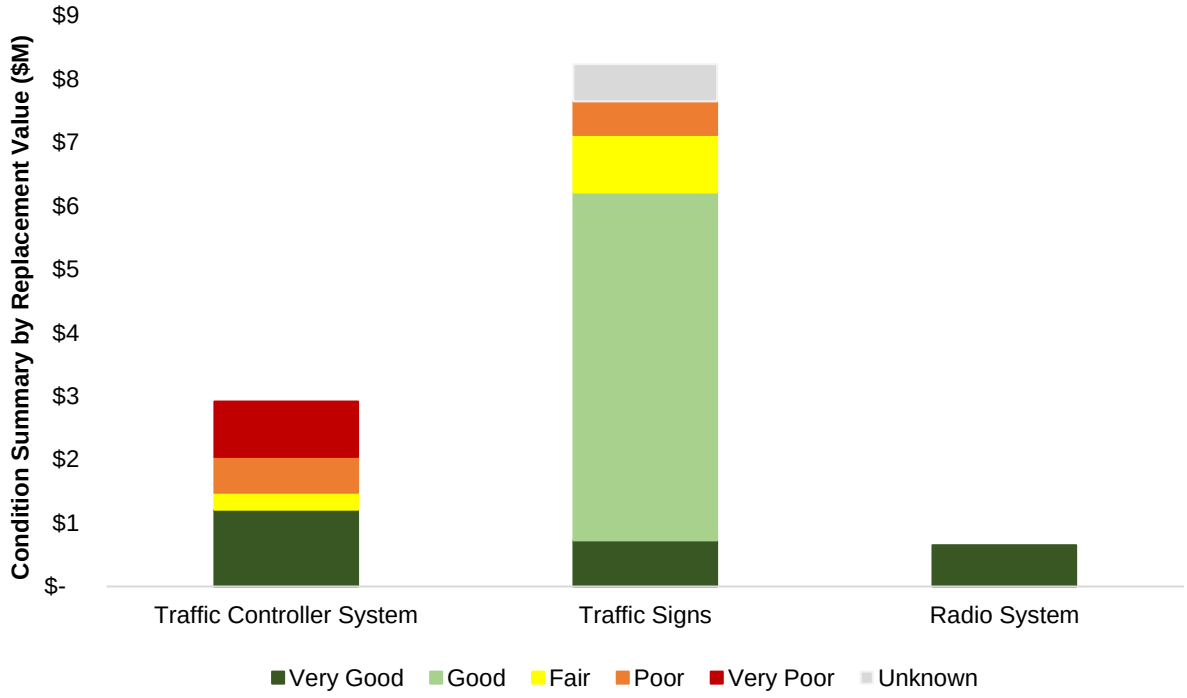

Figure 2-5: Distribution of Roadway Appurtenances Asset Condition

2.3 Asset Data Gap Analysis

This section summarizes the current state of the City's asset data by assessing the quality of the asset inventory. Specifically, this section identifies existing data gaps, determines the overall confidence in the current asset data, and introduces good practices of data management.

2.3.1 Data Gap Observations

The City's roadway appurtenances were previously stored across multiple spreadsheets and GIS database. This project has successfully centralized the data into a single inventory. Additionally, it has addressed and filled gaps in key data, such as expected service life and replacement costs, achieving a 100% completeness rate. **Table 2-4** provides a summary of data completeness levels in the compiled roadway appurtenance inventory across key data attributes. It is recommended that the City continue to work on filling any remaining gaps, ensuring a comprehensive and up-to-date database.

Table 2-4: Asset Data Completeness

Asset Group	Inventory Completeness (%)					
	Asset ID	Location	Install Date	Condition	Expected Service Life	Replacement Cost
Roadway Appurtenances	85%	100%	20%	91%	100%	100%

2.3.2 Data Confidence

The quality of asset data is critical to effective AM, accurate financial forecasts, and informed decision-making. For this reason, it is important to know what the reliability of the information is for the State of Infrastructure analysis of the roadway appurtenances. **Table 2-5** provides a description for the data confidence grades used to classify the reliability of the asset data. This can serve as a reference for the City to assess the quality of their asset data.

Table 2-5: Data Confidence Grading Scale

Confidence Grades	Description
A - Highly reliable	Data is based on sound records, procedures, investigations and analysis, documented properly and agreed as the best method of assessment. Dataset is complete and estimated to be accurate ± 2%
B - Reliable	Data is based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate ± 10%
C - Uncertain	Data is based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy is estimated ± 25%
D - Very Uncertain	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis. Dataset may not be fully complete, and most data is estimated or extrapolated. Accuracy ± 40%
E - Unknown	None or very little data held.

2.3.3 Data Management Practice

The asset data lifecycle is a sequence of stages that data goes through from its initial build (i.e., data capture and entry) to its eventual archival and/or deletion at the end of its useful life[1]. A clear definition and understanding of the organization's process for acquiring, storing, utilizing, assessing, improving, archiving, and deleting data (see **Figure**

[1] TechTarget Network, Definition: Data Life Cycle, 2020.

2-6) will ensure good data management practices and help to sustain levels of data quality required to support AM activities.

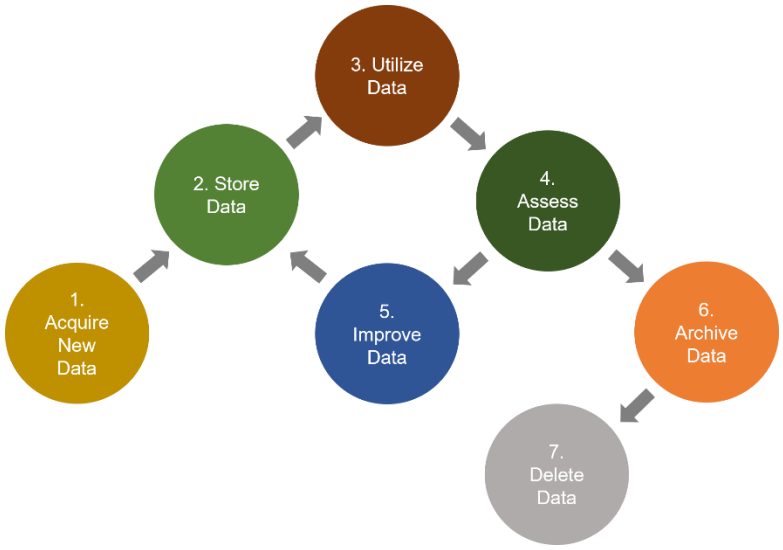

Figure 2-6: Asset Information Lifecycle

The seven key stages of the asset data lifecycle are described in more detail below:

- **Acquiring New Data**: The majority of new asset data arises from asset creation, refurbishment and overhaul activities. New data may also come by way of inheritance or transfers from other business units, organizations, or third parties. As such, it is important to have clearly defined processes in place not only to add or update asset data, but to migrate and merge data from other sources.
- **Storing Data**: The way asset data is stored is an important consideration for overall data quality. Having a planned approach to data storage will inevitably reduce the likelihood of duplication and inconsistencies across datasets within the organization. Depending on the needs of the organization, this stage may involve procuring a new software to adequately house the data, along with a data backup and recovery plan to ensure that the necessary data protection and privacy standards are met.
- **Utilizing / Analysing Data**: This aspect of the asset information lifecycle is where users encounter the data to support data-driven activities within the organization. Data can be viewed, processed, edited, and published to allow users to access the data outside the organization. Critical data that has been modified should be fully traceable to maintain the integrity of the data. As such, it is important to communicate to the users why asset data is so important, and how it is used to inform decisions within the organization.
- **Assessing Data**: Assessing the data quality helps to determine the level of confidence in the information and ensures that decision-makers are making informed decisions based on the quality of data available to them. Moreover, it is important to fully understand the availability and quality of the asset data before issuing information publicly. Some of the results of data degradation, due to improper or lack of assessment, may include:
  - Poor asset performance due to lack of information and understanding of asset behaviour.
  - Non-compliance with statutory regulations or safety requirements.
  - Safety incidents due to risks not being identified or reported.
  - Asset failure due to gaps in maintenance planning.
- **Improving Data**: Improving data quality involves establishing clear targets which are intended to be communicated widely across the organization. It is imperative that the organization understands the costs, benefits, and risks associated with any data improvements since the cost of the improvement may outweigh the overall benefit. It is also important to note that *more* data does not necessarily mean *better* data. It is very possible to collect data that does not add value to the organization. As such, it is critical that the organization

aligns its data improvement targets with its AM objectives and considers the data-driven decisions staff need to make at the operational and strategic level, to ensure that the *right* data is being improved upon.

- **Archiving Data**: Archiving data is the process of storing data that is no longer active or required but is able to be retrieved in case it is needed again. Data that is archived is stored in a location where no usage or maintenance occurs. It is recommended that a data archive strategy exists within an organization in order to lay out the data archival requirements, which includes the following factors:
  - Consider what data should be archived and articulate the reasons behind the archival decisions.
  - Examine any legal obligations pertaining to the retention of data records.
  - Determine the appropriate duration for retaining different categories of data records.
  - Evaluate the risks associated with the inability to retrieve specific data records.
  - Specify the authorized individuals or entities who should have access to archived data records.
  - Establish the expected timeframe for retrieving archived data records.
  - Communicate these requirements across the organization to ensure staff understand why records are being archived, how they can access archived data records, and for how long archived data records can still be accessed.
- **Deleting Data:** The deletion of data is the final component of the asset information lifecycle. Typically, within organizations there is a resistance to permanently delete data, otherwise known as data “squirrelling”, due to the overall capacity of storing data increasing and the cost decreasing. However, within the organization’s data archive strategy, a retention period should be specified to indicate when data should be deleted, along with any processes to follow, such as obtaining prior authorization.

3. Levels of Service

3.1 Purpose

Level of Service (LoS) supports every aspect of the overall AM System. The objective of establishing clearly defined service levels is to help the City meet stakeholder values, achieve its strategic goals, make informed decisions, and implement effective asset lifecycle activities.

Documenting LoS is a proven practice that will enable the City to:

- Link corporate strategic objectives to customer expectations and technical operations.
- Balance customer needs and expectations while evaluating the effectiveness of operations and whether the right LoS is being provided at the right cost.
- Transition from an “Asset Stewardship” approach that focuses on making decisions based on maintaining assets in an acceptable condition to a “Serviceability” approach that is geared towards making decisions based on balancing the costs, risks, and goals for the LoS being provided by the City’s assets.
- Communicate the physical nature of infrastructure that the City owns and is financially responsible for while promoting the use of LoS to enable effective consultation with stakeholders regarding alternative funding options according to desired LoS outcomes.
- Make recommendations on strategies that the City can take now to minimize future renewal costs while ensuring that adequate LoS can be delivered without burdening future generations.
- Assess internal (e.g., program changes) and external (e.g., climate change) factors that have the potential to impact the City’s ability to deliver services and how these factors may impact the LoS being provided.
- Implement a corporate continuous improvement program to further optimize AM across all service areas.

O. Reg. 588/17 mandates that Ontario municipalities must report the current LoS by July 1, 2024. Additionally, the proposed LoS for all municipal assets including core and non core assets should be reported by July 1, 2025.

3.2 Objectives

Defining LoS objectives is important for drawing a line of sight between the City’s corporate objectives and the tangible asset performance outcomes. To do so, the LoS objectives must take into consideration stakeholder interests to develop asset performance measures that aim to meet the needs and expectations of the community. By doing this, the City will ensure that their assets are striving towards optimal performance, not only operationally, but economically, socially, and sustainably as well.

Every stakeholder has certain interests in the service being provided and in general. The City’s corporate objective is to lift up the community and build pride, and attract people (visitors, employers and employees). The City’s Comprehensive Background Report[2] for the New Official Plan outlined the overarching themes that reflect the City’s value, as shown in **Table 3-1**. Each overarching theme is also assigned a corporate service objective.

The development of level of service targets should be aligned with these corporate objectives which will be addressed in the next iteration of the AMP.

[2] City of Sault Ste Marie. 2021. Comprehensive Background Report.

Table 3-1: The City's Overarching Themes and Objectives

Overarching Themes	Corporate Objective
Healthy Community	Supports healthy living, active transportation, access to passive and active recreation, social interaction and the creation of spaces that are comfortable, safe and accessible for all ages and abilities (the "8 to 80 Cities" concept).
Environmental Sustainability	Supports energy conservation and efficiency, improved air quality, reduced greenhouse gas emissions and climate change adaptation.
Integrated Mobility	Supports accessibility and choice of a diversity of transportation modes.
Sense of Place	Fosters a welcoming place for all that establishes connection and provides a memorable experience to visitors.
Sustainable Growth	Stimulates reinvigoration of neighbourhoods to provide a complete range of housing, services, employment and recreation.
Economic Resiliency	Supports the growth and diversification of the city's economy.
Social Equity	Contributes to creating a welcoming and inclusive community, focusing on the removal of systemic barriers so that everyone has access to an acceptable standard of living and can fully participate in all aspects of community life.
Cultural Vitality	Celebrates the Sault's history, diverse communities and natural and cultural heritage, with the Downtown as the Sault's core destination for arts and culture.

3.3 Stakeholders Identification

A stakeholder is any person or organization that can affect, be affected by, or perceive themselves to be affected by a decision or an activity. Stakeholder analysis is the process of understanding stakeholder needs, expectations, and perceptions relative to the stakeholder's level-of-interest and level-of-influence over the organization. The organization typically engages with their stakeholders to:

- Establish which activities or services matter most to them.
- Understand their risk appetite and risk threshold.
- Understand their willingness to pay for services.

Stakeholders can take many forms and may be internal (i.e., staff, Council) or external (i.e., the public, regulatory agencies, suppliers, neighbouring municipalities, etc.) to the organization. The following groups were identified as key stakeholders for roadway appurtenances at the LoS workshops. This is not intended to be an exhaustive list; however, the following groups provide a good starting point for the City to move forward to the next stage. The City's key stakeholder groups for roadway appurtenances are identified below:

- Residential Customers
- Regulatory Agencies
- Neighbouring Municipalities
- Environmental Groups
- Internal City Departments
- Railway Companies

3.3.1 Legislated and Regulatory Requirements

Roadway Appurtenance assets are critical to the Town's ability to provide essential services to the community, and for protecting the health and safety of the public. As such, key legislative requirements exist for the Town's infrastructure assets, which ensure that minimum requirements are met and standards are in place that promote a high quality of life (i.e., clean drinking water and safe roads, etc.). A sample of key Federal and Provincial legislated requirements are outlined below in **Table 3-2.** Policy and guiding documents relevant to roadway appurtenance assets are also listed.

Table 3-2: Legislated and Regulatory Requirements

Federal	Provincial
• Canada Transportation Act • Railway Safety Management System Regulations • Railway Safety Act • Grade Crossings Regulations • Canadian Rail Operating Rules	• Highway Traffic Act – Ontario Regulation 615 – Traffic Signs – Ontario Regulation 402 – Pedestrian Crossover Signs – Ontario Regulation 408 – Traffic Control Signal Systems – Ontario Regulation 626 - Traffic Control Signal Systems • Municipal Act – Ontario Regulation 239 – Minimum Maintenance Standards for Municipal Highways • Public Transportation and Highway Improvement Act • Ontario Traffic Manual

3.4 O. Reg 588/17 Levels of Service Metrics

Currently, O. Reg 588/17 identifies levels of service metrics for core assets. A number of key LoS performance measures for roadway appurtenances assets have been identified in consultation with City staff through workshops, are detailed in **Section 3.5**.

3.5 Levels of Service Performance Metrics

Through a review of the legislated and regulatory requirements required for roadway appurtenances and Collaboration with the City during the level of service's workshop, 1 levels of service performance metric was determined for roadway appurtenances and is presented in **Table 3-3**.

Table 3-3: Levels of Service Performance Metrics (Roadway Appurtenances)

	Asset Category	Service Value	LoS Performance Measure	Unit	Is Data Available? (Y/N)	Regulation
1.	Roadway Appurtenances	Quality & Reliability	Frequency of inspecting signs	# of Inspections /year	Y	O. Reg. 239/02: Minimum Maintenance Standards

3.6 Levels of Service Performance Targets

Establishing LoS targets is an important part of continual improvement and performance management. Without performance targets, it is difficult to ascertain whether goals are being met, or the extent of the gap if they are not. Incorporating targets into the City's LoS Framework helps to ensure that targets are reasonable, aligned with customer expectations, and evaluated on an objective basis by considering cost-benefit trade-offs.

One of the key challenges in setting infrastructure performance targets in a municipal environment is that they can often become biased and/or politically motivated. Therefore, it is important to review LoS targets with internal and external stakeholders, especially the customers who will be impacted the most by changes in service delivery. An important aspect of evaluating LoS targets is determining how the user is willing to pay for the service. Regulatory requirements are an exception; however, they only provide the minimum service standard. Cost is still an important parameter to consider when assessing the merits of service improvements. To deal with the financial realities, it is necessary to:

- Calculate how much the service costs based on current LoS.
- Determine the cost associated with varying the LoS.

- Assess the customers' willingness to pay.

It is important that any targets set be realistic and achievable. Therefore, it is not advisable that the City sets any firm targets until their current performance has been fully assessed. O. Reg. 588/17 requires AMPs to include proposed levels of service and a formalized financial strategy by July 1, 2025.

3.7 Future Demand Drivers

Demand management is a critical component of managing the desired LoS in a sustainable manner, now and into the future. Understanding demand drivers enables the City to proactively develop effective, long-term strategies that are suitable for the City's unique political, environmental, social and technological landscape.

A summary of factors identified from the LoS workshop that would impact roadway appurtenances service levels include, but are not limited to, the following:

- Technology.
- Growth.
- Speed Management.
- Funding level.

On November 2, 2021, the City of Sault Ste. Marie's Planning Division released the Comprehensive Background Report for updating the Official Plan[3]. The City's Official Plan guides the local decision-making on land use, development and public infrastructure over the next 20 years. The City's population is expected to roughly reach to 80,000 (by 2031), and 83,300 people by 2036. Employment is projected to grow by about 6,000 jobs, from approximately 31,000 jobs in 2016 to 36,900 jobs in 2036.

When additional assets to accommodate this population and employment growth are introduced to the City's portfolio, additional human resources, training and funding are required to maintain and operate, and renew or replace those assets. O. Reg. 588/17 requires municipalities by July 1, 2025, to estimate capital expenditures and significant operating costs to achieve the proposed LoS and accommodate projected increases in demand caused by population and employment growth. This includes the estimated capital expenditures and significant operating costs related to new construction and / or to upgrade existing municipal infrastructure assets. The City will have to address these aspects during the later phases of the AM regulatory compliance process and before the July 1, 2025 deadline.

[3] City of Sault Ste Marie. 1996. Official Plan

4. Asset Management Strategies

4.1 Asset Lifecycle Management Introduction

Asset lifecycle management focuses on the specific activities that should be undertaken during all phases of the asset lifecycle. Considering the entire asset lifecycle ensures that the City makes sound decisions that take into account present and future service delivery needs.

The overarching goal of lifecycle management is to maximize the long-term benefits and services that the City's assets deliver while minimizing the associated costs and risks in the long run. Every asset has a lifecycle cost, which is the total cost of all activities undertaken throughout its service life. Part of the purpose of the asset management planning process is to fully understand and predict the long-range financial requirements for the City's infrastructure, facilitating planning and resource management in the most cost-effective manner possible. **Figure 4-1** illustrates how costs typically accumulate over an asset's life. It is worth noting that the ongoing operations and maintenance, renewal & replacement, and disposal costs accumulate to many multiples of the initial acquisition costs. As such, it is important to fully understand the entire lifecycle costs before proceeding with asset acquisition.

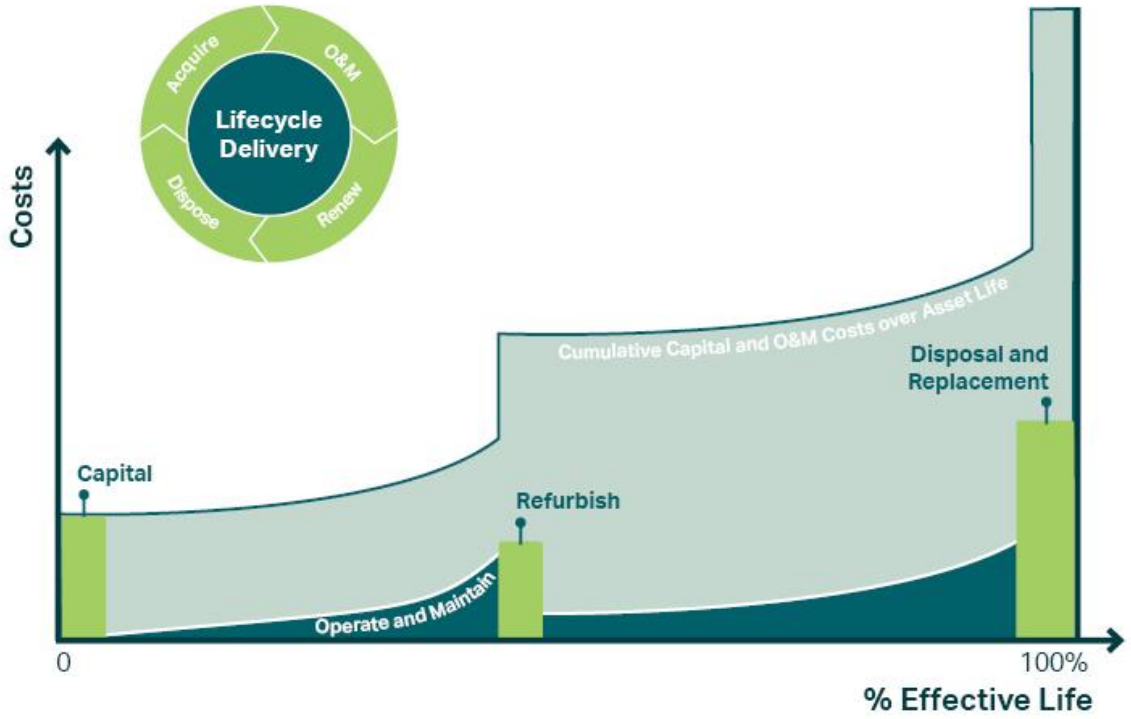

Figure 4-1: Lifecycle Cost Accumulation Over Asset Life

Asset lifecycle management strategies are typically organized into the following categories.

1. **Asset Acquisition / Procurement / Construction**: Acquisition includes expansion activities and upgrading activities to extend services to previously unserved areas or meet the demands of growth and functional requirements. When acquiring new assets, the City should evaluate credible alternative design solutions, considering how the asset will be managed at each of its lifecycle stages. Asset management and full lifecycle considerations for the acquisition of new assets include, but are not limited to, the following:

    - The asset's operability and maintainability.

- Availability and management of detours.
- Staff skill and availability to manage the asset.
- The manner of the asset's eventual disposal.

2. **Asset Operations and Maintenance (O&M)**: As new infrastructure is commissioned, the City assumes the responsibility of operating and maintaining the infrastructure according to O&M standards to ensure its safety and reliability. The operations staff provides the necessary day-to-day support for operating the assets. Maintenance expenses include periodic preventive maintenance to ensure that the infrastructure can provide reliable service throughout the life of the asset and corrective maintenance that is required to repair defective assets as needed. Inadequate funding for O&M will adversely impact the lifespan of assets. The number of O&M resources required in any period is a function of the current inventory of infrastructure and the total O&M needs for each asset. As the inventory of infrastructure grows, total O&M requirements will also increase.

3. **Renewal and Replacement:** The third aspect of full lifecycle costing pertains to the renewal and replacement of assets that have deteriorated to the point where they no longer provide the required service. Renewal or rehabilitation costs may be incurred during the life of an asset where an investment is made to improve its condition and/or functionality, for example, resurfacing a parking lot. Replacement activities are expected to occur once an asset has reached the end of its useful life, and rehabilitation is no longer a viable option.

4. **Decommissioning and Disposal:** There will inevitably come to a point in time when an asset must be removed from service, and depending on the type of asset, there may be significant costs associated with its decommissioning and disposal. Factors that may influence the decision to retire an asset include changes to leading to non-compliance, the inability of the asset to handle increased service levels, technological advances rendering the asset obsolete, the cost of retaining the asset exceeding the benefits gained, the current risk associated with the asset's failure being tolerable, assets negatively impacting service delivery or the environment.

Normally, major costs that may be incurred during disposal and decommissioning derive from the environmental impact of the disposal and, if required, the rehabilitation and decontamination of land. However, some cost savings may be achieved through the residual value of the asset or by exploring alternative uses for the asset. In all cases, it is important to consider disposal and decommissioning as the strategy employed has the potential to attract significant stakeholder attention. For that reason, the costs and risks associated with disposal and decommissioning should be equally considered in the City's capital investment decision-making process.

4.2 Asset Acquisition Strategies

The City's pursuit of new roadway appurtenances is primarily fueled by their growth. With the expansion of both population and infrastructure, there arises a need for updated and enhanced road features to cater to the rising traffic and facilitate efficient transportation. The City's commitment to complying with traffic and safety regulations is equally crucial, ensuring that the transportation infrastructure aligns with current standards, thereby improving overall road safety. This input prompts targeted improvements in response to resident concerns. Last but not least, the City's dedication to sustainability initiatives propels the adoption of smart, energy-efficient technologies, contributing to environmentally friendly solutions in the transportation system.

Table 4-1 summarizes the acquisition activities associated with the City's roadway appurtenances.

Table 4-1: Acquisition Activities for Roadway Appurtenances

Asset Group	Activities Undertaken by the City	Guiding Documents
Roadway Appurtenances	• New Intersections Development: Accompanied by the creation of GIS data and drawings. • Cameras: New installations to Improve timing of traffic signals and contribute to a reduction in customer complaints.	• Official Plan • Transportation Master Plan • Corporate Strategic Plan • Energy Conservation & Demand Management Plan • Community Greenhouse Gas Reduction Plan • Strategic Asset Management Policy

4.3 Asset Operations and Maintenance Strategies

Effective O&M of assets is crucial for sustainable performance and longevity. Managing O&M costs involves developing comprehensive strategies that optimize resource utilization while ensuring asset reliability. Proactive maintenance schedules and condition monitoring can help identify potential issues before they escalate, reducing unplanned downtime and minimizing repair costs. Implementing energy-efficient technologies and best practices in roadway appurtenances management also contributes to cost-effectiveness over the asset's lifecycle. It is worth noting that currently the City has not established maintenance targets for roadway appurtenances; instead, they rely on the minimum maintenance standards as the guiding document.

Table 4-2 summarizes the O&M activities associated with the City's roadway appurtenances.

Table 4-2: O&M Activities for Roadway Appurtenances

Asset Group	Asset Category	Activities Undertaken by the City	Note
Roadway Appurtenances	Traffic Signals	• Regular monitoring of signal functionality. • Inspection and repair of traffic signal poles. • Implementation of software updates and hardware repairs. • Repairs of LED lamps: – Entire LED segments are replaced rather than repairing individual bulbs. – Daily inspections to ensure signal functionality. – Conducting visual and digital inspections, documenting any defects found.	Challenges in Traffic Signals O&M: • Managing the high volume of maintenance work at each intersection poses tracking difficulties, requiring ongoing efforts for documentation. • Addressing staffing and budget constraints is crucial for effective maintenance operations. • The short operational season, from May to the beginning of November, demands focused efforts to optimize maintenance activities. • Conducting maintenance internally is the current approach; there are challenges in utilizing external contractors for specialized work. • The installation of PXOs has been delayed for a few years due to their lower priority.
	Traffic Equipment	• Regular calibration and cleaning of equipment. • Inspection and repair of hardware. • Updates of software: – It is an ongoing process for traffic signals. – Updates are typically required for most controllers, traffic controllers cabinets, and any hardware in the field.	NA

Asset Group	Asset Category	Activities Undertaken by the City	Note
	Traffic Signs	• Regular inspections. • Cleaning and repairing signs. • Replacing faded or damaged signs. • Conducting a reflectivity study each summer for regulatory and warning signs. • Conducting annual reflectivity studies to comply with regulatory standards. • Conducting bi-yearly inspections alongside bridge inspections for overhead signs.	• The O&M of traffic signs is mandated by the Municipal Act, which stipulates specific requirements that must be met. This involves conducting regular inspections and testing, with a commitment to proving compliance with the established standards and regulations. • The City document sign inspections results in GIS.
	Parking Lots	• Regular cleaning and surface repairs. • Repairing lighting, signage, and markings. • Winter maintenance such as snow clearing. • Repairing markings for parking spaces.	NA
	Railway Crossing	• Inspecting and maintaining signal equipment. • Inspecting barrier functionality and safety mechanisms. • Testing traffic signals at railway crossing interconnections annually through collaborative efforts between the City and the railway company.	• The City needs to address public complaints arising from offset rails, with the responsibility for action falling on the railway companies. The difficulties lie in coordinating and communicating with railway companies to establish proactive maintenance plans, adding a layer of complexity to ensuring the safety and functionality of railway crossings.

4.4 Renewal and Replacement Strategies

Renewal often involves upgrading or refurbishing existing assets to extend their lifespan, while replacement entails acquiring new assets. The costs associated with these activities include not only the direct expenses of acquisition but also indirect costs such as downtime during the transition, training for new technologies, and potential disposal or recycling costs. **Table 4-3** summarizes the renewal and replacement activities associated with the City's roadway appurtenances.

Table 4-3: Renewal and Replacement Activities for Roadway Appurtenances

Asset Group	Asset Category	Activities Undertaken by the City	Note
Roadway Appurtenances	Traffic Signals	• Replacement at the end of life.	• The City has undertaken the replacement for overhead flashers for sustainability purposes. • The City is in the process of replacing cabinets, and the replacement process is being facilitated through the capital road transportation program. • The re-lamping process has been completed, utilizing exclusively LED bulbs with a 10–15 years lifecycle; however, the City currently lacks a plan for end-of-life replacements.
	Traffic Equipment	• Replacement at end of life.	• The City is implementing smart traffic system by adding more intersections online.
	Traffic Signs	• Replacement at end of life.	• A replacement program is in place, and replacements of regulatory and warning signs are documented in GIS. • South facing signs may require more frequent replacement.
	Parking Lots	• Resurfacing (currently not budgeted for regular resurfacing)	• Currently, there is no plan on replacement of parking lots assets.

Asset Group	Asset Category	Activities Undertaken by the City	Note
	Railway Crossing	• Replacement at end of life (currently unplanned).	• The renewal and replacement activities are determined by the railway company, with maintenance requests communicated to the City, which provides funds for the maintenance.

4.5 Decommissioning and Disposal Strategies

Effective asset decommissioning and disposal are integral components of strategic asset management. As the City's roadway appurtenances approach the end of their lifecycle or become obsolete, a systematic methodology to their removal and decommissioning is essential. This process involves careful planning, environmental considerations, and adherence to the City's regulatory requirements. **Table 4-4** summarizes the decommissioning and disposal activities associated with the City's roadway appurtenances.

Table 4-4: Decommissioning and Disposal Activities for Roadway Appurtenances

Asset Group	Activities Undertaken by the City
Roadway Appurtenances	• Recycling metal, plastic, electronic components, and asphalt and concrete, etc. • Ensuring proper disposal of batteries and electronic waste. • Providing hazardous waste depots. • Participating in metal recycling, receiving some funds in return.

4.6 Risk Associated with Lifecyle Activities

In the context of AM, risk is defined as the consequence or impact of uncertainties on AM objectives. These uncertainties span a spectrum of events, including financial market fluctuations, unexpected asset failures, changes in regulatory environments, and other factors capable of influencing the performance or condition of assets. Risk management, developed to handle uncertainties in a systematic and timely manner, is a practical framework that ensures thoughtful decision-making and protects the achievement of goals. The risk management process generally follows a series of steps, as outlined in **Table 4-5**.

Table 4-5: Key Steps in the Risk Management Process

Step	Description
1. Establish the context	• Define the scope of the risk management process and the objectives that the City seeks to achieve through effective risk management. • Consider the City's internal and external factors, and understand stakeholder expectations.
2. Risk identification	• Identify potential risks that could impact the City's AM objectives.
3. Risk analysis	• Utilize qualitative or quantitative analysis methods to assess risks.
4. Risk evaluation	• Evaluate the likelihood and impact of identified risks. • Prioritize risks based on their criticality.
5. Risk treatment	• Develop strategies to reduce the likelihood and impact of identified risks. • Implement preventive measures to address potential issues proactively. • Establish contingency plans for managing risks that cannot be eliminated.
6. Monitor and review	• Regularly update risk assessments to reflect evolving circumstances. • Develop KPIs and monitoring tools to track the effectiveness of risk treatment strategies. • Learn from the City's past experiences and continuously improve risk management strategies.

Over the course of an asset's service life, the accelerating rate of deterioration with age poses inherent risks, inevitably leading to a corresponding increase in maintenance costs. **Figure 4-2** illustrates a general asset

deterioration curve. This trend becomes particularly pronounced in the final phase of the asset's service life, where the cost of maintenance experiences a rapid escalation, highlighting the financial risks associated with prolonged neglect. This phenomenon underscores the critical importance of preventive maintenance in the early stages of an asset's service life. By addressing risks proactively during these initial periods, the potential financial burden tied to accelerated deterioration in later stages can be effectively mitigated.

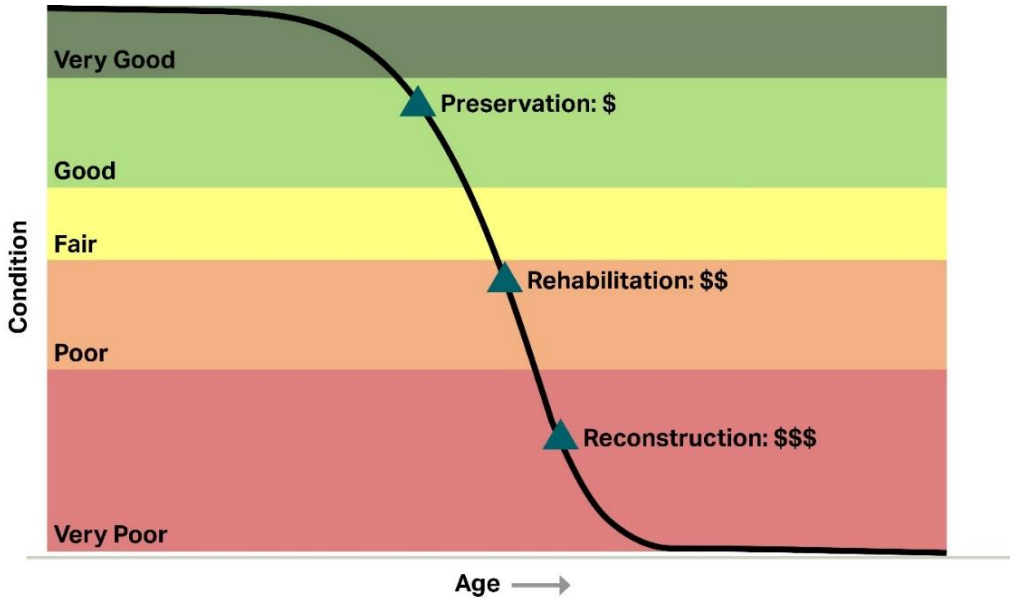

Figure 4-2: Asset Deterioration Curve and Rehabilitation Costs

Beyond the general guidance, the City's approach to risk management should be tailored to their overarching goals, financial resources, and willingness to tolerate uncertainties. To help shape the City's risk management process, AECOM recommends taking into account the following key considerations:

1. Legislation Ambiguity for Railway Crossings

Managing roadway appurtenances involves navigating uncertainties in legislation, especially when responsibilities for railway crossings are ambiguous. The division of duties and obligations between the rail company and the City may not always be clearly delineated, presenting a potential challenge in terms of accountability and decision-making. This lack of clarity in legislation can lead to difficulties in establishing a comprehensive and streamlined approach to managing roadway appurtenances at railway crossings, potentially resulting in delays, disputes, or suboptimal maintenance practices.

2. Growing Accessibility Requirements

As the demand for higher levels of service grows, the City faces an increased need to ensure that roadway appurtenances align with accessibility standards, accommodating the diverse needs of the community. However, the City's aging infrastructure poses an additional risk, as some equipment may not meet evolving standards, potentially resulting in accessibility gaps. To address these challenges, the City should adopt a holistic approach that combines technological innovation, policy adjustments, and systematic infrastructure upgrades.

3. Safety

Maintaining traffic signals and signs is crucial for keeping the City's streets safe. Not only does neglecting them pose a safety hazard, but it can also lead to costly lawsuits against the City. The City is now fully compliant with the regulatory requirements for the upkeep of traffic signs and signals. By investing in the maintenance of the traffic systems, the City is committed to building a safer environment for residents to travel.

4. Traffic Congestion and Environmental Impact

Non-functional or missing traffic signals and signs can disrupt the flow of traffic, leading to congestion, delays, and increased frustration for road users. Increased traffic congestion due to poorly maintained traffic control systems can lead to higher emissions from vehicles, contributing to pollution.

5. Increased Maintenance Costs

Regular maintenance of roadway appurtenance assets is a cost-effective strategy that prevents the escalation of minor issues into major repairs or replacements (see **Figure 4-2**).

6. Decreased Efficiency of Emergency Services

Well-maintained traffic signals and signs are essential for enabling emergency response vehicles to navigate the City swiftly and efficiently. Proper upkeep ensures that these vehicles can quickly reach their destinations during emergencies, enhancing the City's ability to provide timely and effective emergency services.

5. Funding Need Analysis

Financial forecasting and capital planning are a critical element of ensuring the efficient and sustainable management of infrastructure. This involves estimating future financial needs and developing a strategic plan to secure the necessary funding for maintaining, renewal, or expanding assets. By accurately forecasting financial requirements and implementing a well-structured capital plan, the City can not only ensure the long-term viability of their infrastructure systems but also effectively manage costs, reduce environmental risks, and protect public health.

The financial projections presented in the subsequent sections provide visualizations of the results from the financial model. The subsequent sections are structured as follows:

Section 5.1 shows the assumptions adopted in the financial model to determine the reinvestment or replacement decisions for each subcategory of roadway appurtenances.

Section 5.2 assesses the annual funding requirements for the next 20 years (2024-2043). Additionally, a smoothed allocation of annual funding is provided to align with the City's budgeting requirements.

Section 5.3 summarizes the O&M budget forecast over the next 10 years (2024-2033).

Section 5.4 presents the full funding needed over the next 10 years (2024-2033). The full funding expenditure profile includes the budget required for capital, O&M, and disposal.

5.1 Reinvestment Forecast and Lifecycle Modeling

The lifecycle analysis was conducted using an MS Excel Asset Lifecycle Model that integrated asset inventory, age, ESLs, replacement values, and condition to establish a theoretical replacement cycle for each roadway appurtenance asset. The reinvestment forecasts prepared for this assessment provide estimates of the costs required over the next 20 years to sustain each of the City's roadway appurtenance assets. A financial dashboard was developed to present the results of the lifecycle modeling (**Appendix A**).

The annual reinvestment needs for the roadway appurtenance assets were determined based on their age and ESL in years (i.e., replacing assets that have exceeded their ESL) in inflated dollar values, incorporating the following assumptions:

- Base year: The base year used is 2024. Any historic asset valuations have been inflated using the experienced inflation rate.
- Inflation rate: the inflation rates adopted for the financial model are presented in **Table 5-1**.

Table 5-1: Inflation Rate over 20 Years [4]

Year	Inflation Rate
2024	7%
2025	6%
2026	5%
2027	4%
2028	4%
2029	3%
2030 - 2043	3%

- Markup: The project management and engineering, and contingency mark ups are 15% and 30% respectively.

[4] AECOM Analysis, "Rising Inflation", June 2022, Retrieved in October 2022

- Disposal Rate: 1% of the annual reinvestment is used as an allocation for disposal costs.

In cases where the installation date is unavailable, an annual reinvestment rate is applied to estimate the asset replacement need. Detailed reinvestment assumptions for assets with missing installation dates or asset categories requiring a specific renewal approach are provided in **Table 5-2**.

Table 5-2: Roadway Appurtenances Asset Capital Reinvestment Assumptions

Asset Categories	Annual Reinvestment Rate (2024-2033)	Reinvestment Strategy	Annual Average Reinvestment Cost (2024-2033)*	Assumption
All Traffic Signal Assets without Install Date	Varies	Replace assets for when they exceed their ESLs	$ 270,000	Varies; covered under O&M budget forecast
Traffic Signs (Exclude Regulatory Signs)	6.7%	Replace assets for a life cycle of 15 years	$ 398,000	6.7% of traffic signs replaced annually; covered under O&M budget forecast
Overhead Signs	2%	Replace assets for a life cycle of 50 years	$ 13,000	2% of overhead signs replaced annually; covered under O&M budget forecast
Parking Lots	1.5%	Resurface every 25 years	$ 151,000	4% of parking lots resurfaced annually with a unit cost of $80/m^2
Railway Crossings	3.3%	Replace assets for a life cycle of 30 years	$ 404,000	3.3% of railway crossing replaced annually

**Note: The annual average reinvestment cost are presented in non inflated dollar value.*

5.2 Capital Reinvestment Need Analysis

5.2.1 20-Year Reinvestment Need Analysis

The City's roadway appurtenances require an average annual reinvestment rate of $1.0 million over the period 2024-2033 and $1.2 million over 2034-2043 in inflated dollar values, as presented in **Figure 5-1**. This is equivalent to a total of approximately $22 million over the next 20-year period. Notably, the reinvestment funding needs for railway crossings account for the largest share in most years. However, it is worth noting that due to legislative ambiguity, there is a possibility for the City to share the reinvestment costs of railway crossings with both the government and the railway company.

Furthermore, the radio system significantly contributes to the reinvestment requirements for 2043. This is largely attributed to the majority of the City's radio system being installed in 2018, and with an ESL of 25 years, these assets are scheduled for replacement in 2043.

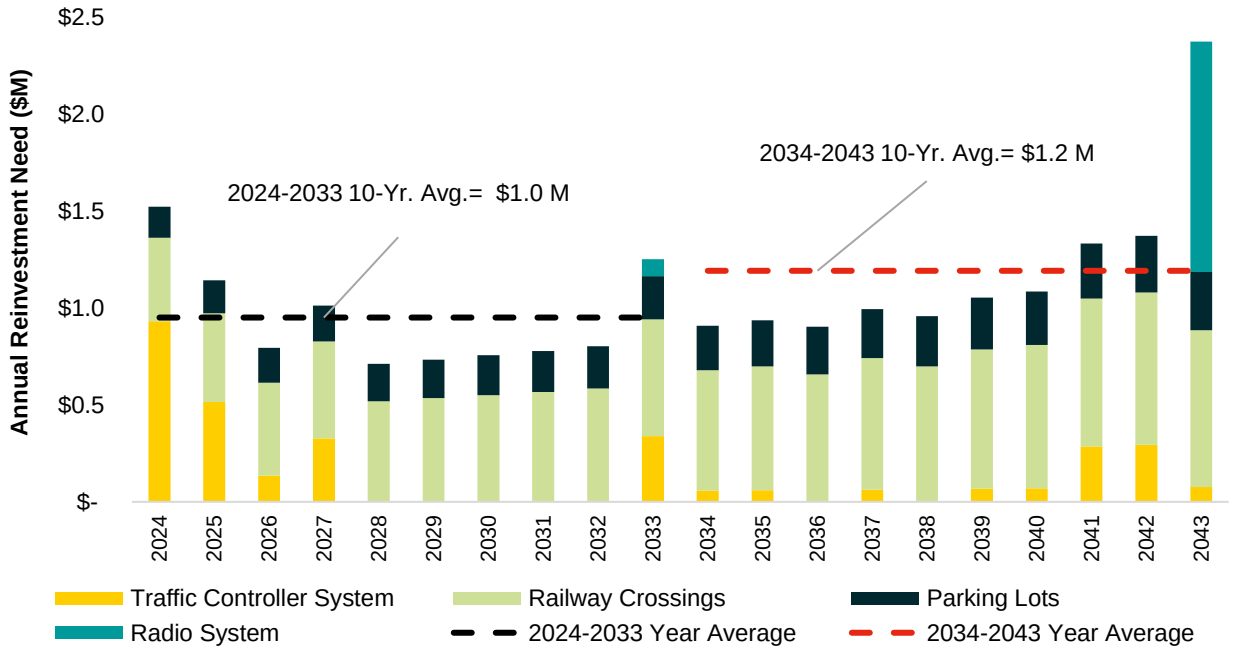

Figure 5-1: Roadway Appurtenances 20-Year Reinvestment Need

The detailed 20-year reinvestment needs for roadway appurtenances are presented in **Table 5-3** in inflated dollar values.

Table 5-3: Roadway Appurtenances 20-Year Total and Annual Average Reinvestment Need

Asset Sub-Category	Annual Average Need	20-Year Total
Traffic Controller System	$161,000	$3,225,000
Radio System	$64,000	$1,276,000
Railway Crossings	$617,000	$12,343,000
Parking Lots	$230,000	$4,595,000
Total	**$1,072,000**	**$21,439,000**

To better align with the City's budgeting requirements, the annual capital reinvestment needs for the City's roadway appurtenances have been evenly distributed over the next 20 years, as illustrated in **Figure 5-2**. This smoothing of reinvestment requirements aims to facilitate the City's budgeting processes by providing a more predictable and steady financial outlook. Rather than experiencing significant fluctuations in capital expenditure from year to year, this approach allows for a more consistent and manageable financial planning for the City throughout the period of 2024-2043.

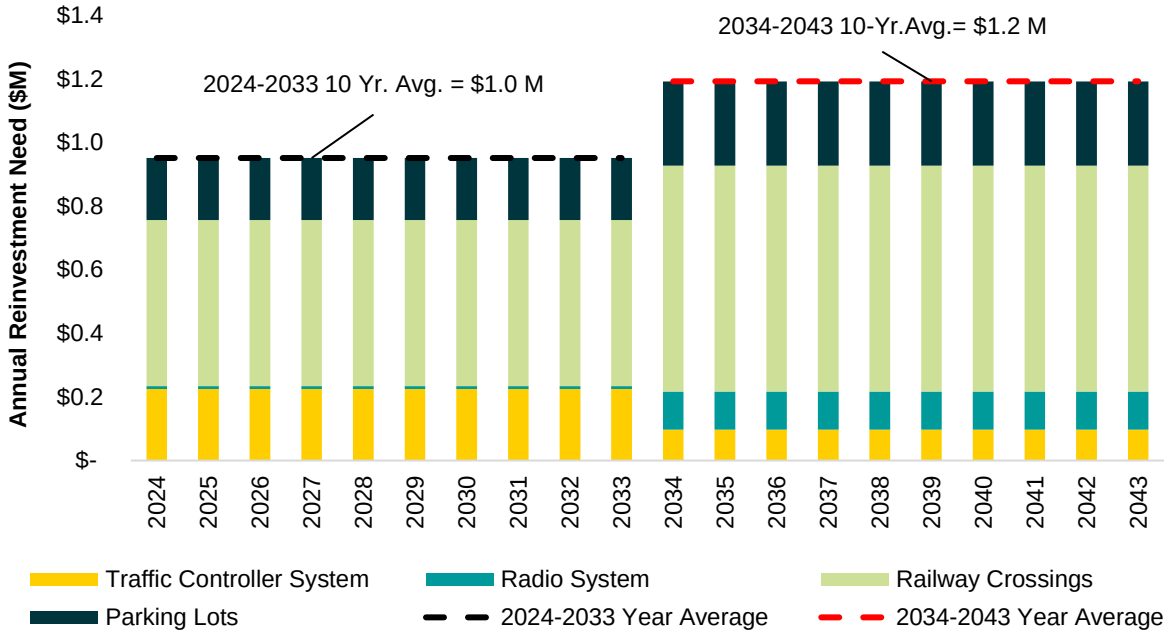

Figure 5-2: Roadway Appurtenances 20-Year Smoothed Annual Reinvestment Needs

5.3 O&M Funding Need

Figure 5-3 and **Table 5-4** show the O&M funding forecast for the next 10 years from 2024 to 2033. The annual average forecasted O&M funding need is $3.6 million over the next 10 years in inflated dollar value. This O&M forecast is based on the current O&M expenditure under the Traffic and Communication and Parking O&M budget, overlaid with the anticipated future expenditure. It is noted that the replacement of regulatory signs is covered by the current O&M budget, while the need for replacing other signs, traffic signals, and equipment (excluding the traffic controller system and radio system) has been added to the current budget and is included in the future forecasted O&M budget.

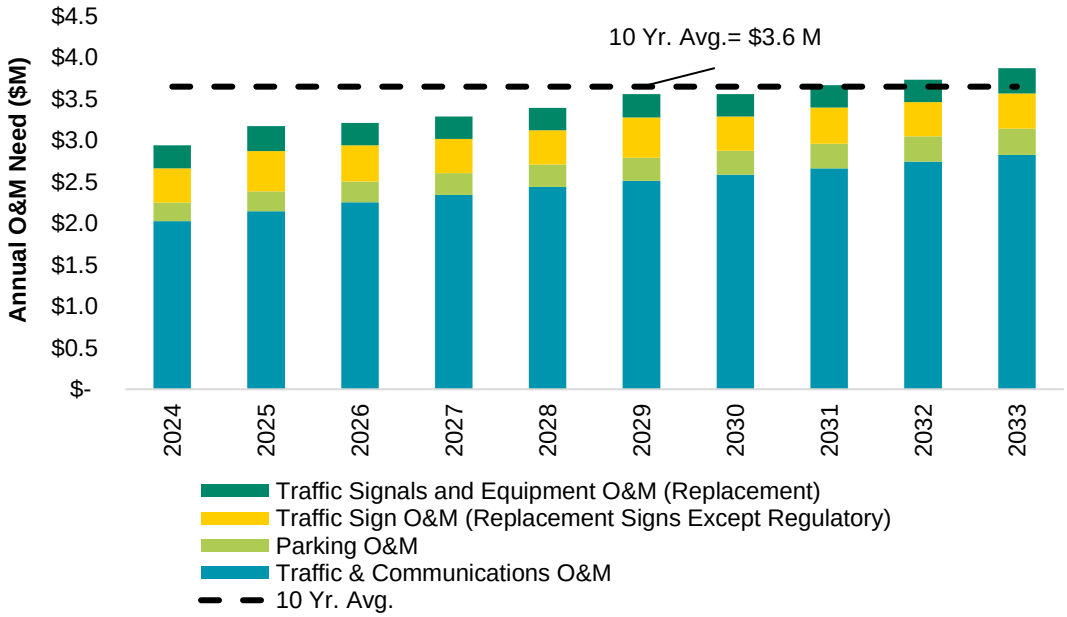

Figure 5-3: Roadway Appurtenance O&M Forecast

The detailed 10-year O&M budgets for roadway appurtenances are presented in **Table 5-4** in inflated dollar values.

Table 5-4: Roadway Appurtenance 10-Year Total and Annual O&M Budget

O&M Category	Annual Average Budget	10-Year Total
Traffic Signals and Equipment O&M (Replacement)	$278,000	$2,780,000
Traffic Sign O&M (Replacement Signs Except Regulatory)	$432,000	$4,318,000
Parking O&M	$274,000	$2,738,000
Traffic & Communications O&M	$2,454,000	$24,538,000
Total	**$3,647,000**	**$36,472,000**

5.4 Full Funding Need Profile

Figure 5-4 shows a full picture of the City's roadway appurtenances funding forecast for the next 10 years. This graph provides the City with a comprehensive understanding of the full funding requirements, essential for effective financial planning activities. The total annual reinvestment cost (**Figure 5-1**) was combined with the City's projected roadway appurtenances O&M cost (**Figure 5-3**). Additionally, one percent of the annual replacement cost was added to account for the asset disposal cost. With these additions, the City's roadway appurtenances full funding requirement increases to approximately $46 million over the next 10 years, averaging $4.6 million per year in inflated dollar value.

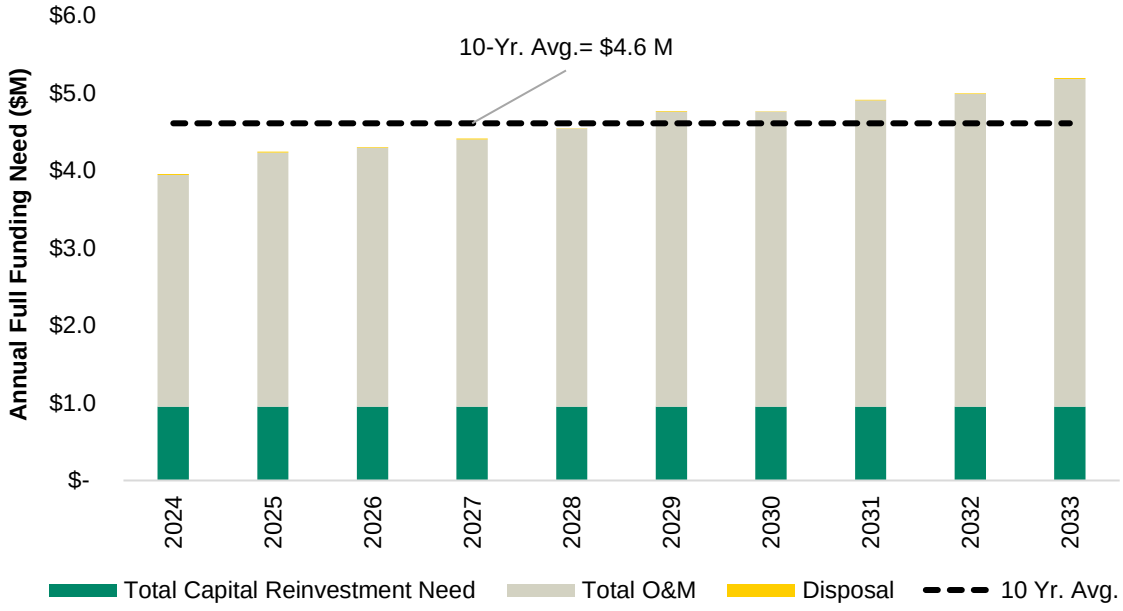

Figure 5-4: Roadway Appurtenances Full Funding Need Profile

5.5 Funding Strategies

The City primarily relies on tax levy for funding roadway appurtenances, supplemented by potential amounts from Ontario Community Infrastructure Funding (OCIF) and Canada Community-Building Fund (CCBF). In addition, AECOM suggests the following options that could be considered, acknowledging that the City's eligibility for these funds is subject to certain criteria:

- Investing in Canada Infrastructure Program

- Municipal Asset Management Program (MAMP)
- Enabling Accessibility Fund (EAF)

5.5.1 Investing in Canada Infrastructure Program

The Investing in Canada Infrastructure Program is a key component of the Government of Canada's broader Investing in Canada Plan. Administered by Infrastructure Canada, this program delivers long-term and stable funding to communities with the aim of addressing environmental challenges, fostering clean growth, and enhancing resilience to climate change. Through bilateral agreements, over $33 billion in funding is allocated to provinces and territories, supporting a diverse range of infrastructure projects nationwide[5].

The program encompasses investments across four targeted funding streams: the public transit stream, green infrastructure stream, community, culture, and recreation infrastructure stream, and the rural and northern communities' infrastructure stream. The public transit stream allocates funds for the construction, expansion, and enhancement of public transit infrastructure. The focus of these investments is on projects that aim to increase the capacity of public transit systems, enhance the quality and safety of existing or future transit infrastructure, and improve overall access to public transit systems. In pursuit of funding through this stream, the City has actively submitted proposals for the following projects[6]:

- Electrification of Transit System
- Transit Facility and Equipment Upgrades
- Purchase of Rolling Stock Assets
- Relocation of the Downtown Transit Terminal Construction and Renovation
- Transit Facility and Equipment Upgrades
- Purchase of Transit Ticket Vending Machines
- Purchase and Installation of Transit Bus Shelter

5.5.2 Municipal Asset Management Program (MAMP)

Municipal Asset Management Program (MAMP) is aimed at improving asset management practices within municipalities[7]. Designed to assist municipalities in gaining a better understanding, planning, and efficient and sustainable management of their infrastructure assets, the program may offer funding to support the development or improvement of asset management plans. This financial support is intended to incentivize municipalities to adopt and implement sustainable asset management practices.

5.5.3 Enabling Accessibility Fund (EAF)

The Enabling Accessibility Fund (EAF) is a federal government program aimed at supporting projects that enhance accessibility for individuals with disabilities[8]. The fund provides financial assistance to eligible organizations for initiatives such as infrastructure improvements, renovations, and retrofitting to create more accessible spaces. Its goal is to contribute to a barrier-free and inclusive society by addressing physical barriers and promoting equal access in community spaces.

[5]Investing in Canada Infrastructure Program. (2023). Infrastructure Canada. Infrastructure Canada - Investing in Canada Infrastructure Program. Retrieved on February 14th, 2024.

[6] Investing in Canada Infrastructure Program: Projects Under Review. (2022). Infrastructure Canada. Infrastructure Canada - Investing in Canada Infrastructure Program: Projects Under Review. Retrieved on February 14th, 2024.

[7] Municipal Asset Management Program. (n.d.). Federation of Canadian Municipalities. Municipal Asset Management Program | FCM. Retrieved on February 14th, 2024.

[8] About Enabling Accessibility Fund. (2023). Government of Canada. Enabling Accessibility Fund - Canada.ca. Retrieved on Retrieved on February 14th, 2024.

6. Implementation Plan and Continuous Improvement

Continuous improvement is an important component of any AM program and is achieved through the implementation of recommended improvement initiatives which support sustainable service delivery. AECOM has identified a set of activities that represents the next stage of AM planning and implementation within the City, as shown in **Table 6-1**.

Table 6-1: Recommended AM Improvement Initiatives

Index	Improvement Initiative	Description
1.	Refine the asset inventory.	• Continue to refine the asset inventory and close existing data gaps, so as to have a more accurate representation of the current state of the roadway appurtenances; and, ultimately, to make more informed and defensible decisions. – AECOM recommends the City to continue maintaining the roadway appurtenances inventory, keep updating the inventory as assets are acquired or disposed. – Refine the install date information of roadway appurtenances assets to better estimate the remaining service life.
2.	Use consistent condition grading schemes for roadway appurtenance assets and develop condition assessment process for all roadway appurtenance assets.	• The grading system should include a description directly tied to each condition grade, along with details about the asset's performance and the necessary level of corrective and preventive maintenance required for assets falling within a certain condition rating category. This process will enable the City to keep track of and better forecast asset renewal needs. – Currently, the City has condition data for regulated traffic signs, categorized as Fair, Good, Poor, and New. It is suggested that these condition categories be refined to align with the corporate-wide standard for consistency. • Prioritize condition assessments on the most critical assets. The City's execution of a controller cabinets age report has already proven to be instrumental in supporting this business case.
3.	Refine the LoS Framework and Setting LOS Target.	• Gathering current data on asset performance for Key Performance Indicators (KPIs) that are currently not monitored. • Analyzing this data to identify trends and set annual performance benchmarks. • Engaging with key stakeholders to define service level targets and calculate the costs required to achieve these targets. • Upon establishing service level targets, the City should strategize on achieving these targets within the constraints of its operational context, including staff availability, existing funding, and available resources. • Initiating a Customer Consultation Plan to involve the public and stakeholders in discussions about the Level of Service (LoS) framework, aiming to understand their willingness to pay for improved service levels. • Continue to maintain, monitor, and periodically update the Level of Service (LoS) Framework.
4.	Incorporate risk assessment for future iterations of the AM plan and use the risk assessment results to drive future condition assessments and financial needs forecasting.	• Conduct a criticality and risk assessment of assets to inform work prioritization. • Review risk attribute values periodically to ensure alignment with business objectives and risk appetite. • Overlay the risk model with the current state of the assets (i.e., condition) and the financial forecast. Using this approach, the City could focus its monitoring, maintenance, and renewal and replacement budget and activities on high-risk assets. Medium-risk infrastructure could be addressed through the mitigation of failure via regular monitoring, while low-risk assets could be accepted with caution.
5.	Establish a sustainable roadway appurtenances funding model that fits the needs of the community	• In light of the annual funding need outlined in **Figure 5-2**, it is recommended that the City allocate an average of $1.0 million per year over the next 10 years for capital reinvestment in roadway appurtenances. Additionally, a total of $3.6 million should be budgeted for O&M expenditures during the same period. • Review financial modeling assumptions on reinvestment rate and replacement values and update the financial model with new information as it becomes available. The financial model is based on several key assumptions that could have a significant impact on the outcomes of the model.

Index	Improvement Initiative	Description
		• To address legislative ambiguities concerning railway crossings, it is recommended that the City engage in dialogue with rail companies to clarify responsibilities and obligations. Establishing clear agreements or guidelines can help delineate duties, enhance accountability, and streamline decision-making processes. This proactive approach will mitigate potential delays, disputes, and ensure effective maintenance practices for railway crossings. • Explore funding resources that the City may take into consideration while performing strategic lifecycle and financial strategies (**Sections 5.5**)
6.	Continue to improve AM initiatives across the City by maintaining a high level of AM awareness through training, communication, and knowledge sharing.	• Conduct an AM Software Assessment to identify future system requirements that may include enhancing existing software, adding-on, or replacing. • Develop a Knowledge Retention Strategy & Internal Communications Plan to document staff AM knowledge and experience for reporting and succession planning purposes. Communicate AM improvement initiatives and enhance natural AM awareness internally through internal communication.

Appendix A - Roadway Appurtenances MS Excel Lifecycle Model and Inventory