Asset Management Plan Framework

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1 TERMINOLOGY AND DEFINITIONS

1.1 Terminology

Comprehensive Asset Management	Integrated business approach involving planning, finance, engineering, maintenance and operations geared towards effectively managing existing and new infrastructure to maximize benefits, reduce risk and provide safe and reliable levels of service to community users. This is accomplished in a socially, culturally, environmentally and economically conscious manner.
Asset Management Plan	Documented information that specifies the activities, resources and timescales required for an individual asset or a grouping of assets, to achieve the organization's Levels of Service
Levels of Service	Parameters, or combination of parameters, which reflect social, political, environmental and economic outcomes that the organization delivers
Master Plan	A master plan serves as a blueprint for the future expansion of any organization / service to accommodate population growth.
Official Plan	The Official Plan provides a vision of the future growth of the city and a policy framework to guide its physical development.
Strategic document	A document that sets strategic goals and guidelines for an organization or specific service / department within the organization.
Functional Group	A generic term that has been used in this document to denote representatives from parts of the City, such as operations, planning, asset management, growth etc. who participate in the development of the AMP.
Core Assets	The core assets defined in '**O. Reg. 588/17**' are water, wastewater, stormwater, roads and bridges.
ISO 55000	International standard for asset management
Strategic Asset Management Plan	Senior management approved long-term approach to management of assets
Comprehensive Asset Management Policy	Council adopted asset management principles

1.2 Acronyms

The City	The City of Ottawa
CAM	Comprehensive Asset Management
Building Together Guide	Building Together Guide for Municipal Asset Management Plans
O. Reg. 588/17	Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure
The Province	The Province of Ontario

AMP	Asset Management Plan
AODA	Accessibility for Ontarians with Disabilities Act
OP	Official Plan
SOAR	State of Asset Report
LOS	Levels of Service
SAMP	Strategic Asset Management Plan
TMP	Transportation Master Plan
TCA	Tangible Capital Assets
TAC	Technical Advisory Committee
CIRC	Canadian Infrastructure Report Card

2 CONTEXT

2.1 Introduction

This document forms a guiding framework that will be utilized by the City to produce Asset Management Plans (AMPs) across its various service areas. Section 1 provides an overview of specific terminology and abbreviations that will recur in the development of an AMP. Section 2 provides overall context, by describing the overall governance of Asset Management at the City, the provincial regulations that are, in part, driving the need to develop AMPs under certain timelines, and the stakeholders at the City who will be involved in the development of the service AMPs and their anticipated roles. Section 3 outlines the objectives and benefits of this AMP framework and its' associated template document (referenced in Section 5). Section 4 provides additional information regarding the structure and intent of the AMP and contains high-level guidance on the concept of Levels of Service (LOS), since documenting LOS is a new concept that is currently not well established in the City. Section 5 presents in further detail, the typical content of each section of an AMP, by providing detailed descriptions and example content to be included in an AMP. Embedded within Section 5 is a link to an AMP template document, which is a generic, fillable document with the required instructions to users. The template includes section headers, example tables and graphs (as well as a list of the data required to generate them), and the associated formatting, required to generate an AMP for a given service area. This template is to be utilized as the base document for future users to develop an AMP for a given service area, with the intent of promoting consistency in the AMPs developed across the City.

2.2 What is an Asset Management Plan

An Asset Management Plan is a strategic document with a planning horizon of at least 10 years that sets out the strategies and activities that will be applied to the assets to move towards stakeholder expectations within the financial and delivery constraints in effect within a municipality. AMPs should be service-based and include all the assets required to deliver the service even though some of the assets may be stewarded in different parts of the organization. The City should plan to update the AMP on roughly a 3 to 5-year cycle to comply with regulations and to promote increasing maturity in asset management practices.

The AMP should provide a holistic view of the strategy for a service area and capture all strategic aspects, from growth plans (typically derived from the master plan and other strategic plans that affect asset management planning), through to lifecycle management of existing assets, for the service area. It should bring together these strategic activities into a coherent and integrated forward-looking plan, over at least a 10-year horizon. The AMP is likely to give rise to strategic trade-offs between the performance expectations of the service area, the available funding, and the long-term risks. The AMP should identify, analyze and provide recommendations on such trade-offs, serving as a transparent platform to inform senior decision-makers and elected officials in decision making.

The preparation of AMPs is generally considered good practice in asset management and is a requirement of ISO 55000. The Ontario Provincial regulation **O. Reg. 588/17** has mandated that municipalities prepare AMPs documenting the existing status for their core service assets, as a minimum, by mid-2021.

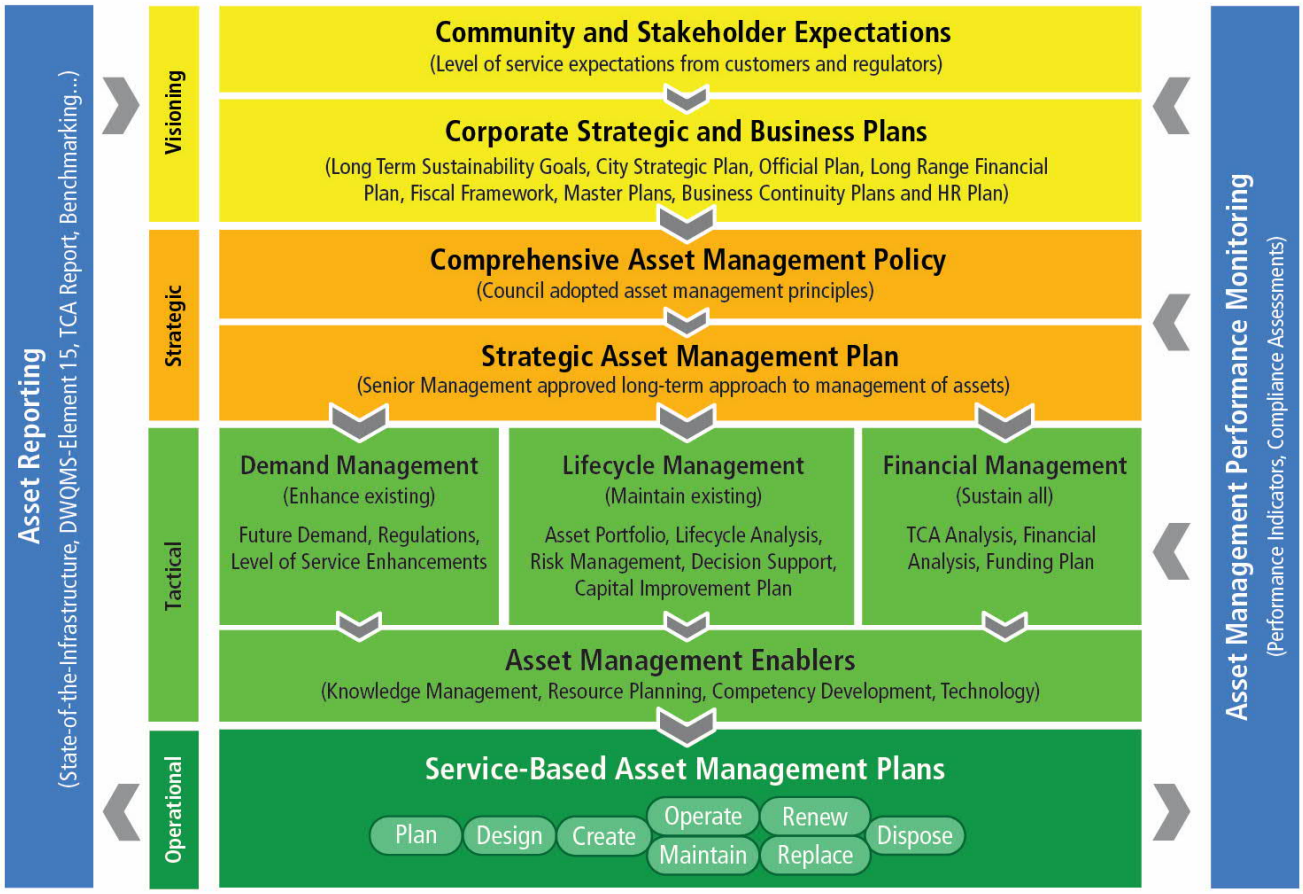
While AMPs are widely implemented across many sectors both public and private, asset owners tend to vary in their maturity and capacity to produce a comprehensive AMP, particularly when embarking on "first generation" AMPs for a given service area. Since an AMP is meant to be updated over a 3 to 5 year cycle, "first generation" AMPs are likely to have gaps in data and information. Therefore, an improvement plan, to be

conducted over the intervening 3 to 5 year period, will form an integral part of such AMPs, and will enable municipalities to document their approach towards enhancing their asset management maturity.

2.3 Asset Management at the City

The City of Ottawa's (The City's) Comprehensive Asset Management (CAM) Policy (2012), the CAM strategy (2012), Strategic Asset Management Plan (SAMP) (2017) and the other strategic documents guide the City in the application of asset management standards and practices supporting effective service delivery. The City's CAM Framework is shown in Figure 2.1.

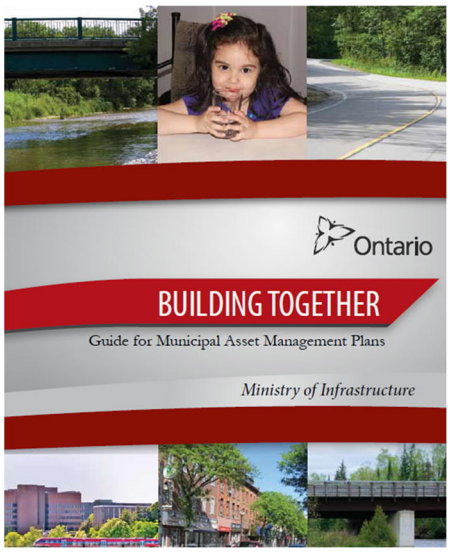
Figure 2.1: City of Ottawa CAM Framework



The City intends to develop a suite of service area AMPs, in a phased approach, that comply with the relevant regulations and guidelines (described further below), but most importantly provide a valuable strategic tool for achieving the agreed service delivery performance in the most cost-effective manner.

The City intends for their AMPs to serve as guiding documents, that normalizes the asset management concepts, promotes understanding and transparency across the various City stakeholders involved in the management of a service area. The AMP presents an opportunity to promote transparency of decision making, as it relates to asset management, in line with the City's Equity, Inclusion and Diversity values.

2.4 The Ontario Regulations



The '**Building Together Guide**' was published in 2012 to encourage and support municipalities in Ontario to develop AMPs in a consistent manner. '**O. Reg. 588/17**' was subsequently enacted in 2017 and further expands on the '**Building Together Guide'** by mandating specific requirements for municipal Asset Management Policies and AMPs.

The City is responsible for the development of AMPs that will document the measures needed to meet service requirements, while managing risk and minimizing the cost of infrastructure ownership.

'**O. Reg. 588/17'** has set three AMP-related deadlines:

- **July 1, 2021 deadline:** where 'Core' assets (water, wastewater, stormwater, roads and bridges) will have an AMP documenting current levels of service.
- **July 1, 2023 deadline:** all City infrastructure assets will have an AMP documenting current levels of service.
- **July 1, 2024 deadline:** AMPs are developed to a stage of maturity that they document proposed levels of service and financial strategies to fund these expenditures.

The City has an obligation to develop AMPs to meet these deadlines under the provincial regulation. However, the City intends to go beyond simply satisfying the minimum regulatory requirements, and is seeking to produce AMPs that truly add value to the service areas by providing platforms that improve the visibility of all the various aspects affecting a service area.

2.5 Who is Involved

An overview of the City's Departments, Services and Branches that are most likely to participate in the development of service area AMPs is shown in Table 2.1.

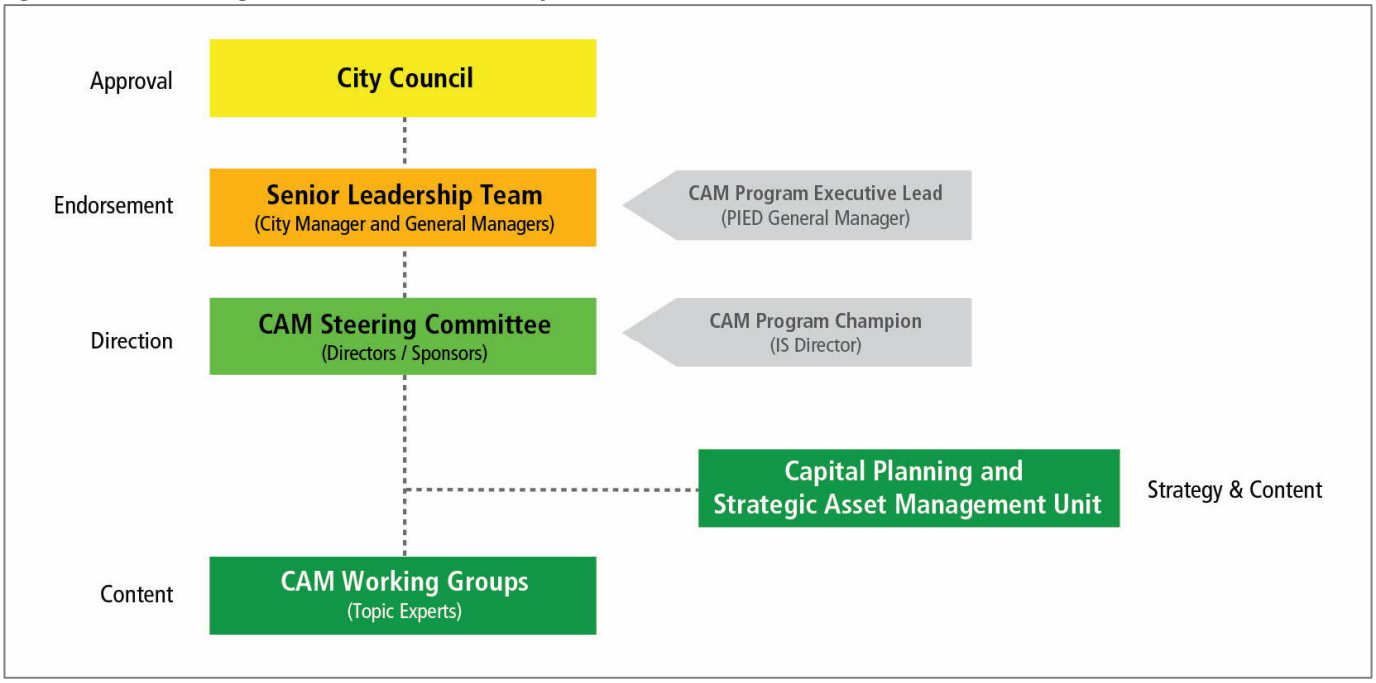
Table 2.1: Key AMP Participants from the City

Department	Service	Branch
Finance Services Department	Corporate Finance Service	Financial Services Branch
Public Works and Environmental Services Department	Water Services	
	Roads & Parking Services	
	Parks, Forestry and Stormwater Services	
	Solid Waste Services	
	Technology, Innovation and Engineering Support Services	
Recreation, Cultural & Facility Services Department	Parks and Facilities Planning Services	
	Facility Operations Service	Facility Operations Central Branch
		Facility Operations Special Branch

		Facility Operations East Branch
		Facility Operations West Branch
		Maintenance Management Branch
		Building Engineering & Energy Management Branch
	Economic Development Services	
	Corporate Real Estate Office	
	Infrastructure Services	Design and Construction Facilities Branch
Planning, Infrastructure and Economic Development Department		Asset Management Branch including: Infrastructure Assessment Water Resources Infrastructure Assessment Transportation Infrastructure Assessment Water Facilities Infrastructure Assessment Buildings and Parks Infrastructure Assessment Planning Capital Planning and Strategic Asset Management
		Design and Construction Municipal Branch
	Planning Services	

The overall governance structure for asset management in the City is shown in Figure 2.2.

Figure 2.2: Asset Management Governance at the City



The Comprehensive Asset Management (CAM) Steering Committee will be chaired by the Manager of the Asset Management Branch and have representation at Director level from the various Services across the City (e.g. Water Services, Roads & Parking Services). Each service area AMP will have a sponsor from the Steering Committee, and it will have a working group to act as a Technical Advisory Committee (TAC), comprised of representatives from:

- Asset Management
- Operations & Maintenance
- Growth
- Programmers

Each service area AMP will be dependent on contributions from a range of individuals and teams across the City including planning, growth, operations & maintenance and finance who will provide data, information, knowledge and insight and may conduct various types of forward-looking analyses. For the purpose of this document the generic term functional group will be used to denote representatives from various parts of the City who contribute to the AMP. Some functional groups may be more heavily involved than others, for example, Design & Construction Branch may have more of an awareness role rather than being a major contributor.

3 OBJECTIVES AND BENEFITS OF THE AMP FRAMEWORK

This section describes the objectives and benefits of this AMP framework document.

3.1 Objectives

The objectives of this AMP framework document are to:

- Communicate the nature and intent of AMPs to a wide range of stakeholders across the City
- Provide explanation and supplemental information to support the development of asset management concepts, such as Level of Service, that may vary in their state of maturity across the various asset classes in the City.
- Present the required content of an AMP, such that developed AMPs meet the requirements of '**O. Reg. 588/17**', and have common approach, content, and look and feel. Content examples that are relevant to the City, and use City data, have been provided in this AMP framework when possible. When not possible, generic content data has been provided at this time, to provide an example of the type of content that should be reported on, during the development of an AMP. Content examples that are generic will be updated with City-specific content, once it is available.
- Provide an associated AMP template document that will be used to generate future AMPs for each service area, which provides the users with the required instructions, section headers, example tables and graphs, and formatting. This template document is to be utilized to promote consistency across the various AMPs that will be developed by the City.

It is recognized that there will be variations in service area AMPs due to nature of different service areas and different asset classes and different levels of maturity. However, it is important that users follow the AMP template as closely as possible, while referring to this framework for additional context and instruction.

The City also produces a State of the Assets Report (SOAR) and the AMP framework and associated template have been designed to align with future versions of SOAR so that common information can be re-used to the greatest extent possible.

It is the intent of the City to go beyond the minimum requirements of '**O. Reg. 588/17**' and that ultimately AMPs developed for a given service area will become the strategic plans for that service area.

This version of the AMP framework and associated template have been designed to meet the 'O. Reg. 588/17' requirements for July 2021 and July 2023. A subsequent version of this AMP framework and associated template will be developed that will incorporate lessons learnt from each service area and set out the additional structure and content to meet the July 2024 deadline.

3.2 Benefits

The benefits of the development and use of the AMP framework document are:

- Consistency with current Canadian best practices and alignment with the '**Building Together Guide**' and '**O. Reg. 588/17**'.
- City staff with different backgrounds, from various functional groups and varying levels of AM maturity have a common understanding of the approach to the development of AMPs.
- Consistent language to support clear communication between all stakeholders involved in the development of AMPs.
- Consistency of AMPs across service areas.
- Consistency between different versions (updates) of the same AMP.
- This AMP framework and associated AMP template will prove to be effective if it is adopted consistently amongst the service areas during their AMP development. Likewise, this AMP framework can serve as tool to promote understanding amongst City staff of the intent, typical content, and expected outcomes from a service AMP.

4 OVERVIEW OF AMP FRAMEWORK

4.1 Asset Management Plan Overview

An AMP documents an organization's strategy for meeting defined service objectives through strategic infrastructure investment and business change over time. The AMP provides a platform to detail and systematically examine the relationship between service levels and the existing asset base, management practices and levels of investment, and to establish an improvement program to progressively address identified gaps and deficiencies. Once established, the AMP allows the organization to:

1. Demonstrate that the LOS for each of the Service Areas is being delivered in the most effective and efficient manner.
2. Demonstrate that due regard is being given to the long-term stewardship of the asset base.
3. Demonstrate the responsible management of the asset portfolio.
4. Communicate and justify funding needs and the implications of funding shortfalls.
5. Show how regulatory compliance will be achieved and growth accommodated while maintaining the asset stock.
6. Highlight factors that may impact service levels (i.e. climate change, growth, etc.) and how the organization plans to address these factors.
7. Easily extract the information needed to produce a State of Asset Report.

4.2 Asset Management Plan Framework

The '**Building Together Guide**' presents the following as a typical detailed AMP structure / content:

1. Executive summary
2. Introduction
3. State of local Infrastructure
4. Desired levels of service
5. Asset management strategy
6. Financing strategy

'**O. Reg. 588/17**' does not provide a typical AMP structure, but requires the following elements to be included:

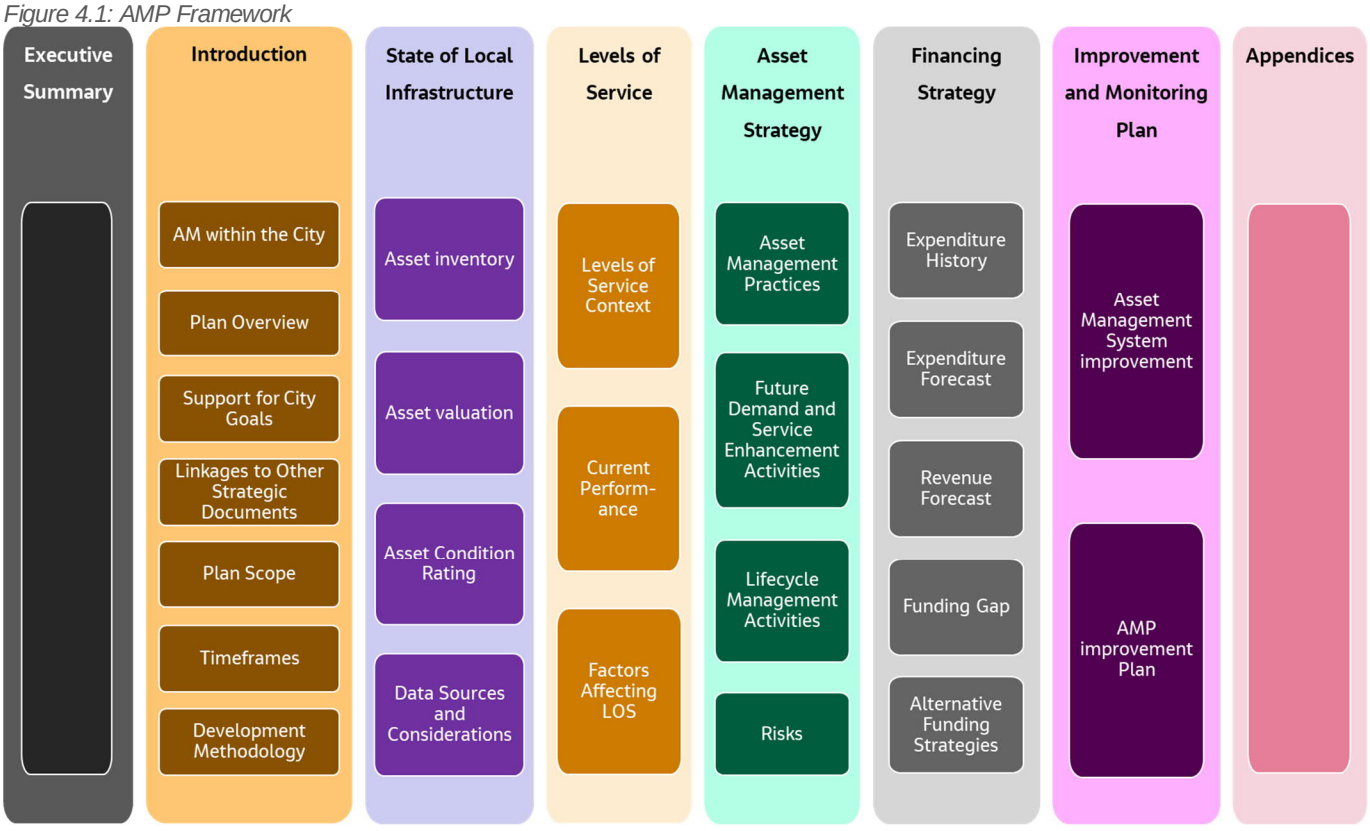
1. Subject to July 2021 and July 2023 deadlines and related to current LOS:

    - For each asset category:
        - Current LOS, this must be done using the LOS tables template that guides and states how the minimum required LOS reporting should be presented for core assets and qualitative descriptions and technical metrics established by the municipality for other municipal infrastructure assets (further details are provided in the LOS part in this section;
        - Current performance determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency;
        - Summary of assets;

  - Replacement costs;
  - The average age;
  - A description of the municipality's approach to assess condition;
  - Asset condition;
  - Lifecycle activities that would need to be undertaken to maintain the current levels of service for each of the 10 years following the year for which the current levels of service are determined and the costs of providing those activities;
- The population and employment forecasts for the municipality
- The estimated capital expenditures and operating costs to achieve the levels of service in order to accommodate projected increases in demand caused by population and employment growth
- How all background information and reports, upon which the information is based, will be made available to the public.

This AMP framework contains eight sections as shown in Figure 4.1. This version of the framework has been designed to meet the **'O. Reg. 588/17'** requirements for July 2021 and July 2023. A subsequent version of this framework will be developed that will incorporate lessons learnt from each service area and set out the additional structure and content to meet the July 2024 deadline.

Figure 4.1: AMP Framework



Executive Summary	Provides a succinct overview of the major points in the AMP. It should be capable of being read as a stand-alone document. The structure of the section should reflect the content. It is the last section to be written.
Introduction	Provides the context for the AMP including the link to overarching City goals and other strategic documents such as the Official Plan and master plans. It sets out the scope of the AMP by defining the assets included and not included, the overall approach to development and the timeframes for update.
State of Local Infrastructure	Provides an overview of the asset portfolio including the inventory, valuation, age and condition of the main asset classes and sub-classes and the approach to condition assessment. It includes commentary on the data sources and data quality and applies a criticality lens to data quality so that improvements in data quality are focused on higher criticality asset classes.
Levels of Service	Provides the current LOS for the service area. It includes the specific data required in Tables 1 to 5 of '**O. Reg. 588/17**' plus other LOS information that the City deems to be important. Further information on LOS is given in Section 4.3.
Asset Management Strategy	Provides forward-looking asset strategies over at a least a 10-year horizon and the associated funding needs. The asset strategies are presented in two major groups: • Demand forecasts and other new regulatory or service enhancement drivers, often a summary of relevant master plans. An example of service enhancement is Complete Streets. • Lifecycle management activities for the existing asset base The asset strategies show how LOS are being delivered through a lowest lifecycle cost approach including the use of non-infrastructure solutions where appropriate. Supported by a high-level risk assessment that includes climate change.
Financial Strategy	Provides an overview of both historic capex and opex and future budgeted/allocated capex and opex. It includes commentary on the funding/revenue sources (tax-supported, user fees, provincial grants etc.) and their volatility. The infrastructure gap is the difference between the funding needed to deliver the asset strategies and the funding that has been budgeted/allocated. An important element of the AMP is consideration of the alternative approaches for closing the infrastructure gap and should include reduced LOS and other non-financial strategies. $Infrastructure\ Gap = Funding\ for\ asset\ strategies - Budgeted\ or\ allocated\ funding$
Improvement and Monitoring Plan	Provides high level improvement actions in two main categories: Improvements to the Asset Management System (the various practices and processes that underpin asset management) Improvements to the AMP such as changes to lifecycle management activities, changes to data collection or other actions that will improve the overall performance of the service area and future AMPs
Appendices	Supporting information as appropriate

4.3 Levels of Service

The purpose of Levels of Service is to define and measure service delivery performance to customers and stakeholders and then asset strategies are designed to achieve those LOS. So, it is important that LOS are developed for a service area as a whole where a number of asset classes combine to deliver a service to customers and stakeholders. In this context the natural environment is considered a stakeholder. LOS should clearly align to overall City goals in the Official Plan and other strategic planning documents.

LOS should measure the actual service received by customers and stakeholders. In defining these measures (technical metrics) the City should carefully consider the viability and affordability of data collection and in the early stages of development of LOS the City may choose to use some more readily available indirect measures. For example, if cleanliness of transit vehicles was an important element of LOS then the City might initially use existing customer satisfaction surveys rather than establish a new inspection program.

'**O. Reg. 588/17**' contains a set of mandatory LOS measures shown in Table 4.1. These measures must be included in the relevant service area AMPs. The LOS measures are defined by three characteristics:

- **Service Attribute**: a generic category defining an aspect of the service
- **Community Levels of Service**: a qualitative description of the what the City is aiming to achieve
- **Technical Levels of Service**: quantitative performance measures showing how well the City has performed over at least the last two years

Table 4.1: O. Reg. 588/17 LOS Measures

Water Assets		
Service attribute	Community levels of service (qualitative descriptions)	Technical levels of service (technical metrics)
Scope	1. Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system. 2. Description, which may include maps, of the user groups or areas of the municipality that have fire flow.	1. Percentage of properties connected to the municipal water system. 2. Percentage of properties where fire flow is available.
Reliability	Description of boil water advisories and service interruptions.	1. The number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system. 2. The number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system.
Wastewater Assets		
Service attribute	Community levels of service (qualitative descriptions)	Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.	Percentage of properties connected to the municipal wastewater system.

Reliability	1. Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes. 2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches. 3. Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes. 4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3. 5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.	1. The number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system. 2. The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system. 3. The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.
Stormwater Assets		
Service attribute	Community levels of service (qualitative descriptions)	Technical levels of service (technical metrics)
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.	1. Percentage of properties in municipality resilient to a 100-year storm. 2. Percentage of the municipal stormwater management system resilient to a 5-year storm.
Roads		
Service attribute	Community levels of service (qualitative descriptions)	Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	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.
Quality	Description or images that illustrate the different levels of road class pavement condition.	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).
Bridges and Culverts		
Service attribute	Community levels of service (qualitative descriptions)	Technical levels of service (technical metrics)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Percentage of bridges in the municipality with loading or dimensional restrictions.
Quality	1. Description or images of the condition of bridges and how this would affect use of the bridges. 2. Description or images of the condition of culverts and how this would affect use of the culverts.	1. For bridges in the municipality, the average bridge condition index value. 2. For structural culverts in the municipality, the average bridge condition index value.

'**O. Reg. 588/17**' also requires the City to consider other performance measures that may be relevant and appropriate. A well established and useful technique is to expand the list of service attributes and develop community and technical levels of service for each service area accordingly. The list of service attributes to be used in this AMP Framework are:

Scope	The extent of use
Accessibility	The ease of access to the service. This may include considerations such as proximity, sufficient to meet demand, AODA etc.
Reliability	The reliability of the service. This may include considerations such as unplanned loss of service, on-time arrival, open as advertised etc.
Quality	The quality of the service. This may include water quality, pavement quality, modern and fit for purpose etc.
Customer Service	The interaction between our staff and customers
Safety	Safety and security performance
Sustainability	Environmental sustainability performance. This may include greenhouse gas (GHG) emissions, resource recovery, pollution, waste minimization, biodiversity etc.

The service attributes should be considered as a set of prompts and will apply to different degrees across the various service areas. Each service area should aim for a small number of LOS measures (generally between six and twelve) that capture the main elements of the service. The service attributes are aligned with the eight core values in the City's SAMP (2017).

This version of service area AMPs will focus on current level of service (2021 and 2023 deadlines). An update to this framework will be developed that sets out the additional information needed on the proposed LOS (2024 deadline).

4.3.1 LOS Trends

In the early stages of developing LOS, the City may not have either direct or indirect measures that provide a quantitative assessment of performance. In this case it may be useful to provide qualitative trend indicators. A set of trend indicators are given in Table 4.2.

Table 4.2: LOS Trend Indicators

Symbol	Trend	Description
	Negative Upward Trend	An upward trend represents a negative outcome for the City. E.g. higher risk service delivery
	Positive Upward Trend	An upward trend represents a positive outcome for the City. E.g. improve LOS
	Negative Downward Trend	A downward trend represents a negative outcome for the City. E.g. declining LOS
	Positive Downward Trend	A downward trend represents a positive outcome for the City. E.g. lower risk to service delivery
	Consistent / Stable Trend	No anticipated changes noted at this time.

5 ASSET MANAGEMENT PLAN CONTENT

The purpose of this section is to provide detail on the typical content to be provided in each of the eight AMP sections that were presented in section 4.2. Detailed descriptions and example content data for each of the AMP sections is provided below, to guide future users AMPs are developed for a given service area. A link to an AMP template document is provided here, which is a generic, fillable document, complete with instructions to users, section headers, example tables and graphs, description of the data required to prepare the tables and graphs, and formatting. To prepare an AMP, users are to populate the AMP template document with the requested information, while referring back to this Section 5 of the AMP Framework, for additional context and to view sample content data expected.

5.1 Executive Summary

Quick Facts

- Provides a succinct overview of the Asset Management Plan, highlighting major points.
- Should be able to be read as a stand-alone document.
- Less structure is provided in this part in order to allow for flexibility.
- It is the final section to be prepared.

The executive summary part of the AMP should be able to be read as a stand-alone document that provides a succinct summary of the main elements for the plan. Less structure is provided in this part than the rest of the Framework in order to allow for flexibility. As a minimum the following content should be highlighted:

a. Plan background and status
b. Current asset management practices summary and regulation requirements
c. Summary of current state of infrastructure and performance
d. Life cycle management strategies
e. Financial forecasts and funding strategies
f. Improvement plan and recommendations summary

The target audience is senior leadership, committees and Council and so the summary should be clear and concise and avoid overly technical descriptions.

5.2 Introduction

Quick Facts

- Provides an overview of asset management within the City.
- Sets out the objectives and context for the Asset Management Plan.
- Introduction can be broken into seven sections

AM within the City

Plan Overview

Support for City and Goals

Linkages to Other Strategic Documents

Plan Scope

Timeframes

Development Methodology

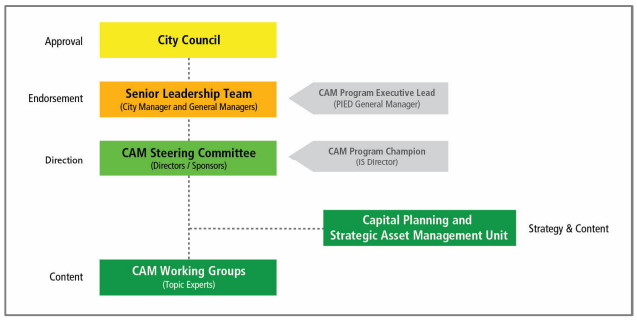
5.2.1 Asset Management within the City

This section provides a brief, high-level overview of asset management within The City. It should include both the CAM governance structure, the key Departments and their responsibilities related to the service area.

Content Example

The City of Ottawa has adopted a comprehensive approach to managing its assets to meet required levels of service at the lowest lifecycle cost of ownership. To meet this objective responsibility for the asset management function is divided between the Corporate Asset Management Program and the City's Departments.
As outlined in the CAM strategy; The CAM governance structure is a foundational element of the City's Asset Management Program. As shown in Figure in the right, it provides guidance on the development of asset management tools, guidelines and processes, and it provides oversight on their application across the organization.

Sample Figure: CAM Governance Structure



On the development side, the following represent key roles:

Senior Management Committee:

- Endorses the CAM Policy for approval by Council and the CAM Strategy.
- Provides overall guidance and direction for development and application of asset management initiatives.
- Ensures that adequate resources are available for development and implementation of these initiatives.
- Reviews the overall performance of the Asset Management Program and reports to Executive Committee.
- Provides leadership in embedding asset management practices across the organization.

CAM Steering Committee:

- Develops the practices to support the CAM Strategy.
- Oversees the development of Asset Management Plans.
- Provides strategic direction on the implementation of technologies and competencies needed to support the management of the City's assets.
- Monitors progress and performance of the asset management practices and reports to Senior Management Committee.
- Ensures consistency and continuous improvement of asset management approaches across the City's service areas

CAM Project Teams:

- Set up as required by the Steering Committee.
- Work on specific initiatives.
- Develop approaches, protocols, tools & techniques for use across the City.

The key Departments involved in the Transportation AMP are:
Planning, Infrastructure and Economic Development Department

- Growth planning
- Renewals planning
- Capital project delivery
- Transportation Planning

Public Works and Environmental Services Department

- Operations and maintenance

Finance Services Department

- Financial information and financial planning

5.2.2 Plan Overview

This section describes the AMP's purpose and highlights its relation to asset management within the City. As a minimum, the overview should include the following:

- A brief description of the AMP and its purpose and objectives.
- The regulatory requirements related to the development of the AMP and how they are being addressed.
- A discussion of the current status of AMP deployment.

Content Example

Overview

The Asset Management Plan is a long-term strategic document fostering service sustainability and the achievement of key corporate results. It also translates the City's short and long terms strategic goals into specific tasks and activities for managing its infrastructure assets cost-effectively.

The Asset Management Plan summarizes current infrastructure planning and decision-making practices within the service area, and identifies the actions needed to meet current and future service delivery goals. This is a "living document", which will be regularly updated and built upon to track the evolution of asset management within the City, and guide the ongoing refinement of practices, strategies, and tools.

The Asset Management Plan provides a framework/platform for building upon current practices to achieve a comprehensive Asset Management Program within the service area and across the City. To achieve this outcome the Plan includes the following items:

- A structured description of the relationship between the City's physical infrastructure and the overall service delivered to customers and stakeholders.
- A report of current service levels as they relate to short and long-term objectives
- A list of business and operational improvements that align with the Comprehensive Asset Management Strategy to achieve targeted results.
- A list of projects, and delivery schedule, selected based on the rigorous investment planning framework implemented at the City.

Provincial Requirements

This AMP is compliant with July 2021 deadline requirements of 'O. Reg. 588/17'.

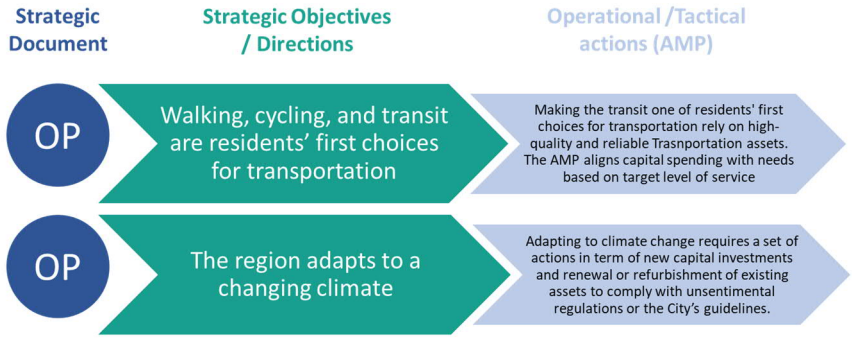
5.2.3 Support for City Goals

This section shows how asset management efforts and the AMP align with the overall strategic goals and objectives of the City. This will involve highlighting alignment between the AMP and adopted asset management practices, and the City's stated goals.

Content Example

The following highlights how the AMP aligns with strategic objectives outlined in the Official Plan (OP).

Sample Figure: How the AMP supports the strategic goals and directions



5.2.4 Linkages to Other Strategic Documents

While the section above broadly demonstrates alignment of the AMP with the overall goals and objectives of the City (at a high level), this section further identifies linkages between the Asset Management Plan and City strategic documents (possibly including those referenced above), plus any others. The intent of this section is to demonstrate how the Asset Management Plan is supported and aligned with all relevant strategic documents.

Content Example

The City has an array of strategic, long-term planning documents that complement each other and work together to direct Ottawa's future. Some examples include the City's Strategic Plan that outlines Council's priorities, the Corporate Planning Framework that demonstrates the integration of Council's priorities, the Official Plan (OP) which sets the vision for Ottawa's future growth as detailed in such documents as the Transportation Master Plan (TMP), the Infrastructure Master Plan (IMP), the Ottawa Cycling Plan (OCP), and the Ottawa Pedestrian Plan (OPP).

This AMP is intended to align with and support the City and Department's existing strategic documents. The alignment of the AMP to these strategic documents is highlighted in the following Figures.

The Official Plan

Transportation Master Plan

…

5.2.5 Plan Scope

This section clearly states the assets that are included and those that are not included in the AMP. It is recognized that some assets may not be included due to data or development issues, the lack of valid information, or other constraints. If needed, the nature and reason should be presented and discussed.

Content Example

This Asset Management Plan focuses on high level planning for the Transportation Service area core and related assets. The Plan addresses two core and related asset classes:

- Roads, including: OR 174 Freeway, Arterials, Collectors, Transit roads, Local roads, Gravel roads and Lanes;
- Bridges and Bridge Culverts;

The plan, also addresses the following service-related assets:

- Sidewalks, Pedestrian Cross-overs, Crosswalks and OC Transpo Walkways
- Pathways
- Noise Barriers

- Retaining Walls
- Guide Rails
- Parking Facilities
- Roads Services Building and Garages

This plan does not cover Transit assets such as buses, O-train and railways. These asset classes will be covered by a separate AMP.

5.2.6 Timeframes

This section clarifies the timeframe covered by the Asset Management Plan and related review and update frequencies of the AMP and related asset management strategic documents. The '**O. Reg. 588/17**' requires as a minimum 10 years planning time period for the lifecycle activities and related capital expenditures and significant operating costs. As further linkages between LOS and investment are established this forecast will be extended to 30+ years, to cover long-term service management. Performance measures will be collected and monitored annually to ensure the AMP is being implemented. Significant events may trigger the need for additional updates.

The City, will also review periodically its Comprehensive Asset Management Policy, Master Plans, State of Asset Report (SOAR), etc. This section should also mention the frequency of the updates of these documents.

Content Example

This AMP is a living document that reflect the evolution of asset management within The City, the service area and the various functional groups involved in the management of the assets. This evolution will result in a periodic review and updates the AMP.

This AMP covers a planning period of 10 years. A full re-evaluation and update of the AMP will be conducted at least every 5 years and may be more frequent should business circumstances warrant. In addition, an annual progress review will be conducted.

Review frequencies of the AMP are summarised in the following table:

Sample Table: Timeframes and frequency for review

Review Type	Frequency
Progress review	Annual
Full review	Every 5 years

Please refer to the Strategic Asset Management Plan for the other asset management documents review and update frequencies.

5.2.7 Development Methodology

This section should describe the City's approach in completing the AMP and highlight any significant limitations or exclusions of the information presented.

Content Example

This Asset Management Plan employed an inclusive development approach, gathering information and input from the various Department asset management stakeholders. The AMP was developed in accordance with the City of Ottawa AMP Framework; it is consistent with current Canadian best practice and aligns with the '**Building Together Guide**' and addresses the '**O. Reg 588/17**' requirements. It is broken in to seven parts, the first two sections include an **Executive Summary** (Part 1) and an **Introduction** (Part 2) that summarize the plan scope, its relations with the other strategic documents, methodology etc. The core main parts and their contents are presented below:

The **State of Local Infrastructure** (Part 3) presents information on the asset portfolio including inventory, condition, cost, etc.

The **Levels of Service** (Part 4) describes how service is linked to infrastructure investment and defines how service is measured and how performance goals and expectations are identified and set.

The **Asset Management Strategy** (Part 5) sets planned actions that will enable the assets to provide the desired levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost (e.g. through preventative action).

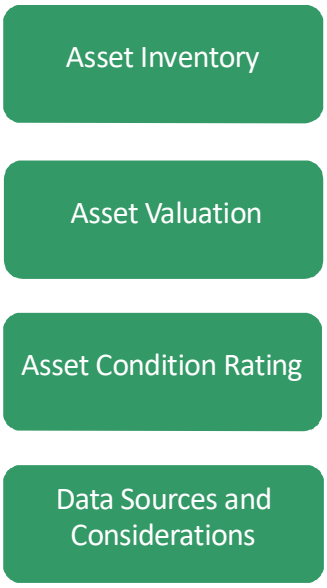
The **Financial Strategy** (Part 6) identifies lifecycle investment requirements and appropriate funding strategies for completing the work.

The **Improvement and Monitoring Plan** (Part 7) describes how AM will be monitored and improved across the City over time.

5.3 State of Local Infrastructure

Quick Facts

- Presents information on the asset portfolio
- Specifically, addresses the 'O. Reg. 588/17' requirements related to asset inventory, valuation and condition:
  - Summary of assets,
  - Replacement costs,
  - Average age,
  - Condition assessment approach,
  - Asset condition
- Highlights data sources such sources of inventory, valuation and condition.
- Commentary on data quality should apply a criticality lens, do the more critical assets have adequate data quality?
- State of Local Infrastructure can be broken into four sections



The main approach in compiling this information will be the same across the City services, however the accuracy and granularity may vary amongst AMPs, based on the level of maturity of asset management practices, the nature of traditional assessment programs, and the availability of current and relevant data available during the development of the given AMP.

'**O. Reg. 588/17**' requires the following information to be included for each asset category:

- A summary of the assets in the category
- The replacement costs 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 municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.

It is also possible to group sections (i.e. asset inventory and valuation could be presented in same tables).

The Asset Management Branch at the City will be responsible for updating and maintaining the data presentation standards for the State of Infrastructure information and ensuring consistency with the State of Assets Report.

5.3.1 Asset Inventory

This section provides a structured snapshot of the current infrastructure. Infrastructure should be broken out by service area, function and category to demonstrate the depth and breadth of the asset base. Information should be collected from sources providing the best available data, and the sources of the data should be noted. Known gaps and issues with information should be noted and discussed; where possible these can be filled in using supplementary data sources.

The typical information to be presented in this section are:

- Inventory by asset type
- Average age by asset type
- Consumed Life Profile

Content Example

Summary

Ottawa's transportation system lies within three government jurisdictions, each of which has specific interests with respect to the planning, design, construction and maintenance of its own facilities. Most of the road, transit and pathway networks are owned and maintained by the City, but major intercity highways (Highways 416, 417 and 7) are the responsibility of the provincial government, and the NCC's roads and multi-use pathways as well as five interprovincial road bridges are under federal jurisdiction.

The City is responsible for a multimodal transportation system with facilities and services for walking, cycling, public transit, roads and parking:

- About 6,000 kilometres of roads, including 1,400 km of arterials, 4,600 km of collectors, local streets and a freeway
- About 1,890 km of sidewalks and 340 km of on-road bicycle lanes;
- City operated off-street parking lots with 2,824 spaces, and 3,965 paid on-street parking spaces

	Roads	Bridges and Culverts	Other Structures
Inventory	• 12,551 Lane kilometers	• 652 Bridges • 226 Big Culverts	• 424 Retaining Walls • 38 Noise Barriers
Replacement Costs	$3.677 Billion	$1.257 Billion	$51.2 Million

Overall Condition			

Inventory

The City is responsible for approximately About 6,000 kilometres of roads, the main asset types falling under the road's asset category are:

- Freeways: 1 Freeway
- Arterials: 1454 km
- Collectors (Major Collectors and Collectors): 1410 km
- Local roads: 2366 km

Asset service-related to roads are:

- Guide Rails
- Pathways

The following figure summarizes the asset types included in this AMP arranged by asset category.

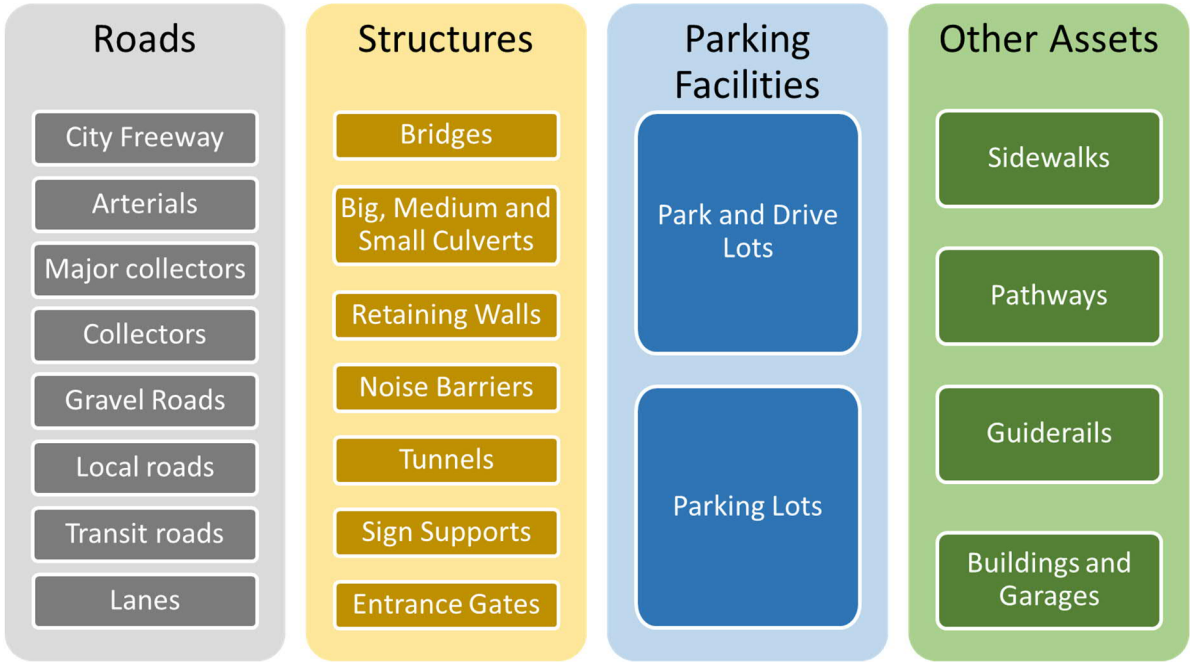


Table 3.1 summarizes the asset inventory of the roads and related service assets.

Sample Table: Inventory and Inventory change

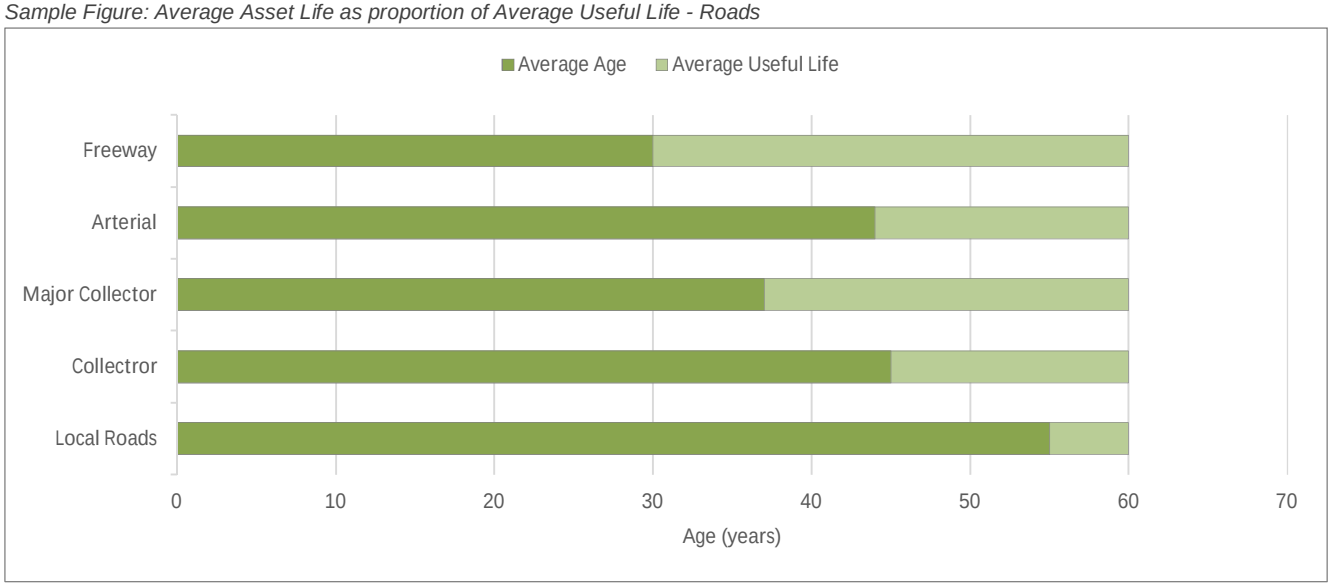
Asset Class	Asset Types	Inventory			Change	
		2017	2020	Unit	Value	%
Roadways	City Freeway (174)		83	Lane-kilometer		
	Arterials		3,277	Lane-kilometer		
	Major Collectors		322	Lane-kilometer		
	Collectors		3,485	Lane-kilometer		
	Gravel Roads		5,218	Lane-kilometer		
	Local Roads			Lane-kilometer		
	Transit Roads		145	Lane-kilometer		
	Lanes		20	Lane-kilometer		
Structures	Bridges		652	Each		
	Big Culverts		226	Each		
	Medium Culverts		1271	Each		
	Small Culverts		4962	Each		
	Retaining Walls		424	Each		
	Noise Barriers		8.3	Kilometer		
	Tunnels		2	Each		
	Sign Supports		63	Each		
	Entrance Gates		300	Each		
…						

Average Age Summary

The average age for the related infrastructure was calculated using …

The figure below shows the roads average age as a portion of useful life by asset types.

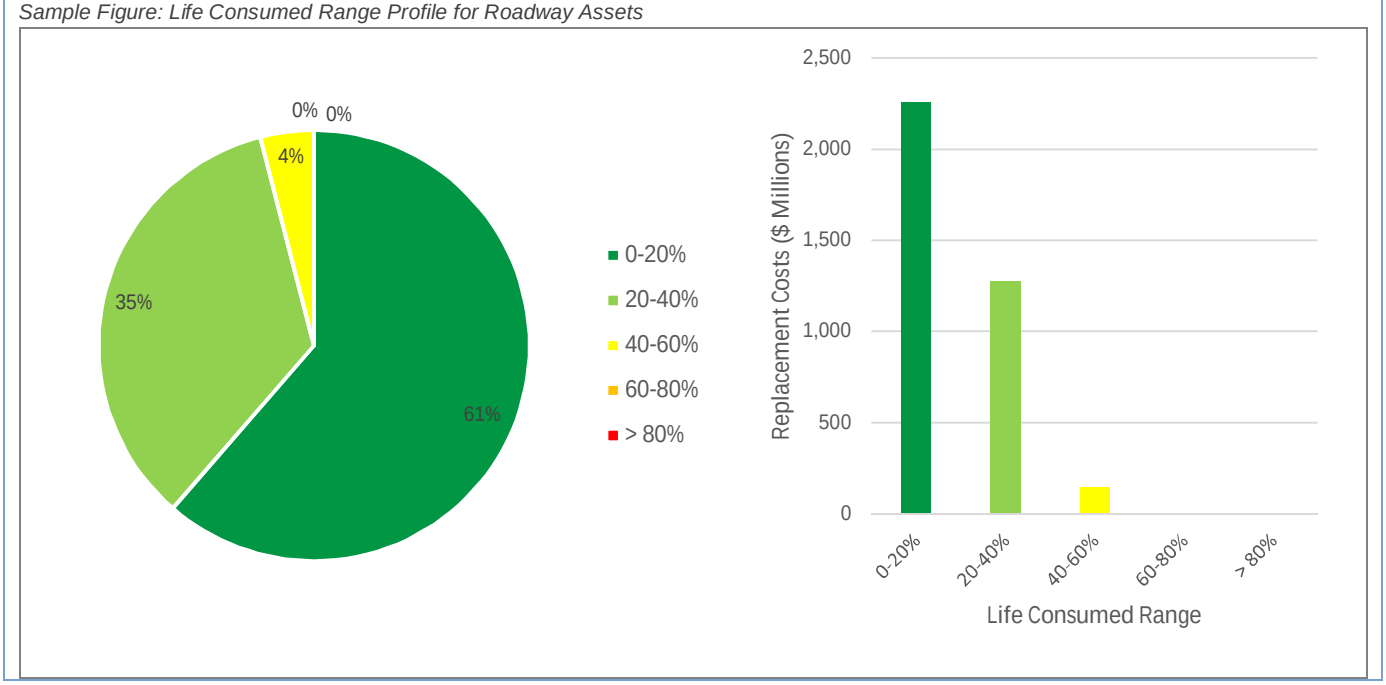
Sample Figure: Average Asset Life as proportion of Average Useful Life - Roads



Life Consumed Profile

As shown in the figure below, more than 95 percent of Roadway assets are in an acceptable range (0 to 40 percent)

Sample Figure: Life Consumed Range Profile for Roadway Assets



5.3.2 Asset Valuation

The valuation of the assets is expressed in terms of “replacement value” or “replacement cost”. The replacement value refers to the amount the City would have to pay to replace an asset with a new one, should it undergo catastrophic failure or reaches it end-of- service life.

The replacement value of the assets can be developed in various ways, depending on the information available, and the ongoing approaches that the City may already take to manage replacement valuation, in support of other business activities. For instance, replacement value can either be calculated based on the original installation cost adjusted for escalation or estimated using unit rates based on the historical capital costs data compiled for similar assets or using a less granular approach such as the Tangible Capital Assets report.

- **Asset Registry:** The database that keeps record of the asset inventory may also track historical unit costs which can be used to calculate the replacement value of the assets. This is likely to the most accurate source of information for asset valuation.
- **Tangible Capital Assets report:** Tangible Capital Assets are the public property managed by the City to deliver programs and services. Every Municipality in Canada is required by the Financial Administration Act to report on its Tangible Capital Assets. The report includes the replacement value of all assets owned by the City. However, in TCA reports, many asset classes are “bundled” together and reported as a group of assets. It is therefore not always possible to extract the exact replacement value of a specific asset from the TCA report.
- **“In-house” estimate:** When replacement values for certain assets are not available in asset registry or easily accessible in TCA reports, the City should estimate them based on experience. Previous procurement documentation may be very useful in getting a fairly accurate valuation of certain assets.

It is possible that for a given asset class, there are different levels of granularity in the valuation approach that are utilized for the sub-classes of assets. For instance, a more detailed approach may be utilized for higher valuation assets (such as bridges) versus small culverts. Determine the best approach toward valuation per asset class and utilize the information that is available. Documenting assumptions and known limitations with the valuation approach is also important. For communication purposes it may also be appropriate to contrast replacement value with book value, as presented in the TCA Annual Report.

For consistency with future AMP updates, it is important to document the various components included in the estimate of the valuation for the AMP, such as the capital cost of the asset itself, engineering and design costs, internal City management costs, contractor costs, etc.

Content Example

The replacement value of the City's transportation assets within the scope of this actual AMP is over $5 billion.

The following summarize the replacement cost values (in millions) by asset type.

Asset Valuation

Sample Table: Replacement Values and their change

Asset Classes	Asset Types	Replacement Value ($ Millions)		Change	
		2017	2020	Value	%
Roadways	City Freeway (174)		19.13		
	Arterials		2,068.74		
	Major Collectors		121.21		
	Collectors		661.22		
	Gravel Roads		763.47		
	Local Roads				
	Transit Roads		42.48		
	Lanes		0.79		
Structures	Bridges		789.21		
	Big Culverts		87.58		
	Medium Culverts		90.22		
	Small Culverts		133.38		
	Retaining Walls		23.05		
	Noise Barriers		4.62		
	Tunnels		9.25		
	Sign Supports		4.66		
	Entrance Gates		0.64		
…	…				
Total					

…

5.3.3 Asset Condition Rating

The current state of the local infrastructure section standardizes the presentation of the asset condition into five categories: Very Poor, Poor, Fair, Good, and Very Good. The first step is to establish a single evaluation scale to act as the common denominator for all assets. The 5-point scale aligns with the Canadian Infrastructure Report Card (CIRC) for ease of comparison and leverages any future information. The 5-point

scale is based on a 100-point score (common denominator) that allows different assets using different attributes, different metrics, and different scales to be rolled up to a common rating and condition description. The condition rating scale is consistent with the City's SOAR report.

Ratings from Very Good to Very Poor reflect the condition of the assets as described in the table below. Translating

Rating	Rating Description	Life Consumed	Asset Type Metric		
			Pavement Quality Index (PQI)	Bridge Condition Index (BCI)	Facility Condition Index (FCI)
Very Good	Very Good – Fit for Future Well maintained, good condition, new or recently rehabilitated	0 to 19%	80 to 100	90 to 100	0 to 5%
Good	Good – Adequate for Now Acceptable, generally in mid stage of expected service life	20% to 39%	60 to 80	70 to 90	5 to 10%
Fair	Fair – Requires Attention Signs of deterioration, requires attention, some elements exhibit deficiencies	40% to 59%	40 to 60	60 to 70	10 to 20%
Poor	Poor – Increasing potential of affecting service Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	60% to 79%	20 to 40	20 to 60	20 to 30%
Very Poor	Very Poor – Unfit for Sustained Service Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable.	80% or more	20 or less	20 or less	30% or more

In addition to rating asset condition, this section should highlight how condition was originally collected, and how the translation to the five-point rating scale was achieved. The table above provides sample translations of two condition indices (PQI and BCI) used currently by the City to the five-point rating scale, as well as another index (FCI), which is provided as an example content only. This table would need to be updated in order to include all the relevant condition indices used by the City (for all asset class types), and their translation to the five-point rating scale provided, when preparing a given service area AMP.

Condition ratings may come from a variety of sources, including scheduled inspection, maintenance reviews, statistical performance modeling, etc. Where condition is not formally captured or tracked, it may need to be estimated using indirect data (e.g. age and expected useful life) or staff / expert opinion.

When age and estimated useful life are used for estimating the condition of the asset use the rule presented in table above.

The commentary on the asset condition should apply a criticality lens, by commenting on the condition of more critical assets.

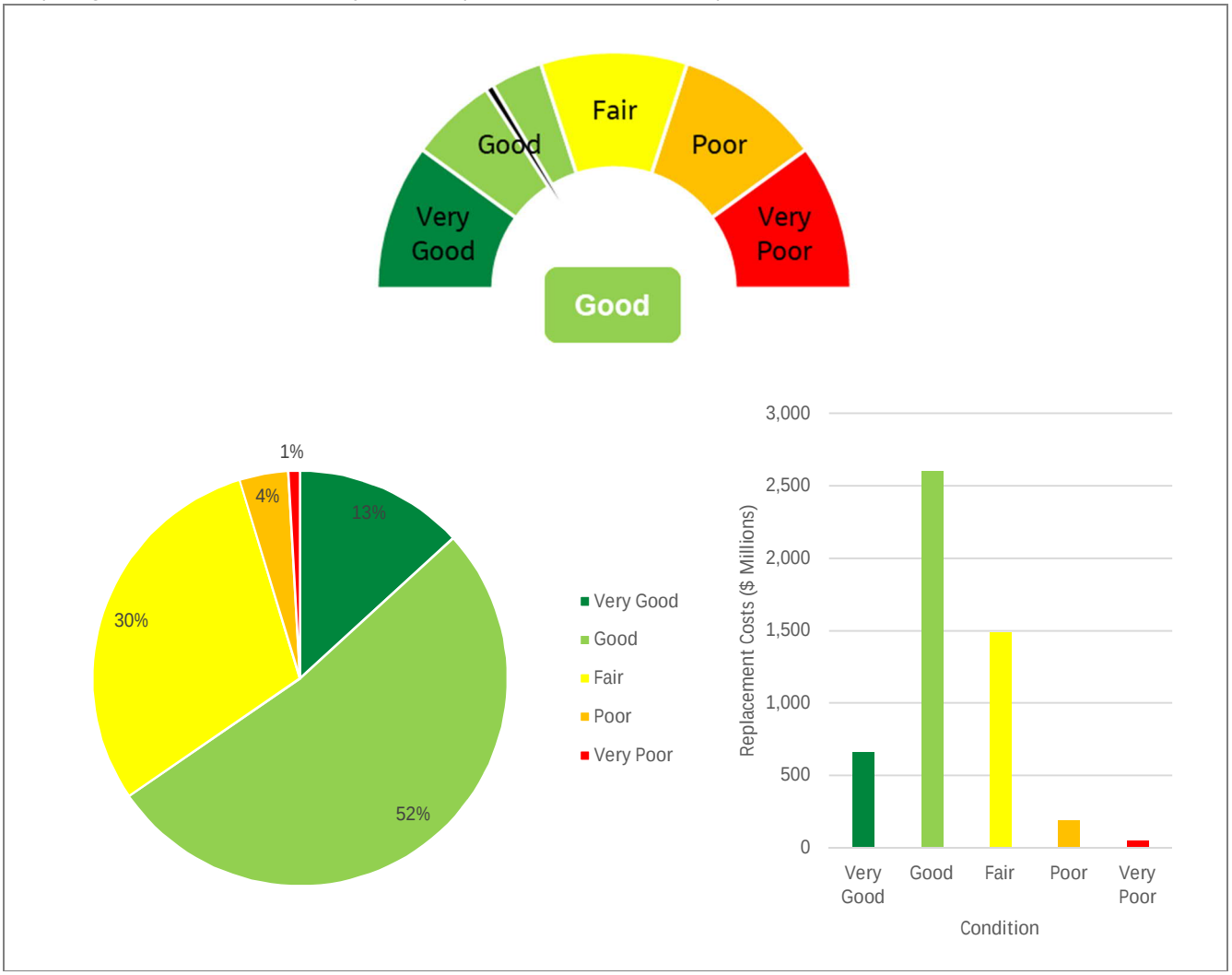
Content Example

The overall condition of the City's transportation service's assets within the scope of this AMP is Good.

95 percent of assets are in Fair to Very Good condition.

Figure below illustrates the summary of asset condition profile.

Sample Figure: Asset Condition summary – All Transportation within the AMP Scope



The condition of Transportation infrastructure is evaluated on regular basis. Various Condition Assessment techniques are used to determine condition ratings based on the asset type. The Table below summaries the condition assessment techniques used for the different asset types.

Sample Table: Summary of Condition assessment techniques by asset classes / types

Asset Class /Types	Condition Data Collection Method	Frequency
Roadways	…	
Bridges		
…		

Roads

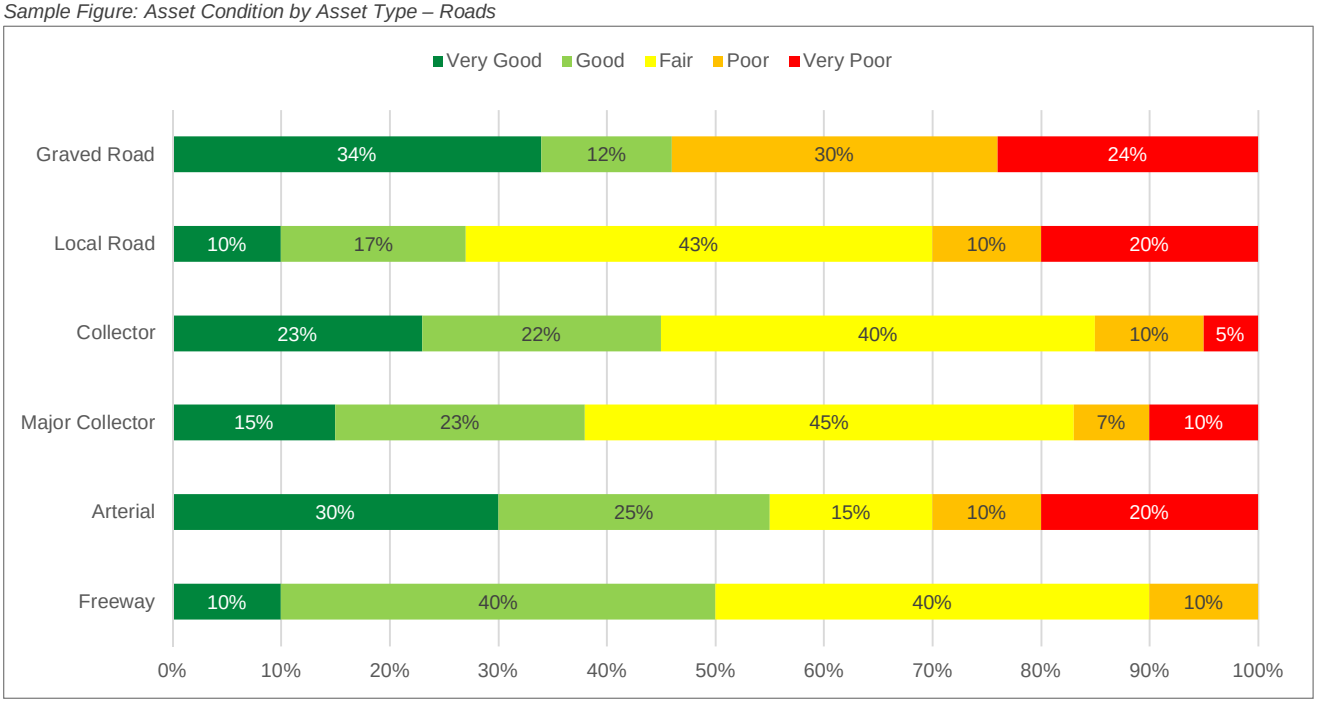
The overall condition of Roadways assets is Fair.

The City roads are classified into 5 categories…

Results are analyzed and used to establish the pavement quality for each road segment in the City measured against road criteria known as the Pavement Quality Index (PQI). The PQI are then translated to 5-point rating scale using the table below:

Figure below illustrates the condition of each road category and related service assets.

Sample Figure: Asset Condition by Asset Type – Roads



5.3.4 Data Sources and Considerations

5.3.4.1 Data Sources

This section is intended to summarize the sources of inventory, valuation and condition data. This information should be updated to reflect changes to data collection and storage practices over time. A sample is provided as an example for a given City.

Service Area	Inventory	Valuation	Condition
Water and Wastewater	GIS and various database and spreadsheets. New integrated Asset Management Software under development.	Spreadsheets & TCA	GIS and various database and spreadsheets. New integrated Asset Management Software under development.

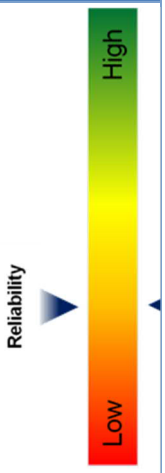
Service Area	Inventory	Valuation	Condition
Roads	Asset Register Enterprise.	PPT (Performance Prediction Technology from VEMAX)	Asset Register Enterprise/ Modelling of condition available in PPT (Performance Prediction Technology from VEMAX)
Municipal Accommodations	VFA	Likely TCA	VFA
Traffic	Staff knowledge. In house asset registry software under development.	Likely TCA	Access database
Parks	Parks Asset Registry (incomplete)	Likely TCA	Only for amenities and Forestry
Transit	MMIS (Maintenance Monitoring Information System) and dedicated spreadsheet	Master list of costs and replacement value with Account Receivable staff	MMIS (Maintenance Monitoring Information System) and dedicated spreadsheet
Fire	Various spreadsheets, VFA	Likely TCA	VFA reports and LOS assessment (for stations only).
Parking	Various spreadsheets	Likely TCA	Available from LOS assessments

5.3.4.2 Data Reliability and Accuracy

The quality of data used to report the current state of infrastructure will vary depending on the source for the data. To aid in the interpretation of the report, it is recommended in this section to include a data confidence rating in terms of reliability and accuracy of the data used for the analysis.

The data confidence rating scales defined below, are used to support the rating, with confidence based on the lower of the reliability and accuracy ratings. Data accuracy refers to the correctness of a data value in comparison to its true value in the real world. Data reliability refers to consistency of obtaining the data.

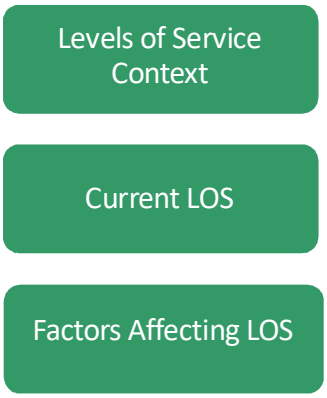
Note that determining the data confidence is a qualitative exercise and relies on the team judgement. Hence, no formal quantitative assessment is required.

Measure	Description	High	Moderate	Low	Rating Scale
Reliability	Consistency of procedures / processes used to obtain data	Based on sound records, procedures, or analyses that have been acceptably documented, and are recognized as the best method of assessment	Based upon known reasonable procedures, or analyses that have been acceptably documented	Based upon expert verbal opinion or cursory inspections/ observations	
Accuracy	Correctness of data value in comparison with its true value	+/- 1%	+/- 10%	+/- 50%	

5.4 Levels of Service

Quick Facts

- Presents the context of LOS, shows current performance and discuss any factors or issues that may affect the expected LOS.
- Addresses the '**O. Reg. 588/17**' LOS reporting Requirements
- Highlights linkage between LOS and City's Objectives.
- Provides flexibility to report more advanced (in addition to the required) metrics
- Levels of Service can be broken into three sections.



5.4.1 Level of Service Context

Assets exist to deliver service to customers and stakeholders and so it is important to understand and measure current service delivery performance as a baseline for future planning. This section describes briefly the progress of the service area in establishing effective LOS measures and aligning them with organizational and customer goals.

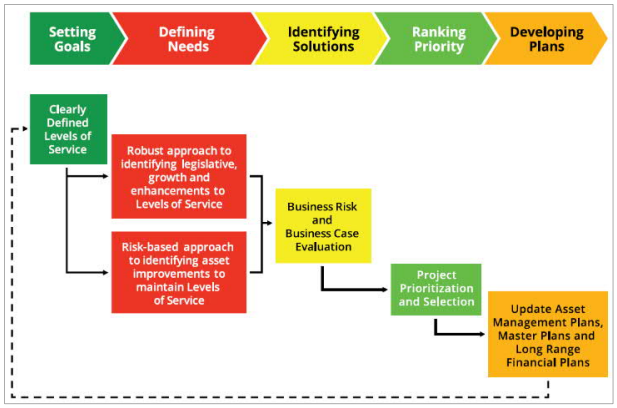
Content Example

A key objective of Asset Management is to optimize the competing objectives of sustainability, economic prosperity, social diversity, and environmental responsibility, while meeting customer service levels at the lowest life cycle costs.

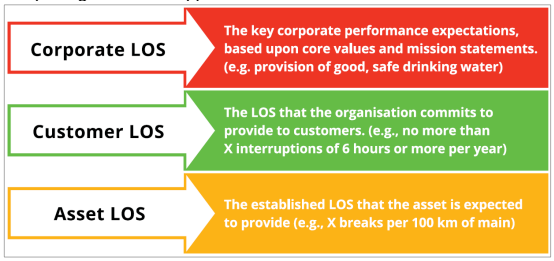
LOS can be aligned to meet legislated or environmental requirements or to meet the City's service objectives. As shown in figure in the right, having clearly defined LOS forms the basis for defining needs, establishing priorities and identifying investment requirements. Without clearly defined levels of service, there is a risk that investments will not achieve the desired service outcomes.

LOS can be defined and measured by linking three perspectives for the same service: corporate, customer, and asset. Figure below demonstrates the distinction between each perspective for a given service.

Sample Figure: Linking Investments to Service Outcomes



Sample Figure: Tiered Approach to Document Levels of Service



In 2012, Council adopted an overarching LOS objective to maintain City infrastructure assets in a state of good repair.

5.4.2 Current Levels of Service

This section reports the performance in delivering service to customers and stakeholders. It should contain the LOS measures required by '**O. Reg. 588/17**' and any other LOS measures that the City deems appropriate for this version of the AMP. The data should report on at least the last two years and, if possible, the last five years. If direct or indirect measures are not yet available, then consider using trend arrows to indicate performance and provide additional commentary.

Content Example

The following tables and figures highlight the current '**O. Reg. 588/17**' required Transportation service customer and technical LOS.

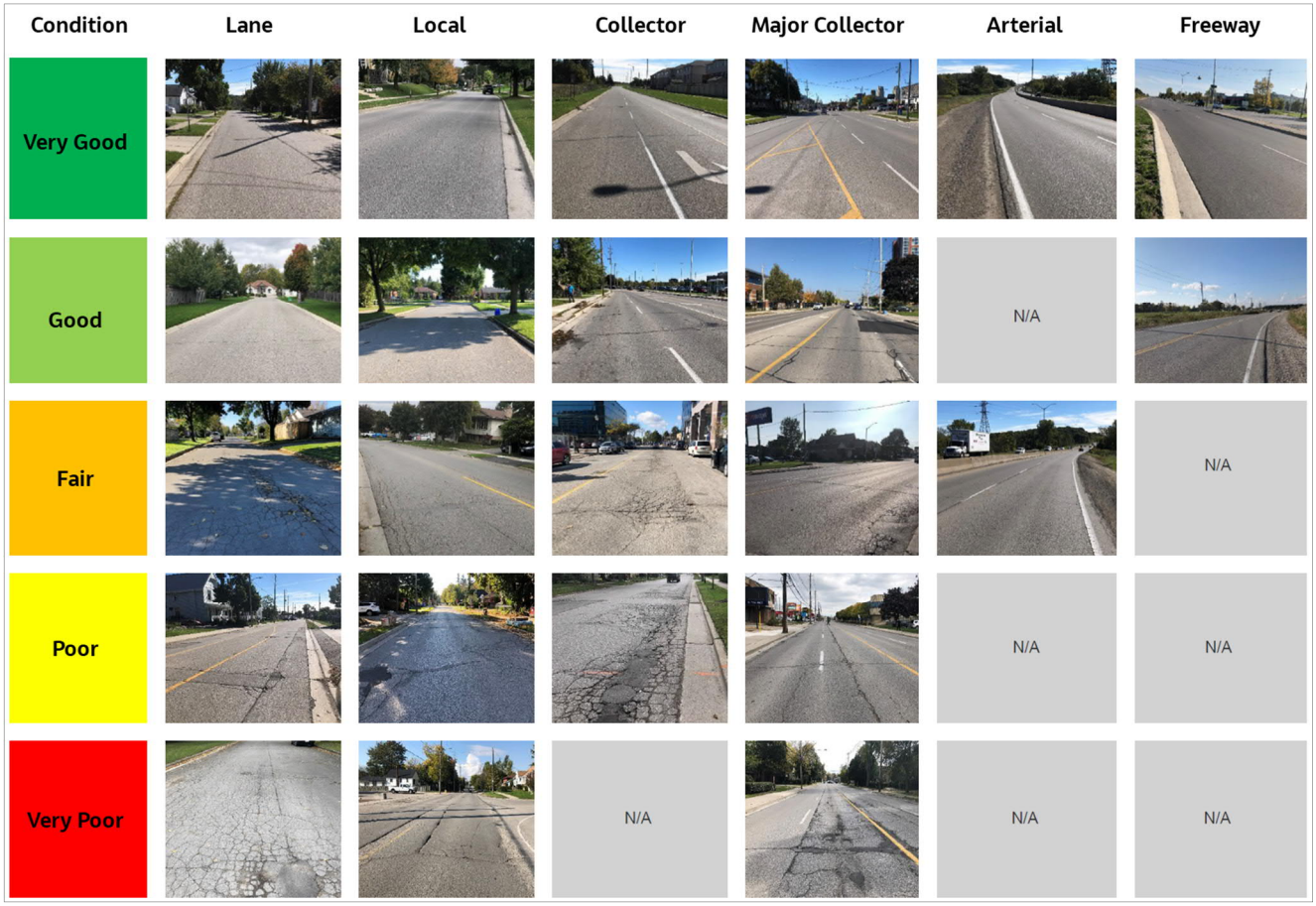
Roads

Sample Table: LOS metrics required by O. Reg. 588/17 - Roads

Service Attribute	Community LOS	Technical LOS	2018	2019
Scope		# of lane-kilometres of arterial roads (Class 1 and 2) as a proportion of square kilometres of land area of the municipality.		
		# of lane-kilometres of collector roads (Class 3 and 4) as a proportion of		

		square kilometres of land area of the municipality.		
Quality		For paved roads in the municipality, the average pavement condition index value.	75	78
		For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).	Fair	Fair

Sample Figure: Images of pavements compared to condition assessment rating



Bridges and Structure

…

5.4.3 Factors Affecting LOS

This section highlights and discusses any internal or external factors impacting the City's ability to deliver service such as:

a. Climate change
b. Aging Infrastructure

c. Changing public expectations

These can relate to specific performance measures and technical LOS (e.g. system reliability is decreasing because equipment is reaching the end of its useful life), or to the overall ability to deliver service.

Content Example

In addition to the measure-specific LOS targets highlighted above, the following factors are influencing the ability of the service area to maintain or enhance the LOS.

Roads

Climate Change	While the full impacts of climate change will not be fully understood in the near future, the City is currently experiencing issues that can be directly attributed to climate change. Examples include changing source water chemistry affecting water treatment plant operations (e.g. algae), severe winter weather leading to increased frost penetration, etc.
Aging Infrastructure	Some of the City's infrastructure are relatively old. This is a trend that will continue to burden the City and may impact its ability to provide high levels of service.
Changing public expectations	Societal and political influences will continue to shape the City's strategy and priorities. The fluid and rapidly changing nature of socio-political concerns, expectations and requirements will continue to influence the City's targets and priorities for service delivery. Examples of such expectations include aspects like enhanced environmental stewardship and more cost-effective delivery of services.

…

Impacts from climate change should be informed by reference documents directly relevant to the City such as Climate Projections for the National Capital Region (2020). An extract of which is presented below.

Future Climate in Canada's Capital Region

	What to expect*	2030's	2050's	2080's
Temperature	Average temperature	↑ 1.8°C	↑ 3.2°C	↑ 5.3°C
	Very hot days (above 30°C)	2.5 times more	4 times more	6.5 times more
	Very cold days (below -10°C)	20% less	35% less	63% less
Seasons	Winters shorter by	4 weeks	5 weeks	8 weeks
	Springs earlier by	2 weeks	2 weeks	4 weeks
	Winter freeze-thaw	↑ 13%	↑ 33%	↑ 54%
Precipitation	Fall-winter-spring precipitation	↑ 5%	↑ 8%	↑ 12%
	Intense precipitation	↑ 5%	↑ 14%	↑ 19%
	Snowfall	↓ 10%	↓ 20%	↓ 44%
Extreme events	Possible increases in freezing rain			
	Warming favours conditions conducive to storms, wildfires			

More certainty ... Less certainty

* For a high carbon emission scenario (RCP 8.5)

More certainty ... Less certainty

5.5 Asset Management Strategy

Quick Facts

- Sets planned actions that will enable the assets to provide the levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost.
- Addresses the '**O. Reg. 588/17**' reporting requirements related to future demand and lifecycle management activities
- Discussion of risks and external factors (i.e. climate change) on the maintenance or achievability of current LOS
- Asset Management Strategy can be broken into four sections.

Asset Management Practices, Procedures and Tools

Future Demand and Service Enhancement Activities

Lifecycle Management Activities

Risks

5.5.1 Asset Management Practices, Procedures and Tools

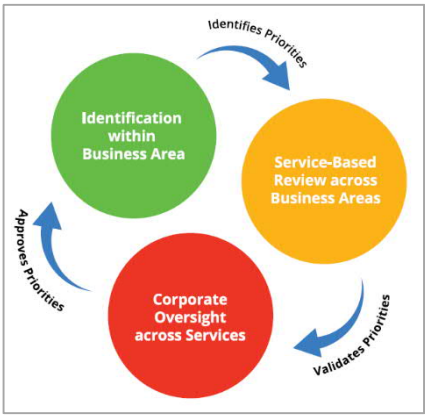
This section summarizes the practices and tools used for asset management to meet current and future service commitments. Information presented should generally align with the stages within the City's investment planning framework: Needs Assessment, Solution Definition, Priority Setting, and Plan Development. Subsections ranging from a paragraph to a page in length can be included to highlight details of key practices and programs. The level of detail should align with the importance of the activity and should include discussion of timing, responsibility, work steps and information flows.

Content Example

The City have developed a large number of procedures, practices and tools that are used to drive infrastructure condition assessment and investment planning to support effective service delivery.

The City currently identifies future requirements through different means. Projects or needs are typically identified through inspections, as part of a maintenance or operational routine, network level numerical modeling, physical deterioration modeling, through client driven needs, or other strategic initiatives. The overall capital investment planning process (Figure below) is structured to develop capital investment plans from a service perspective as opposed to departmental budget allocations. This includes asset assessment; planning; procuring; implementing and commissioning (or bringing into operation) with the focus on delivering the right project, with the right intervention, on the right asset, at the right time.

Sample Figure: Capital Investment Planning Process



The following tables summarize current strategies, practices and tools; details on key items follow.

Sample Table: Asset Management Strategy activities, practices and tools – Roads

Stage	AM activities and practices	Documented procedures	Specific Tools
Investment Planning	…	…	…
Maintenance and Operations	…	…	…
Renewal and rehabilitation	…	…	…

…

5.5.2 Future Demand and Service Enhancement Activities

This section details the strategies for addressing future service requirements brought about by growth, shifting demand, and changes to policy and legislation. Drivers influencing future needs should be presented, followed by the strategy and mechanisms for meeting this need, and the basis for budgeting this work. For example, the Transportation Master Plan, Ottawa Pedestrian Plan and Ottawa Cycling Plan would inform this section.

Content Example

The Transportation services future requirements are driven primarily by three factors: growth, environmental performance and climate change. To address these challenges and the requirements associated with the City have developed and started to implement a series of programs and initiatives.

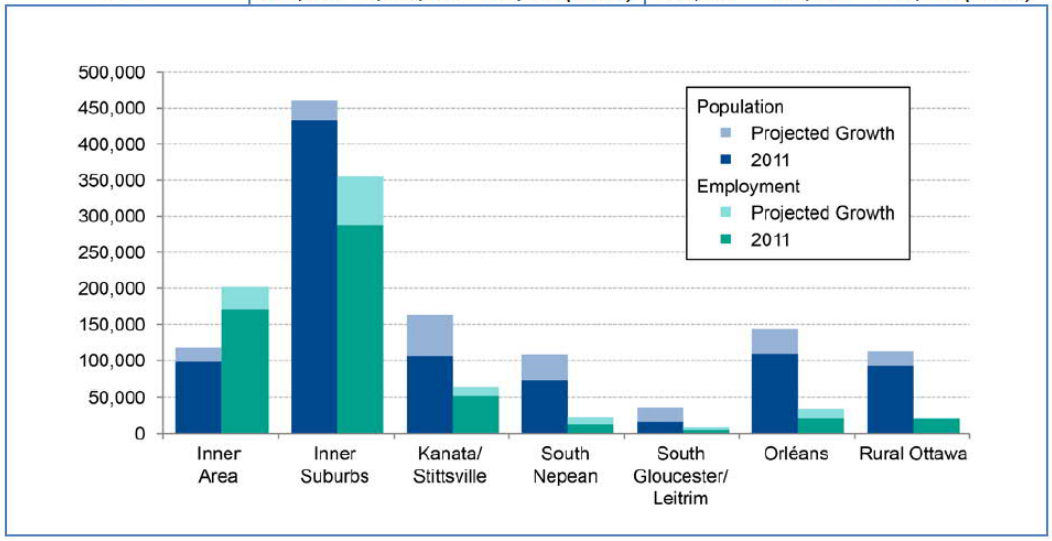
The following section explains the factors, the requirements and the associated programs & initiatives:

Growth

The City has prepared population and employment growth projections for the period from 2011 to 2031 (see figure below). The City expects a 23% increase in population from 922,000 to 1.14 million people, and a 24% increase in employment from 565,000 to 703,000 jobs. Although infill development and intensification are forecast to increase the population of Ottawa's Inner Area and Inner Suburbs by about 46,000 people over the next 18 years, most growth (about 168,000 people) will occur in the Outer Suburbs. In contrast, 72% of employment growth will occur inside the Greenbelt.

Sample Figure: Population and Employment: 2011 Data and 2031 Projections (Transportation Master Plan)

Area	Population			Employment		
	2011	2031	Growth and distribution	2011	2031	Growth & distribution
Inner Area	97,200	116,400	19,200 (9%)	170,600	201,800	31,200 (23%)
Inner Suburbs	432,500	459,300	26,800 (13%)	287,400	355,300	67,900 (49%)
Kanata/Stittsville	105,200	162,000	56,800 (27%)	51,300	62,500	11,200 (8%)
Barrhaven	71,200	107,400	36,200 (17%)	11,100	21,800	10,700 (8%)
Riverside South/Leitrim	15,900	35,800	19,900 (9%)	4,000	7,800	3,800 (3%)
Orléans	108,200	143,400	35,200 (16%)	20,600	33,000	12,400 (9%)
Rural Ottawa	91,400	111,700	20,300 (9%)	20,000	20,900	900 (1%)
Total	***922,000***	***1,135,900***	***213,900 (100%)***	***564,900***	***703,200***	***138,100 (100%)***



To address those challenges the city has established and will continue, the following programs and initiatives:

Sample Table: Activities to address growth challenges

Activity	Description	Service Impact
Grade Separation	…	…
Active Transportation	…	…

Climate change

Climate change impacts our health and safety, our infrastructure, our economy and our environment. The impacts of climate change to our health will be increasingly felt through extreme heat and cold events, increased risk of vector-borne diseases, reduced air quality from forest fires, and disruption and displacement from floods. And while climate change will impact everyone, our individual abilities to deal with those impacts will vary and disproportionately affect our more vulnerable populations. In terms of infrastructure, our roads, buildings, pipes and other built structures were not necessarily designed to withstand projected future climate conditions such as high temperatures, high winds and freeze-thaw cycles. Climate change will also affect our economy and natural environment. Agricultural practices, for example, will need to change in response to more unpredictable water availability (droughts or heavy rains), shifting seasons and new challenges such as pests and invasive species.

To address those challenges the City have established and will continue, the following programs and initiatives:

Sample Table: Activities to address climate change challenges

Activity	Description	Service Impact
Maintaining guidelines for infrastructure design and operation that reflect best practices	Consider the climate change as an input for decision-making process regarding new projects and renewal & rehabilitation of existing asset base.	…
…	…	…

…

This section should set out the funding requirements (capex and opex) over the planning period that are needed for the delivery of the growth and enhancement strategies. These should be broken down and aligned with the various drivers and programs above.

Content Example

An example of the proposed capital expenditure from the Transportation Master Plan 2013.

Sample Table: Capital Costs of New Infrastructure and Services: Affordable RTTP and Road Networks, Pedestrian Facilities, cycling Network ($2013 millions)

Type	Capital cost
LRT+ Vehicles + Maintenance and Storage Facility	2,360
BRT	317
O-Train + Vehicles + Maintenance and Storage Facility	118
Transit priority	200
Road Network plus Intersection Modification	864
Cycling *	70
Pedestrian *	66**
Total	***$3,995M***

* *Road project costs include the costs of integral cycling and pedestrian facilities.*

** *Includes major multi-use pathway structures*

5.5.3 Lifecycle Management Activities

This section describes how the City plans to maintain current service through the lifecycle management of its assets. The nature and drivers behind current operation, maintenance, renewal and disposal activities should be presented and discussed, along with the basis for determining needed investments. Condition assessment programs are reported in detail in the State of Infrastructure chapter and need not be duplicated here. The overall lifecycle performance should be discussed and opportunities for improvement identified. For example, could small increases in operational maintenance lead to a longer economic life and hence defer capital. Improvement initiatives should be included in the AMP improvement plan. Disposal activities should consider both responsible disposal at end of life and the opportunities for asset rationalization. Asset rationalization is the elimination of 'surplus' assets that are no longer used to provide service to customers.

Non-infrastructure interventions that reduce lifecycle cost should be highlighted. Strategies that impact on lifecycle management activities, such as Complete Streets, should be discussed.

The assessment of lifecycle performance should be supported by key items of evidence such as data analysis showing, for example, maintenance delivery performance or trends over time or analysis of economic life. If a quantitative assessment of alternative lifecycle strategies has been carried out then the results should be reported.

Content Example

It comes as no surprise that different assets are managed differently. What is more difficult to appreciate is how two similar assets supporting the same service may also be managed differently.

A different strategy may be the result of an identified risk to the service, varying operating conditions, or simply where the asset lies in its expected life cycle. Typically, when an asset is still relatively new or freshly renewed, the interventions consist of monitoring and minor maintenance. Then as it ages and routine maintenance can no longer ensure the provision of the intended service, the types of interventions may migrate towards more significant maintenance, repairs or even replacement.

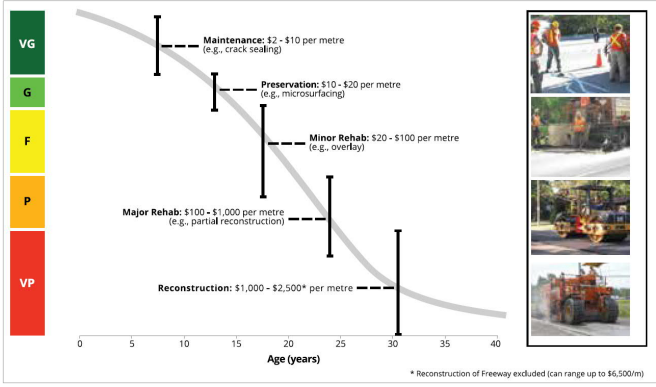
The City has developed different lifecycle management strategies that could be broken in the main categories: Maintenance, Renewal, Disposal, Non-Infrastructure Solutions, …

The following tables provide a summary of lifecycle activities.

Sample Table: Lifecycle management activities to maintain current performance - Roadways

Activities category	Lifecycle Activities
Maintenance	• Routine maintenance such as street sweeping, pothole patching, utility cut repairs, • sidewalk levelling, etc. • Snow and ice removal maintenance • Meet Provincial Minimum Maintenance Standards. • Scheduled preventative maintenance programs such as the rout and seal program to stop leakage damage. • Seasonal maintenance activities (Spring street clean-up, winter maintenance) • …
Renewal	Select Intervention strategies that are generally appropriate depending on the stage of deterioration, for some key assets based on their condition. The actual selection of the renewal strategy is determined through the analysis of renewal options in order to come up with the preferred intervention. Figure below summarizes example intervention for roads.
Disposal	
Non-Infrastructure Solutions	

Sample Figure: Pavement Interventions against deterioration



Sample Table: Lifecycle management activities to maintain current performance – Bridges and Structures

Activities category	Practices and actions
Maintenance	• … • …
Renewal	• … • …
Disposal	
Non-Infrastructure Solutions	

…

The following subsections provide detailed descriptions of the different adopted lifecycle strategies by asset class.

Maintenance activities

Roads

The City has fairly good practices and programs in place for both hard and gravel surfaces.

Planned maintenance programs for hard surfaces including routine …

This section should set out the funding requirements over the planning period that are needed for the delivery of the lifecycle activities.

This section should briefly describe the supporting business processes such as:

- IT / technology and asset data for example the interconnectivity of Maximo, Lagan, RIVA, GIS, etc. for Transportation
- People resources
- Emergency management plans
- Procurement activities including coordination with external governments, utilities and agencies

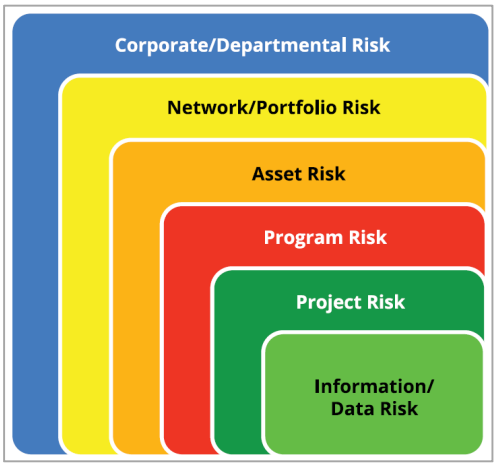
5.5.4 Risks

This section sets out the risks associated with the asset strategies above. This must include a top-down risk assessment that documents the key issues that could impact on the assets' strategies. Information on the risks (likelihood and consequences) and service impacts associated with each factor should be presented, as well as any identified mitigation or control actions.

Content Example

The City has in place a number of practices and processes to identify, quantify, and mitigate risk and also to elevate opportunities. In assessing and managing risk, the City considers risks at different levels and in varying degrees of details, as demonstrated through the risk framework (Figure below).

Sample Figure: The City's risk management framework



A risk assessment of key risks and mitigation / control actions are presented in the table below.

Sample Table: Risk assessment of factors impacting the asset strategies

Factor	Potential Impact	Likelihood	Consequence	Risk	Mitigation / Control actions
Required funding not secured	• Backlog of work increases • Assets deteriorate further • Assets deteriorate beyond current need level (i.e., a maintenance need becomes a rehabilitation need) • More costly treatments are required • Network average LOS decreases	H	M	M	
Substantial increase in maintenance and rehabilitation costs	• Inability to complete all planned projects with allotted budget levels • Backlog of work increases • Assets deteriorate further • Assets deteriorate beyond current need level (i.e., a maintenance need becomes a rehabilitation need) • More costly treatments are required	L	M	L	

	• Network average LOS decreases				
Underestimated deterioration rates	• More rapid asset deterioration • Underestimated funding needs • More costly treatments are required • Network average LOS decreases	VL	L	VL	

A bottom-up asset risk assessment can be included if it is available. This should be a summary of the outputs of the asset risk assessment.

Content example

The City has conducted an asset risk assessment of the roadways' assets. The factors driving consequence of failure are shown in the table below.

Sample Table: Factors driving consequence of failure

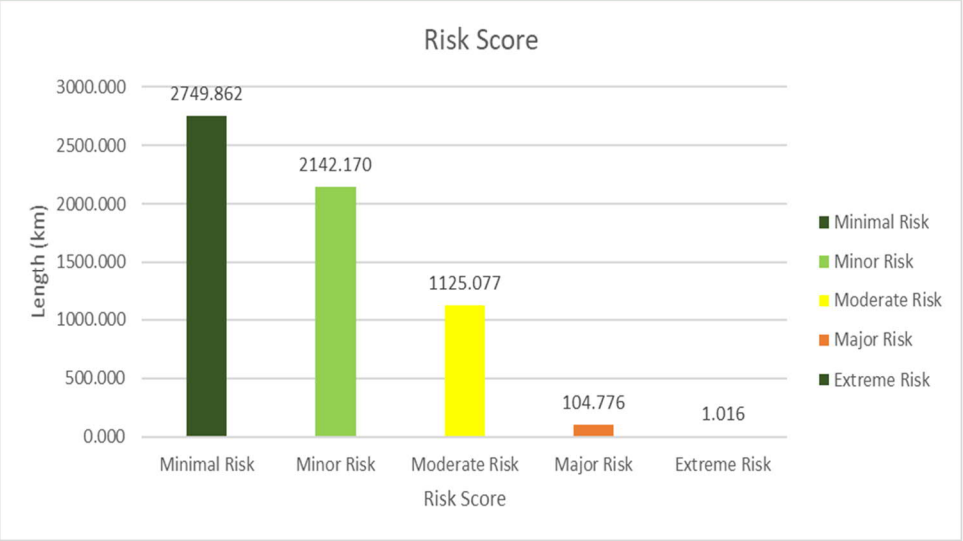
Category	Criteria	Factors measured by
Direct Financial	Replacement Cost	Treatment Strategy, Pavement Area and Pavement Structure
	Level Railway	Approach to an at-grade railway
Environmental	Species at Risk	Screening Data
	Existing Environmental Agreements	Existing environmental agreement Y/N
Socio-Economic	Traffic	Usage per lane: AADT, Number of Lanes
	Transit Route(s)	Number of Bus Routes on roadway
	Truck Route	Truck Route Y/N
	Emergency Detour Route	Emergency Detour Route Y/N
	Cycling Route	Cycling Route Y/N
	Service Requests	Number of pothole or ponding service requests (SAP)

The factors driving likelihood of failure are shown below.

Sample Table : Factors driving likelihood of failure

Criteria	Factors measured by
CAM Condition Rating	Pavement Quality Index (PQI)

The overall results of the risk assessment show that the majority of the assets are not of concern but that approximately 105 km should be investigated further to ensure that appropriate action is being taken either through the renewals program or other mitigating activities.



5.6 Financing Strategy

Quick Facts

- Identifies and aligns available funding with the operating and capital investment needed to meet / maintain the service requirements.
- Identifies funding gaps.
- Highlights the alternatives (non-financial) strategies to address the funding gap.
- Addresses the '**O. Reg. 588/17**' reporting requirements related to the estimated capex and significant opex to maintain current LOS or to accommodate future demand.
- Financial Strategy can be broken into five sections.

Expenditure History

Expenditure Forecast

Revenue Forecast

Funding Gap

Alternative Funding Strategies

In a mature AMP, the investment needed to deliver the asset strategies should be compared with planned spending and available funding sources to identify and quantify the funding shortfall and recommended strategies to address the shortfall. Where accurate 'needs' information is unavailable, then the service implications of embarking on the budgeted spending plan should be qualitatively discussed.

The financial information presented in this section should match financial information reported in other strategic documents, including the Long Range Financial Plan. Any differences should be clearly explained. Financial information should be presented in consistent categories.

Operating Expenditure	Can be presented as a single value per year. Provide a breakdown by asset class or other category if it is useful to support the narrative.	
Capital Expenditure	Growth and Enhancement	Provide a breakdown by the main drivers and programs
	Renewals	Provide a breakdown by the main asset classes
Revenue Sources	Provide a breakdown by the main categories such as property taxes, user fees, reserves, debt etc.	

5.6.1 Expenditure History

This section highlights the City's operating and capital expenditure history and relates it back to observed service trends. Ideally, spending information should be categorized to align with the Growth & Enhancement and Lifecycle Management activities presented in Section 5 and by major asset class. Qualitative discussion may be needed where clear relationships between investment and level of service are not known.

Content Example

The following table relates a given municipality's road and bridge investment over the last five years to observed trends in level of service.

Sample Table: Expenditure history and LOS

Component	Expenditure ($ Thousands)						Level of Service				
	2014	2015	2016	2017	2018	Trend	Accessible	Safe	Reliable	Regulatory	Overall
Operating											
Roads	$22.1	$23.2	$24.8	$22.2	$26.3						
Structures											
…											
…											
Total / Overall											

	Negative Upward Trend		Negative Downward Trend
	Positive Upward Trend		Positive Downward Trend
	Consistent / Stable Trend		

Despite slight increases in operating and paved roads capital expenditure over the last five years, there have been noted degradations of service accessibility (affordability) and reliability (quality, capacity, interruption). Based on this it appears that historical spending is below that required to maintain service, and that service will continue to degrade without an increase in roadway investment.

Bridge spending has seen a moderate increase over the last five years, and despite a slight reduction in accessibility (affordability), service appears to remain quite stable. Accordingly, it would appear that current funding levels are near those required to maintain service provided by these assets, and that further increases would only be needed to improve service or keep pace with anticipated deterioration.

5.6.2 Expenditure Forecast

The expenditure forecast presents the City's investment strategy to maintain service and/or meet desired targets over the medium to long-term. When possible, the expenditure presented should be categorized to

align with the Growth & Enhancement and Lifecycle Management Activities presented in Section 5. The financial information presented in this expenditure forecast should be the budgeted or allocated expenditure for the service area.

As a minimum AMPs will forecast investment requirements ten (10) years in to the future, even if this is insufficient to achieve the City's ultimate service goal. Where advanced forecasting tools are in place, longer-term forecasts showing service attainment can be presented. Information on the source of the forecasts, along with any assumptions or limitations should also be presented and discussed.

Content Example

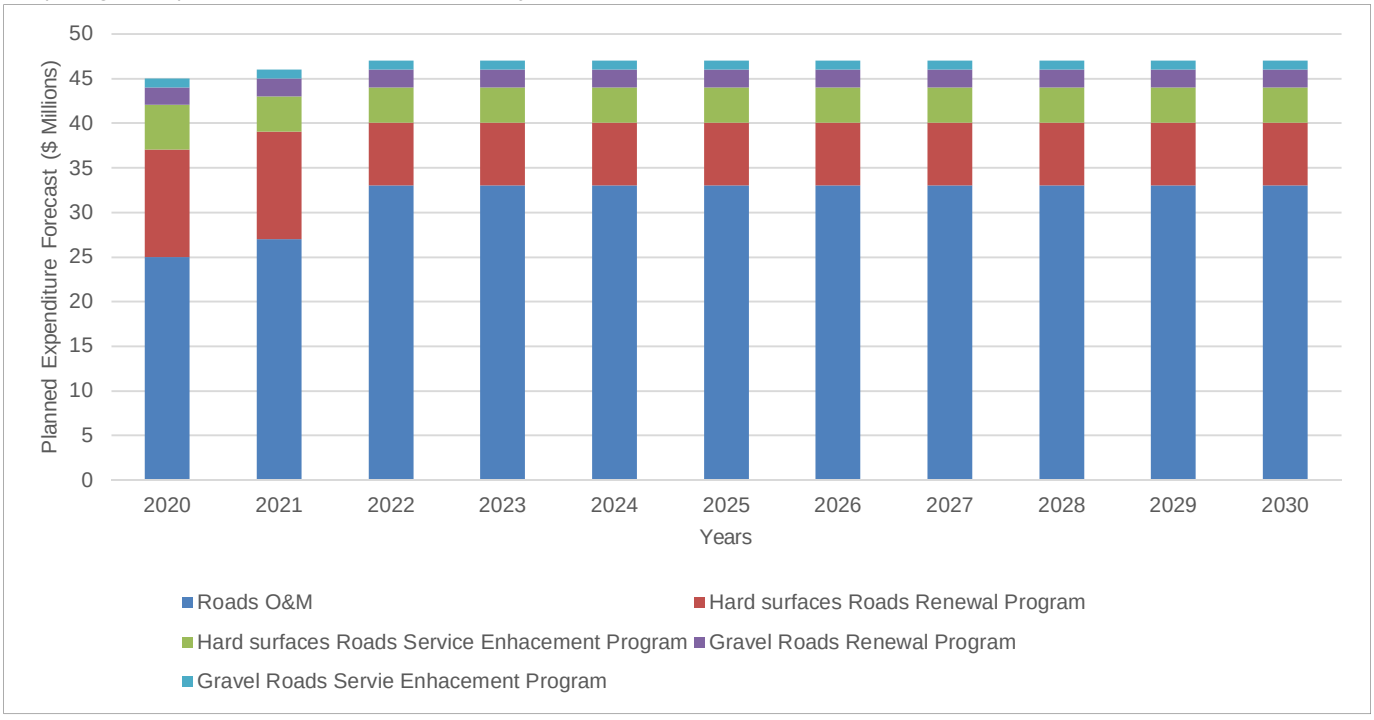
Roads

Roadways spending is currently allocated by asset class / type and service objective (maintain vs. enhance), based on the following table. Lifecycle Management activities are focused on maintaining service and meeting current service objectives, where Service Enhancement activities are focused on addressing growth and changing demands.

Sample Table: Spending Allocation – Roads

Asset Class / Type	Lifecycle Management	Service Enhancement
Local Streets	• Local Street / Sidewalk O&M • Local Street / Lane / Sidewalk Renewals • Local TBO Program • Enhanced Local Streets Renewals	• Granular Roadway Improvements
Regional Streets	• Regional Street / Sidewalk O&M • Regional Sidewalk and Curb Renewals • Downtown Streets • Regional Major Rehabilitation Works • Regional Mill & Fill • Regional Enhanced Renewal Program	• Regional Streets Improvements • Regional Upgrades - Paved Shoulders • Regional Upgrades - Accessibility Improvements • New Transportation Facilities

Sample Figure: Expenditure Forecast over the next 10 years – Roads



Bridges and Structures

…

Total

…

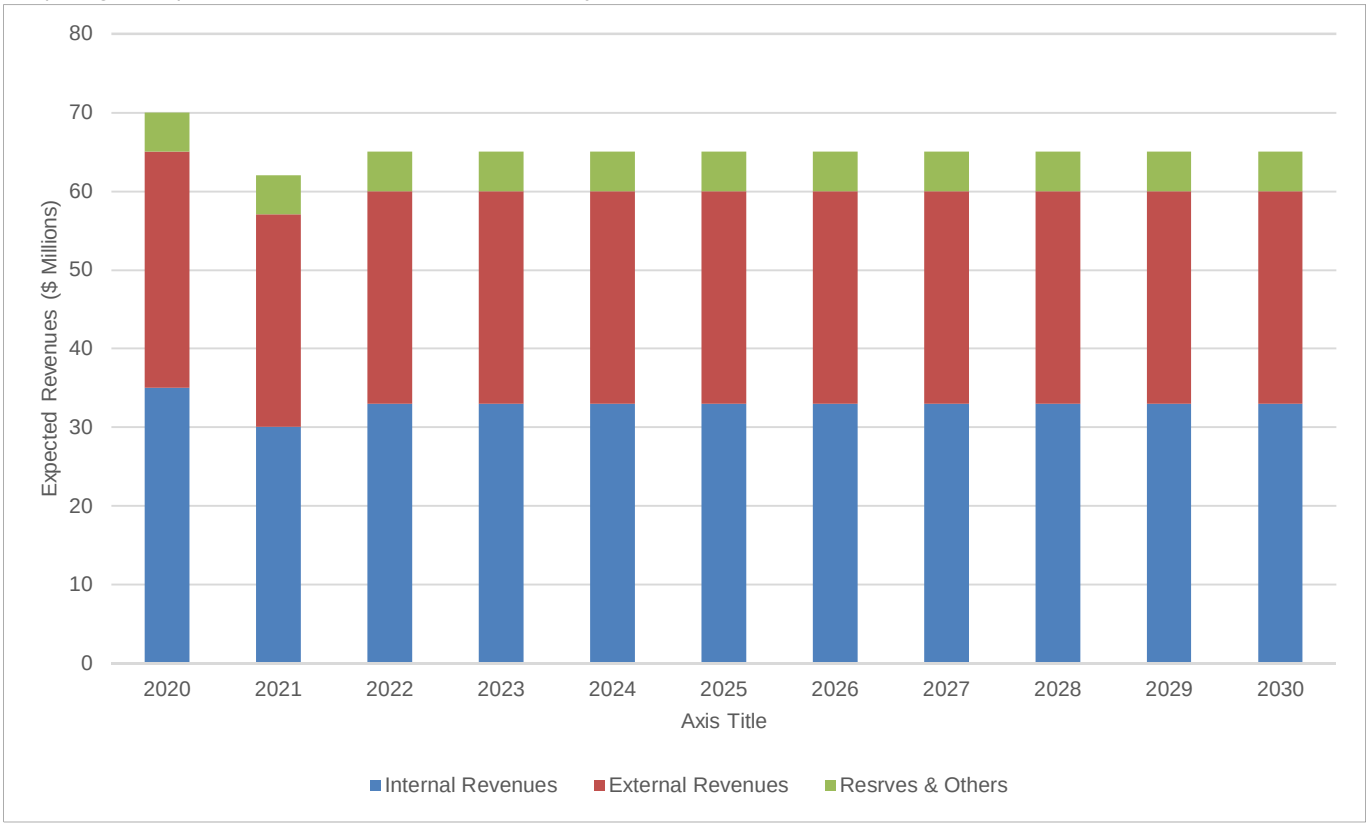
5.6.3 Revenue Sources

This section details the current and forecasted revenue sources available to fund the expenditure forecast. Therefore, the total of the revenue sources should match the total of the expenditure forecast. Provide commentary on the stability or volatility of the revenue sources particularly from higher levels of government.

Content Example

The projected investment and associated funding sources for Local Streets capital investment is summarized below. The values presented represent the approved budget for 2014 and forecasts for the period 2015-2023. This revenue information is available at the level of granularity for local streets level.

Sample Figure: Expected Revenue Forecast over the next 10 years



5.6.4 Funding Gap

This section compares the expenditure forecast to the funding required to deliver the asset strategies to identify any unfunded investment requirements.

$$Infrastructure\ Gap = Funding\ for\ asset\ strategies - Budgeted\ or\ allocated\ funding$$

A mature Asset Management Plan should be able to quantitatively identify the areas and magnitude of funding shortfalls and specific strategies for addressing these issues. Initially it is unlikely that this level of information will be available and service areas will need to present a more qualitative assessment of issues and constraints. As the use of asset management evolves within the City, so too will the quality of information for financial forecasts, allowing it to move toward quantitative assessment.

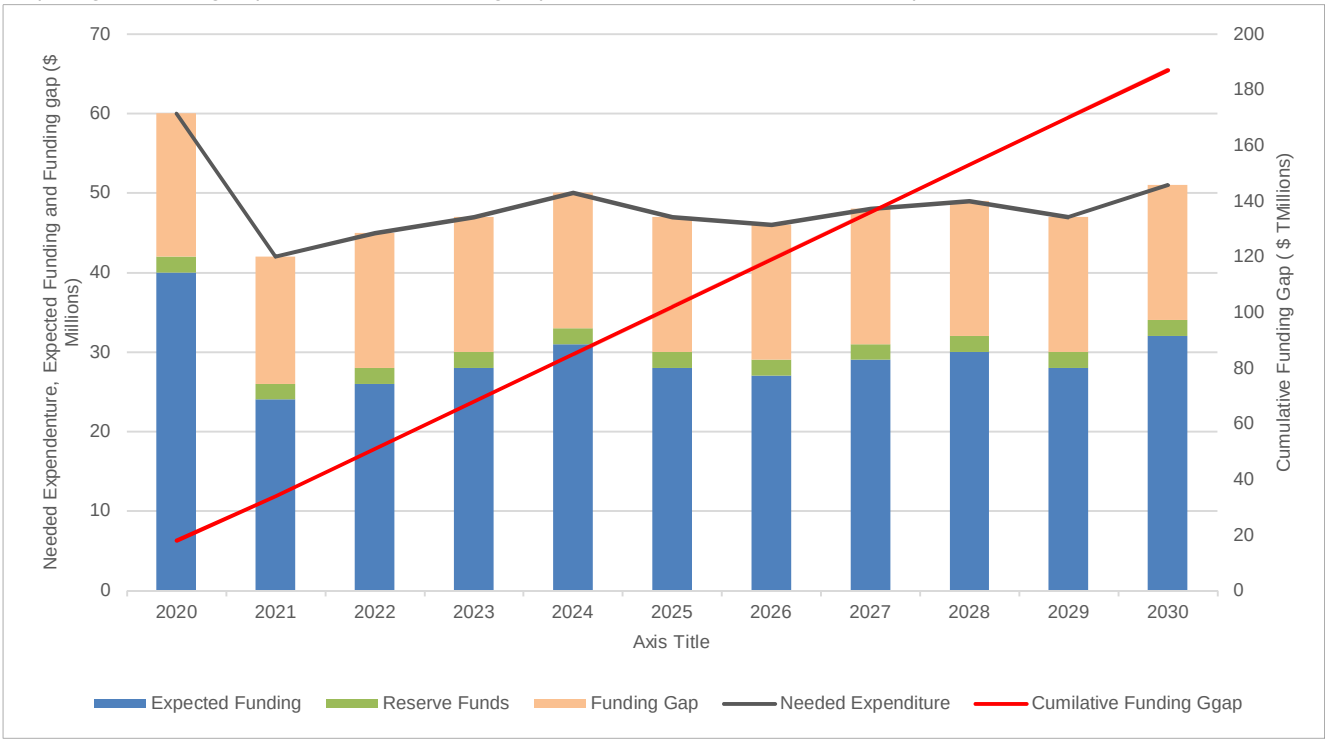
Based on this, the presentation of this section will vary, depending on whether or not the City was able to forecast its investment needs, or if it merely presented budgeted spending over the analysis period.

- Where needs are presented, then it is very likely that sufficient funding is unavailable to cover investment and a gap will exist. In this case the City should highlight unfunded areas and detail intended strategies for overcoming these deficits (i.e. where it will pursue alternative funding or reduce service provided).
- Where planned spending is used (i.e. budget documents are primary sources of information), investment will mirror funding, showing a net zero funding gap. In these cases, the City should identify areas of constrained spending, qualitatively explain their respective service impacts, and highlight prospective available mitigation strategies.

Content Example

The following investment strategy highlights how planned Water service area spending will be addressed for a given municipality. While review of available funding vs. planned investment shows a balanced capital budget, increased spending on expansion and upgrading of the Wastewater Treatment Plant will place significant financial pressure on this City, increasing reliance on Grant Programs and forcing the deferral of linear and facility works, risking system reliability and customer service impacts. Also, current investment in sewer and water distribution system rehabilitation and renewal activities are insufficient to keep up with deterioration resulting in reliability issues, particularly during extreme weather events. This coupled with project deferrals needed to accommodate treatment plant spending have resulted in several high-profile failures and negative press for the Department.

Sample Figure: Funding Gap and Cumulative Funding Gap – Needed Investment Forecast vs. Expected Revenue Forecast



5.6.5 Alternative Funding (Non-Financial) Strategies

This section should highlight the City's strategies, from a non-financial perspective, for overcoming identified quantitative or qualitative funding gaps. Various forms of alternative delivery, service reduction, or outright suspension of service are all viable non-financial solutions that should be explored to support the City's overall financial strategies.

Note that it is not the intention of this document to identify and analyze all available options, but merely to report on the planned actions, based on properly supported external analysis. Where this analysis has yet to be conducted then the City can provide a timeline for this assessment and highlight potential options under consideration.

5.7 Improvement & Monitoring Plan

Quick Facts

- Describes how both the AMP and the asset management system will be improved over time.
- This will include highlights on planned asset management improvement initiatives, along with a monitoring strategy aimed at tracking the progress over time.
- Improvement & Monitoring Plan can be broken into two sections

Asset Management System improvement

AMP improvement Plan

5.7.1 Asset Management System Improvement

This section highlights planned actions to improve asset management practices. If possible, it should include a limited number of key measures used in tracking its adoption and use of service-based and corporate practices and tools.

Content Example

As described in the **"Timeframes"** section within the **"Introduction** (Part 2) the asset management practices, activities and related documents are subject to a continuous improvement, periodic reviews and updates.

The City's asset management activities will be reviewed annually in conjunction with a broader review of the CAM program. The review will consist of:

a. Review of Asset Management program metrics to track actual vs. planned progress,
b. Consultation with City Asset Management stakeholders to assess the completeness and effectiveness of key practices and tools.

A summary report will be presented to the City Management Team, and consolidated and presented in future versions of this Plan.

The CAM program will be reviewed annually, by reviewing metrics and consulting with relevant functional groups. A summary report will be developed and presented to the CAM Steering Team to ensure the program's continued suitability, adequacy, and effectiveness. Feedback will be collected and used to shape the AMP and the City's AM strategic documents as needed.

The following table summaries the actions the City will undertake to improve the Asset Management System.

Sample Table: Actions for Improvement – Asset Management Program

#	Action	Responsibility	Resources	Timeline
1	…	…	…	…
2	…	…	…	…

The following metrics will be used to track AM program adoption and effectiveness:

Sample Table: Metrics used to track asset management program progress

Type	Metric	Target	Tracking Frequency	Metric Data Source
Finance	Value of capital $ deferred beyond preferred point in time			
	% of business cases over $500k based on whole life costs (WLC)			
	Value of capital $ savings achieved			
	Value of opex $ reductions achieved			
Customer	Citizen survey outcome on service satisfaction			
	% of LOS measures with baseline data			
	% of LOS measures with target set			
	Customer LOS vs. target			
Internal Process	% of opex budget (by activity, $, service) subject to review			
	Number of activities reviewed for ASD potential			
	% of operating functions with SOPs			
	% of asset base with up-to-date risk assessments			
	% of projects in CIP with robust business cases			
	% of capital program has gone through the MCP process			
	% of business cases with recommending opex outcome			

	$ value of spend-to-save opportunities identified			
Learning & Growth	% of target employees going through AM training			
	% of job roles going through AM competency assessment			
	Staff feedback on training 6 months after completion of training			
	% of PDEs with AM-related outcomes			
	% of PDEs with AM-related outcomes successfully achieved			

5.7.2 AMP Improvement Plan

This section highlights activities planned to enhance service delivery performance and subsequent versions of the AMP. It may be useful to include the annual monitoring review of the AMP in this section.

Content example

This Asset Management Plan sets out a strategic framework for managing the City's Transportation services core and related infrastructure to effectively meet current and future service requirements. As asset management practices continue to evolve, so too will the completeness and value of this Plan in guiding investment in these assets.

The following planned improvements highlight the City's continued commitment to the sustainable management of its core infrastructure to support the delivery of safe, reliable and effective municipal services to the residents.

Sample Table: Actions for Improvement – Asset Management Plan

#	Action	Responsibility	Resources	Timeline
1	Further development and implementation of LOS framework - Work will continue on implementing a comprehensive framework of customer and corporate indicators to facilitate the City's transition to a service-oriented investment planning approach.	…	…	…
2	Refresh AM systems and tools – Work on the planned update of conveyance system condition assessment and planning tools will proceed. In addition to renewing aging technology, the work will improve the tracking and management of asset performance information, provide asset risk analysis capabilities, and enhance the identification and forecasting of investment needs. Tools will be configured to align with the support the corporate investment planning process, significantly reducing the level of effort needed to support this work.	…	…	…

…

5.8 Appendices

The AMP Appendices should be structured to house details supporting information presented in the body of the AMP. Content will vary from AMP to AMP, but examples might be:

Supporting Strategic Documents	Links to (or copies of) supporting / supported strategic documents referenced in the **Introduction** (Part 1) of the AMP, including strategic and business plans, policies, SAMP and masterplans.
State of Asset Report	Detailed information on the asset base, including inventory data, condition and levels of service, replacement and book value, average remaining life, etc. for key assets. This can be in the form of a tailored summary supporting the information presented in the AMP, or an excerpt from a broader public-facing State of Asset Report, published by the City.

Detailed Capital and Operating Expenditure Forecasts	Details on the capital and operating expenditures to be incurred by the service area in order to maintain, replace and enhance the existing and growing asset base. Information should be aligned to support that presented in the body of the AMP.
State of Asset Management Report	Outcomes of the latest CAM Program Review, as detailed in Section 6 of the AMP along with agreed metrics for tracking the progression of asset management within the City.
Asset Management Improvement Plan	Further information on the improvement activates presented in the main report, including expected outcomes and required investment, and supporting business cases if they are available.