Corporate Asset Management Fleet Services and EAM 2024 Asset Management Plan

Hamilton

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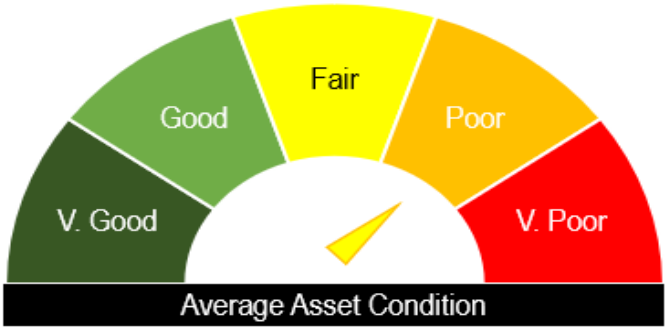
Corporate Asset Management Division (CAM) oversees sections that have either city-wide responsibilities (such as Asset Management and Fleet Services) or department-wide responsibilities as well as the GM's Office. This plan focused on Fleet Services, addressing its dual role: as a service provider supporting various city service areas, and as an asset owner with resources dedicated to facilitating this service delivery.

ASSET SUMMARY

Replacement Value
87.4 M
Poor Condition
Average Age of **27** years
or **36%** of the average
remaining service life



LEVEL OF SERVICE SUMMARY

Customer

- Customer Levels of Service were not identified.

Technical

- 96% of monthly of Periodic Mandatory Commercial Vehicle Inspections (PMCVI) are completed by their due date.
- On average Fleet Services meets the set targets for Fleet maintenance invoices.
- 75% of Fleet Services vehicles are over their estimated service life.

ASSET HIGHLIGHTS

ASSETS	QUANTITY	REPLACEMENT COST	AVERAGE CONDITION	STEWARDSHIP MEASURES
Vehicles – Fleet Services	20	$0.8M	Poor	Vehicles are inspected twice a year.
Equipment (including fuel stations, EV chargers, and tools)	2,386	$20.0M	Fair	Annual and monthly visual inspections completed by subject matter experts.
Facilities (garages)	4	$62.9M	Very Poor	Building Condition Assessments are completed every 5 years.
Technology (computers and EAM)	132	$3.7M	Very Good	Assets are replaced at the end of their useful lives.

DATA CONFIDENCE

VERY HIGH — MEDIUM — VERY LOW

CORPORATE ASSET MANAGEMENT (FLEET SERVICES AND EAM) - 2024 ASSET MANAGEMENT PLAN

KEY DEMAND DRIVERS

Population change – The forecasted population of the City of Hamilton is expected to reach 820,000 by 2051. This will drive the demand for City services and will require Fleet Services to support service growth in other service areas.

Technological Changes - The transition from internal combustion engine (ICE) vehicles to battery electric vehicles (BEV) generates some technological demands for Fleet Services, such as staff training and resources for BEV vehicle maintenance. The transition to BEVs will also change the supply of fuel delivery infrastructure that Fleet Services manages.

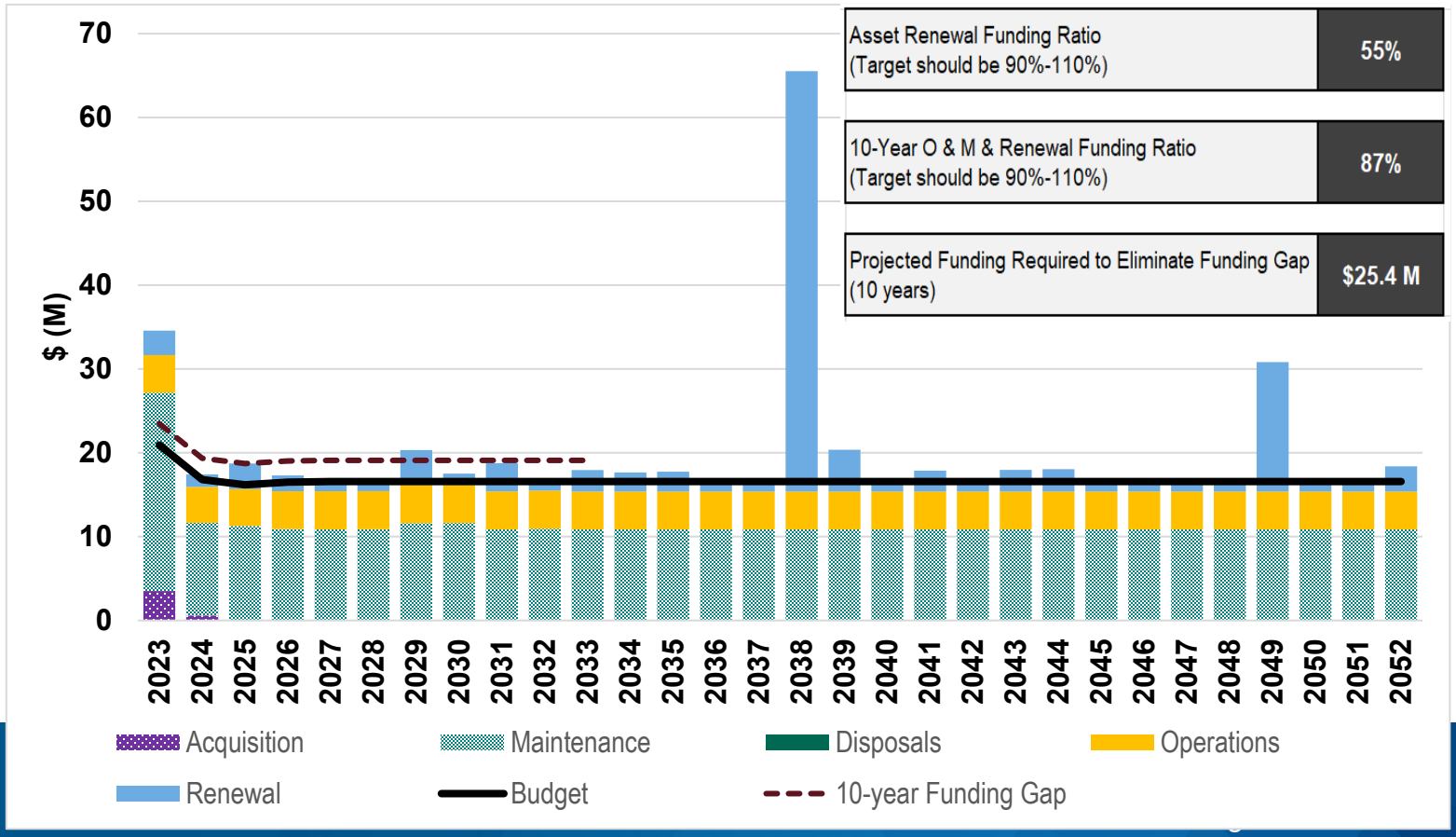
RISK

- The fuel management system has been identified as a critical asset for Fleet Services and Corporate Asset Management at this time.

CLIMATE CHANGE MITIGATION

- Promoting fleet renewals with new battery electric vehicles and proposing providing alternate fuels such as natural gas, biodiesel and EcoDiesel, to achieve the goal of net zero carbon by 2050.

LIFECYCLE SUMMARY



1. INTRODUCTION

The Corporate Asset Management (CAM) Division within Public Works was created in 2023 to align Sections whose focus is either City-wide (Asset Management and Fleet Services) or Department-wide, Public Works Departmental Programs and Initiatives, Technology, and Innovation (which includes the Enterprise Asset Management (EAM) Project), and the General Manager's Office.

The purpose of this Asset Management Plan (AM Plan) is to ensure that the Corporate Asset Management Division, has fulfilled the Asset Management Planning requirements outlined in O. Reg 588/17[1] for current levels of service.

This AM Plan is intended to communicate the requirements for the sustainable delivery of services through the management of assets, compliance with regulatory requirements and required funding to provide the appropriate levels of service over the 2023-2052 planning period.

Fleet Services as a Service Provider:

This AM Plan covers the assets of the Corporate Asset Management Division. This plan will concentrate on the Fleet Services group since it holds most of the assets. The other groups in the CAM Division are mainly administrative and will have less emphasis in this plan.

Fleet Services is both a service provider supporting service areas across the city and an asset owner with their own assets that support this service. This plan will focus on Fleet Services in their capacity as a service provider and their own assets used to support the delivery of the service.

City-Wide Fleet and Equipment Asset Discussion:

A brief section of this AM Plan will also discuss all city-wide fleet assets managed by Fleet Services. These fleet assets are across the corporation. Detailed discussion on age, condition, replacement value and renewal schedules for city-wide fleet assets have been built into separate individual service area AM Plans as these assets support the delivery of multiple services.

It is important however to take a broad view of the City-wide Fleet Asset Summary, presented in ***Table 4,*** and renewal costs of the entire city-wide fleet, detailed in **Section 8.3,** as it relates to the fleet reserve which is managed by Fleet Services. However, it is important to note that these financial gaps or asset renewals and conditions are already accounted for in the other AM Plans. The overall fleet data provided here serves for information only and is compiled into a single location to illustrate the overall condition of the fleet assets.

Since Sunday, February 25, 2024, the City of Hamilton experienced a cyber incident that disabled some of the IT systems. As a result, this AM Plan was created based on the data that was accessible at the time of publication.

[1] Government of Ontario, 2017

2. BACKGROUND

The information in this section is intended to provide background on the CAM division service areas by providing a service profile, outlining legislative requirements, and defining the asset hierarchy used throughout the report. This section will provide the necessary background for the remainder of the AM Plan.

2.1 SERVICE PROFILE

Listed below are related documents reviewed in preparation of the Asset Management Plan:

- ***Asset Management Plan Overview Document; and,***
- ***PW03147(e) (City Wide) - Green Fleet Strategy Report & Action Plan (May 31, 2021)[2].***

Additional financial-related documents are identified in ***Section 10*** Plan Improvement and Monitoring.

2.1.1 SERVICE HISTORY

The mission of the CAM Division is to drive optimal and sustainable service delivery across the organization through the implementation of Asset and Quality Management, the provision of Fleet Services, and the improvement of operational and climate performance.

The CAM Office was formed in July 2021 with the objective of meeting the City's obligations under O. Reg. 588/17[3] and to develop a Corporate Asset Management Program for the City of Hamilton. Program elements include the development of the Strategic Asset Management Policy, relevant strategies, and procedures as well as training and education programs to embed asset management into city processes. The CAM Office in partnership with asset owners and key stakeholders across the City worked to create the first iteration of AM Plans for all assets by July 2024 which define current levels of service and the costs to maintain them. CAM is also working to develop proposed Levels of Service and the costs to maintain them by July 2025.

In February 2023, the General Manager of the Public Works Department (GM PW) identified an opportunity to balance divisional portfolios and leverage service alignment by transferring the Fleet Services section (Fleet) from the Corporate Facilities and Energy Management (CFEM) to the Corporate Asset Management Division (CAM).

The Fleet Services section's client groups span throughout the corporation, including Public Works, Planning and Economic Development (Building Division and Municipal Licensing and Bylaw Division), Library (bookmobiles) and Healthy and Safe Communities (Recreation Division

[2] Kagianis & Parker (2021)
[3] Government of Ontario, 2017

and Public Health Division, i.e. dental buses). Fleet Services does not manage assets for Emergency Services (Fire, Police, Paramedics) or Transit (HSR).

The Departmental Programs and Initiatives section/GM's Office was formed in 2016 and specifically focuses on improving the operational performance of Public Works through the implementation of quality and asset management principles and processes as well as other strategic initiatives. This section is also responsible for the overall Public Works response to the climate emergency declared by the City in 2019, supporting the Office of Climate Change Initiatives at the corporate level. This group manages the Quality Management System for Public Works.

The Technology and Innovation section drives improving operational performance from a technology lens and the desire to innovatively improve performance. The recognition in 2018 that Public Works has 11 different information systems resulted in the launch of the Enterprise Asset Management (EAM) project in 2020, with the intention of bringing all of Public Works into one system.

This will help streamline the process of managing the lifecycle of physical assets to maximize their use; save money; improve quality and efficiency; and safeguard health, safety, and the environment.

2.1.2 SERVICE FUNCTION

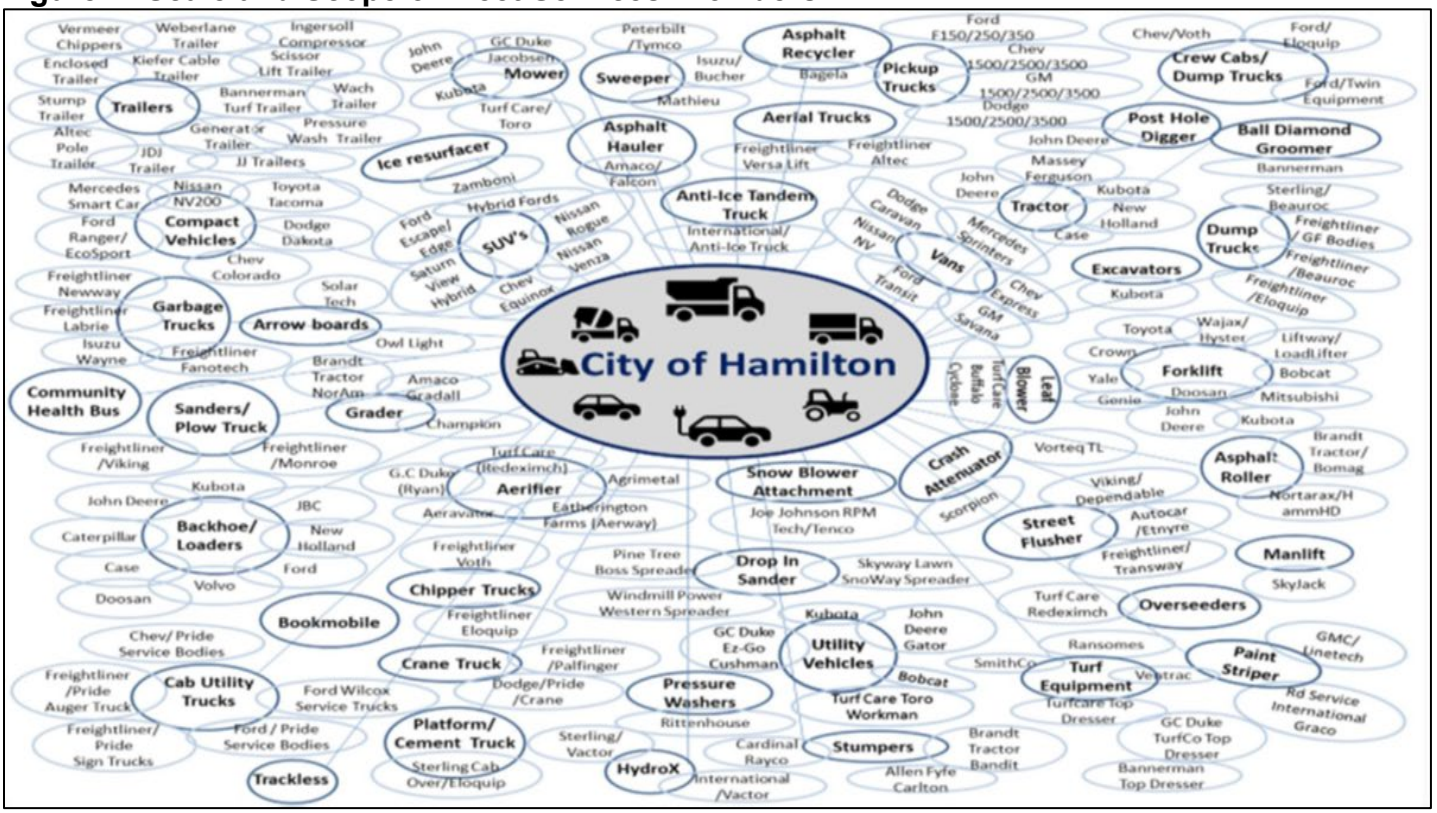
The CAM Division has many unique characteristics, the primary focus of this AM Plan will be on Fleet Services as a service provider.

Fleet Services serves departments such as Roads and Transportation, Engineering, Water, Wastewater, Environmental, Recreation and Parks, Cemetery, Buildings Controls and Facilities, By-law, and Housing Operations. The remaining four categories, HSR Transit, Fire, Police, and Paramedic Services, each independently manage their respective fleets and are not within the scope of this AM Plan.

Fleet Services manages approximately 1,536 vehicle assets, which include 1,381 active, 9 surplus and 146 extended-use assets. These assets include vehicles, trailers, landscape equipment, road maintenance vehicles and waste collection vehicles, and pieces of equipment. Fleet Services does not manage small equipment valued under $5,000 or those lacking seats and/or wheels and not registered for use on the road. These assets are managed directly by the service areas. Fleet Services purchases, manages, and maintains vehicles, equipment, and fuel. Fleet Services provides responsive and efficient fleet management services to the City of Hamilton's divisions that maximize safety and environmental sustainability and minimize lifecycle costs.

Figure 1 below shows the variety of vehicles, and equipment Fleet Services maintains and highlights the wide range of skills, training and inventory needed to manage such a diverse fleet.

Figure 1: Scale and Scope of Fleet Services Providers



Fleet Services provides a range of essential services across the City and has four core business units:

- **Maintenance:** Licensed by the Ministry of Transportation, Fleet Services conducts and manages repairs, maintenance and safety inspections on all vehicles and equipment in the Fleet Services portfolio across the city, internally and externally. Service areas are charged a fee for each vehicle maintained to cover all operational expenses;

- **Materials and Fuel**: Manages the City's private fuel stations and a varied inventory of parts and supplies related to fleet services across multiple locations. Fuel charges billed to service areas are expected to cover the cost of fuel, and all other operating expenses related to the fuel station;

- **Regulatory Compliance**: Facilitates driver education and training for all operators of fleet vehicles and manages the licensing and Commercial Vehicle Operator Registration (CVOR) requirements for the City. Driver training and vehicle license renewals are charged back to the service areas; and,

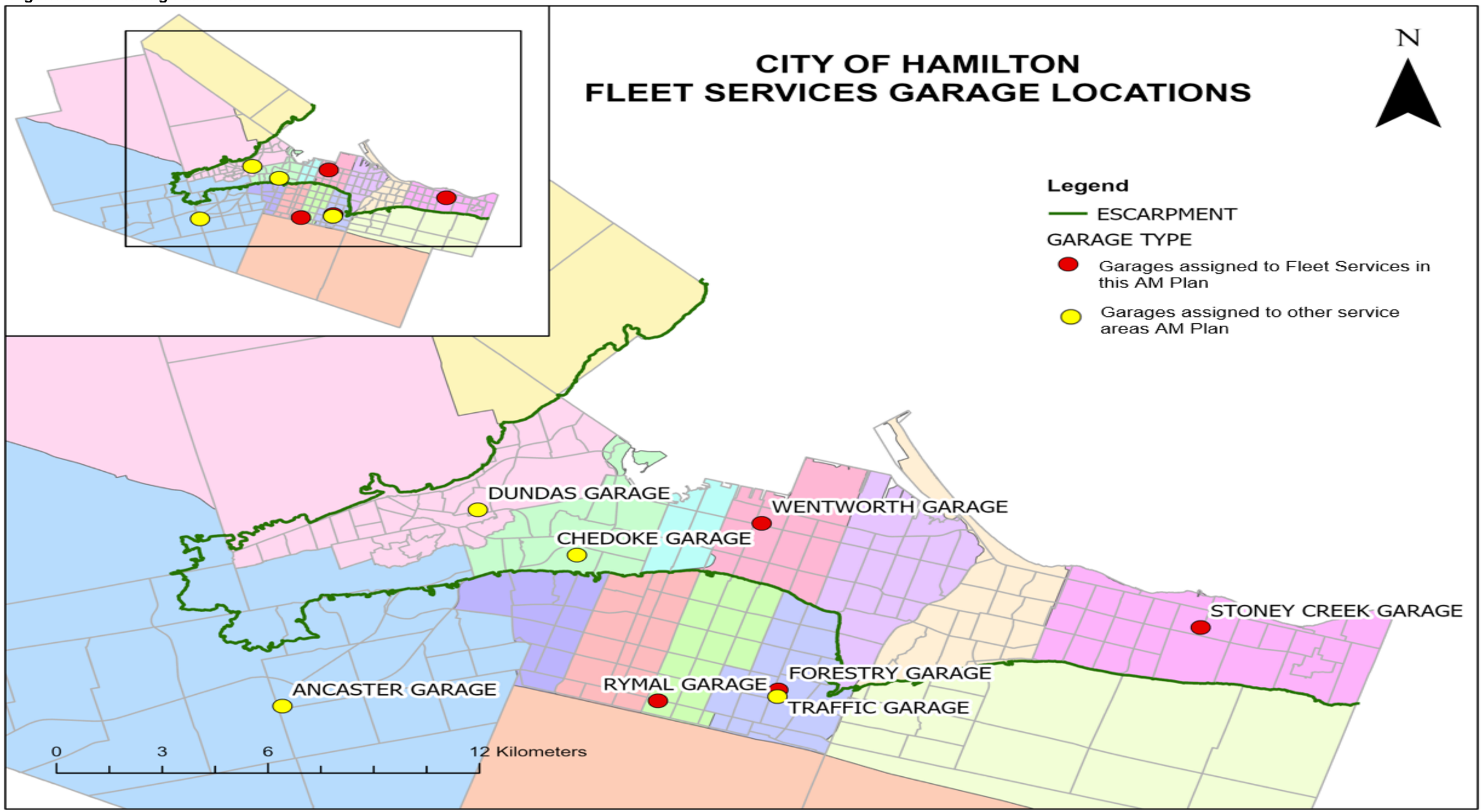
- **Capital Planning**: Plans for capital renewal of existing fleet and develops technical specifications and documents to procure fleet vehicles/equipment and arranges for upfitting to prepare vehicles to come into service. Fleet renewals, are funded through the Fleet Capital Reserve Account, discussed further in ***Section 8.3.*** Funds are transferred from each service area into this account to be set aside for future renewal of assets at the end of their service life and based on other parameters discussed in ***Section 3.2.5.2***. This fund is in a deficit, indicating that the charge rates for fleet renewal should be reviewed in detail to ensure sustainable funding for vehicle renewals.

Fleet Services has undertaken an ongoing Consultant assignment to analyze and provide fleet management improvement solutions discussed in ***Section 2.14*** with recommendations expected in 2024. A key component of this assignment is to develop recommendations relating to funding fleet renewals and the current cost allocation to the reserve.

2.1.3 USERS OF THE SERVICE

The users of service for the Corporate Asset Management Division primarily comprise the internal City of Hamilton staff, and some contractors working for Fleet Services. As mentioned in ***Section 2.1.1***, the user groups span throughout the corporation, serving over 50 service areas in the City of Hamilton.

Figure 2: Fleet Garage Locations



2.1.4 UNIQUE SERVICE CHALLENGES

Corporate Asset Management has many challenges relating to:

- The development of Asset Management Plans, training, procedures and policy within a regulated timeline and limited resources; and,

- The capacity for asset owners and their teams to support the development of plans and to implement and develop continuous improvement items.

Fleet Services has many challenges relating to:

- **Vehicle Availability:** Supply chain disruptions have hindered the timely replacement of fleet assets, a situation expected to persist until at least 2025. This often means vehicles and equipment used are extended beyond their estimated service life and may need increased or more extensive repairs to remain safe and serviceable;

- **Market for Fleet Assets:** Replacement costs have soared beyond funding availability due to sharp increases in average Manufacturers Suggested Retail Prices, leading to vendors hesitating to bid competitively and meet delivery deadlines. This often results in limited bids for equipment supply contracts or bids exceeding projected costs;

- **Increased Parts and Supply Contract Pricing:** Rising prices of parts and supply contracts are impacting vehicle repair costs city-wide. This along with utilizing vehicles beyond their estimated service life has raised ongoing operation and maintenance costs of city-wide vehicles;

- **Long Wait Times for Parts:** Delays in obtaining parts hinder efficient vehicle repairs, prolonging the time vehicles are out of service which can affect the ability to deliver services to the public;

- **Unsustainable Fleet Reserve Contributions:** The rate/fund contributed by client groups to the fleet reserve is unsustainable, resulting in a negative balance. The expense of replacing vehicles surpasses available funds, delaying timely vehicle renewal and inflating total ownership costs;

- **Diverse Equipment and Vehicles:** The wide and diverse variety of equipment and vehicles operated by the City, as shown in ***Figure 1,*** necessitates maintaining a diverse assortment of parts and diverse staff training, directly impacting operational efficiency;

- **Renewal of Fuel Sites and Equipment:** Capital funding for renewal or extensive maintenance of fuel sites and shop equipment has not kept pace with needs. This funding is coming from the vehicle reserve, in some cases, which further reduces available funding for fleet renewal; and,

- **Inadequate Data Collection from Current Systems:** Existing systems cannot collect all necessary data components required for fleet services operations. This presents a challenge for fleet management in effectively monitoring and managing the fleet portfolio.

In June 2023, Fleet Services initiated a consulting assignment[4] to develop a Fleet Management Strategy that will investigate and recommend actions relating to:

- Fleet Replacement Reserve Sustainability (Renewal);
- Competitive Service Provider (Operations and Maintenance);
- Fleet Maintenance Resources (Future Demand);
- Parts Management (Operations and Maintenance/Inventory);
- Fleet Rightsizing / Replacement Plan (Green Fleet);
- Safety and Compliance; and,
- Procurement (Renewal).

The recommended actions are expected to significantly change how Fleet Services operates and serves customers with the goal of improving all aspects of the operation. The final recommendations are anticipated in the second quarter (Q2) of 2024. Once implemented these changes will help to reduce identified funding gaps and better define Levels of Service for Fleet Services. These changes will be incorporated into the next AM Plan, where known, and will help to address some of the challenges identified above.

The Technology & Innovation team has many challenges relating to:

- **Tight Timelines for EAM Implementation:** Pressing deadlines for Enterprise Asset Management (EAM) implementation and resource constraints pose challenges; and,

- **Change Management** will be a key challenge as all of Public Works is transitioned to new systems.

The Departmental Programs and Initiatives Section has many challenges relating to:

- **Ongoing Management System Implementation:** Due to resource pressures and departmental culture, the continuous implementation of the management system presents challenges.

2.2 LEGISLATIVE REQUIREMENTS

The most significant legislative requirements that impact the delivery of Asset Management and Fleet Services are outlined in ***Table 1***. These requirements are considered throughout the report, and where relevant, are included in the levels of service measurements.

[4] Ward (2023)

Table 1: Legislative Requirements

LEGISLATION OR REGULATION	REQUIREMENT
Environmental Protection Act R.S.O. 1990	The purpose of this Act is to provide for the protection and conservation of the natural environment. The Act makes provisions for the improved control of pollution to the air, water, and land by regulating the management of waste and the control of emissions.
Highway Traffic Act	This is an Ontario regulation describing the rules of operating vehicles on public roads including types of operators, drivers, and loads.
O. Reg. 424/97: Commercial Motor Vehicle Operators' Information	The Ministry of Transportation has developed an annual renewal program whereby Commercial Vehicle Operators Registration (CVOR) holders are required to update their operating information on an annual basis.
Ministry of Transportation (MTO)	Adhere to all sections that pertain to daily functions performed in Fleet Services.
Occupational Health & Safety Act (OSHA)	Adhere to all sections that pertain to daily functions performed in Fleet Services.
O. Reg 588/17: Asset Management Planning for Municipal Infrastructure	The regulation sets out requirements for municipal asset management planning to help municipalities better understand their infrastructure needs and inform infrastructure planning and investment decisions.
Technical Standards and Safety Authority (TSSA)	Compliance with the Liquid Fuels Handling code that regulates the requirements of our fuel sites.
Canadian Motor Vehicles Safety Act	Regulates the modification and build requirements of motor vehicles.
American National Standards	Provides standards in reference to certain aspects of vehicle modifications.

2.3 COUNCIL PRIORITIES

As referenced in the ***AM Plan Overview*** in ***Section 5.4***, Strategic Alignment, The City's strategic goals and objectives are shaped by internal drivers such as Council-approved strategies and plans, as well as external forces such as citizen expectations, and legislative and regulatory requirements. The specific legislative and regulatory requirements for service areas are provided in each AM Plan.

City objectives provide asset owners with direction regarding levels of service and asset investment priorities. This AM Plan will demonstrate how the City's objectives for non-core assets can influence levels of service and direct asset expenditures.

2.4 ASSET HIERARCHY

In order to deliver reliable and safe services, Fleet Services and the remainder of the CAM Division require assets. The Fleet Service area has been broken down into four asset classes for the purpose of this AM Plan:

- **Vehicles**: refers to vehicles, equipment and attachments listed in Fleet Services inventory that are used specifically by Fleet Services to perform their service. This does not include other equipment and vehicles used by other areas of the city for the delivery of their services;
- **Equipment**: refers to all tools and equipment including fuel stations and EV Chargers, used to deliver Fleet Services; and,
- **Facilities**: refers to garages utilized by Fleet Services staff to deliver their services.

The remainder of the CAM Division has been broken down into a single asset class for the purposes of this AM Plan:

- **Information Technology:** refers to the hardware and software, including Enterprise Asset Management (EAM) software used by Fleet Services and the remainder of CAM Division and service areas.

Asset hierarchy is also being developed for the implementation of the EAM system. The hierarchy presented in this AM Plan may be different from the EAM hierarchy.

The asset class hierarchy outlining assets included in this section is shown below in ***Table 2.***

Table 2: Asset Class Hierarchy

DIVISION	CORPORATE ASSET MANAGEMENT			
SERVICE AREA	FLEET SERVICES			CORPORATE ASSET MANAGEMENT
ASSET CLASS	VEHICLES	EQUIPMENT	FACILITIES	INFORMATION TECHNOLOGY
Asset	SUV Van Pickup Fleet Equipment	Hoists Vehicle Service Tools Fuel Stations EV Charging Stations	Garages	CAM IT Equipment Fleet Services IT Enterprise Asset Management (EAM) Software[5]

[5] EAM Software is a shared asset, and the costs are shared across different service areas in Public Works Department. EAM software will be part all AM Plans utilizing this software in the next iteration of AM Plans.

3. SUMMARY OF ASSETS

This section provides a detailed summary and analysis of the existing inventory information as of August 2023 including age profile, condition methodology, condition profile, asset usage, and performance for each of the asset classes. The information provided in this AM Plan is sourced from a combination of data retrieved from the City's database and other relevant sources. Inventory information does change often, and this is a snapshot of information available as of August 2023.

Table 3 displays the detailed summary of assets for the Fleet Services and the remainder of the CAM Division service area assets.

The City owns approximately **$87.4 Million** in CAM Division service area assets which are on average in **Poor** condition. Assets are a weighted average of **27 years** of age, which is **36%** of the average remaining service life (RSL).

Fleet Services:

The City owns approximately **$83.8 Million** in Fleet Services assets which are on average in **Very Poor** condition. Assets are a weighted average of **29 years** of age, which is **33%** of the average remaining service life (RSL).

Corporate Asset Management (CAM):

The City owns approximately **$3.6 Million** in CAM section assets including CAM IT and EAM software. These assets are on average in **Very Good** condition and have a weighted average of **1 year** in age, which is **99%** of the average remaining service life (RSL). The majority of the weighting for these averages comes from the Enterprise Asset Management software asset class.

The Corporate Asset Management (CAM) Division recognizes that certain tasks and projects are continually progressing, and as a result, some of the deficiencies mentioned may have already been addressed by the time this document is published. Furthermore, the assets listed below are assumed to be in operation and in use at the time of writing. It is also important to note that there could be assets not owned by Public Works but still considered Corporate Asset Management assets, which might not be included in this inventory. This issue has been marked as an area for ongoing enhancement in ***Table 28.***

Table 3: Detailed Summary of Assets
****Weighted Average based on Replacement Costs***

VEHICLES				
ASSET CATEGORY	**NUMBER OF ASSETS**	**REPLACEMENT VALUE**	**AVERAGE AGE (% RSL)**	**AVERAGE EQUIVALENT CONDITION**
SUV	5	$165.0 K	4 years (45%)	4 – POOR
Data Confidence	High	Medium	High	Medium
Van	9	$443.0 K	16 YEARS (0%)	5 – VERY POOR
Data Confidence	High	Medium	High	Medium
Pickup	3	$43.0 K	13 YEARS (4%)	5 – VERY POOR
Data Confidence	High	Medium	High	Medium
Fleet equipment	3	$165.0 K	8.5 YEARS (23%)	4 – POOR
Data Confidence	High	Medium	High	Medium
SUBTOTAL	**$816.0 K**		**11 YEARS* (12%)***	**4 –POOR***
Data Confidence	**High**		**High**	**Medium**

EQUIPMENT				
ASSET CATEGORY	**NUMBER OF ASSETS**	**REPLACEMENT VALUE**	**AVERAGE AGE (% RSL)**	**AVERAGE EQUIVALENT CONDITION**
Hoists	6	$2.2 M	19 years (24%)	4 – POOR
Data Confidence	Medium	Medium	Medium	Low
Vehicle Service Tools	2,309	$4.5 M	No Data	No Data
Data Confidence	Medium	Medium		
Fuel stations	22	$12.6 M	21 YEARS (40 %)	4 – POOR
Data Confidence	High	Medium	Medium	Low
EV charging stations	47 Level II and 2 Level III	$757 K[6]	1 year (100 %)	1 – VERY GOOD[7]
Data Confidence	High	High	High	High
SUBTOTAL	**$20.0M**		**15 YEARS* (32%) ***	**3-FAIR***
Data Confidence	**Medium**		**Low**	**Low**

[6] Infrastructure connection/construction costs not included as they are To Be Determined. The replacement value is for the charger only.
[7] Fleet Services began installing EV chargers in September 2023, with the majority expected to be installed in 2024.

FACILITIES				
ASSET CATEGORY	**NUMBER OF ASSETS**	**REPLACEMENT VALUE**	**AVERAGE AGE (% RSL)**	**AVERAGE EQUIVALENT CONDITION**
Garages	4	$62.9 M	33 years (34%)	5 – VERY POOR
Data Confidence	High	High	High	High
SUBTOTAL	**$62.9 M**		**33 YEARS* (34%) ***	**5 – VERY POOR***
Data Confidence	**High**		**High**	**High**

TECHNOLOGY				
ASSET CATEGORY	**NUMBER OF ASSETS**	**REPLACEMENT VALUE**	**AVERAGE AGE (% RSL)**	**AVERAGE EQUIVALENT CONDITION**
Corporate Asset Management				
CAM IT Equipment (e.g., laptops, desktops, and mobiles)	47	$61.9K	3 YEARS (35%)	3 - FAIR
Data Confidence	High	Medium	High	Medium
Fleet IT Equipment (e.g., laptops, desktops, and mobiles)	84	$102.4 K	4 YEARS (23%)	4 – POOR
Data Confidence	High	Medium	High	Medium
Enterprise Asset Management (EAM) Software	1	$3.5M	0 years (100%)	1 – VERY GOOD
Data Confidence	Very High	High	Very High	Very High
SUBTOTAL	**$3.7M**		**0 YEARS* (97%) ***	**1 – VERY GOOD***
Data Confidence	High		Very High	Very High
TOTAL		**$87.4M**	**27 years* (36%) ***	**4 –POOR***
DATA CONFIDENCE		**Medium**	**Medium**	**Medium**

Table 4 – City Wide Fleet Asset Summary – For Information Only

VEHICLES – CITY WIDE[8]				
ASSET CATEGORY	**NUMBER OF ASSETS**	**REPLACEMENT VALUE**	**AVERAGE AGE (% RSL)**	**AVERAGE EQUIVALENT CONDITION**
City-wide Fleet[9]	1,536	$131M[10]	7 Years (34%)	4-POOR
Data Confidence	High	Medium	Medium	Medium
	TOTAL	**$131.0 M**	**7 Years (34%)**	**4-POOR**
	Data Confidence	**Medium**	**Medium**	**Medium**

The overall replacement value data confidence for the registry is **Medium**. For facilities, these replacement costs are calculated using an internal tool which encompasses current market rates, building type and size. Fleet, and technology assets replacement costs were gathered from the most recent purchase price for similar assets. For Fleet renewal costs if we have not purchased that specific type of vehicle/equipment recently it is likely the replacement costs used in the preceding calculations are less than current market rates. Replacement values for fuel stations are determined by subject matter expertise and are dependent on the infrastructure installed, such as the number of underground fuel tanks, fuel pumps, etc. Additionally, replacement costs may increase depending on the condition of these components at the time of disposal.

Please refer to the AM Plan Overview, ***Section 6.2.2*** for a detailed description of data confidence.

[8] City-wide Fleet includes vehicles utilized by Roads and Transportation, Engineering, Water, Wastewater, Environmental, Recreation and Parks, Cemetery, Buildings Controls and Facilities, By-law, and Housing Operations.
[9] Fleet Inventory List as of June 2023
[10] Excludes “Active – Extended Use” from replacement value as these vehicles have typically already been replaced in the fleet complement however the replaced vehicle is kept in service for some period. Active-Extended Use vehicles are included in the Age, %RSL and Condition calculations as these vehicles are still maintained by the City of Hamilton and as such these factors are important to consider in how they can deliver services.

3.1 ASSET CONDITION GRADING

Condition refers to the physical state of the Fleet Services assets and is a measure of the physical integrity of these assets or components and is the preferred measurement for planning lifecycle activities to ensure assets reach their expected useful life. Since condition scores are reported using different scales and ranges depending on the asset, ***Table 5*** below shows how each rating was converted to a standardized 5-point condition category so that the condition could be reported consistently across the AM Plan. A continuous improvement item identified in ***Table 28***, is to review existing internal condition assessments and ensure they are revised to report on the same 5-point scale with equivalent descriptions.

Table 5: Equivalent Condition Conversion Table

EQUIVALENT CONDITION GRADING CATEGORY	CONDITION DESCRIPTION	% REMAINING SERVICE LIFE	FACILITIES CONDITION INDEX (FCI)	EQUIPMENT	VEHICLES	TECHNOLOGY
1 Very Good	The asset is new, recently rehabilitated, or very well maintained. Preventative maintenance is required only.	>79.5%	N/A	Very Good	Very Good	Very Good
2 Good	The asset is adequate and has slight defects and shows signs of some deterioration that has no significant impact on the asset's usage. Minor/preventative maintenance may be required.	69.5% – 79.4%	< 5%	Good	Good	Good
3 Fair	The asset is sound but has minor defects. Deterioration has some impact on asset usage. Minor to significant maintenance is required.	39.5% - 69.4%	>= 5% to < 10%	Fair	Fair	Fair
4 Poor	The asset has significant defects and deterioration. Deterioration has an impact on asset usage. Rehabilitation or major maintenance is required in the next year.	19.5% -39.4%	>= 10% to <30%	Poor	Poor	Poor
5 Very Poor	The asset has serious defects and deterioration. The asset is not fit for use. Urgent rehabilitation or closure is required.	<19.4%	>= 30%	Very Poor	Very Poor	Very Poor
0 - Unknown	Asset condition is based on other factors (such as age) and is unknown.	Unknown	N/A	Unknown	N/A	N/A

The following conversion assumptions were made:

- A condition assessment was not completed for Technology and Vehicle assets, the condition was based on the percent of remaining service life;
- Facilities Condition Index was based on ranges provided by the consultant who completed the Building Condition Assessment (BCA) which corresponds to a 4-Point scale; therefore, facilities will not be able to attain a score of 1 – Very Good; and,
- Fuel station condition is based on results from annual inspections. The rest of the equipment assets do not have a formalized inspection and the condition was based on the percent of remaining service life.

3.2 ASSET CLASS PROFILE ANALYSIS

This section outlines the Age Profile, Condition Methodology, Condition Profile, and Performance Issues for each of the asset classes.

- The age of an asset is an important consideration in the asset management process as it can be used for planning purposes as typically assets have an estimated service life (ESL) where they can be planned for replacement. Some lower-cost or lower criticality assets can be planned for renewal based on age as a proxy for condition or until other condition methodologies are established. It should be noted that if an asset's condition is based on age, it is typically considered to be of a low confidence level. Although typically, age is used when projecting replacements beyond the 10-year forecast to predict degradation;

- Condition refers to the physical state of assets and is a measure of the physical integrity of assets or components and is the preferred measurement for planning lifecycle activities to ensure assets reach their expected useful life. Assets are inspected/assessed at different frequencies and using different methodologies to determine their condition which are noted in this section; and

- Finally, there are often insufficient resources to address all known asset deficiencies, and so performance issues may arise which must be noted and prioritized.

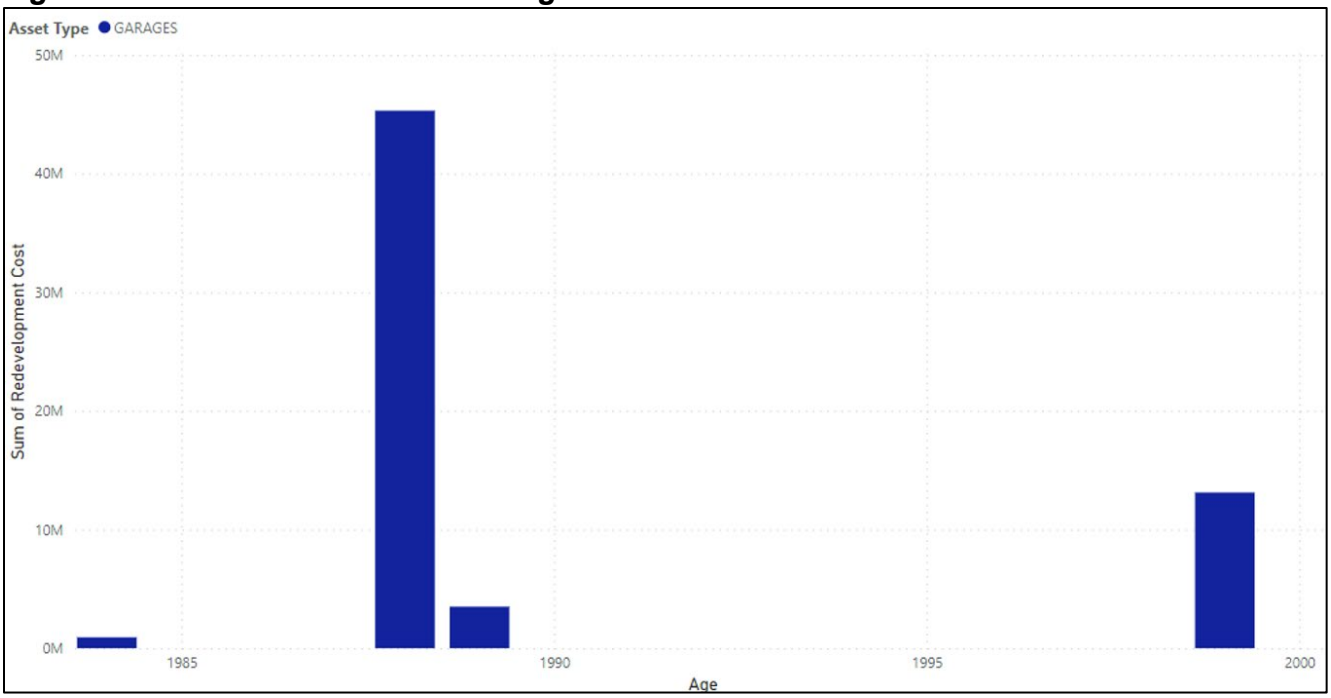
3.2.1 FLEET SERVICES FACILITIES

Fleet Services operates from eight facilities, of which four are considered shared-use facilities that consist of fleet garages. Fleet Services has a presence at four other city locations to swiftly respond to maintenance and repair needs. These locations are not classified as fleet assets; instead, they are co-located with the service groups that rely on their support. These are identified as garages owned by other service area locations in the map shown in ***Figure 2.***

3.2.1.1. AGE PROFILE

The age profile of facility assets is shown in ***Figure 3***. The data confidence for age is typically high for these facility assets because this data was formally recorded at the time of construction.

Figure 3: Fleet Services Facilities Age Profile



The estimated Service Life (ESL) of these facilities was provided by Corporate Facilities and Energy Management (CFEM) as 50 years. Three of these facilities were built in the 1980s and one was more recently built in 1999. The average age of these facilities is 33 years with 34 percent of RSL.

3.2.1.2. CONDITION METHODOLOGY & PROFILE

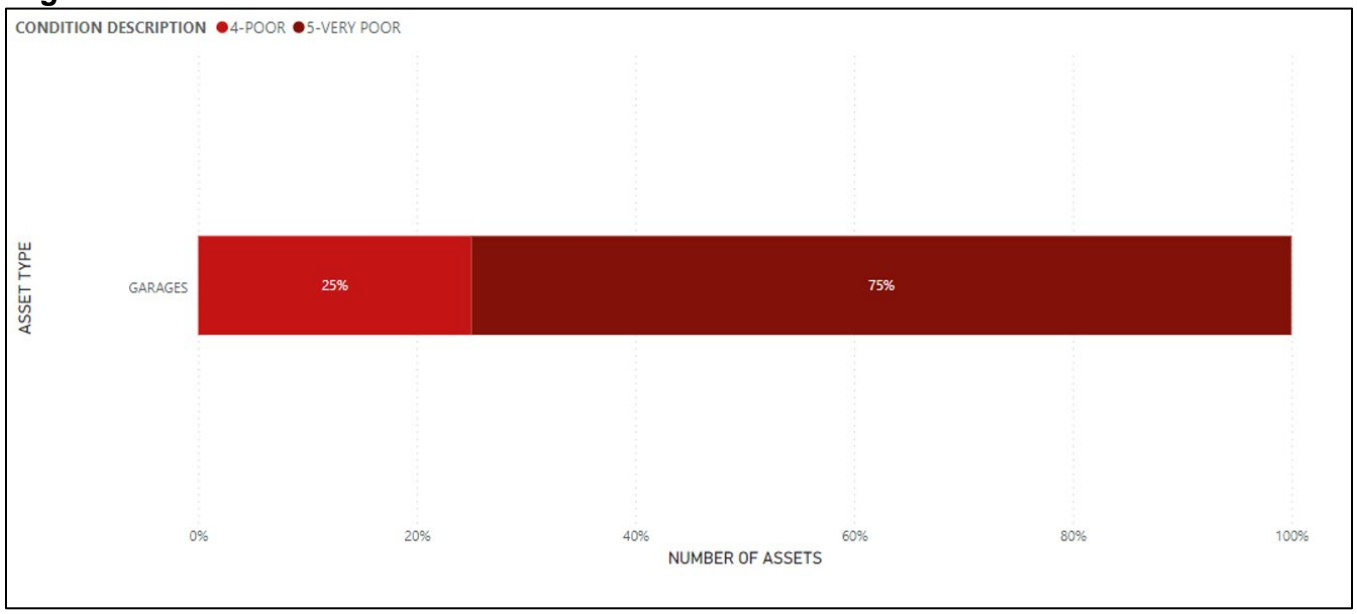
The condition for Fleet Services facilities is determined based on the results of a Building Condition Assessment (BCA). The condition conversion from FCI (Facility Condition Index) to the standardized 5-point scale used in Asset Management is shown in ***Table 5.*** BCAs are completed on these facilities every five years and output a score called a Facility Condition Index (FCI) which is typically considered to be a high confidence level source in the AM Plans. The FCI is calculated based on a ratio of the cost of work required on the facility to the total replacement cost of the facility. FCI is a financial condition assessment.

Table 6: Inspection and Condition Information

ASSET	INSPECTION FREQUENCY	LAST INSPECTION	CONDITION SCORE OUTPUT
Garages	5 Year Regular Facilities Inspection	2019, Mantecon, Admin Transit Yards	Facility Condition Index (0% - 100%)
	5 Year Regular Facilities Inspection	2018, Mantecon, Recreation Facilities	Facility Condition Index (0% - 100%)

Per the BCA, all facilities are in Very Poor or Poor condition. However, the BCA is a visual, surface-level inspection which is typically a high confidence indicator of condition in the AM Plans but does not involve detailed analysis such as cutting into walls or removing mechanical panels, and therefore occasionally additional findings arise during detailed analysis which can result in modifications to the condition score. The condition profile of the City's Fleet Services facilities assets is shown below in ***Figure 4***.

Figure 4: Facilities Condition Distribution



3.2.1.3. ASSET USAGE AND PERFORMANCE

Assets are generally provided to meet design standards where available. However, there are often insufficient resources to address all known deficiencies.

The known service performance deficiencies in ***Table 7*** were identified using staff input.

Table 7: Known Service Performance Deficiencies

ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Garages	**Rymal**	Poor building design	The building design does not allow the mobile hoist to easily move because of the pillars and support beams.
		Insufficient building components	Bay doors patched and corroded, insufficient lighting, crumbling floors, insufficient parts storage, insufficient number, and size of bays for the volume of work and size of vehicles, continually failing HVAC, and insufficient floor drains.

ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
	Wentworth	Insufficient parking	Efficiency reduced to accommodate all vehicles in for service.
		Insufficient building security and non-compliant with AODA (Accessibility for Ontarians with Disabilities Act)	Not compliant with AODA and requires more building security.
	Stoney Creek	Insufficient garage space	Insufficient space for efficient repair operations.
	Rymal		
	Forestry		
	All garages	Insufficient garage space for BEV servicing	Currently, only the Wentworth garage can meet specific space criteria required for the installation of EV chargers. All the rest of the garages cannot meet these requirements even with modifications.

3.2.2 FLEET SERVICES VEHICLES PROFILE

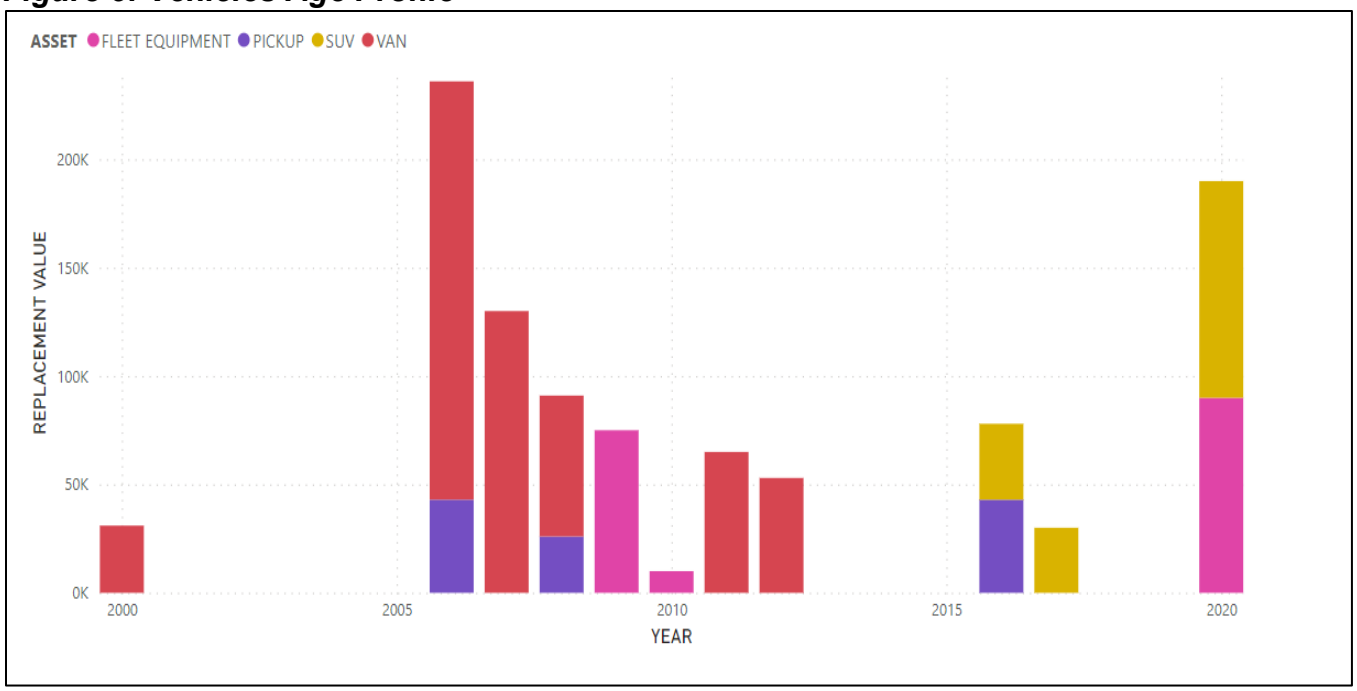
3.2.2.1. AGE PROFILE

The age profile of Vehicle assets is shown in ***Figure 5***. For Fleet Services assets, the data confidence for age is typically high because asset ages are formally tracked. Renewal forecast is based on the age of vehicles, but actual vehicle replacement criteria include other parameters such as maintenance costs, mileage and years exceeding estimated service life. A consultant study[11] is ongoing to review these criteria and provide recommendations.

Vehicles presented in this section of the AM Plan are the only vehicles operated by Fleet Services directly to provide their services. A high-level citywide fleet analysis for other equipment and vehicles can be seen in ***Section 3.2.5***. A detailed analysis of those vehicles and equipment is contained in the individual Asset Management Plans for the service areas.

[11] Ward (2023)

Figure 5: Vehicles Age Profile



3.2.2.2. CONDITION METHODOLOGY & PROFILE

Vehicles are inspected and maintenance activities are conducted at specific intervals throughout the asset's lifecycle, however, no formal condition rating is assigned to each vehicle.

A continuous improvement item identified in ***Table 28*** is to develop and incorporate a condition rating during regular vehicle inspection/maintenance activities. This will assist Fleet Services with capital forecasting for all vehicles and provide information to make decisions about vehicle renewal in addition to their vehicle renewal formula.

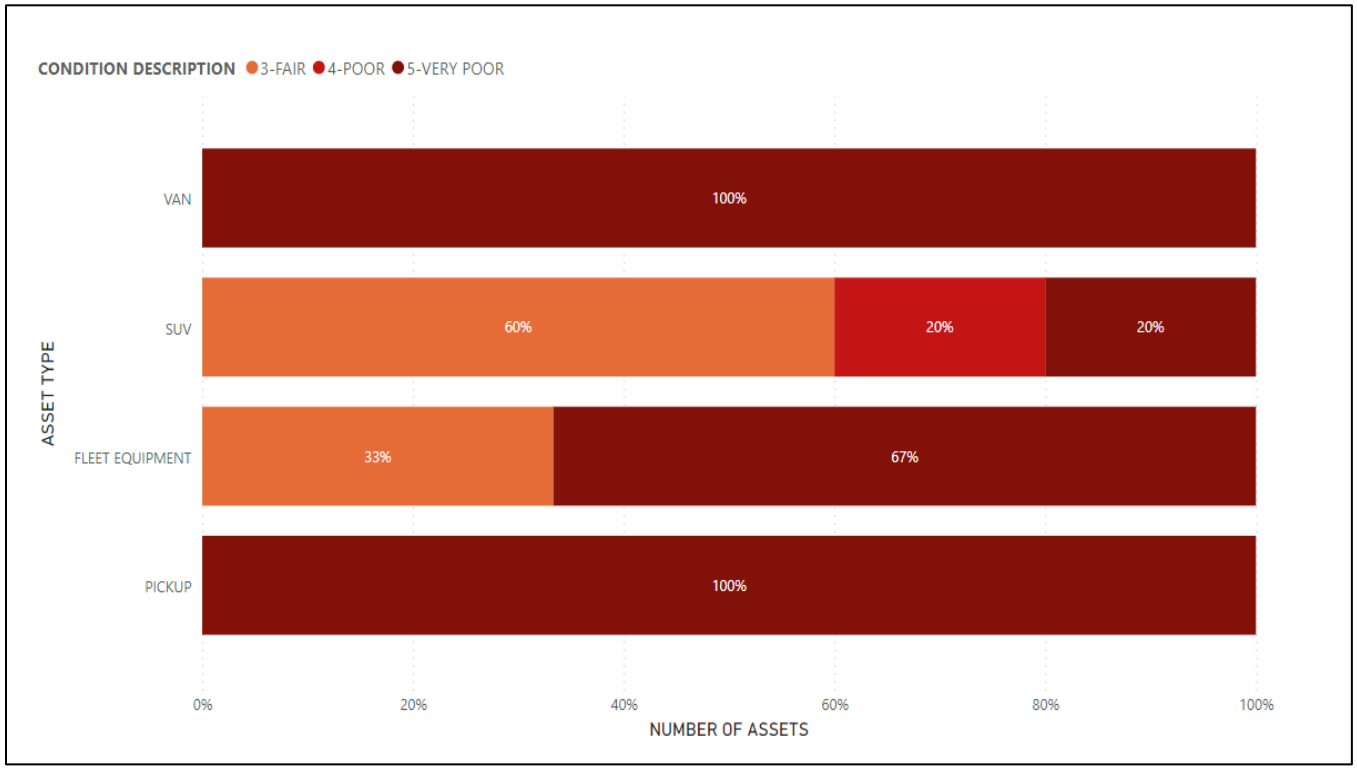
Table 8: Inspection and Condition Information

ASSET	INSPECTION TYPE	DESCRIPTION	FREQUENCY	CONDITION SCORE OUTPUT
Vehicles	**Servicing vehicle**	Various maintenance checks are completed for vehicles	Minimum twice a year	N/A
Vehicles	**PMCVI**	Safety inspection for Commercial Vehicle Operator Registration (CVOR) vehicles (>4500kg)	Once a year	Pass/Fail

Asset Condition Profile

The condition profile of Fleet Services assets is shown in ***Figure 6***. Most of the vehicles and equipment are in Poor or Very Poor condition, with some in Fair condition. Condition is based solely on the percent of remaining service life converted to a condition score as per ***Table 5***.

Figure 6: Vehicles Condition Profile



3.2.2.3. ASSET USAGE AND PERFORMANCE

Table 9: Known Service Performance Deficiencies

ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Vehicles	**Various**	Vehicles used beyond expected replacement interval.	Increases in maintenance costs and vehicle downtime affect daily operations.

3.2.3 EQUIPMENT

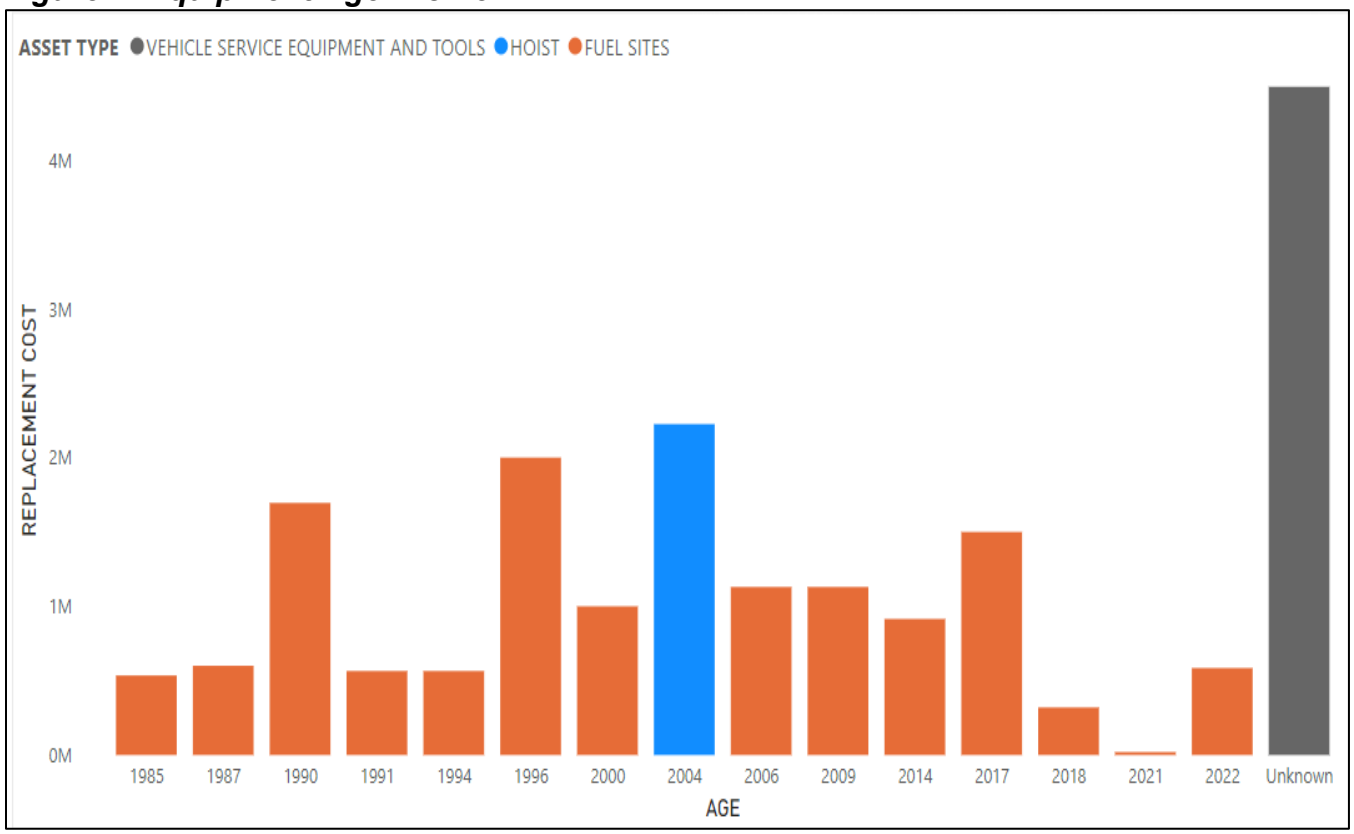
3.2.3.1. AGE PROFILE

For fuel station assets, the data confidence for age is typically low because no formal construction date was recorded for some of these fuel stations. Age was estimated from the age of underground fuel tanks.

The Estimated Service Life (ESL) for the fuel stations is provided by Subject Matter Expertise (SME) and is based on the estimated service life of underground fuel tanks. This ESL is considered a low confidence level as the physical condition of underground fuel tanks is more challenging to examine.

There was no age or condition data available on vehicle service equipment and tools, shown as unknown age in ***Figure 7.*** The age of the Hoists was estimated based on the age of the facility.

Figure 7: Equipment Age Profile



3.2.3.2. CONDITION METHODOLOGY AND PROFILE

Vehicle Service Equipment, Tools, and Hoists are inspected, and maintenance activities are conducted at specific intervals throughout the asset's lifecycle as shown in ***Table 10***, however, no formal condition rating is assigned to these assets. The Fuel Stations are inspected annually by an external expert to ensure fuel stations are in a good state of repair and to identify any costs for required repairs, renewal, or upgrades for each site. Repair costs identified from the 2023 inspection were used to calculate a Financial Condition Indicator using a ratio of estimated repair costs to replacement costs. This is similar to the way the Facility Condition Index condition is calculated for Facilities. A continuous improvement item identified in ***Table 28*** is to use this regular inspection program to develop a 5-point scale for use during the inspection so a higher confidence condition can be determined.

Table 10: Inspection and Condition Information

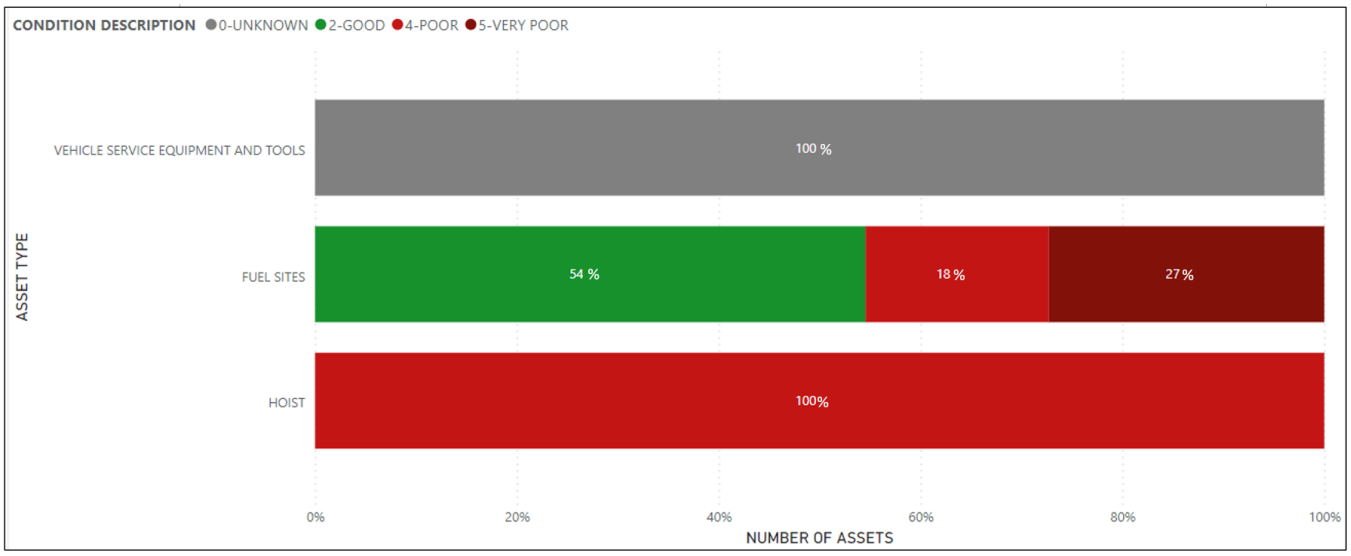
ASSET	INSPECTION FREQUENCY	LAST INSPECTION	CONDITION SCORE OUTPUT
Hoists	Annual inspection	2023	Based on subject matter expertise.
Vehicle Service Equipment and Tools	Annual inspection for overhead crane devices	2023	
	An annual inspection of the Generator	2023	
	Annual inspection of Fuel Generator	2024	
	An annual inspection of Torch sets	2023	
	Annual Calibration of Torque wrenches	2023	
	An annual inspection of Chain lifting devices	2022	
	Monthly inspection of Rolling Staircases	2024	
	Monthly inspection of Ladders	2024	
	An annual inspection of Racking	2024	
	An annual inspection of the Drum attachment	2023	
	An annual inspection of the Lifting attachment	2023	
	An annual inspection of Jacks	2023	
Fuel Stations	Annual	2023	No Formal Condition. %FCI calculated from inspection reports and subject matter expertise.

Based on the condition, the fuel stations were divided into Good condition (55%), Poor condition (18%) and Very Poor condition (27%). This aligns with the findings from the 2023 fuel station inspection which suggests that nearly half of the fuel stations will require renewal (full reconstruction) in the next five years.

In line with the current Council-approved action plan to achieve net-zero carbon emissions by 2050, and the potential transition away from diesel fuel by 2035, Fleet Services is investing in Electric Vehicle (EV) charging station infrastructure as part of its transition to Battery Electric Vehicles (BEVs). As part of this transition, Fleet Services is participating in a Yards study led by Corporate Facilities and Energy Management (CFEM), to strategize the optimal use of fuel stations and potential decommissioning of underutilized locations as a strategy to eliminate future renewal costs.

The replacement value for each fuel station was provided based on the Fleet Services team's subject matter expertise and is considered a medium confidence value. The condition ratio used for Fuel Stations was calculated using the most recent inspection information and is considered a low-confidence number.

Figure 8: Equipment Condition Distribution



3.2.3.3. ASSET USAGE AND PERFORMANCE

Table 11: Known Service Performance Deficiencies

ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Equipment (Hoists)	**Wentworth Street Operations Centre**	Potential leaking inground hoists.	Leaking hydraulic oil could cause potential environmental damage and cause service delays if the hoist needs to be repaired.

ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Fuel Stations	**Various**	Fuel stations with dispensing infrastructure that exceeds Estimated Service Life.	Potential service interruption and higher repair costs.
Fuel Stations	**Multiple Locations**	Insufficient electrical systems for EV stations.	Current electrical infrastructure is insufficient to support EV charging stations and electrical upgrades are required.
	Ancaster and Chedoke	Asphalt in poor condition.	Signs of cracking and settlement throughout the parking lots.
	Airport Fuel Station and Rockton Yard Fuel Station and Rockton site	Yard utilization changes.	Yards underutilized due to operational changes.

3.2.4 TECHNOLOGY PROFILE

3.2.4.1. AGE PROFILE

The age profile for Technology assets is shown in ***Figure 10 and Figure 11. Figure 11*** shows Fleet Services and CAM IT age profiles at a different scale to provide better detail. Many technology assets have estimated service lives of five to 15 years. Since these assets have relatively short ESLs, they will repeat throughout the renewal forecast shown in ***Section 8.3.***

Figure 9: Fleet, CAM & EAM IT Equipment Age

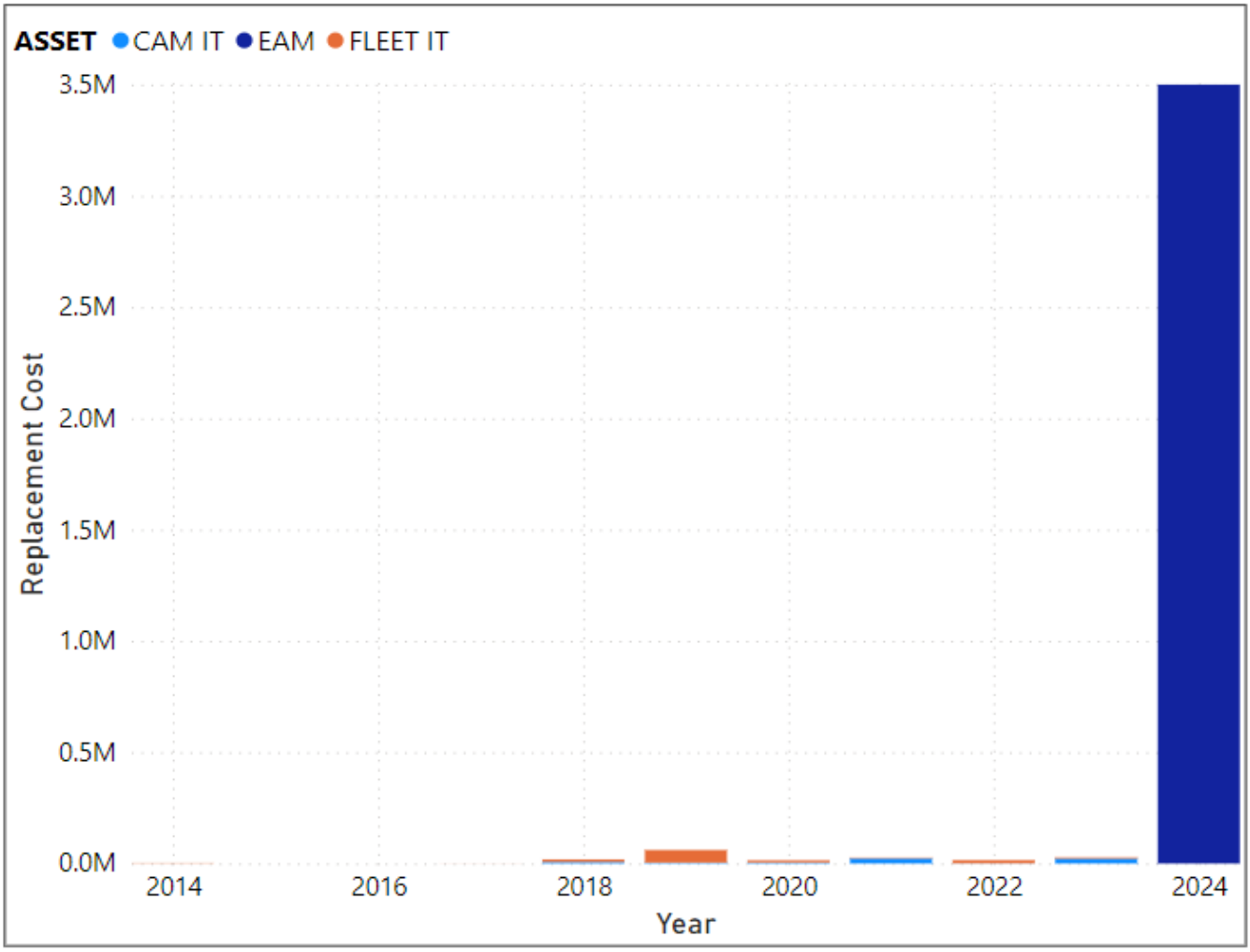
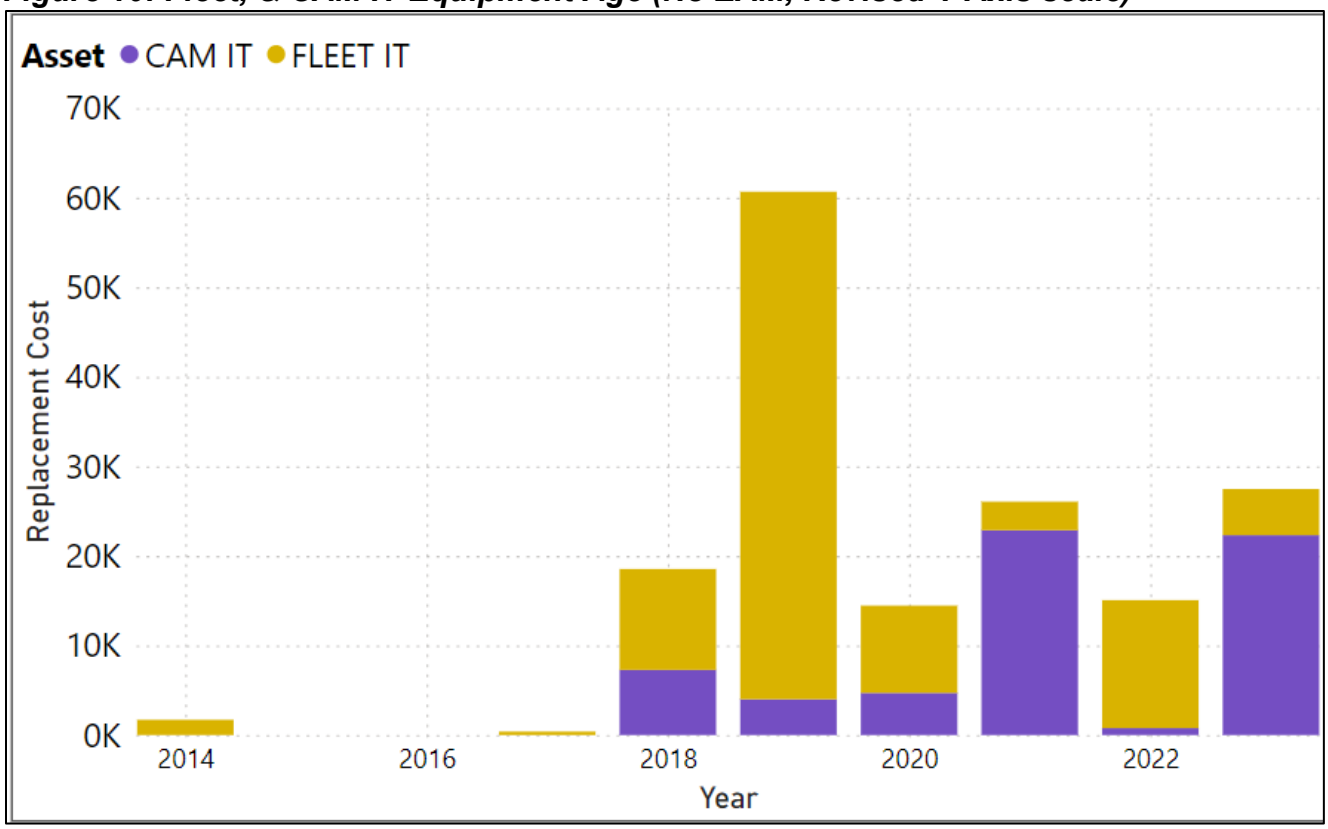


Figure 10: Fleet, & CAM IT Equipment Age (No EAM, Revised Y Axis scale)



3.2.4.2. CONDITION METHODOLOGY & PROFILE

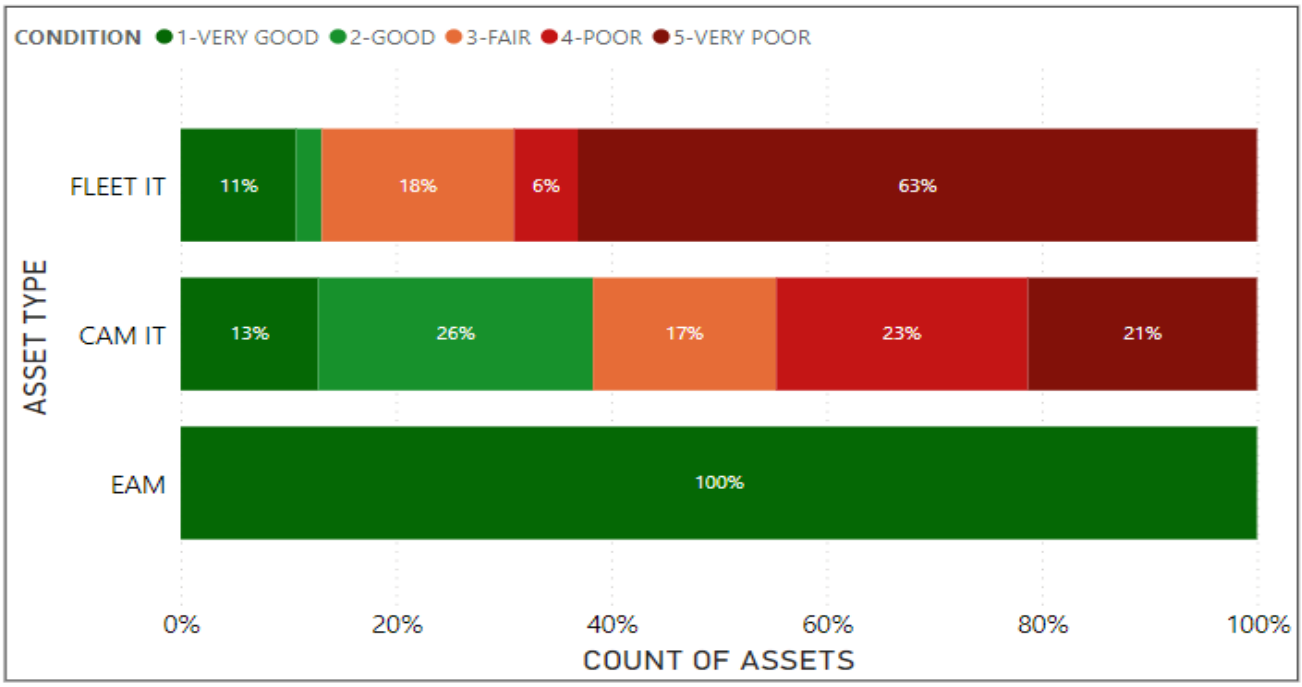
Currently, Technology assets do not have a formal method to determine condition and therefore age has been used to estimate the condition of these assets where age is known. This has been identified as a continuous improvement item in ***Table 28***.

Table 12: Inspection and Condition Information

ASSET	INSPECTION FREQUENCY	LAST INSPECTION	CONDITION SCORE OUTPUT
CAM and Fleet IT Equipment	Ad Hoc	Ad Hoc	None

The condition profile of the City's assets is shown in ***Figure 12.*** Currently, the average weighted condition of technology is considered to be Very Good. Most of the weighting is from EAM software. The average condition is considered to be Poor for Fleet IT and Fair for CAM IT. Due to the condition methodology, a number of assets are showing poor or very poor condition because they are approaching or beyond their ESL.

Figure 11: Fleet, CAM & EAM IT Equipment Condition Distribution



3.2.4.3. ASSET USAGE AND PERFORMANCE

At present, no performance deficiencies have been identified with Technology assets. The Enterprise Asset Management (EAM) system is currently in the implementation stage, and its service performance cannot yet be assessed.

3.2.5 VEHICLES PROFILE – CITY-WIDE FLEET

As mentioned in ***Section 2.1.2***, Fleet Services manages approximately 1,546 city-wide assets which include vehicles, trailers, landscape equipment, road maintenance vehicles waste collection vehicles, and road-going pieces of equipment. This section provides an overview of the age and condition of these assets.

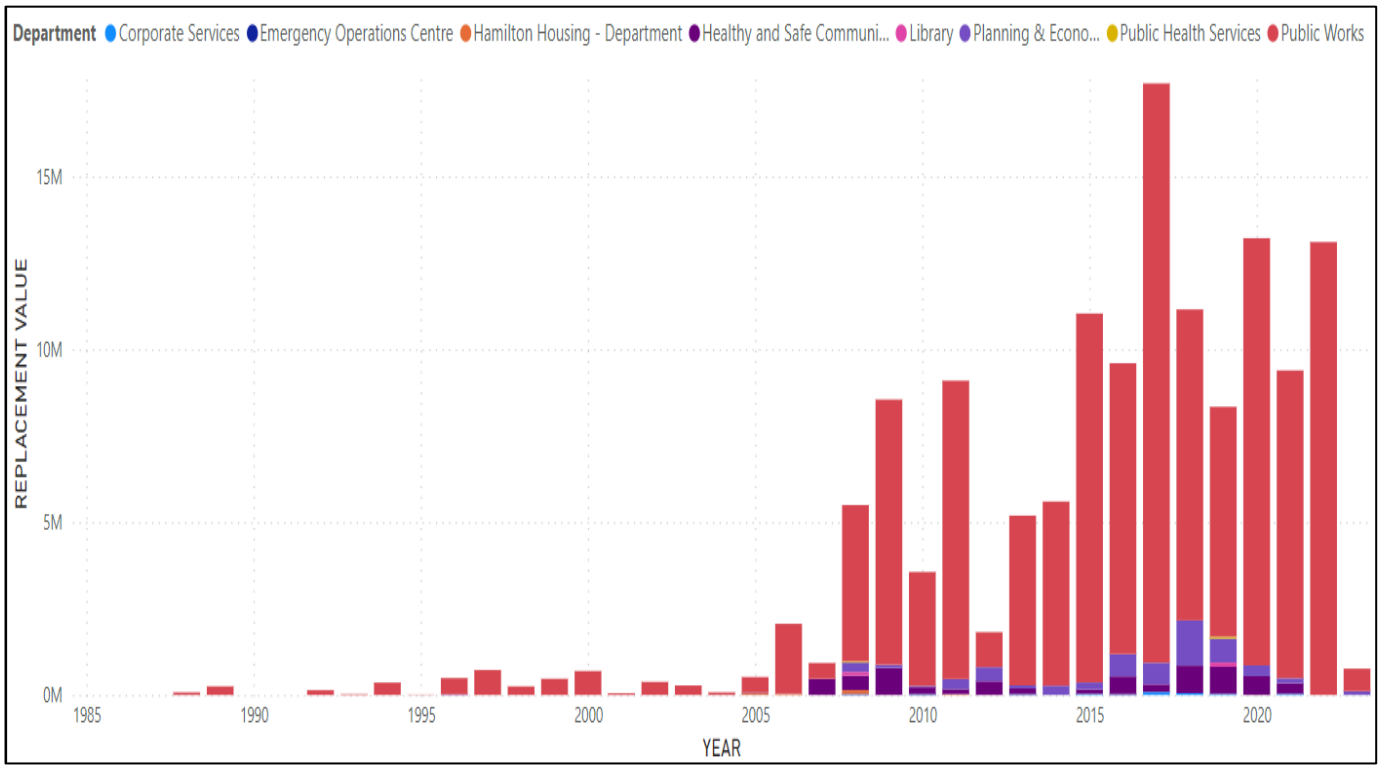
3.2.5.1. AGE PROFILE

The age profile of the city-wide vehicle assets is shown in ***Figure 13***. For these assets, the data confidence for age is typically high because asset ages are formally tracked. Renewal forecast is based on the age of vehicles, but actual vehicle replacement criteria include other parameters such as maintenance costs, mileage and years exceeding estimated service life. A consultant study[12] is ongoing to review these criteria and provide recommendations.

[12] Ward (2023)

The detailed analysis of the equipment and vehicles below is within the other individual Asset Management Plans for those service areas. The average estimated service life (non-weighted to type or value) is 10 years. Assets in ***Figure 13*** to the left of 2014 are possibly beyond or approaching their ESL.

Figure 12: Vehicles Age Profile - CITY WIDE



3.2.5.2. CONDITION METHODOLOGY & PROFILE

Vehicles are inspected and maintenance activities are conducted at specific intervals throughout the asset's lifecycle, however, no formal condition rating is assigned to each vehicle.

Vehicle replacement is based on the Fleet Capital Replacement Schedule established by Fleet Services. The schedule is compiled using a various data point to assess whether fleet assets meet the replacement criteria, which include but not limited to:

- Planned replacement year (Based on Estimated Service Life);
- Condition assessment;
- Dollars spent on maintenance Life to Date versus the estimated replacement cost;
- Fuel consumption and Green House Gas emissions; and,
- Kilometres and/or hour meter reading.

Further discussions take place between Fleet Services and the service area to discuss any specific operational concerns that will affect fleet requirements such as:

- Consideration of size/weight of equipment carried (in vehicle and/or trailers);
- Capability of tow vehicles;
- Fit for purpose; and,
- Green options available.

Fleet Services will consider delaying the replacement of a vehicle where extending its life will not cause significant operational concerns or financial impacts to align with the purchase of an available Battery Electric Vehicle (BEV).

A continuous improvement item identified in ***Table 28*** is to develop and incorporate a condition rating during regular vehicle inspection/maintenance activities. This will assist Fleet Services with capital forecasting for all vehicles and provide information to make decisions about vehicle renewal in addition to their vehicle renewal formula.

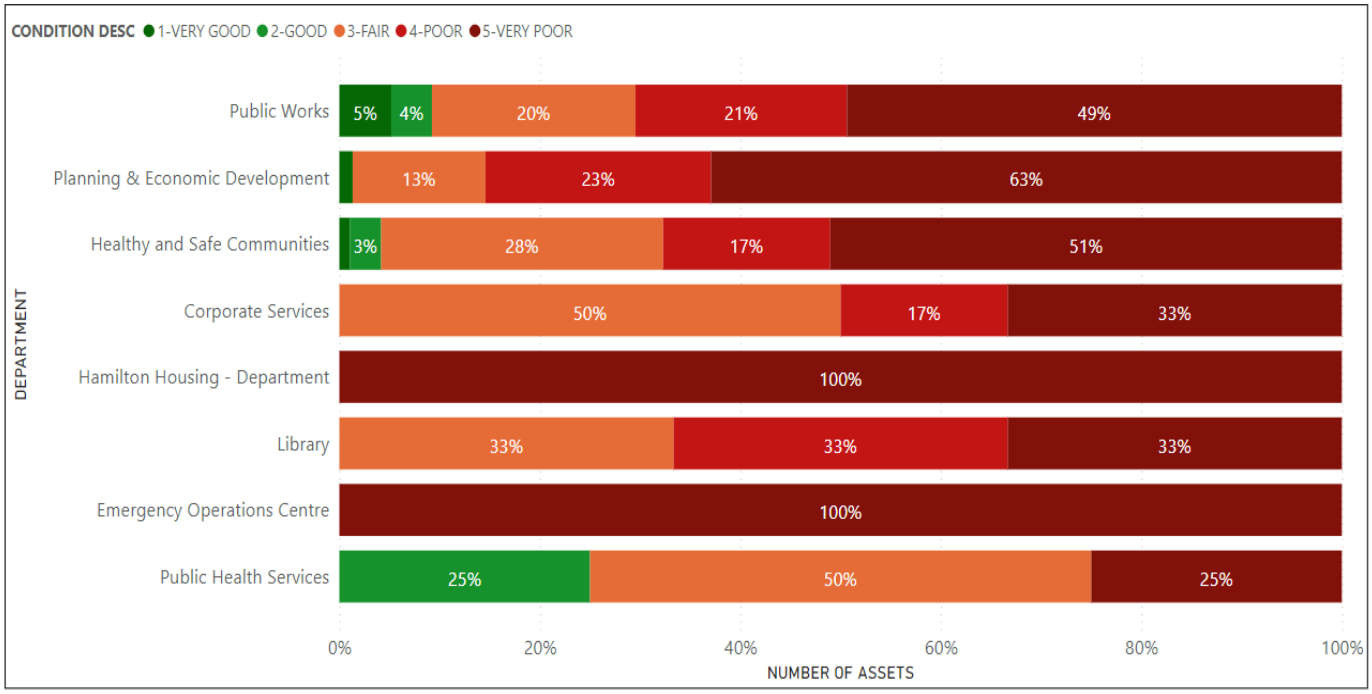
Table 13: Inspection and Condition Information

ASSET	INSPECTION TYPE	DESCRIPTION	FREQUENCY	CONDITION SCORE OUTPUT
Vehicles	**Servicing vehicle**	Various maintenance checks are completed for vehicles.	Minimum twice a year.	N/A
Vehicles	**PMCVI**	Safety inspection for Commercial Vehicle Operator Registration – (CVOR) vehicles (>4500kg).	Once a year.	Pass/Fail

Asset Condition Profile

The condition profile of the city-wide fleet assets is shown in ***Figure 14***. The majority of the vehicles and equipment are in Poor or Very Poor condition. Condition is based solely on the percent of remaining estimated service life converted to condition as per the table in ***Section 4***. This data is presented here for information purposes as the detailed analysis of the equipment and vehicles below is within the other individual AM Plans for those service areas.

Figure 13: Vehicles Condition Profile - CITY WIDE



3.2.5.3. ASSET USAGE AND PERFORMANCE

Table 14: Known Service Performance Deficiencies

ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Vehicles	**Various**	Vehicles used beyond the expected replacement interval.	Increases in maintenance costs and vehicle downtime affect daily operations.

4. MUNICIPALLY DEFINED LEVELS OF SERVICE

Levels of service are measures of what the City provides to its customers, residents, and visitors, and are best described as the link between providing the outcomes the community desires, and the way that the City provides those services.

O.Reg 588/17[13] does not define levels of service for CAM assets and therefore the City has developed municipally defined levels of service. Levels of service are defined in three ways, customer values, customer levels of service and technical levels of service which are outlined in this section. An explanation for how these were developed is provided in Section 7.5 of the ***AM Plan Overview***.

4.1 SURVEY METHODOLOGY

A Customer Engagement Survey is typically completed to develop customer values and customer levels of service. CAM is mainly a service provider to internal customers and other City of Hamilton groups. At this time, an internal survey of customers who use CAM Division and Fleet Services has not been completed. A continuous improvement item in ***Table 28*** is to develop an internal services survey to help develop customer values and customer levels of service for future Asset Management Plans.

4.2 CUSTOMER VALUES

A customer survey was not conducted for CAM Division and Fleet Services and no Customer Levels of Service were identified for this iteration of AM Plan.

4.2.1 TECHNICAL LEVELS OF SERVICE

Technical levels of service are operational or technical measures of performance, which measure how the City plans to achieve the desired customer outcomes and demonstrate effective performance, compliance, and management. The metrics should demonstrate how the City delivers its services in alignment with its customer values; and should be viewed as levers to impact and influence the Customer Levels of Service. The City will measure specific lifecycle activities to demonstrate how the City is performing in delivering the desired level of service as well as to influence how customers perceive the services they receive from the assets.

Technical service measures are linked to the activities and annual budgets covering Acquisition, Operation, Maintenance, and Renewal. Asset owners and managers create, implement and control technical service levels to influence the service outcomes.[14]

Table 15 shows the activities expected to be provided under the current 10-year Planned Budget allocation and the forecast activity requirements being recommended in this AM Plan.

[13] Government of Ontario, 2017
[14] IPWEA, 2015, IIMM, p 2|28.

Table 15: Technical Levels of Service

LIFECYCLE ACTIVITY	LEVEL OF SERVICE	ACTIVITY MEASURE	CURRENT ACTUAL PERFORMANCE 2023	CURRENT TARGET PERFORMANCE 2023	PROPOSED 10-YEAR PERFORMANCE
Operation	Ensure assets and operators are safe and reliable and comply with regulations.	Average monthly CVOR (Commercial Vehicle Operator's Rating).	57.5 (December 2023)	50.0	50.0
		# of time CVOR data is pulled per year.	248	258	258
		# of driver abstracts review processed per year for Fleet Compliance.	6230	5800	5800
		# of spot checks completed by the driver trainers per year.	83	84	84
		Average monthly % of Periodic Mandatory Commercial Vehicle Inspections (PMCVI) completed by their due dates.	96%	100%	100%
		Fleet Training and Compliance Costs	**$600K**	**$600K**	**Not yet quantified**
	Ensure all city-wide vehicles are repaired in a timely manner.	Average number of Fleet maintenance invoices open for over 30 days.	47	120	120
		Maintenance Lifecycle Costs	**$11.7 M**	**$11.7 M**	**Not yet quantified**
		Average monthly % of parts returned by the technicians back to inventory.	1%	3%	3%
		Average monthly % of direct purchases returned to the vendor.	5%	8%	8%
		Average monthly % of orders filled by stock availability.	60%	55%	55%
		Average monthly % of stock issued before replenishment is triggered.	54%	50%	50%
		Vehicle Parts Costs	**$2.0M**	**$2.0M**	**Not yet quantified**
Renewal	Ensure Fleet Services vehicles are renewed, as necessary.	% of vehicles pass their estimated service life.	75%	To Be Determined	To Be Determined
		Fleet Renewal Costs	**$769.0K**	**$769.0K**	**Not yet quantified**

It is important to monitor the service levels regularly as circumstances can and do change. Current performance is based on existing resource provision and work efficiencies. It is acknowledged changing circumstances such as technology and customer priorities will change over time.

It is important to note that these metrics were created specifically for this 2023 AM Plan with available data. Many of these metrics should be improved to include a target to be in line with SMART objectives identified on ***Page 43*** of the ***AM Plan Overview***. In addition, performance measure data should be both easy to extract and measured over time, and a data collection process may need to be created.

4.2.2 PROPOSED LEVELS OF SERVICE DISCUSSION

It is evident per ***Table 15*** that CAM Division and Fleet Services are often meeting its current technical standards with some exceptions. However, since a customer survey was not conducted for this iteration of the Asset Management Plan, we are unable to compare customer expectations with internal technical targets.

It has been assumed in the interim that the current levels of service will be the proposed levels of service moving forward past 2025 in accordance with O. Reg 588/17[15].

CONDITION / QUALITY

No changes are proposed at this time for CAM Division and Fleet Services relating to Condition/Quality. Proposed levels of service may be developed upon completion of the Fleet Management Strategy.

FUNCTION

No changes are proposed at this time for CAM Division and Fleet Services relating to Function. Proposed levels of service may be developed upon completion of the Fleet Management Strategy.

CAPACITY

No changes are proposed at this time for CAM Division and Fleet Services relating to Capacity. Proposed levels of service may be developed upon completion of the Fleet Management Strategy.

[15] Government of Ontario, 2017

5. FUTURE DEMAND

Demand is defined as the desire customers have for assets or services that they are willing to pay for. These desires are for either new assets/services or current assets.

The ability for the City to be able to predict future demand for services enables the City to plan ahead and identify the best way of meeting the current demand while being responsive to inevitable changes in demand. Demand will inevitably change over time and will impact the needs and desires of the community in terms of the quantity of services and types of services required.

5.1 DEMAND DRIVERS

For the Fleet Services service area, the key drivers are population change, technological changes, and expansion of service programs.

- **Population Change** – The City of Hamilton's population is forecast to be 820,000[16] by 2051 which will increase the demand for City services and will require Fleet Services to support service growth in other service areas.
- **Technological Changes** – City Council approved a phase-in strategy of 89 internal combustion type engines to be converted to Battery Electric Vehicle (BEV) to be replaced in 2022 to 2024. The development and implementation of the BEV strategy is a critical component of transitioning the City of Hamilton to a low-carbon city and its journey to meeting aggressive targets by 2050. The transition from internal combustion type engines to BEV also generates some technological demands for Fleet Services. The transition to BEV will also change the supply of fuel delivery infrastructure that Fleet Services manages.
-

5.2 DEMAND FORECASTS

The present position and projections for demand drivers that may impact future service delivery and use of assets have been identified and documented in ***Table 16***. Growth projections have been shown on ***Page 45*** of the ***AM Plan Overview*** document.

Where costs are known, these additional demands as well as anticipated operations and maintenance costs have been encompassed in the Lifecycle Models in ***Section 8***.

[16] Census Profile, 2021 Census of Population, 2021

5.3 DEMAND IMPACT AND DEMAND MANAGEMENT PLAN

The impact of demand drivers that may affect future service delivery and use of assets is shown in ***Table 16***. Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management. Demand management practices can include non-asset solutions, insuring against risks, and managing failures.

Opportunities identified to date for demand management are shown in ***Table 16***. Climate change adaptation is included in ***Table 21.***

Table 16: Demand Management Plan

SERVICE AREA	DEMAND DRIVER	CURRENT POSITION	PROJECTION - 10-YEAR HORIZON	IMPACT ON SERVICES	DEMAND MANAGEMENT PLAN
Fleet Services	**Population Growth**	565,000 population	625,000[17] population	Increasing demand for more City services will raise the demand for more vehicles from service areas.	Develop an annual Fleet Planning Process to identify and capture future fleet needs to improve planning and operational effectiveness. Develop fleet utilization strategy to ensure efficient use of all existing vehicles.
	Technological Changes	City-wide 89 electric vehicles	The city's mission is to have net zero greenhouse gas emissions by 2050 which will mean more electric vehicle acquisitions.	New Battery Electric Vehicle (BEV) training is required for technicians to service BEVs acquired by the City.	Develop a standardized BEV servicing training program for technicians. Increase funding to acquire appropriate diagnostic tools and equipment for BEV servicing.

[17] Census Profile, 2021 Census of Population, 2021

5.4 ASSET PROGRAMS TO MEET DEMAND

The new assets required to meet demand may be acquired, donated, or constructed. For **the** CAM Division, assets are typically acquired or constructed.

There is about $4.1M (EAM Software) in assets acquired over the next 2 years. Acquiring new assets will commit the CAM Division to ongoing operations, maintenance and renewal costs for the time required. These future costs have been estimated at a high level in the Lifecycle Models in ***Section 8*** but should be quantified further for future iterations of the report for consideration in developing higher confidence forecasts of future operations, maintenance, and renewal costs for inclusion in the long-term financial plan.

Fleet Services acquires vehicle and equipment assets for other service areas, with the need for additional vehicles identified in individual plans or as part of the annual capital budget process. Funding for acquisitions is typically allocated within the capital budgets of the requesting service areas. Therefore, acquisition costs and additional forecasted needs are generally reflected in the individual Asset Management Plans of those service areas but have an impact on Fleet Services, particularly the acquisition and maintenance of vehicles beyond the existing fleet portfolio.

6. RISK MANAGEMENT

The purpose of infrastructure risk management is to document the findings and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure, using the fundamentals of International Standard ISO 31000:2018 Risk management – Principles and guidelines.

Risk Management is defined in ISO 31000:2018 as: 'coordinated activities to direct and control with regard to risk[18].

The City is developing and implementing a formalized risk assessment process to identify risks associated with service delivery and to implement proactive strategies to mitigate risk to tolerable levels. The risk assessment process identifies credible risks associated with service delivery and will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

The risk assessment process identifies credible risks, the likelihood of those risks occurring, and the consequences should the event occur. The City utilizes two risk assessment methods to determine risk along with subject matter expert opinion to inform the prioritization. Hamilton is further developing its risk assessment maturity with the inclusion of a risk rating, evaluation of the risks and development of a risk treatment plan for those risks that are deemed to be non-acceptable in the next iteration of the plan.

6.1 CRITICAL ASSETS

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Critical assets have been identified, and along with their typical failure mode, and the impact on service delivery, are summarized in ***Table 17***. Failure modes may include physical failure, collapse or essential service interruption.

Table 17: Critical Assets

CRITICAL ASSET(S)	FALIURE MODE	IMPACT
Fuel Management System	Essential Service Interruption	Inability to dispense fuel.

By identifying critical assets and failure modes, an organization can ensure that investigative activities, condition inspection programs, maintenance and capital expenditure plans are targeted at critical assets.

[18] ISO 31000:2009, p 2

6.2 RISK ASSESSMENT

The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, the development of a risk rating, the evaluation of the risk and the development of a risk treatment plan for non-acceptable risks.

An assessment of risks associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) and 'High' (requiring corrective action) risk ratings identified in the Infrastructure Risk Management Plan. The residual risk and treatment costs of implementing the selected treatment plan are shown in ***Table 18.*** It is essential that these critical risks and costs are reported to management.

Table 18: Risks and Treatment Plans

SERVICE OR ASSET AT RISK	WHAT COULD HAPPEN	RISK RATING	RISK TREATMENT PLAN	RESIDUAL RISK	TREATMENT COSTS
Fuel Station	Underground fuel tanks can leak and cause potentially detrimental environmental damage.	High	Implemented regular continuous leak detection through software and regular vacuum testing.	Low	$44,000 annually for specialized fuel tank leak inspections.
			Reduce the number of fueling stations overall as transition to alternative fuels/yards study and eliminate or renew older facilities.	Medium	TBD
Fuel Station (Above ground fuel tank)	Above-ground fluid storage tanks can leak and potentially cause environmental damage.	High	Plan to complete condition assessment on all fuel storage tanks.	Medium	Consultant costs TBD.
Facilities (Underground fuel tank)	Underground automotive storage tanks can leak and cause potentially detrimental environmental damage.	High	Eliminate or discontinue the use of underground fluid storage tanks at facilities where possible.	High	TBD
Equipment (In-Ground Hoists)	Hydraulic fluids can leak and contaminate the environment.	High	Develop a programmed leak inspection program.	Medium	$27,000 to develop a programmed hydraulic leak inspection program.
			Consider substituting it for non-hazardous hydraulic fluid.	Medium	TBD

CORPORATE ASSET MANAGEMENT (FLEET SERVICES AND EAM) - 2024 ASSET MANAGEMENT PLAN

SERVICE OR ASSET AT RISK	WHAT COULD HAPPEN	RISK RATING	RISK TREATMENT PLAN	RESIDUAL RISK	TREATMENT COSTS
Vehicles	Inadequate funding of Reserve based on non-current replacement values.	Very High	Consultant's Fleet Service Delivery review[19] aims to adjust user group contributions to the Fleet Reserve, ensuring adequate funding for fleet replacements and accurately accounting for fleet management costs.	Medium	Minimal treatment costs and increased contributions to reserve will affect all service areas using Fleet Services
Corporate Asset Management Plans	Unable to complete all AM Plans for non-core assets by the July 2024 deadline to meet the O. Reg 588/17[20] requirement, discussed further in ***Section 2.1.1***.	High	Comprehensive project management plans and project charters have been implemented for each asset management plan to ensure that all work is completed by the deadline.	Medium	CAM internal resources

[19] Ward (2023)
[20] Government of Ontario, 2017

6.3 INFRASTRUCTURE RESILIENCE APPROACH

The resilience of our critical infrastructure is vital to the ongoing provision of services to customers. To adapt to changing conditions the City needs to understand its capacity to 'withstand a given level of stress or demand,' and to respond to possible disruptions to ensure continuity of service. We do not currently measure our resilience in service delivery and this will be included in the next iteration of the AM Plan.

Resilience covers the capacity of the City to withstand any service disruptions, act appropriately and effectively in a crisis, absorb shocks and disturbances as well as adapting to ever-changing conditions. Resilience is built on aspects such as response and recovery planning, financial capacity, climate change risk, assessment, and crisis leadership.

6.4 SERVICE AND RISK TRADE-OFFS

The decisions made in AM Plans are based on the objective of achieving the optimum benefits from the available resources.

Table 19 below outlines what activities Fleet Services cannot afford to do over the next 10 years with their existing budget and provides the associated service and risk tradeoffs.

Table 19: Service and Risk Tradeoffs

WHAT WE CAN NOT DO (What can we not afford over the next 10 years?)	SERVICE TRADE-OFF (How will not completing this affect our service?)	RISK TRADE-OFF (What risk consequences are we undertaking?)
Fully fund the vehicle-renewal reserve and replace vehicles at the optimum time.	Increases in frequency and costs of repairs and delays in repairs and maintenance.	Vehicles are kept on the road longer resulting in interruptions to service groups across the city, increased operational costs and reduced efficiency. Levels of service at risk.
Absence of a fuel station strategy	Risk downtime and major failure triggered capital funding requirement	Fuel stations using aged components and replacement parts will be increasingly difficult to source. Despite robust leak detection and tank gauging systems, the risk of failure increases with age.

Inefficient Maintenance Operations	Additional staff resources will be required to manage 8 maintenance facilities. The facilities are not specifically designed for fleet operations, resulting in inefficiencies, heightened risks to employee safety, and adverse environmental impacts. Without an effective system scheduling work efficiently and setting benchmarks for service standards will continue to be challenging.	Consultant review of operations to provide recommendations to improve efficiencies
Procure ICE vehicles	Greenhouse gas targets will not be met. Additionally contributes to climate change and impacts to the environment.	Continue to investigate viable alternative power options including naturally derived or lower impact fuels, electric and hydrogen

7. CLIMATE CHANGE AND MITIGATION

Cities have a vital role to play in reducing the emission of greenhouse gases (mitigation), as well as preparing assets for the accelerating changes we have already begun to experience (adaptation). At a minimum, the City must consider how to manage our existing assets given the potential climate change impacts for our region.

Changes to Hamilton's climate will impact City assets in the following ways:

- Affect the asset lifecycle;
- Affect the levels of service that can be provided and the cost to maintain;
- Increase or change the demand on some of our systems; and
- Increase or change the risks involved in delivering service.

To quantify the above asset/service impacts due to climate change in the Asset Management Plan, climate change is considered as both a future demand and a risk for both mitigation and adaptation efforts. These demands and risks should be quantified and incorporated into the lifecycle models and levels of service targets.

If climate change mitigation/adaptation projects have already been budgeted, these costs have been incorporated into the lifecycle models. However, many asset owners have not yet quantified the effects of the proposed demand management and risk adaptation plans described in this section, and so associated levels of service and costs will be addressed in future revisions of the plan.

7.1 CLIMATE CHANGE MITIGATION

Climate Mitigation refers to human intervention to reduce GHG emissions or enhance GHG removals (e.g. building transportation infrastructure that can support cycling and public transit and reduce the need for car travel). The City of Hamilton's Community Energy + Emissions Plan[21] (CEEP includes five Low-carbon Transformations necessary to achieve the City's target of net-zero GHG emissions by 2050):

- Innovating our industry;
- Transforming our buildings;
- Changing how we move;
- Revolutionizing renewables; and
- Growing Green.

[21] Newbold, Skidmore, Chessman, Imhoff, & McDowell, 2022

Mitigation Demand Analysis

These transformations were incorporated into the climate mitigation demand analysis for this service area by:

- Identifying the City's modelled targets for the low carbon transformations that applied to the service/asset;
- Discussing the impact, the targets would have on the service/asset; and
- Proposing a preliminary demand management plan for how this modelled target will be achieved by 2050 as shown in ***Table 20*** below.

As previously mentioned, due to the high level of uncertainty with the demand management plans, the cost of the demand impacts below has not been included in the lifecycle models or levels of service at this time. The demand management plans discussed in this section should be explored by asset owners in more detail following the AM Plan, and new projects should incorporate GHG emissions reduction methods, and changes which will be incorporated into future iterations of the AM Plan.

Moving forward, the Climate Lens tool discussed in the AM Plan Overview will assess projects based on these targets and will assist with the prioritization of climate mitigation projects.

Mitigation Demand Analysis

Table 20: Climate Change Mitigation Transformation

CLIMATE CHANGE MITIGATION TRANSFORMATION	MODELLED TARGET	IMPACT TO SERVICE OR ASSET	DEMAND MANAGEMENT PLAN
Changing How We Move	100% of new municipal small and light-duty vehicles are electric by 2040. 100% of new municipal heavy-duty vehicles switch to clean hydrogen by 2040.	Electric vehicle (EV) chargers will need to be installed at all stations. Initial upfront capital costs for electric vehicles.	Develop a business case for an electric vehicle (EV) conversion as an internal combustion-type engine (ICE) vehicle reaches its estimated service life and determines full-lifecycle costs.
			Develop business case for EV charging stations to support growing EV demand.
		BEV vehicle training for Fleet Services maintenance staff to complete EV repairs within the City as there may be a risk of dealers backing away from being EV certified.	Some dealers are backing away from EV certification due to high costs which may lead to future service challenges. The city should ensure EV providers can service vehicles adequately. The city may need to consider performing its own EV maintenance if dealers are

CLIMATE CHANGE MITIGATION TRANSFORMATION	MODELLED TARGET	IMPACT TO SERVICE OR ASSET	DEMAND MANAGEMENT PLAN
			not authorized for repairs or if the nearest service centre is inaccessible.
		Decommissioning select fuel sites based on the replacement of internal combustion engine (ICE) vehicles.	Currently, a consultant study[22] is underway which will offer recommendations for maximizing garage utilization, potentially including the decommissioning of underutilized garages.

MITIGATION RISK ANALYSIS

Additionally, since the risk of not completing climate change mitigation projects is that the City continues to contribute to climate change in varying degrees which were modelled in the Climate Science Report for the City of Hamilton completed by ICLEI Canada, a risk analysis has not been completed in this AM Plan for not completing climate mitigation projects (ICLEI Canada, 2021).

CURRENT MITIGATION PROJECTS

On March 27, 2019, Hamilton City Council declared a Climate Change Emergency, committing to achieving net zero greenhouse gas emissions by 2050 and preparing for climate change impacts. The 2021 Green Fleet Strategy[23] recommended freezing the renewal of internal combustion engine (ICE) vehicles in anticipation of a transition to battery-electric vehicles (BEVs). Concerns were raised about the potential obsolescence of ICE vehicles as BEVs become more widespread. With the possibility of BEV prices decreasing, and reaching price similarity with ICEs by 2025, it was suggested that, if feasible based on the condition of current Hamilton fleet ICE vehicles, their lifecycles be extended until BEV replacements are available.

Following these recommendations from Green Fleet Strategy[23], Fleet Services and service areas discuss any operational concerns including renewing ICE vehicles as BEVs for all fleet renewals and acquisitions as discussed in ***Section 3.2.5.2***. If viable BEV options are not available, the service areas will review the following items prior to requesting an ICE vehicle:

[22] Ward (2023)
[23] Kagianis & Parker (2021)

1. Lease or Rent to bridge the gap until an electric vehicle becomes available;
2. Perform condition assessment of vehicle to be replaced and defer replacement; and,
3. If available, provide an extended-use city-wide fleet vehicle until electric options become available.

If the above options cannot be satisfied and cause significant operational concerns or financial impacts, the service area will be required to provide an email to Fleet Planning with the Director's approval to support reasons why the electric option does not meet their operational requirements.

Fleet Services is also exploring alternative fuel options such as natural gas, biodiesel, and EcoDiesel. As more technology advances are made and incorporated into Fleet Services operations, these advancements and updates will be integrated into the next iteration of the AM Plan.

7.2 CLIMATE CHANGE ADAPTATION

Climate Adaptation refers to the process of adjusting to actual or expected climate and its effects (e.g. building facilities that can handle new climate loads).

The impacts of climate change may have a significant impact on the assets we manage and the services we provide. Climate change impacts on assets will vary depending on the location and the type of services provided, as will how those impacts are responded to and managed.[24]

In 2021, the City of Hamilton completed a Vulnerability and Risk Assessment Report[25] guided by ICLEI's Building Adaptive and Resilient Communities (BARC) Framework as part of the Climate Change Impact Adaptation Plan (CCIAP) (ICLEI, 2021). The BARC Framework identified thirteen high-impact areas.

[24] IPWEA Practice Note 12.1 Climate Change Impacts on the Useful Life of Infrastructure
[25] City of Hamilton & Local Governments for Sustainability Canada, 2021

Adaptation Demand Analysis

Table 21: Managing the Demand of Climate Change on Assets and Services

ADAPTATION IMPACT STATEMENT	BASELINE (1976 – 2005)[26]	AVERAGE PROJECTED CHANGE 2021-2050[25]ASSUMING RCP4.5[27] SCENARIO)	POTENTIAL IMPACT ON ASSETS AND SERVICES	DEMAND MANAGEMENT PLAN
Prolonged power outages during winter months due to an increase in ice storms resulting in public safety concerns.	187 mm average total winter precipitation.	204 mm average total winter precipitation.	Inability to charge vehicles.	Investigate alternate power sources for emergency EV charging.
			Fuel stations operation disruption when power is out.	Ensure generators are available at the fuel station.
Changes in the frequency of extreme rainfall events will result in increased instances of flooding on private and public properties.	6.7 heavy precipitation days (20 mm)	7.7 heavy precipitation days (20 mm)	Flooding-related erosion may cause issues with underground fuel tanks. Rapid moving water can erode backfill that is covering the underground fuel tanks and piping systems.	More frequent maintenance may be needed which may require more funding to address these potential damages.
			Extreme rainfall may strain the roofing and drainage systems of buildings leading to more frequent repairs and earlier replacement of roof and drainage systems.	
Increased instances of heat-related issues due to extreme heat.	16.1 average days where the temperature is 30 degrees Celsius or more	34.4 average days where the temperature is 30 degrees Celsius or more	Heat advisories impact staff activities (i.e., working in garages if proper air conditioning is not provided).	Investigate workspace cooling options for maintenance staff working in garages.

[26] ICLEI Canada, 2022
[27] RCP4.5 Scenario: Moderate projected Green House Gas concentrations, resulting from substantial climate change mitigation measures. It represents an increase of 4.5 W/m2 in radiative forcing to the climate system. RCP 4.5 is associated with 580-720 ppm of CO2 and would more than likely lead to 3°C of warming by the end of the 21st century.

ADAPTATION RISK ANALYSIS

Additionally, the City should consider the risks for the asset or service as a result of climate change and consider ways to adapt to reduce the risk. Adaptation can have the following benefits:

- Assets will withstand the impacts of climate change;
- Services can be sustained; and,
- Assets that can endure may potentially lower the lifecycle cost and reduce their carbon footprint.

Similarly, to the exercise above and using the risk process in ***Section 6***, asset owners:

- Reviewed the likelihood scores in the Vulnerability and Risk Assessment Report for the adaptation impact occurring;
- Identified the consequence to the asset/service if the event did happen to develop a risk rating; and,
- If the risk was identified as high, the asset owner produced a preliminary risk adaptation plan shown below in ***Table 22.***

It is important to note that due to the high level of uncertainty with the climate change risk adaptation plans, the cost of mitigating the risks below has not been included in the lifecycle and financial models at this time. The adaptation plans discussed in this section should be explored by asset owners in more detail following the AM Plan, and new projects should consider these risks during the planning and design processes. Future changes will be incorporated into future iterations of the AM Plan. Moving forward, the Climate Lens tool will assess projects based on these targets and will assist with the prioritization of climate adaptation projects.

Table 22: Adapting to Climate Change

ADAPTATION IMPACT STATEMENT	SERVICE OR ASSET AT RISK DUE TO IMPACT	WHAT COULD HAPPEN	RISK RATING	RISK ADAPTATION PLAN
Prolonged power outages during winter months due to an increase in ice storms resulting in public safety concerns.	**EV Charging Station**	Unable to charge vehicles	High	Investigate redundancy in power sources at EV charging stations. Ensure proper maintenance of the backup power system.

ADAPTATION IMPACT STATEMENT	SERVICE OR ASSET AT RISK DUE TO IMPACT	WHAT COULD HAPPEN	RISK RATING	RISK ADAPTATION PLAN
	Fuel Stations	The potential impact of the fuel management system at fueling stations	Medium	Major fuel station locations have backup building generators.
		Supply chain disruption for delivery to City's fuel stations	High	Working with fuel suppliers to prioritize the City's fuel supply in emergencies. Investigate mobile re-fueling for emergency use

CURRENT ADAPTATION PROJECTS

Currently, Fleet Services and the remainder of CAM Division service areas do not have any current or past climate change adaptation-specific projects identified. The impact of climate change on assets and how the City will adapt is a new and complex discussion and further opportunities will be developed in future revisions of this AM Plan.

CLIMATE ADAPTATION DISCUSSION

Currently, Fleet Services has focused its climate change efforts on mitigation efforts and not yet on adaptation methods. This is because climate effects are more difficult to assess on Fleet Services and assets and need to be investigated further which has been identified as a continuous improvement item in ***Table 28***.

8. LIFECYCLE MANAGEMENT PLAN

The lifecycle management plan details how the City plans to manage these assets at the agreed levels of service and at the accepted lifecycle costs while excluding inflationary values. The costs included in the lifecycle management plan include costs from both the Capital and Operating budgets. Asset management focuses on how taxpayer or ratepayer dollars are invested by lifecycle activities and not by budget allocation. Since both budgets contain various lifecycle activities, they have been consolidated together and separated by lifecycle activity in this section.

As a result of this new process, there may be some areas where the budget was not able to be broken down perfectly by lifecycle activity. Future AM Plans will focus on improving the understanding of Whole Life Costs and funding options. However, at this time the plan is limited to those aspects. Expenditure on new assets and services will be accommodated in the long-term financial plan but only to the extent that there is available funding.

Fleet Services is a service provider to various City of Hamilton service areas. Fleet Services relies on interdepartmental funding and the majority of the funding is in the form of cost allocations that are charged as a fee to user groups from other departments. Fleet has a total operational budget of $15.7M, with $15.4M from interdepartmental funding. The service costs are allocated to user groups within departments.

8.1 ACQUISITION PLAN

The acquisition reflects new assets that did not previously exist or works which will upgrade or improve an existing asset beyond its current capacity. They may result from growth, demand, legal obligations or social or environmental needs.

CURRENT PROJECT DRIVERS – 10-YEAR PLANNING HORIZON

The City prioritizes capital projects based on various drivers to help determine ranking for project priorities and investment decisions. As part of future AM Plans, the City will continue to develop its understanding of how projects are prioritized and ensure that multiple factors are being considered to drive investment decisions in the next iteration of the AM Plan. These drivers will include legal compliance, risk mitigation, operation and maintenance impacts, growth impacts, health and safety, reputation, and others. These drivers should be reviewed during each iteration of the AM Plan to ensure they are appropriate and effective in informing decision-making. Fleet Services and CAM do not assume any assets. Asset acquisitions are purchased or constructed for these service areas.

Fleet Services acquires vehicle and equipment assets for other service areas with acquisition requests originating from the service areas. The acquisition budgets are allocated to the service area's budgets. Fleet Services does not have any of its own acquisitions identified at this time.

CAM Division is implementing EAM software which is considered an acquisition for CAM. The priority ranking criteria for EAM acquisition can be seen in ***Table 23***.

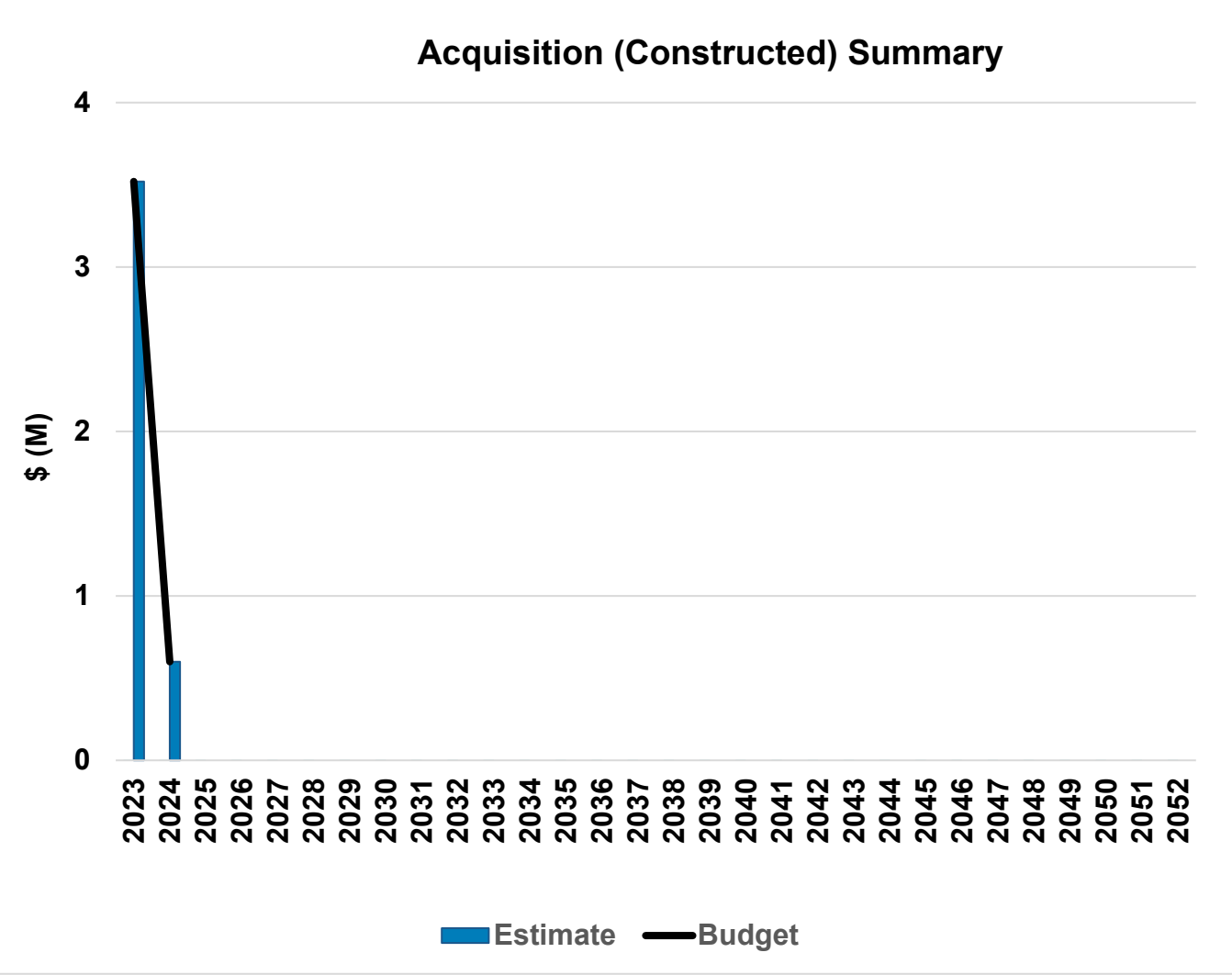
Table 23: Priority Ranking Criteria for EAM Acquisition

CRITERIA	WEIGHTING
Operational efficiency	50%
Cost reduction	50%
Total	**100%**

CONSTRUCTED OR PURCHASED ACQUISITIONS

Over the next two-year planning period, the City will spend $4.1M in EAM acquisition.

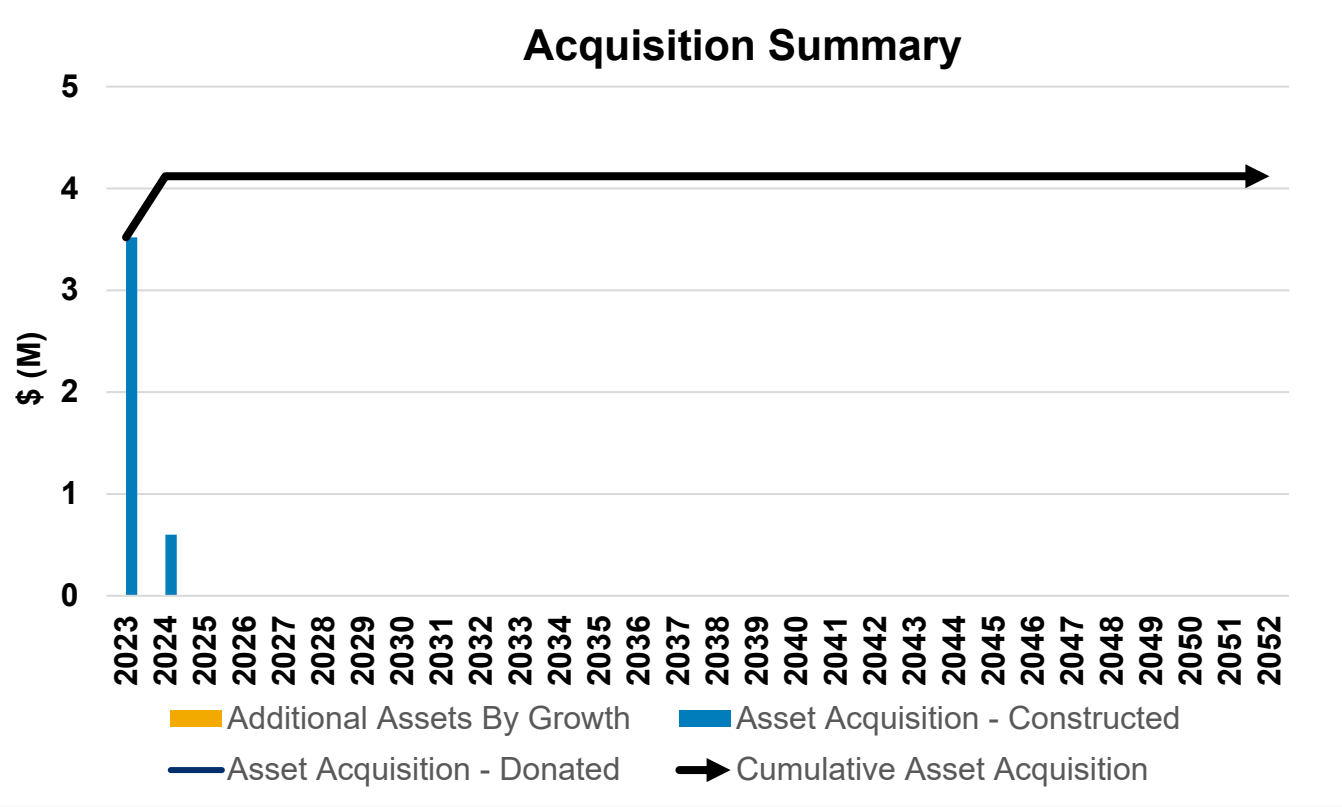
Figure 14: Acquisition Constructed Summary
All Figure Values Are Shown In 2023 Dollars



ACQUISITIONS SUMMARY

Forecast acquisition asset costs are summarized in ***Figure 16*** and show the cumulative effect of asset acquisitions over the next 10-year planning period.

Figure 15: Acquisition Summary
All Figure Values Are Shown in 2023 Dollars



8.2 OPERATIONS AND MAINTENANCE PLAN

Operations include all regular activities to provide services. Daily, weekly, seasonal, and annual activities are undertaken by staff to ensure the assets perform within acceptable parameters and to monitor the condition of the assets for safety and regulatory reasons.

- **$1.6 Million** annually for employee-related costs for the operation of Fleet Services (including Driver Training, Management, and Inventory Stores and Fuel); and,
- **$1.9 Million** annually for employee-related costs for Corporate Asset Management.

Maintenance should be viewed as the ongoing management of deterioration. The purpose of planned maintenance is to ensure that the correct interventions are proactively applied to assets and to ensure they reach its intended useful life. Maintenance does not significantly extend the useful life of the asset but allows assets to reach their intended useful life by returning the assets to a desired condition. Examples of typical maintenance activities include equipment repairs and

component replacements along with appropriate staffing and material resources required to perform these activities.

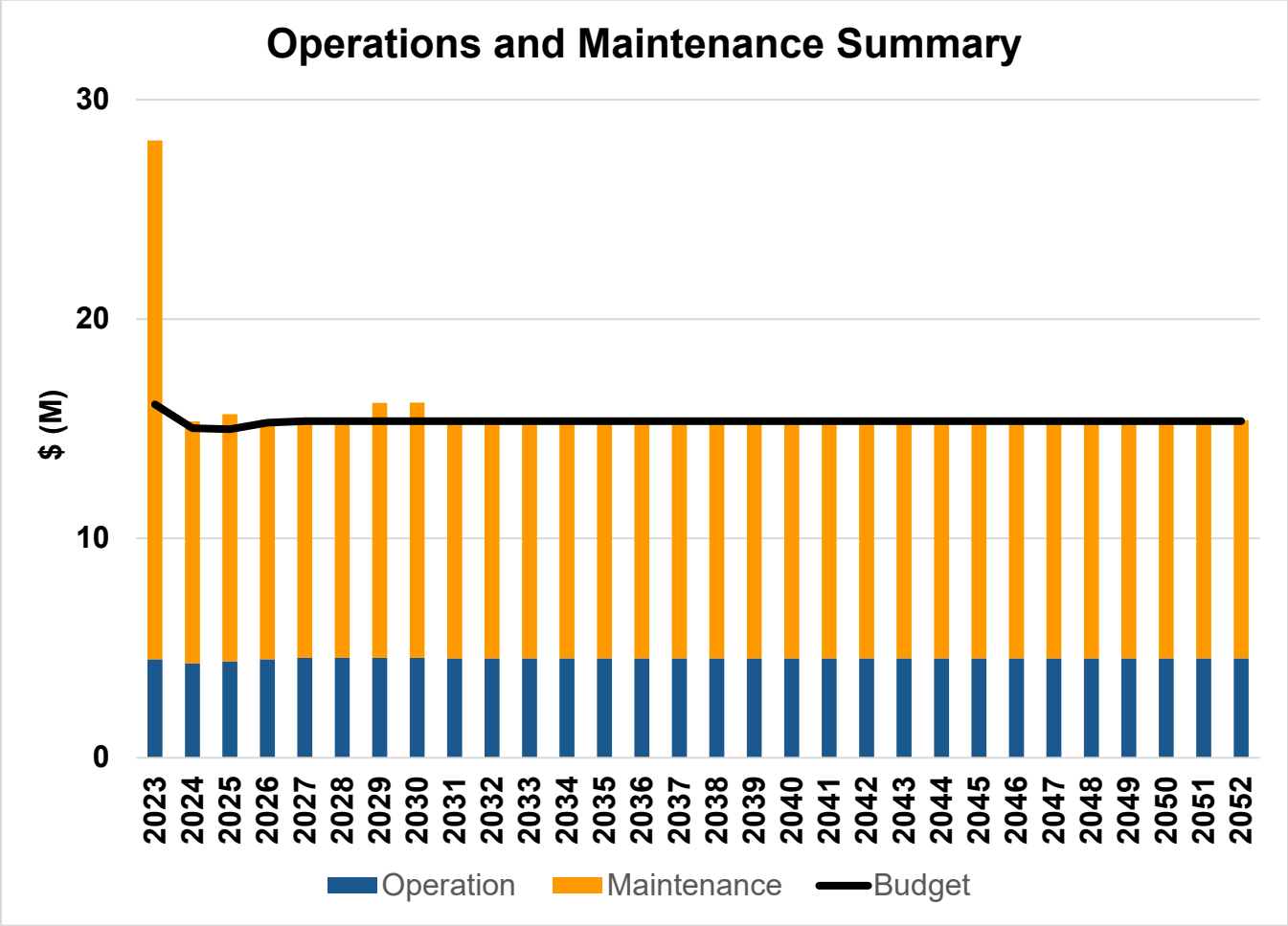
Proactively planned maintenance significantly reduces the occurrence of reactive maintenance which is always linked to a higher risk to human safety and higher financial costs. The City needs to plan and properly fund its maintenance to ensure the CAM and Fleet Services assets are reliable and can achieve the desired level of service.

Major maintenance activities the City plans to complete over 10 years include:

- **$4.6 Million** annually for employee-related costs for maintenance staff;
- **$2.0 Million** annually for purchasing vehicle parts;
- **$3.3 Million** annually for outside maintenance service;
- **$883 Thousand** annually for maintenance shop supplies;
- **$80 Thousand** annually on fuel station maintenance; and,
- **$342 Thousand** for 2024 to upgrade dispensers at fuel station sites (carry-over project).

Forecast operations and maintenance costs vary in relation to the total value of the asset registry. When additional assets are acquired, future operations and maintenance costs are forecast to increase. When assets are disposed of the forecast operation and maintenance costs are reduced. ***Figure 17*** shows the forecast operations and maintenance costs relative to the proposed operations and maintenance planned budget.

Figure 16: Operations and Maintenance Summary
All Figure Values Are Shown In 2023 Dollars.



The forecasted operations and maintenance needs will increase steadily over time with the addition of new assets that CAM Division and Fleet Services manages, such as new city-wide fleet assets, administrative assets, and vehicle service tools and equipment. Forecasted operational and maintenance costs for additional acquired assets are not included in this AM Plan due to data limitations.

As per ***Figure 17***, Fleet Services and CAM Division has insufficient funding from the current year budget and multi-year forecast 2023-2026 to achieve the majority of operations and maintenance requirements to ensure that Fleet Services and CAM Division will be able to continue delivering their current levels of service. However, it is expected that these projections follow better costing models as recommended by ongoing consultant assignments.

For 2023, the maintenance needs shown in the graph above include $11.96 Million of deferred maintenance work which has accumulated over time, as per the BCAs. The operational and maintenance forecasted needs include some unfunded activities maintenance activities

identified in the BCA, and additional operational activities identified in the risk management plans as part of the risk assessment.

Generally, Fleet Services is largely funded through user fees charged to other service areas. When maintenance is performed on a vehicle, the parts and labour are charged to the service area, when a vehicle is fuelled the fuel cost is recovered from the service area. When licensing or driver services are used the costs are also recovered. Increases in operation and maintenance needs would be offset by increased charges to other city service areas as the approved budget allows.

Fleet Services and CAM Division created a three-year multi-year operating budget which included operations, maintenance, and renewal items until 2026. This multi-year forecast was included in the figure above with the operations and maintenance portions of the Operating budget, and then these numbers were carried flat across the thirty-year forecast from 2027-2052.

As the City continues to develop condition profiles and necessary works are identified based on their condition, it is anticipated these operation and maintenance forecasts will change. Future iterations of this plan will provide a more thorough analysis of operations and maintenance costs including types of expenditures for BEV vehicle maintenance training, mandatory certifications, staffing costs and requirements, equipment, and maintenance activities.

8.3 RENEWAL PLAN

Renewal is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces, or renews an existing asset to its original service potential. Works over and above restoring an asset to its original service potential is considered to be an acquisition resulting in additional future operations and maintenance costs.

Asset renewals are typically undertaken to ensure the asset's reliability or quality will meet the service requirements set out by the City. Renewal projects are often triggered by service quality failure and can often be prioritized by those that have the highest consequence of failure, have high usage, have high operational and maintenance costs and other deciding factors.

The typical useful lives of assets used to develop projected asset renewal forecasts are shown in ***Table 24*** and are based on the estimated design life for this iteration. Future iterations of the plan will focus on the Lifecycle approach to ESL which can vary greatly from design life. Asset useful lives were last reviewed in 2022 however they will be reviewed annually until their accuracy reflects the City's current practices.

Table 24: Useful Lives of Assets

ASSET SUBCATEGORY	ESTIMATED SERVICE LIFE (YEARS)
CAM and Fleet Services IT Equipment	4-5
EAM Software	15
EV Charging Stations	10
Facilities	50
Fuel Stations – added in based on FCI and age of fuel infrastructure	35
Hoists	25
Vehicles	8-15
Vehicle Service Equipment and Tools	10

RENEWAL RANKING CRITERIA

Asset renewal is typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the service it was constructed to facilitate (e.g., Facilities can process required volumes); or
- To ensure the infrastructure is of sufficient quality to meet the service requirements (e.g., Vehicles are reliable).[28]

Future methodologies may be developed to optimize and prioritize renewals by identifying assets or asset groups that:

- Have a high consequence of failure;
- Have high use and the subsequent impact on users would be significant;
- Have higher than expected operational or maintenance costs; and,
- Have the potential to reduce life cycle costs by replacement with a modern equivalent asset that would provide the equivalent service.[29]

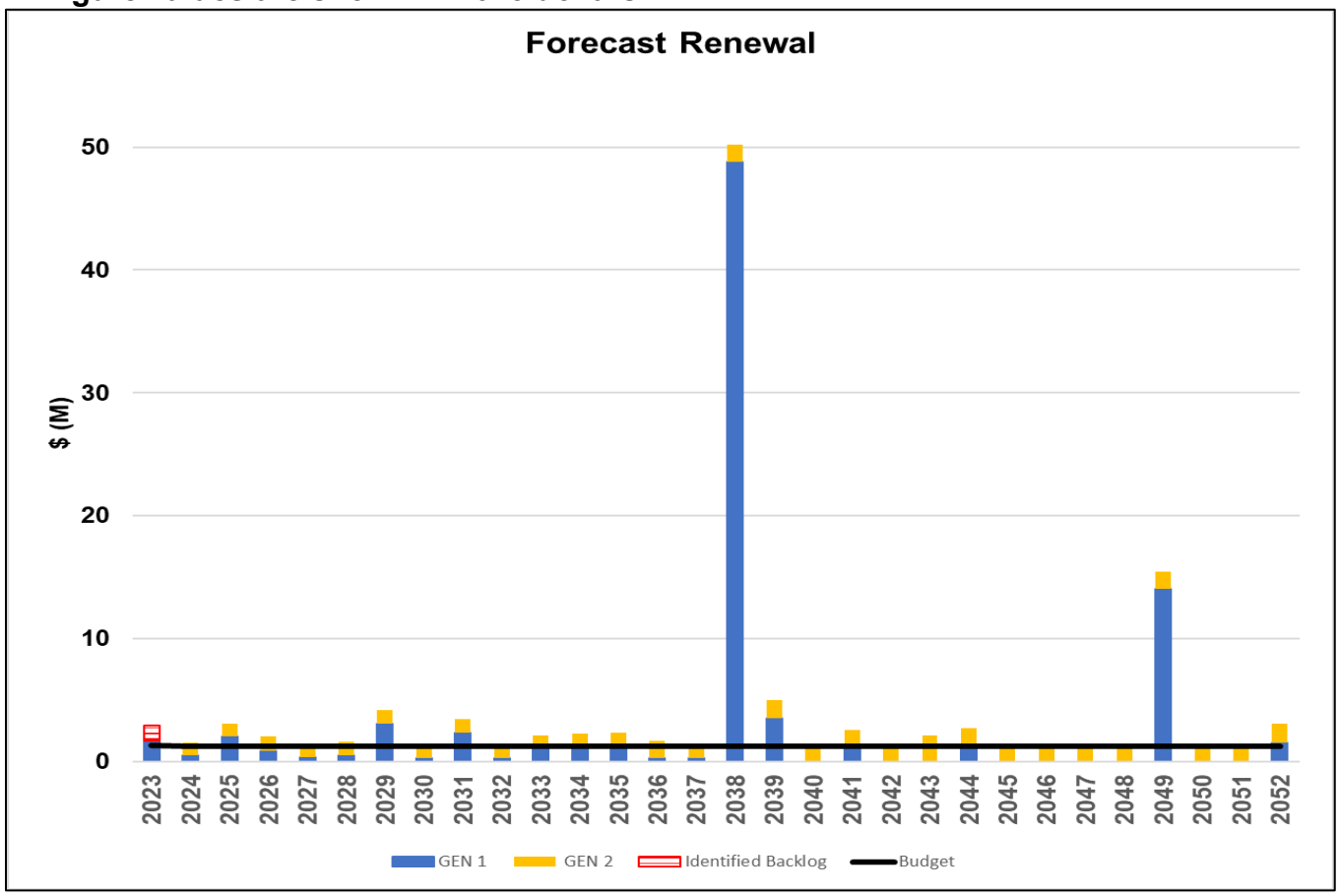
[28] IPWEA, 2015, IIMM, Sec 3.4.4, p 3|91.
[29] Based on IPWEA, 2015, IIMM, Sec 3.4.5, p 3|97.

SUMMARY OF FUTURE RENEWAL COST

Forecast renewal costs are projected to increase over time if the asset stock increases. The forecast costs associated with renewals are shown relative to the proposed renewal budget in ***Figure 18.***

In the figure below, Generation 1 (Gen 1) costs refer to renewals that occur for the first time in the model based on the estimated service life and Generation 2+ (Gen 2+) costs refer to renewals that have occurred twice or more based on the estimated service life.

Figure 17: **Forecast Renewal Costs**
All figure values are shown in 2023 dollars.



Currently, CAM Division and Fleet Services have a backlog of **$1.3 M**, shown in red in 2023. This cumulative backlog represents the deferred work needed to be completed that has been identified through its current estimated service life, ***Table 24***. The major backlog items for Fleet Services include:

- $443 thousand for 11 vehicle renewals; and,
- $835 thousand for two fuel station renewals.

In addition to the backlog, a significant spike of $48.8 million in 2038 is related to the renewal of the Fleet Services allocated portion of the Wentworth Street Operation Centre and the renewal of EAM software.

Other renewal spikes include:

- 2029: $4.1 million in renewals, including:
  - Renewal of one fuel station ($565K);
  - Renewal of six hoists ($2.2M); and,
  - Renewals of vehicle service tools and technology ($350K).

- 2038: $50.1 million in renewals, including:
  - Renewal for one fleet facility ($45.3M);
  - EAM software renewal ($3.5M); and,
  - Renewals of vehicle service tools and technology ($330K).

- 2049: $15.4 million in renewals, including:
  - Renewal for one fleet facility ($13.1M); and,
  - Renewal of two fuel stations ($915K).

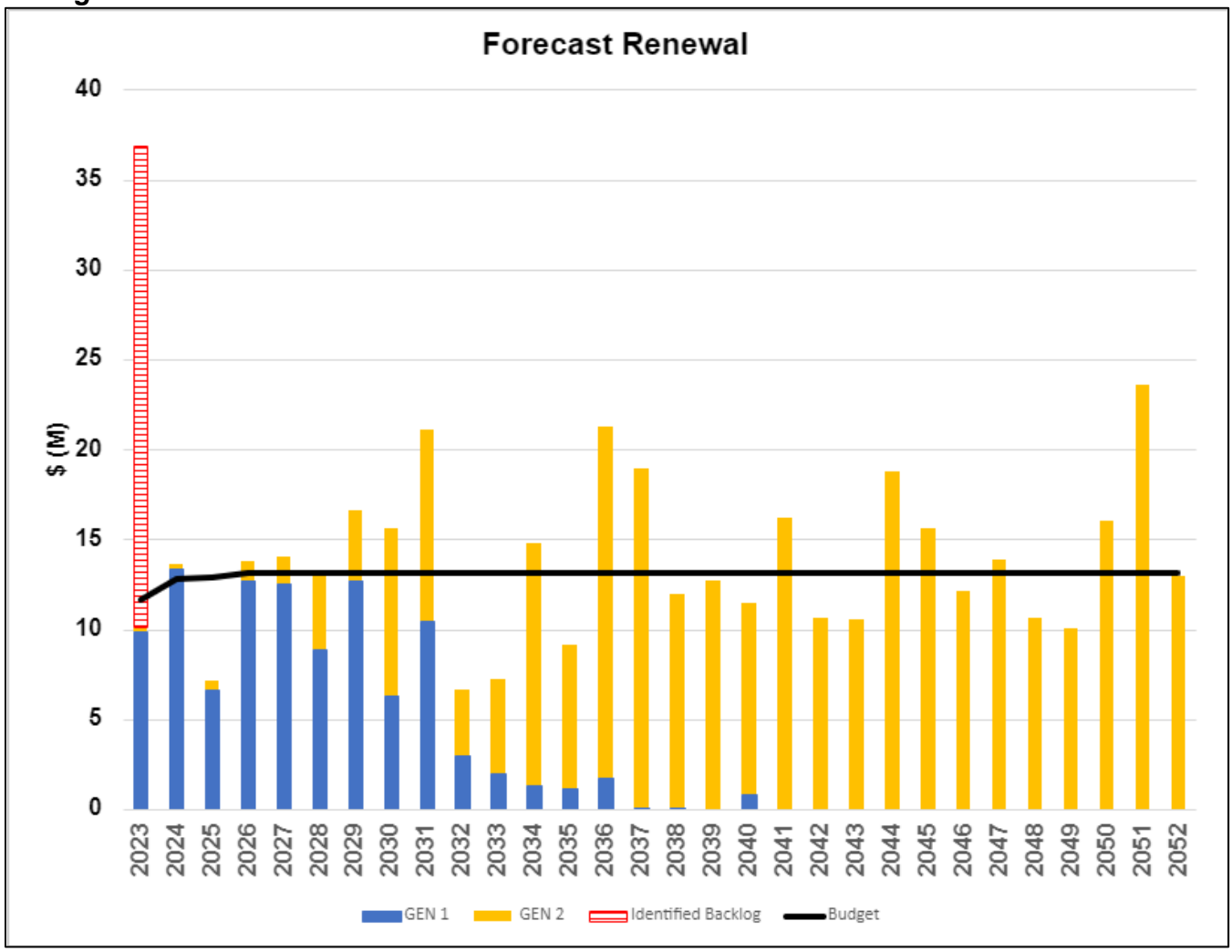
Deferring renewals creates risks of higher financial costs, decreased availability, and decreased satisfaction with asset performance. Continuously deferring renewals work ensures the City of Hamilton will not achieve intergenerational equality. If the City of Hamilton continues to push out necessary renewals, there is a high risk that future generations will be unable to maintain the level of service the customers currently enjoy. It will burden future generations with significant costs that inevitably they will be unable to sustain.

Properly funded and timely renewals will ensure the assets perform as expected and it is recommended to continue to analyze asset renewals based on criticality and availability of funds for future AM Plans.

Summary of Future Renewal Costs for City-Wide Fleet

The renewal graph for the city-wide fleet is shown below in ***Figure 19***. A backlog of $26.7 million is shown in red in 2023. This backlog represents the deferred renewals of 351 City-wide Fleet assets that are past their estimated service life.

Figure 18: Forecast Renewal Costs for City-wide Fleet Renewal
All Figure Values Are Shown In 2023 Dollars



As discussed in ***Section 2.1.2***, the fleet renewals are funded from the Fleet Capital Reserve account, which receives monthly contributions from service areas. These contributions are calculated by Fleet Services based on the last purchase price of the vehicle divided by the estimated service life of the year, aiming to fully cover the replacement costs of vehicles at the end of their service life. However, with the Fleet Capital Reserve account in deficit, these monthly contributions are considered insufficient and require a thorough review. One reason for this deficit could be the use of the original purchase price to calculate contributions, which fails to account for inflation-driven increases in vehicle prices over time. Updating replacement values for these assets has been identified as a continuous improvement item in ***Table 28***.

A consultant study[30] is underway to conduct an impact assessment of the current fleet capital replacement funding model, identify gaps and make recommendations for lifecycle

[30] Ward (2023)

management. The recommendations from this study are anticipated by the second quarter (Q2) 2024 and will be considered in the next iteration of the AM Plan where implemented. A renewal strategy recommendation is also being prepared as part of this consultant study.

The forecast vehicle costs in this AM Plan do not include the renewal of internal combustion engine (ICE) vehicles with battery electric vehicles (BEV). On average, it is expected that renewing an ICE vehicle with a BEV would require an additional 62% of funding which does not include the installation of a charging structure. Therefore, incorporating these BEV renewals would significantly increase the overall costs beyond what is currently estimated in this AM Plan. The funding gap depicted in ***Figure 19*** is likely to be larger than indicated here once these additional costs are factored in.

8.4 DISPOSAL PLAN

Disposal includes any activity associated with the disposal of a decommissioned asset including sale, possible closure of service, decommissioning, disposal of asset materials, or relocation. Disposals will occur when an asset reaches the end of its useful life. The end of its useful life can be determined by factors such as excessive operation and maintenance costs, regulatory changes, obsolescence, or demand for the asset has fallen.

Assets identified for possible decommissioning and disposal are shown in ***Table 25.*** A summary of the disposal costs and estimated reductions in annual operations and maintenance of disposing of the assets are also outlined in ***Table 25.*** Any costs or revenue gained from asset disposals is included in future iterations of the plan and the long-term financial plan.

Table 25: Assets Identified for Disposal

ASSET	REASON FOR DISPOSAL	TIMING	DISPOSAL COSTS	OPERATIONS & MAINTENANCE ANNUAL SAVINGS
Fuel Stations	Transition to EV charging stations as part of net zero greenhouse gas emission goal by 2050.	2050	$115K per fuel station.	TBD
Vehicles[31]	Replacement at end of useful life.	Ad Hoc	N/A	No data available

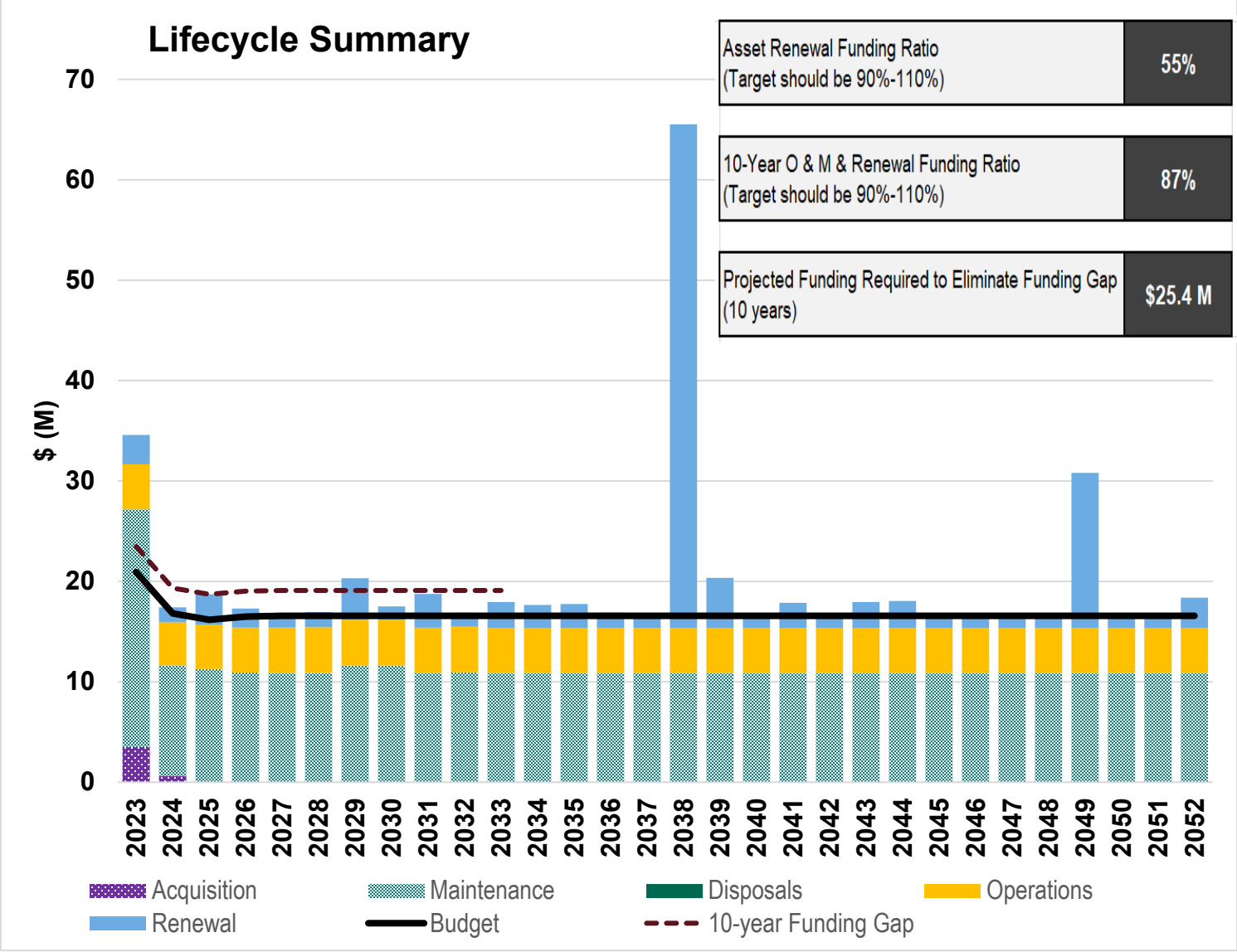
[31] Residual Value from auctioned fleet assets is transferred to the Fleet Reserve.

8.5 LIFECYCLE COST SUMMARY

The financial projections from this asset plan are shown in ***Figure 20***. These projections include forecast costs for acquisition, operation, maintenance, renewal, and disposal. These forecast costs are shown relative to the proposed budget.

The bars in the graphs represent the forecast costs estimated to minimize the life cycle costs associated with the service provision. The proposed budget line indicates the estimate of available funding. The gap between the forecast work and the proposed budget is the basis of the discussion on achieving a balance between costs, levels of service and risk to achieve the best value outcome.

Figure 19: Forecast Renewal Costs
All Figure Values Are Shown In 2023 Dollars.



As per ***Figure 20***, there is insufficient budget to address all lifecycle activities by Fleet Services and CAM Division. The underfunded activities include deferred facility maintenance activities, additional forecasted operational activities, and underfunded asset renewals. It is anticipated that this gap will evolve as Fleet Services investigates the reasons behind the Fleet Reserve Renewal account deficit and assesses whether the cost allocations for services provided are sufficient to cover 100% of the operational costs related to the service.

The City will continue to improve its lifecycle data, and this will allow for informed choices as to how best to mitigate impacts and how to address the funding gap itself. This gap in funding for future plans will be refined in the future to improve the confidence and accuracy of the forecasts.

9. FINANCIAL SUMMARY

This section contains the financial requirements resulting from the information presented in the previous sections of this AM Plan. Effective asset and financial management will enable the City to ensure its CAM and Fleet Services provide the appropriate level of service for the City to achieve its goals and objectives. Reporting to stakeholders on service and financial performance ensures the City is transparently fulfilling its stewardship accountabilities.

Long-term financial planning (LTFP) is critical for the City to ensure that network lifecycle activities such as renewals, operations, maintenance, and acquisitions can happen at the optimal time. The City is under increasing pressure to meet the wants and needs of its customers while keeping costs at an affordable level and maintaining its financial sustainability.

Without funding asset activities properly for CAM and Fleet Services; the City will have difficult choices to make in the future which will include options such as higher costs reactive maintenance and operational costs, reduction of service and potential reputational damage.

Aligning the LTFP with the AM Plan is critical to ensure all the network needs will be met while the City is finalizing a clear financial strategy with measurable financial targets. The financial projections will be improved as the discussion on desired levels of service and asset performance matures.

9.1 SUSTAINABILITY OF SERVICE DELIVERY

There are two key indicators of sustainable service delivery that are considered within the AM Plan for this service area. The two indicators are the:

- Asset renewal funding ratio (proposed renewal budget for the next 10 years / forecast renewal costs for next 10 years); and,
- Medium-term forecast costs/proposed budget (over 10 years of the planning period).

ASSET RENEWAL FUNDING RATIO

Asset Renewal Funding Ratio[32] **55%**

The Asset Renewal Funding Ratio (ARFR) is used to determine if the City is accommodating asset renewals in an **optimal** and **cost-effective** manner from a timing perspective and relative to financial constraints, the risk the City is prepared to accept and targeted service levels it wishes to maintain. The target renewal funding ratio should be ideally between **90% - 110%** over the entire planning period. A low indicator result generally indicates that service levels are achievable, however, the expenditures are below this level in some service areas predominantly

[32] AIFMM, 2015, Version 1.0, Financial Sustainability Indicator 3, Sec 2.6, p 9.

due to underinvestment, including a lack of permanent infrastructure funding from senior levels of government, as well as large spikes of growth throughout the years.

The Asset Renewal Funding Ratio is influenced by the upcoming renewals of nine fuel stations ($6.0 M) and six hoists ($2.2M) within the next 10 years, for which no planned budget has been allocated. Approximately $2M has been approved for hoist renewal in the 2024 Capital budget, which will help close the funding gap. This has not been included in this lifecycle model.

If assets are not renewed at the appropriate timing, it will inevitably require difficult trade-off choices that could include:

- A reduction of the level of service and availability of assets;
- Increased complaints and reduced customer satisfaction;
- Increased reactive maintenance and renewal costs; and,
- Damage to the City's reputation and risk of fines or legal costs.

The lack of renewal resources will be addressed in future AM Plans while aligning the plan to the LTFP. This will allow staff to develop options and long-term strategies to address the renewal rate. The City will review its renewal allocations once the entire inventory has been confirmed and amalgamated.

City-Wide Fleet

Asset Renewal Funding Ratio[33] **Not Yet Quantified**

As outlined in ***Section 8.3***, Fleet Services currently has a consultant report[34] in progress to tackle identified deficiencies with the sustainability of the Fleet Capital Reserve Account and assess the monthly contributions it receives from service areas. Upon completion of the consultant study[33], the AM Plan will be revised accordingly, and the Asset Renewal Funding Ratio will be updated for the next iteration of the AM Plan.

MEDIUM-TERM – 10 YEAR FINANCIAL PLANNING PERIOD

10-Year Operating, Maintenance and Renewal Ratio 87%

Although this AM Plan includes forecast projections to 30 years, the higher confidence numbers are typically within the first 10 years of the lifecycle forecast. The 10-year Operating, Maintenance and Renewal Ratio compares the Planned Budget with the Lifecycle Forecast for the optimal operation, maintenance, and renewal of assets to provide an agreed level of service over the next 10-year period. Similarly, to the ARFR, the optimal ratio is also between **90-110%**. A low ratio would indicate that assets are not being funded at the rate that would meet the organization's risk and service level commitments.

[33] AIFMM, 2015, Version 1.0, Financial Sustainability Indicator 3, Sec 2.6, p 9.
[34] Ward (2023)

The forecast operations, maintenance, and renewal costs over the 10-year planning period are **$19.1M** on average per year. Over time as improved information becomes available, it is anticipated to see this number change. The proposed (budget) operations, maintenance and renewal funding is **$16.6M** on average per year giving a 10-year funding shortfall of **$2.54M** per year or **$25.4M** over the 10-year planning period. This indicates that **87%** of the forecast costs needed to provide the services documented in this AM Plan are accommodated in the proposed budget, which is outside of the 90-110% range. Therefore, it can be concluded that Fleet Services is funding its assets at a lower-than-acceptable rate. Note, that these calculations exclude acquired assets.

Funding an annual funding shortfall or funding 'gap' should not be addressed immediately. The overall gap in funding city-wide will require vetting, planning and resources to begin to incorporate gap management into the future budgets for all City services. This gap will need to be managed over time to reduce it in a sustainable manner and limit financial shock to customers. Options for managing the gap include;

- Financing strategies – increased funding, block funding for specific lifecycle activities, long-term debt utilization;
- Adjustments to lifecycle activities – increase/decrease maintenance or operations, increase/decrease frequency of renewals, limit acquisitions or dispose of underutilized assets;
- Influence level of service expectations or demand drivers;
- Analyze the charge rates for all services provided by Fleet Services to assess if they are sufficient to cover the service; and,
- Conduct a cost analysis of the Fleet Capital Reserve account.

These options and others will allow Hamilton to ensure the gap is managed appropriately and ensure the level of service outcomes the customers desire.

Providing sustainable services from infrastructure requires the management of service levels, risks, forecast outlays and financing to eventually achieve a financial indicator of **90-110%** for the first years of the AM Plan and ideally over the 10-year life of the Long-Term Financial Plan.

9.2 FORECAST COSTS (OUTLAYS) FOR THE LONG-TERM FINANCIAL PLAN

Table 26 shows the forecast costs (outlays) required for consideration in the 30-year long-term financial plan.

Providing services in a financially sustainable manner requires a balance between the forecast outlays required to deliver the agreed service levels with the planned budget allocations in the operational and capital budget. The City will begin developing its long-term financial plan (LTFP) to incorporate both the operational and capital budget information and help align the LTFP to the AM Plan which is critical for effective asset management planning.

A gap between the forecast outlays and the amounts allocated in the financial plan indicates further work is required on reviewing service levels in the AM Plan (including possibly revising the long-term financial plan).

The city will manage the 'gap' by continuing to develop this AM Plan to provide guidance on future service levels and resources required to provide these services in consultation with the community. Options to manage the gap include reduction and closure of low-use assets, increased funding allocations, reduce the expected level of service, utilize debt-based funding over the long term, adjustments to lifecycle activities, improved renewals and multiple other options or combinations of options.

Table 26: Forecast Costs (Outlays) For the Long-Term Financial Plan
Forecast Costs Are Shown In 2023 Dollar Values.

YEAR	ACQUISITION	OPERATION	MAINTENANCE	RENEWAL	DISPOSAL
2023	$ 3,520,000	$ 4,490,173	$ 23,651,560	$ 2,920,479	$ -
2024	$ 600,000	$ 4,293,017	$ 10,694,869	$ 1,495,361	$ -
2025	$ -	$ 4,391,381	$ 11,274,482	$ 3,050,218	$ -
2026	$ -	$ 4,491,339	$ 10,920,260	$ 1,884,887	$ -
2027	$ -	$ 4,561,913	$ 10,855,399	$ 1,358,293	$ -
2028	$ -	$ 4,561,913	$ 10,875,308	$ 1,508,231	$ -
2029	$ -	$ 4,561,913	$ 11,613,863	$ 4,144,428	$ -
2030	$ -	$ 4,561,913	$ 11,626,262	$ 1,322,427	$ -
2031	$ -	$ 4,561,913	$ 10,858,051	$ 3,358,293	$ -
2032	$ -	$ 4,561,913	$ 10,949,977	$ 1,388,611	$ -
2033	$ -	$ 4,561,913	$ 10,852,946	$ 2,560,972	$ -
2034	$ -	$ 4,561,913	$ 10,852,946	$ 2,271,278	$ -
2035	$ -	$ 4,561,913	$ 10,852,946	$ 2,360,833	$ -
2036	$ -	$ 4,561,913	$ 10,852,946	$ 1,500,611	$ -
2037	$ -	$ 4,561,913	$ 10,852,946	$ 1,322,678	$ -
2038	$ -	$ 4,561,913	$ 10,852,946	$ 50,136,164	$ -
2039	$ -	$ 4,561,913	$ 10,852,946	$ 4,968,199	$ -
2040	$ -	$ 4,561,913	$ 10,852,946	$ 1,391,151	$ -
2041	$ -	$ 4,561,913	$ 10,852,946	$ 2,482,678	$ -
2042	$ -	$ 4,561,913	$ 10,852,946	$ 1,319,887	$ -

YEAR	ACQUISITION	OPERATION	MAINTENANCE	RENEWAL	DISPOSAL
2043	$ -	$ 4,561,913	$ 10,852,946	$ 2,566,587	$ -
2044	$ -	$ 4,561,913	$ 10,852,946	$ 2,662,361	$ -
2045	$ -	$ 4,561,913	$ 10,852,946	$ 1,325,218	$ -
2046	$ -	$ 4,561,913	$ 10,852,946	$ 1,319,887	$ -
2047	$ -	$ 4,561,913	$ 10,852,946	$ 1,358,293	$ -
2048	$ -	$ 4,561,913	$ 10,852,946	$ 1,396,231	$ -
2049	$ -	$ 4,561,913	$ 10,852,946	$ 15,424,224	$ -
2050	$ -	$ 4,561,913	$ 10,852,946	$ 1,322,427	$ -
2051	$ -	$ 4,561,913	$ 10,852,946	$ 1,358,293	$ -
2052	$ -	$ 4,561,913	$ 10,852,946	$ 3,000,611	$ -

9.3 FUNDING STRATEGY

The proposed funding for assets is outlined in the City's operational budget and the 10-year capital budget.

These operational and capital budgets determine how funding will be provided, whereas the AM Plan typically communicates how and when this will be spent, along with the service and risk consequences. Future iterations of the AM plan will provide service delivery options and alternatives to optimize limited financial resources.

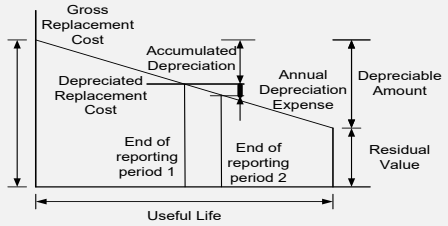
9.4 VALUATION FORECASTS

Asset values are forecast to increase as additional assets are added into service. As projections improve and can be validated with market pricing, the net valuations will likely increase significantly despite some assets being programmed for disposal that will be removed from the register over the 30-year planning horizon.

Additional assets will add to the operations and maintenance needs in the longer term. Additional assets will also require additional costs due to future renewals. Any additional assets will also add to future depreciation forecasts. Any disposals of assets would decrease the operations and maintenance needs in the longer term and remove the high costs of renewal obligations. At this time, it is not possible to separate the disposal costs from the renewal or maintenance costs however this will be improved for the next iteration of the plan.

9.5 ASSET VALUATION

Replacement Cost (Current/Gross)	**$87.4 M**
Depreciable Amount	**$87.4 M**
Depreciated Replacement Cost[35]	**$33.9 M**
Depreciation	**$ 2.4 M**



The current replacement cost is the most common valuation approach for specialized infrastructure assets. The methodology includes establishing a comprehensive asset registry, assessing replacement costs (based on market pricing for the modern equivalent assets) and useful lives, determining the appropriate depreciation method, testing for impairments, and determining remaining useful life.

As the City matures its asset data, it is highly likely that these valuations will fluctuate significantly over the next three years, and they should increase over time based on improved market equivalent costs as well as anticipated cost changes due to climate change mitigation and adaptation strategies.

9.6 KEY ASSUMPTIONS MADE IN FINANCIAL FORECASTS

In compiling this AM Plan, it was necessary to make some assumptions. This section details the key assumptions made in the development of this AM Plan and should provide readers with an understanding of the level of confidence in the data behind the financial forecasts.

Key assumptions made in this AM Plan are:

- Operational forecasts are based on current budget allocations and are the basis for the projections for the 30-year horizon and encompass additional operational needs, where known, but do not address all other operational needs that may not yet be identified;
- Maintenance forecasts are based on current budget allocations and encompass anticipated needs, where known, but do not necessarily identify all asset needs at this time; and,
- Replacement costs were based on historical costing and subject matter expertise. They were also made without determining what the asset would be replaced with in the future.

[35] Also reported as Written Down Value, Carrying or Net Book Value.

9.7 FORECAST RELIABILITY AND CONFIDENCE

The forecast costs, proposed budgets, and valuation projections in this AM Plan are based on the best available data. For effective asset and financial management, it is critical that the information is current and accurate. Data confidence is defined in the ***AM Plan Overview***.

The estimated confidence level for and reliability of data used in this AM Plan is considered to be a **Medium** confidence level.

Table 27: Data Confidence Assessment for Data Used in AM Plan

DATA	CONFIDENCE ASSESSMENT	COMMENT
Demand Drivers	Low	The impacts from the identified demand drivers were not added to the lifecycle model for this iteration of the AM plan. The overall demand for city-wide vehicles is spread across AM Plans of other service areas and the overall vehicle demand forecast is not included and is out of scope for this AM Plan.
Acquisition Forecast	Low	Fleet Services acquisitions are captured in the other service area budgets. CAM Division EAM software implementation is added as an acquisition based on the capital project budget.
Operation Forecast	Medium	Currently budget-based with few additional forecast operational activities. Additional forecast operational activities may be added after completion of the consultant study, as mentioned in ***Section 2.14***.
Maintenance Forecast	Low	Maintenance forecasts in this Asset Management Plan are typically based on the results of the Building Condition Assessment which have been updated by the Corporate Facilities and Energy Management division and are assumed to be a medium confidence. The maintenance forecast for vehicles is based on budget. Additional maintenance KPIs (Key Performance Indicators) may be included after the implementation of EAM software which may trigger additional maintenance activities. The maintenance forecast of vehicle servicing tools and hoists is not clearly forecasted in this AM plan and is based on budget.

DATA	CONFIDENCE ASSESSMENT	COMMENT
Renewal Forecast - Asset Value	Low	The renewal forecast for vehicles is of medium confidence however as part of the Fleet Capital Reserve cost analysis, these vehicle renewal values are expected to change. Renewal values of vehicle service equipment and tools are low confidence. The renewal of ICE vehicles with BEVs is not modelled into the lifecycle model, as mentioned in ***Section 8.3***, and the renewal costs are underreported.
Renewal Forecast – Asset Useful Life	Medium	Estimated service lives of assets were based on subject matter expertise. Estimated service lives for vehicles, facilities, fuel stations and technology renewals were medium confidence. Vehicle service equipment and tools' estimated service lives are low confidence due to a lack of detailed inventory data.
Renewal Forecast - Condition Modelling	Medium	Condition assessments were conducted for facilities based on Building Condition Assessment reports. The condition of fuel stations was determined using the Financial Condition Index calculated for this AM Plan. For vehicles and technology assets, assessments relied on subject matter expertise. However, no condition information was available for vehicle service equipment and tools.
Disposal forecast	Not Applicable	No disposals were integrated into the forecast.

10. PLAN IMPROVEMENT AND MONITORING

10.1 STATUS OF ASSET MANAGEMENT PRACTICES[36]

ACCOUNTING AND FINANCIAL DATA SOURCES

This AM Plan utilizes accounting and financial data. The sources of the data are:

- 2023 Approved CAM and Fleet Operating Budget;
- 2024-2025 Multi-Year CAM and Fleet Operating Forecast;
- 2023 Approved CAM and Fleet Capital Budget;
- 2024-2032 Multi-Year Capital Forecast;
- Building Condition Assessment Reports;
- Asset Management Data Collection Templates; and,
- Historical cost and estimates of budget allocation based on SME expertise.

ASSET MANAGEMENT DATA SOURCES

This AM Plan also utilizes asset management data. The sources of the data are:

- Data extracts from various city applications and management software;
- Asset Management Data Collection Templates;
- Tender documents, subdivision agreements and projected growth forecasts as well as internal reports;
- Condition assessments;
- Subject matter Expert Opinion and Anecdotal Information; and,
- Reports from the mandatory inspections, operational and maintenance activities internal reports.

10.2 IMPROVEMENT PLAN

It is important that the City recognize areas of the AM Plan and planning processes that require future improvements to ensure both effective asset management and informed decision-making. The tasks listed below are essential to improving the AM Plan and the City's ability to make evidence-based and informed decisions. These improvements span from improved lifecycle activities, improved financial planning and plans to physically improve the assets.

The Improvement Plan ***Table 28*** below highlights proposed improvement items that will require further discussion and analysis to determine feasibility, resource requirements and alignment to current work plans. Future iterations of this AM Plan will provide updates on these improvement plans.

[36] ISO 55000 Refers to this as the Asset Management System

Table 28: Improvement Plan

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
1.	**Design and develop a condition assessment for all equipment and tools assets.**	Fleet Services	Internal Resources	2024-2025
2.	**Deploy an Enterprise Asset Management System to comply with fleet operational requirements.**	Fleet Services and Corporate Asset Management	Training, dedicated hours to support	Commencement of EAM
3.	**Complete resource assessment for Fleet Services to determine staffing needs.**	Fleet Services	Internal Resources	TBD
4.	**Conduct cost analysis for Fleet Capital Reserve account and update vehicle replacement costs, additional changes from modern technology, and monthly charges paid by service areas.**	Fleet Services / Finance	TBD	TBD
5.	**Develop an internal services survey to help develop customer values and customer levels of service for future Asset Management Plans.**	Corporate Asset Management / Fleet Services	Internal Resources	In the next iteration of the AM Plan
6.	**Investigate incorporating a condition rating during regular vehicle inspection / maintenance activities on a 5-point scale.**	Fleet Services	Internal Resources	TBD
7.	**Enhance methodology for vehicle-specific Key Performance Indicators such as vehicle downtime, mileage etc., and build into EAM software.**	Fleet Services	Internal Resources	TBD

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
8.	**Develop a strategy to optimize the Fleet Services vehicle portfolio utilization.**	Fleet Services	Internal and External Resources	TBD
9.	**Investigate incorporating a condition rating during annual fuel station inspection activities per a 5-point scale.**	Fleet Services	Internal Resources	2025

10.3 MONITORING AND REVIEW PROCEDURES

This AM Plan will be reviewed during the annual budget planning process and revised to show any material changes in service levels, risks, forecast costs and proposed budgets as a result of budget decisions.

The AM Plan will be reviewed and updated regularly to ensure it represents the current service level, asset values, forecast operations, maintenance, renewals, acquisition and asset disposal costs and planned budgets. These forecast costs and proposed budget will be incorporated into the Long-Term Financial Plan once completed.

10.4 PERFORMANCE MEASURES

The effectiveness of this AM Plan can be measured in the following ways:

- The degree to which the required forecast costs identified in this AM Plan are incorporated into the long-term financial plan;
- The degree to which the one-to-ten-year detailed works programs, budgets, business plans and corporate structures consider the 'global' works program trends provided by the AM Plan;
- The degree to which the existing and projected service levels and service consequences, risks and residual risks are incorporated into the Strategic Planning documents and associated plans; and,
- The Asset Renewal Funding Ratio achieving the Organizational target (this target is often 90 – 110%).

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