TOWN OF LINCOLN

May 2024

FLEET ASSET MANAGEMENT PLAN

TOWN OF LINCOLN

DATE: MAY 2024

APPENDICES

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1 GOVERNANCE AND LEADERSHIP

1.1 OVERVIEW

The Town of Lincoln is located in the heart of Niagara region, with one of the most diverse economies in Niagara including agriculture, small businesses, advanced manufacturing, and health care. The Town of Lincoln is currently the fourth fastest growing municipality in Niagara, with a focus on developing a complete community. Our towns and villages are filled with over 50 wineries, fresh fruit, vegetables, and flowers, heritage and cultural sites, and natural attractions such as the Niagara Escarpment and Lake Ontario. The Town of Lincoln is part of a two-tier municipality with Niagara Region as the upper tier comprising of 12 municipalities, including Lincoln.

The Fleet Services Division, which is part of the Public Works Department provides responsive and efficient fleet management services to the Town's internal departments while maximizing safety and environmental sustainability and minimizing lifecycle costs. Fleet Services has an in-house mechanic team that services all equipment from push mowers to snowplows. Fleet Services is responsible for driver training, vehicle maintenance, asset management, green fleet initiatives, and licensing of vehicles.

The Town of Lincoln's fleet services include the following asset types:

- Heavy-duty vehicles
- Medium-duty vehicles
- Light-duty vehicles
- Capital equipment

1.2 ROLES AND RESPONSIBILITIES

The **Chief Administrative Officer** (CAO) is responsible for oversight and administration of the Town's services. The CAO implements the policies and direction of Council and develops strategic planning initiatives for the organization with support from the senior management team.

The **Town's Public Works Department** is responsible for the stewardship of all core asset categories outlined in the Fleet Asset Management Plan. The teams supporting this mandate are highlighted below:

- **Director of Public Works -** Reports to the CAO, brings forward annual fleet budget business case requests to the Corporate Leadership Team (CLT) and Council for consideration and approval support. Involved in reviewing updates to the capital forecast brought forward by the Manager of Operations and provides general leadership and

direction of service delivery to the fleet team. Fosters and helps facilitate fleet needs across departments.

- **Associate Director of Public Works -** Reports to the Director of Public Works. Involved in reviewing updates to the capital forecast brought forward by the Manager of Operations. Provides general leadership and direction of service delivery to the fleet team. Foster and help facilitate fleet needs across departments.

- **Manager of Operations** - Reports to Associate Director of Public Works. Responsible for processes involved with fleet procurement within the Town's policies. Provides input, recommendations, and assistance with the preparation and monitoring of Fleet operating and capital budgets and operating budget expenditures. Develops, implements, recommends, and maintains a fleet management system that optimizes the use and life cycle of fleet assets at the least possible cost and impact on climate. Prepares, reviews and presents reports related to departmental issues such as tender analysis, contract awards, by-law amendments, budget recommendations, current condition of the fleet and equipment and program updates to Department leadership, Senior Leadership Team and/or Council.

- **Fleet Coordinator** – Reports to the Manager of operation, responsible for the entire lifecycle of the fleet of vehicles and equipment. This includes the procurement process of new assets, maintenance and repairs, inventory management licensing and regulatory compliance. The Fleet Coordinator is also on call for emergencies 24h/7. The Fleet Supervisor directs and oversees the work of the Equipment Technician.

- **Equipment Technician** - Reports to Fleet Coordinator and provides vehicle troubleshooting and diagnostic repairs. Performs scheduled and unscheduled maintenance and repairs to municipal equipment in order to ensure that the equipment is available, reliable and safe to operate. Orders parts and supplies for the shop and other departments, Is responsible for finding and working with suppliers, mechanic shops and dealerships for a wide range of equipment that need repairs and/or parts, Monitors inventory and supply levels and orders replenishment of materials. Responds to emergency situations as well as when requested by other divisions.
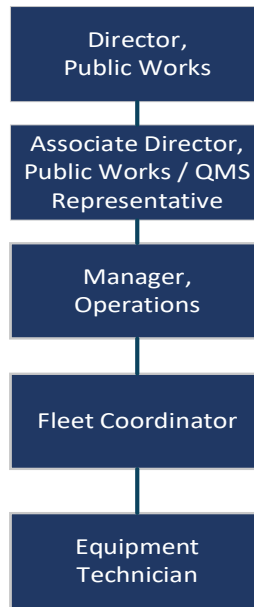
Figure 1: Town of Lincoln Fleet Service Organization Chart

1.3 GOALS AND OBJECTIVES

The Town of Lincoln's strategic plan "A Future Fit Lincoln" describes its strategic priorities to build a welcoming, connected, vibrant and resilient community. The long-term vision statement for the Town is:

A place to grow:

Youth, aging in place, agriculture – growing crops, farming, greenhouse support, business growth, early childhood development (youth), proper planning and growing smart, growing your family here in Lincoln.

A place to prosper:

A place for small/medium businesses to succeed, opportunities, job creation, tourism, destination, local markets, festivals, beautification, industrial parks, prosperity, community vibrancy, innovation.

A place to belong:

Maintain community feeling, connectedness, more local events, support for families, history and heritage, local markets, local and unique festivals, moving around town, one community.

1.3.1 TOWN OF LINCOLN FLEET GOALS

The Town of Lincoln Fleet Service is an essential service that supports achievement of the Town's vision (a place to grow; a place to prosper; and a place to belong).

The Corporation of the Town of Lincoln, as owner and operator of the Fleet service is committed to:

- Complying with applicable legislation and regulations, and
- Maintaining and continually improving its quality management system.
- Provide and maintain vehicles and equipment required for all departments in Town to operate and meet required levels of service.

1.4 CONTEXT FOR ASSET MANAGEMENT PLAN DOCUMENT

1.4.1 RELATIONSHIP WITH OTHER DOCUMENTS

The Town recognizes the importance of proactive and responsible management of its fleet infrastructure. Figure 2 shows the linkage and relationships between asset data and how it informs asset management plans, financial and master planning documents, corporate asset management plans, climate adaptation and mitigation plan and policy statements, which in the Fleet Asset Management Plan will strive to meet the goals of a *Future-Fit Lincoln*. These goals are to provide a reliable, effective, and supportive service in a financially responsible way that is aligned to the community vision.
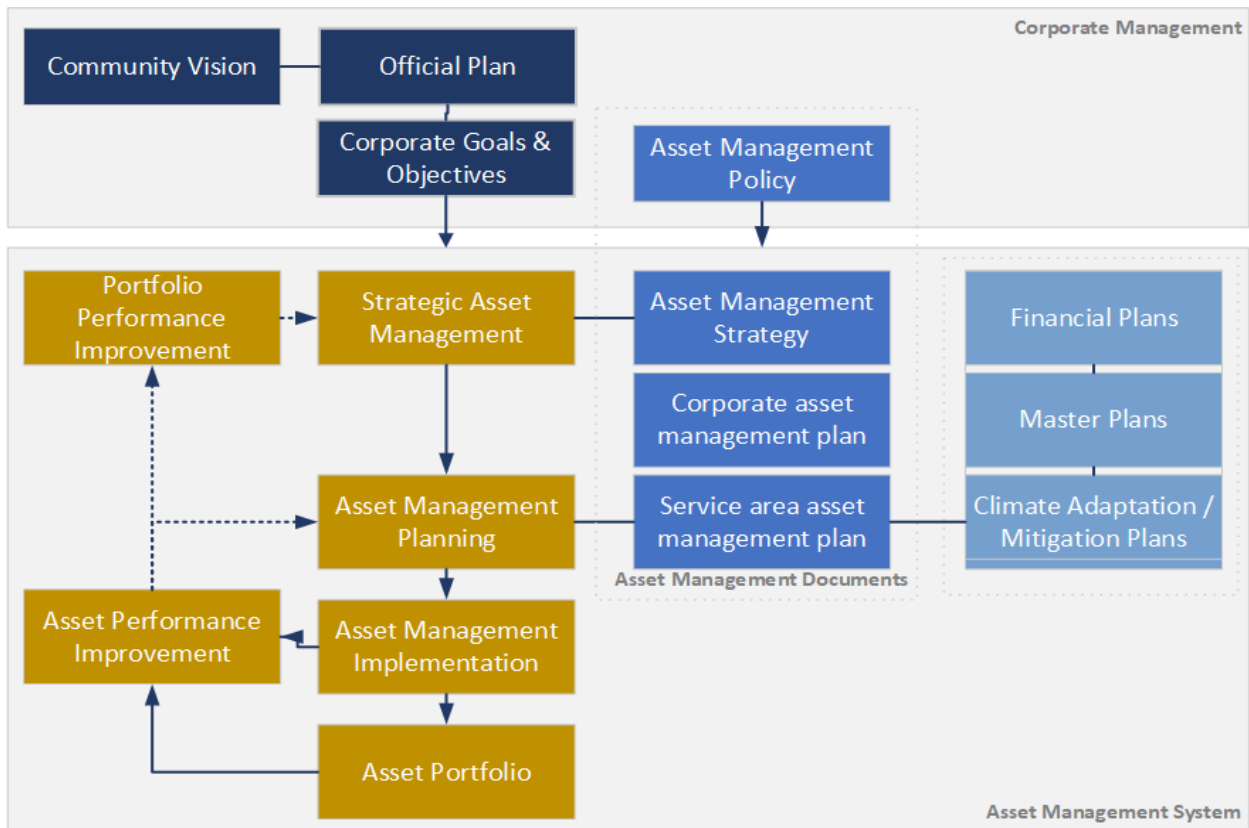
Figure 2: Relationship to Corporate Documents

1.4.2 LIMITATIONS AND ASSUMPTIONS

This Asset Management Plan has been prepared based on the best information available regarding inventory and costs of providing the service, adequate maintenance, and renewal of assets in a "whole of lifecycle" manner. Continuous improvement of the Town of Lincoln's asset management practices is essential to collect accurate asset information that supports quality planning and sustainable infrastructure management.

Key limitations of this Asset Management Plan are described in Table 1. Improvement items have been identified and prioritized in Section 6 Continuous Improvement Plan and will address the limitations listed below.

Table 1: Limitations of the Asset Management Plan

Limitation	Impact
Asset data	The analysis done as part of this Asset Management Plan has assumed an EUL of 10-16 years for all fleet assets. While a 10-years is a typical lifespan for fleet assets, it may vary significantly, depending on utilization, maintenance, and operating environment. Using a generic EUL assumption across all fleet assets may under- or over-estimate the renewal needs. Replacement costs for some assets have been last updated in 2020. Replacement costs for capital assets may change drastically year-over-year due to micro and macro-economic factors, technology regulations, and overall economic state of the world. Improving data quality and reliability is a recommended task in the continuous improvement process for this AMP.
Performance measures: current performance and targets	Current service level performance and targets are not currently known. Lifecycle strategies assumed for this Asset Management Plan may require adjustment once current service performance is measured and targets are set. Service-level targets relative to performance should be reviewed periodically and the forecast adjusted to reflect investment needed for achieving level of service commitments.
Lifecycle cost in the financial forecast do not include costs for operations, maintenance, and inspection forecast.	Needs-based forecast of operational costs has not been developed as part of this AMP. Currently, operations, maintenance, and inspection activities are not documented, and their cost and frequency are unknown. Identifying the complete set of lifecycle activities as well as their frequency and costs is a recommended improvements for updates to this AMP.

1.4.3 IMPLEMENTATION AND REVIEW

The fleet asset management plan forms part of the Town of Lincoln's continuous asset management improvement process. It documents current practices and information on:

- The quantity, age, condition, and value of the assets

- Current level of service and performance measures
- Current practices for managing the assets
- Risks to service delivery
- Renewal plans and financial strategy

The asset management plan also documents improvement tasks that, if addressed, will increase the level of understanding of the service provided by the fleet services. It will empower decision-makers with accurate and complete information in an easy-to-understand format that will support well-informed, evidence-based decisions that can make the best use of available funding whilst meeting the interests of the Town's residents. The implementation of this Asset Management Plan should therefore include regular review and update to keep the plan up to date with the latest information, understanding and projections.

The review cycle for implementing and updating the asset management plan is every five years as a minimum, and sooner if there is a significant change in costs, requirements, available data, or risks. Consideration must also be given in each asset management plan update to any changes in the Ontario Requirements 588/17: Asset Management Planning for Municipal Infrastructure.

2 KNOW YOUR ASSETS

2.1 OVERVIEW

A state-of-infrastructure analysis provides an objective assessment of the physical and financial status of assets. The following sections describe the current state of infrastructure for the fleet service assets owned and maintained by the Town of Lincoln. The Town's current fleet service asset inventory (year end 2022) is assessed through an evaluation framework designed to answer three fundamental asset management questions:

- What assets do we own (asset types and quantity/extent)?
- What are they worth (replacement cost)?
- What is their condition (asset age and condition distribution)?

The results provide an objective assessment of asset types, quantity, age, value, and condition. The analysis also provides a long-term forecast for asset replacements based on current age and condition compared to expected lifespan and the estimated replacement value for each asset. This information provides guidance to the Town of Lincoln for investment and lifecycle management decisions to achieve required level of service for the optimum lifecycle cost.

State of infrastructure results can also be tracked over time to understand trends such as overall increase or decrease in condition profile or age profile, increasing asset base (quantity), increasing asset replacement values, and other asset metrics.

2.2 OVERVIEW OF ASSETS

This section provides an overview of the fleet service assets owned and maintained by the Town of Lincoln. The asset inventory is divided into 4 asset classes: heavy-duty vehicles, medium duty vehicles, light-duty vehicles, and capital equipment. These are described in Table 2.

Table 2: Asset Inventory Overview

Asset Class	Description
Heavy-duty vehicles[1]	Heavy-duty vehicles include motor graders, wheel loaders, backhoe loaders, sweepers, compactors / asphalt rollers, single axle dump trucks, tandem axle dump trucks, tractors, and ice resurfaces.
Medium-duty vehicles[1]	Medium-duty vehicles include pick-up trucks, utility vans, transit vans, mowers, gators, and telescopic forklifts.
Light-duty vehicles[1]	Light-duty vehicles include passenger cars, sport utility vehicles (SUVs), and rugged terrain vehicles (RTVs).

Asset Class	Description
Capital equipment	Capital equipment assets include portable generators, hydraulic powerpacks, trash pumps, mower attachments, utility trailers, sweeper attachments, and plow attachments.

[1]*Note: Some vehicles are equipped with 360 warning lights, GPS, 2-way radio, spreader, front plow, and wing plows. These attachments are included in the total replacement cost of the vehicle and are assumed to have the same estimated useful life as the vehicle*

Fleet and equipment assets service multiple departments within the organization, including administration, bylaw, community services, environmental services, road services, and technical services. Table 3 summarizes the asset quantities by class and department serviced.

Table 3: Fleet and equipment asset quantities, by class and department

Department	Heavy-duty vehicles	Medium-duty vehicles	Light-duty vehicles	Capital equipment	Total
Administration	-	1	-	-	1
Bylaw	-	-	3		3
Community services	9	23	4	7	43
Environmental services	-	5	-	2	7
Road services	22	12	5	8	47
Technical services	-	1	1	-	2
Total	31	42	13	17	103

2.3 CONTEXT FOR INFORMATION IN THIS SECTION

2.3.1 ASSET DATA SOURCE

The inventory data for fleet service assets is maintained in spreadsheets.

2.3.2 MINIMUM DATA REQUIREMENTS

Currency and accuracy of asset data is critical to effective asset management, accurate financial forecasts, and informed decision-making. To produce the state of infrastructure section of the asset management plan, the following attribute data is required (where applicable):

- Unique asset identifier
- Asset owner
- Asset status (e.g., active, abandoned, not in use)
- Asset group

- Asset class
- Asset type
- Acquisition year
- Estimated useful life (EUL)
- Quantity (where applicable)
- Replacement cost or Unit rate

All assets currently have the minimum attribute information available.

2.3.3 ASSET REPLACEMENT COSTS

The asset replacement costs have either been based on historic values or estimated by Town staff. The asset register provides both replacement cost and the date it was added. All costs that were added before 2023 were translated into 2023 costs using Statistics Canada's machinery and equipment price index (MEPI), by commodity, quarterly (Table: 18-10-0269-01). **"The total machinery and equipment"** series of the index was used to make replacement costs adjustments.

2.3.4 ASSET LIFESPANS

The lifespan of all fleet service assets is based on Town staff experience. Fleet and capital equipment assets have an estimated lifespan of 10 to 30 years, depending on type of asset. The Town staff specified estimated useful life for each unique asset in the asset register.

2.3.5 ASSET CONDITION

The condition of an asset is estimated based on the asset's age and remaining lifespan following the scale shown in Table 4.

Table 4: Age-based condition rating

SCORE	CONDITION RATING	CRITERIA	RATING DESCRIPTION
1	**Very Good:** Fit for the future	RUL* ≥ 75%	The asset has greater than or equal to 75% of its remaining useful life. It is generally in very good condition, typically new or recently rehabilitated.
2	**Good:** Adequate for now	75% > RUL* ≥ 35%	The asset has less than 75% (and greater than or equal to 35%) of its remaining service life. It is in good condition.
3	**Fair:** Requires attention	35% > RUL* ≥ 13%	The asset has less than 35% (and greater than or equal to 13%) of its remaining service life. It is in fair condition.
4	**Poor:** At risk	13% > RUL* ≥ 3%	The asset has less than 13% (and greater than or equal to 3%) of its remaining service life. It is in poor condition and mostly below standard, with many elements approaching the end of their service life.
5	**Very Poor:** Unfit for sustained service	RUL* < 3%	The asset has less than 3% of its remaining service life. It is in very poor, unacceptable condition and should be replaced or rehabilitated.
RUL stands for Remaining Useful Life			

2.3.6 DATA ASSUMPTIONS

This section provides a high-level summary of assumptions made to address missing information and data gaps in the current inventory records. These assumptions influence the state of infrastructure analysis and results reported in this section.

Estimated Useful Lives – Estimated useful lives entered in the Town of Lincoln's fleet and equipment asset register are assumed to be accurate. Estimated useful lives were specified by Town staff and vary from 10 to 30 years.

Replacement Cost – Replacement costs entered in the Town of Lincoln's fleet and equipment asset register are assumed to be accurate. All replacement costs were converted to 2023 dollars, per section 2.3.3.

2.3.7 REPORT STRUCTURE – STATE OF INFRASTRUCTURE

This section summarizes the state of the Town of Lincoln's fleet and equipment asset portfolio in the form of a dashboard. The dashboard includes:

- Asset groups and their quantities,
- Asset value, defined as replacement cost,
- Asset average age, weighted by their value,

- Asset average expected useful lives, weighted by their value,
- Asset average condition, weighted by their value,
- Asset replacement cost, and
- Asset renewal forecast.

Fleet and equipment assets were grouped by department for reporting purposes. See section 2.2 for departments and type and quantity of fleet assets they own.

2.4 STATE OF INFRASTRUCTURE

Table 5, Figure 3, and Figure 4 summarize the state of infrastructure for Town of Lincoln's fleet service assets in tabular and dashboard formats based on assets as of April 2024. The state of infrastructure reporting shows that:

- The Town of Lincoln's fleet and capital equipment assets are valued at approximately $9.6M (in 2023 dollars).

- Most of the fleet and capital equipment assets (74.7% by value) are in fair or better condition, with the remaining 25.3 in poor or very poor condition (see Figure 3).

- The age of the fleet and capital equipment assets ranges from 0 to 40 years, with average age (weighted by value) of 9 years (see Figure 3).

- The forecasted 100-year average annual renewal cost for fleet and capital equipment assets is $724K (in 2023 dollars), as shown in Figure 4.

Table 5: Current State of Infrastructure

Asset Group	Quantity		Average Age (years)	Average Expected Life (years)	Average Condition	Current Replacement Cost ($2023 dollars)
Administration	1	No.	1	15	Very Good	$55,600
Bylaw	3	No.	5	15	Good	$108,100
Community services	43	No.	9	16	Fair	$2,123,500
Environmental services	7	No.	6	16	Good	$523,400
Road services	47	No.	10	14	Fair	$6,710,300
Technical services	2	No.	9	15	Fair	$64,400
Asset Total	**103**	**No.**	**9**	**15**	**Fair**	**$9,590,300**

It should be noted that inspection condition data is not available for fleet and capital equipment assets. Therefore, an age-based-performance profile is assumed to assess the expected physical condition of assets. This method is described in section 2.3.5. It is recommended that the Town completes condition assessments of fleet and capital equipment assets and revise the condition ratings and remaining life in the state of infrastructure tool and report revised values in the next iteration of this asset management plan.
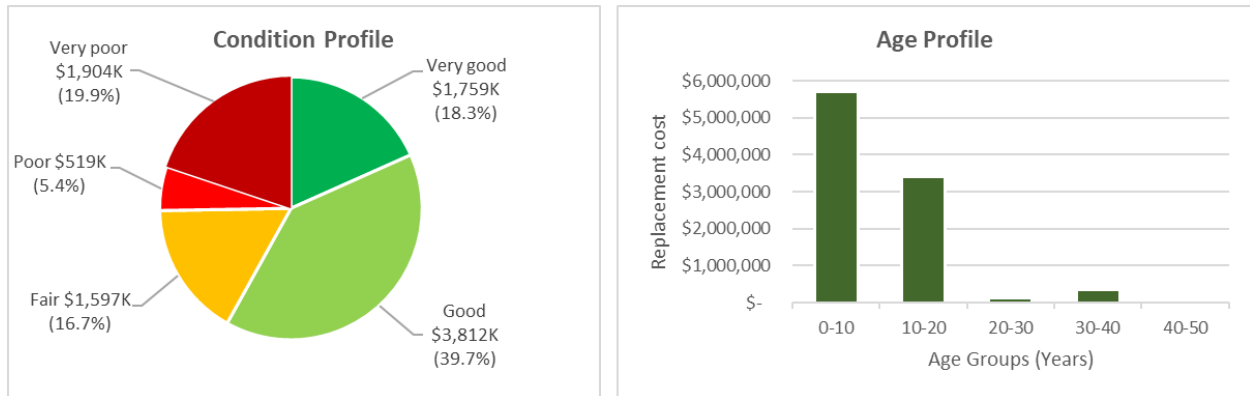
Figure 3: Condition and Age Profile

Figure 4 shows the 100-year renewal forecast of existing assets based on asset age and estimated replacement cost. Based on the current inventory, there are approximately $1.9M worth of assets indicated for replacement in the first year of the forecast period. These renewals comprise of approximately $1.5M of road services fleet assets and $415K of community services fleet assets. These assets should be inspected to confirm condition and timing for replacement, and update replacement cost.
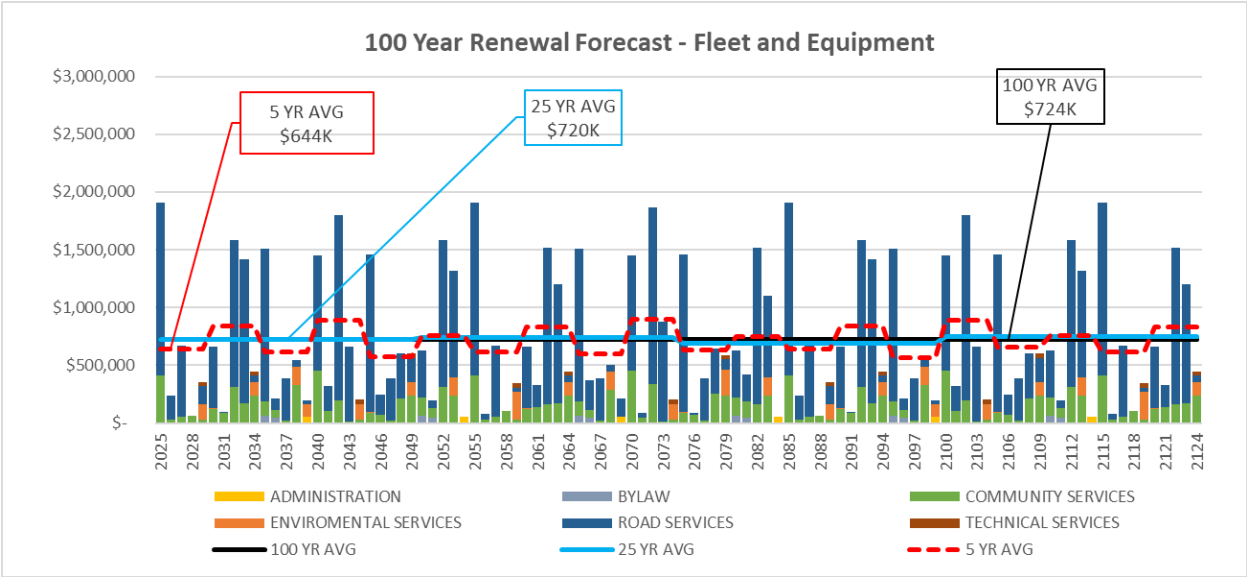
Figure 4: 100-Year Renewal Forecast – Fleet and Equipment Assets

2.5 STATE OF THE INFRASTRUCTURE IMPROVEMENT PRIORITIES

Table 6 shows a prioritized list of improvements relating to asset data and state of infrastructure.

Table 6: State of Infrastructure Improvement Tasks

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
1	2	Asset Data	Consider developing a data policy, data management plan and data standards to provide more robust data governance, including roles and responsibilities and clear rules on data attributes. This will improve confidence in the consistency and accuracy of recorded data and simplify the data preparation for state of infrastructure analysis.	High
2	2	Asset Data	Develop a condition assessment approach for fleet and capital equipment.	High

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
3	2	Asset Data	Complete and document condition inspections on fleet and capital equipment assets and use the results to improve the accuracy of the renewal forecasts.	Medium
4	2	Asset Data	Capture data on asset age at end of life to validate estimated useful life values used for planning and forecasting.	Medium
5	2	Asset Data	Continue to review and update replacement costs to build confidence in replacement unit rates to use in future state of infrastructure analysis and future replacement forecasts.	High

3 MANAGE SERVICE DELIVERY

3.1 LEVEL OF SERVICE

This section describes the Level of Service for the fleet service that the Town of Lincoln aims to deliver. It defines the criteria, measures, and targets that will be used to report achievement.

Level of service are the service outcomes that an organization delivers. They are a key driver for decisions on future investments in infrastructure assets. As such, they need to be clearly articulated in terms that end users and decision-makers can understand. Having well defined service levels will allow the Town of Lincoln to work with its internal stakeholders (other business units and service areas that use the municipal infrastructure), taxpayers and other stakeholders to find an appropriate balance between affordability and community expectations for level of service.

Performance measures indicate what the customers and stakeholders experience from the service that is delivered. Performance measures also define management targets for staff to manage infrastructure and service. Performance targets are set for performance measures to deliver the intended level of service so that decisions can be made about the assets based on the service that they provide rather than simply on their condition. The Town of Lincoln Fleet Asset Management Plan establishes level of service statements, performance measures and appropriate performance targets that aligns the Towns strategic goals with customer and stakeholder expectations to support informed decision-making.

Table 7 presents a summary of the approach to describe level of service and performance measures.

Table 7: Level of Service and Performance Measure Terminology

Concept	Definition	Example
Level of Service Statements	Specific attributes of the service that the Town intends to deliver from the **customer point of view**. Level of service attributes provide the link between higher level corporate and asset management objectives and more detailed technical and operational objectives. They must all align to give the customer the intended experience of the service.	Provide a fleet of vehicles that facilitates delivery of service in safe and efficient manner.
Service Criteria	These are the **specific attributes** or key characteristics that each stakeholder group is interested in, regarding the customer level of service	Reliability Availability Safety

Concept	Definition	Example
Performance measures	Criteria that can be measured and provide an indication of how the organization is doing in delivering the intended level of service. These can be defined as: • Customer performance measures: Measures describing **how the customer receives or experiences the service**. • Technical performance measures: **Technical criteria the organization can measure** to indicate how the service being achieved.	<u>Customer:</u> Number of valid deficiencies reported Customer satisfaction survey <u>Technical:</u> Number of scheduled maintenance services completed Condition of assets Number of breakdowns
Performance Targets	The required value (target), for each criterion that is being used as a performance measure. The expectation is that the intended level of service will be achieved if these targets are met.	<u>Customer:</u> >80% satisfaction (from survey) <u>Technical:</u> Percentage of assets that are less than Y years of age

3.1.1 STAKEHOLDERS

Table 8: Fleet Service Stakeholders

Stakeholder Group	Description
Service Users (Customers)	Includes everyone who uses the service provided by the fleet service. Fleet service users are the Town's administration, bylaw, community services, environmental services, road services, and technical services departments.
Regulatory agencies	Provincial or Federal Government expressing their influence through legislation, regulations, and higher-level plans (e.g., Ministry of Transportation (MTO))
Neighbouring communities	Stakeholders who share inter-collaboration agreements, services, and responsibilities with the Town of Lincoln.
Wider Community	Other stakeholders who influence decision-making but may or may not be users of the service.

3.1.2 LEVEL OF SERVICE

Table 9 describes the level of service the Town of Lincoln aims to deliver and defines the criteria, measures, and targets that will be used to report achievement.

Table 9: Service criteria and stakeholder key expectations

Service Criteria	Level of service statement	Performance Measure	Measure Status	Performance	
				Current	Target
Safe	Provide a fleet of vehicles that is safe to operate	% Circle check completed every 24 hours (Checklist)	Measured	100%	100%
		% Operating and maintenance schedules up to date	Measured	100%	100%
Reliable	Provision of a well-maintained and reliable fleet of vehicles and equipment	% Vehicles suitable for required service	Measured	95%	95%
		% Meeting replacement schedule within identified useful life	Measured	87%	95%
Available	Fleet available to meet operational needs.	% unplanned downtime due to asset failure	Measured	5%	<5%
		% of unmet service needs	Measured	3%	0%
		% of available vehicles to meet seasonal demand	Measured	90%	90%
		% of complaints due to fleet availability	Measured	10%	5%
Compliance	Fleet that meets, or exceeds, legislative guidelines, standards, and regulations	% Annual safety inspection MTO mandate	Measured	100%	100%
		% Compliance with fleet vehicle standards	Measured	100%	100%

Service Criteria	Level of service statement	Performance Measure	Measure Status	Performance	
				Current	Target
Good stewardship	Good stewardship and efficient use of taxpayers' dollars	% of vehicle with age < than expected life	Measured	87%	95%
Environmental Stewardship	Provide fleet service that is environmentally conscious of emissions	Meet emission standards	Measured	100%	100%
		% of Fleet that is Hybrid/EV	Measured	4%	15%
Coordination	Collaborate and effectively communicate with the internal service providers to provide a responsible, accountable, and transparent basis for management of fleet	% satisfaction for overall service	Measured	100%	100%
Affordable	Cost of service is maintained at an adequate level.	% difference between available budgets and existing capital and operations needs	Measured	6.4%	<10%

3.1.3 LEGISLATIVE REQUIREMENTS

The services provided by municipal assets must meet the legislative requirements at the municipal, provincial, and federal levels.

Key legislative requirements applicable to municipal organizations as well as the various services and asset groups, are included in Table 10.

Table 10: Key Legislative Requirements

Legislation	Requirement
Municipal Government Act (2001)	Sets out role, for 443 of 444 Ontario Municipalities and recognizes them as a responsible and accountable level of government. The Act gives municipalities broad powers to pass bylaws and govern within their jurisdiction. The Act also outlines requirements for municipalities including: • Practices and procedures • Accountability and transparency • Finance
Ministry of Transportation (yellow sticker)	An annual safety inspection (MTO mandated), provide collision notifications

3.1.4 LEVEL OF SERVICE IMPROVEMENT PRIORITIES

Table 11 shows a prioritized list of improvements relating to levels of service.

Table 11: Level of Service Improvement Tasks

Action No.	AMP Section	AMP Practice Area	Task Description	Action Priority
6	3.1	Level of Service	Regularly review the level of service statements to ensure they continually align with the Town of Lincoln's strategic goals and stakeholder's expectations	High
7	3.1	Level of Service	Develop and implement a data collection strategy that will provide sufficient information for measuring level of service performance	High
9	3.1	Level of Service	Develop 10-year forecast for performance targets	Medium
10	3.1	Level of Service	Develop processes to inform operation needs to meet level of service targets	Medium
11	3.1	Level of Service	Develop key performance indicators that encourage alignment between level of service delivery and operations and maintenance standards	Medium

3.2 LIFECYCLE STRATEGIES

3.2.1 OVERVIEW

This section describes the lifecycle strategies employed by the Town of Lincoln throughout the fleet assets' life.

A lifecycle strategy sets out the planned actions and intended maintenance management methods for an asset throughout its life. The purpose of lifecycle strategies is to maintain assets in an appropriate way that will deliver the required level of service for the least overall cost, while keeping risk at a level acceptable to the Town. Assets of different types have different lifecycle lengths, deteriorate at different rates, and require different strategies for optimum performance and cost-efficiency over their lifecycle.

3.2.2 LIFECYCLE STRATEGY TERMINOLOGY

The current business practices for lifecycle management have been identified under the following work categories:

- Operations, Maintenance & Inspections (OMI)
    - Preventive Maintenance
    - Inspections
    - Operations
    - Reactive Maintenance
- Renewal and Rehabilitation (R&R)
    - Early-life Intervention
    - Mid-life Rehabilitation
    - Later-life Rehabilitation
    - End of life

Table 12 shows the definitions of the terminology used for the lifecycle strategy work categories.

Table 12: Lifecycle strategy work categories

Terminology	Definition
Preventative maintenance	These are regularly scheduled activities, completed whilst the asset is still in an operational condition. The purpose of preventative maintenance (when they are required), is to ensure the asset achieves its expected life (i.e., does not fail early).
Inspections	There are different types of inspections that can occur throughout the lifecycle of an asset. Some are for checking the asset is operating as planned – these provide early warning for any issues that can then be remedied quickly and less expensively than if the problem remained undetected for some time. Other inspections are for measuring or observing the condition of the assets, or for measuring performance. These provide information for planning renewals and determining if performance targets will be met. Inspections may also be required by legislation, departmental policy, or completed based an industry standard or manufacturers recommendation.
Operations	These are routine activities necessary for the correct operation of the assets. They differ from preventative maintenance activities in that they are operational tasks or activities that must occur, or the asset will cease to function as intended (e.g., cease to operate or operate inadequately), whereas an asset will usually continue to operate even if preventative maintenance tasks are not done, but the overall lifespan of the asset could be reduced and the asset may fail early.
Reactive maintenance	These activities are physical repairs to an asset that has broken down or is not functioning as required or expected. The repair reinstates the asset to its normal "operating" condition but does not significantly extend the overall life of the asset e.g. it is a repair not a full replacement nor is it an upgrade or major rehabilitation. Maintenance repairs are expected as assets age and are part of the overall lifecycle management to keep the asset operational for as long as physically and economically viable.
Early life interventions	These are treatment options that may be considered when an asset is in the first quarter of its lifespan. Typically, they are rare for most asset types, but some assets do require replacement of component parts at frequent intervals throughout the overall lifespan of the asset.
Mid-life interventions	These are treatment options that may be considered when an asset is in the second or third quarter of its lifespan. Most common forms of mid-life

Terminology	Definition
	rehabilitation are the replacement or refurbishment of component parts that have a shorter lifespan than the overall asset.
Later Life Interventions	These are treatment options considered to be still viable even when an asset is in the fourth quarter of its lifespan. They can include replacement or refurbishment of component parts the same as might be considered for mid-life rehabilitation. However, Later Life Rehabilitation should only be undertaken if it is cost-effective given the potentially short remaining life of the overall asset.
End of life	These are treatment options considered when an asset is approaching or at the end of its lifespan. Typical options include replacement (renewal) of the asset with an equivalent new asset, major rehabilitation that returns the asset to new or near new status, disposal (removal) of the asset without replacement, retirement of the asset (with or without disposal), divestment of the asset (sale or gift to another's ownership), or upgrade (replace with new asset that will provide an increase in level of service e.g. a bigger asset or higher specification).

3.2.3 MANAGEMENT APPROACH

An asset's lifecycle strategy typically consists of early life, mid life, and later life interventions, followed by a full replacement or renewal, as well as operations, maintenance and inspections activities. However, not all assets have the same management approach. Early life interventions are usually only appropriate for asset types where reliability is a major factor. Other assets have a "run to fail" approach where relevant maintenance is completed as and when required and the asset is replaced at the end of its life. Some assets will benefit from mid-life and later-life interventions (e.g., component replacements, refurbishments, or major overhauls) as some of these interventions may extend the asset lifespan.

The management approach for all fleet assets in this Asset Management Plan is summarized in Table 13. Detailed lifecycle strategies for each asset group are provided in **Appendix A.**

Table 13: Lifecycle Strategies Overview

Asset Group	Operation, maintenance & inspections					Renewal & Rehabilitation				
	Preventative Maintenance	Inspections	Operations	Reactive Maintenance	Typical OMI Activities	Early-Life Intervention	Mid-Life Intervention	Later Life Intervention	Run-to-Fail	Typical R & R Activities
Heavy Duty Vehicles	✓	✓	✓	✓	• Oil spraying • Detailed inspections • General safety inspections • Oil changes • Washing/cleaning • Repairs as required	✓	✓	✓	✓	• Battery replacements • Engine replacements, if necessary • Replace at end of life
Medium Duty Vehicles	✓	✓	✓	✓	• Annual inspections • Oil spraying • Detailed inspections • General safety inspections • Oil changes • Washing/cleaning • Repairs as required	✓	✓	✓	✓	• Battery replacements • Engine replacements, if necessary • Replace at end of life
Light Duty Vehicles	✓	✓	✓	✓	• Annual inspections • Oil spraying • Detailed inspections	✓	✓	✓	✓	• Battery replacements • Engine replacements, if necessary

Asset Group	Operation, maintenance & inspections					Renewal & Rehabilitation				
	Preventative Maintenance	Inspections	Operations	Reactive Maintenance	Typical OMI Activities	Early-Life Intervention	Mid-Life Intervention	Later Life Intervention	Run-to-Fail	Typical R & R Activities
					• General safety inspections					• Replace at end of life
Capital Equipment	✓	✓	✓	✓	• Annual inspections • Cleaning • Oil change (if applicable)	✓	✓	✓	✓	• Battery replacements • Engine replacements, if necessary • Replace at end of life

3.2.4 LIFECYCLE STRATEGY IMPROVEMENT PRIORITIES

Table 14 shows a prioritized list of improvements relating to lifecycle strategies.

Table 14: Lifecycle Strategy Improvement Tasks

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
12	3.2	Lifecycle Strategy	Develop lifecycle strategies for any new assets that become part of the fleet service	Medium
13	3.2	Lifecycle Strategies	Identify and document costing and frequency information for lifecycle strategies to develop a needs-based forecast of operations, maintenance, and inspection activities	Medium
14	3.2	Lifecycle Strategy	Review and revise lifecycle strategies if maintenance approaches change (including where new technologies are employed) and include more details and costs and specify decision processes	Medium

3.3 RISK PROFILE

Risk is evaluated at both the **service level** and the **asset level**. The importance of identifying risks is to provide early warning of all potential issues that could adversely affect delivering the level of service. When risks are known and have a rating, staff can prioritize activities to focus on assets that exceed the risk tolerance set by the Town of Lincoln.

3.3.1 SERVICE LEVEL RISK

Service level risks are the risks generated by events or circumstances other than individual asset failures and affect the delivery of the service to the Town's customers and stakeholders.

The service level risks are grouped into 5 categories. The categories and examples of the risks in each category are shown in Table 15.

Table 15: Service Level Risk Categories

Category	Examples of Common Risk Events
Planning	Regulatory changes, Council changing strategic priorities, demand management, etc.
Management	Lack of resources (people) to implement or advance Asset Management, reputational risk, data security risk, etc.
Service Delivery	Outdated or unsupported software or hardware failures, power outages, inadequate stakeholder communication/engagement, etc.
Assets (In General)	Security and safety of physical or information assets from theft/vandalism/cyberattacks, inadequate maintenance and rehabilitation programs to preserve asset value and longevity, etc.
Hazards and Environmental	Extreme weather events, climate change, improper storage, or usage of hazardous or toxic materials, etc.

3.3.1.1 CONNECTION OF RISK TO LEVEL OF SERVICE

The connection between risk and level of service begins with looking at how the potential risk events from each of the 5 categories (refer Table 15) affect the service commitments made in Section 3.1 (Level of Service) and defining a risk outcome (e.g., stating how the risk event would affect the service commitment). For example, how insufficient staff resources (which is a management risk) can affect the availability of fleet services (which is a service commitment). Therefore, the risk outcome is that a shortage of qualified staff to operate fleet will lead to

operational needs not being met by the fleet service. Figure 5 shows the connection of risk to level of service.
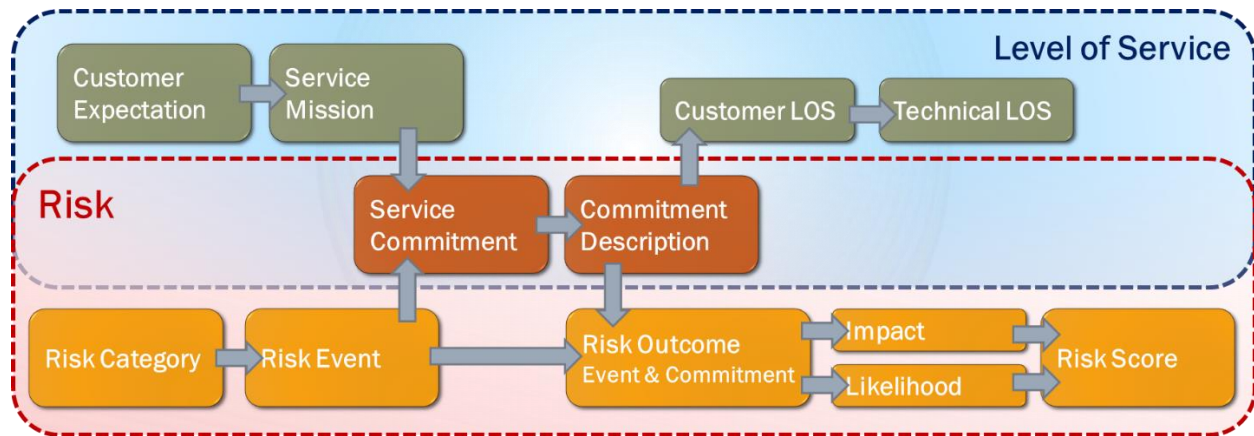

Figure 5: Connection of Risk to Level of Service

3.3.1.2   *SERVICE LEVEL RISKS – FLEET*

The service risks are characterized by the impact to service delivery and the likelihood of that impact event occurring. The Town has assessed the service level risks in each risk category that are relevant to the Town's fleet service and identified an appropriate action for each risk, as shown in Table 16.

Table 16: Risk level and action

Risk level	Recommended action
Very low	**Accept:** These risks can be tolerated. They should be assessed annually to determine whether the level of risk has changed.
Low	**Accept:** These risks can be tolerated. They should be assessed annually to determine whether the level of risk has changed.
Medium	**Monitor:** These risks require a balanced approach to management. They should be included in future risk mitigation plans and assessed at least annually to determine whether levels of risk have changed.
High	**Mitigate:** These risks should be prioritized. Existing mitigation programs and plans should be modified to include these risks, and where new risks are identified, update mitigation programs and plans. An assessment of the effectiveness of the mitigation programs and plans must be conducted annually and updated as appropriate.

Risk level	Recommended action
Very High	**Take action:** These risks cannot be tolerated as they are critical to service delivery. Immediate corrective actions to mitigate risk should be taken. A risk level monitoring program should be developed to reduce or prevent potential reoccurrence of the risk.

3.3.1.3   CURRENT SERVICE RISK

Table 17 reports the number of risks rated in each category and their respective risk scores (current). The risk ratings are also shown in a graphical format in Figure 6.

Table 17: Service-Level Risk Ratings – Current (Unmitigated)

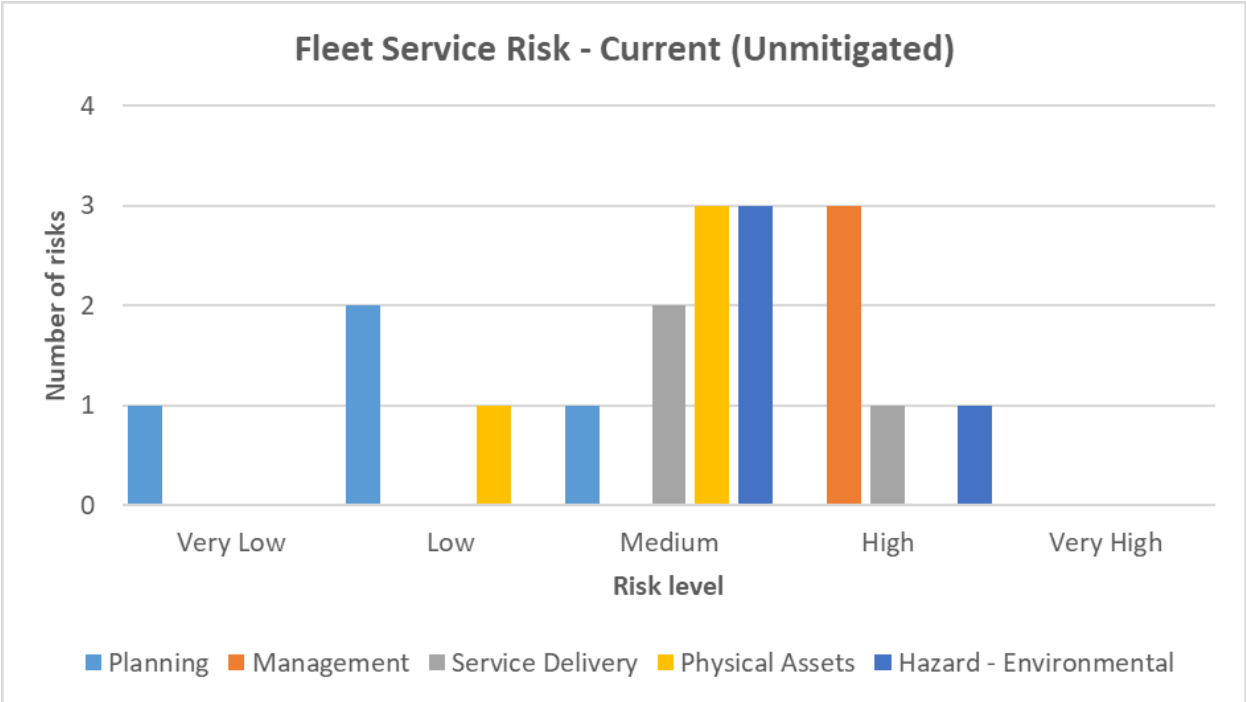| Risk Category	Risk Rating					Count
	Very Low	*Low*	*Medium*	*High*	*Very High*	
Planning	1	2	1	0	0	**4**
Management	0	0	0	3	0	**3**
Service Delivery	0	0	2	1	0	**3**
Physical Assets	0	1	3	0	0	**4**
Hazard – Environmental	0	0	3	1	0	**4**
Total	1	3	9	5	0	18

Figure 6: Service-Level Risk – Current (Unmitigated)

3.3.1.4 MITIGATED SERVICE RISK

Table 18 shows the number of risks rated in each category and their respective mitigated risk scores. The results of the mitigated risk ratings are also shown in a graphical format in Figure 7.

These mitigated risk scores will be realized when the relevant mitigation measures are funded and implemented. Until then, the current risk rating applies. Details of proposed mitigation measures are given in section 3.3.1.5 (Detailed Service Risk Results).

Table 18: Service Level Risks (Post Mitigation) – Fleet

Risk Category	Risk Rating					Count
	Very Low	Low	Medium	High	Very High	
Planning	1	2	1	0	0	4
Management	0	1	2	0	0	3
Service Delivery	0	0	2	1	0	3
Physical Assets	0	1	3	0	0	4

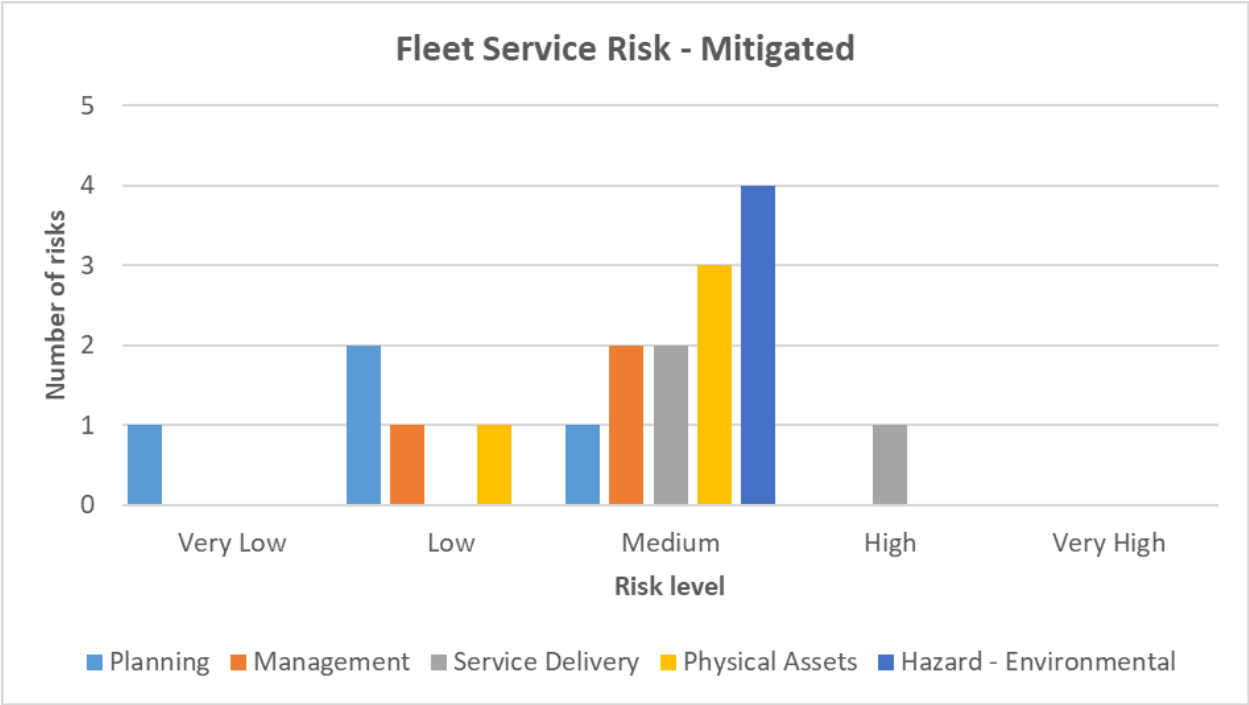| Risk Category	Risk Rating					Count
	Very Low	*Low*	*Medium*	*High*	*Very High*	
Hazard – Environmental	0	0	4	0	0	**4**
Total	**1**	**4**	**12**	**1**	**0**	**18**

Figure 7: Service-Level Risks – Mitigated

3.3.1.5 *DETAILED SERVICE RISK RESULTS*

PLANNING RISKS

A total of four (4) planning risks were identified and rated by the Town staff. Out of the four planning risks, one (1) was rated as medium, two (2) risks were rated as low, and one (1) risk was rated as very low. Table 19 lists the planning risks along with their ratings and mitigation measures, where applicable.

Table 19: Planning Risks

Risk Event / Outcome	Risk Score	Risk Rating	Mitigation Measures[1]	Mitigated Risk Score	Mitigated Risk Rating
Change in policy or legislation may require a transition to EV vehicles in the future, which may make the town non-compliant with the new standards/regulations.	2	Very Low	n/a	2	Very Low
Increasing the scope of services provided by the Town could affect service availability. In this case, bringing sidewalk maintenance in-house under current level of resources available may pose a planning risk and may result in delays.	8	Medium	n/a	8	Medium
If current budget levels do not grow proportionally to the change in cost of service, the Town might not be able to maintain fleet service at current levels.	4	Low	n/a	4	Low
Insufficient planning for or management of user demands can result in the Town not being able to cope with demand, causing service issues	6	Low	n/a	6	Low

[1]*Note: Mitigation measures for medium, low, or very low risks were not determined.*

MANAGEMENT RISKS

A total of three (3) management risks were identified and rated by the Town staff. All three management risks were rated as high risks. Table 20 lists the management risks along with their ratings and mitigation measures.

Table 20: Management Risks

Risk Event / Outcome	Risk Score	Risk Rating	Mitigation Measures[1]	Mitigated Risk Score	Mitigated Risk Rating
Shortage of qualified staff to operate specialized equipment may affect current level of service.	12	High	Train staff and require new hires to have the necessary training and licenses, where applicable.	4	Low
Delayed supply of equipment puts more pressure on existing assets and results into higher cost to maintain older equipment.	12	High	Improve planning and forecasting to ensure timely deliveries of equipment and machinery.	8	Medium
Delays in asset replacements may affect the reliability of services delivered.	16	High	Annually update needs-based forecasts for operations, maintenance, and replacements to ensure timely interventions.	8	Medium

[1]*Note: Mitigation measures for medium, low, or very low risks were not determined.*

SERVICE DELIVERY RISKS

The Town has identified and rated 3 service delivery risks. Of these, 1 risk was rated as high, and 2 risks were rated as medium. Table 21 lists the management risks along with their ratings and mitigation measures, where applicable.

Table 21: Service Delivery Risks

Risk Event / Outcome	Risk Score	Risk Rating	Mitigation Measures[1]	Mitigated Risk Score	Mitigated Risk Rating
Due to supply chain issues, the Town has no choice to use outdated equipment to complete certain tasks. Outdated equipment and unavailability of specialized equipment requires more resources to complete the work and deliver services.	12	High	Mitigation measure has not been identified.[2]	12	High
Increased safety concerns with having to do manual work due to lack of specialized equipment and outdated equipment.	8	Medium	n/a	8	Medium
Insufficient stakeholder consultation could result in not meeting expectations for fleet services.	9	Medium	n/a	9	Medium

[1]*Note: Mitigation measures for medium, low, or very low risks were not determined.*

[2]*Note: No mitigation measure was identified as supply is steadily increasing.*

PHYSICAL ASSET RISKS

A total of four (4) physical asset risks were identified and rated by the Town staff. Out of these, three (3) risks were rated as medium and one (1) risk was rated as low. Table 22 lists the physical asset risks along with their ratings. No mitigation measures were applicable.

Table 22: Physical Asset Risks

Risk Event / Outcome	Risk Score	Risk Rating	Mitigation Measures	Mitigated Risk Score	Mitigated Risk Rating
Using equipment not as intended may reduce the reliability of service provided.	8	Medium	n/a	8	Medium
Insufficient protection of assets or insufficient inspections could increase possibility of theft, vandalism, and accidental damage, therefore reducing the quality of assets and availability of service.	6	Low	n/a	6	Low
Insufficient protection of assets or insufficient inspections could increase possibility of theft, vandalism, and accidental damage, therefore increasing the cost of service.	8	Medium	n/a	8	Medium
Untimely failure of EV batteries may result in reliability of services provided.	9	Medium	n/a	9	Medium

[1]*Note: Mitigation measures for medium, low, or very low risks were not determined.*

HAZARD-ENVIRONMENTAL RISKS

The Town has identified four (4) hazard-environmental risks. Of those, one (1) risk was rated as high and three (3) risks were rated as medium. Table 23 lists the management risks along with their ratings. No mitigation measures were identified.

Table 23: Hazard-Environmental Risks

Risk Event / Outcome	Risk Score	Risk Rating	Mitigation Measures[1]	Mitigated Risk Score	Mitigated Risk Rating
Someone may get heavily injured while operating fleet and/or equipment.	8	Medium	n/a	8	Medium
Members of crews can get injured during an emergency event reducing staffing levels and reducing service availability.	6	Low	n/a	6	Low
Operators may leave equipment idling with AC on during heat waves, therefore increasing emissions.	8	Medium	n/a	8	Medium
Operators may leave equipment idling with AC on during heat waves, therefore increasing operating and maintenance cost of the assets (e.g, recharging the refrigerant, fixing leaks, repairing compressor, condenser, evaporator)	9	Medium	n/a	9	Medium

[1]Note: Mitigation measures for medium, low, or very low risks were not determined.

3.3.2 ASSET LEVEL RISKS

The results of **asset level risk** assessments are considered when reviewing lifecycle strategies to determine the most appropriate treatments, preventative maintenance, and inspection frequencies for a particular asset or group of assets. Both asset level risks and service risks are considered in prioritizing capital works projects and other funding decisions.

Asset level risks are calculated by multiplying the individual consequence of failure for each asset with the likelihood of that asset failing. For the initial assessment, the likelihood and consequence of failure for the assets are a 1-5 rating based on:

- Likelihood of failure: uses the 1-5 score for remaining life of each asset (based on age-based condition rating).
- Consequence of failure: uses the 1-5 criticality rating for each asset (see criticality ratings in Table 25).

Table 24 summarizes the current risk profile of the Town's fleet assets by replacement value. The fleet and equipment assets were grouped by department for reporting purposes. See section 2.2 for departments and type and quantity of fleet assets they own.

Most of the Town's fleet and equipment assets (63% by value) are rated as medium or lower risk, with the remaining 37% rated as high or very high risk. Most of the Town's fleet service assets were assigned very high critically due to being heavy duty fleet (see Table 3 for quantities and Table 25 for a description of criticality ratings criteria) and about 20% of fleet assets have a high or very high likelihood of failure due to being in very poor condition and approaching end of their expected useful life (see condition and age profiles in section 2.4). Therefore, it is not unexpected to have a high portion of assets being ranked as high or very high risk.

Table 24: Risk Profile, by Replacement Value

Asset Group	Current Replacement Value [$'000][2]				
	Very Low	**Low**	**Medium**	**High**	**Very High**
Administration	-	$56	-	-	-
Bylaw	-	$108	-	-	-
Community services	$40	$449	$1,005	$252	$378
Environmental Services	-	$262	$124	$137	-
Road services	-	$1,285	$2,776	$1,236	$1,413
Technical Services	-	$34	-	$35	-
Total	**$40**	**$2,194**	**$3,905**	**$1,660**	**$1,791**
Percent of Grand Total	**0.4%**	**22.9%**	**40.7%**	**17.3%**	**18.7%**

Asset Group	Current Replacement Value [$'000][2]				
	Very Low	Low	Medium	High	Very High

[2] Note: the values are shown in thousands.

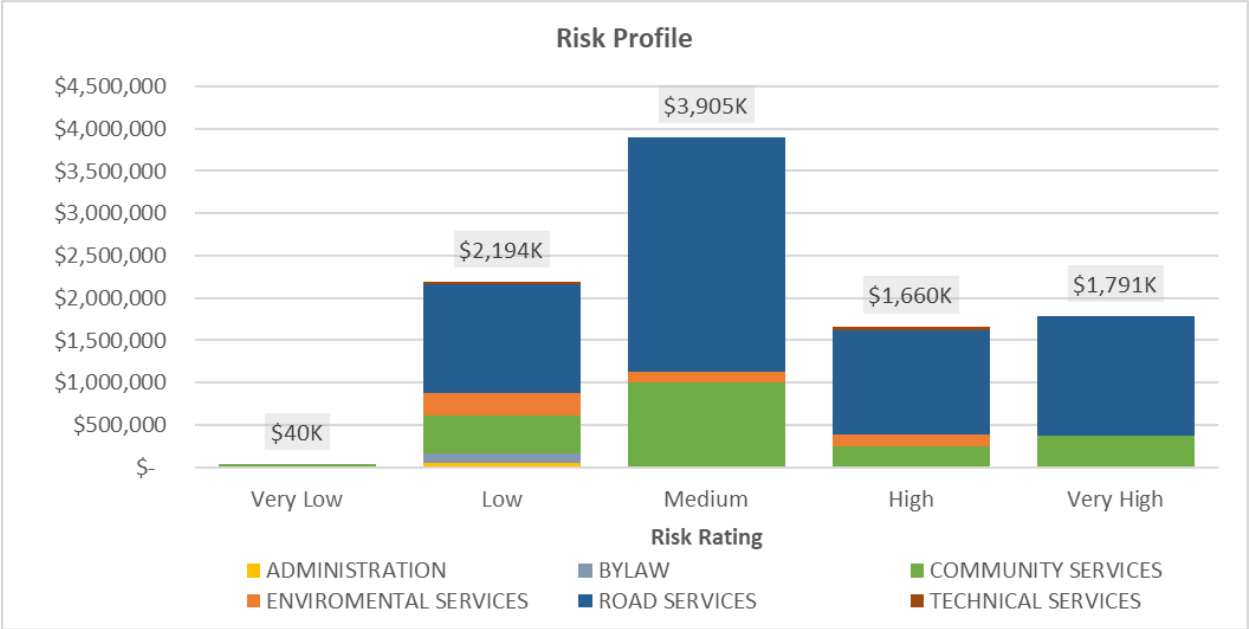Figure 8 illustrates the asset risk profile graphically.

Figure 8: Risk Profile, by Replacement Value

3.3.2.1 CONNECTION TO ASSET CRITICALITY

The criticality of the asset or component of an asset is defined by its effect on the operation of an asset system if the asset failed. The assets in the scope of this Asset Management Plan have been rated for criticality using the criteria in Table 25.

Table 25: Criticality criteria

Asset Class	Asset Type(s)	Criticality Rating
Heavy-Duty	All heavy-duty and specialized machinery	5 – Very High
Medium-Duty	Pickup Truck	5 – Very High
	All other medium-duty vehicles, including gators, mowers, telehandlers, and vans	4 – High

Asset Class	Asset Type(s)	Criticality Rating
Light-Duty	All light-duty vehicles, including cars, sport utility vehicles (SUVs), and rugged terrain vehicles (RTVs)	2 – Low
Capital Equipment	All capital equipment	3 – Medium

3.3.3 RISK IMPROVEMENT PRIORITIES

Table 26 shows a prioritized list of improvements relating to risk.

Table 26: Risk improvement tasks

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
15	3.3	Risk	Complete condition assessments on assets to improve understanding of likelihood of failure for asset level risks. Where asset level risks remain high or very high, consider if assets should be added into renewal or rehabilitation programs.	High
16	3.3	Risk	Develop and implement mitigation strategies for all high or very high service level risks and track their progress and effectiveness.	High
17	3.3	Risk	Identify possible mitigation strategies or actions for all very low, low, and medium service level risks and implement, if deemed feasible and cost-effective.	Medium
18	3.3	Risk	Regularly update and revise service level risk register, as risk levels may change over time and new risk may be identified.	Medium

3.4 RESOURCE NEEDS

This section compares available resource and capacity with demand and identifies whether current resource are sufficient for existing demand or if additional resources are required.

3.4.1 EXISTING CAPACITY

For reporting purposes, the activities are grouped into the following categories:

- Administration
- Operations and Maintenance
- Inspections
- Reactive maintenance
- Contract/Procurement Management
- Fleet Allocation and Scheduling

Table 27 shows the number of available hours for all departments associated with the fleet services.

Table 27: Available Resources

Staff Type	Senior Leadership	Operations Staff	-	Total
No. of Staff (full time equivalent (FTE))	0.08	1.3	1	2.38
Available Hours Annually	120	2,288	1800	4,208
Senior Leadership – Director and Associate Director of Public Works Operations – Fleet Supervisor and Manager of Operations Technical – Equipment Technician				

3.4.2 RESOURCE NEEDS

The tasks and associate level of effort required to deliver the fleet service and meet level of service are shown in Table 28. The tasks have been grouped in categories for reporting.

Table 28: Resource needs

Task category	Resource needs (hr/yr)
Administration	1,424
Operations and maintenance	1,196
Inspections	1,144
Reactive maintenance	1,560
Contract/procurement management	160
Fleet allocation and scheduling	72
Total	5,556

3.4.3 COMPARING RESOURCE NEEDS AND CAPACITY

A comparison was made between required resources to deliver the level of service and current resource availability.

The resource demand shown in Figure 9 indicates that resources requirements for the Operations and Technicians are higher than current capability. Note that articulating what is included in Operations, Reactive Maintenance and Inspections activities is needed to ensure they are not being double counted. There are options that could be investigated to resolve this gap including:

- Reassess activities and reduce resource demand wherever possible
- Obtain additional resources and reassign activities
- Outsource some activities under contract
- Reduce service level (usually this is not desired, and reduction is limited under legislation)
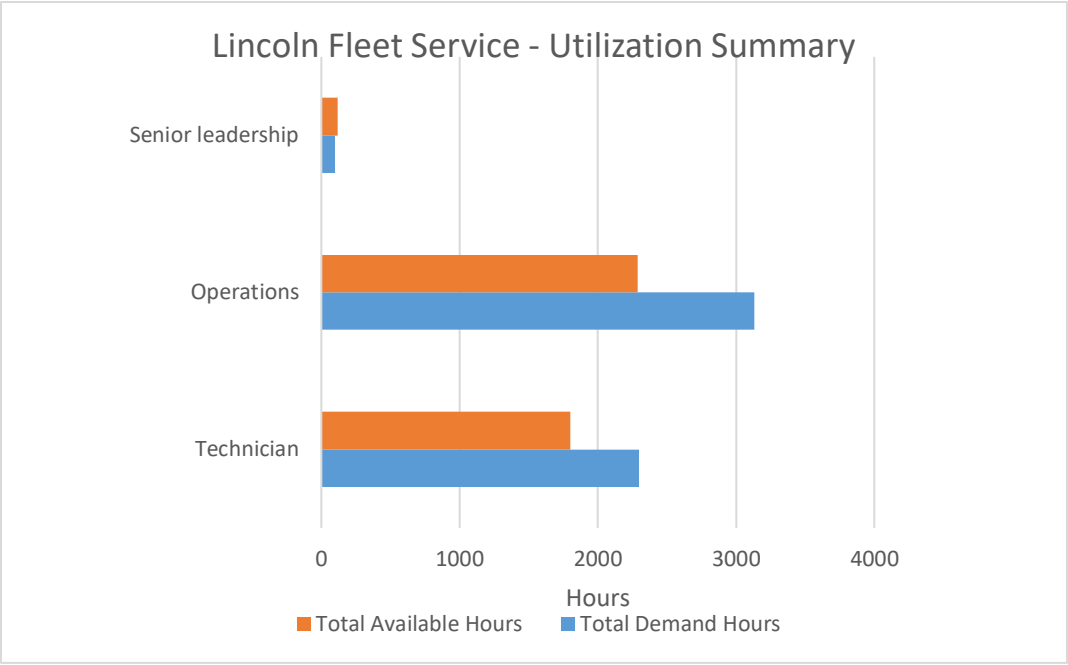
Figure 9: Utilization summary

3.4.4 RESOURCE IMPROVEMENT PRIORITIES

Table 29 shows the improvement relating to resource needs.

Table 29: Resource Improvement Tasks

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
19	3.4	Resources	Review resourcing requirements and assess if current capacity is sufficient. This may include defining tasks and requirements in further detail.	High
20	3.4	Resources	Review repair tasks in reactive maintenance and operations activities to ensure there are no duplications.	Medium

4 FUTURE READY

4.1 DEMAND MANAGEMENT

Drivers affecting demand include things such as population change, regulations, changes in demographics, seasonal factors, climate change, consumer preferences and expectations, technological changes, economic factors, agricultural practices, and environmental awareness.

The main demands for new services are created by growth and development. Growth is a critical infrastructure demand driver for most infrastructure services. As such, the Town of Lincoln must not only account for the lifecycle cost for its existing asset portfolio, but those of any anticipated and forecasted capital projects associated specifically with growth.

The Town of Lincoln is one of the fastest growing municipalities in Niagara. During the 25 years between 1986 and 2011 the population of the Town increased by about 8,100 people or at an annual rate of 1.4%. Currently, the Town of Lincoln has a population of approximately 25,000 and is expected to grow by 50% by 2031.

In conjunction with raw population growth, demographics change can also dictate how the Town will allocate its infrastructure investments. As the demographics change and the Town assumes responsibility of new infrastructure, the level of strain on various critical and supplementary infrastructure services will shift to reflect the needs of the residents.

4.1.1 DEMAND ASSESSMENT

The Town has assessed the following drivers for the fleet service:

- Legislative change
- Population growth
- Aging or disabled population growth
- Increase in commercial/industrial development
- Cultural/society change (e.g., changing demographics)

The drivers are assessed for impacts to health and safety of the Town's residents and businesses and the impact the growth drivers have on the assets that provide fleet services and the ability of the Town to continue to provide required level of service.

Table 30 reports the number of risks rated in each demand category and their respective risk scores (current). The risk ratings are also shown in a graphical format in Figure 10.

Table 30: Initial Demand Assessment Results (Unmitigated)

Demand Driver	Very Low	Low	Medium	High	Very High	Count
Legislative change	-	2	1	-	-	**3**
Population Growth	-	-	-	1	1	**2**
Aging & Disabled Population Growth	1	-	-	-	-	**1**
Increase in Commercial/Industrial Development	-	-	-	1	0	**1**
Cultural/society change	-	1	-	-	-	**1**
Total	**1**	**3**	**1**	**2**	**1**	**8**

Figure 10: Initial Demand Assessment Results

The three high and very high risks are associated with increase in population and increase in commercial and industrial development that will lead to increase in demand for service. This

growth will likely require additional fleet assets and staff to respond to increased maintenance needs and maintain previously established level of service.

Table 31 shows the number of demand drivers in each category and their respective mitigated risk ratings. The results of the mitigated demand risk ratings are also shown in a graphical format in Figure 11.

The mitigation measures for the three high and very high risks include purchase of new fleet equipment, hiring of additional staff, and/or outsourcing of service delivery until sufficient in-house resources become available.

These mitigated impact ratings will be realized when the relevant mitigation measures are funded and implemented. Until then, the current (unmitigated) impact rating will apply.

Table 31: Mitigated Demand Assessment Results

Demand Driver	Very Low	Low	Medium	High	Very High	Count
Legislative change	-	2	1	-	-	**3**
Population Growth	-	-	-	1	1	**2**
Aging & Disabled Population Growth	1	-	-	-	-	**1**
Increase in Commercial/Industrial Development	-	-	-	1	0	**1**
Cultural/society change	-	1	-	-	-	**1**
Total	**1**	**3**	**2**	**0**	**0**	**8**

Figure 11: Mitigated Demand Assessment Results

4.1.2 DEMAND IMPROVEMENT PRIORITIES

Table 32 shows of the prioritized improvement relating to demand management.

Table 32: Demand Improvement Tasks

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
21	4.1	Demand management	Annually review and revise demand risk to reflect when mitigation measures have been implemented and if additional demand drivers are identified.	Low

4.2 RESILIENCY AND ADAPTATION

The resilience of our critical infrastructure is vital to our customers and the services we provide. To adapt to changing conditions and grow over time we need to understand our capacity to respond to possible disruptions and be positioned to absorb disturbance and act effectively in a

crisis to ensure continuity of service. Resilience is built on aspects such as response and recovery planning, financial capacity, and crisis leadership.

4.2.1   GROWTH

Asset management planning must consider potential future impacts on the services being delivered. 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.

4.2.2   CLIMATE CHANGE

The Town has completed a Corporate Climate Adaptation Plan (CCAP) as a guideline to support and inform climate adaptation at the Corporate municipal level. It outlines how the municipality will adapt its assets, operations, and services to the current and future impacts of climate change.

The development of a CCAP for the Town of Lincoln is supported by the 2016 Asset Management Plan which states, "infrastructure is inextricably linked to the economic, social and environmental advancement of a community" and that "broader environmental and weather patterns have a direct impact on the reliability of critical infrastructure services".

The Town's 2014 Official Plan also affirms, "reviewing opportunities for reducing the impact of climate change, meeting the challenges of climate change and other environmental issues through integrated solutions, and incorporating low impact design and other site design strategies to mitigate environmental impacts".

The development of a CCAP is also driven and supported by the 2017 Growth Plan for the Greater Golden Horseshoe, of which a guiding principle is to "integrate climate change considerations into planning and managing growth such as planning for more resilient communities and infrastructure – that are adaptive to the impacts of a changing climate".

Climate projections shown in Table 33 for the Town of Lincoln are based on RCP 8.5 climate models from climatedata.ca, a collaboration between Environment and Climate Change Canada, the Computer Research Institute of Montréal, Ouranos, the Pacific Climate Impacts Consortium, the Prairie Climate Centre, and Habitat Seven.

Table 33: Climate Projections for the Town of Lincoln based on RCP 8.5 models from climatedata.ca

Variable	Sub-Variable	Average (1976-2005)	2050 Projection	2100 Projection	Trend
Temperature	Hottest day °C	33	37	40	↑
	Mean Temp °C	9	12	15	↑
	Min. Temp °C	4	7	11	↑
	Max. Temp °C	13	16	19	↑
	Days Over 30 °C	11	47	91	↑
	Coldest Day °C	-20	-13	-8	↑
	Days Below -15°C	8	0	0	↓
	Days Below -25°C	0	0	0	↓
	Frost Days	124	85	46	↓
	Cooling Degree Days	328	670	1200	↑
	Growing Degree Days 10°C	1390	1996	2725	↑
	Growing Degree Days 5°C	2390	3096	3977	↑
	Cumulative Degree Days >0 °C	3657	4440	5526	↑
	Heating Degree Days	3402	2669	2011	↓
	Ice Days (below 0°C)	48	24	6	↓
	Tropical Nights >18°C	26	61	106	↑
	Tropical Nights >20°C	10	39	84	↑
	Tropical Nights >22°C	2	18	60	↑
Precipitation	Total Precipitation	864	1016	955	↑
	Max 1 Day Total mm	39	39	38	↓
	Wet Days >10mm	26	33	32	↑
	Wet Days >20mm	6	9	9	↑

The overall risk and vulnerability of the Town to each projected impact was assessed to determine its priority and if action to address the impact would be taken. By assessing vulnerability and risk, the following climatic threats were identified as a top priority to the Town of Lincoln, within the corporate scope (refer Figure 12).
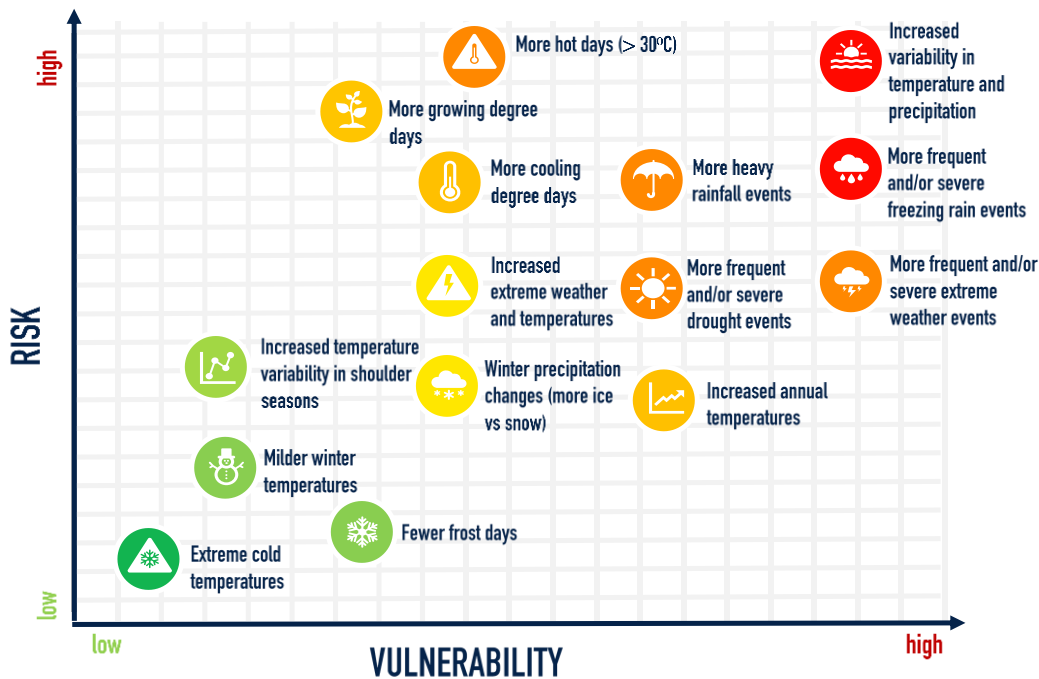
Figure 12: Vulnerability and risk of climatic threats

4.2.3 MITIGATION ACTIONS

Mitigation Actions that have been identified in relation to vehicles and equipment are related to reducing greenhouse gas emissions (GHG). At this time the Town's resilience plan has not been completed and GHG targets and reduction plans have not been established. The Town does consider alternatives for reducing GHG emissions when reviewing fleet procurement. Due to the nature of the vehicles and equipment, not all have alternative options.

All fleet is currently equipped with monitoring equipment to identify idling concern. Vehicles that do not require engines to remain on for operational needs are flagged.

GROWTH

In order to manage growth, the Town can investment more into service areas and/or reduce the need for investment by considering the following strategies:

- **Extending service lives of assets through better maintenance** – Targeted preventative maintenance, and operational practices that preserve the asset can extend an asset's lifespan and reduce long term costs.

- **Earlier interventions with lower lifecycles costs** – Early, low-cost interventions in an asset lifecycle may lengthen service lives. Failing to do early interventions and replacing assets when they fail are generally more expensive.

- **Accept reduced service levels** –Lower levels of quality, availability, consistency, and/or reliability of service or less consistency of service may be acceptable in order to lower operational and capital costs.

- **Fewer services** – Eliminating services saves on operating and capital costs.

- **Alternative revenues** – Alternatives to tax increases may include development cost charges or user fees as examples.

CLIMATE

The Town of Lincoln is committed to providing its community with an equitable, sustainable, and prosperous quality of life. In order to adapt, manage, and reduce the impacts of climate change, the Town has committed to 47 actions that the municipality will undertake to adapt to climate change. Adapting assets and the asset management process to anticipated climate change are included in the following goals:

- **Goal 1:** Integrate climate change considerations into Town strategies, plans, policies, procedures, operations, & services.

- **Goal 2:** Increase resiliency & adaptive capacity within economic development, community services, parks, & recreation.

- **Goal 3:** Protect natural resources, promote ecosystem services, & minimize environmental degradation.

- **Goal 4:** Mitigate harmful consequences of extreme weather & emergency events.

- **Goal 7:** Consider climate change impacts in built infrastructure & asset management.

- **Goal 8:** Increase climate change literacy among staff & public.

4.2.4 RESILIENCY AND ADAPTATION IMPROVEMENT PRIORITIES

Table 34 shows a prioritized list of improvements relating to resilience and adaptation.

Table 34: Resiliency and Adaptation Improvement Tasks

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
22	4.2	Resiliency and adaptation	Review climate change forecasts regularly and modify adaptation plan if appropriate.	Low

4.3 SUSTAINABILITY

For this inaugural asset management plan, the fleet service has been assessed for the first time using the Service Sustainability Assessment Tool which was developed by Asset Management BC (AMBC). This tool highlights where the service sustainability may be threatened and provides feedback on performance of business practices that contribute to service sustainability. This first assessment provides a benchmark for the Town, Assessments in future years can be compared to this assessment to report if the level of sustainability for each service area is being maintained, improving or declining.

Service sustainability requires balancing service delivery with good governance and strong finances. Many communities have a strong understanding of service delivery itself, that is, how services are delivered, in what quantity, to whom, and where. In fact, much of the work of local government is in the delivery of services. Good governance provides consistent and transparent decision-making that takes a long-term view. Strong finances are key to being able to deliver a service affordably over time.

By assessing the three components of sustainable service delivery together, feedback on strengths and gaps for each component can be identified.

4.3.1 ASSESSMENT

The Town of Lincoln's Fleet service staff completed the service sustainability assessment by rating statements that correspond to the current situation of the fleet services and to their level of preparedness for the future.

4.3.2 CURRENT PERFORMANCE

The results of the Service Sustainability Assessment Tool show that the current level of sustainability of the fleet service is 72% and its preparedness for the future is 89%. The results of the assessments are shown in Figure 13.

	CURRENT PERFORMANCE	PREPAREDNESS FOR THE FUTURE	OVERALL SUSTAINABILITY
Fleet	72%	89%	
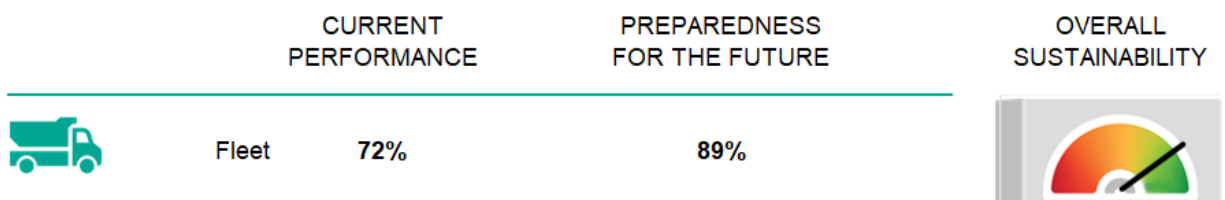
Figure 13: Sustainability Results – Fleet

The current performance score is based on the following:

- Fleet assets are able to meet the needs of most users.
- Fleet assets receive adequate maintenance.

- The Town replaces old fleet with EV vehicles, where possible

- There is sufficient revenue to fund the requirements in the capital plan.

- Reserve amounts are adequate and can buffer any short-term revenue fluctuations.

- Decision-making process considers short- and long-term implications.

- Stakeholder consultations are common and user complaints are rare and minor.

The preparedness for the future score is based on the following:

- Future service master plan is in place, but the funding is not sufficient to implement it.

- The Town of Lincoln follows a formal preventative maintenance program.

- Comprehensive long-term financial plan based on up-to-date information.

- Policies are in place to guide decision making.

4.3.3 SUSTAINABILITY IMPROVEMENT PRIORITIES

Table 35 shows a prioritized list of improvements related to sustainability.

Table 35: Sustainability Improvement Tasks

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
23	4.3	Sustainability	Fleet service staff to annually re-assess service against AMBC's Sustainable Service Assessment Tool	Medium

5 FINANCIAL SUMMARY

5.1 CONTEXT FOR INFORMATION IN THIS SECTION

This section provides an overview of the revenues and costs to provide the services, including operations and maintenance forecasts and capital renewal forecasts as well as new assets and upgrades to support growth. The information included in the financial reflects the 2024-2034 capital budget and the renewal forecasts from Section 2.4.

5.2 CAPITAL AND MAINTENANCE BUDGETS

5.2.1 CAPITAL BUDGET

Figure 14 shows the current (2024) and planned capital budget from 2025 to 2034. The total capital budget for the period from 2024 to 2034 is $7,887,200. The capital plan includes replacement of existing equipment and vehicles as well as planned acquisitions of new assets. Of the $7,887,200, $7,647,200 is for existing capital replacements and renewals, and the remaining $240,000 is for new asset acquisitions and purchases.
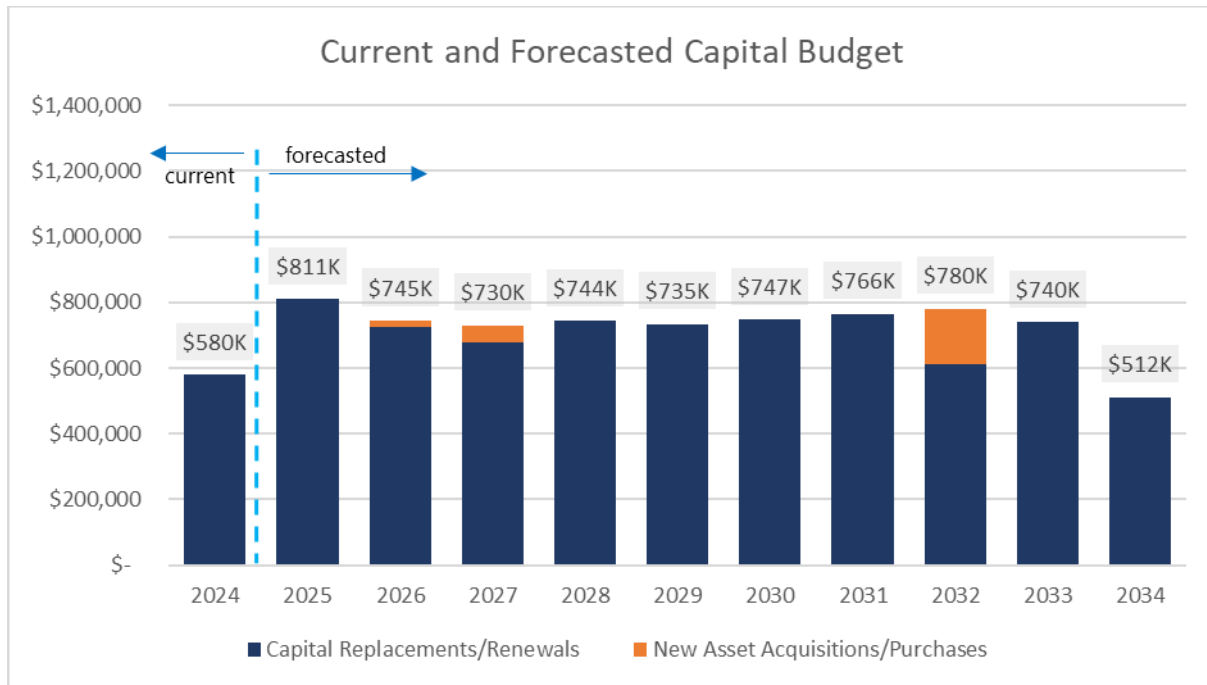
Figure 14: Fleet Capital Budget, 2024 – 2034

Figure 15 shows the distribution of capital budget by asset group. Most of planned capital expenditures (69.6%) are allocated for the road services fleet, with remaining 20.8% allocated for community services fleet, 5.1% allocated for environmental services fleet, and 4.5% allocated for other departments.
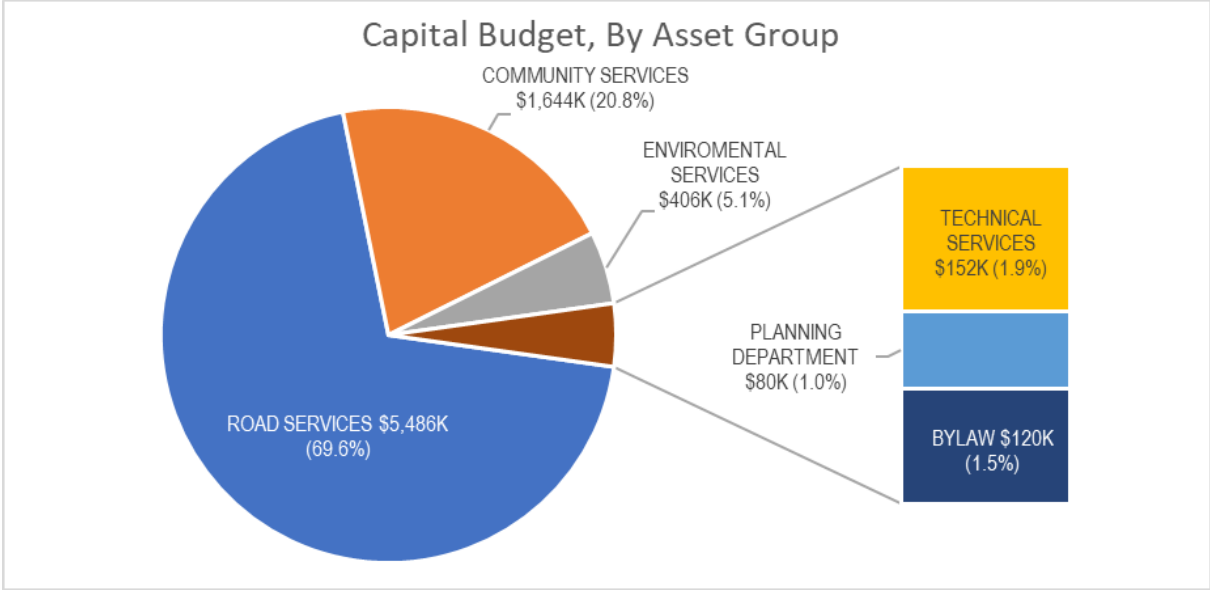
Figure 15: Fleet Capital Budget, by Asset Group, 2024 – 2034

5.2.2   *OPERATIONS AND MAINTENANCE BUDGET*

Figure 16 shows the current (2024) and forecasted operations and maintenance budget. The current annual operating budget of $373,483 was assumed to grow 3% annually (in real terms).
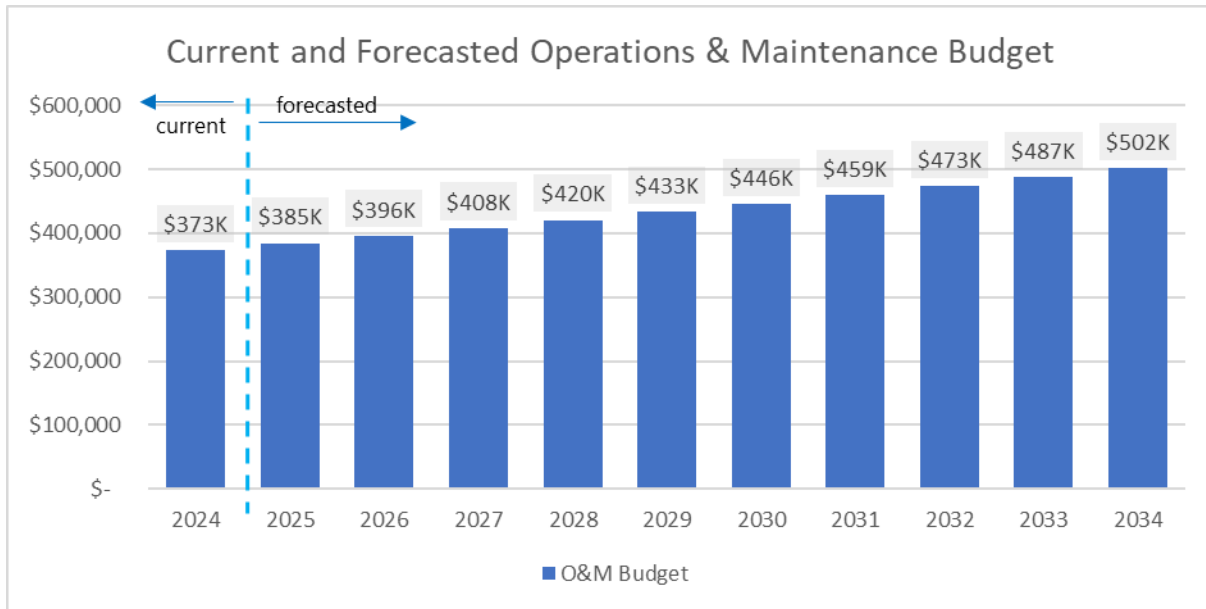
Figure 16: Current and Forecasted Operations & Maintenance Budget

5.2.3 REVENUE SOURCES

Capital works, operations and maintenance of fleet services are currently funded by the following sources of revenues:

- Capital levy
- Development charges
- Water user rate fees (only for water department required purchases, under Environmental services)

Figure 17 shows the anticipated funding sources for the capital expenditures (asset renewals and new asset purchases) for fleet service assets between 2024 and 2034.
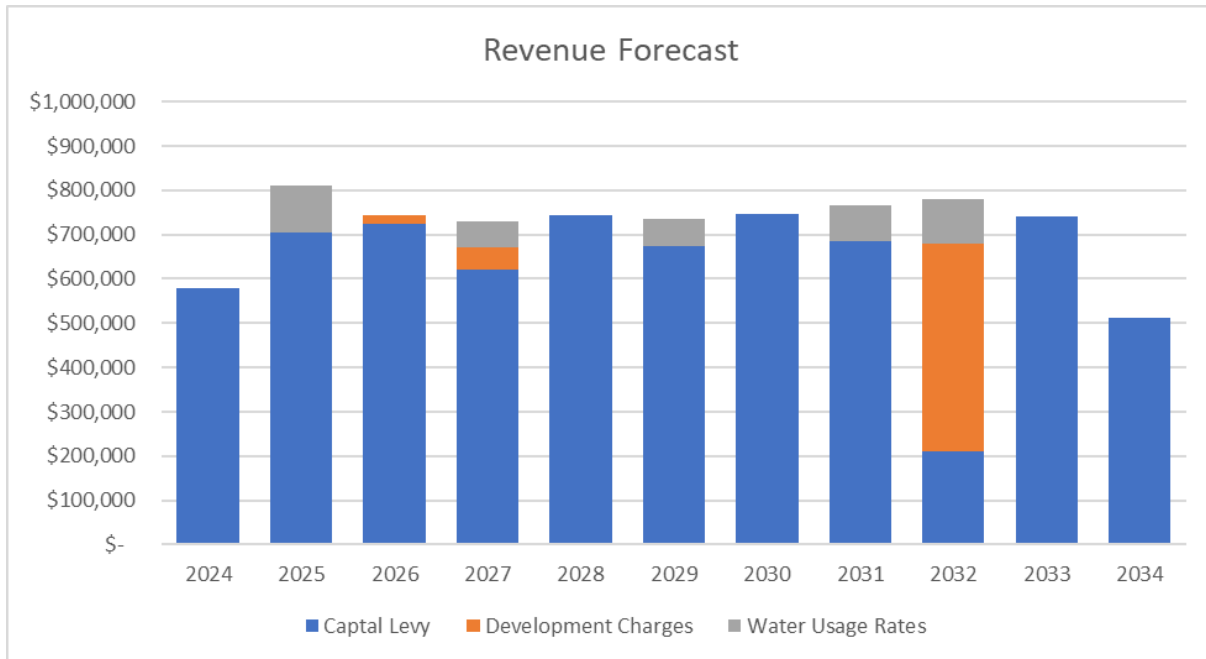
Figure 17: Fleet Capital Budget Revenues, 2024 – 2034

The funding sources for capital projects are shown in Figure 18. It is anticipated that most capital works will be funded through capital levy. In addition, any water department (under Environmental Services) fleet assets are funded through water user rate fees.
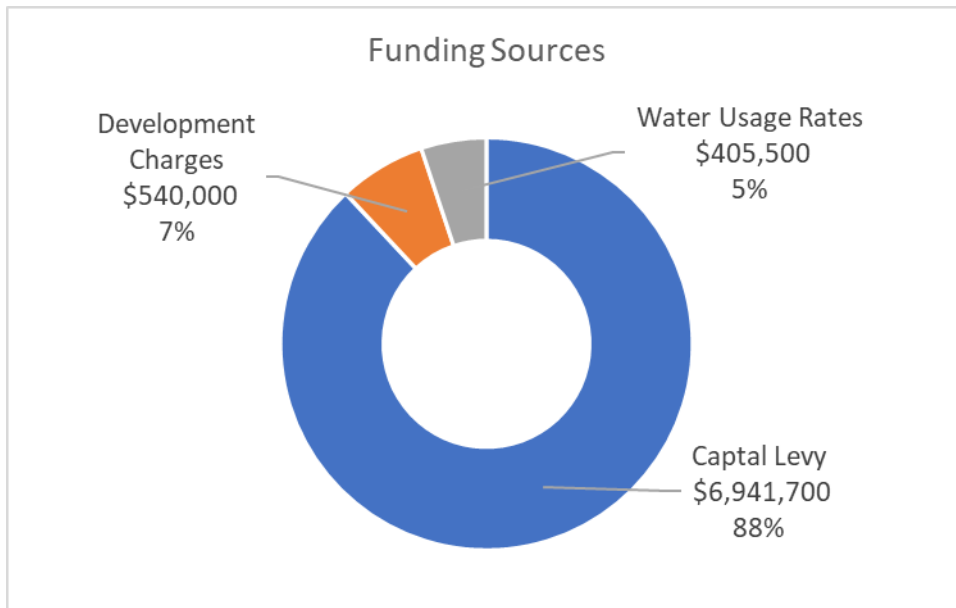
Figure 18: Fleet Capital Budget Funding Sources, 2024 – 2034

5.3 FINANCIAL FORECASTS

5.3.1 CAPITAL RENEWAL FORECAST (STATE OF INFRASTRUCTURE)

The State of Infrastructure capital renewal forecast presented in this section is limited to replacement with like-for-like of existing assets only and does not include any expenditures on new asset acquisitions/purchases or asset upgrades. It is also important to note that this renewal forecast is based on lifecycle timing only.

Figure 19 shows the State of the Infrastructure capital renewal forecast over the next 10 years (2025 – 2034) by asset group. Points to note are:

- The 10-year total forecasted capital renewal cost for fleet assets is approximately $7.4M. This corresponds to an annual average capital cost of $742,400.

- Seventy-five (75%) of the costs are for replacing road services fleet assets.

- Community services fleet asset replacement represent 20% of the forecasted capital costs.

- Environmental services fleet assets represent 4% of the forecasted capital costs.

- Technical services fleet assets represent 1% of the forecasted capital costs.
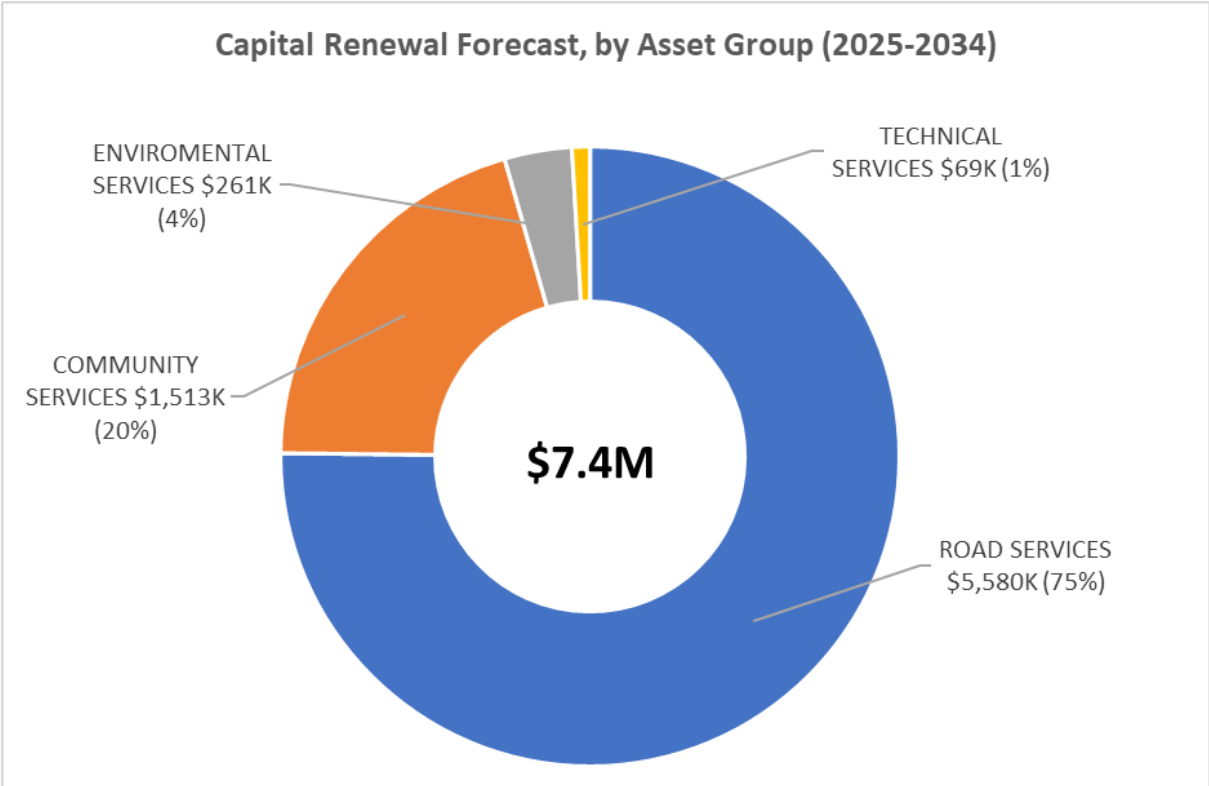
Figure 19: Total Forecast Capital Renewal Cost, by Asset Group, 2025 – 2034

Figure 20 shows the capital renewal forecast between years 2025 and 2034. It is important to note that this forecast is for replacement like-for-like of existing assets only and does not include any new assets or asset upgrades and their renewal that may occur in the future. This forecast is based on lifecycle timing of current assets only.
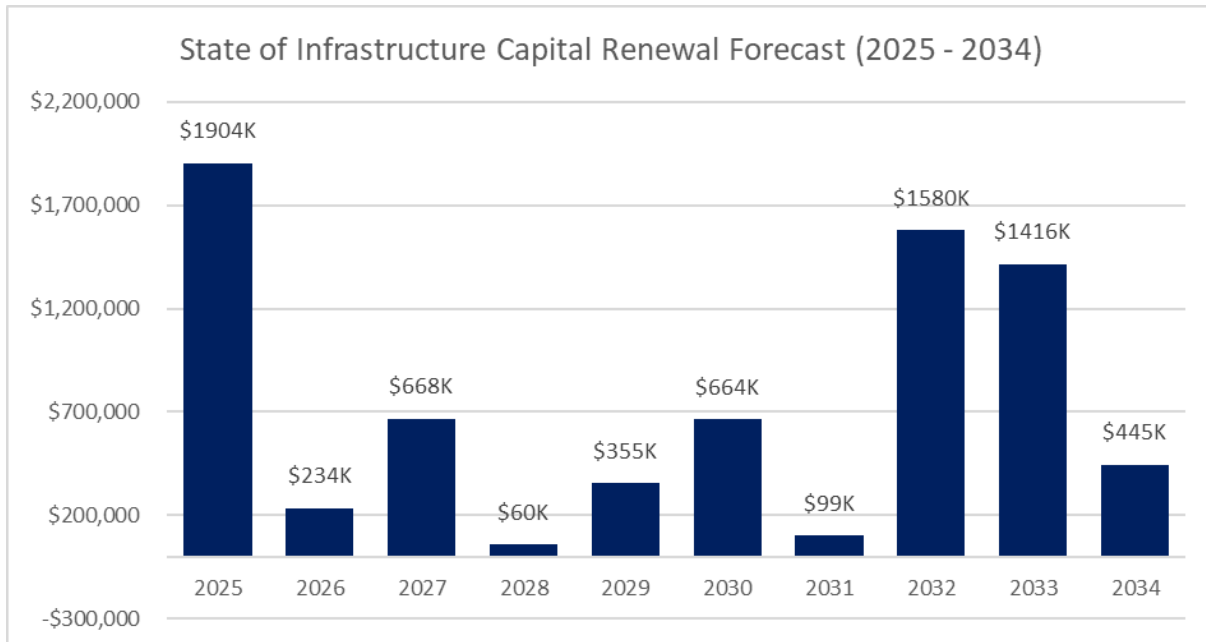
Figure 20: Fleet Age-based Renewal Forecast, 2025 – 2034

5.3.2 OPERATIONS AND MAINTENANCE FORECAST

The Town of Lincoln fleet service are yet to develop a needs-based operations, maintenance, and inspection (OMI) forecast aligned to agreed level of service. Current operations and maintenance budget is provided in Figure 16.

5.4 COMPARISON OF BUDGET VS FORECAST

5.4.1.1 CAPITAL RENEWALS BUDGET VS NEEDS-BASED FORECAST (STATE OF THE INFRASTRUCTURE)

Figure 21 shows a comparison of the planned capital replacements (sourced from 2024-2034 capital plan) and forecasted capital asset renewals identified in the State of Infrastructure analysis.
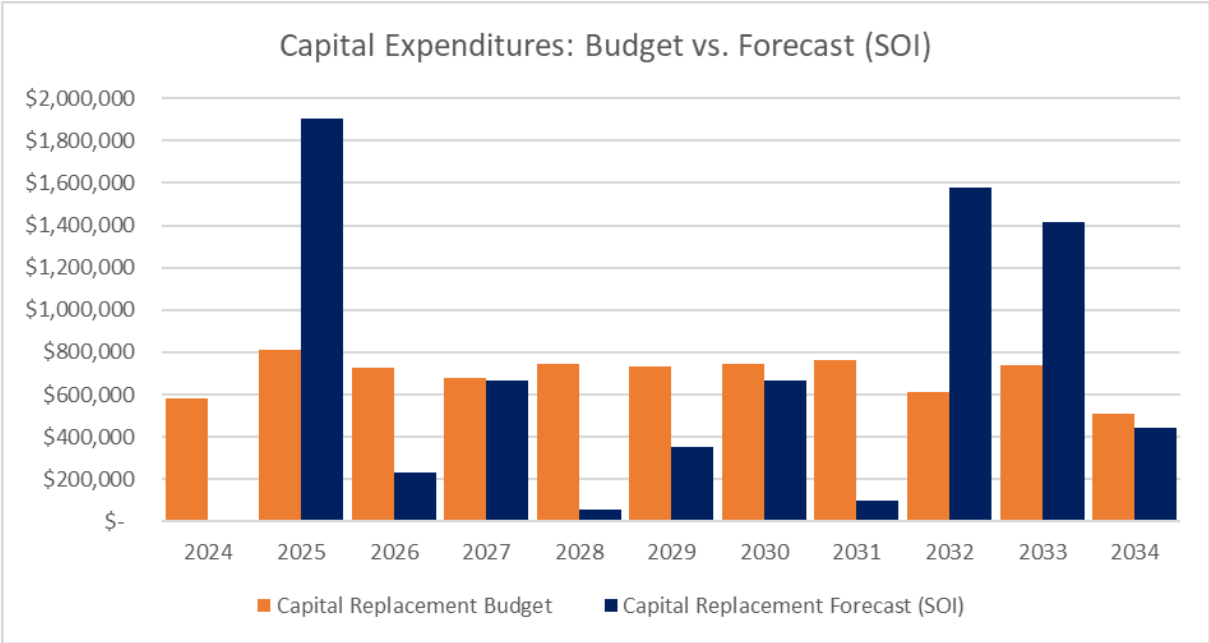
Figure 21: Comparison between the Capital Budget and the State of the Infrastructure renewal forecast

The Town of Lincoln's fleet service average annual budget for capital renewals and replacements between 2024 and 2034 is $695,200. This is $47,200 lower than the forecasted average annual renewal costs of $742,400. This indicates that, on average, planned budget is sufficient to meet the estimated capital renewal and replacement needs during the period from 2024 and 2034.

10-year Average Annual Capital Replacements (Planned Budget)	**$695,200**
Forecasted 10-year Average Annual Capital Replacements (Needs-Based on State of Infrastructure analysis)	**$742,400**
Annual Funding Gap*	**-$47,200**

Comparing current capital renewal and replacement budget levels ($695,200 budget) with annual capital replacement needs ($742,400 forecast), the funding gap can expect to increase to just $472K over the 10-year planning period, as shown in Figure 22.
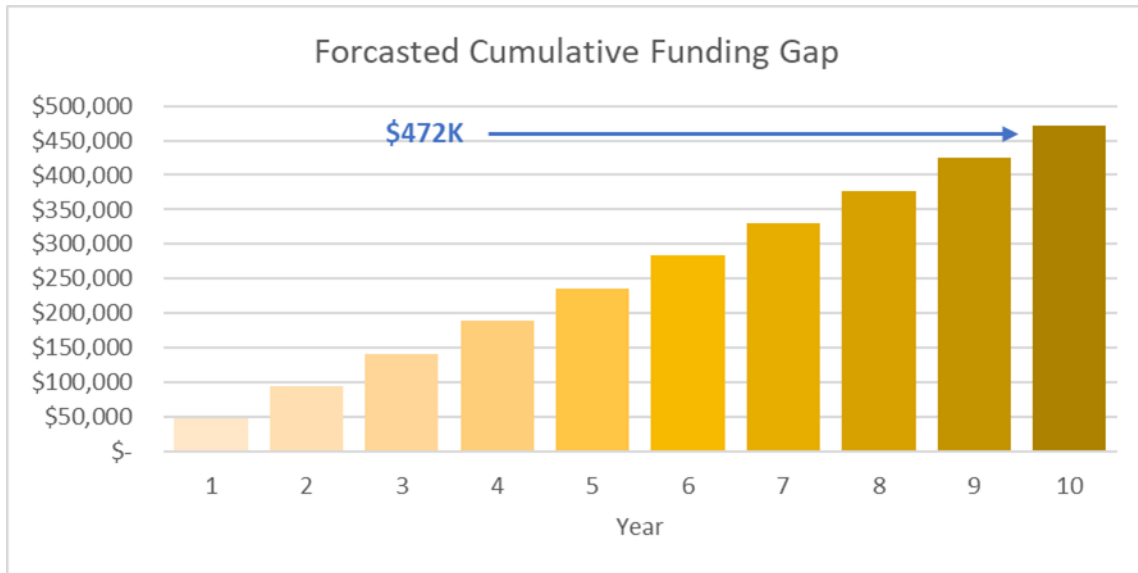
Figure 22: Visual Representation of Accumulated Funding Gap Under Current Capital Budget Levels and Capital Needs

5.4.1.2 *OPERATIONS BUDGET VS NEEDS-BASED FORECAST*

A needs-based forecast of operational forecast (operation, maintenance, and inspections) has not been undertaken but is identified as a recommended improvement task for future updates of this Asset Management Plan.

5.5 FINANCIAL IMPROVEMENT PRIORITIES

Table 36 shows the prioritized improvements relating to financial summary.

Table 36: Financial Improvement Tasks

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
24	5	Finance	Develop a detailed needs-based forecast at the activity level for operations, maintenance, and inspection activities, necessary to deliver the required level of service. Include the developed forecast in the next iteration of the Asset Management Plan and compare	High

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
			current OMI budget to needs-based operations, maintenance and inspections forecast.	
25	5	Finance	Regularly review and update the asset management plan with the most recent 10-year capital plan.	High
26	5	Finance	Continue to review inventory, estimated lifespans, and replacement costs for all assets to improve the accuracy of the needs-based renewal financial forecasts.	High
27	5	Finance	Assess condition of assets and use the information to improve the accuracy of needs-based financial forecasts.	Medium
28	5	Finance	Develop a process to track and separate capital renewals and rehabilitation costs from capital upgrades to support growth, improvements, and new assets.	Medium

6 CONTINUOUS IMPROVEMENT

6.1 ASSET MANAGEMENT MATURITY ASSESSMENT

An assessment of the Fleet service's asset management practices was completed in 2020 to evaluate service area capabilities and develop a work plan towards enhanced asset management maturity. The results are scored from 1 to 4 based on eight key improvement categories:

1. Leadership and Commitment
2. Financial Capacity
3. Know Your Assets
4. Know Your Financial Situation
5. Understand Decision Making
6. Manage Asset Lifecycle
7. Know the Rules
8. Monitor Sustainability

The rating for each question was based on the scale shown in Table 37.

Table 37: Maturity Rating Description

Rating	Description
1	None: does not exist or has not been started at this stage
2	Started: some work has begun, or some parts of the asset management practice are available, but progress is less than 40% complete
3	Progressing: work is underway, and progress is more than 40% complete, but there is still more to do
4	Complete: the required targets, standards, and/or outcomes for the asset management practice are completed, available, and in use in the business

6.1.1 ASSESSMENT RESULTS – FLEET

Assessment results were recorded in a spreadsheet designed for benchmarking the Town's asset management practices. Staff can use the spreadsheet tool to re-evaluate asset management maturity in subsequent years and report progress.

Figure 23 provides a radar chart completed in 2020 that shows the maturity scores of the Fleet Service.

Asset Management Practice
FLEET

Figure 23: Maturity Assessment Fleet Service 2020

The leadership and commitment and financial capacity criteria of the maturity assessment were assessed at a corporate level rather than by service area. The results for asset management practices for the fleet service are described below.
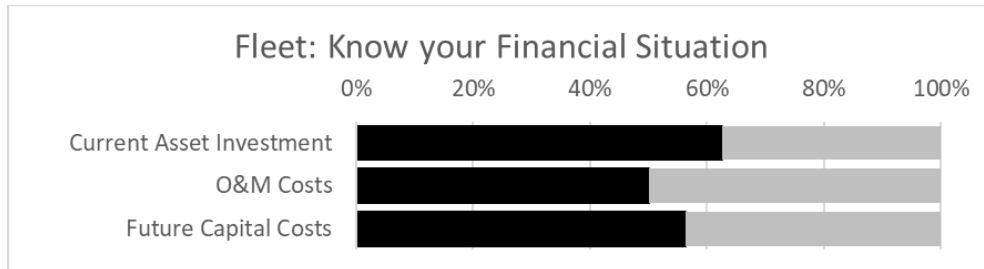
AM PRACTICES & INFORMATION – FLEET

The assessment for the remaining six categories of Asset Management Practice and Information were completed in 2020 for the fleet service. The following section provides comments on the key points.

- **Know Your Assets:** Datasets are largely complete with some missing attribute information mainly for non-vehicle assets. Fleet asset data is stored in CityWide. Grouping of assets has started, consistent data records and processes will need to be developed to ensure that asset information for all groups is consistent, current, and accurate.
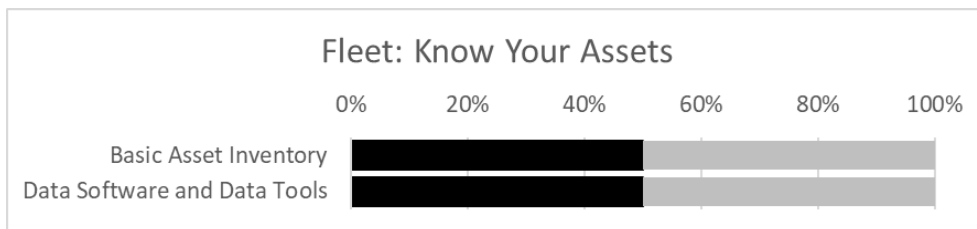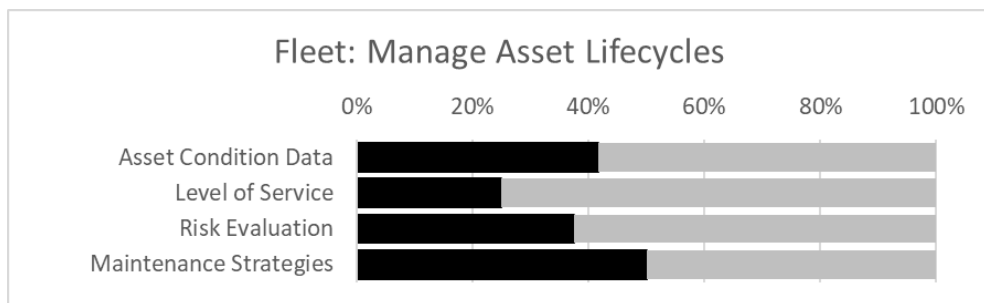
- **Know Your Financial Situation:** The fleet service typical lifespans are based on experience with no measurements to support them. The Asset replacement costs are based on previous purchases and are adjusted for inflation etc. Processes have been put in place to track O&M costs, however not currently tracked.

Fleet: Know your Financial Situation

	0%	20%	40%	60%	80%	100%
Current Asset Investment						
O&M Costs						
Future Capital Costs						

- **Understand Decision-Making:** Decision-making processes for fleet services are informal and based on staff input on the unit's condition, maintenance costs, and need fulfilment. Most decision processes and criteria are not documented, although the outcome of decisions and some rationale is reported on a case-by-case basis. At the time of the assessment, an asset management plan had not been developed, but has been addressed with the development of this plan.

Fleet: Understand Decision Making

	0%	20%	40%	60%	80%	100%
Decision Process						
AM Plan						
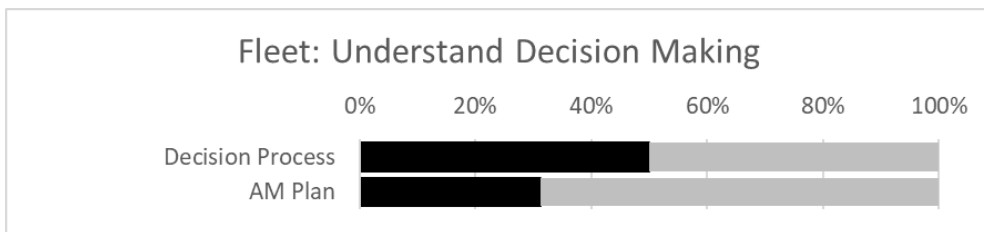
- **Manage Asset Lifecycle:** Current condition data is available but no formal process for evaluating condition it is done on staff input. Service statements did not exist for the fleet service, and performance measure have not been established or tracked. High risk assets are known by experienced staff. There is no formal risk scoring and mitigation plans are informal and not documented.

Fleet: Manage Asset Lifecycles

	0%	20%	40%	60%	80%	100%
Asset Condition Data						
Level of Service						
Risk Evaluation						
Maintenance Strategies						

- **Know the Rules:** The fleet service is aware of relative legislation and rules relating to the assets they manage. Compliance is not carefully monitored; records are kept but no regular reporting. Stakeholders are consulted prior to replacement. Stakeholders are
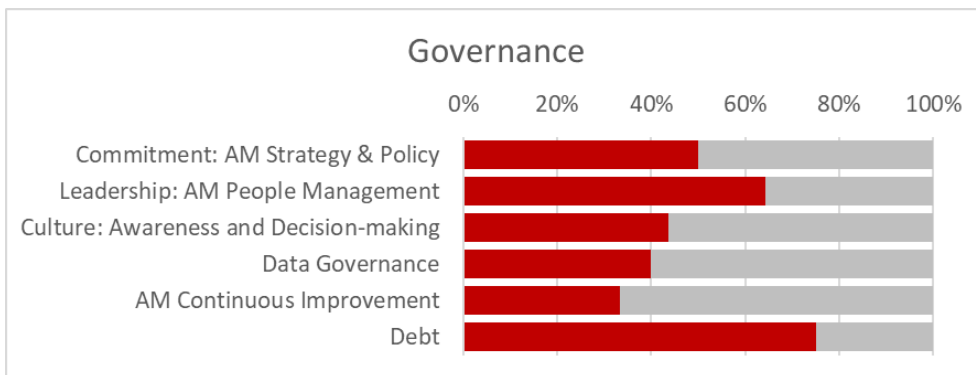
consulted on all matters pertaining to the replacement unit not the date. Stakeholder expectations to be documented and formalize the process.

Fleet: Know the Rules

	0%	20%	40%	60%	80%	100%
Strategic Goals						
Legislation / Regulation						
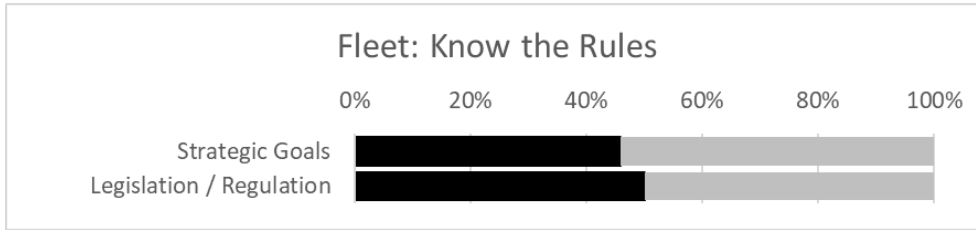
- **Monitor Sustainability:** Sustainability goals are yet to be developed for the fleet service. New technology is considered at the time of replacement.
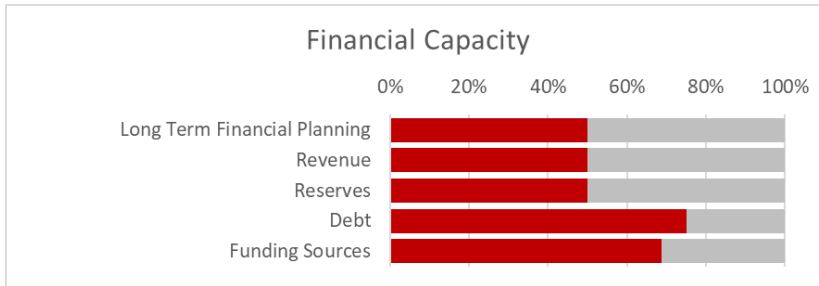
Fleet: Monitor Sustainability

	0%	20%	40%	60%	80%	100%
Sustainability						
Renewal Alternatives						
Coordinating Works						
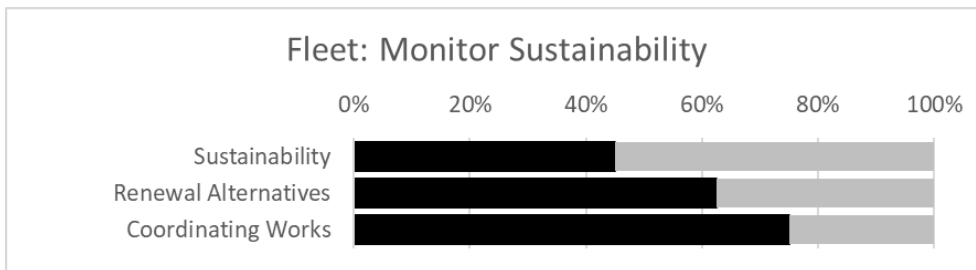
- **Leadership and Commitment: T**he Town of Lincoln has an asset management policy but does not yet have an asset management strategy or a defined asset management framework. There is an established asset management focus group and there is a strong culture of teamwork across the service areas, however the group does not have any terms of reference and the roles and responsibilities for asset management are still in the development phase. The leadership team is empowering staff to deliver asset management practices, but dedicated resources have not been established and asset management practices to identify and report o key issues are in early phase of development. There is no formalized data governance document or data structure model.

Governance

	0%	20%	40%	60%	80%	100%
Commitment: AM Strategy & Policy						
Leadership: AM People Management						
Culture: Awareness and Decision-making						
Data Governance						
AM Continuous Improvement						
Debt						

- **Financial Capacity:** The Town of Lincoln produces short term (5-10 years) financial plans. Plans rarely consider long term planning horizons of 20-30 years or more. The level of current revenue is deemed adequate in the short term but there is no supporting

information available too if they are adequate for longer term financial sustainability and service delivery. Some reserves are in place but there is not sufficient information to understand if they are adequate. Similarly, there is insufficient information to determine if revenues are adequate for the long-term. Debt levels have been rated as reasonable and stable, but long-term sustainability is uncertain because a long-term assessment and plan are still to be established. Funding sources for the short to medium term are well understood and there is medium to low risk of significant change, but little is understood of longer-term risks or vulnerabilities.

Financial Capacity

	0%	20%	40%	60%	80%	100%
Long Term Financial Planning						
Revenue						
Reserves						
Debt						
Funding Sources						

6.1.2 IMPROVEMENT STRATEGY (PRIORITY AREAS FOR IMPROVEMENT)

Table 38 shows the areas for improvement that were identified as part of the 2020 asset management maturity assessment. Most of these tasks have been completed since doing the maturity assessment.

The remaining tasks were considered for recommended improvement actions for this asset management plan. The improvement action list is given in Table 39. Column "Action No." in Table 38, provides a link between the remaining maturity assessment tasks and the recommended improvement actions in Table 39, where relevant. Note that one task is not currently relevant but may be considered as a potential future task and another task will be included in the corporate asset management plan.

Table 38: Asset Management Improvement Strategy Tasks (2020 AM Maturity Assessment)

Task No.	Category	Task/Activity	Description	Action No. (see Table 39)
1	Data	Data Structure	Includes defining the core attributes to be recorded, data formats, naming conventions, etc.	Done

Task No.	Category	Task/Activity	Description	Action No. (see Table 39)
2	Data	Data Governance	Includes the data structure and adds data roles & responsibilities plus the purpose and intended use of the data and the main standard business processes (or operating procedures) for creating, updating, and maintaining asset data.	1
3	Data	Data Capture	Includes data gap assessment, prioritizing what to capture, defining method for data capture, and developing a data capture program (prioritized schedule of data capture work).	Done
4	AMP	Renewal Forecast	Includes completing a State of Infrastructure assessment based on the most up to date asset data and collaborating with the Town of Lincoln to define typical unit replacement costs and lifespans, then using this data to forecast the timing and cost of asset replacements for a long-term forecast.	5
5	AMP	Basic Level of Service	This begins with a basic level of service description of expectations for each stakeholder group and identifying performance measures (what to measure and what targets to be achieved).	Done

Task No.	Category	Task/Activity	Description	Action No. (see Table 39)
6	AMP	Advanced Level of Service	This will build on the basic level of service details but will expand to include details on Customer level of service, Technical level of service, Operational level of service, and consider both current and future states.	6, 7, 8
7	AMP	State of Infrastructure	This is an analysis of current asset data to determine the quantity, condition, and age of each asset, it expected lifespan and replacement value, its current book value, and its expected replacement year.	Done
8	AMP	Basic Lifecycle Strategies	This begins with a basic description of the lifecycle management of groups of assets detailing the types and frequency of inspections, any preventative maintenance activities, any significant rehabilitation treatments that will be done during its life and what happens at the end of its life (and how is replacement managed).	Done
9	AMP	Advanced Lifecycle Strategies	This builds on the basic lifecycle strategies and expands to provide more details and costs and specify decision processes and any data monitoring or analysis.	13, 14

Task No.	Category	Task/Activity	Description	Action No. (see Table 39)
10	AMP	Basic Risk Assessment	This begins with assigning a rating for the criticality of each asset in regard to delivering the service, combined with a rating for the likelihood of the asset failing (based on its age and expected remaining life) to generate a basic risk rating.	Done
11	AMP	Advanced Risk Assessment	This builds on the basic risk rating to consider other aspects of consequence in addition to service delivery and analyses failure likelihood in more detail including failure on functionality and capacity as well as physical failure, to derive a more detailed risk analysis.	Done
12	AMP	Service Plan Documents	This is to collate Asset Management Plan components into a Service Delivery Plan for each significant service area.	No longer relevant. Potential Future Task
13	AMP	Corporate Plan Document	This is to generate a summary corporate Asset Management Plan document that provides highlights from each Service Delivery Plan and collated corporately significant data such as financial forecasts, state of the infrastructure, level of service performance, risk profiles and major issues or vulnerabilities.	See Corporate Asset Management Plan

Task No.	Category	Task/Activity	Description	Action No. (see Table 39)
14	People	Resource Plan	This is a detailed plan identifying the resources required to complete work and comparing these to available resources to quantify the gap (i.e., resources needed) and facilitate decisions on what tasks to do when and whether to use internal or external resource as well as providing evidence for requests for additional staff. It can be completed just for AM improvement work, or it can be for all work including operations and maintenance tasks required to deliver agreed level of service as well as managing capital works programs and administrative tasks as well as other council initiatives as and when they are being considered or have been adopted.	19, 20
15	Software Tools	Functional Requirements	This is the first step required before considering purchase of software to assist AM. It is a process of identifying and prioritizing what each department needs the system to do. This prioritized list of requirements can then be used as a measure for objective comparison and rating of software options from vendors.	TBD
16	Governance	Goals and Objectives	This includes to identify the primary objectives of AM for the organization and key goals (with measurable targets) that will help the organization achieve those objectives.	TBD

Task No.	Category	Task/Activity	Description	Action No. (see Table 39)
17	Business Management	Procedures and Decisions	The first step is to identify key decision processes that should have some controls or documentation to ensure they consider all relevant information, involve all the right people, and the decision made in a consistent way that can be explained.	TBD

6.2 ASSET MANAGEMENT PLAN IMPROVEMENT ACTIONS

Table 39 shows a prioritized list of improvement actions/tasks collated from each section of this asset management plan.

Table 39: Asset Management Plan Improvement Tasks

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
1	2	Asset Data	Consider developing a data policy, data management plan and data standards to provide more robust data governance, including roles and responsibilities and clear rules on data attributes. This will improve confidence in the consistency and accuracy of recorded data and simplify the data preparation for state of infrastructure analysis.	High
2	2	Asset Data	Develop a condition assessment approach for fleet and capital equipment.	High
3	2	Asset Data	Complete and document condition inspections on fleet and capital equipment assets and use the results to improve the accuracy of the renewal forecasts.	Medium
4	2	Asset Data	Capture data on asset age at end of life to validate estimated useful life values used for planning and forecasting.	Medium
5	2	Asset Data	Continue to review and update replacement costs to build confidence in replacement unit rates to use in future state of infrastructure analysis and future replacement forecasts.	High
6	3.1	Level of Service	Regularly review the level of service statements to ensure they continually align with the strategic goals and the stakeholder's expectations.	High

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
7	3.1	Level of Service	Develop and implement a data collection strategy that will provide information for measuring level of service performance.	High
8	3.1	Level of Service	Identify a performance target for each performance measure. This can be done at any time, but it is more effective to set targets after you have at least 1 year of measured results to refer to.	High
9	3.1	Level of Service	Develop 10-year forecast for performance targets,	Medium
10	3.1	Level of Service	Develop processes to inform operation needs	Medium
11	3.1	Level of Service	Develop key performance indicators that encourage alignment between level of service delivery and operations and maintenance standards	Medium
12	3.2	Lifecycle Strategy	Develop lifecycle strategies for any new assets that become part of the fleet service.	Medium
13	3.2	Lifecycle Strategies	Identify and document costing and frequency information for lifecycle strategies to develop a needs-based forecast of operations, maintenance, and inspection activities.	Medium
14	3.2	Lifecycle Strategy	Review and revise lifecycle strategies if maintenance approaches change (including where new technologies are employed) and include more details and costs and specify decision processes.	Medium
15	3.3	Risk	Complete condition assessments on assets to improve understanding of likelihood of failure for asset level risks. Where asset level risks remain high or very high,	High

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
			consider if assets should be added into renewal or rehabilitation programs.	
16	3.3	Risk	Develop and implement mitigation strategies for all high or very high service level risks and track their progress and effectiveness.	High
17	3.3	Risk	Identify possible mitigation strategies or actions for all very low, low, and medium service level risks and implement, if deemed feasible and cost-effective.	Medium
18	3.3	Risk	Regularly update and revise service level risk register, as risk levels may change over time.	Medium
19	3.4	Resources	Review resourcing requirements and assess if current capacity is sufficient. This may include defining tasks and requirements in further detail.	High
20	3.4	Resources	Review repair tasks in reactive maintenance and operations activities to ensure there are no duplications.	Medium
21	4.1	Demand management	Annually review and revise demand risk to reflect when mitigation measures have been implemented and if additional demand drivers are identified.	Low
22	4.2	Resiliency and adaptation	Review climate change forecasts regularly and modify adaptation plan if appropriate.	Low

Action No.	AMP Section	AM Practice Area	Task Description	Action Priority
23	4.3	Sustainability	Fleet service staff to annually re-assess service against AMBC Sustainable Service Assessment Tool (SSAT).	Medium
24	5	Finance	Develop a detailed needs-based forecast at the activity level for operations, maintenance, and inspection activities, necessary to deliver the required level of service. Include the developed forecast in the next iteration of the Asset Management Plan and compare current OMI budget to needs-based OMI forecast.	High
25	5	Finance	Regularly review and update the asset management plan with the most recent 10-year capital plan.	High
26	5	Finance	Continue to review inventory, estimated lifespans, and replacement costs for all assets to improve the accuracy of the needs-based renewal financial forecasts.	High
27	5	Finance	Collect condition data of assets to improve the accuracy of needs-based financial forecasts.	Medium
28	5	Finance	Develop a process to track and separate capital renewals and rehabilitation costs from capital upgrades to support growth, improvements, and new assets.	Medium

6.3 IMPLEMENTATION PLAN

In addition to documenting current state and business practices for the management of the Town's fleet services, the asset management plan provides recommended improvement tasks as described in Section 6.2. These improvement tasks will:

- Increase the level of understanding of the assets and services provided.
- Improve the accuracy of financial forecasts and risk assessments.
- Provide decision-makers with more accurate and complete information in an easy-to-understand format to assist them with making evidence-based decisions for the best use of available funding and the best interests of the community.

6.3.1 CONTINUOUS IMPROVEMENT PROCEDURES

The Town will adopt a continuous improvement approach as shown in Figure 24. A continuous improvement approach includes a regular review and adjustment process to keep the asset management plan up to date with the latest information, understanding, and forecasts.

This can also be described as a 'Plan, Do, Check, Adjust,' process (based on the Deming Cycle).

This four-step process can be used to generate on-going iterative improvements to the asset management plan and all business processes for the management of the assets and the delivery of the service, and to facilitate responsible adaptation to change. Each phase of the four-step process is described in Figure 24, starting with the implementation or 'Do' phase for this asset management plan as the development of this asset management plan was the first iteration of the 'Plan' phase.

The review cycle for implementing and updating the asset management plan should be done annually. However, it may be done every two years where little change has occurred. The timing for the asset management plan update is preferably prior to the annual budget process. This will facilitate consideration of outcomes and inclusion of updated forecasts into the financial planning process.
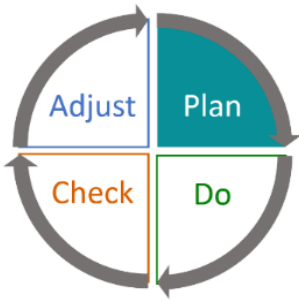
PLAN

- Collate available data and analysis results
- Consider data and analysis results in relation to objectives
- Document outcomes and recommendations
- Update assessment of limitations and assumptions
- Update asset management plan, consult and confirm for implementation
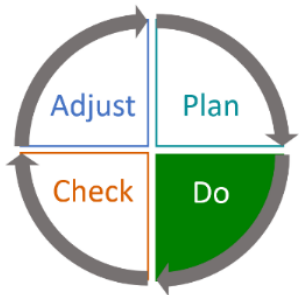
DO

- Schedule, fund, and complete improvement tasks
- Improve asset and cost data
- Monitor, manage, and mitigate risk
- Manage assets and deliver required service
- Measure and record performance
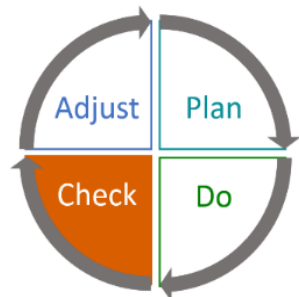
CHECK

- Review performance results
- Analyze asset and cost data
- Re-assess state of infrastructure and risk ratings
- Re-assess state of asset management practice
- Report achievements
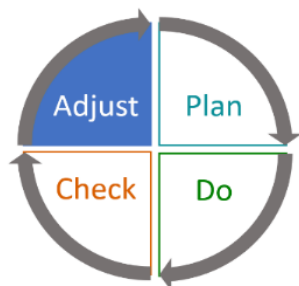
ADJUST

- Update improvement tasks and plan
- Adjust lifecycle strategies
- Adjust priorities and targets
- Update forecasts

Figure 24: Continuous Improvement Cycle

6.3.2 *CHANGE MANAGEMENT STRATEGY AND ACTION PLAN*

The Town currently doesn't have a change management strategy and action plan. Several improvements have been identified in the asset management plan, in addition to the data management plan and overall asset management process currently being considered. It is recommended that a formal change management strategy is developed to provide a clear path.

GENERAL CHANGE MANAGEMENT STRATEGY

Relationships

Managing relationships within the Town is crucial for the successful implementation of asset management practices. Helping staff see the path, providing them with the resources they need to succeed, and clear communication will support the Town on its path to creating a cultural shift and ingraining asset management practices into all levels of the organization.

There are several strategies the Town can implement to increase the likelihood of effecting a change successfully. These strategies include:

Establishing a Clear Vision

Developing a clear and concise vision statement for how asset management will impact the organization is the first step toward general agreement on what the organization wants to achieve with the change. The vision will also support communicating the change to staff. Any communication should ultimately align with vision and will help staff to envision how their tasks align and support the organizational goal.

Mapping the Journey

One of the main reasons why implementing a change can fail is because an organization tried to implement too many change initiatives too quickly, and without prioritization. Being over ambitious can harm the process as people may need time to adjust to the change. Providing too many tasks without alignment to an objective can also confuse staff. Identifying areas of focus and mapping out the journey can help the team understand the steps needed to reach the end goal. Reviewing the implementation can provide a sense of how ambitious the Town intends to be in implement changes, what the changes are, which areas of the organization will be affected, and when. A strategy can then be prepared prior to rolling out the change to minimize staff resistance.

Prioritize People and Leverage the Champions

Change is not possible without its people and changing an organization's culture takes time. People have different tolerances for embracing change and by identifying champions for change and empowering them to deliver results can be an effective strategy for change. The Town can identify a sponsor and create an asset management working group which can be open to anyone who is interested in leading the change. Facilitating weekly or monthly meetings to provide updates on quick wins, and schedules can keep momentum. By creating this collective group of passionate people who have bought into the change can increase the Town's likelihood of success.

Anticipate and Manage Resistance to Change

Any change can be disruptive to a person's role, and a person may resist a change for various reasons. Being aware of the reasons why people may resist a change and having a set of prepared response strategies can help to communicate a change in a positive way. For example, some individuals may think that Asset Management practices create unnecessary work that provides little value. A strategy to counteract this claim is to help the individual treat it as a new challenge to be solved. One could also reiterate how the practices will support better decision making. Table 40 includes some sample reasons why people resist change, sample scenarios, as well as strategies to minimize staff resistance.

Table 40: Reasons why people resist change, and strategies to minimize resistance

Reasons People Resist the Change	Anticipated Scenario	Strategy to Minimize the Resistance
Parochial self interest – Individuals are concerned with the implications for themselves	Some individuals may become frustrated because they feel as though the new tasks will create unnecessary work.	It's a new challenge to be solved! Reiterate how the practices will support better decisions.
Misunderstanding due to miscommunication or inadequate information	Asset management can sound like a large undertaking, and some may not understand it.	When communicating, keep it simple. Leverage subject matter experts
Low tolerance for change due to a sense of insecurity or lack of patience	People may fear that their jobs are being replaced by technology.	Highlight that it is an opportunity for development.
Different assessment of the situation – disagree over the need for change or the advantages.	May have a different understanding for the level of effort vs the benefit. If they don't understand the benefit, the level of effort may not seem worth the time.	Opportunity to participate and shape the outcome.
Individual challenges with implementing the change	Some field staff do not enjoy working with computers daily and may resist the requirement to input data into a computer or system.	Pairing up a senior person with a data manager will support succession planning while reducing the need for a person

Reasons People Resist the Change	Anticipated Scenario	Strategy to Minimize the Resistance
		being forced to learn new systems.
Loss in momentum	A member may have been on-board, but over time change was not seen and interest and momentum are lost.	Submit an internal anonymous survey that asks question to gauge the level of engagement.

Assess the Town's Change Readiness

A change readiness assessment can be completed to understand how prepared an organization is to undertake a major change. The assessment can consider how an organization manages its assets, and how it adapts to change. An Asset Management change readiness assessment can evaluate the organization's context for change based on the components in Table 41.

Table 41: Sample change readiness assessment categories and components

Category	Component
Employee readiness	- Awareness and perception of change - Support for and commitment to change - Understanding the ability to implement the required skills and behaviours
Organizational context	- Goals and alignment - Leadership Support - Organizational structure and culture - Authority and initiative for decision-making - Communication and engagement - Residual of previous change efforts - Resources available for the change

The feedback from this assessment can then inform a change management strategy that can accompany an asset management implementation plan.

Communicate the Change

Before communicating a task to staff members, it is important to be clear on what you need them to do and how they'll succeed. Below are some considerations to help prepare and plan for discussions when implementing a change.

- **Consider who is involved** and why they may resist the change. Communicate what the AM benefits will be.

- **Align the task with the vision** to provide purpose to the change.

- **Does the team have what they need to be successful?** Do they need training, additional resources, or new software and tools?

- **Will their role change?** What do you think some of their fears will be? How can you support them through the change?

- **Be clear about the task** and communicate what is involved, what the proposed change is, why the change is needed, what the major effects will be, and how the process will be managed.

Develop a Change Management Team

Developing and implementing a change management team can support business process improvement initiatives and can help drive cultural transformation, focusing on building agility, accountability, and employee empowerment.

Provide Training to Support Staff

Implementing asset management can feel like a large undertaking to many. Providing training to introduce asset management concepts will allow staff to "speak the same language". Training staff on what AM can do for them creates a personal connection as they now understand how AM will make their role more effective.

Monitoring

The Town should schedule a recurring monitoring schedule to review progress. It should include metrics on how the organization plans to measure success and review whether the organization is achieving its objectives. A process for receiving staff feedback should be established to determine focus areas for adjustment. Lastly, upon reflecting on the progress to date, the Town should review whether additional support is needed.

6.3.3 *PERFORMANCE MEASURES & EVALUATION PROCESS*

PERFORMANCE MONITORING

To inform and support improvement, it is necessary to monitor current performance, and to review performance outcomes compared to the intended outcomes. Performance Monitoring & Evaluation (PME) is therefore an integral part of implementing robust Asset Management.

Monitoring and evaluating the performance of the assets and services will help to improve the reliability and consistency of service delivery.

The primary objective for performance measurement is not reporting performance; it is managing performance to achieve a specific target.

This section describes the three key performance measurement processes for asset management that will evaluate whether the Utility management team are:

- Completing the asset management improvement tasks.
- Achieving asset management and the maturity targets, and.
- Improving asset data that will support evidence-based decisions.

REPORTING PROGRESS ON IMPROVEMENT TASKS

At least annually review and report the percent complete for each improvement task. Compare results to the schedule of work planned for completion in that year. It would also be useful to compare the hours spent on each task and the total expenses for the year compared to budget hours and expenses. This will inform whether each task is on track for completion on time and to budget and identify areas of concern for any tasks that are not on track. However, the ability to do this detailed reporting will depend on whether records are kept of staff time and expenses for work done on each task throughout the year. The minimum requirement is to report annually on the overall percent complete for scheduled improvement tasks.

At least annually the schedule for asset management improvement tasks must be reviewed and revised. Completed tasks should be removed, and new tasks added where necessary. New completion dates should be agreed for tasks that are partially complete. All other tasks in the asset management improvement plan, including tasks that were scheduled for completion during the year but have not been started, should be reassessed for priority and where appropriate assigned new start and completion dates. Any tasks that are no longer required should be removed from the plan.

This annual review and updating of the improvement program should also consider the outcomes of re-assessment of asset management maturity and re-assessment of Asset Data quality.

The asset management maturity assessment process is described in Section 6.1. To measure improvements of asset management maturity, a re-assessment should be completed (at least annually) and the results from each year compared to the previous year. Where appropriate, add a comparison to the first year of the program.

The step-by-step instruction for completing a re-assessment of asset management maturity using the assessment tools included in the "Notes" tab of that assessment tool. Each year a new copy of the analysis spreadsheet can be made so changes are easily tracked over time.
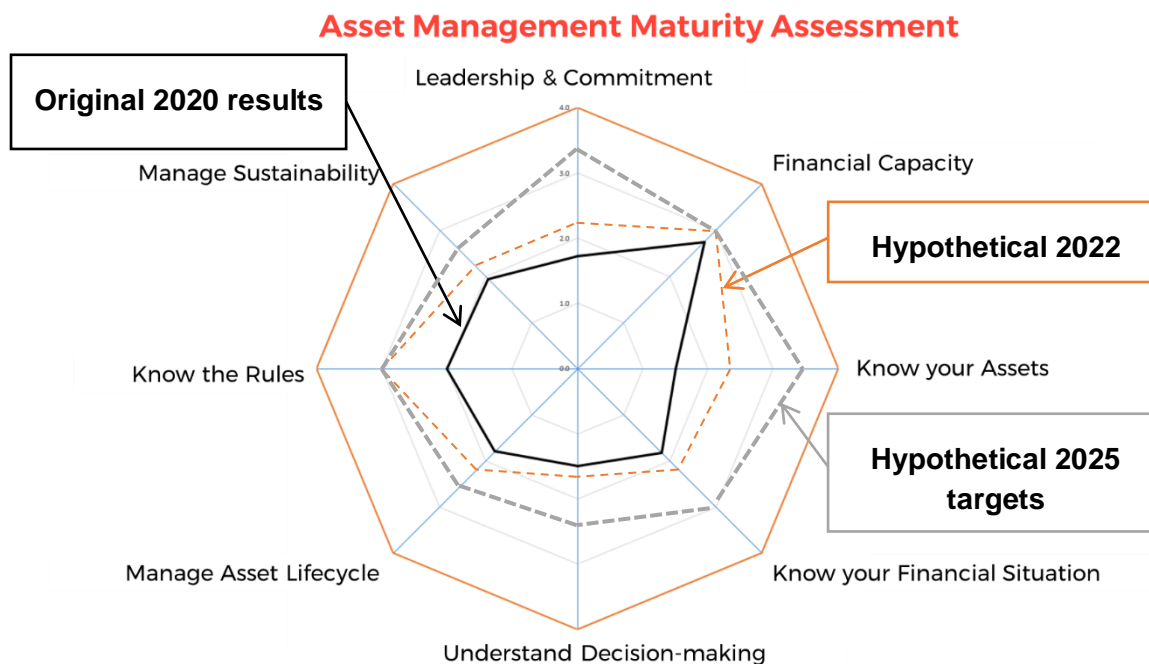
Figure 25: Reporting Progress on AM Maturity - Example

The Asset Management Maturity assessment tool provides several automated infographics and tables for reporting current results and comparing results to previous results and to any future targets if these have been set. The following diagram is an example.

The assessment tool provides further detail if required, for the results within each of the categories summarized in the graph above.

The results of the annual asset management maturity re-assessment provide important input to decisions on the continued relevance and the appropriate priority for asset management improvement tasks. Asset management maturity results should therefore be considered in the annual review and revision of the asset management improvement plan.

The currency and accuracy of asset data is critical to effective asset management, accurate financial forecasts, and informed decision-making. However, even more important than this is knowing what the reliability of the information is. Even data that is not highly accurate can be of benefit to decision-makers provided the accuracy is declared.

The Town has yet to develop a consistent data structure for recording asset information. A data management plan has been developed to support staff in understanding the attributes required to develop asset registers for all asset groups and locations and understand the significant impact on the accuracy of assessments for when each asset may need replacing and how much it will cost to replace.

As staff build their asset register and collate available asset information, the accuracy of these key attributes can be recorded in the relevant columns for confidence rating. This will facilitate measurement of the asset data quality and reporting on improvements in data quality.

The confidence ratings for asset data are a numerical value between 1 and 5, as appropriate to each asset record and each key attribute. A score of 1 indicates high confidence and 5 indicates low confidence. An example of how this is used would be, if the size of an asset (such as a hose) is known but its material type is not known, and its install date is not certain but has been reasonably assumed from the age of other assets in the station, then its confidence ratings would be 1 for the size attribute, 4 or 5 for material type and a 2 or 3 for install date depending on how compelling the supporting data is.

The general description for each confidence level is:

1. Data is verified as factual (accurate).

2. Data is known with a high level of certainty, but it may not be verified as factual (there is a small possibility of error).

3. Data has been reasonably assumed or determined from other known facts. There is a moderate level of certainty and a moderate possibility for error.

4. Data has been assumed or determined from some indicator, but the opportunity for error (at an asset level) is high.

5. Data is a default value assigned as a temporary measure until better information is available, because at this time, the correct data is not known, nor can it be reasonably assumed from known facts or some indicator.

Annually, an assessment should be made to determine the quantity (and completeness) of recorded asset data and the confidence profile for the recorded information.

The process will include to:

- Report the number of recorded assets.

- Calculate the percent (by value) of asset records that have confidence ratings 1 to 5.

- Graph results with comparison to the previous year's result.

The change in the number of assets recorded in the asset register will advise decision-makers of how complete the asset data is and any analysis results that are based on current asset data.

The change in the confidence ratings for key attributes will advise decision-makers of how accurate the asset data is and therefore, how confident they can be in any analysis results that are based on that asset data.

The following are examples of data quality graphs.

Both examples quantify the change (improvement) in data confidence from one year to the next. The graphs show a reduction in very low confidence records (rating of 5) and an increase in moderate and good confidence records (ratings of 3 and 2).
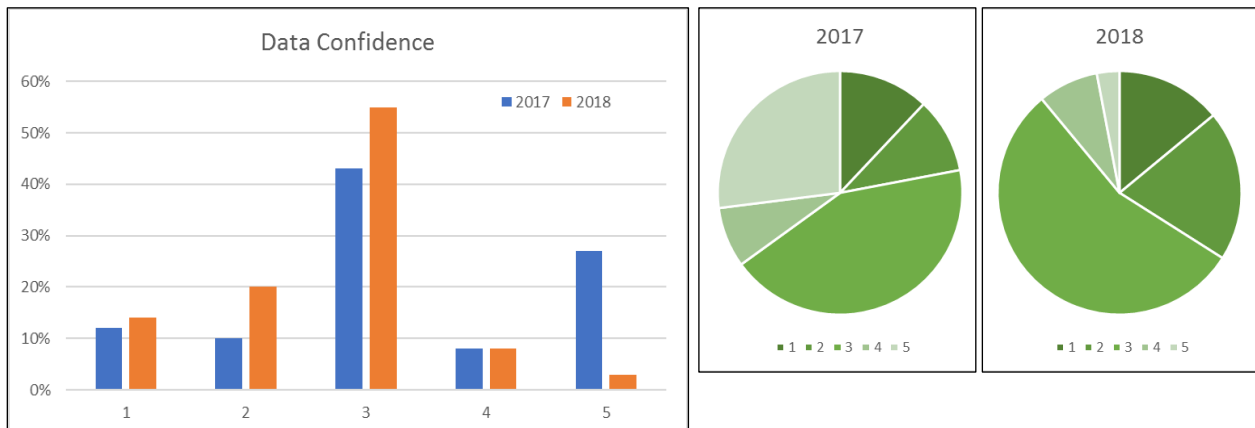
While staff are building their asset register, and until confidence ratings for key attributes have been recorded in the data register, it is recommended that a high-level data quality assessment is done.

Table 42 describes a set of data confidence grades (class A to class E) that can be used by the Utility management team for classifying data reliability at a high-level. This is different to the 1 to 5 confidence ratings that would be entered against each asset record in the asset register. The 1 to 5 ratings are for asset-level assessments whereas the A to E ratings is for an overall view when detailed data for asset-level assessments is not available.

The data quality assessment using the A to E ratings is a subjective assessment but based on knowledge of the accuracy and completeness of the data set (e.g., it is a judgement call made by a suitably experienced person or team who are very familiar with the dataset).

Table 42: High-Level Data Confidence Ratings

Data Grade	Data Confidence	Description
A	Highly Reliable	An asset inventory exists and is appropriately structured with asset type and sub-type classifications; the inventory includes key attribute information* for every asset and this information is highly reliable.
B	Reliable	An asset inventory exists and is appropriately structured with asset type and sub-type classifications; the inventory includes reliable information for most key attributes of most assets; where information is missing or unreliable, a reasonable estimate can be made based on known values (e.g., based on values for similar assets connected to or located close to the asset, or an average of known values for assets of the same type).
C	Some Uncertainty	An asset inventory exists but it may not be complete and it may or may not have an appropriate structure with asset type and sub-types, or these may not be fully populated; the inventory has a mixture of reliable and unreliable (or missing) information for key attributes for many assets; replacement costs may be based high-level average values or derived from purchase cost multiplied by an annual default percentage; useful life values may also be based on high-level average values or a default assumption.
D	Very Uncertain	An asset inventory exists but may not be complete and it may or may not have an appropriate structure; most key attribute information is missing or has low reliability; but some known, default, or assumed values do exist for some assets.
E	Unknown	An asset inventory does not exist, or it contains very little data.

*   *Key attribute information includes asset type and sub-type classification, install date, relevant size information, material type, and estimated unit cost and useful life values. Table 43 is an example of a high-level data quality report for fleet assets.*

Table 43: Data Confidence Ratings example

Asset Group	Asset Type	Acquisition Date	Model	Make	EUL	EUC
Fleet	A	A	A	A	B	B

Asset Group	Asset Type	Acquisition Date	Model	Make	EUL	EUC
Capital equipment	A	A	A	A	B	B

The results for one year can be compared to previous year(s) and the change in data quality can be shown graphically (in the same way as reporting for asset-level data quality).

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APPENDIX

A LIFECYCLE STRATEGIES

7.2.1.1.1.1.1 LIFECYCLE STRATEGIES – HEAVY-DUTY VEHICLES

Fleet & Equipment - Heavy Duty Vehicles

	Preventative Maintenance	Inspections	Operations	Reactive Maintenance	EUC	Comments
OMI	Annual maintenance (oil spray)	Annual inspections (compliance) - twice a year (hrs based) General daily safety inspections by operators at the start of their shift	Oil changes (twice a year) Washed after snowstorm events Cleaning	Repairs as required	Variable	Costs tracked by vehicle
(New) — line — (Replace)						
R&R				Run-to-fail. Replace at end of life	Variable	Typically 10 years, but department tries to extend the lifespan as much as possible
	Early Life Interventions	Mid-life Rehab	Later Life Rehab Option	End of Life	EUL	

7.2.1.1.1.1.2 LIFECYCLE STRATEGIES – MEDIUM-DUTY VEHICLES

Fleet & Equipment - Medium Duty Vehicles

	Preventative Maintenance	Inspections	Operations	Reactive Maintenance	EUC	Comments
OMI	Bi-annual maintenance (oil spray)	Annual inspections - twice a year (hrs based) General daily safety inspections by operators at the start of their shift	Oil changes (twice a year) Washed after snowstorm events Cleaning	Repairs as required	Variable	Costs tracked by vehicle
New → Replace						
R&R		Battery replacements	Engine-replacements, if necessary	Replace at end of life	Variable	Typically 10 years, but department tries to extend the lifespan as much as possible
	Early Life Interventions	Mid-life Rehab	Later Life Rehab Option	End of Life	EUL	

7.2.1.1.1.1.3 LIFECYCLE STRATEGIES – LIGHT-DUTY VEHICLES

Fleet & Equipment - Light Duty Vehicles

	Preventative Maintenance	Inspections	Operations	Reactive Maintenance	EUC	Comments
OMI	Bi-annual maintenance (oil spray)	Visual inspections, Detailed inspections General daily safety inspections by operators at the start of their shift	Oil changes (twice a year) Washed after snowstorm events Cleaning	Repairs as required	Variable	Costs tracked by vehicle
New → Replace						
R&R		Battery replacements	Engine-replacements, if necessary	Replace at end of life	Variable	Typically 10 years, but department tries to extend the lifespan as much as possible
	Early Life Interventions	Mid-life Rehab	Later Life Rehab Option	End of Life	EUL	

7.2.1.1.1.1.4 LIFECYCLE STRATEGIES – CAPITAL EQUIPMENT

Fleet & Equipment - Capital Equipment

	Preventative Maintenance	Inspections	Operations	Reactive Maintenance	EUC	Comments
OMI		Annual inspections	Cleaning, Oil change (if applicable)	Repairs as required	Variable	Depends on equipment type
R&R				Run-to-fail. Replace at end of life	Variable	Depends on equipment type
	Early Life Interventions	Mid-life Rehab	Later Life Rehab Option	End of Life	EUL	

(New) — (Replace)