ASSET MANAGEMENT PLAN

Storm Water Register

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Contents

1.0 EXECUTIVE SUMMARY

1.1 The Purpose of the Plan

This Asset Management Plan (AM Plan) details information about infrastructure assets with actions required to provide an agreed level of service in the most cost-effective manner while outlining associated risks. The plan provides a overview of the City's storm water assets, the customer values; the levels of services provided to the customer, what funds are required to provide over the ten (10) year planning period to maintain these service; the risks associated and plans for improvement. The AM Plan will link to a Long-Term Financial Plan which typically considers a 10 year planning period.

1.2 Asset Description

This plan covers the infrastructure assets that provide Storm Collection Services. The total length of the storm collection network is 37.8 km of gravity mains and includes 669 manholes.

The plan currently does not include the storm ditches or service connections.

The above infrastructure assets have a replacement value estimated at $41,400.00. Storm ponds are not included in this cost as they will not have a replacement cost.

The Storm collection system network comprises:

Storm Asset Type	Amount of Asset
150mm Diameter Storm Main	147m
200mm Diameter Storm Main	12m
250mm Diameter Storm Main	663m
300mm Diameter Storm Main	6,670m
375mm Diameter Storm Main	4,918m
400mm Diameter Storm Main	47m
450mm Diameter Storm Main	5,800m
525mm Diameter Storm Main	1,304m
600mm Diameter Storm Main	5,387m
675mm Diameter Storm Main	1,437m
750mm Diameter Storm Main	4,186m
800mm Diameter Storm Main	113m
900mm Diameter Storm Main	3,370m
1050mm Diameter Storm Main	1,246m
1200mm Diameter Storm Main	818m
1350mm Diameter Storm Main	249m
1500mm Diameter Storm Main	449m
1800mm Diameter Storm Main	207m
Unknown Diameter	8,821m
Total Length of Storm Main	**45,636m**
Storm Manholes	669
Catch Basins	885
Storm Ponds (Not included in replacement value)	17
Storm Discharge Points (Includes pond outfalls)	83
Storm scepters	3

Culverts	436m
Total Storm Network Replacement Cost	**$41,400,000**

The average age of the storm system network is 21 years giving the system and overall good condition rating for the storm network.

1.3 Levels of Service

The allocation in the planned budget is sufficient to continue providing existing services at current levels for the planning period.

The main service consequences of the Planned Budget are:

- Unable to maintain storm assets adequately in the near to long term
- Increased risk of property damage to customers
- Impacts to transportation with increased risk of road flooding
- Increased erosion, sediment and decreased discharge water quality

1.4 Future Demand

The factors influencing future demand and the impacts they have on service delivery are created by:

- Development – Commercial and Residential development
- Weather and water table fluctuation – impact on maintenance and renewal
- Existing Drainage Issues to be addressed in older communities not meeting the standards
- Land Use Changes- intensification of density
- Asset deterioration and breaks based on age and longevity of pipe
- Provincial Standard changes for licensing requirements

  These demands will be approached using a combination of managing existing assets, upgrading existing assets and providing new assets to meet demand. Demand management practices may also include a combination of non-asset solutions, insuring against risks and managing failures.
- Adding additional assets to accommodate increased growth provided by developer contributions and offsite levy contributions
- New and Renewed Pipes will be designed to appropriately accommodate demand and provide financial stability
- Renewals and upgrades will be aligned with other infrastructure such as road reconstruction- optimize municipal resources to visit the area once
- Pipe repairs as needed
- Flushing and cleaning
- Storm pond maintenance
- Periodic Master Plan updates
- Capacity upgrades due to growth increases

1.5 Lifecycle Management Plan

1.5.1 What does it Cost?

The forecast lifecycle costs necessary to provide the services covered by this AM Plan includes operation, maintenance, renewal, acquisition, and disposal of assets. Although the AM Plan may be prepared for a range of time periods, it typically informs a Long-Term Financial Planning period of 10 years. Therefore, a summary

output from the AM Plan is the forecast of 10 year total outlays, which for the Storm Collection System is estimated as $6,316,842 or $631,684 on average per year.

1.6 Financial Summary

1.6.1 What we will do

Estimated available funding for the 10 year period is $6,995,000 or $699,500 on average per year as per the Long-Term Financial plan or Planned Budget. This is 110.74% of the cost to sustain the current level of service at the lowest lifecycle cost.

The infrastructure reality is that only what is funded in the long-term financial plan can be provided. The Informed decision making depends on the AM Plan emphasising the consequences of Planned Budgets on the service levels provided and risks.

The anticipated Planned Budget for Storm Water Collection leaves an excess of $67,816 on average per year of the forecast lifecycle costs required to provide services in the AM Plan compared with the Planned Budget currently included in the Long-Term Financial Plan. This is shown in the figure below. This excess is caused by capital renewal projects being approved to upgrade the capacity of the storm mains prior to the assets reaching their end of life resulting in the current allocated renewal budgets exceeding the recommended renewal cost. The overall maintenance and operation budgets are limited in ensuring the approved service levels are being met. This is explored further in this document in section 3.6 and 7.0.

Forecast Lifecycle Costs and Planned Budgets

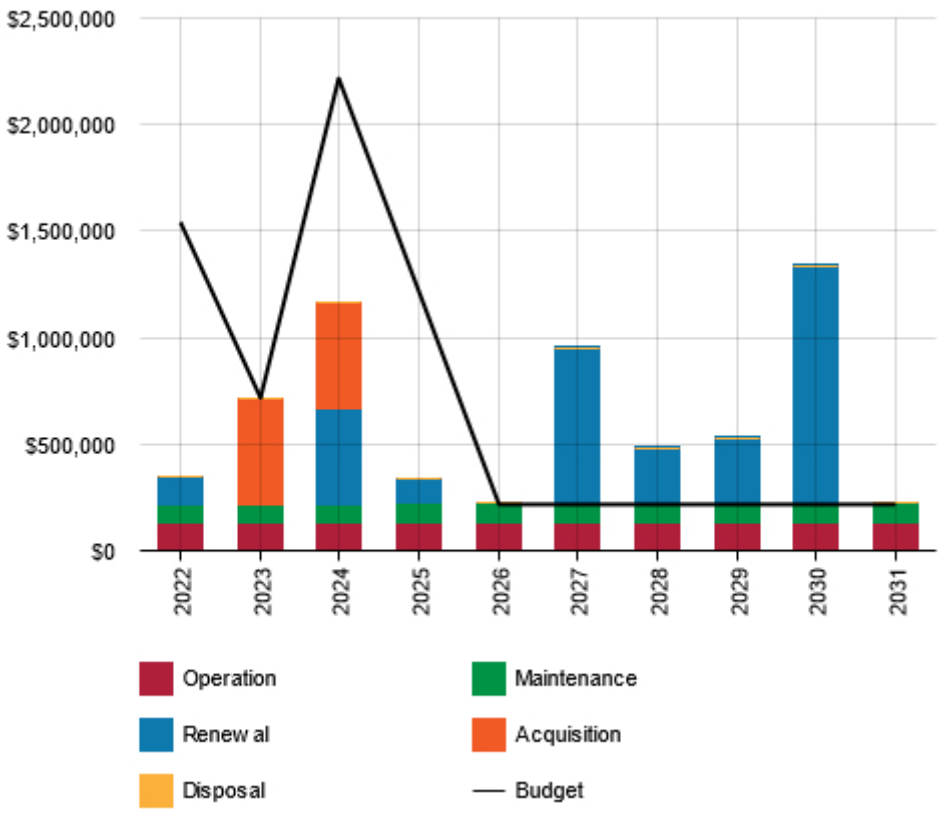


Figure Values are in current dollars.

We plan to provide Storm Water Collection services for the following:

- Operation, maintenance, renewal and acquisition of storm mains, ponds and culverts to meet service levels set by the City of Cold Lake in annual budgets.

- The following acquisitions within the 10 year planning period:
    - Wetland Remediation 2023 $500,000 2024 $500,000 check name

    The following renewals within the 10 year planning period:

    - Birch Avenue Storm Upgrade 2022 $175,000
    - 900mm and 750mm storm upgrade 11 Street from 8 avenue to 12 avenue 2022 $750,000
    - 900mm and 600mm culvert renewal Highway 55 west 2022 $400,000
    - Lakeshore Drive Infrastructure Improvements 2024 $1,500,000
    - 750 mm and 900mm storm upgrade 13 street back alley from 6 avenue to 8 avenue 2025 $1,000,000

1.6.2 What we cannot do

We currently do **not** allocate enough budget to sustain these services at the proposed service levels or to provide all new services being sought. Works and services that cannot be provided under present funding levels are:

- Planned and reactive maintenance activities such as repairing catch basin and disposing of contaminants from storm water management ponds
- Annually inspect 10% of the storm sewers (Currently completing 0.5% of the storm sewers)
- Annually flush and clean all catch basins (Currently completing 2.8% of the catch basins)
- Annually flush and clean 50% of the storm sewers (Currently completing 2.6% of the storm sewers)
- Annually complete camera inspection on 20% of the storm sewers (Currently completing 0.5% of the storm sewers)

1.6.3 Managing the Risks

Our present budget levels are sufficient to continue to manage risks in the medium term.

The main risk consequences are:

- Property Damage due to flooding due to less maintenance in response to insufficient operation and maintenance funding
- Environmental Damage- Contaminants impacting the environment and the natural water course for future generations
- Non Compliance to AEP regulations- sediment- flow controls
- Increased risk of bird attraction in the Airport Zoning Regulation and the Cold Lake Airport Zoning Regulation
- High cost reactive maintenance will increase financial shock and divert funds from other services
- Capacity for resources- staffing and contractor availability

We will endeavour to manage these risks within available funding by:

- Ensure future development is appropriately sized and financial risk mitigated through offsite levy implementation
- Improve data confidence through donated acquisition quality checks and condition assessment practices
- Ensure the public are adequately informed to the risks and financial obligations and responsibilities of long lived assets
- Inspection, flushing and training
- Succession planning of city staff

- Improve/update design to reduce maintenance costs
- Perform maintenance operations as required for licensing
- Having high use material and equipment available to repair issues
- Offsite levy accountability / establishment/ collection for oversizing of pipes to accommodate growth and construct storm ponds

1.7 Asset Management Planning Practices

Key assumptions made in this AM Plan are:

- The acquisitions are based on the drainage master plan and development
- Renewals are triggered by failure and road network renewals replacement
- Age and condition information is based on historical Tangible Capital Asset data as well as the asset registry which required some estimations
- Costs are based on historical Tangible Capital Asset data as well as the asset registry which required some estimations and replacement costs were determined by applying the Canadian Inflation rate
- Renewal timing is based on age of asset not condition for those not triggered by failure and road network renewals/ replacement
- Storm Ponds are included in this plan however their acquisition, replacement and renewal cost are not included
- Lift station, culvert and residential connections are not included in this plan

Assets requiring renewal are identified from either the asset register or an alternative method.

- The timing of capital renewals based on the asset register is applied by adding the useful life to the year of acquisition or year of last renewal,
- Alternatively, an estimate of renewal lifecycle costs is projected from external condition modelling systems and may be supplemented with, or based on, expert knowledge.

The Register Method was used to forecast the renewal lifecycle costs for this AM Plan.

This AM Plan was developed with a combination of historical TCA data, internal data and professional judgement.

1.8 Monitoring and Improvement Program

The next steps resulting from this AM Plan to improve asset management practices are:

- Undertake condition assessments of all the assets to improve data quality and support decision making
- Develop Stormwater assets condition rating scale based on age
- Establish actual customer value baseline through public engagement and/or survey
- Increased system operation practices that are digitally documented to better track information related to the asset
- Develop Storm utility billing bylaw to cover operation and maintenance budgets
- Develop resiliency plan to address climate change impacts
- Include Storm Ponds, and culverts in future AMP
- Establish acquisition and renewal costs for existing storm ponds

2.0 Introduction

2.1 Background

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

The AM Plan is to be read with the Storm Water Register planning documents. This should include the Asset Management Policy and Asset Management Strategy, where developed, along with other key planning documents:

- Drainage Master Plan 2014
- City of Cold Lake Engineering Standards and Specifications 2020
- City of Cold Lake Asset Management Policy 206-AD-19
- Council's Strategic Plan 072-AD-01
- Council's Projected 10 year Capital Plan
- City of Cold Lake Levels of Service
- City of Cold Lake Strategic Plan
- Cityworks
- 2017 Growth Study
- Current Road System Analysis with Road Matrix
- Area Structure Plans
- Asset Optimizer for the asset registry and financial background
- Storm Pond Management Standards
- City of Cold Lake Economic Development strategy 2019
- City of Cold Lake Business plan 2015
- Offsite levy bylaw 281-AD-07
- Water, sanitary and storm service connection policy 216-AD-21

Asset Management is currently managed through collaboration of various departments with the City of Cold Lake. Yearly the departments present capital budgets with suggested infrastructure renewal and acquisition projects based on knowledge of the condition of the asset, projected growth within the community or as suggested in our Underground Infrastructure Master Plans based on our 5 year Capital Plan or due to a reaction of the current situation with that portion of infrastructure. The operation and maintenance budgets are also reviewed and allocated based on administrative experience and knowledge and developed service levels for the department. These are then presented to Council for review to get approval and budget allocation as required. This is the system that is currently followed with no formal AMP. The implementation of a formal Asset Management Plan will be the next logical progression to overall asset management of the City's Strom Water assets.

The infrastructure assets covered by this AM Plan include conveyance pipes, manholes, catch basins, weir walls/ orifice plate. For a detailed summary of the assets covered in this AM Plan refer to Table in Section 5.

These assets are used to provide Storm Collection services.

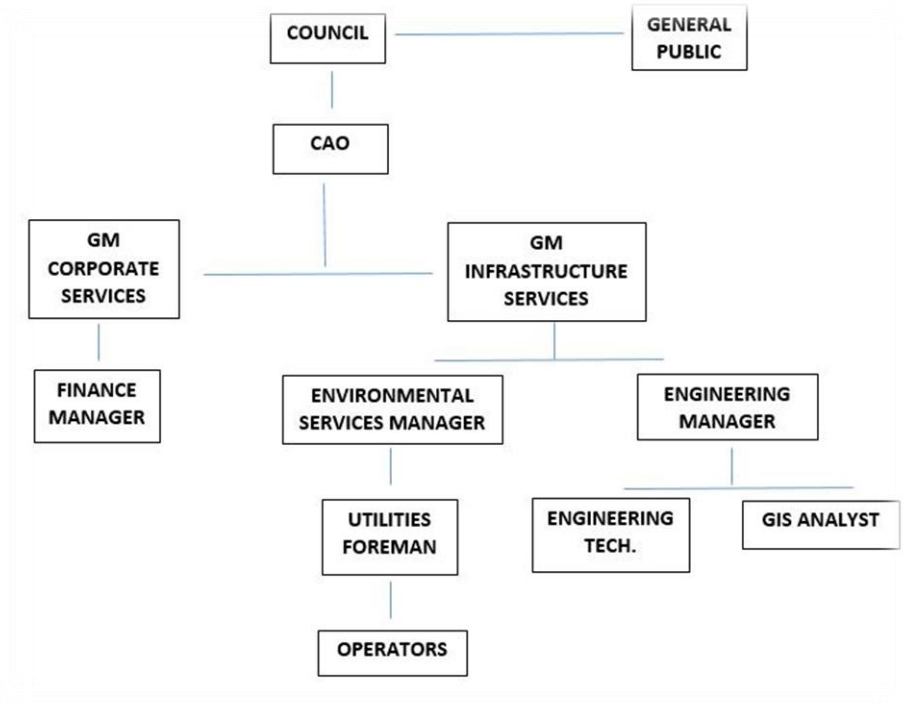
The infrastructure assets included in this plan have a total replacement value of $41,386,352.

Key stakeholders in the preparation and implementation of this AM Plan are shown in Table 2.1.

Table 2.1: Key Stakeholders in the AM Plan

Key Stakeholder	Role in Asset Management Plan
City Council	■ Represent needs of community/shareholders, ■ Allocate resources to meet planning objectives in providing services while managing risks, ■ Ensure service sustainable.
CAO/Management	■ Represent needs of the community/ shareholders/ administration, ■ Allocate resources to meet planning objectives in providing services while managing risks ■ Ensure the service is sustainable ■ Ensure that adequate resources are available to develop staff knowledge and skills to aid the implementation and continuous improvement of asset management practices ■ Set high level priorities for asset management development and raise awareness of this function to staff and outside contractors ■ Support the Asset Management Driven budget (10 year) and long term financial plan (5 year)
Administration	■ Operate and maintain the Storm collection network ■ Report to CAO and Management progress, deficiencies and effectiveness of operations and maintenance activities ■ Verify location and condition of assets
Province of Alberta	■ Sets policy for Storm water collection management through legislation which outlines mandatory standards and practices
Customers	■ Participate in engagement with the City to understand the residents desired level of service ■ Use the storm water collection system to dispose or manage storm water

Our organisational structure for service delivery from infrastructure assets is detailed below,



2.2 Goals and Objectives of Asset Ownership

Our goal for managing infrastructure assets is to meet the defined level of service (as amended from time to time) in the most cost effective manner for present and future consumers. The key elements of infrastructure asset management are:

- Providing a defined level of service and monitoring performance,
- Managing the impact of growth through demand management and infrastructure investment,
- Taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet the defined level of service,
- Identifying, assessing and appropriately controlling risks, and
- Linking to a Long-Term Financial Plan which identifies required, affordable forecast costs and how it will be allocated.

Key elements of the planning framework are

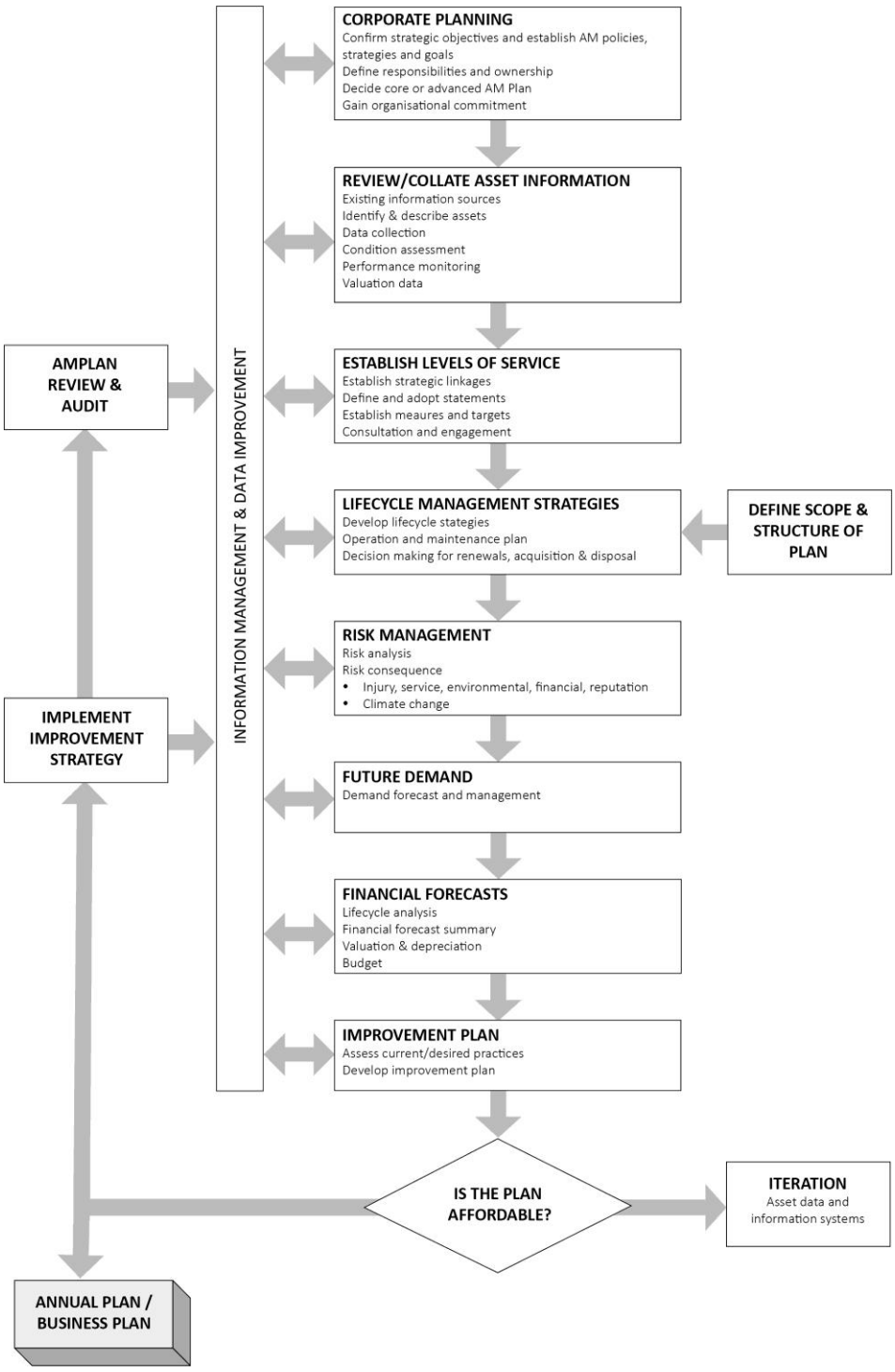
- Levels of service – specifies the services and levels of service to be provided,
- Risk Management,
- Future demand – how this will impact on future service delivery and how this is to be met,
- Lifecycle management – how to manage its existing and future assets to provide defined levels of service,
- Financial summary – what funds are required to provide the defined services,
- Asset management practices – how we manage provision of the services,
- Monitoring – how the plan will be monitored to ensure objectives are met,
- Asset management improvement plan – how we increase asset management maturity.

Other references to the benefits, fundamentals principles and objectives of asset management are:

- International Infrastructure Management Manual 2015 [1]
- ISO 55000[2]

A road map for preparing an AM Plan is shown below.

Road Map for preparing an Asset Management Plan
Source: IPWEA, 2006, IIMM, Fig 1.5.1, p 1.11



[1] Based on IPWEA 2015 IIMM, Sec 2.1.3, p 2| 13
[2] ISO 55000 Overview, principles and terminology

3.0 LEVELS OF SERVICE

3.1 Customer Research and Expectations

This AM Plan is prepared to facilitate consultation prior to adoption of levels of service by the City of Cold Lake. Future revisions of the AM Plan will incorporate customer consultation on service levels and costs of providing the service. This will assist the City of Cold Lake and stakeholders in matching the level of service required, service risks and consequences with the customer's ability and willingness to pay for the service.

We currently have no research on customer expectations. This will be investigated for future updates of the AM Plan.

3.2 Strategic and Corporate Goals

This AM Plan is prepared under the direction of the Storm Water Register vision, mission, goals and objectives.

Our vision is:

To make Cold Lake a sustainable, diverse and vibrant community

Our mission is:

"To maintain a strong balance between expanding and modernizing old infrastructure to provide excellent municipal services while delivering expanded updated economic development strategies, infrastructure maintenance programs and capital projects for new and renewed infrastructure to accommodate growth and diversity."

Strategic goals have been set by the Storm Water Register. The relevant goals and objectives and how these are addressed in this AM Plan are summarised in Table 3.2.

Table 3.2: Goals and how these are addressed in this Plan

Goal	Objective	How Goal and Objectives are addressed in the AM Plan
Sustainability	Maintain and renew existing while adding the new infrastructure within budget	Maintenance will continue as per service levels and budgets, work to provide projected renewal 10 year asset plans, provide implementation plans, report to Council on funding required for renewal
Excellent Services	Ensure the storm water flows into the pipe network and ponds as expected and intended	Maintain Service Levels, prepare emergency response plans, education the public on the water system
Growth and Diversity	Provide new or modernized services	Work to provide projected new and upgrade 10 year asset plans, report to Council on funding requirements

3.3 Legislative Requirements

There are many legislative requirements relating to the management of assets. Legislative requirements that impact the delivery of the Storm Water Collection service are outlined in Table 3.3.

Table 3.3: Legislative Requirements

Legislation	Requirement
Municipal Government Act	Preparation of annual financial statements for immediately preceding year
Public Sector Accounting Board	Standards on how to account for and report on tangible capital assets in governmental financial statements

Canada- Alberta Gas Tax Fund Agreement	Alberta and Canada agreement to "Work in collaboration to develop the approach to Asset management based on where Alberta is today." Alberta to provide a "Outcomes Report"
Alberta Environment and Parks	Code of Practice
Alberta Environment and Parks	Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems

3.4 Customer Values

Service levels are defined in three ways, customer values, customer levels of service and technical levels of service.

Customer Values indicate:

- what aspects of the service is important to the customer,
- whether they see value in what is currently provided and
- the likely trend over time based on the current budget provision

Table 3.4: Customer Values

Service Objective:

Customer Values	Customer Satisfaction Measure	Current Feedback	Expected Trend Based on Planned Budget
Accessibility. Service has enough capacity and storm network is accessible	Property has access to the storm network immediately adjacent to the property	all have access	Remain the same until customer survey is completed
Reliable. Service is reliable and responsive to customer.	Storm water assets are kept in a state of good repair	Storm water drains from property without causing flooding on road way after rain stops	Remain the same
Function. Service meets needs within limited impact to health, safety and property	Capacity to protect life and property	5 service requests regarding flooding in 2022	Remain the same

3.5 Customer Levels of Service

The Customer Levels of Service are considered in terms of:

Condition How good is the service … what is the condition or quality of the service?

Function Is it suitable for its intended purpose …. Is it the right service?

Capacity/Use Is the service over or under used … do we need more or less of these assets?

In Table 3.5 under each of the service measures types (Condition, Function, Capacity/Use) there is a summary of the performance measure being used, the current performance, and the expected performance based on the current budget allocation.

These are measures of fact related to the service delivery outcome (e.g. number of occasions when service is not available or proportion of replacement value by condition %'s) to provide a balance in comparison to the customer perception that may be more subjective.

Table 3.5: Customer Level of Service Measures

Type of Measure	Level of Service	Performance Measure	Current Performance	Expected Trend Based on Planned Budget
Condition	Storm water assets are kept in good repair	% with a condition rating 3 and above	Currently, 82.1% of assets in fair or better condition	Increase slightly
	Confidence levels		Medium (Professional judgement supported by data sampling	Medium (Professional judgement supported by data sampling
Function	Storm Water Quality	# of noncompliance reports	No noncompliance submissions	Remain the same
	Confidence levels		Medium (Professional judgement supported by data sampling	Medium (Professional judgement supported by data sampling
Capacity	Adequate Storm sizing	% of storm mains that require upgrades	10% of the storm mains require upgrades	Decrease slightly
	Storm network is performing as designed	# of maintenance requests caused by blockage	13 maintenance requests caused by blockage	Remain the same
	Confidence levels		Medium (Professional judgement supported by data sampling	Medium (Professional judgement supported by data sampling

3.6 Technical Levels of Service

Technical Levels of Service – To deliver the customer values, and impact the achieved Customer Levels of Service, are operational or technical measures of performance. These technical measures relate to the activities and allocation of resources to best achieve the desired customer outcomes and demonstrate effective performance.

Technical service measures are linked to the activities and annual budgets covering:

- **Acquisition** – the activities to provide a higher level of service (e.g. widening a road, sealing an unsealed road, replacing a pipeline with a larger size) or a new service that did not exist previously (e.g. a new library).
- **Operation** – the regular activities to provide services (e.g. opening hours, cleansing, mowing grass, energy, inspections, etc.

- **Maintenance** – the activities necessary to retain an asset as near as practicable to an appropriate service condition. Maintenance activities enable an asset to provide service for its planned life (e.g. road patching, unsealed road grading, building and structure repairs),
- **Renewal** – the activities that return the service capability of an asset up to that which it had originally provided (e.g. road resurfacing and pavement reconstruction, pipeline replacement and building component replacement),

Service and asset managers plan, implement and control technical service levels to influence the service outcomes.[3]

Table 3.6 shows the activities expected to be provided under the current 10 year Planned Budget allocation, and the Forecast activity requirements being recommended in this AM Plan.

Table 3.6: Technical Levels of Service

Lifecycle Activity	Purpose of Activity	Activity Measure	Current Performance*	Recommended Performance **
TECHNICAL LEVELS OF SERVICE				
Acquisition Inspection and Review of Proposed Designs	Assets will meet anticipated future demand in newly constructed communities	Inspection to ensure the assets constructed or acquired conform to expected standards for condition, quality, resiliency and function	All acquired assets are inspected and reviewed	All acquired assets are inspected and reviewed
New storm asset installation	Provide drainage systems to existing urban road networks previously serviced by open ditch or no pipe	Installation of storm sewer system for road renewal in urban areas	On road renewal basis	On road renewal basis
		Budget	$100,000	$100,000
Operation Camera Inspection	Determine the condition of the asset	% of Network inspected annually	In 2022 0.5% of total network inspected	The current approved service level is 20% of total network
Discharge water quality testing	Testing for discharge water quality compliance (mitigating contaminants entering natural water courses)	% of tests results that pass regulation	All test submitted pass regulation	All test submitted pass regulation
Locates	Locates to make sure Storm water assets are not struck and cause	All locates are completed within 14 days of request and 0 incidents have	All are located within 14 days and 0 incidents	Remain the same

[3] IPWEA, 2015, IIMM, p 2|28.

Lifecycle Activity	Purpose of Activity	Activity Measure	Current Performance*	Recommended Performance **
	disruptions or need for repair	occurred do to wrong locates		
Storm Outfall Inspection	Determine condition of storm outfall	Annual condition survey of 100% of outfalls	All storm outfalls are inspected	All storm outfalls are inspected
		Budget	$130,000	$132,325
Maintenance Catch basin cleaning	Ensure catch basins are free of debris and reduce sedimentation that enters the pipe network	% of catch basins cleaned annually	In 2022 2.8% of the catch basins were cleaned	All catch basins to be cleaned annually
Storm Pipe Flushing	Ensure the storm pipes are free of debris to allow for free flow of storm water	% of storm pipe flushed annually	In 2022 2.6% of the storm pipes were flushed	Half of the storm pipes are to be flushed annually
Storm Pond Cleaning	Ensure storm ponds are functioning as designed and not restricting storm water flow	% of Storm ponds cleaned annually	In 2022 all ponds were cleaned	All ponds are cleaned annually
		Budget	$87,000	$88,575
Renewal Catch basin replacement	Replace broken catch basins	# of Cath basins replaced annually	In 2022 2 catch basins were replaced	As required
Storm Main Replacement	Replace broken or undersized storm mains	% of asset replaced annually	In 2022 0.7% of the network was replaced	As required
		Budget	$382,500	$310,784
Disposal Storm Main Removal	Removal of unused or deteriorated assets	% of Storm mains removed annually	In 2022 no storm mains were removed	No storm mains are removed
		Budget	$0	$0

Note: * Current activities related to Planned Budget.

** Expected performance related to forecast lifecycle costs.

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

4.0 FUTURE DEMAND

4.1 Demand Drivers

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

4.2 Demand Forecasts

The present position and projections for demand drivers that may impact future service delivery and use of assets have been identified and documented.

4.3 Demand Impact and Demand Management Plan

The impact of demand drivers that may affect future service delivery and use of assets are shown in Table 4.3.

Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management. Demand management practices can include non-asset solutions, insuring against risks and managing failures.

Opportunities identified to date for demand management are shown in Table 4.3. Further opportunities will be developed in future revisions of this AM Plan.

Table 4.3: Demand Management Plan

Demand driver	Current position	Projection	Impact on services	Demand Management Plan
Population Growth	15,661	2.5% growth rate	Increase demand for all services	Education will continue to the public through brochure development and during Public Works Day.
Land Use Changes	Increasing densities and rezoning	Downtown re-purposing to mixed uses and lower density areas transition to higher density	Increase volumes of flow, more maintenance and need for upgrades	Education will continue to the public through brochure development and during Public Works Day.
Weather and Water table fluctuation	Current annual rain fall 234mm and snowfall 146 cm	Increased storm severity	Storm water assets will require appropriate sizing to deal with higher intensity events. Undersized systems will show prolonged standing water	Tracking through rain gauges and government tacking websites

4.4 Asset Programs to meet Demand

The new assets required to meet demand may be acquired, donated or constructed. Additional assets are discussed in Section 5.4.

Acquiring new assets will commit the Storm Water Register to ongoing operations, maintenance and renewal costs for the period that the service provided from the assets is required. These future costs are identified and

considered in developing forecasts of future operations, maintenance and renewal costs for inclusion in the long-term financial plan (Refer to Section 5).

4.5 Climate Change Adaptation

The impacts of climate change may have a significant impact on the assets we manage and the services they provide. In the context of the Asset Management Planning process climate change can be considered as both a future demand and a risk.

How climate change impacts on assets will vary depending on the location and the type of services provided, as will the way in which we respond and manage those impacts.[4]

The impact of climate change on assets is a new and complex discussion and further opportunities will be developed in future revisions of this AM Plan.

[4] IPWEA Practice Note 12.1 Climate Change Impacts on the Useful Life of Infrastructure

5.0 LIFECYCLE MANAGEMENT PLAN

The lifecycle management plan details how the Storm Water Register plans to manage and operate the assets at the agreed levels of service (Refer to Section 3) while managing life cycle costs.

5.1 Background Data

5.1.1 Physical parameters

The assets covered by this AM Plan are shown in Table 5.1.1.

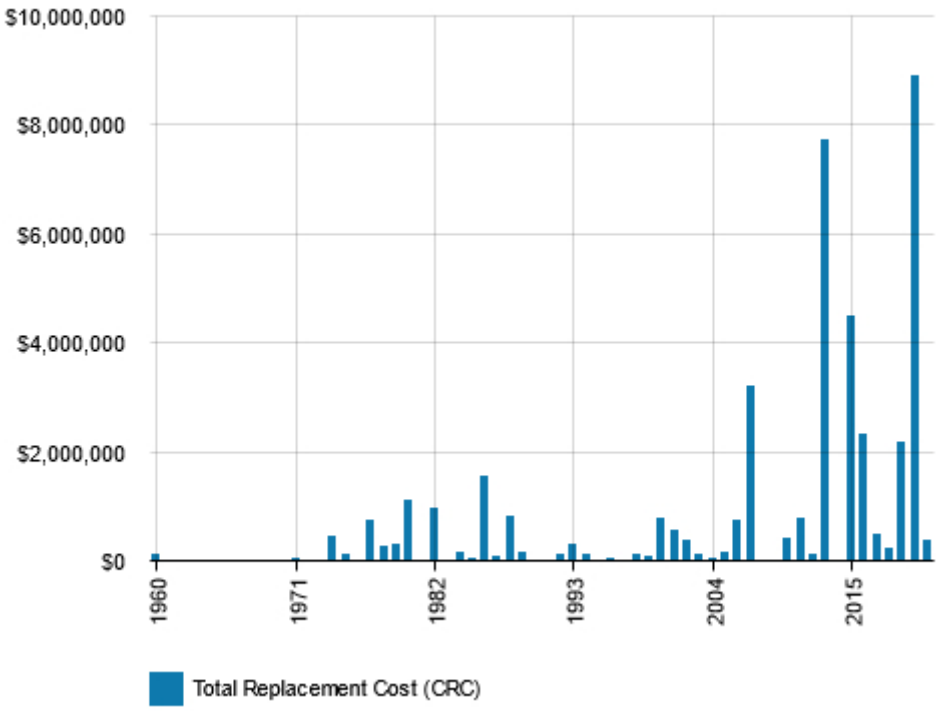
The assets included in this AM Plan are conveyance pipes, manholes, catch basins, culverts, ditches, weir walls/ orifice plates, storm ponds, lift stations, personal drain connections and water quality devices.

The age profile of the assets included in this AM Plan are shown in Figure 5.1.1.

Table 5.1.1: Assets covered by this Plan

Asset Category	Dimension	Replacement Value
Conveyance Pipes	45,636 lm	$41,083,000
Manholes	649 Manholes	Value with the conveyance pipes
Catch basins	885 Catchbasins	Value with the conveyance pipes
Service Connections	# of lots with storm connections- only commercial or residential	Value with the conveyance pipes
Storm Ponds	17 Storm Ponds	Replacement costs not available
Culverts	436 lm	$317,000
Storm scepters	3	Value with the conveyance pipes
Discharge points	83	Value with the conveyance pipes
TOTAL		**$41,400,000**

Figure 5.1.1: Asset Age Profile



All figure values are shown in current day dollars.

The Majority of the Storm Network assets have been installed in the past 20 years and the anticipated renewal costs reflect the anticipated 30+ years of useful life. As the storm system continues to age there will be a noticeable increase in the renewal costs required to maintain the 50 year useful life. The overall newness of the assets will also have an impact on the maintenance and operation costs.

5.1.2 Asset capacity and performance

Assets are generally provided to meet design standards where these are available. However, there is insufficient resources to address all known deficiencies. Locations where deficiencies in service performance are known are detailed in Table 5.1.2.

Table 5.1.2: Known Service Performance Deficiencies

Location	Service Deficiency
Marina Outlet to the Lake	Outlet submerged and full of sand requires higher operational cleanout
18 Street Outlet to the Lake	Outlet faces the waves of the lake and fills with sand and requires higher operational cleanout
906 English Bay Road	Flooding over road and requires increased ditch maintenance
1st Avenue and 19th Street	Water does not drain from street and sidewalk after rainfall events
Dry ponds	Dry ponds are to release all water within a 24 hour period and many ponds are holding water for longer than 24 hours
Birch Avenue and Tamarak Street	Water does not drain from the street after rainfall events and the landscaped area is consistently water logged

The above service deficiencies were identified from Drainage Master plan and professional experience.

5.1.3 Asset condition

Condition is currently monitored based on the install age and material of the storm pipe.

Condition is measured using a 1 – 5 grading system[5] as detailed in Table 5.1.3. It is important that a consistent approach is used in reporting asset performance enabling effective decision support. A finer grading system may be used at a more specific level, however, for reporting in the AM plan results are translated to a 1 – 5 grading scale for ease of communication.

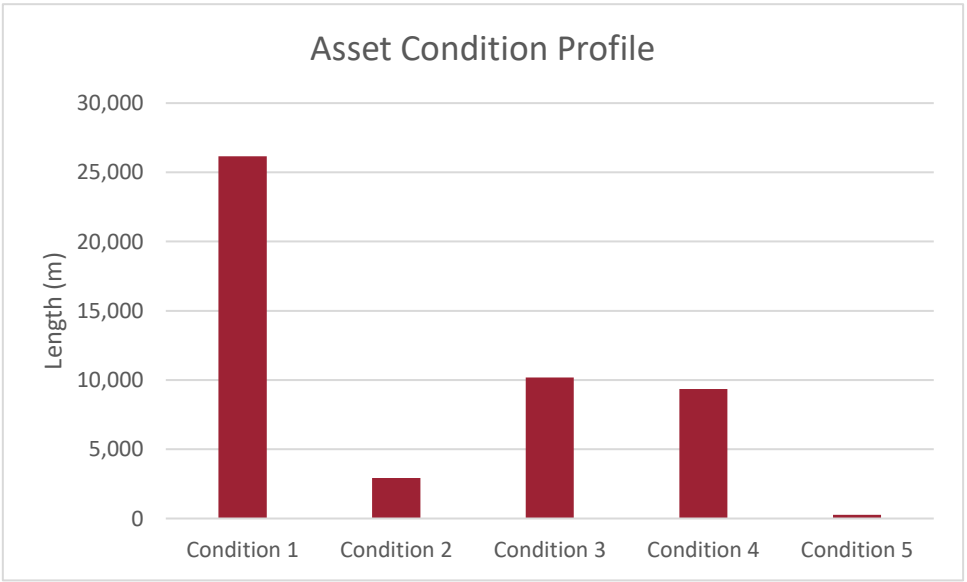
Table 5.1.3: Condition Grading System

Condition Grading	Description of Condition
1	**Very Good**: free of defects, only planned and/or routine maintenance required
2	**Good**: minor defects, increasing maintenance required plus planned maintenance
3	**Fair**: defects requiring regular and/or significant maintenance to reinstate service
4	**Poor**: significant defects, higher order cost intervention likely
5	**Very Poor**: physically unsound and/or beyond rehabilitation, immediate action required

- **54.5%** 24,871 l.m. of pipe network has a condition **rating of 1** (0-20 years age) – very good
- **6%** or 2,738 l.m. of pipe network has a condition **rating of 2** (21-30 years age) - good
- **21.5%** or 9,811 l.m. of pipe network has a condition **rating of 3** (31-40 years age) - fair
- **17.5%** or 7,986 l.m. of pipe network has a condition **rating of 4** (41-50 years age) - poor
- **0.5%** or 228 l.m. of pipe network has a condition **rating of 5** (50+ years age) – very poor

The condition profile of our assets is shown in Figure 5.1.3.

Figure 5.1.3: Asset Condition Profile



[5] IPWEA, 2015, IIMM, Sec 2.5.4, p 2|80.

The Storm network is relatively new compared to the other asset classes, this results in the majority of the assets to be in good condition and requiring less maintenance and operation. It should be noted that as the network continues to age increased maintenance and renewal costs will begin appearing.

5.2 Operations and Maintenance Plan

Operations include regular activities to provide services. Examples of typical operational activities include cleaning, flushing, asset inspection, and utility costs.

Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service condition including regular ongoing day-to-day work necessary to keep assets operating. Examples of typical maintenance activities include pipe repairs, asphalt patching, and equipment repairs.

The trend in maintenance budgets are shown in Table 5.2.1.

Table 5.2.1: Maintenance Budget Trends

Year	Maintenance Budget $
2021	$87,000
2022	$87,000
2023	$87,000

Maintenance budget levels are considered to be inadequate to meet projected service levels, which may be less than or equal to current service levels. Where maintenance budget allocations are such that they will result in a lesser level of service, the service consequences and service risks have been identified and are highlighted in this AM Plan and service risks considered in the Infrastructure Risk Management Plan.

Assessment and priority of reactive maintenance is undertaken by staff using experience and judgement.

Asset hierarchy

An asset hierarchy provides a framework for structuring data in an information system to assist in collection of data, reporting information and making decisions. The hierarchy includes the asset class and component used for asset planning and financial reporting and service level hierarchy used for service planning and delivery.

The service hierarchy is shown is Table 5.2.2.

Table 5.2.2: Asset Service Hierarchy

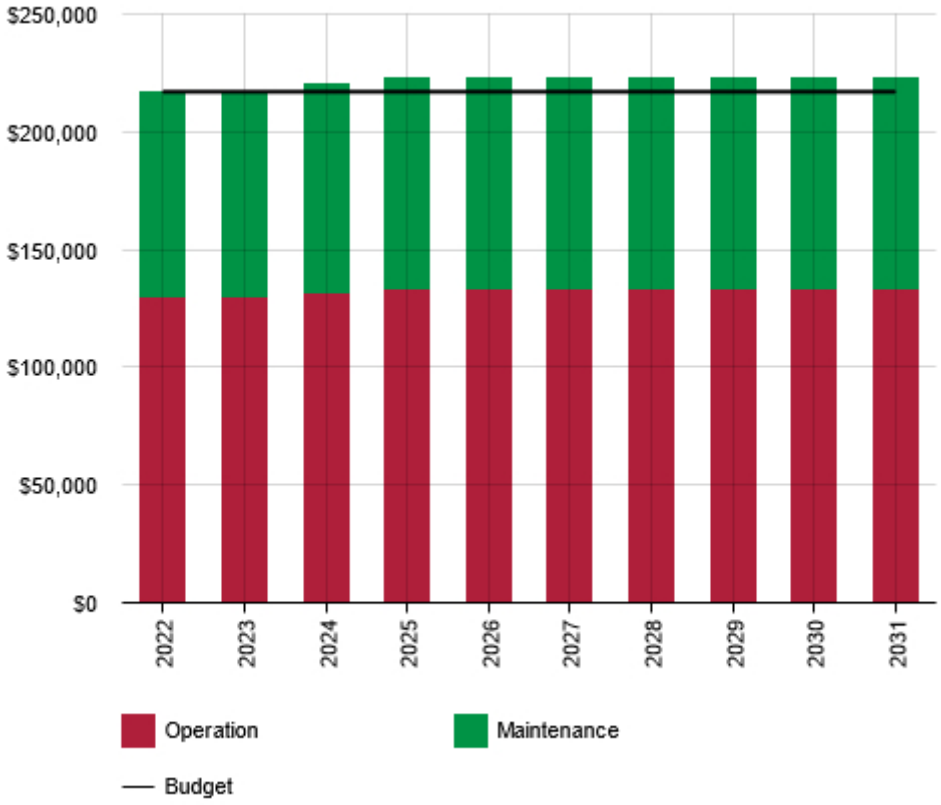
Service Hierarchy	Service Level Objective
Asset Class	Asset Network to provide storm services to customers
Conveyance pipes, storm ponds, catch basins, manholes and service connections	Specific components of infrastructure that enables the asset class to deliver its service. These major components of the storm water network ensure the delivery of storm water services.

Summary of forecast operations and maintenance costs

Forecast operations and maintenance costs are expected to vary in relation to the total value of the asset stock. If additional assets are acquired, the future operations and maintenance costs are forecast to increase. If assets are disposed of the forecast operation and maintenance costs are expected to decrease. Figure 5.2

shows the forecast operations and maintenance costs relative to the proposed operations and maintenance Planned Budget.

Figure 5.2: Operations and Maintenance Summary



All figure values are shown in current day dollars.

The above figure assumes that the current allocated budget for the operation and maintenance is sufficient to provide the current service level. In future versions of this Asset Management plan this figure will be updated to reflect the actual cost to complete the approved levels of service. The planned acquisitions are reflected in additional budget required the year after the asset is acquired.

5.3 Renewal Plan

Renewal is major capital work which does not significantly alter the original service provided by the asset, but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Work over and above restoring an asset to original service potential is considered to be an acquisition resulting in additional future operations and maintenance costs.

Assets requiring renewal are identified from one of two approaches in the Lifecycle Model.

- The first method uses Asset Register data to project the renewal costs (current replacement cost) and renewal timing (acquisition year plus updated useful life to determine the renewal year), or
- The second method uses an alternative approach to estimate the timing and cost of forecast renewal work (i.e. condition modelling system, staff judgement, average network renewals, or other).

The typical useful lives of assets used to develop projected asset renewal forecasts are shown in Table 5.3. Asset useful lives were last reviewed on 2021.

Table 5.3: Useful Lives of Assets

Asset (Sub)Category	Useful life
Storm Water Conveyance Pipes	50 Years
Manholes	50 Years
Catch Basins	50 Years
Water Quality Devices	50 Years
Storm Ponds	Perpetual with maintenance
Service Connections	50 years
Culverts	50 Years
Storm Scepters	50 Years
Storm Discharge Points	50 Years

The estimates for renewals in this AM Plan were based on the Register Method

5.3.1 Renewal ranking criteria

Asset renewal is typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the service it was constructed to facilitate (e.g. replacing a bridge that has a 5 t load limit), or
- To ensure the infrastructure is of sufficient quality to meet the service requirements (e.g. condition of a playground).[6]

It is possible to prioritise renewals by identifying assets or asset groups that:

- Have a high consequence of failure,
- Have high use and subsequent impact on users would be significant,
- Have higher than expected operational or maintenance costs, and
- Have potential to reduce life cycle costs by replacement with a modern equivalent asset that would provide the equivalent service.[7]

The ranking criteria used to determine priority of identified renewal proposals is detailed in Table 5.3.1.

Table 5.3.1: Renewal Priority Ranking Criteria

Criteria	Weighting
Asset Failure	10%
Coordinated with other asset replacement	30%
Capacity Improvements	50%
Condition is 5 or less (Grading Scale 5.1.3)	10%

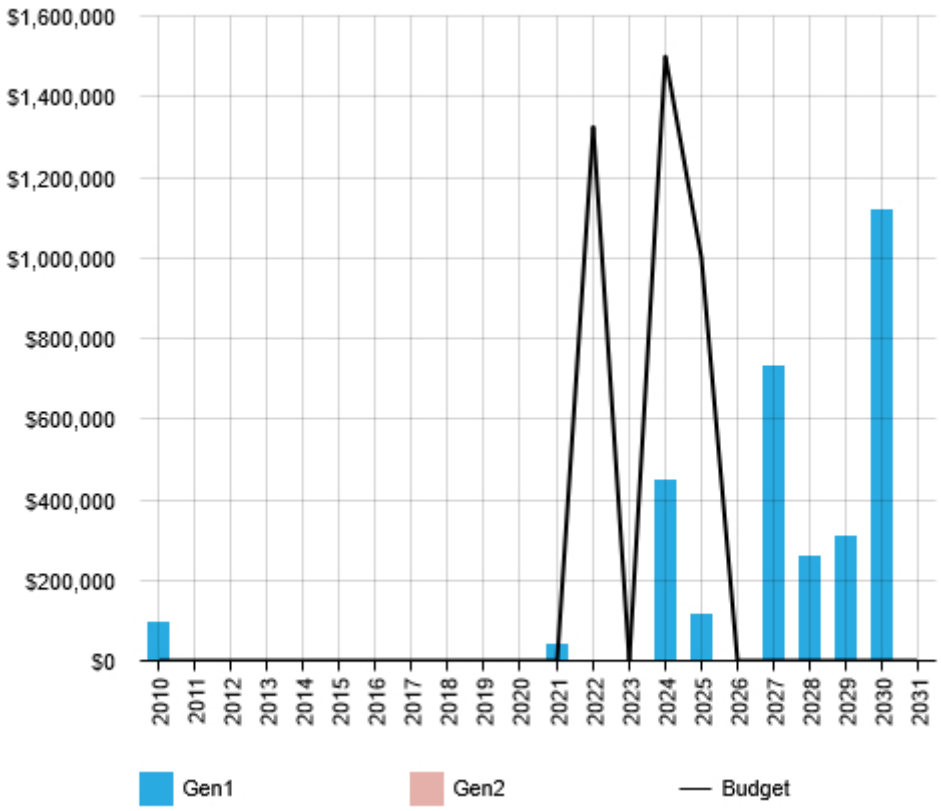
[6] IPWEA, 2015, IIMM, Sec 3.4.4, p 3|91.
[7] Based on IPWEA, 2015, IIMM, Sec 3.4.5, p 3|97.

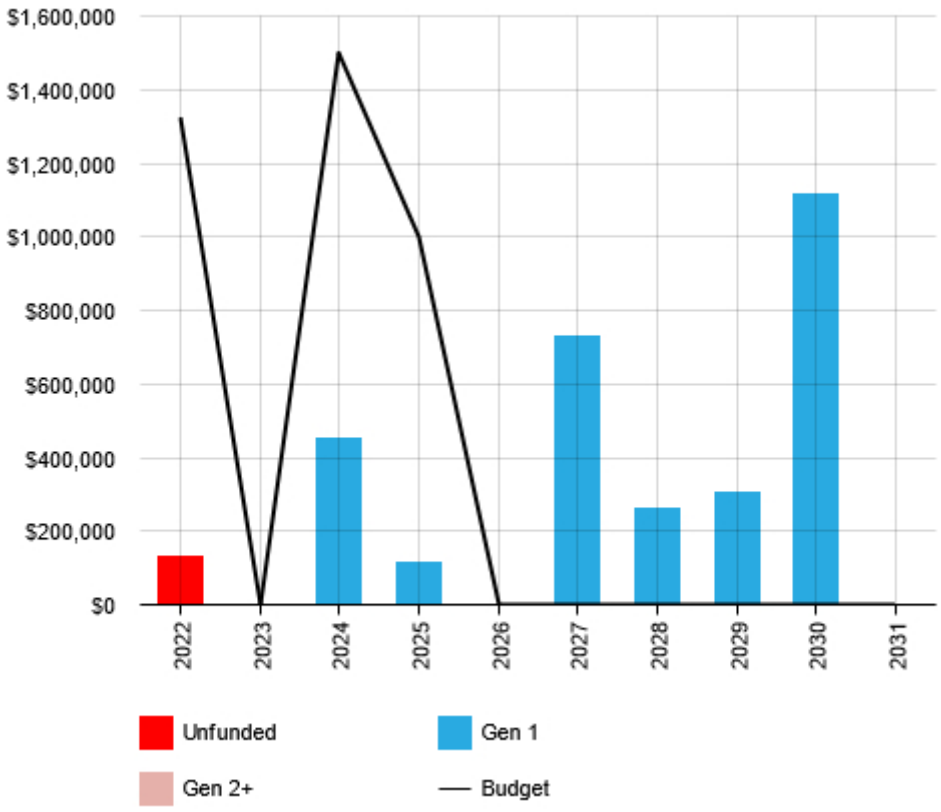
Criteria	Weighting
Total	100%

5.4 Summary of future renewal costs

Forecast renewal costs are projected to increase over time if the asset stock increases. The forecast costs associated with renewals are shown relative to the proposed renewal budget in Figure 5.4.1. A detailed summary of the forecast renewal costs is shown in Appendix D.

Figure 5.4.1: Forecast Renewal Costs





All figure values are shown in current day dollars.

Within the next 10 years there are 5 planned renewal projects approved in the 10 year capital plan (11 Street Underground improvements, Highway 55 culvert repair, Birch Avenue Storm Upgrade, Lakeshore Drive Infrastructure Improvements, and 13 Street back Alley). Theses approved renewal projects do not include the estimate renewals of any assets due to end of life and are triggered based on required capacity upgrades. In the future AM Plans the estimated renewals will increase annually.

5.5 Acquisition Plan

Acquisition reflects are new assets that did not previously exist or works which will upgrade or improve an existing asset beyond its existing capacity. They may result from growth, demand, social or environmental needs. Assets may also be donated to the Storm Water Register.

5.5.1 Selection criteria

Proposed acquisition of new assets, and upgrade of existing assets, are identified from various sources such as community requests, proposals identified by strategic plans or partnerships with others. Potential upgrade and new works should be reviewed to verify that they are essential to the Entities needs. Proposed upgrade and new work analysis should also include the development of a preliminary renewal estimate to ensure that the services are sustainable over the longer term. Verified proposals can then be ranked by priority and available funds and scheduled in future works programmes. The priority ranking criteria is detailed in Table 5.5.1.

Table 5.5.1: Acquired Assets Priority Ranking Criteria

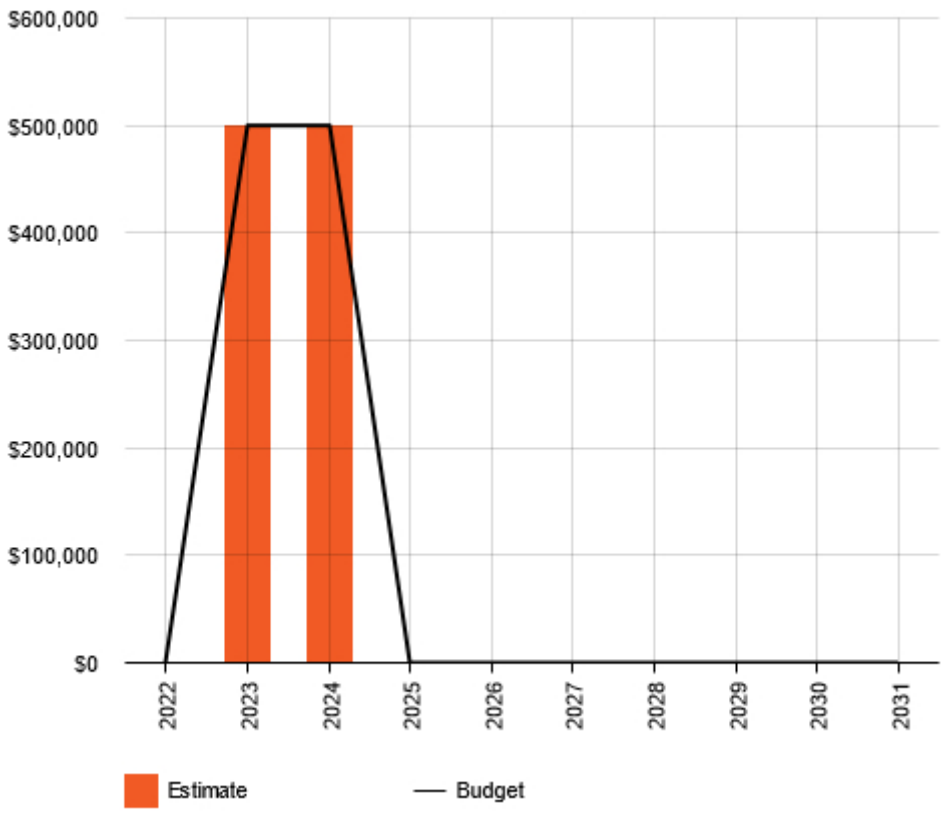
Criteria	Weighting
Growth Contributed Assets	90%

New Service Requests	10%
Total	**100%**

Summary of future asset acquisition costs

Forecast acquisition asset costs are summarised / summarized in Figure 5.5.1 and shown relative to the proposed acquisition budget. The forecast acquisition capital works program is shown in Appendix A.

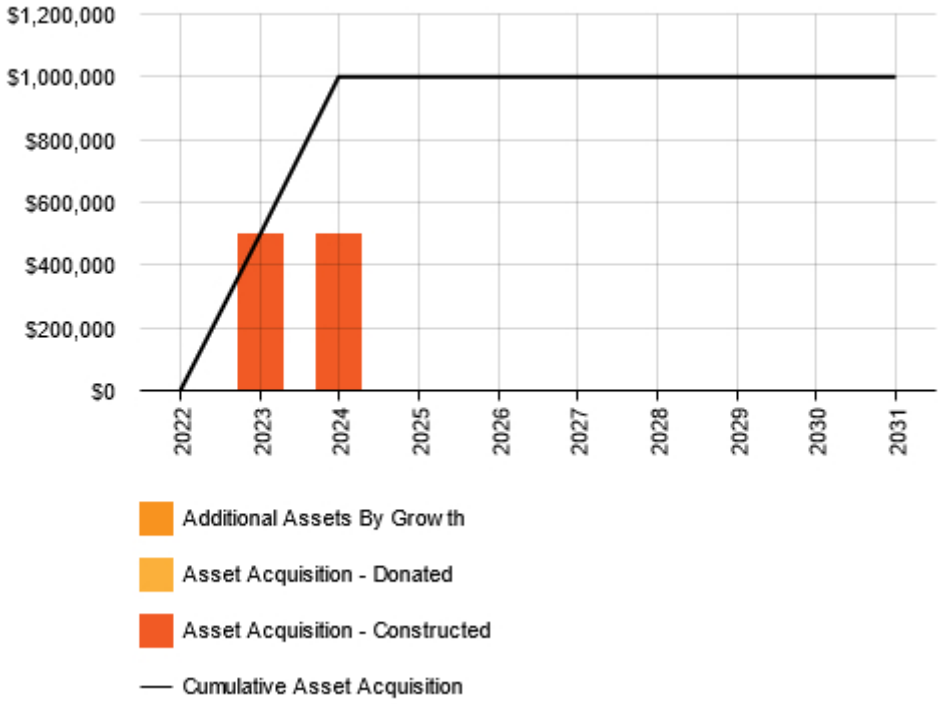
Figure 5.5.1: Acquisition (Constructed) Summary



All figure values are shown in current day dollars.

When an Entity commits to new assets, they must be prepared to fund future operations, maintenance and renewal costs. They must also account for future depreciation when reviewing long term sustainability. When reviewing the long-term impacts of asset acquisition, it is useful to consider the cumulative value of the acquired assets being taken on by the Entity. The cumulative value of all acquisition work, including assets that are constructed and contributed shown in Figure 5.5.2.

Figure 5.5.2: Acquisition Summary



All figure values are shown in current dollars.

Expenditure on new assets and services in the capital works program will be accommodated in the long-term financial plan, but only to the extent that there is available funding.

The City of Cold Lake anticipates six (6) new subdivisions (Parkview, Lakewood, west of HSB- "Heights of English Bay", Lefebvre Heights, Tri City, Colonial) in the near term that will add assets to the storm water network as donated assets. These contributed assets will require additional operational and maintenance resources to ensure level of service can be maintained. These estimated donated acquisitions are not included the graphs above as a firm timeline of acquisition to the City of Cold Lake cannot be given.

Continued asset acquisition without sustainable funding allocation for operations and maintenance will require the City to lower its level of service and increase the likelihood of high cost reactive maintenance and the need for premature renewals.

5.6 Disposal Plan

Disposal includes any activity associated with the disposal of a decommissioned asset including sale, demolition or relocation. Assets identified for possible decommissioning and disposal are shown in Table 5.6. A summary of the disposal costs and estimated reductions in annual operations and maintenance of disposing of the assets are also outlined in Table 5.6. Any costs or revenue gained from asset disposals is included in the long-term financial plan.

Table 5.6: Assets Identified for Disposal

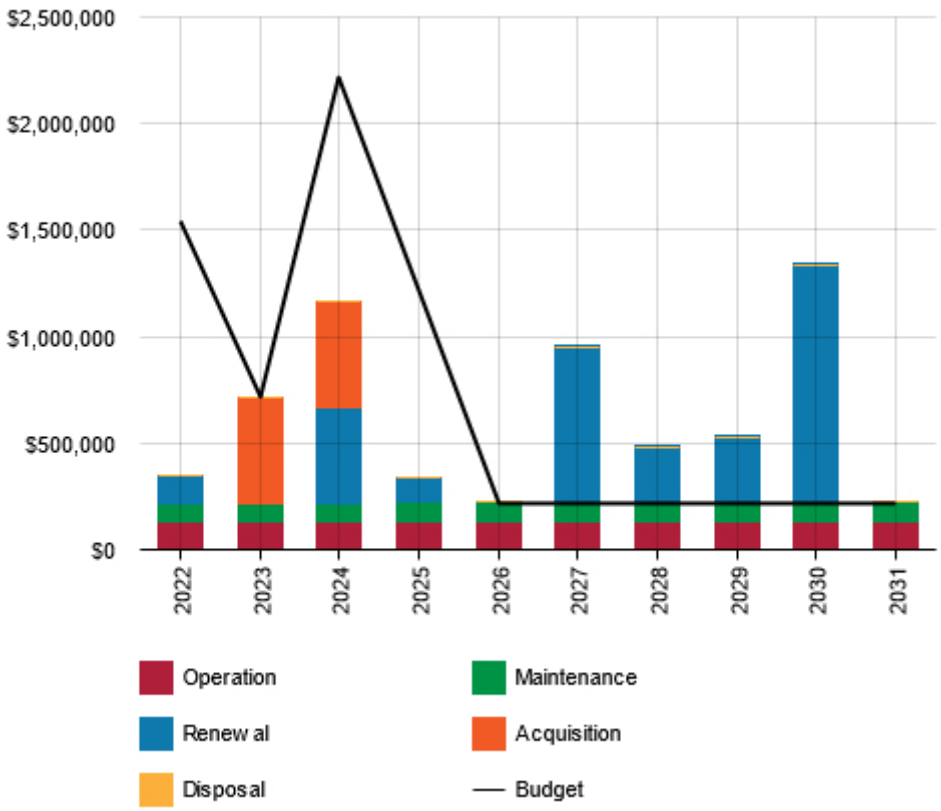
Asset	Reason for Disposal	Timing	Disposal Costs	Operations & Maintenance Annual Savings
N/A	N/A	N/A	N/A	N/A

5.7 Summary of asset forecast costs

The financial projections from this asset plan are shown in Figure 5.7.1. These projections include forecast costs for acquisition, operation, maintenance, renewal, and disposal. These forecast costs are shown relative to the proposed budget.

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

Figure 5.7.1: Lifecycle Summary



All figure values are shown in current day dollars.

The forecasted trend shows that the City of Cold Lake has sufficient funds allocated for the required renewals, however the projects planned are not a result of the assets reaching their end of life but rather required upgrades or other infrastructure requiring renewals. The infrastructure acquisitions as a result of development are not included in the figure and will create an upward financial pressure for resources to enable the city to operate and maintain the assets at the current service level. It is noted that as the asset network continues to age more renewal projects will be required. Comparing the sanitary network total replacement value with the storm network it is noted that the total values are similar at $48,882,656 and $41,400,000, respectively. While the operation and maintenance budgets are $2,837,000 (sanitary) and $217,000 (Storm) annually. The sanitary network does have additional operation and maintenance requirements but the low storm budget may be a factor in not fully meeting the approved levels of service.

6.0 RISK MANAGEMENT PLANNING

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

Risk Management is defined in ISO 31000:2018 as: 'coordinated activities to direct and control with regard to risk'[8].

An assessment of risks[9] associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences. The risk assessment process identifies credible risks, the likelihood of the risk event occurring, and the consequences should the event occur. The risk assessment should also include the development of a risk rating, evaluation of the risks and development of a risk treatment plan for those risks that are deemed to be non-acceptable.

6.1 Critical Assets

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Critical assets have been identified and along with their typical failure mode, and the impact on service delivery, are summarised in Table 6.1. Failure modes may include physical failure, collapse or essential service interruption.

Table 6.1 Critical Assets

Critical Asset(s)	Failure Mode	Impact
Storm Water Management Ponds	Physical Failure	Environmental contamination of natural water course, property damage, damage to natural environment (erosion)
Outfalls into lake or creeks	Blockage / breaks	Increased risk of flooding up stream
Storm water lift stations	Pump failure/ break	Overflowing of ponds
Bridge Culverts	Blockage / Breaks	Flooding up stream / water overtopping roads
Weir walls / orifice plates	Blockage / Breaks	Flooding

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

6.2 Risk Assessment

The risk management process used is shown in Figure 6.2 below.

It is an analysis and problem-solving technique designed to provide a logical process for the selection of treatment plans and management actions to protect the community against unacceptable risks.

The process is based on the fundamentals of International Standard ISO 31000:2018.

[8] ISO 31000:2009, p 2

[9] REPLACE with Reference to the Corporate or Infrastructure Risk Management Plan as the footnote

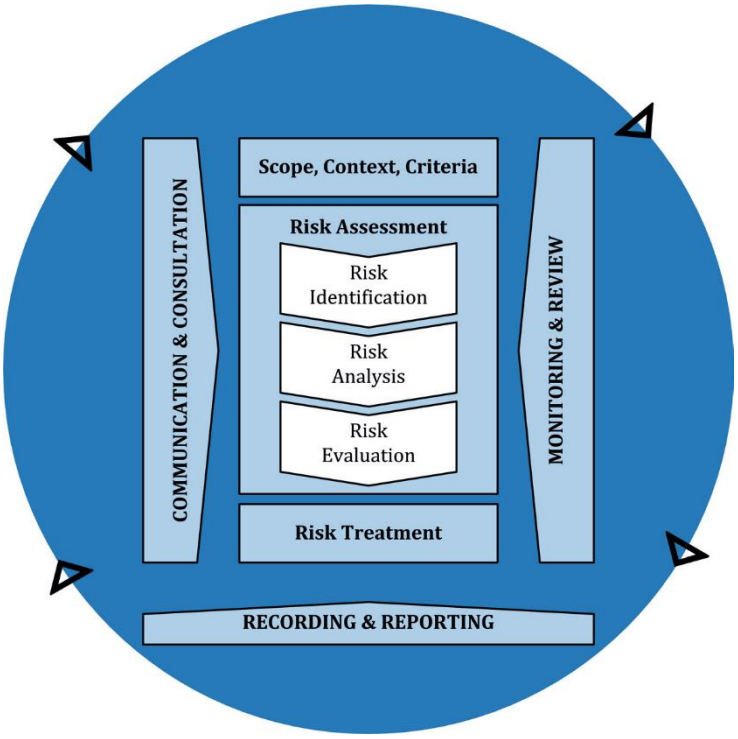


Fig 6.2 Risk Management Process – Abridged
Source: ISO 31000:2018, Figure 1, p9

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

An assessment of risks[10] associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) and 'High' (requiring corrective action) risk ratings identified in the Infrastructure Risk Management Plan. The residual risk and treatment costs of implementing the selected treatment plan is shown in Table 6.2. It is essential that these critical risks and costs are reported to management and the City of Cold Lake CAO, administration and council.

Table 6.2: Risks and Treatment Plans

[10] REPLACE with Reference to the Corporate or Infrastructure Risk Management Plan as the footnote

Service or Asset at Risk	What can Happen	Risk Rating (VH, H)	Risk Treatment Plan	Residual Risk *	Treatment Costs
Storm Water Lift Stations	Pump Failure/ Blockage / break	High	Regular maintenance and inspection every 3 days	High	$10,000
Storm Outfalls	Blockage / break / high water level	High	Pipe Cleaning	High	$10,000
Storm Water Ponds	Physical failure	Very high	Annual Inspection and after major rain events	High	$20,000
Bridge Culverts	Blockage / Break	High	Bridge Inspections	High	$10,000
Weir walls / Orifice Plates	Blockage / break	High	Regular maintenance and inspection	High	$10,000
Conveyance pipes	Blockage / Break / Freezing	High	Flushing and thawing frozen pipes	High	$10,000
Ditches	Blockage	High	Ditch cleaning and grass cutting	Medium	$20,000

Note * The residual risk is the risk remaining after the selected risk treatment plan is implemented.

6.3 Infrastructure Resilience Approach

The resilience of our critical infrastructure is vital to the ongoing provision of services to customers. To adapt to changing conditions we need to understand our capacity to 'withstand a given level of stress or demand', and to respond to possible disruptions to ensure continuity of service.

Resilience recovery planning, financial capacity, climate change risk assessment and crisis leadership.

Our current measure of resilience is shown in Table 6.3 which includes the type of threats and hazards and the current measures that the organisation takes to ensure service delivery resilience.

Table 6.3: Resilience Assessment

We do not currently measure our resilience in service delivery. This will be included in future iterations of the AM Plan.

6.4 Service and Risk Trade-Offs

The decisions made in adopting this AM Plan are based on the objective to achieve the optimum benefits from the available resources.

6.4.1 What we cannot do

There are some operations and maintenance activities to meet the approved service level and capital projects that are unable to be undertaken within the next 10 years. These include:

- Planned and reactive maintenance activities such as repairing catch basin and disposing of contaminants from storm water management ponds

- Annually inspect 10% of the storm sewers (Currently completing 0.5% of the storm sewers)
- Annually flush and clean all catch basins (Currently completing 2.8% of the catch basins)
- Annually flush and clean 50% of the storm sewers (Currently completing 2.6% of the storm sewers)
- Annually complete camera inspection on 20% of the storm sewers (Currently completing 0.5% of the storm sewers)

6.4.2 Service trade-off

If there is forecast work (operations, maintenance, renewal, acquisition or disposal) that cannot be undertaken due to available resources, then this will result in service consequences for users. These service consequences include:

- Potential flood impacts to property for customers
- Possible roadway flooding impacting transportation network

6.4.3 Risk trade-off

The operations and maintenance activities and capital projects that cannot be undertaken may sustain or create risk consequences. These risk consequences include:

- Property Damage due to flooding due to less maintenance in response to insufficient operation and maintenance funding
- Environmental Damage- Contaminants impacting the environment and the natural water course for future generations
- Non Compliance to AEP regulations- sediment- flow controls
- Increased risk of bird attraction in the Airport Zoning Regulation and the Cold Lake Airport Zoning Regulation
- High cost reactive maintenance will increase financial shock and divert funds from other services
- Capacity for resources- staffing and contractor availability

These actions and expenditures are considered and included in the forecast costs, and where developed, the Risk Management Plan.

7.0 FINANCIAL SUMMARY

This section contains the financial requirements resulting from the information presented in the previous sections of this AM Plan. The financial projections will be improved as the discussion on desired levels of service and asset performance matures.

7.1 Financial Sustainability and Projections

7.1.1 Sustainability of service delivery

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

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

Asset Renewal Funding Ratio

Asset Renewal Funding Ratio[11] 123.08%

The Asset Renewal Funding Ratio is an important indicator and illustrates that over the next 10 years we expect to have 123.08% of the funds required for the optimal renewal of assets.

The forecast renewal work along with the proposed renewal budget, and the cumulative shortfall, is illustrated in Appendix D.

Medium term – 10 year financial planning period

This AM Plan identifies the forecast operations, maintenance and renewal costs required to provide an agreed level of service to the community over a 10 year period. This provides input into 10 year financial and funding plans aimed at providing the required services in a sustainable manner.

This forecast work can be compared to the proposed budget over the first 10 years of the planning period to identify any funding shortfall.

The forecast operations, maintenance and renewal costs over the 10 year planning period is $531,684 average per year.

The proposed (budget) operations, maintenance and renewal funding is $599,500 on average per year giving a 10 year funding excess of $67,816 per year. This indicates that 112.75% of the forecast costs needed to provide the services documented in this AM Plan are accommodated in the proposed budget. Note, these calculations exclude acquired assets.

Providing sustainable services from infrastructure requires the management of service levels, risks, forecast outlays and financing to achieve a financial indicator of approximately 1.0 for the first years of the AM Plan and ideally over the 10 year life of the Long-Term Financial Plan.

7.1.2 Forecast Costs (outlays) for the long-term financial plan

Table 7.1.2 shows the forecast costs (outlays) required for consideration in the 10 year long-term financial plan.

Providing services in a financially sustainable manner requires a balance between the forecast outlays required to deliver the agreed service levels with the planned budget allocations in the long-term financial plan.

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

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

We will manage the 'gap' by developing this AM Plan to provide guidance on future service levels and resources required to provide these services in consultation with the community.

Forecast costs are shown in 2022 dollar values.

Table 7.1.2: Forecast Costs (Outlays) for the Long-Term Financial Plan

Year	Acquisition	Operation	Maintenance	Renewal	Disposal
2022	0	$130,000	$87,000	$131,608	0
2023	$500,000	$130,000	$87,000	0	0
2024	$500,000	$131,550	$88,050	$449,613	0
2025	0	$133,100	$89,100	$112,018	0
2026	0	$133,100	$89,100	0	0
2027	0	$133,100	$89,100	$730,996	0
2028	0	$133,100	$89,100	$260,106	0
2029	0	$133,100	$89,100	$307,134	0
2030	0	$133,100	$89,100	$1,116,367	0
2031	0	$133,100	$89,100	0	0

7.2 Funding Strategy

The proposed funding for assets is outlined in the Entity's budget and Long-Term financial plan.

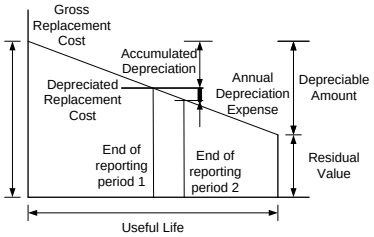
The financial strategy of the entity determines how funding will be provided, whereas the AM Plan communicates how and when this will be spent, along with the service and risk consequences of various service alternatives.

7.3 Valuation Forecasts

7.3.1 Asset valuations

The best available estimate of the value of assets included in this AM Plan are shown below. The assets are valued at fair value at cost to replace service capacity based on installation costs and Canada's inflation rate applied to the initial construction costs.

Replacement Cost (Current/Gross)	$41,386,352
Depreciable Amount	$41,386,352
Depreciated Replacement Cost[12]	$30,377,302
Depreciation	$827,727.0



7.3.2 Valuation forecast

Asset values are forecast to increase as additional assets are added to service.

Additional assets will generally add to the operations and maintenance needs in the longer term. Additional assets will also require additional costs due to future renewals. Any additional assets will also add to future depreciation forecasts.

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

7.4 Key Assumptions Made in Financial Forecasts

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

Key assumptions made in this AM Plan are:

- Budget will continue to be provided based on the 10 year plan
- Original asset values recorded are from install year
- Asset data is derived from the asset registry

7.5 Forecast Reliability and Confidence

The forecast costs, proposed budgets, and valuation projections in this AM Plan are based on the best available data. For effective asset and financial management, it is critical that the information is current and accurate. Data confidence is classified on a A - E level scale[13] in accordance with Table 7.5.1.

Table 7.5.1: Data Confidence Grading System

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

The estimated confidence level for and reliability of data used in this AM Plan is shown in Table 7.5.2.

Table 7.5.2: Data Confidence Assessment for Data used in AM Plan

Data	Confidence Assessment	Comment
Demand drivers	High	The Demand Drivers and Growth Projections are based on previous development extrapolation and future development studies.
Growth projections	High	
Acquisition forecast	Low	Acquisition forecast is rated as a low due to the uncertainty with when developers will develop within Cold Lake

[13] IPWEA, 2015, IIMM, Table 2.4.6, p 2|71.

Operation forecast	Medium	Operation and maintenance forecasts are rated low as we currently are not meeting the desired service levels and information has to be created to plan for the future.
Maintenance forecast	Medium	
Renewal forecast - Asset values	High	Asset Values are rated high based on the newly implemented asset optimizer system which updated all asset costs.
- Asset useful lives	Medium	Useful lives is rated medium to the overall newness of the asset network and very little assets have reached their end of life.
- Condition modelling	Low	Condition modelling is rated due to the limited amount of camera inspections being completed.
Disposal forecast	High	Disposal forecast is rated high as we do not expect any of the assets to be disposed of within the planning period

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

8.0 PLAN IMPROVEMENT AND MONITORING

8.1 Status of Asset Management Practices[14]

8.1.1 Accounting and financial data sources

This AM Plan utilises accounting and financial data. The source of the data is the Asset Optimizer Program, the 2022 10 year capital budget, the 2022 operations and maintenance budgets and the Drainage master plan.

8.1.2 Asset management data sources

This AM Plan also utilises asset management data. The source of the data is from the Asset Optimizer program, the Drainage master plan, the GIS database and 2021 levels of service.

8.2 Improvement Plan

It is important that an entity recognise areas of their AM Plan and planning process that require future improvements to ensure effective asset management and informed decision making. The improvement plan generated from this AM Plan is shown in Table 8.2.

Table 8.2: Improvement Plan

Task	Task	Responsibility	Resources Required	Timeline
1	Develop a condition rating assessment mapping system base on age/useful life and material for baseline	City staff and management	Storm pipe camera inspections	2024
2	Establish actual customer value baseline	Management and council	Public engagement and survey	2023
3	Improve practices to provide resiliency of new assets to climate change	City staff and management	Research and understanding of climate impacts to assets	2026
4	Increase reliability of data sets	City staff	Storm pipe camera inspection	2029
5	Determine the percentage of stormwater infrastructure that on average would be donated	City staff and management	Development plans	2024
6	Inclusion of storm ponds, lift stations, service connections and ditches in renewals	City staff and management	Financial information of the assets	2026
7	Manhole / Catchbasin assessment inclusion	Contractor	Inspection of assets	2028
8	Service Connection inclusion	City staff and management	Financial information of the assets	2026
9	Update Capital plans to reflect recent Drainage Master Plan Updates for acquisitions based on age condition rating and RoadMatrix triggers	City staff and management	Drainage Master Plans, RoadMatrix projected road renewals/ replacement , age condition.	2025

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

10	Renewal Plans and Options based on assessments for cost effectiveness ie) lining, pipe bursting, removal and replacement	Consultant	Camera inspection and contractor/ consultant recommended renewal option report	2032

8.3 Monitoring and Review Procedures

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

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

The AM Plan has a maximum life of 4 years and is due for complete revision and updating within 1 year of each City of Cold Lake election.

8.4 Performance Measures

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

- The degree to which the required forecast costs identified in this AM Plan are incorporated into the long-term financial plan,
- The degree to which the 1-5 year detailed works programs, budgets, business plans and corporate structures consider the 'global' works program trends provided by the AM Plan,
- The degree to which the existing and projected service levels and service consequences, risks and residual risks are incorporated into the Strategic Planning documents and associated plans,
- The Asset Renewal Funding Ratio achieving the Organisational target (this target is often 90 – 100%).

9.0 REFERENCES

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10.0 APPENDICES

Appendix A Acquisition Forecast

A.1 – Acquisition Forecast Assumptions and Source

The City of Cold Lake anticipates six (6) new subdivisions (Parkview, Lakewood, west of HSB- "Heights of English Bay", Lefebvre Heights, Tri City, Colonial) in the near term.
All acquired assets projected are a result of City of cold Lake funding.

A.2 – Acquisition Project Summary

The project titles included in the lifecycle forecast are included here.

2023 Wetland Remediation $500,000
2024 Wetland Remediation $500,000

A.3 – Acquisition Forecast Summary

Recommend using NAMS+ Outputs Summary for Acquisition

Table A3 - Acquisition Forecast Summary

Year	Constructed	Donated	Growth
2022	0	0	0
2023	$500,000	0	0
2024	$500,000	0	0
2025	0	0	0
2026	0	0	0
2027	0	0	0
2028	0	0	0
2029	0	0	0
2030	0	0	0
2031	0	0	0

Appendix B Operation Forecast

B.1 – Operation Forecast Assumptions and Source

Assumed that no additional assets will be donated to the City of Cold Lake through development. The operations forecast is based on the annual operations budget.

B.2 – Operation Forecast Summary

Recommend using NAMS+ Outputs Summary for Operation

Table B2 - Operation Forecast Summary

Year	Operation Forecast	Additional Operation Forecast	Total Operation Forecast
2022	$130,000	0	$130,000
2023	$130,000	$1,550	$130,000
2024	$130,000	$1,550	$131,550
2025	$130,000	0	$133,100
2026	$130,000	0	$133,100
2027	$130,000	0	$133,100
2028	$130,000	0	$133,100
2029	$130,000	0	$133,100
2030	$130,000	0	$133,100
2031	$130,000	0	$133,100

Appendix C Maintenance Forecast

C.1 – Maintenance Forecast Assumptions and Source

Assumed that no additional assets will be donated to the City of Cold Lake through development. The Maintenance forecast is based on the annual operations budget.

C.2 – Maintenance Forecast Summary

Recommend using NAMS+ Outputs Summary for Maintenance

Table C2 - Maintenance Forecast Summary

Year	Maintenance Forecast	Additional Maintenance Forecast	Total Maintenance Forecast
2022	$87,000	0	$87,000
2023	$87,000	$1,050	$87,000
2024	$87,000	$1,050	$88,050
2025	$87,000	0	$89,100
2026	$87,000	0	$89,100
2027	$87,000	0	$89,100
2028	$87,000	0	$89,100
2029	$87,000	0	$89,100
2030	$87,000	0	$89,100
2031	$87,000	0	$89,100

Appendix D Renewal Forecast Summary

D.1 – Renewal Forecast Assumptions and Source
The renewal forecast is assumed based on the registered method total amounts for 10 years being divided over the 10 years. It is also assumed that the data provided with the asset register is correct.

D.2 – Renewal Project Summary
The project titles included in the lifecycle forecast are included here.

2022 11 Street Storm Sewer upgrade $750,000
2022 Birch Avenue Storm Upgrade $175,000
2024Lakeshore Drive Infrastructure Improvements $1,500,000
2025 Highway 55 Culvert crossing repair $1,000,000
2025 750 and 900 mm storm upgrade 13 street back alley from 6 avenue to 8 avenue $1,000,000

D.3 – Renewal Forecast Summary
Recommend using NAMS+ Outputs Summary for Renewal

Table D3 - Renewal Forecast Summary

Year	Renewal Forecast	Renewal Budget
2022	$131,608	$1,325,000
2023	0	0
2024	$449,613	$1,500,000
2025	$112,018	$1,000,000
2026	0	0
2027	$730,996	0
2028	$260,106	0
2029	$307,134	0
2030	$1,116,367	0
2031	0	0

D.4 –Renewal Plan
Detail output from NAMS+ Report for the Register Method

Renewal plan is based on the register method total divided by 10 years.

Appendix E Disposal Summary

E.1 – Disposal Forecast Assumptions and Source
Assumed that no assets will be disposed of in the planning period.

E.2 – Disposal Forecast Summary
Recommend using NAMS+ Outputs Summary for Disposal

Table E3 – Disposal Activity Summary

Year	Disposal Forecast	Disposal Budget
2022	0	0
2023	0	0
2024	0	0
2025	0	0
2026	0	0
2027	0	0
2028	0	0
2029	0	0
2030	0	0
2031	0	0

Appendix F Budget Summary by Lifecycle Activity

The assumptions as noted in Appendix A-E remain for the total budget summary.

Table F1 – Budget Summary by Lifecycle Activity

Year	Acquisition	Operation	Maintenance	Renewal	Disposal	Total
2022	0	$130,000	$87,000	$1,325,000	0	$1,542,000
2023	$500,000	$130,000	$87,000	0	0	$717,000
2024	$500,000	$130,000	$87,000	$1,500,000	0	$2,217,000
2025	0	$130,000	$87,000	$1,000,000	0	$1,217,000
2026	0	$130,000	$87,000	0	0	$217,000
2027	0	$130,000	$87,000	0	0	$217,000
2028	0	$130,000	$87,000	0	0	$217,000
2029	0	$130,000	$87,000	0	0	$217,000
2030	0	$130,000	$87,000	0	0	$217,000
2031	0	$130,000	$87,000	0	0	$217,000