

Calgary



2017 Corporate Asset Management Plan



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Executive Summary

The City must skillfully manage assets and invest well despite tight funding.

As The City of Calgary prepares for the next four-year business planning cycle, business units are under significant pressure to deliver services in a challenging economic climate.

The current economic environment has created additional funding constraints which means the allocation of scarce resources must be prioritized efficiently and effectively. The goal of asset management is to achieve these efficiency and effectiveness goals and realize more value from the asset base. This Corporate Asset Management Plan (CAMP) draws on business unit asset management plans to highlight investment needs, in the next service-based multi-year plans and budgets for 2019-2022, One Calgary. The CAMP considers infrastructure based on service performance objectives, asset performance trends, asset condition and risks.

This document summarizes the objectives set by the 2020 Sustainability Direction and the performance trends based on the delivery of Action Plan 2015-2018. It provides a line of sight between strategic documents - including imagineCalgary, Calgary Transportation Plan and the Municipal Development Plan - and business strategies and investment needs. Additionally, it provides a foundation to support and align with new council directives and new corporate infrastructure and investment strategies and plans.

The CAMP also considers asset management practices across The City, highlights where strong practice has led to better decision-making and where improvements can close existing gaps to support more efficient and effective investment. This work is in alignment with Infrastructure Calgary's efforts to improve decision-making as part of the capital planning process.

Key messages to assist business units in business planning

1. The information contained in this document should be considered in business planning.
2. Infrastructure Calgary, Corporate Asset Management and other corporate initiatives need to coordinate and collaborate to achieve their shared goals of improving the efficiency and effectiveness of service to Calgarians.
3. The City's recent decline in growth and forecasted slow recovery until the later part of the 2019-2022 business cycle, provides the opportunity to optimize investment programs and tackle backlogs in investment needs such as capital maintenance.
4. The Infrastructure Status Report (ISR) indicates a minor decline in condition, potentially as a result of gaps in maintenance spending.
5. Declining condition is a lead indicator for asset and service performance and needs to be actively managed so that service targets can continue to be achieved.
6. Uncertainty over funding is a common risk for business units.
7. Winter storms, power outages, heatwaves and severe flooding represent significant risks to The City.
8. Business units need to be aware of strategies developed in other parts of the organization to support a more integrated approach to investment planning.
9. Investment in improving asset management practices needs to be incorporated in business unit business plans and supported through funding at a corporate level.
10. The governance mechanisms currently in place would benefit from consolidation or closer collaboration in the execution and monitoring of this CAMP.

If the condition of assets continues to drop, performance and citizen satisfaction could decline

More than 86 percent of The City's infrastructure assets are in good or very good physical condition. However, this percentage is down from 95 percent in 2013. Approximately 2.7 percent of The City's assets are in poor physical condition. This is up from 1.5 percent in 2013. Declining condition is a lead indicator for asset performance and ultimately service performance.

Given the extent and confidence in the data, it is difficult to accurately determine whether asset and technical performance is improving or declining. However, marginal trends were established for stable, improving or declining service.

Based on feedback from Calgarians, The City is currently either improving or maintaining levels of service. Levels of customer satisfaction are generally improving. However, customer satisfaction could be impacted if the condition of assets continues to decline. Customer satisfaction levels may have to be propped up through extensive operational customer service and response efforts.

Because this is the first time that risk has been evaluated in the Corporate Asset Management Plan, it is not possible to determine the trend in risk. The risk visibility, however, does provide the opportunity to make more informed decisions regarding investment levels across the infrastructure portfolio.

The City has put a more concerted effort into developing Asset Management frameworks, plans, guidance and practice since 2008, which shows in the improvement trend. To continue this trend, Corporate Asset Management and Infrastructure Calgary will need to collaborate on further improvement opportunities and ensure they capture these initiatives in business plans

Business units will add value to asset portfolios through forecasts and clear actions for improvement

Business units have developed investment forecasts that will begin to drive the development of business cases through the business planning period. In addition, business units have identified clear actions for improvement, including improving the understanding of performance and risk. This information will be utilized in decision-making, improving the quality of data and information to build more confidence in the decisions taken, and to integrate asset management into the core business planning processes to realize more value from the asset portfolio.

Corporate support for building an integrated asset management culture is essential to making this a success for the organization. It will result in enhanced efficiency and effectiveness and more successful achievement of corporate objectives.

1 Introduction

Key Messages for business plans

1. The information contained in this document should be considered in the next round of business planning.
2. Asset management brings a useful approach to managing infrastructure and is entirely consistent with the principle of the 2020 Sustainability Direction to think connected.
3. Asset management needs to be an integral part of The City's end to end business planning and delivery processes.
4. The City needs to continually learn, refine and update plans and activities and the process of continuous improvement should be integrated into the organizational philosophy.
5. Infrastructure Calgary, Corporate Asset Management and other corporate initiatives need to coordinate and collaborate to achieve their shared goals of improving the efficiency and effectiveness of service to Calgarians.

1.1 Purpose

CAMP is a plan for improving asset management, highlights AMPs and informs about service areas and risks

This document is The City of Calgary's second Corporate Asset Management Plan (CAMP) and forms a key component of The City's Asset Management System.

The CAMP serves as an action plan for the improvement of The Corporation's Asset Management System (including practices, technology, people and business processes). It includes highlights of the asset management plans (AMPs) developed by each of the main asset owning business units. The CAMP also describes a high-level summary of the Infrastructure Status Report and the state of asset management within The Corporation.

Business units included in this CAMP

- Calgary Housing
- Facility Management
- Fire
- Fleet Services
- Information Technology
- Parks
- Recreation
- Roads
- Transit
- Waste & Recycling Services
- Water Resources
- Water Services

The CAMP is intended to act as a communication document for senior management within The Corporation. It provides information about key service areas and associated risks that may need attention during the next round of business planning. It also provides an indication of the value of investment for consideration in the Investment Optimization Program.

1.2 Structure

This CAMP builds on first version and aligns with other documents

The structure of this CAMP builds on the first version of the document developed in 2011, but also aligns with the Corporate Asset Management Strategy and Asset Management Framework developed in 2016. These documents encapsulate an approach to asset management planning that has been applied in a consistent manner by each of the asset-owning business units throughout The Corporation.

This document is based around seven sections, four of which form a gap assessment for infrastructure management

- Section 2; Direction & Objectives – What does The City need to achieve?
- Section 3; Current Status – Infrastructure and Practices - How is The City doing now?
- Section 4; Actions & Strategies – How will The City get there?
- Section 5; Financial Considerations – What will it cost?

1.3 Service Lines Structure

Business units have not yet aligned infrastructure status and investment planning with service lines

This CAMP provides an indication of portfolio value, condition, strategies and financial requirements by service line. In 2016 and 2017, business units have all sought to more clearly understand services provided within their areas of responsibility. Many business units provide five or six clear services.

Reported information from within the business units regarding infrastructure status or investment planning is not yet aligned with these service lines. As a result, this document takes a more aggregated view of service lines. The structure presented in this document is informed by the Canadian Infrastructure Report Card (CIRC) which is reflected in some of the terminology used throughout the document.

The following service structure has therefore been applied to sections of the CAMP where appropriate.

Service Line	Associated Business Units and [Department]	2019 - 2022 Business Plan Service Lines	Comment
Utilities & Environment			
Potable Water	Water Services and Water Resources [Utilities & Environmental Protection]	Water Treatment & Supply	
Wastewater		Wastewater Collection & Treatment	
Stormwater		Stormwater Management	
Waste and Recycling	Waste & Recycling Services [Utilities & Environmental Protection]	Waste and Recycling	Not in CIRC
Transportation			
Public Transit	Transit [Transportation]	Public Transit, Specialized Transit	
Roads and Bridges	Roads [Transportation]	Streets, Sidewalks & Pathways; Street Cleaning; Parking & Enforcement; Traffic Operations	
Sport & Recreational Facilities			
Parks & Open Spaces	Parks [Community Services]	Parks & Open Spaces; Urban Forestry	
Recreational Facilities	Recreation [Community Services]	Recreation Opportunities	
Protective Services			
Protective Services	Calgary Fire [Community Services]	Fire & Emergency Response; Fire Inspections & Enforcement; Fire Safety Education	
Buildings			
Corporate Accommodation Portfolio	Facilities Management [DCMO]	Facility Management	
Affordable Housing Portfolio	Calgary Housing [Community Services] Calgary Housing Company [City Subsidiary]	Affordable Housing	Not in CIRC
Support Services			
Fleet Services	Fleet Services [DCMO]	Fleet Management	Not in CIRC
Information Technology	Information Technology [CFOD]	Information Technology Solutions & Support	Not in CIRC

1.4 Background

Continual improvement of asset management allows The City to maximize funding and planning

To maximise available funding for the levels of service provided, there is a need for a strategic corporate approach for managing a diverse portfolio of assets valued at over \$83 billion. Asset management provides a holistic approach to help realize value from our assets, provide clarity on purpose and needs, and achieve long-term outcomes. In 2004, City Council approved an Asset Management Strategy and Corporate Asset Management Program to more efficiently use and maintain corporate assets. Since then, The City has evolved and improved its asset management capabilities through the development of a more robust policy and updated strategy, the alignment of practices with international standards, and the development of internal, made-in-Calgary-for-Calgary corporate standards and frameworks.

Planning for capital investment and operational budgets is improving through infrastructure investment plans (IIPs) developed across the organization. Business units develop these plans based on robust studies of growth and development needs, climate change risks and impacts, and an understanding of infrastructure condition to maintain the services that they provide to Calgarians.

1.5 Goal of Asset Management

Asset management helps City infrastructure contribute to City's evolving goals

Ultimately, the goal for asset management is to enable infrastructure to support the achievement of the Corporate vision encapsulated in council priorities and informed by the 100-year vision imagineCALGARY.

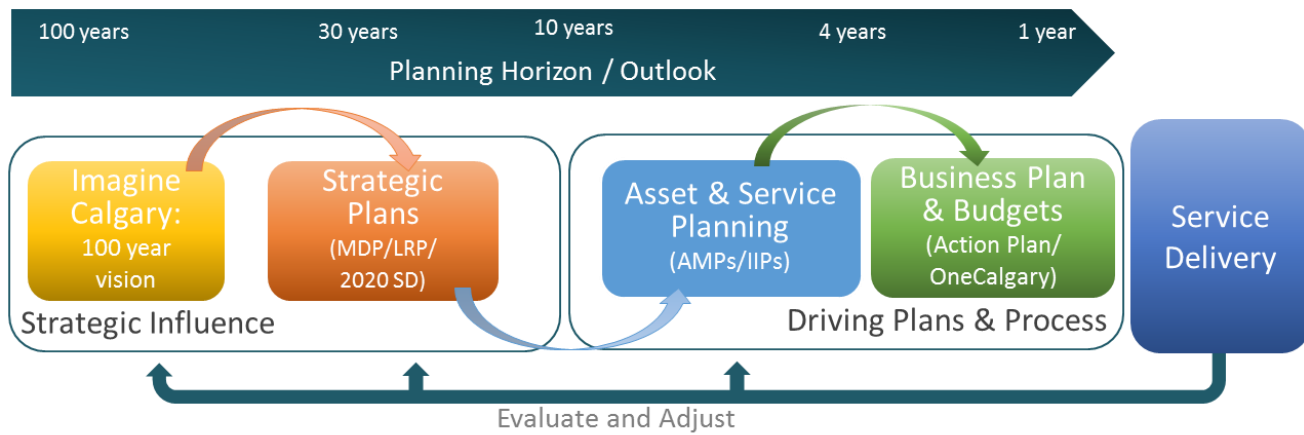
As the economic, social and environmental landscape changes, specific corporate priorities and goals evolve. A constant is the need to ensure that services, and the assets that support them are delivered effectively and efficiently. Asset management will provide a more systematic approach to achieving the desired efficiency and effectiveness targets.

Asset management needs to be an integrated part of The City's business planning and service delivery processes.

Improved asset management contributes to all the 2020 goals through objectives related to the reduction of greenhouse gases; provision of built and natural spaces; maintenance and improvement of emergency response; and the management of waste, biodiversity, water quality and water resources. However, Asset management is also the heart of several goals associated with creating a sustainable corporation

- **Effective Service Delivery:** Services, service levels, business plans, and budgets for external and internal programs are aligned to long-term goals, policies and citizen priorities through regular review and citizen engagement.
- **Efficiency:** The City delivers services and programs efficiently through a culture of progression and creativity that supports innovation and is adaptable to changing needs and pressures.
- **Infrastructure Management:** The City utilizes quality, cost effective, safe and innovative corporate assets that enable and support the provision of desired public and corporate services. The management of public and corporate assets (both physical and information) are optimized and based on continuous improvement.

Asset management planning as an integral part of business planning



Fundamentals of Asset Management;

Value: Assets exist to provide value to the organization and its stakeholders.

Alignment: Asset management translates the organizational objectives into technical and financial decisions, plans and activities.

Leadership: Leadership and workplace culture determine the value realized

Assurance: Asset management gives assurance that assets will fulfill their required purpose.

Asset Management Principles to apply;

Holistic: Take a comprehensive approach that looks at the big picture.

Systematic: Take a methodical approach that is repeatable and consistent.

Systemic: Make asset investment decisions in a systems context.

Risk-based: Manage risk associated with attaining levels of service and focusing resources and priorities based on risk, costs and benefits.

Optimal: Make asset investment decisions based on trade-offs between cost, risk, and performance

Sustainable: Take a long-term lifecycle based view in decision making.

Integrated: Coordinate the above principles to deliver well defined outcomes.

Aligned: Align the AM system with strategic objectives, legislation and other business systems

1.6 Asset Management Framework

The City must continuously improve the way it manages its assets

To achieve its goals, The City created an asset management framework comprised of a Corporate Asset Management Policy, Strategic Asset Management Plan (SAMP – incorporating the Asset Management Strategy and Asset Management Framework), Corporate Standards for Levels of Service and Infrastructure Risk Management, and business unit asset management plans.

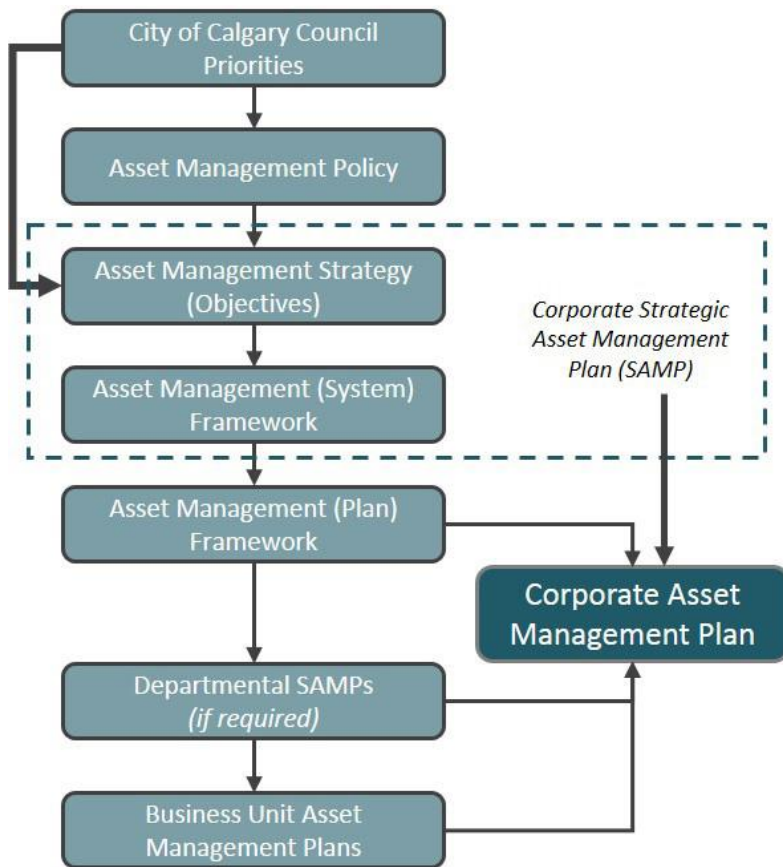
This CAMP is influenced and informed by these documents to provide an overview of the current state of asset management at The City. It identifies potential strategies for infrastructure and improvement of practices.

The business unit asset management plans are a critical building block representing both the progress and the needs of each of the main asset owning business units. Business units developed these plans to support their business needs in a broadly consistent manner with guidance from Corporate Asset Management. Their plans reflect specific



business differences associated with the assets they manage. These asset management plans are the basis of the CAMP.

The Corporation needs to reflect, learn and improve on its asset management practices to develop more effective and robust plans going forward. It is important that the approach to asset management incorporates the principles of continuous improvement in everything.



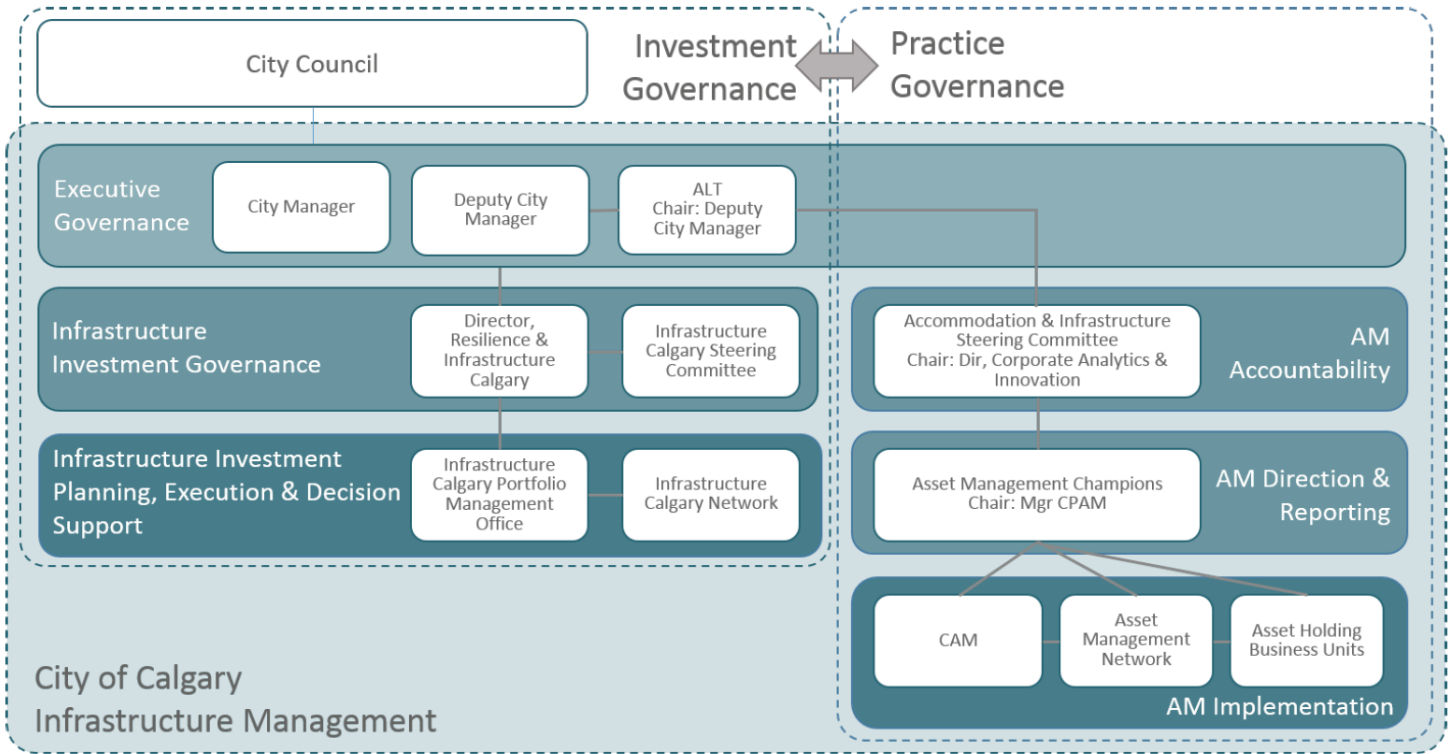
1.7 Governance

The City uses investment governance and practice governance to manage our infrastructure successfully

To manage infrastructure effectively, The City needs to govern the planning and delivery of investment in infrastructure while improving its planning, program delivery, and monitoring and reporting processes. This work forms an essential component of The City’s asset management system. These functions are provided by two key governance hierarchies that are managed by Infrastructure Calgary: investment governance and practice governance, which is enabled through the Corporate Project and Asset Management (CPAM) division within Corporate Analytics & Innovation (CAI).

Together they share the objectives of improving infrastructure resilience, efficiency and effectiveness, by optimizing investment to foster the local economy and support community health and well-being, through environmental benefits that improve the lives of all Calgarians.

Governance of infrastructure management



2 Direction and Objectives

Stresses and opportunities

1. Traffic congestion, road conditions and good public transportation networks, including transit, continue to be priorities for Calgarians.
2. Updates to the Municipal Government Act and Bill 20 on Climate Leadership will have a significant impact on infrastructure spending.
3. The City still faces steady growth, but the current lower growth rate provides the opportunity to optimize investment programs and tackle backlogs in investment needs.
4. A 3°C temperature increase and six percent increase in precipitation will have significant impact on our infrastructure.
5. imagineCalgary and the 2020 Sustainability Direction still set clear aspirations for a great and well-run city.

2.1 Introduction

Understanding infrastructure requirements for serving Calgarians

A fundamental element of any asset management plan (AMP) is a clear understanding of what is being required of the asset infrastructure to meet the needs and expectations of Calgarians and other stakeholders. These requirements are forward looking and come in many forms from many sources including:

Customer Expectations

- What services are important to Calgarians and what is their willingness to pay for these services?

Legislative Requirements

- What are the federal, provincial and municipal regulatory and other legal requirements of the infrastructure and the management practices of working with that infrastructure?

Future Demand

- What growth pressures will the infrastructure need to accommodate through the planning period?

Climate Change

- What climate change related pressures will the infrastructure need to be resilient enough to withstand?

Strategic and Corporate Goals

- What strategic and corporate goals will the infrastructure need to support to achieve and maintain the municipal identity?

Each of these drivers are explored in Sections 2.3 to 2.7 and provide the basis of defining the customer and technical levels of service expected of the asset infrastructure.

2.2 Service Purpose and Outcomes

The City provides various services through our infrastructure

Water, wastewater and stormwater services are provided by two business units within Utilities & Environmental Protection (UEP). Water Resources provides planning and engineering services and Water Services operates and maintains the infrastructure. Between them they provide three key lines of service including:

- The provision of a fresh, clean and sustainable supply of water to Calgarians and surrounding communities

- The removal, treatment and recycling of used water from customers to the environment
- The management of stormwater to protect properties and infrastructure from flooding and provide responsible stewardship of the environment.

Waste and recycling is provided by the Waste & Recycling Services (WRS) business unit within the UEP Department. WRS provides waste management services including garbage collection, recycling, management of active and closed landfills, and education.

Transportation services supports all modes of travel and promotes sustainable growth through a safe, reliable, efficient, and customer focused transportation system.

Sport and recreational facilities are provided by Calgary Parks and Calgary Recreation business units both within Community Services Department to provide recreational opportunities and natural environments for Calgarians.

Protective services provided by Calgary Fire deliver emergency fire response & firefighting, fire prevention and investigations, fire disaster planning and preparedness.

Buildings are corporately owned and primarily managed by three business units: Facility Management (FM), Calgary Housing Company (CHC - a wholly-owned subsidiary) and Calgary Housing (CH) business unit. Between them they provide convenient, functional, safe and healthy places to work or live. This is delivered through affordable housing options and public spaces for Calgarians, and public servicing, office and operational workspaces for The City.

Support services are comprised of the Fleet Services and Information Technology (IT) business units. Fleet Services provides and maintains the vehicle fleet across all business units, excluding Fire, Calgary Transit (CT) and Calgary Police Service (CPS), while the IT business unit provides information technology services across all business units through the provision of hardware, software and communications network infrastructure.

2.3 Customer Expectations

City infrastructure must serve our customers

Our customers, who are citizens and other stakeholders, are the prime reason our infrastructure exists. We must understand their needs and expectations to understand what levels of asset creation, maintenance and upgrade are required.

The City undertakes extensive customer engagement campaigns to determine customer needs and expectations. To develop the 100-year vision for Calgary, imagineCALGARY, we took contributions from 18,000 citizens and stakeholders. This process has supported past Council Priorities and the current Council Directives.

The City also relies on the annual Citizen Satisfaction Survey to determine the needs of the public, to learn how the public feel about the quality of services being provided, and to support the prioritization of investment into services through business planning cycles. Trends are tracked based on data from previous years.

In 2016, “Infrastructure, traffic and roads” remains the top priority for Calgarians, though the trend is generally decreasing in prominence. “Transit” continues to hold second place. “Crime, safety and policing” is a clear third priority for citizens. The “economy” emerged as an important issue in 2016.

Recent annual trends from Calgary’s Citizen Satisfaction Surveys, indicate a rise in the need for policing and safety, versus the other top three areas, which have declined in importance in recent years.








While survey results are a function of how questions are asked, they provide a useful indication of customer and citizen priorities. In future campaigns of citizen engagement, we will seek to more explicitly understand service levels that citizens expect of roads, transit, water services and other municipal services. With this information, we’ll explore

how willing citizens are to pay for these services. This data, in turn, will give us a framework for investment planning and will help us avoid investing in services that citizens don't require or don't value.

2.4 Legislative Requirements

Legislative requirements impact City planning and management

We strive to meet regulatory requirements every day in everything we do. When regulations change, the way we invest in and manage infrastructure can be impacted. It's important we have input to and understand the changes to our regulatory framework for investment planning. The table below summarizes several proposed and potential legislative changes, anticipated over the next four to eight years, which may impact infrastructure and investment decision-making within The City.

Legislation	Changes	Impacts	Cost Pressure
Municipal Government Act	As part of a general trend towards regionalization the update of the MGA could lead to the requirement for increased consultation and collaboration with external stakeholders through, for example, Intermunicipal Collaboration Frameworks, Joint Use Agreements, and Growth Management Boards. This could lead to more opportunities for sharing of facilities and costs between municipalities, aboriginal communities and schools. Opportunity to include inclusionary housing as option within land-use bylaws.	<ul style="list-style-type: none"> Increase in consultation & planning costs associated with collaboration projects and potential for increasing governance and participation with regional boards and potentially pressure for more regionally driven infrastructure. Reduction in overall infrastructure cost associated with shared use & financing. Opportunity for clearer cost sharing with regional partners. Potential reduction in City burden for creating affordable housing within Calgary. 	  
Waste Control Regulations	There is significant potential for change within the next few years related to provincial regulatory requirements for landfill gas mitigation by the landfill owner/operator.	<ul style="list-style-type: none"> More stringent requirements for landfill gas collection and management by the landfill owner/operator. 	
Health Canada Drinking Water Guidelines	Drinking water standard for lead in water may be significantly reduced within the next few years.	<ul style="list-style-type: none"> Cost increases to water utilities to ensure lead levels are below the required standard by the removal of potentially water utility as well as customer owned contaminated pipes and fixtures. 	
Bill 20: Climate Leadership Implementation Act,	Carbon tax of \$20/tonne Jan. 1, 2017 will increase to \$30/tonne Jan. 1, 2018. The price will increase each year after that. Tax applies to gasoline, diesel, propane and natural gas.	<ul style="list-style-type: none"> Increasing cost of acquiring, operating and maintaining all City owned vehicles and equipment using traditional carbon-based fuels. 	
National Energy Code of Canada (2015)	NECB 2015 included more than 90 new changes in regards to energy efficiency in new buildings [6].	<ul style="list-style-type: none"> Potential increase in capital cost of constructing new buildings. Applies to housing and commercial buildings. Subsequent reductions in energy costs. 	

2.5 Future Demand

Lower but steady population growth increases demands

Drawing on information in The City of Calgary Economic Outlook, it is expected that economic activity will impact City assets and how they are managed.

While it is not expected that growth will be as strong as it's been in previous years, steady growth of the city's population is forecasted and expected to pick up towards the end of the plan period. This growth will lead to an increase in population of approximately 86,000 people between 2018 and 2022.

Transit ridership is not linked to population growth quite so directly and is more a function of economic prosperity. Currently, ridership is down from the 2014 peak, but will steadily increase to similar levels by the end of the plan period. However, The City has set a goal of providing

2.6 service hours per person by 2020. This will lead to an additional 223,000 service hours per year, which will impact requirements for vehicle fleet, maintenance, storage and associated staff to operate and maintain the service.

To serve The Corporation, Facilities Management has identified the need for additional space to accommodate 1,950 new staff and over 450 acres of new land over the 10-year asset management plan period. The land will support one regional and four satellite operational sites, some of which will be required during the next business plan period.

The current demographic profile is not expected to change significantly for the 2019-2022 Strategic Plan business cycle. This means continued but slower growth in all age bands placing increasing demands on parks, playgrounds and recreational facilities. Seniors will continue to need suitable services and facilities.

Generally, demand for municipal services will be reflected by the overall growth profile. The current slightly slower annual growth provides The City with the opportunity to optimize investment programs, tackle backlog in maintenance and update investment needs.

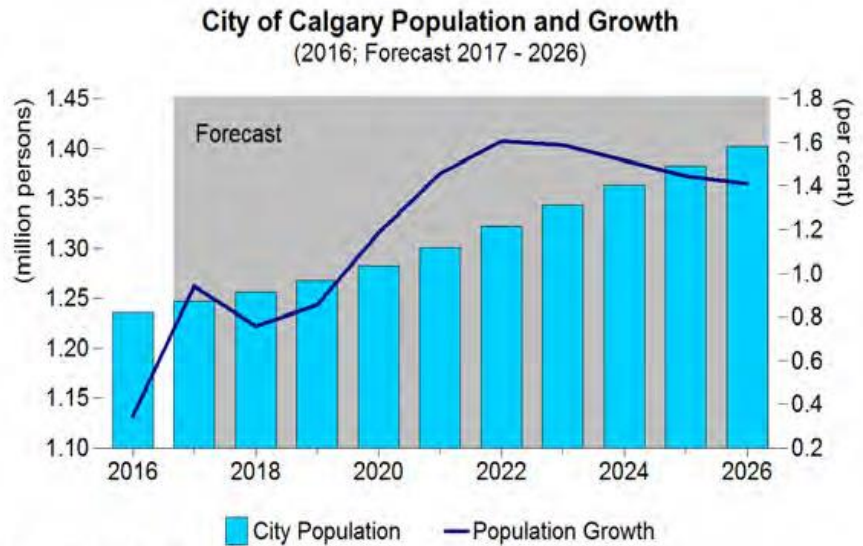
Forecast Implications Summary Table is provided in Appendix A.

2.6 Climate Change

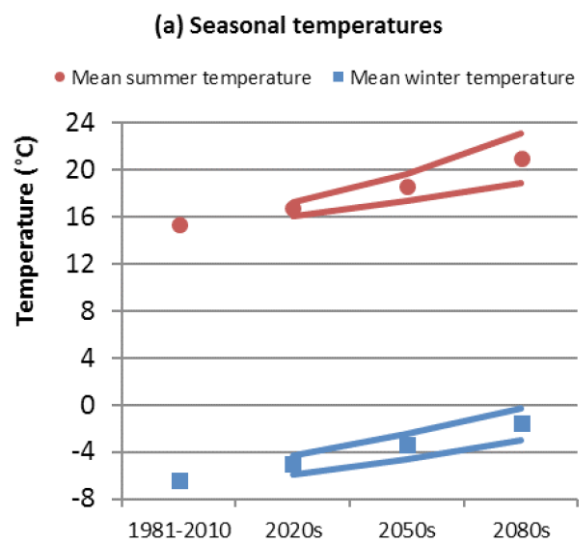
Climate change could strain infrastructure and services

Global climate change is fast becoming the critical challenge of this century. The potential impacts on infrastructure, economies, businesses and people will be far-reaching. Changing climatic conditions can significantly impact the lifespan and serviceability of infrastructure and may result in economic loss, disruption to communities, and increased public health and safety concerns.

The City is committed to considering climate change in our policies, strategies and municipal plans. It has taken steps to understand climate-related vulnerabilities that could impact our infrastructure and services with our Climate Adaptation Strategy. With this study, The City has and will adapt and mitigate actions across the organization and will incorporate climate change considerations into business processes.



Source: Calgary Civic Census, Corporate Economics



The graph and table shows the projected changes to Calgary’s climate. Summers will become hotter and dryer, with the potential for short duration – high intensity (SDHI) rain or wind storms. Winters in Calgary will become warmer and wetter (i.e., more snow potentially mixed with rain), with the potential for ice storms or even severe cold spells.

Projected Climate Changes in Calgary

Climate Variable	Season	Changes by 2050's – mean C	Changes by 2080's – mean C	Consequences of temperature and precipitation changes
Temperature	Annual	+3	+4.9	<ul style="list-style-type: none"> • Changes to air temperature • Decreases in snow and ice cover • Shifts in species habitat ranges • Variations in precipitation patterns • Increases in riverine flooding of urban areas • Increases in the frequency and magnitude of severe weather events and storms, • Increases in wildfire veracity and frequency • Increases in heat-related health risks.
	Winter	+3	+4.9	
	Summer	+3.3	+5.7	
Precipitation	Annual	+6%	+8%	
	Winter	+9%	+16%	
	Summer	-3%	-8%	

Source: Climate Change Adaption Research - Report

Extreme weather events can damage infrastructure and cause frequent service disruptions, while long-term changes to climate (e.g. increased annual temperature ranges) can negatively impact the lifecycle durability of public and private infrastructure.

The impacts of these changed weather patterns will influence our existing infrastructure and the services we provide in many ways, including more pressure on water resources, reductions in infrastructure capacity (especially storm management systems), reduction in the reliability of many assets including electrical equipment leading to potential power outages, loss of transportation corridors, and potential contamination of water resources, parks and other natural environments. Heat waves, pests and disease also represent threats to the health of City staff and citizens, complicating the ability to provide municipal services such as outdoor recreation or adequate cooling at City facilities.

It is important for service and infrastructure planning processes to consider these potential impacts and how to mitigate the risks to citizen services supported by infrastructure. Infrastructure that is part of a wider system of interactions between assets and the environment in which they exist.

2.7 Strategic and Corporate Goals

The City uses several inputs to set many goals and measurements for assets

Drawing on customer expectations, changes in legislation, growth demands, changing climate, and an understanding of assets and risks (next section), The City can develop goals, objectives and targets along with strategies to achieve these targets. This process is guided by imagineCALGARY and other strategic documents. The 2020 Sustainability Direction used this information to define 10-year targets that will soon be updated to form a new 2030 Sustainability Direction.

The current 2020 Sustainability Direction, however, still provides useful targets (six goals, 33 objectives and 82 targets of which 68 relate to investment in the asset base and the way it is managed) that can inform asset management planning. The targets include measures of service outcomes, service performance measures, and technical indicators of asset and operational performance and health, samples of which are included below.

Objective	Target
Service Outcomes	
Effective Service Delivery	By 2020, more than 90% of Calgarians are satisfied with the overall quality of services.
GHG Emission Reduction	By 2020, greenhouse gas emissions will be reduced by 20% from 2005 baseline.
Efficiency	By 2020, total City operating expenditures per capita are maintained or reduced.
Service Performance	
Water Quality	By 2020, drinking water and treated wastewater effluent will continue to meet provincial regulations for quality 100% of the time.
Improve Goods Movement	By 2020, maintain or improve the average travel time on selected Goods Movement Network corridors, reducing traffic delays (Average speed on selected goods movement corridors).
Technical Performance	
Provide Safe, Reliable and Affordable Public Infrastructure	By 2020, 80% of roadway pavement meets good or very good condition ratings.
	By 2020, the average transit vehicle age is maintained at the 2009 levels – LRV 16 years, Bus 14 years.
	By 2020, 80% of City recreation facilities are maintained at a level B or higher.
Infrastructure Management	By 2020, 90% of City buildings and 100% of the workplaces provided to City employees will be in good condition (15% FCI / 75% WCI)
Enabling Activity Performance Indicators	
Infrastructure Management	By 2020, 100% of City leaders responsible for asset management planning activities and or project management of capital infrastructure initiatives will have corporate asset management and or project management competencies.
	By 2020, the practice of asset management at the City will achieve a minimum of level four out of five compliance with respect to the Asset Management Policy.

The full list of goals, objectives and targets (from The City's 2020 Sustainability Direction) is indicated in Appendix B.

In addition to these targets, business units have begun to develop customer and asset performance measures. These are being developed with guidance from the Corporate Standard for Levels of Service Frameworks, and in conjunction with initiatives such as results based accountability and customer service framework. Through the next business plan period, the intelligence gathered from these initiatives will be used to support updates of the business unit AMPs and to improve the allocation of investment funds into the future.

The objectives and targets will be supplemented through updates of other corporate documents such as RouteAhead (the 30-year roadmap for Calgary Transit), Pedestrian Strategy, Cycling Strategy, Downtown Parking Strategy, Municipal Development Plan and the 2020 Sustainability Direction update. These documents will also form important direct inputs to business planning for the 2019-2022 business cycle.

As part of the implementation of Resilience & Infrastructure Calgary as a business unit, five key goals were outlined which partly relate to outcomes, but also to improving enabling activities associated with investment planning and delivery. These goals are:

1. Stimulate the economy by increasing the quality and velocity of capital expenditures
2. Strengthen investment decision-making to maximize return for Calgarians
3. Enhance capital delivery efficiency and effectiveness
4. Improve transparency and line of sight for key stakeholders
5. Attract investment to Calgary

These goals form an important framework to guide us in developing investment strategies, including strategies to improve asset management practices within The City.

3 Current Status

Key Messages on decline, risk

1. The Infrastructure portfolio has grown by \$23 billion in three years through creation of new assets, valuation methodologies, maturity in the asset management practice and better information.
2. The approach to asset valuation should be reviewed for consistency across The Corporation.
3. The condition trend indicates declining condition on existing infrastructure meaning that maintenance spending is not keeping pace with asset deterioration.
4. Declining condition is a lead indicator for asset performance and ultimately service performance and may lead to marginal trends over the next few years.
5. Asset classes with high risk are indicated in transportation service lines. Services identified as a priority by Calgarians.
6. Uncertainty over funding is a common risk for business units.
7. Climatic changes triggering more frequent and severe winter storms, power outages, heatwaves and flooding represent significant risks to City infrastructure and private property.
8. Integration of asset management into business processes is a significant challenge and is impacting overall infrastructure.

3.1 Current Asset Status

Understanding The City's asset status helps identify what should be done

Understanding the current asset status is an important element in determining the size of the gap and the actions required to achieve targets and objectives outlined in Section 2.

Understanding the status requires an understanding not only of what The City owns but also what is it worth, what condition is it in, and what is the current capacity of the infrastructure?

It is also important to understand the current state of practices and processes at The City. This provides an indication of the organizational capacity to deliver any required actions to achieve objectives.

Section 3 seeks to answer some of these basic questions. The infrastructure status is presented at an asset portfolio level, rolling up information and data from individual assets. The information supports an assessment of how well our assets are achieving their strategic objectives and consequently supports asset stewards to develop infrastructure investment priorities.

3.2 What do we own and what is it worth?

The City's infrastructure asset portfolio is made up of six broad categories:

- **Buildings (\$3.6 B)** – All buildings including the corporate accommodation portfolio (69 properties), fire halls, recreation centres, laboratories, and affordable housing portfolio.
- **Engineered Structures (\$74.6 B)** – A broad portfolio of assets including roads, bridges, and associated assets; track and stations; water treatment and distribution; wastewater collection and treatment infrastructure; communications towers and cabling conduits; and landfill sites.
- **Land Improvements (\$2.9 B)** – Includes parks, playgrounds, pathways, park benches and sports fields.
- **Machinery and Equipment (\$0.7 B)** – Includes plant and equipment used in supporting fleet maintenance for transit and other vehicles to work landfill facilities, equipment to create asphalt for roads, fire fighting equipment and computer hardware.
- **Vehicles (\$1.7 B)** – Includes all bus and light rail vehicles as well as trucks and other vehicles to support all business unit operations.

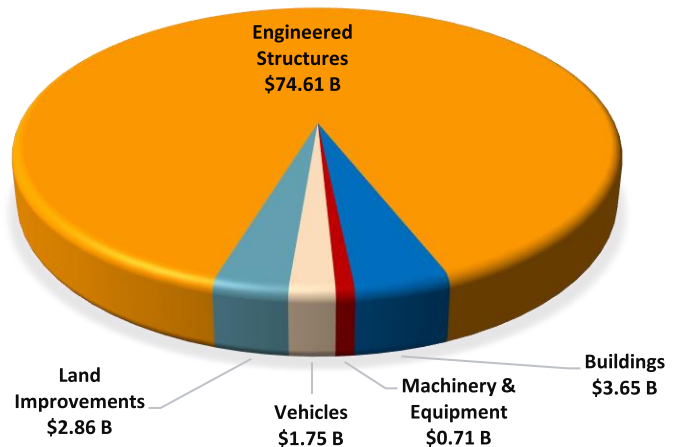
- Land** - In addition to these major asset portfolios, The City also has land holdings. However, land does not depreciate or age in the same way as other assets and does not require the same level of maintenance. For this reason, it has not been included in the information presented here and is not considered further in this CAMP. Total value of land holdings owned by The City is \$4.22 billion. *source; 2017 City of Calgary Infrastructure Status Report.*

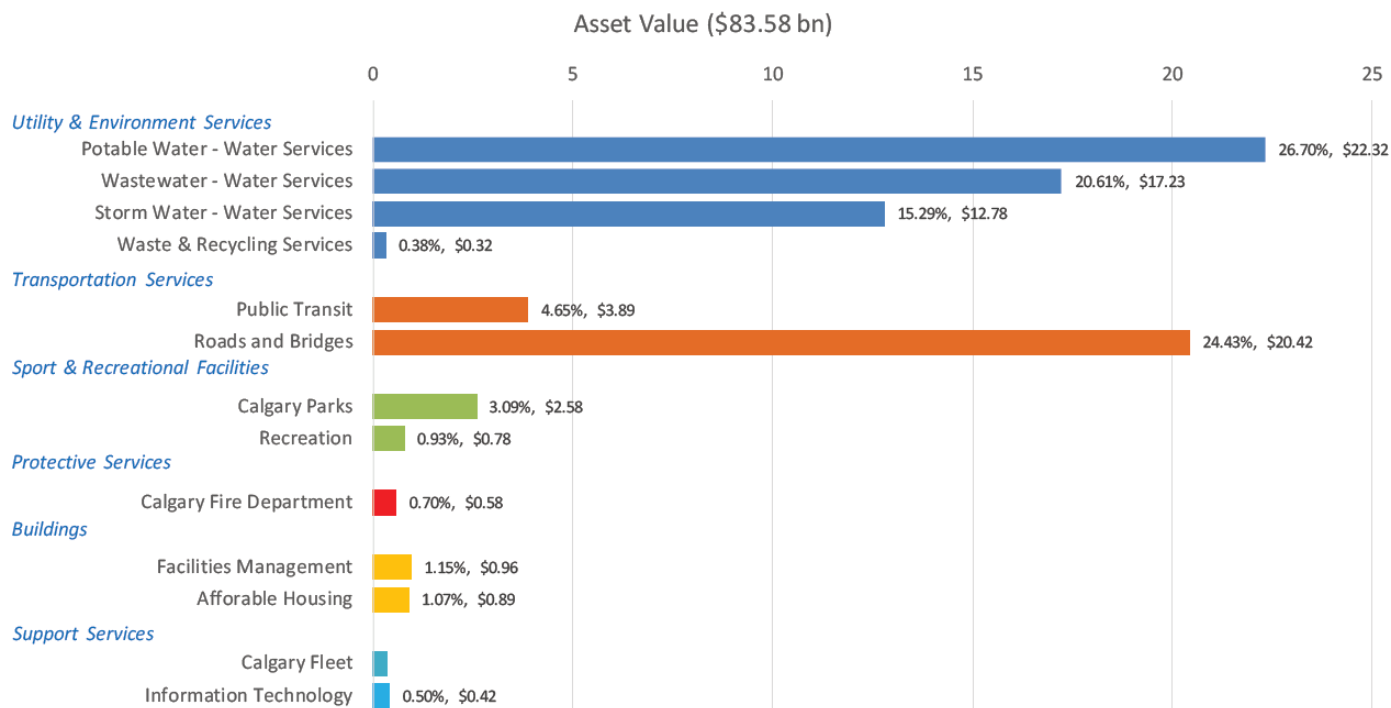
The overall asset portfolio has increased in value from 2013 by \$23.8 billion to a current portfolio replacement value of \$83.6 billion*. This 39.4 percent increase in value is across all asset classes and service lines with the largest dollar value increases in Water and Roads. Just over 5 percent of the value increase is due to inflation. The rest, however, reflects upgraded or additional infrastructure added to the corporate asset portfolio. This is therefore unrelated to asset renewal and as such creates a direct impact on the required maintenance and operating budgets associated with each service line.

It is also recognized that the asset portfolio value increase may be a function of the valuation approach adopted by business units. In the next business cycle, the approach to asset valuation should be reviewed for consistency to improve the accuracy of this data.

****Does not include approximately \$1.1 billion in assets held by Related Entities & Civic Partners, identified in the 2017 City of Calgary Infrastructure Status Report (ISR).***

ASSET VALUE (\$83.58 BILLION)





3.3 Asset Condition

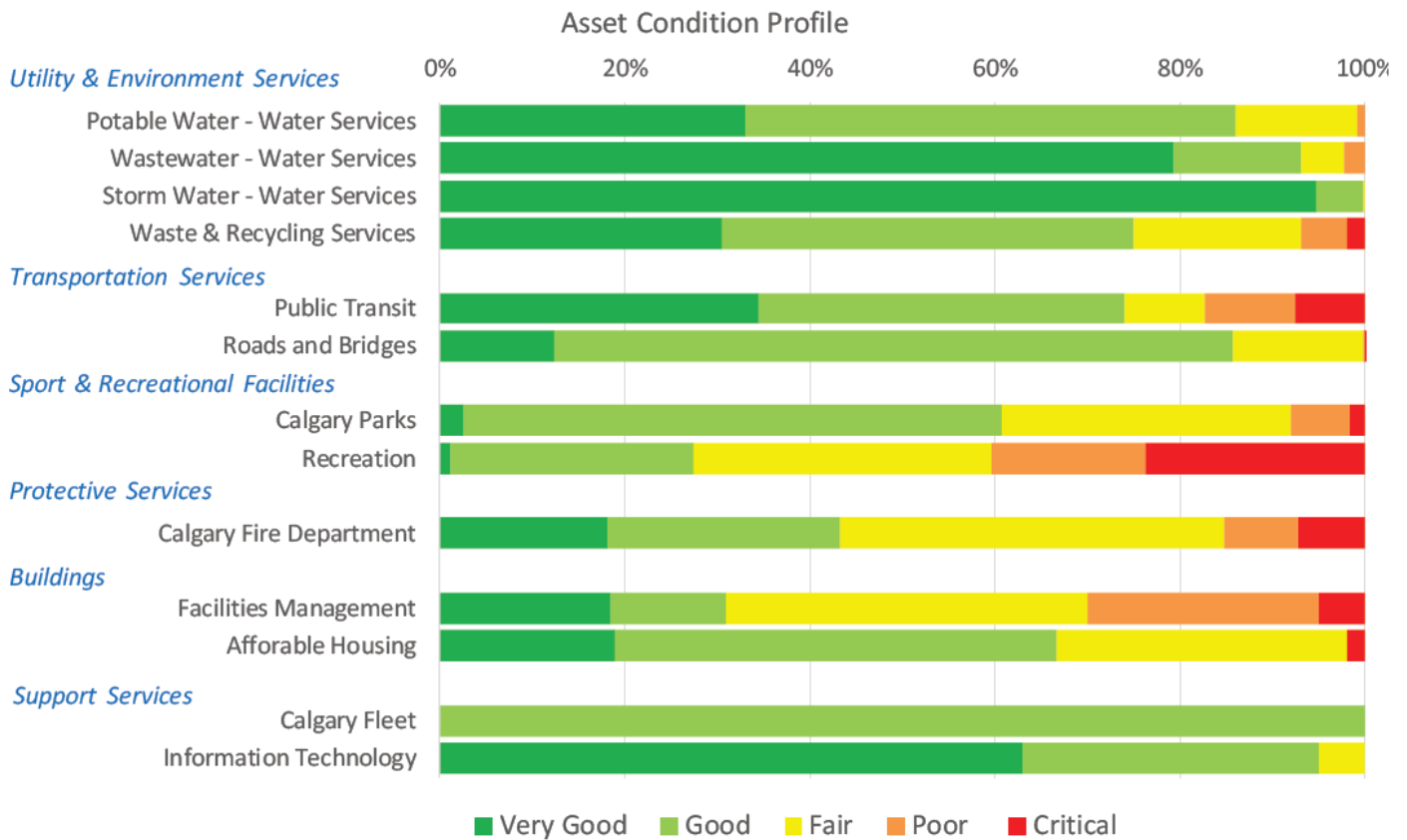
When we know the condition of our assets, we can plan improvements to sustain service

Asset condition is a useful indicator of the extent of asset deterioration and remaining life of the asset. Assets in poor condition are more likely to be unreliable, leading to asset failures and potentially service failures. Asset condition is therefore critical information for The City to understand to support decisions on the timing of possible interventions to improve or maintain the levels of service at a desired standard and avoid catastrophic failures.

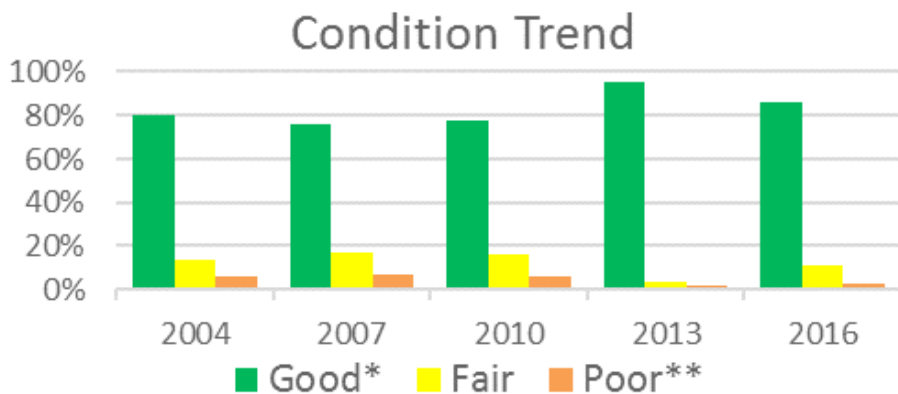
Condition Status	Interpretation
Very Good	Sound or “as new” condition. Only planned maintenance required.
Good	Acceptable physical condition. Asset shows only minor deterioration. Minor maintenance required plus planned maintenance.
Fair	Tolerable physical condition. Moderate deterioration evident. Significant additional maintenance required.
Poor	Major deterioration evident. Significant renewal or rehabilitation required.
Critical	Asset deteriorated to such an extent that it is generally inoperable or unsafe. Physically unsound and or beyond rehabilitation.

The condition information presented is consistent with the approach adopted in the Canadian Infrastructure Report Card (CIRC) and is based on a five-point scale ranging from very good to critical.

At an aggregate portfolio level over 87 percent of the asset base is in good or very good condition with approximately a further 11 percent in fair condition. However, this leaves 2.7 percent in poor to critical condition equating to almost \$2.3 billion of infrastructure.



While overall asset health is still good with a general upward trend over the last decade, the condition profile has deteriorated since 2013. The 40 percent increase in value of the asset portfolio comprises new and upgraded infrastructure which should all be in good to very good condition, and will only improve the overall asset condition grade. Excluding new infrastructure built since 2013, the proportion of the 2013 asset portfolio in good to very good condition is approximately 81 percent with 15 percent in fair condition and almost 4 percent in poor to critical condition indicating an overall deterioration of the asset base.



Condition	2004	2007	2010	2013	2016
Good*	80%	76%	78%	95%	86.3%
Fair	14%	17%	16%	3.5%	11%
Poor**	6%	7%	6%	1.5%	2.7%

* Good and Very Good combined for comparison with prior years

** Poor and Critical combined for comparison with prior years

3.4 Performance

Measuring performance helps The City manage the services it provides

The City tracks a variety of performance measures across all service lines through the Action Plan 2016 Year-End Accountability Reporting. This tracking gives an indication of how well services (levels of service or LOS) are being provided and, in turn, how well the infrastructure is providing that service. The measures also include key milestones that indicate if progress against Action Plan is being achieved as planned. Through the current Action Plan, several improvements to the approach to evaluating service performance have been implemented, including:

- Results Based Accountability (RBA) and the Levels of Service Frameworks (LOSF) both seek to develop a framework of measures that provide a line of sight between investments, initiatives and outcomes they are seeking to achieve. The corporate standard for LOSF provides guidance regarding developing service performance measures and associated technical performance measures to support investment planning.
- The customer performance framework is improving the understanding of the service provided to customers with a focus on customer performance driven by staff interactions with Calgarians.
- Zero Based Reviews investigate in some detail how services are being delivered. These reviews determine approaches to improving the efficiency and effectiveness of those services.

These initiatives are improving The City's approach to managing services and understanding serviceability. Serviceability is the capability of the infrastructure portfolio to deliver a reference level of service to Calgarians and the environment, now and into the future. Understanding the relationship between outcomes (customer LOS) and leading performance indicators (technical LOS) is important to this concept.

It's important to note that upward trends measure an improvement between 2015 and 2016 results, they do not necessarily mean that 2016 targets were met. For additional information regarding the LOS trends refer to Appendix C.

Alongside the performance framework initiatives above, all business units face the challenge of improving data quantity, quality and robustness. This will need to be a major focus for all business units going into the next business plan and budget.

Levels of Service Trends

Service Class	Service LOS	Technical LOS
Potable Water		
Wastewater		
Stormwater		
Waste and Recycling		
Public Transit		
Roads and Bridges		

Utility, Environment, and Transportation LOS Trends

Service Class	Service LOS	Technical LOS
Parks & Open Spaces		
Recreational Facilities		
Fire Services		
Corporate Accommodation		
Affordable Housing		
Fleet Services		
Information Technology		

Corporate, Community & Fire Services LOS Trends

3.5 Infrastructure Risk Profile

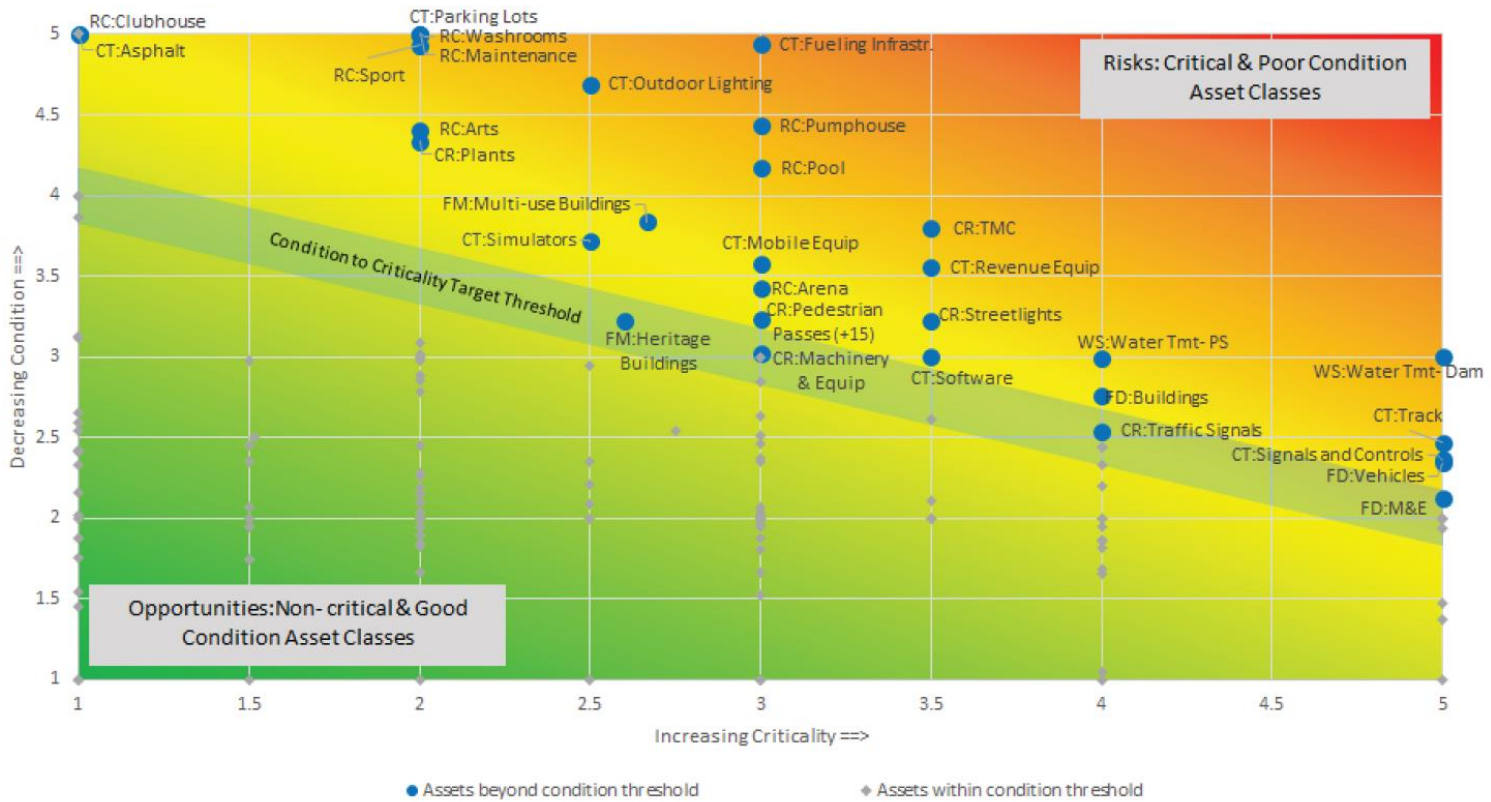
IIRMF helps identify and prioritize investment needs

Since the last Corporate Asset Management Plan and Infrastructure Status Report, The City has developed an Integrated Infrastructure Risk Management Framework (IIRMF) that business units are adopting to support the identification and prioritization of investment needs. This CAMP applies a simple risk evaluation across the corporate asset portfolio drawing on a broad understanding of asset criticality and condition status outlined in the Infrastructure Status Report. We use the condition of the asset portfolio to represent the likelihood of failure and the criticality of asset classes to represent consequence. In combination, the risk rating provides an asset health index for the asset class.

In the Infrastructure Risk Profile figure (next page), each dot represents the condition and criticality of different asset classes. Critical asset classes need to be maintained in better condition while less critical asset classes may be allowed to deteriorate to a lower condition grade. This concept has been used to develop a criticality score to condition grade relationship and threshold. This process enables the identification of risk (criticality x condition), to assess whether the average condition of an asset class is tolerable or not.

Code	Service
RC	Recreation
CT	Transit
CR	Roads
WS	Water
FD	Fire Dept
FM	Facilities Mgt

Infrastructure Risk Profile;



Source: Condition information 2017 ISR; Criticality information CEMA and other sources

The threshold for the relationship between condition and criticality is represented by the shaded line. Assets above and to the right of the shaded line represent higher risks (their overall condition is not good given the criticality of the asset) whereas asset classes towards the bottom left represent asset classes that may or may not be critical, but are in relatively good condition. These may present opportunities for investment efficiencies.

Appendix D contains the full list of asset classes and associated condition, criticality and risk scores.

For asset classes beyond their criticality threshold, we should consider improving the average condition of these assets through targeted asset investment programs.

The table below summarizes these higher risk asset classes by business unit indicating the current replacement value (CRV), weighted average condition, criticality and the overall risk rating for the high-risk asset classes.

Service Line	CRV (\$M)	Condition	Criticality	Risk
Fire	584	2.6	4.3	11.2
FM	112	3.3	2.6	8.7
Recreation	386	4.0	2.6	10.2
Roads	273	3.3	2.9	9.7
Transit	624	2.9	4.5	12.8
Water	1238	3.0	4.5	13.4
Overall	3217	3.1	4.0	12.3

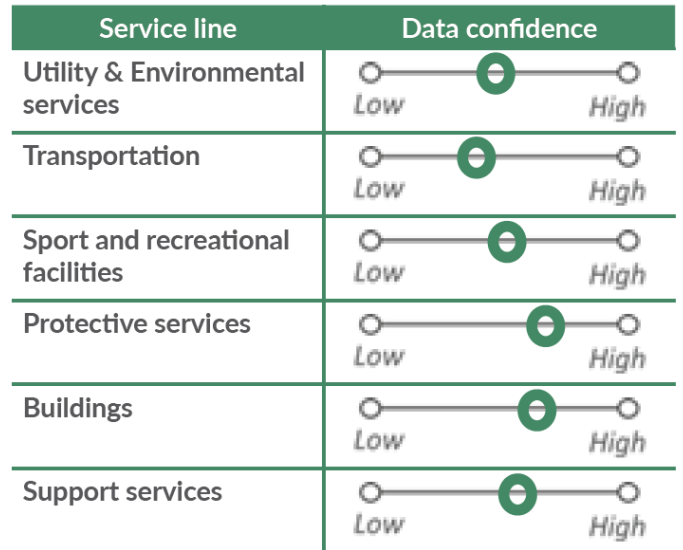
Asset class risk summary

While the process may mask poor condition assets in a class that is generally in good condition it does provide an indicator for further, more focused analysis.

The process highlights higher risk asset classes associated with several service lines. These assets and the opportunities indicated by assets in the bottom left of the chart, become more of a priority in the strategies section for maintenance investment or for potential opportunities for efficiency savings. Corporate Asset Management will facilitate a deeper dive into using this information to support the optimization of asset investment in conjunction with Infrastructure Calgary.

Good data builds confidence

The understanding of asset value, condition, performance and risk is very dependent on good quality data and information. An assessment has been made for each asset class indicated in the risk assessment for the level of confidence in replacement values, criticality, performance and investment needs as indicated in the table. This will inform areas to focus on for data quality improvement and build more confidence in investment forecasts.



Data confidence by service line

3.6 Asset Management Related Business Risk

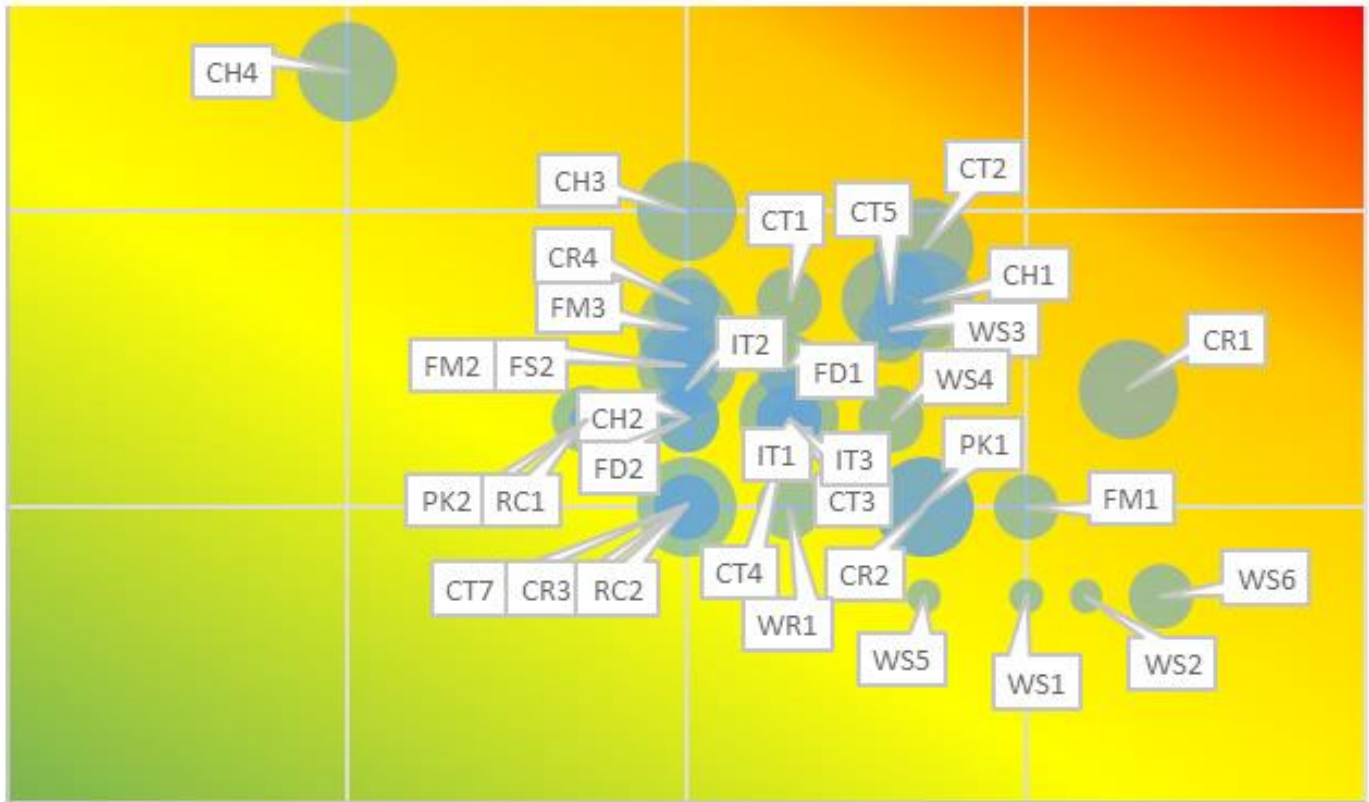
Risks to assets and services need to be understood and carefully addressed

The City asset base and the services provided by these assets face a number of risks that require a broader understanding of the context and environment of these assets and how they are managed. These risks are outlined in the figure below, and represent more business-related challenges and concerns for asset managers across The Corporation. They are generally more strategic in nature and require the collaboration of teams to develop policy and strategy to address these risks.

This process is facilitated by both the Integrated Risk Management and the Integrated Infrastructure Risk Management Framework processes, and informed by the insight gained in developing each of the business unit AMPs.

Code	Service
CH	Housing
CR	Roads
CT	Transit
FD	Fire
FM	Facilities
IT	Information Technology
RC	Recreation
WR	Waste and Recycling
WS	Water

High Level Asset Related Business Risks



Source Data; Business Unit Asset Management Plans (AMPs)

Each risk and associated risk rating is listed in Appendix E and can be cross referenced by the code label.

Utility and transportation related infrastructure forms the largest part of the corporate asset portfolio and is used by all Calgarians. The impacts associated with this infrastructure tend to be more significant and consequently carry a higher level of risk. Corporate, community and protective services risks are broader in nature and range from risks associated with protective services to changing technology, which are becoming more significant.

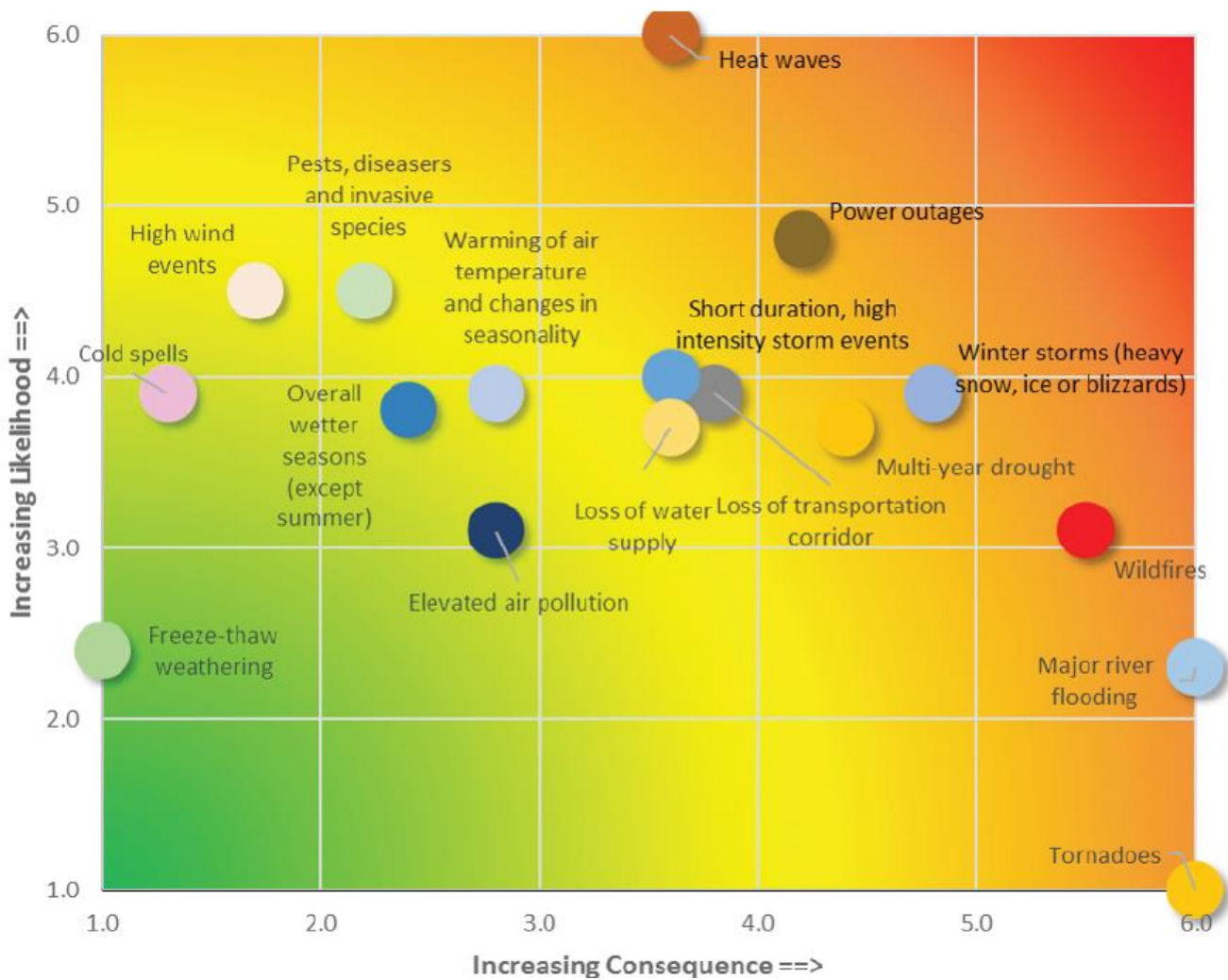
The risk rating represents both the likelihood and the consequences associated with the risk threat. Many of these risks have mitigation plans in place to address, but there will be a need to further investigate other risks through the next business plan cycle. Climate change related risks impact the entire asset portfolio and are discussed in the next Section.

3.7 Climate Change Related Risks

Climate change challenges could be wide-ranging

As stated in Section 2.6, climate change will be a critical challenge for Calgary. The consequences of climate change will include not only environmental impacts but also damage to City infrastructure, service disruption, community impacts, and health and safety impacts for the public and employees of The City. Other potentially more uncertain but equally far reaching impacts include reputational damage and loss of public trust, legal liabilities, and broader financial and economic impacts.

Climate Change Related Risks



Source Data: City of Calgary Climate Change Adaptation Research 2017

The climate change vulnerability and risk assessment undertaken in 2016/17 for Calgary examines the projected likelihood and consequences of climate change on communities, human health, natural environment, City services delivery, and infrastructure.

This risk understanding allows the consideration of broader strategies, initiatives and plans to begin to address some of these risks but also creates more of a focus for understanding specific asset vulnerabilities in each of the service classes. This evaluation of specific asset risks will form an important next step in developing more robust adaptation actions. The City must proactively address climate changes in the design of infrastructure and services to minimize the impact of climatic changes and weather events before they occur, as well as ensure appropriate emergency response measures to respond to and recover from extreme events.

It is also important to identify potentially new opportunities as a means of acting against significant environmental change. For example, changing weather patterns may stimulate innovation in a bid to find new, more efficient, and resilient ways of delivering core services.

3.8 Asset Management Practices

City and business units are successfully improving asset management practices

Adoption, development and continual improvement of asset management practices is a key strategy for The City in meeting service delivery obligations and commitments.

The City initiated the formal practice of asset management in 2004 and recognized that it would require several business cycles to establish a mature program. Since 2004, The City has been building asset management capability. A culture of continuous improvement to better align with ISO 55001 is reflected updates to the Asset Management Policy, Strategy and Framework. Business unit infrastructure status reporting and asset management plans have improved. Other highlights include implementation of RIVA asset modelling and the development of corporate standards and guidelines for Levels of Service and Infrastructure Risk.

These tools and frameworks enable business units to better align and prioritize infrastructure investment with risk and customer's needs. Application of the tools and framework have assisted Water Resources and Water Services with regard to zero-based reviews. Calgary Housing Company and Transportation Planning have also undertaken internal audit assessments on asset management.

This further enables improvement of practices and the development of further frameworks. The Calgary Fire Department developed a star quality rating system for buildings, and Facility Management developed a levels of service framework. Calgary Roads and Waste & Recycling Services have improved their risk analysis using IIRMF to improve their understanding of risk to prioritize their investment or focus management actions.

These initiatives are fostering more critical thinking on investment programs to encourage greater clarity and justification for decision-making. They encourage a focus on continuous improvement and stronger line of sight from strategic portfolio level insight to project level decisions.

Business units have applied State of Asset Management (SOAM) reporting to document their progress, challenges and achievements when they implemented asset management practices in four key areas: strategy, assets, people effectiveness and business process. They used SOAM, a 29-point self-assessment tool, to score themselves against a scale of 1 to 5 from Innocence to Excellence. SOAM was first published in 2008 and showed a City-wide average score of 2.56. This average rose to 2.77 in 2010 and 3.12 in 2013. The 2014 SOAM Report (for the 2013 assessment) concludes:

- Corporately, 75 percent of the 2020 Sustainability Direction target has been achieved, meaning The City has exceeded expectations of the 2014 target and reached the target for 2015
- Business units have progressed through the “Innocence” and “Applying” phases, and are now in the “Development” phase.

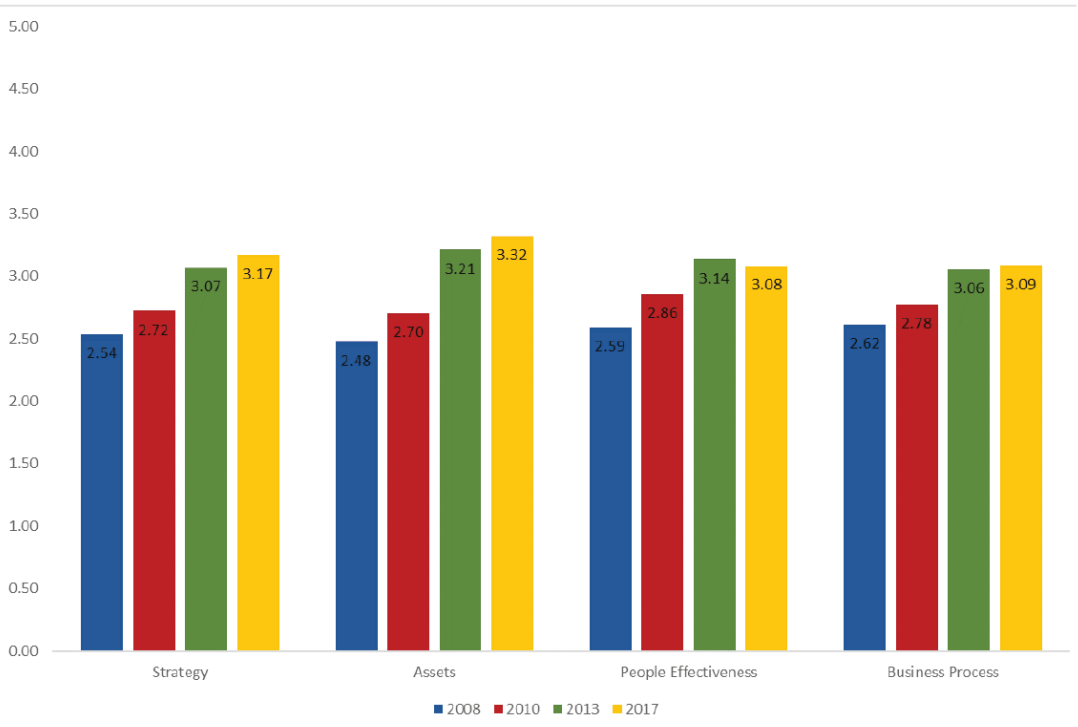


Business units report the following common improvement themes in the latest AMPs:

- Development of asset inventory and work management systems
- Improved asset data, including condition and criticality assessments
- Implementation of asset management training programs
- Improvements in communication between the strategic level to/from the operations level
- Consolidation and clarity of service lines
- Development of improved customer and technical service metrics as a part of levels of service

- Improved investment planning processes and systems, including better risk understanding and decision-making.

The chart below shows the progress business units made in asset management practice since 2008. It is based on previous assessments and the 2017 AMPs prepared by each business unit.



State of Asset Management (SOAM) – 2017 Business Unit AMP Review

The continuous improvement trend identified in previous SOAM reports and the 2011 CAMP has been maintained, although the pace of improvement has slowed. This slowdown is understandable and reflects the effort of business units to achieve the more challenging integration of asset management into the culture of the organization. The integration of strong asset management practice into business planning and management is critical to fully realizing the value for The City. Business units have developed improvement plans as part of the asset management plans. Their execution of these improvements is expected to provide the final push towards meeting the 2020 Sustainability Direction target. Highlights of the improvement plans are presented in Section 4.15.

4 Actions and Strategies

Key messages on Actions and Strategies

1. Asset management principles outlined in the SAMP are aligned with the guiding principles developed by Infrastructure Calgary.
2. Business units will need to further develop strategies through business planning.
3. Business units need to be aware of strategies developed in other parts of the organization, such as Integrated Civic Facility Planning coordinated by Facility Management, and the capital investment strategies developed by Infrastructure Calgary, to support a more integrated approach to investment planning.
4. Business units need to consider practice improvement strategies in the next business plan.
5. Climate change investment will be a significant feature of investment programs in the next business planning period, but business units should deliver it in conjunction with other maintenance and enhancement programs.

4.1 Investment Strategy Guiding Principles

Principles guide investment strategy

The information presented in previous sections and detailed business unit asset management plans is being used to develop strategies for the coming business plan period 2019 to 2022. Infrastructure Calgary has developed and adopted several guiding principles, which, while aimed at influencing the culture of the business unit, are also useful in guiding the development of these strategies

Guiding principles:

- Support the delivery of programs and services to citizens through maximising the investment and value of The City's capital infrastructure.
- Employ collaborative, integrated systems approach.
- Ground infrastructure strategies in resilience and sustainability outcomes.
- Quantify, communicate and manage risk.
- Exercise collective accountability, individual responsibility.
- Adapt a flexible infrastructure planning process and delivery practice that is responsive to dynamic conditions.

These principles are consistent with the asset management principles outlined in the Corporate Asset Management Strategic Asset Management Plan (SAMP) adopted by The City. They form the foundation for strategy development.

4.2 Investment Strategy Drivers

The strategies outlined here reflect the key drivers for investment. In the 2011 CAMP, the adoption of four broad areas which broadly correlate with the four MUGS categories were recommended (maintenance, upgrades, growth, service enhancement).

	BASE SERVICE (Maintaining Service)	Maintaining current levels of service and improving efficiencies in service provision
	ENHANCEMENT OF SERVICE	Providing measurable and permanent change in the overall level of service to existing customers
	GROWTH	Accommodating the needs of a growing population base
	REGULATORY CHANGE	Complying with new legally enforceable obligations

4.3 Potable Water

The water utility has developed a Strategic Asset Management Plan and separate Tactical Asset Management Plans for the two water treatment plants (Glenmore and Bearspaw) and water networks including the system of feeder mains, secondary pump stations, service reservoirs, flow control stations and distribution piping that supply potable water to customers. Key areas of investment are as follows:

Maintenance of base service

- Continue the existing approach to capital maintenance for treatment plants, watermain replacement, including feeder mains, water meter replacement, pump station and reservoir maintenance
- Improve the life expectancy of the linear metallic infrastructure through the continued use of a cathodic protection program
- Maintain inventory of critical spares to improve the restoration of service following asset failure
- Drive the Energy Efficiency Program to delivery reductions in energy consumption and associated GHG emissions

Upgrades for meeting regulatory and environmental requirements

- Align watershed planning and protection to the provincial Water for Life strategy and regional watershed management plans to protect the watershed
- Engage with Alberta Environment and Parks regarding a range of measures in both the short and longer term, including: increasing flow diversions at Bearspaw Water Treatment Plant to improve resiliency and reliability of supply, and resolving Giardia reduction requirements between Alberta standards and Health Canada guidelines
- The requirements of Giardia reduction may lead to drinking water disinfection investment if necessary

Growth

- Push for water conservation to accommodate population growth demand with the same amount of water removed from the river as in 2003 by proactively replacing old water mains, installing water-efficient fixtures in City facilities, and engaging with the public about water efficiency
- Upgrade capacity at Glenmore Water Treatment Plant to provide incremental water treatment capacity to Maximum Day Demand (summer peak demand) for anticipated growth to around the year 2032
- Glenmore Dam Infrastructure Improvement is to align with Glenmore Water Treatment Plant upgrades and is to increase storage capacity such that more water can be carried through into the winter and facilitate sustained production capacity during the winter months
- Upgrade secondary pump station including: Shaganappi PS and 210 Ave SW
- Construct new pump stations, including Spy Hill East and Spy Hill West Reservoir

- Construct new feeder mains and flow control stations, including Belvedere, Shepard, Ogden, Northridge, 210 Avenue, Nosehill, Lower Sarcee and Strathcona
- Water Meter Installation Program

Service enhancements

- Install process upgrades at Glenmore Water Treatment Plant and Bearspaw Water Treatment Plant to improve resiliency of services under extreme operational conditions

4.4 Wastewater

Wastewater services are provided jointly by the water utility, comprising Water Resources and Water Services. To support the water utility, Strategic Asset Management Plan, Tactical Asset Management Plans for sanitary networks and wastewater treatment have been developed by Water Resources with input from Water Services. Key investment strategies developed for wastewater in the Tactical Asset Management Plans include:

Maintenance of base service

- Drive and optimize maintenance and renewal programs through improved condition assessment information and analysis of lifecycle costs for all asset classes including those at the three wastewater treatment plants Bonnybrook, Fish Creek and Pine Creek, sanitary lift stations and sewer mains
- Adopt innovative technologies to improve the effectiveness of condition assessment, maintenance and rehabilitation programs
- Adopt more sustainable technologies which will transform wastewater into beneficial products to generate value for the utility & its customers. Wastewater Treatment Plants will be converted into resource recovery facilities (energy generation, nutrient recovery and clean water)
- Sanitary network criticality modelling

Upgrades and expansion to accommodate growth and environmental requirements

- Expand and upgrade Bonnybrook treatment plant including:
 - Plant D expansion, which will increase the capacity of the facility by 325,000 equivalent population to allow for continued growth within that catchment until approximately 2035
 - Biosolids dewatering facility to improve long-term environmental performance and protect the Bow River
- South Catchment Servicing Strategy
- Engagement with Alberta Environment and Parks regarding future regulatory requirements for discharge limits from the wastewater treatment plants
- Construction of new sewer infrastructure in northeast, southwest, southeast and north central for developing communities

Service enhancements

- Improvements to the resiliency and reliability of the wastewater treatment and network assets.
- Deliver outfall and effluent upgrades at the Bonnybrook Wastewater Treatment Plant to improve flood resiliency and prevent river backup during high water events.
- Wastewater sewer upgrade program (Bowness, 15th Street and Nose Creek Trunks)
- Energy efficiency program on blowers and pumps
- Energy generation by biogas
- Resource recovery enhancement via innovative technologies

4.5 Stormwater

Stormwater services are provided, alongside water and wastewater services, by the water utility and are guided by the same Strategic Asset Management Plan. A separate Tactical Asset Management Plan is currently being developed for the stormwater system, which includes the conveyance system (pipes, culverts, lift stations), ponds (wet and dry), wetlands and green infrastructure (Low Impact Development assets such as absorbent landscape, rain garden, vegetated swales) that conveys and treats stormwater. For green infrastructure Water works closely with Parks to ensure these assets are maintained. Key areas of investment are as follows:

Maintenance of base service

- Drive and optimize maintenance and renewal programs through improved condition and performance assessment information and analysis of lifecycle costs for all asset classes
- Develop robust preventative maintenance programs to maximise the life cycle potentials of each asset class
- Adopt innovative technologies, systems or methods to improve the effectiveness of condition and performance assessment, maintenance and rehabilitation programs
- Identify critical assets and integrate risk management approach to protect and maintain these assets

Upgrades for meeting regulatory and environmental requirements

- Align City's watershed planning and protection to the provincial Water for Life strategy and regional watershed management plans
- Engage with Alberta Environment and Parks regarding a range of water quantity and quality measures in both the short and longer terms, including release rates to water bodies, total suspended solid limit and phosphorus limit
- Upgrade existing assets to maintain their functions, meet the most current regulatory and environmental objectives, and allow for future regulatory and environmental provisions

Growth

- Development of Master Drainage Plans to effectively manage storm water for green field areas
- Research and implement new technologies and innovative solutions for improving stormwater system design through the Drainage Knowledge Program

Service enhancements

- Redevelopment Master Drainage Plan and strategies for redevelopment of older communities to accommodate service enhancement
- Upgrade existing infrastructure to improve asset performance by integrating new technology and adopting new knowledge in the drainage system
- Invest in Community Drainage Improvement program to protect communities where flooding is occurring

4.6 Waste and Recycling

The Waste & Recycling Services (WRS) business unit is mandated to provide municipal solid waste (MSW) management services to protect public health, safety and the environment.

WRS operates from the dual roles of governance and service provision. From a governance role, WRS develops municipal-level bylaws and policies (for Council to enact) and ensures they are followed. From a service provision role, WRS provides a range of MSW management services to Calgarians. WRS is solely responsible for all MSW management services to single-family households from collection to recycling, and disposal. WRS is also primarily responsible for cleanups after natural events. Besides, WRS offers limited commercial service (in competition with

private companies) to multi-family residential, industrial, commercial and institutional customers. To deliver on its mandate, WRS takes a “systems” approach to business management which integrates the service expectations and constraints corresponding to its roles in governance, as a municipal service provider, and as a commercial enterprise. Systematic (ISO 55000 aligned) asset management is a key enabler to this integrated management approach.

The Waste Diversion Strategy (adopted by Council in 2015) has set the strategic goal of diverting 70% of waste destined to landfills by 2025. Accordingly, WRS’ business focus is to maximize waste diversion (3Rs of reduce, reuse and recycle) across all customer sectors. This shift in focus (i.e., from best practice landfilling to intensive diversion) has consequences on the asset portfolio such as the need for new types of assets, reduction or removal of existing assets, and even non-asset based solutions, such as education and outreach. WRS is benefitting from its systematic asset management practice to help inform this transition.

Furthermore, provincial regulations govern several aspects of MSW management – in terms of both procedures, as well as outcomes. In its pursuit of excellence in environmental management, WRS has implemented an ISO 14000 certified environmental management system which influences the lifecycle management of several classes of assets.

Consistent with the corporate Asset Management Policy, WRS assets are a means to deliver MSW management services, and asset management is the practice of delivering service by optimizing the equation of service level, cost and risks. Asset management implies optimally managing the assets through the life stages of planning, acquisition (or renewal or upgrade), operation, maintenance, performance evaluation, disposal and liability management. In addition to the service needs (plus risks) and regulatory requirements, corporate policies dictate certain aspects of asset lifecycle management. To this end, WRS’ asset lifecycle management strategy features a mix of direct ownership, leases (both short- and long-term) and service contracts (e.g. for supply of asset, maintenance agreement, performance level agreement, and pay per use).

The Waste & Recycling Services Infrastructure Investment Plan (WRIIP) presents proposed capital investments over the next 10 years reflecting a blend of policy, operational activity, asset maintenance, and capital investment to meet the specified service level objectives. The intent is to minimize risks in service delivery, increase effectiveness of existing infrastructure, reduce impact on the natural environment, and ensure the best coordination of activities.

WRS capital investments are not funded through general municipal revenues or property taxes. WRIIP expenditures are met entirely through Gas Tax Fund (GTF) grant, self-supported debt, and self-funded Sustainment (Capital) Reserve capitalized from user fees and revenues. The current WRIIP presents capital investments of \$626 million (January 2017) through the 2015-2024 planning period. The next version of WRIIP (2019-2028) is currently under development.

Highlights of the key actions and strategies specific to each investment driver in the current WRIIP are as follows:

Maintain Assets

- Replacement of old equipment with modern equivalent asset and other action necessary to meet current codes/standards (but no increase in capacity or output performance)
- Resolving overloading due to historic growth
- Spend to save and other efficiency projects
- Reconfiguration rather than like for like replacement to maintain existing service levels

Regulatory and Environmental Protection

- Leachate treatment
- Stormwater management
- GHG emissions reduction
- LEED buildings

Services

- Blue and green cart program
- Throw 'n Go
- Construction & Demolition drop off facilities

Growth

- Additional landfill cells
- Additional carts and bins
- Increases in capacity of existing equipment

As part of continual improvement, key ongoing initiatives are as follows:

- Waste & Recycling Asset Management System (WRAMS) information system
- Asset condition assessment and lifecycle modeling (buildings, roads and pads, drainage infrastructure)
- Integrated Infrastructure Risk Management Framework (IIRMF)
- WRS 10-Year Strategic Framework
- Business Continuity and Emergency Management (BCEM) planning
- Climate Change planning

4.7 Public Transit

The content of this section focuses on roadway related strategies for physical infrastructure, recognizing that there are other investments related to education and manpower (e.g. improved inspection programs) needed to meet service targets. Not included are studies or cost/benefit analysis aimed at understanding the need for infrastructure investment.

Maintenance of base service

- Improve reliability and schedule adherence of services
- Prioritize lighting and security systems
- Maintain existing transit priority measures in the road network

Meeting new regulatory requirements

- Implement “Yield to the Bus” legislation

Growth

- Invest in Greenline LRT construction
- Expand the Primary Transit Network through completion of Bus Rapid Transit (BRT) projects currently underway
- Build new maintenance facilities to store and maintain the transit fleet (bus and LRT)
- Procure more buses to address Calgary Transportation Plan (CTP) target of 2.6 hours of service per capita
- Integrate with regional transit services on connections to the rapid transit network
- Open a public safety and enforcement office on each line or in quadrants and city centre

Service enhancements

- Provide visual and audible communication of information to disabled or physically challenged customers

- Improve the trip planning tools, availability, timeliness and usefulness of customer information
- Increase service frequency, availability and quality of shelters on the Primary Transit Network
- Improve feeder bus frequency in evenings at connection points to the CTrain, based on demand
- Implement future pedestrian and cycling improvements at high demand locations
- Incorporate mobility improvements when renewing existing infrastructure
- Increase the number of bus routes with bike racks on buses
- Implement more transit-only lanes, queue jumps, transit signal priority, and other transit priority measures for BRT routes

4.8 Roads and Bridges

The content of this section, focuses on roadway related strategies for physical infrastructure, recognizing that there are other investments related to education and manpower (e.g. improved inspection programs) needed to meet service targets. Not included are studies or cost/benefit analysis aimed at understanding the need for infrastructure investment.

Maintenance of base service

- Increase bridge inspections and proactive maintenance work
- Maintain roadway infrastructure to meet existing targets
- Give gravel lanes at least one surface treatment during the Summer Roads Program
- Improve equipment up-times to meet targets for snow and ice control
- Improve or maintain existing repair completion rates for 3-1-1 requests (e.g. potholes, streetlights)
- Maintain the quality and visibility of existing pedestrian crossing locations/installations
- Continue enforcement of traffic rules and regulations in road and intersection design
- Provide facilities for traffic demand management strategies such as high-occupancy vehicle lanes, bus only lanes, bicycle lanes
- Maintain snow and ice control for the Primary Cycle, Transit or Goods Movement Network.

Meeting new regulatory requirements

None identified.

Growth

- Provide a road network for intermodal and warehousing facilities within 1600 metres of Primary Goods Movement Network.

Service enhancements

- Enhancements to reduce travel time and improve reliability on major goods movement network
- Optimize the existing capacity of the network
- Complete missing pedestrian links and retrofit pedestrian crossings to include wheelchair ramps Installation of Rectangular Rapid Flashing Beacon (RRFB)
- Install facilities for disabled customers on pedestrian crossings
- Reduce average energy usage (watts) per street light
- Increase the number of signal installations with pedestrian crossings equipped with countdown timers
- Improve Advanced Traveller Information Systems (ATIS) and increase the number of signals connected to the Traffic Management Centre
- Implement the road network to support the Primary Transit Network

- Implement Complete Streets Standards for arterials, urban/ neighbourhood boulevards and parkways
- Improve roadway safety (traffic safety reviews, traffic safety implementations)
- Implement the Speed Limit Observation and Warning System (iSLOWS)
- Maximize the economic value of recycled materials to encourage sustainability and use by industry
- Reduce the number of days to resolve street light outage
- Support recycling goals by diverting project waste.

4.9 Sport and Recreational Facilities

Calgary Recreation and Calgary Parks both use systematic approaches to identify investment needs and priority projects. The Culture, Parks and Recreation Infrastructure Investment Plan (CPRiIP) uses research, current Building Condition Assessments (BCAs), and growth and maintenance requirements to prioritize needed renovations, upgrades and new developments. CPRiIP also outlines funding requirements to support this work.

4.9.1 Recreational facilities

As Calgary continues to grow and change, so too do Calgarians' needs. Calgary Recreation has identified several opportunities to address challenges in a strategic way. The following approaches will help maintain and improve service levels while ensuring investments are based on sound evidence of where investment will have the greatest value for citizens.

Maintenance of base service

There are many challenges for recreational facilities, including aging mechanical systems that are inefficient and operationally costly and may not be environmentally sustainable. Several facilities are past their useful life and require redevelopment or complete replacement. Other facilities are deficient in terms of space and amenities. And service maintenance contract fees are escalating beyond inflation rates.

Maintenance strategies will need to be focused on these challenges.

- Maintenance investment needs are across the portfolio of 70 facilities and will require investment of \$154 million. This amount includes \$47 million of lifecycle cost savings associated with the upgrade and development of facilities to accommodate growth.
- Modernization of facilities and new asset management software are needed to allow for better monitoring and forecasting of high priority projects.

Accommodating growth and service enhancement

Population growth has resulted in increased demand causing a service gap in growth areas of The City. Citizen dynamics, expectations and preferences are also changing. There is a shortage of available land for expanded or new developments to meet service requirements in some existing communities. Changes in legislation and best practices are outpacing upgrades and investment.

Strategies will need to focus on these challenges and include the following:

- Investment of \$142 million in aquatic facilities for Bob Bahan, Beltline / Inglewood and Glenmore.
- The possible conversion of facilities for alternative uses.
- Possible closure or repurposing of some facilities.

4.9.2 Parks and open spaces

Calgary Parks provides citizens nature and recreation experiences through the provision of parks and well-maintained soft (living) and hard (non-living infrastructure) assets.

High level goals for Parks were developed and approved through imagineParks (2014) which is a “30-year vision that sets the overall strategic direction for the development and management of public parks and open spaces in Calgary”.

imagineParks and its goals align with higher level corporate plans such as imagineCalgary, 2020 Sustainability Direction, Municipal Development Plan, Calgary Transportation Plan and Action Plan 2015-2018.

The Parks Asset Management Plan 2017 describes the approach Calgary Parks will use to ultimately deliver Parks services to stakeholders and citizens. The Parks Asset Management Plan also estimates the future cost of providing and maintaining assets.

Maintenance of Base Service

Sustaining asset growth from new development

Replace/refurbish aging infrastructure

Develop dashboards to compare performance from year to year

Utilize asset data to develop infrastructure and financial forecasts

Legislative requirements and growth

None identified.

Service Enhancement

- Through the “This is My Neighbourhood Program” engagement
 - Adult fitness parks
 - Installation of HB1 garbage containers and benches
 - Additional signage
- Community beautification through banners and flowers
- Pathways counters
- Adventure and mobile playgrounds
- Pickle ball court installation
- Slack lining
- Water Management system software upgrade
- Implement more community gardens and orchards
- Use of tackifiers on trails for erosion control
- Use of tablets for asset management
- Pathway snow and ice control clearing map
- Poppy planting on Memorial Drive
- Naturalization projects across the city
- Reducing overall costs such as constructing more grey water vs. potable water sites.
- Pilot project using goats for weed management

4.10 Protective Services

Calgary Fire Department (CFD) has developed a 30-year infrastructure master plan that represents an asset management plan for investment in the infrastructure for CFD from 2016 to 2043. It incorporates asset management principles in determining the long-term and more strategic plan of new and replacement fire stations both in greenfield and existing communities. Other investment needs, such as fire apparatus and equipment, are driven from an understanding of risk and criticality to determine lifecycle investment needs in conjunction with National Fire Protection Association (NFPA) codes.

Maintenance of base service

- For the next business planning period, CFD has identified \$56 million for four major upgrade and replacement needs of existing fire stations including Station 36 (2019), Station 1 (2020), Station 12 (2020), and Station 2 (2021)
- A further \$17 million is required to provide facility life-cycle maintenance, including planned and corrective maintenance
- Fleet maintenance requirements have been determined from Riva modelling and include \$54 million over the next business plan period and \$28 million in fleet operating cost. CFD identified a further \$80 million for equipment capital and operating expenditure
- CFD will improve utilization and life-expectancy by balancing its fleet between high demand and less busy fire stations
- CFD will improve the balance of run to failure asset strategies and proactive maintenance to optimize the investment required

Meeting new regulatory requirements

- The Alberta Government Climate Leadership Plan will substantially impact CFD, who will need to consider and incorporate the implications into capital and operating expenditure forecasts for the next business planning period. This work will build on existing strategies for LEED buildings, cost-efficient lighting and reducing the length of fire engines. However, CFD will require a more strategic view, including the closer tracking of energy use and carbon footprint.

Accommodating growth

- CFD has identified a \$43 million investment requirement for new stations, including Cornerstone (2019), Keystone (2019), and, potentially, South Shepard and South Macleod, though the timeline for these last two stations is still to be determined.
- CFD will continue the strategy of fire prevention to minimize the number of fires through education and inspection programs.
- CFD will improve the reach of fire stations through the use of faster response times by employing strategies such as traffic pre-emption systems.

4.11 Buildings

Buildings form a significant part of the asset portfolio with a replacement value of approximately \$4.2 billion. Buildings exist in all service lines, however, the strategies we outline here are for the corporate accommodation portfolio of buildings and the affordable housing asset portfolio managed by Facility Management (FM) and Calgary Housing Company (CHC) respectively. Buildings associated with other service lines are incorporated in their respective strategies.

4.11.1 Corporate Accommodation Portfolio

The base service program is driven from an understanding of risk associated with the asset portfolio and of efficiency opportunities, especially in relation to energy management. The analysis indicates that there is an overall higher risk in multi-use buildings and heritage buildings, but the program will recognize specific investment needs in higher risk building systems in other building classes as well. Key strategies that will be relevant in the next business plan period include:

- Rehabilitation of higher risk building systems with a focus on building envelopes, mechanical systems and interior spaces not meeting quality standards and expectations. Specific buildings that show a need for attention in the planning period include Spring Garden H, Historic City Hall, Shaganappi, Manchester U, Z, North Hill Library Annex, and Municipal Building.
- Improving energy efficiency through light fixtures, control systems and rooftop units and on improving preventative maintenance regimes and reviewing potential capital interventions to drive operational efficiency savings.
- Standardizing Service Level Agreements (SLAs) and reprioritizing the scopes of work associated with building contracts.
- Deploying improved technology and processes to improve FM's operations, maintenance and management of the asset portfolio by improving access to, and the accuracy of, information to support decision making through myFM.

Meeting new regulatory requirements

- FM will focus on heritage portfolio planning and investment in line with federal and provincial historical buildings legislation
- In line with operational efficiency actions listed under base maintenance, these areas will also need to be in compliance with National Energy Code of Canada and Alberta Climate Leadership Act requirements
- FM will also need to incorporate Access Design Standards and updates to the Alberta Building Code and Fire Code requirements to all new buildings and major renovations.

Accommodating growth

Given the identified need to accommodate 1,950 new staff by 2027, FM has advanced, and will continue to advance, several growth management strategies through the next business plan period, including:

- Driving toward more mobile working through the Administrative Workplace Strategy, which makes it easier to support the growth and contraction of the workforce.
- Continuing the strategy of co-location of different business units in the same location through Integrated Civic Planning. This strategy has been leveraged well in Operations Workplace Centres (OWC) and in the future co-location with other public institutions and private development will be explored.
- FM will optimize the use of existing facilities through short, mid and long-range portfolio planning

4.11.2 Affordable Housing Portfolio

The Corporate Affordable Housing Strategy and Implementation Plan were approved by Council in July 2016. This plan identified six priority areas to grow affordable housing, including developing new affordable housing units and creating a long-term pipeline of prioritized projects. This 10-year plan would then be incorporated into the capital budget plan cycles for 2019-2022 and 2023-2026. A stable source of funding is required to commit to these development projects.

The six parts of the strategy are:

- Getting the Calgary community building – Support housing developers in getting new homes into the ground for people in need
- Leveraging City land – Provide City land for affordable housing development
- Designing and building new City unity – Model tenant-centred design and place-making for inclusive communities
- Regenerating City-owned properties – Lead strategic reinvestment to preserve homes for the highest-need residents

- Strengthening intergovernmental partnerships – Recommend solutions to the federal and provincial governments
- Improving the housing system – Leverage research, programs, and partnerships to transform outcomes for people

To carry out these strategic objectives, The City needs \$67 million of development program funding. Our objective is to develop 868 new affordable housing units by 2027. Combined with the projected units currently under construction in the 2016-2020 program, these new units will contribute to the Corporate Affordable Housing Strategy and Implementation Plan (2016) and Action Plan 2015-2018 target of 88 units per year.

The purpose of this program is to develop new affordable housing units to address the CHC waitlist of 4,000 households. It is also intended to increase the acceptance of affordable housing developments through community engagement, creative architecture and place-making.

The development program leverages municipal, provincial and federal funding to create units in all Calgary communities. A variety of built forms are utilized. The City has strived to leverage other City funds (i.e., Parks, Centre City, Heritage, Integrated Civic Facilities, Transit Oriented Development) wherever feasible.

4.12 Support Services (Fleet Services and Information Technology)

In this section, we focus on strategies for physical infrastructure, recognizing that there are other investments related to education and manpower (e.g. training to meet new legislative requirements) needed to meet service targets.

4.12.1 Fleet Services

Fleet Services' investment program consists of operating and maintenance investment. All capital investment is captured under each of the service lines for which the Fleet Services business unit provides service. There is no capital plan specific to Fleet Services.

Maintenance of base service

- Use Service Level Agreements and Partnership Agreements with business units.
- Support business units in right sizing their fleet requirements.
- Maintain a central main facility at Manchester and satellite support facilities at Spring Gardens, Bearspaw, Spyhill, East Calgary and Shepard.
- Apply manufacturer recommended maintenance practices.
- Upgrades (legislative)
- Apply Green Fleet strategies to provide units that meet operational needs with minimal environmental impact.

Growth

None identified

Service enhancement

- Reduce greenhouse gas emissions in existing fleet through timely maintenance, technological innovation, alternative fuels and green driver training
- Integrate a customer service approach into its service delivery model to assist business partners as they address citizen engagement findings, including increased use of customer engagement programs, providing personalized

service, encouraging staff empowerment and using technologies and analytics to better understand areas for improvement

- Utilize increasingly sophisticated electronics for diagnostics and repair e.g. use of water jet technology in fabrication and welding, as well as real-time on-vehicle computerized data collection capability
- Maintenance activities could include non-project enhancements to functionality.

4.12.2 Information Technology (IT)

Maintenance of base service

- Continue strategy of replacing short lived assets based on age, performance and demand condition rather than on asset condition
- Keep existing information technology infrastructure current and compatible with industry and product life cycles
- Actively manage a portion of infrastructure to extend expected life cycles where reasonable
- Proactively replace Data Centre infrastructure based on hours of service or condition assessment
- Use third parties to maintain and repair hardware assets including data centres and use vendors to monitor patch levels of hardware under service agreements
- First, second and third level desktop hardware and software support performed by contractors
- Continue to meet Freedom of Information and Protection of Privacy Act (FOIP) requirements
- Manage storage demand by limiting storage available to each user
- Continue to provide support to business units for connecting devices and objects via internet to improve real time data
- Support the flexible work styles of the myFlexwork program
- Continue with the multi-data centre strategy to support resiliency and complex technology.

Growth

IT manages service growth and absorbs costs by taking advantage of its existing infrastructure assets and capital investments, looking at alternate ways to deliver services by using third party providers, adopting more subscription-based services or looking to open source solutions. IT is also pursuing revenue opportunities with other municipalities and Civic Partners, and aggressively manages cost and contracts with third party providers.

- Enable the use of cloud computing (e.g. Virtual Desktop infrastructure, Citrix, VPN)
- Deliver a high-speed fibre network to support Calgary City Net
- Leverage new and existing technologies (e.g. Long Range Wide Area Network [LoRaWAN], Low Power Wide Area Network [LPWAN], Internet of Things [IoT], Artificial Intelligence [AI], Advanced Analytics, Calgary City Net) in response to growth.

Service enhancement

- Provide increased Wi-Fi availability at City buildings and common spaces
- Provide technology to support The Digital Strategy (open and transparent Government and eServices at The City).

4.13 Other Corporate Strategies

Corporately, Infrastructure Calgary (IC) has developed several strategies that cross service lines to create a more coordinated and integrated approach to investment spending. It will begin to shape business unit asset investment plans and business plans going forward. With its strategies, it recognizes the broader context of The City within the Calgary Economic Region and the importance of engagement and collaboration with other stakeholders in the

achievement of the strategy outcomes. The 12 key strategies are grouped into the three key programs of geographic investment, targeted theme investment and community investment.

Focus	Capital investment Plan description
Geographic investment	
1. Inland Port and Logistics District	The exploitation of Calgary as a transportation hub requires the alignment of City investment among stakeholders in the area surrounding the Calgary International Airport.
2. Culture and Entertainment District	The focus of investment in the areas downtown east of Centre Street to encourage a vibrant arts, culture and entertainment district and improve the livability of Calgary.
3. Innovation, Education and Wellness District	An investment focus in The City's northwest – University, Foothills, McMahon Stadium area that recognizes the creativity and essential innovation that can be created when there is a high concentration of innovation oriented firms in proximity.
Targeted theme investment	
4. Transit and Transportation	Maximise the opportunity of all three levels of government investing in frequent, safe, convenient and affordable access to transportation for Calgarians.
5. Main Streets	The maintenance, upgrade and creation of new infrastructure to attract Calgarians to socialize, work, live, shop, dine and celebrate local events in initially 24 main streets.
6. Housing	Ensure the adequacy of market and non-market housing through collaboration with federal, provincial and municipal governments and private investment.
7. Education	Identify opportunities to collaborate with local institutions to attract and retain talent in The City and encourage higher enrollment and capacity at these institutions.
8. Resilience	Optimize the opportunity afforded by membership of the Rockefeller Foundation's 100 Resilient Cities network by working with government and institutions on resilience investment.
Community investment	
9. Schools	Support the delivery of complete communities by building, modernizing and re-purposing surplus school infrastructure.
10. Multi-service facilities	Strategically invest in community infrastructure and exploit the opportunity of integrating community and city services in multi-service facilities.
11. Parks and public spaces	Continue to partner with public and private investors to improve the availability of recreation opportunities in underserved areas and encourage the conservation of natural areas.
12. Growth infrastructure	Partner with the development industry on planning, funding and delivery of growth driven infrastructure.

For Infrastructure Calgary to effectively deliver these strategies and achieve the goals outlined in Section 2.6, it must execute the Investment Optimization Program that will implement a citywide view of investment needs, clear decision criteria and stronger processes for the request, approval and allocation of funding. In developing business plans and subsequent asset management plans, business units should be cognizant of these strategies and determine how they will influence investment plans in respective service lines.

4.14 Climate Change Mitigation and Adaptation

The City is already addressing some climate change risks; more work is needed

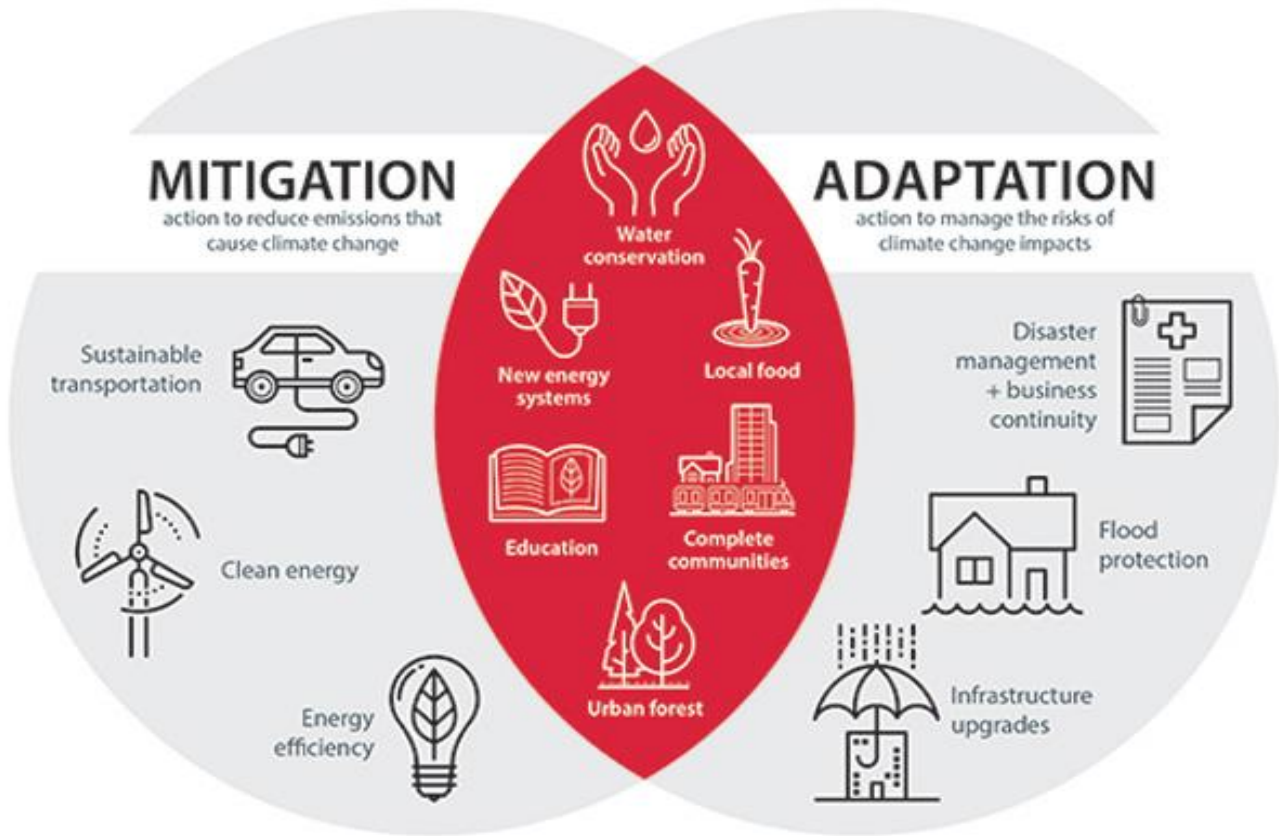
The City's Climate Resilience Strategy and Action Plans, which include Climate Mitigation and Climate Adaptation Plans for The City are targeted to be released in 2018 with the intention of embedding climate resilience into our communities and services. The strategy is to continue to reduce carbon emissions to address the underlying causes of climate change (mitigation) and reduce the overall vulnerability of infrastructure and services to the impacts of climate change (adaptation) as discussed in Section 3.7.

Many of the effects of climate change are already impacting The City in the form of more intense rainfall, flooding, wildfire smoke, and higher summer temperatures among other impacts.

City business units have already begun the process of adapting to these changes by improving the flood resilience of our infrastructure and implementing enhanced flood protection by Water Resources, disseminating a community

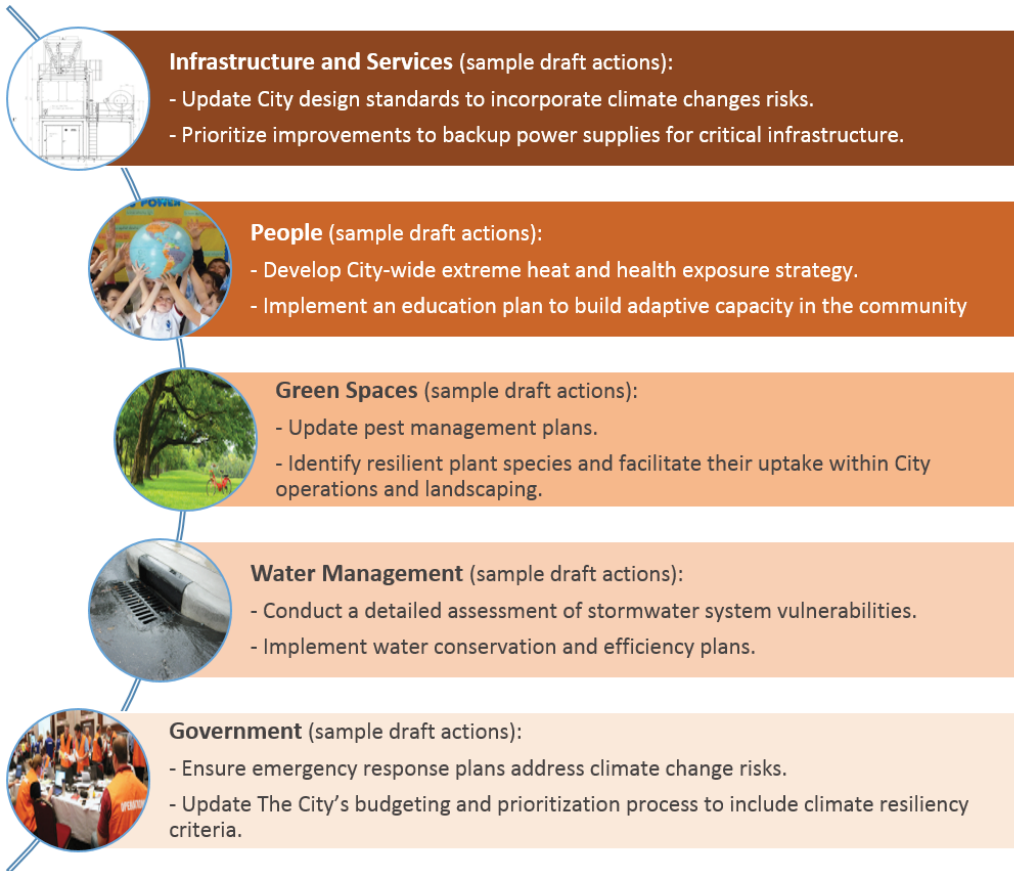
preparedness program developed by Calgary Emergency Management Agency, Re-tree community and naturalization program led by Calgary Parks, strengthening bridges etc.

Mitigation initiatives are also underway through the procurement of renewable energy to run the light rail fleet, the improvement of energy efficiency in our streetlight network and in our buildings. However, more needs to be done. Business units continue to incorporate climate adaptation actions in their business plans to address risks to municipal infrastructure and services and align to The City’s Climate Resilience Strategy and Action Plans.



Climate Change strategy considerations

The City has identified five draft thematic areas where The City needs to act. These are shown below along with sample draft actions representative of each theme.



4.15 Corporate Practice Improvement Strategies

Improvement still needed in asset management practices

Section 3.8 highlights the state of asset management and the improvements in asset management practices since the adoption of the formal Asset Management Program in 2004. However, the pace of improvement has slowed in recent years and significant work is still required to meet the 2020 Sustainability Direction target to achieve a State of Asset Management score of 4 on a 5-point scale by 2020. Business units have identified a comprehensive improvement plan as part of the 2017 Asset Management Plans to address this need (summarized in Appendix F).

Common areas for improvement are evident in the business unit improvement programs. These areas will be a priority for action and corporate support through the development of the next planning cycle. The key improvement areas identified are as follows:

Many business units have recognized the need for improvements regarding levels of service. Improvement plans include actions to help address these. A Corporate Standard for Levels of Service Framework was developed in 2015 and a gap analysis was conducted with business units in 2015/16. The gap analysis identified some significant areas for improvement across The Corporation. Some of these areas remain outstanding. Key areas for improvements include:

- Improved mapping of services to different customers and stakeholders using a consistent approach across The Corporation
- Development of service measures and targets which are better aligned with Council Directives and customer expectations

- Development of technical levels of service which directly support customer levels of service and more directly link to asset performance
- Better understanding of the financial relationships (both capital expenditures and operating expenditures) for achieving specific levels of service and thereby facilitate cost-benefit discussions with customers and stakeholders
- Improved use of performance information in understanding risk and supporting decision making.

It is also clear that there are a variety of other corporate initiatives that can support the delivery of these improvements including the development of results based accountability metrics, customer service framework and the zero-based review initiatives. Where some of these initiatives are more focused in their intent, the level of service framework seeks to create an integrated end to end framework that links cost, risk, and performance into a holistic decision making and monitoring framework.

At a corporate level, support in the form of funding and guidance, is required to assist the business in achieving the identified improvements. In addition, there needs to be more collaboration and integration between the various corporate initiatives related to understanding performance and the corporate asset management initiatives for improving asset management practices.

1. Risk-Based Methodologies for Investment Prioritization

The key business risks faced by the asset-owning business units are relatively well understood and methods are generally in place to consider and address these risks as part of normal business practice. The introduction of the Integrated Risk Management as a significant step forward in this regard and the benefits are being realized. However, the adoption of risk-based methodologies for the assessment of assets for the prioritization of investment remains an area of weakness.

The Corporate Standard for Integrated Infrastructure Risk Management Framework was developed in 2015 to help address this weakness. Based on the business unit asset management plans the adoption and execution of the Integrated Infrastructure Risk Management Framework recommendations has been slow and this remains a significant area for improvement.

Full adoption of the Integrated Infrastructure Risk Management Framework standards may not be appropriate in all asset classes but corporate support is required to continue to assist the business units with the development of risk-based methodologies where the benefits can clearly be identified.

2. Data Management

The improvements identified in relation to both levels of service and infrastructure risk will require better information to support the more objective decision-making that is being promoted. This will also require the recognition and closing of the data gap relating to condition and performance information. Much work has been done in recent years to improve the capture and control of corporate information, with significant investment made in information systems such as the Infor EAM application. Many business units demonstrate good practices but the information does not always sufficiently influence an understanding of infrastructure status at a strategic level and drive investment allocation and decision making.

Investment will need to continue with the development of clear data management strategies, to address collection, capture, analysis, reporting and communication of the information. The first step for most business units is to review what needs to be measured to support the objectives of improving levels of service and risk-based decision making.

3. Integration of Asset Management Practice

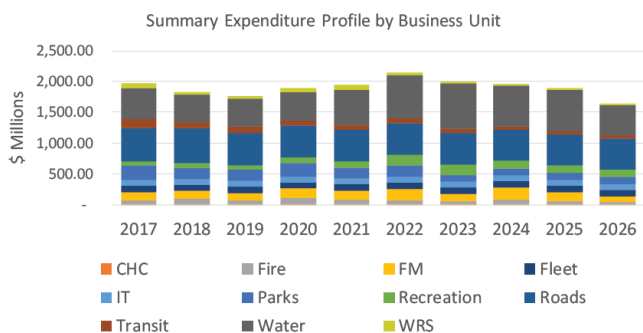
In the development of the Asset Management Plans, many business units have identified issues with the integration and alignment of asset management practice and the other business practices used across the Corporation. Assets exist only to deliver services to customers and stakeholders. Their effective and efficient management is therefore fully aligned with The City's organizational goals and asset management now needs to be fully integrated into normal business practice.

There is some sense that asset management is the preserve of specialist teams with a specific remit to develop the discipline as a separate area of practice. It is vital to recognize the operation and maintenance aspects of the individual assets when providing strategic and long-range planning. Greater collaboration can be achieved by acknowledging the complete life cycle of an asset, that is, planning/ design, implementation, operation, maintenance, and replacement.

Whilst there is certainly a need for specialist asset management teams with the expertise and experience to guide the development of practice within an organization, the most successful deployment of asset management practice is achieved when a fully integrated culture is adopted. Continued corporate support is required to foster and embrace the cultural change required.

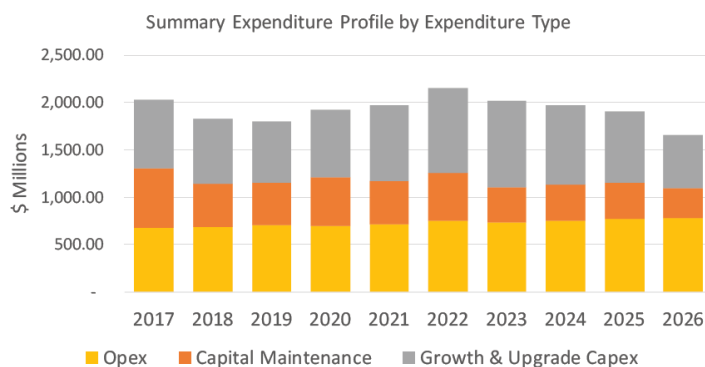
5 Financial Considerations

Financial projections have been developed for both the 10-year period from 2017 to 2026 and for the next business plan period from 2019 to 2022. These projections, however, are only indicative at this stage. They need to be confirmed with business units through the business planning process to develop more detailed business cases and robust infrastructure investment plans.



Identified asset renewal expenditure over the period 2019 to 2022 is approximately \$1.9 billion with a further \$3.0 billion invested in enhancement to the infrastructure (growth, regulatory driven upgrades and service enhancements). This expenditure provides a renewal to growth investment ratio of approximately 61 percent and an annualized reinvestment into the infrastructure of 0.55 percent. This annualized investment provides an indication of whether the existing infrastructure is receiving adequate attention through the planning period.

Currently, the focus of attention is largely on growth and upgrade investment which will partly be driven by increasing demand for infrastructure across The City but may also be a function of funding mechanisms.



Practice improvement commitment

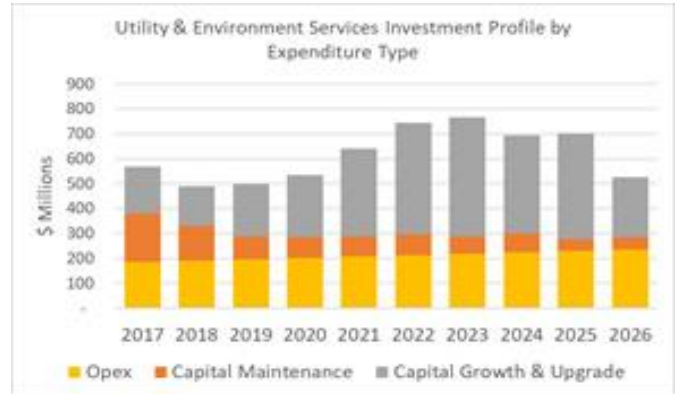
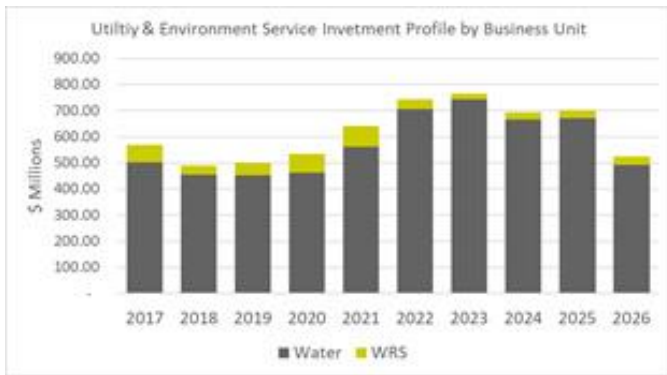
Investment to support practice improvement plans is not included in these forecasts, but it will be important in order for business units to achieve the objectives of their investment plans. Business units need recognition and support to further develop and improve levels of service understanding and reporting, infrastructure risk evaluation, improvement in data management and to support initiatives to integrate asset management practices into core business.

Funding uncertainty

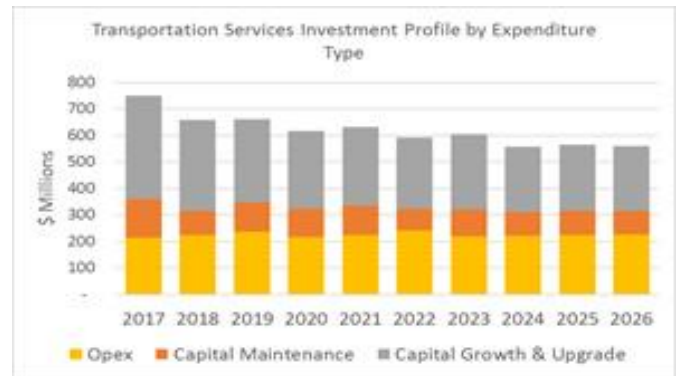
Provincial and federal funding sources account for a large proportion of capital funding. To implement every project, The City requires approximately \$12 billion in capital maintenance and growth investment over the next 10 years; however, capital funding for many service lines will decline as many provincial and federal funding programs end. The resulting funding gap means some priority infrastructure projects will remain unfunded until new funding becomes available.

The following graphs indicate the investment profile for each service line.

Utility & Environment Services infrastructure investment needs



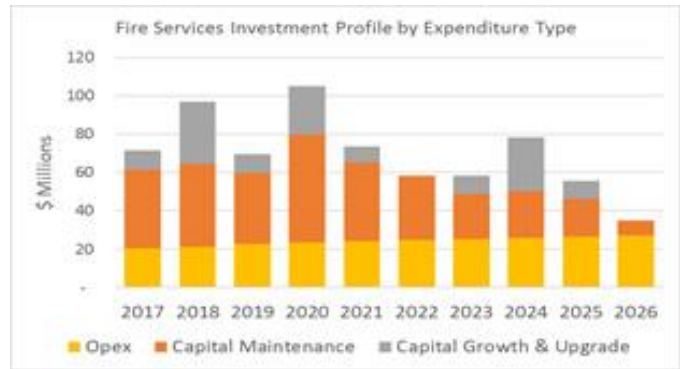
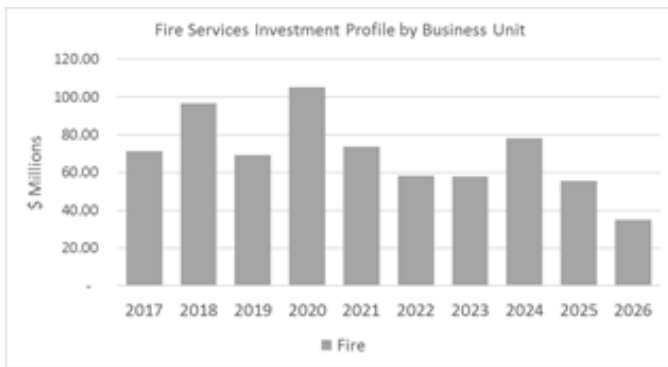
Transportation infrastructure investment needs



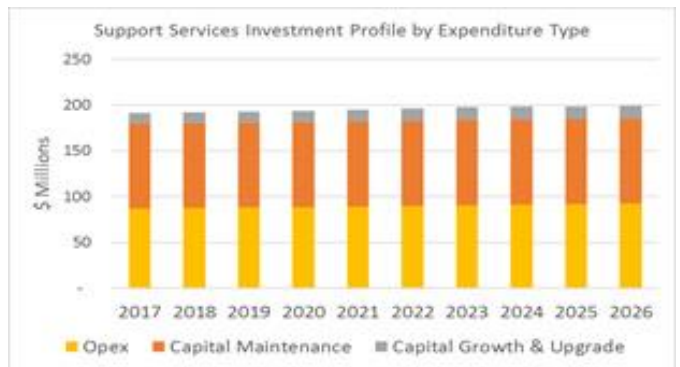
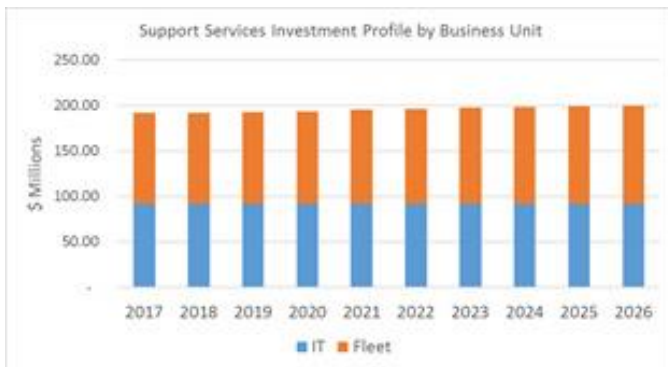
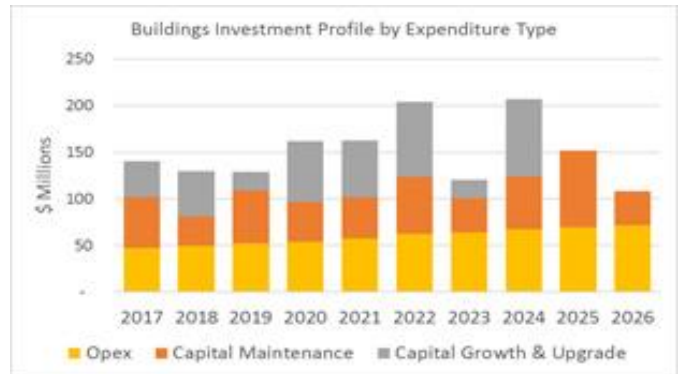
Sport and Recreational facilities infrastructure investment needs



Protective Services infrastructure investment needs



Buildings



Support services

The above charts indicate a high degree of uncertainty associated with the projections. The assumption of standard rates of inflation has been applied to the Opex projections. However, given the growth projections, investment levels are likely to be increased, especially with growth and upgrades.

The 2016 Canadian Infrastructure Report Card indicates some target levels for reinvestment rates. These levels have been included for comparison where available.

2016 Canadian Infrastructure Report Card target levels for reinvestment rates

Service line	% Maintenance investment ¹	Average annual maintenance to CRV ratio ²	Target maintenance to CRV ratios ³
Utilities Services (Water)	23 percent	0.16 percent	1 percent – 2.5 percent
Waste and Recycling (WRS)	23 percent	3.19 percent	N/A
Transportation (Transit, Roads)	26 percent	0.42 percent	1 percent – 3 percent
Sport & recreational services (Parks, Recreation)	49 percent	2.22 percent	1.7 percent - 2.5 percent
Protective services (Fire Dept.)	71 percent	5.60 percent	n/a
Buildings (FM, CHC)	55 percent	2.72 percent	1.7 percent - 2.5 percent
Support services (Fleet, IT)	87 percent	12.12 percent	n/a
Overall	37 percent	0.53 percent	

The percentage maintenance investment provides a comparison between the level of capital maintenance (asset renewal and refurbishment) and total capital investment (including growth, upgrade and service enhancement). This comparison will vary depending on economic and demographic growth patterns experienced in Calgary.

Currently, enhancement investment will also include upgrades to accommodate a changing environment, including climate change. The level of reinvestment compared to enhancement varies significantly between different service lines.

Target reinvestment levels for support services and the Fire Department are not available, but observed levels are substantially higher than for other infrastructure classes. The high reinvestment levels will reflect the shorter life expectancies of assets in these classes. Utilities infrastructure, especially with water and sanitary mains, generally have much greater life expectancies so reinvestment levels can be lower. The target figures are reflective of mature infrastructure systems. However, the infrastructure in Calgary could be considered relatively young, which would lead to a relatively lower level of infrastructure reinvestment on long lived asset classes.

Corporate Asset Management in conjunction with Infrastructure Calgary will begin to undertake further analysis of these investment ratios to determine appropriate targets for the Calgary environment.

Summary of Investment Ratios for each Department:

Note 1: Proportion of capital re-investment (i.e., Renewal Capex) in the asset base versus the total level of capital expenditure for the asset class

Note 2: Based on aggregated Maintenance and CRV data for business units within service line

Note 3: From the 2016, Canadian Infrastructure Report Card

Note 4: CIRC does not include target ratios for affordable housing assets and realistic targets may be significantly different.

6 Assumptions and Uncertainties

The Corporate Asset Management Plan will have to be adjusted as conditions change.

This Corporate Asset Management Plan has been developed based on assumptions regarding the political, economic, environmental and social landscape. Changes in these environments and associated assumptions could and will have a significant impact on the delivery of this plan and may require substantial re-planning efforts, adjustments to priorities and modifications to the required levels of funding.

The table below outlines a few key assumptions and associated uncertainties that could substantially affect execution of this plan.

Assumption	Description
We've incorporated climate change, but we haven't planned for extraordinary events in the plan period.	This plan includes the consideration of risks associated with climate change and the implementation of actions to address a changing climate including consideration of provincial and federal requirements. However, adapting to a changing climate is a long game and does not address all climate related risks in the plan period. A significant event such as the 2013 floods or other extreme events would divert funds significantly from existing known initiatives.
Changes in the demographic profile and growth forecast for the Calgary Economic Region and The City	The growth forecasts for Calgary are presented in Section 2.3 and assume recovery from the recent recession leading to modest growth through the plan period and then more accelerated growth towards the back end of the plan. The opportunities afforded by the reduced growth rate will be eliminated in the event of both lower or higher growth due to a reduction in funding or increased pressure to meet the demands of growth.
The economic environment will remain largely unchanged or will move into a period of gradual improvement through the plan period.	There are likely to be several price pressures which should be considered in the determination of expenditure demands. These pressures include a more modest level of inflation, a weaker Canadian dollar, and increased interest service charges which either directly or indirectly result in increasing cost pressures, especially for large ticket items like LRT cars and other vehicles. However, the continued low price of oil will likely result in a lower overall cost of petroleum products such as diesel and asphalt.
Funding sources remain largely the same.	Many funding sources are applied to The City's investment program including the municipal tax base, utility user fees, development charges and Provincial and Federal funding contributions. While there is some uncertainty around the continuity of these funding sources, unless otherwise stated the assumption is that the mix and level of funding will remain relatively stable.

There are many other assumptions with associated uncertainties that could affect the delivery of this and related business unit plans. These assumptions are outlined in the respective plans.

7 Plan Execution, Monitoring and Control

The City's Asset Management Framework is founded on the Plan, Do, Check, Act Model (The "Deming" Cycle), i.e.:

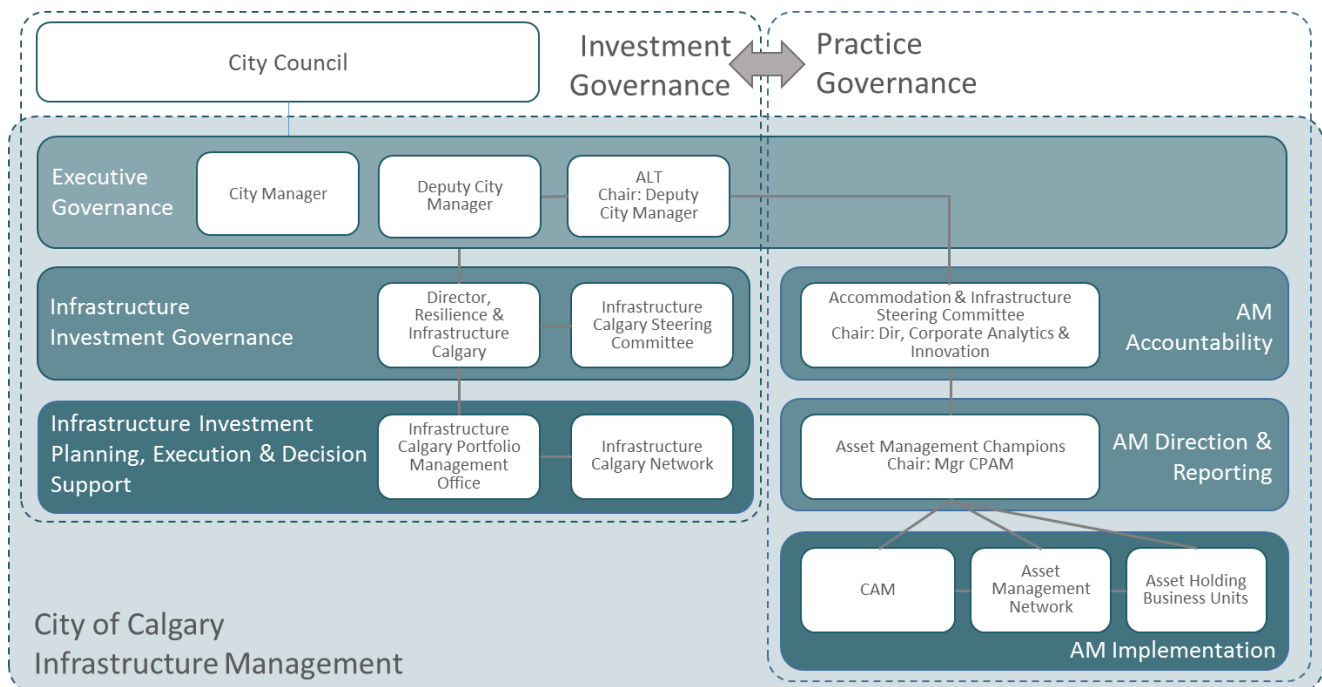
- **Plan** Policy, Strategy, Objectives, and Plans
- **Do** AM Enablers and Controls, Implementation of AMPs
- **Check** Management Review and Performance Assessment
- **Act** Improvement Planning and Implementation



This CAMP document and the business unit AMPs are naturally focused on the Plan stage of the cycle, together with identification of the work to be executed during the Do stage, including both investment activities (operating expenditures and capital expenditures) and asset management improvement activities. The effective and efficient execution of the plan and the mechanisms for monitoring and control during the Do, Check and Act stages of the cycle are equally important to successful delivery and, consequently, the achievement of corporate objectives.

Following corporate level approval and funding provisions for the investment activities and improvement plans at the Plan stage, the primary responsibility for delivery sits with the individual business units. However, an appropriate level of corporate governance and oversight must be maintained throughout the cycle to provide the required co-ordination, monitoring and control to keep both the investment activities and improvement plan activities on target to deliver against Council Directives and long term organizational objectives. The diagram below shows the corporate governance structure for both infrastructure investment and practice improvement.

As noted in Section 4, a key corporate strategy for the planning and delivery of capital investment is Infrastructure Calgary (IC). The IC team and work programs will play a lead role in the execution, monitoring and control of all capital infrastructure investments and will co-ordinate and complement the various business unit programs and initiatives within the business unit AMPs. The Investment Optimization Program includes the improvement of governance and oversight of capital programs including clearer definition of accountabilities and responsibilities.



Key strategies and initiatives for the execution, monitoring and control of investment plans and for the practice improvement plans are summarized in the tables below.

Governance for Execution, Monitoring and Control of Infrastructure Investment Plans and Practice Improvement Plans

CORPORATE LEVEL		BUSINESS UNIT LEVEL
INFRASTRUCTURE INVESTMENT PLANS		
EXECUTION	<p>IC: Corporate Infrastructure Delivery Program:</p> <ul style="list-style-type: none"> ● Monitor portfolio progress, including issue/risk management. ● Stage Gate Reviews - including approval/allocation of funding within scope of Council/ ALT approved budget. ● Ongoing workload forecast / planning. ● Capital project resource capacity management. ● Develop Project, Program & Portfolio Management. ● Consider alternate capital delivery models (e.g., P3s). 	<p>Business Unit Project Management Offices:</p> <ul style="list-style-type: none"> ● Implement AMP through IIPs. ● Manage Project Stage Gating. ● Review budget and reforecasts. ● Apply CPMF. ● Review project estimation, contingency, & scheduling. ● Manage project Risk. ● Manage supply chain relationships to better align and support business unit performance goals.
MONITORING & CONTROL	<p>IC: Corporate Infrastructure Reporting program:</p> <ul style="list-style-type: none"> ● Track changes in Council reported service measures through year-end accountability reporting. ● Review Results Based Accountability reporting. ● Provide enterprise capital reporting. ● Provide major program and project reviews. ● Review Infrastructure Status Report (ISR) updates. ● Review mid-cycle adjustments. ● Critically examine and recast cash flows, reprioritize and update capital investment plans. 	<p>Business Unit Management (SMT):</p> <ul style="list-style-type: none"> ● Track and report service and technical performance through LOSF and RBA – including Council reported measures and internal performance metrics. ● Monitor delivery of outputs of investment programs. ● Review and update the Infrastructure Status Report and recognize changes due to investment (CAPEX or OPEX).
PRACTICE IMPROVEMENT PLANS		
EXECUTION	<p>Asset Management Champions (AMC) & CPAM:</p> <ul style="list-style-type: none"> ● Approve appropriate funding for corporate and business unit Improvement Plans. ● Coordinate support for key improvement plan initiatives, e.g., levels of service framework (LOSF) and integrated infrastructure risk management. ● Provide oversight in the application of CPMF. ● Enhance Project and Asset Management Training. 	<p>Business Unit Management (SMT):-</p> <ul style="list-style-type: none"> ● Prioritize and plan for implementation of AM Improvement Plans including assigning adequate resources and budgets to Improvement Plan tasks. ● Determine clear roles, responsibilities, deliverable, timelines and milestones for Improvement Plan tasks. ● Provide management level support for implementation of AM Improvement Plans. ● Coordinate the communication, engagement and collaboration on the AMP execution within the business unit and department.
MONITORING & CONTROL	<p>Accommodation & Infra Steering Committee (AISC):</p> <ul style="list-style-type: none"> ● Undertake management reviews of program effectiveness. ● Coordinate internal audits reviews. ● Review of corporate level SOAM. ● Undertake maturity assessment and GAP Analysis. ● Review AM performance reports prepared by CAM. ● Support Zero Based Reviews Programs. ● Coordinate cross-municipality level benchmarking. 	<p>Business Unit Management (SMT):</p> <ul style="list-style-type: none"> ● Review effectiveness and gaps for key practice areas, e.g., IIRMF, LOSF and other BU practices. ● Undertake periodic SOAM assessments and review results and progress. ● Initiate and undertake Zero Based Reviews. ● Carry out industry benchmarking. ● Review AMP Improvement Plan progress and update.

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35. ISO 5500 Asset Management Systems Overview, Principles and Terminology.

36. Canadian Infrastructure Report Card, 2016

Appendix A – Economic Outlook Forecast Implications

Forecast Implications				
Variable	2012-2016	2017-2021	Direction of Change	Implications for The City of Calgary
Canada				
Gross Domestic Product (%)	1.8	1.8	Flat	Lack of growth driver in Canadian economy should also impact Calgary's growth prospective.
Prime Business Loan Rate (%)	2.9	3.5	Higher interest rates with tightening of monetary policy	Increased interest service charges do not have a direct effect on The City. However, the impacts would be indirect as service providers pass on increased charges as higher fees to The City.
Canadian / US Exchange Rate	0.88	0.79	Weaker Canadian dollar against US dollar	<ul style="list-style-type: none"> Benefits exporting sectors but increases costs of imports and inflation pressures. Lower exchange rate makes it more expensive to buy large ticket items like LRT cars, busses, vehicles.
Alberta				
Crude Oil Price – WYI (US\$/bbl)	75.3	57.3	Down	This should reduce the cost for petroleum based products such as diesel and asphalt for The City.
Alberta Natural Gas Price (C\$/GJ)	2.8	3.3	Upward	Modest growth in franchise fees as growth would come mainly from consumption volumes and not from price increases.
Calgary Economic Region (CER) and City of Calgary (City)				
Gross Domestic Product (%) (CER)	2.5	2.6	Flat	<ul style="list-style-type: none"> Reduces growth rate for new space; residential and non-residential; Slower growth in revenue base; assessment and non-assessment; The economy and revenue base would be larger at the end of this period compared to the previous period.
Total Population ('000 Persons) (City)	1,188	1,277	Modest population growth	<ul style="list-style-type: none"> The demand for municipal services would grow at a slower pace; Increased demand for services specific to immigrants and aging population; Slower growth in the demand for new residential dwellings; The City would have a larger population (household) base to service.
Annual Population Growth Rate (%) (City)	2.5	1.2	Slower annual growth	Provides The City with the ability to deal with backlogs.
Net Migration ('000 Persons) (City)	18.5	5.9	Net migration to Calgary will fall as Calgary's unemployment rate	Net migration from other provinces is negligible while international migration has not slowed. This will result in more diverse Calgary.

			remains high relative to BC and Ontario.	
Total Employment ('000 Persons) (City)	851	912	Modest growth in employment	Increased demand for transit and other services used by businesses.
Annual Employment Growth (%) (CER)	2.5	1.9	Reduced growth rate	Slower growth in non-residential construction.
Unemployment Rate (%) (CER)	6.0	6.9	Higher than previous averages due to slower job creation	Alberta wage settlement should be lower than previous averages. This should reduce the inflation pressures of goods and services that are purchased by the City.
Inflation Rate (%) (CMA)	1.6	2.1	Upward	Costs that are tied to CPI should escalate over the forecast period at a more modest rate.
Building Permits (\$billion) (City)	6.8	4.1	Down	Reduction in building permit revenues.
Transit Adult Ridership (million trips)	66.1	62.9	Down	Downward pressure on transit revenues.
House Price Inflation (%)	1.9	2.6	Moderate increase due to increased household formation	Housing would remain affordable in Calgary.
Non-Residential Building Price Inflation (%)	0.6	1.1	Increasing inflation pressures from increasing U.S. public infrastructure investments	Prices for non-residential construction activity in Calgary are linked to the US President's success in achieving his goals. This represents an increased upside risk to the construction materials price forecast.
* %: year-over-year percentage change				

Appendix B – 2020 Sustainability Direction Goals, Objectives and Targets

2020 Sustainability Direction Goals, Objectives, and Targets

Community Well-being: Calgary is a vibrant, safe, healthy and socially inclusive city. Communities are resilient, complete and connected – built with strong social, community, recreation, arts and culture, parks and natural spaces, and public safety infrastructure. Programs, services and amenities are accessible, affordable and high quality.	
EQUITY – Calgarians have fair access to public programs, services, facilities and spaces.	
1	By 2020, 100% of eligible low-income Calgarians have improved access to low-income programs and services.
2	By 2020, City facilities and spaces incorporate Corporate Access Design Standards for physical, sensory and cognitive disabilities.
3	By 2020, a continuum of built and natural park spaces is available to citizens on a ‘community cluster/regional’ approach.
4	By 2020, no adoptable animal is euthanized.
DIVERSITY, INCLUSIVENESS & CREATIVITY – Calgary is a diverse and socially inclusive city that respects its heritage and the arts.	
1	By 2020, Calgary will be an age friendly city.
2	By 2020, City programs and services will demonstrate inclusiveness.
3	By 2020, cultural landscapes are conserved and enjoyed as a valued piece of Calgary’s heritage.
4	By 2020, 600 festival and event days per year will be supported by The City.
5	By 2020, 100% of Calgarians will have access to arts and culture programs and facilities within their area of the city.
HEALTHY & ACTIVE CITY – Calgary has a natural and built system that contributes to physical, social and mental well-being and personal development.	
1	By 2020, 100% of Calgarians report that they have convenient access to indoor recreation facilities within their area of the city.
2	By 2020, the availability of recreational opportunities and the percentage of Calgarians satisfied with these opportunities to participate in active lifestyles are increased or maintained.
ENGAGEMENT & EMPOWERMENT – The City’s programs and services are reflective of the voice of citizens, and citizens can play active roles in their communities and The City’s processes.	
1	By 2020, The City demonstrates that a broad representation of our citizens’ voice has been considered in setting priorities and delivering services.
2	By 2020, The City communication and engagement opportunities are available in multiple formats, channels and languages.
SAFETY & RESILIENCY – Calgary, its communities and neighbourhoods are safe, resilient and supportive.	
1	By 2020, Calgary communities are increasingly able to resolve community based problems.

2	By 2020, emergency response performance is maintained or improved.
3	By 2020, more than 86% of citizens report Calgary is a safe city to live in.
4	By 2020, communities will have demonstrated the resiliency to self-activate in response to natural disasters.
5	By 2020, all citizens will have access to 911 using a variety of technologies, and 911 will have the capacity to manage all calls.

Prosperous Economy: Calgary is the undisputed choice for people and business, with a vibrant, resilient, environmentally sound and sustainable local economy that fosters opportunity for all to achieve individual economic well-being.

A FOCUS ON BUSINESS AND ENTERPRISE – Calgary’s economy is diverse and supports locally owned and operated businesses that re-invest back within the city.

1	By 2020, there is an increase in the diversity of business sectors in Calgary.
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A FOCUS ON PEOPLE AND COMMUNITY – All Calgarians have access to meaningful employment and the ability to achieve individual economic well-being.

1	By 2020, there is an increase in the percentage of people living in Calgary at or above Statistics Canada’s Low-income Cut-off rate.
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2	By 2020, there is a sustained labour force in Calgary.
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A CITY THAT ATTRACTS, DEVELOPS AND RETAINS – Calgary attracts business, new citizens and visitors through its reputation as a vibrant city with a strong sense of place where we put learning, creativity and livability first.

1	By 2020, there is an increase in the number of businesses that support sustainable practices.
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2	By 2020, a higher percentage of Calgary’s gross domestic product is invested in research and development.
---	---

Financial Capacity: The City serves the needs of citizens by achieving a sustainable financial position.

FLEXIBILITY – The City is able to respond to changing circumstances, which may relate to economic, social, environmental or political conditions.

1	By 2020, total debt and debt servicing returns to 50% or lower of Municipal Government Act (MGA) debt limit.
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2	By 2020, tax supported debt per capita does not exceed \$1000 and debt servicing for tax supported debt does not exceed 10% of gross expenditures net of recoveries.
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COST EFFICIENCY – The City uses public funds in ways that provide the highest level of needed services possible within the amount of funding available.

1	By 2020, total City operating expenditures per capita (inflation adjusted for the Municipal Price Index) are maintained or reduced.
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2	By 2020, fully loaded expenditures per capita for a given level of service are measured/tracked for each service periodically.
---	--

FUNDING SUFFICIENCY – The City has sufficient resources to support the delivery of services as per Councils direction.

1	By 2020, property and business taxes as a percentage of total revenue are maintained or reduced.
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2	By 2020, The City does not have a planned surplus and actual surpluses are less than 1% of budgeted operating expenditures.
3	By 2020, The City does not use debt or one-time funding from reserves to fund any base operating budget expenditures.
RISK MANAGEMENT – The City reduces risks to financial sustainability which, in turn reduces risks to The City’s ability to provide needed infrastructure and services (consistent with The City’s Integrated Risk Management approach).	
1	By 2020, level of Unallocated Reserves: Fiscal Stability Reserve equals 10-15% of Gross City Expenditures.
CREDIBILITY – The City achieve financial performance in a way that achieves and maintains public confidence in the municipal corporation.	
1	By 2020, Credit Rating is maintained at AA+

Sustainable Environment: The protection of air, land and water is recognized as critical for achieving healthy ecosystems within Calgary and this understanding is applied to the way we grow and operate as a city.	
GHG EMISSION REDUCTION – GHG emissions in Calgary are reduced by decreasing energy use, doing more with less energy and developing and using low energy from sources that are renewable or low-carbon.	
1	By 2020, greenhouse gas emissions will be reduced by 20% from 2005 baseline.
BROWNFIELDS – Brownfield remediation and redevelopment support efficient land use and environmental protection in Calgary.	
1	By 2020, 25% of the current vacant former gas station sites (within an Area Redevelopment Plan) will be returned to productive community use.
2	By 2020, fuel storage sites located within residential communities will be redeveloped within three years of the termination of their original use.
3	By 2020, The City has completed plans for land development and disposition of two City-owned surplus properties.
AIR QUALITY – Calgarians recognize the importance of air quality to their health and well being and are working collaboratively to protect the airshed.	
1	By 2020, Calgary’s ambient air quality meets or surpasses national and provincial air quality standards, objectives and guidelines.
WASTE MANAGEMENT – Calgarians recognize waste is a resource and that effective waste management protects public health and the environment.	
1	70% diversion of waste from City-run landfills by 2025. * *Revised from original 2020 SD.
BIODIVERSITY – Calgary’s ecosystems are healthy, connected and diverse and represent the breadth of our natural heritage.	
1	By 2020, no net loss of unique and environmentally significant habitats.
2	By 2020, species at risk are protected and have sustainable populations.
3	By 2020, significant landscapes and habitats in Calgary will be restored and / or reconnected.
4	By 2020, there will be an increase in the use of native plant xeriscaping in Calgary parks.

WATER QUALITY – Calgary’s public health and the health of its watersheds are protected by delivering save and reliable drinking water, collecting and treating wastewater, and minimizing the impact of Calgary’s urban form.	
1	By 2020, drinking water and treated wastewater effluent will continue to meet provincial regulations for quality 100% of the time.
2	By 2020, total loading targets continue to be met in The City’s Licence to Operate.
WATER QUANTITY – The long term sustainability and resiliency of Calgary’s water supply meets the current and future needs of a growing city and region.	
1	By 2020, accommodate Calgary’s population with the same amount of water withdrawn from the river as 2003.
2	By 2020, diversify Calgary’s future water supply to align with water demand.
3	By 2020, the per capita daily residential demand will be 210 litres per person per day.

Smart Growth and Mobility Choice: New population and job growth will be accommodated through strategic intensification of developed areas and by completing existing greenfield communities. This will be done in ways that support existing infrastructure investments and promote an integrated transportation system that provides safe, reliable and convenient travel choices.	
COMPLETE COMMUNITIES – Calgary fosters distinctive, complete communities with a strong sense of place. A greenfield community will be complete when it is fully built out and the suite of City provided facilities and services is delivered. Developed area communities, while they often have services and amenities already, have capitalized on opportunities to provide a wider range of housing choices, intensification of population and jobs and greater mobility choices.	
1	By 2020, 100% of eligible low-income Calgarians have improved access to low-income programs and services.
2	By 2020, increase land use diversity index to 0.56 (Mix Land Use).
3	By 2020, increase residential diversity index in communities to 0.23 (Residential Mix).
4	By 2020, increase per cent of intermodal and warehousing facilities within 1600m (actual) of the Primary Goods Movement Network to 77% (Goods access).
5	By 2020, The City of Calgary will enable affordable housing choices targeting 600 – 800 new units in new and established communities.
6	By 2020, plans for all new and redeveloped communities will include community services infrastructure that accommodates the diverse social, recreational and public safety needs of residents.
STRATEGIC INTENSIFICATION – Calgary directs the future growth of the city in a way that fosters a more compact efficient use of land, creates complete communities, allows for greater mobility choices and enhances vitality and character in local neighbourhoods.	
1	By 2020, 15% of population and 43% of jobs are within 400m of the Primary Transit Network (Accessibility to Primary Transit Network).
2	By 2020, 20% of population lives within Activity Centres or within 600m of Urban and Neighbourhood Corridors, with access to daily needs (Accessibility to Daily Needs).
3	By 2020, 10% of population growth is accommodated within 2005 Built Up Urban Area (Urban Expansion).
4	By 2020, 30% of net new residential units are accommodated within 2005 Built Up Urban Area. (Percentage of net residential unit growth).

INITIATE PRIMARY TRANSIT NETWORK – Calgary operates a portion of the Primary Transit Network at or near Primary Transit service levels, to provide faster, more frequent, reliable transit service to more Calgarians.	
1	By 2020, 27% of the total Primary Transit Network is implemented.
2	By 2020, 2.6 hours per capita of transit service is provided annually (transit service).
INCREASE TRANSPORTATION CHOICE – Calgary provides more travel choices in strategic locations aligned with land use direction.	
1	By 2020, mode split is 15% walking / cycling, 10% transit, 75% auto (Mode Split [All Purpose / 24hrs / Citywide])
2	By 2020, 100% of the transit fleet is accessible to all Calgarians (Accessibility to transit).
IMPROVE GOODS MOVEMENT – Calgary has improved goods movement reliability along the Goods Movement Network.	
1	By 2020, decrease the buffer index – extra time needed to ensure on-time arrival (Travel time reliability on selected goods movement corridors).
2	By 2020, maintain or improve the average travel time on selected Goods Movement Network corridors, reducing traffic delays (Average speed on selected goods movement corridors).
OPTIMIZE EXISTING TRANSPORTATION SYSTEM – Calgary has increased the overall quality of service for all modes of transportation, using effective and cost-efficient transportation management tools and techniques.	
1	By 2020, 100% of the implemented Primary Transit Network will have transit priority measures, to provide faster, more convenient transit service.
2	By 2020, 100% of traffic signals in the city will be optimized, to improve traffic flow and reduce congestion.
PROVIDE SAFE, RELIABLE AND AFFORDABLE PUBLIC INFRASTRUCTURE – Complete communities have the required safe, reliable public infrastructure which enables available, accessible and affordable municipal services to its residents, businesses and visitors.	
1	By 2020, 80% of roadway pavement meets good or very good condition ratings.
2	By 2020, the average transit vehicle age is maintained at the 2009 levels – LRV 16 years, Bus 14 years.
3	By 2020, 80% of City recreation facilities are maintained at a level B or higher.
DELIVERING TRANSPORTATION SERVICES - Safe, clean, well-maintained, effective and efficient transportation services are delivered to Calgarians.	
1	By 2020, there is a 10% decrease in the rate of reportable traffic collisions resulting in injuries and fatalities.

Sustainable Corporation: The City of Calgary serves citizens through engagement, transparency, resiliency and innovation.	
WORKFORCE – The City of Calgary’s competitive offering and employee experience enables the attraction and hire of qualified candidates from all segments of the community. This workforce is skilled, engaged and productive in the delivery and continuity of quality and efficient public services.	
1	By 2020, The City of Calgary employees represent the diversity of Calgary’s available workforce.
2	By 2020, the annual non-retirement turnover for The City of Calgary is less than 5%.
3	By 2020, The City of Calgary’s recordable injury rate is best in class for Canadian municipalities.

EFFECTIVE SERVICE DELIVERY – Services and service levels, and business plans and budgets for external and internal programs are aligned to long-term goals, policies and citizen priorities through regular review and citizen engagement.	
1	By 2020, more than 90% of Calgarians are satisfied with the overall quality of services.
EFFICIENCY – The City delivers services and programs efficiently through a culture of progression and creativity that supports innovation and is adaptable to changing needs and pressures.	
1	By 2020, total City operating expenditures per capita (inflation adjusted for the Municipal Price Index) are maintained or reduced.
2	By 2020, Calgary’s 10 largest services will meet or exceed the average performance of comparable Canadian municipalities for both efficiency and effectiveness.
3	By 2020, City services will have undergone a zero-based review to identify service effectiveness and efficiency opportunities (Target 80%).
INFRASTRUCTURE MANAGEMENT – The City of Calgary utilizes quality, cost effective, safe and innovative corporate assets that enable and support the provision of desired public and corporate services. The management of public and corporate assets (both physical and information) are optimized and based upon continuous improvement.	
1	By 2020, the City will have achieved appropriate levels of service within acceptable levels of infrastructure, condition, performance, investment and risk and will be effectively managing the Infrastructure Gap, as indicated by: <ul style="list-style-type: none"> • The implementation, delivery upon, and continuous improvement of integrated asset and growth management plans, • Level of service assessments, including star rating where appropriate, for all asset managing businesses and reported within the Infrastructure Status Report, • Demonstrated affordability and sustainability of asset management and infrastructure investment plans, based upon lifecycle and whole life cost analysis, and • Appropriate infrastructure risk analysis and reporting for all asset managing business units.
2	By 2020, the practice of asset management at the City will achieve a minimum of level four out of five compliance with respect to the Asset Management Policy. There will be demonstrated alignment to its Growth Management Strategy and MDP/CTP, as well as to other corporate financial and business planning processes.
3	By 2020, The City of Calgary efficiently and effectively disposes of surplus City-owned land to provide optimum value for Calgarians as indicated by: <ul style="list-style-type: none"> • Practice and process is reported in the State of Asset Management Report. • Tangible Capital Asset reporting in corporate financial reports.
4	By 2020, 90% of City buildings and 100% of the workplaces provided to City employees will be in good condition (15% FCI / 75% WCI) and 100% of administrative workspace will have a completed workspace condition index rating.
5	By 2020, 100% of City leaders responsible for asset management planning activities and or project management of capital infrastructure initiatives will have corporate asset management and or project management competencies.
6	By 2020, 100% of the City’s assets will adhere to Municipal Naming Policy.
7	By 2020, the City’s web mapping framework and associated spatial information is compliant with all relevant ISO standards.

Appendix C – Performance Trends

Service Line Performance Assessment

Utilities & Environmental Protection

Customer (Lag/Outcomes) Performance Measures	Source	Trend	Technical (Lead) Performance Measures	Source	Trend
Water					
H.PM5 Provincial regulations met for treated drinking water quality.	2016 Year End Accountability Report	Stable	H.PM7 Single-family avg. daily water consumption per person (litres per capita per day).	2016 Year End Accountability Report	Improving
H.PM8 Annual river water withdrawals (megalitres).	2016 Year End Accountability Report	Improving	N.PM1 Projected remaining years of water treatment capacity	2016 Year End Accountability Report	Improving
W.PM11 Calgarians' satisfaction with drinking water quality.	2016 Year End Accountability Report	Stable	Water main breaks	Water Network TAMP	Improving
W.PM12 % of customers that experience zero water service interruptions in the past year.	2016 Year End Accountability Report	Improving	W.PM1 Per cent of water, wastewater and drainage systems assessed to be in fair or better condition.	2016 Year End Accountability Report	Stable
# Water Quality Complaints	Water Network TAMP	Improving			
Wastewater					
H.PM6 Provincial regulations met for treated wastewater.	2016 Year End Accountability Report	Stable	N. PM2 Projected remaining years of wastewater treatment capacity.	2016 Year End Accountability Report	Improving
W.PM13 Per cent of customers that experience zero wastewater service back-ups in the past year.	2016 Year End Accountability Report	Improving	W.PM1 Per cent of water, wastewater and drainage systems assessed to be in fair or better condition.	2016 Year End Accountability Report	Stable
# customers impacted by sanitary backups per year	Sanitary Network TAMP	Improving	Blocked Sewer Mains	Sanitary Network TAMP	Not Rated
Wastewater treatment and collection O&M cost per capita	Wastewater treatment TAMP	Not Rated			
Stormwater					
			H.PM9 Total suspended solids (TSS) loading from stormwater to the river (kg/day).	2016 Year End Accountability Report	Marginal
			W.PM1 Per cent of water, wastewater and drainage systems assessed to be in fair or better condition.	2016 Year End Accountability Report	Stable
Waste and Recycling					

Customer (Lag/Outcomes) Performance Measures	Source	Trend	Technical (Lead) Performance Measures	Source	Trend
H.PM1 Annual waste collected per household (kgs).	2016 Year End Accountability Report	Stable	W.PM3 Percentage of Collection Service Units available for operational use.	2016 Year End Accountability Report	Stable
H.PM3 Annual waste diverted from landfills through City of Calgary programs per capita (kgs).	2016 Year End Accountability Report	Stable	Annual O&M cost of waste disposed per tonne	WRS AMP	Marginal
W.PM9 Calgarians' satisfaction with residential garbage collection.	2016 Year End Accountability Report	Stable			
W.PM10 Calgarians' satisfaction with residential blue cart collection.	2016 Year End Accountability Report	Improving			
H.PM2 Annual waste landfilled per capita (kilograms).	2016 Year End Accountability Report	Improving			
Cross Service					
			W.PM14 UEP 3-1-1 service requests completed on time.	2016 Year End Accountability Report	Stable
			W.PM15 UEP employees that know what is expected of them in providing excellent customer service.	2016 Year End Accountability Report	Improving

Service Line Performance Assessment

Transportation

Customer (Lag/Outcomes) Performance Measures	Source	Trend	Technical (Lead) Performance Measures	Source	Trend
Public Transit					
M.PM5 Annual Transit Ridership (in millions).	2016 Year End Accountability Report	Declining	N.PM2 Per cent of population that live within 400m of the Primary Transit Network (PTN).	2016 Year End Accountability Report	Marginal
P.PM2 Per cent of new and existing development within 400m of transit service.	2016 Year End Accountability Report	Improving	N.PM3 Per cent of jobs that are located within 400m of the Primary Transit Network (PTN).	2016 Year End Accountability Report	Stable
N.PM1 Average safety ratings of Calgary Transit services.	2016 Year End Accountability Report	Improving	M.PM2 Average distance (km) between bus breakdowns.	2016 Year End Accountability Report	Improving
M.PM1 Number of C-Train delays > 5 minutes per 1,000 hours of service.	2016 Year End Accountability Report	Improving	M.PM3 Transit service hours per capita.	2016 Year End Accountability Report	Improving
W.PM11 Number of transit routes that perform below minimum expectations.	2016 Year End Accountability Report	Declining	M.PM4 Passenger trips per transit service hour.	2016 Year End Accountability Report	Declining
W.PM10 Per cent of Calgary Transit customers that rated services as good or excellent.	2016 Year End Accountability Report	Improving	H.PM4 Fleet greenhouse gas emissions (Kg) per 1,000 kilometres.	2016 Year End Accountability Report	Improving
C-Train on time performance	Citizen Dashboard	Stable	Escalator mean time between failure (hours)	Calgary Transit AMP	Improving
CT Access on time performance	Citizen Dashboard	Stable	Elevator mean time between failure (hours)	Calgary Transit AMP	Improving
Bus on time performance	Citizen Dashboard	Stable	LRT Station Escalator Availability (%)	Calgary Transit AMP	Marginal
Number of track related major train delays >30mins	Calgary Transit AMP	Stable	LRT Station Elevator Availability (%)	Calgary Transit AMP	No Data
			% PPM WO completed in qtr.	Calgary Transit AMP	Declining
			# unplanned infrastructure incidents affecting availability of LRT system for train movement (>5min)	Calgary Transit AMP	Improving
			OCS Availability mainline	Calgary Transit AMP	Improving
			Rail signals availability	Calgary Transit AMP	Marginal
			# of unplanned signal equipment outages	Calgary Transit AMP	Improving

Customer (Lag/Outcomes) Performance Measures	Source	Trend	Technical (Lead) Performance Measures	Source	Trend
			Mean distance between failure - Bus (km)	Calgary Transit AMP	Improving
			Mean distance between failure - LRV (km)	Calgary Transit AMP	Improving
Roads and Bridges					
P.PM1 Travel time reliability on major transportation corridors and primary goods movement routes.	2016 Year End Accountability Report	Declining	N.PM5 Number of days to repair residential streetlights.	2016 Year End Accountability Report	Improving
M.PM9 Per cent of time that reasonable winter driving conditions are achieved following a snow event on major routes within 48 hrs.	2016 Year End Accountability Report	Improving	N.PM6 Kilometres of streets that meet Complete Streets Standards for arterial streets, urban and neighbourhood boulevards and parkways.	2016 Year End Accountability Report	Improving
M.PM16 Per cent of trips going to the Centre City made by transit in the AM peak period.	2016 Year End Accountability Report	Improving	N.PM4 Per cent of roads swept during Spring Clean Up program that achieve quality standards.	2016 Year End Accountability Report	Improving
M.PM10 Per cent of citizens not limited from being able to travel due to road conditions.	2016 Year End Accountability Report	Marginal	M.PM6 Per cent of roadway pavement that is in good or very good condition.	2016 Year End Accountability Report	Declining
All Casualty Collisions per 100,000 population	Citizen Dashboard	Improving	M.PM7 Per cent of concrete sidewalks that are in good or very good condition.	2016 Year End Accountability Report	Stable
Vulnerable Users Casualty Collisions per 100,000 population	Citizen Dashboard	Stable / Improving	M.PM8 Per cent of bridges that are in good or very good condition.	2016 Year End Accountability Report	Stable
Citizen Satisfaction - Riding a bicycle on roads in Calgary	Citizen Dashboard	No recent data	M.PM11 Per cent of gravel lanes receiving at least one surface treatment during the Summer Roads program.	2016 Year End Accountability Report	Improving
Citizen Satisfaction - Pedestrian crosswalk markings on neighbourhood roads	Citizen Dashboard	No recent data	H.PM1 Average energy usage (Watts) per streetlight.	2016 Year End Accountability Report	Improving
			M.PM2: Number of traffic intersections with connections through Calgary City Net to support mobility initiatives.	2016 Year End Accountability Report	Improving
Cross Service					
M.PM12 Overall annual casualty collision rate per 100,000 population.	2016 Year End Accountability Report	Improving	W.PM8 Per cent of employees that know what is expected of	2016 Year End Accountability Report	Improving

Customer (Lag/Outcomes) Performance Measures	Source	Trend		Technical (Lead) Performance Measures	Source	Trend
				them in providing excellent customer service.		
M.PM13 Vulnerable road user annual casualty collision rate per 100,000 population.	2016 Year End Accountability Report	Declining				

Service Line Performance Assessment

Parks, Recreation, Fire, Buildings and Support Services

Customer (Lag/Outcomes) Performance Measures	Source	Trend	Technical (Lead) Performance Measures	Source	Trend
Parks					
M.PM2 Per cent of citizens satisfied with Calgary's pathway system.	2016 Year End Accountability Report	Improving	M.PM1 Number of kilometers of pathways that are cleared of snow.	2016 Year End Accountability Report	Stable
Recreation					
P.PM9 Number of children and youth participant visits to City of Calgary Recreation programs, services and facilities.	2016 Year End Accountability Report	Improving	P.PM8 Number of Calgary Afterschool program visits in targeted neighborhoods and recreation facilities.	2016 Year End Accountability Report	Improving
H.PM5 % of Calgarians surveyed who are satisfied with Recreation's programs.	2016 Year End Accountability Report	Stable	Average Condition of Recreational Facilities	ISR	Not Rated
H.PM6 % of Calgarians surveyed who are satisfied with Recreation's facilities.	2016 Year End Accountability Report	Stable			
Cross Services					
N.PM8 % of Calgarians who agree they have easy access to places where they can get physical activity.	2016 Year End Accountability Report	Improving	W.PM1 % of employees who agree that "I am personally focused on delivering excellent customer service to citizens".	2016 Year End Accountability Report	Improving
Fire					
N.PM2 First-in unit emergency response within seven minutes at fire suppression incidents.	2016 Year End Accountability Report	Improving			
N.PM3 First-in unit emergency response within seven minutes at emergency medical incidents.	2016 Year End Accountability Report	Improving			
N.PM4 Achieve full first alarm assignment at high-risk fire suppression incidents within 11 minutes.	2016 Year End Accountability Report	Improving			
N.PM1 % of Public Safety Answering Point 9-1-1 calls answered within 15 seconds.	2016 Year End Accountability Report	Improving			

Contain fire to room of origin 90% of the time	City of Calgary Citizen Dashboard	Declining			
Affordable Housing					
P.PM13 Time to re-occupy subsidized housing units leased by Calgary Housing Company.	2016 Year End Accountability Report	Improving			
P.PM14 Percentage of fully subsidized housing occupied by high needs household (as per provincial rating scale).	2016 Year End Accountability Report	Stable			
Corporate Accommodation					
N.PM5 Facility Condition Index of Facility Management managed Heritage Buildings portfolio (Range; 0.0 – 1.0 where 0.0 is a building in new condition and > 0.5 indicates a failing building).	2016 Year End Accountability Report	Declining	H.PM1 Energy units (kilowatts/hour) consumption per gross floor area for buildings in Facility Management's Building Management System (based on facility's operating hours).	2016 Year End Accountability Report	Improving
W.PM12 Facility Condition Index of Facility Management Corporate Accommodation Buildings portfolio (Range; 0.0 – 1.0 where 0.0 is a building in new condition and > 0.5 indicates a failing building).	2016 Year End Accountability Report	Improving			
Fleet					
W.PM2 Percentage of Snow Units available for operational use (seasonal average).	2016 Year End Accountability Report	Declining	H.PM2 Percent of Fleet vehicles that are green.	2016 Year End Accountability Report	Stable
W.PM3 Percentage of Collection Service Units available for operational use.	2016 Year End Accountability Report	Declining	W.PM4 Vehicle equivalent units maintained per Fleet technician annually.	2016 Year End Accountability Report	Declining
Information Technology					
M.PM2: Number of traffic intersections with connections through Calgary City Net to support mobility initiatives	2016 Year End Accountability Report	Improving	H.PM3: Power saved from installing energy efficient end-user devices (KW/Year)	2016 Year End Accountability Report	Improving
P.PM13: Number of public City of Calgary facilities with free access to wireless internet	2016 Year End Accountability Report	Improving	N.PM3: Percentage of business-critical systems that can sustain an unscheduled data centre service interruption with minimal business impact	2016 Year End Accountability Report	Improving

P.PM14: Number of citizen-facing transactions that can be completed online or with a mobile device	2016 Year End Accountability Report	Improving	
W.PM47: Information technology cost per user compared to benchmarked organizations (% below peer)	2016 Year End Accountability Report	Improving	
W.PM48: Cost avoidance (in Millions) for City business units as a result of using City of Calgary fibre network	2016 Year End Accountability Report	Improving	

Appendix D – Asset Class Risks

Asset Classes **Beyond** Condition Threshold

Business Unit	Asset Class	Sub-Type	CRV \$ (M)	Avg. condition Score	Criticality BAU	Risk
Water	Engineered Structures	WS:Water Tmt- Dam	\$581.76	3.0	5.0	15.0
Transit	Machinery & Equipment	CT:Fueling Infrastr.	\$0.82	4.9	3.0	14.8
Recreation	Buildings	RC:Pumphouse	\$0.81	4.4	3.0	13.3
Roads	Engineered Structure	CR:TMC	\$8.10	3.8	3.5	13.3
Recreation	Buildings	RC:Pool	\$74.69	4.2	3.0	12.5
Transit	Machinery & Equipment	CT:Revenue Equip	\$3.29	3.6	3.5	12.5
Transit	Engineered Structures	CT:Track	\$322.16	2.5	5.0	12.3
Water	Engineered Structures	WS:Water Tmt- PS	\$656.74	3.0	4.0	12.0
Transit	Engineered Structures	CT:Signals and Controls	\$164.56	2.4	5.0	11.8
Transit	Land Improvements	CT:Outdoor Lighting	\$105.72	4.7	2.5	11.7
Fire	Vehicles	FD:Vehicles	\$91.00	2.3	5.0	11.7
Fire	Buildings	FD:Buildings	\$420.30	2.8	4.0	11.0
Transit	Machinery & Equipment	CT:Mobile Equip	\$4.50	3.6	3.0	10.7
Fire	Machinery & Equipment	FD:M&E	\$73.00	2.1	5.0	10.6
Transit	Machinery & Equipment	CT:Software	\$1.04	3.0	3.5	10.5
Recreation	Buildings	RC:Arena	\$199.94	3.4	3.0	10.3
FM	Buildings	FM:Multi-use Buildings	\$17.64	3.8	2.7	10.2
Recreation	Buildings	RC:Maintenance	\$3.29	5.0	2.0	10.0
Recreation	Buildings	RC:Washrooms	\$0.24	5.0	2.0	10.0
Transit	Land Improvements	CT:Parking Lots	\$0.00	5.0	2.0	10.0
Recreation	Buildings	RC:Sport	\$35.62	4.9	2.0	9.9
Roads	Engineered Structure	CR:Pedestrian Passes (+15)	\$227.00	3.2	3.0	9.7
Transit	Machinery & Equipment	CT:Simulators	\$21.79	3.7	2.5	9.3
Roads	M&E	CR:Machinery & Equip	\$15.34	3.0	3.0	9.1
Recreation	Buildings	RC:Arts	\$13.30	4.4	2.0	8.8
Roads	Engineered Structure	CR:Plants	\$22.27	4.3	2.0	8.7
FM	Buildings	FM:Heritage Buildings	\$94.49	3.2	2.6	8.4
Transit	Land Improvements	CT:Asphalt	\$0.07	5.0	1.0	5.0
Recreation	Buildings	RC:Clubhouse	\$6.54	5.0	1.0	5.0
Recreation	Buildings	RC:Planetarium	\$42.11	5.0	1.0	5.0
Recreation	Buildings	RC:Stadium	\$9.07	5.0	1.0	5.0

Risk is a factor of Condition X Criticality

Condition	Criticality					
	Low	1	2	3	4	High
Very Good	5	5	10	15	20	25
Good	4	4	8	12	16	20
Fair	3	3	6	9	12	15
Marginal	2	2	4	6	8	10
Poor	1	1	2	3	4	5

Asset Classes **within** Condition Threshold

Business Unit	Asset Class	Sub-Type	CRV \$ (M)	Avg. condition Score	Criticality BAU	Risk
Water	Engineered Structures	WS:Water Tmt- HL PS	\$211.64	2.0	5.0	10.0
Transit	Engineered Structures	CT:Catenary	\$104.32	2.4	4.0	9.8
Water	Engineered Structures	WS:Water Tmt- Potable Res	\$485.43	2.4	4.0	9.8
Transit	Engineered Structures	CT:Power Supply	\$193.72	1.9	5.0	9.7
Water	Engineered Structures	WS:Water Tmt- Stand-by Power Generation	\$19.18	2.3	4.0	9.3
Water	Engineered Structures	WS:Water Tmt- GM Process Stream	\$1,200.12	1.9	5.0	9.3
Transit	Engineered Structures	CT:Communications	\$57.49	2.6	3.5	9.1
Water	Engineered Structures	WS:Water Tmt- BP Process Stream	\$1,758.92	1.8	5.0	9.1
Water	Engineered Structures	WS:WW Tmt- Canada Creosote	\$38.72	3.0	3.0	9.0
Water	Engineered Structures	WS:WW Tmt- Bonnybrook Process	\$1,391.60	2.2	4.0	8.8
Transit	Engineered Structures	CT:Roadway	\$27.95	2.8	3.0	8.5
Water	Engineered Structures	WS:Water Tmt- Raw Water Res	\$517.12	2.0	4.0	8.0
Transit	Vehicles	CT:Buses	\$392.53	2.6	3.0	7.9
Roads	Engineered Structure	CR:Traffic Signals	\$208.30	2.5	3.0	7.6
Transit	Vehicles	CT:LRV	\$538.94	2.5	3.0	7.5
Transit	Engineered Structures	CT:Stations and Platforms	\$566.24	1.9	4.0	7.5
Water	Engineered Structures	WS:WW Tmt- Fish Creek	\$509.96	2.1	3.5	7.4
FM	Buildings	FM:Administration Buildings	\$544.29	2.9	2.5	7.4
Water	Engineered Structures	WS:WW Tmt- Shappard Sludge Lagoons	\$108.88	2.5	3.0	7.4
Transit	Engineered Structures	CT:Bridges	\$136.94	1.5	5.0	7.3
CH	Buildings	CH:CHC Owned	\$409.17	2.4	3.0	7.1
WRS	Engineered Structures	WR:Diversion Infrastructure	\$8.34	2.4	3.0	7.1
Water	Engineered Structures	WS:WW Tmt- Pine Creek	\$438.42	2.0	3.5	7.0
Water	Engineered Structures	WS:WW Tmt- Standby Power Generation	\$113.73	2.0	3.5	7.0
Fleet	Vehicles	FS:Vehicles	\$239.16	2.0	3.5	7.0
FM	Buildings	FM:Emergency Response Buildings	\$128.29	2.5	2.8	7.0
Transit	Engineered Structures	CT:Tunnels	\$270.23	1.4	5.0	6.9
Water	Engineered Structures	WS:Water Distribution- Feeder mains	\$1,264.61	1.7	4.0	6.6
Roads	Engineered Structure	CR:Streetlights	\$1,532.10	3.2	2.0	6.4
Transit	Machinery & Equipment	CT:Stat.Equipment	\$16.15	2.1	3.0	6.2
Transit	Buildings	CT:Building systems	\$116.10	3.1	2.0	6.2
WRS	Engineered Structures	WR:Leachate	\$41.90	2.0	3.0	6.1
CH	Buildings	CH:City Owned	\$481.41	2.0	3.0	6.1
Transit	Machinery & Equipment	CT:Miscellaneous	\$0.09	3.0	2.0	6.0
WRS	Engineered Structures	WR:Liners	\$10.30	2.0	3.0	6.0
Water	Engineered Structures	WS:Water Treatment- BP Non-Process	\$25.04	2.0	3.0	6.0
Water	Engineered Structures	WS:Water Tmt- GM Non-Process	\$14.00	2.0	3.0	6.0
IT	Buildings	IT:Buildings	\$6.84	2.0	3.0	6.0
Recreation	Land Improvements	RC:Land Improvements	\$61.81	2.0	3.0	6.0
Recreation	Machinery & Equipment	RC:Machinery & Equipment	\$3.39	3.0	2.0	6.0
IT	Machinery & Equipment	IT:HW	\$11.85	2.0	3.0	6.0
Roads	Land Improvement	CR:Fences / Guardrails	\$282.00	3.0	2.0	6.0

Asset Classes **within** Condition Threshold (continued)

Business Unit	Asset Class	Sub-Type	CRV \$ (M)	Avg. condition Score	Criticality BAU	Risk
WRS	Machinery & Equipment	WR:Specialized Vehicles and Portable Equipment	\$1.30	2.4	2.5	5.9
WRS	Engineered Structures	WR:Caps	\$68.38	2.0	3.0	5.9
Roads	Engineered Structure	CR:Pavement	\$9,935.30	1.9	3.0	5.8
Roads	Buildings	CR:Facilities and Storages	\$46.60	2.9	2.0	5.8
Recreation	Buildings	RC:Rec	\$329.69	2.9	2.0	5.7
Water	Engineered Structures	WS:Drainage- Storm LS	\$49.84	1.9	3.0	5.6
Parks	Machinery & Equipment	PK:M&E	\$3.30	2.8	2.0	5.6
Transit	Buildings	CT:Building structures	\$180.01	2.2	2.5	5.5
WRS	Engineered Structures	WR:Gas Collection	\$25.10	1.8	3.0	5.4
Transit	Machinery & Equipment	CT:Furniture & Signage	\$0.35	2.1	2.5	5.2
Roads	Engineered Structure	CR:Bridges and Tunnels	\$1,514.40	1.7	3.0	5.1
Fleet	Machinery & Equipment	FS:M&E	\$103.84	2.0	2.5	5.0
IT	Engineered Structure	IT:Engineered Structure	\$42.17	1.0	5.0	5.0
Water	Engineered Structures	WS:WW Collection- Lift Stations	\$73.81	1.7	3.0	5.0
Roads	Engineered Structure	CR:Timber Stairways	\$3.00	2.4	2.0	4.9
Water	Engineered Structures	WS:Water Distribution- Distribution Pipes	\$7,711.27	1.5	3.0	4.6
Water	Engineered Structures	WS:WW Tmt- Buildings	\$192.58	2.3	2.0	4.6
Transit	Engineered Structures	CT:Parking Lots	\$60.03	2.3	2.0	4.5
Roads	Engineered Structure	CR:Traffic Barriers	\$60.30	3.0	1.5	4.5
Water	Engineered Structures	WS:Water Tmt- Buildings	\$28.25	2.2	2.0	4.4
WRS	Engineered Structures	WR:Drainage	\$21.64	2.2	2.0	4.3
WRS	Buildings	WR:Buildings	\$56.06	2.1	2.0	4.2
Transit	Machinery & Equipment	CT:Communications	\$13.97	1.0	4.0	4.2
Roads	Engineered Structure	CR:Signs	\$48.00	2.0	2.0	4.1
WRS	Machinery & Equipment	WR:Specialized Software	\$5.00	2.0	2.0	4.0
Transit	Engineered Structures	CT:Cabling	\$1.68	1.0	4.0	4.0
Transit	Vehicles	CT:Supporting Fleet	\$8.10	2.0	2.0	4.0
Water	Engineered Structures	WS:Drainage- Retention Ponds	\$640.81	2.0	2.0	4.0
Recreation	Buildings	RC:Trailer	\$0.50	4.0	1.0	4.0
Transit	Machinery & Equipment	CT:Machinery & Equip	\$7.17	1.0	4.0	4.0
Transit	Engineered Structures	CT:Concrete	\$52.94	4.0	1.0	4.0
WRS	Machinery & Equipment	WR:Carts	\$36.80	2.0	2.0	3.9
IT	Machinery & Equipment	IT:SW	\$241.66	1.9	2.0	3.9
Transit	Engineered Structures	CT:Fencing	\$26.36	3.9	1.0	3.9
WRS	Machinery & Equipment	WR:Fences (Litter)	\$0.68	1.9	2.0	3.8
FM	Buildings	FM:Operational Buildings	\$175.56	2.5	1.5	3.8
Transit	Engineered Structures	CT:Storm Lift Stations	\$7.08	1.8	2.0	3.7
Parks	Land Improvement	PK:Land Improvement	\$2,411.00	2.5	1.5	3.7
Roads	Engineered Structure	CR:Guide Signs	\$3.45	1.8	2.0	3.7
Transit	Buildings	CT:Utilities	\$4.39	2.4	1.5	3.5
Transit	Land Improvements	CT:Furniture & Signage	\$0.45	1.7	2.0	3.3
Roads	Land Improvement	CR:Boulevards	\$148.50	3.1	1.0	3.1
Roads	Engineered Structure	CR:Retaining Walls <= 1m	\$16.50	3.1	1.0	3.1
Roads	Engineered Structure	CR:Sidewalks	\$2,627.70	2.1	1.5	3.1

Asset Classes **within** Condition Threshold (continued)

Business Unit	Asset Class	Sub-Type	CRV \$ (M)	Avg. condition Score	Criticality BAU	Risk
Roads	Land Improvement	CR:Engineered Walkways	\$17.60	3.0	1.0	3.0
Water	Engineered Structures	WS:WW Tmt- Bonnybrook Non-Process	\$119.37	1.5	2.0	3.0
Water	Engineered Structures	WS:Water Distribution- Hydrants	\$35.20	1.0	3.0	3.0
Water	Engineered Structures	WS:WW Collection- Mains	\$7,192.85	1.0	3.0	3.0
Water	Engineered Structures	WS:Drainage- Storm Mains & Forcemains	\$6,821.65	1.0	3.0	3.0
Fleet	Buildings	FS:Buildings	\$0.79	2.0	1.5	3.0
Roads	Engineered Structure	CR:Retaining Structures > 1m	\$132.30	1.9	1.5	2.9
WRS	Machinery & Equipment	WR:Bins	\$17.76	2.7	1.0	2.7
WRS	Land Improvements	WR:Fences (Security)	\$3.90	1.7	1.5	2.6
Parks	Buildings	PK:Buildings	\$169.00	2.6	1.0	2.6
Roads	Engineered Structure	CR:Lanes	\$897.00	2.6	1.0	2.6
Transit	Engineered Structures	CT:Landscaping	\$45.81	2.5	1.0	2.5
Water	Buildings	WS:Buildings	\$62.76	1.0	2.5	2.5
Transit	Machinery & Equipment	CT:Office Furniture	\$11.26	2.4	1.0	2.4
Roads	Land Improvement	CR:Street Furniture	\$3.20	2.4	1.0	2.4
Transit	Land Improvements	CT:Landscaping	\$0.44	2.3	1.0	2.3
Water	Engineered Structures	WS:Water Distribution- Valves	\$746.91	1.1	2.0	2.3
Transit	Vehicles	CT:Unknown	\$19.14	2.2	1.0	2.2
Roads	Engineered Structure	CR:Curbs & Gutters	\$2,514.10	2.0	1.0	2.0
Water	Engineered Structures	WS:Drainage- Storm Ancillaries	\$1,284.05	1.0	2.0	2.0
Water	Engineered Structures	WS:Water Distribution- Other Network Ancillaries	\$7,012.42	2.0	1.0	2.0
Transit	Land Improvements	CT:Fencing	\$0.13	1.9	1.0	1.9
WRS	Engineered Structures	WR:Roadways	\$22.36	1.8	1.0	1.8
Transit	Buildings	CT:Landscaping	\$16.15	1.5	1.0	1.5
Water	Engineered Structures	WS:WW Collection- Laterals	\$6,541.87	1.0	1.5	1.5
Fire	Land	FD:Land	\$202.00	1.5	1.0	1.5
Water	Engineered Structures	WS:Water Distribution- Meters	\$47.92	1.0	1.0	1.0
Water	Engineered Structures	WS:WW Collection- Manholes and chambers	\$506.32	1.0	1.0	1.0
Water	Engineered Structures	WS:Drainage- Laterals	\$3,985.69	1.0	1.0	1.0

Appendix E – Asset Related Business Risks

Asset Management Related Business Risk

Ref	BU	Asset Class	Risks	Likelihood	Impact	Risk	Extent of Control	Risk Rating
CH1	CHC	Buildings	Revenue and cost imbalance leading to increasing level of deferred maintenance especially in housing portfolio	0.50	5000	2500	2	High
CH2	CHC	Buildings	Hazardous materials inventory is incomplete	0.20	1000	200	3	Medium / Low
CH3	CHC	Buildings	Asset management data not yet available poses an infrastructure risk	1.00	1000	1000	2	Medium
CH4	CHC	Buildings	Flood and fire damage	3.00	100	300	2	Medium / Low
CR1	Roads	Transportation Infrastructure	Transfer of Deerfoot trail to Calgary Roads	0.25	20000	5000	2	High
CR2	Roads	Transportation Infrastructure	Changing traffic loadings associated with densification and changing vehicle types	0.10	5000	500	2	Medium
CR3	Roads	Transportation Infrastructure	Traffic congestion through suboptimal traffic management & asset failure	0.10	1000	100	2	Low
CR4	Roads	Transportation Infrastructure	Corten Steel streetlight and signal Infrastructure	0.50	1000	500	3	Medium
CT1	Transit	Transportation Infrastructure	Aging stations & associated electrical & structural systems	0.50	2000	1000	3	Medium
CT2	Transit	Transportation Infrastructure	Diversion of funding during Greenline Delivery	0.75	5000	3750	2	High
CT3	Transit	Buildings	Aging Maintenance facilities	0.20	2000	400	2	Medium / Low
CT4	Transit	Transportation Infrastructure	Maintaining pace with changing technology and managing outdated and unsupported technologies	0.20	2000	400	3	Medium / Low
CT5	Transit	Fleet	Aging rail and bus fleet	0.50	4000	2000	2	High
CT7	Transit	Transportation Infrastructure	Managing shutdowns without compromising service	0.10	1000	100	2	Low
FD1	Fire		Severe weather events and the ability and capacity to respond	0.30	2000	600	2	Medium
FD2	Fire	Fleet	Maintaining steady or stable investment in fleet and facilities	0.20	1000	200	2	Medium / Low
FM1	Facility Management	Buildings	Disaster and climate resilience	0.10	1000	100	2	Medium
FM2	Facility Management	Buildings	Economic impact of downturn leading to increasing level of deferred maintenance	0.30	1000	300	2	Medium / Low
FM3	Facility Management	Buildings	Changes to energy codes and legislation and relationship with GHG emissions and associated carbon taxes	0.40	1000	400	1	Medium / Low
FS2	Fleet	Fleet	Inability to retain workforce through economic cycles	0.30	1000	300	1	Medium / Low
IT1	Information Technology	Information Technology	Resiliency and disaster recovery	0.20	2000	400	4	Medium / Low
IT2	Information Technology	Information Technology	Technology Security	0.25	1000	250	4	Medium / Low
IT3	Information Technology	Information Technology	Maintaining capacity and performance while in a rapidly evolving world of new software and increasing demands for data and e-services	0.20	2000	400	3	Medium / Low
PK1	Parks		Parks and Natural Area degradation through severe weather events or other climate change related disasters	0.10	5000	500	2	Medium
PK2	Parks		Maintaining safe playgrounds and infrastructure	0.2	500	100	4	Low
RC1	Recreation	Buildings	Maintaining safe environments & facilities	0.2	500	100	3	Low

Ref	BU	Asset Class	Risks	Likelihood	Impact	Risk	Extent of Control	Risk Rating
RC2	Recreation	Buildings	Keeping pace with changing service expectations	0.1	1000	100	3	Low
WR1	Waste & Recycling	Utility Infrastructure	Environmental contamination	0.1	2000	200	3	Medium / Low
WS1	Water	Utility Infrastructure	Inadequate resource during severe drought and plant outage	0.05	10000	500	4	Medium
WS2	Water	Utility Infrastructure	Water quality contamination leading to advisory and compromised water supply	0.05	15000	750	4	Medium
WS3	Water	Utility Infrastructure	Major distribution system component outage	0.4	4000	1600	3	High
WS4	Water	Utility Infrastructure	Surcharging of system and property flooding during wet weather event.	0.2	4000	800	3	Medium
WS5	Water	Utility Infrastructure	Pollution of Bow River through asset failure	0.05	5000	250	4	Medium / Low
WS6	Water	Utility Infrastructure	InfrastructureCommunity level inundation through severe weather	0.05	25000	1250	3	High

Appendix F – Asset Management Improvement Plans

<i>Service Class</i>	<i>SOAM Category</i>	<i>Key Improvement Areas</i>
Potable Water	Strategy	<ul style="list-style-type: none"> • Ongoing AMP development and refinement • Develop long term strategies for asset management • Alignment of growth strategies between investment plans and AMP • Develop land acquisition strategy for new water treatment plant
	Assets	<ul style="list-style-type: none"> • Ongoing development of asset criticality analysis • Improvements to customer levels of service to align with the corporate standard • Refine programs for asset inspection and condition assessments using risk information where appropriate. • Improve risk assessment methodologies for key asset classes.
	Business Processes	<ul style="list-style-type: none"> • Review critical spare parts inventory to correspond with risk mitigation strategies. • Gap analysis for risk mitigation measures and develop risk mitigation strategies for critical assets. • Develop asset management and data collection practices. • Review and alignment with ongoing energy efficiency and sustainability practices. • Alignment with drinking Water Safety Plans
Wastewater	Strategy	<ul style="list-style-type: none"> • Ongoing AMP development and refinement • Develop long term strategies for asset management • Alignment of growth strategies between investment plans and AMP • Develop land acquisition strategy for new wastewater treatment plant.
	Assets	<ul style="list-style-type: none"> • Ongoing development of asset criticality analysis • Improvements to customer levels of service to align with the corporate standard • Refine programs for asset inspection and condition assessments using risk information where appropriate. • Improve risk assessment methodologies for key asset classes
	Business Process	<ul style="list-style-type: none"> • Review critical spare parts inventory to correspond with risk mitigation strategies • Gap analysis for risk mitigation measures and develop risk mitigation strategies for critical assets • Develop asset management and data collection practices • Review and alignment with ongoing energy efficiency and sustainability practices
Waste and Recycling	Strategy	<ul style="list-style-type: none"> • Ongoing improvement in asset management maturity (SOAM) through continued assessment and execution of improvement actions • Development and alignment of asset management processes to ISO 55000 standards
	Assets	<ul style="list-style-type: none"> • Ongoing development of WRAMS to improve the availability and reliability of asset information
	People Effectiveness	<ul style="list-style-type: none"> • Implementation of change management and training requirements around new systems and practices
	Business Process	<ul style="list-style-type: none"> • Improvements in the WRIP process to better capture innovative ideas and feedback from operations and maintenance. • Improve business case development • Development of service-based budgeting model – to provide a line-of- sight between services and assets (investments) • Better co-ordination and integration of asset management with business planning initiatives
Public Transit	Strategy	<ul style="list-style-type: none"> • Complete 20-year Capital Plan and associated long-term Operational Plan
	Assets	<ul style="list-style-type: none"> • Develop the systems and processes for asset condition information across key asset categories, including development of InforEAM • Review and adjust preventative maintenance schedules for reliability optimization

<i>Service Class</i>	<i>SOAM Category</i>	<i>Key Improvement Areas</i>
	People Effectiveness	<ul style="list-style-type: none"> Build asset management capacity and competencies
	Business Process	<ul style="list-style-type: none"> Implement a Tangible Capital Assets (TCA) sustainment process.
Roads and Bridges	Strategy	<ul style="list-style-type: none"> Develop a 5-year Roadmap for an aligned Asset Management system
	Business Process	<ul style="list-style-type: none"> Co-ordinate a Strategic Asset Management Plan (SAMP) for the Transportation Department, to include Roads, Transit and Transportation Planning
Buildings	Strategy	<ul style="list-style-type: none"> Co-ordination of strategic and long-range planning. Integration with land-use planning
	Assets	<ul style="list-style-type: none"> Ongoing development of asset management systems, including InforEAM and RIVA. Data management strategies data acquisition, including Building Condition Assessments programs Development of Levels of Service Frameworks, including better service measures, baselines and targets. Understanding of investment needs to meet different levels of service Improve risk management Customized lifecycle management plans for specific buildings
	People Effectiveness	<ul style="list-style-type: none"> Asset management governance Additional asset management recourses Competencies, including training for all levels of staff
	Business Process	<ul style="list-style-type: none"> Alignment with other business processes Better stakeholder communication
Protective Services	Strategy	<ul style="list-style-type: none"> Better integration of asset management practices and procedure with the wider business planning process
	Assets	<ul style="list-style-type: none"> Development of asset performance and service measures with targets aligned to business unit and corporate goals Development of improved or updated design standard for key assets
	People Effectiveness	<ul style="list-style-type: none"> Training for development of asset management understanding, skills and competencies
	Business Process	<ul style="list-style-type: none"> Improved reporting of asset performance and communication to all stakeholders Develop improved process for the allocation of operating budgets based on asset requirements Improvements to the governance of asset management practices, including development of an audit program
Support Services	Strategy	<ul style="list-style-type: none"> Prioritized infrastructure investment planning and project portfolio management to ensure investments are directed toward highest business value Coordination and evaluation of projects that support growth and development objectives of The City to ensure that investments are optimized Financial policy setting in support of asset management goals
	Assets	<ul style="list-style-type: none"> Continual improvement of asset knowledge and systems for managing the data A program to establish recommended thresholds for utilization and for standardization of fleet vehicles Asset lifecycle cost forecasting for IT assets Refined and detailed customer service level development for IT assets Better understanding of asset risk
	People Effectiveness	<ul style="list-style-type: none"> Employee engagement and development in asset management practices Succession management planning, mentoring and training programs
	Business Process	<ul style="list-style-type: none"> Establishment of better asset management governance Improved capital investment planning
Sport and Recreational Facilities	Strategy	<ul style="list-style-type: none"> Develop an Integrated Infrastructure Risk Management Policy Develop a Risk Management Framework at the BU and asset level Assess and document 20 growth/demand projections

<i>Service Class</i>	<i>SOAM Category</i>	<i>Key Improvement Areas</i>
	Assets	<ul style="list-style-type: none"> • Update, improve and align asset management systems, including InforEAM and RIVA • Development of service category specific level of service standards. • Assess resources and costs for meeting different levels of service • Improve the accuracy and completeness of the asset data in business unit asset systems • Improve asset risk classification • Develop a condition index for key facility assets • Asset Management staff training • Maintenance management (determine percent of proactive work and maintenance intervals) • Audit program implementation for asset management
	Business Processes	<ul style="list-style-type: none"> • Modify data systems to align data reporting with work programs to provide better reporting of capital and operating expenditures • Implement risk reports for Capital Project Management processes • Develop and implement improved financial reporting for tracking capital projects

List of Abbreviations

AEP	Alberta Environment & Parks	IIPs	Infrastructure Investment Plans
AM	Asset Management	IIRMF	Integrated Infrastructure Risk Management Framework
AMP	Asset Management Plan	IRM	Integrated Risk Management
ATIS	Advanced Traveller Information Systems	iSLOWS	Speed Limit Observation and Warning System
BBWWTP	Bonnybrook Wastewater Treatment Plant	ISO	International Standards Organization
BWTP	Bearspaw Water Treatment Plant	ISR	Infrastructure Status Report
BAU	Business as Usual i.e., normal operations	IT	Information Technology
BCA	Building Condition Assessment	LEED	Leadership in Energy and Environmental Design
BRT	Bus Rapid Transit	LOS	Levels of Service
CAM	Corporate Asset Management	LOSF	Levels of Service Framework
CAMP	Corporate Asset Management Plan	MDP	Municipal Development Plan
CEMA	Calgary Emergency Management Agency	MSW	Municipal Solid Waste
CER	Calgary Economic Region	OWC	Operations Workplace Centre
CFD	Calgary Fire Department	PAMP	Parks Asset Management Plan
CPS	Calgary Police Service	PWWTP	Pinecreek Wastewater Treatment Plant
CH	Calgary Housing	RBA	Results Based Accountability
CHC	Calgary Housing Company	RRFB	Rectangular Rapid Flashing Beacon
CIRC	Canadian Infrastructure Report Card	SAMP	Strategic Asset Management Plan
CPAM	Corporate Project and Asset Management	SDHI	Short Duration – High Intensity
CPRIIP	Culture, Parks and Recreation Infrastructure Investment Plan	SLA	Service Level Agreement
CRV	Current Replacement Value	SOAM	State of Asset Management
CS	Community Services	TAMP	Tactical Asset Management Plan
CT	Calgary Transit	TRANS	Transportation Department
CTP	Calgary Transportation Plan	UEP	Utilities and Environmental Protection
DCMO	Deputy City Manager’s Office	WCI	Workplace Condition Index
FCI	Facility Condition Index	WRIIP	Waste & Recycling Services Infrastructure Investment Plan
FCWWTP	Fish Creek Wastewater Treatment Plant	WRS	Waste & Recycling Services
FM	Facility Management	WTP	Water Treatment Plant
GHG	Greenhouse Gases	WWTP	Wastewater Treatment Plant
GWTP	Glenmore Water Treatment Plant	ZBR	Zero-Based Review
GTF	Gas Tax Fund		

Glossary

Asset – ISO 55000 defines assets as: “An asset is an item, thing or entity that has potential or actual value to an organisation”. This is deliberately wider than physical assets although in this document the key focus is on physical assets.

Asset Management – ISO 55000 defines Asset management as the “coordinated activity of an organisation to realize value from assets”.

Asset Management Plan – The Asset Management Plan (AMP) is the output of an asset management planning process. It is not expected to outline the detail of the process that forms part of the business unit’s asset management system. However, the AMP should refer to the asset management planning processes applied in various sections of the document.

Customer – The term customer used in this document refers to people or organizations who receive a service and may include internal and external customers, regulators, council and other stakeholders.

imagineCALGARY – A City of Calgary strategic document that sets out the 100-year vision for urban sustainability.

Levels of Service – The term ‘levels of service’ should always be considered in conjunction with the term ‘performance’ in the AMP. It is referred to in several locations in the AMP.

Onward – Onward is a City of Calgary’s motto established in 1909.

Serviceability – The capability of the system of assets to deliver a defined level of service to citizens and the environment, now and into the future.

The City – The City of Calgary Corporate Administration.

Stakeholder – A person with an interest or concern in something, especially a business.