Integrated Infrastructure
Services

2020 Infrastructure
Inventory
State and Condition

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Table of Contents

Background

Infrastructure inventory has been collected annually in the City of Edmonton (the 'City') since 2000. The inventory of assets has been refined over the years, with a view of continuous improvement in data collection methods and ensuring the inventory is as inclusive as possible, capturing the assets we own and manage.

Asset inventory information provides the foundation for effective Asset Management. Asset inventory information is the base input into decision models to substantiate infrastructure investment requirements, identifying the infrastructure areas with the greatest needs. By historically tracking the changes in the City's infrastructure inventory, the City can assess the effectiveness of capital investments and provide a rationale for business decisions. Not only is an inventory or quantity of our assets collected, but we also collect the replacement value, average age, expected asset life and assessment classification of all assets.

In 1998, City Council directed Administration to prepare a report to detail the municipal assets we own, manage and condition. This first Infrastructure Inventory Report was released in 2000. At the time, this first report was very cursory, with only a first cut of the major assets included. Details were minimal with no common method to assign condition rating. Starting in 2002, infrastructure was looked at in three dimensions:

- Physical condition: the condition of the physical infrastructure that allows it to meet the intended service level.
- Demand/Capacity: The capacity of the physical infrastructure and its ability to meet service needs.
- Functionality: The ability of the physical infrastructure to meet program delivery needs.

Each dimension of the assessment provides a high-level perspective of the state and condition of the City's infrastructure. A five-point rating system, included in Appendix B, is used to compare the condition of dissimilar assets.

The ratings applied to the various assets are derived from a combination of quantitative and quantitative data. Quantitative data, such as the depth and width of cracks along a roadway, most often informs the dimension of Physical Condition. Whereas qualitative data, such as user satisfaction survey results, typically informs the dimension of Functionality. Depending on the asset type, and the information available for the asset,

ratings for each of the dimensions are often a combination of both quantitative and qualitative data.

The importance of sound asset data (qualitative or quantitative) and the processes for capturing the data cannot be stressed enough. Knowing what we own and manage is integral to providing service to our citizens and supporting the quality of life expected by Edmontonians.

Infrastructure Strategy

The City of Edmonton was one of the first Canadian cities to recognize the need for a strategic plan to manage infrastructure and has worked assertively to overcome the infrastructure challenge. The City defines infrastructure as "the physical assets developed and used by the City to support the community's social and economic activities".

The City is on its third iteration of an Infrastructure Strategy. The first strategy in 1998 consisted of a list of 15 guiding principles and supportive strategies. This recognition of the need to manage municipal assets cohesively resulted in the creation of the Office of Infrastructure with the specific mandate to be stewards of Edmonton's municipal assets. In 2005, the Office completed an update of the original Infrastructure Strategy with the Edmonton City Council's Infrastructure Strategy, developed in conjunction with Council, senior managers, administrative staff and external stakeholders. It sought to balance the renewal needs of existing infrastructure with the growth and expansion pressures faced by the City. The 2005 Infrastructure Strategy supported the continuing development of effective infrastructure management tools, as well as collaboration between engineers, academia, financial services, industry, citizens, other orders of government and other stakeholders.

In 2018, the Infrastructure Strategy was once again updated. This work was undertaken with support from the Federation of Canadian Municipalities (FCM) under the Leadership in Asset Management Program (LAMP). The purpose of the updated Infrastructure Strategy is to set out an agreed-upon path forward for infrastructure asset management that is aligned with Council's vision for the City and corporate strategic plans and to set out the mandate for asset management processes in the City. The City has undergone dramatic changes in its organizational approach to the integrated delivery of infrastructure services. Through this version of the Infrastructure

Strategy, the City is moving forward in better integrating asset management and sustainability efforts, to improve the connection between investment decisions, level of service commitments to citizens and sustainable outcomes for communities.

In all iterations of the Infrastructure Strategy, the City's goal for asset management has always been to build an effective, transparent, data-driven asset management system that connects asset investment with progress towards strategic goals and service level outcomes.

Reasons we collect infrastructure data

Through assessment and analysis of the City's infrastructure inventory, the City can continually evaluate how effective it's capital investment decisions have been and subsequently provide a rationale for key budget decisions.

Fundamental questions that need to be answered:

What do we OWN?

Edmonton owns and manages a variety of different assets. It is important to maintain an accurate count of these assets.

What is it WORTH?

If an asset failed today, what would it cost to replace it? This is a value that provides an order of magnitude to assist in understanding the value of the assets Edmonton owns.

What is the STATE AND CONDITION?

Edmonton uses a standardized 5-point rating system on a scale of A to F (Very Good to Very Poor) to identify asset state and condition.

What is the AVERAGE AGE of our infrastructure?

In managing assets, we need to know how many more years we can expect the asset to last. Generally speaking, the older the asset, the more reinvestment required to keep the asset functioning safely.

What will it COST to bring the asset back to an acceptable condition?

Many tools are used to identify assets that require reinvestment and possibly funding strategies. An acceptable condition does not necessarily mean back to a new state, it means a condition that allows the asset to perform its intended service safely.

These fundamental questions are referred to as the Five W's of asset management, while the data needed to answer these questions is quite extensive the concept of what we need to know is not.

Changes to the Hierarchy

The hierarchy of Edmonton's municipal assets, or how assets are viewed or classified, has been adjusted and refined in the last 20 years, from listing major assets without any significant details to hierarchies of 12 or more asset classes broken down and grouped portfolios to support better interpretations. Generally speaking, the types of assets owned and managed by Edmonton were fairly static with little change in the actual asset types. However, new technologies have seen new types of assets being put into service. Also, Edmonton has taken a new approach to how service is provided to Edmontonians. With the new lens on a service-based approach, it was prudent to consider how municipal assets are managed as well. To that end, a significant update of the infrastructure hierarchy was required, which took place in 2018.

Continued improvements in data collection generate a more consistent analysis that will enable the City to make more informed decisions regarding the need for infrastructure renewal, upgrading or expansion and provide a useful perspective on the overall state and condition of our infrastructure. The new asset hierarchy consists of seven portfolios and 25 asset classes. This new breakdown of Edmonton's municipal assets is more detailed and comprehensive than in the past 20 years. However, there is always room for improvement, as assets change so too must we change how assets are viewed and managed.

As this is the first time this new hierarchy has been used to report the state and condition of Edmonton's infrastructure, it is acknowledged that there are some gaps in the data. Some assets have never been accounted for or considered as part of this exercise in the past, in some cases, this information does not yet exist. Infrastructure inventory is an iterative process with the expectation that data refinements will continue year over year until such time as a fully comprehensive inventory is tracked for all infrastructure owned and managed by the City. The majority of the assets listed within the below table are included in the analysis. The City is continuously working to refine and improve the City's asset data collection and reporting processes, which will address the above-noted gaps in future reports.

Infrastructure Hierarchy and Description	
Portfolio	**Goods and People Movement**
Supports the movement of vehicle, pedestrian and intermodal travel options.	
Asset Class	**Description**
Roads	The primary function of the assets is the movement of vehicle traffic.
Bridges	Allows transition of vehicles and pedestrians to traverse over or under other infrastructure, including all manner of structure that supports a traffic load either under or over another mode of transportation.
Active Mode	Mainly pedestrian traffic promotes health and wellness, includes bike paths, sidewalks, shared-use paths and trails.
Light Rail Transit	LRT related infrastructure and systems to support the travel of trains and movement of passengers; excludes transit stations
Transit Bus System	Supports the bus systems and connection to other mass transit options, excludes major bus stations
Portfolio	**Open Space**
Open-air infrastructure with a predominance of green space, minimal hard surface and support a sustainable natural environment.	
Asset Class	**Description**
Park Space	Assets intended to maintain a connection to the natural environment and promote outdoor play and activities
Play Space	Programmable spaces and assets dedicated to sports and play in an outdoor setting
Cemeteries	Assets which support the memorialization of individuals in perpetuity.
Portfolio	**Service Delivery**
Infrastructure provides direct service to citizens in support of quality of life.	
Asset Class	**Description**
Attractions	Infrastructure having multiple components and asset types which function as a whole facility. These assets have paying customers and generally are open to the public.
Recreation	All assets which support the programming of a recreation facility, excluding the building.

Police	Assets that are for use only by Edmonton Police Service, specialized in nature, not found in other areas of the city, including Police rolling stock and specialized IT equipment, but excluding buildings.
Fire Rescue	Assets that are for use only by Fire Rescue in performing a specialized function, not found in other areas of the city, excluding rolling stock and buildings.
Library	Materials and equipment supporting programs and services which are open to the public, excluding buildings.

Portfolio	**Ancillary Infrastructure**
Infrastructure which is part of an overall system and/or supports in the delivery of service for which other assets types rely on.	

Asset Class	**Description**
Barrier / Separation Infrastructure	Infrastructure which separates two modes of traffic provides a safety function or is supporting the function of another asset.
Signs and Signals	Performs the function of traffic control and roadway safety for users, including signs, traffic signals, street lighting and traffic control.
Technology Equipment	Assets that support the communication and information collection and dissemination to internal and external partners; excludes technology assets from Library and Police.
Fleet	Rolling stock assets, supporting services offered by the city; includes all heavy equipment, municipal fleet vehicles, fire trucks and associated equipment to maintain the assets.
Research and Testing	Labs and equipment intended to collect and analyze information in support of maintaining municipal infrastructure.
Engineered Drainage	Built assets whose primary function is to mitigate the flow of water on to, or away from other built assets

Portfolio	**Facilities**
Vertical structures consist of several systems and house programs delivered by the City.	

Asset Class	**Description**
Buildings	All structures that are owned by the City of Edmonton, housing programs, service, or operations run by the City in support of citizen needs.
Affordable Housing	Housing facilities which are in support of not-for-profit and community housing and provide affordable options for Edmontonians

Portfolio	Utilities
Infrastructure provides service to citizens and is regulated by an external body.	
Asset Class	**Description**
Waste Services	Assets that support the collection and management of waste produced within the city.
Renewable Energy	Technology and assets supporting the development of renewable energy generation and delivery; excludes buildings.
Portfolio	**Culture and Heritage Assets**
Assets intended to preserve the city's heritage.	
Asset Class	**Description**
City's Heritage Collection	Man-made items of cultural or historical significance, preserved to maintain our history
Public Art	All forms of artistic expression owned by the City and installed for the enjoyment of all citizens, includes monuments, statues, murals, and memorials.

Use of Inventory Data and Risk Assessment

Robust and accurate data is the foundation for effective asset management at the City of Edmonton. Regular exercises in data collection not only ensure that the data is collected, it allows the opportunity to continually refine data collection activities and potentially improves the accuracy.   The base data collected through the annual infrastructure inventory is used to support decisions related to asset management. Base data is input into the Risk-based Infrastructure Management System (RIMS) which supports decisions on the renewal needs of municipal infrastructure.

Risk is defined as the product of the possibility of suffering loss (or harm) and the impact that loss would have on the affected party. With Risk Assessment Methodology it is possible to determine the level of risk to infrastructure associated with its failure. A risk approach is a balanced approach that integrates the municipality's social (e.g. health and safety of citizens), environmental (e.g. impact on the environment) and economic (e.g. cost of failure) objectives into the decision-making process. With the RIMS model, the physical condition of an asset is projected over time, yielding a picture of the controllable factors of deterioration of each asset type, which can be addressed via investments and maintenance. Within the limited financial resources available, Administration can assist decision-makers in determining where the available funding can provide the most benefit to existing assets.

RIMS is a made-for-Edmonton solution to help determine, justify and rank the rehabilitation needs of the City, as well as optimize the allocation of funds to ensure long-term value. The model can run a variety of scenarios to assist decision-makers on investments that would provide the most benefit, including a "Do Nothing" simulation that gives asset managers an idea of how quickly assets will deteriorate without the necessary intervention. The "Budget Allocation" function allocates a set dollar amount to those assets that will require the most re-investment. The "Cost Minimization" simulation provides the optimum renewal strategy to achieve or maintain certain performance levels of infrastructure, and has been the basis of the City's renewal program since 2012. The model can also recommend asset reinvestment given a certain level of funding.

Demands on Infrastructure Assets

Infrastructure supports the services the City of Edmonton provides to its citizens, without the service there is no need for the infrastructure. As the demand for services intensifies or changes, so too must the infrastructure that supports the service. There are many reasons for the changing demand for municipal infrastructure. Population growth, demographic shifts and the wants and needs of citizens change over time.

Another reason for increasing demands on infrastructure is simply due to aging and required maintenance. Edmonton's infrastructure is aging with an average age of 40 to 50 years old. Much of our assets and neighbourhoods were built within large boom times; after World War II and the oil boom of the 1970s.   As a result, the need for renewal dollars to support existing and future infrastructure will continue to grow. Not only to address the backlog of assets but to ensure the ongoing support is available for anything we build today.

Edmonton continues to grow into greenfield areas, but also through infill in mature neighbourhoods. Both of these actions have an impact on the demand for infrastructure. As Edmonton continues towards a population of two million, it will be required to provide more services such as transit, recreation, fire services, police and waste collection. These additional services will require new and upgraded infrastructure assets to support the required services. In addition to buildings and equipment, the City needs to ensure associated operations and maintenance are supported along with required staff to provide the service. Construction of new infrastructure reflects only initial costs. Funding is also required to eventually rehabilitate or replace the asset in the future.

Increasing the amount of infill development within Edmonton's redeveloping area over time will also impact infrastructure demand. Assets such as roads, pipes (storm and sewer), sidewalks and parks were designed for the original build of the neighbourhood. Accommodating more people, housing and jobs within these areas generally means that the existing infrastructure will require expanded capacity to manage the higher demand for its service.

Myth-Busting

Over the 20 years that Edmonton has been collecting asset information and managing assets strategically, several "myths" have developed. This section will endeavour to bust some of the more prevalent myths surrounding asset management.

- Not all assets need to be in Very Good condition, depending on their use, some can function adequately in a Fair or even Poor condition for quite some time.
- All assets are not equal, some need more attention than others due to high use or high impact of failure.
- Assets which are depreciated, as per accounting rules, do not generate an equivalent amount of funding for rehabilitation. Depreciating an asset is merely an accounting exercise to demonstrate the cost of doing business, which includes "using up" your assets. For example, the High-Level Bridge was "used up" or fully depreciated over 50 years ago, but with regular maintenance and rehabilitation, it is still functioning for its intended use.
- Being good stewards of our assets is all of our responsibility. There is not one department that is the owner of assets, everything is owned by the City. All staff and departments have a role to play in managing municipal infrastructure.
- Inventory is not a "one and done" exercise; the data requires regular maintenance and validation.
- Fixing an aspect of a physical condition problem can impact the assessment of demand/capacity or functionality. The resulting "fix" of the physical condition could potentially address the poor rating of functionality or demand/capacity.
- Retiring assets is not a bad thing; if it costs more to bring the asset up to the required level of service than to retire the asset (a.k.a. demolish, dispose, or sell) then this should be the chosen alternative.
- If the asset was purchased, built or inherited, Edmonton owns it and the asset must be tracked and maintained regardless of the funding source used to acquire the infrastructure asset.

Criteria to evaluate the state and condition

Edmonton uses a standardized rating system to evaluate the state and condition of existing infrastructure assets. It consists of three criteria - Physical Condition, Demand/Capacity and Functionality. For each of the three criteria, a standardized 5-point rating system on a scale of A to F (Very Good to Very Poor) is used to identify asset state and condition. The system was established in 2002 through a collaborative exercise with internal and external stakeholders.

Wherever possible, all of the City's assets are evaluated based on each of the three criteria. Although the quality of data varies and requires some interpretation, the ranking system provides a high-level strategic perspective of the state and condition of the City's infrastructure. The ranking system helps Edmonton City Council and Administration compare the condition of disparate infrastructure elements and improves the quality of information used to make more informed decisions and establish priority projects. For the renewal program, all of the City's assets are assessed under the Physical Condition criterion and this information is used as an input into the RIMS, which determines a recommended budget allocation based on the Physical Condition and other asset characteristics. The Demand/Capacity and Functionality criteria do not apply to all asset types. For example, Street Lighting requirements are dictated by design standards based on road type and would be unaffected by traffic volume. Therefore, demand/capacity would not be applicable in this case.

While the definitions are displayed below, it is perhaps easiest to understand these criteria by applying the example of a road. The presence of potholes on a road and how much this impairs driving would be an example of how physical condition could be affected. Consistent traffic congestion on a road would indicate if the capacity of the road was able to meet user demands. An example of functionality would be a road with a shared-use path and sidewalk that meets the functionality requirements of multi-modal transportation.

Physical Condition	Demand/Capacity	Functionality
The actual condition of the infrastructure that allows it to meet the intended service level.	*The amount of demand placed upon the physical infrastructure relative to its intended use and how this impacts its ability to meet service needs.*	*The ability of the physical infrastructure to function in its intended manner to meet program delivery needs.*

As part of the implementation of the Infrastructure Strategy, the City is refining and improving upon its assessment methodology. As we develop level of service targets and measures for assets through the development of Asset Management Plans, this information can be incorporated with the current asset assessment categories to further improve the assessment.

State and Condition

In 2020, the City's existing infrastructure remains in good to very good condition in all asset classifications: Physical Condition: 55.7%; Demand/Capacity: 63.9%; and Functionality: 75.1%.

Status of Infrastructure

Physical Condition	Demand/Capacity	Functionality
The percentage of assets in the good & very good physical condition category has reduced slightly from 57.1% in 2015 to 55.7% in 2020. The percentage of assets in the fair condition has slightly increased from 30.8% to 35.7%, while there has been a decrease from 12.1% to 8.6% of assets in poor and very poor condition.	The demand/capacity classification remains stable in good and very good ratings from 64.5% (2015) to 63.9% in 2020 and an increase in assets with fair ratings (20.3% to 22.4%). This is accompanied by a decrease in the percentage of poor and very poor ratings from 15.2% in 2015 to 13.7% in 2020.	Compared to the 2015 Infrastructure Inventory report, the functionality classification shows a slight decrease in the good and very good ratings (79.4% in 2015 versus 75.1% in 2020), an increase in the fair rating classification (9.3% to 13.9%), and a slight decrease in the assets in the poor and very poor rating (11..0% versus 11.9%)

Historical Asset Condition Ratings
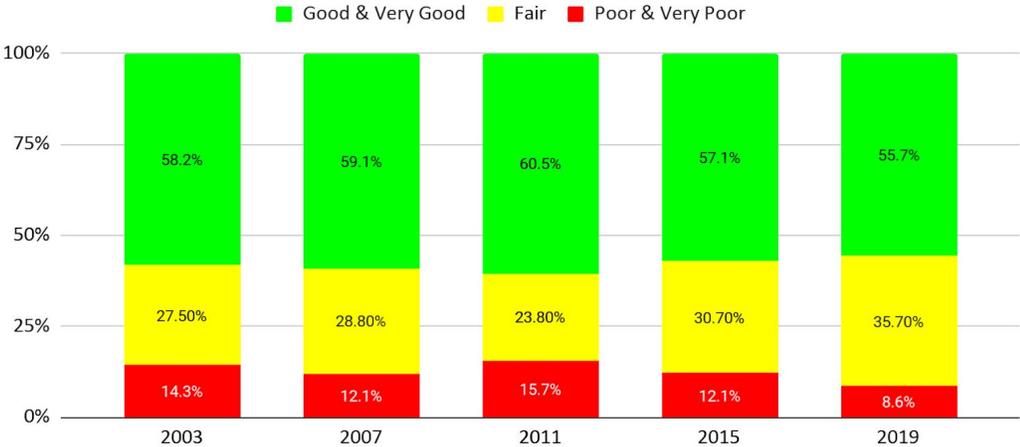
In the above chart, we see the progression of asset condition ratings over a period of 16 years. By 2011, there was a swell of assets in Good and Very Good condition, directly correlating to a swell in assets in Poor and Very Poor Condition. In the years previous to this, during the Province's last big financial boom, more focus was directed toward growth projects than renewal projects. As a result, the City had many new assets, but its existing assets did not get the required attention and fell to disrepair. Since this time, the City has strategically moved from rapid growth and upgrade to a more balanced approach, with measured growth, and focused renewal, which has resulted in a significant reduction of assets in Poor and Very Poor condition.

Replacement Value

The 2020 total replacement value of the City's infrastructure is $29.9 billion, a decrease of approximately $16.3 billion from the $46.2 billion reported in the 2015 Infrastructure Inventory Report. This is largely due to Drainage assets moving to EPCOR in 2017.

The below pie chart illustrates the breakdown of the total 2020 replacement value by Portfolio. The Goods and People Movement Portfolio contains five asset classes: Roads, Bridges, Active Mode, Light Rail Transit and Bus Transit System. The Portfolio replacement value of $15.1 billion represents 50.6% of the total city-wide infrastructure replacement value. This Portfolio is closely followed by the Facility Infrastructure Portfolio with a value of $7.9 billion which is 26.4% of the city-wide replacement value and included Buildings and Affordable Housing.

Replacement value by portfolio
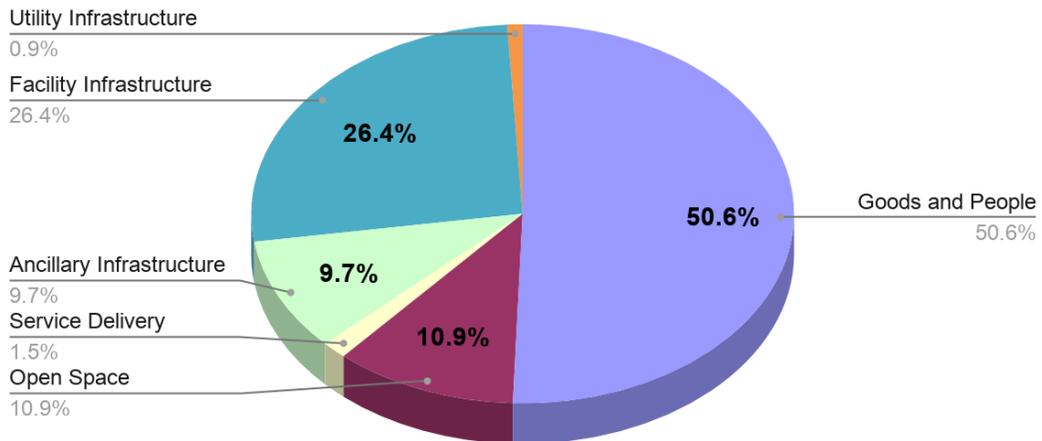
Next is Open Space assets which consist of Play Space, Parks Space and Cemetery asset classes with a replacement value of $3.2 billion and is 10.9% of the overall city-wide replacement value. Ancillary Infrastructure closely follows with 9.7% of the overall replacement value worth $2.9 billion and consists of Barrier/Separation Infrastructure, Signs and Signals, Technology Equipment, Fleet, Research and Testing and Engineered Drainage.

Utility Infrastructure and Service Delivery Infrastructure consist of 0.9% and 1.5% respectively of the city-wide replacement value. Utility Infrastructure has a value of $273 million and includes Waste Services and Renewable Energy asset classes. Service Delivery has a value of $446 million and includes the following asset classes; Fire Rescue, Library, Police, Technology Equipment, Recreation and Attractions. The below graph displays the replacement value by asset class.

Replacement value by Asset Class
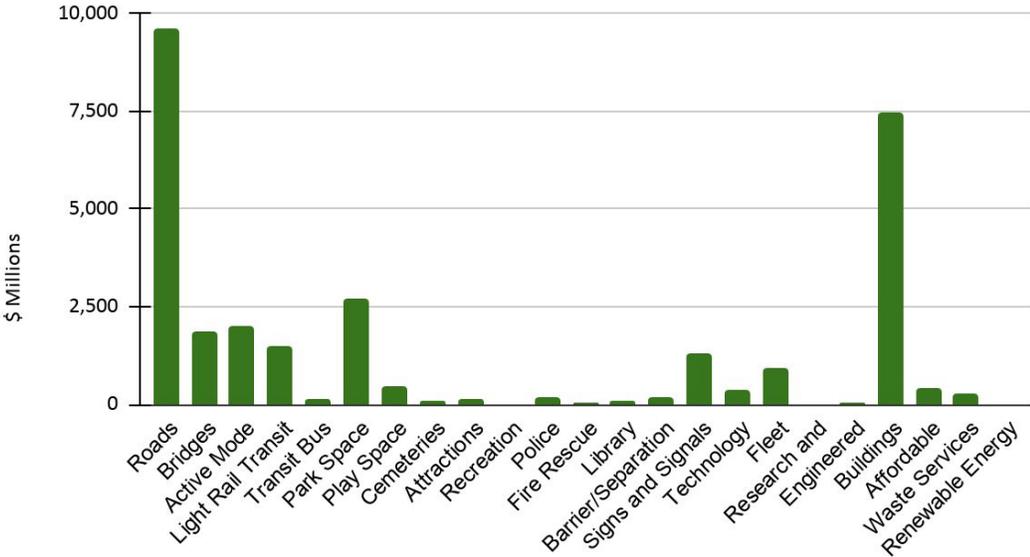
In most cases, asset replacement values remain relatively static throughout the life of an asset, with only marginal changes due to cost escalation. However, the replacement value of some assets, such as trees, actually increase significantly over time. This is because the asset grows in size over its lifespan, and as it grows, the baseline for its replacement increases, thereby increasing the cost of replacement.

In addition to the assets noted above, the City owns a portfolio of over 9000 land holdings, with a combined area of over 8,900 hectares. As land assets are not replaced in the same manner as physical infrastructure assets, a replacement value is not recorded.

Average and Expected Age

The average asset age and the expected life of an asset are general indicators of an asset's ability to perform throughout the asset life cycle and are input into advanced deterioration modelling. The expected life of city infrastructure can range anywhere from one year to 100 years depending on the asset type. Assets such as Buildings or Bridges tend to have a longer expected life than many Technology assets. Overall, the aggregate average age of the City's infrastructure is approximately 30 years and the average life expectancy is approximately 40 years, both rounded to the nearest five years.

As shown below, both Ancillary Infrastructure and Facilities Infrastructure have the longest expected life at approximately 45 years, rounded to the nearest five years as well.

Age by Porfolio/Average Age and Age by Porfolio/Expected Asset Life
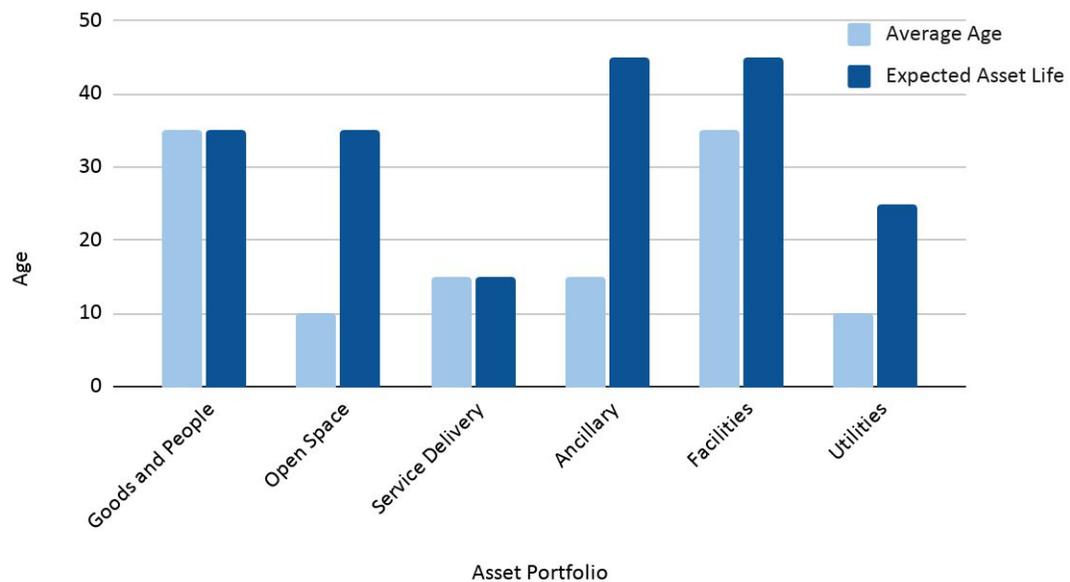
Asset Characteristics by Portfolio

Goods and People Movement

The Goods and People Movement Portfolio makes up 50.6% of the total citywide replacement value. This Portfolio consists of Roads ($9.6 Billion), Bridges ($1.8 billion), Active mode ($2.0 billion), Light Rail Transit ($1.5 billion) and Transit Bus System ($152 million). The Light Rail Transit category includes the track, signals and equipment and Light Rail Vehicles. Facilities, bridges and tunnels supporting the service are included within other portfolios. Similarly, the Transit Bus System includes only the systems and equipment while transit facilities and fleet of vehicles are included in other portfolios.

Replacement Value Goods and People Movement

Transit Bus System	1.0%
Light Rail Transit	9.9%
Active Mode	13.2%
Bridges	12.3%
Roads	63.6%
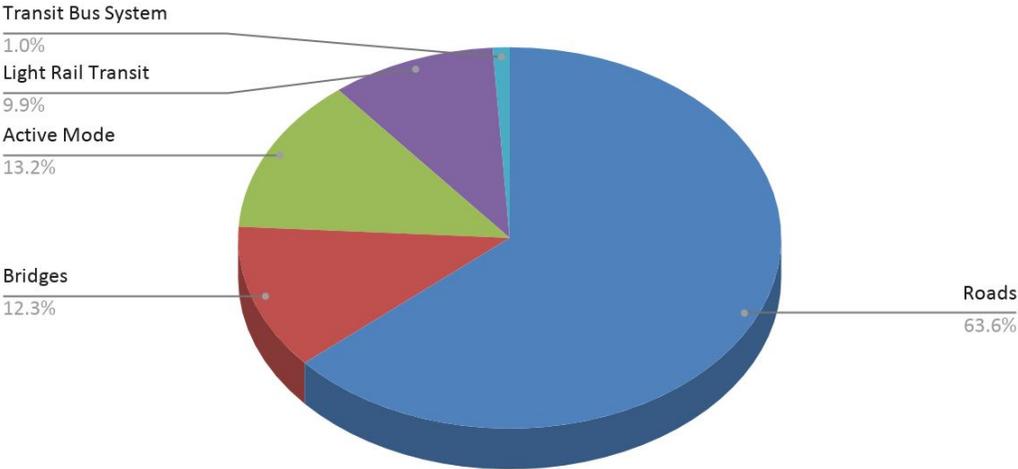
Overall, the average age of the Goods and People Movement Portfolio is 37 years with an expected life of 33 years. Roads' assets are at or over their expected asset life. With appropriate maintenance and renewal schedules roads can be maintained past their expected asset life. However, there will come a point when full replacement will be needed.

Goods and People Movement Age and Expected Asset Life
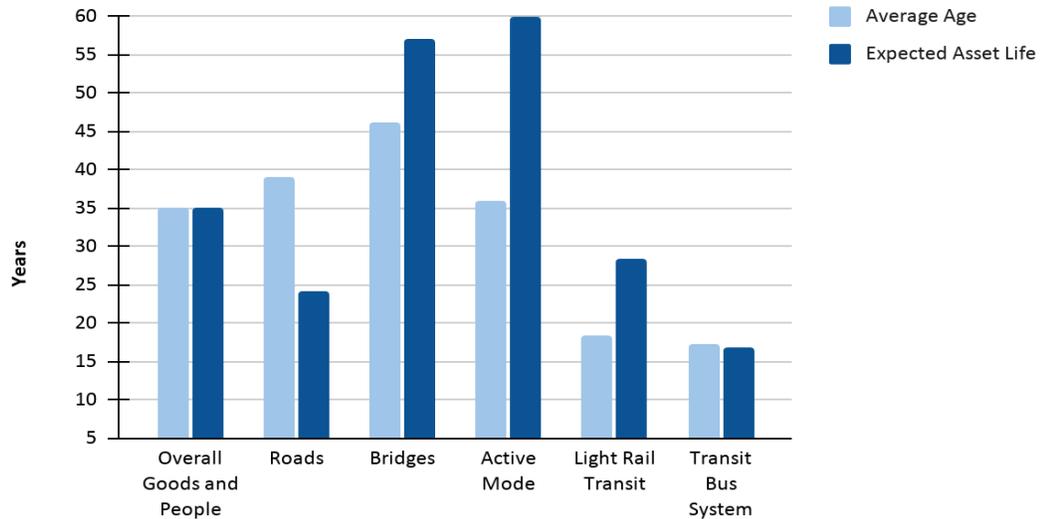
In terms of physical condition, within the Goods and People Movement portfolio, the majority of assets are in Good and Very Good condition. Bridges have 53% of its assets in Fair condition and 39% in Good and Very Good condition. Overtime without intervention, the condition could deteriorate further.

Transit Bus Systems asset class has the most infrastructure in Poor and Very Poor Condition with 29%.

% Physical Condition Goods and People Movement
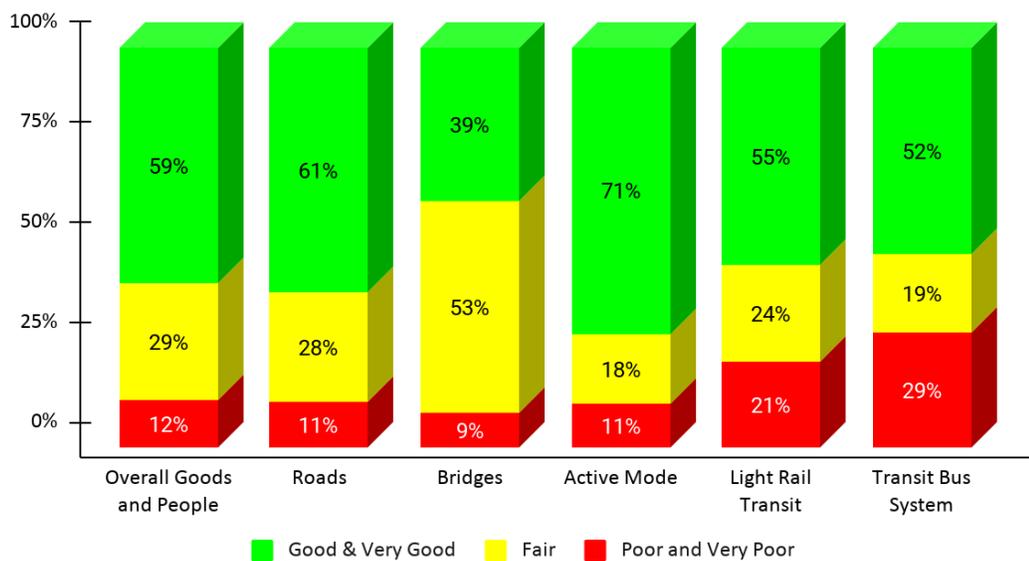
Open Space

The Open Space Portfolio consists of Park Space ($2.7 billion), Play Space ($478 million) and Cemeteries ($75 million) and makes up 10.9% of the overall city-wide value of infrastructure assets. Park Space comprises 83% of the Open Space Portfolio. Included within the Park Space category is the City's inventory of 393,356 trees and its urban forest within over 5,900 hectares of natural area.

Of special note, the Park Space Category also contains the City's inventory of River Valley trails, which spans 247,662m and has a replacement value of $106.7 million. 52% of the trails are in Good or Very Good condition and 6% are in Poor or Very Poor condition.

Open Space Replacement Value
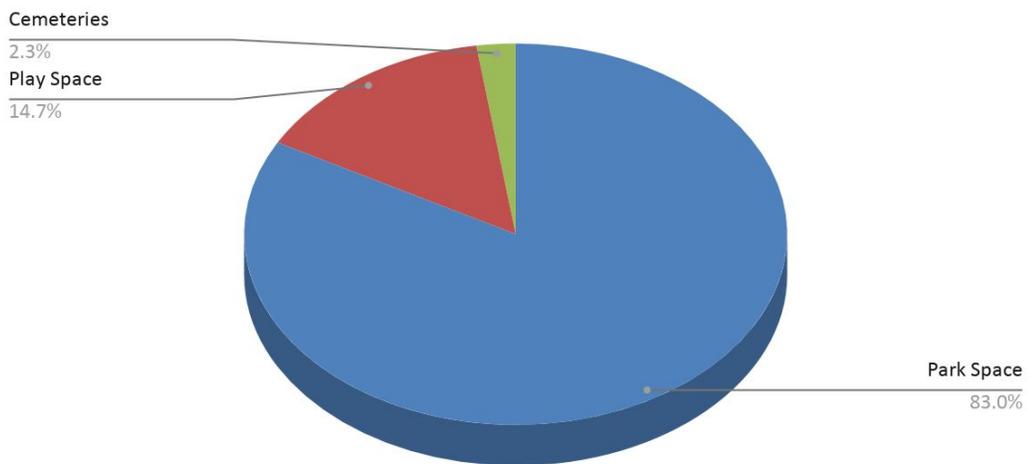
The average age of the Open Space Portfolio is 11 years with an expected asset life of 36 years. Based on the data provided, Open Space assets have only expended about one-third of their planned life. With regular maintenance and renewal, the asset can be sustained for its intended purpose.

Open Space Age and Expected Asset Life
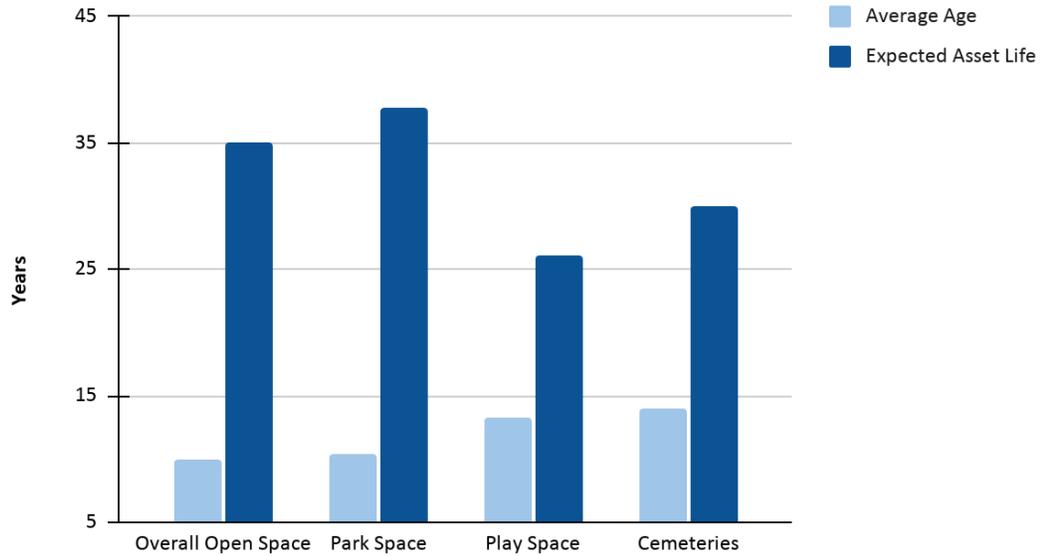
Most of the assets are in Good and Very Good physical condition. Cemeteries do not have any assets in poor and very poor condition, however with half of the cemetery assets in Fair condition, without reinvestment, these assets could slip in terms of their physical condition rating.

% Physical Condition Open Space
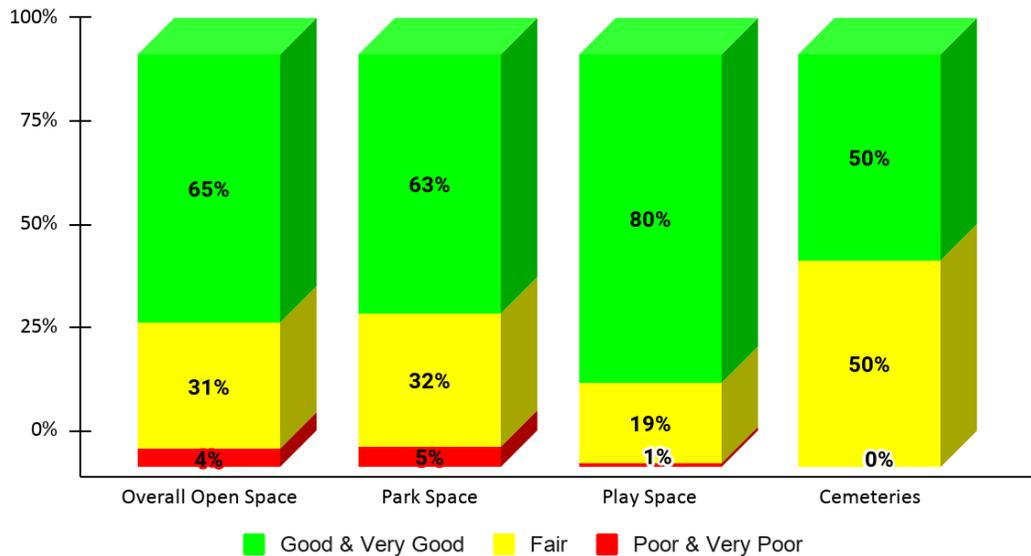
Facility Infrastructure

Facility Infrastructure consists of only two asset classes Affordable Housing ($444 million) and Buildings ($7.5 billion). This portfolio makes up 26.4% of the city-wide replacement value. There are over 950 buildings owned and managed by Edmonton and almost 1800 affordable housing units. Many of the 1800 units are developer owned, however, capital funding was provided by the City. Though these assets may not be outright owned by Edmonton, it is important to be aware of these asset types, and include them in the inventory as the City has inherent responsibility with regards to Affordable Housing.

Replacement Value Facility Infrastructure

Affordable Housing
5.6%

Buildings
94.4%
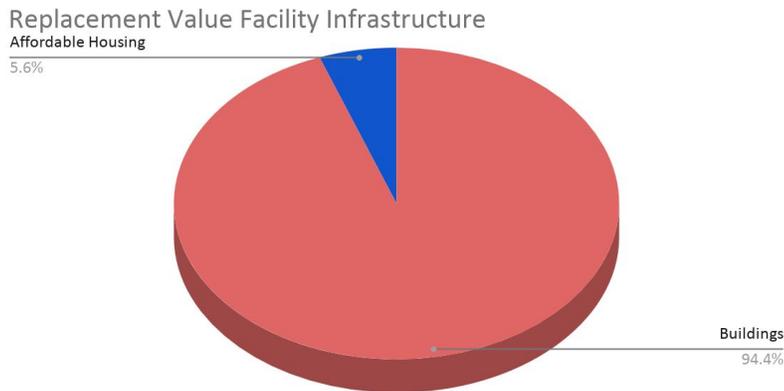
The average age of this portfolio is 36 years with an expected asset life of 44 years. As demonstrated by the graph, each asset class is nearing the end of its expected asset life. While renewal activities can assist in extending the life of the assets, eventually, these assets will need to be replaced as the cost to operate and maintain the aging assets will increase steeply toward the assets end of life.

Facilities Infrastrucure Age and Expected Asset Life

Average Age
Expected Asset Life

Years

Overall Facilities   Buildings   Affordable Housing
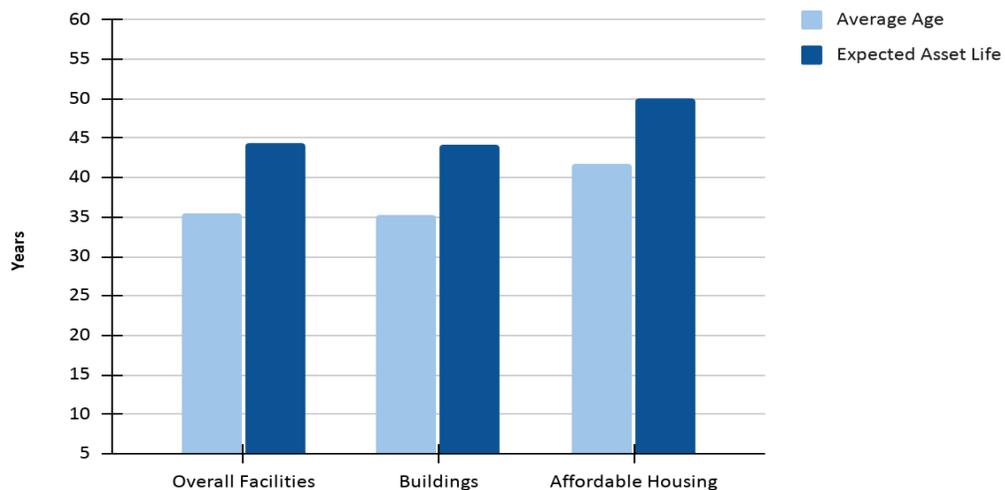
More than half of the assets in this portfolio are in Fair condition. However, Affordable Housing has 45% of its assets in Poor and Very Poor condition. While Affordable Housing is included within the City's inventory, it is important to note that maintenance and capital investment is a shared responsibility with various levels of government and service delivery partners.

As of the end of 2019, 45% of Affordable Housing assets are rated in Poor and Very Poor condition, as provided by the program operators. Based on recommendations from the Social Housing Regeneration Advisory Group, the City and its partners in social housing have embarked on a program of regenerating its housing assets, which will begin to reduce the number of assets in Poor and Very Poor condition. For reference, the City is currently undertaking a regeneration of 240 of its units in 2020, which when completed will reduce the percentage of assets in Poor and Very Poor by approximately 10%

Having affordable Housing assets listed in Poor or Very Poor condition does not indicate these assets are unsafe, just that components of these facilities are in a condition below established norms and have a higher likelihood of failure. The City, or other responsible partners will need to prepare for renewal or replacement as these components fail.

% Physical Condition Facilities Infrastructure

	Overall Facilities	Buildings	Affordable Housing
Good & Very Good	37.19%	36.97%	40.87%
Fair	59.11%	61.81%	13.81%
Poor & Very Poor	3.70%	1.22%	45.32%
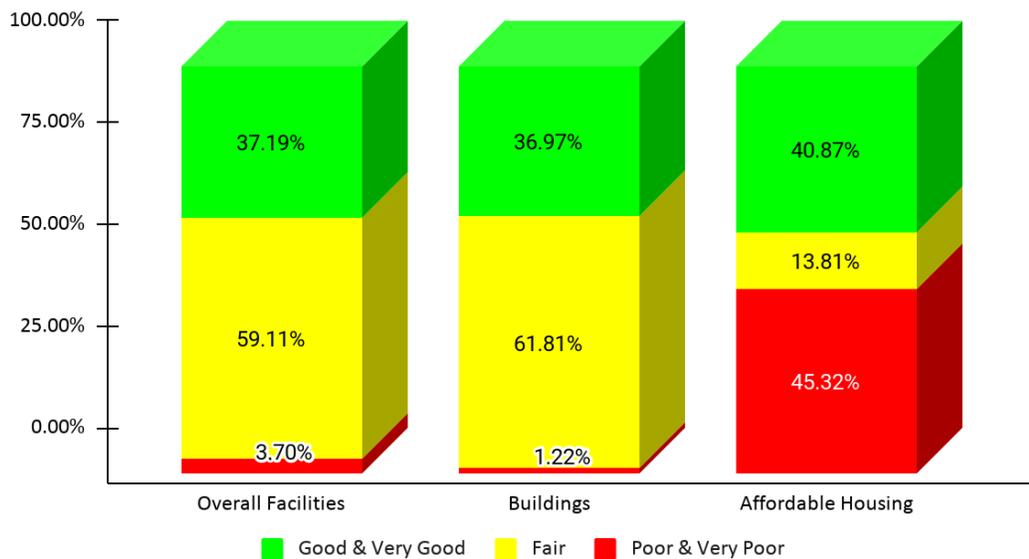
Service Delivery Infrastructure

Service Delivery is a new categorization of assets. This portfolio consists of Libraries assets, which contains materials and equipment supporting library service delivery ($97 million), Fire Rescue which contains technology and equipment supporting fire rescue service delivery ($28 million), Police ($174 million), Recreation, which includes the equipment and specialty assets within recreation facilities ($20 million) and Attractions, which are specialized sites containing multiple asset types combined to provide a service. Examples include golf courses, Edmonton Valley Zoo, Fort Edmonton Park and John Janzen Nature Centre ($125 million). These asset classes count the assets required to support the program. Examples include: Police radio equipment, library books, fire hoses, and even live animals at the zoo. The associated buildings, access, open space, fleet or other assets are counted under other portfolios.

Replacement Value Service Delivery

Library
21.8%

Attractions
28.1%

Fire Rescue
6.4%

Recreation
4.6%

Police
39.1%
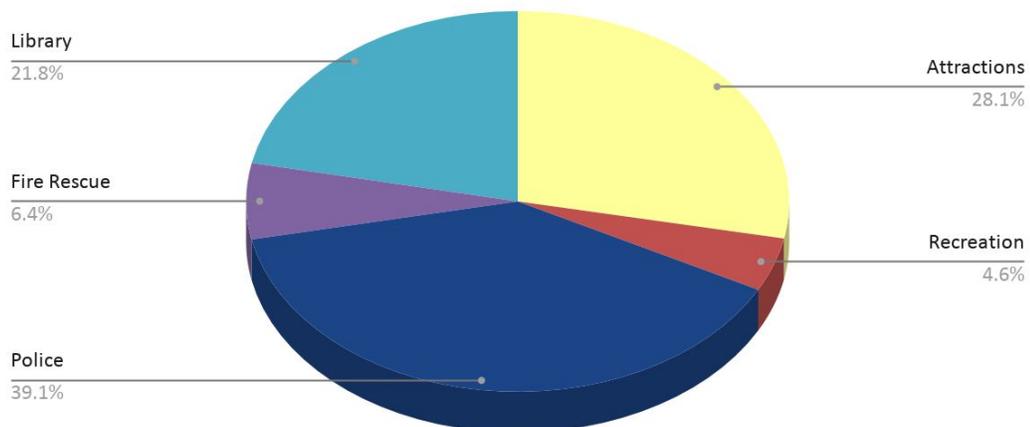
Both the average age and expected asset life of this portfolio are 15 years. Attractions have exceeded their life expectancy with an average of 39 years and an expected asset life of 26 years.

Service Delivery Age and Expected Asset Life
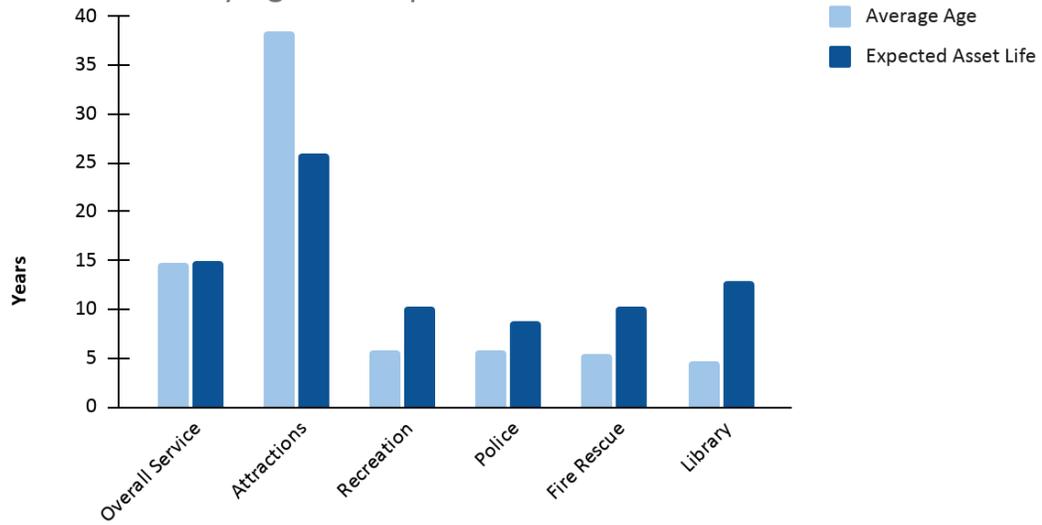
Overall the portfolio is in good shape in terms of physical condition with over half the assets in Good and Very Good Condition and 24% in Fair Condition. Fire Rescue and Recreation and Attractions are both over 85% of their assets in Good and Very Good Condition.

% Physcial Condition Service Delivery
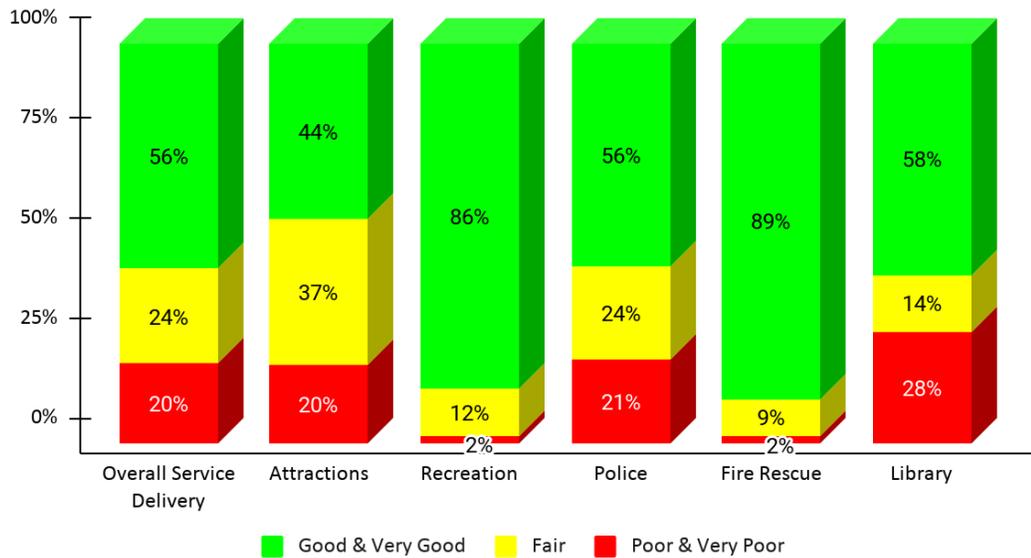
Ancillary Infrastructure

Ancillary Infrastructure is another new portfolio of assets that contain assets that have not been included in annual inventories in the past. This portfolio is flagged for continuous improvement and will continue to gather and refine the assets under its purview. The portfolio includes Engineered Drainage ($60 million), Fleet ($942 million), Barrier/Separation Infrastructure ($206 million), Signs and Signals ($1.3 billion) and Technology Equipment ($373 million).

Ancillary Infrastructure Replacement Value
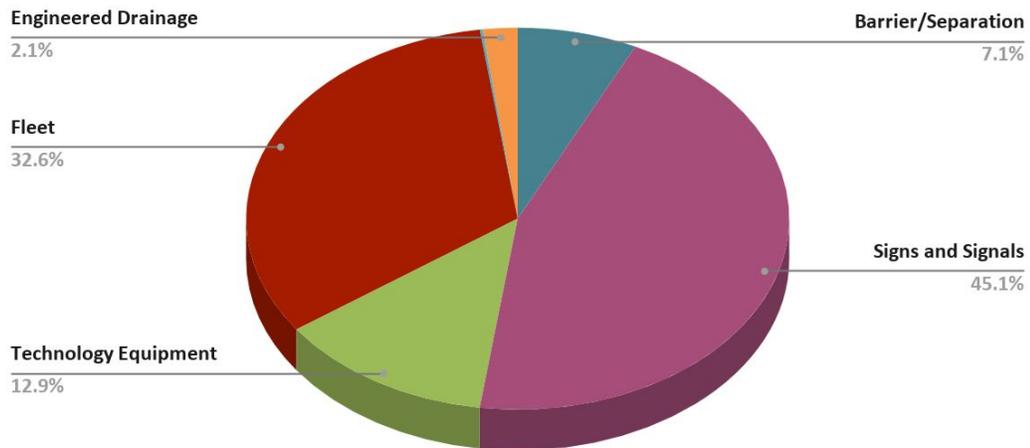
The expected age of this portfolio is 46 years with the average age of 17 years. Technology Equipment has a short expected asset life due to rapid changes within the industry. The average age of this asset class has exceeded the expected life, however, the asset class is still performing as intended.

Ancilary Infrastructure Age and Expected Asset Life
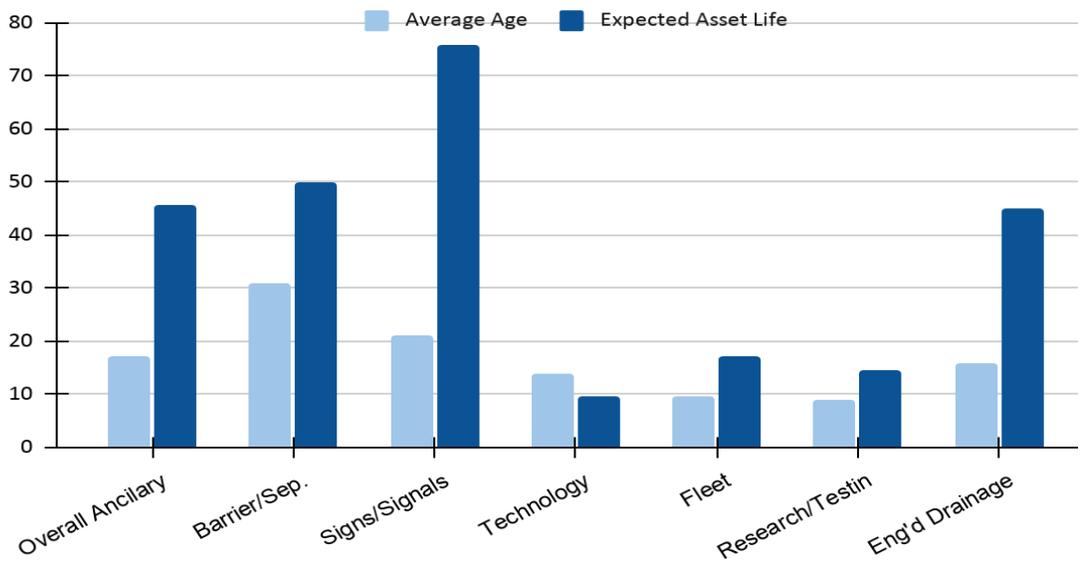
Overall Ancillary Infrastructure has two-thirds of its assets in Good and Very Good Condition. This portfolio has minimal assets in Poor and Very Poor condition.

% Physical Condition Ancilary Infrastructure
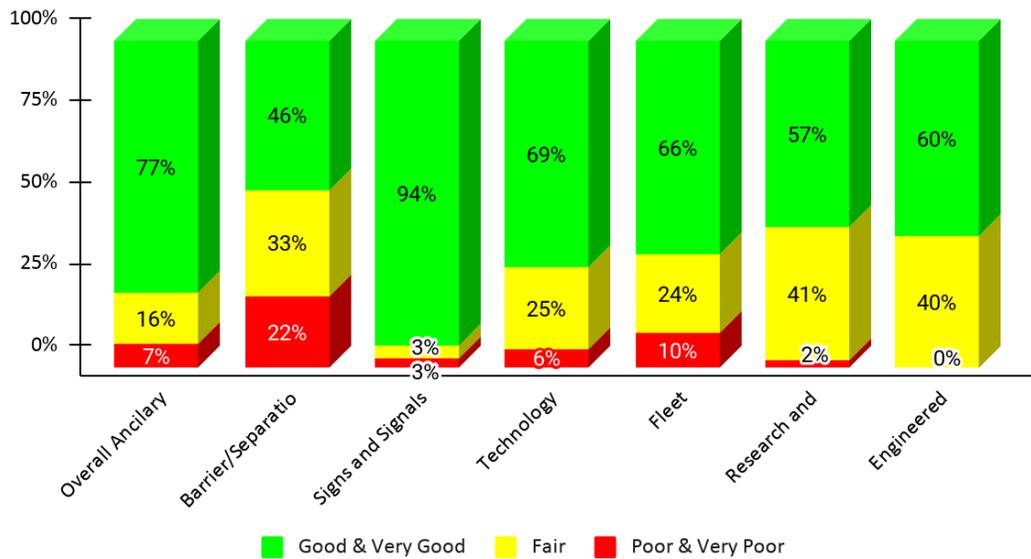
Utilities Infrastructure

The Utilities Infrastructure Portfolio has two asset classes; Waste Services ($263 million) and Renewable Energy ($10 million). Renewable Energy is a new asset to Edmonton mainly consisting of the assets recently installed at Blatchford. As district energy and Blatchford continue to grow it is expected that this asset class will continue to expand.

Utilities Infrastructure Replacement Value
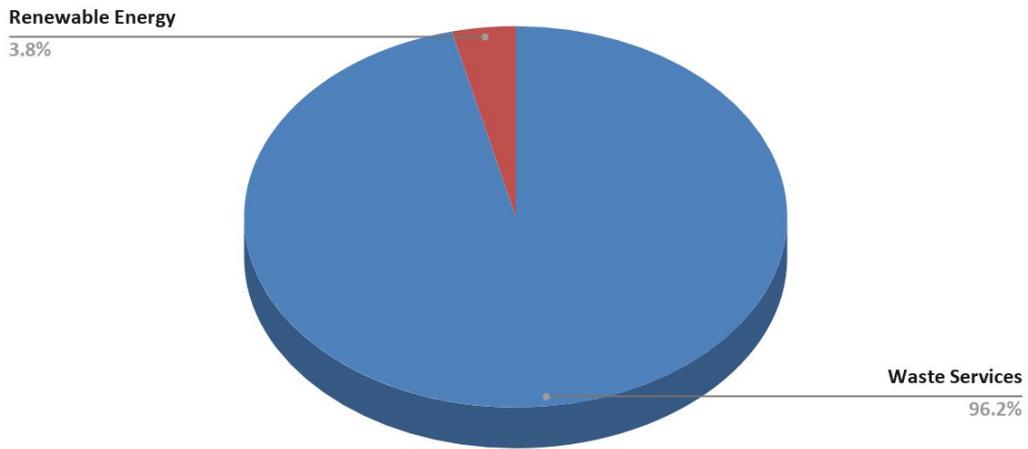
This portfolio has an average age of 9 years with an expected asset life of 23 years. Most of the Renewable Energy assets are less than one year old.

Utilities Infrastrucure Age and Expected Asset Life

Overall the physical condition of the assets within the portfolio is in Good and Very Good condition (74%). Minimal assets are in Poor and Very Poor condition. As mentioned, Renewable Energy assets are new and are in 100% Good and Very Good condition.

% Physical Condition Utilities Infrastructure
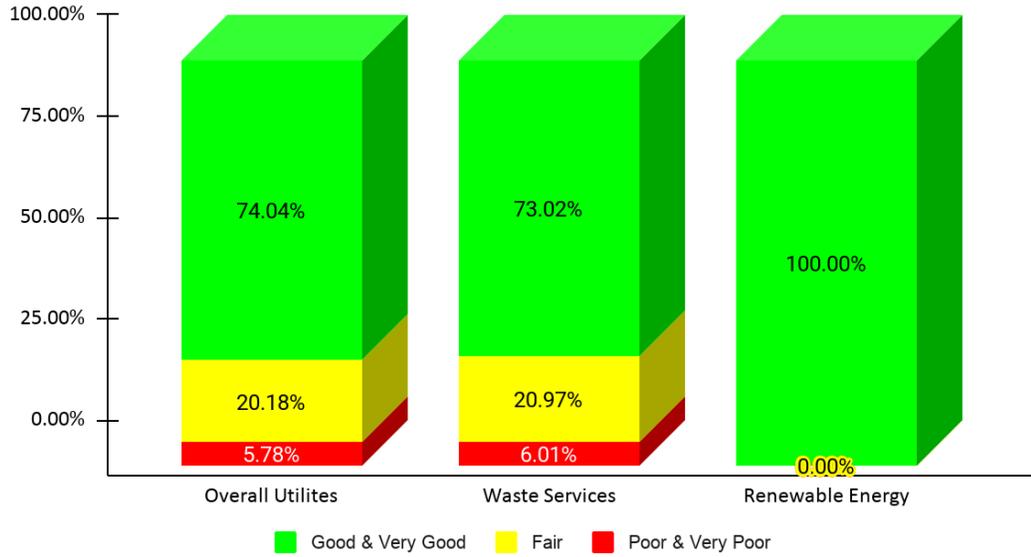
Appendix A - Inventory, State & Condition and Replacement Value

Infrastructure	Quantity	Unit of Measure	Average Age	Expected Asset Life	Physical Condition	Demand / Capacity	Functionality	Replacement Value
			(Note 1)	*(Note 1)*	*(Note 2)*	*(Note 2)*	*(Note 2)*	
					A+B / C / D+F	A+B / C / D+F	A+B / C / D+F	
		(#)	(Years)	(Years)	(%) *(Note 3)*	(%) *(Note 3)*	(%) *(Note 3)*	(millions)
Goods and People Movement								
Major Arterial	596.2	Lane km	30	22	78 / 20 / 2	35 / 38 / 27	99 / 0 / 1	$711
Minor Arterial	2927.2	Lane km	48	22	53 / 40 / 7	35 / 38 / 27	88 / 0 / 12	$2,914
Local Roads	4830.30	Lane km	38	28	70 / 17 / 13	100 / 0 / 0	95 / 0 / 5	$3,461
Collector Roads	1763.10	Lane km	35	20	62 / 34 / 5	80 / 13 / 7	96 / 0 / 4	$1,888
Alleys	1192.7	Lane km	30	28	20 / 16 / 64	100 / 0 / 0	99 / 0 / 1	$501
Service Roads	56690	metres	10	30	46 / 37 / 17	100 / 0 / 0	46 / 37 / 17	$139
Roads	61,977	varies	39	24	61 / 28 / 11	72 / 17 / 12	93 / 1 / 7	$9,614
Roadway Bridges	73427	sq m	62	57	37 / 50 / 13	35 / 38 / 27	99 / 0 / 1	$749
Rail Bridges	92972	sq m	35	57	50 / 44 / 6	35 / 38 / 27	99 / 0 / 1	$530
Pedestrian Bridges	34485	sq m	39	57	38 / 51 / 11	35 / 38 / 27	99 / 0 / 1	$248
Culvert	5234	sq m	38	57	26 / 70 / 5	0 / 0 / 0	0 / 0 / 0	$24
Below Grade Structure	30330	sq m	34	57	21 / 78 / 1	35 / 38 / 27	99 / 0 / 1	$282
Bridges	241,198	sq m	46	57	39 / 53 / 9	35 / 38 / 27	99 / 0 / 1	$1,862
Neighborhood Sidewalks	4842	KM	36	60	70 / 18 / 12	100 / 0 / 0	91 / 0 / 9	$1,754
Arterial Sidewalks	725.6	KM	36	60	85 / 12 / 3	100 / 0 / 0	91 / 0 / 9	$241
Active Modes	5,568	KM	36	60	71 / 18 / 11	100 / 0 / 0	91 / 0 / 9	$1,995
Fare Collection	241	each	10	14	37 / 41 / 22	35 / 48 / 17	0 / 7 / 93	$10
LRT Specialized Equipment	48	varies	34	34	80 / 10 / 11	85 / 8 / 7	81 / 11 / 7	$24
LRT Line	380	varies	15	35	68 / 14 / 17	84 / 7 / 9	74 / 16 / 10	$748
Communications	104	varies	22	26	34 / 11 / 54	37 / 10 / 53	36 / 3 / 61	$143
Light Rail Vehicles	94	each	22	20	41 / 40 / 19	78 / 14 / 7	90 / 10 / 0	$564
Light Rail Transit (LRT)	866	varies	18	28	55 / 24 / 21	77 / 11 / 13	76 / 12 / 12	$1,489
Bus on-board Equipment	3,380	each	19	16	39 / 13 / 49	34 / 66 / 0	46 / 16 / 38	$49
Bus Stops	7,546	each	17	18	58 / 23 / 20	66 / 18 / 16	66 / 14 / 20	$103
Transit Bus System	11,503	each	17	17	52 / 19 / 29	56 / 33 / 11	59 / 15 / 26	$152
Goods and People Movement			37	33	59 / 29 / 12	71 / 17 / 12	91 / 2 / 7	$15,113
Open Space								
Horticulture	2,442,232	varies	12	44	69 / 24 / 6	19 / 22 / 59	24 / 52 / 107	$1,183
Parks Access and Circulation	935,822	varies	8	26	54 / 40 / 6	91 / 8 / 1	62 / 33 / 6	$619
Park Structures	803,121	varies	6	20	50 / 48 / 2	100 / 0 / 0	99 / 0 / 1	$321
Bioretention and / or Hydro Feature	158,188	varies	15	70	25 / 69 / 7	100 / 0 / 0	80 / 13 / 7	$21
Furniture	20,509	each	4	21	79 / 19 / 3	100 / 0 / 0	99 / 0 / 1	$61
Park Space	4,370,844	varies	10	38	63 / 32 / 5	48 / 26 / 26	70 / 26 / 4	$2,700
Park Utilities	10,972	each	13	50	68 / 30 / 2	18 / 82 / 0	99 / 0 / 1	$495
Play Areas	289,844	varies	16	27	89 / 10 / 0	72 / 9 / 19	72 / 19 / 10	$357
Sports Fields / Fixtures	5,541	each	7	21	38 / 60 / 2	62 / 3 / 35	38 / 60 / 2	$76

Protection Elements	334,376	varies	6	24	72 / 25 / 3	0 / 100 / 0	76 / 23 / 0	$46
Play Space	629,761	varies	13	26	80 / 19 / 1	64 / 16 / 20	67 / 26 / 8	$478
Cemeteries	8	Each	14	30	50 / 50 / 0	90 / 10 / 0	90 / 10 / 0	$76
Open Space			11	36	65 / 31 / 4	51 / 25 / 24	70 / 25 / 5	$3,254
Service Delivery								
Fitness and Wellness Equipment	1,886	each	4	11	97 / 3 / 0	100 / 0 / 0	100 / 0 / 0	$7
General Equipment	19,857	each	7	10	83 / 16 / 1	92 / 8 / 0	89 / 11 / 0	$7
Program Equipment	38,761	each	7	11	78 / 15 / 7	91 / 4 / 5	95 / 1 / 5	$4
Small Hand tools	2,004	each	6	7	74 / 26 / 0	98 / 1 / 1	99 / 1 / 0	$2
Recreation	62,508	each	6	10	86 / 12 / 2	95 / 4 / 1	95 / 4 / 1	$20
Library Contents	376,401	sq ft	13	40	77 / 16 / 7	89 / 11 / 1	86 / 13 / 1	$21
Library Materials	1,307,375	units	2	5	54 / 12 / 34	80 / 20 / 0	80 / 20 / 0	$65
Library Vehicles	11	units	6	10	92 / 5 / 3	100 / 0 / 0	93 / 7 / 0	$1
Library Information Technology	1,264,368,000,000	each	4	6	38 / 26 / 36	66 / 24 / 9	60 / 35 / 6	$10
Library			5	13	58 / 14 / 28	81 / 18 / 1	79 / 20 / 1	$97
Police Vehicles	1,004	each	4	10	62 / 18 / 19	62 / 18 / 19	62 / 18 / 19	$56
Communications	3,577	each	9	8	61 / 36 / 2	61 / 36 / 2	61 / 36 / 2	$29
Police Technology Equipment	10,577	each	4	8	45 / 23 / 32	57 / 20 / 23	31 / 42 / 27	$64
Police Special Equipment	4,383	each	9	10	60 / 23 / 17	60 / 23 / 17	60 / 23 / 17	$25
Police	19,541	each	6	9	56 / 24 / 21	60 / 23 / 17	50 / 31 / 19	$175
Communication Equipment	1,457	each	3	8	100 / 0 / 0	100 / 0 / 0	100 / 0 / 0	$8
Personal Fire Specialized Equipment	3,417	each	1	9	100 / 0 / 0	100 / 0 / 0	100 / 0 / 0	$8
Specialty Team equipment	886	each	11	11	95 / 5 / 0	98 / 0 / 2	98 / 0 / 2	$2
Fitness / Wellness Equipment	36	facilities	5	10	80 / 15 / 5	95 / 5 / 0	95 / 5 / 0	$2
On-board Equipment	90	each	11	13	70 / 25 / 5	70 / 15 / 15	80 / 15 / 5	$9
Specialized Traffic Equipment	1	lot	1	15	100 / 0 / 0	100 / 0 / 0	100 / 0 / 0	$1
Fire Rescue	5,887	varies	6	10	89 / 9 / 2	90 / 5 / 5	93 / 5 / 2	$29
Golf Courses	436,171	varies	46	22	40 / 40 / 20	0 / 31 / 69	40 / 60 / 0	$85
Valley Zoo	16,503	varies	24	34	53 / 27 / 20	70 / 10 / 20	72 / 7 / 22	$38
John Janzen Nature Centre	864	each	11	23	17 / 80 / 3	68 / 31 / 1	97 / 3 / 0	$2
Attractions	453,537	varies	39	26	44 / 37 / 20	22 / 24 / 53	50 / 43 / 7	$125
Service Delivery			15	15	56 / 24 / 20	57 / 20 / 22	61 / 29 / 10	$446
Ancillary Infrastructure								
Roadside Barrier	99,113	varies	25	50	53 / 34 / 13	100 / 0 / 0	53 / 27 / 20	$73
Roadside structures	50,409	metres	34	50	42 / 32 / 26	0 / 0 / 0	0 / 0 / 0	$133
Barrier/Separation Infrastructure	149,522	varies	31	50	46 / 33 / 22	100 / 0 / 0	53 / 27 / 20	$206
Parking Meters	481	each	5	8	100 / 0 / 0	100 / 0 / 0	100 / 0 / 0	$4
Street Lighting	100,180	each	22	77	100 / 0 / 0	0 / 0 / 0	0 / 0 / 0	$999
Traffic Signals	6,084	each	22	90	73 / 14 / 13	0 / 0 / 0	73 / 14 / 13	$183

Traffic Signs	166,977	each	16	47	72 / 17 / 10	0 / 0 / 0	72 / 17 / 11	$117
Signs and Signals	273,722		21	76	94 / 3 / 3	100 / 0 / 0	73 / 15 / 12	$1,304
Emergency Response Vehicles	130	each	7	15	84 / 13 / 2	98 / 2 / 0	100 / 0 / 0	$106
Municipal Department Vehicles	1,676	each	6	9	64 / 20 / 17	91 / 9 / 0	100 / 0 / 0	$160
Shop Equipment	561	each	10	20	75 / 7 / 18	82 / 13 / 5	82 / 13 / 5	$96
Transit Buses	1,027	each	11	19	61 / 30 / 9	99 / 1 / 0	99 / 1 / 0	$581
Fleet	3,394	each	10	17	66 / 24 / 10	96 / 3 / 0	98 / 2 / 0	$943
Desktops & Mobile Equipment	29,517	each	5	6	70 / 24 / 7	86 / 10 / 4	86 / 10 / 4	$13
Servers	120	each	3	5	73 / 18 / 10	73 / 18 / 10	95 / 3 / 2	$20
Storage	5,791	varies	3	6	93 / 0 / 7	93 / 0 / 7	93 / 0 / 7	$7
Data Centre Facilities	77	each	2	7	93 / 7 / 0	93 / 7 / 0	93 / 7 / 0	$5
IT Equipment	245	#	5	9	66 / 28 / 6	66 / 34 / 0	66 / 28 / 6	$0
Network & Communication	143,088	varies	9	19	65 / 15 / 20	65 / 15 / 20	65 / 15 / 20	$36
Software & Applications	483		16	9	69 / 27 / 4	55 / 43 / 2	44 / 50 / 6	$293
Technology Equipment	179,321		14	10	69 / 25 / 6	59 / 36 / 5	52 / 41 / 7	$373
Geotechnical Lab	1	each	12	20	77 / 20 / 3	95 / 5 / 0	92 / 8 / 0	$0
Concrete Lab	1	each	12	20	84 / 15 / 1	86 / 13 / 1	86 / 13 / 1	$1
Density Lab	1	each	9	22	82 / 10 / 8	92 / 0 / 8	90 / 3 / 8	$0
Environmental Lab	1	each	12	20	75 / 20 / 5	100 / 0 / 0	75 / 20 / 5	$0
Asphalt Lab	1	each	10	16	84 / 14 / 2	95 / 3 / 2	92 / 6 / 2	$1
Binder Lab	1	each	8	13	85 / 10 / 6	85 / 10 / 6	85 / 10 / 6	$1
Field testing equipment	3	unit	11	16	20 / 80 / 0	0 / 100 / 0	0 / 0 / 0	$2
Research and Testing	9	varies	9	15	57 / 41 / 2	91 / 6 / 3	87 / 10 / 3	$5
Snow Storage Sites	5	facilities	16	45	60 / 40 / 0	60 / 40 / 0	60 / 40 / 0	$60
Engineered Drainage	5	facilities	16	45	60 / 40 / 0	60 / 40 / 0	60 / 40 / 0	$60
Ancillary Infrastructure			17	46	77 / 16 / 7	93 / 7 / 1	77 / 15 / 8	$2,891
Facilities Infrastructure							
Office Buildings	35	#	43	45	9 / 90 / 1	55 / 43 / 2	74 / 23 / 2	$368
Ambulance	7	#	31	45	49 / 51 / 0	100 / 0 / 0	57 / 30 / 13	$19
Ice Arena	17	#	43	35	72 / 28 / 0	56 / 25 / 19	48 / 32 / 20	$762
Assembly/Gallery/Museum/Theatre	12	#	47	45	0 / 100 / 0	8 / 89 / 3	13 / 11 / 76	$695
Clubhouse/Senior Centre	25	#	48	45	32 / 62 / 6	67 / 27 / 6	80 / 14 / 6	$125
Commercial	61	#	49	45	17 / 79 / 5	4 / 69 / 27	4 / 69 / 27	$477
Fire Station	30	#	31	45	48 / 52 / 0	90 / 6 / 4	41 / 51 / 8	$184
Fort Edmonton	109	#	35	50	51 / 47 / 1	43 / 33 / 24	22 / 0 / 78	$57
Historic	20	#	95	45	0 / 94 / 6	4 / 96 / 0	4 / 96 / 0	$69
Fitness Facility	22	#	27	35	66 / 34 / 0	44 / 43 / 13	41 / 57 / 2	$983
Swimming Pool	11	#	43	35	13 / 87 / 0	44 / 43 / 13	41 / 57 / 2	$98
Library	14	#	26	45	37 / 63 / 0	98 / 2 / 0	38 / 62 / 0	$201
LRT Stations	37	#	24	64	27 / 73 / 0	73 / 27 / 0	100 / 0 / 0	$605
Mechanical/Electrical	20	#	32	30	77 / 23 / 0	0 / 100 / 0	0 / 100 / 0	$5
Parkade	6	#	35	45	0 / 100 / 0	100 / 0 / 0	100 / 0 / 0	$292
Police	18	#	19	45	42 / 58 / 0	26 / 8 / 66	26 / 8 / 66	$340

Residential	70	#	62	45	0 / 100 / 0	19 / 41 / 40	19 / 40 / 41	$22
Restroom	43	#	36	45	20 / 67 / 13	12 / 70 / 18	26 / 49 / 25	$15
Service and Operations	87	#	33	45	59 / 35 / 6	46 / 42 / 12	51 / 38 / 11	$797
Shelter	69	#	17	45	49 / 49 / 2	73 / 24 / 3	14 / 84 / 2	$17
Stadium	2	#	30	45	3 / 97 / 0	5 / 1 / 94	6 / 0 / 94	$209
Storage	97	#	30	45	20 / 80 / 0	36 / 9 / 55	39 / 17 / 44	$106
Structures	16	#	35	45	72 / 28 / 0	21 / 57 / 22	21 / 57 / 22	$104
Training Centre	4	#	27	45	43 / 57 / 0	100 / 0 / 0	64 / 36 / 0	$32
Transit Bus Facility	18	#	16	45	96 / 4 / 0	73 / 27 / 0	100 / 0 / 0	$24
Vehicle Repair/Vehicle Storage	27	#	32	45	29 / 71 / 0	38 / 31 / 31	50 / 19 / 31	$771
Visitor Centre	21	#	31	45	54 / 42 / 4	47 / 39 / 14	47 / 39 / 14	$43
Wash/Fuel Facility	11	#	24	45	41 / 46 / 12	70 / 30 / 0	31 / 52 / 17	$7
Zoo	48	#	18	45	53 / 46 / 1	19 / 81 / 0	12 / 7 / 81	$31
Buildings	957	#	35	44	37 / 62 / 1	45 / 38 / 18	46 / 31 / 24	$7,458
Partnership Housing	1,797	units	42	50	41 / 14 / 45	50 / 45 / 5	50 / 45 / 6	$444
Affordable Housing	1,797	units	42	50	41 / 14 / 45	50 / 45 / 5	50 / 45 / 6	$444
Facilities Infrastructure			36	44	37 / 59 / 4	45 / 38 / 17	46 / 31 / 23	$7,903
Utilities								
Vehicles & Equipment	353	units	8	13	65 / 29 / 6	93 / 4 / 2	95 / 2 / 2	$104
Waste Processing	143,008	varies	10	27	79 / 16 / 4	51 / 44 / 6	87 / 11 / 3	$135
Roads, Utilities and Site Equipment	173,603	varies	12	31	81 / 16 / 2	94 / 6 / 0	97 / 2 / 1	$19
Landfill	3	each	23	27	29 / 0 / 71	100 / 0 / 0	0 / 60 / 40	$5
Waste Services	316,967	varies	9	22	73 / 21 / 6	72 / 25 / 4	89 / 8 / 3	$263
Energy Distribution	98	varies	1	42	100 / 0 / 0	100 / 0 / 0	100 / 0 / 0	$10
Renewable Energy	98	varies	1	42	100 / 0 / 0	100 / 0 / 0	100 / 0 / 0	$10
Utilities			9	23	74 / 20 / 6	73 / 24 / 4	89 / 7 / 3	$274
Total			31	37	56 / 36 / 9	64 / 22 / 14	75 / 14 / 11	$29,880

1. The average age and expected asset life for the infrastructure totals are rounded off to the nearest 5 years.
2. A + B = Very Good and Good
C = Fair
D + F = Poor + Very Poor
3. %'s may not add exactly to 100% due to rounding.

Appendix B - Assessment Classification

Physical Condition Classification

MARK	STATE	DESCRIPTION
A	Very Good	The element is physically sound and is performing its function as originally intended. Required maintenance costs are well within standards and norms. Typically, the element is new or recently rehabilitated.
B	Good	The element is physically sound and is performing its function as originally intended. Required maintenance costs are within acceptable standards and norms but are increasing. Typically, an element has been used for sometime but is within mid-stage of its expected life.
C	Fair	The element is showing signs of deterioration and is performing at a lower level than originally intended. Some components of the element are becoming physically deficient. Required maintenance costs exceed acceptable standards and norms but are increasing. Typically, element has been used for a long time and is within the later stage of its expected life.
D	Poor	The element is showing significant signs of deterioration and is performing to a much lower level than originally intended. A major portion of the element is physically deficient. Required maintenance costs significantly exceed acceptable standards and norms. Typically, an element is approaching the end of its expected life.
F	Very Poor	The element is physically unsound and/or not performing as originally intended. Element has higher probability of failure or failure is imminent. Maintenance costs are unacceptable and rehabilitation is not cost effective. Replacement / major refurbishment is required.

Demand/Capacity Classification

MARK	STATE	DESCRIPTION
A	Very Good	Demand corresponds well with design capacity and no operational problems experienced.
B	Good	Demand is within design capacity and occasional operational problems experienced.
C	Fair	Demand is approaching design capacity and/or operational problems occur frequently.
D	Poor	Demand exceeds design capacity and/or significant operational problems are evident.
F	Very Poor	Demand exceeds design capacity and/ or operational problems are serious and ongoing.

Functionality Classification

MARK	STATE	DESCRIPTION
A	Very good	The element meets all program/service delivery needs in a fully efficient and effective manner.
B	Good	The element meets program/service delivery needs in an acceptable manner
C	Fair	The element meets most program/service delivery needs and some inefficiencies and ineffectiveness present
D	Poor	The element has a limited ability to meet program/service delivery needs
F	Very Poor	The element is critically deficient and does not meet program/service delivery and is neither efficient nor effective.