Region of Waterloo

Region of Waterloo

2015 Asset Management Plan

September 13, 2016

This Document is Available in an Alternate Format Upon Request

Executive Summary

Introduction

The Asset Management Plan (AM Plan) is a long range planning document which is intended to improve the Region of Waterloo's (the Region's) ability to meet its corporate goals and objectives in a way that best serves its customers. It outlines the asset activities for each service area and provides a guide to understanding key items such as:

- Alignment with the Region's strategic goals
- The value and condition of Region's asset portfolio
- Levels of service and performance measures
- Management techniques to assist in making long term funding decisions
- Lifecycle activities to operate, maintain, renew, develop and dispose of assets
- Budget forecasts for growth and renewal to sustain the Region's asset portfolio

The AM Plan relies on input from strategic and master plans, and forms the base framework or tool to assist the Region in developing appropriate direction and inputs to budget forecasts, annual 10-year capital and 1-year operating programs, and long range financial plans.

While the Region has a long history of implementing advanced asset management practices that incorporate both asset renewal, enhanced operation and maintenance practices, policies, and programs, there has also been a legislative and regulatory push for the development of formal asset management plans which formalize these strategies. Legislative and regulatory requirements for Asset Management Plans include the following:

- Province of Ontario – Water Opportunities and Water Conservation Act
- Province of Ontario - Municipal Infrastructure Strategy
- Province of Ontario - Development Charges Act
- Province of Ontario - Infrastructure for Jobs and Prosperity Act
- Federal Gas Tax Funding
- Transport Canada – Airports

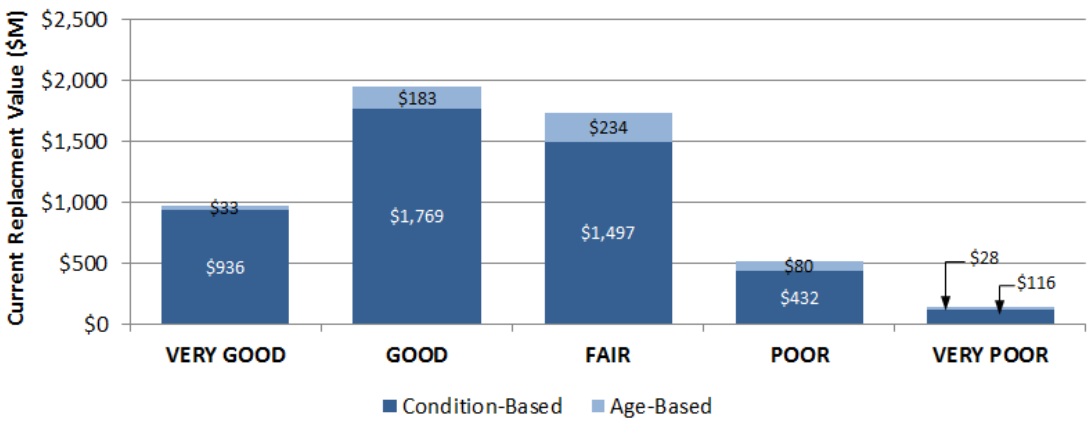
This legislation stipulates that an Asset Management Plan must be completed, approved by Council, and made available publicly by December 2016 in order to be eligible to apply for grants. This plan has been developed closely following the Provincial guidelines to ensure that it meets the requirements for funding applications.

State of Local Infrastructure

The AM Plan describes the Region's asset portfolio by service area, asset type, condition and replacement value. The Region owns assets with a total replacement value of approximately $5.3 billion covering a wide range of different asset types. In 2015, the Region invested approximately $125 million to renew assets to enable the Region to meet current service levels. The breakdown of asset valuation for each division is outlined in the table below.

Service Area	Replacement Cost ($2015)
Transportation	$1,629,000,000
Water Services	$1,970,000,000
Waste Management	$133,000,000
Airport	$49,000,000
Grand River Transit	$154,000,000
Facilities	$1,342,000,000
Fleet	$43,000,000
TOTALS	**$5,320,000,000**

The AM Plan identifies that the Region's assets are well managed and currently in reasonable condition with approximately 88% of the Region's assets in fair or better condition. The chart below illustrates the distribution of assets, by condition and by asset value. There are a significant number of assets in fair condition (approximately $1.729 billion), which identifies a significant need for future renewal before those assets drop to poor or very poor condition.



The AM Plan also identifies approximately $645 million in assets that are in poor or very poor condition. This represents the assets that are scheduled for replacement within the first few years of the 10-year capital program. This is also representative of the “run to failure” strategy that is currently in place for equipment that can quickly and easily be replaced or that has redundancy, so the failure and subsequent replacement does not impact service delivery.

Levels of Service

Legislative and technical levels of service have been identified in the AM Plan. Performance indicators and targets have been stated to describe, quantify, and communicate the services that regulators expect and customers want based on community input to the Corporate Strategic Plan. The measures noted in the plan confirm we are meeting or approaching these target service levels.

Asset Management Strategy

The Region’s ability to deliver the levels of service outlined in the AM Plan are impacted by future population growth, resulting in a need for additional infrastructure, and addressing the aging infrastructure, which will increase future renewal, operation and maintenance needs.

Asset condition, performance and relative importance are identified through risk assessments. Required work can then be prioritized based on the relative risks of the assets. Consistent maintenance and renewal strategies are required and must be followed to minimize those risks.

The current strategies that are being applied include:

- Investment in demand reduction solutions such as education and conservation programs, smoothing peaks and balancing asset use.
- Optimising management costs through sharing of assets and coordinating work between internal service areas and local municipalities.
- Identification of expansion and investment needs through increased and comprehensive master planning for all service areas and asset types as

discussed in the Long-term Financial Sustainability Initiatives Report (COR-FSD-16-04, dated Feb 2, 2016).

- Identification of renewals needs and investment through the development of comprehensive asset inventories and condition assessments, which are used to develop medium and long term capital plans.
- Maintenance and operations needs and investment which are assessed and prioritized based on criticality and reliability. Routine preventative maintenance activities are completed to ensure preservation of existing assets. Operational and maintenance requirements are considered when planning new infrastructure.

By applying these strategies, the Region is currently meeting identified legislated and customer levels of service, however some internal performance targets are not being met, specifically the delivery of work within the anticipated timeframes. All necessary work is being completed, but often not in the year that was planned. This can result in increased operation and maintenance costs. Deferring renewal work can also lead to earlier deterioration of assets, increasing costs faster than inflation.

Financing Strategy

The financial strategy integrates asset management planning with financial planning and budgeting. Financial management principles for asset intensive organizations include recognizing the consumption of asset service potential (degradation of assets), categorizing expenditure by lifecycle activity, allocating costs to assets as far as practical, preparing long term forecasts, cost-effective financing, and effective reporting of financial performance.

The AM Plan identifies long-term funding needs by service area. It forecasts that the long-term (100-year) average investment needed to maintain current assets is $185.4 million. It also indicates that an annual average of $139.8 million is included in the 10-year capital program. While it is clear that there is some gap between the long-term forecast and what is being budgeted, at this point it is difficult to accurately determine that gap. This is for a number of reasons. Part of this is in the timing of asset lifecycle replacements. Some 10-year periods may be significantly higher than the 100-year average while others may be significantly lower. Also, more work is needed to develop complete asset inventories and comprehensive condition assessments. Every asset should have a planned replacement date and financing strategy. As more information is gathered and analysis done, a better assessment of the gap can be completed and then reported to Council. Through a future budget process staff would present a budget addressing the gap and Council can approve that budget as appropriate.

Regional Council has approved the capital financing principle that asset renewal projects should be financed through reserves and current year revenues from property tax and user rate sources, and not through borrowing, as set out in the Corporate Financing Principles Report (COR-FSD-16-16, dated Jun 14, 2016). The AM Plan clearly identifies these current and long term funding needs.

Regional Council ultimately controls the financial aspect of the AM Plan by approving the strategy included in the Plan, approving service levels and approving the budget to support the plan and service levels.

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Introduction

Goals of the Region of Waterloo

The Region of Waterloo (the Region) is located in Southwestern Ontario, approximately 90km west of Toronto. The Region includes a number of urban and rural local municipalities including the Cities of Cambridge, Kitchener, and Waterloo and the Townships of North Dumfries, Wellesley, Wilmot, and Woolwich. Together, the Region, Cities and Townships serve a population of just over half a million people – making the Region of Waterloo the fourth largest urban area in Ontario and tenth largest in Canada.

The Region's Strategic Plan is the foundation that supports all other plans, policies, and programs. It provides focus to guide actions and future decisions. It is a long-term planning document that directs the Region's priority setting. The focus areas identified in the Strategic Plan 2015-2018 are as follows:

- **Thriving Economy**: The Region will support the work of the Waterloo Region Economic Development Corporation to achieve a shared vision for our economic prosperity that is locally rooted, internationally competitive and globally recognized. The Region will plan for and provide the infrastructure and services necessary to create the foundation for innovation and economic success.
- **Sustainable Transportation**: The Region will offer more travel choices to residents, and strive to ensure that our transportation system is affordable and environmentally sustainable. The transportation network will be integrated and accessible and will contribute positively to urban intensification and economic prosperity. The Region will encourage more active transportation by enhancing facilities that make it more comfortable and convenient to walk and cycle in our community.
- **Environment and Sustainable Growth**: The Region plays a key role in protecting and enhancing the natural environment including, clean air, water and land, and protected green spaces and sensitive environmental features. The Region will work in partnership with the community and local municipalities to manage growth in environmentally sustainable ways and create spaces and places that enhance living, working and travelling experiences for the community.
- **Healthy, Safe and Inclusive Communities**: The Region plays a key role in protecting and enhancing the natural environment including, clean air, water and land, and protected green spaces and sensitive environmental features. The Region will work in partnership with the community and local municipalities to manage growth in environmentally sustainable ways and create spaces and places that enhance living, working and travelling experiences for the community.
- **Responsive and Engaging Government Services**: The Region will strive to inspire public trust by engaging citizens and collaborating with

community partners to foster meaningful and open conversations about Regional programs and services. The Region will attract, recruit and retain a skilled, engaged and caring workforce that delivers excellent citizen-centered services to meet the diverse needs of the community. Organizational processes, facilities and resources will be reliable, cost efficient and effective, and will strive to provide excellent value to the community.

Infrastructure is the foundation for the Region's economic development, competitiveness, prosperity, reputation and the overall quality of life for its residents. As population continues to grow to a projected 729,000 by 2031, as indicated in the Regional Official Plan, it becomes increasingly important to ensure that the infrastructure that supports the goals of the community and services provided by the Region are sustainable, affordable and reliable.

Asset Management at the Region of Waterloo

The Region defines asset management as "an integrated set of processes and best practices that minimizes the lifecycle costs of owning, operating, and maintaining assets, at an acceptable level of risk, while continuously delivering established levels of service".

In 2011, Transportation & Environmental Services (TES) and Facilities & Fleet Management (FFM) began a Corporate Asset Management Strategy Project with the objective of developing asset management best practices that would be shared across all Regional departments. Outcomes of the project included asset management implementation plans for TES and FFM, completed in 2012.

In 2015, a Corporate Asset Management Governance Structure was implemented to build on the structure used during the Corporate Asset Management Strategy Project to ensure that there is a single consistent corporate direction and that consistent processes are applied across the various program areas.

An Asset Management Steering Committee (AMSC), consisting of the Commissioners and two (2) Directors each from Corporate Services (CS) and Transportation & Environmental Services (TES), has been created. The AMSC provides overall direction to the asset management program.

An Asset Management Implementation Group (AMIG) was formed to support the governance structure which includes representation from the operating divisions, Finance (procurement and corporate finance), Human Resources and Information Technology (IT). The AMIG provides input, general project direction, ensures acceptance and buy-in to asset management principles, and coordinates the work across departments and divisions. Staff within each division gathers information, provides comments, tests concepts and strategies, and completes the actual asset management activities.

The Region has adopted a **Corporate Asset Management Policy** and agreed on the vision to "work together to continuously improve infrastructure services with comprehensive asset management practices that ensure that

the right work is done at the right time, for the right reasons and at the right price". The policy also outlines the following goals:

- Provide documented and accepted levels of service
- Ensure assets are sustainable and appropriate for use
- Minimize costs of asset ownership and service delivery
- Monitor and address risk associated with asset failure
- Communicate a common purpose, gaining the support and trust of the staff and external stakeholders (local municipalities, industrial, commercial, institutional, and residential customers)
- Ensure that current and accurate asset information is available to all that need it
- Facilitate prioritization and optimization of capital investment in the Region's assets

Most recently, the Region has embarked on an Asset Management System (AMS) Implementation Project which will include a centralized Corporate Work Management System (WMS) and Decision Support System(s) (DSS). Implementation of an Asset Management System will ensure the Region has a complete and consistent asset inventory, data definition and business process integration for all phases of the asset lifecycle – from procurement to decommissioning.

Asset Management Service Groups

The AM Plan includes seven (7) service groups within the Region.

- **Transportation Services**

  Transportation Services is responsible for roads, traffic control, bridges and a stormwater control network. Road functions include arterial, commercial residential and commercial industrial. In addition to roadways, the Region is also responsible for roadside and traffic control assets including traffic signals, noise walls, retaining walls, guiderails and cables on Regional roads. The stormwater network includes storm sewers, management ponds, oil / grit separators, catch basins, and culverts.

- **Water Services**

  Water Services includes both water and wastewater services. The Region is responsible for supplying clean, safe drinking water to the cities of Cambridge, Kitchener and Waterloo, and the townships of North Dumfries, Wellesley, Wilmot and Woolwich. Water from over 100 water supply wells and the Grand River is treated to drinking water standards for the local municipalities. Kitchener, Cambridge, Waterloo, Wilmot and Woolwich directly own the pipes that deliver treated water to residents' homes, businesses and industry, and they are responsible for metering and billing for their customers. North Dumfries and Wellesley townships are the exception: the Region distributes water directly to customers. For wastewater services, the Region owns wastewater treatment facilities, a biosolids processing facility, pumping stations, and two collection systems, all of which are operated by the Ontario Clean Water Agency (OCWA).

- **Waste Management**

  Waste Management is responsible for all solid waste disposal facilities, as well as Region-wide garbage collection, recycling and waste reduction/diversion programs. This involves the operation of the Waterloo Waste Management Centre and a bulk waste transfer facility at the Cambridge Waste Management Centre. The Region is also responsible for protecting the public's investment in this infrastructure and protecting the natural and social environment from impacts of its operations.

- **ROW International Airport**

  The Region of Waterloo International Airport (YKF) is a full-service facility which supports commercial, corporate and general aviation. The Airport is responsible for managing Airport assets including pavement (runways, taxiways, aprons, access roads, parking lots and sidewalks), visual aids, the glycol de-icing system, fencing, security, and utilities & services (i.e., water, wastewater, power, gas, data/telephone).

- **Transit Services – Grand River Transit (GRT)**

  Grand River Transit (GRT) connects the three cities of Kitchener, Waterloo and Cambridge. By the end of 2014, ridership reached more than 21.6 million and nearly 12 million kilometres were travelled. In 2009, service was started to provide the first rural GRT bus route in Woolwich providing service from Elmira, through St. Jacobs, to Conestoga Mall. GRT is responsible for managing a number of assets including conventional low floor buses, MobilityPLUS vehicles, bus shelters and other supporting assets which enable the Region to provide transit services.

  Rapid Transit has not been included in this Asset Management Plan. The Light Rail Transit (LRT) service is set to commence in early 2018. Stage 1 of the two stage project includes a 36 kilometre corridor that includes a) 19 kilometres of LRT from the Northfield Drive terminal in Waterloo to a new Fairway Road Terminal in Kitchener, and b) 17 kilometres of adapted Bus Rapid Transit (BRT) from the Ainslie Street transit terminal in Cambridge to the Fairway Road terminal. Stage 2 will see the BRT converted to LRT, creating a 36 kilometre route of LRT across the three urban centres.

- **Facilities Management**

  Facilities Management is responsible for managing the planning, construction, maintenance, asset management and protective services for 747 owned or leased Regional buildings; including community housing stock, downloaded to the Region in 2001, that now comprises of 349 buildings. Services include: project and construction management for new facilities; voice radio operations; building maintenance and operations, including janitorial and grounds maintenance; energy management; space and long range accommodation planning; building and office renovations; furniture management; lease negotiation and administration; security and parking management; and asset management.

- **Fleet Management**

Fleet Management is responsible for fleet planning, maintenance and support services for vehicles and moving equipment in the Region's corporate fleet, including ambulances and police vehicles. Services include: vehicle and moving equipment procurement and licensing; vehicle servicing, repair and modification; servicing standards development; road side assistance; service scheduling and warranty enforcement; policy and procedure development.

The infrastructure assets related to the service groups above that are covered in this AM Plan are summarized below.

Transportation Services

707 km of paved roadway
112 roadside noisewalls
352 roadside retaining walls
72,467 m roadside guide rails
170 bridges & major culverts
469 traffic signals
8,423 illumination assets
335 km stormwater pipe
5,083 manholes
6,857 catch basins
11 stormwater ponds
38 oil / grit separators
1,056 storm water culverts

Water Services

110 ground water production wells
43 ground water treatment systems
1 surface water treatment plant
11 water pumping stations
16 treated water storage facilities
398,381 m of watermains
13 wastewater treatment plants
1 residual management centre
6 wastewater pumping stations
1,458 m WWTP outfall
38,232 m of gravity sewers
11,202 m of forcemains

Waste Management

1 engineered landfill & other disposal assets
1 material recycling centre & other diversion assets
7 scales & other transfer assets
3 landfill gas collection systems
12 groundwater extraction wells
6 leachate pump stations
5 storm water management ponds

Airport

770,657 m2 aircraft movement system (runways, taxiways, aprons)
203,772 m visual aids
21,201 m security fences / gates
492 m glycol collection system assets
7,506 m2 airside roadway
146,889 m2 groundside roadway
107 illumination assets
492 m electrical distribution assets
31,145 m stormwater management
3,285 m sanitary sewer collection
5,891 m water distribution
47 equipment assets

Grand River Transit

254 conventional low floor buses
33 MobilityPlus buses
21 inspector / service vehicles
2 Training buses
29 hoists
2 platforms
28 bus shelters / landing pads
15 Technology assets
7 communications assets
6 security equipment assets
22 shop equipment assets
12 furniture/office equipment assets

Facilities

11 libraries
5 child care centres
9 paramedic stations
26 administration/office buildings
349 community housing buildings
2 long term care/seniors residences
14 office/storage/maintenance facilities
11 waste management buildings
132 water processing buildings
64 outbuildings/structures
28 museum buildings
8 transit terminals
4 training facilities

Fleet

271 light vehicles (ie: cars, vans, pickups etc)
66 medium vehicles (ie utility truck, ambulances, generators etc)
69 heavy vehicles (ie plow trucks, loaders, graders etc)

Legislated Requirements for Asset Management Plans

The challenges of public sector entities to maintain and renew ageing infrastructure under current funding/resource levels and structures is widely recognized. Rapid growth, public demands for high levels of service, increased exposure to liability and risk, and downloaded responsibilities add to these challenges. While the Region has a long history of implementing advanced asset management practices that incorporate both asset renewal, enhanced operation and maintenance practices, policies, and programs, there has also been a legislative and regulatory push for the development of formal asset management plans which formalize these strategies. Legislative and regulatory requirements for Asset Management Plans include the following:

- **Province of Ontario – Water Opportunities and Water Conservation Act**

  In November 2010 the Province of Ontario passed the Water Opportunities and Water Conservation Act. The purposes of this Act are to foster innovative water, wastewater and stormwater technologies, services and practices in the private and public sectors; to create opportunities for economic development and clean-technology jobs in Ontario; and to conserve and sustain water resources for present and future generations. This Act sets the framework for a performance management regime and sustainability planning (including asset management planning) for water, wastewater and stormwater over the lifetime of the infrastructure assets.

- **Province of Ontario - Municipal Infrastructure Strategy**

  In August 2012, the Province of Ontario initiated the Municipal Infrastructure Strategy. This initiative focuses on asset management planning for municipalities. Any Ontario municipality or local service board seeking provincial capital funding in the future must submit a detailed asset management plan as part of the grant application process.

- **Province of Ontario - Infrastructure for Jobs and Prosperity Act**

  The Infrastructure for Jobs & Prosperity Act, 2015 was proclaimed on May 1, 2016. The purpose of this Act is to establish mechanisms to encourage principled, evidence-based and strategic long-term infrastructure planning that supports job creation and training opportunities, economic growth and protection of the environment, and incorporate design excellence into infrastructure planning. The Act sets out principles which the Province and all broader public sector entities (including Municipalities) should consider when making decisions respecting infrastructure. The Act also stipulates that the Province and all broader public sector entities prepare infrastructure asset management plans.

- **Province of Ontario - Development Charges Act**

  On December 3, 2015 the Province passed Bill 73 which amended the Development Charges Act (DCA) and the Planning Act. Subsequent to the passing of Bill 73, Ontario Regulation 428/15 (which amends O. Reg. 82/98) was filed on December 17, 2015. Among other updates, the

regulations now require detailed asset management plans to support Transit DC By-laws. Less detailed Asset Management Plans that demonstrate that the assets included in the background study are financially feasible over their full lifecycle are also required for all other DC eligible services.

- **Federal Gas Tax Funding**

  In April 2014 the Region entered into a ten year municipal funding agreement with the Association of Municipalities of Ontario (AMO) for the transfer of Federal Gas Tax funds. The agreement stipulates that the Region must develop and implement an Asset Management Plan prior to December 31, 2016. The definition of "Asset Management Plan" as prescribed by the agreement is as follows:

  "Asset Management Plan" means a strategic document that states how a group of assets are to be managed over a period of time. The plan describes the characteristics and condition of infrastructure assets, the levels of service expected from them, planned actions to ensure the assets are providing the expected level of service, and financing strategies to implement the planned actions. The plan may use any appropriate format, as long as it includes the information and analysis required to be in a plan as described in Ontario's Building Together: Guide for Asset Management Plans.

  Future outcomes reporting to be developed and implemented by AMO will require the Region to provide a report to AMO demonstrating that Asset Management Plans are being used to guide infrastructure planning and investment decisions and how gas tax funds are being used to address priority projects.

- **Transport Canada – Airports**

  Federal regulations overseen by Transport Canada require maintenance programs including preventative maintenance at all airports to ensure that facilities are maintained in a condition which does not impair the safety, regularity or efficiency of air navigation. Facilities include, but are not limited to, pavements, prepared surfaces, visual aids, fencing, drainage systems and buildings.

This Asset Management Plan

This AM Plan is a long range planning document that is used to provide a rational framework for managing the Region's assets. It has been developed closely following the Provinces' Building Together: Guide for Asset Management Plans to ensure that it meets the requirements for funding applications. It outlines the asset activities for each service area and provides a guide to understanding key items such as:

- Alignment with the Region's strategic goals
- The value and condition of Region's asset portfolio
- Levels of service and performance measures
- Management techniques to assist in making long term funding decisions

- Lifecycle activities to operate, maintain, renew, develop and dispose of assets
- Budget forecasts for growth and renewal to sustain the Region's asset portfolio

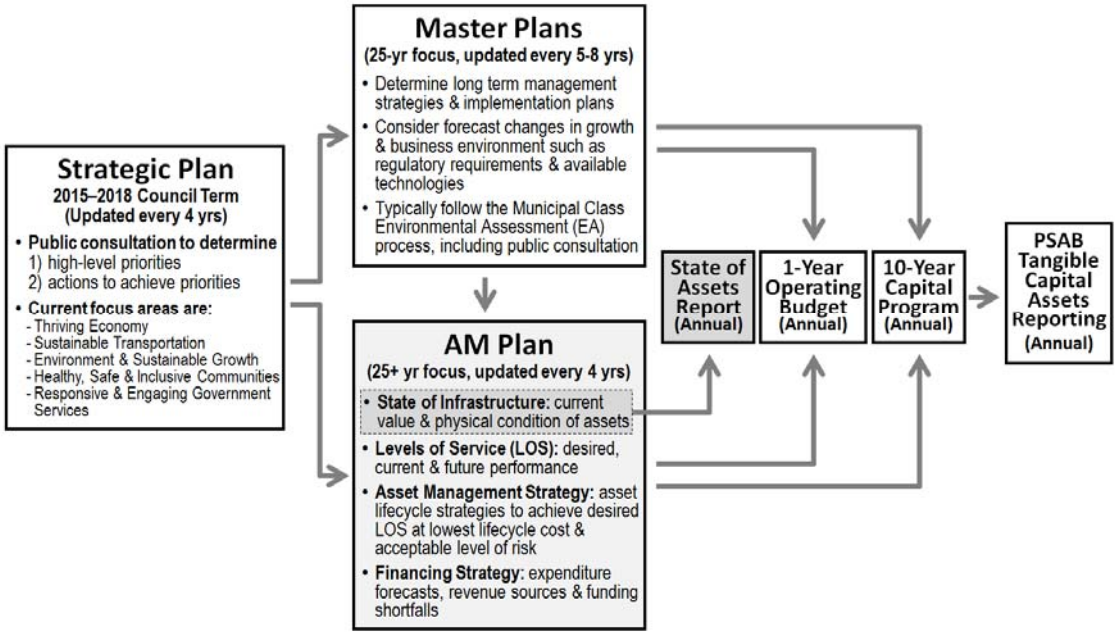
This AM Plan contains consolidated information that is currently available for the Region's assets to provide both a short term (10 years) and a long term (100 years) focus. This AM Plan is a written representation of proposed risk reduction programs and strategies for the Region's assets based on understanding of customer requirements, regulatory compliance, and the ability of the assets to meet required levels of service.

This AM Plan identifies future costs and assists in predicting future problems that may hinder service delivery. This creates opportunities for the Region's asset managers and operators to remove physical, financial and political barriers before they negatively impact customer levels of service.

This AM Plan was developed under the guidance of the Region's Asset Management Implementation Group (AMIG) which includes representation from all service areas covered under this Plan. Input data was provided by each service area and by the Financial Services and Development Financing Division. The AM Plan was reviewed and presented to the Planning and Works Committee by the Asset Management Steering Committee (AMSC).

The relationship of this AM Plan to other Region documents and planning outputs is illustrated in the figure below. The AM Plan relies on input from strategic and master plans, and forms the base framework or tool to assist the Region in developing appropriate direction and inputs to budget forecasts, annual 10-year capital and 1-year operating programs, and long range financial plans.

Figure 0-1 Relationship of AM Plan to Other Region Documents



The AM Plan is a living document that will continue to reflect the evolution of asset management practices within the Region over time. It is intended that continuous improvements to asset management practices within the Region, including implementation of the Asset Management System, will result in updates to this AM Plan.

The AM Plan is organized to meet the requirements of the Province's "Guide for Municipal Asset Management Plans". The contents of this AM Plan follow the recommended elements of a detailed AM Plan:

Executive Summary

1. Introduction

2. State of Local Infrastructure – Summarizes the asset hierarchy, inventory, valuation, age distribution, and condition.

3. Desired Levels of Service – Defines levels of service through performance indicators and targets, and outlined current performance. Describes external trends or issues that may affect expected levels of service.

4. Asset management Strategy – Summarizes the asset management strategies (i.e., planned actions) that will enable the assets to provide the required levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost.

5. Financing Strategy – Summarizes the financial planning and budgeting associated with asset management planning.

Sections 2, 4 and 5 include a general discussion on the relevant topics and provide a summary sheet(s) for each of the seven (7) service areas. The summary sheet(s) are to be read in conjunction with the text that precedes them.

State of Local Infrastructure

Overview

This section summarizes the Region's asset types and quantities, historical cost and replacement cost valuations, asset age distribution, and asset condition. The following sections provide a general discussion and summary of the current state of the infrastructure for each of the seven (7) service groups: Transportation Services, Water Services, Waste Management, Airport, Grand River Transit, Facilities, and Fleet. A one page summary is also provided for each of the service areas.

Asset Hierarchy & Inventory

Understanding the assets owned by the Region that are used to support each major service area is important to enable their effective and efficient management. In this AM Plan, the Region's asset inventory has been organized around the following major service areas:

- Transportation
- Water Services
- Waste Management
- Airport
- Grand River Transit
- Facilities Management
- Fleet Management

Asset Valuation

Financial accounting valuation uses historical costs and depreciation assumptions to determine the book value of capital assets in accordance with the Public Sector Accounting Board (PSAB). Policies and procedures relating to the development of net book values for accounting purposes have been developed by the Financial Services and Development Financing Division to comply with PSAB 3150 Tangible Capital Assets reporting.

For the most part, the replacement values are calculated using historical costs indexed to December 31, 2015 using the Non-Residential Building Construction Price Indices (NRBCPI) or Consumer Price Index (CPI). The replacement cost valuation is presented in current (2015) dollars and does not account for technology improvements. Transportation replacement values, with the exception of structures, are all benchmark values calculated from current and previous construction year contracts.

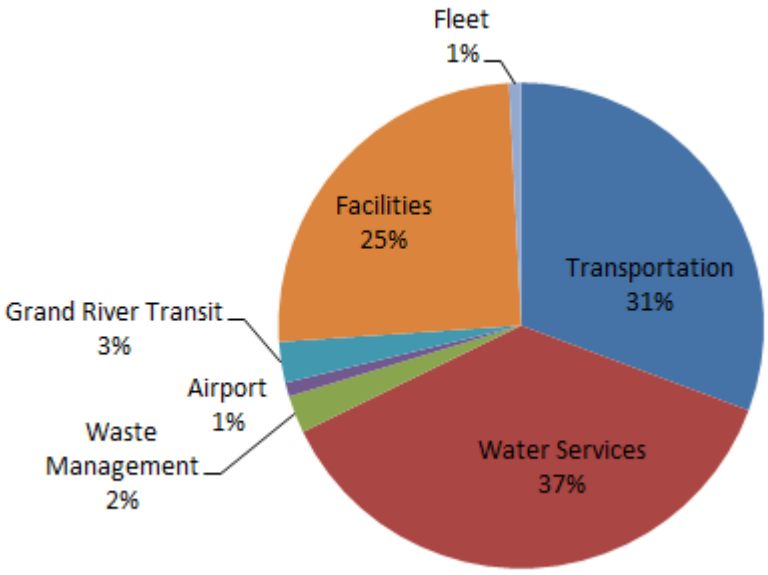
The estimated current replacement cost of Regional assets is **$5.32 billion**, as outlined in the following table. The historic cost of these assets is **$2.87 billion.**

Table 0-1 Asset Replacement Costs

Service Area	Replacement Cost ($2015)
Transportation	$1,629,000,000
Water Services	$1,970,000,000
Waste Management	$133,000,000
Airport	$49,000,000
Grand River Transit	$154,000,000
Facilities	$1,342,000,000
Fleet	$43,000,000
TOTALS	**$5,320,000,000**

Replacement cost percentages are shown in the following graph, with Water Services, Transportation and Facilities assets comprising 93% of the Region's asset portfolio.

Figure 0-1 Replacement Cost Percentages



Asset Age Distribution

To assist the Region with future funding needs analysis, it is helpful to understand the installation profile of the asset portfolio. Details relating to the

installation year and the replacement cost for each asset are maintained in the Region's financial management system.

Figure 0-2 Asset Installation Profile

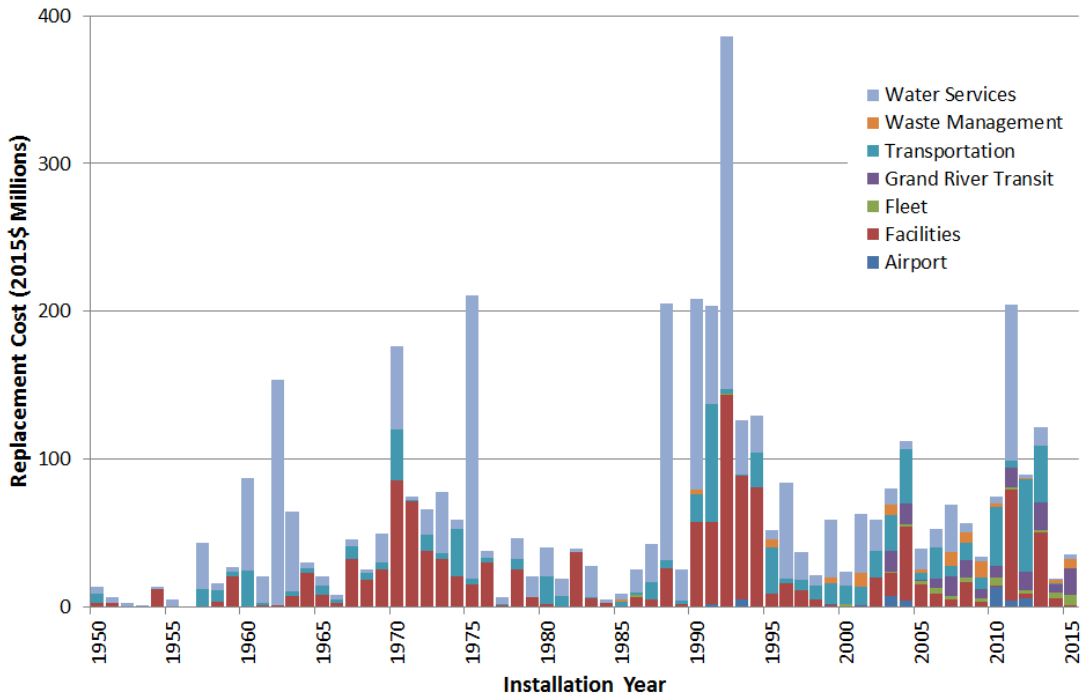


Figure 0-2 plots the asset installation year within each service area against the replacement costs, in 2015$. The graph depicts several periods of moderate growth in the 1970's, late 1980's and early 1990's, and over the last few years. These periods of moderate growth will result in the requirement for "peaks" in future renewal investment.

Asset Condition

In this AM Plan, the term "condition" refers to the degree of physical deterioration of an asset or asset element. "Performance" is a more general term that typically describes an asset's ability to achieve levels of service, and can refer to: (i) the state of physical condition, (ii) the capacity relative to demand, and/or (iii) the ability to perform intended functions.

An ongoing condition assessment program evaluates current physical condition, determines rate of deterioration over time, enables forecasts of future condition, and informs the most beneficial type and timing of treatment. Condition assessment methods and rating systems have become relatively standard for many assets but vary depending on the type of asset. The Region conducts inspections more frequently on more critical assets such as bridges and major culverts, while routine condition assessments are undertaken for less critical assets such as parking lots and building roofs, at an appropriate frequency for the asset group.

To enable comparison of conditions and condition trends over time between different asset types, a generic condition grading scale is often used to translate detailed engineering data about assets into information that the

public and council can compare across asset groups. For this purpose, the Region uses an industry standard general condition grading system based on the International Infrastructure Management Manual (IIMM), summarized in the table below.

Table 0-2 Asset Condition Grade System

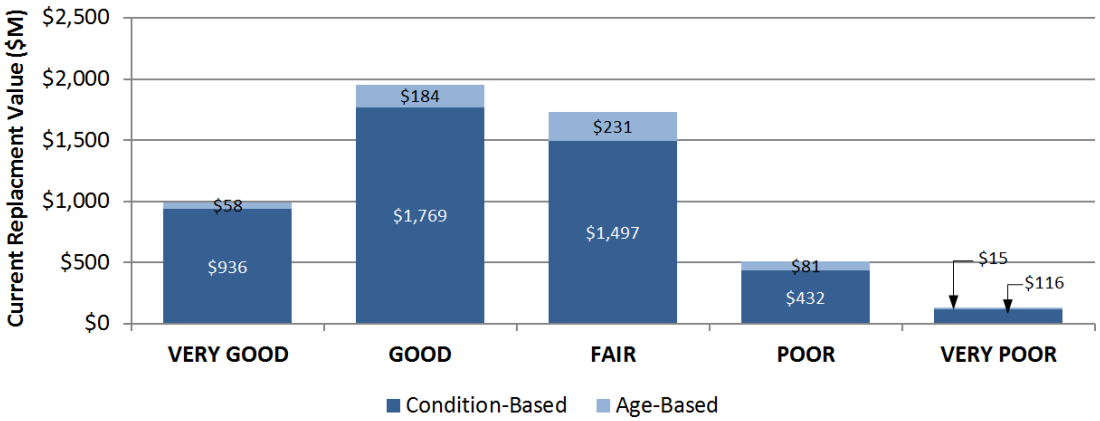
Grade	Description	Condition Criteria
VG	Very Good	Asset is physically sound and is performing its function as originally intended. Required maintenance costs are well within standards and norms. Typically, asset is new or recently rehabilitated.
G	Good	Asset is physically sound and is performing its function as originally intended. Required maintenance costs are within acceptable standards and norms but are increasing. Typically, asset has been used for some time but is still within early to mid-stage of its expected life.
F	Fair	Asset is showing signs of deterioration and is performing at a lower level than originally intended. Some components of the asset are becoming physically deficient and component replacement may be necessary. Maintenance requirements and costs are continuing to increase. Typically, asset has been used for a long time and is within the mid- to later stage of its expected life.
P	Poor	Asset is showing significant signs of deterioration and is performing to a much lower level than originally intended. A major portion of the asset is physically deficient. Required maintenance costs exceed acceptable standards and norms. Typically, asset is approaching the end of its expected life.
VP	Very Poor	Asset is physically unsound and/or not performing as originally intended. Asset has higher probability of failure or failure is imminent. Maintenance costs are unacceptable and rehabilitation is not cost effective. Replacement / major refurbishment is required.

Details relating to the condition of each asset are currently maintained in various databases and spreadsheets, which will be incorporated into the corporate work management system (WMS) and decision support system (DSS) as part of the implementation of these systems.

The following figure depicts the distribution of current condition of the various groups of assets within the Region's asset portfolio, using the above grading scale, weighted by replacement cost (2015$). For those assets with no condition data, age-based condition is estimated as % Life Remaining = (Expected Useful Life – Age) / Expected Useful Life. Using age data as a surrogate for condition data is widely used in municipal organizations, but it can be misleading as age does not directly reflect condition.

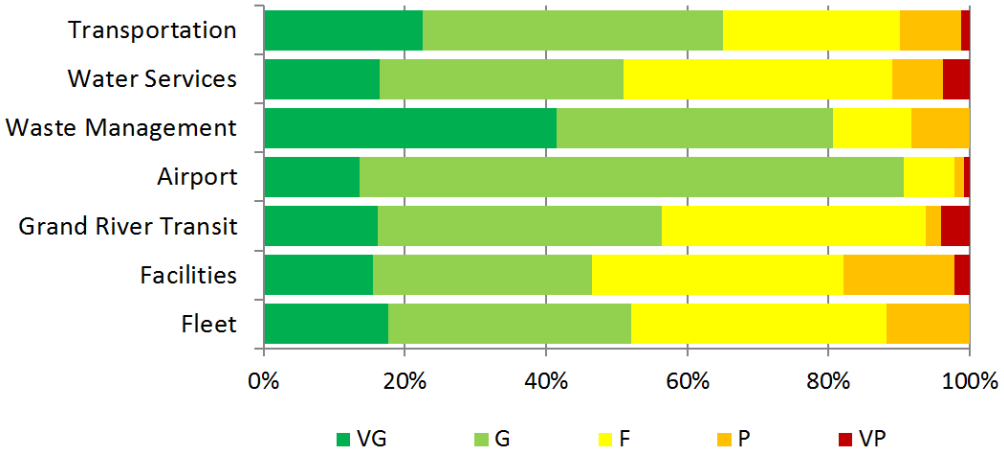
Figure 0-3 depicts the value of assets that fall within each of the condition grades (very good, good, fair, poor, very poor) for condition based (shown in dark blue) and age based (shown in light blue) assessments. Assessments based on condition more accurately reflect the current physical condition of an asset than an age based assessment. The majority of Region asset condition grades are based on physical condition.

Figure 0-3 Asset Condition Grade Profile



To adequately meet service levels and manage risk while minimizing whole-of-life costs, most assets should generally be preserved in **FAIR** or better condition. Approximately **88%** of the Region's assets are in fair or better condition. Assets in poor or very poor condition require increased attention and renewal investment (i.e., funding and staff resources) to avoid increased maintenance costs and/or unexpected failure. The assets that are currently in poor or very poor condition are those that are included in 10-year capital renewal programs and budget forecasts.

Figure 0-4 Asset Condition Grade Profile, By Service Area



Asset Information Updates

The Region has well-developed policies, procedures and guidelines for sustainability of the Tangible Capital Asset information. Additionally, a sustainable, auditable and replicable process was developed and documented as part of the development of this AM Plan, including all data sources and any assumptions that were used.

The information that supports this AM Plan is continuously updated. The Region intends to update this AM Plan following the completion of the AMS implementation and every four (4) years, as required by the proposed

regulation under the Infrastructure for Jobs and Prosperity Act, 2015, or more frequently if needed.

The following pages describe the assets included within each service group and a discussion of the overall condition of those assets.

Transportation

GOOD–FAIR

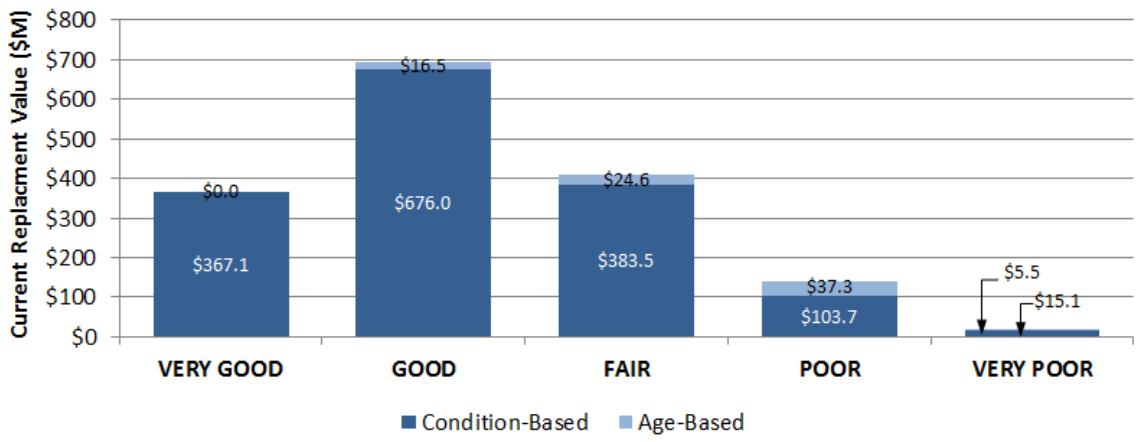
2015 Replacement Value

$1.63 Billion

Includes

707 km of paved roadway
112 roadside noisewalls
352 roadside retaining walls
72,467 m roadside guide rails
170 bridges & major culverts
469 traffic signals
8,423 illumination assets
335 km stormwater pipe
5,083 manholes
6,857 catch basins
11 stormwater ponds
38 oil / grit separators
1,056 storm water culverts

The overall transportation system is rated as GOOD to FAIR with **89%** of assets in fair or better condition. This reflects the relatively young age of the transportation infrastructure, as well as recent investments in pavements. However, approximately 10% of transportation infrastructure, representing $161.6 million, is rated in the poor and very poor categories and an additional 25% in the fair category, representing $408.1 million. These assets will require ongoing monitoring to identify and prioritize which assets require rehabilitation or replacement to minimize risk of service failure.



Water Services

GOOD–FAIR

2015 Replacement Value

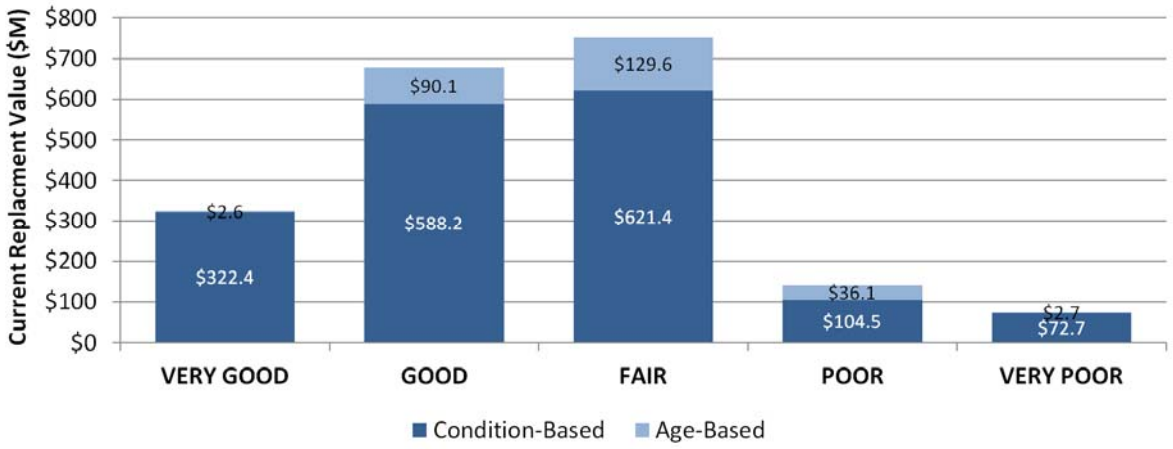
$1.97 Billion

Includes

110 ground water production wells
43 ground water treatment systems
1 surface water treatment plant
11 water pumping stations
16 treated water storage facilities
398,381 m of watermain
---
13 wastewater treatment plants
1 residual management centre
6 wastewater pumping stations
1,458 m WWTP outfall
38,232 m gravity sewers
11,202 m forcemains

Water and wastewater service assets overall are rated as GOOD to FAIR with **89%** of assets in fair or better condition. This reflects the relatively young age of the infrastructure, as well as significant reinvestment for replacements and upgrades made in recent years. However, 11% of the infrastructure, representing $216.0 million, is rated in the poor and very poor categories. These assets are reaching the end of their useful life and will require ongoing monitoring to identify and

prioritize which assets require rehabilitation or replacement.



Waste Management

GOOD

2015 Replacement Value

$132.6 Million

Includes

1 Engineered landfill & other disposal assets

1 Material recycling centre & other diversion assets

7 Scales & other transfer assets

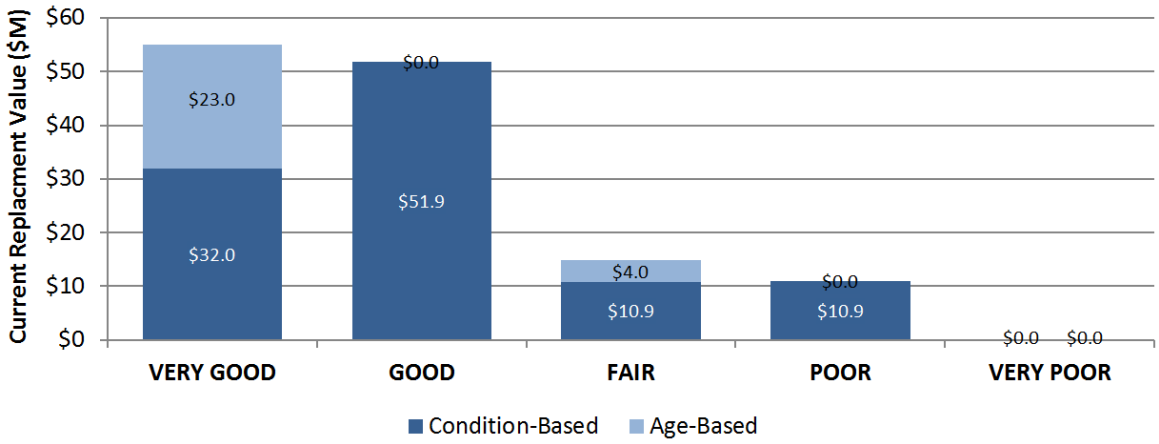
3 Landfill gas collection systems

12 Groundwater extraction wells

The overall waste management system is rated as GOOD with **92%** of assets in fair or better condition. This reflects the relatively young age of many of the assets, as well as recent investments in environmental controls systems replacement. Condition of the landfill disposal cells is measured by volume consumed, with an estimated 18

6 Leachate pump stations
5 Storm water management ponds

years remaining. 8% of waste management's assets are rated as poor and very poor, representing $10.9 million. These assets are reaching the end of their useful life and will require ongoing monitoring to identify and prioritize which assets require rehabilitation or replacement.



Airport

GOOD

2015 Replacement Value

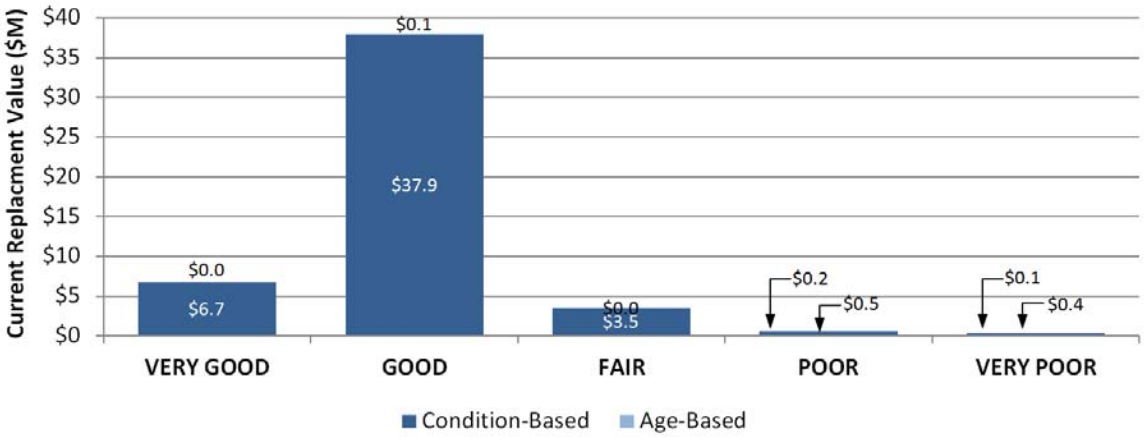
$49.5 Million

Includes

The overall airport asset portfolio is rated as GOOD with **98%** of assets in fair or better condition. This reflects the

770,657 m2 aircraft movement system pavement (runways, taxiways, aprons)
203,772 m visual aids
21,201 m security fences / gates
492 m glycol collection system assets
7,506 m2 airside roadway
146,889 m2 groundside roadway
107 illumination assets
492 m electrical distribution assets
31,145 m stormwater management assets
3,285 m sanitary sewer collection
5,891 m water distribution
47 equipment assets

ongoing Airport pavement rehabilitation program and the recent introduction of municipal services to the property. Although only a very small portion of airport infrastructure is rated in the poor and very poor categories (2%), higher risk assets such as airside pavement and visual aids will require ongoing monitoring to identify and prioritize which assets require rehabilitation or replacement.



Grand River Transit

GOOD–FAIR

2015 Replacement Value

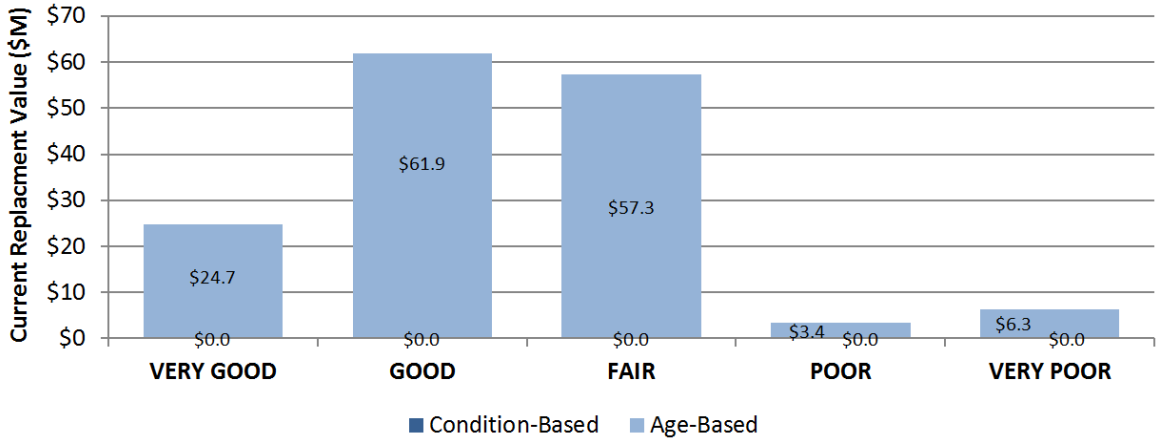
The overall Grand River Transit

$153.6 Million

Includes

254 conventional low floor buses
33 MobilityPlus buses
21 inspector / service vehicles
2 Training buses
29 hoists
2 platforms
28 bus shelters / landing pads
15 Technology assets
7 Communications assets
6 Security equipment assets
22 Shop equipment assets
12 Furniture/office equipment assets

asset portfolio is rated as GOOD to FAIR with **94%** of assets in fair or better condition. This comprises a relatively evenly distributed condition for rolling stock which is regularly replaced, but a relatively poor condition for equipment. A total of 6% of Grand River Transit assets are rated in the poor and very poor categories, comprising facility equipment totalling $9.7 million. These assets are reaching the end of their useful life and will require ongoing monitoring to identify and prioritize which assets require renewal.



Facilities

GOOD–FAIR

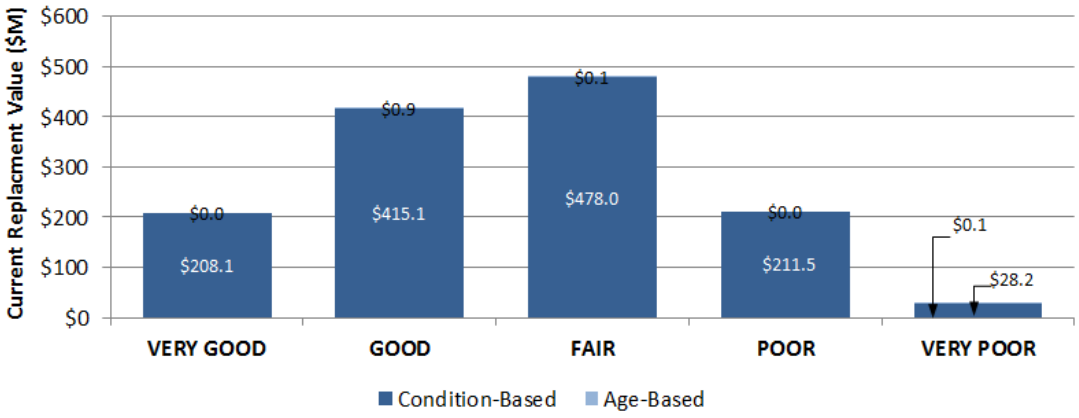
2015 Replacement Value

$1.34 Billion

Includes

11 Libraries
5 Child Care Centres
9 Paramedic Stations
26 Administration/Office buildings
349 Community Housing buildings
2 Long Term Care/Seniors Residences
14 Office/Storage/Maintenance Facilities
11 Waste Management buildings
132 Water Processing buildings
64 Outbuildings/Structures
28 Museum buildings
8 Transit Terminals
4 Training Facilities

The overall facilities asset portfolio is rated as GOOD to FAIR with **82%** in fair or better condition. This reflects the timely implementation of capital renewals works in the recent past and a “run-to-failure” strategy for many non-critical assets. However 18% are in the poor and very poor category, representing $239.8 million. These assets are reaching the end of their useful life and will require ongoing monitoring to identify and prioritize which assets require rehabilitation or replacement.



Fleet

GOOD–FAIR

2015 Replacement Value

$42.7 Million

Includes

271 Light Vehicles, including cars, vans, and pickup trucks

66 Medium Vehicles, including utility trucks, ambulances, and generators

69 Heavy Vehicles, including plow trucks, loaders, and graders

The overall fleet of vehicles is rated as GOOD to FAIR with **88%** in fair or better condition. This is expected as these assets are generally managed by replacing them when they reach their expected end of life age. A number of vehicles are retained beyond their expected life cycle to support seasonal and low utilization needs, as indicated by the number of vehicles in the poor category at this time. Very poor and poor assets represent 12% of the asset portfolio. These assets will require ongoing monitoring to identify and prioritize which assets require renewal.

Levels of Service

Defined Levels of Service

Levels of Service (LOS) are a key business driver that influence asset management decisions. LOS statements describe the quality of service the Region is striving to provide customers, and commonly relate to service attributes such as availability, reliability, suitability, health and safety, affordability, environmental sustainability, responsiveness, and timeliness. Performance indicators and targets are used to describe, quantify, and communicate the services that customers expect to receive and relate the expected LOS into the cost required to provide the services.

For most service providers, LOS (formally or informally established and communicated) are guided by a combination of customer expectations, regulatory and legislated requirements, and internal guidelines, policies and procedures. In many cases, LOS are also implied based on past precedence, community expectation, and system design. However, effective asset management requires that LOS be formalized and supported through a framework of performance measures, targets, and timeframes to achieve targets, and that the costs to deliver the documented LOS be understood.

This section describes Regional LOS under the following categories:

- **Customer LOS**: Understanding the Region's customers and their expectations is a key input into LOS. Customer LOS are balanced against legislative requirements and the customer's ability/willingness to pay.
- **Legislated LOS**: Legislated requirements define the standards by which the Region is obligated to provide services. Legislative requirements are a significant business driver for most municipal services.
- **Technical LOS**: The Region must translate customer expectations and legislative requirements into technical objectives, performance measures, and targets. Technical levels of service define what the Region must do to deliver services that meet customer and legislated LOS.

Customer LOS

The Region gathers information on customer expectations and satisfaction through a number of research instruments. The intent of this research is to better understand customer expectations and satisfaction and to measure progress towards the Region's customer service goals.

The Region of Waterloo's 2015-2018 Strategic planning process provided many opportunities for community members, partner organizations and customers of regional services to have a "Strat Chat" on the key issues and priorities that matter most to the community. Participants were invited to participate through a variety of channels including: Facebook and Weather Channel ads, bookmarks in all township and city libraries, bus advertisements and displays at local events. Conversations took place through focus groups, a telephone survey, online and paper surveys, community meetings and

through a new online discussion forum. Over 3,000 members of the public participated in the process. The Region also engaged staff to help identify actions that would have the most benefit and impact on community priorities and needs.

The Regional Strategic Plan Framework outlines strategic objectives (what we are trying to achieve), actions (how we will achieve the strategic objectives), and progress indicators (how we know if we are successful). The Regional focus areas and strategic objectives for 2015-2018 follow.

Figure 0-1 Focus Areas and Strategic Objectives 2015-2018

Legislated and Technical Levels of Service

The pages included in the next section, Performance Measurement, provide information on legislated LOS and list technical LOS for each service area.

Performance Measurement

Performance indicators and targets are commonly used to describe, quantify, and communicate the services that the customers expect to receive and relate the expected LOS into the cost required to provide the services.

In Ontario there are a number of municipal performance measurement programs. The Region participates in the following programs and, in doing so, is able to trend historical performance information within its own program and in comparison to peer organizations.

- **Municipal Performance Measurement Program (MPMP)** is a mandatory performance measurement program launched by the Ontario government designed to promote local government transparency and accountability. Municipalities report MPMP measure results to the province through the

annual Financial Information Return (FIR). Prior to 2015, municipalities were required to publish MPMP results in a set format to local taxpayers. This public reporting is no longer required; although the data is still reported in the publically available FIR.

- **Municipal Benchmarking Network Canada (MBNCanada)** is a voluntary partnership of Canadian municipalities. Partner municipalities identify and collect consistent and comparable data on their municipal service areas, report the findings annually and analyze those results to see how they measure up. Partners use the network to discuss results and share their practices and strategies. The goal is to foster a culture of service excellence in municipal government. The Region has participated in MBNCanada (previously known as OMBI) since 1999.
- **National Water and Wastewater Benchmarking Initiative (NWWBI)** is a partnership benchmarking initiative currently comprised of more than 40 municipalities and regional organizations across Canada. The objective of the initiative is to provide a consistent model through which water, wastewater, and stormwater utility managers can monitor trends with benchmarked data in key business functions and, through collaboration with other utility experts, managers can then take proactive steps to avoid and resolve issues in the operating environment.
- **Canadian Urban Transit Association (CUTA)** is a member-based association that supports public transit as the core of integrated mobility across Canada. CUTA collects benchmarking technical data and does trend analysis for transit systems. The primary data resource is the annual Canadian Transit Fact Book. Detailed operating statistics, along with key performance indicators, are collected from and provided for each transit system. The report also provides summary information for each province, population group, metropolitan page, and for Canada, summary tables for revenues buses by accessibility, fuel type, and number as well as graphs comparing key indicators. Data is available for GRT since its inception and for the preceding agencies (Kitchener Transit and Cambridge Transit) since at least the early 1980's.

1.

The following pages provide information on legislated Levels of Service (LOS) and service performance for each service area. Technical LOS are also measured and tracked at a much greater level of detail.

Transportation

Legislated LOS

- **Road Maintenance**: The Region has adopted a Road Maintenance LOS that defines the activities to be carried out as part of the maintenance of the Region's road infrastructure to ensure safety and preservation of assets, and establishes the timeframes within which those activities will be completed. The Road Maintenance LOS meets the Ontario Regulation 239/02 Minimum Standards for Municipal Highways (MMSMH).
  - The objective is to meet the Road Maintenance LOS (100%).
- **Bridges and Major Structures**: Biannual structure inspections are performed on all bridges and major structures in accordance with Ontario Regulation 104/97 Standards for Bridges to ensure structures are kept safe and in good repair.
  - The objective is to meet the inspection requirements under Ontario Regulation 104/97.

Performance Measurement

Transportation measures numerous indicators through MBNCanada (formerly OMBI). The following are a small subset of those measures related to asset performance.

Measure	2012	2013	2014	2015
Percent paved lane kms rated good to very good	51	54	51	50
Percent Bridges and Major Culverts rated good to very good (based on number of structures)	69	69	74	73

With regards to the above performance measures, the following should be noted:

- In 2014, the method used for condition surveys on the road network was changed. The severity and density of individual distress types was incorporated into the survey, which allowed for improved deterioration modelling, and the ability to determine the appropriate type and timing of investment for each road section.

  Also in 2014, the condition rating summary ranges for bridges was changed from a 3 point system, to a 5 point system to better accommodate the Canadian Infrastructure Report Card. As a result, increased granularity was achieved, and a slight increase in the performance measure was observed.

Water Services

Legislated LOS

The Ontario Drinking-Water Systems Regulation (O.Reg. 170/03 under the Safe Drinking Water Act, 2002 (SDWA)) prescribes stringent and mandatory requirements to monitor, test and report drinking water quality. Schedule 22 of the Ontario Drinking Water Systems Regulation (O.Reg 170/03) also requires annual reporting demonstrating compliance with the terms and conditions of Approvals, Licences, Permits and the requirements of the Safe Drinking Water Act, 2002 (SDWA) and its regulations.

- **Drinking Water Systems Flow (DWSF) Compliance:**
  - The objective is to meet all DWSF requirements (100% compliance)
- **Annual Water Quality Tests Compliance**
  - The objective is to meet all Drinking Water Quality requirements (100% compliance)
- **Environmental Compliance Approvals (ECAs)**
  - The objective is to achieve full compliance of emission levels of air and discharges (100% compliance)

Technical LOS

- **Water Efficiency Program**
  - The objective is to reduce the total system per capita demand for water to 235 l/capita/day

Performance Measurement

Water Services measures numerous performance measures through MBNCanada (formerly OMBI), NWWBI, and at an operational level. The following are a small subset of performance measures related to legislated levels of service as well as the Region's Water Efficiency Program.

Measure	2012	2013	2014	2015
Drinking Water Systems Flow Compliance	99.999%	99.9995%	99.9995%	99.999%
Percent of Compliance to Drinking Water Standards	99.98%	99.90%	99.97%	99.96%
Number of Household Days w/ Boil Water Advisories	0	0	0	0
Megalitres of Treated Drinking Water per 100,000	10,321.8	10,085.9	10,137.3	9,827.3
Drinking Water per Capita Demand (l/capita/day)	282.79	276.33	277.73	269.24
Percent of Wastewater Estimated to have Bypassed Treatment	1.83%	1.81%	0.17%	0.20%

- The Region's water service infrastructure, at its current "GOOD to FAIR" condition, is able to meet legislative requirements, with only a few exceptions. Continued performance will require capital investment as assets age, and or legislated requirements change.
- The Region has not yet reached the 2025 per capita water efficiency

demand target; however, the Region has the lowest treated water volumes per capita among MBNCanada participants. As indicated above, in 2014, the Region's megalitres of treated water per 100,000 was 10,137.3, whereas the median MBNCanada reported value was 13,004. The Region's Water Efficiency Program has been successful in reducing water demands.

Waste Management

Legislated LOS

- **Environmental Compliance Approvals (ECA's)**
  - The objective is to achieve full compliance with all applicable ECA's (100% compliance)

Technical LOS

- **Waste Diversion**
  - The objective is to increase the amount of material diverted from landfill and maximize the remaining capacity of the Waterloo landfill. The Region's intent is to increase this with changes to the curbside policy LOS.

Performance Measurement

The following is a small subset of performance measures related to legislated levels of service.

Measure	2012	2013	2014	2015
Number of days per year when a Ministry of the Environment Compliance Order for remediation concerning air or groundwater standard was in effect for a Solid Waste Facility with a Certificate of Approval	0	0	0	0
Tonnes of Residential Waste Disposed	90,259	93,161	94,104	93,786
Residential Waste Diversion Rate	52%	52%	52%	53%

- The Region's waste management infrastructure, at its current "GOOD" condition, is able to meet legislative requirements, with only a few exceptions. Continued performance will require capital investment / reinvestment as assets age, and or legislated requirements change.

Airport

Legislated LOS

- **TP 312 Aerodrome Standards & Recommended Practices, 9.4 Maintenance**
  - The objective is to meet the Aerodrome Standards (100%)
  - The objectives are to improve the quality and performance of pavements and minimize costs through good management practices.
  - Future: set Pavement Condition Index (PCI) thresholds based on consequence of failure (CoF). E.g. Average airside PCI >= 80.

Performance Measurement

The following is a small subset of performance measures related to legislated levels of service.

Measure	2012	2013	2014	2015
Canadian Aviation Regulations Compliance	100%	100%	100%	100%

Actual measurements and formal reporting are made for regulatory compliance only at this time. In the future, the Region will measure and trend airside, groundside and common utility asset condition.

Grand River Transit

Legislated LOS

- **Vehicles Meet Regulatory Acts and Standards:** Details Vehicle Maintenance and Performance Standards as per Ministry of Transportation (MTO) regulations for the following vehicle components: General, Brakes, Engine Controls and Steering, Suspension, Electrical Components, Tires and Wheels, Number Plates.
  - The objective is to ensure that the Grand River Transit fleet maintains compliance with legislative requirements, to mitigate risks to the vehicle operators and the organization
- **Vehicle Maintenance and Performance Standards:** Each of the legislative acts lists the minimum requirements, protocols, procedures and enforcement for vehicle operations and operators
  - The objective is to maintain the Grand River Transit fleet vehicle assets in a safe, reliable and available condition to support department programs in the delivery of their services

Performance Measurement

The current performance of Grand River Transit assets is tracked using the following measures.

Measure	2012	2013	2014	2015
Change off per 100,000 km	26.45	22.12	21.08	23.74
Service reliability	99.94%	99.91%	99.91%	99.91%
Buses cleaned actual vs. planned	80.35%	74.23%	86.43%	86.68%
Preventative Maintenance - actual vs. planned	80.56%	79.40%	90.48%	84.96%

Facilities

Legislated LOS

- **Designated substances:** All buildings are to be assessed for designated substances such as lead, mercury and silica (O. Reg. 490/09); and for asbestos, and a management program put in place to ensure that asbestos containing materials are inspected at least annually and are dealt with properly if damaged or disturbed.
  - The objectives are that all buildings are assessed for designated substances and that those with asbestos containing materials are inspected annually for signs of damage (100% compliance)
- Under **Ontario's Green Energy Act**, public agencies must report on energy consumption and greenhouse gas emissions (O. Reg. 397/11).
  - The objectives are that energy consumption, intensity and GHG emissions are monitored for all buildings and reported annually to the Province with a target that energy intensity decreases over time and GHG emissions remain constant as the Region's building portfolio continues to grow.

Technical LOS

- Work Management: A quality preventive maintenance (PM) program will reduce the risk of service disruptions and reduce/avoid maintenance costs.
  - The objective is to manage an effective PM program (80% compliance)..

Performance Measurement

The current performance of Facility assets is tracked using the following measures.

Measure	2012	2013	2014	2015
Designated Substance Survey Completion	100%	100%	67%	93%
Efficiency of non-water buildings (eKWh/sq.ft)	N/A	18.77	19.83	18.45
Water treatment plant efficiency (ekWh/ML)	N/A	83,975	93,675	N/A
GHG Emissions (Tonnes)	N/A	64,077	68,711	67,180
Work Orders Completed on time	77%	76%	75%	39%
Building Condition Assessments Completed	82%	73%	100%	82%

Notes: Prior to 2014 restructuring, Facilities Management managed the shared corporate buildings only. The energy measure for treated water in 2015 is not yet available. The energy and GHG measures are not available prior to 2013, when Provincial reporting began. ekWh (equivalent kilowatt hours) is a standard unit of energy consumption used to compare energy sources. OCWA is responsible for the wastewater facilities; these buildings are not included in the building condition assessments by Facilities Management.

The trends demonstrate the following:

- The additional facilities' designated substances and asbestos containing materials assessments for buildings with responsibilities recently transferred to FM will be 100% complete in 2016
- The energy consumption for non-water buildings is remaining fairly consistent

- Work order completion rate reduced in 2015 coincided with FM restructuring and responsibility of additional buildings transferring to FM.
- The increased portfolio schedule is being balanced and some work accelerated to get condition data of buildings sooner to develop an appropriate renewal program

Fleet

Legislated LOS

- **Vehicles Meet Regulatory Acts and Standards**: Details Vehicle Maintenance and Performance Standards as per Ministry of Transportation regulations for the following vehicle components: General, Brakes, Engine Controls and Steering, Suspension, Electrical Components, Tires and Wheels, Number Plates.
  - The objective is to ensure that Region Corporate Fleet maintains compliance with legislative requirements, to mitigate risks to the vehicle operators and the organization.
- **Vehicle Maintenance and Performance Standards**: Each of the legislative acts lists the minimum requirements, protocols, procedures and enforcement for vehicle operations and operators.
  - The objective is to maintain the Region Corporate Fleet vehicle assets in a safe, reliable and available condition to support department programs in the delivery of their services

Performance Measurement

The current performance of Fleet assets is tracked using the following measures.

Measure	2012	2013	2014	2015
Life cycle cost by vehicle KM	$0.54/0.79	$0.56/0.74	$0.64/0.77	$0.63/N/A
Compliance to PM (OT=On Time)	N/A	N/A	N/A	> 92% OT
Service Request Rate	77% / 66%	78% / 68%	77% / 71%	78% / N/A
Energy Efficiency (Average)	N/A	4.34	4.20	4.42
Energy Efficiency (Km)	N/A	11,066,582	10,101,883	9,968,025
Energy Efficiency (Hours)	N/A	46,741	48,686	51,533
Energy Efficiency (Litres)	N/A	2,980,615	2,863,164	2,720,936

- The service request rate measurement is an MBNCanada measurement and it represents the percentage of time a vehicle is being worked on in the shop for work related to any repairs, other than those associated with preventative maintenance work orders. The first number is the Region Corporate fleet service rate and the second number is the median value from MBNCanada when compared to other participating municipal fleets.
- The “energy efficiency average” reflects the average kilometres travelled per litre of fuel consumed for the calendar year. (Note: this calculation includes conversion of hours to kilometres)

External Trends

External trends and issues affecting expected LOS or the Region's ability to meet the desired LOS include the following.

- Population and employment changes (e.g., growth, demographics), which will impact infrastructure use.
- Changes in expectations for programs or patterns of use from the public, which will impact infrastructure use and revenue for services.
- Potential changes in technology or methods, which may replace obsolete equipment, provide longer asset life, and/or achieve higher quality and greater efficiencies.
- Potential changes to the cost of input variables (e.g., cost of power, fuel), which will impact costs to deliver the services.
- Infrastructure failing prematurely due to environmental factors and/or construction practices requiring repair or replacement much earlier than the expected life of the asset.
- Availability of external funding (e.g., federal and provincial infrastructure programs) which may affect the infrastructure improvement activities that can be undertaken.
- Unexpected downloading of services by more senior levels of government.
- Popularity of sustainability initiatives and "greening" trends (e.g., LEEDs).
- Climate change, including changing storm events and patterns (e.g., higher frequency storms occurring more regularly), which will impact the infrastructure.
- Potential changes in Federal or Provincial legislation.

Asset Management Strategy

Overview

This section sets out the Region's current strategies for asset renewals, maintenance and operations. The following sections provide a general discussion on expected future growth in population and need for additional infrastructure, risks to the Region's ability to deliver the LOS outlined in the preceding section, and the Region's maintenance and renewal strategies to minimize those risks. The remainder of this section provides a two page summary of the asset management strategy for each of the seven (7) service areas.

This plan sets a baseline for potential future strategy changes or to help inform or justify service level changes that may be needed to reflect changing demands. Current strategies include non-asset solutions and investment such as education and demand reduction and balancing use; identifying expansion needs such as the development of detailed master plans; prioritization of asset renewal requirements based on condition assessment programs; and prioritizing maintenance and operations needs and investment based on analysis of known historical and forecasted future costs.

One factor that has not been taken into account in this section is funding constraints and timing. Minimizing the life cycle costs of assets often involves spending now to avoid greater costs later on. Funding constraints, and the amended work program to fit these constraints, are considered in Section 5 Financing Strategy.

Future Growth

Population Growth

The Region's census population in 2011 was 507,100 and, based on the Region's Official Plan, population is expected to grow to a projected 729,000 by 2031. While these growth projections are under review by Regional Planning for use in ongoing master planning, they amount to approximately 2.2% average annual growth from now until 2031.

Asset Portfolio Growth

This level of population growth will place significant pressure on the capacity of existing infrastructure and creates demand for new infrastructure. Based on forecasted capital growth expenditures, the asset portfolios are expected to grow as shown in the following table.

Table 0-1 Annual Growth Factors for Region Assets

Service Area	Annual Growth Factor (2016 – 2025)
Transportation	2.8%
Water Services	3.5%
Waste Management	1.7%
Airport	0.6%
Grand River Transit	7.3%
Facilities	1.2%
Fleet	0.7%
Average	**2.7%**

Consequential Operational Expenditure Growth

Consequential operational expenditure is the operations and maintenance cost of new assets. For example, for a new streetlight, the cost of electricity, replacement bulbs, and graffiti removal all contribute to the consequential operational expenditure associated with that new asset. These costs are incurred by the Region in the future, regardless of whether the streetlight was initially constructed by the Region as part of a capital project, or by a developer which then passed the streetlight to the Region as a vested asset.

For most assets, a good estimate of the consequential operational expenditure required to operate and maintain the new assets is simply the existing operations and maintenance cost multiplied by the growth factor.

Risk Assessment to Identify Potential Service Gaps

The Region's key asset management principle is to meet service levels and to manage risk, while minimizing life cycle costs. Risk events, such as an asset failure, are events which may compromise the delivery of the Region's strategic objectives. The Region's asset risk assessment takes into account potential losses to services, financial loss, and potential safety hazards (see table 4-2 below). All assets are scored according to the impact of asset failure against these criteria and the likelihood of that failure occurring based on asset age, condition and performance.

Managing risk is achieved in large part by optimizing the timing and type of maintenance and renewal interventions. To provide guidance for asset maintenance and renewal decision-making, the Region's tolerance for risk arising from the deterioration and failure of assets has been defined based on asset criticality.

Asset criticality reflects the importance of an asset to the Region's delivery of services or, in technical terms, the potential consequences of the asset failing (and therefore failing to provide the required LOS). Asset consequence of failure is determined based on the degree to which the failure of the asset would impact the following "triple bottom line" considerations:

- **Service** delivery considerations such as the lack of sufficient service capacity to meet demand or loss of existing service, expressed as degree and duration of impact from minimal localized short-term disruption of non-essential service to widespread and long-term disruption of essential service.
- **Financial** impact considerations such as damages to Regional or private property and infrastructure, loss of revenue, and fines.
- **Safety** impact considerations such as ability to meet H&S related regulatory requirements and degree and extent of injury, from negligible injuries and multiple loss of life.

The higher the criticality an asset has, the lower the Region's tolerance for risk is for that asset. Conversely, the Region will tolerate greater risk in relation to less critical assets.

The Region has defined five criticality grades, from Very High to Very Low, that reflect its tolerance for asset risk. The following table outlines the "triple bottom line" impacts and typical asset LOS for corresponding to each criticality grade.

Table 0-2 Asset Criticality Grades, Considerations & Asset LOS

Impacts	Consequence of Failure (CoF)				
	1 Very Low	2 Low	3 Moderate	4 High	5 Very High
Service	Service not affected or minimal impact	Localized disruption of non-essential service	Localized disruption of essential service	Widespread short-term disruption or localized long-term disruption of essential service	Widespread and long-term disruption of essential service
Financial	Damages, losses or fines <$10,000	Damages, losses or fines $10,000 to $200,000	Damages, losses or fines $200,000 to $2,000,000	Damages, losses or fines $2,000,000 to $10,000,000	Damages, losses or fines >$10,000,000
Safety	Negligible injuries	Minor injuries, medical attention required	Serious Injuries, multiple minor injuries	Multiple serious injuries, Loss of life	Multiple loss of life

The above criticality profiles enable risk to be incorporated into maintenance and renewals assessments in the following mitigating ways:

- by providing redundant or backup assets in case of failure of assets required to meet demand
- by setting maintenance service levels, including response times, to address identified asset defects and issues, based on risk tolerance
- by setting a condition-based LOS (the renewals intervention points) and monitoring condition, with frequency based on the tolerance for risk for each asset
- by setting the time to address assets that are considered Very High and High criticality assets that are in worse condition than their nominated intervention point.

These factors in turn influence the lifecycle options analysis and recommended strategies, as set out in the following two sections.

The following figures provide risk maps showing the total replacement value of assets for Business Risk Exposure. Business Risk Exposure (BRE) is derived from the multiplication of the probability of failure (PoF), which is the likelihood or chance that an asset failure may occur, and the consequence of failure (CoF), which is the direct and indirect impact on the Region if such an asset failure were to occur. The probability of failure is determined based on an asset's current performance and physical condition, and the consequence of failure is determined as outlined in Table 0-2. The risk maps show the

replacement value and percentage of assets at Very High (red), High (yellow), Moderate (green) and Low (blue) business risk exposure. The assets falling in the Very High and High categories will generally be those assets that are most consumed, as illustrated in the consumption graphs.

- Assets that appear in the red zone are significant to the Region and therefore need to be actively managed and monitored in a more comprehensive manner than other risks.
- Assets that appear in the yellow zone will also be actively managed depending on their nature
- Assets that appear in the green or blue zones are generally acceptable without significant mitigation strategies being implemented, although monitoring may still occur in some form.

The risk maps have enabled the identification and prioritization of Very High risk assets that need to become candidates for closer inspection (to verify if they truly are Very High risk), renewal or replacement.

Risk maps showing both replacement value and percentage of assets by replacement value for all Facility assets are shown in the following figure and table.

Figure 0-1 Risk Exposure Matrix: Region Total (in $M & %)

PoF	VL	L	M	H	VH
5	$14	$40	$18	$19	$40
4	$56	$122	$99	$186	$50
3	$207	$362	$458	$512	$190
2	$163	$201	$368	$806	$415
1	$55	$138	$70	$384	$347
			CoF		

PoF	VL	L	M	H	VH
5	0.3%	0.7%	0.3%	0.4%	0.8%
4	1.1%	2.3%	1.9%	3.5%	0.9%
3	3.9%	6.8%	8.6%	9.6%	3.6%
2	3.1%	3.8%	6.9%	15.2%	7.8%
1	1.0%	2.6%	1.3%	7.2%	6.5%
			CoF		

Table 0-3 Risk Exposure Values: Region Total (in $M & %)

Risk Level	Asset Value ($M)	Proportion of Assets
Very High	$109	2.0%
High	$1,918	36.1%
Moderate	$2,937	55.2%
Low	$356	6.7%
TOTAL	$5,320	100.0%

The majority of the Very High risk category assets are wastewater treatment plants, groundwater treatment systems, and water pumping stations. More detail is provided on the following pages.

Lifecycle Options Analysis

The Region's recommended renewals, maintenance and operations programs have been developed on an "asset needs" basis, applying the Region's asset management process as summarized in Section 0 Asset Management at the Region of Waterloo.

Assessment of Renewal Needs

Renewals work involves replacing assets or components of assets to avoid service failure. For those assets with higher risk profile, renewal works are timed to minimize any risk of failure, while obtaining the longest economic and service life from the assets. The objective is to replace critical assets before condition deteriorates into a poor or very poor state (which would increase the risk of failure).

The predominant drivers of renewals investment are as follows:

- **Current condition and performance:** The Region regularly inspects its assets to monitor their condition and performance, typically using a rating system based on industry standards, converted to a generic grading system based on the International Infrastructure Management Manual (IIMM). Assets are assessed against a 5 point scale, ranging from 1 = Very Good or VG (meets or exceeds customer LOS as set in Section 3) through to 5 = Very Poor or VP (delivers a very poor LOS, at risk of failing completely). For those assets for which condition data is not available, age is used to estimate condition, which can provide unreliable information for those assets for which age is a poor predictor of condition and remaining life.
- **Rate of deterioration:** The Region estimates the rate of deterioration of the various asset classes using deterioration curves which express the rate of deterioration over time based on current condition. These rates are estimations for planning purposes and are based on work previously done within the international infrastructure asset management sector. The Region reviews the accuracy of the deterioration curves and the actual expected life for each asset type periodically based on actual age, condition and useful life trends.
- **Renewals intervention point:** A renewals intervention point is set for each asset class, based on the LOS required from that class and its risk categorisation. Very high and high criticality assets (those with the highest potential consequences of the asset failing) are replaced before they fall into poor or very poor condition. Moderate and low criticality assets are replaced before they fall into very poor condition, and very low criticality assets are allowed to fall into very poor condition, i.e., run to failure.

Asset Management Strategies

Asset management strategies are planned actions that enable assets to provide the desired levels of service in a sustainable way, while managing

risk, at the lowest lifecycle cost (e.g., through preventative action). The following summarizes actions taken by the Region to manage assets:

Non-Asset Solutions and Investment

The Region invests in the following non-asset solutions:

- Continuing to manage demand through education and demand reduction and other demand management programs.
- Balancing use (e.g., kilometres, hours, waste disposal cell volume) by shifting assets from higher use to lower use.
- Smoothing peaks in demand over time.
- Energy conservation and demand management initiatives such as process optimization and education.
- Creation of shared assets to reduce the asset portfolio size.
- Integrating the planning of infrastructure renewal across asset classes (e.g., scheduling road and buried infrastructure replacements at the same time).
- Working with the cities and townships to optimize infrastructure management (e.g. data sharing agreements).
- Continuously improving an integrated set of asset management best practices including implementing a Corporate Work Management System and Decision Support System.

Expansion Needs and Investment

The Region determines its recommended expansion program through the master planning process which develops needs based on an assessment of demand against capacity and future trends in regulatory requirements, customer expectations, council's desired LOS, other business drivers, and availability of enabling technologies. The Region updates master plans periodically, typically every five (5) to eight (8) years, and incorporates the results into renewal, operations and maintenance planning, and the 10-year Capital Program.

The following master plans are complete, underway or planned for the near future:

- Transportation Master Plan
- Cycling Master Plan
- Water Supply and Distribution Operations Master Plan
- Water Efficiency Master Plan
- Water Resource Protection Master Plan
- Wastewater Treatment Master Plan
- Biosolids Management Master Plan
- Waste Management Master Plan
- Airport Master Plan
- Regional Accommodation Master Plan
- Paramedic Services Master Plan

Renewals Needs and Investment

Asset renewals requirements are assessed and prioritized based on:

- Condition assessment programs that assess condition of very high and high criticality assets, basing frequency of assessment on asset criticality.
- Evaluation of the impact of observed condition or specific distresses on future asset performance and identifying appropriate maintenance and renewal works.
- Renewing very high and high criticality assets in the year in which they are predicted to fall beyond the predetermined threshold condition.
- An understanding of timing of associated expansion and renewal works.

Maintenance and Operations Needs and Investment

Renewals and maintenance are strongly linked; maintenance strategies can hasten or delay the need for renewals, and if renewals are deferred, this can increase maintenance needs.

The distinction between renewals (which are capital works) and maintenance (which is an operational expense) is set by accounting policies and Standard Operating Procedures. Maintenance ensures the asset continues to deliver the established LOS, while renewals extend the asset's useful life.

Asset operations and maintenance requirements and required resources are assessed and prioritized based on:

- Carrying out legislated operations and maintenance activities to ensure safety and environmental sustainability in accordance with the appropriate regulations.
- Conducting routine and preventative maintenance activities to ensure preservation of existing assets.
- Analysis of current operations and maintenance (O&M) contracts and known historical costs of the established LOS to forecast future O&M costs. For example, in some cases O&M costs increase at the rate of inflation, and in other cases such as energy and oil for pavement, costs have increased significantly more over time than the overall rate of inflation.
- Assessing consequential operational and maintenance requirements of significant new infrastructure planned to be added to the asset portfolio.

Procurement Methods

Procurement methods help to ensure the most efficient allocation of resources when executing asset management strategies such as maintenance and renewals works completed by external contractors and suppliers. It is the objective of the Region of Waterloo that all goods and services are acquired in a competitive, fair and open manner that is efficient and accountable. Procurement is the delegated authority to perform the following functions: sourcing of products/services, issuance of bids, issuance of purchase orders and contracts, monitoring of the bid process, conducting public tender openings, coordination of the evaluation process, participation

in evaluating committees, issuance of reports to Council and CAO recommending contract award, vendor disputes, as well as the disposal of surplus goods.

The Region's Purchasing Bylaw (BY-LAW NUMBER 10-028) guides all procurement practices and is supported by internal policies and procedures.

Service Area Asset Management Strategies

The following section provides a two page summary outlining critical assets, risk tolerance, risk exposure, as well as asset management strategies for each of the seven (7) service areas.

Transportation

Asset Criticality Grades, by Asset Class

The following table outlines the asset criticality and associated risk tolerance, by asset class.

Asset Criticality	Risk Tolerance	Asset Classes
Very High (Catastrophic Impacts)	Very low: absolute minimum risk of failure is tolerated	• Bridges & Major Culverts w/ Road Class 1 to 3, depending on Current Replacement Value
High (Major Impacts)	Low: minimum risk of failure is tolerated	• Roadway Pavement w/ Road Class 1 to 4 • Roadside Guide Rails • Bridges & Major Culverts w/Road Class 1 to 5, depending on Current Replacement Value • Illumination
Moderate (Moderate Impacts)	Moderate: some risk of failure is tolerated	• Roadway Pavement w/ Road Class 5 or 6 • Roadside Noise Walls • Roadside Retaining Walls w/ H >= 3m • Bridges & Major Culverts w/ Road Class 3 to 6, depending on Current Replacement Value
Low (Minor Impacts)	Relatively high: greater risk of failure is tolerated	• Roadside Retaining Walls w/ 1m >= H > 3m or w/ H < 1m & RC >= $40k • Traffic Signals • Bridges & Major Culverts w/ Road Class 3 to 6, depending on Current Replacement Value • Stormwater Management Assets w/ RC >= $40k
Very Low (Insignificant Impacts)	Very high: risk of failure is tolerated	• Roadside Retaining Walls w/ H < 1m • Stormwater Management Assets w/ RC < $40k

Risk Exposure

The following risk maps show both replacement value ($M) and percentage of assets by replacement value. There are no assets in the Very High risk category at this time.

PoF	VL	L	M	H	VH
5	$0.0	$20.6	$0.0	$0.0	$0.0
4	$2.8	$29.2	$4.5	$104.4	$0.0
3	$5.9	$47.1	$18.9	$306.3	$29.9
2	$7.0	$46.1	$78.7	$390.9	$169.8
1	$0.2	$78.1	$6.6	$196.1	$86.0

CoF

PoF	VL	L	M	H	VH
5	0.0%	1.3%	0.0%	0.0%	0.0%
4	0.2%	1.8%	0.3%	6.4%	0.0%
3	0.4%	2.9%	1.2%	18.8%	1.8%
2	0.4%	2.8%	4.8%	24.0%	10.4%
1	0.0%	4.8%	0.4%	12.0%	5.3%

CoF

Risk Level	Asset Value ($M)	Proportion of Assets
Very High	$0	0.0%
High	$654	40.2%
Moderate	$889	54.6%
Low	$85	5.2%

TOTAL	**$1,629**	**100.0%**

Transportation

Strategies

- **Non-asset solutions** are developed through the master planning process, and include the following:
  - shifting to other modes of transport
  - optimizing signal timing.
- **Expansion** of the asset portfolio is developed through the master planning process, roadway and intersection studies and EA's, as follows:
  - widening very high and high criticality roadways in the year in which volume/capacity is predicted to exceed 1.05
  - expanding intersections in the year in which the intersection LOS is predicted to exceed the threshold or as part of adjacent development requirements or safety related countermeasures as required
- **Renewal** of the asset portfolio is based on reducing risk, as follows:
  - renewing very high criticality assets (e.g., bridges and major culverts) in the year in which they are predicted to fall into fair condition
  - renewing high and moderate criticality assets (e.g., roadway pavement) in the year in which they are predicted to fall into poor condition
  - applying the growth factors to take into account new assets created either through Regional capital works or by developers as part of the subdivision process
  - timing transportation renewal works with other right-of-way needs (e.g., watermain, sanitary sewer replacement or installation), whether regional, city or township.
- **Operations and maintenance** of the asset portfolio is based on industry standards, and includes:
  - Continuing to carry out maintenance of the Region's road infrastructure to ensure safety and preservation of assets in accordance with Ontario Regulation 239/02 Minimum Standards for Municipal Highways (MMSMH).
  - Continuing to analyse current operations and maintenance (O&M) contracts and known historical costs of delivering established LOS to forecast future O&M costs.
  - Assessing consequential operational and maintenance requirements of significant new infrastructure planned to be added to the asset portfolio.

Risks Associated with the Strategies

Within Transportation Services, risks relating to infrastructure failure are mitigated through inspection and maintenance programs which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Annual capital and maintenance programs and associated

budgets ensure that funding to undertake the necessary work is provided.

Water Services

Asset Criticality Grades, by Asset Class

The following table outlines the asset criticality and associated risk tolerance, by asset class.

Asset Criticality	Risk Tolerance	Asset Classes
Very High (Catastrophic Impacts)	Very low: absolute minimum risk of failure is tolerated	• Wastewater (WW) Pumping Stations, WW Treatment Plants (based on level of redundancy) • Outfalls, Forcemains (all) • Gravity Sewers, Watermains with diameter >=900 mm
High (Major Impacts)	Low: minimum risk of failure is tolerated	• WW Pumping Stations, WW Treatment Plants (based on level of redundancy) • Groundwater Treatment Systems, WW Residual Management Centre but varies by level of redundancy • Gravity Sewers, Watermains with diameter >= 600 mm and < 900 mm
Moderate (Moderate Impacts)	Moderate: some risk of failure is tolerated	• All other vertical Asset Classes, but varies by system and level of redundancy • Gravity Sewers, Watermains with diameter >= 350 mm and < 600 mm
Low (Minor Impacts)	Relatively high: greater risk of failure is tolerated	• All other vertical Asset Classes, but varies by system and level of redundancy • Gravity Sewers, Watermains with diameter >= 250 mm and < 350 mm
Very Low (Insignificant)	Very high: risk of failure is tolerated	• All other vertical Asset Classes, but varies by system and level of redundancy • Gravity Sewers, Watermains with diameter <= 250 mm

Risk Exposure

The following risk maps show both replacement value ($M) and percentage of assets by replacement value.

PoF	VL	L	M	H	VH
5	$4.3	$12.5	$4.1	$14.1	$40.3
4	$30.6	$21.5	$27.5	$11.3	$49.6
3	$106.3	$171.0	$233.4	$80.3	$160.0
2	$81.6	$41.9	$142.6	$197.9	$214.3
1	$16.3	$0.3	$0.5	$83.7	$224.2

CoF

PoF	VL	L	M	H	VH
5	0.2%	0.6%	0.2%	0.7%	2.0%
4	1.6%	1.1%	1.4%	0.6%	2.5%
3	5.4%	8.7%	11.8%	4.1%	8.1%
2	4.1%	2.1%	7.2%	10.0%	10.9%
1	0.8%	0.0%	0.0%	4.2%	11.4%

CoF

Risk Level	Asset Value ($M)	Proportion of Assets
Very High	$104	5.3%
High	$743	37.7%
Moderate	$1,025	52.0%
Low	$98	5.0%
TOTAL	**$1,970**	**100.0%**

Water Services

Strategies

- **Non-asset solutions** are developed through the master planning process, and include:
  - Continuing to manage demand through education and water reduction and other demand management programs.
  - Through the Region's Corporate Energy Plan (CEP), strategies and actions are set out to improve energy performance through a structured approach. Where opportunities for energy efficiency are identified, the Region has undertaken a number of energy reduction initiatives including equipment replacement, lighting upgrades, installation of variable frequency drives (VFDs) on pumps, demand shifting/off peak pumping, use of biogas produced in wastewater treatment plant digesters, and building design to incorporate LEED energy efficient components such as building system controls and lighting. Water Services has also been working with local energy providers to obtain financial incentives from the "Save on Energy" program on qualifying projects.
- **Expansion** of the asset portfolio is developed through the master planning process.
  - The Region will continue to update the master plans and incorporate the results into renewal and operations and maintenance planning.
- **Renewal** of the asset portfolio is based on reducing the risk levels, and includes:
  - Continuing to assess condition of very high and high criticality assets, basing frequency of assessment on asset criticality (many condition assessments were conducted in 2007 and are currently being updated).
  - Developing processes and collecting data to better forecast and manage rehabilitation of very high and high criticality assets (current forecasts are based on replacement only), including a more detailed condition assessment protocol than the current 5-point grading scale.
- **Maintenance** of the asset portfolio is based on industry standards, and includes:
  - Implementation of Reliability Centred Maintenance across all very high and high criticality assets.
  - Continuing to analyse current operations and maintenance (O&M) contracts and known historical costs of delivering established LOS to forecast future O&M costs.
  - Assessing consequential operational and maintenance requirements of significant new infrastructure planned to be added to the asset portfolio.

Risks Associated with the Strategies

The Drinking Water Quality Management System (DWQMS) framework is

used to manage risk to the water supply system by identifying possible hazards, assigning risk scores, and identifying procedures to mitigate the risk. In combination with legislated regulations, the wastewater treatment system has procedures, process objectives and preventative measures to help assess and mitigate risk to the environment. In circumstances of non-compliance, the Region reports incidents to the MOECC, outlining mitigating measures. In addition, Master Planning helps to develop comprehensive, long-range plans for infrastructure requirements according to the Municipal Class EA Planning Process.

Waste Management

Asset Criticality Grades, by Asset Class

The following table outlines the asset criticality and associated risk tolerance, by asset class.

Asset Criticality	Risk Tolerance	Asset Classes
Very High (Catastrophic Impacts)	Very low: absolute minimum risk of failure is tolerated	• None
High (Major Impacts)	Low: minimum risk of failure is tolerated	• Disposal Assets
Moderate (Moderate Impacts)	Moderate: some risk of failure is tolerated	• Odour control assets • Groundwater extraction wells assets
Low (Minor Impacts)	Relatively high: greater risk of failure is tolerated	• Other Environmental Control Assets • Diversion Assets • Transfer Assets • Site Works Assets
Very Low (Insignificant)	Very high: risk of failure is tolerated	• None

Risk Exposure

The following risk maps show both replacement value ($M) and percentage of assets by replacement value. There are no assets in the Very High or Vey Low risk categories at this time.

PoF	VL	L	M	H	VH
5	$0.0	$0.0	$0.0	$0.0	$0.0
4	$0.0	$8.9	$2.1	$0.0	$0.0
3	$0.0	$10.9	$0.0	$4.0	$0.0
2	$0.0	$46.6	$5.3	$0.0	$0.0
1	$0.0	$29.8	$2.2	$23.0	$0.0

CoF

PoF	VL	L	M	H	VH
5	0.0%	0.0%	0.0%	0.0%	0.0%
4	0.0%	6.7%	1.5%	0.0%	0.0%
3	0.0%	8.2%	0.0%	3.0%	0.0%
2	0.0%	35.2%	4.0%	0.0%	0.0%
1	0.0%	22.5%	1.7%	17.3%	0.0%

CoF

Risk Level	Asset Value ($M)	Proportion of Assets
Very High	$0	0.0%
High	$6	4.6%
Moderate	$97	73.0%
Low	$30	22.5%
TOTAL	**$133**	**100.0%**

Waste Management

Strategies

- **Non-asset solutions** are developed through the master planning process, and include:
  - Continuing to manage demand through education and waste diversion and other demand management programs.

- **Expansion** of the asset portfolio is developed through the master planning process.
  - The Region will continue to update the master plans and incorporate the results into renewal and operations and maintenance planning.

- **Renewal** of the asset portfolio is based on reducing the risk levels, and includes:
  - Continuing to assess condition of high criticality assets, basing frequency of assessment on asset criticality, developing processes, and collecting data to better forecast and manage rehabilitation of very high and high criticality assets (current forecasts are based on replacement only), including a more detailed condition assessment protocol than the current 5-point grading scale.

- **Maintenance** of the asset portfolio is based on industry standards, and includes:
  - Implementation of Reliability Centred Maintenance across all very high and high criticality assets.
  - Continuing to analyse current operations and maintenance (O&M) contracts and known historical costs of delivering established LOS to forecast future O&M costs.
  - Assessing consequential operational and maintenance requirements of significant new infrastructure planned to be added to the asset portfolio.

Risks Associated with the Strategies

Within Waste Management, risks include losing existing non-infrastructure solutions, limited availability of non-infrastructure solutions, unforeseen MOECC requirements and unforeseen political directions. These risks are evaluated on an ongoing basis to ensure proper action can be taken to reduce the potential impact.

Risks relating to infrastructure failure are mitigated through inspection and maintenance programs which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Annual capital and maintenance programs and associated budgets ensure that funding to

undertake the necessary work is provided.

Airport

Asset Criticality Grades, by Asset Class

The following table outlines the asset criticality and associated risk tolerance, by asset class.

Asset Criticality	Risk Tolerance	Asset Classes
Very High (Catastrophic Impacts)	Very low: absolute minimum risk of failure is tolerated	• None
High (Major Impacts)	Low: minimum risk of failure is tolerated	• Runway pavement for primary runway
Moderate (Moderate Impacts)	Moderate: some risk of failure is tolerated	• Runway pavement for secondary runway and visual aids
Low (Minor Impacts)	Relatively high: greater risk of failure is tolerated	• Taxiway and apron pavement and visual aids Security fences / gates • Common Utilities: electrical distribution, water distribution, sanitary sewer collection, stormwater management • All pavement except runway pavement
Very Low (Insignificant)	Very high: risk of failure is tolerated	• Glycol collection system • Illumination

Risk Exposure

The following risk maps show both replacement value ($M) and percentage of assets by replacement value. There are no assets in the Very High risk category at this time.

PoF	VL	L	M	H	VH
5	$0.0	$0.4	$0.0	$0.0	$0.0
4	$0.0	$0.6	$0.0	$0.0	$0.0
3	$0.5	$2.2	$0.2	$0.6	$0.0
2	$1.6	$29.0	$4.0	$3.5	$0.0
1	$0.0	$4.2	$1.5	$1.0	$0.0

CoF

PoF	VL	L	M	H	VH
5	0.0%	0.9%	0.0%	0.0%	0.0%
4	0.0%	1.3%	0.0%	0.0%	0.0%
3	1.1%	4.5%	0.4%	1.2%	0.0%
2	3.2%	58.8%	8.1%	7.0%	0.0%
1	0.0%	8.4%	3.1%	2.1%	0.0%

CoF

Risk Level	Asset Value ($M)	Proportion of Assets
Very High	$0	0.0%
High	$1	2.5%
Moderate	$42	85.9%
Low	$6	11.6%
TOTAL	**$49**	**100.0%**

Airport

Strategies

- **Non-asset solutions** are developed through the master planning process, and include the following:
  - Smoothing peaks in passenger morning and evening air travel demands on the terminal over the day.

- **Expansion** of the asset portfolio is developed through the master planning process.
  - The Region will continue to update the airport master plan and interim business plans and incorporate the results into renewal and operations and maintenance planning.

- **Renewal** of the asset portfolio is based on reducing the risk levels, and include:
  - Conducting pavement structural condition surveys every 1 to 3 years depending on the history of Pavement Condition Index (PCI) according to Transport Canada advisory circular AC 30-016 (2014-10-10) Airfield Pavement Management System.
  - Evaluating the impact of observed distresses on future pavement performance and identifying appropriate maintenance and renewal works.

- **Operations and maintenance** of the asset portfolio is based on past activities to meet legislated requirements, as follows:
  - Continuing to conduct routine and preventative maintenance activities according to published Transport Canada advisory circulars.
  - Continue to conduct routine and preventative maintenance activities on common utilities to ensure compliance with Provincial and Federal Regulatory requirements.
  - Continuing to analyse current operations and maintenance (O&M) contracts and known historical costs of delivering established LOS to forecast future O&M costs.
  - Assessing consequential operational and maintenance requirements of significant new infrastructure planned to be added to the asset portfolio.

Risks Associated with the Strategies

Within the Airport, risks relating to infrastructure failure are mitigated through inspection and maintenance programs which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Annual capital and maintenance programs and associated budgets ensure

that funding to undertake the necessary work is provided. With 25 private businesses located at the Airport, employing approximately 300 people, impacts to common utilities and Airside infrastructure can have further reaching impacts on those third party companies.

Grand River Transit

Asset Criticality Grades, by Asset Class

The following table outlines the asset criticality and associated risk tolerance, by

asset class.

Asset Criticality	Risk Tolerance	Asset Classes
Very High (Catastrophic Impacts)	Very low: absolute minimum risk of failure is tolerated	• None
High (Major Impacts)	Low: minimum risk of failure is tolerated	• None
Moderate (Moderate Impacts)	Moderate: some risk of failure is tolerated	• Conventional Low Floor Buses • MobilityPlus Buses • Hoists
Low (Minor Impacts)	Relatively high: greater risk of failure is tolerated	• Inspector Vans / Service Vehicles • Platforms & Shop Equipment • Technology, Communications & Security Equipment
Very Low (Insignificant)	Very high: risk of failure is tolerated	• Bus Shelters / Landing Pads • Furniture / Office Equipment

Risk Exposure

The following risk maps show both replacement value ($M) and percentage of assets by replacement value. There are no assets in the Very High or High risk categories at this time.

PoF	VL	L	M	H	VH
5	$6.3	$0.0	$0.0	$0.0	$0.0
4	$3.4	$0.0	$0.0	$0.0	$0.0
3	$57.3	$0.0	$0.0	$0.0	$0.0
2	$61.9	$0.0	$0.0	$0.0	$0.0
1	$24.7	$0.0	$0.0	$0.0	$0.0
CoF					

PoF	VL	L	M	H	VH
5	4.1%	0.0%	0.0%	0.0%	0.0%
4	2.2%	0.0%	0.0%	0.0%	0.0%
3	37.3%	0.0%	0.0%	0.0%	0.0%
2	40.3%	0.0%	0.0%	0.0%	0.0%
1	16.1%	0.0%	0.0%	0.0%	0.0%
CoF					

Risk Level	Asset Value ($M)	Proportion of Assets
Very High	$0	0.0%
High	$0	0.0%
Moderate	$67	43.6%
Low	$87	56.4%
TOTAL	**$154**	**100.0%**

Grand River Transit

Strategies

- **Expansion** of the asset portfolio is developed through the master planning process:
  - The Region will continue to update the Grand River Transit business plan and incorporate the results into renewal and operations and maintenance planning.

- **Renewal** of the fleet portfolio is based on reducing the risk levels, as follows:
  - Planning to renew all assets in the year in which they are predicted to fall into the Very Poor condition grade category, based on age, usage, physical condition, and fuel consumption trends.
  - Applying the growth factors to take into account new assets.

- **Operations and maintenance** of the fleet portfolio is based on forecasted growth, as follows:
  - Continuing to conduct routine and preventative maintenance activities according to legislative requirements.
  - Continuing to track and analyse current operations and maintenance (O&M) contracts and known historical costs of delivering established LOS to forecast future O&M costs.
  - Assessing consequential operational and maintenance requirements of significant new infrastructure planned to be added to the asset portfolio.

Risks Associated with the Strategies

Risks relating to Grand River Transit infrastructure failure include not meeting service standards such as published transit schedules that will jeopardize public trust in the service and potentially result in negative media exposure and loss of confidence in the Region. Unsafe vehicles subject the Region to liability and fines. Performance indicators have been put in place to monitor service standards.

Facilities

Asset Criticality Grades, by Asset Class

The following table outlines the asset criticality and associated risk tolerance, by asset class.

Asset Criticality	Facility Client Group	Facility Systems
Very High (Catastrophic Impacts)	• None	• Services: Conveying • For occupied facilities: Substructure: Foundations, Subgrade Enclosures; Shell: Superstructure; Services: HVAC, Fire Protection, Electrical, Comm's, Electronic Safety & Security
High (Major Impacts)	• Multiple Program: AHQ, Water Lab • GRT Ops Centre – Strasburg • Police & EMS HQs - Maple Grove • Sunnyside Home	• For unoccupied facilities: same as above, for occupied facilities, plus: • Substructure: Slabs-On-Grade, Water & Gas Mitigation • Special Construction & Demolition
Moderate (Moderate Impacts)	• Multiple Program: 99 Regina, 150 Main, Ops Centre • Police Divisions, Housing • Airport Major Buildings • Roads Yards (OPS001-302, -303) • Waste Management Buildings: varies	• Shell: Exterior Vertical & Horizontal Enclosures • Services: Plumbing • Equipment & Furnishings • Building Site Work: Liquid & Gas Utilities, Electrical Improvements, Communications
Low (Minor Impacts)	• GRT Terminals & Ops; Centre - Conestoga, Doon Museum & Curatorial, Village; Child Care Centre, Libraries, Small Museums, Housing (under 20k s.f.); Airport Small Buildings; Roads Yards (all but OPS001-302,3); Waste Mgmt Buildings: varies	• Interiors: Construction & Finishes • Building Site Work: Improvements, Misc. Construction
Very Low (Insignificant)	• Program Operated Buildings: EMS Stations • Waste Management Buildings varies	• Equipment & Furnishings

Risk Exposure

The following risk maps show both replacement value ($M) and percentage of assets by replacement value. There are few assets in the Very High risk category at this time.

PoF	VL	L	M	H	VH
5	$2.8	$6.3	$14.2	$5.0	$0.0
4	$17.5	$58.5	$65.0	$70.4	$0.0
3	$33.0	$119.9	$204.1	$120.9	$0.2
2	$4.2	$30.2	$136.6	$214.0	$30.9
1	$13.2	$20.8	$57.0	$80.6	$36.4

CoF

PoF	VL	L	M	H	VH
5	0.2%	0.5%	1.1%	0.4%	0.0%
4	1.3%	4.4%	4.8%	5.2%	0.0%
3	2.5%	8.9%	15.2%	9.0%	0.0%
2	0.3%	2.3%	10.2%	15.9%	2.3%
1	1.0%	1.6%	4.3%	6.0%	2.7%

CoF

Risk Level	Asset Value ($M)	Proportion of Assets
Very High	$5	0.4%
High	$512	38.2%
Moderate	$787	58.6%
Low	$38	2.9%
TOTAL	**$1,342**	**100.0%**

Facilities

Strategies

- **Non-asset solutions** are developed through the master planning process conducted by Facilities Management with each service area and corporately through groups such as the Energy Planning Working Group. Facilities Management consolidates these, including the following:
  - Energy conservation and demand management initiatives such as process optimization and education.
  - Master Accommodation Planning for space saving initiatives or lease collapses or amalgamations
- **Expansion** of the asset portfolio is developed through the master planning process conducted by each service area. Facilities Management consolidates these into the Master Accommodation Planning.
- **Renewal** of the asset portfolio is based on reducing the risk levels, as follows:
  - renewing very high and high criticality assets in the year in which they fall into poor condition
  - renewing moderate and low criticality assets in the year in which they fall into very poor condition
- **Operations and maintenance** of the asset portfolio is based on forecast growth, as follows:
  - Implementation of Reliability Centred Maintenance across all very high and high criticality assets.
  - Continuing to analyse current operations and maintenance (O&M) contracts and known historical costs of delivering established LOS to forecast future O&M costs. The Region's Corporate Energy Plan includes projects such as facility meter installations, lighting retrofits, HVAC upgrades & automation/controls, and process optimization for Water Services and Waste Management.
  - Assessing consequential operational and maintenance requirements of significant new infrastructure planned to be added to the asset portfolio.

Risks Associated with the Strategies

Within Facilities Management services, risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Annual capital and maintenance programs and associated budgets ensure that funding to undertake the necessary work is provided.

Fleet

Asset Criticality Grades, by Asset Class

The following table outlines the asset criticality and associated risk tolerance, by asset class.

Asset Criticality	Risk Tolerance	Asset LOS	Asset Classes
Very High (Catastrophic Impacts)	Very low: absolute minimum risk of failure is tolerated	No assets in poor or very poor condition	• None
High (Major Impacts)	Low: minimum risk of failure is tolerated	No assets in poor or very poor condition	• None
Moderate (Moderate Impacts)	Moderate: some risk of failure is tolerated	No assets in very poor condition	• Emergency Medical Services vehicles * • Police Services vehicles (not included in this AM Plan as these are managed separately, but supported through Feet Management)
Low (Minor Impacts)	Relatively high: greater risk of failure is tolerated	No assets in very poor condition	• Transportation, Water Services & Waste Management vehicles
Very Low (Insignificant)	Very high: risk of failure is tolerated	Assets allowed to fall into very poor condition and "run to failure"	• All others (Airport, Corporate Services, Other)

* Note: Emergency Medical Services vehicles were moved from High criticality (2012 AM Plan) to Moderate criticality because the level of redundancy in the EMS fleet has been increased since that time.

Risk Exposure

The following risk maps show both replacement value ($M) and percentage of assets by replacement value. There are no assets in the Very High risk category at this time.

PoF	VL	L	M	H	VH
5	$0.1	$0.0	$0.0	$0.0	$0.0
4	$1.7	$3.4	$0.1	$0.0	$0.0
3	$4.1	$10.7	$1.1	$0.0	$0.0
2	$6.4	$6.7	$1.2	$0.0	$0.0
1	$0.7	$4.7	$2.0	$0.0	$0.0

CoF

PoF	VL	L	M	H	VH
5	0.1%	0.0%	0.0%	0.0%	0.0%
4	3.9%	8.1%	0.2%	0.0%	0.0%
3	9.6%	25.0%	2.6%	0.0%	0.0%
2	15.0%	15.7%	2.8%	0.0%	0.0%
1	1.5%	11.0%	4.6%	0.0%	0.0%

CoF

Risk Level	Asset Value ($M)	Proportion of Assets
Very High	$0	0.0%
High	$1	2.7%
Moderate	$30	69.7%
Low	$12	27.5%
TOTAL	**$43**	**100.0%**

Fleet

Strategies

- **Non-asset solutions** are developed through the master planning process, and include the following:
  - Creation of a shared Corporate Motor Pool Program to reduce the fleet size and enhance customer service.
  - Balancing use (kilometres or hours) by shifting vehicles from higher use to lower use client groups.

- **Expansion** of the asset portfolio is developed through consultation with client groups, as follows:
  - Review of client group master plans to estimate growth of new assets.
  - Semi-annual meetings with client groups to determine short term and future needs as part of the 10 year capital replacement planning program.

- **Renewal** of the fleet portfolio is based on reducing the risk levels, as follows:
  - Planning to renew all assets in the year in which they are predicted to fall into the Very Poor condition grade category, based on age, usage, physical condition, and fuel consumption trends.
  - Prioritizing replacement of higher criticality vehicles (e.g., Ambulances) before lower criticality vehicles.
  - Applying the growth factors to take into account new assets.

- **Operations and maintenance** of the fleet portfolio is based on forecast growth, as follows:
  - Continuing to conduct routine and preventative maintenance activities according to legislative requirements.
  - Continuing to track and analyse current operations and maintenance (O&M) contracts and known historical costs of delivering established LOS to forecast future O&M costs. Historically, costs such as fuel have increased significantly over time.
  - Assessing consequential operational and maintenance requirements of significant new infrastructure planned to be added to the asset portfolio.

Risks Associated with the Strategies

Risks relating to Fleet Services vehicle asset failure are mitigated through

inspection and maintenance programs which provide the necessary data to ensure that the work required and the established LOS are identified. Annual capital and maintenance programs and associated budgets ensure that funding to undertake the necessary work is provided.

Financing Strategy

Expenditure Actuals, Forecasts and Funding Requirements

Overview

Financial management in asset-intensive organizations is characterized by high asset values relative to the total organization value. Financial management principles for asset intensive organizations include recognizing the consumption of asset service potential, categorizing expenditure by lifecycle activity, allocating costs to assets as far as practical, preparing long term forecasts, cost-effective financing, and effective reporting of financial performance.

This section integrates asset management planning with financial planning and budgeting. Allocating costs between lifecycle activities such as expansion (also known as growth), upgrade (e.g., due to legislated requirements or availability of new technologies), renewal (e.g., rehabilitation or replacement), and maintenance is not simple due to complexities of the infrastructure needs.

Expansion (Growth) Investment Needs and Funding Gaps

The following table provides a summary of actual historic expenditures and the average expenditure for the 10-year capital program, and average growth rate calculated from the capital program, by service area. The Region's asset portfolio is expected to grow by approximately **$1.4 billion** over the next ten years. The Region is planning for associated increased operations, maintenance and renewal financial and resourcing needs.

Table 0-1 Expansion Investment Needs ($M) & Growth Rates

	Actual Expenditure				Capital Program	Current Replacement Value (CRV)	Calculated Replacement Value (CRV)* in 2015 Dollars	Average Growth (%)
Service Area	2013	2014	2015	Ave	Ave 2016-25	2015	2025	2016-25
Transportation	$24.0	$33.5	$40.0	$32.5	$45.4	$1,629.3	$2,082.9	2.8%
Water Services	$40.9	$30.7	$40.0	$37.2	$68.7	$1,970.2	$2,657.0	3.5%
Waste Mgmt	$1.6	$1.0	$1.7	$1.4	$2.2	$132.6	$154.7	1.7%
Airport	$0.1	$0.2	$0.1	$0.2	$0.3	$49.4	$52.3	0.6%
GRT	$21.7	$17.5	$7.7	$15.6	$11.2	$153.5	$265.6	7.3%
Facilities	$27.2	$27.2	$14.5	$22.9	$16.1	$1,342.0	$1,502.6	1.2%
Fleet	$0.0	$0.15	$0.15	$0.1	$0.3	$42.7	$45.7	0.7%
Totals	$115.5	$110.3	$104.2	$110.0	**$144.1**	**$5,319.6**	**$6,760.7**	**2.7%**

* Based on the expansion needs identified in the current 10-year Capital Program (average 2016-25 Capital Program x 10 years).

Renewals Investment Needs

The following table (Table 0-2) and figure (Figure 0-1) provide a summary of the following:

- Actual historic expenditures for 2013 to 2015
- Planned expenditures for 2016 and average planned expenditures for 2016- 2025 based on the 10-year capital program
- Forecasted annual average expenditure over a 100-year time horizon based on the asset management renewal plan

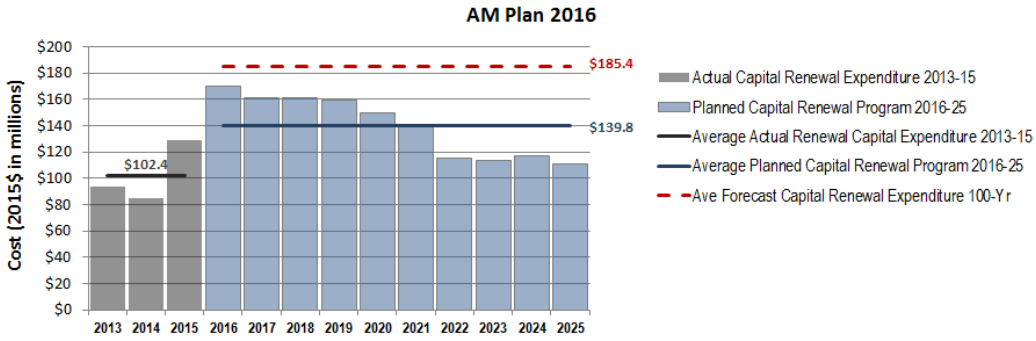
Table 0-2 Renewal Investment Needs ($M)

Asset Class	3-Year Ave. Expenditure	Capital Program		Forecast Ave. Annual Exp.	10-yr Planned vs 100-yr Forecasted Need
	Actual	2016	Ave 2016-25	100- Year	
Transportation	$35.2	$61.8	$42.3	$51.0	$8.7
Water Services	$37.3	$43.3	$46.0	$70.0	$24.0
Waste Management	$6.8	$12.6	$8.8	$8.0	-$0.8
Airport	$0.6	$4.9	$2.6	$1.8	-$0.9
Grand River Transit	$6.7	$5.4	$10.2	$11.8	$1.6
Facilities	$10.7	$32.8	$21.9	$37.7	$15.8
Fleet	$5.2	$9.6	$8.0	$5.0	-$3.0
Totals	**$102.4**	**$170.4**	**$139.8**	**$185.4**	**$45.5**

The last column illustrates the difference between the planned 10-year capital renewal program and the 100-year forecasted average annual renewal need.

The following figure depicts the information provided in the preceding table in graphic form: Actual Capital Renewal Expenditure (grey bars) and Planned Capital Renewal Program (blue bars). The 3-year average actual capital expenditure is shown in black ($102.4M), the 10-year average capital program is shown in blue ($139.8M), and the 100-year average forecast capital expenditure is shown in dashed red ($185.4M).

Figure 0-1 Renewal Investment Needs ($M)



Revenue Sources

Capital Expenditures

Through the annual budget process, capital project information is gathered from the service areas, including investment needs, trends and priorities. The review includes actual historic expenditures for similar projects to determine adequate project funding requirements. The Capital Budget is prepared and includes the current year and a 10-year forecast, often based on service areas' budget forecasts exceeding this time period. Once the Capital Budget is finalized, financing options for the requests are determined based on the optimum funding structure, taking into account the following key sources of funding and financing.

- current year property tax and user rate revenue
- reserves
- grants / recoveries
- development charges (for growth / development infrastructure)
- debt

The Region may issue debentures, if required, for significant growth-related projects, property acquisition, and other major facility and fixed infrastructure projects.

The Province sets an Annual Debt Repayment Limit for municipalities at 25 per cent of own source revenues. The Region's debt servicing costs as a % of own source revenues was 10% at the close of 2015. Although a formal target hasn't been set, the Region intends to maintain debt servicing cost levels well below the Provincial guideline to minimize the impact of debt charges on future Operating Budgets.

Capital Reserves are established to fund the Region's capital program. Funding for these reserves is obtained from property taxes and user rates. The annual reserve contributions are based on forecasted financing requirements and provisions made to sustain reserve balances at appropriate levels to address infrastructure replacement costs in the future and inherent uncertainties in capital funding needs. Reserve transfers are evaluated annually to ensure adequate funds are raised to meet future capital requirements and to smooth out the impact on the annual Operating Budget.

Grants from the Province or the federal government are also used to finance the capital program. However, many grants are a result of stimulus or other one-time funding that may be more difficult to forecast. Most grants are included in the budget forecast when confirmed.

Development Charges (DCs) are collected by the Region from developers under the Region's DC Bylaw. DCs are held in designated DC reserve funds and used to fund a portion of growth-related infrastructure as prescribed by the Region's DC Bylaw. Projections relating to DC revenues are based on DC rates and the projected growth in residential and non-residential areas.

Council has approved the capital financing principle that asset renewal projects should be financed through reserves and current year property tax and user rate reserves, and not through borrowing, as recommended in the Corporate Financing Principles Report (COR-FSD-16-16, dated Jun 14, 2016). The AM Plan clearly identifies these current and long term funding needs.

Operating Expenditures

Operating expenditures include those related to infrastructure operation and maintenance, and capital financing (reserve transfers). The Operating Budget review takes into consideration the Capital Budget forecast to ensure sufficient funding is available to operate, repair, and maintain capital infrastructure. The maintenance of infrastructure in good condition continues to be a priority. Key sources of funding for the Operating Budget include:

- property taxes
- user rates
- other

Property taxes are collected to finance all tax supported Regional programs, including transportation and waste management. Property assessment changes, residential and non-residential unit growth projections and operating cost forecasts are used to estimate property tax revenue over the forecast period.

User rates to support water and wastewater infrastructure are collected from the local municipalities based on the volume water produced and wastewater treated within each municipality, with the exception of North Dumfries and Wellesley where water and wastewater utility rates are billed directly to the customer based on water consumption. Usage fee projections, future capital requirements, desired rate increases and historical trends are used to prepare the forecasted revenue.

Other sources of funding for the Operating Budget include investment interest, user fees for demand based services, and provincial funding.

Addressing the Short Term vs Long Term Forecast Funding Requirements

As previously indicated in Section 2 of this report, 88% of assets are currently in fair or better condition, reflecting assets that are relatively young, but will require significant investments for replacement in the long term. As illustrated in Figure 0-1, there is some gap between

the long-term forecast and what is being budgeted; however at this point it is difficult to accurately determine that gap. This is for a number of reasons. Part of this is in the timing of asset lifecycle replacements. Some 10-year periods may be significantly higher than the 100-year average while others may be significantly lower. Also, more work is needed to develop complete asset inventories and comprehensive condition assessments. Every asset should have a planned replacement date and financing strategy. As more information is gathered and analysis done, a better assessment of the gap can be completed and then reported to Council. Through a future budget process staff would present a budget addressing the gap and Council can approve that budget as appropriate.

Identified gaps are addressed through the following means:

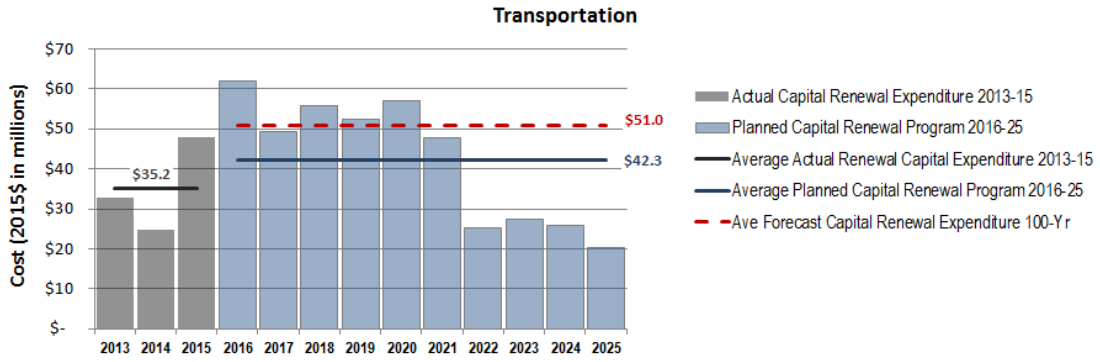
- Transfer to Reserve Funds
- Gas Tax Funding
- Debenture Funding
- Master Planning
- Capital Optimization
- Lifecycle Replacement Funding Strategies
- Business Planning

The figures below illustrate the actual and average capital renewal investment (2013-2015), actual and average planned capital renewal program (2016-2025) and the average forecast capital renewal expenditure (100 yr) for all the seven (7) service areas.

Transportation

Renewals Investment Needs & Historical Expenditures

The following figure depicts the past capital renewal expenditures (grey bars), planned capital renewal program (blue bars), and average annual amounts for actual capital renewal expenditures (black line @ $35.2M), for the 10-year capital program (blue line @ $42.3M), and for the 100-year forecast capital renewal investment needs (dashed red line @ $51.0M).

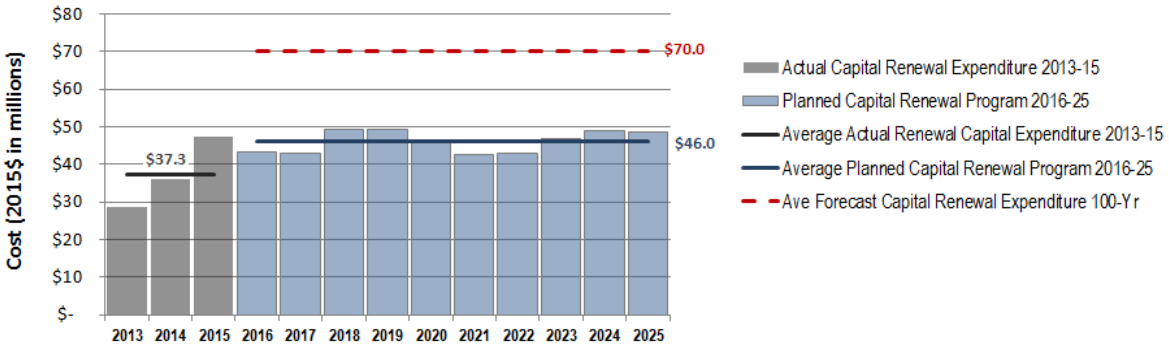


The figure illustrates a difference between the 100-year forecast and the 10-year program of $8.7M. This difference is attributed in large part to the “peaks and valleys” in the timing of asset lifecycle replacements (e.g., the replacement of bridges, which have a long estimated useful life, may fall outside the 10-year capital renewal programming window).

Water Services

Renewals Investment Needs & Historical Expenditures

The following figure depicts the past capital renewal expenditures (grey bars), planned capital renewal program (blue bars), and average annual amounts for actual capital renewal expenditures (black line @ $37.3M), for the 10-year capital program (blue line @ $46.0M), and for the 100-year forecast capital renewal investment needs (dashed red line @ $70.0M).



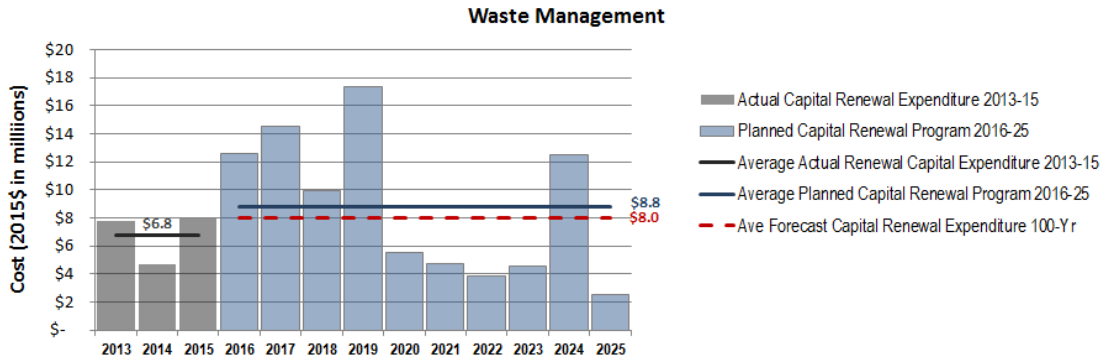
The figure illustrates a difference between the 100-year forecast and the 10-year program of $24.0M. This difference is attributed in large part to the “peaks and

valleys" in the timing of asset lifecycle replacements (e.g., the replacement of treatment plant assets, with a long estimated useful life, may fall outside the 10-year capital renewal programming window).

Waste Management

Renewals Investment Needs & Historical Expenditures

The following figure depicts the past capital renewal expenditures (grey bars), planned capital renewal program (blue bars), and average annual amounts for actual capital renewal expenditures (black line @ $6.8M), for the 10-year capital program (blue line @ $8.8M), and for the 100-year forecast capital renewal investment needs (dashed red line @ $8.0M).

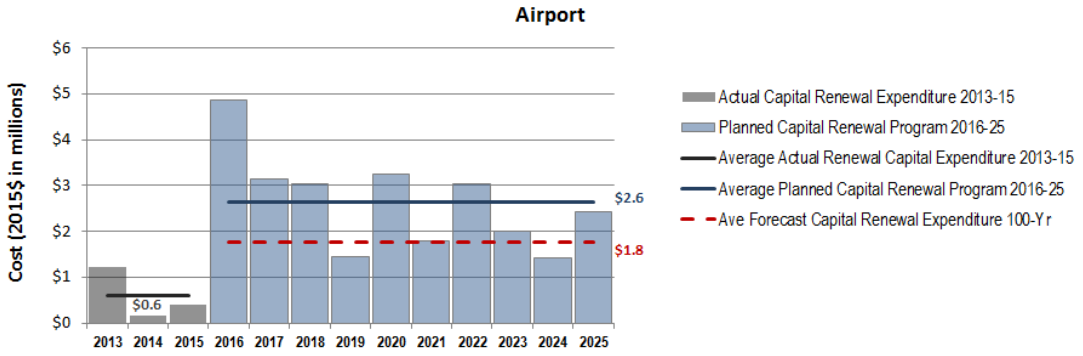


The figure illustrates a difference between the 100-year forecast and the 10-year program of negative $0.8M (i.e., a surplus). The significant spikes in the 10-year forecast in 2016, 2017, 2018, 2019, and 2024 are for design and construction of new cells. This results in higher upfront costs in the Average Planned Capital program as compared to the 100-year average forecast capital expenditure.

Airport

Renewals Investment Needs & Historical Expenditures

The following figure depicts the past capital renewal expenditures (grey bars), planned capital renewal program (blue bars), and average annual amounts for actual capital renewal expenditures (black line @ $0.6M), for the 10-year capital program (blue line @ $2.6M), and for the 100-year forecast capital renewal investment needs (dashed red line @ $1.8M).

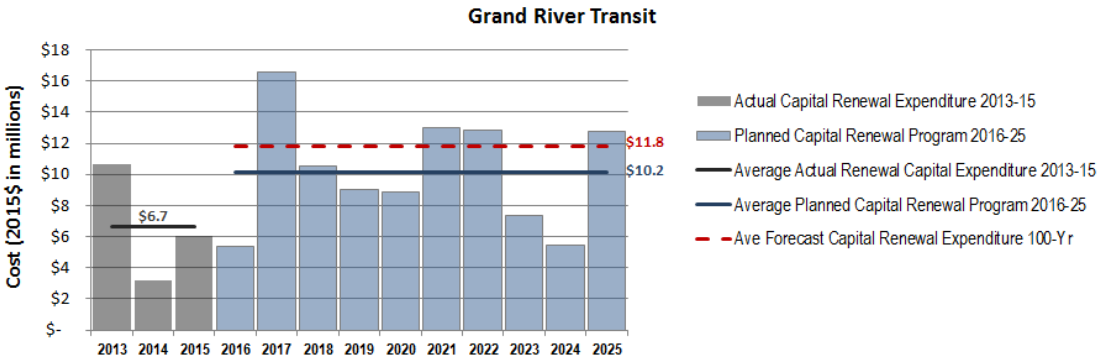


The figure illustrates a difference between the 100-year forecast and the 10-year program of negative $0.8M (i.e., a surplus). This difference is attributed in large part to the "peaks and valleys" in the timing of asset lifecycle replacements. Greater renewal is required today then what is, on average, predicted in the future.

Grand River Transit

Renewals Investment Needs & Historical Expenditures

The following figure depicts the past capital renewal expenditures (grey bars), planned capital renewal program (blue bars), and average annual amounts for actual capital renewal expenditures (black line @ $6.7M), for the 10-year capital program (blue line @ $10.2M), and for the 100-year forecast capital renewal investment needs (dashed red line @ $11.8M).



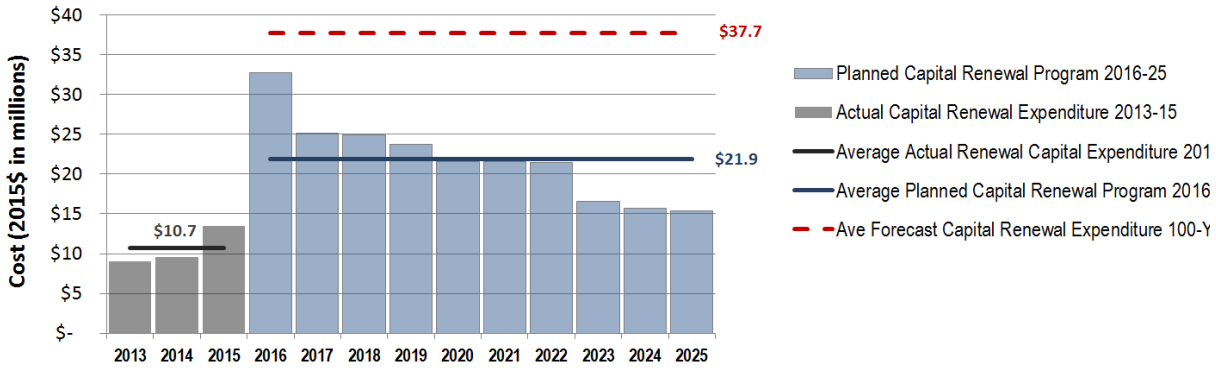
The figure illustrates a difference between the 100-year forecast and the 10-year program of $1.6M. This difference is attributed to the "peaks and valleys" in the timing of asset replacements.

Facilities

Renewals Investment Needs & Historical Expenditures

The following figure depicts the past capital renewal expenditures (grey bars), planned capital renewal program (blue bars), and average annual amounts for actual capital renewal expenditures (black line @ $10.7M), for the 10-year capital program (blue line @ $21.9M), and for the 100-year forecast capital renewal

investment needs (dashed red line @ $37.7M).

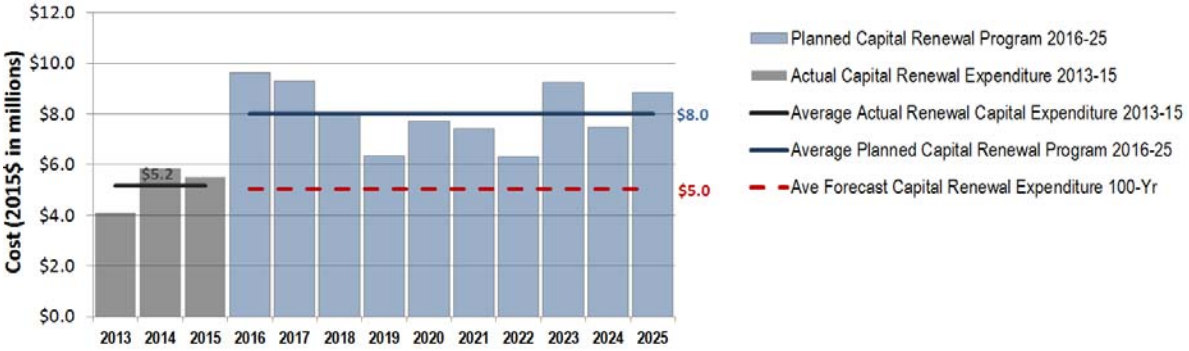


The figure illustrates a difference between the 100-year forecast and the 10-year program of $15.8M. This difference is attributed in large part to the “peaks and valleys” in the timing of asset lifecycle replacements (e.g., the replacement of facility assets, with a long estimated useful life, may fall outside the 10-year capital renewal programming window).

Fleet

Renewals Investment Needs & Historical Expenditures

The following figure depicts the past capital renewal expenditures (grey bars), planned capital renewal program (blue bars), and average annual amounts for actual capital renewal expenditures (black line @ $5.2M), for the 10-year capital program (blue line @ $8.0M), and for the 100-year forecast capital renewal investment needs (dashed red line @ $5.0M).



The figure illustrates a difference between the 100-year forecast and the 10-year program of negative $3.0M (i.e., a surplus). This additional “short term” funding is required to reduce the backlog of vehicle replacements that should have been undertaken in the past.