

Waste & Recycling Services Infrastructure Investment Plan (WRIIP) 2015-2024

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1. Executive Summary

The Waste & Recycling Services Infrastructure Investment Plan (WRIIP) is a strategic, long range capital plan that underpins the delivery of critical services. Capital investments are needed to: maintain assets, meet increasingly stringent regulatory requirements, provide reliable and high quality waste and recycling services, and keep pace with growth. The WRIIP identifies needed infrastructure investments to address the above drivers and to continue to make progress toward the goal of 80 per cent diversion of waste from City landfills by 2020.

2. Background

WRS currently manages and operates infrastructure valued at approximately \$160 million. This infrastructure is vital for the delivery of services to citizens by WRS and includes the following infrastructure which supports:

- Safe and environmentally responsible management of waste:
 - Engineered landfill disposal cells;
 - Stormwater management facilities;
 - Landfill gas collection systems;
 - Leachate collection and treatment systems;
 - Landfill monitoring systems; and
 - Management of closed landfill sites.
- Diversion of materials from landfill:
 - Household hazardous waste collection and transfer facilities;
 - Drop-off facilities for materials including: electronic equipment, appliances, tires, construction material; and
 - Organics collection and processing facilities and equipment.
- Efficient and effective operation of the business:
 - Scalehouses;
 - Collection carts and bins;
 - Truck maintenance and storage buildings;
 - Landfill perimeter fencing and enhancements; and
 - Information technology.

Consistent with the infrastructure described above, the following categories are used for WRS investment programs:

1. Landfill
2. Diversion
3. Facilities & Equipment

In the ten-year horizon (2015-2024), additional investments in infrastructure are necessary within these programs to allow WRS to continue to deliver high quality services. It is important for these investments to be prioritized to ensure the right investments are made in the right program at the right time. This involves evaluation of the needs of the customer and the operational efficiency of the infrastructure. It also involves anticipating the needs and availability of resources (funding, land and construction capacity). This approach helps ensure planned investments can meet existing and emerging customer and environmental priorities. It also

ensures financial and resource plans are in place for the delivery and construction of the proposed infrastructure projects.

Over the next ten years, WRS' infrastructure will face additional strain due to factors such as:

- Aging of the infrastructure which impacts its ability to operate efficiently and effectively;
- Revisions to regulatory and environmental requirements which necessitate upgrades or construction of additional infrastructure;
- Introduction of new services for customers which require upgraded or new infrastructure;
- Continued population growth which impacts the capacity of existing and future infrastructure.

It is anticipated that the investments required to address these factors over the 2015-2024 timeframe will be approximately \$624 million.

3. Investment Drivers

Through a collaborative approach within Utilities & Environmental Protection, four investment drivers were identified which recognize how the above factors influence the ability of infrastructure to meet customer needs. These investment drivers are common to Water Resources / Water Services and WRS. Following is an overview of how these drivers impact WRS:

INVESTMENT DRIVER	EXPLANATION
Maintain assets	Maintaining, protecting and extending the life of infrastructure investments.
Regulatory & Environmental Protection	Continuing to meet increasingly stringent regulatory and environmental protection requirements.
Service	Continuing to provide reliable and high quality waste and recycling services to meet the needs of citizens.
Growth	Investing in growth to meet the needs of a growing Calgary.

Each of these investment drivers provide a different perspective on when and where investments are needed. Prioritization of investments needs to consider the need and timing of investments in light of these drivers to ensure customer and environmental priorities are met.

4. Prioritization Process

Project managers in WRS prepared business cases for all projects to be considered in the ten-year plan. A database of information was created from these business cases which included the following information for each project:

- Summary description;
- Alignment with strategic plans and policies;
- Options and risk analysis;
- Success criteria;

- Driver(s) and Program(s) being addressed; and
- Proposed funding and timing.

WRS used this database to undertake a prioritization process in two phases. The first phase considered the need and the timing of the projects within the ten-year timeframe. This involved a review of each driver within each of the three investment programs. For example, the maintenance needs were considered for Landfills, Diversion and Facilities & Equipment. This allowed for an identification of critical maintenance needs within a specific programs as well as considering the relative needs in other programs.

As each driver was considered, projects were deemed either “high priority” or “low priority”. This rating was based on the ability of the project to meet customer and environmental priorities in the proposed timeframe. High priority projects were further evaluated to ensure the proposed timing in the ten-year plan matched the timing of the need.

A project was deemed a low priority if investments could be delayed without impacting customer or environmental priorities. In this case, the project was evaluated to determine when the priorities needed to be met and the timing in the ten-year plan was adjusted accordingly.

The second phase of the prioritization process involved a review of the proposed timing to ensure the required resources were available to deliver the projects (funding, land and construction capacity). Based on this review, some adjustments were made to the timing of projects to ensure the resources were available. The timing of need for these adjusted projects was further evaluated to ensure customer and environmental priorities were not compromised. This phase concluded with a consideration of the sequencing of projects to make sure the timing of projects was logical (i.e. landfill caps were in place prior to construction of landfill gas collection systems).

The use of the two step prioritization process resulted in an infrastructure investment plan that addressed customer and environmental priorities within the constraints of the available resources.

5. Priorities by Investment Driver

The following table summarizes the prioritized investments for the 2015-2024 timeframe based on the investment drivers for the three investment programs:

	Prioritized Investments 2015-2024 (Inflated Costs)				
	Landfill	Diversion	Facilities and Equipment	Investment Total	Investment % of Total
Maintain Assets	\$53M	\$0.4M	\$51M	\$104M	17%
Regulatory & Environmental Protection	\$152M	\$ 7M	\$3M	\$163M	26%
Services	\$9M	\$216M	\$33M	\$258M	41%
Growth	\$14M	\$20M	\$65M	\$99M	16%
Total:	\$228M	\$244M	\$152M	\$624M	100%

The proposed infrastructure investments will allow WRS to address issues of aging infrastructure, changing regulatory and environmental requirements, providing new services and providing services for a growing population for all three programs. It should be noted that some projects may address more than one investment driver. For example, maintenance of landfill gas collection systems addresses two drivers: Maintain Assets as well as Regulatory & Environmental Protection. In these instances, the cost of the project has been distributed between the affected drivers.

The following sub-sections provide a context and an overview of the investments proposed within each of the investment drivers.

5.1. Maintain Assets - \$104 million

Investments in maintenance are necessary to keep existing infrastructure operating to meet its intended purpose and to help minimize service interruptions. It also helps minimize future maintenance and replacement costs. As the infrastructure continues to age, and as more infrastructure is added to facilitate growth, continual and additional investment in maintenance is required.

Two-thirds of the maintenance investments for landfills consist of maintenance of roads and landfill caps. Maintenance in the Diversion Program is expected to remain at relatively low levels as the intent is for this type of processing infrastructure to be owned and operated by the private sector. About 40 percent of maintenance of facilities is for building maintenance. Lifecycle replacement of blue and black carts accounts for approximately one-third of the investments in equipment.

5.2. Regulatory & Environmental Protection - \$163 million

Investments are necessary to ensure all federal and provincial regulatory requirements are met. Continued investments are required to ensure The City is in compliance with applicable regulations. This includes investments in active landfills for the construction of new landfill cells and environmental protection systems (leachate collection, landfill gas collection and stormwater management systems); construction, maintenance and repair of other landfill infrastructure (buildings, fences, roads, etc.); and maintenance and remediation of inactive landfills. WRS will continue to work with the regulators to understand any changing regulatory requirements and ensure adequate preparedness.

Over half of the expenditures for this driver in the Landfill Program are for installation of leachate collection and pre-treatment systems, landfill gas collection systems, and landfill caps. Another 20 percent of the investments are for the construction of new landfill cells needed in the ten-year timeframe. Investments in the Diversion Program are for an upgraded household hazardous waste transfer station. Expenditures within the Facilities & Equipment program are for fencing required to keep landfill sites secured.

5.3. Service - \$258 million

Investments in this driver help WRS provide reliable and high quality services to meet the needs of citizens. Investments for the construction of an organics and biosolids composting facility and for the implementation of a green cart collection program account for about two-thirds of the investments in this driver. These investments in the collection and processing of organic material will increase the volume of material diverted from landfills. Investments within the Landfill Program include improvements to roads to improve access for customers and to facilitate vehicle and equipment circulation within the sites. The Facilities & Equipment Program

includes additional drop-off facilities for new materials and information technology to support operations.

5.4. Growth - \$99 million

As the population continues to grow, additional investments in infrastructure will be required to increase the capacity of collection and processing infrastructure. This includes investments in existing and new facilities.

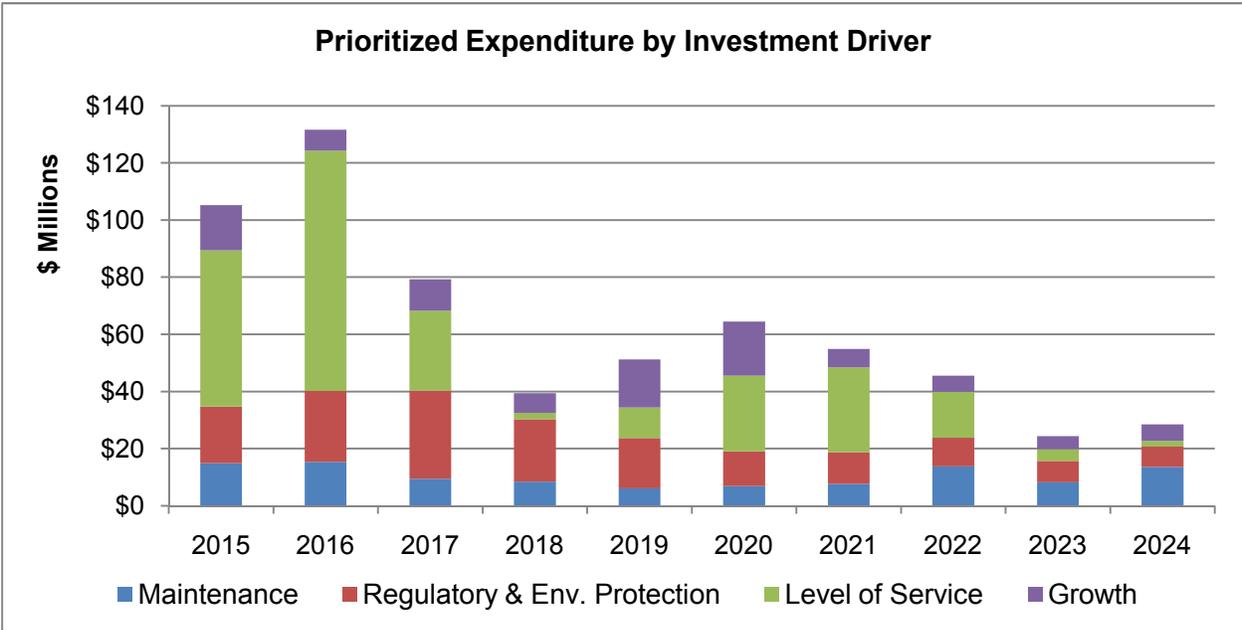
Over half of the expenditures in the Landfill program are for new landfill cells required to handle the ongoing volume of waste delivered to our landfills. For the Diversion Program, about half the investments are for increased capacity for drop-off at the landfill sites. About 60 percent of the expenditures in the Facilities & Equipment Program are for increased capacity of scalehouses, operations and maintenance buildings required to serve the increasing number of customers. Additional expenditures are for blue and black cart purchases and route optimization software to provide service for the growing customer base.

The table below summarizes the proposed expenditures, risks, outcomes and infrastructure for each of the investment drivers:

Investment Driver	Risks and Pressures	Outcomes	Infrastructure Required
<p>Maintain Assets</p> <p><i>\$104 M (17%)</i></p> <p><i>Maintaining, protecting and extending the life of infrastructure investments</i></p>	<p><i>Aging assets</i></p> <p><i>Growing inventory of infrastructure</i></p>	<p><i>Prevent unplanned interruptions to service</i></p> <p><i>Protect investments required to provide services to citizens at a minimum cost</i></p> <p><i>Proactively maintain assets</i></p>	<p><i>Building and Equipment Maintenance</i></p> <p><i>Landfill Maintenance</i></p>
<p>Regulatory and Environmental Protection</p> <p><i>\$163 M (26%)</i></p> <p><i>Continuing to meet increasingly stringent regulatory and environmental protection requirements</i></p>	<p><i>Increasingly stringent regulations</i></p> <p><i>Mitigating greenhouse gas emissions</i></p>	<p><i>Protect public health</i></p> <p><i>Protect land, air and water</i></p>	<p><i>Closed Landfill Monitoring</i></p> <p><i>Leachate and Landfill Gas Systems</i></p> <p><i>Landfill Perimeter Improvements</i></p>
<p>Services</p> <p><i>\$258 M (41%)</i></p> <p><i>Continuing to provide reliable and high quality services to meet the needs of our citizens</i></p>	<p><i>Increasing demand for composting and recycling</i></p> <p><i>Reduce waste</i></p>	<p><i>Provide additional diversion opportunities</i></p>	<p><i>Organics Collection and Processing</i></p> <p><i>Material Drop-off Facilities</i></p> <p><i>Data Management Systems</i></p>

Investment Driver	Risks and Pressures	Outcomes	Infrastructure Required
<p>Growth</p> <p><i>\$99 M (16%)</i></p> <p><i>Investing in growth to meet the needs of a growing Calgary</i></p>	<p><i>Growing population requiring additional infrastructure to deliver services</i></p>	<p><i>Ensure the City provides sufficient services to meet growing population</i></p>	<p><i>Landfill Cells</i></p> <p><i>Collection Facilities and Equipment</i></p>

The tables in Appendix A of this report further summarize the type of infrastructure to be provided in each WRS program from the perspective of the investment drivers. The following graph highlights the prioritized investments for each driver in the ten-year plan.



6. Investment Priorities by Program

The proposed investments in the three WRS programs are as follows:

Prioritized Investments 2015-2024 (Inflated Costs)			
Landfill	Diversion	Facilities and Equipment	Total
\$228 million	\$244 million	\$152 million	\$624 million

6.1. Landfill - \$228 million

The investments in the Landfill program in the ten-year timeframe will allow for the installation of infrastructure needed to manage additional waste safely and in an environmentally responsible manner. Approximately 20 percent of the investments in landfills are for the construction of new cells and caps to handle waste. As well, environmental protection systems (leachate collection & pre-treatment, landfill gas collection and stormwater management systems) are needed for these new cells which will account for just over one-third of the investments in landfills.

Maintenance and care of closed landfills is also an important part of the Landfill program. This requires ongoing and continual investments in remediation of existing caps, maintenance of landfill extraction systems (landfill gas and leachate), and maintenance of drainage systems. In the ten-year timeframe these investments will total approximately 20 percent of the expenditures in the Landfill program.

6.2. Diversion - \$224 million

A total of \$158 million was approved in 2013 for the implementation of an organics composting and collection program (\$133 million for an organics and biosolids composting facility, \$25 million for development of an organics campus site). This represents about two-thirds of the investments in the Diversion program. These investments will have a significant impact on the diversion of material from landfills and will help move Calgary towards the goal of 80 percent diversion of material from City landfills by 2020 (80/20 by 2020).

Another significant investment in the Diversion program is for the future construction of an Anaerobic Digester (approximately \$60 million). This facility will be constructed as an addition to the composting facility and will aid in the future composting of organic material from the commercial sector.

Other investments in the ten-year plan include a facility for collection and transfer of household hazardous wastes; and drop-off facilities for materials such as electronic equipment, appliances, tires, and construction material.

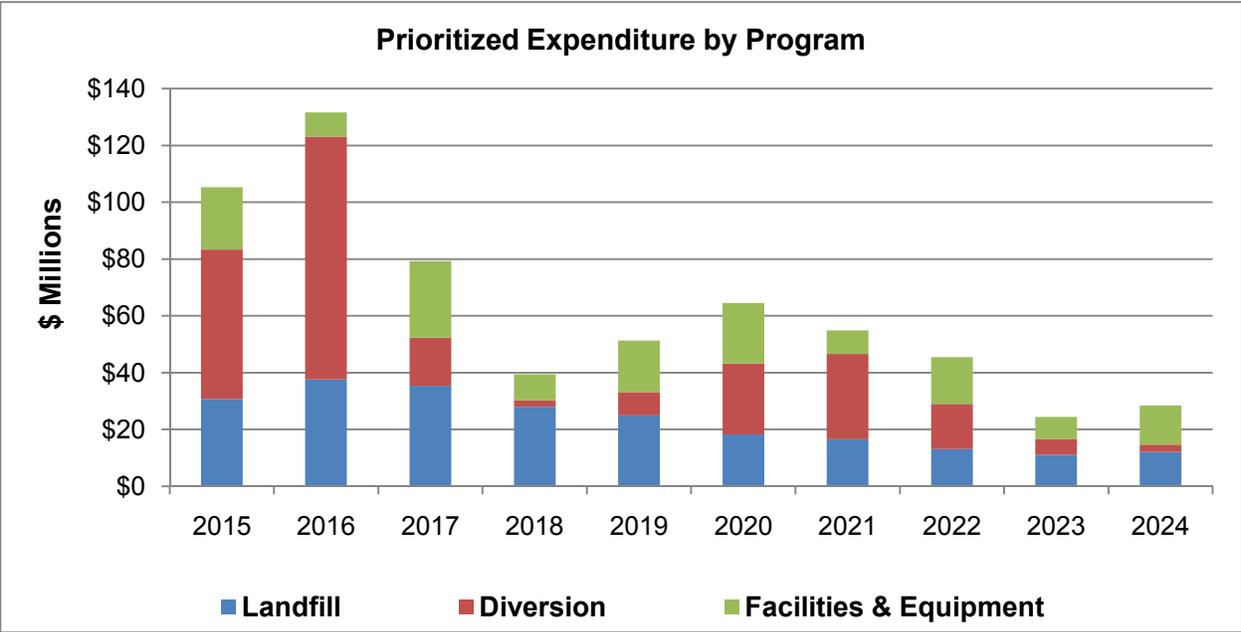
6.3. Facilities and Equipment - \$152 million

Investments in operations depots and maintenance facilities at both the East Calgary and Spyhill waste management facilities account for about one-third of the Facilities and Equipment program. These facilities support the efficient and effective operation and maintenance of collection vehicles.

Blue and black carts, as well as commercial bins, are needed for the collection of recyclable material. Green carts for the implementation of the organics collection program are also required. The purchases for these bins and carts make up approximately one-third of the expenditures in Facilities and Equipment.

In the ten-year timeframe, investments in Information Technology account for just over ten percent of the Facilities and Equipment program. This investment will aid in optimization of route design, management of data, and support monitoring of landfills.

The graph on the following page highlights the prioritized investments for each program in the ten-year plan.



7. Unfunded Infrastructure

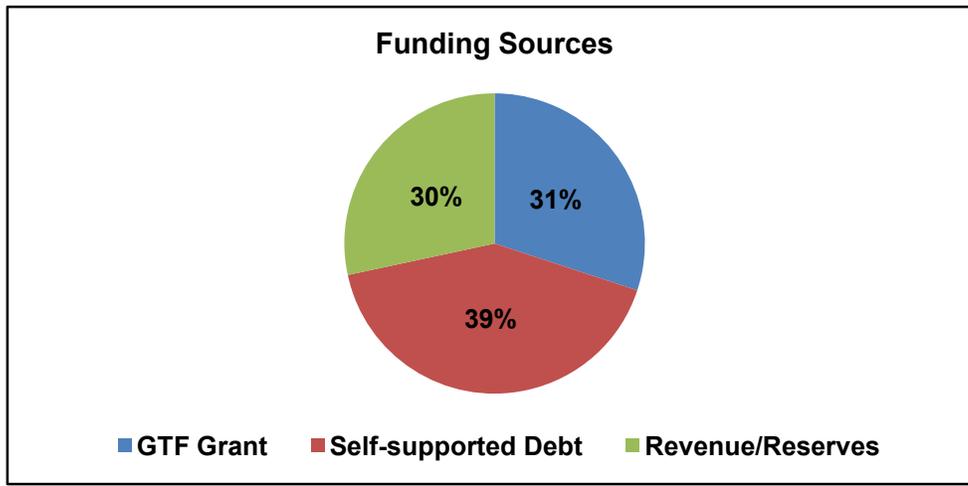
The following infrastructure has not been included in the ten-year plan:

Infrastructure (Cost Estimate)	Explanation
Industrial Commercial Institutional / Residential Materials Recovery Facility (MRF) (\$40 million)	<ul style="list-style-type: none"> Private sector would operate this type of facility
Construction and Demolition MRF (\$50 million)	<ul style="list-style-type: none"> Private sector would operate this type of facility
Eco-Centre (\$10 million)	<ul style="list-style-type: none"> Drop-off facilities for recyclable materials are available at landfills (Throw and Go) and Community Recycling Depots Household hazardous waste drop-offs are located at designated fire halls and the active landfills
Maintenance Facility at Shepard Landfill (\$8 to \$10 million)	<ul style="list-style-type: none"> Anticipated an Operations Work Centre will be funded through a corporate program
Waste to Energy (WTE) Facility (~\$400 million)	<ul style="list-style-type: none"> Private sector would operate this type of facility Funding estimates have been included in the WRIIP to allow for studies to support the implementation of this type of technology

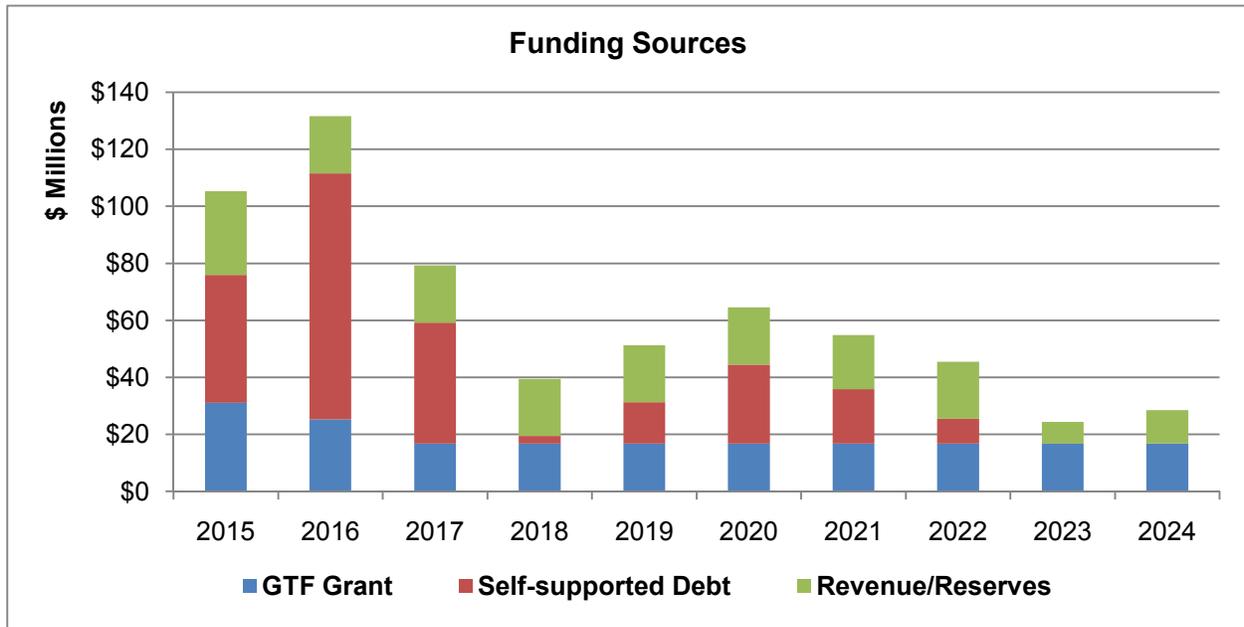
8. Funding Sources

The proposed investments of \$624 million in the WRIIP can be fully funded through self-supported debt, revenues, reserves and Gas Tax funding. A summary of the proposed funding for the infrastructure investment plan is listed in the table below and illustrated in the pie chart that follows.

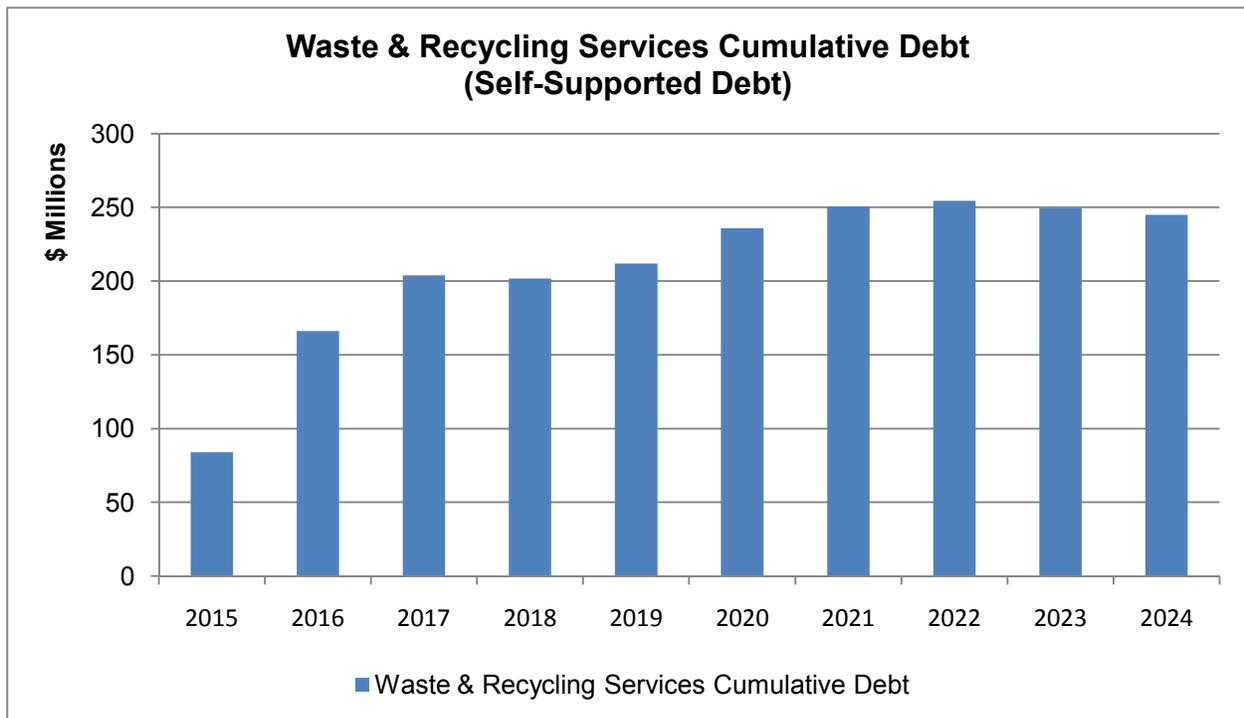
Funding Sources 2015-2024			
Gas Tax	Self-Supported Debt	Revenue / Reserves	Total
\$191 million	\$246 million	\$187 million	\$624 million



The following graph illustrates the use of the funding sources within the ten-year plan:



The following graph illustrates the projected debt for WRS.



The Sustainment Reserve for WRS is required to maintain a minimum balance of ten percent of annual revenues. With the proposed funding plan, this will be achieved.

9. Summary

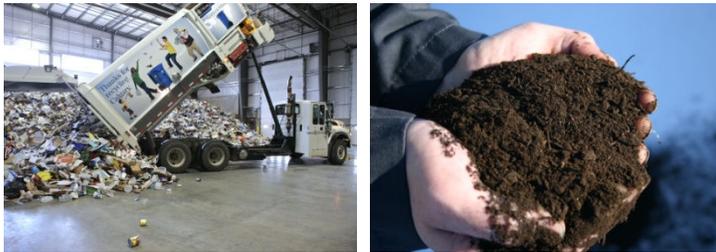
The WRIIP provides a prioritized perspective for long-term and strategic investments in infrastructure. This minimizes risks of decreased service delivery, increases effectiveness of existing infrastructure, reduces impact on the environment, and ensures logical sequencing of projects.

The investments included in the WRIIP will support customers as they deliver waste and resource material for processing; increases capacity to divert additional materials from landfills; and addresses regulatory and environmental risks.

WRS has the financial capacity to deliver the projects listed in the proposed ten-year capital plan without excessive use of debt or depletion of reserves.

APPENDIX A

<p><i>Landfill</i></p>	<p>Waste Management</p> 
<p>Priorities</p>	<p>Continue to operate waste management facilities in a safe and environmentally responsible manner.</p>
<p>Maintain Assets</p>	<p>Continue to invest in maintenance of landfill infrastructure to minimize future maintenance and replacement costs.</p> <p><i>Remediation of Landfill Caps</i></p> <p><i>Landfill Gas Systems</i></p> <p><i>Stormwater Management Systems</i></p>
<p>Regulatory and Environmental Protection</p>	<p>Invest in infrastructure required to meet regulatory requirements and respond to changing regulations.</p> <p><i>Leachate Collection and Treatment Systems</i></p> <p><i>Landfill Gas Collection</i></p> <p><i>Stormwater Management Facilities</i></p> <p><i>Closed Landfill Remediation and Monitoring</i></p>
<p>Services</p>	<p>Continue to improve access to facilities.</p> <p><i>Access Roads</i></p>
<p>Growth</p>	<p>Investments in additional infrastructure to meet the increasing waste volumes from a growing Calgary and Regional customer base.</p> <p><i>New Landfill Cells</i></p>

<i>Diversion</i>	<p>Recovery of Materials</p> 
Priorities	Recover resources and reduce volumes of waste stored in landfills.
Maintain Assets	<p>Continue to invest in maintenance of diversion and collection infrastructure to minimize future maintenance and replacement costs.</p> <p><i>Material Drop-off Facilities</i></p>
Regulatory and Environmental Protection	<p>Investments to protect the environment.</p> <p><i>Household Hazardous Waste Transfer Station</i></p>
Services	<p>Investments to increase recovery of materials and diversion from landfills.</p> <p><i>Composting Facility</i> <i>Organics Collection</i> <i>Construction and Demolition Recycling</i></p>
Growth	<p>Investments in additional infrastructure to meet the increasing volumes of recyclable material from a growing Calgary and Regional customer base.</p> <p><i>Material Drop-off Facilities</i></p>

<p><i>Facilities & Equipment</i></p>	<p align="center">Infrastructure and Technology</p> 
<p align="center">Priorities</p>	<p align="center">Support efficient and effective operation of the business.</p>
<p align="center">Maintain Assets</p>	<p>Investments in maintenance of facilities and information technology.</p> <p align="center"><i>Vehicle Maintenance and Storage Facilities</i> <i>Bin and Cart Replacement Programs</i> <i>Data Management Systems</i></p>
<p align="center">Regulatory and Environmental Protection</p>	<p>Investments in infrastructure to maintain The City's Approval to Operate and protect the environment.</p> <p align="center"><i>Vehicle Wash Stations</i> <i>Perimeter Enhancement and Fencing</i></p>
<p align="center">Services</p>	<p>Investments to support diversion of material and data management.</p> <p align="center"><i>Green Cart Program</i> <i>Scalehouse Improvements</i> <i>GIS Implementation</i></p>
<p align="center">Growth</p>	<p>Investments in infrastructure required to serve a growing population and manage increasing data.</p> <p align="center"><i>Operations Depots</i> <i>Bin and Cart Purchases</i> <i>Route Optimization Software</i></p>