

## Waste Services Vehicles and Equipment

### Business Case

City Operations | Waste Services

City of Edmonton

Capital Profile: CM-81-2048 Composite

Project Number: CP# / OP#

Project Owners: John Felix and Doug Spark

Project Sponsor: Michael Labrecque

Version #: 4.0

Date published: October 12, 2018

*page intentionally left blank*

## TABLE OF CONTENTS

<b>Change History</b>	<b>5</b>
<b>Executive Summary</b>	<b>7</b>
<b>Waste Services Vehicles and Equipment</b>	<b>7</b>
<b>Background</b>	<b>8</b>
<b>Problem / Opportunity</b>	<b>8</b>
<b>Current Situation</b>	<b>8</b>
<b>Initiative Description</b>	<b>11</b>
<b>Initiative Description</b>	<b>11</b>
<b>Urgency of Need</b>	<b>11</b>
<b>Anticipated Outcomes</b>	<b>12</b>
<b>Scope</b>	<b>12</b>
<b>Out of Scope</b>	<b>12</b>
<b>Critical Success Factors</b>	<b>12</b>
<b>Strategic Alignment</b>	<b>12</b>
<b>Context Analysis</b>	<b>13</b>
<b>Alternatives</b>	<b>14</b>
<b>Organizational Change Impact</b>	<b>16</b>
<b>Stakeholder Impact</b>	<b>16</b>
<b>Business and Operational Impact</b>	<b>17</b>
<b>Cost Benefits</b>	<b>19</b>
<b>Tangible Benefits</b>	<b>19</b>
<b>Intangible Benefits</b>	<b>19</b>
<b>Financial Costs</b>	<b>19</b>
<b>Assumptions</b>	<b>21</b>
<b>Resourcing</b>	<b>21</b>
<b>Key Risk(s) and Mitigation Strategy</b>	<b>21</b>
<b>Conclusion and Recommendations</b>	<b>22</b>
<b>Conclusion</b>	<b>22</b>
<b>Recommendations</b>	<b>22</b>
<b>Project Responsibility and Accountability</b>	<b>23</b>
<b>Implementation Approach</b>	<b>23</b>

<b>Review and Approval Process</b>	<b>24</b>
<b>Appendices</b>	<b>24</b>




Change History

Version #	Date	Author	Description
1.0	7/25/2018	Herbert Ramos	Version submitted to General Supervisor, Team Lead and Working Group for review
2.0	8/1/2018	Herbert Ramos	Revised version submitted for Directors review
3.0	8/15/2018	Herbert Ramos	Revised version submitted for Branch Manager and Utility Advisor review
4.0	10/12/2018	Herbert Ramos	Revised version submitted for Business Partner review

SUBMITTED BY:

Version #	Submitter Name	Title	Submission Date
4.0	Stephanie Zhang	Team Lead, Business Strategy, Planning and Performance	10/12/2018

REVIEWED BY:

Version #	Reviewer Name and Title	Signature	Signing Date
4.0	Ryan Kos, General Supervisor, Business Strategy Planning & Performance		10/12/18
4.0	Cameron Grayson Director, Business Integration		10/12/18
4.0	Keith Knoblauch Operational Controller, Business Financial Analytics		10/12/18

APPROVED BY:

Version #	Approver Name and Title	Signature	Signing Date
4.0	Michael Labrecque Branch Manager, Waste Services		10/12/18
4.0	Doug Spark Acting Director, Waste Collection Services		10/12/18
4.0	John Felix Director, Sustainable Waste Processing Services		10/12/18

## 1. Executive Summary

### 1.1. Waste Services Vehicles and Equipment

This business case requests funding for Waste Services Vehicles and Equipment under the CM-81-2048 composite profile. Waste Services has a fleet of over 400 units including vehicles and equipment used in the collection of waste and recyclables as well as processing these materials at the Edmonton Waste Management Centre. Some of the equipment are considered specialty equipment, such as shredders, compost turners, and tub grinders while other equipment are typically heavy duty vehicles such as waste collection vehicles, highway tractors and trailers.

Vehicles and equipment deteriorate as they age even with regular preventive maintenance and operating cost per kilometre increases over time. Replacing the vehicles and equipment, as scheduled, does not only improve the availability of fleet assets, but also results in lower fleet average operating cost per kilometre. Replacement can be done by purchasing new units or where possible, by refurbishment/rehabilitation to extend the useful life. These options were investigated to arrive at the best possible solution.

Waste Services requests approximately \$60.2 million replacement funding over the next four-year capital plan for the replacement of equipment and vehicles as they reach the end of their useful life. This business case requests funds to replace and refurbish/rehabilitate equipment as they age and wear. With the replacement of vehicles and equipment as scheduled, additional customer needs can be met within the budget period.

Alternatives shortlisted to address the funding requirements are as follows:

- Alternative 1: Replace vehicles and equipment as they reach the end of their expected useful life with new ones
- Alternative 2: Replace vehicles and equipment as they reach the end of their expected useful life with new ones, rehabilitate some vehicles/equipment to extend their useful life
- Alternative 3: Replace vehicles and equipment as they reach the end of their expected useful life with new ones, lease some vehicles and equipment

Taking into full consideration the alternatives evaluated in this business case and their impact on the financial well being of Waste Services, residential rates and public service, Alternative 2: Replace vehicles and equipment as they reach the end of their expected useful life with new ones and rehabilitate some vehicles/equipment to extend their useful life, is recommended for the acquisition of replacement vehicles.

## 2. Background

### 2.1. Problem / Opportunity

As vehicles and equipment reach or near end of life, they need to be replaced on an ongoing basis to meet Waste Services’ commitment of providing sustainable waste management services to the residents. In this business case, the additional needs of customers for the next four years can be met with the replacement of vehicles and equipment as scheduled.

The four-year capital plan for vehicles and equipment, which must be funded through rates, identifies 216 vehicles required for replacement (including ten trailers that were deferred from 2018). The level of funding requested will enable Waste Services to continue to meet its commitment to provide sustainable waste management services as set out in the Waste Management Policy C527 and align with Waste Services integrated 25-year strategic outlook.

### 2.2. Current Situation

Waste Services uses vehicles and equipment to collect and process waste and recyclables. The economic and operating life of most of the heavy duty waste collection vehicles is ten years. The replacement of vehicles ensures higher fleet availability and newer technology to meet all new emission, fuel use and efficiency standards. Sustainable Waste Processing equipment is maintained on site, where possible. Some equipment is refurbished at least once based on its use, condition, and operating time. Another refurbishment may be performed in some circumstances before the equipment is replaced. Refurbish/replace decisions are made in collaboration with Fleet and Facility Services subject matter experts. The economic and operating life of most of the Sustainable Waste Processing heavy duty vehicles is between five and 15 years.

Mobile equipment is integral for the successful operation of Waste Service. As such, Waste Services tracks the performance of its fleet on a regular basis. One key metric is fleet availability. This metric shows the availability of the fleet for work over time. As of September 2018, Waste Collection fleet availability is at 83.9% while the Sustainable Waste Processing fleet availability is at 89.8%. Trend analysis of this metric is shown in Appendix C.

Table below shows the inventory of the Waste Services vehicles, services/programs they are intended for, and average age of each vehicle type as of September 2018:

Vehicle Type	Inventory as of September 2018	Average Age/Useful Life (September 2018)	Services/Programs
Tandem Collection Trucks	58	6.6/10	Curbside Collection



Midsize collection trucks	21	8.5/10	Curbside Collection
Rear Load Collection Trucks	11	6.2/10	Single Family Collection
Front end collection trucks	24	8.6/10	Multi-Unit Bin Collection
Automated side loaders	4	4.7/10	Community Recycle Depots
Roll-off trucks	14	5.9/10	Eco Stations, Big Bin events, Commercial Collection, and internal material transfers between facilities at the Edmonton Waste Management Centre
Telescopic Loader	1	8.8/10	Drop-Off
Forklifts	4	6.0/10	Drop-Off
Skid steer	3	8.0/10	Drop-Off
Madvacs	4	4.7/10	Drop-Off
Picker (Crane) Truck	1	6.4/10	Drop-Off
Litter collection vehicles	6	6.7/10	Litter Collection
Long Haul Tractors	23	7.9/6	Waste Transport
Long Haul Trailers	50	7.6/8	Waste Transport
Wheel Loaders	22	3.8/5	Material movement and stacking for waste processing
Pick-up trucks	41	4.3/10	Site Operations
Other major heavy pieces >\$250,000	18	7.6/10	Compost Turners, Screeners, Shredders, Grinders, Track Grapples
Other < \$250,000	48	6.0/10	Various smaller pieces skid steers, manlifts, conveyors, attachments etc

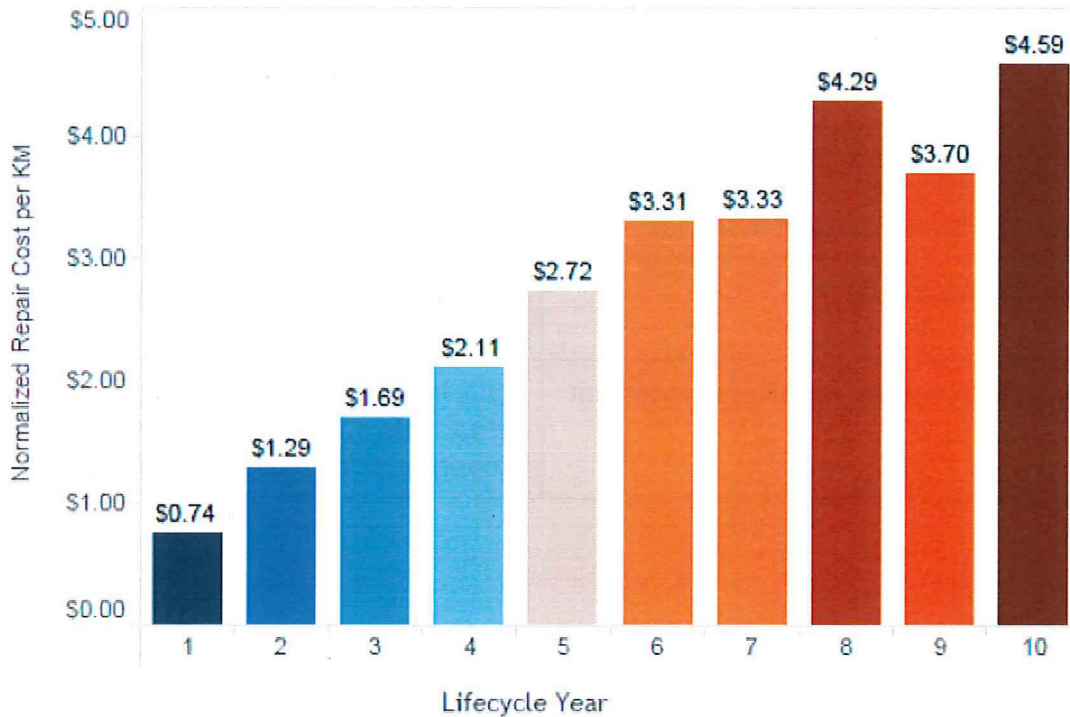
Source: FAST (Fleet Analytics & Strategic Technology)

Illustration: Waste Services collections and processing vehicles and equipment



In 2016, Fleet and Facility Services performed a detailed Total Cost of Ownership and Life Cycle review on the Tandem Collection Trucks fleet. This review confirmed an ideal 10-year life for the Tandem Collection Trucks (the largest individual component of the Collections fleet), and in addition recommended smoothing out large purchasing events to better evenly distribute the age of the fleet and avoid large cost fluctuations. An even annual purchasing plan results in a fleet with an average age that is approximately half of the expected useful life of that class. This results in the lowest possible total cost of ownership. This can be shown through an example comparing the operating cost per kilometre (km) in the vehicle's first year compared to its last year. During the Total Cost of Ownership and Life Cycle review on Tandem Collection Trucks, it was found that a unit of this type would cost \$0.74/km of operation in the first year of life, but \$4.59/km by the tenth (and final) year of life. Assuming the approximate average 2017 usage of 12,500 km per unit, a truck in the final year of life would cost \$48,125 more to operate than a unit in the first year of life.

**Tandem Axle Side Loader Cost per Kilometer by Lifecycle Year**



### 3. Initiative Description

#### 3.1. Initiative Description

This business case reviews alternatives and requests funding for the acquisition of replacement (renewal) vehicles for Waste Services daily operations. Waste Services funding is outlined in Waste Services Equipment profile CM-81-2048.

#### 3.2. Urgency of Need

Fleet replacements are required on an ongoing basis to replace aging equipment (especially those still operating past their useful lives). Curbside collection requires one tandem truck per 4,800 households to collect waste and one tandem truck per 9,600 households to collect recyclables. Multi-unit bin collection requires one front loader per 9,350 households to collect waste and one front loader per 14,500 households to collect recyclables. Edmonton’s population is expected to increase by about 2% annually during this budget period with an estimated 9,000 additional households per year. A review of the waste collection fleet indicated that while it is necessary to replace vehicles that have reached the end of their useful life, Waste Services is expected to be able to continue to provide full collection with the existing fleet.

### 3.3. Anticipated Outcomes

In addition to the fundamental outcome of optimizing existing capital assets while effectively delivering services to residents, Waste Services envisions the following outcomes:

Outcome /Deliverables	Estimated Timeline
Maintain high level of customer service	90% satisfaction rating
Maintain an effective fleet	Meet availability KPI targets in partnership with Fleet and Facility Services
Maintain effective fleet lifecycle management	Achieved by maintaining equipment in serviceable and reliable condition without excessive repair costs or down times

### 3.4. Scope

The profile is required to provide the funding for replacement of vehicles and equipment required for the daily operations of the Waste Collections and Sustainable Waste Processing Services.

### 3.5. Out of Scope

- Light duty equipment leased by Corporate Procurement and Supply Services
- Fixed or non-mobile equipment
- Future initiatives to increase diversion rate (example: source separation and grass ban)

### 3.6. Critical Success Factors

Critical success factors include:

- Timely acquisition of required vehicles and equipment.
- Availability of Fleet Services engineering and procurement expertise.
- Adherence to vehicles and equipment replacement and maintenance plan.

## 4. Strategic Alignment

Waste Services is committed to advancing Council's vision and goals. Council's Strategic Plan and the Corporate Business Plan will provide a blueprint to coordinate activities and efforts

between the goals and the corporation to make an impact towards achieving the vision. As these are developed, Waste Services will work collaboratively to ensure the strategic direction of the Branch is in alignment with that of the department, corporation, Council and citizens.

This profile aligns with the new strategic goals of the City of Edmonton outlined below:

Healthy City	Urban Places	Regional Prosperity	Climate Resilience
Edmonton is a neighbourly city with community and personal wellness that embodies and promotes equity for all Edmontonians.	Edmonton neighbourhoods are more vibrant as density increases, where people and businesses thrive and where housing and mobility options are plentiful.	Edmonton grows prosperity for our Metro Region by driving innovation, competitiveness and relevance for our businesses at the local and global level.	Edmonton is a city transitioning to a low-carbon future, has clean air and water and is adapting to a changing climate.

In addition to this overarching corporate alignment structure, this composite profile will align with the City of Edmonton’s Waste Management Policy C527 and Waste Management Utility Fiscal Policy C558A. This profile also aligns with Waste Services integrated 25-year strategic outlook that will help to ensure Edmontonians receive maximum economic and environmental benefits while minimizing the cost increases of managing solid waste.

## 5. Context Analysis

The current model for Waste Collection fleet replacement is based on a life-cycle costing completed by Fleet and Facility Services. Fleet and Facility Services currently maintains about 420 vehicles and equipment for Waste Services (out of roughly 3,600 units across the corporation maintained by Fleet), and advises on unit condition towards the end of its prescribed life cycle and potential options for replacement. Fleet and Facility Services also performs the purchasing of new assets and disposal of assets that have been replaced.

Sustainable Waste Processing has also contracted out some long haul transfer and processing that is done using mobile equipment. This option is used most often to address activities that are intermittent and to deal with peaks when analysis shows that bringing on additional equipment and staff to do the work is not warranted. The contracting option is assessed on a case by case basis.

Solid waste processing is similar to many bulk materials handling operations, requiring a large amount of mobile equipment to move materials for processing and for moving processed materials. One method to reduce the requirement for mobile equipment is to install permanent infrastructure like hoppers, feeders, conveyors, and bins to handle the material. This option

would be capital intensive due to distances involved, and using permanent infrastructure may cause issues due to the seasonal nature of the material inputs and outputs

In 2019, Waste Services will review both its non-residential waste strategy<sup>1</sup> and approach to waste collection and diversion programs in the multi-unit sector. Inclusive in this review is the provision of waste collection for non-residential customers. This review will determine how best to improve the financial results and waste diversion statistics in these sectors. Any impact of this review on the procurement and provision of vehicles and equipment for this sector will result in an amendment to this business case.

## 6. Alternatives

In preparation of this business case several options were reviewed as outlined below:

Option Description	Advantages	Disadvantages	Further Consideration
1. Replace aging equipment/vehicle (purchase new)	<ul style="list-style-type: none"> <li>Maximizes useful life and capital value</li> </ul>	<ul style="list-style-type: none"> <li>Higher initial cost</li> </ul>	Yes
2. Replace (purchase new) and rehabilitate vehicles and equipment	<ul style="list-style-type: none"> <li>Extends useful lives of some vehicles and equipment</li> </ul>	<ul style="list-style-type: none"> <li>Refurbished/rehabilitated vehicles and equipment may be less reliable than brand new ones</li> </ul>	Yes
3. Replace (purchase new) and lease vehicles and equipment	<ul style="list-style-type: none"> <li>Lesser capital requirement</li> </ul>	<ul style="list-style-type: none"> <li>Increased operating rates and not all vehicle types available</li> </ul>	Yes
4. Rehabilitate/refurbish all vehicles and equipment to extend useful lives	<ul style="list-style-type: none"> <li>Extends useful lives of all vehicles and equipment</li> </ul>	<ul style="list-style-type: none"> <li>Changing technology and models may limit rehabilitation</li> <li>Increase in repair costs and not all vehicles can be</li> </ul>	No, Fleet and Facility Services does not support rehabilitation/refurbishment of all Waste Services

<sup>1</sup> CR\_6217 Industrial, Commercial and Institutional Sector Strategic Review Report.

		rehabilitated	vehicles and equipment
5. Lease all fleet or equipment	<ul style="list-style-type: none"> <li>No capital or major maintenance required</li> </ul>	<ul style="list-style-type: none"> <li>Increased operating rates and not all vehicle types are available</li> </ul>	No, leasing all vehicles is not possible due to fleet standardization and configuration

To further investigate the options identified in above section, Waste Services considered three short list alternatives (those that were categorized “for further consideration”). The following are the detailed advantages and disadvantages for each alternative:

Alternative 1: Replace vehicles/equipment with new ones	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>New vehicles are generally more efficient than refurbished or reconditioned vehicles</li> <li>Owning the equipment gives more options to make alterations if necessary</li> <li>Ability to order more precise specification for an application</li> <li>Lower repair costs over the life of the asset than Alternative 2, on average</li> <li>Newer equipment (compared to refurbishment) may have new technology or upgrades that mitigate safety risks that can be presented by old equipment, even if well-maintained</li> </ul>	<ul style="list-style-type: none"> <li>There may be less ability to upgrade quickly to new technologies, as compared to short term leasing</li> <li>This option may lead to the highest yearly operating cost of the three options late in a unit's life.</li> </ul>

Alternative 2: Replace vehicles and equipment with new ones, Rehabilitate/ Refurbish to extend useful life	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>Lower capital requirement</li> <li>In general, it's more cost-effective to refurbish large equipment than smaller</li> </ul>	<ul style="list-style-type: none"> <li>Dependent on type of machine, age and condition of machine - Not all equipment can be refurbished economically</li> </ul>

<p>equipment</p> <ul style="list-style-type: none"> <li>• In certain cases, refurbishment can more efficiently extract the full useful life of equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• Equipment will be unavailable during refurbishment, potentially leading to service level disruptions</li> <li>• Refurbished equipment will carry higher yearly operating costs than newly purchased equipment.</li> </ul>
--	--

For this business case, Fleet and Facility Services and Waste Services have identified the vehicle types that may be rehabilitated/refurbished. In addition, estimates were provided for expected rehabilitation costs and extended useful lives of the equipment that can be rehabilitated/refurbished.

<b>Alternative 3: Replace vehicles and equipment with new ones, and Lease vehicles and equipment</b>	
<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>• Generally more flexible lease terms</li> <li>• Allows short term equipment testing or pilot programs without long-term equipment investment</li> <li>• Regular short term leasing can better keep pace with new technologies</li> </ul>	<ul style="list-style-type: none"> <li>• Depending on lease terms, overall cost is higher than owning</li> <li>• Not all types of equipment are available for leasing in the Edmonton market</li> </ul>

For this business case, Fleet and Facility Services and Waste Services have identified the vehicle types that may be leased and provided the lease costs.

## 7. Organizational Change Impact

This profile is a continuation of the current practice and no organizational changes in the Waste Services structure is anticipated.

### 7.1. Stakeholder Impact

The table below identifies the stakeholders and the potential impacts for the three alternatives considered by Waste Services:

<b>Stakeholder Requirement</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
<b>Stakeholder 1: Waste Services (primary internal)</b>			



Increase maintenance costs	No	Yes	No
Potentially affect service delivery level	No	No	No
Lower Availability due to varying average fleet age	No	No	No
Potential need for additional resources	No	No	No
<b>Stakeholder 2: City Council (primary internal)</b>			
Higher utility rates may result in more citizen complaints	Yes	Yes	Yes
<b>Stakeholder 3: Residents (primary external)</b>			
Higher cost alternatives means higher utility rates	No	No	Yes
<b>Stakeholder 4: Developers (secondary external)</b>			
Ensure that Waste Services can meet the demand for collection and processing of waste and recyclables as the City grows	Yes	Yes	Yes
<b>Stakeholder 5: Commercial Customers (secondary external)</b>			
Limit disruption in services when lease/contract expires	Yes	Yes	Yes
Limit commercial hauling waste rates/fees increase in the costs for waste services	Yes	Yes	Yes

## 7.2. Business and Operational Impact

Business & Corporate Impact & Description	Alternative 1	Alternative 2	Alternative 3
Corporate Finance (internal)			

<p>Administrative Support:</p> <ul style="list-style-type: none"> <li>Resource demands for providing finance support especially in leasing vehicles with varying terms</li> </ul>	No	No	Yes
<b>Corporate Procurement and Supply Services (internal)</b>			
<p>Procurement:</p> <ul style="list-style-type: none"> <li>More new contracts may be required for Leasing and Refurbishment Alternatives</li> <li>Lease contracts may require more contract administration with monthly payment terms, as well as additional Law Branch and Risk Management requirements.</li> </ul>	No	Yes	Yes
	No	No	Yes
<b>Fleet and Facility Services (internal)</b>			
<p>Fleet Support:</p> <ul style="list-style-type: none"> <li>Rehabilitation options may require more maintenance resources than replacement (purchase new) standard replacement, while leasing vehicles may require less maintenance resources.</li> <li>More resources may be required to perform rehabilitation while maintaining required service levels for repair of remaining fleet.</li> <li>More Engineering and Procurement resources for replacement (purchase new).</li> <li>Additional fleet units will require additional maintenance resources: 1 FTE HD mechanic in the 2019-2022 budget cycle and 1 FTE HD Mechanic in the 2023-2026 budget cycle.</li> </ul>	No	Yes	No
	No	Yes	No
	Yes	No	No
	Yes	Yes	Yes
<b>Law Branch (internal)</b>			
<p>Legal Support:</p> <ul style="list-style-type: none"> <li>May require additional resources for</li> </ul>	No	No	Yes

legal support, review of contracts for non-standard contract terms and conditions, especially for lease.			
--	--	--	--

## 8. Cost Benefits

### 8.1. Tangible Benefits

The following tangible benefits are anticipated to be realized:

- Increased efficiency and reliability with lesser manual labour
- Reduced maintenance costs and downtime due to newer vehicles
- Improved safety

### 8.2. Intangible Benefits

The following intangible benefits are anticipated to be realized:

- Increased or maintained customer satisfaction
- Better vehicle conditions

### 8.3. Financial Costs

Table below shows the comparative capital costs for each alternative:

#### Alternative 1: Replace vehicles/equipment with new ones

Vehicles and Equipment	2019 (\$)	2020 (\$)	2021 (\$)	2022 (\$)	2019-2022 Total (\$)
Capital Cost,	23,712,670*	15,383,000	13,040,964	14,088,330	66,224,964
Incremental O&M Cost, **	7,314	90,710	179,341	442,702	720,067
<b>Total Cost</b>	<b>23,719,984</b>	<b>15,473,710</b>	<b>13,220,305</b>	<b>14,531,032</b>	<b>66,945,031</b>

\* Including deferred purchases from 2018

\*\* This table only shows the incremental O&M for 2019-2022, however Financial analysis captures O&M cost (maintenance and fuel) for the full life cycle of vehicles and equipment

Discussion: Capital cost required for this budget cycle is approximately \$66.2 million. Incremental O&M cost for the budget cycle of vehicles and equipment is \$720,067. Total capital and incremental costs for the budget cycle is approximately \$67 million.

**Alternative 2: Replace vehicles and equipment with new ones, and Rehabilitate/Refurbish to extend useful life**

<b>Vehicles and Equipment</b>	<b>2019 (\$)</b>	<b>2020 (\$)</b>	<b>2021 (\$)</b>	<b>2022 (\$)</b>	<b>2019-2022 Total (\$)</b>
Capital Cost,	19,271,698*	14,085,746	12,950,751	13,905,019	<b>60,213,214</b>
Incremental O&M Cost, **	7,314	90,710	179,341	442,702	<b>720,067</b>
<b>Total Cost</b>	<b>19,279,012</b>	<b>14,176,456</b>	<b>13,130,092</b>	<b>14,347,721</b>	<b>60,933,281</b>

\* Including deferred purchases from 2018

\*\* This table only shows the incremental O&M for 2019-2022, however Financial analysis captures O&M cost (maintenance and fuel) for the full life cycle of vehicles and equipment

Discussion: Capital cost required for this budget cycle is approximately \$60.2 million. Incremental O&M cost for the budget cycle of vehicles and equipment is \$720,067. Total capital and incremental costs for the budget cycle is approximately \$61 million, the lowest among the three alternatives.

**Alternative 3: Replace vehicles and equipment with new ones, and Lease vehicles and equipment**

<b>Vehicles and Equipment</b>	<b>2019 (\$)</b>	<b>2020 (\$)</b>	<b>2021 (\$)</b>	<b>2022 (\$)</b>	<b>2019-2022 Total (\$)</b>
Capital Cost,	19,915,362*	13,590,132	8,807,100	12,851,613	<b>55,164,207</b>
Incremental O&M and Lease Costs, **	4,071,893	7,120,150	12,086,040	14,279,556	<b>37,557,639</b>
<b>Total Cost</b>	<b>23,987,255</b>	<b>20,710,281</b>	<b>20,893,140</b>	<b>27,131,169</b>	<b>92,721,846</b>

\* Including deferred purchases from 2018

\*\* This table only shows the incremental O&M and Lease costs for 2019-2022, however financial analysis captures O&M cost (maintenance and fuel) for the full life cycle of vehicles and equipment

Discussion: Capital cost required for this budget cycle is approximately \$55 million. Incremental O&M and lease costs for the budget cycle of vehicles and equipment is approximately \$37.6 million. While this alternative has the lowest capital cost among the three alternatives, it has the highest incremental O&M cost plus leasing cost. Total capital, incremental O&M and leasing costs for the budget cycle is approximately \$93 million.

## Financial Analysis

	Alternative 1 \$	Alternative 2 \$	Alternative 3 \$
Net Present Value of Outflow @5.4% discount rate,	(58,874,697)	(53,556,885)	(86,902,164)

Alternative 2 yields the most optimal Net Present Value (NPV) of outflow among the alternatives using the weighted average cost of capital (WACC) of 5.4%.

Please refer to Appendix A - Financial Analysis for more details

Please refer to Appendix B - Revenue Requirement Impact Analysis for more details

#### 8.4. Assumptions

- Equipment pricing may be significantly impacted by the market
- Inflation for the budget period is assumed at 1.9% as per the average Corporate assumption for 2019-2022
- 20% contingency is added to absorb minor scope changes and contract price adjustments, market volatility and tariff
- Vehicles/equipment useful life was assumed as between five to 15 years
- Costs to purchase, rehabilitate and lease as well as units to be rehabilitated (including their extended life) and leased, were provided by Waste Collections Services, Sustainable Waste Processing Services, and Fleet and Facility Services
- O&M costs for leased vehicles are not included in leasing costs
- Number of units to purchase were provided by Waste Collections Services and Sustainable Waste Processing Services and reviewed by Fleet and Facility Services
- Only incremental operating and maintenance costs were considered in the financial analysis
- Automated collection system, which is still being studied as part of future strategic initiatives is not considered in this business case.

#### 9. Resourcing

No additional resources are required for the implementation of the alternatives. This project will be led by the Equipment Supervisor who will arrange for equipment replacement through Fleet and Facility Services. For new specialty equipment, an Operations Project Engineer, in collaboration with the operating group, will develop equipment specifications and an RFP for purchase direct from vendors.

#### 10. Key Risk(s) and Mitigation Strategy

Risks	Impact	Mitigation Strategy
Health and customer issues if waste are not collected in a timely manner	High	<ul style="list-style-type: none"> <li>Timely procurement of vehicles and equipment</li> </ul>
Higher costs due to imposition of higher US tariff	Medium	<ul style="list-style-type: none"> <li>Lock in prices prior to effectivity of new imposition</li> <li>Source required parts and equipment outside US</li> </ul>
Some vehicles to be purchased may not be required anymore as new waste strategy is implemented	Medium	<ul style="list-style-type: none"> <li>Update procurement strategy to reflect Council decisions</li> </ul>
The vehicles and equipment are not going to be replaced on time	Medium	<ul style="list-style-type: none"> <li>Opt for short term lease for some vehicles and adjust schedule</li> </ul>
Procurement delay for specialized equipment	Medium	<ul style="list-style-type: none"> <li>start early in looking for vendors to supply the specialized equipment</li> </ul>
Increased maintenance cost, lower availability, risk of unit failure leading to service level disruption due to aging equipment	Medium	<ul style="list-style-type: none"> <li>Replace equipment according to replacement schedule</li> </ul>

## 11. Conclusion and Recommendations

### 11.1. Conclusion

The business case analyzes three different alternatives to acquire replacement vehicles and equipment. Financial analysis shows that Alternative 2 yields the most optimal net present value of outflow of (\$53,556,885) at 5.4% discount rate. Alternative 2, Replace vehicles and equipment with new ones and Rehabilitate /Refurbish to extend useful life, is the most reasonable cost fleet acquisition model.

### 11.2. Recommendations

Taking into full consideration the alternatives evaluated in this business case and their impacts on the financial well being of the Waste Services, residential rates and public service,

Alternative 2 (Replace new and Rehabilitate/Refurbish vehicles and equipment to extend useful life) is recommended for the acquisition of vehicles and equipment. This profile will provide funding for replacement vehicles and equipment requirements of Waste Services. This funding is critical to meet Waste Services commitment of providing and delivering sustainable waste management services.

### 11.3. Project Responsibility and Accountability

The Project Sponsor is the Branch Manager of Waste Services. The overall capital program is managed by the Director of Waste Collections Services and Director of Sustainable Waste Processing Services. The Equipment Supervisors act as customers for the equipment acquisitions for their operations.

## 12. Implementation Approach

Table below identifies the scheduled replacement of vehicles and equipment (purchase and rehabilitate/refurbish) recommended by the Alternative through capital funding:

Vehicles and Equipment Required	2019	2020	2021	2022	2019-2022 Total
Total Vehicles and Equipment Requirement	76*	47	53	46	222

\* Including deferred purchases from 2018

When equipment requirements are identified through the Equipment Replacement List and funding is secured, equipment purchases are made through Fleet and Facility Services. In some cases, specialty equipment is researched and desirable requirements are incorporated into a public tender. Acquisition plan and schedule is developed in collaboration with Waste Services, Fleet and Facility Services, and Corporate Procurement and Supply Services. The proposals are evaluated by engineering and maintenance personnel to select a vendor for award, considering features, reliability, customer references, and other criteria. City Operations Delegation of Authority/Expenditure Authority Limits are followed in the approval of procurement, contract management and payment lifecycle.

When vehicles and equipment are acquired, they are listed in the Fleet Services Information system, M5. The replaced vehicles and equipment are turned over to Fleet and Facility Services for disposal.

Equipment and vehicles listed in M5 are catalogued and classified for routine maintenance. Preventive maintenance schedules are determined by Fleet Services Planning group which are

sent to vehicle coordinators and maintenance providers when they are due for maintenance. Waste Services and Fleet Services shop controllers coordinate maintenance activities.

Ages and other attributes of the vehicles and equipment are tracked and reported in the Fleet Analytics & Strategic Technology (FAST). As well, FAST tracks performance measures. Examples of the performance measures are availability and utilization rates of the vehicles and equipment which are tracked to substantiate decisions on equipment inventory and projected maintenance ratios to ensure service delivery standards are maintained.

### 13. Review and Approval Process

The following review and approval process was followed for this business case:

Review Step	Reviewer
Review 1	Team Lead and General Supervisor of Business Strategy, Planning and Performance, Working Group, and Manager of Client and Vendor Services (Fleet and Facility Services)
Review 2	Operational Controller for Waste Services, Director of Business Integration, Director of Waste Collections Services, Director of Sustainable Waste Processing Services, and Branch Manager of Waste Services
Review 3	Deputy City Manager of City Operations
Review 4	Communications
Review 5	Utility Advisor
Review 6	Utility Committee report presented

### 14. Appendices

- Appendix A - Financial Analysis Summary
- Appendix B - Comparison of Revenue Requirement of Alternatives
- Appendix C - Waste Services Fleet Availability and Trend Analysis



### Appendix A: Financial Analysis Summary

Waste Services Vehicle & Equipment (2019-2022)	Alternative 1: Replace vehicles/equipment with new ones	Alternative 2: Replace vehicles and equipment with new ones, Rehabilitate /Refurbish to extend useful life	Alternative 2 Net Change from Status Quo	Alternative 3: Replace vehicles and equipment with new ones, Lease vehicles and equipment	Alternative 3 Net Change from Status Quo
Total Capital Cost	(\$66,224,964)	(\$60,213,214)	\$6,011,750	(\$55,164,207)	\$11,060,757
Total Revenues	\$0	\$0	\$0	\$0	\$0
Total Operating and Maintenance Costs	(\$4,812,522)	(\$4,812,522)	\$0	(\$39,104,712)	(\$34,292,190)
Total Lease Costs	\$0	\$0	\$0	(\$14,556,480)	(\$14,556,480)
Project Net Inflows (Outflows)	(\$71,037,486)	(\$65,025,736)	\$6,011,750	(\$108,825,399)	(\$37,787,913)
WACC Discount Rate	5.41%	5.41%	0.00%	5.41%	0.00%
Net Present Value	(\$58,874,697)	(\$53,556,885)	\$5,317,812	(\$86,902,164)	(\$28,027,467)

## Appendix B: Comparison of Revenue Requirement of Alternatives

Reference	Alternatives		
	Alternative 1: Replace vehicles/equipment with new ones	Alternative 2: Replace vehicles and equipment with new ones, Rehabilitate /Refurbish to extend useful life	Alternative 3: Replace vehicles and equipment with new ones, Lease vehicles and equipment
Base Year	2018	2018	2018
In-Service Year	All	All	All

Cumulative Revenue Requirement (from base year)	Alternative 1: Replace vehicles/equipment with new ones	Alternative 2: Replace vehicles and equipment with new ones, Rehabilitate /Refurbish to extend useful life	Alternative 3: Replace vehicles and equipment with new ones, Lease vehicles and equipment
CPV @ Yr 5	26,578,453	23,325,662	54,763,341
CPV @ Yr 10	54,537,635	48,566,099	83,422,529
CPV @ Yr 15	59,132,740	53,050,033	88,471,020

Capital Cost Summary (Base Year Dollars)	Alternative 1: Replace vehicles/equipment with new ones	Alternative 2: Replace vehicles and equipment with new ones, Rehabilitate /Refurbish to extend useful life	Alternative 3: Replace vehicles and equipment with new ones, Lease vehicles and equipment
Equipment	53,262,372	48,356,567	44,366,635
Building	0	0	0
Other (engineering/PM/etc)	0	0	0
<b>Total base costs</b>	<b>53,262,372</b>	<b>48,356,567</b>	<b>44,366,635</b>

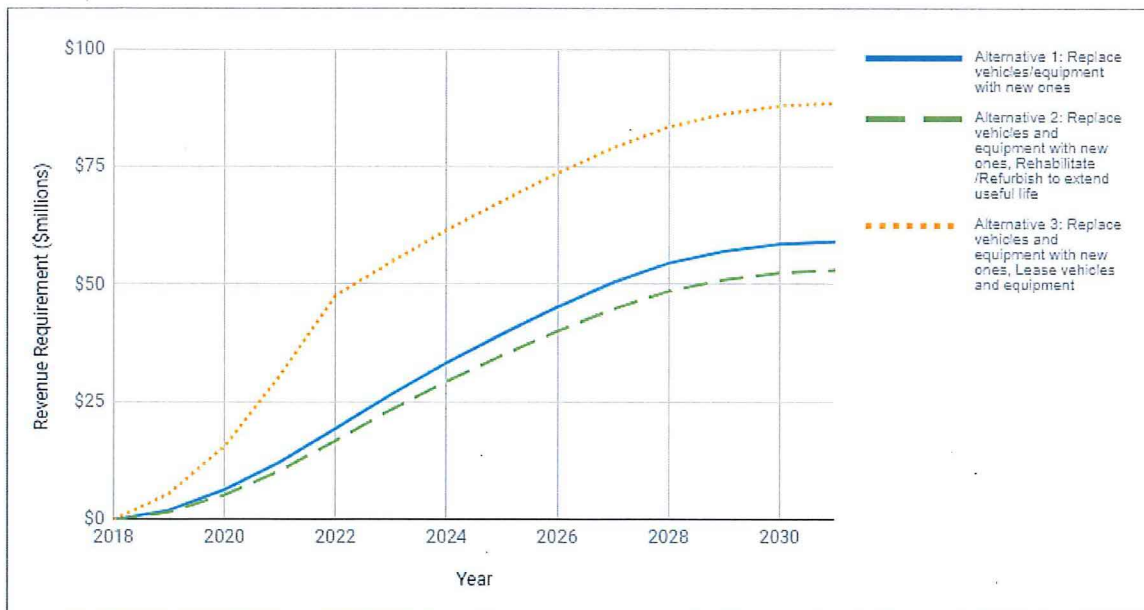
*Add: contingency, inflation*

Contingency	10,652,474	9,671,313	8,873,327
Inflation	2,310,117	2,185,333	1,924,245
<b>Total Capital</b>	<b>66,224,964</b>	<b>60,213,214</b>	<b>55,164,207</b>

**Revenue Requirement Summary (CUMULATIVE PRESENT VALUE)**

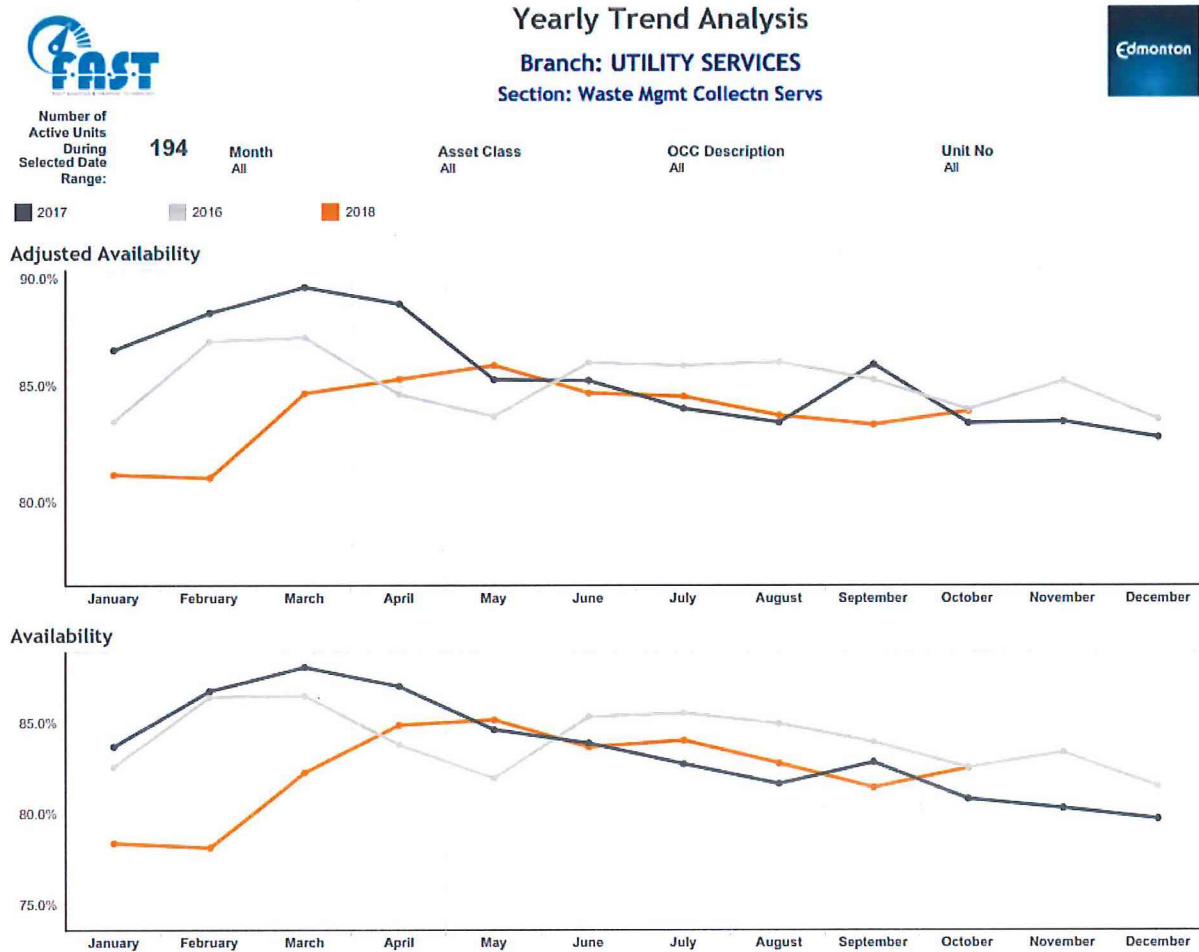
Year	Calendar Year	Alternatives		
		Alternative 1: Replace vehicles/equipment with new ones	Alternative 2: Replace vehicles and equipment with new ones, Rehabilitate /Refurbish to extend useful life	Alternative 3: Replace vehicles and equipment with new ones, Lease vehicles and equipment
0	2018	\$0	\$0	\$0
1	2019	\$2,012,465	\$1,636,865	\$5,547,110
2	2020	\$6,348,585	\$5,282,511	\$15,560,149
3	2021	\$12,151,242	\$10,348,703	\$30,490,996
4	2022	\$19,332,447	\$16,798,003	\$47,613,145
5	2023	\$26,578,453	\$23,325,662	\$54,763,341
6	2024	\$33,286,779	\$29,350,914	\$61,487,608
7	2025	\$39,487,158	\$34,914,783	\$67,746,490
8	2026	\$45,207,772	\$40,054,820	\$73,575,914
9	2027	\$50,475,329	\$44,805,398	\$79,008,842
10	2028	\$54,537,635	\$48,566,099	\$83,422,529
11	2029	\$57,075,259	\$51,020,388	\$86,175,430
12	2030	\$58,586,704	\$52,509,129	\$87,906,013
13	2031	\$59,132,740	\$53,050,033	\$88,471,020

**Project Title: Waste Services Vehicle & Equipment 2019-2022**  
**Cost Impact**  
**Cumulative Present Value of Revenue Requirement**



## Appendix C - Waste Services Fleet Availability and Trend Analysis

### Waste Collection Services



### Sustainable Waste Processing Services



#### Yearly Trend Analysis

Branch: UTILITY SERVICES  
Section: Waste Mgmt Process & Disp



Number of Active Units During Selected Date Range:

283

Month All

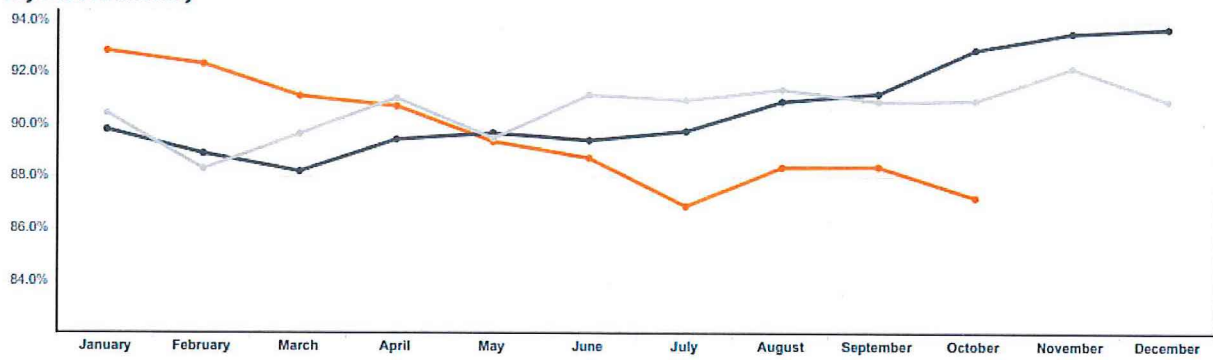
Asset Class All

OCC Description All

Unit No All

2017 2016 2018

#### Adjusted Availability



#### Availability

