

ORGANICS PROCESSING PROGRAM UPDATE

Recommendation

That the March 4, 2024, City Operations report CO02064, be received for information.

Requested Action	Information only		
ConnectEdmonton's Guiding Principle	ConnectEdmonton Strategic Goals		
CONNECTED This unifies our work to achieve our strategic goals.	Climate Resilience		
City Plan Values	PRESERVE.		
City Plan Big City Move(s)	Greener as we grow	Relationship to Council's Strategic Priorities	Climate adaptation and energy transition
Corporate Business Plan	Serving Edmontonians		
Council Policy, Program or Project Relationships	<ul style="list-style-type: none"> • 25-year Waste Strategy • City Policy C558B - Waste Services Fiscal Policy • Waste Reduction Roadmap 		
Related Council Discussions	<ul style="list-style-type: none"> • CR_6669, Organics Management, Utility Committee, February 1, 2019 • IIS00708, High Solids Anaerobic Digestion Facility (HSADF), City Council, September 12, 2022 		

Executive Summary

- In 2019, Waste Services introduced the 25-year Waste Strategy. Among other waste reduction and diversion initiatives, the Waste Strategy set a direction to introduce three-stream waste separation and organic waste collection at all residential properties. This is fully implemented for curbside collection and will be fully introduced to apartment and condo collection by 2027.
- Organic waste processing has evolved to respond to these waste separation changes. The current program uses City and third-party waste processing facilities to meet demand.
- The operational costs of organic waste processing differ greatly. The City uses both outdoor aerobic composting (with oxygen) and anaerobic digestion methods (without oxygen) to

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process organic waste. Anaerobic digestion technology is significantly more expensive to use on a day-to-day basis.

- Further changes to the organics processing program are required to meet the program's future capacity needs in an efficient, cost effective manner. It is projected that 121,000 tonnes of organic waste will require processing by 2027, an approximate increase of 36 per cent from 2023. This increase is attributable to Edmonton's population growth and the implementation of separate food scraps collection in apartments and condos.
- Administration will work to find the most cost-effective and environmentally friendly organics processing program option and will return to Utility Committee later in 2024.

REPORT

The City's organic waste collection program has changed since the introduction of three-stream waste sorting (food scraps, recycling and garbage) to Edmontonians with curbside collection in 2021. As anticipated, the volume of organic waste requiring processing increased, and is projected to increase further as Edmonton's population grows, as The City Plan is implemented and as three-stream collection continues to expand to apartments and condominiums.

Just as Edmontonians have adjusted how they sort and set out organic waste in the past three years, the City has also adjusted how it processes organic waste. Before 2018, all organic waste was processed in the Edmonton Composting Facility and at the Compost Cure Site at the Edmonton Waste Management Centre (EWMC). In 2019, the composting facility was decommissioned due to structural issues and some of the lost processing capacity was replaced through operations at the High Solids Anaerobic Digestion Facility (HSADF).

The Edmonton Cart Rollout in 2021 led to a significant increase in source-separated organic waste picked up through curbside collection. Administration secured enough organics processing capacity from its facilities and third-parties in the Edmonton area to meet the City's needs.

The approximate amount of organic waste processed over the past four years is shown below:

Year	Tonnes Processed
2020	13,700
2021	58,397
2022	89,029
2023	88,573

The City is introducing three-stream waste collection for residents with apartment and condo collection. This rollout started in fall 2023 and is expected to be complete in 2027. Once complete, all residents in Edmonton will have access to at-home organic waste collection.

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The forecasted amount of source-separated organic waste to be processed in 2027 is shown below:

Stream	Tonnes Processed (2027)
Curbside Collection	67,000
Apartment and Condo Collection	31,000
Grass, Leaf and Yard Waste Collection and Drop-off	23,000
Total	121,000

A refined organics processing program is needed to prepare for this increase in source-separated organic waste. The program needs to be capable of accommodating changes to residential waste collection, increased population growth and continued implementation of the 25-year Waste Strategy.

Organic Waste Collection and Management

Organic waste collected and processed by the City falls under three main categories: food scraps, grass, leaf and yard waste, and organic waste separated from mixed garbage/municipal solid waste. Before the Edmonton Cart Rollout and three-stream source separation of waste, all organic waste processed by the City was derived from municipal solid waste.

This stream was pre-processed at the EWMC to remove large contaminants, then transported to the Edmonton Composting Facility to start the composting process. Any piece of waste smaller than 3 cm is considered organic waste in line with industry standards. However, this inevitably led to small contaminants like plastic, metal and glass remaining in the final compost product. While this type of organic waste is low-quality, processing it still helps divert waste from landfill in line with the City's goals.

Organic waste is currently processed using two methods, aerobic (with oxygen) and anaerobic (without oxygen). When organic waste is processed in an anaerobic environment, like a landfill, it generates methane, a harmful greenhouse gas that contributes to climate change. However, in a controlled anaerobic digestion environment like the HSADF, the byproducts of anaerobic decomposition can be captured and converted into beneficial use.

The 25-year Waste Strategy, approved in 2019, transformed how the City managed and developed organic waste programs. Instead of relying on innovative technologies to sort all waste at its facilities, Waste Services would pursue waste reduction and improved sorting practices at the source to minimize the long-term costs of processing waste while diverting waste from landfill. Currently, organic waste is collected and processed by the City as follows:

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Organic Waste Material	Collection	Processing Facility (method)	Cost to Process	Compost Outcome ¹	Compost Sold or Provided To
Food scraps	<ul style="list-style-type: none"> • Curbside food scraps carts • Apartment and condo food scraps carts and bins (in progress) • Drop-off facilities 	Third-party processors (outdoor row composting)	Low / medium	Agricultural <ul style="list-style-type: none"> • Farmland • Cropland • Topsoil 	<ul style="list-style-type: none"> • Businesses • Retail customers
Grass, leaf and yard waste	<ul style="list-style-type: none"> • Curbside bags during seasonal yard waste collection • Drop-off facilities 	Compost Cure Site (outdoor row composting)	Low	Horticultural <ul style="list-style-type: none"> • Food production • Landscaping • Gardening • Tree and shrub planting • Topsoil 	<ul style="list-style-type: none"> • Businesses • Retail customers • Residents (free at select Eco Stations)
Organic waste from municipal solid waste	<ul style="list-style-type: none"> • Apartment and condo garbage bins 	HSADF (indoor anaerobic digestion)	High	Municipal Solid Waste <ul style="list-style-type: none"> • Mine reclamation • Landfill cover 	<ul style="list-style-type: none"> • Industry

Organic Waste Processing Challenge

All food scraps and yard waste collected from residents or dropped off at City facilities must either be processed, which is the preferred approach, or sent to landfill if there is no capacity to process it. Landfilling waste generates additional GHG, lowers waste diversion rates and is not in alignment with the 25-year Waste Strategy or the City's corporate goal to be GHG neutral by 2040. However, there is currently not enough capacity in the Edmonton area to process the 121,000 tonnes of organic waste expected at the EWMC by 2027.

The HSADF is primarily used to process organic waste that has been sorted out from mixed garbage collected from apartments and condos. This organic waste would otherwise be sent to landfill, as it is highly contaminated with other materials like plastic, metal and glass. This is the most efficient way to use the facility to achieve the City's goals. By 2027, all apartments and condos will have access to food scraps collection and organic waste will no longer be sorted out from mixed garbage, leading to a more consistent organic waste feedstock being processed at any facility.

The operational costs of anaerobic digestion at the HSADF are more expensive than equivalent organics processing methods at the Compost Cure Site or third-party processors. The facility was developed as an innovative technology that would support the City as it worked towards a 90 per cent waste diversion goal and was engineered to work in conjunction with the Edmonton Composting Facility. However, the Edmonton Composting Facility's closure led to changes in how the HSADF operated before it was fully commissioned and, as such, the HSADF has not consistently met its design objectives. While the HSADF was designed to process 40,000 tonnes of

¹ City of Edmonton Compost Sales - https://www.edmonton.ca/programs_services/landscaping_gardening/compost-and-topsoil-sales

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organic waste per year and generate green electricity, yearly throughput of the facility has not exceeded 29,000 tonnes. The HSADF currently requires upgrades to its emissions treatment operations and fluid piping and storage systems to meet the original expected throughputs of organic waste. The issues with the emissions treatment operations are also preventing it from reliably and currently generating clean electricity.

Proposed Program Options and Methodology

Because no single facility currently available to the City can meet all of its processing needs, Waste Services uses several processing methods within the organics processing program. To address the future needs of the program, Administration will evaluate different program configurations to determine which combination of processing methods and facilities would meet future City goals in the most stable, cost-effective and environmentally responsible manner.

While a combination of processing methods will continue to be used in any future program, Administration projects three possible program options led by:

1. Constructing new outdoor composting facilities at the EWMC similar to the Compost Cure Site.
2. Investing further into the HSADF to upgrade operational issues and achieve facility goals.
3. Increasing reliance on third-party organic waste processing.

To determine how a future organics processing program would be implemented and managed, Administration will complete an analysis in line with past major program changes. The three program options will be compared against a status quo option, where the organics processing program is maintained as-is. All facilities currently used and their purpose will be reviewed in the context of a future organics processing program. A 20-year lifecycle will be used, as this is a common lifespan for similar organics processing facilities. Factors Administration will use in its options analysis include:

Program Outcomes

The main goal of an updated organics processing program will be to meet the projected 121,000 tonnes of incoming organic waste by 2027 and prevent organic waste from being diverted to landfill. However, additional considerations may have operational and environmental impacts beyond standard waste diversion metrics. Program variables to be assessed include:

- Compliance with provincial regulatory requirements
- Construction and technology risks
- Overall program contingencies in the event of facility issues or shutdown
- Balance between City-operated and third-party operated processing facilities
- Carbon and GHG impacts

Financial Analysis

Waste Services is committed to balancing the demands of waste collection and processing while maintaining stable and consistent waste utility rates for Edmontonians. Financial variables to be assessed include:

- Capital investments needed for new facilities, upgrades to existing facilities and mobile equipment to replace aging assets.

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- Operational costs to use and maintain City-owned facilities and equipment, including utilities.
- Contracting costs paid to third-party processors, extrapolated to future years, in addition to any capital or operating costs transferred to third-parties over the life of the organics processing program.
- Labour and staffing, measured by full-time equivalents required to support organics processing operations.
- Transportation costs to move organic waste from the EWMC to third-party processors, including fuel, fleet maintenance and long-haul trucks.
- Land acquisition for any additional City-owned organics processing facilities.
- GHG credits related to emissions offset values.
- Salvage from any facilities not used in a future organics processing program beyond 2027.

Next Steps

Administration will start work on an options analysis to determine the most appropriate path forward for the organics processing program. A report for information will be provided at the September 3, 2024, Utility Committee meeting with an analysis of four program options and Administration's path forward on a cost-efficient, environmentally friendly, regulatory compliant organics processing program. In the interim, the City will continue with its organics processing program, including the ongoing implementation of three-stream source-separated waste collection to apartments and condos in Edmonton.

Budget/Financial Implications

Waste Services Utility Fiscal Policy C558B requires that Waste Services operates in a financially sustainable, operationally responsible manner. As per City Policy C558B, Waste Services is obligated to provide the best possible service to ratepayers at the lowest cost, and any change to the organics processing program will reflect this principle and be incorporated into future utility rate planning and setting.

Community Insight

The Waste Strategy was developed through extensive consultation with residents, businesses, non-governmental organizations and other collaborators. The rollout of three-stream apartment and condo collection is being supported through a team of waste outreach canvassers talking to residents at their homes and collecting data on how they experience the new program. This data will be used to refine how the rollout is communicated and implemented in future years.

GBA+

The 25-year Waste Strategy calls for achieving equity for curbside and apartment and condo residential collection services. The costs of providing and operating an organics processing program long-term will be fairly distributed into a customer's monthly rate in accordance with City Policy C558B. The City is committed to maintaining stable and consistent utility rates for all residential customers.