

Corporate Report

DEPARTMENT/ DIVISION	Infrastructure & Operations - Environment	REPORT NO.	R 24/2022
DATE PREPARED	2/2/2022	FILE NO.	
MEETING DATE	6/6/2022 (mm/dd/yyyy)		
SUBJECT	Food and Organic Waste Diversion (Green Bin) Program – First Report		

RECOMMENDATION

WITH RESPECT to Report R 24/2022 (Infrastructure & Operations – Environment), we recommend the implementation of a curbside Food and Organic Waste Diversion (Green Bin) Program to single family households starting in 2025 and multi-family properties in 2026 be approved;

AND THAT Green Bin service to local businesses and institutions be evaluated once the residential program is implemented;

AND THAT the City's curbside Leaf and Yard Waste collection program be expanded to four (4) collection events annually beginning in 2023;

AND THAT Garbage Collection services be amended by utilizing proven industry best practices as outlined in this report to achieve compliance with the required diversion targets for Green Bin waste as identified in the Provincial Policy Statement;

AND THAT automated cart-based collection of Garbage and Green Bin waste be implemented for single-family households starting in 2025;

AND THAT all waste collection vehicles purchased between 2022 and 2025 be outfitted auto-cart ready and with split body compartments to accommodate co-collection of Garbage and Green Bin waste;

AND THAT an aerobic Green Bin processing solution as identified through the Request for Information (RFI) process is the preferred option for the City of Thunder Bay;

AND THAT Administration release a Request for Proposal (RFP) for the procurement of an aerobic Green Bin processing solution for the City's program and report back to Council by December 2022 with a recommendation and source of financing;

AND THAT Administration finalize a detailed program implementation plan, including program costs and design parameters and report back to Council by January 2023;

AND THAT the costs associated with this new program development and expansion be added to the Solid Waste and Recycling Services Operating and Capital Budgets for 2023 and beyond for Council's consideration;

AND THAT any necessary by-laws are presented to City Council for ratification.

LINK TO STRATEGIC PLAN

This report directly supports the 'Serve' pillar of the 2019-2022 Corporate Strategic Plan: Advance service excellence through citizen focus and best use of technology. This report also directly supports the fifth goal under the 'Lead' pillar of the Plan to 'Further [previous] commitments to sustainability and climate adaptation.'

EXECUTIVE SUMMARY

The Provincial Policy Statement on Food and Organic Waste creates legal obligations for the City of Thunder Bay.

This report includes recommendations for the development and implementation of a food and organic waste diversion (Green Bin) program to achieve and maintain compliance with the requirements of the Provincial Policy Statement.

The report also includes recommendations for the optimization of the City's collection services with the use of new technology and policies to minimize the cost of implementing the new program and achieve effective participation.

DISCUSSION

The City of Thunder Bay provides a range of solid waste collection, diversion and disposal services to both residents and local businesses. Curbside services include garbage, blue bag recycling and leaf and yard waste collection. Additional services are offered at the City's Solid Waste and Recycling Facility. Waste collection services are offered to approximately 37,018 single-family households, 9,133 multi-family units located in 439 buildings, approximately 956 small businesses, and a range of municipal facilities and public spaces.

Provincial Food and Organic Waste Framework

The Province introduced its Food and Organic Waste Framework on April 30, 2018. The Framework is structured in two parts including the Food and Organic Waste Action Plan, and the Food and Organic Waste Policy Statement.

Amongst the many obligations found within the Policy Statement, there are two requirements of particular relevance to the City of Thunder Bay. The Policy Statement requires municipalities in Northern Ontario with a population greater than 50,000 and density greater than or equal to 300 persons per km² to provide curbside collection of food and organic waste to single-family dwellings in the urban settlement area by 2025. The target for municipalities in Northern Ontario, like the City of Thunder Bay, is a 50 percent waste reduction and resource recovery of food and organic waste by that date.

What is Food and Organic Waste?

Food waste means the edible parts of plants and animals that are produced or harvested but are not ultimately consumed (i.e. kitchen scraps and discarded food). Organic waste means inedible parts of plants and animals, as well as other organic material that may be processed along with food waste. Examples of organic waste can include, but are not limited to leaf and yard waste, compostable products and packaging, soiled paper, diapers and pet waste.

Waste Stream Analysis

The City of Thunder Bay conducted a four season curbside waste composition study (undertaken by AET Consulting Ltd.) between 2018 and 2019. The study results indicated kitchen food waste represented 43.2% of curbside residential collected garbage. The waste composition study also identified that approximately 7% of the curbside residential garbage collected was leaf and yard. The results of the waste composition study suggest there is an additional 17,510 Metric Tonnes of combined kitchen food and yard waste available to be diverted. This tells us that over half of what residents discard today is food and organic waste.

Key Program Design Elements to Meet Obligation

Food waste is a challenging material to divert and lessons have been learned by other communities suggesting implementation requires careful planning and effective communications. There are a number of parameters and options that will need to be considered in designing a program that meets the obligations of the Policy Statement.

Service Level Considerations

The City must provide a curbside collection program for food and organic waste from single-family households and achieve the required 50 % diversion rate by 2025. It does not, however, have to provide this service to multi-family households or the ICI sector. Those property owners are responsible for meeting their obligations under the Policy statement on their own. However, recognizing the City provides garbage and blue bag recycling collection service to both multi-family properties and garbage collection service to selected businesses, it is proposed the City provide Organic ('Green Bin') service to multi-family households starting in 2026 and consideration be given to expanding Green Bin collection service to local businesses and institutions on a cost recovery basis after roll out of the residential program is complete.

Delaying roll out of service to these sectors allows for sufficient time to successfully launch the curbside single-family household program and provides adequate time to develop an appropriate service level policy.

Expanded Leaf and Yard Waste Collection

The City currently diverts roughly 2,100 Metric Tonnes/year of leaf and yard waste and the most recent curbside waste compostion study identified that at least an additional 2,422 Metric Tonnes/year of leaf and yard waste may still be available for diversion from the residential wastestream. Expanding the City's leaf and yard waste collection program is the least expensive and easiest option available to partially meeting the 50% diversion requirement. Leaf and yard waste is significantly less expensive to process than food waste

Expansion of the City's leaf and yard waste collection to four events annually from two, at a minimum, is expected to capture an additional 920 Metric Tonnes/year of material. Expansion of the leaf and yard waste collection services is recommended in 2023 to allow time to assess the diversion potential of this option and reflect this information in upcoming collection and processing contracts.

Weekly Organics (Green Bin) Collection

The Policy Statement does not specify a collection frequency for food waste collection. However, almost all municipalities providing Green Bin service offer weekly collection to minimize the generation of odours and sanitation issues resulting from food storage between collection cycles. Every other week Green Bin collection has been tried in the past by other municipalities, but faced strong public opposition, suffered from poor participation and is not expected to meet the City's diversion requirements. Weekly collection is, therefore, recommended.

Bi-Weekly Garbage Collection

Experience throughout the Province has demonstrated that residents will not fully participate in food waste diversion programs unless the program is accompanied by strict garbage set out limits. While bag or item limits can be useful to some extent, the better practice has been proven to be coupling weekly Green Bin collection with every other week garbage collection. Communities with weekly garbage and Green Bin service will typically achieve capture rates of 80kg/household to 140kg/household whereas those providing every other week garbage and weekly Green Bin collection often divert as much as 110kg/household to 340kg/household material. As an example, in 2021 the City of Greater Sudbury switched to every other week garbage collection and saw an immediate 16% increase in Green Bin program participation.

It is recommended, therefore, that the City move to every other week garbage collection along with implementation of a Green Bin program in 2025 for single family households as a means of ensuring success of the program. Every other week garbage collection does not generate a net savings since the same amount of waste is still being handled irrespective of which week it is collected.

Projected Diversion Rate of Recommended Options

Green Bin capture rates for single-families average between 55%-65% of available material depending on what incentives are used to encourage participation (e.g., every other week garbage service). Multi-family properties tend to have lower participation rates ranging between 15% - 35% depending on building demographics.

Expanding the leaf and yard program as proposed and including every other week garbage collection, would allow the City to achieve the required provincial diversion target without immediate implementation of multi-family household Green Bin service as shown below in Table 1.

Table 1: Predicted Capture Rate of Green Bin Program with Expanded Yard Waste Program

Housing Type	HHLDS*	Predicted Generation Rates (Tonnes/Yr)**	Anticipated Participation Rate***	Predicted Capture Rate (Tonnes/Yr)	Per capita Capture Rate (kg/hh/yr)	Provincial Target (Tonnes/Yr)
Single-Family	37,018	11,134	60%	6,680	180	
Multi-Family	9,133	2,445	27%	660	72	
Yard Waste	N/A	4,500	70%	3,150	N/A	
Total Single-Family only				9,830		8,435
Total including Multi-Family				10,491		9,794

*Households

**Excludes diapers and incontinence products

***Assumes every other week garbage collection

If the City decides to continue with the current weekly garbage collection service and defer expansion of the leaf and yard waste collection program, it is expected it would fail to meet the required provincial diversion requirements as shown below in Table 2.

Table 2: Predicted Generation and Capture Rates with Green Bin Implementation Only

Housing Type	HHLDS*	Predicted Generation Rates (Tonnes/Yr)**	Anticipated Participation Rate***	Predicted Capture Rate (Tonnes/Yr)	Per capita Capture Rate (kg/hh/yr)	Provincial Target (Tonnes/Yr)
Single-Family	37,018	11,134	30%	3,340	90	
Multi-Family	9,133	2,445	20%	489	54	
Yard Waste	N/A	4,500	50%	2,250	N/A	
Total Single-Family only				5,590		8,435
Total including Multi-Family				6,079		9,794

*Households

**Excludes diapers and incontinence products

***Assumes weekly garbage collection

Fleet Requirements and New Technology

Green Bin collection is typically done using carts and trucks fitted with either ‘lift assist’ tippers or automated collection arms. Mechanical assistance is necessary because the weight of the containers typically exceeds safe manual lifting limits. Consideration will need to be given to undertaking separate collection of the new waste stream or employment of split body vehicles to allow co-collection of garbage and Green Bin waste aboard the same truck but in separate compartments.

Co-Collection of Material

The City currently collects garbage and blue bag recycling with separate fleets. Introduction of a third collection truck at the curb to collect Green Bin waste would run counter to the City’s climate change policy goals and increase traffic congestion on City streets. Instead, it is proposed that the City begin purchasing split body side loading trucks that would allow for the co-collection of garbage and Green Bin waste, in separate compartments, onboard the same truck. Given that there is no change in the actual volume of waste being managed, there should be no need to change the number of trucks utilized by the City. Instead, it is recommended that split body trucks be purchased by the City as existing waste collection fleet is replaced.

Automated Cart Based Collection Service

Automated cart-based collection or ‘auto-cart’ is considered a best practice in the solid waste management industry, where improvements can be made in collection efficiency, worker safety and satisfaction, reductions in injuries and climate change impacts.

Typically, single operator collection trucks are capable of achieving 650-850 stops per day. The same driver operating an automated collection vehicle in the same conditions can easily exceed a route efficiency of 1,100-1,500 stops per day. The City currently achieves an average of 1,100 stops per day but does so with two operators on each truck. Moving to automated trucks would reduce net operating costs by as much as 16% or almost \$827,000 per year.

More importantly, a transition to auto-cart collection would significantly improve the safety of collection staff. The waste management industry, as a whole, pays amongst the highest WSIB premiums of any industry in Ontario. Over the last five years, the City has incurred average costs of \$200,000 per year because of WSIB claims. Eliminating the manual collection service will go a long way to reducing these costs and protecting staff.

Introduction of a Green Bin program necessitates use of carts with some sort of mechanical lift assist and co-collection of garbage and Green Bin waste is the recommended collection methodology, therefore a move to automated collection of both garbage and Green Bin waste in concert with the program rollout to single family households is being recommended.

Staffing Implications

Implementation of a Green Bin program and automated cart-based collection will require significant changes to how waste is currently managed and resourced throughout the City.

Different staffing roles are required to support the roll out and long-term success of the new programs. These include staffing roles related to promotion and education, compliance, project development and implementation, and customer service. The new roles are also consistent with other municipalities' experience in rolling out similar programs, which has demonstrated that adequate resourcing is required for implementation and long-term success of solid waste programming.

Despite the need for these new staffing roles, the proposed conversion to automated cart-based collection is projected to result in a net reduction of up to 5.34 FTEs in Solid Waste and Recycling Services. The main driver in this reduction is that automated cart collection only requires one driver per collection vehicle, as opposed to the current two-person crew required for manual collection.

Food and Organic Waste Processing Options

It is expected that the City will require a minimum of 7,300 Metric Tonnes/year of food waste processing capacity to service immediate single-family and multi-family needs. Should it expand service to the ICI sector, and with population growth, additional capacity may be required in the future.

A number of different technologies have been trialed to process various types of food and organic wastes. Generally, technologies fall into two categories including aerobic (decomposition in the presence of oxygen) and anaerobic (decomposition in the absence of oxygen) systems. Each has their advantages and disadvantages. Home based supplemental solutions for food and organic waste traditionally involve methods such as backyard composting, vermicomposters or dehydrators.

In the fall of 2021, the City released a Request for Information (RFI) to solicit information about technologies and capacity from prospective vendors. The City received feedback from vendors representing the primary types of composting technologies confirming their interest in providing a solution for the City. The various technology options were comparatively evaluated against a suite of weighted criteria that considered environmental, social, financial and technical factors as well as risk. The evaluation concluded that an aerobic processing solution for Green Bin waste is the best option for the City of Thunder Bay.

Further, a feasibility study for placing an anaerobic digester at the Mapleward Road Solid Waste and Recycling Facility was completed. Findings suggest this is not a feasible option at this time. Key reasons include not having adequate economies of scale in regards to volume of Green Bin material available for processing to bring down capital and operating costs. Based on the review

of processing technologies it is recommended to proceed with an RFP for the procurement of an aerobic Green Bin processing solution for the City. It is also recommended that the use of supplemental home based solutions continue to be promoted for homeowners who are unable or unwilling to use a cart-based collection system.

Partnerships – Synergy North

A third party consultant, Archibald Engineering, was retained by the City to estimate the potential gas recovery impacts at its landfill site of removing green bin organics from the waste stream (beginning mid-year 2025) over the remaining five (5) years of the current gas supply Agreement with Synergy North. A reduction of up to 2% in gas production per year is projected. The findings from both this study and the anaerobic digester feasibility study have been reviewed with Synergy North.

Sustainability Implications

Introduction of a Green Bin program has the potential to help the City meet its goals as outlined in the Net-Zero Strategy and EarthCare Sustainability Plan. In anticipation of development of a food and organic waste diversion program, emissions from the City's current solid waste management program were reviewed and updated. It is expected that implementation of a Green Bin program will reduce the City's carbon footprint by 5,380 tCO₂e per year and increase the City's residential waste diversion rate from 25% to 42%.

LINK TO EARTHCARE SUSTAINABILITY PLAN

The introduction of a food and organic waste diversion program supports actions within the Waste Section of the EarthCare Sustainability Plan and priority objectives within the Net-Zero Strategy.

Sustainability Plan Objective A, Corporate Action A “Develop and implement a Solid Waste Management Strategy (SWMS) for the next 20 years”.

Sustainability Plan Objective A, Corporate Action C “Maintain and promote provincial waste minimization programs”.

Sustainability Plan Objective A, Corporate Action E “Investigate the implementation of a curbside organic collection program”.

Net-Zero Strategy, Priority Action “Establish residential organics collection program”.

Net-Zero Strategy, Priority Action “Integrate NZS principles into solid waste management operation”.

Net-Zero Strategy, Priority Action “Assess feasibility of rerouting organics to an anaerobic digester”.

FINANCIAL IMPLICATION

Program changes are projected to increase the cost per household for waste management services by an average of approximately \$33 per household or \$1.5 million per year. Offsetting savings of \$827,000 per year is projected with automated cart collection after implementation in 2025.

Table 3 below outlines projected incremental new program costs:

Table 3: Incremental New Program Costs

		2022	2023	2024	2025	2026	2027	2028
Green Bin Program	Capital	\$195,000	\$330,000	\$1,092,031	\$491,532	\$109,798	\$0	\$0
	Operating	\$0	\$61,435	\$370,470	\$1,653,819	\$1,774,545	\$1,553,242	\$1,487,645
Total		\$195,000	\$391,435	\$1,462,501	\$2,145,351	\$1,884,343	\$1,553,242	\$1,487,645
Expanded Yard Waste Collection	Capital	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Operating	\$0	\$161,646	\$164,879	\$168,176	\$171,540	\$174,971	\$178,470
Total		\$0	\$161,646	\$164,879	\$168,176	\$171,540	\$174,971	\$178,470
Auto Cart Program	Capital	\$100,000	\$150,000	\$3,442,674	\$886,387	\$9,133	\$0	\$0
	Operating	\$0	\$0	\$27,764	(\$785,203)	(\$828,638)	(\$863,318)	(\$891,916)
Total		\$100,000	\$150,000	\$3,470,438	\$101,184	(\$819,505)	(\$863,318)	(\$891,916)
Grand Total		\$295,000	\$703,081	\$5,097,818	\$2,414,711	\$1,236,378	\$864,895	\$774,199

Note: All figures are compounded by a CPI rate of 3% annually.

In order to have adequate waste collection vehicles in place to support program roll out in 2025, an additional four (4) collection vehicles over the Fleet Services 2023 capital budget envelope will need to be procured in 2023. Supply chain issues are causing delays across the industry, and we can expect to wait up to two (2) years from date of procurement before actually receiving the vehicle. The approximate cost for the additional collection vehicles required in 2023 is \$2,280,000 (\$1.8k base unit truck costs + \$480k new truck upgrade costs). Fleet Services only have a budget envelope in 2023 for the purchase of two (2) base unit waste collection vehicles. Table 3 above accounts for the costs associated with the required truck upgrades to make vehicles green bin and auto cart compatible, however it does not account for base vehicle costs.

CONCLUSION

The recommendations contained within this report will allow the City to meet its obligations under the Provincial Policy Statement for Food and Organic Waste. The adoption of an automated cart-based collection program will not only improve service efficiency, but will improve worker safety and help mitigate the long term cost of the required Green Bin program. The recommendations will also allow the City to make significant progress towards its stated sustainability goals.

It is concluded that City Council should approve the recommendations to develop a food and organic waste diversion program, including the use of auto-cart technology as outlined in this report.

BACKGROUND

At the April 7, 2014 Committee of the Whole meeting, Report No. 2014.017 – Solid Waste Management Strategy was approved by City Council in principle. The Strategy called for the development of a food and organic waste diversion program, including the use of auto-cart technology.

At the December 9, 2020 Committee of the Whole Meeting, Report R 144/2020 (Program and Service Review) was presented - Administration was directed to evaluate integration of curbside organics program to meet the provincial mandated deadline of 2025 and conduct a feasibility study of moving to automated collection for waste and consider integration of the organics program which will begin 2025 in addition to a number of other diversion actions.

At the March 7, 2022 Committee of the Whole Meeting, a presentation on the development of the City of Thunder Bay Organics (Green Bin) Diversion Program and the City's obligations under the Provincial Policy Statement on Food and Organic Waste was provided.

REFERENCE MATERIAL ATTACHED:

Attachment A – Development of an Organics Program Implementation Plan

PREPARED BY: JASON SHERBAND, MANAGER – SOLID WASTE AND RECYCLING SERVICES

THIS REPORT SIGNED AND VERIFIED BY: (NAME OF GENERAL MANAGER)	DATE:
Kerri Marshall, General Manager – Infrastructure & Operations	May 27, 2022