Waste Management Master Plan – Municipality of Central Manitoulin

November 27, 2022

Prepared for:
The Municipality of Central Manitoulin

Cambium Reference: 15578-001

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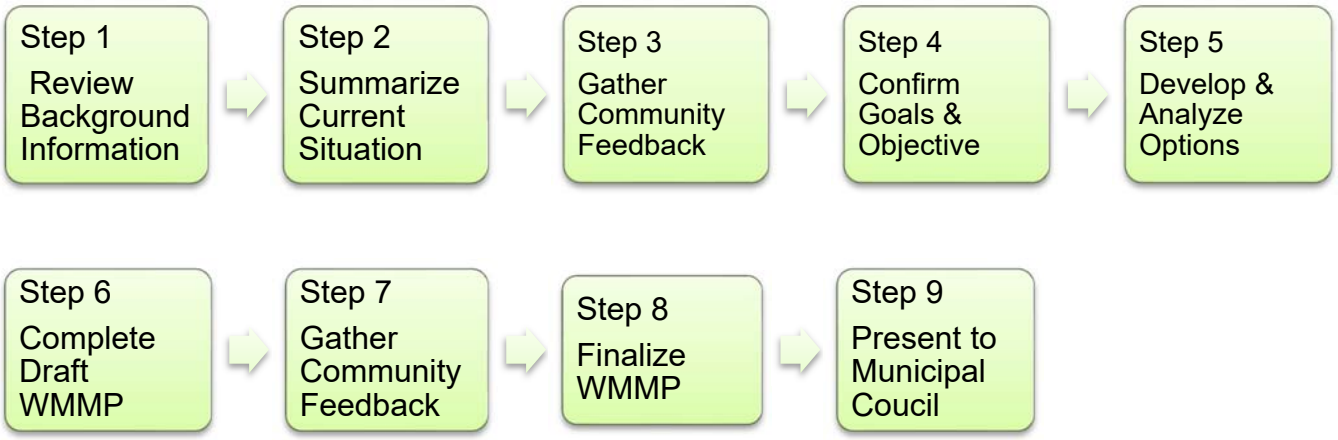
Executive Summary

In 2022, with the vision to be financially and environmentally responsible, the Municipality of Central Manitoulin (Municipality) engaged Cambium Inc. (Cambium) to develop its Waste Management Master Plan (WMPP).

The development of this WMMP set out to accomplish the goals and objectives summarized in the table below.

WMMP Goals and Objectives	
Short-Term: Develop plans to shift from landfill to transfer station operations at the Providence Bay WDS once the landfill closes in June 2023.	1. Find cost effective solutions for temporary export of garbage 2. Implement circular waste management initiatives and policies to reduce garbage quantities
Long-Term: Develop plans for managing waste in the Municipality including consideration for implementing circular waste management initiatives, as well as options for garbage disposal	3. Review options for service delivery including providing in house or contracted garbage collection services 4. Assess continued improvement and diversion initiatives to encourage a sustainable waste management program 5. Provide recommendations on disposal options for garbage

The development of the WMMP consisted of the following process:



Waste is becoming more of an issue globally and locally and as a result, there are many simultaneous changes going on in the waste sector. These shifts include new provincial regulations to make producers responsible for the end-of-life management of their packaging and some products, regulations to streamline and change the environmental assessment process, increasing priorities to reduce greenhouse gas emissions, emerging waste processing and recycling technologies, and federal bans on some single use plastics. This WMMP has considered the most current information available to assist with the development of options that are practical and up to date with current trends.

Short Term Plan

With the imminent closure of the Providence Bay landfill, the Municipality has been put into a position whereby temporary export of waste in the short-term is necessary. To reduce the financial impact of this change and continue to develop the goal of transitioning to the circular economy, several short-term recommendations have been made.

The options of exporting waste off-island (Dodge Landfill) and transferring waste to a local municipal landfill were considered. Overall, a net increase in hauling and disposal fees of an estimated $155,000 to $220,000 annually is expected once the landfill site is closed. Negotiating with a nearby municipality to receive waste as opposed to exporting off island is expected to result in exporting costs on the lower end of the range. Transferring garbage to a

local municipal landfill would also have a positive impact on reducing GHG emissions compared to exporting off-island.

Hauling is a key cost associated with transferring waste, so reducing the number of loads that need to be hauled from the transfer station to a landfill would reduce those costs. Actions to reduce costs of waste hauling and tipping fees include suspending the receipt of large loads of construction and demolition waste at the landfill and maximizing the use of the current curbside program. Establishing a reuse centre, diverting mattresses to a recycling program, and expanding organics programs such as the Food Cycler or at home composter program are circular economy initiatives which will also help to reduce waste and therefore reduce export costs. These options combined would reduce the overall quantity of waste exported annually by 25% and the quantity from the transfer station specifically by 55%.

The Municipality should consider all these options and implement those which they consider to be the most in line with their priorities and needs.

Long Term Plan

In the long-term, the Municipality requested waste management planning solutions for the next 50 years. Although exporting waste may be more cost effective (at least in the short term), the perspective gained during the Plan's development is that the Municipality and its residents would prefer a local solution that they can depend on.

The thermal treatment option presents an opportunity to manage waste locally, and reduces the long-term liability associated with establishing more landfill sites. The process produces materials that can be marketed and proposes to 'recycle' over 80% of the incoming waste stream. The Municipality should continue to consider this option and work with the proposed vendor to determine if it is realistic and cost competitive.

Failing success by the vendor to implement the new technology, the Municipality should consider establishing a landfill. The size of a proposed landfill determines the complexity of the approval process under the Environmental Assessment Act. A less onerous approval process can be completed to provide the municipality with 100,000m^3 (25 years) of capacity and a less costly solution to garbage disposal, compared to a 50 year landfill site. It is recommended that

this possibility be considered if the thermal treatment project is not able to progress in two years' time.

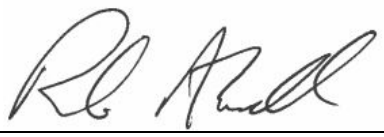
Long-term, to reduce GHG emissions and implement circular economy initiatives, the Municipality should consider curbside textile collection events, repair cafes, glass recycling, and continued consideration for organics diversion opportunities.

This strategy was developed in consultation with the Municipality and based on knowledge of waste management industry and trends, and landfill operations. The recommendations outlined in this Plan are intended to provide clear direction on how the Municipality can achieve its goals.

Respectfully submitted,

Cambium Inc.

Heather Dzurko, M.Sc.
Project Manager



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1.0 Introduction

In 2022, with the vision to be financially and environmentally responsible, the Municipality of Central Manitoulin (Municipality) engaged Cambium Inc. (Cambium) to develop its Waste Management Master Plan (WMPP).

For several years, the Municipality has been working with the Ministry of Environment, Conservation and Parks (MECP) to approve long term operational plans for the Providence Bay Waste Disposal Site (WDS), including a design for 20 to 30 years of landfill capacity. Consensus could not be reached and in June 2021 the MECP issued an amended Environmental Compliance Approval (ECA) A550702 requiring that the Municipality cease landfilling at the site by June 1, 2022. In August 2022, a one-year extension for landfill closure was received and landfilling operations are to cease by June 1, 2023. The site was approved to continue operating as a waste transfer station indefinitely.

In addition to the closure of the Providence Bay landfill, there were two other factors influencing the development of the WMMP. First, the Municipality was considering a proposal for a thermal treatment, Advanced Recycling (AR) technology, pilot project, and second, the province is shifting the management of Blue Box recycling materials to producers through significant regulatory changes.

Developing a WMPP in the current waste sector climate goes well beyond the traditional approaches of the past. This WMMP builds on the existing waste management system and programs and shifts from traditional focus on landfill disposal to a more circular waste management approach – from waste management to resource recovery.

1.1 Goals and Objectives

The development of this WMMP set out to accomplish two goals: 1) to develop a short-term strategy to deal with the Municipality's garbage immediately following closure of the Providence Bay landfill, and 2) to develop a long-term strategy for the Municipality's waste which considers the shift towards greater resource recovery. Each of these goals are supported by their associated objectives.

Short term objectives are those that the Municipality should consider implementing over the next two years. Through the evaluation of the existing waste management system, two objectives have been identified to achieve short term goals.

Long-term objectives are those that the Municipality should consider implementing after short term plans to export waste are in place. When evaluating garbage disposal options, the Municipality requested consideration be given to a 50-year planning period. Through the evaluation of the existing waste management system, three objectives have been identified to achieve long term goals.

WMMP Goals and Objectives	
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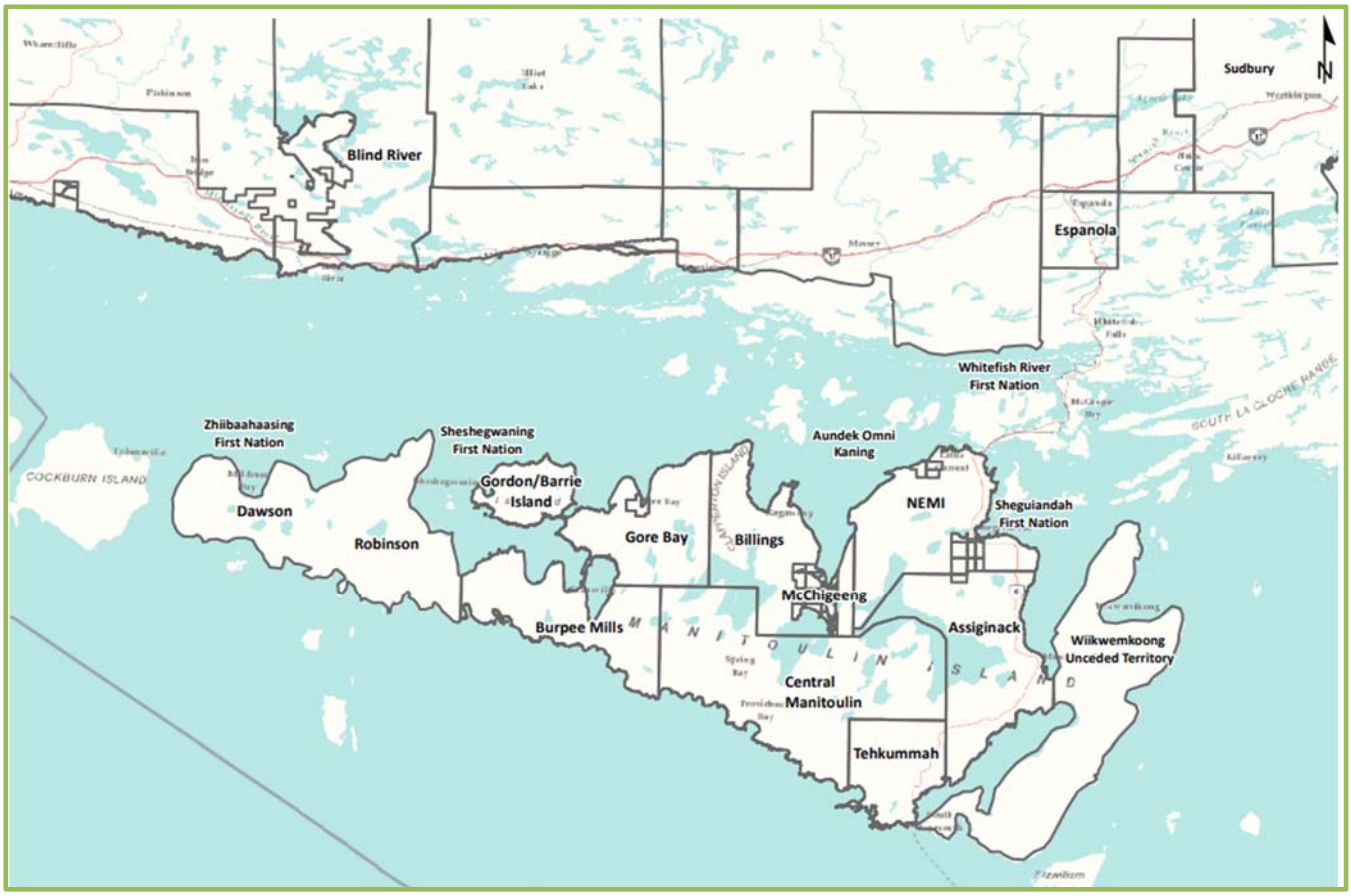
Long-Term: Develop plans for managing waste in the Municipality including consideration for implementing circular waste management initiatives, as well as options for garbage disposal.	3. Review options for service delivery including providing in house or contracted garbage collection services 4. Assess continued improvement and diversion initiatives to encourage a sustainable waste management program 5. Provide recommendations on disposal options for garbage

1.2 Municipal Profile

The Municipality is one of several in the Manitoulin District as shown on Embedded Figure 1.



Embedded Figure 1 Regional Location Plan

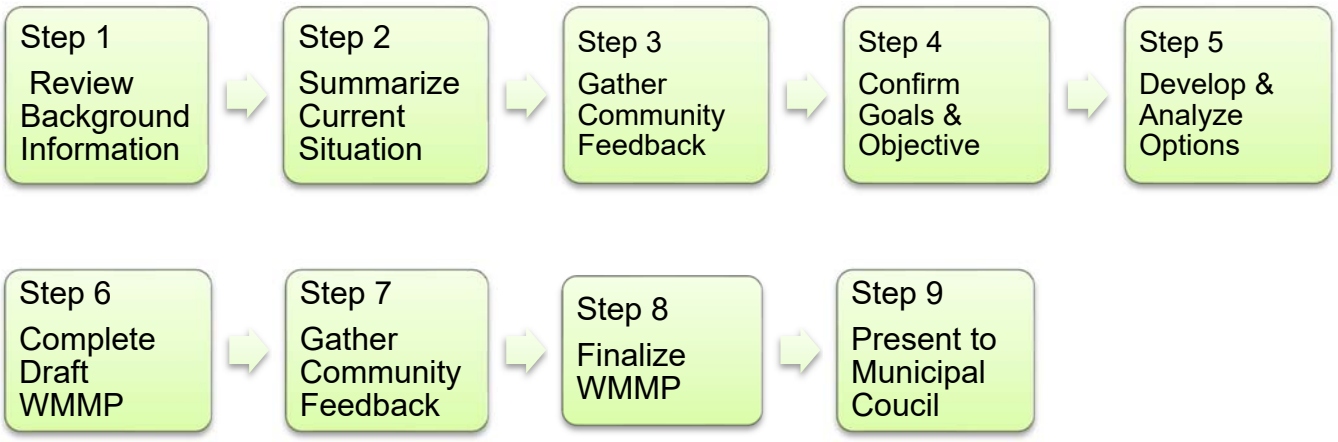
Population data for the Municipality is presented in Embedded Table 1. Population increases of 6.4% and 7.2% were noted for the Municipality in both the 2016 and 2021 census, respectively (Canada, 2022). Central Manitoulin makes up about 16% of the District's total population and tourism is the Municipality's primary industry.

Embedded Table 1 Central Manitoulin Population Summary

	2011	2016	2021
Population in Census Data	1,958	2,084	2,235
Total private dwellings (PD)	1,541	1,629	1,603
PDs occupied by usual residents	881	955	1,050
Population change (%)	0.7	6.4	7.2

2.0 Strategy Development

The development of the WMMP consisted of the following process:



2.1 Background Data

Information was provided by the Municipality to establish a baseline of existing conditions from which to develop future waste management plans. Information included waste tonnage data, waste site logbooks, general ledger reports, and existing waste management policies, programs, and practices.

Existing municipal guidance documents including the *Island Wide Waste Management Plan Waste Stream Identification and Diversion Strategies* (AECOM, 2009), and the *Community Energy and Emissions Plan* (Manitoulin, 2021) were reviewed and considered as they relate to the development of this WMMP. Additionally, site specific documents for existing waste disposal sites including annual monitoring reports, design and operations plans, and approvals were considered.

Of note is the climate action vision in the Community Energy and Emissions Plan:

Reduce by 50%, below 2018 GHG emission levels by 2030 and reduce overall consumption by promoting circular economy concepts and increase waste diversion through recycling rate increases and home composting program.

2.2 Consultation

Consultation on the WMMP was multifaceted and included:

- reaching out to neighbouring municipalities and indigenous communities to initiate dialogue and identify opportunities for collaboration
- attending meetings with Committee of Council
- engaging the public through a survey
- posting the draft WMMP for public consultation and input
- hosting a virtual town hall meeting to discuss the WMMP

2.3 Option Assessment

With an understanding of the existing waste management system, input provided through consultation, and knowledge of waste management trends and policies, a list of options for meeting the short- and long-term goals were identified. Options were considered in relation to environmental, social, and financial factors as shown in Embedded Table 2.

Embedded Table 2 Option Evaluation Considerations

Environment	GHG emissions Land requirements Groundwater and surface water impacts Level of nuisance Potential for waste diversion
Social	Perceived public perception Potential for partnership Status of option Scale of option Level of effort to implement

Financial	Capital expenses Annual operating expenses Level of risk

2.4 Report Development

The information gathered through the development of the WMMP was compiled and is summarized in this report.

3.0 Waste Management Trends and Policy

3.1 Circular Economy

The Circular Economy (CE) is gaining traction in municipalities around the world including here in Canada. Across this country some municipalities have begun their journey towards the CE. The CE shifts us away from our current linear economy by extracting more value out of existing products and resources. It decouples economic growth from the consumption of finite resources, and is built on 3 “design-based” principles:

- Eliminate waste & pollution
- Circulate products and materials (at their highest value)
- Regenerate nature

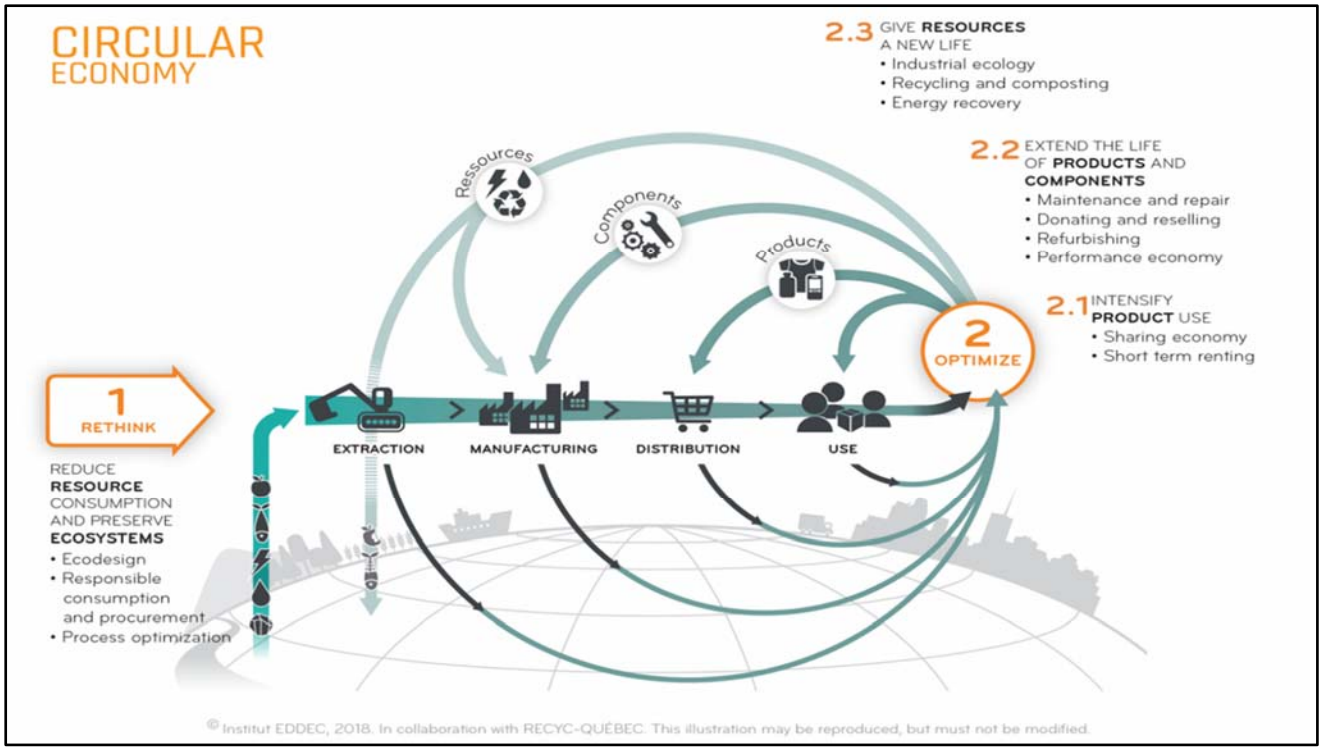
With a CE, the value of resources is maintained through a variety of methods that keeps products/materials in use either in their current form (via sharing, reuse, repair) or as inputs for new products (refurbish, remanufacture, recycle). In other words, the CE feeds existing resources back into the economy, creating more of a closed loop (circular) system. As per

Embedded Figure 2 recycling is the last step before energy from waste and landfill.

Key municipal benefits of the transition to CE include:

- Reducing waste to landfill
- Reducing GHG emissions
- Supporting local economic development

As noted in Section 2.1, the Municipality is already aware of the transition to the CE and is looking to see that incorporated into this Plan. With that in mind any new opportunities or current programs and practices that support the transition have been highlighted.



Embedded Figure 2 The Circular Economy

3.1.1 Focus on Single Use Plastics

In line with the CE's focus on eliminating waste, much effort is being put into reduction in the production and use of single use plastics, and the majority is being driven on a national level. *The Single-use Plastics Prohibition Regulations (SUPPR)* are part of our federal government's plan to meet its target of zero plastic waste by 2030, and help reduce GHG emissions. The Regulations came into effect on June 22, 2022 and "prohibit the manufacture, import and sale of six (6) categories of single-use plastic: checkout bags, cutlery, foodservice ware (made from or containing problematic plastics), ring carriers, stir sticks, and straws."[i]

In addition to the single use plastics ban, there is also movement to establish recycled content requirements for plastic products and packaging. "As part of Canada's plan to achieve zero plastic waste by 2030, we will require plastic packaging in Canada to contain at least 50% recycled content by 2030. Supporting this objective, the Canadian Council of Ministers of the Environment endorsed a 50% recycled content requirement in plastic products, where

applicable, by 2030 as part of Phase 1 of the Canada-wide Action Plan on Zero Plastic Waste (PDF)."[ii]

However, with all the above, the issue of single use plastics that make up much of the Blue Box program are not addressed.

3.1.2 Resource Recovery and Circular Economy Act

In 2016 in Ontario, the Resource Recovery and Circular Economy Act (RRCEA) was established to provide a provincial strategy focused on developing a CE and increasing resource recovery. A fundamental part of this legislation designates that producers become responsible for the post consumer management of their products & packaging, which is referred to as Individual Producer Responsibility (IPR). In 2018 the provincial government released it's a Made-in-Ontario Environment Plan (Ontario, 2018), which maintained the provinces prior commitment to a shift towards a circular economy and IPR.

Under the Act, regulations have been enacted to designate end of life management requirements for recoverable materials as shown in Embedded Table 3:

Embedded Table 3 IPR Transition Schedule

Designated Material	Regulation	Full IPR Program
Blue Box (Transitioning between January 1, 2023 and December 31, 2025)	O. Reg. 391/21	January 1, 2026
Hazardous Special Products	O. Reg. 449/21	October 1, 2021
Electrical and Electronic Equipment	O. Reg 522/20	January 1, 2021
Batteries	O. Reg. 30/20	June 30, 2020
Tires	O. Reg. 225/18	January 1, 2019

Producers or Producer Responsibility Organizations (PRO)s will be responsible for managing each of these programs under the Resource Productivity and Recovery Authority (RPRA). RPRA is an organization delegated by the province to oversee compliance with the regulations. The Municipality may act in coordination with these PROs to offer collection services for residents for designated materials at waste disposal sites or they may rely on PROs to offer services to residents through separate collection programs.

In Ontario, the single-use plastics issue has mainly been addressed through the Province's IPR legislation which requires Producers to take full responsibility (operationally, financially) for the collection, transportation, and management of plastic packaging via the existing Blue Box program. "Management" requires that the recovered resources are:

- marketed for re-use for their original purpose or function, or
- marketed for use in new products or packaging

In addition, O. Reg. 391/21 Blue Box notes that recovered resources do not include materials that are landfilled/disposed, or materials that are incinerated or used in a product that is fuel or a fuel supplement.

The RRCEA is also structured in a way that other materials may be designated under the IPR framework in the future. Organizations such as Association for Municipalities of Ontario (AMO) are already rationalizing and encouraging the government to consider additional materials such as textiles, furniture, carpets, mattresses, and additional electronics and hazardous wastes (AMO, Association of Municipalities Ontario, 2022).

3.2 Environmental Assessment Act

The establishment of a waste management project in Ontario is governed by the MECP through the Environmental Assessment Act (EAA) and Ontario Regulation (O. Reg) 101/07 Waste Management Projects. O. Reg 101/07 sets out the requirements for evaluating the environmental impacts of the proposed waste management project, as well as the consultation process that should be followed. Requirements are outlined in the *Guide to environmental assessment requirements for waste management projects* (MOECC, 2016).

Since 2019, the Ontario government has been consulting on the modernization of Ontario's Environmental Assessment (EA) program including regulations that apply to the establishment of a waste disposal site or advanced recycling facility in Ontario. Before proceeding with a project, the MECP should be consulted to confirm current direction.

3.2.1 Landfill Sites

Under the O. Reg 101/07, waste management projects can be classified into 3 main process streams:

- major undertakings with the potential for significant environmental impacts,
- projects with predictable environmental outcomes that can be mitigated through design, and
- projects that are expected to have minimal environmental impact.

The major undertakings must follow the Individual Environmental Assessment requirements (EA), the projects with predictable outcomes may follow the Environmental Screening Process (ESP), and minor projects require application for an ECA under the Environmental Protection Act (EPA). A high-level summary of the approval requirements for each threshold are included in Embedded Table 4.

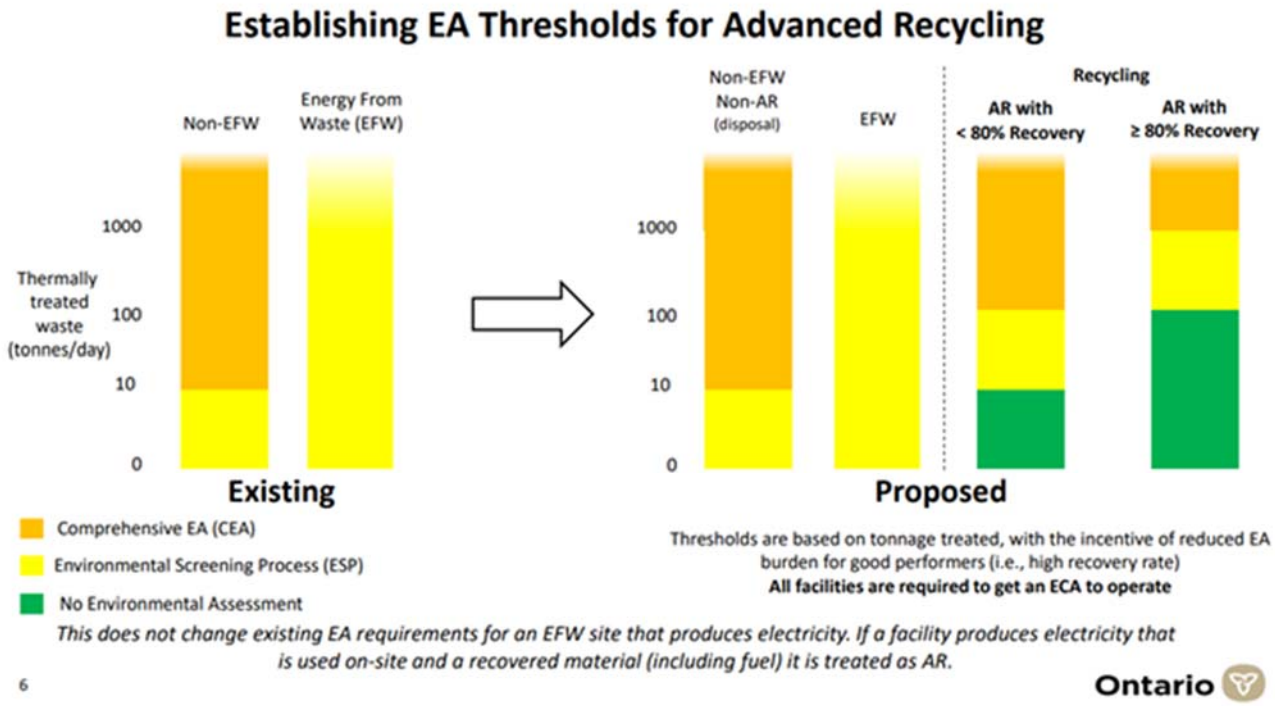
Embedded Table 4 EA Thresholds for Landfill Expansion

Volumetric increase in total waste volume	Approval Process	Notes
<40,000 cubic meters	ECA (requirements under EPA only)	• Review of proposed site • Consultation • Environmental Impact Studies • Ministry Application and Fee
40,000 to 100,000 cubic meters	Streamlined EA (requirements under EAA and EPA)	• Environmental Screening Report including consultation required prior to application for an ECA
>100,000 cubic meters	Comprehensive EA (requirements under EAA and EPA)	• EA including Terms of Reference, review of options, consultation, and EA report required prior to application for an ECA

3.2.2 Advanced Recycling

Through the Environmental Assessment modernization program, the Ontario government committed to supporting advanced recycling (AR), thermal treatment and energy recovery technology, and to clarifying the role advanced recycling plays in recovering valuable resources from waste. Advanced recycling is described as *a waste disposal site where thermal treatment is used to recover materials and whose primary purpose is processing of waste to generate recovered material rather than waste disposal.*

In 2022, proposed changes to the EAA would set thresholds for facilities proposing to operate an AR facility, identifying when a proposal would require a comprehensive EA versus an ESP (Embedded Figure 3). The intent of the change is to encourage a high resource recovery rate (i.e., greater than 80%), by reducing the EA burden for good performers.

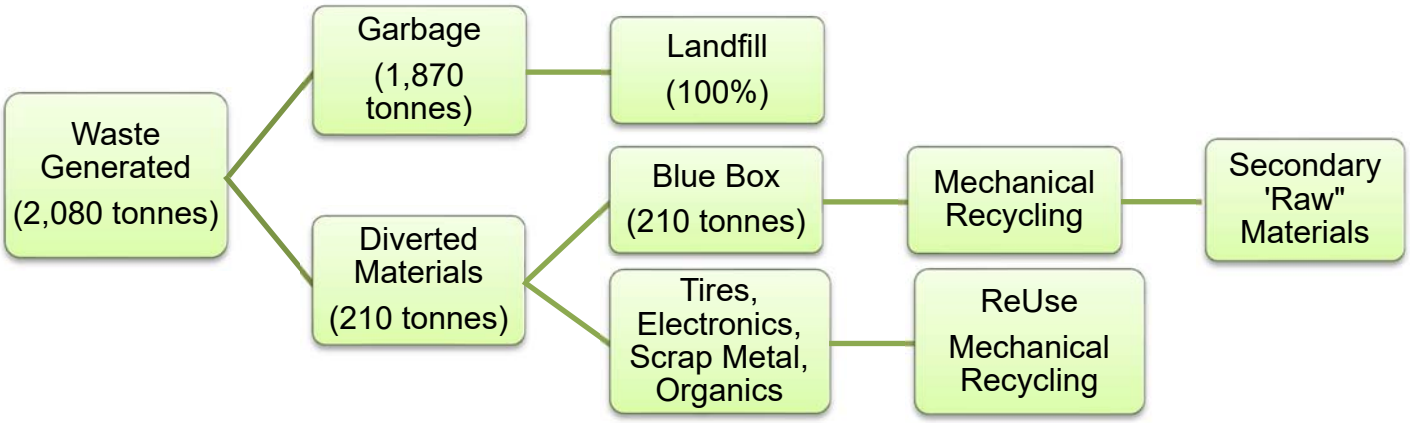


Embedded Figure 3 EAA – Proposed Thresholds for Advanced Recycling

4.0 Existing Waste Management System

4.1 Waste Management System Summary

Central Manitoulin's waste management program consists of a combination of landfill disposal, reuse, and recycling initiatives (Embedded Figure 4). The figure indicates the annual tonnage landfilled versus diverted.



Embedded Figure 4 Current Waste Management Programs

The system for delivery of the existing waste management programs includes the following:

1. Curbside collection of garbage and recycling and transfer to waste disposal site
2. Municipal operation of one landfill (Providence Bay) and two transfer stations (Providence Bay and Big Lake)
3. Export of waste off Island
4. Hazardous waste events
5. Food Cycler pilot project for residential kitchen organics

4.1.1 Contracted Garbage and Recycling Collection and Waste Transfer

Curbside garbage and recycling collection and transfer of waste from the transfer sites is contracted to GFL. The term of contract is January 1, 2020 until December 31, 2024.

The program includes:

- Weekly garbage and recycling collection from all designated households, and institutional/commercial establishments on all roads maintained by the Province or Municipality and private roads as designated by the Municipality.
- Garbage in clear bags only, no bag limit
- Weekly garbage and recycling collection from all transfer stations
- Tipping (dumping) of waste at the Municipal landfill and approximately 40 m^3/week of compacted waste at the Dodge landfill
- Hauling and processing of recycling

4.1.2 Municipal Operation of One Active Landfill and Two Transfer Stations

There are two municipally owned and operated transfer stations and one active landfill site. These locations offer a variety of waste disposal services. The programs include:

Big Lake Transfer Station

- Attendant onsite during operating hours
- Site accepts residential garbage and recycling only – no limit and no fee

Providence Bay Transfer Station and Landfill

- Attendant onsite during operating hours
- Site accepts residential and commercial garbage and recycling – no limit
- Site operates additional diversion programs: tires, electronics, scrap metal
- Bulky item and mattresses collection and transfer off island to landfill

- Chipping and grinding construction and wood waste for use as landfill cover
- Operation of the landfill site – cover and compaction of waste with an excavator
- Tipping fees are applied to specific materials

4.1.3 Export of waste to Dodge landfill

The cost of hauling garbage to the Dodge landfill is included in the contract with GFL. The Dodge landfill accepts a portion of waste collected curbside from the Municipality for final disposal and charges a fee to the Municipality based on the volume of waste received.

4.1.4 Hazardous Waste Event

One hazardous waste event is offered in the Municipality each year usually in the summer. A third party contractor provides this service which is shared with other municipalities on the island.

4.1.5 Food Cycler Pilot Project

In 2022, the Municipality is participating in a Food Cycler Pilot project to increase at home composting of kitchen waste. With this program, kitchen scraps are placed into the unit and the moisture removed (dehydrated), leaving an excellent soil amendment, and diverting the waste from landfill, where when covered would generate methane, a potent GHG. 50 participants were included in the pilot project.

> **Circular Moment** - the Food Cycler project is an example of promoting a circular economy - the program recovers resources and if returned to the soil represents the “regenerate nature” principal.

4.2 Waste Management Costs

Waste management services are provided at a cost to residents and the municipality. Municipalities typically provide a baseline level of services (residential garbage and recycling

collection) which is administered through levies and taxes. The costs of additional waste services (such as construction demolition materials, and bulky household items) may be partially offset through tipping fees. A general summary of costs as it relates to the current waste management system delivery is shown in Embedded Table 5 and a summary of GL is included in Appendix A.

Embedded Table 5 High Level Summary of Annual Program Costs

GFL Contract	
Hauling off island	$20,000
Curbside waste collection, depot service, commercial service, recycling hauling and processing	$265,000
Dodge Landfill	
Tipping fees	$35,000
Hazardous Waste Events	
Cost	$26,000
Stewardship Funding	-$12,000
Food Cycler Pilot	
Cost	$15,000
Resident fees	-$7,500
Depot and Landfill Operations	
Landfill Operations	$105,000
Hydrogeological studies (monitoring and reporting)	$35,000
Closure costs	$75,000
Tipping fees	-$11,500
Blue Box funding	-$29,000
Total	$516,000

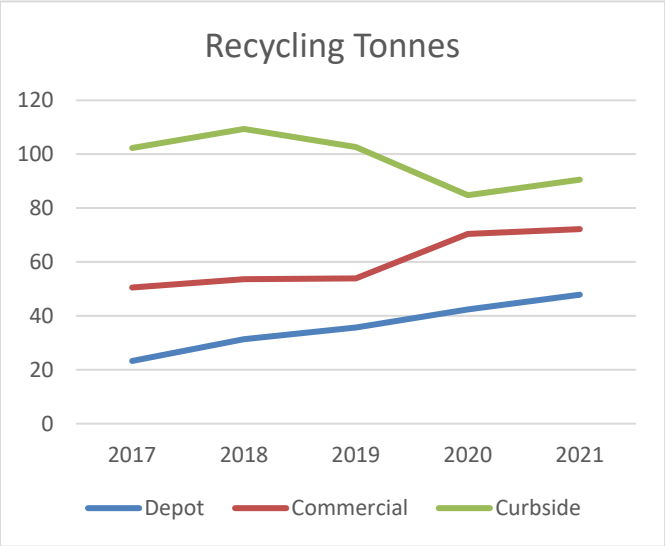
Note costs are meant to provide a general idea and do not reflect exact costs. These numbers are rounded, based on average annual costs, and include items not specifically reported in the waste management GL (such as landfill equipment costs)

4.3 Waste Quantities and Diversion Rate

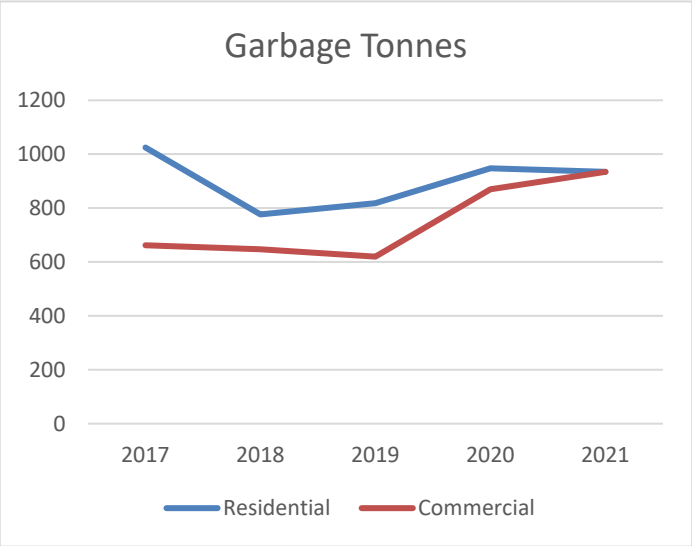
The waste diversion rate is a measure of the percentage of waste that is kept out of (diverted from) the landfill. It is calculated by dividing the waste diverted (recycling) by the total waste generated (garbage + recycling). In 2009, the overall reported diversion rate reported in the Island Wide Waste Management Strategy was 9% with a goal of achieving 34% diversion (AECOM, 2009a).

Based on the data considered in this WMMP (Appendix B), the Municipality's diversion rate has fluctuated between 9% and 12% over the last five years. However, it should be noted that waste diversion rates would be higher if all diversion program tonnages were recorded. The quantities of scrap metal, electronics, leaf and yard waste, and tires are not tracked and therefore were not included in the diversion estimates. As shown in Embedded Figure 5, recycling collected at the transfer station and commercially are increasing.

Tonnes of commercial garbage being managed are increasing and in 2021 were essentially equal to the tonnes of residential garbage collected (Embedded Figure 6).



Embedded Figure 5 Recycling Trends



Embedded Figure 6 Garbage Trends

5.0 Consultation

Consultation was conducted as outlined in Section 2.2 and summarized below.

5.1 Municipal Staff & WWE Committee

Cambium conducted regular meetings with staff throughout the development of the WMMP to clarify information and provide updates on the progress of the project.

The WWE Committee was engaged initially by receiving an overview of the plan for developing the WMMP and some preliminary background information.

5.2 Survey

The survey was distributed to the residents of the Municipality to accumulate public opinion regarding current services and future management options. The survey consisted of a total of twenty-one questions. Questions ranged in subject matter, including – how often residents used each service provided, input on the goals and methodology of the WMMP, and what future services residents would like to see. The survey was available in hard copy and electronic format. Hard copies were available at the municipal office and the electronic surveys (on the Municipal website) were advertised on multiple platforms. The survey was available between August 9 to August 31, 2022. The survey received a good response with a total of 152 people (7% of residents), responding to the survey.

Survey results are summarized in Appendix C. Based on the survey responses, the initial goals of the WMMP were refined to reflect the feedback. Specifically, to clarify the need to complete short-term export of waste and to include a greater focus on circular economy.

Other key survey findings included the following:

- 53% of respondents are satisfied to very satisfied with the current waste management services offered.
- It was clear from comments provided by survey respondents that a local solution was preferred to exporting garbage

- Respondents want to focus on waste reduction and reuse as well as recycling
- Composting options including the establishment of a composting facility, a centralized composting system and an improved backyard composting system all received support from over 50% of respondents.
- Survey respondents were generally opposed to fees, user pay systems, penalties, and material bans
- Other programs that were supported include reuse centres, new landfill or alternative recycling technology, C&D diversion program, mattress recycling program, and more strict enforcement of programs.

Based on survey comments it was also evident that residents appreciate receiving curbside waste collection services. However, over 25% still use the transfer station on a weekly basis for drop off garbage and recycling.

5.3 Discussions with Adjacent Municipalities and Service Providers

To develop meaningful recommendations in the Plan it was important to understand programs being offered in adjacent municipalities as well as gain perspectives and information from existing service providers. Letters were sent to 13 neighbouring communities including municipalities, unorganized townships, and indigenous governments, requesting an opportunity to discus local solutions to waste management and evaluate the potential to collaborate. The proposed collaboration could involve working with other municipalities on waste disposal, diversion, transfer, and implementation of new programs.

Meetings were held with staff from the Town of Northeastern Manitoulin & the Islands (NEMI), Town of Espanola, and Township of Billings as well as the Operations Manager for GFL, the Owner of the Dodge landfill, the Vice President of Gagnon Renewable, and a vendor for Eco-Growth technology. These initial discussions formed the groundwork for future implementation of options and plans included in this WMMP. Ongoing communication with involved stakeholders will be required as the WMMP is implemented.

5.4 Feedback on Draft WMMP

This draft WMMP is posted for comment from the community. A meeting will be held after the draft document has been posted to present the WMMP and answer questions.

6.0 Short Term Plans

As the Providence Bay landfill is scheduled to close within six months of the WMMP being completed, the municipality will have to export garbage from the transfer station, until a long-term and sustainable waste management solution is established. Short-term plans are summarized in Section 6.6. To establish a short-term plan this section considered the following:

6.1 Garbage Transfer Location Options

The Municipality must establish the disposal location for garbage previously landfilled at the Providence Bay WDS (primarily curbside residential waste). Options include sending material to the privately owned Dodge Landfill, like arrangements that exist with the municipality of Espanola, Baldwin, Sables-Spanish River, and Nairn-Hyman, or approaching a neighbouring municipality to negotiate a cost for transfer of garbage to one of their sites (Billings or NEMI). These are being considered as interim plans for garbage until long term solution can be established.

6.1.1 Off Island Export (Dodge Landfill - privately owned and operated)

In conversations with the Owner of the Dodge Landfill, the Municipality could bring garbage there under a similar arrangement to other municipalities at a cost of $97/household/year. The arrangement would likely include a 2 bag per week limit on garbage collected at the curb. It is assumed that tipping fees for material from the waste transfer station would remain as a fee for volume/load size. A comparison of cost between the existing program and requirement to export (including hauling and tipping fees) results in an expected $220,000 per year increase in costs starting in June 2023.

Most residents are likely to place two or less bags of waste at the curb per week, and therefore establishing the limit should not be a major concern. However, by implementing a program based on a fixed fee per household there is limited opportunity to realize cost savings through diversion program improvement at the curb. The Municipality should try to negotiate a per tonne or per volume rate for curbside waste. If this is non-negotiable diversion efforts should be focused on reducing material requiring export from the waste transfer station. Exporting waste to the Dodge Landfill would be more of a catch all solution as the private landfill site is set up and expecting to import waste from external sources such as the Municipality of Central Manitoulin.

Option Evaluation: Export to Off Island Landfill

Environment

less incentive for diversion, greater GHG emissions from travel distance and continued landfilling, potential environmental impacts in receiving community

Social

0 years to implement – process and approvals in place, known technology and process

Not a local solution

Financial

Cost $220,000/year

Curbside tipping fee rates based on a fixed fee model, where cost will not change with decreased waste generation

6.1.2 On-Island Municipal Landfill

The other option for garbage disposal is an agreement with a neighbouring municipality to temporarily use their landfill. Initial discussions have taken place with staff at the Township of

Billings and the Town of NEMI, but further negotiations with each will be required to generate the coordination and political will to move forward.

This would be a better option in terms of a shorter hauling distance, therefore reducing hauling costs (by an estimated 50% versus hauling to Dodge landfill) and associated GHG impacts. Working with an adjacent municipality is more likely to result in a cost per use agreement and the ability to reduce tipping fees through improved diversion initiatives. Overall, the difference between the current program and transferring garbage to a local municipal landfill (including hauling and tipping fees) is estimated at $155,000 per year. Existing garbage being transferred to Dodge Landfill is expected to continue to be sent to that site unless agreement can be made with a municipal landfill to accept that waste as well.

Central Manitoulin should approach their neighbouring municipalities with clear indication that these options are intended to be temporary until a long-term solution can be established. Exporting waste to a municipal landfill site will provide that municipality with some additional income.

Option Evaluation: Export to On Island Municipal Landfill

Environment

possible incentive for diversion, GHG emission from continued landfilling but less travel distance than off island option, potential environmental impacts in receiving community

Social

May take more time to implement due to approval requirements

Receiving municipality must agree to the proposal

Known technology and process

Financial

Cost $155,000/year

Proposed a volume or weight-based fee model, where cost will change with decreased waste generation

6.2 Export Hauling Options

Hauling is a key cost associated with exporting waste, so reducing the number of loads that need to be hauled from the transfer station to a landfill would reduce those costs. The plan considered the following options:

- Increase the use of curbside collection
- Front-end bin collection
- Managing construction & demolition waste
- Chipping and grinding waste before transport
- Waste compactor bins

- Purchasing roll-off bins and truck

6.2.1 Increase Curbside Collection Program Users

Curbside collection costs are fixed versus transfer station costs which vary depending on how much garbage needs to be exported. Over 25% of survey respondents visit a WDS weekly for garbage and recycling. As there is currently no bag limit it is assumed that many of these respondents don't participate in the curbside program and instead visit a transfer station. It is estimated that if these residents participate in the curbside program the annual volume of waste requiring pick up at the WDS would decrease by over 375m^3 and result in an estimated savings of $8,500 per year. Residents should be encouraged to use the curbside program as much as possible.

6.2.1.1 WDS Tipping Fees for Residential Bags

As all residents have curbside collection, the Municipality could consider implementing a nominal fee ($1/bag or $1/visit) for residential garbage brought directly to the transfer stations that are normally accepted at the curb. This fee would result in estimated $12,500 per year in revenue to offset the costs of exporting waste, or alternatively would encourage residents to take advantage of the curbside program.

6.2.2 Front end bin collection

Waste is currently primarily collected from the transfer station in front end bins which are tipped at the landfill tipping face. Collection of waste in front end bins allows waste to be compacted as it is collected, allows half full containers to be emptied, and allows for waste bins from multiple locations to be included in the program. Some commercial establishments have front end bins, and both the Big Lake and Providence Bay Transfer Stations have this style of garbage container. Front end bin collection can be contrasted to hauling of a roll off style bin, discussed in Section 6.2.5 and 6.2.6, which can only be hauled one or two at a time.

The Municipality may consider seasonally implementing every other week collection to reduce the hauling fees associated with collection at the WDS. This would have to be negotiated with

GFL under the existing contract. Based on the methods used to calculate hauling fees this could reduce hauling costs by estimated $3,600 per year.

6.2.3 Managing Construction & Demolition Waste

With the closure of the Providence Bay landfill, all construction and demolition waste will need to be loaded and exported to an alternate disposal facility. One option to reduce transfer costs is to temporarily suspend the receipt of large loads of construction and demolition waste (shingles, trailers full of mixed drywall, treated wood, etc.) from tandem dump trucks or trailers. Based on discussions with adjacent Municipality's this same requirement is in place in the Town of NEMI and Billings Township.

In this scenario small loads of construction and demolition materials could still be accepted at the site but should be loaded into bins available onsite for managing material and no longer tipped into a pile on the ground. Residents would be directed to take large construction loads directly to the Dodge Landfill.

Financially, the costs for the Municipality to export and tip a 40-yard bin of waste was estimated at $1,500 per bin. Current tipping fees applied to tandem loads of material ($200/load) would not offset this cost to the Municipality.

Total landfill revenue from tipping fees is estimated at $15,000 per year, however, it is unclear what portion of those revenues is from large construction and demolition loads of waste coming into the Providence Bay site. Regardless, the decrease in revenues from prohibiting these loads is expected to be more than offset by savings from not hauling those large loads to an alternative landfill.

6.2.4 Chipping before hauling

Cambium considered chipping and grinding waste before hauling. Chipping of construction and wood waste is completed every other year at a cost of $20,000. Approximately 2,000m^3 of waste is chipped reducing the volume in half. Comparing these costs to the costs per load no financial benefit was determined. However, if the Municipality chose to continue processing waste before shipping there may be a reduction in GHG emissions from reduced hauling.

Additionally, in this scenario the Municipality would continue to accept construction and demolition waste and pay the associated tipping fees for disposal.

6.2.5 Waste Compactor Bins

Some municipalities employ waste compactor bins to reduce the frequency of waste pick up requirements. A new 30-yard waste compactor bin costs around $40,000 (excluding delivery) while used/refurbished ones can be purchased for $20,000. These units also require a power supply or solar power system (additional cost) and can be hauled using a roll off truck. Based on the quantity of waste generated, costs of implementing the equipment, and several other logistical and operational considerations, this option is not recommended especially in the short-term.

6.2.6 Purchase of Roll off Bins and Truck

The Municipality will require 40-yard bins to be in place to accept bulky items from residents for disposal. Costs for contracting this requirement are estimated to be $30,000 per year but will depend greatly on how many bins require transfer.

Cambium considered the option of purchasing a roll off truck to provide waste hauling services in-house. Based on the assessment, the costs to transfer the existing quantity of waste generated would be the same if the work is contracted compared to done in-house. If the Municipality implements initiatives to reduce waste generation and increase diversion, then the business case for acquiring municipal assets for hauling garbage decreases.

If the Municipality owned the equipment, there may be opportunities to utilize it for other operations as well. There is also the opportunity to consider electric vehicles. Diesel fuel costs for hauling all waste generated at the transfer stations in roll off bins were estimated at $10,000/year. This can be used to assess costs compared to a diesel fuel truck.

6.2.7 Summary of Export Hauling Options

The following is recommended for short term management of garbage:

- Increase participation in curbside collection program

- Suspend receipt of large construction demolition loads at Providence Bay Transfer Station
- Continue with contracted hauling services in the short term

6.3 Waste Reduction Options

Reduce, Reuse, and Repair initiatives are better options for waste management and resource recovery as they result in less waste being generated and requiring end of life management. By implementing these initiatives, the quantity of waste that needs to be exported for landfilling is reduced, resulting in lower costs and environmental impacts.

6.3.1 Reuse Centre

Cambium estimates that bulky items account for 4% of the garbage stream that is currently generated in the Municipality. This is a rough estimate which could be confirmed through better waste quantity tracking or waste audits. Some of these bulky items may be in a condition which they could find a second home.

Embedded Figure 7 Temporary Storage Shelter

While it may be cost prohibitive for the Municipality to invest in permanent reuse program infrastructure, the Municipality could create a covered space using a temporary infrastructure or sea container (Embedded Figure 7) to receive and reuse some of the more desirable better condition items.

The Providence Bay Transfer Station ECA includes the option to operate a reuse centre at the site. The cost of temporary infrastructure is estimated at $6,000 and would be expected to pay for itself in 2 to 3 years through the reduction in hauling and tipping fees at other sites.

Large Bulky items should not be accepted for reuse if they cannot be kept in a dry and clean location. It is recommended that the Municipality continue to charge for disposal of bulky items but allow residents to take them from the reuse area at no cost.

Implementation of a Reuse site was strongly supported by survey respondents.

6.3.2 Reuse Events

The Municipality should consider coordinating an event through social media which would bring people out to a common location to sell or shared used goods that they no longer need. This could be offered in a similar model to the Town of NEMI's "Junk in the Trunk" event and may also be an opportunity to collaborate with the adjacent municipalities or communities on this type of event.

> **Circular Moment** – Share, Reuse, and Repair initiatives are gaining traction in many municipalities. They are often organized by community organizations and promoted and supported by the host municipality. The result is that product remain useful products and avoid the landfill.

6.4 Waste Diversion Options

6.4.1 Food Cycler Pilot Project Expansion

The Municipality should pursue an expansion of the Food Cycler project. Results of the WMMP survey indicated that over 80% would consider the program if it was offered again. As presented by Food Cycler, this program encourages diversion of waste from landfill and reduces GHG impacts (organics in the landfill generate methane). Feedback to date by program users was positive and suggested less waste was being discarded by residents using

the technology. Although the program is not likely to make a significant impact on export and hauling costs it is an initiative that promotes a healthy community and supports achieving GHG emission reduction targets. It's also an activity that residents feel good about, which is beneficial in changing waste behaviour. Implementation of organic waste solutions was strongly supported by survey residents.

6.4.2 Wood Waste and Brush

Quantities of clean wood waste being managed at the Providence Bay WDS were not available. Based on conversations with staff and contractors, minimal quantities of brush are received at the WDS, as brush is generally discouraged from being brought to the site. Brush and clean wood waste that has not been treated or contains nails should be collected separately from other materials and chipped to be used as ground cover. Cambium expects that every other year chipping and grinding costs would be reduced significantly if only clean wood and brush are included in this waste stream (cost savings of over $7,500/year).

6.4.3 Blue Box Program

Under the O. Reg. 391/21 Blue Box Regulation, the Municipality is scheduled to transition to individual producer responsibility (IPR) on January 1, 2025. On that date, producers will assume both operational and financial responsibility for the Blue Box program. The regulation designates the type of materials that are included in the Blue Box programs and the eligible sources. Circular Materials Ontario (CMO) is currently the organization that will be coordinating the Blue Box program implementation on behalf of the producers. There will be a significant cost savings because of the transfer of these services to producers.

> **Circular Moment** – the new Blue Box regulation is intended to support the transition to the circular economy by requiring producers to process their materials into recovered resources: either as reused for their original purpose or marketed for use in new products or packaging.

6.4.3.1 Transition Planning

During Blue Box transition (January 1, 2025 – December 31, 2025 for the Municipality) CMO has offered to work with municipalities to provide Blue Box services. CMO has developed standard agreement terms including methods for calculating payments which they are negotiating with municipalities. Should the Municipality choose not to enter into an agreement with CMO during transition, CMO will coordinate with 3rd party service providers directly to provide the collection and hauling services for materials they are responsible for. They may still negotiate with the Municipality to provide transfer station services only, should the municipality choose not to extend the collection and hauling portion of the contract with GFL.

Eligible sources under the new regulation exclude commercial businesses. The service agreement proposed by CMO includes a price adjustment that would allow the municipality to continue providing the existing level of service to commercial businesses under the same contract until December 31, 2025.

The contract with GFL ends on December 31, 2024, and therefore, would need to be extended for the transition year if the Municipality enters into agreement with CMO.

The Municipality should negotiate a one-year contract extension with GFL to continue to provide existing services. This contract negotiation process can also include consideration for export of waste starting in June 2023. The Municipality should then negotiate an agreement with CMO to receive compensation for providing services during the transition year (2025) on their behalf.

6.4.3.2 Post Transition Planning

Starting January 1, 2026, producers of Blue Box materials are required to continue the Blue Box program but will have flexibility in how the program is delivered. The key points for the municipalities to consider are as follows:

- The list of materials being accepted will be expanded
- CMO may not provide Blue Box services at the Transfer Stations

- Service will not be provided for non-eligible sources (i.e., commercial sector)

Municipal implications include a requirement to update the scope of work for any waste collection and hauling contracts post 2026 and a need to consider how to manage non-eligible sources of Blue Box materials.

Non-eligible Blue Box materials for the municipality are primarily commercial businesses. The Municipality's current contract with GFL includes curbside collection of commercial recycling and commercial businesses are permitted to bring recycling to the Providence Bay WDS for disposal. Commercial recycling tonnage increased from approximately 27% (between 2017 and 2019) to 35% (2020 and 2021) of the total. The actual amount of recycling collected annually has increased by almost 30 tonnes per year since 2017. A review of the data shows that the increases were primarily from transfer station and commercial quantities (both potentially not eligible under the new program).

As the costs for providing waste services are not clearly defined in the contract it is difficult to estimate the costs of providing this commercial service. The Municipality should identify costs of providing this service separately in collection contracts starting in 2026.

6.4.4 Household Hazardous Waste (HHW)

HHW generated by residents falls into two high level program categories for the purpose of this review, 1) Hazardous and Special Products (HSP) and 2) non-designated materials.

Hazardous and Special Products (HSPs) are materials designated under O. Reg 449/21 as a material that producers are required to manage – meaning subject to IPR. For clarity, a list of materials currently accepted during HHW event days is sorted into designated and non-designated below in Embedded Table 6.

Based on experience working with other municipalities, it is likely that less than half of the hazardous materials managed at the event days are designated (included) under the HSP regulation. The Municipality should expect to continue receiving free collection of designated HSP materials during event days. As the program develops producers may make changes in how they provide these services to meet requirements for service outlined in the regulation.

Specifically, automotive containers are required to be collected in the Municipality. The public should be made aware of recycling opportunities for these materials. In the short-term, given the costs associated with managing most hazardous wastes and other priorities the Municipality should continue to manage this material by collecting them at annual event days.

Embedded Table 6 Designation of Hazardous Materials Accepted at Event Days

Designated Materials	Non-Designated Materials
Paint	Pharmaceuticals
Single Use Batteries	Fire Extinguishers
Propane	CFL Bulbs & Tubes
Antifreeze	Mercury
Oil Filters	Sharps
Plastic Containers	Corrosive Liquid
Pesticides	Flammables Organic
Fertilizers	Oxidizing Solids (nitrates)
Aerosols	Oil

6.4.5 Mattress Recycling Program

Cambium assessed the option of recycling mattresses rather than the current practice of hauling them offsite to another landfill.

It is estimated that the Providence Bay WDS currently receives between 200 and 335 mattresses per year, which are currently shipped to the Dodge Landfill several times per year. These low density, bulky items take up significant space in the 40-yard collection bins used, and result in a relatively high number of hauling trips versus other waste streams. Mattresses also take up a relatively large amount of valuable landfill space.

Circular Moment – recovering mattresses and recycling them puts their materials back into the economy – thus supporting transition to circularity.

Alternatively, they could be recycled. Recyc-Mattress is one company providing this service, recycling mattresses for many municipalities at their facilities in Woodbridge Ontario and Point-Claire, Quebec.

The best way to implement the program in the Municipality would be through mattress collection events. This program would involve the following:

- delivery of a trailer to a WDS,
- trailer left onsite to collect mattresses for several days
- Municipal staff to oversee collection of mattresses
- Trailers are hauled directly to the mattress recycling facility

Residents who cannot wait for Municipal run mattress recycling events have two options: take them directly to the Dodge Landfill and return them to retailers who will accept old mattresses when purchasing new ones. These return-to-vendor programs encourage development of the circular economy.

Collaboration opportunities exist to share costs and increase the frequency of events that are available to residents if neighbouring municipalities opt in to provide a similar program.

In terms of the impact on environment and GHG emissions, although there is a further distance to travel with mattresses to a recycling facility, the recycling of materials reduces GHG emissions from methane generation in the landfill. This option represents a choice supporting waste diversion and reduces environmental impacts to local communities that result from landfilling mattresses.

Costs to implement a mattress recycling program is estimated at $40 per mattress and includes collection, hauling and recycling costs. The costs are dependent on getting 130

mattresses per trailer, which is achievable with proper loading. The program can be designed, via tipping fees, to be cost neutral by charging residents $40 per mattress. The Township currently charges residents a tipping fee of $15 per mattress.

It would be beneficial for the Municipality to track the number of mattresses and tipping fees received for mattresses separately from other materials, to measure the financial viability of the program. The Municipality should also consider banning the receipt of mattresses during non event days. This could be implemented as a short- or long-term initiative.

6.5 Implementation Considerations

6.5.1 Data Management System

Cambium assessed the need for a better waste quantity tracking system. Currently there are two main sources of information available:

- Information from the waste hauler which includes the total tonnes of materials collected. This quantity is assumed to be estimated.
- Vehicle counts from the attendants who do their best to track the number of bags received.

Through the Plan's development Cambium identified data gaps that limited the ability to make meaningful recommendations on services and programs. As the Municipality relies on a variety of sources to evaluate their waste management performance, a good tracking system is important. Given the small size of the municipality and quantity of materials managed, Cambium recommends the use of an electronic spreadsheet (e.g., MS Excel) to manage the various sources of information available on waste quantity and generation.

To help evaluate services in the future it would be beneficial for the Municipality to gain a better idea of:

- The number of customers using each WDS and if they are residential versus commercial customers.
- The number of mattresses and bulky items managed at the site. This can be tracked by attendant logs sheets.

- The quantity of diversion materials managed (scrap metal, electronics, tires).

Although there is not a direct cost savings associated with this option, better data would be invaluable in determining the cost and effectiveness of the various waste management programs and services. The costs associated with improved data management consist primarily of administrative time and effort.

6.5.2 Public Education

Public education is a key component in any strategy focused on increasing waste diversion.

Information on the Municipality's WDSs and collection program are easily available for review on the Municipality's website. Overall, the information on the website covers all necessary information.

The Municipality could take advantage of the website and staff at the WDS to educate residents on upcoming changes or concerted efforts to improve a particular program (i.e., share "little known facts"). The Municipality should also promote platforms for connecting the community and creating items available for resale, sharing, reuse, or refurbishing. This is an opportunity to encourage waste reduction, reuse, or repair using the website as a hub.

Finally, the website can be used to change habits regarding designated materials by identifying alternate locations where residents can bring their materials (for example automotive stores that will take back tires, used oil filters, and empty oil containers).

It is recommended that residents receive communication and information about any new programs and major changes associated with this WMMP well in advance. Signage is required to be posted prior to the landfill closing and should be posted at the WDS regarding upcoming changes and to identify/clarify any changes in material handling.

Public education costs vary depending on the level of effort provided but website updates are generally a low cost if staff time can be dedicated to the requirement.

6.5.3 Staff Training

The Municipality should implement annual training for all WDS operating staff. This training will ensure that employees working at the WDS are familiar with the requirements for the ECAs, and waste management programs. The training sessions can be an opportunity to gather information from staff about site operations, improvement initiatives, and relay important information about any upcoming changes or initiatives that the Municipality wants to reinforce.

6.6 Short-Term Option Summary

Collaboration with other island municipalities has been a key consideration during the development of the plan and was considered an important evaluation factor in assessing options. Based on the options considered there are opportunities to collaborate on the following:

- Mattress recycling events
- Reuse events
- Contracting for providing non-eligible Blue Box services
- Providing garbage collection services

In summary, actions to consider in the short term include the following:

1. Determine if a local municipal landfill will receive waste from Central Manitoulin. Negotiate an agreement with a landfill (local municipality or off island) to receive waste starting in June 2023, with costs for disposal based on a tonnage or volume rate.
2. Encourage residents to use curbside garbage and recycling program.
3. Implement a temporary ban on large loads of construction demolition material starting June 23, 2023.
4. Set up a reuse centre at the Providence Bay Transfer Station for furniture, bulky items, reusable lumber etc.
5. Expand the Food Cycler Pilot Project.

6. Segregate clean wood (not treated and no nails) and brush from other materials – starting June 23, 2023.
7. Transition the Blue Box program including contract and agreement requirements.
8. Negotiate contract costs with contractor to extend until December 2025 and include export of additional waste starting in 2023.
9. Pilot a mattress recycling event in collaboration with adjacent municipalities– aim to host at minimum 2 events per year. Stop accepting mattresses at the municipal transfer stations.
10. Prioritize resources to ensure staff training and public education on upcoming changes.

To Facilitate long-term options the following steps are also required in the short-term.

11. Prioritize lease agreement and pilot project with Gagnon Renewables to establish if this is a viable long-term solution.
12. Issue a Request for Quotation for a 20 cubic yard curbside garbage collection truck.
13. Issue a Tender for any required contracted waste services.

The cost implications of the short-term options are summarized below in Embedded Table 7.

Embedded Table 7 Short Term Option Considerations

Option/Activity	Financial Considerations	Other Considerations
Exporting Waste - Negotiate Export Costs with Landfill Owner and with hauling Contractor	$155,000 to 220,000 new costs for hauling and tipping fees	Required
Encouraging Use of Curbside Program	$ 8,500 export cost reduction and potential $12,500 revenue (from $1/bag or visit fee)	Public Education – unsure of public support for this option Decrease garbage export from Transfer Station by 375m^3

Option/Activity	Financial Considerations	Other Considerations
Implement a Temporary Ban on Large Loads of Construction Waste	$15,000 - $20,000 export cost reduction	Public Education – unsure of public support for this option Decrease garbage export from Transfer Station by 1,500m^3/yr
Establish a Reuse Centre at Providence Bay WDS	$6,000 cost, pay back expected in 2-3 years from reduction of export cost	Decrease garbage export from Transfer Station by 140m^3/yr
Expand the Food Cycler Program	$6,000 cost	For 50 residents to receive a Food Cycler. Decrease garbage in the curbside program by 80m^3/yr
Segregating Clean Wood and Brush	$5,000 for chipping	Decrease garbage exported by 500m^3/yr
Transition the Blue Box Program	>$30,000 increase revenue for 2025 – reduced costs in 2026 and beyond	Revenue will be dependant on terms of agreement, CPI and fuel adjustment costs
Mattress Recycling Events	$11,000 cost for 2 events Revenue $10,400	Assumes residents would be charged $40/mattress (current fee is $15/mattress) Decrease garbage exported from the Transfer Station to landfill by 190m^3/yr
Staff Training and Public Education	Staff time	
Prioritize Pilot Project with Gagnon Renewables	Staff time	

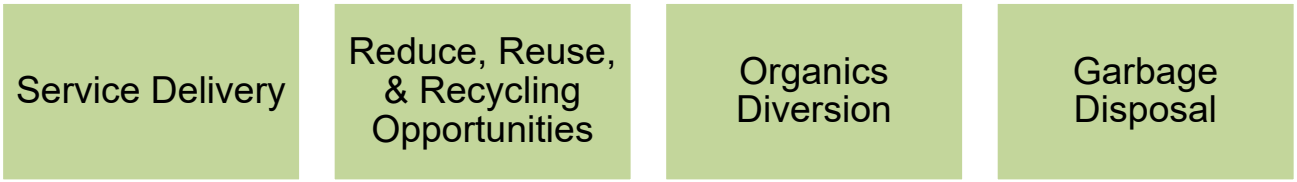
Option/Activity	Financial Considerations	Other Considerations
Issue RFQ for a Garbage Collection Vehicle	Staff time	$345,000 for truck amortized over 10 years

7.0 Long Term Options

Long-term, the Municipality is looking for ways to manage waste for the next 50 years. Waste diversion options are more likely to be implemented in the medium term (2 to 10 years) as waste policy and technology is continually changing, while plans for garbage disposal have considered the longer term 50-year outlook.

Based on survey feedback, the community indicated a preference for local solutions which include improved waste reduction, reuse, and diversion.

This section describes the considerations that were made in preparation of long-term options for the WMMP which included service delivery, reduce and reuse opportunities, organics diversion, and garbage disposal. A summary of the long-term options is provided in Section 7.5.



7.1 Service Delivery

With the Blue Box program's shift to IPR starting for the Municipality in 2025, the option of providing in-house garbage collection services was considered.

As outlined in Section 4.1, all garbage collection and hauling operations are currently contracted to a third party. Cambium reviewed contract documents, existing costs, and expected costs of internal operations to determine if costs savings could be realized through delivery of programs using municipal staff and equipment. The following two services were considered:

- Curbside garbage collection
- Transfer station garbage collection and hauling

7.1.1 Curbside garbage collection

Providing in-house municipal curbside garbage collection and hauling would offer the Municipality more control over the services provided and flexibility to provide additional services as needed.

The assessment considered the costs to purchase a waste collection vehicle (including amortization), labour, fuel, and vehicle maintenance. With no cost breakdown of the current GFL contract, the analysis assumed curbside garbage collection costs to be around $135,000 of the waste services contract. Based on this assessment, the costs to provide services in house are expected to be more than contracted costs. However, costs would be expected to increase under a new contract as well.

The assessment considered that a rear loading truck would require two people for 21 hours per week and that waste would be taken to the Dodge landfill to be disposed. There are opportunities for additional savings if only one person can complete the collection route (a side loading truck is purchased) and waste is taken to a landfill site closer to the municipality.

The evaluation also considered the use of a diesel truck. Electric or Renewable Natural Gas (RNG) vehicles are green fleet technology that could be considered and would have a positive impact for the Municipality's GHG goals. Electric garbage trucks have recently been implemented in major cities in the US. They are reliable in cold weather and cost effective when considering long term fuel use; however, assessments on routing and charging requirements would have to be completed to assess viability. Additionally, the accessibility and timelines associated with acquiring electric garbage trucks would need to be confirmed. RNG trucks are an option being implemented in urban Canadian municipalities. RNG vehicles require access to fuel which may be difficult to obtain in Central Manitoulin. The Municipality should include electric vehicle in a garbage truck Request for Proposal (RFP) and complete an assessment on the cost benefit once a better understanding of cost and availability are provided.

An additional benefit of investing in equipment is that there may be flexibility to utilize the truck to receive residential waste during transfer station hours to reduce contracted bin rental and

transfer costs. These logistics would have to be refined if the Municipality proceeded with this route.

As the cost for future in-house or contracted services are unknown, the Municipality should release an RFP for collection equipment in the short term as mentioned in Section 6.0 to consider more accurately and formally the implementation of this option in 2026. If equipment delivery timelines and costs are appropriate the Municipality could take this service in-house.

7.1.2 Transfer Station Garbage Collection and Hauling

Cambium considered the option of in-house hauling of garbage from the transfer station to landfill but recommends maintaining contracted services for these activities in the short-term. This includes front end bin services and roll off bin services. This should be reassessed once a more permanent solution for garbage disposal (Section 7.4) has been finalized.

7.2 Reduce, Reuse, and Recycling Opportunities

7.2.1 Curbside Textile Collection

Textile and clothing waste has been gaining attention over the past decade and has become a stream of focus as the waste sector shifts to a circular economy. As there are limited options for textile reuse in the municipality, the Municipality could consider offering event or curbside textile collection events. These events would be coordinated with an external clothing or textile recycling company. This option would have a significant impact on GHG reduction and limited cost (truck rental and labour for the day) if a receiving facility will accept the materials at no cost for reuse or recycling.

Circular Moment – Much work is being done to create a more circular clothing/textile sector – from sharing/reuse to breaking down the fibres and recycling them into new textiles. Collecting textiles and returning them for reuse or recycling supports the circular transition.

7.2.2 Repair Cafés

The Municipality should consider encouraging and supporting repair cafés. These are gathering places designed for people to repair things (e.g., furniture, clothes, small appliances, bicycles, toys) together. These spaces include tools, materials, and on-hand volunteers with the expertise to train/assist individuals in making repairs. There are over 2,200 repair café's operating worldwide, with many across Canada and in Ontario. They can be run on an ongoing basis or held as a special event several times per year. Municipalities can support these initiatives in a variety of ways: providing funds, providing space, promoting the events. This initiative could be completed in collaboration with adjacent municipalities.

Circular Moment – Repair cafes are quickly gaining traction in communities across the country, sometimes being folded into a Share, Reuse, Repair initiative. Repairing products and keeping them in use in their current form is very impactful from a circular economy point of view. And the use of 3D printing is an emerging technology that is helping facilitate this activity even more.

7.2.3 Glass Recycling

In 2020, glass was removed from the recycling program due to challenges in managing the materials post collection. Prior to 2020, glass was measured separately by the waste hauler and consistently recorded as 5% of the recycling stream or less than 1% of the overall waste tonnage.

Glass is commonly collected in Blue Box programs; however, it is costly to manage as it becomes contaminated in the mixed container recycling stream and the glass often ends up in the landfill mixed with small plastics pieces. Recycling collected by the contractor in the existing program is brought to Blind River and bailed to be sent for further processing or end market. As such glass is likely a contaminant that impacts the quality of the plastics or metal material bails.

Glass is a material that is designated under the new Blue Box regulation discussed in Section 3.1.2 and 6.4.3. Under the new regulation, producers may send materials to an alternate recycling facility which can manage glass to meet recovery targets for this material. To avoid confusion, not create additional work, and facilitate a smooth transition to the new program, it is suggested that the municipality wait for the producers to determine how they will collect and manage this material in the new system starting January 1, 2026.

7.3 Organics Diversion

Municipalities and residents are always looking for options to improve their management of food waste. It is generally accepted and understood that: 1) food waste is a significant amount of our overall garbage, 2) compost is a valuable resource, and 3) landfilling organics creates GHG emissions. On average, 30% of household garbage generated is organics (WM, 2018)

In addition to the policies referenced in Section 3.0, the current provincial direction includes action items to manage issues around food waste and its related GHG emissions (Ontario, 2018). Both the provincial and federal governments' mandates to reduce GHG emissions have the potential to impact the food waste issue and possibly waste related transportation.

There are two general options for diverting municipal organic waste: decentralized "at home" programs or centralized collection and/or processing systems. Often municipalities the size of Central Manitoulin choose a decentralized option for promoting composting as it can be costly and inefficient to collect and manage the quantities of organics waste generated. That said, the assessment did review both and a summary of organics technologies evaluation is included in Appendix D.

There are three organics management technologies that were considered in this review: composting, anaerobic digestion, and dehydration. Details on the processes of each are included in Appendix E.

Under the EPA and O. Reg. 347, the MECP oversees approvals for most waste treatment technologies, including those considered for organics management, to ensure that materials are safe for end use. It is important to note that for composted materials to be land applied

they must meet MECP standards for compost. Alternatively, they need to be sent to an organics processing facility for incorporation into their process. At this time there is no exemption for small scale waste composting technologies (other than residential at home composting) and most technologies would require an ECA. Exemptions would apply to processes that do not involve combustion or land application.

Circular Moment – Regenerating nature is the 3rd principle of the circular economy. Returning organic material to the soil directly supports this principle.

7.3.1 Decentralized "at Home" Composting

Backyard composters and digesters (Embedded Figure 1) are the traditional way to divert household organics. Municipalities often order and supply backyard composters and/or digesters to residents at a subsidized price to encourage participation. A backyard composting program requires some public education to gain traction and be effective. Cambium estimates that with a $30 rebate per unit and with 100 composters and 50 digesters sold, the program would cost $4,500 annually. This cost would result in 15 tonnes per year of food waste diversion.

Notes: left – composter, right – digester,

Embedded Figure 8 "At Home" Composting Options

7.3.2 Centralized Organics Options

Centralized programs either collect/haul or collect/process organic waste at a common location (a WDS). Generally, for a program like this to work, the Municipality would need to ban organics from landfill to encourage residents to source separate the material. There would also be implications associated with the curbside collection program as either a new stream would have to be added to collection or residents would be required to bring organics to the WDS, somewhat defeating the purpose of providing curbside waste collection.

7.3.2.1 Collection and off-site processing

One assessment included a high-level costing for collection locally and hauling to an offsite composting facility. The closest facility identified is in Sudbury. As residential waste is primarily collected curbside, a curbside organics collection program would be recommended, and waste would be transferred directly to an organics processing facility in the curbside truck.

The capital costs were estimated around $250,000 for a collection vehicle and the required residential carts. The annual estimated operating costs of $160,000 per year include fuel, maintenance, labour, and tipping fees. It should also be noted that unless an electric vehicle is used, the GHG emission offset is greatly impacted by the significant and routine travel distance. If this option is preferred following further consideration, the receiving facility should be confirmed and a detailed assessment of GHG impacts should be considered.

No transfer station collection option was considered as this would require additional infrastructure and residents to bring their organic material to a transfer station on a frequent basis.

7.3.2.2 Collection and on-island processing

There are technologies available to conduct composting onsite via in-vessel technology or covered windrow; however, these require regular addition of feedstock and operational oversight and are typically designed for commercial applications or larger quantities of feedstock. To date these technologies are not scalable to a municipal operation the size of Central Manitoulin. Historically, municipalities were able to compost organics in open

windrows, however due to odour concerns this approach is not typically accepted by the MECP.

Dehydrating technologies are available which could process the quantities of materials generated in the Municipality. But the dehydrated organics would not be approved by the MECP for land application under current regulations and would require further treatment before it was no longer deemed waste. This option may be considered further if an appropriate organics collection system and realistic use for the dehydrated organics becomes available and is demonstrated to be something that the MECP would support. At the time of preparing this draft report this option was not considered an opportunity.

These dehydration technologies are currently being used in an at-home scale (e.g., Food Cycler) where the dehydrated material can be managed in a decentralized manner and in small quantities.

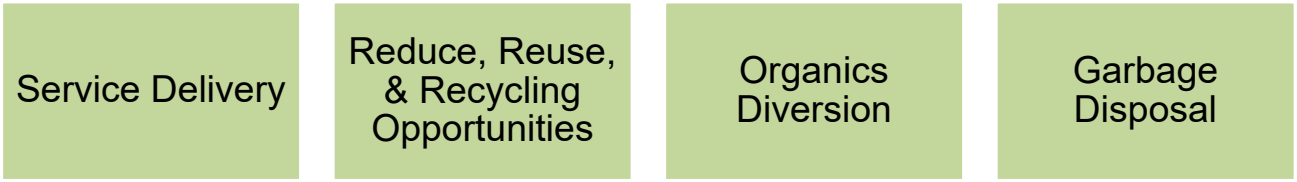
7.3.3 Organics Diversion Summary

In summary, at this time the Municipality is encouraged to continue promoting backyard composting initiatives and the at-home digester technologies described in Section 4.1.5.

In 5 years' time, once a long-term garbage disposal option is established, the Municipality should review the option of implementing a centralized organics management system. By that time, a few factors may occur which make collection, hauling, and/or processing a more preferred option. These factors include:

1) Vehicles for waste collection are more commonly available or more efficient vehicles (electric or RNG) become mandated
2) The MECP issues further direction making centralized organics processing in rural communities either a requirement or easier to manage.
3) Garbage disposal options chosen in Section 7.5 are unsuccessful.
4) The Municipality receives a proposal for an organics management solution which is implementable and beneficial for the community.

7.4 Garbage Disposal



Long term waste management plans for the Municipality were last considered as part of the Island Wide Waste Management Strategy completed in 2009 (AECOM, 2009a). Through that process three (3) options were examined: thermal treatment technologies, establishing a new landfill site, and exporting the garbage. At that time, the Municipality agreed that exporting waste was the preferred disposal option once existing landfill capacity was used. The strategy also included a focus on increasing diversion of waste from landfill.

Considering that the Municipality will have no landfill capacity starting mid-2023, and that a thermal treatment operation has been presented as an opportunity, this WMMP has revisited those same garbage disposal options.

7.4.1 Thermal Treatment Technologies

As part of the 2009 Island Wide Waste Management Study, thermal treatment technologies were considered. At the time, these technologies were deemed to be non-viable or reasonable from a scope and scale perspective, and thus were rejected.

In recent years, thermal treatment technologies have become more commonly discussed and several Ontario municipalities (including Central Manitoulin) have been approached by suppliers of these systems. These “non-incineration” technologies use heat, sometimes in combination with pressure, to process waste. Some of these technologies have evolved to the point that they are now being labelled as *advanced recycling* by the Province (as noted in Section 3.2.2) and are potentially being given preferential treatment from a regulatory approval point of view. “Traditionally, thermal treatment technologies have been used for the final disposal of waste, like through incineration, or to produce energy-from-waste such as generating electricity or fuel. However, advanced recycling represents an evolution of thermal

treatment technologies, allowing for the recovery of resources from waste via *waste breakdown* rather than *waste disposal*" (MECP, 2022).

While these technologies are being actively touted to municipalities across Ontario, it is uncertain if any are actually up and running in the province, and many are looking for a municipal partner through which a demonstration project can be launched. Such is the case with the opportunity being considered by the Municipality.

In many of these situations, the thermal technologies are being proposed as third-party owner/operator ventures, where the municipality does not participate in the operation of the facility. However, the partnership does require a municipal commitment to supply the agreed upon waste streams exclusively to the operation for a contracted term and to pay the associated tipping fee to do so.

One of the benefits of alternative recycling (AR) technology is that they divert from landfill some or all municipal solid waste (MSW), as the MSW is used as feedstock (inputs) to create a reusable product (outputs). The main output is an energy source (heat, gas, oil, biomass pellets), which can be used to generate energy (e.g., electricity). Other outputs include char, carbon black, and metals.

Given the shift to IPR, it should be noted that the output of these technologies is not necessarily considered to be waste diversion by the province's regulations. For example, in the Blue Box regulation, recovered resources do not include fuel or products used as a fuel supplement. As the regulations are relatively new, and the one for AR is not yet finalized, these details stand to be clarified.

A technology summary and evaluation of thermal treatment technologies is included in Appendix D. A description of the various thermal treatment technologies is included in Appendix E.

7.4.1.1 Alternative Recycling Pilot Project Opportunity

The Municipality has been approached by a company looking to partner in the development of a thermal treatment operation in the community. Based on a review of the available information

regarding the proposed pilot project, there are still lots of variables to be confirmed. It is beyond the scope of the WMMP to complete a detailed (including financial) analysis of this opportunity, other than to identify the technology and key considerations of the proposed pilot project. In making its decision, the Municipality should keep the factors identified below in mind.

Environmental

- This operation has the potential to reduce GHG emissions both by reducing requirements to transport waste long distances and eliminating methane generation from wastes if they were to go to landfill. The technology also has potential to replace other higher GHG content energy. It should be noted the emissions generated using this technology are not confirmed.
- One key decision to be made pertains to the feedstock. The operation has been communicated as being able to handle most MSW streams, including Blue Box materials and organics. The Municipality will need to decide if that is the highest and best use for these streams. It is suggested that other waste diversion programs that encourage waste reduction, reuse, and recycling be prioritized over thermal treatment.
- The technology will be required to go through MECP approval process prior to becoming established. The MECP will conduct a thorough review of the environmental considerations for the undertaking. There is a risk that the MECP will not approve the technology if it doesn’t meet their standards and requirements. Conversely the MECP may approve the technology, however the Municipality may have concerns with some of the details of the approval or undertaking (e.g., unexpected emissions).

Social

- In addition to the waste diversion aspects noted above, this opportunity provides a local solution as the MSW does not need to be transported off-island to a landfill. This operation would be built in the Municipality, although the sale of the outputs may go to off-island markets.

- There is future potential for this location to become a transfer station open to the public. This would reduce the requirement to transfer waste from one of the existing municipal transfer stations, and could allow the Municipality to close one or both of them.
- Thermal treatment technologies are evolving. But most, including this one, are in the proposal stage in Canada.
- There is a risk that the pilot project won't have enough feedstock and will be required to import waste onto the island from other sources.

Financial

- While the proponent has advised that the tipping fees would be competitive with other existing options, those fees have not yet been confirmed.
- Like any recycling technology, this operation is a for-profit business, meaning its revenues need to exceed its expenditures to remain viable. Revenue will be derived from tipping fees for the feedstock and the sales of outputs. As outlined by the province, "reports indicate that some advanced recycling facilities have found that construction and operating costs were higher than anticipated, faced ongoing challenges related to contamination rates of the feedstock (e.g., takeout containers contaminated with food residue) that impact facility performance, or produced output material with a lower financial value than anticipated." (MECP, 2022).

If this technology is established, it has the potential to achieve the WMMP goals of creating a more sustainable waste management solution and put Central Manitoulin in a good position for the future management of wastes.

The next steps include establishing a lease agreement and providing the non-monetary support necessary to advance approvals for the project. The lease agreement should be reviewed by a municipal lawyer and include the ability for the Municipality to terminate the agreement if the technology is not proceeding as planned.

Option Evaluation: Thermal Treatment

Environment

Assumed to divert over 80% of waste stream from landfill and need to export

Waste reduction, reuse, recycling should also be used to manage waste streams

Reduces extraction of virgin materials

Potential GHG emission reductions versus export of garbage

Minimal concerns regarding groundwater and surface water contamination

Social

Local solution

Perceived acceptance unknown – may be challenges associated with “Not in my Back Yard” NIMBY mentality

Known vendor interested in piloting in Central Manitoulin

1-3 years to implement

Financial

Unknown

7.4.2 Establish a New Landfill

In 2009, an Environmental Assessment (EA) process was initiated to establish a landfill site on Manitoulin Island which would service multiple municipalities. During the process development, a draft document outlining considerations for landfill site selection was prepared (AECOM, 2009b). As a result of the EA process, the alternative of exporting waste was chosen and nothing further was completed in terms of establishing a new landfill site.

As mentioned in Section 3.2.1 there are various thresholds associated with establishing a new landfill site. The WMMP requested consideration of a 50-year planning term; however, a 25-year term is considered reasonable from the MECP's perspective. As such, the capacity requirements for both planning periods are included in Embedded Table 8.

Embedded Table 8 Estimated Landfill Capacity Requirements

	25 yrs.	50 yrs.
Annual Capacity Required (m^3)[1]	62,500	125,000
Annual Capacity Required 1% growth (m^3)	70,608	161,158
Annual Capacity Required 3% growth (m^3)	91,148	281,992

Notes:

1. *Estimated annual volume of capacity required at Providence Bay in 2022 as noted in the Development and Operations Report is 2,500m^3*

To establish a landfill which would serve the Municipality for 50 years, a capacity of 280,000 m³ and an EA would be required. This size facility would require a minimum of 10 to 12 ha of suitable land, and the associated EA process to establish this site could take seven to ten years including site selection, consultation, and approval.

To establish a landfill which would serve the Municipality for 25 years, a capacity of 99,000 m³ would be required and an ESP (or streamlined EA) would have to be completed. This size facility would require a minimum of 5 to 7 ha and five to seven years to establish a facility.

Based on the evaluation completed, the costs to complete an EA study for 50 years of landfill capacity is far greater than the costs of exporting waste. However, if the municipality considered a 25-year planning term and proceeded with an ESP for establishing a landfill site less than 100,000m³, then the business case for establishing a landfill in the municipality is more realistic. Costs for designing and constructing a landfill site will vary greatly depending on the level of engineering required for the site selected.

In the process of planning to establish a landfill in 2009, seven sites within municipal boundaries were initially considered potential sites. Based on notes provided on these

properties, most are private land and land acquisition would be required. There was one municipally owned property with the lagoons, identified during the process; this property has potential for either a new landfill site or thermal treatment technology. The requirement to purchase property if Municipal property was not suitable for this purpose would have to be considered.

Although establishing a new landfill is a local solution, it does not achieve other objectives such as increasing circularity and reducing GHG emissions. Additionally, there is long term liability and potential for environmental contamination which exists with the establishment of a landfill.

Option Evaluation: New Landfill

Environment –

Neutral to negative impact on diversion,

Increases extraction of virgin materials

Increases GHG from continued methane generation

Results in leaching of contaminants into groundwater and surface water

Social

Local solution is preferred

Challenges associated with “Not in my Back Yard” NIMBY mentality

Known technology and process

5 to 7 years to implement

Financial

ESP Cost 7M-11M (capital costs amortized over 25 years)

EA Cost 24M to 50M (capital costs amortized over 50 years)

7.4.3 Export of Waste

Cambium estimated the costs associated with export of all garbage generated in the Municipality. The costs are estimated to be $315,000 per year. Exporting waste has benefits and draw backs. On the positive side, the Municipality is not using land, creating nuisances for residents, and in theory the option is more affordable. The drawback is that the Municipality is not in control of their waste and reliant on others to dictate what can and cannot be done. There is also not much influence over operational and design decisions which could impact the Municipality as well as the host municipality if the site is privately owned and operated.

Although projected costs currently make this option more viable, increasing fuel prices, unknown ownership, and general lack of control make this option less desirable. The Municipality will also be forced to rely on short term planning, based on contract terms as opposed to long term planning based on a known volume of waste capacity remaining.

Option Evaluation: Export Garbage

Environment –

May encourage more diversion,

Increases GHG from continued methane generation and hauling

Results in leaching of contaminants into groundwater and surface water in neighbouring municipality

Social

Local solution is preferred

Current process

Less local impacts on environment

0 to 1 year to implement

Changes are out of Municipal control

Financial

$315,000 per year

50-year cost $35M (3% annual CPI increase)

No control over potential cost escalation

7.5 Long Term Option Summary

The evaluation showed that the Municipality could consider releasing an RFP for garbage collection equipment to assess the implementation of this option more accurately for 2026. If equipment delivery timelines and costs are appropriate the Municipality could take this service in-house. The municipality can also include cost provisions for an electric vehicle in the RFP

for a comparative analysis. Shifting the collection and hauling of transfer station garbage in-house is a decision that should be made once a more permanent disposal solution is in place.

In terms of increasing circular economy initiatives and reduce, reuse, recycle, the following options are recommended:

- Implement curbside textile collection program to collect textiles for recycling
- Establish a repair café in the community to promote sharing and repairing/reusing materials.
- Start glass recycling with the shift to producer responsibility in 2026
- Continue to promote “at home” composting options including the food cycler, composters, and digesters
- In five years, reconsider options for organic collection and processing

Based on the evaluation of each of the long-term garbage disposal options considered in Section 7.4, the thermal treatment technology option, if successful, would meet the goals of increased diversion, reducing GHG emissions, and creating a local long-term solution for waste disposal. Thermal treatment ranks higher in terms of the environmental and social criteria; however, the costs are still unknown.

As this preferred option is still in the proposal stage and not yet approved by the MECP, it is recommended that the Municipality proceed with exporting waste for two years to see how the project develops prior to committing to a long-term disposal option. There are still several steps that need to be verified before committing to the thermal treatment technology once it is approved by the MECP including cost for the service and feedstock requirements.

Should the Municipality be in a position in two years with no more information than it has now on the development of the thermal treatment pilot project, the Municipality should consider proceeding with an Environmental Screening Process to establish a waste disposal site with an estimated capacity for at least 25 years. Although establishing a waste disposal site may be more expensive than exporting waste, it provides a local solution and one that is more reliable. The Municipality can continue to develop circular economy initiatives and decrease reliance on

garbage disposal options. A summary of the cost evaluation for establishing a landfill site compared to exporting is presented in Embedded Table 9

Embedded Table 9 Projected Costs of Landfill vs Export

		Annual (Capital Cost Amortized)	Annual Operating Cost (2023)	25 Year Total Cost	50 Year Total Cost
Establishing a New Landfill (comparison of size and design options)	Waste Disposal Site 99,000m3 (natural attenuation) ($)	36,000	155,000	7,000,000	NA
	Waste Disposal Site 99,000m3 (engineered clay liner) ($)	107,000	205,000	11,000,000	NA
	Waste Disposal Site 280,000m3 (natural attenuation) ($)	55,000	155,000	NA	23,700,000
	Waste Disposal Site 280,000m3 (engineered clay liner) ($)	230,000	205,000	NA	49,100,000
Exporting Garbage	Export ($)	0	315,000	8,300,000	33,000,000

8.0 Summary - Future Waste Management System

In conclusion the Municipality has been put into a position whereby export of waste in the short-term is necessary. To reduce the financial impact of this change and continue to develop the goal of increasing the circularity of its economy, several short-term recommendations have been made.

Overall, a net increase in hauling and disposal fees of an estimated $155,000 to $220,000 annually is expected once the landfill site is closed. Negotiating with a nearby municipality to receive waste as opposed to exporting off island is expected to result exporting costs on the lower end of the range. Exporting to a local municipal landfill would also have a positive impact on reducing transportation related GHG emissions compared to exporting off-island.

Additional options to reduce costs of waste hauling and tipping fees include suspending the receipt of large loads of construction and demolition waste at the landfill and increasing the use of the curbside program. Establishing a reuse centre, diverting mattresses to a recycling program, and expanding the Food cycler program are all circular economy initiatives which will also help to reduce waste and therefore reduce export costs. These options combined would reduce the overall quantity of waste exported annually by 25%. From the transfer station we could expect a 55% reduction in quantity of waste required to be exported annually.

The Municipality should consider all these options and implement those which they consider to be the most in line with their priorities and needs.

In the long-term, the Municipality requested waste management planning solutions for the next 50 years. Although exporting waste may be more cost effective (at least in the short term), the perspective gained during the Plan’s development is that the Municipality and its residents would prefer a local solution that they can depend on.

The Thermal treatment option presents an opportunity to manage waste locally, and reduces the long-term liability associated with establishing more landfill sites. The process produces materials that can be marketed and proposes to ‘recycle’ over 80% of the incoming waste

stream. The Municipality should continue to consider this option and work with the proposed vendor to determine if it is realistic and cost competitive.

Failing success by the vendor to implement the new technology, the Municipality should consider establishing a landfill. The size of a proposed landfill determines the complexity of the approval process under the Environmental Assessment Act. A less onerous approval process can be completed to provide the municipality with 100,000m^3 (25 years) of capacity and a less costly solution to garbage disposal. It is recommended that this possibility be considered if the thermal treatment project is not able to progress in two years' time.

Long-term, to reduce GHG emissions and implement circular economy initiatives, the Municipality should consider curbside textile collection events, repair cafes, glass recycling, and continued consideration for organics diversion opportunities.

This strategy was developed in consultation with the Municipality and based on knowledge of waste management industry and trends, and landfill operations. The recommendations outlined in this Plan are intended to provide clear direction on how the Municipality can achieve its goals.

References

AECOM. (2009). *Island Wide Waste Management Plan Waste Stream Identification and Diversion Strategies.* Markham.

AECOM. (2009a). *Discussion Paper No. 1 Purpose and Rationale for the Undertaking.* Markham.

AECOM. (2009b). *DRAFT Landfill Site Selection Methodology Document.* Markham.

AECOM. (2009c). *Discussion Paper No. 2 Consieration of "Alternatives" to the Undertaking.* Markham.

AMO, Association of Municipalities Ontario. (2022). *Where to from here: Expanding designated materials under Ontario's Resource Recovery and Circular Economy Act (DRAFT discussion paper).* Ontario.

Canada, S. (2022). *2021 Census of Population. Statistics Canada Catalogue no. 98-316-X202100.* Ottawa.

Manitoulin, M. o. (2021). *Community Enegery and Emission Plan (CEEP) A Plan for Climate Action in the Municipality of Central Manitoulin.*

MECP. (2022). *Environmental assessment requiremetns for advanced recycling facilities under the Environmental Assessment Act (EAA)*. Retrieved from Environmental Registry of Ontario: https://ero.ontario.ca/notice/019-4867

MOECC. (2016). *Guide to Environmental Assessment Requirements for Waste Management Projects.* Queens Printer for Ontario.

Ontario. (2018). *Preserving and Protecting our Environment for Future Generations, A Made-in-Ontario Environment Plan.* Queens Printer for Ontario.

Real Agriculture. (2022). Retrieved from https://www.realagriculture.com/2021/07/ontario-to-allow-more-materials-through-on-farm-biodigesters/

WM. (2018). *2018 Sustainability Report.* Waste Management.

Glossary of Terms

- **Advanced Recycling**
  waste disposal site where thermal treatment is used to recover materials and whose primary purpose is processing of waste to generate recovered material rather than waste disposal.
- **Annual Monitoring Report (AMR)**
  Report documenting the results of water quality, environmental quality, and operations monitoring for the year, or for a period as prescribed in the Certificate of Approval.
- **Attenuation**
  Natural process through which the concentrations of landfill generated contaminants are reduced to safe levels.
- **Bag Tag**
  A clearly identifiable sticker approved for sale by resolution of the Council of the Municipality and used to indicate that a fee has been paid for the disposal of the tagged waste
- **Best Practices**
  Waste system practices concerning diversion programs that result in the attainment of provincial and municipal material diversion goals in the most cost-effective way possible.
- **Blue Box**
  A plastic container, often blue in colour, for conveying acceptable recyclable materials. Also refers to a municipal curbside or transfer station recycling program.
- **Capture Rate**
  The amount of materials diverted from the waste stream for recycling expressed as a percentage of the total quantity generated of those materials.
- **Circular Economy (CE)**
  An economy that retains and recovers as much value as possible from resources by reusing, repairing, refurbishing, remanufacturing, repurposing, or recycling products and materials.
- **Certificate of Approval**
  The license or permit issued by the MECP for the operation of a landfill site. Issued to the owner of the site with conditions of compliance stated therein.
- **Co-mingled**
  Recycling programs where a number of different materials are mixed together, not collected separately.
- **Composting**
  The controlled microbial decomposition of organic matter, such as food and yard wastes, in the presence of oxygen, into humus, a soil-like material. Compost can be used in vegetable and flower gardens, hedges, etc.
- **Construction & Demolition Waste (C & D)**
  Solid waste produced in the course of residential, commercial, industrial, or institutional building construction, demolition or renovation (e.g. lumber, concrete, brick, plaster, glass, stone, drywall, wire, paint, etc.).
- **Contaminant**
  A compound, element, or physical parameter, usually resulting from human activity, or found at elevated concentrations that have or may have a harmful effect on public health or the environment.
- **Contamination Attenuation Zone**
  The zone beneath the surface, located beyond the landfill site boundary, where contaminants will be naturally attenuated to predetermined levels. Also, see Reasonable Use Policy.
- **Cover Material**
  Material approved by the MECP that is used to cover compacted solid waste. Usually, a soil with suitable characteristics for specific end-use.
- **Design Capacity**
  The maximum amount of waste that is planned to be disposed of at a landfill site.
- **Design and Operations Plan**
  The design of a landfill site and its facilities which have been submitted along with the application documents for which formal MECP approval has been issued through the Certificate of Approval.
- **Disposal**
  Final placement or destruction of wastes. Disposal is typically accomplished through the use of approved sanitary landfills or incineration with or without energy recovery.
- **Diversion**
  The process of reducing, recycling, or reusing materials with the purpose of keeping waste out of landfills.
- **Diversion Rate**
  The percentage of waste diverted from landfill through means of diversion programs (Blue Box, composting, etc.). The diversion rate is determined by dividing the total quantity of waste diverted by the total amount diverted and disposed. Also known as the waste diversion rate.
- **EAA or EA Act**
  Environmental Assessment Act, Revised Statutes of Ontario, 1990. One of the primary acts of legislation intended to protect, conserve, and wisely manage Ontario's environment through regulating planning and development.
- **Environmental Compliance Approval (ECA)**
  The license or permit issued by the MECP for the operation of a landfill site. Issued to the owner of the site with conditions of compliance stated therein.
- **EPA**
  Environmental Protection Act, Revised Status of Ontario, 1990. EPA is another of the primary pieces of Provincial legislation governing the protection of the natural environment of the Province.
- **Extended Producer Responsibility (EPR)**
  A policy to shift the responsibility of a product's life cycle away from the municipality to the producers and to provide incentives for producers to consider the environmental impacts in the selection of materials and the design of their product(s).
- **Hazardous Waste**
  Any residual hazardous materials which by their nature are potentially hazardous to human health and/or the

environment, as well as any materials, wastes or objects assimilated to a hazardous material. Hazardous waste is defined by Ontario Regulation 347 and may be explosive, gaseous, flammable, toxic, radioactive, corrosive, combustive or leachable.

- **Landfill Gas**
  Combustible gas (primarily methane and carbon dioxide) generated by the decomposition of organic waste materials.
- **Landfill Site**
  A parcel of land where solid waste is disposed of in or on land for the purposes of waste management.
- **Leachate**
  Water or other liquid that has been contaminated by dissolved or suspended particles due to contact with solid waste.
- **Limit of Filling**
  The outermost limit at which waste has been disposed of or approved or proposed for disposal at a landfill.
- **MECP**
  Ontario Ministry of the Environment, Conservation and Parks.
- **Monitoring**
  Regular or spontaneous procedures used to methodically inspect and collect data on the performance of a landfill site relating to environmental quality (i.e., air, leachate, gas, ground or surface water, unsaturated soils, etc.).
- **Natural Attenuation**
  Where contaminants are reduced to acceptable concentration levels by natural mechanisms (dilution, absorption onto the soil matrix, etc.), biological action, and chemical interaction.
- **Occupational Health and Safety Act**
  The primary act of legislation enacted by Ontario Ministry of Labour to regulate and control the safety in the workplace; also Occupational Health and Safety Act, Revised Statutes of Ontario, 1990.
- **Odour Control**
  Minimizing or eliminating the nuisance and undesirable impact of objectionable or unpleasant odours arising from waste disposal operations.
- **Operations Plan**
  A document detailing the waste disposal operations in a planned, and if necessary, a staged manner, that ensure compliance with regulatory provisions concerning the operations of a landfill site.
- **Operator (Site Operator)/Attendant**
  The individual or organization who, through ownership or under contract, manages and operates a landfill site for the purpose of waste disposal.
- **Organic Waste**
  Waste of animal or plant origin, typically food, yard waste, and paper. It is what feeds a compost site.
- **Owner**
  A person, persons, organization, or municipal authority who own a landfill facility or part of a landfill facility, and in whose name the Certificate of Approval for the site is issued.
- **Pay As You Throw / User Pay**
  A program in which every individual bag or container of waste to be disposed of is paid for directly by the resident, commonly by the purchase of bag tags.
- **Recycling**
  Sorting, collecting, or processing waste materials that can be used as a substitute for the raw materials in a process or activity for the production of (the same or other) goods. For example, the "Blue Box" system, in-plant scrap handling, or raw material recovery systems. Recycling is also the marketing of products made from recycled or recycled materials.
- **Reduction (of waste or component of 3Rs program)**
  Those actions, practices, or processes that result in the production or generation of less waste.
- **Remedial Action**
  Corrective action taken to clean-up or remedy a spill, an uncontrolled discharge of a contaminant, or a breach in a facility or its operations, in order to minimize the consequent threat to public health and the environment.
- **Reuse (component of 3Rs program)**
  The use of an item again in its original form, for a similar purpose as originally intended, or to fulfil a different function.
- **RPRA**
  The Resource Productivity and Recovery Authority. The regulatory authority supporting the new Resource Recovery and Circular Economy Act.
- **Site Capacity**
  The maximum amount of waste that is planned to be disposed (design capacity) or that has been disposed of at a landfill site.
- **Site Closure**
  The planned and approved cessation or termination of landfilling activities at a landfill site upon reaching its site capacity.
- **Site Life**
  The period from its inception through active period of waste disposal, to the time when a landfill site reaches its' site capacity, when it ceases to receive any further waste, including and up to closure.
- **Solid Waste**
  Any waste matter that cannot be characterized by its physical properties as a liquid waste product.
- **Solid Waste Disposal Site or Facility**
  A site or facility such as a landfill site where solid waste is disposed of.
- **Source Separation**
  The separation of various wastes at their point of generation for the purposes of recycling or further processing.
- **Source Separated Organics (SSO)**
  This includes residential organic waste such as food waste and non-recyclable paper that is segregated for composting or other organic waste processing. Some municipalities have widened the definition of SSO to include diapers, sanitary products and pet waste.

- **Transfer Station**
  A transfer station-style location where residents of a Municipality may come to dispose of their wastes; residents generally separate wastes into designated areas. Accumulated wastes are transferred to a disposal site or diversion facility.
- **Waste**
  A general term that describes all waste generated including “garbage,” recyclables, organic waste, leaf and yard waste, MHSW, and WEEE.
- **Waste Audit**
  Exercise of determining the quantity and composition of waste which is disposed.
- **Waste Disposal Site (Facility)**
  Any land or land covered by water upon, into, in or through which, or building or structure in which, waste is deposited or processed and any machinery or equipment or operation required for the treatment or disposal of waste.
- **Waste Management System**
  All facilities, equipment, and operations for the complete management of waste, including the collection, handling, transportation, storage, processing and disposal thereof, and may include one or more waste disposal sites.

Standard Limitations

Limited Warranty

In performing work on behalf of a client, Cambium relies on its client to provide instructions on the scope of its retainer and, on that basis, Cambium determines the precise nature of the work to be performed. Cambium undertakes all work in accordance with applicable accepted industry practices and standards. Unless required under local laws, other than as expressly stated herein, no other warranties or conditions, either expressed or implied, are made regarding the services, work or reports provided.

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Site Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

Only conditions at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site chosen for study by the client, or any other matter not specifically addressed in a report prepared by Cambium, are beyond the scope of the work performed by Cambium and such matters have not been investigated or addressed.

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Personal Liability

The client expressly agrees that Cambium employees shall have no personal liability to the client with respect to a claim, whether in contract, tort and/or other cause of action in law. Furthermore, the client agrees that it will bring no proceedings nor take any action in any court of law against Cambium employees in their personal capacity.

Appendix A
GL Summary

Summary of Financials/Waste Management GL

	2019	2020	2021	3 Yr. Avg.
Revenue Items				
Dump Revenues	$ 1,582	$ 17,605	$ 15,804	$ 11,663
Blue Box Funding	$ 28,878	$ 29,130	$ 29,598	$ 29,202
MSHW Reimbursement from Municipalities	$ 9,745	$ 12,107	$ 13,191	$ 11,681
Total Revenues	$ 40,204	$ 58,841	$ 58,593	$ 52,546
Expense Items				
Landfill Attendant Wages and Salaries	$ 36,478	$ 39,854	$ 42,115	$ 39,482
Landfill Attendant Benefits	$ 5,000	$ 5,913	$ 5,767	$ 5,560
Landfill Attendant Mileage	$ 1,150	$ 1,442	$ 1,050	$ 1,214
Landfill Supplies/Services[1]	$ 25,626	$ 5,965	$ 30,694	$ 20,762
Landfill Insurance	$ 1,925	$ 1,958	$ 2,351	$ 2,078
Weekly Waste Pick up (garbage and recycling)	$ 216,189	$ 259,269	$ 266,610	$ 247,356
Garbage Haulage to Espanola[2]	$ 22,007	$ 20,749	$ 18,929	$ 20,562
Tipping Fees at Espanloa Landfill	$ 35,183	$ 33,199	$ 31,273	$ 33,218
Closure of Landfill Sites	$ 18,551	$ 203,712	$ 6,539	$ 76,267
Dumps Recycling[3]	$ 2,264	$ -	$ 4,070	$ 2,112
Dumps Household Hazardous Waste Day	$ 25,333	$ 25,584	$ 27,891	$ 26,270
Dumps Hydrogeological Study	$ 57,652	$ 26,540	$ 34,010	$ 39,401
Cost for Equipment Use (6 hrs/wk @ $100/hr x 52)[4]	$ 31,200	$ 31,200	$ 31,200	$ 31,200
Excavator Staffing (6 hrs/wk @ $20/hr x 52)[4]	$ 6,240	$ 6,240	$ 6,240	$ 6,240
Total Expenses	$ 484,799	$ 661,626	$ 508,738	$ 551,721
Net Expenses	$ 444,595	$ 602,784	$ 450,145	$ 499,175

Notes:
1. difference due to every other year grinding
2. 2020 ans 2021 costs for hauling estimated using cost of $360/load and information available on number of loads
3. some of the hauling costs for mattresses
4. estimated based on calculations shown - not included in GL for waste management

Appendix B
Waste Quantity Data

Waste Quantities from GFL

Blue Box - Commingled (tonnes)[1]					
	2017	**2018**	**2019**	**2020**	**2021**
Commercial	8	10	10	12	13
Depot	9	10	13	14	16
Curbside	41	47	44	38	40
Total	58	67	67	64	70

Blue Box - Fibres (tonnes)[1]					
	2017	**2018**	**2019**	**2020**	**2021**
Commercial	42	43	43	59	59
Depot	15	21	23	28	32
Curbside	61	62	58	47	50
Total	118	127	125	134	141

Blue Box Total (tonnes)[1]					
	2017	**2018**	**2019**	**2020**	**2021**
Depot	23	31	36	42	48
Commercial	51	54	54	70	72
Curbside	102	109	103	85	91
Total	176	194	192	198	211

Garbage (m^3)[1]					
	2017	**2018**	**2019**	**2020**	**2021**
Residential	2153	1632	1718	1990	1963
Commercial	1391	1359	1302	1827	1964
Total	3543	2991	3020	3817	3927

Garbage (tonnes)[1]					
	2017	**2018**	**2019**	**2020**	**2021**
Residential	1025	777	818	947	934
Commercial	662	647	620	870	935
Total	1687	1424	1438	1817	1869

Volumes from Other Sources

	2017	**2018**	**2019**	**2020**	**2021**
Annual surveyed volume of material landfilled at Providence Bay WDS (m^3)[2]	2149	1343	1031	1587	1502
Estimated loose volumes of waste stockpiled for chipping (m^3)[3]		1450	1450	1950	1950

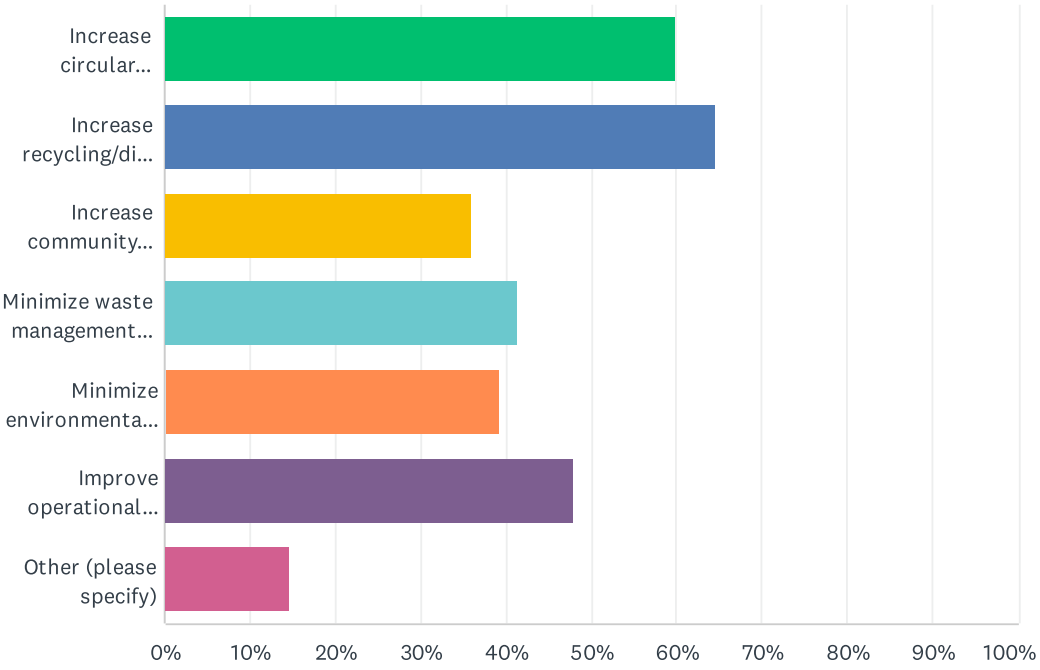
Notes

1. reported by GFL - density used to convert waste volume to tonnes by GFL was 476 kg/m^3
2. includes all materials added to landfill - construction demolition waste for alternative daily
3. provided by chipping and grinding contractor

Appendix C
Survey Results

Q1 Please indicate which goals and/or objectives that you feel we should consider for our Waste Management Master Plan (Check all that apply):

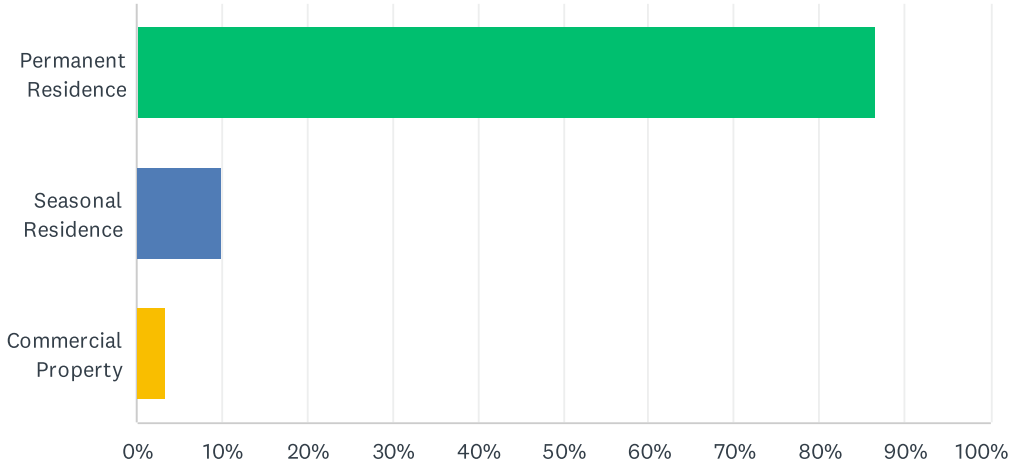
Answered: 150 Skipped: 2



ANSWER CHOICES	RESPONSES	
Increase circular programs (reduce, reuse, repair, sharing, etc.)	60.00%	90
Increase recycling/diversion	64.67%	97
Increase community education	36.00%	54
Minimize waste management costs	41.33%	62
Minimize environmental impact/greenhouse gas emissions	39.33%	59
Improve operational efficiency	48.00%	72
Other (please specify)	14.67%	22
Total Respondents: 150		

Q2 Which of the following best describes your property?

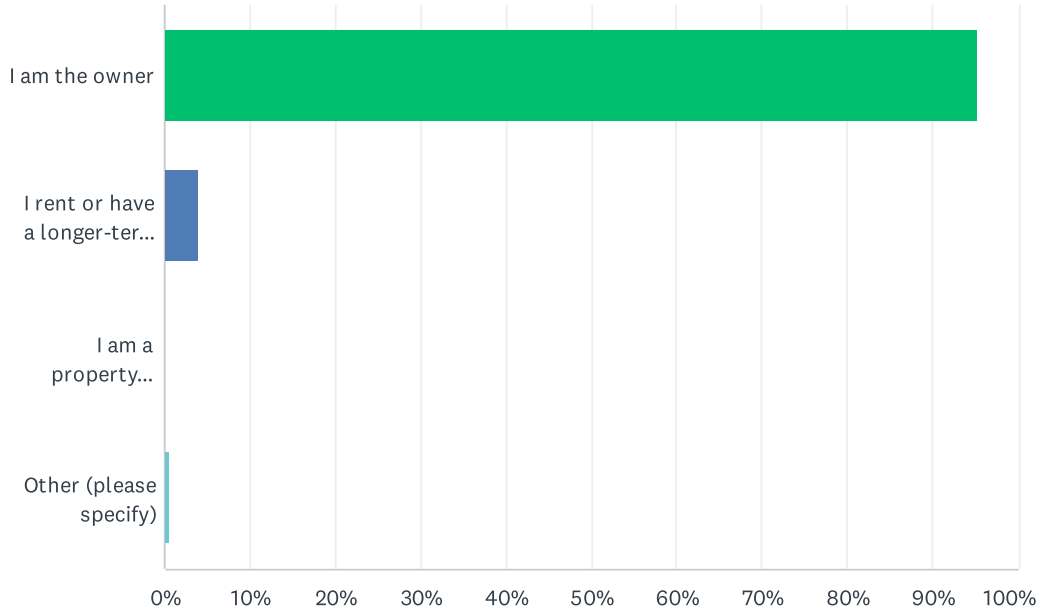
Answered: 149 Skipped: 3



ANSWER CHOICES	RESPONSES	
Permanent Residence	86.58%	129
Seasonal Residence	10.07%	15
Commercial Property	3.36%	5
TOTAL		149

Q3 Which of the following best describes your relationship to the property noted above?

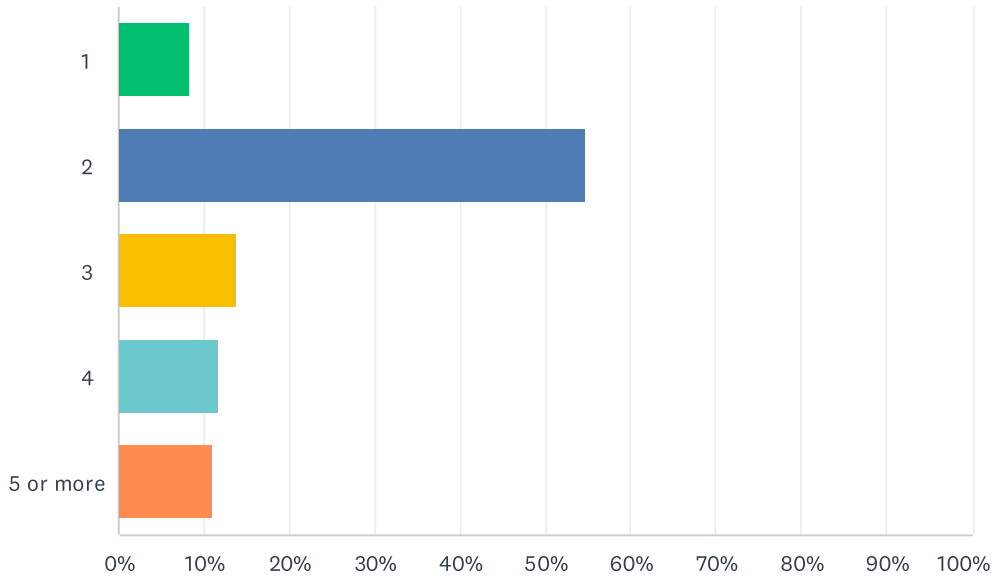
Answered: 151 Skipped: 1



ANSWER CHOICES	RESPONSES	
I am the owner	95.36%	144
I rent or have a longer-term lease	3.97%	6
I am a property manager/operator	0.00%	0
Other (please specify)	0.66%	1
TOTAL		151

Q4 If permanent residence, how many people live on your property

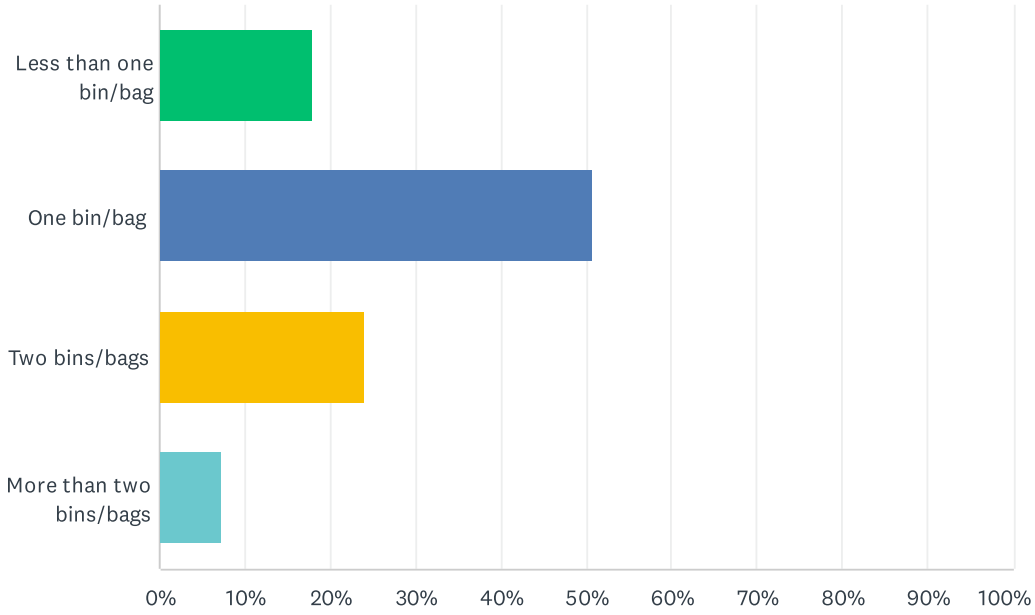
Answered: 144 Skipped: 8



ANSWER CHOICES	RESPONSES	
1	8.33%	12
2	54.86%	79
3	13.89%	20
4	11.81%	17
5 or more	11.11%	16
TOTAL		144

Q5 On average, how much recycling does your property generate per week?

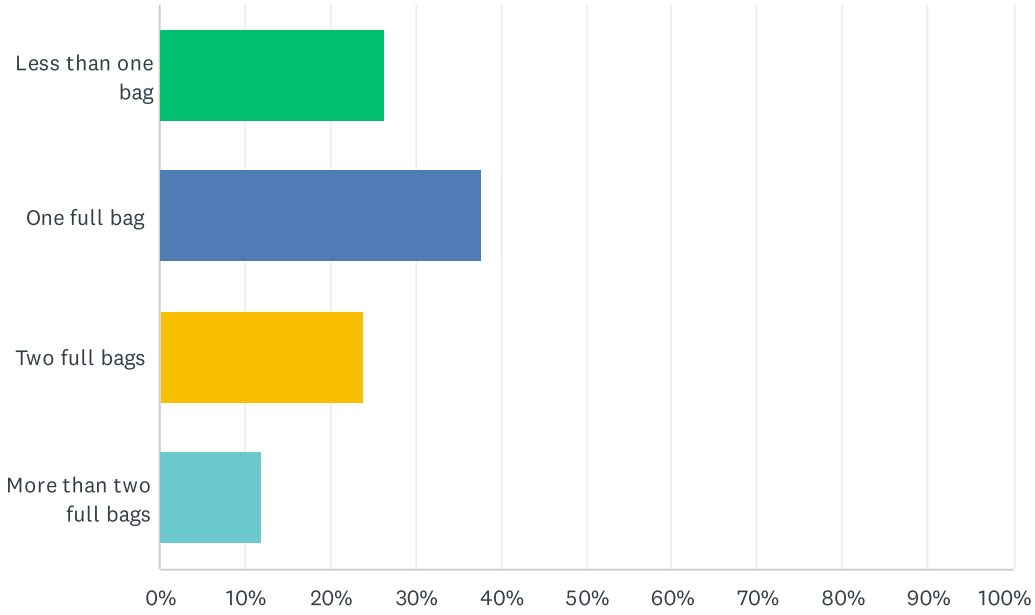
Answered: 150 Skipped: 2



ANSWER CHOICES	RESPONSES	
Less than one bin/bag	18.00%	27
One bin/bag	50.67%	76
Two bins/bags	24.00%	36
More than two bins/bags	7.33%	11
TOTAL		150

Q6 On average how much garbage does your property generate per week?

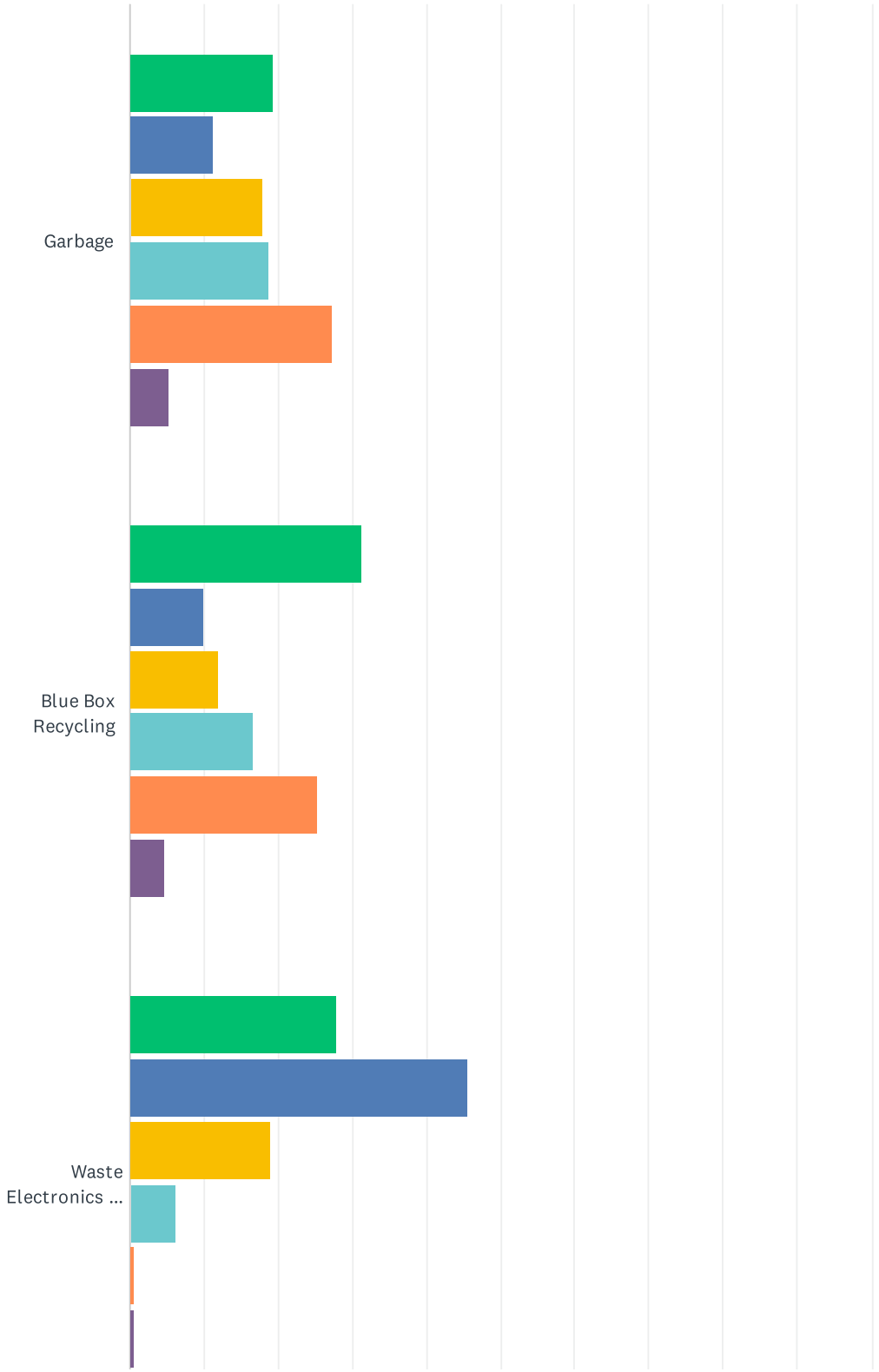
Answered: 151 Skipped: 1

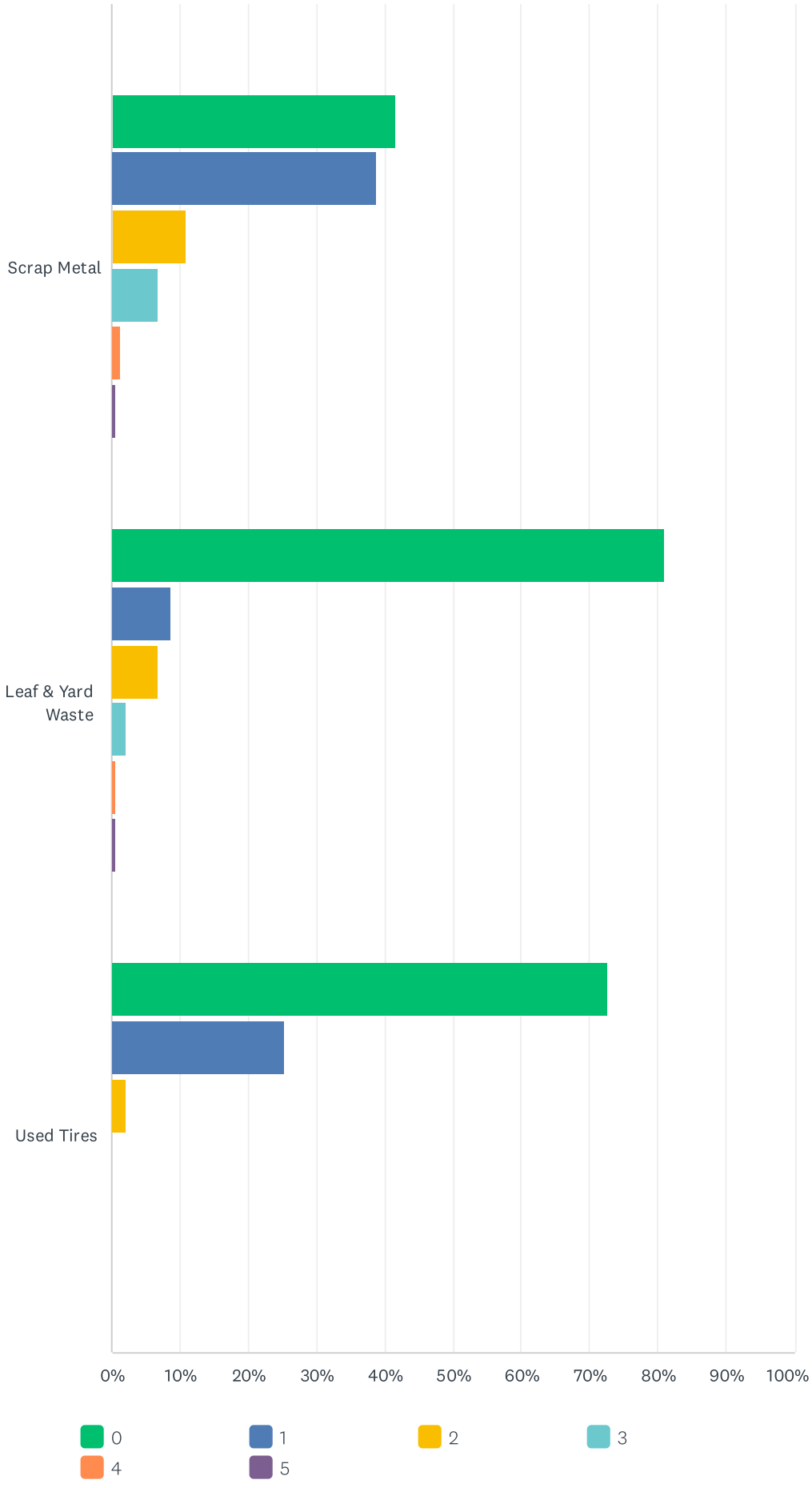


ANSWER CHOICES	RESPONSES	
Less than one bag	26.49%	40
One full bag	37.75%	57
Two full bags	23.84%	36
More than two full bags	11.92%	18
TOTAL		151

Q7 Please check how often you visit a Waste Disposal Site for these programs (0 - never, 1 - annually, 2 - seasonally, 3 - monthly, 4 - weekly, 5 - more than once weekly):

Answered: 151 Skipped: 1

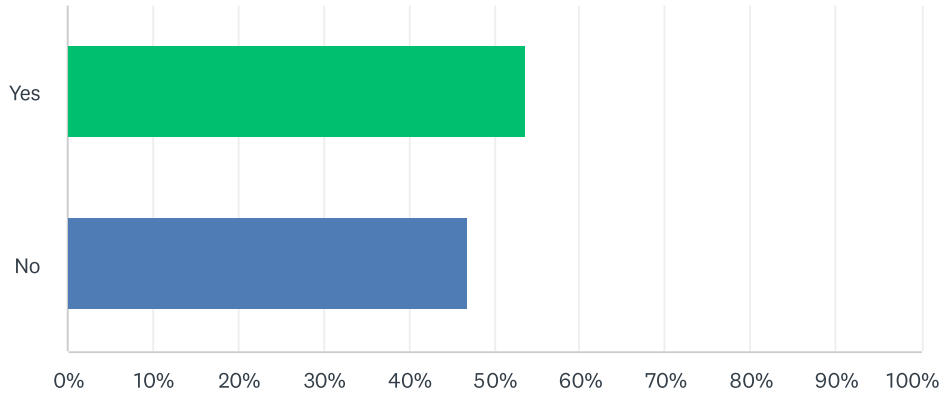



Scrap Metal
Leaf & Yard Waste
Used Tires
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
0
1
2
3
4
5

	0	1	2	3	4	5	TOTAL	WEIGHTED AVERAGE
Garbage	19.33% 29	11.33% 17	18.00% 27	18.67% 28	27.33% 41	5.33% 8	150	3.39
Blue Box Recycling	31.33% 47	10.00% 15	12.00% 18	16.67% 25	25.33% 38	4.67% 7	150	3.09
Waste Electronics & Electrical Equipment	27.89% 41	45.58% 67	19.05% 28	6.12% 9	0.68% 1	0.68% 1	147	2.08
Scrap Metal	41.50% 61	38.78% 57	10.88% 16	6.80% 10	1.36% 2	0.68% 1	147	1.90
Leaf & Yard Waste	81.08% 120	8.78% 13	6.76% 10	2.03% 3	0.68% 1	0.68% 1	148	1.34
Used Tires	72.60% 106	25.34% 37	2.05% 3	0.00% 0	0.00% 0	0.00% 0	146	1.29

Q8 The Goal of the Waste Management Master Plan is to examine options for service delivery and develop short term plans for shifting from landfilling waste at the Providence Bay WDS to export of all waste and long-term sustainable solutions for managing wastes generated in the municipality. Do you agree with these goals?

Answered: 145 Skipped: 7



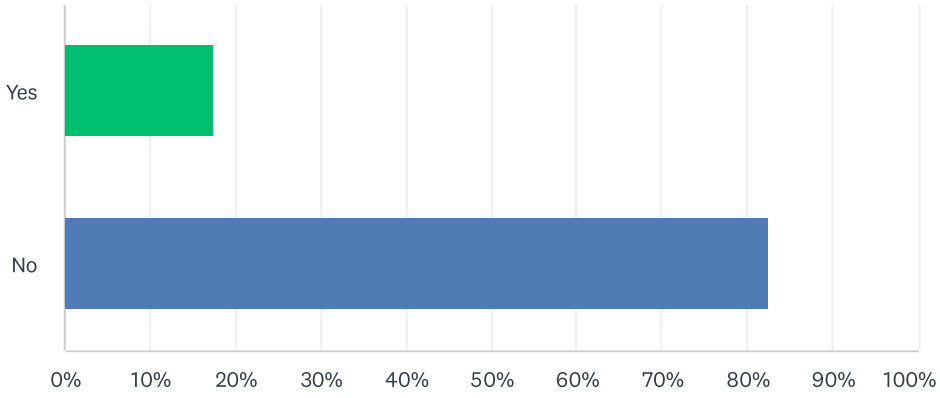
ANSWER CHOICES	RESPONSES	
Yes	53.79%	78
No	46.90%	68
Total Respondents: 145		

Q9 We have developed a list of possible options to address our waste management needs. Details of implementation times lines will be refined through the Master Plan Process. Short-medium term (0-2 years) Waste policy options (material bans, bag limits, bag tags, mixed load fees) Options to reduce transfer costs (size reducing, compactors) Operational considerations (tipping fees, equipment, contractual) Options to increase diversion (mattress, textile, construction demolition, and organic waste (kitchen and leaf and yard), recycling, and reuse opportunities) In-house vs contracted waste services (transfer station and curbside) Collaboration with other local communities Long term (2 to 50 years) Alternative Technology (incineration, pyrolysis, gasification, flash dissociation) Organics Options – composting and anaerobic digestions New Engineered Landfill Location of Transfer Stations Did we miss anything when considering the options?

Answered: 72 Skipped: 80

Q10 Did you participate in the Food Cycler Pilot project which provided an at-home composting alternative to residents at a subsidized rate?

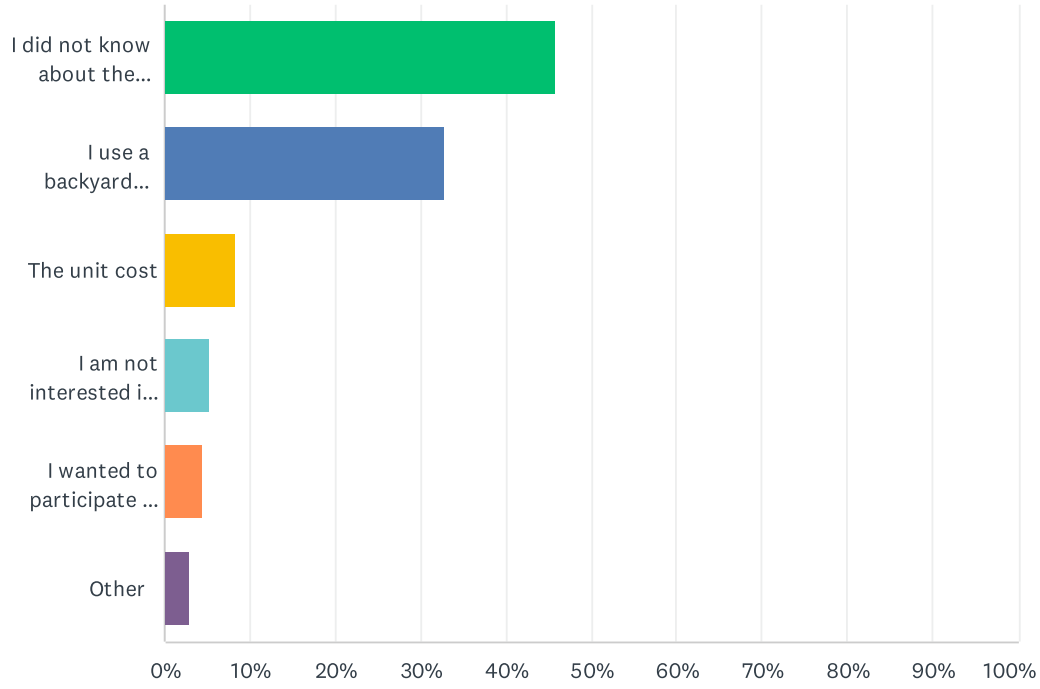
Answered: 149 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	17.45%	26
No	82.55%	123
TOTAL		149

Q11 If you did not participate in the Food Cycler program, please tell us why:

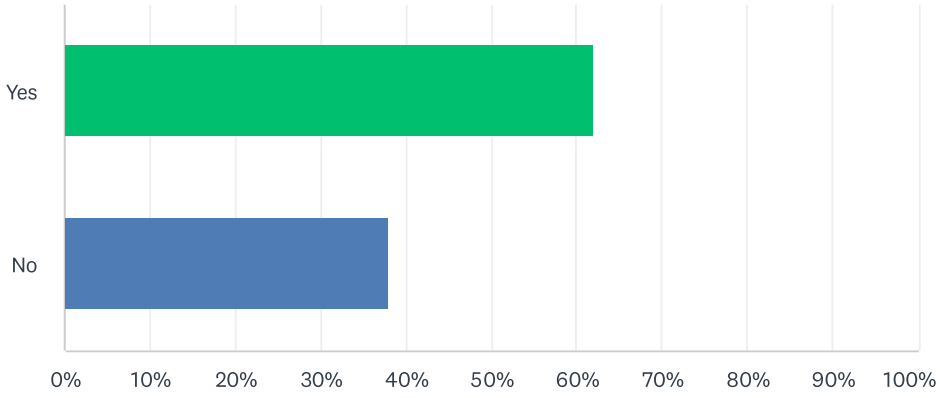
Answered: 131 Skipped: 21



ANSWER CHOICES	RESPONSES	
I did not know about the program	45.80%	60
I use a backyard composter	32.82%	43
The unit cost	8.40%	11
I am not interested in composting	5.34%	7
I wanted to participate but the program was full	4.58%	6
Other	3.05%	4
TOTAL		131

Q12 If you did not participate in the Food Cycler Pilot program, would you consider it next time?

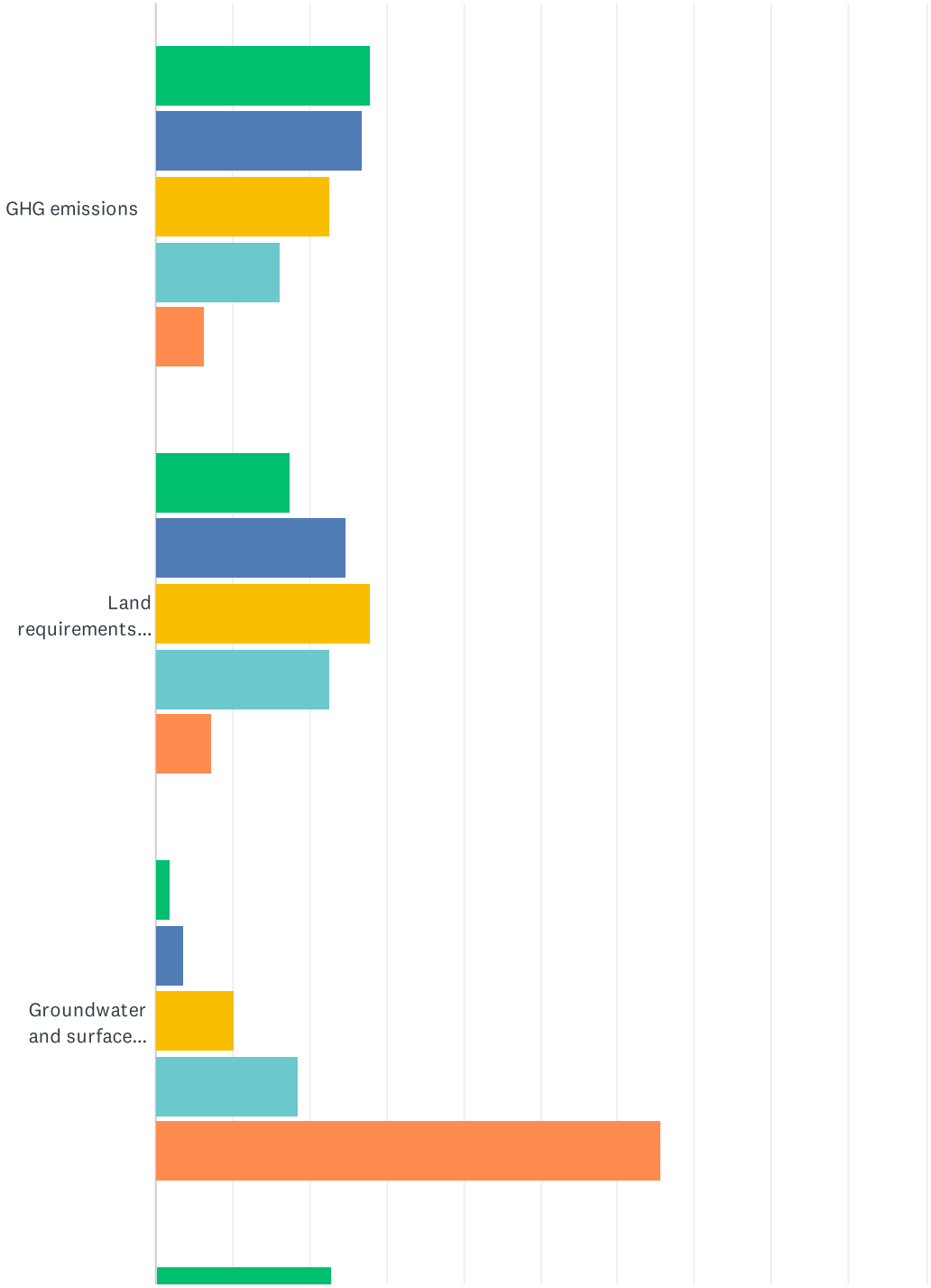
Answered: 132 Skipped: 20

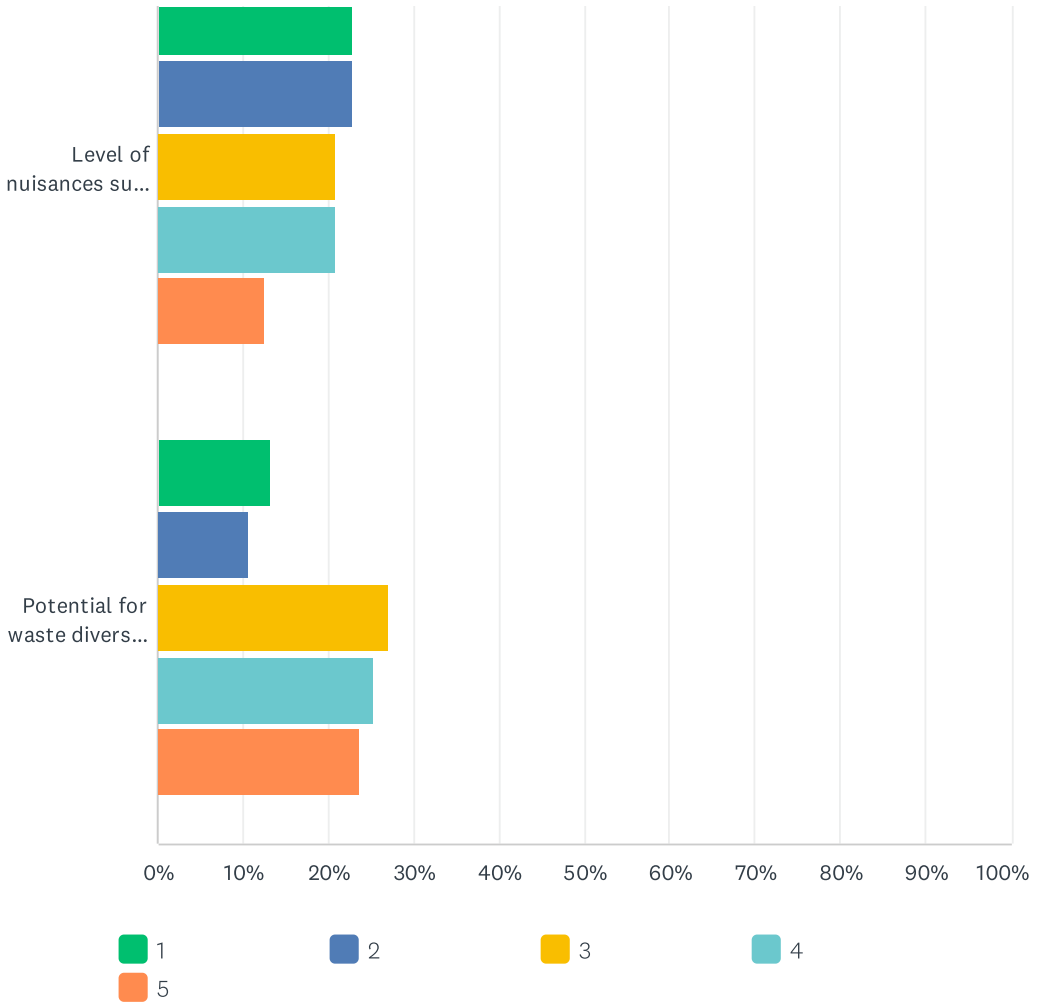


ANSWER CHOICES	RESPONSES	
Yes	62.12%	82
No	37.88%	50
TOTAL		132

Q13 The WMMP options will be evaluated considering three categories of criteria: Environmental, Social, Financial. These criteria were developed based on principles in the Municipality's guiding documents – Strategic Plan and Community Energy and Emissions Plan. Kindly review and rank the criteria below and let us know if you feel any additional criteria should be added.Environmental (1-least important, 5- most important)

Answered: 146 Skipped: 6

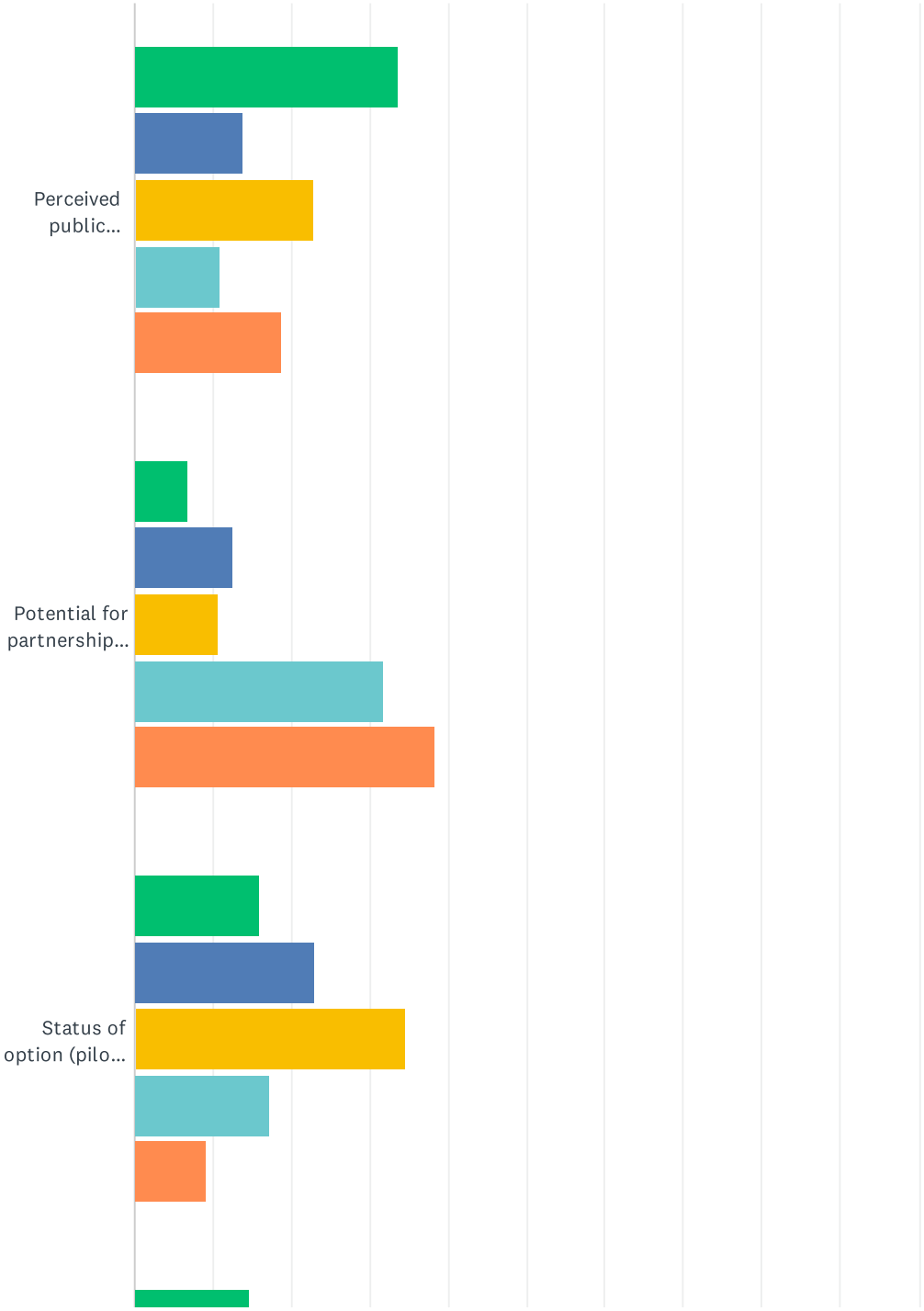


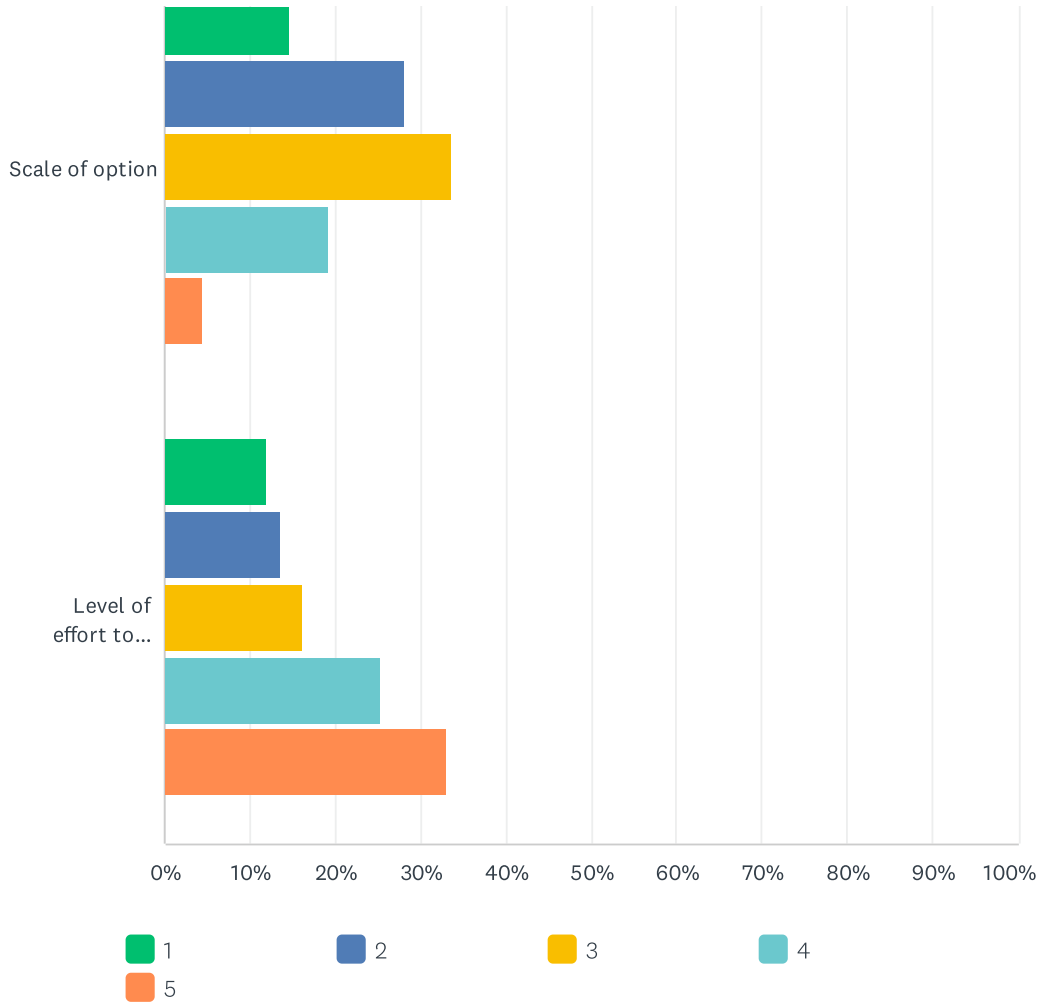


	1	2	3	4	5	TOTAL	WEIGHTED AVERAGE
GHG emissions	27.96% 26	26.88% 25	22.58% 21	16.13% 15	6.45% 6	93	2.46
Land requirements for the option	17.53% 17	24.74% 24	27.84% 27	22.68% 22	7.22% 7	97	2.77
Groundwater and surface water impacts	1.85% 2	3.70% 4	10.19% 11	18.52% 20	65.74% 71	108	4.43
Level of nuisances such as odour, litter, and traffic	22.92% 22	22.92% 22	20.83% 20	20.83% 20	12.50% 12	96	2.77
Potential for waste diversion and/or reduction	13.11% 16	10.66% 13	27.05% 33	25.41% 31	23.77% 29	122	3.36

Q14 The WMMP options will be evaluated considering three categories of criteria: Environmental, Social, Financial. These criteria were developed based on principles in the Municipality's guiding documents – Strategic Plan and Community Energy and Emissions Plan. Kindly review and rank the criteria below and let us know if you feel any additional criteria should be added.Social (1-least important, 5- most important)

Answered: 143 Skipped: 9

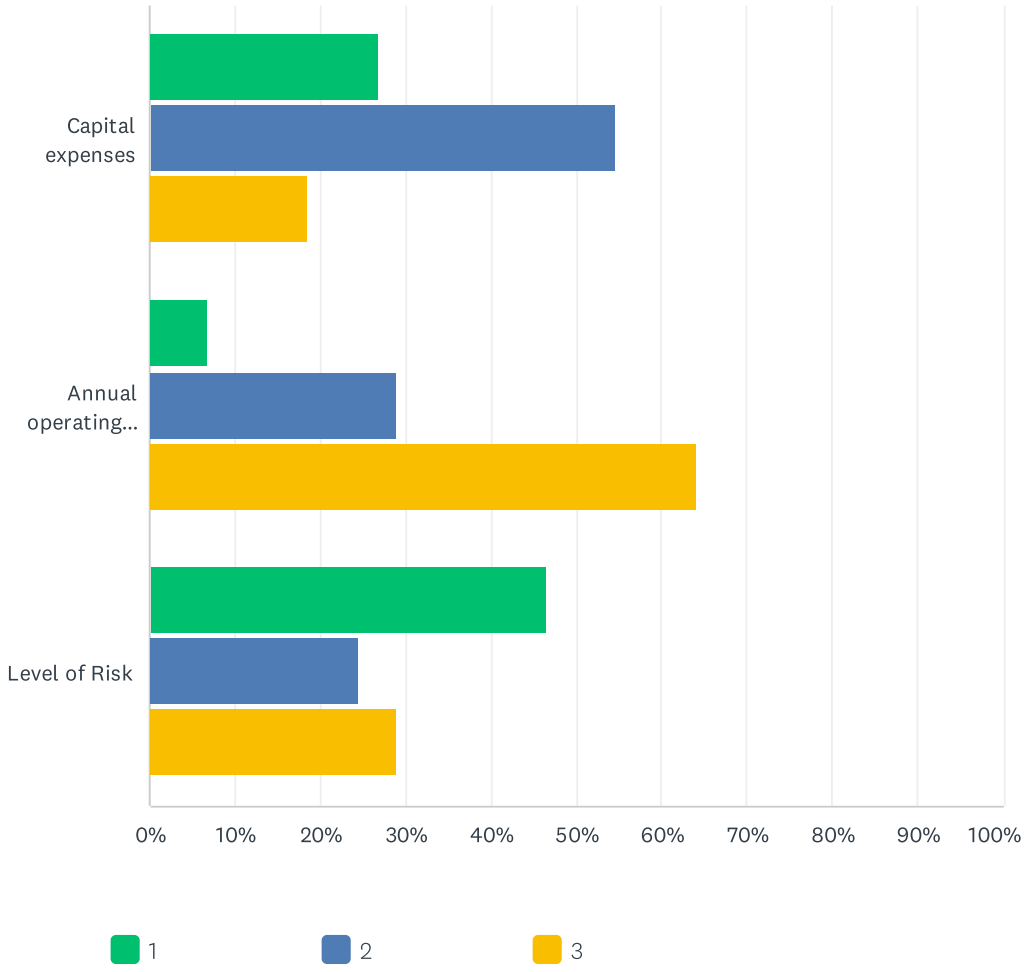




	1	2	3	4	5	TOTAL	WEIGHTED AVERAGE
Perceived public acceptance	33.66% 34	13.86% 14	22.77% 23	10.89% 11	18.81% 19	101	2.67
Potential for partnership with neighbouring municipalities	6.73% 7	12.50% 13	10.58% 11	31.73% 33	38.46% 40	104	3.83
Status of option (pilot or proven)	16.09% 14	22.99% 20	34.48% 30	17.24% 15	9.20% 8	87	2.80
Scale of option	14.61% 13	28.09% 25	33.71% 30	19.10% 17	4.49% 4	89	2.71
Level of effort to develop, implement, and maintain the option	11.86% 14	13.56% 16	16.10% 19	25.42% 30	33.05% 39	118	3.54

Q15 The WMMP options will be evaluated considering three categories of criteria: Environmental, Social, Financial. These criteria were developed based on principles in the Municipality's guiding documents – Strategic Plan and Community Energy and Emissions Plan. Kindly review and rank the criteria below and let us know if you feel any additional criteria should be added.Financial (1-least important, 3- most important)

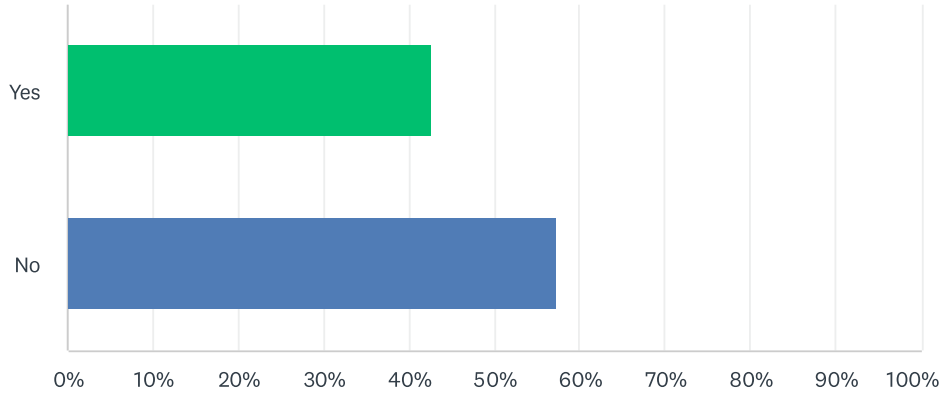
Answered: 144 Skipped: 8



	1	2	3	TOTAL	WEIGHTED AVERAGE
Capital expenses	26.80% 26	54.64% 53	18.56% 18	97	1.92
Annual operating expenses	6.84% 8	29.06% 34	64.10% 75	117	2.57
Level of Risk	46.49% 53	24.56% 28	28.95% 33	114	1.82

Q16 Do you support implementing user pay programs (fee for service) as a way to offset waste management program costs and minimize potential mill rate increases?

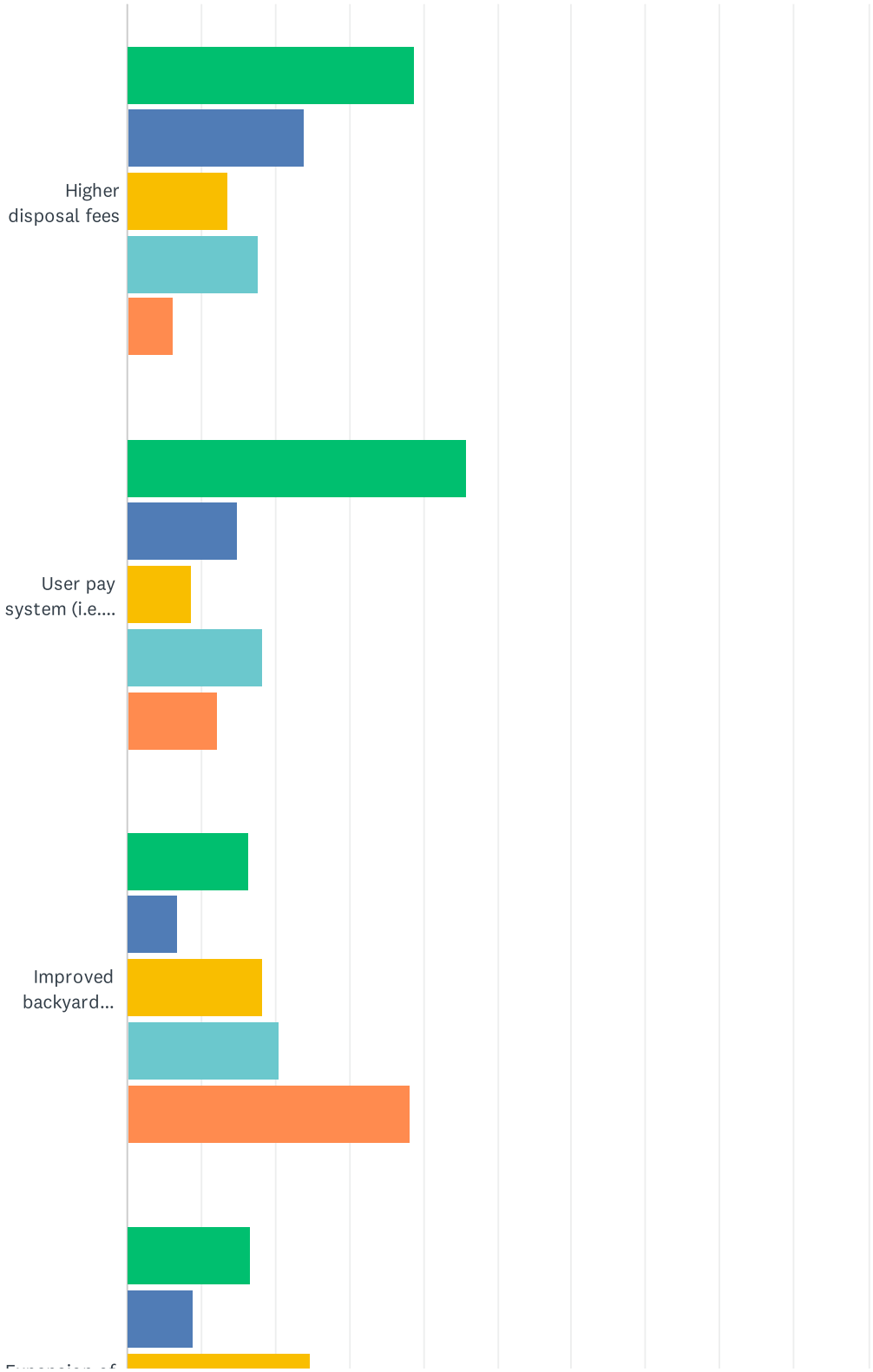
Answered: 148 Skipped: 4

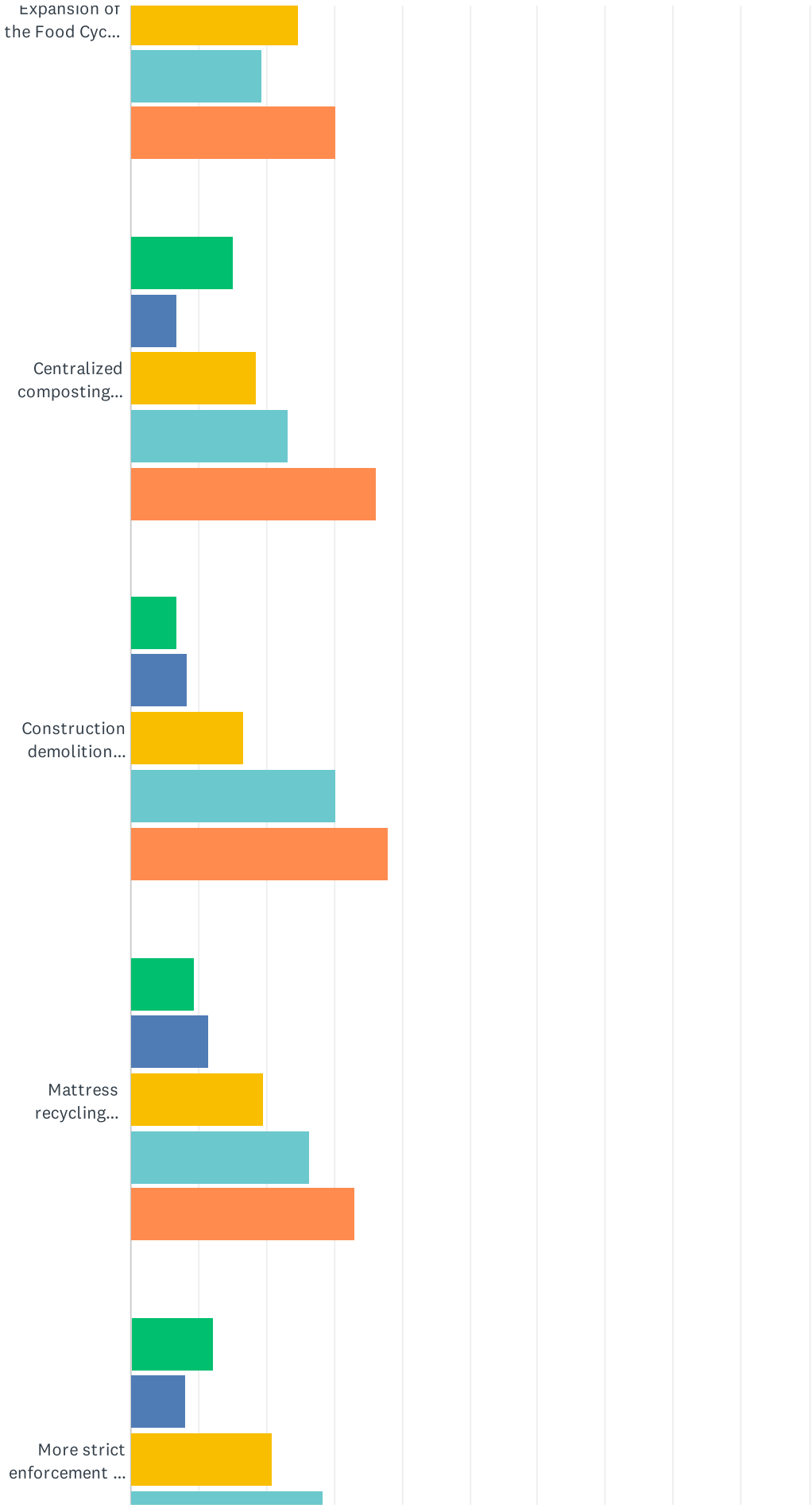


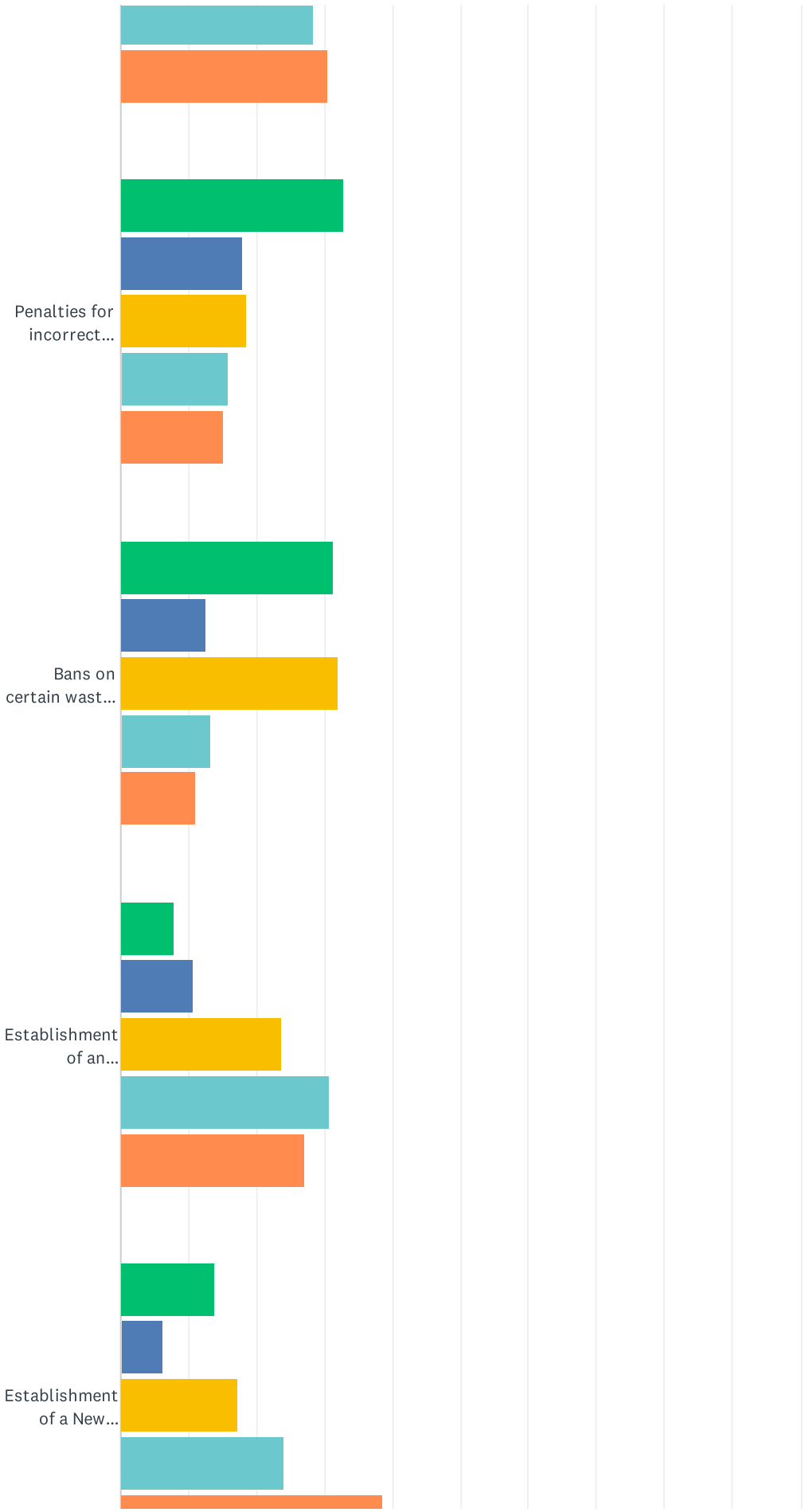
ANSWER CHOICES	RESPONSES	
Yes	42.57%	63
No	57.43%	85
TOTAL		148

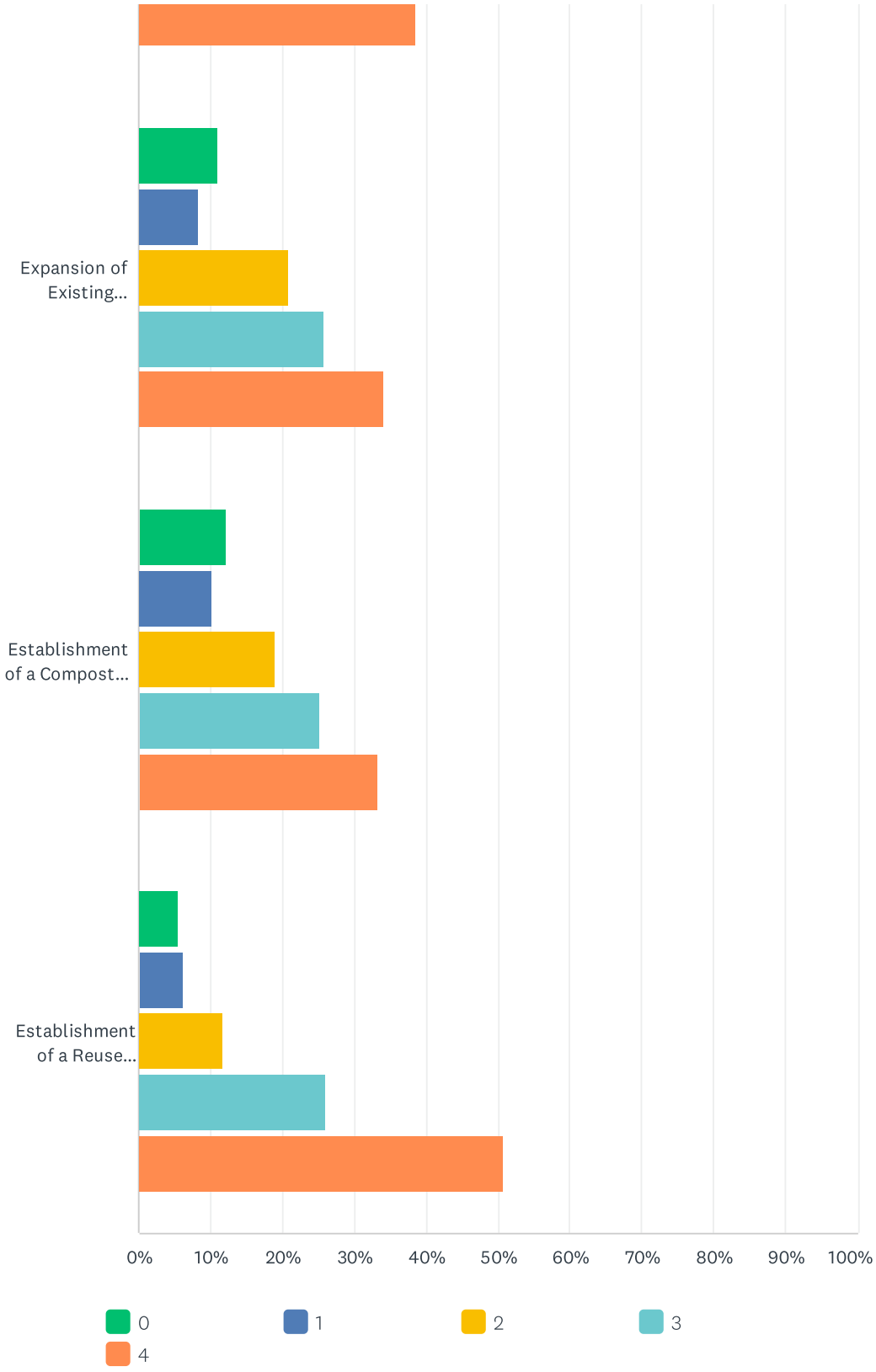
Q17 Please rank your support for any of these potential program changes. (0- no support, 1- minimal support, 2- indifferent, 3- support, 4- strongly support).

Answered: 149 Skipped: 3




Expansion of the Food Cyc...
Centralized composting...
Construction demolition...
Mattress recycling...
More strict enforcement ...

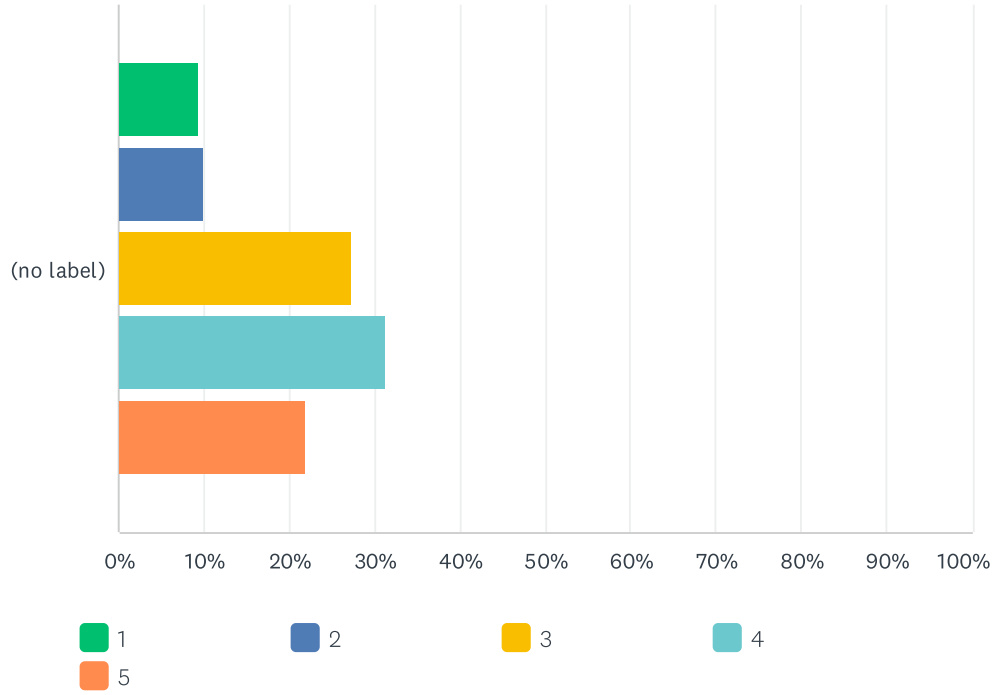

Penalties for incorrect...
Bans on certain wast...
Establishment of an...
Establishment of a New...


Expansion of Existing...
Establishment of a Compost...
Establishment of a Reuse...
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
0
1
2
3
4

	0	1	2	3	4	TOTAL	WEIGHTED AVERAGE
Higher disposal fees	38.78% 57	23.81% 35	13.61% 20	17.69% 26	6.12% 9	147	2.29
User pay system (i.e. bag tags or punch cards for waste disposal)	45.95% 68	14.86% 22	8.78% 13	18.24% 27	12.16% 18	148	2.36
Improved backyard composting program	16.33% 24	6.80% 10	18.37% 27	20.41% 30	38.10% 56	147	3.57
Expansion of the Food Cycler program	16.55% 24	8.97% 13	24.83% 36	19.31% 28	30.34% 44	145	3.38
Centralized composting program	15.07% 22	6.85% 10	18.49% 27	23.29% 34	36.30% 53	146	3.59
Construction demolition waste diversion program	6.90% 10	8.28% 12	16.55% 24	30.34% 44	37.93% 55	145	3.84
Mattress recycling program	9.46% 14	11.49% 17	19.59% 29	26.35% 39	33.11% 49	148	3.62
More strict enforcement of recycling / diversion programs	12.16% 18	8.11% 12	20.95% 31	28.38% 42	30.41% 45	148	3.57
Penalties for incorrect sorting (i.e. recycling in garbage)	32.88% 48	17.81% 26	18.49% 27	15.75% 23	15.07% 22	146	2.62
Bans on certain waste streams for municipal program	31.25% 45	12.50% 18	31.94% 46	13.19% 19	11.11% 16	144	2.60
Establishment of an Alternative Recycling Technology Facility	7.86% 11	10.71% 15	23.57% 33	30.71% 43	27.14% 38	140	3.59
Establishment of a New Landfill	13.79% 20	6.21% 9	17.24% 25	24.14% 35	38.62% 56	145	3.68
Expansion of Existing Transfer Station	11.11% 16	8.33% 12	20.83% 30	25.69% 37	34.03% 49	144	3.63
Establishment of a Composting Facility	12.24% 18	10.20% 15	19.05% 28	25.17% 37	33.33% 49	147	3.57
Establishment of a Reuse Centre	5.48% 8	6.16% 9	11.64% 17	26.03% 38	50.68% 74	146	4.10

Q18 How satisfied are you with the current level of waste management services (garbage & recycling) offered on a scale of 1 to 5 (1- unsatisfied, 3- okay, and 5- very satisfied)

Answered: 150 Skipped: 2



	1	2	3	4	5	TOTAL	WEIGHTED AVERAGE
(no label)	9.33% 14	10.00% 15	27.33% 41	31.33% 47	22.00% 33	150	3.47

Q19 What do you like about our current waste management program?

Answered: 122 Skipped: 30

Q20 What changes or additional services would you like to see, if any?

Answered: 116 Skipped: 36

Q21 Please provide any other comments in the space provided below.

Answered: 56 Skipped: 96

Appendix D

Technology Summary and Evaluation

Central Manitoulin Waste Management Master Plan

Alternative Waste Diversion - Technology Summary

Technology	How It Works	Current Stage	Examples	Accepted Inputs (Feedstock)	Minimum Daily Volume	Outputs	Use of Outputs
Pretreatment							
Dehydration	Use heat & vibration to remove moisture	Established technology	Food Cycler	Organics (food)	No Minimum	reduced volume biomass biofuel	Soil additive
	Use heat & vibration to remove moisture	Established technology	Eco-Growth Environmental also offers boiler technology to turn output into heat	Organics (food & fibre)	No Minimum Max depends on unit size	Reduced volume biomass water stream (waste)	- Soil additive - alternative fertilizer (O'Connor 2022) - Hot water (heating) - via - Eco-Growth boiler system land application
Biochemical							
Composting - Aerobic	Use bacteria in presence of oxygen to decompose organic waste	Established technology	Backyard Compster	Organics (food & fibre)	No minimum	compost	Soil amendment
	Relies on earthworms and microorganisms to decompose organic waste	Established technology	Small Scale In-Vessel - The Rocket	Manure, leaves, yard trimmings, wood and paper, food	No minimum	compost	
		Established technology	Large Scale		80 MT	compost	
Anaerobic Digestion	Use bacteria in a heated, oxygen-reduced environment to decompose organic waste *Good for waste with higher moisture content but requires careful selection of feed materials	Established technology		Organics (food) Agricultural waste Sewage sludge		Biogas (mainly methane, CO2 and H2) Liquid digestate Solid digestate	Electricity Renewable Natural Gas Fertilizer Compost

Central Manitoulin Waste Management Master Plan

Alternative Waste Diversion - Technology Summary

Technology	How It Works	Current Stage	Examples	Accepted Inputs (Feedstock)	Minimum Daily Volume	Outputs	Use of Outputs
Thermochemical							
Incineration	Complete combustion of waste (750 - 1200 C)						
Diposal Only	Burn waste in presence of oxygen	Established technology		Municipal solid waste		CO_2 & Water vapour Slag (ash)	None
Energy from Waste	Burn waste in presence of oxygen	Established technology	Durham York Energy Centre	Municipal solid waste		Steam	Electricity (Power) Heat Combined Heath/Power
	*Not great for food waste - items with higher moisture content require more energy					Coarse combustion Residuals - (e.g. metal/glass) Bottom ash Fly ash - Toxic (heavy metals accumulation)	Landfill / Aggregate for roads
Pyrolysis	Use high heat (400 °C - 600 °C) and pressure in an inert environment (oxygen-free) to break down waste into liquid. A non-combustion process. Can be a zero-waste option as all products are useful. Process controls can be adjusted to prioritize liquid or gas fraction.	Pilot scale	Cool Green Solutions	Landfill waste Tires, rubber Plastics Agricultural Waste Hardwood / Softwood Railway Ties Sewage sludge	3 tonnes (with small unit)	Synthetic gas (syngas)	Heat Electricity Liquid Fuels
	* Requires skilled operation			- 2 - 6 mm depending on technology used		Solid - biochar Liquid - biooil Gas - syngas	Soil/coal applications, activated carbon Fuel Fuel
Gasification	Use high heat (above 600 °C) and pressure in a partial air, low oxygen environment to break down waste into liquid. A non-combustion process. *Requires skilled operation	Pilot scale		Biodegradeable MSW Agricultural Waste		Synthetic gas (syngas) with higher caloric value than pyrolysis	Generate Electricity Fuel - Methanol - Ethanol Catalytic conversion to synthetic natural gas

Central Manitoulin Waste Management Master Plan

Alternative Waste Diversion - Technology Summary

Technology	How It Works	Current Stage	Examples	Accepted Inputs (Feedstock)	Minimum Daily Volume	Outputs	Use of Outputs
Thermochemical							
Flash Dissociation	The system converts waste feedstock to a synthetic gas in an oxygen deprived pre-heated chamber. The Synthetic gas is extracted and consumed onsite. This is conversion technology in a non combustion chamber and meets EU EPA standard without air treatment.	Pilot Scale	Gagnon Renewable Resources Inc.	Organics (food & fibre) Plastics Wood waste Electronics Sewage sludge Used motor oil Tires/shingles (Phase 2) (pending waste audit for material characterization and waste preparation)	10-100 MT	Electricity, heating, cooling, carbon black, metal recovery	Project Specific
Thermal Depolymerization	Use water, pressure, and heat to degrade waste into a light crude oil						
Torrefaction	Use heat (200°C - 300°C) to convert w Also called Light/Low-temp pyrolysis *Arbor Report	Research stage		2 cm cubes Woody waste *Not ideal for MSW		Combustable gas 70 wt% Biochar (charcoal)	 Can be pelletized into fuel

Central Manitoulin Waste Management Master Plan

Alternative Waste Diversion - Technology Evaluation

Technology		ENVIRONMENTAL IMPACT						
		GHG Emission Reduction vs Current	**Land Requirements**	**Nuisance Level****	**Potential Diversion from Landfill**	**% *****	**Approvals Req'd**	**Economic Impact (Jobs)**
Scale Details	**Low**	**< 20% of emissions**	**Building only**	**Minimal Complaints (<5)**	**0-30%**		**None**	**< 5**
	Medium	**20% - 50% of emissions**	**Building plus outdoor storage**	**Moderate Complaints (5-10)**	**30-60%**		**yes**	**5-20**
	High	**> %50 of emissions**	**Landfill-type area required**	**High Complaints (10+)**	**60-100%**		**yes**	**20+**
Pretreatment								
Dehydration		Medium	Minimal	None	Medium to High		None	None
Composting - Aerobic								
Backyard		Low	None	None	Low	14%	None	None
Small Scale - In-Vessel		Low	Low	None	Low	29%	None	Low
Large Scale		Low	Medium	High - Odour	Low	29%	Yes	Medium
Biochemical								
Anaerobic Digestion - large scale		High	Medium	Low	Medium	56%	Yes	Medium
Incineration								
Diposal Only		Low	Medium	Medium	High	84%	Yes	Medium
Energy from Waste		Medium	Medium	Medium	High	84%	Yes	Medium
Thermochemical								
Pyrolysis		High	Medium	None	High	84%	Yes	Medium
Gasification		High	Medium	None	Medium to High	62%	Yes	Medium
Flash Dissociation		High	Low to Medium	None	High	84%	Yes	Medium

Central Manitoulin Waste Management Master Plan

Alternative Waste Diversion - Technology Evaluation

		SOCIAL			
Technology		**Percieved Acceptance**	**Partnership Potential**	**Status (Proven / Unproven) Public knowledge**	**Scalability**
Scale Details	**Low**			**Full Scale - Plants are currently in full operation**	
	Medium			**Pilot Scale - Small facilities for testing proven technologies**	
	High			**Bench Scale - Technologies currently in research stage**	
Pretreatment					
Dehydration		High	N/A	Full Scale	Scalable
Composting - Aerobic					
Backyard		Medium		Established	No
Small Scale - In-Vessel		Medium		Full Scale	small scale
Large Scale		Medium		Full Scale	Large scale
Biochemical					
Anaerobic Digestion - large scale				Full Scale	Scalable
Incineration					
Diposal Only		Very Poor	Low	Full Scale	Small remote scale
Energy from Waste		Poor	Low	Full Scale	Large scale
Thermochemical					
Pyrolysis		Unknown	Medium	Pilot Scale	to be confirmed
Gasification		Unknown	High	Full Scale	to be confirmed
Flash Dissociation		Unknown	Confirmed	Pilot Scale	to be confirmed

Appendix E

Organics and Thermal Treatment Technology Information

1.0 Organics Management Technologies

This section describes some of the technologies and options that are often considered for managing organic wastes at the municipal level.

1.1 Composting

Composting is the process of using bacteria to decompose organic waste in an aerobic (oxygen filled) environment. There are many composting technologies on the market ranging from back yard composters to large scale municipal and private operations. The compost process is regulated by moisture, air, and temperature and can be either a batch or continual process depending on the technology and design chosen.

The benefits of a composting program are that it produces a soil amendment which can be utilized to improve soil quality and conserve soil nutrients, and it reduces GHG emissions by reducing the quantity of organic waste being sent for decomposition in an anaerobic (oxygen reduced) landfill environment (the organics are buried and produce methane as they decompose).

1.2 Anaerobic Digestion

Anaerobic Digestion is a naturally occurring process in which bacteria breaks down organic materials in an oxygen reduced environment. The process results in biogas (primarily methane) and digestate (liquid and solid) which need to be managed. Options for managing the biogas include: 1) venting (not preferred as it would produce methane emissions), 2) combustion to convert methane to produce heat and electricity, and 3) collection and conversion to renewable natural gas. The recommended use for the digestate is a soil amendment in the agricultural environment; however, other uses may be determined. Previously, anaerobic digestion was most used in the agricultural waste and sewage sludge treatment processes. However, it is increasingly being used to address food processing and source separated organic waste materials.

The Ontario government has announced changes to biogas rules in an effort to expand the biogas and renewable natural gas market in the province. The regulation changes will enable new on-farm biogas systems and expansion of existing systems to be approved more easily and at a lower cost, to help ensure that Ontario continues to be a biogas sector leader in Canada, the province says (Real Agriculture, 2022).

1.3 Dehydration

Dehydration is a common organic pre-treatment technology for food waste and typically uses heat and vibration to remove moisture from the waste. Since organics are comprised primarily of liquid this technology is very efficient at reducing volume of material by 80-90%. The output of this process is a material that can be used as a biofuel or soil amendment. The material is not technically ‘composted’ so it will restart the decomposition process if it is rehydrated. Land application is recommended in combination with soils to ensure that materials cause no adverse effects (e.g., odour) when they start to decompose.

This technology is generally focused on interior programs – from homes (e.g., the current Food Cycler program) to high rise office and/or residential buildings. It is relatively small, requires no plumbing, and is relatively easy to operate. Several brands of this technology area currently on the market.

2.0 Thermal Treatment Technology

The technologies generally use thermal treatment and go by different names, based upon the details of their process – mainly operating temperature and level of oxygen used. As described in the 2009 report, the main differences between thermal technology and conventional combustion is that combustion technologies are aerobic and the exhaust gases are cleaned up after combustion. With thermal technology (gasification, pyrolysis) the oxygen is limited, and the syngas is often cleaned up prior to its combustion (AECOM, 2009c). A few of the specific processes are described below.

2.1 Incineration

Mass burn incineration process traditionally meant to reduce the volume of waste that requires disposal by burning it in a controlled environment. But, more recently the process has been modernized to capture the energy released to generate power. The process involves high temperatures in the presence of oxygen to fuel a steam engine and produce energy in the form of electricity. This process is used in many countries to manage municipal waste that cannot otherwise be managed through recycling and composting processes. These technologies are more frequently used for larger operations or to manage hazardous materials and medical wastes that cannot otherwise be managed. These systems require careful operation to ensure that temperatures reach sufficient peaks to result in full combustion. Partial combustion of organics is what contributes to hazardous contaminant emissions such as dioxins and furans.

2.2 Pyrolysis

A treatment method which uses heat (usually between 400-600°C) in the absence of air to break down matter into a combination of solid, liquid and gas by-products. This process is commonly used in conjunction with gasification. Pyrolysis can also be referred to as chemical recycling as it converts the chemical composition of materials.

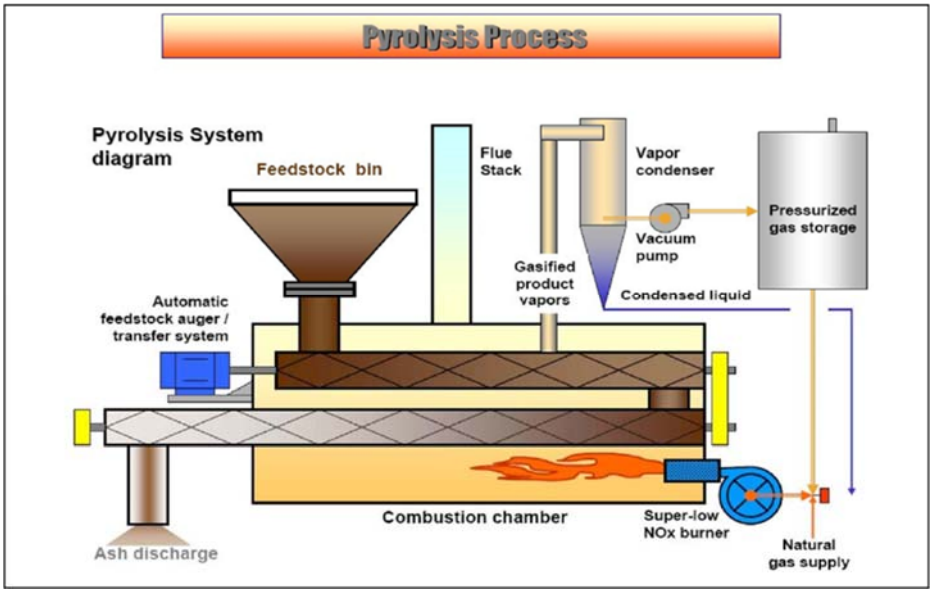


Figure 1 - Pyrolysis

2.3 Gasification

Biomass or combustible materials are treated in a highly controlled chamber, through a non-combustion thermal treatment process, at temperatures above 600ºC to produce a syngas. When organic materials are pressurized at a high temperature in the absence of oxygen it forces molecules to separate and create the syngas. The syngas is a cleaner fuel which results in fewer emissions than direct combustion of waste if done correctly. The specific technology may involve regulated addition of steam or oxygen to facilitate the process. The syngas is then often fed into a boiler or generator to convert the gas into energy, either thermal or electricity.

2.4 Flash Dissociation

Similar to gasification but operates a 1000°C. The higher temperature allows for a wider range of MSW (feedstock) streams versus the lower temperature technologies.

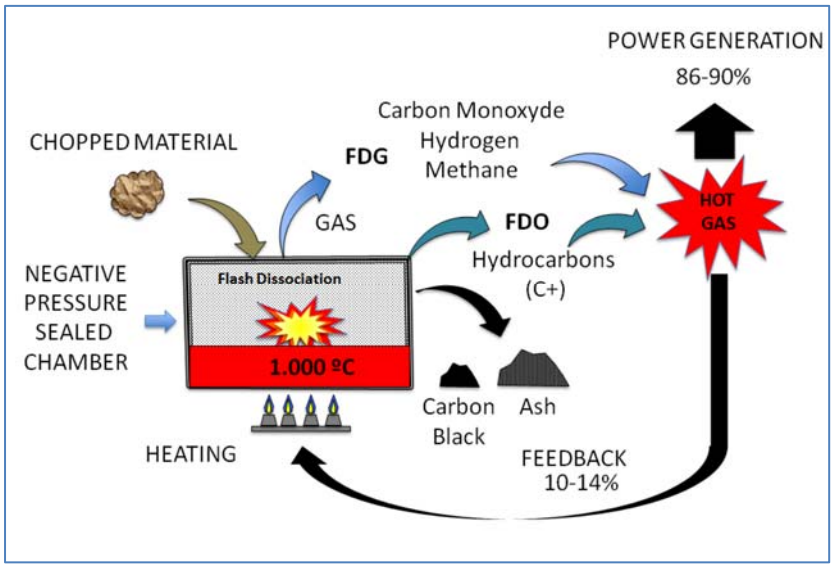


Figure 1 - Flash Dissociation Process (courtesy Gagnon Renewables)