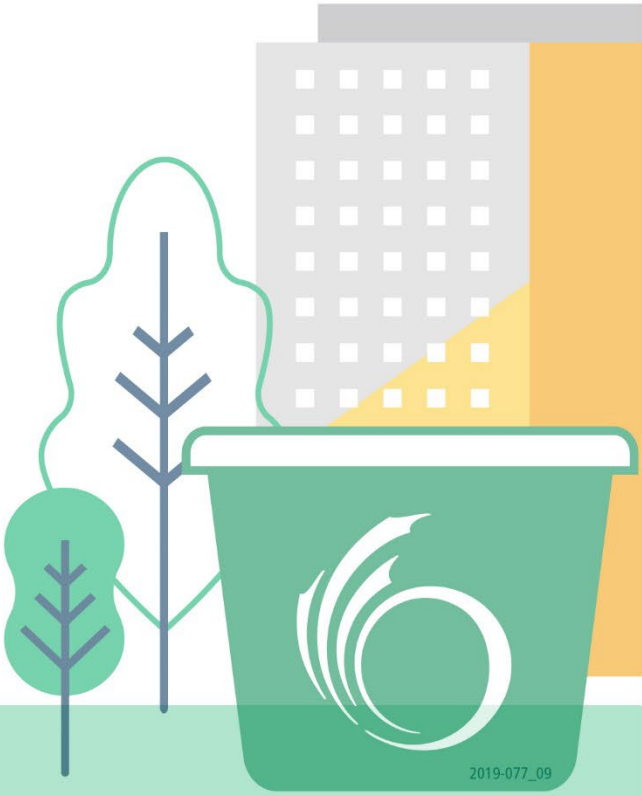
Solid Waste Master Plan

June, 2024



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Glossary of Terms & Acronyms

ACC	Accessibility Advisory Committee
AD	Anaerobic Digestion
Biweekly Collection	The collection of any material set out at curbside, one day every two weeks.
Black Bin Recycling Program	The City of Ottawa's curbside recycling program that accepts paper products, including newspapers, mixed fine paper, magazines and catalogues, telephone books, unsoiled boxboard, unsoiled corrugated cardboard, and Kraft paper.
Blue Bin Recycling Program	The City of Ottawa's curbside recycling program that accepts recyclable glass-metal and plastic containers, including most plastic containers (excluding Styrofoam), polycoat paper containers, metal cans, aluminum cans, and glass jars and bottles.
Bulky Items	Items that are too large to fit inside a regular garbage container for collection. Some examples include bicycles, floor lamps, mattresses, furniture, sinks, toilet bowls, barrels, pool pumps, pool covers and any other discarded materials, normally accumulated at residential dwellings. Bulky items exclude appliances and WEEE.
C&D	Construction and Demolition (waste)
CCG	City Champions Group
CCMP	Climate Change Master Plan
CEPA	Canadian Environmental Protection Act
City Facility	A building or structure owned or leased by the City of Ottawa.

CNG	Compressed Natural Gas
Containerized Collection	A system of collection of garbage, recyclable material or organic material placed in approved containers by means of a front-end collection vehicle – example 360L plastic carts for garbage.
CSG	Council Sponsors Group
Curbside Collection	Method of waste collection where residents place garbage, Blue Bin, Black Bin and Green Bin materials at or near the curb or at a pad location.
Diversion Rate	Percentage of total material that is diverted from landfill through programs such as recycling or green bin program. (weight of material diverted / total weight of all material generated) × 100%
ECCC	Environment and Climate Change Canada
EES	Energy Evolution Strategy
ESAC	Environmental Stewardship Advisory Committee
FTE	Full-Time Equivalent, which refers to a City of Ottawa employee working full time.
Feedstock	Materials or inputs for a certain waste stream, i.e., material that is accepted in a certain waste stream for diversion or disposal.
Garbage	The portion of the waste stream that has no practical or feasible further use. It cannot be recycled or composted. This is the portion sent for disposal.
GJ	One Gigajoule

Green Bin Program	The Green Bin Program is the collection of both household organics and leaf and yard waste which is currently processed using an in-vessel tunnel composting system.
GHG	Greenhouse Gas
Hazardous and Special Products	Any material, which is designated or restricted within the meaning of any Federal or Provincial statute or regulation. These materials can only be disposed of by returning them to accepted retailers, through the Take it back!" program and/or through the City's hazardous and special waste collection event depot program.
HDDV	Heavy Duty Diesel Vehicle
HHW	Household Hazardous Waste
Household Organics	Refers to any biodegradable material, including food waste, such as meat, dairy products, bread and pasta, kitty litter, cold ash, wood chips, sawdust, tissue paper, paper towels, pizza boxes and pet feces.
HSP	Hazardous and Special Products
IC&I	Industrial, Commercial & Institutional establishment, a non-residential location which is regulated by the Province of Ontario.
IPR	Individual Producer Responsibility
LFG	Landfill Gas
LYW	Leaf and Yard Waste

Leaf and Yard Waste	Refers to organic yard material collected for composting, including leaves, grass clippings, garden waste, branches, brush, wind-fallen fruit and Christmas trees.
LRFP	Long-range financial plan
M3RC	Municipal Recycling Collaborative
MHSW	Municipal Hazardous or Special Waste
MSW	Municipal Solid Waste
MWP	Mixed Waste Processing
Multi-Residential Property	A residential building or townhouse complex containing multiple self-contained residential dwelling units which have their own sleeping, cooking, eating, sanitary facilities. They include, but not limited to garden homes, town homes, terrace homes, maisonettes, stacked town homes. low rises and high rises.
PAYT	Pay-as-you-throw
P&E	Promotion and Education
PSAs	Public Service Announcements
RFID	Radio-frequency Identification which uses wireless technology to automatically identify and track tags attached to objects.
RMOC	Regional Municipality of Ottawa-Carleton
RNG	Renewable Natural Gas derived from the digestion of organic material.
ROPEC	Robert O. Pickard Environmental Centre
SSB	Stakeholder Sounding Board

SSO	Source-Separated Organics
SWMP	Solid Waste Master Plan
SWS	Solid Waste Service
TBL	Triple Bottom Line
TWFL	Trail Waste Facility Landfill
UPR	Universal Program Review
Waste	Refers to anything discarded for City collection from any source.
WEEE	Waste Electrical and Electronic Equipment
WTE	Waste to Energy
Yellow Bag Program	A curbside collection program for small, eligible IC&I establishments that purchase and use specific yellow garbage bags to set our garbage.

1.0 Introduction

The management of solid waste is a universal issue affecting every single person on the planet. The safe, efficient, and sustainable management of waste directly affects the health and cleanliness of our entire community.

According to the World Bank Group, “the world is on a trajectory where waste generation will drastically outpace population growth by more than double by 2050. Although we are seeing improvements and innovations in solid waste management globally, it is a complex issue and one that we need to take urgent action on.” This increase in waste generation is expected to create further challenges for municipal waste management systems as rapid urbanization will continue to test reduction efforts, as well as waste collection, processing and disposal systems. Governments around the world are recognizing that waste management must become a top priority for all levels of government, and that industry and residents all have a part to play to help solve the issues at hand.

Ottawa is not immune to this unsustainable global trend. Ottawa is Canada’s sixth largest city with an increasing population that is expected to reach 1.4 million people by 2046. More people mean more waste and the amount of waste the City will need to manage is forecasted to increase by 31% over the next three decades. The City’s owned and operated Trail Waste Facility Landfill (TWFL) is estimated to be full between 2034 and 2036, and will not meet the City’s long-term disposal needs if immediate changes are not made.

The Trail Waste Facility Landfill (TWFL) is a significant City-owned and community asset and must be utilized to the greatest extent possible. Overall landfill capacity available across the Province is diminishing, with most recent estimates highlighting that province-wide landfill capacity could be depleted in the next 15 years. The cost of establishing a new landfill could be in the range of $350 to $400 million, in 2023 dollars, and could take up to 15 years before becoming fully operational.

A long-term plan is needed to decrease the amount of waste to manage, divert as much waste as possible from the landfill, recover maximum resources and energy from the remaining garbage and dispose of residual waste in an environmentally sustainable way – all while keeping waste management cost efficient and affordable.

To do this, the SWMP considers the successes and failures of the past and present, defines an aspirational Zero Waste vision for the future, and creates a roadmap to reach that vision with concrete actions that are viable for the long term, sustainable, and flexible to the ever-changing industry.

The **Solid Waste Master Plan** (SWMP) provides the framework for how the City will tackle these challenges and ensure its responsibilities for this critical service can be met in a sustainable way over the next 30 years. The SWMP recognizes that there is no one solution or silver bullet to address the ongoing and future challenges. Addressing these issues will require a multi-pronged approach through a combination of regulation, collection management, technology and behavioural change in the public and in industry.

The SWMP was built with input from stakeholder groups and the public throughout each stage of the plan's development. Waste management impacts everyone, and meaningful engagement ensures the SWMP is built to reflect community needs and desires. Comprehensive engagement also helps create an implementation plan that the broader community can buy into, participate in, and make collective change together. The recommendations in the SWMP span the collection and management of waste from curbside-residential and multi-residential homes, parks and other public spaces, City facilities and operations and existing partner programs.

Key considerations

Several key factors were integral in shaping the development of the SWMP.

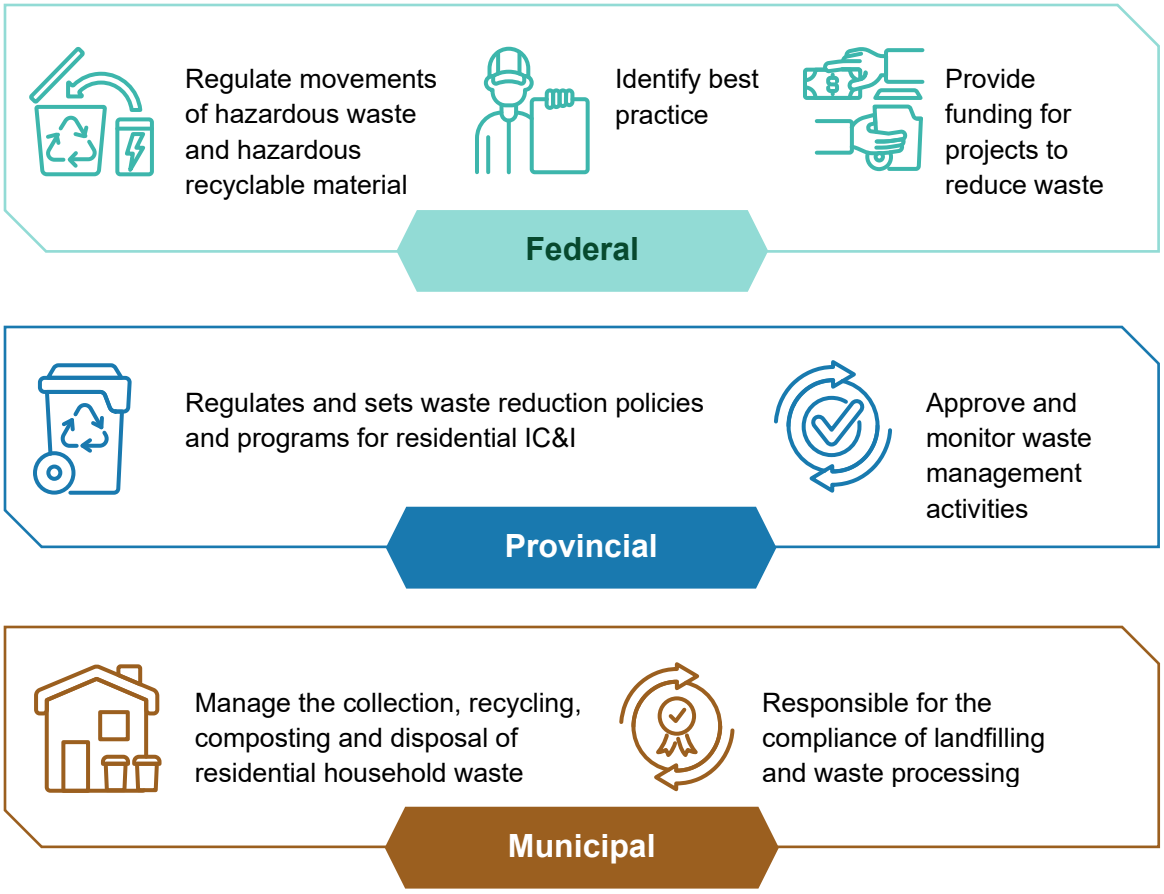
- **Government roles**

  In Canada, municipalities are the front-line governments responsible for the bulk of residential waste collection and management. The scope of the SWMP, therefore, covers almost exclusively residential waste. Approximately 60 to 70% of waste in Ontario comes from the Industrial, Commercial and Institutional (IC&I) sector. This waste is regulated by the province and includes waste from restaurants, construction sites and multi-residential buildings. Since the City is not responsible for its collection and management, the SWMP recommendations are largely limited to ways the City can help influence the collection and processing of this waste.

  All three levels of government have a role to play in waste management and new municipal policies, programs and bylaws need to align with federal and provincial waste management legislation.

Figure 1 describes the solid waste management roles of the three levels of government in Canada.

Figure 1: Solid Waste Management at Three Levels of Government



Over the last few years there has been a significant amount of new solid waste-related policy and legislative updates from both the federal and provincial governments. There is every indication that initiatives related to waste reduction and diversion will continue to increase, particularly with growing interest and concerns about the greenhouse gas (GHG) impacts of waste management programs and practices, and the challenges and opportunities for waste-related GHG mitigation at all levels of government, businesses and society. Current and future initiatives include:

- Shifting the responsibility of the collection and management of certain recyclables from municipalities to producers of those recyclables (Individual Producer Responsibility) starting in 2026.
- A potential food and organic waste disposal ban that would prohibit the disposal of organic material at landfills.
- The federal government ban prohibiting the manufacture, import and sale of six single-use plastic items from June 2023.

Federal and provincial policies and regulations, both current and potential future, were all considered as the SWMP was developed and will continue to be a consideration as SWMP Actions are implemented.

- **Climate change**

  In April 2019, the City of Ottawa declared a Climate Emergency and approved its first Climate Change Master Plan (CCMP) in January 2020. The CCMP is the City's overarching framework to reduce greenhouse gas (GHG) emissions and respond to the current and future effects of climate change. City Council adopted GHG reduction targets, based on 2012 levels, to reduce emissions from the community by 100 per cent by 2050 and to reduce emissions from City operations by 100 per cent by 2040.

  Waste management contributes directly to GHG emissions, particularly through the release of methane in landfills as food waste breaks down. Throughout the SWMP development, mechanisms within the City's control that have the potential to reduce GHG emissions associated with waste management were considered. This includes new and improved policies and programs that divert organic waste from landfill, technologies to generate renewable natural gas from organics and fleet technologies that release fewer GHG emissions.

- **Leveraging innovation and technology**

  Many municipalities in Canada are exploring alternatives to traditional methods of processing and disposal of waste. Some of these technologies have been utilized in other countries for many years and are becoming more widely utilized in North

America as technology improves, public acceptance grows and the political and regulatory climates change.

A range of new and emerging technologies potentially applicable to the City's future solid waste management were explored throughout development of the SWMP. This includes technologies to support waste collection, diversion, recycling, recovery and disposal. While the SWMP provides a recommended direction on new technologies, all options will require more fulsome business cases to be developed that consider financial, environmental, operational and regulatory implications, as well as benefits and risks.

- **The waste management hierarchy**

  The waste management hierarchy is a conceptual framework that ranks the preferred approaches to waste management to generate the minimum amount of waste. It places top priority on reducing or preventing as much waste as possible, followed by recycling, recovery and finally disposal, as illustrated in **Figure 2**. The hierarchy was considered throughout SWMP development and was used to help prioritize the various recommended Actions.

Figure 2: Waste Management Hierarchy

The Path to Zero Waste

An aspirational **Zero Waste Vision** for the SWMP was developed using feedback from the public and stakeholders and approved by City Council in July 2021.

Getting closer to Zero Waste is complex. The SWMP lays out the planning and implementation timing of 50 Actions to manage the various aspects of the waste stream. The Actions are multifaceted and interconnected and the timing for their implementation is based on feedback from the community on how far, how fast and what cost we should move towards the City's Zero Waste vision.

Zero Waste is recognized as aspirational, a philosophy and a call to action rather than an absolute target. It means working towards a future where nothing is wasted, ultimately leading to the conservation of natural resources and eliminating discharges to land, water or air. Zero Waste cannot be achieved by a municipality on its own but requires a concerted effort and coordination between all levels of government as well as industry, businesses and consumers.

While a true Zero Waste future is not anticipated to happen within the term of the SWMP, the proposed actions are expected to move the City much closer to that goal.

The recommended SWMP Actions are laid out by short-term (0-5 years), medium-term (5-10 years) and long-term (10+ years) time frames. The recommended short-term timeframe provides:

- A list of Actions that can be implemented immediately to have the maximum impact on waste reuse, reduction and diversion.
- A plan to implement other diversion Actions over the next few years when impacts of the more immediate Actions are better understood and end markets for a range of recyclables have been explored.
- A direction to pursue for planning Actions that will manage leftover waste and ensure maximum energy and resources are extracted from that remaining stream.

Five objectives were developed to present and help measure how the recommended SWMP Actions would directly work towards achieving Zero Waste.

The 5 SWMP objectives

1. Maximize the Reduction and Reuse of Waste

Actions under this objective are prioritized in the short-term (0-5 years) and are recommended to begin immediately to decrease waste generated in the first place. Managing less waste is cost-effective for taxpayers, prevents the extraction of natural resources and minimizes the amount of waste that needs to be managed at a disposal facility.

2. Maximize the Recycling of Waste

Actions under this objective that have the biggest impact on keeping waste out of the landfill are recommended for prioritizing in the short-term (0-5 years). Diverting more waste not only extends the life of the landfill but decreases GHG emissions and can help to generate revenue opportunities to offset the cost of those programs.

3. Maximize the Recovery of Waste and Energy and the Optimal Management of Remaining Residuals

There will still be waste that can't be reduced, diverted or recycled and the City's landfill does not have enough space to meet the City's future needs. This objective includes actions that will be explored and implemented in the short-term (0-5 years), medium-term (5-10 years) and long-term (10+ years) to address the immediate and future need to free up and expand landfill capacity and extract maximum resources and energy from this remaining waste stream.

4. Maximize Operational Advancements

Actions within this objective support maximizing operational advancements through innovation and new technology to make operations more efficient and less impactful on the environment.

5. Develop a Zero Waste Culture Across the City

Getting to Zero Waste will require guiding and supporting the community to change their lifestyles and waste management practices. Actions under this objective will help residents understand what they can do to work toward Zero Waste, and influence industry and the wider community to reduce, reuse and divert waste.

Targets

The SWMP identifies 50 Actions that are recommended for implementation to meet the objectives of the plan and work towards the plan's Zero Waste vision. These Actions aim to:

- Decrease the amount of waste disposed by the community within households, City facilities, parks and public spaces by 15% in 2029 and by 23% by 2034, compared to the 2024 baseline.
- Increase the amount of organics captured by diversion programs by 14% by 2029 and by 20% by 2034, compared to the 2024 baseline.

SWMP highlights for the short-term (0-5 years)

Actions that are recommended for prioritization in the short-term (0-5 years) include:

Objective 1: Maximize the reduction and reuse of waste

- Development of a food waste reduction strategy in partnership with community organizations and industry.

Objective 2: Maximize the recycling of waste

- Development of a strategy to reduce and recycle bulky waste and construction and demolition waste, which together make up over 27% of the waste stream.
- Leading by example by implementing initiatives and strategies for City-owned facilities to decrease waste generation and maximize diversion of waste from landfill.

Objective 3: Maximize the Recovery of Waste and Energy and the Optimal Management of Remaining Residuals

- Planning and development of new technologies to reduce waste going to landfill and reduce greenhouse gas (GHG) emissions including:
    - planning for an anaerobic digestion (AD) facility for Ottawa's Green Bin program that will process organic waste and generate renewable natural gas (RNG) to help meet the City's climate change commitments and goals outlined in the City's Energy Evolution Plan.
    - initiating a feasibility study and business case for a waste to energy incineration/mixed waste processing facility to significantly reduce the amount of waste going to landfill and lower GHG emissions.
- Completing the Council-approved Residual Waste Management Strategy to maximize the life of the City's TWFL. This includes expanding the landfill within its existing footprint, banning commercial waste from the TWFL, and redirecting a portion of the waste to private landfills in the area.

Objective 4: Maximize operational advancements

- Maximization of operational advancements through innovation and new technology to make operations more efficient.
- Working toward a zero emissions solid waste fleet.

Objective 5: Develop a Zero Waste culture across the City

- New promotion and education programs and a Behavioural Change Management Strategy to help encourage participation in Actions supporting the vision of the SWMP.

The SWMP will be a living document that will be updated every 5 years. Actions are based on what we know today; the City's waste management needs will change over time depending on many factors such as resident participation, types and quantities of wastes to be managed, availability of end markets, new legislation and new technologies.

The SWMP provides a comprehensive set of integrated actions and implementation plan to reduce the amount of avoidable waste going to landfill to achieve the vision of zero waste. Getting closer to zero waste is complex. The SWMP coordinates and integrates the implementation of 50 actions into a recommended waste management system that together will help to achieve the plan's targets and Zero Waste vision. An implementation roadmap was developed based on short-term (0 to 5 years), medium-term (5-10 years) and long-term (10+ years) timing for the recommended actions.

2.0 Developing the SWMP

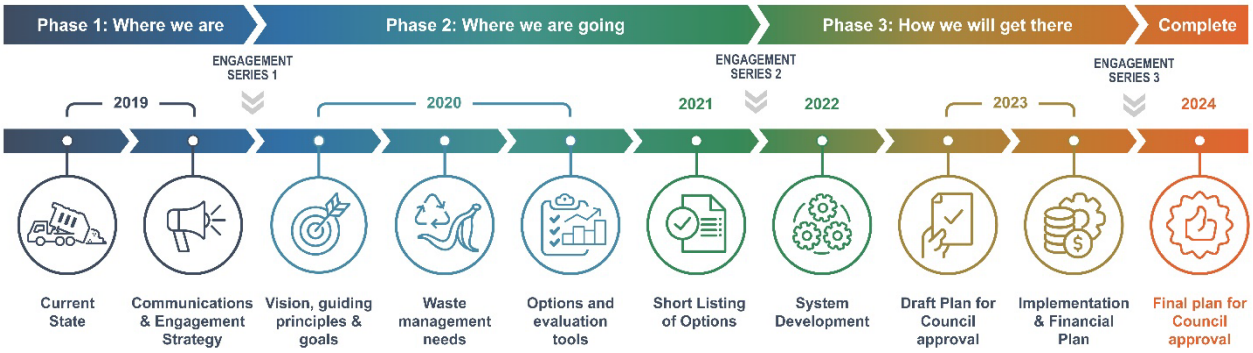
The SWMP was prepared using a three-phased approach, with each phase being based on a solid foundation of research, data, best practices and extensive engagement with key stakeholders and the public.

Early in SWMP development, extensive research was conducted on best practices and lessons learned from municipalities considered leaders in the field across Canada, and internationally, as well as Canadian and global emerging policy, program, and technology waste management trends.

This extensive research and analysis enabled a thorough analysis of the gaps in Ottawa's waste management system and the types of actions that could fill those needs. Please refer to the **Comparative Scan of Municipal Strategies, Practices and Initiatives, Review of Policies and Trends** and **Waste Management Technologies and Approaches** for more information.

The development process is presented in **Figure 3** with a brief description of each phase.

Figure 3: Development Process



Phase 1 – Where We Are At

Phase 1 documented key baseline information on the City's current Integrated Waste Management System and available mechanisms for municipalities to influence waste reduction and diversion. Extensive research was conducted on international emerging policy, program, and technology trends with a focus on best practices and lessons learned from communities considered leaders in sustainable waste management.

The objective of this phase was to establish a current state baseline to assess the performance of the City's current waste management system and future initiatives undertaken by the City to achieve the objectives of the SWMP. It included foundational work to help gauge where the City could and wanted to go in the future. A robust Community and Stakeholder Engagement Plan was developed at this Phase to help support the development process.

Phase 2 – Where We Are Going

Phase 2 captured the anticipated future needs for the City's solid waste management system based on an understanding of the gaps, challenges and opportunities in the City's waste management system, as well as long-term projections of future waste tonnages that will need to be managed by the City. To meet these future needs, a long list of policy, program and technology options was identified and evaluated using a triple bottom line approach to select and prioritize options that align with the SWMP's vision, guiding principles and goals.

The evaluation process narrowed down the options to a short list of recommended Actions for engagement and consideration.

Community and stakeholder engagement was a key aspect of this phase. Two engagement series were conducted to assist with determining the vision, guiding principles and goals of the SWMP as well as prioritizing the different options identified and how and when these recommendations should be put into action.

Phase 3 – How We Will Get There

Once the short list of Actions was determined, a draft SWMP was prepared that presented when each Action would be planned and implemented, the potential impacts the Actions could have on the goals of the SWMP, the targets and performance measures and the financial requirements to support the new system. Feedback from the community and stakeholders on the draft SWMP was then incorporated into the final SWMP before presenting to Committee and City Council for approval.

Community and Stakeholder Engagement

Development of the SWMP included a significant engagement component to provide the community and stakeholders with an opportunity to have their say. Engagement throughout the development of the SWMP played a critical role in incorporating insights and perspectives from a range of demographics into the recommendations put forward in the SWMP as well as to support community buy-in of the SWMP.

A multi-phased engagement approach was used to receive valuable feedback at specific times during the development of the SWMP to align with technical deliverables.

Engagement Series 1 took place at the beginning of Phase 2 to obtain feedback on:

- The current state of waste management in Ottawa and desired future state.
- Options required to move the City forward towards a desired state.
- The vision, guiding principles and goals of the SWMP.

Engagement Series 2 took place at the beginning of Phase 3 to obtain feedback on:

- The prioritization of the various recommended Actions for the SWMP.
- How far and how fast the Actions should be implemented in order to reach the vision and goals of the SWMP.

- How much more residents would be willing to pay for a waste management system that reaches the goals of the SWMP.

Engagement Series 3 took place at the end of Phase 3 in order to:

- Provide an opportunity for residents and stakeholders to review the draft SWMP and offer their feedback before the final SWMP is presented to City Council.
- Obtain feedback to help inform initial planning and implementation of the SWMP actions.
- Let residents and stakeholders know what will happen next and how they can remain informed on implementation engagement.

Key Audiences

To ensure that the final SWMP is supported by the community, it was critical that engagement included a robust list of stakeholders representative of Ottawa's diverse demographics and many businesses, associations, and organizations that contribute to Ottawa's economic, social, and environmental well-being. The City applied an Equity Lens when identifying a long list of key stakeholders that stood to be affected by the new City of Ottawa SWMP.

> Equity is treating everyone fairly by acknowledging their unique situation and addressing systemic barriers. The aim of equity is to ensure that everyone has access to equal results and benefits.[1]

1 City of Ottawa, Equity and Inclusion Lens Handbook 2018, https://documents.ottawa.ca/sites/documents/files/ei_lens_hb_en.pdf

Key audiences included:

- Residents, including equity-seeking groups, and multi-residential residents
- Associations, including those representing diverse perspectives and resident interests
- Businesses, including Business Improvement Associations (BIAs), coalitions, construction businesses, demolition businesses, for-profit businesses and businesses receiving City services
- Multi-residential property managers and owners
- Municipal boards and agencies
- Waste service providers
- Educational institutions, including universities, colleges, and school boards
- Environmental groups and non-governmental organizations, including both urban and rural associations and organizations
- Government and waste management associations
- City staff
- City Council Representatives from the City's former Environmental Stewardship Advisory Committee (ESAC) and Accessibility Advisory Committee (AAC)

In order to ensure stakeholders, members of City Council, and relevant City staff were engaged at major milestones throughout the SWMP's development, the following key stakeholder groups were also developed:

- **Stakeholder Sounding Board (SSB):** Individuals and organizations from across the city that represent a broad range of resident and stakeholder perspectives, including differing demographics and housing types. The SSB provided a forum for mutual learning and enhanced discourse on topics related to the SWMP.
- **Council Sponsors Group (CSG):** A committee of City Council members was established and comprises the Chair and Vice-Chair of the Environment and Climate Change Committee; a representative from the Mayor's Office; and three

additional members of Council. The CSG provided vital input, and strategic advice to staff supporting the SWMP's development and will act as a champion to help see the project through to its completion.

- **City Champions Group (CCG):** City staff leaders and subject-matter experts from across the organization. Members helped support the project team by providing input into the SWMP based on their respective areas of expertise. The group was also consulted to ensure the SWMP's alignment with other departmental objectives and operational requirements.

Engagement Activities

The Community and Stakeholder Engagement Plan incorporated a variety of engagement activities to enable participation from a wide range of groups and stakeholders. However, all activities originally planned for Engagement Series 1 and 2 were modified to enable virtual engagement in response to the COVID-19 pandemic and Public Health's direction regarding gatherings. Every effort was made to replace planned in-person sessions with effective virtual activities, which included the following online activities:

- Dialogue sessions and workshops for all residents and stakeholders.
- Focus groups with equity-seeking groups.
- Information sessions for all residents and stakeholders.
- Surveys, including use of an online survey tool Choicebook, that presented participants with facts and scenarios before asking for their views through a series of open and closed-ended questions.
- Online engagement platform, Engage Ottawa, where residents and stakeholders could participate in forums, ask questions of staff and submit their ideas.

In-person activities were able to resume for Engagement Series 3 and engagement sessions were held at various City facilities, in addition to conducting the virtual activities listed above.

Figure 4, **Figure 5** and **Figure 6** summarize the various engagement activities undertaken throughout plan development and provides a snapshot of participation.

Figure 4: Engagement Activities Undertaken During Engagement Series 1

4 Vision Workshops	Guiding Principles Survey – **50 respondents**	Online Forum & Ideation on Engage Ottawa – **46 Respondents**	4 Online Dialog Sessions – **96 participants**
Staff survey – **1,800 respondents**	Public Survey – **762 respondents**	**4 virtual focus groups** and **3 key informant interviews** with equity-seeking groups	**3 dialog sessions with solid waste management staff**
10 internal surveys with frontline solid waste staff	**3 workshops with Council Sponsors Group, City Champions Group and Stakeholder Sounding Board on vision, guiding principles and goals**	**3 evaluation tool workshops** Council Sponsors Group, City Champions Group and Stakeholder Sounding Board	**Ongoing meetings with Councillors**

Figure 5: Engagement Activities Undertaken During Engagement Series 2

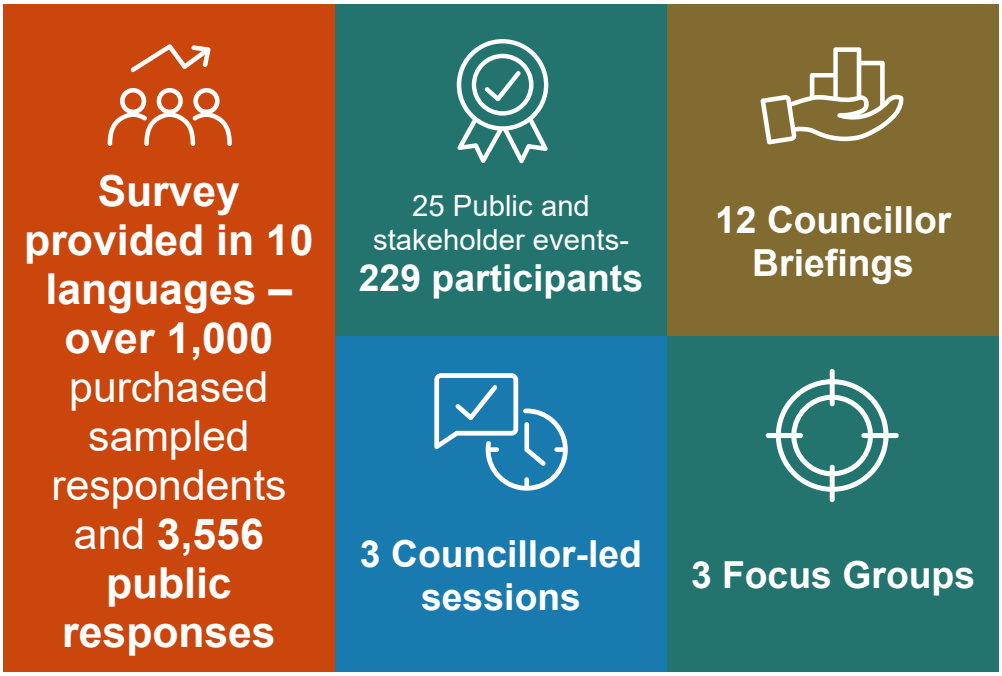


Figure 6: Engagement Activities Undertaken During Engagement Series 3

Promotion

A robust communications plan to encourage participation in the engagement process was developed to reach a broad range of residents and stakeholders. Communications activities include targeted online advertising, news releases, public service announcements (PSAs), media releases, social media, promotional kits for Councillors and stakeholders, features on Ottawa.ca, e-Newsletters, advertisements on City assets and the distribution of outreach materials.

Furthermore, applying the City's Equity and Inclusion Lens, staff developed connections with several groups that were at risk of exclusion in order to disseminate information about engagement opportunities and encourage individuals to participate in online workshops and focus groups.

All Councillors were regularly updated by way of information and briefings throughout the course of the SWMP development and were provided with resources to include in their ward newsletters and constituent communications.

Common Themes

What We Learned Reports were released after each engagement series to inform residents and stakeholders of the results and to present how the input received was used to inform development of the SWMP.

Throughout Engagement Series 1 and 2 several prominent themes emerged that helped provide direction on how the SWMP was developed. This frequent feedback included:

- Behavioral and societal change will be required to meet higher diversion rates, and the City needs a strong focus on education to encourage such changes.
- Actions that support the higher tiers of the waste management hierarchy (reduction, reuse and recycling) should be a priority.
- Waste needs to be redefined as a "resource" and circular economy principles should be embedded into the waste management system.
- Accessibility, convenience and affordability should be incorporated into the SWMP and strongly considered when developing implementation plans for any new policies and services.

- Working with the community and external stakeholders when planning and implementing SWMP Actions will be crucial to success.

During Engagement Series 3 frequent feedback included:

- The SWMP should strongly emphasize the waste management hierarchy and explain why and how reuse and reduction is being prioritised.
- Ensure the SWMP clearly explains why technologies such as Waste-To-Energy and Mixed Waste Processing are being considered and how they will be assessed.
- Some of the Action Suites may be difficult to participate in due to accessibility, cost and convenience factors, therefore engagement with the public should continue as the various Action Suites are planned and implemented.
- The potential for service user fees to increase is a concern and the mechanisms for funding all the Action Suites in the plan should be made clear.

3.0 Vision Statement, Guiding Principles, Goals of the SWMP

The SWMP's vision statement, guiding principles and goals form a framework for the SWMP's development process and will help guide the City's future waste management decision making. They were designed to reflect recent and anticipated future trends in the waste management industry and to support the advancement of healthy, inclusive and equitable communities and services. The vision statement, guiding principles and goals also considers new City policies and strategies that are influencing the SWMP's priorities. This includes Ottawa City Council's declaration of a climate emergency and recognition of the important role the future Integrated Waste Management System will have in helping achieve Council's climate change goals. The statements were all developed using feedback from Engagement Series 1. The **What We Learned** report documents the process and presents how the input was used.

The **Vision statement** defines where we want to be in 30 years. It serves as the inspiration and framework for strategic planning.

The **Guiding principles** outline our beliefs, define what is important for success, guided us throughout the development of the SWMP and will continue to guide us through its implementation.

The eleven **Goals** are statements that define outcomes we want to achieve in implementing the SWMP. They help transition the vision statement from a broad statement to a more specific direction.

Vision Statement: A Zero Waste Ottawa achieved through progressive, collective and innovative action.

Guiding Principles:

- **Honouring the 5Rs waste management hierarchy** by prioritizing options that support waste reduction, reuse, recycling and recovery so that minimal residual waste is sent to landfill.
- **Changing community values** so that residents and stakeholders view waste as a resource, share the responsibility of waste management and play a role in achieving the goals of the SWMP.

- **Protecting the environment for future generations to come** by mitigating the environmental impacts of managing waste.
- **Leading by example** when managing waste as a corporation by incorporating the 5Rs waste management hierarchy across the City's entire operations.
- **Adopting circular economy principles** to minimize the use of raw materials, recognize waste as a resource, maximize the value of waste and keep products and materials in use, and advocate for industry and other levels of government to take action that supports the transition to this economic model.
- **Embracing innovation** and being open to opportunities to adopt to emerging technologies, policies and industry trends.
- **Keeping waste local** by treating residential waste within the City's boundaries, wherever operationally and economically feasible.
- **Utilizing the triple bottom line** to balance environmental sustainability, City and community desires and fiscal responsibility.

Circular Economy

The traditional linear economy model follows a "take-make-dispose" pattern where raw materials are extracted, used to create products, and then discarded as waste at the end of their life cycle. Conversely, a circular economy is an economic model designed to maximize resource efficiency and minimize waste by keeping products, materials, and resources in continuous cycles of use and reuse. Resources that can be reused, repaired, leased, refurbished, or remanufactured are kept in the economy for as long as possible and products are designed in a way to prioritize reparability over new purchases. Over the past five years there has been uptake of circular economy principles around the world. In Canada, the federal government has introduced several circular economy initiatives, including the **Greening Government Strategy**, At the provincial level, the Province of Ontario released its Strategy for a Waste Free Ontario – Building the Circular Economy which sets out requirements to achieve a circular economy in the province.

Municipalities across Canada are also developing strategies to accelerate the development of the broader circular economy at a local level. Fifteen municipalities are participating in the **Canadian Circular Cities & Regions Initiative**, which aims to advance circular economy knowledge sharing and capacity building in Canadian cities and communities. Municipalities are uniquely positioned to support the transition to a circular economy through policy instruments and tools that influence the economy and change the behaviour of people and business.

Comparison of Linear Economy versus Circular Economy

Goals:

1. Extend the life of the Trail Waste Facility Landfill significantly beyond its existing anticipated end of life to eliminate the need for a new residential landfill.
2. Reduce the amount of waste generated by residents and the City as a corporation.
3. Maximize the reuse of waste generated by residents and the City as a corporation.
4. Maximize the recycling of waste generated by residents and the City as a corporation.
5. Maximize the recovery of materials and energy from the remaining waste stream.
6. Aspire to achieve 100 per cent GHG emission reductions produced by the City's integrated waste management system.
7. Support, influence and partner with the Industrial, Commercial and Institutional sector, including multi-residential, small businesses, the agriculture sector and the Construction and Demolition sector, to reduce, reuse and divert waste in the broader community.
8. Maximize participation by enhancing the accessibility, convenience, consistency and affordability of waste management programs and services.
9. Maximize cost containment, revenue generation and the efficient use of waste management resources to help minimize costs to taxpayers.
10. Make sustainable waste management design an essential part of the City's planning process.
11. Collaborate with external stakeholders, including industry and other levels of government, to advance waste management practices.

Objectives:

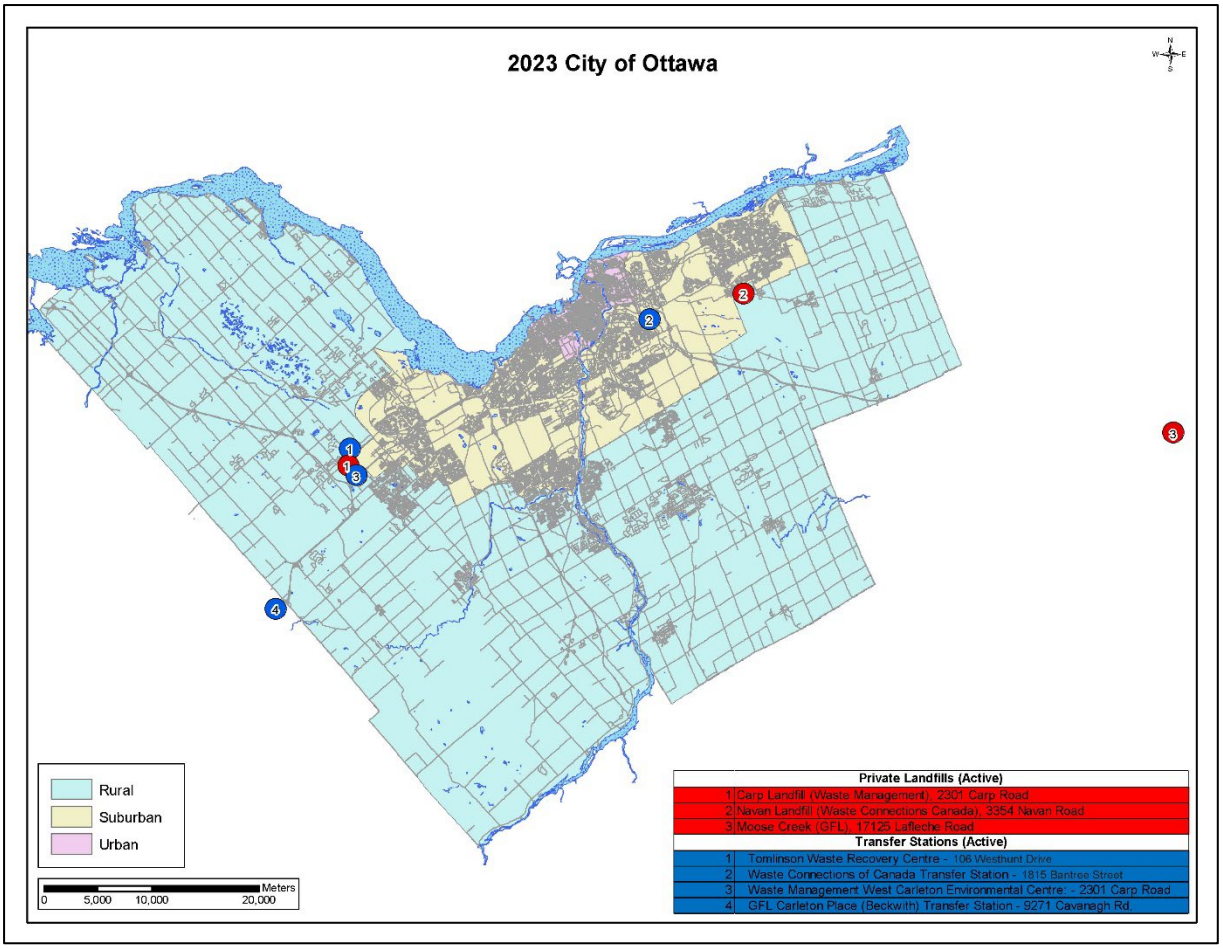
Five objectives were developed to capture what needs to be accomplished to reach the 11 SWMP goals.

1. Maximize the Reduction and Reuse of Waste
2. Maximize the Recycling of Waste
3. Maximize the Recovery of Waste and Energy and the Optimal Management of Remaining Residuals
4. Maximize Operational Advancements
5. Develop a Zero Waste Culture Across the City

4.0 The Current Integrated Waste Management System

The City of Ottawa, the Nation's capital, is the second largest municipality within the Province of Ontario and is the sixth largest city in Canada after Toronto, Montreal, Vancouver, Calgary and Edmonton. The city is home to over one million people and is made up of distinct urban, suburban and rural communities that span 2,800 square km. **Figure 7** shows a map of the City.

Figure 7: Map of the City of Ottawa



The City has a complex and integrated solid waste management system that maintains public health and supports environmental sustainably by offering a number of programs and services to residents. The City's waste management system is continually evolving to enhance existing programs and to improve service to residents.

4.1 Waste Management Services

The City provides waste management services for approximately:

- 310,700 curbside-residential households
- 2,300 multi-residential households
- 750 on-street waste bins (garbage and recycling)
- 5,400 waste bins in City parks
- 500 City facilities
- 300 small businesses and places of worship through the Yellow Bag Program for Small Businesses
- 300 schools through the Green Bins in Schools Program

The City is responsible for providing garbage, household organics and leaf and yard waste collection and processing for the residents of Ottawa.

Curbside-residential households include curbside-residential homes and town homes that receive curbside collection. Multi-residential households are generally buildings that have more than 6 units, such as low rise and high rise buildings as well as some townhome complexes that receive centralized containerized collection, either located in a communal area outdoors or in a dedicated waste room inside the facility.

A history of the key milestones in the evolution of the City's waste management system since the opening of the TWFL in 1980 is provided in **Table 1**.

Table 1 City of Ottawa Waste Management System Key Milestone

Year	Description
1980	• Trail Waste Facility Landfill opens
1980s	• Blue Bin Programs implemented individually by all 11 municipalities (that now make up Ottawa).
1992	• Household Hazardous Waste (HHW) Depot opens at the TWFL. • Operated by the Regional Municipality of Ottawa-Carleton.
1995	• Regional Municipality of Ottawa-Carleton (RMOC) amalgamates Solid Waste programs with 10 out of the 11 municipalities. The remaining municipality joined in 2001. • Four mobile 1-day HHW depots added.
1996	• More recyclable items added to the Blue Bin.
1997	• Take It Back! Program commences. Program encourages local businesses to "take back" many of the household materials that they sell, and to ensure they are reused, recycled or disposed of properly.
1999	• RMOC begins managed competition process with in-house team. • Black Box program introduced.
2001	• New City of Ottawa created by the amalgamation of 11 former municipalities and the RMOC. Solid Waste Services incorporated under the new Ottawa. • Start of Compost Plus Pilot Project (5,300 households).
2003	• Ottawa City Council approves the Integrated Waste Management Master Plan.

2004	• Due to Universal Program Review (UPR), Ottawa City Council reduced the garbage and recycling services by eliminating:
	  ○ Problematic blue bin items (e.g., polystyrene and film plastic);
	  ○ The leaf and yard waste collections in the summer months (reinstated 2005); and
	  ○ The pick-up of garbage and recycling from all commercial businesses.

2005	• Ottawa City Council approves Source Separated Organics collection (Green Bin Program). • Ministry of Environment approves the TWFL expansion. • City enters into partnership agreement with Plasco for waste processing. • Permanent HHW depot closes at the TWFL and 10 mobile HHW depots added.

Year	Description
2006	• New collection contracts for curbside and multi-residential sectors. • Yellow Bag Program for Small Businesses commences.
2007	• The first Give Away Day/Weekend. This initiative encouraged residents to place unwanted household items at the curb for other residents to take home and reuse.
2008	• City signs contract with Convertus (formally Orgaworld and Renewi) for organics processing.
2009	• HHW mobile depots expanded to 13 per year. • Ontario's Electrical Waste and Equipment Program begins. • Green Bin Champions Program commences.
2010	• Green Bin Program implemented for curbside residents and schools. • Supply of green bins and recycling containers (and collection) for special events commences.
2011	• Green Bin Program implemented for the multi-residential sector. • Service Level Review completed. • Distribution of blue bins, black bins and green bins through the Canadian Tire coupon program begins.
2012	• New curbside collection contract commences with the introduction of an appointed in-house group for Zone 3 (ended May 2020). • Start of biweekly garbage collection, weekly green bin collection and biweekly Special Considerations Program (Diapers & Incontinence products) collection. • Green Bin collection in the rural areas commences.
2014	• New multi-residential contract commences and includes the collection of waste from City facilities (ended May 2020).
2015	• City terminates agreement with Plasco.
2018	• City terminates agreement with Canadian Tire to supply blue bins, black bins and green bins to the public. Program moved to private service provider. • City Council approves changes to the City's Green Bin Program to improve program participation.
2019	• Ottawa City Council approves 3-year sole source extension of curbside collection contracts (end date: May 2023). • City implements changes to Green Bin Program, accepting dog waste and use of plastic and compostable bags to bag organic waste. • City Council approves Solid Waste Master Plan Roadmap.

Year	Description
2020	• New 5 year multi-residential/City facility collection contract commences. This contract includes the collection of bulky items and Green Bin collection from private property. • City Council received Phase 1 Solid Waste Master Plan Report.
2021	• City Council approves Multi-Residential Diversion Strategy, making Green Bins mandatory for new properties and phasing in for remaining properties without a program in place. • City Council receives Phase 2 Solid Waste Master Plan Report. • Curbside Collection Contract Extension approved by Council.
2022	• Collection of household hazardous waste transitions to IPR under the Hazardous and Special Products Program across Ontario
2023	• City begins the transition of its municipally-run recycling programs to IPR under the Blue Box regulation – which will end on December 31, 2025 and further extends the curbside collection contract to March 2026 • City Council approves 3-item curbside garbage limit to begin in 2024. • City Council approves new curbside collection contract to begin in 2026.

4.1.1 Organics Management

The City has a contract with Convertus (formerly Renewi Canada) for the processing of household organics and leaf and yard waste until 2030. Convertus uses aerobic composting to process the Green Bin food and organic waste. Aerobic composting uses oxygen and heat-activated bacteria to break down the organic material and create compost and other products such as animal bedding.

Leaf and yard waste is collected with household organic waste. During the peak spring and fall leaf and yard waste season, material is collected in a separate vehicle and taken to the Barnsdale Road outdoor windrow composting facility which is owned by the City.

4.1.2 Waste Disposal

All garbage collected by the City is brought to the TWFL for final disposal. The TWFL also accepts waste directly at its gates from Ottawa residents and small businesses, such as contractors. The TWFL is a key City asset and is the second largest active municipal landfill in Ontario. It opened in 1980 and was expanded in June 2007. As of 2022, the TWFL had 3,486,525 m^3 of available air space remaining and is anticipated to be full between 2034 and 2036 if current waste disposal practices continue.

The landfill uses innovative technologies and methods and is operated above industry standards. It is permitted to accept solid, non-hazardous waste generated within the boundaries of the city of Ottawa. The landfill has a robust gas collection system that captures methane gas, which is a powerful GHG that is more than 25 times as potent as carbon dioxide at trapping heat in the atmosphere. The methane gas is converted into electricity that is enough to power approximately 6,000 homes in Ottawa. The 3rd party agreement to upgrade the City's landfill gas to electricity is managed by PowerTrail and expires in 2027. An aerial photo of the TWFL is shown in **Figure 8.**

Figure 8: Aerial Photo of the Trail Waste Facility Landfill

The City also manages the environmental monitoring of a number of open and closed landfills across the city, including:

- The Springhill Landfill (operated by a third-party contractor based on a Management Agreement signed in 1996 between the former Township of Osgoode) - landfill operations are currently suspended;
- Nepean Landfill (closed 1980); and
- Provision of perpetual care for 81 other closed landfill sites (managed by City's Real Estate Office).

4.2 Waste Diversion and Individual Producer Responsibility (IPR)

In Ontario, residential waste diversion responsibilities for Blue and Black Bin recyclables, hazardous and special waste, electrical and electronic waste, batteries and used tires, which were traditionally managed by municipalities, have transitioned to an Individual Producer Responsibility (IPR) framework. Under the new provincially driven framework, the City is no longer in control of or responsible for the management of these waste streams. Producers of products and packaging are 100 per cent responsible for the collection and processing of designated materials, as well as program promotion and resident education. The IPR framework is intended to give producers incentive to redesign products and make them easier to recycle while reducing municipal taxpayer costs for managing waste.

- Used tires (December 2018)
- Batteries (July 2020)
- Electrical and Electronic Equipment waste (January 2021)
- Hazardous and special products waste (September 2021)
- Blue and Black Bin recyclables (July 2023)

4.2.1 Blue and Black Bin

As the Blue and Black Bin transition is still underway across the province, the City has entered into an agreement with producers to provide Blue and Black Bin recycling collection to residents on behalf of producers until December 31, 2025, after which producers will take over collection. Because the scope of IPR mainly includes curbside-residential and multi-residential households, the City still provides Blue and Black Bin collection and processing for City facilities, small businesses under the Yellow Bag Program for Small Businesses, in public spaces and for the ongoing parks recycling pilot project.

4.2.2 Hazardous and Special Products Waste

On October 1, 2021, producers became responsible for managing most Hazardous and Special Products (HSP) waste. The final regulation does not cover the variety of hazardous waste materials that were accepted at the City's hazardous waste collection events, leaving the City responsible, should it wish (i.e., not a regulated requirement), for managing select hazardous and special products to ensure diversion from the City's TWFL, or from having them end up in waterways and natural areas. To date, producers have yet to implement a new approach to manage HSP under the new Provincial program and they continue to rely on City operated Household Hazardous Waste events to meet their regulated requirements.

In 2023, the City provided 9 mobile Hazardous and Special Waste Events in various locations across Ottawa. Producers contribute financially to support events, but producer-funding covers less than half of the costs of materials management and mobilization. The City continues to advocate for full cost funding thorough its work with the Municipal Recycling Collaborative (M3RC) and other Ontario municipalities.

4.2.3 Other Waste Diversion Programs

Residents also have access to several waste diversion programs to further divert waste from landfill. This includes producer led programs for battery, electronic and used tire waste as well as the City-organized Take It Back! Program which encourages local businesses to "take back" many of the household materials that they sell, and to ensure they are reused, recycled or disposed of properly. This program provides a convenient and safe way for residents of Ottawa to return household items that should not go in the garbage to participating retailers and charitable organizations. The program accepts a range of items, such as used furniture, appliances and used clothing and textiles.

4.3 Waste Generation, Composition and Diversion

In 2023, a total of 345,901 tonnes of waste was collected and managed by the City including approximately 183,000 tonnes of garbage, 99,400 tonnes of organics and leaf and yard waste and 63,400 tonnes of recyclables.

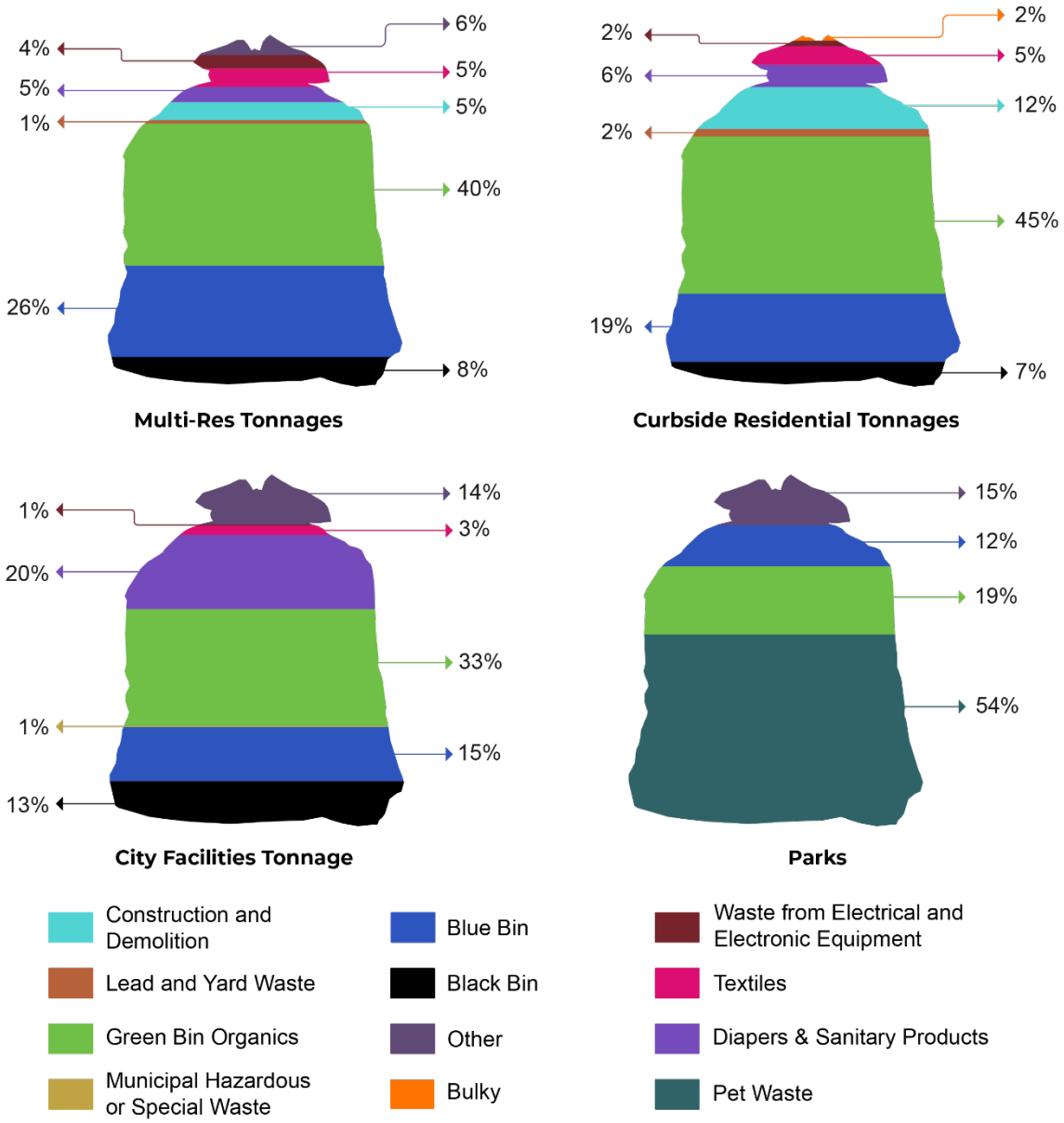
> On average, **each Ottawa household** generated around **1 tonne** of garbage (approximately the weight of a baby humpback whale) in 2023.

In 2023, the City's overall diversion rate was 47%. The diversion rate is calculated based on the quantity of material collected for diversion and the total quantity of waste collected (i.e., for disposal and diversion). Curbside households continue to divert more waste than multi-residential households. The 2023 diversion rate for curbside households was 54% and the 2023 diversion rate for multi-residential households was 17%.

In 2018 and 2019, waste composition studies were completed for curbside and multi-residential households and City facilities to understand program participation rates. The studies also provided a better understanding of what's in our garbage. A new 4-season waste audit is being undertaken in 2024 and results of this audit will be reported in Q1 2025.

Figure 9 provides an illustration of the composition of the waste that is left in the City's garbage stream for curbside residential, multi-residential, City facilities and parks included in the Parks Pilot Project. Of the categories still left in the garbage stream, leaf and yard waste, green bin organics, Municipal Household SW, electronics, blue bin materials and black bin materials could have been diverted with existing programs offered by the City.

Figure 9: Overview of What's Left in the Garbage Stream by Sector



Between the Fall of 2019 and the Summer of 2020, a four-season waste audit of the Pilot Parks Project was conducted. The audit found that the diversion rate by tonnage was 71.84%.

4.4 Promotion, Education and Outreach

The City provides regular communications to residents that promote the City's waste programs and educate on how to properly manage the different waste streams. The City uses different tools and tactics to promote services and programs and to educate the public about how to reduce, reuse, recycle and/or dispose of waste in the city. Examples of current promotion, education and outreach initiatives include:

- The City's website
- Waste Explorer Search Tool
- Collection calendar app and mail-out
- Outreach Staff for community events, school presentations, and campaign roll outs
- Targeted campaigns (such as the Cleaning the Capital events, circular economy month, and green bin roll out in multi-residential buildings)
- Social media (active or paid advertising) and earned media

The City has also recently begun work to apply a more robust equity, diversity and inclusion lens to better reach diverse communities. This is done through providing communications and educational materials in multiple languages, and using images instead of text, including the use of ethnic products in waste diversion promotions materials.

4.5 How Solid Waste is Funded

In 2024 Solid Waste Services' gross operating budget is $115 million for Net Expenditure and the capital budget is $35 million. The City's waste management programs and services are funded directly through a combination of an annual set user fee rate, general property taxes, revenues, and user fees.

Garbage collection and disposal services as well as landfill operations and capital planning are funded by a flat rate applied to each residential unit. This individual fee is presented on the tax bill. Waste diversion services are funded through the tax base and are based on the value of the property. These costs are funded by all tax classes from

the whole assessment-based tax bill, which means all property owners, both residential and commercial, provide funding to support waste diversion initiatives. Waste diversion initiatives include the collection and processing of household organic waste, leaf and yard waste and the City's portion of hosting Hazardous and Special Waste Events.

Some costs are offset by revenues from tipping fees at the TWFL, user rates, and royalty revenue from landfill gas electricity generation. In 2023, the City's Solid Waste Services revenue was $74.1 million. Note, as a result of the transition of various recycling programs to the Provincial Individual Producer Responsibility Program, the City is no longer receiving revenues from the sale of recyclable materials.

Please refer to the Current State Report for additional information.

5.0 Future Waste Management Considerations

The City is faced with an increasing population, changing waste composition, and industry trends that are impacting the quantities and composition of waste requiring management. How the City manages its waste will also be impacted by changes to provincial and federal legislation and will need to align with future initiatives within other City plans and strategies. In addition, new and emerging technologies are becoming available that offer more innovative ways of managing the various waste streams.

By understanding these future waste projections and waste management considerations, the City can make effective and efficient decisions about solid waste programs and services, and plan for the proper supporting infrastructure and contracts to be developed or maintained.

5.1 Household Projections

Ottawa's population is projected to grow to approximately 1.5 million people in 2053. With this, the number of households in Ottawa is expected to increase by almost 40% from 2024 levels. **Table 2** summarizes household projections for the City of Ottawa used for the SWMP, which are based on population and household projections developed through the City's new Official Plan. Details on the methodology and approach to developing the projections can be found in the Long-Term Waste Management Needs Technical Memorandum.

Table 2: Household Projections for the City of Ottawa

Year	Per cent of Curbside-residential Households	Per cent of Multi Residential Households	Total No. of Households Serviced
2024	71%	29%	445,900
2029	71%	29%	483,600
2034	72%	28%	517,500
2039	72%	28%	547,400
2044	73%	27%	573,900
2049	73%	27%	600,700
2053	73%	27%	623,000

5.2 Waste Projections By Source

Waste projections include total estimated waste generation from curbside-residential households, multi-residential households, City facilities, parks and public spaces, hazardous and special products (HSP), and waste that is disposed of directly at the TWFL. The projections, as shown in **Figure** 10 and **Table 3**, estimate the quantity of waste that Ottawans are expected to generate over time, based on the City's status quo waste management system, i.e., assuming no changes are made to the City's programs.

> The quantity of waste managed by the City could increase by approximately 31 per cent by 2053, from about 403,000 tonnes of waste generated in 2024 to 528,200 tonnes in 2053.

Figure 10: Projected Waste Generation by Source (tonnes)

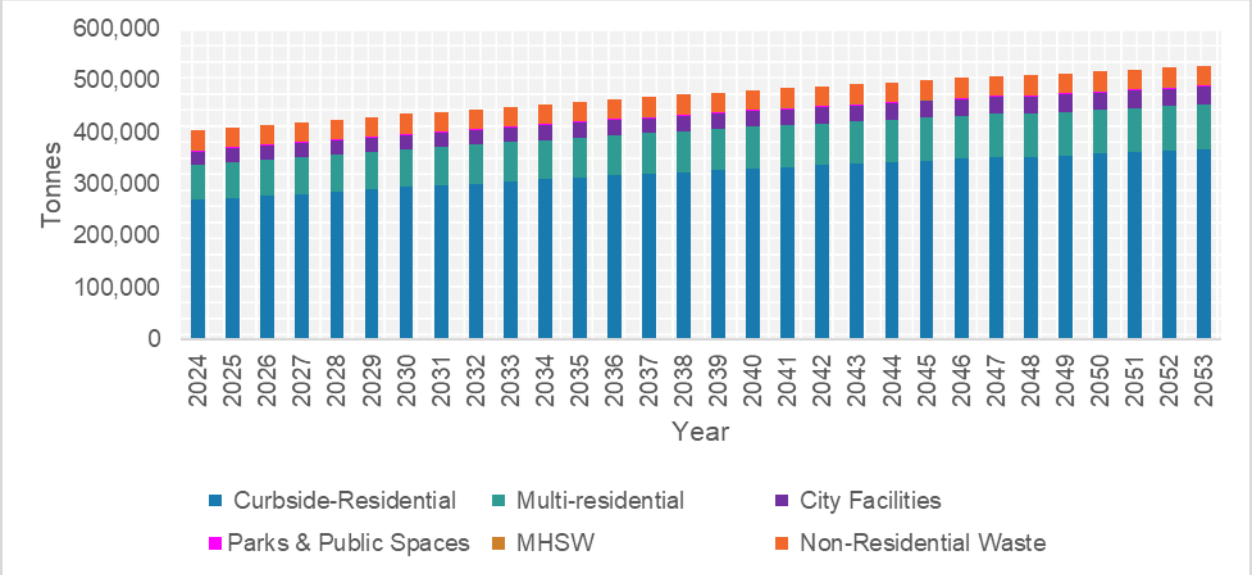


Table 3: Projected Waste Generation by Source (tonnes)

Year	Curbside-residential	Multi-residential	City Facilities	Parks & Public Spaces	HSP	Non-Residential Waste	Total Waste Generation
2024	268,800	69,000	25,100	1,900	700	37,400	403,000
2029	289,300	73,100	26,900	2,000	800	37,400	429,600
2034	308,600	76,500	28,700	2,100	800	37,400	454,200
2039	326,600	79,500	30,200	2,200	900	37,400	476,800
2044	342,200	82,200	31,600	2,300	900	37,400	496,600
2049	355,300	84,300	32,800	2,500	1,000	37,400	513,200
2053	367,400	86,300	33,900	2,600	1,000	37,400	528,600

As is the case today, over the next 30 years, curbside-residential households are expected to continue to generate the largest amount of waste requiring management (70%), followed by multi-residential households (16%), waste that is disposed of directly at the TWFL (7%), City facilities (6%), waste disposed of in parks and public spaces (0.5%) and HSP (0.2%).

5.3 Projections by Waste Stream

Future waste quantities to be managed by the City were also forecasted by waste stream, including garbage and bulky waste, organic waste, blue bin materials, and black bin materials. The waste quantities shown in the figures below are based on the City's existing solid waste management system (i.e., before the SWMP is implemented), and therefore do not include the diversion impacts discussed in **Section 8**.

5.3.1 Garbage and Bulky Waste

Figure 11 and **Table 4** presents the projected quantities of garbage and bulky waste to be managed for disposal by the City from the curbside-residential, multi-residential, City facilities, and parks and public spaces. The amount of garbage and bulky waste generated is expected to increase from approximately 201,100 tonnes in 2024 to approximately 267,600 tonnes in 2053.

A majority of the garbage and bulky waste (approximately 60%) is generated by curbside-residential households, followed by multi-residential (approximately 30%) and City facilities (approximately 10%). Less than 1% of the garbage and bulky waste is generated by parks and public spaces.

Figure 11: Garbage and Bulky Waste Disposal Projections by Sector (tonnes)

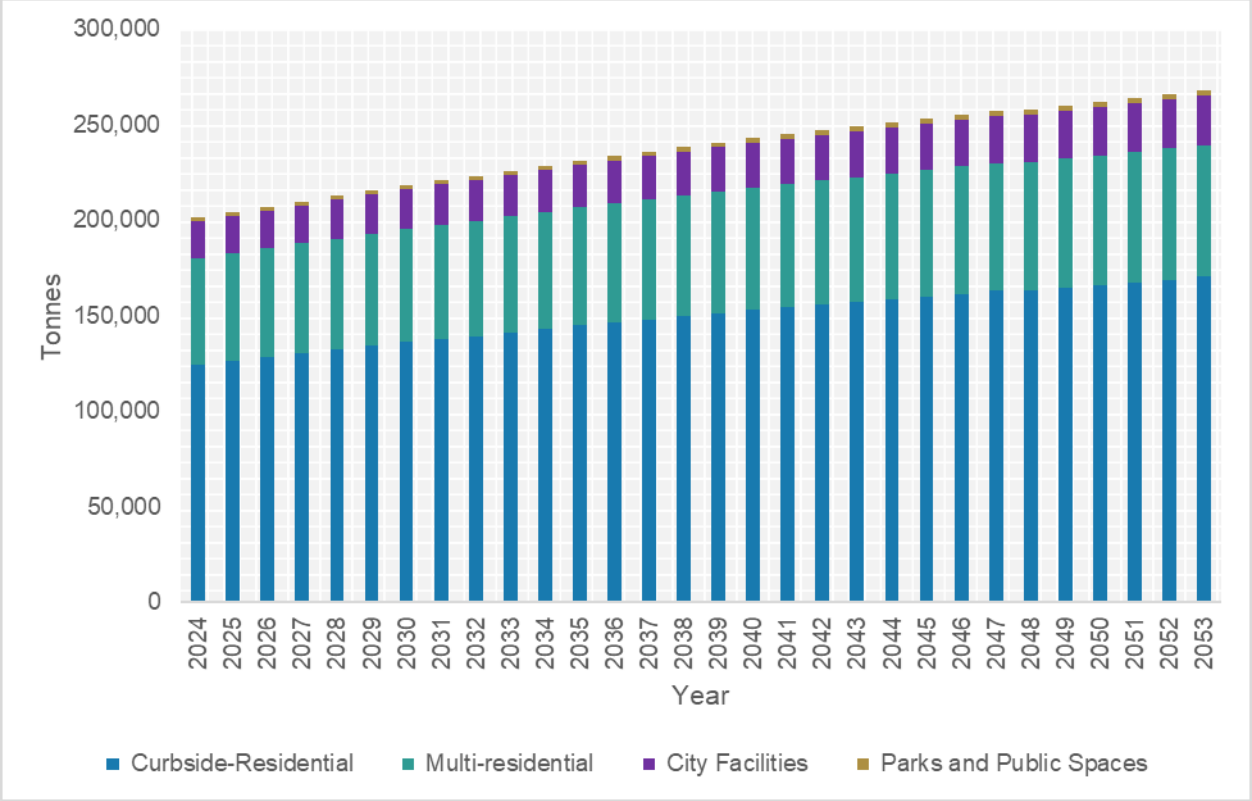


Table 4: Garbage and Bulky Waste Disposal Projections by Sector (tonnes)

Year	Curbside-residential	Multi-residential	City Facilities	Parks & Public Spaces	Total Waste Generation
2024	124,600	55,400	19,200	1,800	201,100
2029	134,100	58,700	20,600	2,000	215,400
2034	143,000	61,300	21,900	2,100	228,400
2039	151,400	63,600	23,100	2,200	240,300
2044	158,600	65,700	24,200	2,300	250,800
2049	164,700	67,400	25,100	2,400	259,500
2053	170,300	68,900	25,900	2,500	267,600

5.3.2 Organic and Leaf and Yard Waste

Figure 12 and **Table 5** show the projected quantities of organic waste to be managed by the City through 2053. Total source-separated organics (SSO) includes curbside-residential household organics, multi-residential household organics, and City facilities household organics. Total leaf and yard waste (LYW) includes separately collected and processed LYW and curbside residential LYW collected with household organics.

These projections include household organics and LYW mixed with household organics in the Green Bin from curbside-residential households. This is because under the status quo waste management system, the City allows residents to dispose of both household organics waste and leaf and yard waste into the Green Bin which is processed separately from leaf and waste collected outside of the Green Bin. The quantity of Green Bin organics is projected to increase from 88,200 tonnes in 2024 to approximately 120,500 tonnes in 2053. Starting in 2026, separately collected LYW is projected to increase from 9,800 tonnes in 2024 to approximately 13,400 tonnes in 2053.

Figure 13 shows organics projections in 2024 through 2053 for household organics and LYW. Household organics are projected to increase from approximately 48,700 tonnes in 2024 to approximately 66,500 tonnes in 2053. LYW is projected to increase from approximately 49,400 tonnes in 2024 to approximately 67,500 tonnes in 2053.

Figure 12: Organic Waste Projections by Sector (tonnes)

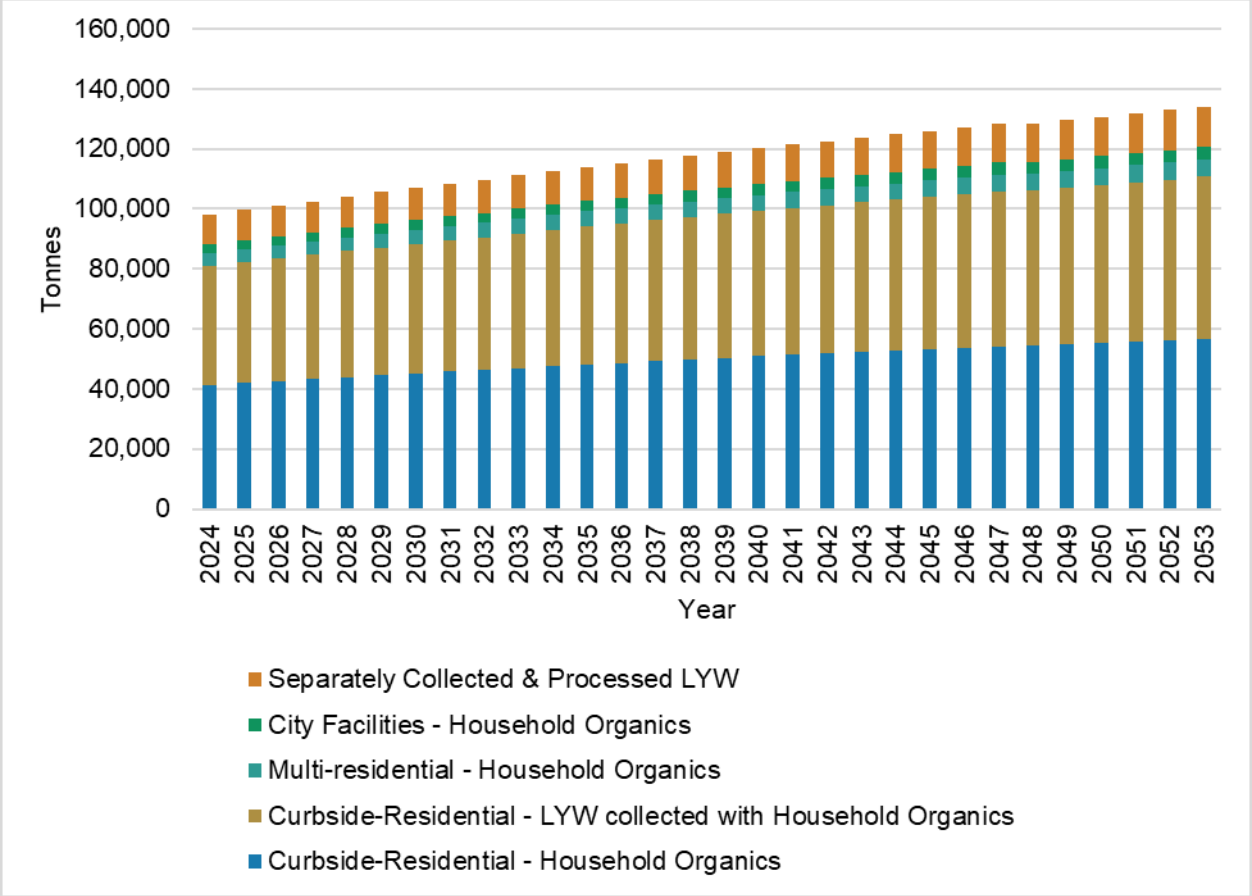
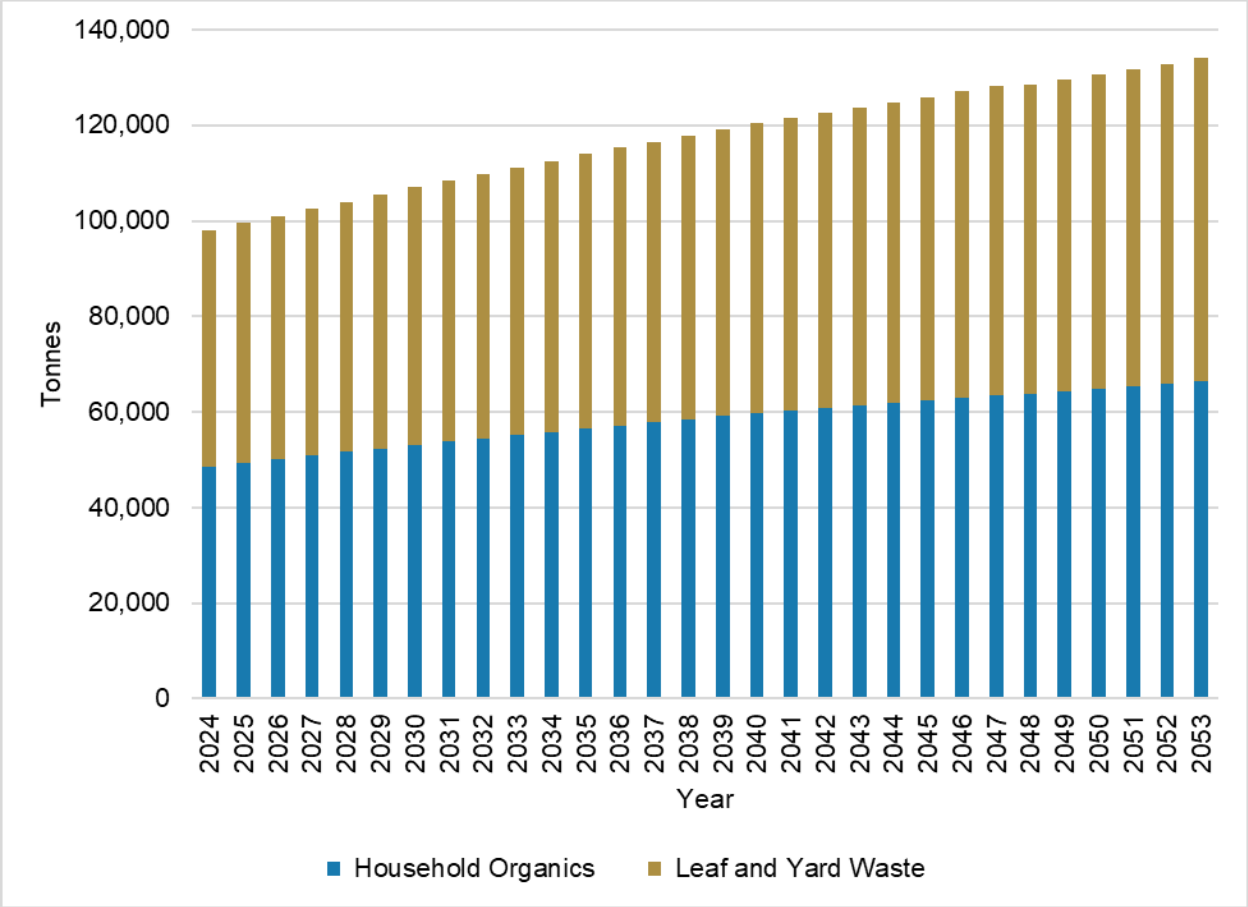


Table 5: Organic Waste Projections by Sector (tonnes)

Year	Curbside-residential - Household Organics	Curbside-residential - LYW collected with Household Organics	Multi-residential - Household Organics	City Facilities - Household Organics	Separately Collected & Processed LYW	Total Waste Generation
2024	41,400	39,600	4,300	3,000	9,800	98,100
2029	44,500	42,600	4,600	3,200	10,600	105,500
2034	47,500	45,400	4,900	3,500	11,300	112,600
2039	50,300	48,100	5,200	3,700	11,900	119,100
2044	52,700	50,300	5,400	3,800	12,500	124,800
2049	54,700	52,300	5,600	4,000	13,000	129,600
2053	56,600	54,100	5,800	4,100	13,400	134,000

Figure 13: Organic Waste Projections for Household Organics and Leaf and Yard Waste (tonnes)



5.3.3 Blue and Black Bin Materials

As of July 1, 2023, the responsibility for managing blue and black bin recyclables from residential households and some City facilities (long term care facilities) transitioned to Individual Producer Responsibility. The transition directly impacts the quantities of recyclables the City will be required to manage in the future. The projections below reflect the estimated quantities of Blue and Black bin materials that will require management by the City.

Figure 14 and **Table 6** shows that the estimated quantity of Blue Bin materials generated in City facilities is projected to increase from 400 tonnes in 2024 to 600 tonnes in 2053, and the estimated Black Bin materials generated in City facilities is projected to increase from approximately 2,200 tonnes in 2024 to 3,000 tonnes in 2053.

Figure 14: Black and Blue Bin Recycling Waste Projections for City Facilities (tonnes)

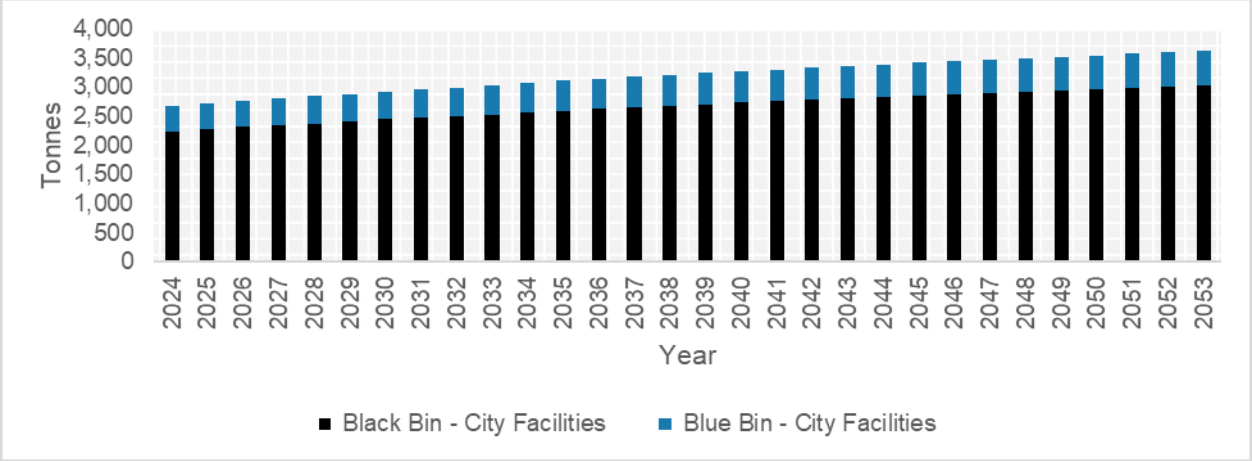


Table 6: Blue and Black Bin Recycling Waste Projections for City Facilities (tonnes)

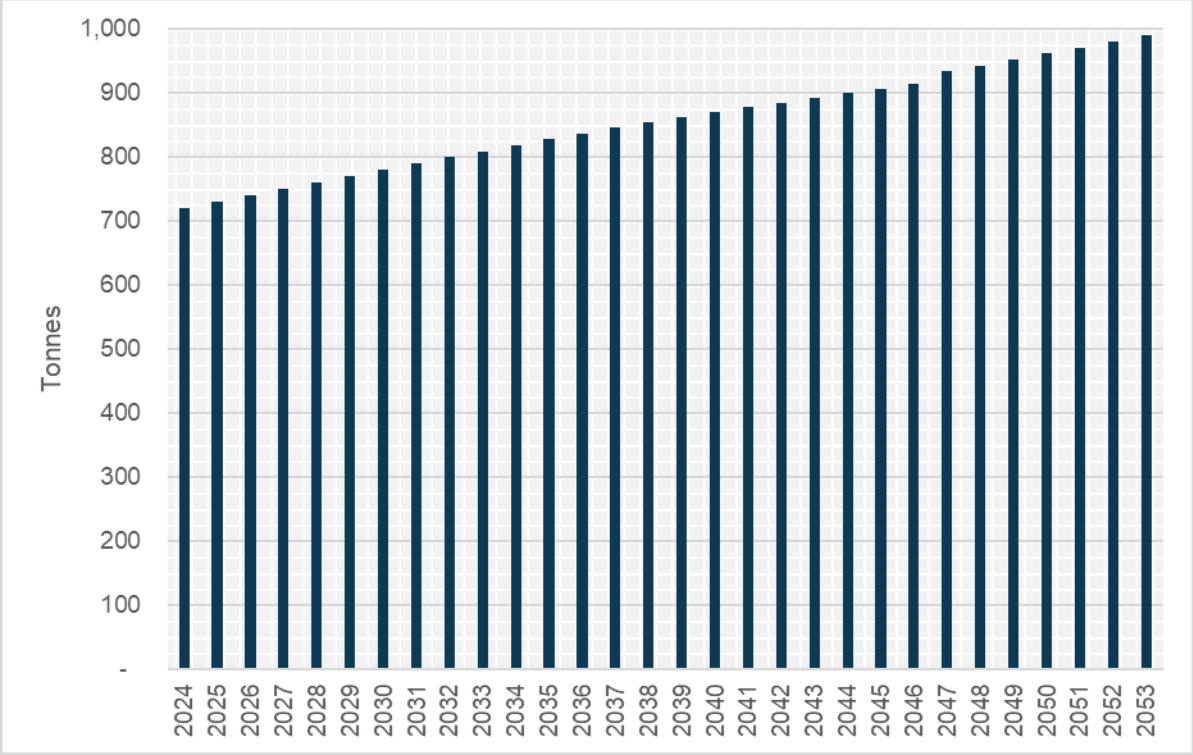
Year	Blue Bin	Black Bin
2024	400	2,200
2029	500	2,400
2034	500	2,600
2039	500	2,700
2044	600	2,800
2049	600	2,900
2053	600	3,000

5.3.4 Hazardous and Special Products Waste Projections

As of October 1, 2021, the responsibility for managing most HSP transitioned to Individual Producer Responsibility. As noted in **Section 4.2.2** producers have yet to implement a new approach to manage HSP under the new Provincial program and they continue to rely on City operated Household Hazardous Waste events to meet their regulated requirements.

Figure 15 presents the projected quantities of HSP requiring management into the future. Quantities are expected to increase from approximately 720 tonnes in 2024 to 990 tonnes in 2053. These projections were developed in 2019 when few details were known about the transition of HSP management to individual producer responsibility. As such, the amount of undesignated products which the City could elect to continue to manage into the future makes up approximately 45% of total tonnes managed today, which would translate to approximately 446 tonnes in 2053.

Figure 15: Projected Tonnes of HSP



5.4 Regulatory and Legislative Changes

Over the last few years there has been a significant amount of new solid waste-related policy and legislative updates from both the federal and provincial governments. Three key areas are currently being focused on that will require the SWMP, and the implementation of its recommendations, to be flexible and adaptable in the next few years:

- Individual Producer Responsibility (IPR);
- Increased food and organic waste diversion and reduction; and,
- The management of single-use plastics.

5.4.1 IPR Planning Considerations

There is a risk that materials that have transitioned to IPR, and are no longer managed by the City, will make their way into the garbage at the TWFL. Key considerations for the City will be to determine how to manage these materials and how best to work with producers to prevent this from occurring. Improperly managed materials may increase the tonnage of material that needs to be processed at the landfill, increasing the City's costs. The City may want to consider policy mechanisms, such a material bans, and enhanced education to residents to prevent recyclable materials from making their way into the garbage stream. Due to these factors, it remains to be seen how the provincial Blue bin Program will impact the City of Ottawa's waste diversion rate.

The transition to IPR is expected to impact some options being considered by the City as part of their future waste management system. For example, City facilities and small businesses registered in the City's Yellow Bag Program for Small Businesses are not included in the transition and collection and management of materials from these locations will continue to be the responsibility of municipalities. Until the IPR programs have been fully implemented, the SWMP will have to remain flexible to accommodate the need to potentially revisit the City's strategy on IPR, as more details become available and as producers finalize their collection systems.

5.4.2 Food and Organic Waste

Food and organic waste continue to be a large focus for the Ontario government, due to both the impact on climate change from methane released as food waste breaks down in the landfill and the potential of using this waste stream as valuable resource. The Province's Food and Organic Waste Framework provides direction to municipalities, the IC&I sector, owners and operators of resource recovery systems and others to take action to reduce and recover food and organic waste. The City needs to consider the impact of the Framework on its own operations, policies and programs, and through the development and implementation of the SWMP.

The Framework outlines strategic commitments to be taken by the Province, including preventing food waste through education and innovative approaches, increasing resource recovery across the IC&I sector, supporting the recovery of food and organic waste in the multi-residential sector and promoting the reintegration of end-products into the economy.

The Framework also states that the Province will develop, consult on, and implement a food and organic waste disposal ban regulation under the Environmental Protection Act, which could prohibit the disposal of food waste and organic waste at landfills. A recent announcement from the Province states that their priority is to move to phase out food and organic waste sent to landfill by 2030.

The Framework's **Policy Statement** establishes targets for food and organic waste reduction and resource recovery by sector, including municipalities and multi-residential buildings.

> The Policy Statement directs municipalities that already provide curbside collection of source separate food and organic waste to ramp up diversion of organics to meet the 70 per cent target for curbside households by 2023 and has a separate 50 per cent target for multi-residential properties by 2025.

On September 30, 2020, proposed changes to the Statement were released that expand the categories of food and organic waste that municipalities should make efforts to reduce and recover, including compostable coffee pods, soiled paper food packaging, and certified compostable bags. Amendments also encourage municipalities to support the use of pilot projects and research on the processing of compostable products and packaging and consider adopting technology to collect and process these materials in their systems when they are planning for new processing technology.

5.4.3 Federal Government Action on Single-use Plastics

On June 20, 2022, the federal government released the **Single-use Plastic Prohibition Regulations** which prohibit the manufacturing, import and sale of six single-use plastic items:

- checkout bags
- cutlery
- foodservice ware made from or containing problematic plastics that are hard to recycle
- ring carriers
- stir sticks
- straws (with some exceptions)

The regulation banned most of these items for sale across Canada as of December 20, 2023, and the regulation states that the manufacture, import and export of these items will be banned between 2023 and 2025. However, the future of this ban is now uncertain due to the Federal Court striking down the federal government's rationale to add "plastic manufactured items" to the List of Toxic Substances in Schedule 1 of the *Canadian Environmental Protection Act*, 1999 (CEPA). The federal government is appealing this decision and relevant actions in the SWMP will need to remain flexible to accommodate the final outcome.

Impacts to the City that needed to be considered as the SWMP was developed, and will continue to be a consideration as SWMP recommendations are implemented in the future, include:

- An increase in single-use plastic substitutes going to landfill, which typically have higher climate change impacts. The introduction of these products may therefore have an impact on GHG emissions at the landfill.
- An increase in the amount of compostable packaging being used as an alternative. Compostable packaging presents its own challenges, given that biodegradable plastics and compostable packaging vary widely with no consistent or regulated standards. Currently, Ottawa's composting facility cannot process most of these products.
- The potential to affect how residents participate in the City's Green Bin Program. In July 2019, the City began accepting the use of plastic bags as green bin liners to increase participation in the Green Bin program. Although the federal ban does not include all plastic bags that residents use to line their green bins, it does include plastic checkout bags and thus may require an adjustment for some residents.

5.5 Alignment with Other City Plans and Strategies

Other City plans and strategies were considered during development of the SWMP that will continue to shape how SWMP recommendations are implemented. These include:

- Draft Official Plan – In May 2020, a moderate growth strategy was approved that will require 51 per cent of new dwellings to be built in already developed areas (increasing to 60 per cent by 2046) and will add between 1,350 to 1,650 hectares of residential and employment land to Ottawa's urban area. The Province approved the plan in November 2022.
- Climate Change Master Plan (CCMP) – This plan provides direction for addressing the impacts of climate change on the community and City operations. It includes initiatives to reduce greenhouse gas emissions and build climate resilience in Ottawa.
- Energy Evolution Strategy (EES) – This Strategy, part of the Climate Change Master Plan, lays out pathways for getting to 100 per cent reduction of greenhouse gas emissions in Ottawa.
- Greenspace Master Plan, Official Plan and Urban Forest Management Plan – These documents provide direction on maintaining and increasing green space in

the City and tree canopy protection policies, which can have an impact on quantities of LYW that the City will need to manage in the future.

5.6 Industry and Lifestyle Trends

There are a number of industry and lifestyle trends affecting waste management now and will continue to do so into the future. The City needs resiliency and flexibility in its future waste management system to respond to these changes. **Review of Policy and Trends Technical Memorandum** describes these trends in detail but some of the most significant trends include:

- **Changes in consumer trends** – The COVID-19 pandemic caused a shift in tonnes typically managed in the IC&I sector to the residential sector, with more people working and learning from home. The pandemic has also caused an upswing in online shopping and delivery of groceries/meals to homes, which has also shifted the composition of waste managed by the City. For example, Blue Bin materials increased by up to 18% over the course of the pandemic, and currently remain at 10% higher than pre-pandemic levels, likely due to the increase in the number of people working from home.
- **Packaging trends** – It is anticipated that the use of bioplastics and compostable packaging, as well as lighter weight materials, will continue to increase as producers try to make their packaging more sustainable.
- **Demand for convenience** – As lifestyles grow busier and demographics change, there is an increased demand for convenience, which has caused changes in how people access and consume goods. Our throw-away society is characterized by a high turnover in consumer products such as toys and consumer electronics, and the notion of “planned obsolescence”, which has resulted in the production of less-durable or non-durable consumer goods.
- **End market challenges** – The China Sword Policy and an amendment to the Basel Convention saw the introduction of more stringent monitoring of the export of recyclables to China and developing countries. Furthermore, recycled plastic end markets are competing with cheap natural gas, which can replace recycled plastic as feedstock in manufacturing plastic bottles. It will also be important to monitor the availability of end markets for other potentially divertible materials,

such as construction waste, textiles and mattresses, as SWMP recommendations are both planned and implemented.

5.7 Alternative and Emerging Technologies

In addition to the various regulatory tools, policies and programs that can be used to reduce and divert waste, new and alternative technologies can also be used to capture more materials from the garbage stream, thus extending the life of the TWFL. Some of these technologies also provide the opportunity to generate energy and have the potential to generate revenue from the sale of energy produced, which can help offset their operational cost. This would also allow the City to amortize current and future required capital investments in the TWFL over a longer period.

Alternative technologies that can generate energy from the organics waste stream include:

- Anaerobic digestion of organics
- Co-digestion of sewage and organics at a wastewater treatment plant

Alternative technology that can recover valuable recyclables and organics from the waste stream include:

- Mixed Waste Processing

Alternative technology that can reduce waste to landfill and generate energy include:

- Thermal processes, such as Incineration

Some of these technologies have been utilized in other countries for many years and are becoming more widely utilized in North America as technology improves, public acceptance grows and the political and regulatory climates change. Many municipalities in Canada are also now exploring these alternatives.

Waste and energy recovery are directly tied to the City's climate change goals and targets, as well as the Energy Evolution Strategy, which identifies the opportunity to recover as much organic waste from the waste stream as possible and create renewable energy from this waste stream as a key means for the City to meet its greenhouse gas reduction targets.

6.0 Future Waste Management Needs

Findings from the analysis of the current state of waste management in the city, future waste projections and future waste management considerations were used to identify potential gaps, constraints and opportunities that would impact the development of options for the City's future integrated waste management system. This Future Needs Analysis was developed based on an understanding of the types and amounts of waste anticipated to require management over the next 30 years, provincial and federal legislation changes, as well as various industry trends and best practices affecting solid waste management.

A total of 21 future needs for the City's integrated waste management system were identified. The needs were developed to align with the Vision, Guiding Principles and Goals of the SWMP and are categorized in **Table 7** as per the SWMP objectives. Anticipated timelines for each future need are specified at a high level in terms of short (0 to 5 years), medium (5 to 10 years) and long term (10+ years) timeframes. Timelines are noted in brackets following each identified future need.

Table 7: Ottawa Solid Waste Management System Future Needs

SWMP Objective	Future Need
Maximize the Reduction and Reuse of Waste	• Identify more ways to reduce and reuse waste generated by residents and in its own operations to decrease the amount of waste entering the City's solid waste management system. (Short, medium and long terms) • Focus on the value of food to increase the prevention of food waste, which is higher in the waste hierarchy. (Short, medium and long terms)

SWMP Objective	Future Need
Maximize the Recycling of Waste	• Decide if a comprehensive and consistent public spaces waste diversion program, including recycling and organics diversion, should be implemented. (Short and medium terms) • Identify an approach to support increased curbside waste diversion performance by increasing participation in waste diversion programs. (Short-term) • Recognizing the inherent challenges that exist in increasing participation and the waste diversion rate in the multi-residential sector, actively work with stakeholders in this sector to improve multi-residential waste diversion programs. (Short, medium and long terms) • Identify specific waste streams that can be diverted from landfill disposal and develop new collection and diversion programs to capture these streams. (Short, medium and long terms) • Waste management practices at special events should support and facilitate waste minimization and waste diversion. (Short-term) • Develop a strategy that identifies ways in which City facilities and operations can avoid, reduce and divert more waste from disposal. (Short-term) • Provide enhanced convenience and additional drop-off opportunities for residents to reduce, reuse and recycle. (Short and medium terms)
Maximize Operational Advancements	• Considering the future Green Bin processing capacity needs, the City needs to consider potential options to manage future quantities of LYW, both in the short and medium term. (Short and medium terms) • Building on the current systems, services and programs, identify more ways to efficiently collect that are more convenient and accessible to residents and customers. (Short-term) • Progressively work towards a zero emissions solid waste fleet. (Short, medium and long terms)

SWMP Objective	Future Need
	• Confirm the City has sufficient organics processing capacity prior to 2030 and secure capacity beyond 2030. (Short and medium terms) • Determine the future use of bufferland properties around the current TWFL, including for operational, community use and or pilot/demonstration opportunities. (Short-term) • Ensure long-term financial sustainability of the solid waste management system for effective operations and management of solid waste assets. (Short-term)
Maximize the Recovery of Waste and Energy and the Optimal Management of Remaining Residuals	• Determine what, if any, waste recovery technologies or approaches will be employed to extend the life of the TWFL. (Short, medium and long terms) • Determine what energy recovery technologies or approaches will be employed to recover as much waste as possible from the waste stream and create renewable energy from this waste. (Short-term) • Identify an approach to utilizing landfill gas and producing energy once the current contract with PowerTrail expires in 2027. (Short-term) • Being a key City asset, determine ways to extend the life of the TWFL to maximize the life of the asset and plan for new disposal capacity when required. (Short-term)
Develop a Zero Waste Culture Across the City	• Expand and/or modify technologies and approaches used to reach the City's diverse customer base to create the desired behavioural changes and to support program priorities. (Short-term) • Having appropriate regulatory tools in place can facilitate the prevention of waste entering the system and improve sorting practices and participation rates in the City's waste diversion programs. (Short-term)

7.0 Options Identification, Evaluation and Short Listing

In order to address the City's future waste management needs, a variety of options were carefully considered for inclusion in the SWMP. Options were identified for each sector within the SWMP's scope, which includes curbside-residential, multi-residential, parks and other public spaces, City facilities and operations and current partner programs. Each option was then evaluated against set criteria to assess the environmental, social and financial aspects of each option in order to develop a recommended short list of options. Consultation feedback from the public and internal staff was then used to help further inform this recommended short list.

7.1 Options Identification

A long list of 71 potential options was identified that the City could adopt to address the anticipated future needs for the City's solid waste management system. **Table 8** lists the number of options that relate to each SWMP objective. Research was completed for each option to understand the potential environmental, social, regulatory, technical and financial considerations, potential outcomes, how success of the option could be measured and case studies / evidence of results. Details on each option are provided in the **High Level Long List of Options** technical memo (June 2021) which was tabled for Committee and Council's receipt on July 7, 2021.

Table 8: Number of Options Identified by SWMP Objective

SWMP Objective	Number of Options Identified
1. Maximize the Reduction and Reuse of Waste	**11**
2. Maximize the Recycling of Waste	**25**
3. Maximize the Recovery of Waste and Energy and the Optimal Management of Remaining Residuals	**15**
4. Maximize Operational Advancements	**12**
5. Develop a Zero Waste Culture Across the City	**8**

7.2 Options Evaluation and Shortlisting

All 71 options went through an initial screening process where each was measured against set evaluation criteria. Any options that did not meet the established criteria in the initial screening process were further evaluated using a comprehensive triple bottom line (TBL) evaluation framework that considered the environmental, social, and financial aspects of each of the options. The methodology to screen and evaluate the long list of options is provided in the report **Evaluation Process** and the results are provided in the report **Options Evaluation.**

Following the TBL evaluation process, two potential timelines were developed to show how the options could be planned and implemented at a gradual versus accelerated pace. This was done to gain an understanding of the costs associated with implementing the options at a slower versus faster pace. It also demonstrated what the two timelines would mean in terms of impacts on the objectives of the SWMP, particularly waste diversion, TWFL life and GHG emissions reductions. A financial analysis and impact analysis were conducted on the two timeline models and the results were used to further adapt and defer some of the options on the short list.

Following the accelerated and gradual timeline analysis, Engagement Series 2 asked the public to prioritize the short-listed options and offer feedback on how far and how fast they felt the City should move to reach the goals of the SWMP. The **Engagement Series 2 What We Learned Report** provides a summary of this feedback, which was used to inform the final recommended short list of options.

Options that are recommended for deferral will be reviewed at the SWMP 5-year refresh, at which time their viability/applicability may be reassessed considering advancing technologies or new data from initiatives being implemented within the first five years. **Appendix A** presents those options that are recommended for removal or deferral and the rationale behind each recommendation.

8.0 Recommended Waste Management System

A total of 50 options were carried forward as recommended "Actions" to include in the SWMP. Actions that address similar challenges and opportunities were grouped together into **Action Suites** and Actions within those suites are recommended to be implemented simultaneously for maximum results and to take advantage of resource efficiencies. This **Recommended Waste Management System** was developed to achieve the Vision, Goals and Objectives of the SWMP and align with the Guiding Principles. It is an integrated system that includes Action Suites that work together, are interconnected and, in some cases, depend on each other for success.

The Action Suites are organized under each SWMP objective below to show which recommendations will work together to achieve each objective.

8.1 Objective 1: Maximize the Reduction and Reuse of Waste

Reducing and reusing waste helps to prevent the extraction of natural resources and the generation of waste in the first place. Engagement participants frequently mentioned the importance of prioritizing reduction and reuse to protect the environment and help keep waste management costs down. As presented in Section 9 below, early implementation is recommended for Action Suites within this objective.

Action Suite 1 - Waste Avoidance, Reduction, and Reuse Initiatives	
Description:	Increasing waste avoidance, reduction, and reuse across the city through strategic partnerships with community and industry, financially incentivizing innovative ideas and programs, and expanding or improving existing programs.
Included Actions:	• Sharing Space/Swaps/ Library/Repair Cafes (for various materials) • Community reuse events • Develop community strategies, opportunities and partnerships to increase reuse and recycling and avoid waste • Subsidies, Rebates, Grants for Options that Avoid, Reduce or Reuse Waste • Expand the Take It Back! Program • Textile Waste Diversion Enhancement
Planning & Implementation Timing:	2024-2027
Targeted Sectors:	Curbside-residential Multi-Residential City Facilities
Affected Waste Streams:	Bulky Waste Construction & Demolition (C&D) Waste Waste Electronics Textiles
Tonnages Diverted from Landfilling:	**Annual:** Reduction of more than 2,750 tonnes per year (~0.7% of City's total waste stream) by the 5-year refresh (2028) **Over 30-year plan:** Reduction of 31,050 tonnes
Considerations and Limitations:	Recommend staggered implementation timing to develop partnerships and focus on existing community initiatives first, which supports engagement feedback. New initiatives to be planned and implemented subsequently.
Cost over the 30-year SWMP period	Total capital cost: $0 Total operating cost (net including any currently known potential cost offsets): $19,000,000

Food that ends up in landfills creates methane, a very powerful greenhouse gas. Reducing food waste supports reducing greenhouse gas emissions by lowering the amount of methane. Of all the reduction and reuse actions, engagement participants stated they'd be most likely to participate in food waste reduction actions.

Action Suite 2 - Food Waste Reduction Strategy and Reduction Education Initiatives	
Description:	Reducing the amount of food waste generated in the city through reduction strategies, supported by education of residents to build awareness of food waste and its impacts.
Included Actions:	• Implement a Food Waste Reduction Strategy • Develop and implement Food Waste Reduction education initiatives
Planning & Implementation Timing:	2024
Targeted Sectors:	Curbside-residential Multi-Residential City Facilities IC&I
Affected Waste Streams:	Green Bin Garbage
Tonnages Diverted from Landfilling:	Reduction to be estimated during strategy development as initiatives are formalized
Considerations and Limitations:	No anticipated limitations but should be considered when developing the capacity for anaerobic digestion as it may affect tonnages estimated for organics processing facilities.
Cost over the 30-year SWMP period	Total capital cost: $350,000 Total operating cost (net including any currently known potential cost offsets): $6,000,000

Action Suite 3 - Waste Minimization and Diversion at Special Events	
Description:	Developing a plan to phase in additional reduction, reuse and recycling waste management requirements at small and large special events in the city
Included Actions:	• Supporting Waste Minimization and Diversion at Special Events
Planning & Implementation Timing:	2025-2028
Targeted Sectors:	City Facilities IC&I
Affected Waste Streams:	Green Bin Blue Bin Black Bin/Cardboard
Tonnages Diverted from Landfilling:	Diversion and/or reduction to be determined during implementation planning.
Considerations and Limitations:	City will need to monitor special events applications and activities to ensure compliance with the City's requirements
Cost over the 30-year SWMP period	Total capital cost: $0 Total operating cost (net including any currently known potential cost offsets): $1,500,000

8.2 Objective 2: Maximize the Recycling of Waste

Maximizing the recycling of waste by improving existing initiatives and investing in new recycling programs will reduce materials currently going to landfill. We learned from public engagement that there is a preference for prioritizing waste diversion and delaying the need for a new landfill or new technology, mainly due to cost. Recycling materials also results in lower lifecycle GHG emissions and creates opportunities to gain revenue to help offset waste management costs.

Action Suite 4 - Enhanced Source Separation of Waste	
Description:	Implementing Actions to maximize diversion of waste from the landfill, including a new curbside diversion policy and Actions to encourage participation.
Included Actions:	• Firm Garbage Limit • Disposal bans • Enforce Source Separation Requirements for Recycling and Organics
Planning & Implementation Timing:	2024-2027
Targeted Sectors:	Curbside-residential Multi-residential
Affected Waste Streams:	Green Bin Black Bin Blue Bin
Tonnages Diverted from Landfilling:	**Annual:** Organics: > 8,000 tonnes per year (~1.9% of City's total waste stream) by the 5-year refresh (2028) Recyclables: > 6,700 tonnes per year (~1.6% of City's total waste stream) by the 5-year refresh (2028) **Over 30-year plan:** Organics: ~250,000 tonnes over the 30-year plan Recyclables: ~210,000, tonnes over the 30-year plan
Considerations and Limitations:	Implementation planning already underway for Firm Garbage Limit. Council approved new policy in Q2 2023 for implementation in Q2 2024.
Cost over the 30-year SWMP period	Total capital cost: $200,000 Total operating cost (net including any currently known potential cost offsets): -$9,100,000

Action Suite 5 - Supporting Additional Diversion in Multi-Residential Buildings	
Description:	Implementing strategies to decrease waste generation and maximize diversion of waste in multi-residential buildings.
Included Actions:	• Making Green Bin a prerequisite to receive City Waste Management services • Multi-residential Building Development Standards • Chute Closure/Conversion to Organic Chutes Program at Multi-Residential Buildings (Pilot)
Planning & Implementation Timing:	2024-2027
Targeted Sectors:	Multi-Residential
Affected Waste Streams:	Green Bin Black Bin Blue Bin
Tonnages Diverted from Landfilling:	**Annual:** Organics: > 5,900 tonnes per year (~1.4% of City's total waste stream) by 5-year refresh (2028) Recyclables: > 680 tonnes per year (~0.2% of City's total waste stream) by 5-year refresh (2028) **Over 30-year plan:** Organics: ~194,000 tonnes over the 30-year plan Recyclables: ~209,000 tonnes over the 30-year plan
Considerations and Limitations:	No anticipated limitations but is strategically advantageous to implement early due to its focus on the multi-residential sector, which historically has lower diversion rates than the curbside-residential sector. Implementation planning already underway for "Making Green Bin a Prerequisite to Receive City Waste Management Services" as a component project of the SWMP. Approved by Council and Committee in Q2 2022.
Cost over the 30-year SWMP period	Total capital cost: $235,000 Total operating cost (net including any currently known potential cost offsets): -$2,200,000

Action Suite 6 - Waste Diversion Initiatives and Strategies at City Facilities	
Description:	Implementing strategies to decrease waste generation, maximize diversion and implement circular solutions in City-owned facilities.
Included Actions:	• Develop a Corporate Strategy to Increase Waste Reduction, Reuse and Recycling • Single-Use Item Reduction Initiative • Mandatory Waste Diversion in all City Facilities • Expanded Diversion Program at City Facilities and Operations
Planning & Implementation Timing:	2024-2028
Targeted Sectors:	City Facilities
Affected Waste Streams:	Green Bin Black Bin Blue Bin Textiles
Tonnages Diverted from Landfilling:	**Annual:** Organics: > 4,300 tonnes per year (~1.0% of City's total waste stream) by 5 year refresh (2028) Recyclables: > 3,500 tonnes per year (~0.8% of City's total waste stream) by 5-year refresh (2028) Textiles: >140 tonnes per year (~0.03% of City's total waste stream) by 5-year refresh (2028) **Over 30-year plan:** Organics: ~135,000 tonnes over the 30-year plan Recyclables: ~210,000 tonnes over the 30-year plan Textiles: ~4,500 tonnes over the 30-year plan
Considerations and Limitations:	No anticipated limitations, but early implementation would demonstrate to the community that the City is leading by example, which is a guiding principle of the SWMP and may influence community behavioural change.
Cost over the 30-year SWMP period	Total capital cost: $1,800,000 Total operating cost (net including any currently known potential cost offsets): $29,600,000

Action Suite 7 - Waste Diversion in Parks and Public Spaces	
Description:	Implementing a broad-scale, comprehensive waste diversion program, with recycling and organics bins in parks and public spaces across the City.
Included Actions:	• Waste Diversion Program in Parks and Other Public Spaces
Planning & Implementation Timing:	2025-2028
Targeted Sectors:	Parks and Public Spaces
Affected Waste Streams:	Organics, including pet waste Recycling
Tonnages Diverted from Landfilling:	**Annual:** Organics: > 1,000 tonnes per year (~0.2% of City's total waste stream) by 5-year refresh (2028) Blue Bin Recyclables: > 25 tonnes per year (~0.01% of City's total waste stream) by 5-year refresh (2028) **Over 30-year plan:** Organics: ~33,000 tonnes over the 30-year plan Blue Bin Recyclables: ~820 tonnes over the 30-year plan
Considerations and Limitations:	Consideration needs to be given to the impact that IPR transition will have on recycling programs in both parks and other public spaces beginning in 2026.
Cost over the 30-year SWMP period	Total capital cost: $1,000,000 Total operating cost (net including any currently known potential cost offsets): $27,000,000

Action Suite 8 - Residential C&D Waste Diversion Strategy	
Description:	Developing a strategy to review construction and demolition (C&D) waste that focuses on decreasing waste generation and maximizing diversion of residential C&D waste from the landfill.
Included Actions:	• Mandatory C&D Waste Diversion Strategy Development
Planning & Implementation Timing:	2024-2028
Targeted Sectors:	Curbside-residential Multi-Residential City Facilities IC&I
Affected Waste Streams:	Construction & Demolition (C&D) Waste
Tonnages Diverted from Landfilling:	Diversion to be estimated through strategy development, pending characterization of C&D waste and research into possible markets.
Considerations and Limitations:	This option is limited by reduction, reuse and recycling options and/or markets for C&D materials. If C&D can be dropped off at TWFL for reuse or recycling, an amendment to the landfill's Environmental Compliance Approval will be necessary.
Cost over the 30-year SWMP period	Total capital cost: $0 Total operating cost (net including any currently known potential cost offsets): $790,000

Action Suite 9 - Bulky Waste Diversion Strategy	
Description:	Developing a strategy to review bulky waste that will focus on decreasing waste generation and maximizing diversion of bulky waste from the landfill.
Included Actions:	• Separate Bulky Waste Collection and Recycling Strategy
Planning & Implementation Timing:	2024-2028
Targeted Sectors:	Curbside-residential Multi-Residential
Affected Waste Streams:	Bulky Waste
Tonnages Diverted from Landfilling:	Diversion to be estimated through strategy development, pending characterization of bulky waste and research into possible reuse and recycling/processing markets.
Considerations and Limitations:	Implementation will require consideration and alignment with future waste collections contracts allowing separate collection from mixed municipal waste stream.
Cost over the 30-year SWMP period	Total capital cost: $0 Total operating cost (net including any currently known potential cost offsets): $950,000

Action Suite 10 – Municipal Hazardous Solid Waste Strategy Development	
Description:	Developing a strategy to focus on decreasing HSP generation and maximizing the diversion of HSP from the landfill.
Included Actions:	• HSP Strategy Development (formerly "Expand Number of Existing Mobile One Day Depots for Municipal Hazardous Special Waste". Action was broadened to a strategy development to reflect the new recommendation that research be undertaken on a range of tactics to manage this waste)
Planning & Implementation Timing:	2024-2026
Targeted Sectors:	Curbside-residential Multi-Residential
Affected Waste Streams:	Hazardous and Special Products (HSP)
Tonnages Diverted from Landfilling:	Diversion to be estimated during strategy development.
Considerations and Limitations:	Given the ongoing work at the Provincial level to transition HSP to full producer responsibility, this Action has been converted into a strategy. The strategy will be informed by Provincial direction while also incorporating feedback from engagement regarding appropriate and most effective services.
Cost over the 30-year SWMP period	Total capital cost: $0 Total operating cost (net including any currently known potential cost offsets): $115,000

Action Suite 11 - Sustainable Development Initiatives	
Description:	Implementing financial mechanisms for new developments and redevelopments to encourage waste reduction and diversion during the planning and development phase and to offset growth-related capital costs for providing additional municipal services.
Included Actions:	• Waste Diversion Infrastructure Fee for New Development • Development Charges for Waste Diversion Growth • Bonds for Green Buildings
Planning & Implementation Timing:	2025-2027
Targeted Sectors:	IC&I Multi-Residential Curbside-residential
Affected Waste Streams:	N/A
Tonnages Diverted from Landfilling:	Indirectly supports diversion through waste centric design that encourages convenience for residents.
Considerations and Limitations:	The City would need to determine the fees and charges and could consider aligning this with the City-wide review of development charges (planned for 2024).
Cost over the 30-year SWMP period	Total capital cost: $250,000 Total operating cost (net including any currently known potential cost offsets): $150,000

8.3 Objective 3: Maximize the recovery of waste and energy and the optimal management of remaining residuals

While reduction and diversion Actions will reduce the amount of waste going to landfill, there will still be waste that cannot be captured under the first two objectives that the City will need to manage. These recommended SWMP Action Suites look at recovering resources and energy in keeping with the SWMP guiding principle to treat waste as a resource. This includes short-term and long-term Actions to find new disposal capacity for the remaining residual waste stream.

Action Suite 12 - Anaerobic Digestion (AD) and/or Co-digestion	
Description:	Using anaerobic digestion as an alternative to process household organics and generate renewable natural gas (RNG) in alignment with the goals outlined in the City's Energy Evolution Plan.
Included Actions:	• Anaerobic Digestion (AD) • Co-digestion of Sewage and Organics at the Robert O. Pickard Environmental Centre (ROPEC) or Co-location of Anaerobic Processing Facility for Organics at ROPEC
Planning & Implementation Timing:	2024-2030
Targeted Sectors:	Applicable to all sectors
Affected Waste Streams:	Organics
Tonnages Diverted from Landfilling:	N/A - Processing Action - no change to diversion
Considerations and Limitations:	An organics processing alternative will be required by the end of the current organics contract (March 2030) unless an extension is obtained from the current contractor. Feasibility study, business case and market sounding underway.
Cost over the 30-year SWMP period	Total capital cost: $140,000,000 Total operating cost (net including any currently known potential cost offsets): $233,000,000

Action Suite 13 - Separate Collection of Leaf and Yard Waste (LYW)	
Description:	Increasing the amount of LYW collected and composted separately from household organics by the City.
Included Actions:	• Separate Composting of LYW
Planning & Implementation Timing:	2024-2026
Targeted Sectors:	Curbside-residential (curbside program)
Affected Waste Streams:	Leaf and Yard Waste (LYW)
Tonnages Diverted from Landfilling:	N/A - Processing Action - no change to diversion
Considerations and Limitations:	Planning already underway to increase the number of weeks LYW is collected separately from 12 to 25 weeks through the curbside collection contract starting 2026. Any future changes will also need to consider collection contracts.
Cost over the 30-year SWMP period	Total capital cost: $0 Total operating cost (net including any currently known potential cost offsets): $26,700,000

Action Suite 14 - Waste Recovery and/or Treatment Facility Feasibility Study	
Description:	Advancing the feasibility study and business case development to implement either Mixed Waste Processing (MWP) or Waste to Energy Incineration, evaluating the pros and cons of each of these technologies, and analyzing how Mechanical Biological Treatment or Emerging Technologies may be used in conjunction with a chosen technology.
Included Actions:	• Mixed Waste Processing (Mechanical Pre-sort only) • Mechanical Biological Treatment • Waste to Energy Incineration (Direct Combustion)
Planning & Implementation Timing:	2024-2026 (feasibility and business case development only). Total planning and implementation period could take upwards of 10 to 15 years to become operational.
Targeted Sectors:	Curbside-residential Multi-Residential City Facilities IC&I
Affected Waste Streams:	All
Tonnages Diverted from Landfilling:	To be determined through development of the study
Considerations and Limitations:	The City would have to undertake a planning and siting process, procurement, approvals, implementation, operation and maintenance of a facility. Dependencies and limitations for implementation of solutions to be developed within the study.
Cost over the 30-year SWMP period	(Costs for feasibility and business case development only). Total capital cost: $800,000 Total operating cost (net including any currently known potential cost offsets): $300,000

Action Suite 15 - Landfill Gas Management Strategy	
Description:	The development of a Landfill Gas Management Strategy that considers the generation of renewable natural gas (RNG) after the current landfill gas management agreement expires in 2027.
Included Actions:	• Landfill Gas Management Strategy
Planning & Implementation Timing:	2024
Targeted Sectors:	N/A - Landfill Operations
Affected Waste Streams:	N/A - Landfill Operations
Tonnages Diverted from Landfilling:	N/A - Landfill Operations
Considerations and Limitations:	The strategy considers two main factors: 1) energy markets and 2) corporate strategy. The provincial Feed-in-Tariff regime, which offered stable prices for electricity, has ended and will likely reduce the revenues for electricity, but the market for Renewable Natural Gas (RNG) has become more favourable. Corporate strategy outlined in the Energy Evolution Study explains that Landfill Gas (LFG) needs to switch to producing RNG to support the City's climate change goals. The strategy is determining if and how LFG can be upgraded to RNG and injected into the natural gas network.
Cost over the 30-year SWMP period	Total capital cost: $500,000 Total operating cost (net including any currently known potential cost offsets): $38,000

Action Suite 16 - Residual Waste Management Strategy	
Description:	A strategy developed to extend the life of the TWFL while the other options in the SWMP work to reduce waste generation and remove waste from going to landfill. This Action includes expansion of the current TWFL, redirecting a portion of waste to private landfills, and a supplemental option developed during Engagement Series 2 to prolong the life of the TWFL by no longer accepting IC&I waste.
Included Actions:	• TWFL Expansion within existing footprint • Use of Private Landfill(s) • New Action: Ban IC&I Waste from the TWFL
Planning & Implementation Timing:	2024-2026 2024-2032 (Landfill Expansion)
Targeted Sectors:	N/A - Landfill Operations
Affected Waste Streams:	IC&I
Tonnages Diverted from Landfilling:	N/A - Landfill Operations
Considerations and Limitations:	Options in this Action Suite are directly connected to life span at the TWFL. Any construction relating to expanding the TWFL cannot be started until the regulatory approvals are obtained and the City secures project funding. Total development timing to implement this option including planning, approvals, permitting, regulatory approvals, design and construction is likely to take a minimum of 5 years. A new Action “Ban IC&I Waste from the TWFL” has been added post-engagement and system development. The City is uniquely positioned to consider preserving TWFL capacity for residential use only, given the number of private sector landfills and transfer stations located within the city’s boundaries and within 100km of its boundaries.
Cost over the 30-year SWMP period	Total capital cost: $86,000,000 Total operating cost (net including any currently known potential cost offsets): $150,000,000

8.4 Objective 4: Maximize Operational Advancements

The first three objectives include Actions to support SWMP goals associated with the direct management of waste and the five levels of the waste management hierarchy. Actions within this objective support maximizing operational advancements through innovation and new technology to make operations more efficient and less impactful on the environment.

Action Suite 17 – Pilot Alternative Collection Containers	
Description:	Use of alternate collection containers in parks and public spaces, and multi-residential properties, such as in-ground collection, plastic front-end load containers, multi-stream containers, and waste bins with solar compactors to improve collections efficiency, enhance accessibility and/or aesthetics.
Included Actions:	• Use of Alternate Collection Containers in Parks, Public Spaces and Multi-residential Properties
Planning & Implementation Timing:	2024-2026
Targeted Sectors:	Parks and Public Spaces Multi-Residential
Affected Waste Streams:	All
Tonnages Diverted from Landfilling:	N/A - Operations
Considerations and Limitations:	Implementation may need to align with collections contracts, especially if specialized vehicles are required.
Cost over the 30-year SWMP period	Total capital cost: $3,000,000 Total operating cost (net including any currently known potential cost offsets): $600,000

Action Suite 18 - RFID Technology on Waste Containers	
Description:	Equipping containers with radio-frequency identification (RFID) capabilities to gain real-time information about collection services and performance, and ensure systems are in place to capture the information on vehicles or programs.
Included Actions:	• RFID Technology on Waste Collection Containers
Planning & Implementation Timing:	2028-2029 (Multi-Residential) 2032-2033 (Curbside-residential)
Targeted Sectors:	Curbside-residential Multi-Residential
Affected Waste Streams:	N/A - Operations
Tonnages Diverted from Landfilling:	N/A - Operations
Considerations and Limitations:	No anticipated limitations for implementation in multi-residential collections. Implementation for curbside collection will need to align with planning and implementing of potential Automated Cart Collection and may also need to align with future waste collections contracts.
Cost over the 30-year SWMP period	Total capital cost: $5,000,000 Total operating cost (net including any currently known potential cost offsets): $12,300,000

Action Suite 19 - Identifying Curbside Collection Efficiencies	
Description:	Undertaking studies to review efficiencies in curbside collection in relation to costs, services, and GHG reductions, and reviewing the potential of offering collection for additional materials not currently collected at the curb.
Included Actions:	• Collection of More Materials at the Curb • Identify Curbside Collection Efficiencies
Planning & Implementation Timing:	2030
Targeted Sectors:	Curbside-residential (Curbside)
Affected Waste Streams:	To be developed through the various studies
Tonnages Diverted from Landfilling:	To be developed through the various studies
Considerations and Limitations:	Options are currently set to align with development of future curbside collections contracts.
Cost over the 30-year SWMP period	Total capital cost: $1,100,000 Total operating cost (net including any currently known potential cost offsets): $375,000

Action Suite 20 - Yellow Bag Program for Small Businesses Review	
Description:	Undertaking a review of the City's Yellow Bag for Businesses program, including eligibility requirements and impacts on Individual Producer Responsibility (IPR) for the recycling portion of the program.
Included Actions:	• Undertake a review of the Yellow Bag program for Small Businesses
Planning & Implementation Timing:	2024-2027
Targeted Sectors:	IC&I (small business)
Affected Waste Streams:	To be developed through the review
Tonnages Diverted from Landfilling:	To be developed through the review
Considerations and Limitations:	Engagement with City staff and stakeholders should be undertaken to understand the strengths and limitations of the current program.
Cost over the 30-year SWMP period	Total capital cost: $0 Total operating cost (net including any currently known potential cost offsets): $150,000

Action Suite 21 - Automated Cart Collection for Curbside Garbage	
Description:	Switching from bags to automated cart-based curbside collection of garbage.
Included Actions:	• Automated Cart Collection for Curbside Garbage
Planning & Implementation Timing:	2030-2033
Targeted Sectors:	Curbside-residential (curbside)
Affected Waste Streams:	Garbage
Tonnages Diverted from Landfilling:	N/A - Operations

Action Suite 21 - Automated Cart Collection for Curbside Garbage	
Considerations and Limitations:	Action implementation will need to align with future waste collections contracts. Can be used in conjunction with RFID Tag options and various curbside collection programs and could be piloted with the In-House Collections Group to inform future collection contract.
Cost over the 30-year SWMP period	Total capital cost: $15,000,000 Total operating cost (net including any currently known potential cost offsets): $21,900,000

Action Suite 22 - Innovation and Technology	
Description:	Development of a strategy to integrate innovation into solid waste technologies and approaches to help drive the City towards its Zero Waste, Circular Economy and Climate Change Master Plan Goals, and includes completing a review of potential alternate and additional uses for the bufferland properties adjacent to the TWFL.
Included Actions:	• Innovation and Technology Strategy • Future Use of Bufferlands Around TWFL and Nepean Landfill
Planning & Implementation Timing:	2025
Targeted Sectors:	To be developed in the strategy
Affected Waste Streams:	To be developed in the strategy
Tonnages Diverted from Landfilling:	To be developed in the strategy
Considerations and Limitations:	The City could consider leveraging existing partnerships with Invest Ottawa and others to explore innovative solutions to meet waste management needs.
Cost over the 30-year SWMP period	Total capital cost: $0 Total operating cost (net including any currently known potential cost offsets): $6,100,000

Action Suite 23 - Working Toward a Zero Emissions Solid Waste Fleet	
Description:	Building on the City's past and future Green Fleet related work and the Energy Evolution Strategy, it would consider opportunities such as different fuel types, including Renewable Natural Gas (RNG) and hybrid or electric vehicles for the solid waste fleet.
Included Actions:	• Working Towards a Zero Emissions Solid Waste Fleet
Planning & Implementation Timing:	2027-2033
Targeted Sectors:	Curbside-residential Multi-Residential City Facilities Parks and Public Spaces
Affected Waste Streams:	N/A - Operations
Tonnages Diverted from Landfilling:	N/A - Operations
Considerations and Limitations:	Implementation will need to align with collections contracts, piloting of potential technologies and availability of appropriate technology. Certain types of technologies may require new supporting infrastructure, such as transfer stations and charging stations located throughout the city.
Cost over the 30-year SWMP period	Total capital cost: $0 Total operating cost (net including any currently known potential cost offsets): $875,000

8.5 Objective 5: Develop a Zero Waste Culture Across the City

Many of the integrated Actions in the SWMP will require community behaviour change for optimal success. In addition, reaching the SWMP vision will require a shift in community social norms to develop a Zero Waste culture across the city. Actions to support these changes are included within this objective.

Action Suite 24 - Promotion & Education to Support Plan Implementation	
Description:	Enhancing the City's investment in Promotion and Education (P&E) and outreach to match comparator municipality investment is a major key to success for the various Actions found in the SWMP, to educate residents, educational institutions, and businesses, and help promote the behavioural change needed to achieve the City's vision toward a zero waste City and circular economy.
Included Actions:	• Develop and implement New/Expanded Outreach Initiatives • Behavioural Change Management Strategy • Develop and Implement Educational Initiatives • Develop and Implement Marketing & Communication Tools
Planning & Implementation Timing:	2024
Targeted Sectors:	All
Affected Waste Streams:	All
Tonnages Diverted from Landfilling:	N/A
Considerations and Limitations:	Immediate implementation to support SWMP program, due to the importance of promotion and education.
Cost over the 30-year SWMP period	Total capital cost: $16,500,000 Total operating cost (net including any currently known potential cost offsets): $13,500,000

Action Suite 25 - Circular Economy Strategy and Implementation	
Description:	• Developing a Circular Economy Strategy, that would align with provincial and federal efforts, and be the primary framework and action plan for how Ottawa will work toward its aspirational vision of becoming a Zero Waste and circular city. This option would involve the development of a dedicated cross-departmental Circular Economy Committee, with support from external stakeholders and industry experts, to develop a community and organization Circular Economy Strategy and Action Plan. At a high level, the strategy would: Explore the integration of circular economy principles into public procurement frameworks and develop implementation plans that can be implemented across departments. • Investigate municipal policy levers, initiatives and actions the City could implement to support the community transition to a circular economy. • Explore opportunities to become an innovation hub for circular economy innovations to accelerate industry and community transition to a circular economy.
Included Actions:	• Develop a Circular Economy Strategy & Implementation
Planning & Implementation Timing:	2025-2027
Targeted Sectors:	All
Affected Waste Streams:	All
Tonnages Diverted from Landfilling:	N/A - Framework Strategy
Considerations and Limitations:	The City may be limited by market availability of products that support a circular economy and meet the City's operational needs.
Cost over the 30-year SWMP period	Total capital cost: $5,800,000 Total operating cost (net including any currently known potential cost offsets): $8,400,000

Table 9 below presents the number of Actions identified for each SWMP objective and the high-level estimated costs associated with those Actions. Costs associated with Objective 3 are substantially higher due to the nature of the Action Suites, which include the introduction of new technologies. The majority, 31 of 50, of the SWMP Actions address the top 3 tiers of the waste hierarchy and supporting promotion and education and behaviour change initiatives.

Table 9: Number of Actions and Estimated Costs Identified by SWMP Objective

SWMP Objective	Number of Actions Identified	Total Capital Costs	Total Operating Cost (net of cost offsets)
1. Maximize the Reduction and Reuse of Waste	**9**	**$350,000**	**$27,100,000**
2. Maximize the Recycling of Waste	**17**	**$3,485,000**	**$47,305,000**
3. Maximize the Recovery of Waste and Energy and the Optimal Management of Remaining Residuals	**10**	**$227,300,000**	**$410,038,000**
4. Maximize Operational Advancements	**9**	**$24,100,000**	**$42,300,000**
5. Develop a Zero Waste Culture Across the City	**5**	**$22,300,000**	**$21,900,000**

9.0 Implementation Plan

Recommended SWMP Action Suites are set to be planned and implemented in the short-term (0-5 years), medium-term (5-10 years) and long-term (10+ years) timeframes of the 30-year planning period (2024-2053). Several factors were considered when developing this timeline including:

- The Vision, Guiding Principles, Goals and Objectives of the SWMP
- The waste management hierarchy framework
- Public and stakeholder engagement feedback
- Potential behaviour change required for success of some of the Action Suites
- Costs associated with implementing each Action Suite and the recommended system as a whole
- The environmental impact of each of the Action Suites, including their potential impact on reducing GHG emissions.

At a high level, some of the key findings from the extensive engagement and technical analyses used to prioritize Action Suites in the planning and implementation timeline included:

- Waste reduction Actions could be strategically advantageous to implement early to help facilitate overall community behavioural change.
- The Action Suites that could potentially divert the most waste from landfill, such as the Enhanced Source Separation of Waste and Supporting Additional Diversion in Multi-Residential Buildings, also had the greatest impact on GHG emissions reductions.
- May be advantageous to implement those Action Suites early which have the greatest diversion potential at the lowest cost.
- Work with external partners before implementing some of the community events/initiatives, to learn from their experiences and build on what is already working.
- Some Action Suites can be implemented early but the implementation timeline could span several years to lower costs and manage operational capacity.

- Fulsome feasibility studies will be required before any decisions can be made on a new landfill and/or residual waste management technology.

Appendix B presents how consultation feedback was used, alongside operational and cost considerations, to prioritize and adapt Actions Suites.

Figure 16 below shows the high-level timeline for planning, implementing and maintaining the SWMP Action Suites. Following the waste management hierarchy and in alignment with engagement feedback, reuse, reduction and diversion are prioritized. Prioritizing these Action Suites also helps preserve capacity at the landfill while residual waste management solutions are explored.

Figure 17 to **Figure 21** provide a more detailed overview of the implementation plan for each of the individual SWMP Action Suites. The different stages of implementation include Plan, Plan and Implement, Implement, Implement and Maintain, Maintain and No Activity.

Figure 16: High-level Timeline for SWMP Implementation

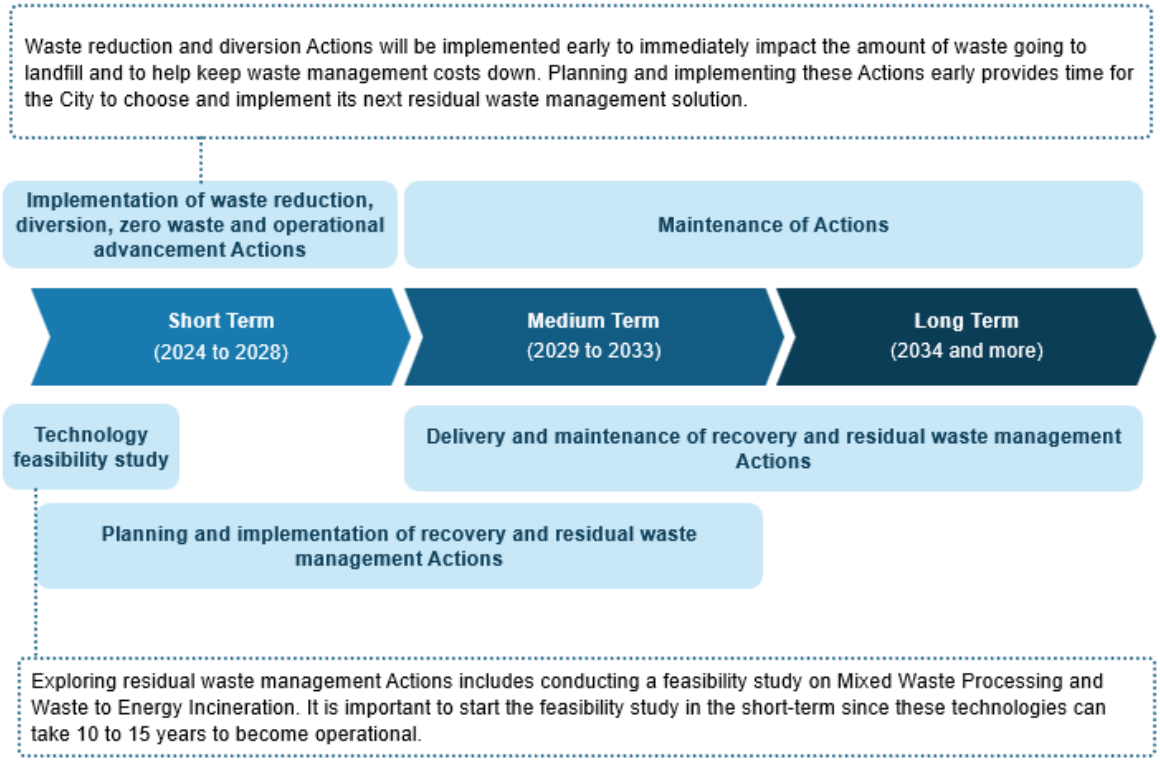


Figure 17: Implementation Plan for Actions Suites Under Objective 1: Maximize the Reduction and Reuse of Waste

Objective 1 Actions: Maximize the Reduction and Reuse of Waste	Short-Term (0 to 5 Years) 2024 to 2028					Medium-Term (5 to 10 Years) 2029 to 2033					Long Term (11+ Years) 2034 To 2053		
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034 to 2039	2040 to 2045	2046 to 2053
1. Waste Avoidance, Reduction, and Reuse Initiatives	Plan	Plan and Implement		Implement	Maintain								
2. Food Waste Reduction Strategy and Reduction Education Initiatives	Plan	Implement and Maintain	Maintain										
3. Waste Minimization and Diversion at Special Events	No Activity	Plan and Implement	Implement	Maintain									

Figure 18: Implementation Plan for Action Suites Under Objective 2: Maximize the Recycling of Waste

Objective 2 Actions: Maximize the Recycling of Waste	Short-Term (0 to 5 Years) 2024 to 2028					Medium-Term (5 to 10 Years) 2029 to 2033					Long Term (11+ Years) 2034 To 2053		
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034 to 2039	2040 to 2045	2046 to 2053
4. Enhanced Source Separation of Waste	Plan	Plan and Implement			Maintain								
5. Supporting Additional Diversion in Multi-Residential Buildings	Plan	Plan and Implement			Maintain								
6. Waste Diversion Initiatives and Strategies at City Facilities	Plan	Plan and Implement	Implement			Maintain							
7. Waste Diversion in Parks and Public Spaces	Plan	Implement			Maintain								
8. C&D Waste Diversion Strategy	Plan			Implement		Maintain							
9. Bulky Waste Diversion Strategy	Plan				Implement	Maintain							
10. HSP Strategy Development	Plan and Implement		No Activity										
11. Sustainable Development Initiatives	No Activity	Plan	Implement		Maintain								

Figure 19: Implementation Plan for Action Suites Under Objective 3: Maximize the Recovery of Waste and Energy and the Optimal Management of Remaining Residuals

Objective 3 Actions: Maximize the Recovery of Waste and Energy and the Optimal Management of Remaining Residuals	Short-Term (0 to 5 Years) 2024 to 2028					Medium-Term (5 to 10 Years) 2029 to 2033					Long Term (11+ Years) 2034 To 2053		
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034 to 2039	2040 to 2045	2046 to 2053
12. Anaerobic Digestion (AD) and/or Co-digestion	Plan				Implement			Maintain					
13. Separate Collection of Leaf and Yard Waste (LYW)	Plan	Implement	Maintain										
14. Waste Recovery and/or Treatment Facility Study	Plan			No Activity									
15. Landfill Gas Management Strategy	Plan	No Activity											
16. Residual Waste Management Strategy	Plan		Plan/Implement	Plan		Implement		Maintain		Purchase new landfill land	Permitting (Plan)		New Landfill Begins Operations (Implement/Maintain)

Figure 20: Implementation Plan for Action Suites Under Objective 4: Maximize Operational Advancements

Objective 4 Actions: Maximize Operational Advancements	Short-Term (0 to 5 Years) 2024 to 2028					Medium-Term (5 to 10 Years) 2029 to 2033					Long Term (11+ Years) 2034 To 2053		
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034 to 2039	2040 to 2045	2046 to 2053
17. Alternative Collection Containers	Plan	Plan/Implement		Maintain									
18. RFID Technology on Waste Containers	No Activity				Plan	Implement	Maintain		Plan	Implement	Maintain		
19. Identifying Curbside Collection Efficiencies	No Activity						Plan	No Activity			Plan	No Activity	Plan	No Activity	Plan	No Activity	Plan	No Activity
20. Yellow Bag Program for Small Businesses Review	Plan	Implement		No Activity									
21. Automated Cart Collection for Curbside Garbage	No Activity						Plan			Implement	Maintain		
22. Innovation and Technology		Plan and Implement		Maintain									
23. Working Toward a Zero Emissions Solid Waste Fleet	Plan			Plan and Implement				No Activity		Implement	No Activity		

Figure 21: Implementation Plan for Action Suites Under Objective 5: Develop a Zero Waste Culture Across the City

Objective 5 Actions: Develop a Zero Waste Culture Across the City	Short-Term (0 to 5 Years) 2024 to 2028					Medium-Term (5 to 10 Years) 2029 to 2033					Long Term (11+ Years) 2034 To 2053		
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034 to 2039	2040 to 2045	2046 to 2053
24. Promotion & Education to Support Plan Implementation	Plan	Implement/Maintain	Maintain										
25. Circular Economy Strategy and Implementation	No Activity	Plan	Plan and Implement	Maintain									

10.0 Anticipated Impacts of the SWMP

The proposed Action Suites of the SWMP are strategically designed to be planned and implemented in the short-term (0-5 years), medium-term (5-10 years) and long-term (10+ years) timeframes of the 30-year planning period (2024 to 2053). Combined, they create an opportunity to significantly reduce the amount of waste going to landfill, divert valuable resources to be recycled and repurposed into new products, and further preserve and expand capacity at the TWFL, providing time for the City to choose, plan and implement its next residual waste disposal solution.

Most of the proposed short-term Action Suites have the potential to immediately impact the amount of waste going to the landfill and provide lasting benefits over the term of the SWMP. Many of the medium-term and long-term Actions will require further study, data insights and planning in the short-term to better understand their estimated potential, but they are expected to also reduce the amount of waste requiring disposal when implemented. Updated estimates will be included in the 5-year SWMP refresh once more work on these initiatives takes place in the shorter term.

The proposed Action Suites supporting the first three objectives of the SWMP are expected to have more tangible impacts on the waste management system in terms of waste reduction, diversion, and landfill life.

- Objective 1 – Maximize the reduction and reuse of waste
- Objective 2 – Maximize the recycling of waste
- Objective 3 – Maximize the recovery of waste and energy and the optimal management of remaining residuals

The proposed Action Suites supporting Objectives 4 and 5 are not expected to directly result in waste reduction, diversion and expanded landfill capacity, but are intended to support the various SWMP Actions in achieving full success and improving customer service and operational efficiency. They are also expected to indirectly result in cost savings through enhancing system performance.

10.1 Maximize the Reduction and Reuse of Waste

Proposed Waste Avoidance, Reduction, and Reuse initiatives are estimated to reduce landfill disposal by an estimated 2,750 tonnes over the first 5 years of the SWMP. Over the 30-year term of the SWMP, the proposed Action Suites are estimated to reduce a total of **31,050 tonnes** requiring disposal. In the short term, the reduction Actions will not have a significant impact on the life of the TWFL, but the long-term reduction totals may slightly increase landfill life. Most of the estimated waste reduction in the short-term is through action on textiles, followed by bulky waste and construction & demolition waste, as well as a small reduction in Waste Electrical and Electronic Equipment (WEEE) as shown in **Table 10.**

Table 10: Estimated Waste Reduction & Reuse

Action	Reduction	Waste Reduction and Reuse (tonnes)				Total
		Bulky	C&D	WEEE	Textiles	
Action 1 – Waste Avoidance, Reduction, and Reuse Initiatives	Reduction and Reuse Per Year	200	110	30	410	550
	Total Short-Term (5-Year) Reduction and Reuse	410	230	50	2,060	2,750
	Total Reduction and Reuse over 30-year SWMP	8,310	4,640	1,070	17,030	31,050

These estimates are based on the proposed Action Suites where City or industry data was readily available to make estimates. There remains a significant opportunity to target food waste reduction, which is an emerging area of focus in the industry where little data is available. The estimated impacts of Action Suite 2 (Food Waste Reduction Strategy and Reduction Education Initiatives) and Action Suite 3 (Waste Minimization and Diversion at Special Events) will be assessed during the “planning” and “planning and implementation” stages of the initiatives.

10.2 Maximize the Recycling of Waste

Proposed recycling initiatives are estimated to divert approximately 85,790 tonnes of additional waste from the landfill over the first 5 years of the SWMP. Over the 30-year term of the SWMP, the proposed Action Suites are estimated to divert a total of **970,520 tonnes** from landfill. By 2053, the City is anticipated to dispose approximately 199,500 tonnes per year (assuming that SWMP Actions are implemented), and therefore the tonnage savings is equivalent to an estimated 4-5 years of landfill life. The greatest impact is expected from the Enhanced Source Separation of Waste Action Suite, which primarily targets enhanced waste diversion in the curbside sector, followed by enhancing waste diversion from multi-residential properties, City facilities, and parks and public spaces as shown in **Table 11**.

Table 11: Estimated Waste Diverted by Recycling Initiatives

Action	Sector Affected	Total Short-Term (5-Year) Waste Diversion (tonnes)				Total Diversion
		Organics	Black Bin	Blue Bin	Textiles	
Action 4: Enhanced Source Separation of Waste	Curbside-residential	22,950	9,470	10,560	-	42,980
Action 5: Supporting Additional Diversion in Multi-Residential Buildings	Multi-Residential	22,490	730	1,150	-	24,370
Action 6: Waste Diversion Initiatives and Strategies at City Facilities	City Facilities	8,620	2,690	4,430	290	16,030
Action 7: Waste Diversion in Parks and Public Spaces	Parks and Public Spaces	2,350	-	50	-	2,400
Total (first 5-years)		**56,410**	**12,890**	**16,200**	**290**	**85,790**
Total (over 30-year SWMP)		**617,390**	**151,700**	**196,880**	**4,550**	**970,520**

These estimates are based on the proposed Actions where City or industry data was readily available to make estimates. Once the proposed Actions listed above have been implemented, bulky waste and C&D waste are expected to account for nearly 28 per cent of the remaining waste going to landfill. Due to the high prevalence of bulky materials and C&D in the waste stream, the proposed C&D Waste Strategy and Bulky Waste Strategy are intended to identify available potential recycling markets at which time potential diversion for these Actions can be quantified.

10.3 Maximizing the Recovery of Waste and Energy and the Optimal Management of Remaining Residuals

Proposed AD of Organics, Separate collection of LYW and Landfill Gas Management Strategy Actions do not directly result in waste reduction, diversion, or increased landfill life. However, they create significant opportunity for the City to reduce GHG emissions from the waste management system, increase opportunities to lower community carbon emissions through the generation of renewable energy and generate new revenue streams that will help offset waste management costs. This is further described in **Section 13** of the SWMP.

The Waste Recovery and/or Treatment Facility Study Action Suite recommends the City advance the feasibility study and business case in the short-term (0-5 years) to consider implementing a waste recovery technology to further divert waste and/or reduce the amount of waste requiring landfilling in the longer term (10+ years). These types of technologies can take upwards of 10 to 15 years to become operational, due to environmental approvals, siting, land purchase, planning approvals, community engagement, procurement, design and construction. Should the City decide to implement one of these technologies, it will not be operational until the long-term (10+ years).

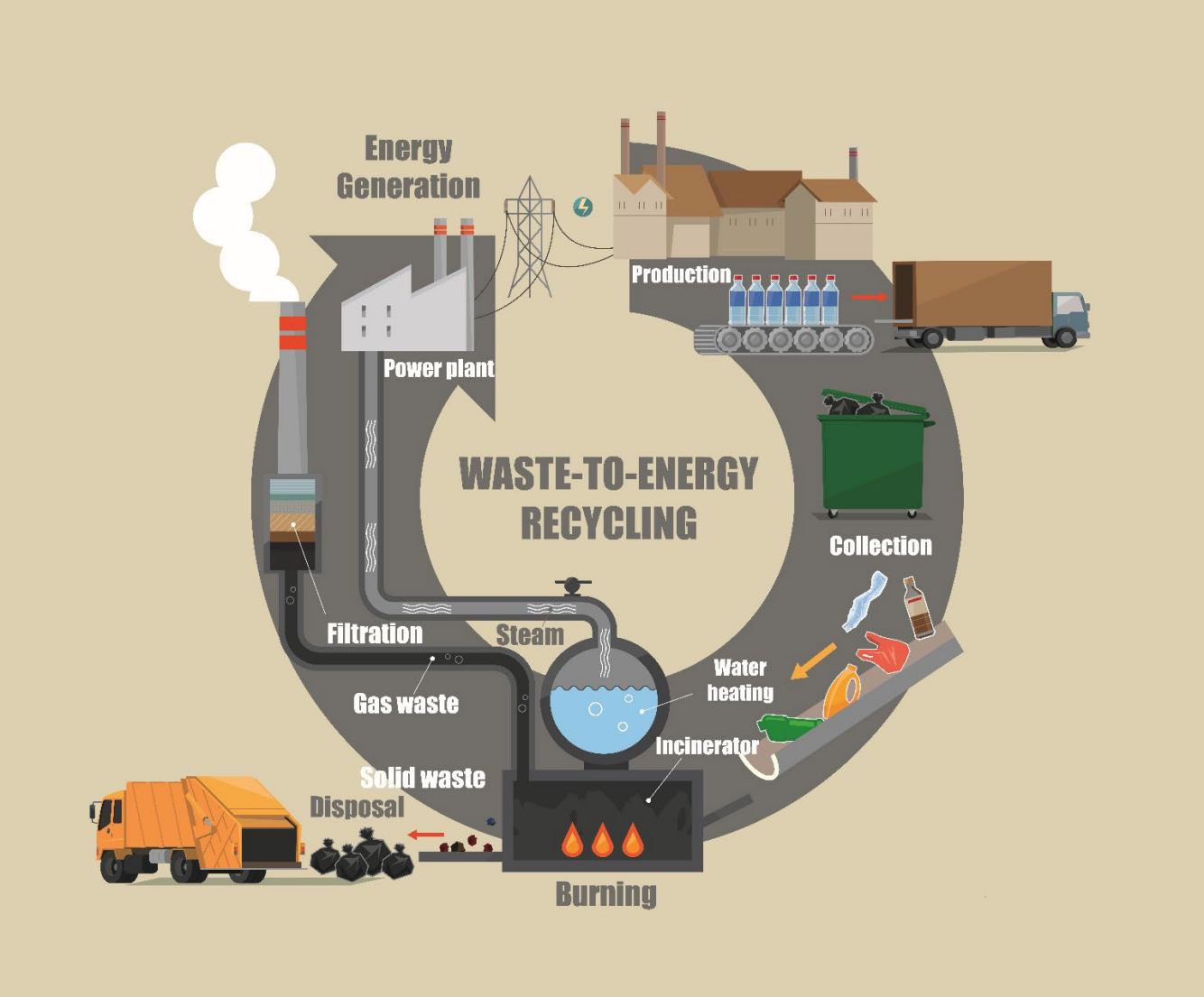
Two technologies that the City could consider implementing are Waste to Energy (WTE) incineration and Mixed Waste Processing (MWP). Both technologies present differing opportunities and pros and cons and come at a high cost compared to traditional landfilling. The SWMP is therefore recommending advancing a more detailed feasibility assessment and business case to provide comprehensive, up-to-date information before a making a on whether to pursue either technology.

10.3.1 Waste to Energy Incineration Facility

An incineration facility is a type of Waste to Energy (WTE) facility. WTE is an umbrella term that describes processing and breaking down waste to produce energy by using either heat, chemicals, or by using a biological process. Deciding which WTE facility to use depends largely on feedstock. Organics are best suited for a biological process, such as Anaerobic Digestion (AD) which produces biogas and can be upgraded to RNG or electricity. Mixed waste is best suited for a thermal process, such as mass-burn incineration, which produces steam, which can then power an electric generator turbine as an example. Both systems are optimized by managing moisture content, AD can handle wetter material whereas Incineration is optimized by dry feedstock. Chemical processes are still up and coming and have yet to establish a proven track record.

As further detailed in Appendix A-7, Hight-Level Long List of Options Technical Memo, WTE incineration facilities are proven technologies that combust municipal solid waste (MSW) to produce energy. These facilities also significantly reduce the total tonnages of waste requiring landfilling. Beneficial end-products and energy outputs include steam, electricity, and the recovery of some metals. Steam can be used to replace natural gas in a district energy system, which can support lowering community carbon emissions, and electricity can be used to help operate the facility and be sold to the power grid. An example WTE system is shown in **Figure 22**.

Figure 22: Example Waste to Energy Incineration Facility



Using WTE incineration creates ash, which can be compacted more densely than waste but it does not fully eliminate the need for landfilling. **The combustion process reduces the volume of the waste by approximately 73%, and the remaining ash material is landfilled.** There is a potential for other uses for non-hazardous ash that could further reduce what goes to landfill, but none have been approved within the Province of Ontario to date. WTE incineration is proven to process MSW and requires

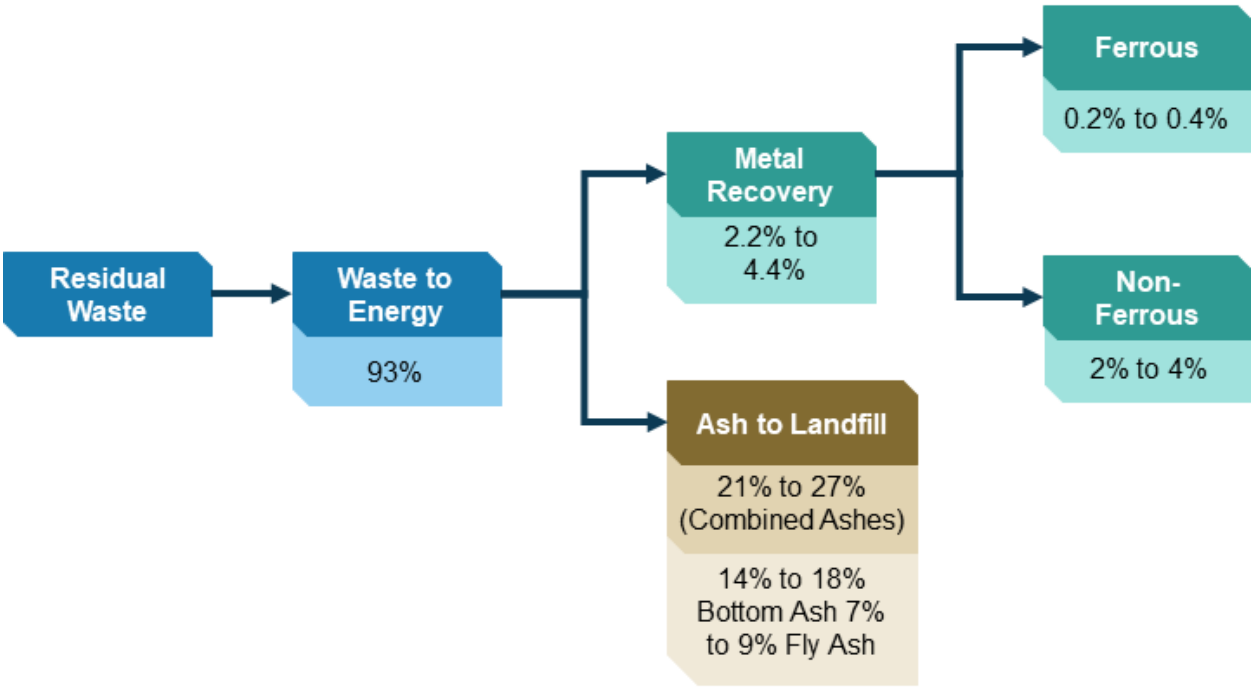
minimal pre-processing of incoming waste. It does, however, require a waste stream with less than 40% moisture to operate optimally, which highlights the importance of implementing the recommended reduction and diversion SWMP Action Suites that target increasing organics diversion.

WTE incineration presents some revenue generation opportunities, but the revenue generated is not expected to fully cover the cost of operating such a facility, as evidenced by existing facilities in operation. There are many changes underway in the Ontario electricity market, which also makes it unclear what the actual offset opportunity could be without a more detailed feasibility study and business case.

WTE incineration would not change estimates for diversion, as WTE is not considered a diversion technology by the Province of Ontario, but it does create the opportunity to significantly reduce the amount of waste requiring landfilling, which would help extend the time in which the City will need to invest in a new landfill. **Assuming that an expansion of the TWFL occurs in approximately 2032, WTE incineration would allow the TWFL to continue to operate through the end of the 30-year planning period.**

Figure 23 shows an example of a process flow for a typical WTE incineration facility, including volume reduction and metal recovery. The percentages represent the approximate portion of the residual waste stream that would go to each step/facility in the process.

Figure 23: Waste to Energy Incineration Process Flow



Note: Approximately 7% of waste generated is estimated to be C&D waste and Municipal Hazardous or Special Waste (MHSW), which would not be processed and would instead be directed to landfill. The remaining 93% of waste would be directed to the MWP facility.

In terms of GHG emissions, WTE incineration facilities can substantially reduce net GHG emissions when generating electricity and/or steam for district heating (used to offset natural gas use) compared to traditional landfilling with electricity capture. This aligns with the goals of the **City's Climate Change Master Plan**. Further details on GHG emissions are contained in **Section 10.6** .

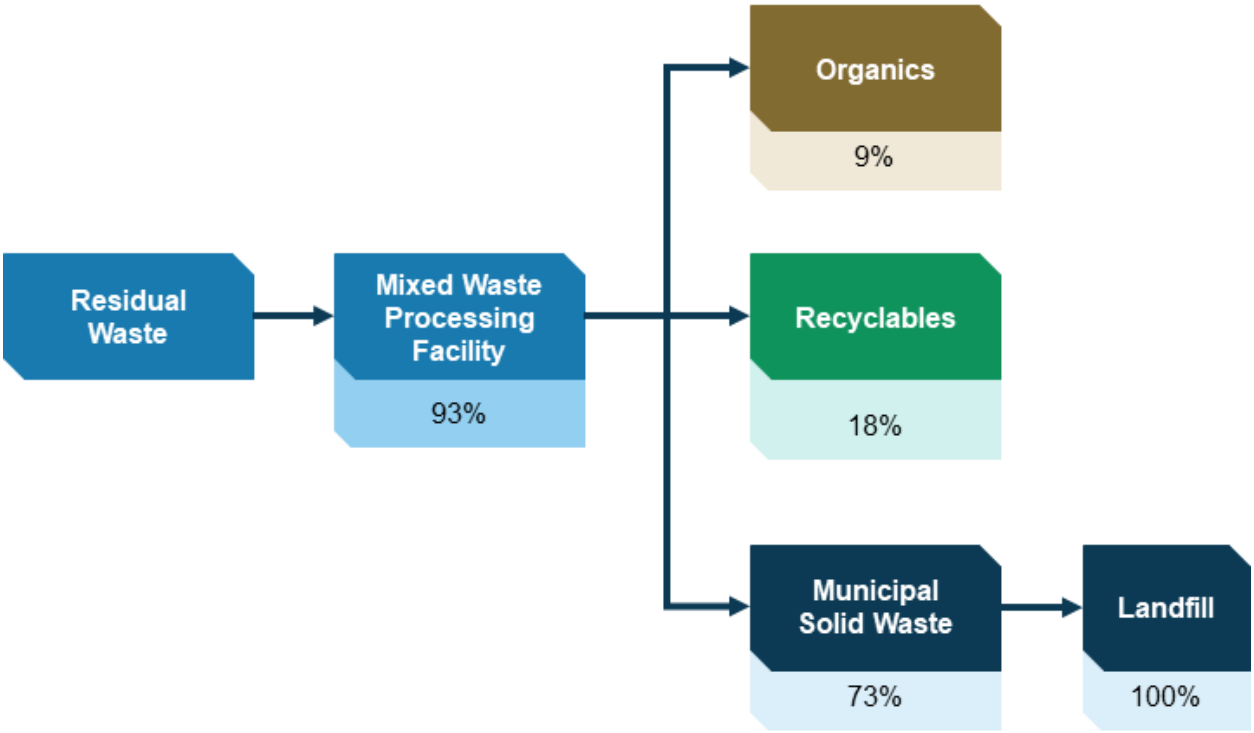
10.3.2 Mixed Waste Processing Facility

As further detailed in the High-Level Long List of Options Technical Memo, MWP facilities are proven technologies that separate garbage into materials that can be diverted and materials that can be landfilled.

MWP has the potential to divert an additional 30,000 tonnes of organic waste from landfill every year, assuming that the recovered organics are not overly contaminated and can proceed to processing. MWP can also increase the capture of recyclables that still end up in the garbage. If MWP was used to process waste managed by the City, approximately 18% of the material is projected to be recyclables, and another 9% is projected to be organics. MWP could further increase diversion of organics and recyclables that remain in the waste stream and could extend the time in which the City will need to invest in a new landfill.

MWP has the potential to expand the life of the TWFL by approximately four years, to approximately 2049. Figure 24 shows the process flow for a MWP facility, assuming that the facility will recover approximately 9% of the garbage stream for organics processing and 18% of the garbage stream for recycling. This recovered material would then be sent to the proper facility for processing.

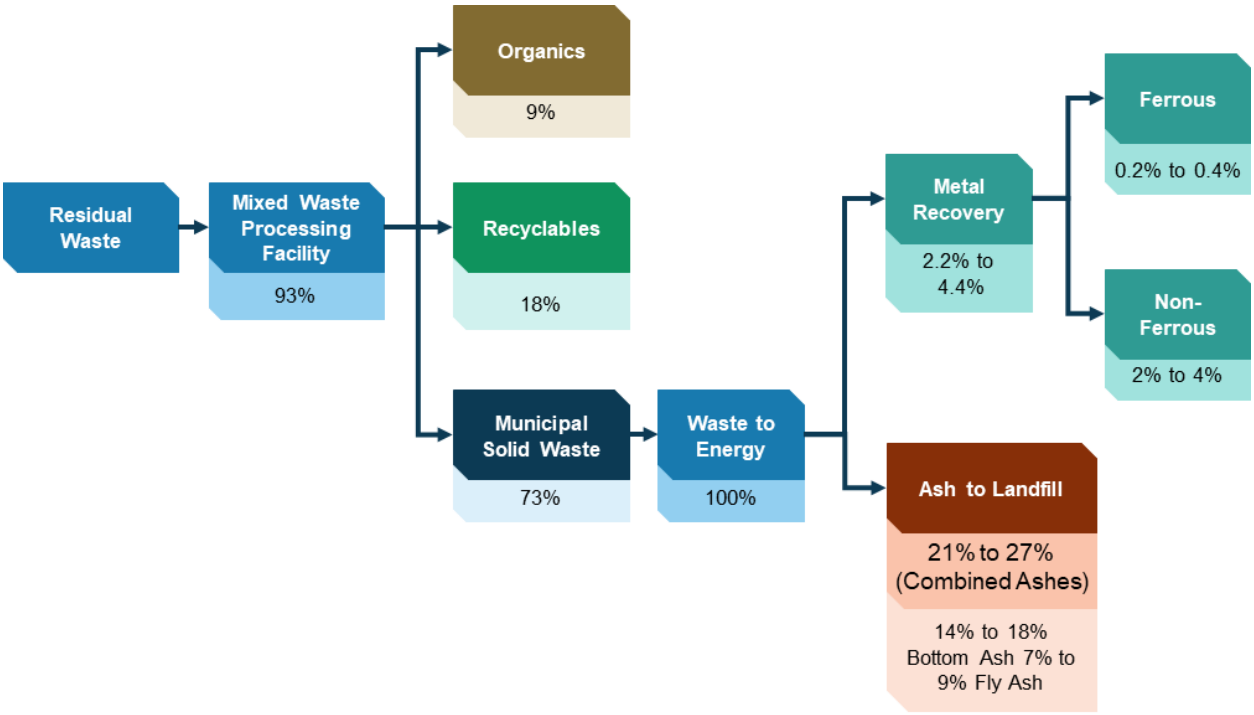
Figure 24: Mixed Waste Processing Process Flow



Note: Approximately 7% of waste generated is estimated to be C&D waste and MHSW, which would not be processed and would instead be directed to landfill. The remaining 93% of waste would be directed to the MWP facility.

WTE incineration and MWP can also be used together to maximize diversion from the landfill. Implementing the SWMP Actions, WTE incineration, and MWP reduces the landfill airspace used by nearly 2 million tonnes over the SWMP planning period, as compared to implementing SWMP Actions alone. This is also projected to extend the life of the landfill beyond the 30-year SWMP planning period. **Figure 26** shows an example process flow for a typical MWP to WTE incineration. The percentages represent the approximate portion of the waste stream that would go to each step/facility in the process.

Figure 25: Mixed Waste Processing to Waste to Energy Incineration Facility Process Flow



Note: Approximately 7% of waste generated is estimated to be C&D waste and MHSW, which would not be processed and would instead be directed to landfill. The remaining 93% of waste would be directed to the MWP facility.

Increasing the diversion of additional recyclables and organics from landfill can help reduce GHG emissions and increase revenues. Increasing diversion of these materials are important to achieving the goals of the CCMP. However, the quality of these materials is not as high as when materials are separated at home by residents before the waste is collected, which could result in lesser revenue to the City for the divertible material. Furthermore, it is unknown if producers would partner with the City to help subsidize the cost of a facility that further diverts recyclables which they are responsible for managing under the new Provincial IPR program.

By advancing a feasibility study and business case for a WTE facility or MWP facility, the City will be better positioned to understand the diversion potential from each technology based on the City's projected waste stream. The feasibility study will also include further analysis on costs and revenue opportunities, environmental impacts, and community support for these technologies.

10.3.3 Optimal Management of Remaining Residuals

The Residual Waste Management Action Suite includes 3 Actions to further extend the life of the TWFL in the short term (0 to 5 years) and medium term (5 to 10 years) to provide the City with enough time to implement a new longer-term residual waste management solution. The proposed Actions include:

- Expanding the TWFL within its existing footprint.
- Using private landfills to optimize collections efficiencies and gain additional airspace.
- Banning IC&I waste from TWFL to preserve its remaining capacity for residential waste only.

Seeking Provincial approval to expand the TWFL within its existing footprint, between stages 4 and 5, has the estimated potential to increase capacity by up to 2.28 million m^3, which is equivalent to adding an estimated **5** years of life to the TWFL. The Provincial approval process could take upwards of 10 years to complete, as evidenced by recent landfill expansion applications in the industry that took approximately 8 years. There also is the risk that the Province will not approve the expansion. The SWMP is therefore recommending advancing this Action Suite to begin immediately.

Re-directing approximately one-third of residential waste to private sector landfills in the Ottawa and greater Ottawa region could help improve collections efficiencies, reducing collections costs and GHG emissions, and could add approximately two years of life to the TWFL over the term of the SWMP, assuming that the waste reduction and diversion

Actions recommended in the SWMP are implemented. While there is an added cost to processing waste at a private sector landfill, these costs are expected to be offset by the value of preserving TWFL space and lower collections costs. This presents an opportunity to provide the City with enough time to implement a longer-term residual waste management solution. It could also present a suitable longer-term solution in the absence of waste transfer stations.

If the City chooses to implement the waste reduction and diversion Actions, plus re-directing waste to private landfill and expand the life of the TWFL within its current footprint, this could add approximately 14 years of life to the TWFL.

Lastly, banning commercial waste for the TWFL as early as 2025 will allow the City to save approximately 374,400 cubic metres of airspace, which could result in at least one additional year of capacity at the TWFL over the term of the SWMP. The City is uniquely positioned to consider preserving TWFL capacity for residential use only, given the number of private sector landfills and transfer stations located within the city's boundaries and within 100km of its boundaries. Beginning in 2025, with the expansion of the Carp Road landfill, owned and operated by Waste Management, additional private sector capacity will be available for private business and commercial use should the City proceed with restricting the TWFL to residential use only. While this is anticipated to result in lost tipping fee revenues for the City, the value of the preserved landfill space outweighs the value of lost revenues.

10.4 Impacts on the Trail Waste Facility Landfill

As evidenced by the results analysis in the previous sections, extending the life of the TWFL and deferring the need to invest in a new landfill or alternative technology requires a multi-pronged approach, including short, medium and longer-term Actions. Following the implementation of the various recommended Action Suites, approximately 199,500 tonnes of waste will still require management by 2053 if the SWMP Actions are implemented and WTE incineration and MWP are not.

Table 12 shows the impacts of various City decisions on the estimated date of landfill closure of the TWFL. Note that the estimated additional years of life associated with landfill expansion and redirection, MWP, WTE incineration, and WTE incineration with MWP assume that SWMP Actions are implemented.

In most scenarios, the TWFL is expected to run out of airspace and close prior to the end of the 30-year SWMP planning period. Expanding the landfill, redirecting waste to private landfills, banning IC&I waste from the TWFL, implementing the SWMP Actions, and using MWP technology all increase the life of the landfill, but do not extend the life of the TWFL beyond the 30-year planning period. If the City elects to implement WTE incineration or WTE and MWP concurrently, the TWFL is estimated to have capacity to receive waste beyond the 30-year SWMP planning period.

Table 12: Impacts on Life of TWFL

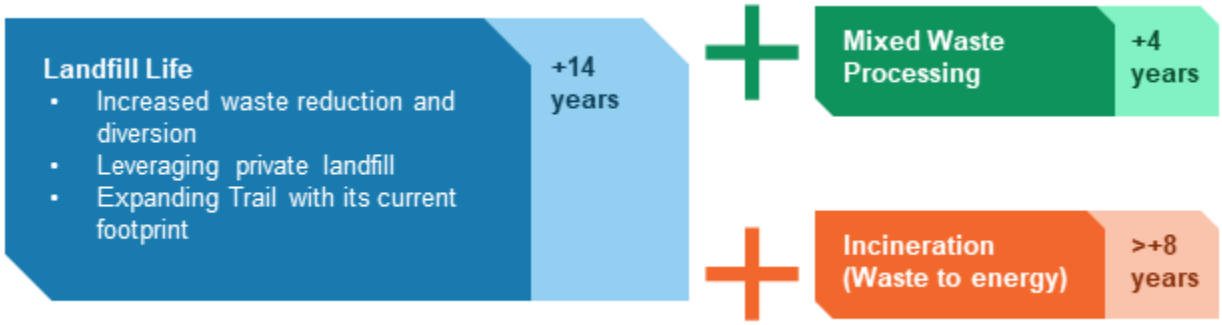
Technology	Cumulative Estimated Additional Years of Life
No Change to System – No Expansion/Redirection	-
Landfill Expansion and Redirection of 30% of Waste to Private Landfills	8
SWMP Actions	14
Mixed Waste Processing	18
Waste to Energy Incineration Facility	30+
Waste to Energy Incineration Facility with Mixed Waste Processing	30+

While a core goal of the SWMP is to extend the life of the TWFL beyond the 30-year term of the plan, the analysis conducted through the SWMP planning process has concluded that this is not possible without investment in some form of alternative technology that further reduces the amount of waste going to landfill.

If the City chooses to implement an alternative technology following a detailed feasibility study and business case, the life of the TWFL could be extended, which would further delay the need for a new landfill until at least 2049 (if MWP is implemented) or for the duration of the 30-year planning period (if WTE incineration or WTE incineration with MWP are implemented).

Figure 26 provides an overview of the cumulative impact of the recommended multipronged approach to further extend the life of the TWFL.

Figure 26: Cumulative Impact on TWFL Lifespan

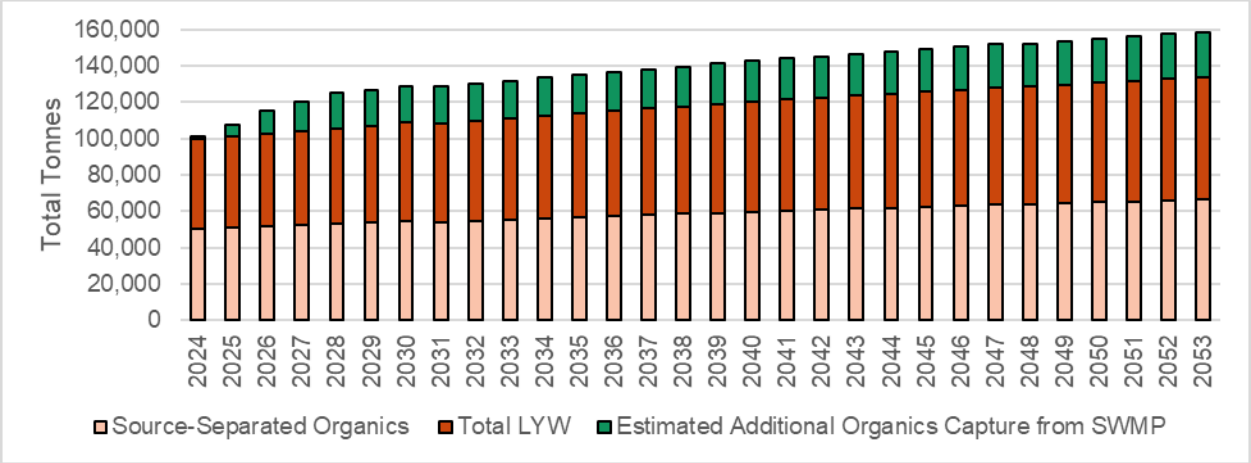


10.5 Impacts to Organics and Recycling Processing Capacity

10.5.1 Organics Processing Capacity

The recommended waste diversion Actions that are currently quantifiable are expected to increase organic waste diversion by approximately 20,000 tonnes per year. **Figure 27** shows the projected 30-year tonnage of organic waste capture from the SWMP, including Green Bin materials but excluding LYW.

Figure 27: SWMP Projected Tonnages for Organic Waste (including Green Bin, excluding LYW)



In terms of processing impacts, the City currently processes household organics at the privately owned and operated Convertus facility, which can process up to 100,000 tonnes of organic waste per year. Leaf and yard waste (LYW) is typically collected with the Green Bin Program and sent to Convertus for composting. However, during peak seasons (fall and spring), some curbside LYW is collected separately and composted at the Barnsdale Road Facility which has a capacity of 60,000 tonnes of LYW per year.

The processing contract with Convertus ends in March of 2030. At that time, the SWMP is proposing that household organic waste be processed using Anaerobic Digestion (AD) to generate renewable natural gas from organic food waste. This technology can only process certain organic feedstock and requires LYW to be processed separately. Separate collection of LYW will increase the amount of LYW that is separately collected and composted at the Barnsdale facility, which can also be done at a lower cost.

Organic material managed by the City could potentially exceed the capacity of the Convertus facility before a new facility/contract is in place by 2030, which is one of the reasons why the City has made changes to the 2026 curbside collection contract to allow for separate LYW collection. This will allow the City greater flexibility to manage its capacity at Convertus until such time that a new facility is operational and meets the City's future organics processing capacity needs.

10.5.2 Recycling Processing Capacity

As outlined in **Section 4.2**, with the transition of the City's Blue and Black Bin programs to IPR, the City is no longer responsible for the management of these waste streams. Because the scope of IPR mainly includes residential households, the City is expected to continue to provide Blue and Black Bin collection and processing for City facilities and small businesses under the Yellow Bag Program for Small Businesses through transition. It also remains unclear what the role of producers versus the City will be in managing recyclables from parks and public spaces beginning in 2026. Given the City still has a small role to play in recycling collection and processing for these specific programs, the City will need to plan for its future processing capacity needs.

Figure 28 and **Figure 29** show the projected 30-year tonnages of black bin and blue bin recyclables projected to be generated from City facilities, parks, and public places. Because the Yellow Bag Program for Small Businesses is collected with curbside household waste, it is not possible to project the estimated amount of recyclables

generated through this program, but it is anticipated to be quite low given the number of businesses participating in the program. Black bin recyclables are projected to reach approximately 3,700 tonnes in the first five years, with blue bin recyclables projected to reach approximately 2,700 tonnes. **Figure 30** shows the projected 30-year tonnage for additional capture of recyclables from the SWMP for the City facility and parks.

Figure 28: SWMP Projections for Black Bin Recyclables from City Facilities

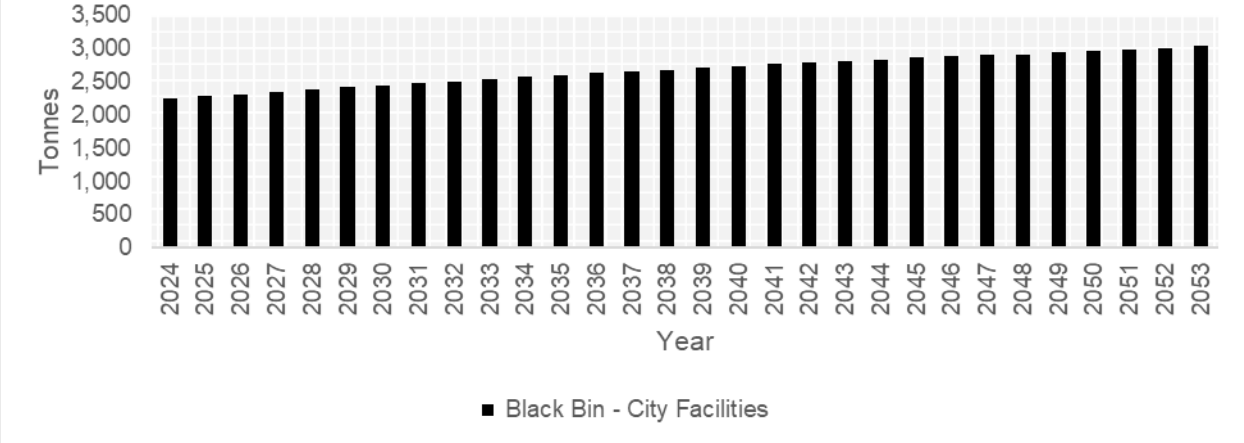


Figure 29: Projections for Blue Bin Recyclables from City Facilities, Parks, and Public Spaces

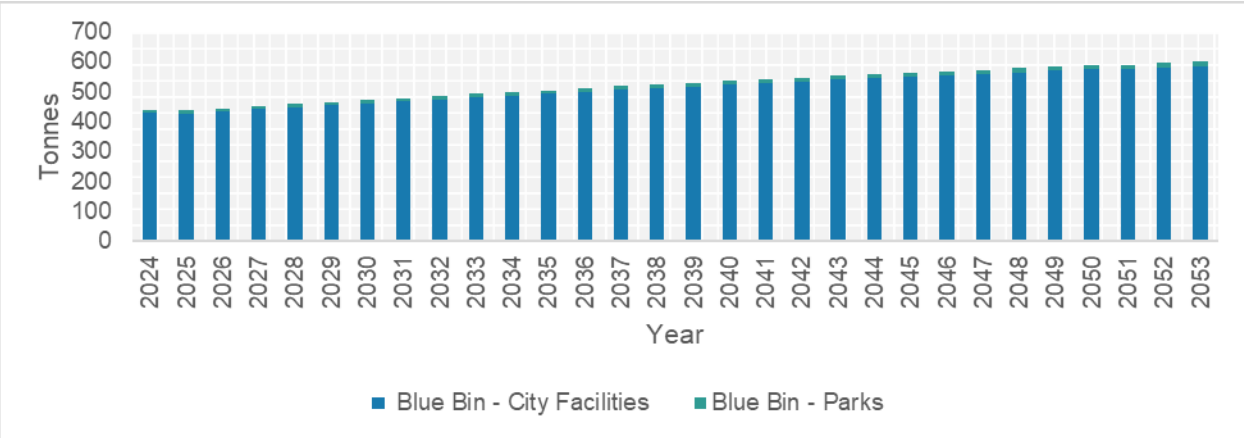
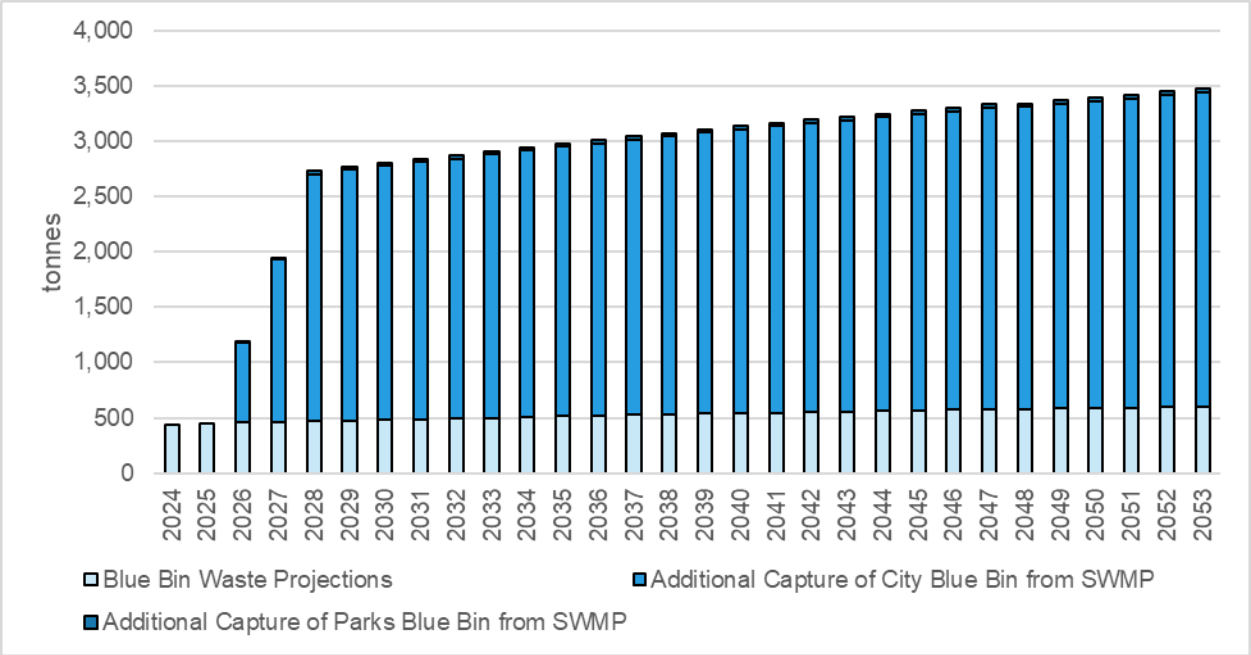


Figure 30: Projections for Additional Capture of Recyclables from SWMP



10.6 Impacts on Greenhouse Gas Emissions

In 2019, the City of Ottawa declared a Climate Emergency and approved its first Climate Change Master Plan (CCMP) in 2020. The CCMP is the City's overarching framework to reduce GHG emissions and respond to the current and future effects of climate change. It includes the Energy Evolution Strategy (EES), which aims to take unprecedented collective action to transition Ottawa into a clean, renewable, and resilient city by 2050, meaning a 100 per cent reduction in emissions in comparison to 2018 emissions levels. For community emissions, this includes an emissions reduction of 43 per cent by 2025, 68 per cent by 2030 and 96 per cent by 2040. For corporate emissions, the goal is 30 per cent reduction by 2025, as well as a 50 per cent reduction target for 2030, and 100 per cent reduction target by 2040.

Four key areas of the SWMP were developed to support the goals of the CCMP:

- Reducing, avoiding, and reusing waste
- Increasing organics waste diversion
- Generating renewable natural gas from organics food waste
- Transitioning to a zero emissions fleet

The 2023 CCMP Progress Report identifies key performance indicators that include natural gas, fleet, and landfill gas emissions reductions. The EES refines the CCMP waste goals by using landfill gas (LFG) to generate renewable natural gas (RNG) and diverting organics to anaerobic digestion (AD), which also produces RNG.

The SWMP supports the goals in the CCMP and EES using the strategies presented in **Table 13**.

Table 13: Strategies that Support The Goals in the CCMP and EES

Goal	SWMP Strategies that Support Goals
EES: Removing organics from the landfill and processing organic waste using anaerobic digestion to produce RNG.	The SWMP identifies several Actions intended to divert organics. Furthermore, Action 12 specifies the use of AD for organics processing.
CCMP: A community emissions reduction within the residential buildings sector, reducing from 1,320 kt CO_2e down to 390 kt CO_2e by 2030.	Generating RNG using AD (Action 12) will reduce community emissions if the City elects to inject the RNG into the natural gas grid.
CCMP: A City-wide fleet emissions reduction from the current 2,000 kt CO_2e, reducing to 910 kt CO_2e by 2030.	Action 23: Working Toward a Zero Emissions Solid Waste Fleet, is in alignment with this goal.
CCMP: A 50 per cent reduction in corporate emissions by 2030.	Several of the Actions will reduce methane-generating materials in the landfill, including food waste, leaf and yard waste, textiles, and pet waste.

Where applicable, the impacts of each Action were evaluated using **Environment and Climate Change Canada's (ECCC) Organic Waste GHG calculator**. The ECCC created the GHG Calculator for Organic Waste Management to help municipalities, project developers, waste generators, and other users estimate the impact on GHG

emissions of different organic waste management approaches. Details on the methodology, approach and impacts are provided in the **GHG Analysis of Actions in the Draft Solid Waste Master Plan** memo.

The EES model prescribed changes to how solid waste in the city is managed and processed in order to reduce GHGs. The EES model projected that Solid Waste Service (SWS) could cut 454,000 tonnes of CO_2e by 2050 with 82% of the reductions by 2030. Of this amount, 162,000 tonnes (36%) would be from residential, and 292,000 tonnes (64%) would come from the IC&I sector. SWS is responsible for the management of residential waste only and the IC&I sector is managed by the Province. Given this, the SWMP explores only what it is capable of impacting directly, which is residential emissions.

10.6.1 Landfill GHG Reductions

While the EES was aiming for a near total elimination of organics from landfill, it was largely driven by Provincial organics ban in landfills which has not transpired. However, the Actions described following this section, will still make meaningful contributions to the goal set out by the EES.

Baseline GHG emissions for Ottawa's TWFL were estimated based on waste projections. Waste diversion and reduction Actions associated with the SWMP and the estimated GHG reduction associated with each Action are listed in **Table 14** below. Note that the 30-year total is cumulative over the SWMP planning period, and therefore is not the sum of the emission reduction for the years listed on this table.

Table 14: Initial Net Landfill GHG Reductions of the SWMP (tonnes CO_2e)

Year	Total Emissions Reductions (tonnes CO2e)					Total Emissions Reduction (tn CO_2e)
	Action No.1 (Reduction and Reuse)	Action No.4 (Curbside)	Action No.5 (Multi-residential)	Action No.6 (City facilities)	Action No.7 (Parks & Public Spaces)	
2025	0	0	-70	0	0	-80
2030	-40	-1,070	-930	-450	-140	-2,630
2040	-100	-2,280	-1,700	-1,250	-320	-5,650
2050	-140	-2,770	-2,020	-1,630	-380	-6,940
30 – year Totals	**-2,600**	**-55,730**	**-42,380**	**-30,240**	**-7,670**	**-138,620**

The total reduction in GHG emissions is expected to increase over time as Actions are implemented. Over the course of the 30-year SWMP, the short-term Actions are estimated to reduce Ottawa's GHGs at the landfill by an estimated 138,620 tonnes of CO_2e, or an average of 4,620 tonnes of CO_2e per year. This is equivalent to removing 1,415 passenger vehicles off the road or combustion of 1.97 million litres of gasoline every year.

10.6.2 Anaerobic Digestion and RNG

Anaerobic digestion (AD) is the process of organic matter decomposing without oxygen in a bioreactor. The decomposition process produces biogas. The biogas is approximately 60 per cent methane and can be further refined into RNG by removing the oxygen, carbon dioxide, and trace gases. RNG can be injected into a pipeline and used as a lower-carbon-intensity substitute for fossil fuel natural gas. The life cycle emissions for RNG are lower than fossil fuel natural gas.

As outlined in the Council approved EES, the City is currently studying the feasibility of processing organic food waste collected by the City in an AD facility. **Table 15** provides the estimated GHG emissions offsets produced from an AD facility. Note that the 30-year total is cumulative over the SWMP planning period, and therefore is not the sum of the emission reduction for the years listed on this table.

The first-year operation of an AD facility is projected to generate nearly 2 million m^3 of RNG, which offsets 1,840 tonnes of CO_2e. By 2050, the 89,000 tonnes of organic material (does not include leaf and yard waste) processed in the facility will produce approximately 4.7 million m^3 of RNG, offsetting emissions by an estimated 4,390 tonnes of CO_2e.

Table 15: Estimated GHG emissions Offsets for RNG Produced from Anaerobic Digestion

Year	Organics Processed (tonnes)	RNG (m3)	RNG (GJ)	Emissions Reductions (tonnes CO2e)
2030	37,400	1,974,700	73,700	-1,840
2040	82,100	4,336,300	161,800	-4,040
2050	89,100	4,704,400	175,500	-4,390
30 – year Totals	**1,951,200**	**103,024,800**	**3,842,800**	**-96,080**

These 4,390 tonnes of avoided CO_2e emissions in 2050 are equivalent to the emissions from 1,344 passenger vehicles or 1.87 million litres of gasoline per year. By the end of the 30-year planning period in 2053, RNG production through AD will have offset a combined total of approximately 96,080 tonnes of CO_2e through community use of 103.02 million m^3 of RNG.

10.6.3 Potential GHG Reductions in Waste Fleet

Ottawa's CCMP states that the transportation sector was responsible for 48 per cent of Ottawa's corporate emissions in 2018. In response to this, the SWMP established, Action 23: Working Towards a Zero Emissions Solid Waste Fleet to address emissions from collection vehicles. This Action includes reviewing emissions from the City's current solid waste fleet vehicles and researching vehicles that use low-carbon fuels. The following vehicles were analyzed to estimate the GHG emissions from the City's solid waste collections fleet:

- Curbside-residential waste collection vehicles
- Multi-residential and City Facility waste collection vehicles
- Mini-packer and F550 trucks used for Parks and Public Spaces collection

Data was not available for on-street and OC Transpo waste, which are collected under contract, and therefore the fleet collecting this waste is not accounted for in this GHG analysis.

Table 16 summarizes the GHG emissions results for the waste fleet analyzed. Note HDDV stands for Heavy Duty Diesel Vehicle. The estimated GHG emissions from City-owned or contracted waste collection vehicles is 13,040 metric tonnes CO_2e using the Waste To Resource Ontario methodology for waste collections vehicles. Based on information provided by the City, Parks and Public Spaces emissions are estimated at 100 metric tonnes CO_2e, for a total estimated emissions of 13,140 metric tonnes of CO_2e.

Table 16: GHG Emissions Results for Waste Collections (2021)

Vehicle		Fuel Type	2021 Emissions tonnes CO2e
Waste Collections	Curbside-residential (Contracted)	Diesel HDDV	6,330
	Curbside-residential (City-owned)		4,600
	Multi-Residential & City Facilities		2,110
Parks & Public Spaces		Diesel HDDV	100
Total Emissions (tonnes CO_2e)			**13,140**

The City understands that low emissions fleet technologies are rapidly developing and that the City's strategy for a zero-emissions fleet will evolve as new technologies or fuel sources become available.

As an example, electric waste collections vehicles are currently undergoing testing in several Canadian jurisdictions and could offer further GHG reductions. The City will monitor these ongoing efforts and include them in its planning process. The City will also explore fuel types such as RNG and Compressed Natural Gas (CNG).

10.6.4 Waste to Energy Incineration GHG Impacts

For Ottawa's waste, it is estimated that approximately 185,000 tonnes per year of waste could be eligible for incineration in a WTE system. If the City elects to pursue a WTE incineration facility that produces steam and uses that steam to instead of Natural Gas, the system will produce more energy than it uses, which creates a 'net-negative' scenario because the energy from the steam offsets any energy used in the process. It is estimated that a WTE incineration facility in Ottawa could result in a net negative of –25,647 tonnes of CO_2e per year.

10.6.5 Mixed Waste Processing (MWP) GHG Impacts

In Ottawa, MWP has the potential to divert approximately 30,000 tonnes of organics per year from the landfill to an AD facility. The impact of this is an estimated net negative -973 tonnes of CO_2e per year.

11.0 SWMP Targets and Action Performance Measures

The City has selected targets to evaluate its progress under the SWMP. Targets are measurable parameters used to assess the performance of the waste system. The City plans to evaluate progress toward its targets annually. Performance measures have also been selected for the individual actions to measure their ongoing effectiveness and efficiency.

11.1 SWMP Targets

Municipalities have historically used diversion rates to measure the performance of their waste system. However, diversion rates do not accurately capture the effects of avoidance, reduction, and reuse. Further, some items that affect diversion rate are outside of a municipality's control. Therefore, measurements related to waste deposition and organics capture have been chosen for the SWMP. Diversion rates may still be used to compare the current and future waste system to historical data but will not be the key measure of progress for the SWMP.

The SWMP Actions are anticipated to:

- Decrease the amount of waste disposed by the community within households, City facilities, parks and public spaces by 15% in 2029 and by 23% by 2034, compared to the 2024 baseline.
- Increase the amount of organics captured by diversion programs by 14% by 2029 and by 20% by 2034, compared to the 2024 baseline.

The short and medium-term targets are detailed in **Table 17**, separated into per capita impact and curbside-residential and multi-residential impact.

Table 17: SWMP Targets

Measurement	2024 Baseline	Short-Term	Medium-Term	Unit
		2029 Target	2034 Target	
Total Waste Landfilled	181	154	139	kg/capita
Curbside-residential	388	342	308	kg/household
Multi-residential	425	375	338	kg/household
Total Food Waste Capture Rate	41%	55%	61%	%
Curbside-residential	48%	57%	63%	%
Multi-residential	18%	42%	46%	%

Medium-term targets assume that the City may achieve an additional 10 per cent reduction and diversion from the 2029 targets by 2033. This accounts for the SWMP strategies that will be planned in the short-term but whose impacts will not be realized until closer to the medium-term. This includes the impacts of the Bulky Waste and C&D Diversion Strategies and the Food Waste Reduction Strategy. In addition, the medium-term target also considers ongoing success of the short-term Actions and their potential to be more successful with time as an increasing number of residents participate in the new/improved programs.

11.2 Updating of SWMP Targets

Targets will be updated to include the impacts of various strategies and medium-term Actions as new data is acquired. Targets will be updated to include this new data in the 5-year SWMP refresh.

11.3 Performance Measures for Individual Action Suites

Performance measures will be used internally by City staff to measure the effectiveness and efficiency of the individual SWMP Actions. Data used to evaluate performance measures will be gathered through waste audits, processing facility and collections operations data, and annual surveys.

Table 18 provides internal performance measures that will be used to measure the success of the SWMP Action Suites.

Table 18: SWMP Action Suite Performance Measures

Objective 1: Maximize the reduction and reuse of waste	
Included Actions	**Possible Performance Measures**
Action Suite 1 – Waste Avoidance, Reduction, and Reuse Initiatives: Take It Back! Program Expansion	• Exploring the feasibility of tracking quantifiable Take It Back! Items will be investigated as part of Action planning, understanding there are challenges with data collection for this waste stream (e.g. no ability to weigh materials).
Action Suite 1 – Waste Avoidance, Reduction, and Reuse Initiatives – Options for new community reuse and reduction events or initiatives	• Number of community groups worked with/year • Number of events/initiatives supported overall • Number of new events/initiatives initiated • Number of events that City Staff (educators) attend • As initiatives are developed new performance measures will be added, such as number of items collected/repaired at events.
Action Suite 1 – Waste Avoidance, Reduction, and Reuse Initiatives: Financial incentive options (providing subsidies and grants to residents and community organisations to initiate or improve ideas and programs)	• Amount of money spent on new community-run waste initiatives or improvements ($) • Number of new initiatives or improvements • Money spent vs. waste diverted ($/kg) • Event metrics, including number of events held, participants, tonnages collected and reduced, etc.

Objective 1: Maximize the reduction and reuse of waste	
Action Suite 1 – Waste Avoidance, Reduction, and Reuse Initiatives: Textile waste diversion	• Decreased landfilling of textiles by (tonnes/year) • Public satisfaction regarding use of clothing donation bins • Total tonnages collected in collection bins
Action Suite 2 – Food Waste Reduction Strategy and Reduction Education Initiatives	• Decrease in overall food waste generation in the organics stream (kg/household), understanding this Action will be only one part of the measurable food waste reduction with other Actions that affect food waste.
Action Suite 3: Waste Minimization and Diversion at Special Events	• Number of events reviewed or consulted on by City Staff

Objective 2: Maximize the recycling of waste	
Included Actions	**Possible Performance Measures**
Action Suite 4 – Enhanced Source Separation of Waste: Including Partial Pay-as-you-t hrow (PAYT) and Enhanced Enforcement	• Individual capture rate targets by waste stream (%) • Reduction in waste generation by household (kg/household) • Set out rate (# of households that have both their green bin and garbage bin out on the same day) • Curbside contamination rates (% of waste that is in the wrong bin, by waste stream)

Objective 2: Maximize the recycling of waste	
Action Suite 5 – Supporting Additional Diversion in Multi-Residential Buildings	• Capture rate of organic waste for units receiving City service (%) • Waste generation by multi-residential household (kg/household) • Number of chutes closed or converted to organics chutes (chutes/year) • Number of multi-residential buildings taking on green bin programs (buildings/year) • Number of multi-residential buildings with Ambassador programs (# or %) • Number of downloads of the multi-residential toolkits or posters • Contamination rates of collected streams (%)
Action Suite 6 – Waste Diversion Initiatives and Strategies at City Facilities (including implementing improved/expanded recycling streams in all buildings)	• Individual capture rates by stream (%) • Number of new streams collected (e.g. Light bulbs, electronics etc.) • Waste generation (kg/building/site) • Set out rates (number of recycling bins) • Contamination Rates (%)
Action Suite 7 – Waste Diversion in Parks and Public Spaces (expansion of diversion to more parks and spaces)	• Capture rates of each of the waste streams, including pet waste and organics (%) • Decrease tonnages going to landfill (%) • Contamination rate in parks and public spaces bins (%)
Action Suite 8 – Residential Construction & Demolition Waste Diversion Strategy	• Performance measures will be developed within the strategy but may contain capture rates of the various materials in C&D waste or targets related to supporting reduction, reuse, and recycling.

Objective 2: Maximize the recycling of waste	
Action Suite 9 – Bulky Waste Diversion Strategy	• Performance measures will be developed within the strategy but may contain capture rates of the various materials in bulky waste, number of items reduced or recycled, or targets related to supporting reduction, reuse, and recycling.
Action Suite 10 – HSP Strategy Development	• Performance measures will be developed within the strategy but may contain capture rates of the various materials in HSP, or number of items not landfilled.
Action Suite 11 – Sustainable Development Initiatives (incentives for developers to support waste reduction and diversion)	• N/A – these would be standardized mechanisms through City Planning.

Objective 3: Maximize the recovery of waste and energy and the optimal management of remaining residuals	
Included Actions	**Possible Performance Measures**
Action Suite 12 – Anaerobic Digestion (AD) and/or Co-digestion (noting that a feasibility study for this Action has commenced)	• Amount of GHG's offset or reduced – measured annually
Action Suite 13 – Separate Collection of Leaf and Yard Waste (LYW)	• Cost savings through separate collection and processing ($/tonne)
Action Suite 14 – Waste Recovery and/or Treatment Facility Study	• Potential measures for each option will be developed during the study
Action Suite 15 – Landfill Gas Management Strategy	• Amount of GHG's reduced – measured annually
Action Suite 16 – Residual Waste Management Strategy	• Volume of TWFL preserved annually (m^3)

Objective 4: Maximize operational advancements	
Included Actions	**Possible Performance Measures**
Action Suite 17 – Pilot Alternative Collection Containers	• Operational item, but could increase diversion in rare instances where other bins are not accessible or do not allow for capture of materials (kg/container/year)
Action Suite 18 – RFID Technology on Waste Containers	• Performance measures will be developed depending on the type of technology utilized and its capabilities. Examples include ability to track participation verification and missed collections.
Action Suite 19 – Identifying Curbside Collection Efficiencies	• To be established within the curbside review
Action Suite 20 – Yellow Bag Program for Small Businesses Review	• To be established within the Yellow Bag Program for Small Businesses review
Action Suite 21 - Automated Cart Collection for Curbside Garbage	• Performance measures will be developed as the Action is planned. Examples could include participation increase, contamination decrease and customer satisfaction with the change.
Action Suite 22 - Innovation and Technology	• To be established when strategy is developed, and innovations and technologies are analyzed
Action Suite 23 - Working Toward a Zero Emissions Solid Waste Fleet	• Amount of GHG's offset or reduced – measured annually

Objective 5: Develop a Zero Waste culture across the city	
Included Actions	**Possible Performance Measures**
Action Suite 24 - Promotion & Education to Support Plan Implementation – additional investment to support enhancements	• Reach: Number of schools/multi-residential units/curbside households per year • Number of new outreach initiatives expanded or created • Reach of programs (# of visits to schools, businesses, and multi-residential buildings) • Social Media analysis – number of hits, likes, shares, visits. Indicates what info the public is looking for/seeking out/reading • Social Media content - # of posts, updates, info published by City per month/quarter/year. # hits to website. • Questions can also be asked through annual customer service survey
Action Suite 24 - Promotion & Education to Support Plan Implementation - Behavioural change management strategy	• Questions through annual customer survey on behaviour shifts • Tonnage data can help determine how well people are adapting to new policies
Action Suite 25 - Circular Economy Strategy	• Performance measures and targets to be developed within the strategy. Examples could include number of partnerships formed and tracking changes to public procurement practices.

12.0 SWMP Financing and Funding

The SWMP includes 25 proposed Action Suites (containing 50 Actions) to drive change and work towards meeting the vision and goals of the SWMP. Most of these proposed Actions involve providing enhanced services to the community and reducing the climate impact of managing waste, all of which requires funding. However, some Action Suites create new revenue generation opportunities for the City that will help offset costs. In addition, many of the proposed Actions create efficiencies, which will result in cost savings over time.

Since the SWMP is a high-level planning exercise, the financial analysis is intended to provide order of magnitude estimates with respect to estimated future cost impacts to households through the solid waste tax and rate contributions. The analysis provides an estimated cost for the recommended system as a whole and a relative cost comparison between the recommended Actions.

Due to the difficulty in predicting future costs, given the significant impacts of a range of market and macroeconomic factors, cost escalation and inflation are not considered in the estimates below. Therefore, it is important to note that actual costs incurred if the recommended Actions are implemented will likely differ from those presented herein. More refined estimates will be developed as part of the Long Range Financial Plan that will accompany the final Solid Waste Master Plan. Cost estimates will also be refreshed on a 5-year basis.

Baseline Budget Needs to Maintain Solid Waste Services

Over the next ten years (2025-2034), there is a need for capital expenditures of approximately $185 million, with a significant portion, around $117 million[2], needed to cover regulatory costs for the existing landfill and to maintain existing waste services for residents. These baseline costs encompass various capital investments, including asset renewal, fleet renewal, technology upgrades, long-term planning, and landfill-related

[2] Based on 2024 10-year Capital Forecast which is updated annually as part of the budget process to reflect updated cost estimates.

expenses. There is also an additional estimated cost of $350-400 million[3] for a new landfill, which is not currently included in the City's 10-year financial plan.

The Solid Waste capital reserve is currently in deficit, without funding to support these future needs to maintain current services. Furthermore, over the past number of years, tax recovery, which funds diversion programs, has not fully supported the cost of providing diversion programs and has resulted in user rate surpluses being used to support diversion programs rather than being used to contribute to the solid waste capital reserve. Even without implementing the recommended SWMP Actions, rate increases will be required to cover the cost of the City's current forecasted budget needs.

Since 2020, Council has approved rate increases between $8 and $15 per household per year to support funding needs to make solid waste operations whole and to bring the capital reserve into a positive position. Despite these recent investments, the City's current 10-year capital plan forecast and historical rate increase will not be sufficient to fund the 10-year capital plan, the proposed SWMP initiatives, and a new landfill or an alternative technology for residual waste management when the TWFL reaches capacity without further rate increases. A Long-Range Financial Plan is being developed to accompany the final solid waste master plan which will propose a sustainable funding model to fund current and future solid waste service needs.

Total Estimated Financial Impacts of Recommended Actions

The recommended waste plan Actions will require around $346 million in new capital investment, excluding costs for a new landfill or alternative waste management technology. Operating costs are expected to rise by up to $20 million annually by 2031. As outlined in the table below, despite the added expenses, these Actions would delay the need for a new landfill by approximately 14 years. By reducing the amount of waste requiring landfilling, based on 2023 dollars, there is an estimated average asset value savings of approximately $4.3 million per year[4] by preserving air space at the Trail Waste Facility Landfill.

[3] High-level estimates based on City's capacity needs and similar municipal projects.

[4] Estimate is based on the estimated reduction in waste to landfill per year averaged over the 30-year planning period. Exact asset value savings per year will fluctuate based on actual total tonnage of waste reduced/diverted per year.

If the city decides to pursue Waste to Energy Incineration (WTE) or Mixed Waste Processing (MWP) technologies, there will be additional costs, with WTE being the more cost-effective option due to its higher capital cost but lower operating costs and higher revenue potential. Both technologies could further delay the need for a new landfill, resulting in greater cost savings at the Trail Waste Facility Landfill. The capital cost for a WTE facility is estimated to be between $450 and $500 million, annual operating costs are estimated to be $25 million per year and annual revenue offsets are estimated to be approximately $14 million per year. The capital cost for a MWP facility is estimated to be between $60 and $70 million, annual operating costs are estimated to be $41 million per year and annual revenue offsets are estimated to be $2 million per year.

As outlined in **Section 10.4**, both of these residual management technologies could further delay the need to invest in a new landfill by an estimated 30+ additional years for WTE and an additional 18 years with MWP (assuming that SWMP Actions are implemented). This further delays the costs required to invest in a new landfill, resulting in a further estimated asset value savings of approximately $13.58 million per year for WTE[5] and an estimated $5.78 million per year for MWP[6] in preserved air space at the Trail Waste Facility Landfill.

Estimated Impacts – Cost Per Household

Funding the budget needs required to meet existing service requirements and the recommendations of the waste plan will represent a sizable increase to solid waste tax and rate contributions to sustainably fund these programs into the future. For context, in **2024** curbside residential homes paid an average of **$201** per year for waste management services (tax and rate) and multi-residential households paid an average of **$138** per year (tax and rate) which is significantly lower than comparable municipalities. **Table 19** and **Table 20** below presents the estimated increase in cost

[5] Based on the estimated reduction in waste to landfill averaged over the number of years the technology will be in place until the end of the 30-year planning period. Landfill airspace savings will continue beyond the 30-year planning period as a WTE facility is estimated to extend the life of the TWFL beyond the 30 year planning period.

[6] Based on the estimated reduction in waste to landfill averaged over the number of years the technology will be in place until the estimated end of life of the TWFL which is before the end of the 30-year planning period.

per household to maintain existing solid waste services over the next year plus the cost of implementing the recommended waste plan Actions.

Even if the City chooses to do nothing and does not implement the recommended Actions in the SWMP, there will still be a requirement to increase rates in the near term to build up sufficient funding to pay for the costs of the City's current capital plan and additional landfilling capacity.

Table 19: Projected 10-Year Estimated Fee per Curbside Residential Household

Curbside Residential Cost per Household (SR)				
Year	**2025**	**2034**	**2043**	**2053**
Status quo system (2024) with new landfill	$219	$355	$461	$610
+ SWMP	$232	$365	$475	$682

Table 20: Projected 10-Year Estimated Fee per Multi-Residential Household

Multi-Residential Cost per Household (MR)				
Year	**2025**	**2034**	**2043**	**2053**
Status quo system (2024) with new landfill	$144	$213	$253	$332
+ SWMP	$155	$216	$255	$374

As outlined in the tables above, the SWMP is marginally more expensive than maintaining the status quo waste management system with a new landfill, while also adding 50 additional Actions that improve the waste management service level and provide innovative ways to protect the environment.

Despite the added expenses, these Actions would delay the need for a new landfill by approximately 14 years, pushing the needs for a significant cash outlay further into the future, while also saving millions of dollars by preserving air space at the Trail Waste Facility Landfill and pushing the costs for a new landfill into the future.

If the city decides to pursue Waste to Energy Incineration (WTE) or Mixed Waste Processing (MWP) technologies, there will be additional costs, with WTE being the more cost-effective option due to its higher capital cost but lower operating costs and

higher revenue potential. Both technologies could further delay the need for a new landfill, resulting in greater cost savings at the Trail Waste Facility Landfill.

Over the 30-year planning period, the most significant cost increases are required within the first 10 years, when the majority of initiatives are planned for implementation. This includes the requirement for new Full-Time Equivalent (F

TEs) to plan and implement the various actions. The table below presents the estimated net new FTEs required to plan and implement the SWMP Action Suites within the first 5 years of SWMP roll out. **Table 21** shows, most resources will be required within the first two years of SWMP roll out. Some strategies and initiatives require more resources for initial planning and implementation compared to the maintenance of the actions, hence the negative number for several of the latter years in the table.

Table 21: Estimated Net New FTEs Required for the First 5 Years

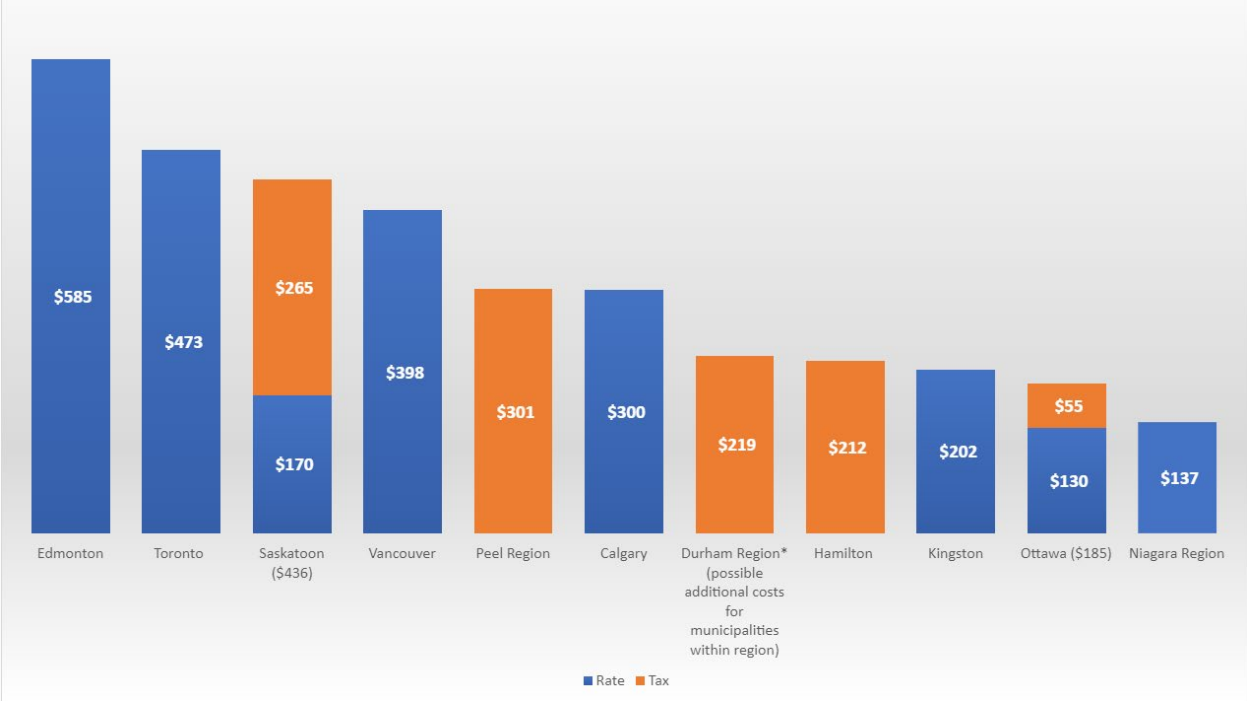
	Year 1	Year 2	Year 3	Year 4	Year 5
Net new FTE estimated requirement	10.25	11	-2.5	-0.5	-1.25

The development of the Long-Range Financial Plan will consider multiple funding strategies to minimize large swings in cost increases for residents, providing more reasonable and predictable cost increases.

Cost Impact to Households - Comparable Municipalities

Funding the budget needs required to meet existing service requirements and the recommendations of the waste plan will represent a sizable increase to solid waste tax and rate contributions to sustainably fund these programs into the future. While the analysis presented above does present a steep increase above what residents currently pay for solid waste services, the increased costs are in line with what other municipal jurisdictions charge residents to provide these critical regulated services. As outlined in **Figure 31** below, Ottawa currently charges the least amount for solid waste management services of the comparator cities included in the sample.

Figure 31: 2023 Canadian Municipal Solid Waste Fees



Sustainably Funding Solid Waste Services into the Future

To sustainably fund solid waste services into the future, a long-range financial plan (LRFP) is being developed to accompany the final SWMP. The LRFP will consider current and future affordability and will align with the City's Fiscal Framework. The scope of the LRFP will include:

- Exploring the debt limit restrictions to determine whether the waste program costs can be reasonably spread out over the decades to come;
- Assessing the potential to spread the significant capital costs anticipated in 2030 and 2044 (for a 2049 operational opening) across several years to ease the financial burden in those years;
- Assessing the policy, social and financial implications of raising user fees for City residents; and,
- Reviewing any planned user fee increases and considering making adjustments based on the anticipated waste program costs.

The LRFP will present Council with a series of recommendations to sustainably fund both the current unfunded capital plan as well as the recommendations of the SWMP.

13.0 Keys to Success

Implementing the SWMP's 50 Actions and achieving the Zero Waste vision will require participation and collaboration from stakeholders across the City and the entire community. In particular, success of the SWMP will be dependent on:

- **Community participation and behaviour change** – Many of the SWMP reuse, reduction and diversion Actions will require significant participation from residents across the city. Participation can be encouraged and improved by expanding outreach and education programs and initiatives, but full community involvement will require a shift in behaviour away from the current practice of waste creation and disposal to waste avoidance, reduction, reuse and recycling. Implementation of the SWMP's Behaviour Change Management Strategy will be instrumental in encouraging this shift in residents' individual habits and transitioning Ottawa to a community that prioritizes the principles of the waste management hierarchy.
- **Successful partnerships** – Many SWMP Actions require partnering with various stakeholders, such as businesses, community organizations and Non-governmental Organizations, for optimal success. Engagement with these groups was key during development of the SWMP and these partnerships will continue to be crucial, particularly as the various reuse, reduction and recycling initiatives are planned and implemented. Many existing and potential partners have already introduced initiatives and events in Ottawa that are in line with advancing the circular economy and have established networks with various sectors of the community. Continued City collaboration with these groups will benefit both the expansion of existing community initiatives and support the implementation of aligned City programs and policies.
- **Internal collaboration** – The SWMP scope includes the collection and processing of waste from curbside-residential and multi-residential homes, parks and other public spaces, City facilities and operations, and existing partner programs. Managing and enhancing waste programs needs to align with other City projects, operations, and initiatives led by various internal departments. Collaboration of internal City stakeholders across all departments will support the successful planning and implementation of the SWMP Actions and ensure they complement other City programs and initiatives impacting waste management.

- **Cooperation from all three levels of government –** The SWMP contains a variety of recommended Actions that can be initiated and implemented by the City to work towards the vision of Zero Waste. However, achieving Zero Waste will require the ongoing employment of various policies and legislation on multiple levels of governance. Cooperation will continue to be an important part of working towards Zero Waste to help ensure the various tools and instruments used by all three levels of government align and build on each other's efforts.
- **Sustainable long-term financing –** the SWMP will need to be sufficiently financed to ensure its success. This requires a long-term sustainable funding model that not only includes the SWMP recommendations but incorporates funding for a new landfill or an alternative technology for residual waste management when the TWFL reaches capacity, as well as the current 10-year Solid Waste Services capital plan. The Long-Range Financial Plan that will accompany the final SWMP needs to clearly outline strategies for how to sustainably fund all these initiatives and projects over the next 30 years.

14.0 Conclusion

The amount of waste the City will need to manage is forecasted to increase by 37% over the next three decades. The SWMP provides a framework for how Ottawa can manage this waste in a financially, socially and environmentally sustainable manner over the next 30 years. It considers numerous factors, including the limited lifespan of the TWFL, the need to reduce GHG emissions associated with the waste management system as well as the current and potential future provincial and federal government regulations that can impact how waste is managed at the municipal level.

An aspirational Zero Waste Vision was developed in the early stages of plan development to define where the community wants to be in 30 years' time. The Vision, as well as the Guiding Principles and Goals of the plan, were developed using feedback from the public and various stakeholders to form a framework that guided the SWMP development process. The 5 Objectives of the SWMP were developed based on this framework and they present and help measure how the 50 recommended Actions will work directly towards achieving Zero Waste.

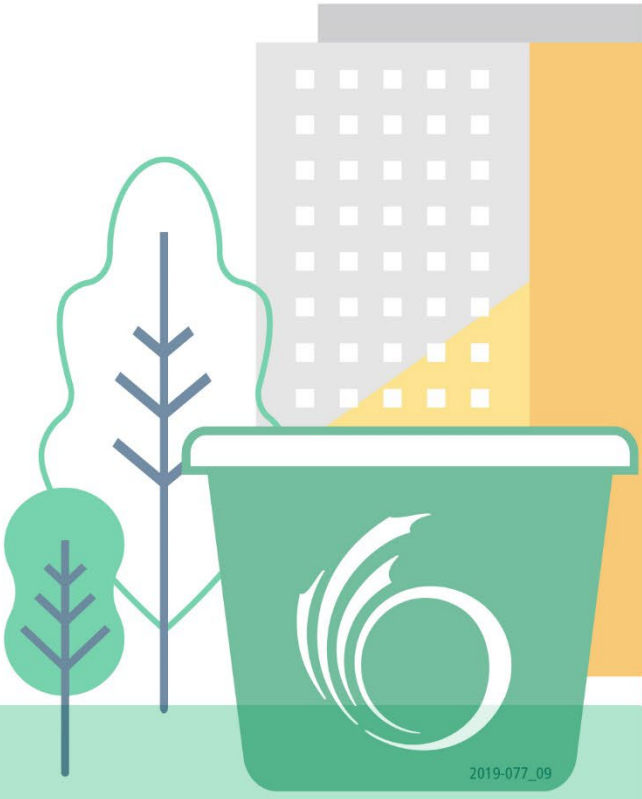
The SWMP also breaks down what needs to be achieved in the short-term (0-5 years), medium-term (5-10 years) and long-term (10+ years) timeframes in order to achieve maximum impact on waste reduction and diversion and to ensure immediate and future needs are addressed to free landfill capacity and extract maximum resources and energy from the remaining waste stream.

The SWMP recognizes there is no one solution for managing all waste in a sustainable manner but instead presents a multi-pronged approach to address the ongoing and future challenges affecting the City's waste management system. The plan is also a living document, based on what we know today, and is designed to be adaptable to the City's changing waste management needs, including population growth, types of waste to be managed, availability of end markets and new legislation and technologies. Actions in the SWMP, and the targets they are anticipated to achieve, will be adapted at each SWMP 5-year refresh.

Finally, the success of the SWMP will depend on the participation and collaboration of stakeholders from across the community. Waste management affects everyone, and it will take collective change by the City, residents, community organizations and all levels of government to achieve the goals of the SWMP and a Zero Waste Ottawa.

Solid Waste Master Plan | Plan directeur des déchets solides

Appendix A – Options Recommended for Removal or Deferral from SWMP System



Based on the results of the evaluation process, staff recommend that some options not advance to the short list.

Options deferred following triple bottom line evaluation process:

Option	Rationale	Estimated Cost of Deferred Option
Develop Specialized Reuse Centre(s)	Option did not score well in comparison to similar options. High level of effort and cost for minimal anticipated diversion and waste reduction results. Challenges exist in equitable placement of depots so that they are generally equally accessible to all neighbourhoods. Recommended to be considered in future plan updates once other higher scoring options have been implemented. Data from temporary facilities are recommended to be used to inform consideration of more permanent arrangements.	Estimated capital cost for this option was between $500,000 and $1 million. Estimated operating cost for this option was between $100,000 and $1 million.

Option	Rationale	Estimated Cost of Deferred Option
Mobile Municipal Hazardous Special Waste Home Collection	Option did not score well in comparison to similar options. Low/minimal potential for diversion with high cost in relation to new mobile collection fleet required for option. Very low impact potential on the lifespan of the Trail Waste Facility. Recommended to be considered in future plan updates once other higher scoring options have been implemented and once further clarity is available on the new producer led system is implemented under the new Provincial Individual Producer Responsibility regulations.	Estimated capital cost for this option was expected to be less than $500,000. Estimated operating cost for this option was between $100,000 and $1 million.
Permanent Neighbourhood Drop-off Depots for Some or All Materials	Recommended deferral to the 5-year SWMP refresh until data collected on Option 4D1 – Temporary Neighbourhood Drop-off Depots for Divertible Materials usage has been collected and analyzed. Data (usage, higher performing locations, etc.) from temporary depots are proposed to be used to inform consideration of more permanent arrangements.	Estimated capital cost for this option was between $10 and $50 million. Estimated operating cost for this option was between $1 and $3 million.

Option	Rationale	Estimated Cost of Deferred Option
Optibags	Option not found to be appropriate for systems wide implementation. Significantly complex, and limited flexibility to accommodate changes to the waste management system. Would require a sorting facility. Optibag is a patented system and would require third party partnerships. Consideration could be given for smaller scale applications (e.g. Apartment complexes and/or high-density residential developments).	Estimated capital cost for this option was between $10 and $50 million. Estimated operating cost for this option was more than $10 million.
Vacuum Collection System	Option not found to be appropriate for systems wide implementation. Challenging from a permitting perspective, and would require approvals/permits for the complete system, including underground collection channels, control centre, and multi-stream collection space. Limited capacity that does not easily adapt to changes in the waste system. Consideration could be given for smaller scale applications (e.g. Apartment complexes and/or high-density residential developments) as part of new development applications.	Estimated capital cost for this option was between $10 and $50 million. Estimated operating cost for this option was less than $1 million.

Option	Rationale	Estimated Cost of Deferred Option
Animal Feed Production	Option did not score well in comparison to similar options. Potential for increased cost due to more stringent regulations surrounding animal feed. No availability of facilities, vendors, or technology in the North American market. Technology and equipment are not proven or demonstrated at a similar scale, waste composition, or climate to the City of Ottawa.	Estimated capital cost for this option was between $10 and $50 million. Estimated operating cost for this option was less than $1 million.
Gasification of LYW	Option did not score well in comparison to similar options. No availability of facilities, vendors, or technology in the North American market. Technology and equipment are not proven or demonstrated at a similar scale, waste composition, or climate to the City of Ottawa. New technology and proven vendors are limited globally. To be considered in future plan updates once higher scoring options have been implemented and technology advances to be commercially viable for the City's needs.	Estimated capital cost for this option was expected to exceed $200 million. Operating costs are currently unknown as there were limited examples where gasification has been applied to LYW.

Option	Rationale	Estimated Cost of Deferred Option
Landfill Mining	Option not carried forward at this time into systems development. High potential to increase GHG emissions and odors to surrounding community during mining operation. High potential for environmental impact compared to other options due to the open excavation of waste. Could still be a viable option under specific circumstances (e.g. leachate plume mitigation) and should be considered as/when required and at the appropriate time.	Estimated capital cost for this option was less than $10 million but could increase to be up to $20 million, depending on processing equipment. Estimated operating cost for this option was between $6 and $10 million.
Purchase an Existing Landfill	Option not carried forward at this time into systems development. Option deferred to future iterations of SWMP, with prioritization given to extending the life of the TWFL. through waste reduction, enhanced diversion, private landfill use, landfill expansion and advancing pre-feasibility study for a residual waste management technology.	Estimated capital cost for this option was expected to be greater than $100 million. Estimated operating cost for this option was between $6 and $10 million.

Option	Rationale	Estimated Cost of Deferred Option
Develop a New Landfill	Option not carried forward at this time into systems development. Option deferred to future iterations of SWMP, with prioritization given to extending the life of the TWFL through waste reduction, enhanced diversion, private landfill use, landfill expansion and advancing pre-feasibility study for a residual waste management technology.	Estimated capital cost for this option was between $50 to $100 million. Estimated operating cost for this option was between $6 and $10 million.

Options removed during systems development

As the recommended future waste management system was being developed, information gleaned from several analyses, including a financial analysis and options impact analysis, was used to further inform deferral of some options. In addition, input from Engagement Series 2 was also used at this time to inform the short-listing process. The table below provides the rationale for the recommended deferral of these options.

Option	Rationale	Estimated Cost of Deferred Option
Develop and Maintain Dedicated Waste Portal	Option has been bundled into “1B1 - Develop and Implement Educational Initiatives” as a tactic that may be considered to enhance promotion and outreach efforts. “1B1 - Develop and Implement Educational Initiatives” is recommended for planning starting in Year 1 of SWMP roll out in line with engagement feedback on the importance of promotion and education to support the success of many of the SWMP options.	Estimated capital cost for this option ranged from $100,000 to $500,000.
Develop and Implement Call-Click-Visit Campaign	Option has been bundled into “1B1 - Develop and Implement Educational Initiatives” as a tactic that may be considered to enhance promotion and outreach efforts. “1B1 - Develop and Implement Educational Initiatives” is recommended for planning starting in Year 1 of SWMP roll out in line with engagement feedback on the importance of promotion and education to support the success of many of the SWMP options.	Estimated capital cost for this option ranged from $100,000 to $500,000.

Option	Rationale	Estimated Cost of Deferred Option
Partial Pay-As-You-Throw	Option not advancing in favour of Enforcing Set-Out Limits for Garbage and Reduce Container Limit, as approved in City Council Motion in June 2023. Pay-As-You-Throw may be added to this policy in 2024, pending Council review of the policy based on direction to review expanding the Yellow Bag Program to residents for waste disposal needs above firm item limit. Extensive public engagement was conducted on this option as a part of the Curbside Waste Diversion Options project.	Estimated capital cost for this option was up to $3.5 million. Estimated operating cost for this option was up to $1.5 million.
Clear Bags for Curbside Garbage	Option deferred in favour of Enforcing Set-Out Limits for Garbage and Reduce Container Limit. Will be considered in 2027 (as per City Council direction) when effectiveness of Council approved 3-item firm limit is reviewed. Extensive public engagement was conducted on this option as a part of the Curbside Waste Diversion Options project.	Estimated capital cost for this option was up to $2 million. Estimated operating cost for this option was up to $1 million.

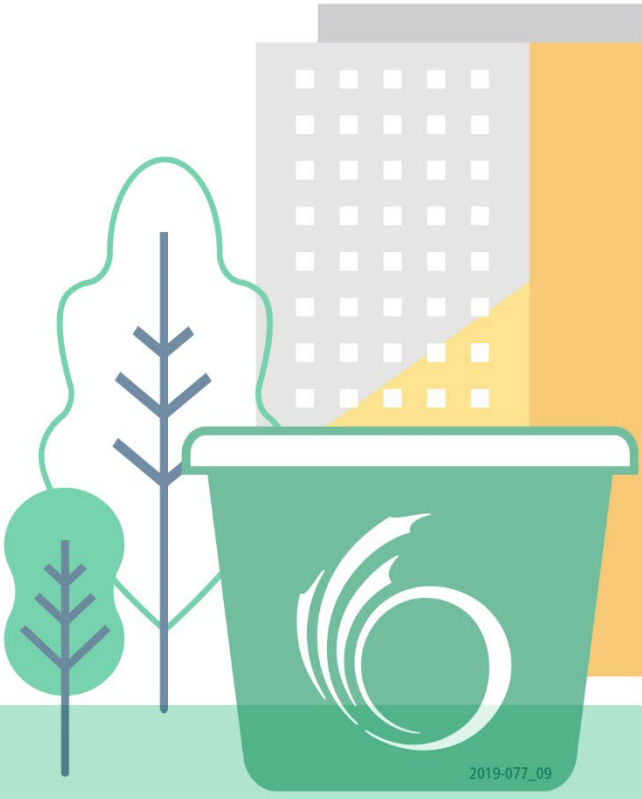
Option	Rationale	Estimated Cost of Deferred Option
Temporary Neighbourhood Drop-off Depots for Divertible Materials	Action recommended for deferral until the impacts of IPR and potential end markets for the materials are better understood. Action will be considered again once staff have further information on these technical considerations since the option was a relatively high priority for engagement participants.	Estimated capital cost for this option was less than $10 million. Estimated operating cost for each individual drop-off depot was likely between $5 to $10 million a year.
Expanded Drop-off Areas for Divertible Materials at Trail Waste Facility	Action recommended for deferral due to operational constraints with development of final stage of landfill and breadth of existing diversion options currently available at landfill.	Estimated capital cost for this option was less than $10 million. Estimated operating cost for this option was less than $1 million a year.
On-Site Organics Management	Option deferred to 5-year refresh, but the education aspect of this option will be considered as part of “1B1 - Develop and Implement Educational Initiatives” to encourage use of backyard composters for residents interested in using them as an alternative/to supplement Green Bin program.	Estimated capital cost for this option was less than $10 million. Estimated operating cost for this option was less than $1 million a year.

Option	Rationale	Estimated Cost of Deferred Option
Single Stream Collection of Recycling	Typically results in higher levels of contamination and greater challenges with marketing to end markets. Option significantly impacted by Provincial Individual Producer Responsibility (IPR) Legislation. Deferred to the 5-year SWMP to reconsider for recycling programs City will be responsible for managing (e.g. city facilities).	Estimated capital cost for this option was less than $10 million. Estimated operating cost for this option is in line with current costs.
Trail Landfill Optimization Strategy	Removed as already accomplished through current operations and will continue as part of regular operational efficiency reviews.	Estimated capital cost for this option was less than $10 million. Estimated operating costs for managing waste at Trail Landfill would not change significantly.
Tipping Fee Strategy for Trail Waste Facility	Removed as already accomplished through Residual Waste Management Strategy and regular reviews will continue as part of regular annual budgeting process.	Estimated capital cost to develop the strategy would be less than $500,000. Estimated operating cost for this option was between $100,000 and $500,000.

Option	Rationale	Estimated Cost of Deferred Option
Emerging Technologies (Gasification, Pyrolysis, Hydrolysis, Chemical Recycling)	These technologies are currently at the research stage and/or have not been proven at commercial scale yet. Option will be considered at the 5-year SWMP refresh when more is understood on their viability in the Ottawa context and when a feasibility study on MWP and WTE has been completed.	Estimated capital cost dependent on facility design but anticipated to be >$200M. Estimated operating cost dependent on facility design but anticipated to be >$10M.

Solid Waste Master Plan | Plan directeur des déchets solides

Appendix B - How Engagement Series 2 Feedback and Operational and Cost Considerations Informed Action Implementation Timeline



SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
Maximize the Reduction and Reuse of Waste	**Food Waste Reduction Strategy**	Question: Please select the type of activities you would participate in: % participants selected: 60%: food waste reduction initiatives 55%: lending libraries 52%: community reuse events 51%; community swaps 47%: repair cafes 29%: sharing spaces	Question: Please rank what would influence your participation in these activities the most: % participants selected: 78%: location close to where I live 77%: Easy to use 64%: type of materials accepted 58%: cost to household 18%: Inclusive (various languages)	- Food waste reduction should be prioritized before diversion - The City should work on initiatives with external partners	N/A - priority level similar across all survey demographics	Capital cost - <$500,000 Operating cost - $1M - $10M Impact - significant waste reduction potential Operational considerations - Program design, delivery and maintenance if the City develops its own program versus partnering with an existing one	Implement action early based on community feedback, high placement in in waste hierarchy, low cost and significant waste reduction potential

	Sharing spaces, swaps, sharing libraries, repair cafes and reuse events	**Question: Please select the type of activities you would participate in:** **% participants selected:** **60%: food waste reduction initiatives** **55%: lending libraries** **52%: community reuse events** **51%; community swaps** **47%: repair cafes** **29%: sharing spaces**	**Question: Please rank what would influence your participation in these activities the most:** **% participants selected:** **78%: location close to where I live** **77%: Easy to use** **64%: type of materials accepted** **58%: cost to household** **18%: Inclusive (various languages)**	- Waste reduction initiatives should be prioritized - Cost could be a concern, depending on the initiative - Accessibility considerations and transport availability will be key for success of these actions - The City should work on initiatives with external partners and support the work already happening in the community.	N/A - priority level similar across all survey demographics	Capital cost - <$500,000 Operating cost - <$500,000 Impact - relatively low waste reduction potential Operational considerations - Program design, delivery and maintenance if the City develops its own program versus partnering with an existing one	Plan action early but implement over more than one year to keep costs down. Recommendation based on community feedback, placement in waste hierarchy and low cost of action. Action also has high potential to support developing community partnerships and opportunities early. Implementing over more than on year allows City to work with external partners and support existing initiatives first, before implementing new City-led events, in line with engagement feedback. Relatively low waste reduction potential by itself, but when combined with other waste reduction actions could be strategically

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
							advantageous to implement early to help facilitate overall community behavioural change.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Expand and improve Take it Back	**Question: How important is it to you that the City of Ottawa advance expansion of the Take It Back! Program? Participants were asked to rank from1 (not important at all) to 5 (very important)** **% participants:** **55%: Very important to expand** **78%: Very important or important**	**Question: Rank which efforts you feel the City should prioritize:** **% participants selected:** **78%: expand number of temporary hazardous waste events making them more accessible to residents** **77%: partner with producers for permanent drop off depots in select locations across the City** **76%: add more locations to the take it back program**	- Waste reduction should still be prioritised - Improve monitoring of where materials end up - Need to concentrate on improving, not just expanding	N/A - priority level similar across all survey demographics	Operating cost - <$500,000 Impact - relatively low waste reduction potential, but also opportunity for recycling Operational considerations - Data reporting for community partners will need to be established	Implement action early based on community feedback, high placement in waste hierarchy and low cost. Focus on program improvement, including monitoring of end use opportunities, as well as expansion of the program itself. Relatively low waste reduction potential by itself, but when combined with other waste reduction actions could be strategically advantageous to implement early to help facilitate overall community behavioural change and develop community partnerships and opportunities early.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Subsidies, rebates, or grants to local residents, resident groups, or non-profit organizations	**Question - Do you think the City should provide subsidies, rebates, or grants to local residents, resident groups, or non-profit organizations for ideas or programs that avoid, reduce, or reuse waste in our communities?** **% participants:** **68%: Yes** **32%: No**		- Cost was main concern cited by participants	Less priority for older adults and higher earners	Operating cost - <$500,000 Impact - relatively low waste reduction potential Operational considerations - Will need to determine which materials to target	Plan action early but implement over more than one year to keep costs down. Recommendation based on community feedback, placement in waste hierarchy and low cost of action. Action also has high potential to support developing community partnerships and opportunities early. Relatively low waste reduction potential by itself, but when combined with other waste reduction actions could be strategically advantageous to implement early to help facilitate overall community behavioural change.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Single-Use Item Reduction Initiative (in City facilities)	**Question: Rank which efforts you feel the City should prioritize implementation of:** **Ranking order:** 67%: single use item reduction 61%: expanded diversion program at City facilities 60%: Policies making it mandatory to divert waste in city facilities and operations	**Question - Given the fed government's intent, what role do you feel the City should play in further influencing a reduction of single-use items in the community?** **% participants selected:** **44%: city should support/pilot innovative ideas to reduce community reliance on single use items** **31% explore opportunities with local businesses to reduce reliance on other non-medical single-use items** **14% nothing** **6%; don't know** **5%: other, specify in comments**	- Single-use plastics should be a priority - City should work with community for ideas and implementation	N/A - priority level similar across all survey demographics	Capital cost - <$500,000 Impact - relatively unknown and may depend on success of federal government initiative Operational considerations - Alignment with federal ban on single-use items; need to find environmentally sustainable solutions while accommodating accessibility needs; may require contractual amendments with providers of single-use items	Plan early as per engagement feedback and to align with the SWMP guiding principle of the City leading by example. Recommendation will align with other actions that address waste reduction and diversion in City facilities but will also need to align with federal government ban.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
Maximize the Recycling of Waste	**Temporary neighbourhood drop-off depots for divertible materials**	**Question - Rank which efforts you feel the City should prioritize implementation of:** **Ranking order:** **73%: Temporary drop-off depots** **60%: Collection more materials at curb** **58%: Waste diversion program in parks** **58%: Textile waste diversion** **53%: Separate bulky waste collection** **45%: Expanded drop off areas at Trail**	**Question: Which do you prefer?** **- Collect more recyclable materials at curbside (more convenient, more expensive)** **- Collect more recyclable materials through mobile depots (less convenient, less expensive)** **% participants:** **58%: collect more recyclables at curb** **42%: collect more at mobile depots**	- Having a "one stop shop" for many recyclables was a preference mentioned frequently - Availability of end markets required for success -Strong implementation considerations for success are accessibility and convenient locations	N/A - priority level similar across all survey demographics	Capital cost - <$10M Operating cost - $5M - $10M Impact - Operational considerations - development of action will need to consider impact of Individual Producer Responsibility (IPR) as some materials collected at depots fall under IPR capture.	Action recommended for deferral until the impacts of IPR and potential end markets for the materials are better understood.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Collection of more materials at the curb	**Question - Rank which efforts you feel the City should prioritize implementation of:** **% participants selected:** **73%: Temporary drop-off depots** **60%: Collection of more materials at the curb** **58%: Waste diversion program in parks** **58%: Textile waste diversion** **53%: Separate bulky waste collection** **45%: Expanded drop off areas at Trail**	**Question: Which do you prefer?** **- Collect more recyclable materials at curbside (more convenient, more expensive)** **- Collect more recyclable materials through mobile depots (less convenient, less expensive)** **% participants:** **58%: collect more recyclables at curb** **42%: collect more at mobile depots**	- Curbside collection is more efficient and convenient	N/A - priority level similar across all survey demographics	Capital cost - <$500,000 Operating cost - $500,000 - $1M Impact - Low to medium (depending on collected material) Operational considerations - action may need to align with collections contracts (every 5 years), allowing time for implementation of results into procurement documents.	Due to Operational considerations, action is recommended to be further researched and explored for implementation prior to each new collection contract. Diversion potential to be estimated during study.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Waste Diversion in Parks and Public Spaces	**Question - Rank which efforts you feel the City should prioritize implementation of:** **% participants selected:** **73%: Temporary drop-off depots** **60%: Collection of more materials at the curb** **58%: Waste diversion program in parks** **58%: Textile waste diversion** **53%: Separate bulky waste collection** **45%: Expanded drop off areas at Trail**	**How much of a priority is to you that the City have a recycling and green bin program in parks and expand organics recycling to public spaces? (scale)** **Participants were asked to rank from1 (not important at all) to 5 (very important)** **% participants:** **41%: Very important** **22%: Important** **17%: Somewhat important** **9%: Somewhat not important** **10%: Not important**	- Cost of action compared to potential waste diversion is high - Issues such as recycling stream contamination and difficult enforcement will be hard to resolve	- Slightly lower priority for suburban versus urban population - Slightly lower priority for high earners	Capital cost - $1M -$10M Operating cost - $10M - $100M Impact - Low Operational considerations - Will require assessment of recycling bins in parks pilot, currently ongoing, as well as IPR transition, prior to planning and implementation	Plan in second year of SWMP roll out when results of current parks recycling pilot are known and when impact of IPR is fully understood. This aligns with engagement feedback as action not as high a priority as some other diversion actions. Implement action over three years to lower costs and resource requirements since diversion impact is low.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Textile Waste Diversion Enhancement	**Question - Rank which efforts you feel the City should prioritize implementation of:** **% participants selected:** **73%: Temporary drop-off depots** **60%: Collection of more materials at the curb** **58%: Waste diversion program in parks** **58%: Textile waste diversion** **53%: Separate bulky waste collection** **45%: Expanded drop off areas at Trail**		N/A	N/A - priority level similar across all survey demographics	Operating cost - <$500,000 Impact - Low to medium Operational considerations - Support from by-law services to ensure bins are safe and properly maintained	Plan action early in SWMP roll out. Recommendation based on community feedback, potential medium impact on diversion and low cost of action. Action also has high potential to support developing community partnerships and opportunities early.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Separate bulky waste collection	**Question - Rank which efforts you feel the City should prioritize implementation of:** **% participants selected:** **73%: Temporary drop-off depots** **60%: Collection of more materials at the curb** **58%: Waste diversion program in parks** **58%: Textile waste diversion** **53%: Separate bulky waste collection** **45%: Expanded drop off areas at Trail**		- Bulky item separation was mentioned as a preference at some of the online workshops	N/A - priority level similar across all survey demographics	Capital cost - <$500,000 Operating cost - $500,000 - $1M Impact - Low to medium Operational considerations - Needs to align with future waste collection contracts. Research required on end markets of materials.	Plan early due to significant portion of this material in the waste stream. Implement over several years, which aligns with engagement feedback (not as high a priority as some other diversion actions) and also aligns with Operational considerations, particularly the requirement of end market research for bulky items.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Expanded drop off areas at Trail	**Question - Rank which efforts you feel the City should prioritize implementation of:** **% participants selected:** **73%: Temporary drop-off depots** **60%: Collection of more materials at the curb** **58%: Waste diversion program in parks** **58%: Textile waste diversion** **53%: Separate bulky waste collection** **45%: Expanded drop off areas at Trail**			N/A - priority level similar across all survey demographics	Capital cost - <$500,000 Operating cost - $500,000 - $1M Impact - Low to medium Operational considerations - Well established end markets or materials brokers/buyers would be needed ahead of expanding	Action recommended for deferral due to operational constraints with development of final stage of landfill and breadth of existing diversion options currently available at landfill.

	Expand Number of Existing Mobile One Day Depots for Municipal Hazardous Special Waste	**Question - How much do you support each of these approaches?** **Sliding scale 1-100** **78%: expand number of temporary hazardous waste events making them more accessible to residents** **77%: partner with producers for permanent drop off depots in select locations across the City** **76%: add more locations to the take it back program**		- General support for this action at workshops - Expanding the number of depots may not be the only solution. Look to other initiatives to manage MHSW. - Need to make action convenient for residents.	action was a higher priority for older adults.	Capital cost - <$500,000 Operating cost - $1M - $5M Impact - Low diversion impact Operational considerations - Availability of suitable locations is extremely limited and outdoor depots are limited by weather conditions.	Recommend developing a MHSW strategy, with the consideration of the experience the City has had with Hazardous and Special Products regulation implementation, before making decision to expand the number of depots. More research is also required on other initiatives that may have more impact and be more convenient for residents and if they would be funded by Producers under the Individual Producer Responsibility regulation. Recommendation is to develop the strategy early in SWMP roll out to reflect engagement feedback, which also takes into consideration that developing a strategy will be a

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
							first step before an implementation timeline is developed.
	Permanent neighbourhood drop off depots for some or all materials	**Question - How much do you support each of these approaches?** **Sliding scale 1-100** **78%: expand number of temporary hazardous waste events making them more accessible to residents** **77%: partner with producers for permanent drop off depots in select locations across the City** **76%: add more locations to the take it back program**			Action was a higher priority for older adults.	Capital cost - $10M - $50M Operating cost - $1M - $5M Impact - Medium diversion impact Operational considerations - development of action will need to consider impact of Individual Producer Responsibility (IPR) as some materials collected at depots fall under IPR capture.	Action recommended for deferral until the impacts of IPR and potential end markets for the materials are better understood.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Chute Closure/Conversion to Organic Chutes Program at Multi-residential Buildings	**Question: If garbage chutes were closed forcing residents to take their waste to the garbage or recycling room, would it encourage you to sort your waste?** **% participants selected:** **71%: No** **29%: Yes**	**Question: If garbage chutes were converted to green bin chutes, would it encourage you to use the green bin program?** **% participants selected:** **71%: Yes** **29%: No**	- Closing garbage chutes decreases convenience of dealing with waste in multi-residential buildings - Doesn't provide much of an incentive to sort waste	N/A - priority level similar across all survey demographics	Operating cost - <$500,000 Impact - Low to medium diversion impact Operational considerations - Pilots for organics chutes may be required prior to any full scale implementation	Actions that address multi-residential waste recommended for early implementation due to diversion potential and feedback from engagement. However, due to further research and pilots required for chute closures/conversions, this action is recommended for planning, piloting and implementing over several years.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Expanded Diversion Program at City Facilities and Operations	**Question: Rank which efforts you feel the City should prioritize implementation of:** **Ranking order:** 67%: single use item reduction 61%: expanded diversion program at City facilities 60%: Policies making it mandatory to divert waste in city facilities and operations		- Many comments on the need to improve diversion at City facilities and for the City to lead by example - Comments on costs and operational capacity to implement these actions	N/A - priority level similar across all survey demographics	Capital cost - <$500,000 Operating cost - $500,000 - $1M Impact - Medium diversion impact Operational considerations - would need to set up agreements for the safe disposal of other divertible material	Prioritise planning early in SWMP roll out, in line with engagement feedback and the potential impact of this action. Implement over several years to lower costs and manage operational capacity.
	Mandatory Waste Diversion in all City Facilities	**Question: Rank which efforts you feel the City should prioritize implementation of:** **Ranking order:** 67%: single use item reduction 61%: expanded diversion program at City facilities 60%: Policies making it mandatory to divert waste in city facilities and operations		- Many comments on the need to improve diversion at City facilities and for the City to lead by example - Comments on costs and operational capacity to implement these actions	N/A - priority level similar across all survey demographics	Capital cost - $500,000 - $1M Operating cost - <$500,000 Impact - Medium diversion impact Operational considerations - Need to understand the impacts of IPR on City Facilities recycling	Prioritise planning early in SWMP roll out, in line with engagement feedback and the potential impact of this action. Implement over several years to lower costs and manage operational capacity.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Supporting Waste Minimization and Diversion at Special Events	**Question: How important is it to you that the City of Ottawa start increasing waste reduction, recycling, and organics diversion requirements on organizations that hold special events (festivals, outdoor events, events using City facilities, etc.)? % participants selected: 60%: very important 20%: important 10%: somewhat important 4%: not important 5%: not at all important**		- Concerns over perceived low impact of the action compared to the high cost - Difficult to manage contamination in the waste streams and hard to enforce correct separation of waste	N/A - priority level similar across all survey demographics	Capital cost - <$500,000 Operating cost - $1M - $10M Impact - Low diversion impact Operational considerations - Will need to align with relevant City by-laws and by-law reviews	Prioritize planning early in SWMP roll out in line with engagement feedback. The action consists of a number of tactics, each requiring various levels of resources and costs, therefore recommend implementation is staggered over 3 years.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
Maximize the recovery of waste and energy and the optimal management of remaining residuals	**Anaerobic Digestion (AD)**	**Question: Do you support the City investing in technology to generate renewable natural gas from food waste to help achieve the City's climate goals?** **% participants selected:** **85%: Yes** **15%: No**	**Question: If you do not currently participate in the green bin program, would knowing that your food waste is being used to generate renewable energy encourage you to participate?** **% participants selected:** 24%: Yes 9%: No 66%: Not applicable	- The City also needs to invest in food waste reduction and reduction should remain a priority.	N/A - priority level similar across all survey demographics	Capital cost - >$100M Operating cost - >$100M Impact - High GHG emissions reduction impact Operational considerations - An AD facility would be required by the end of the current organics contract (March 2030) unless an extension is obtained from the current contractor.	Feasibility study, business case and market sounding underway due to current aerobic organics processing facility contract end date in 2030. Exploring the use of anaerobic digestion technology also aligns with engagement feedback and Energy Evolution Strategy.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Mixed Waste Processing	**Question: Rank which efforts you feel the City should prioritize implementing to further reduce the amount of waste going to the landfill** **% participants selected:** **61%: mechanical biological treatment** **61%: mixed waste processing** **46%: mass burn incineration**	**Question: What considerations do you feel are the top priorities for the City when further studying these technologies** **% participants selected:** **68% impacts on health** **63%: impacts on climate goals** **59%: financial impacts on residents** **42%: financial impacts to city** **28%: potential facility location** **4% other please specify**	- Cost is the main concern, followed by some perceived risks with technologies - Need to focus on reduction and diversion actions that require behaviour change, mainly because less expensive for residents to reduce and divert at home than rely on a technology for separation of recyclables and organics. - Technology can help address life of landfill but more research is required before a decision can be made.	N/A - priority level similar across all survey demographics	Capital cost - >$10-50M Operating cost - >$10M Impact - High GHG emissions reduction impact Operational considerations - Feasibility study required before decision can be made on any new technology to manage residual waste. Preparing to operationalize a new facility can take 7 - 10 years	Recommend conducting feasibility study and developing business case for this action within first two years of SWMP roll out. Recommendation in line with engagement feedback on costs, perceived risks and the need to conduct further research. Also in line with the need to establish direction for managing residual waste in the long-term early on in SWMP roll out to address life of landfill.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Mechanical Biological Treatment	**Question: Rank which efforts you feel the City should prioritize implementing to further reduce the amount of waste going to the landfill** **% participants selected:** 61%: mechanical biological treatment 61%: mixed waste processing 46%: mass burn incineration	**Question: What considerations do you feel are the top priorities for the City when further studying these technologies** **% participants selected:** 68% impacts on health 63%: impacts on climate goals 59%: financial impacts on residents 42%: financial impacts to city 28%: potential facility location 4% other please specify	- Cost is the main concern, followed by some perceived risks with technologies - Need to focus on reduction and diversion actions that require behaviour change, mainly because less expensive for residents to reduce and divert at home than rely on a technology for separation of recyclables and organics. - Technology can help address life of landfill but more research is required before a decision can be made.	N/A - priority level similar across all survey demographics	Capital cost - >$200M Operating cost - <$10M Impact - High GHG emissions reduction impact Operational considerations - Feasibility study required before decision can be made on any new technology to manage residual waste.	Recommended for deferral as feasibility study, business case and market sounding underway is underway for Anaerobic Digestion. Exploring the use of Anaerobic Digestion technology aligns with engagement feedback and Energy Evolution Strategy.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Mass Burn Incineration	**Question: Rank which efforts you feel the City should prioritize implementing to further reduce the amount of waste going to the landfill** **% participants selected:** **61%: mechanical biological treatment** **61%: mixed waste processing** **46%: mass burn incineration**	**Question: What considerations do you feel are the top priorities for the City when further studying these technologies** **% participants selected:** **68% impacts on health** **63%: impacts on climate goals** **59%: financial impacts on residents** **42%: financial impacts to city** **28%: potential facility location** **4% other please specify**	- Cost is the main concern, followed by some perceived risks with technologies - Need to focus on reduction and diversion actions that require behaviour change, partly due to environmental considerations and partly because less expensive to reduce and divert than deal with residual waste - Technology can help address life of landfill but more research is required before a decision can be made.	N/A - priority level similar across all survey demographics	Capital cost - >$200M Operating cost - >$10M Impact - High GHG emissions reduction impact Operational considerations - Feasibility study required before decision can be made on any new technology to manage residual waste. Preparing to operationalize a new facility can take 10-15 years	Recommend conducting feasibility study and developing business case for this action within first two years of SWMP roll out. Recommendation in line with engagement feedback on costs, perceived risks and the need to conduct further research. Also in line with the need to establish direction for managing residual waste in the long-term early on in SWMP roll out to address life of landfill.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Trail Waste Facility Landfill Expansion	**Question: Please prioritize the approaches below to extend the life of the Trail Road Landfill:** **% participants selected:** **71%: focus on behaviour management programs and policies** **67%: all reasonable efforts should be made to extend life of landfill** **42%: use tipping fees** **40% expand landfill facility within current property** **24%: use private landfills**			Action slightly less of a priority for youth.	Capital cost - >$50M Operating cost - <$1M Impact - High landfill life extension impact Operational considerations - Significant planning required including acquiring approvals from regulatory authorities.	Recommended seeking provincial approval to expand the TWFL within its existing footprint. Low priority for engagement participants but action will work alongside reduction and diversion actions to expand life of this asset in the short and medium term to provide City time to implement a longer-term residual waste management solution.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Use a Private Landfill	**Question: Please prioritize the approaches below to extend the life of the Trail Road Landfill:** **% participants selected:** **71%: focus on behaviour management programs and policies** **67%: all reasonable efforts should be made to extend life of landfill** **42%: use tipping fees** **40% expand landfill facility within current property** **24%: use private landfills**			Ranked slightly higher among panel respondents compared to public survey respondents	Capital cost - $10M - $100M Operating cost - >$100M Impact - High landfill life extension impact Operational considerations - Private landfill capacity and transportation distances will need to be considered.	Recommended implementing in the short and medium term. Low priority for engagement participants but action will work alongside reduction and diversion actions to expand life of this asset in the short and medium term to provide City time to implement a longer-term residual waste management solution.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Tipping Fee Strategy for Trail Waste Facility	**Question: Please prioritize the approaches below to extend the life of the Trail Road Landfill:** **% participants selected:** **71%: focus on behaviour management programs and policies** **67%: all reasonable efforts should be made to extend life of landfill** **42%: use tipping fees** **40% expand landfill facility within current property** **24%: use private landfills**				Capital cost - <$500,000 Operating cost - <$500,000 Impact - potential to manage fewer tonnes at the landfill Operational considerations - Study would need to be undertaken on eligible materials	Action has already accomplished through Residual Waste Management Strategy and regular reviews will continue as part of regular annual budgeting process.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
Maximise operational advancements	**Use of Alternate Collection Containers in Parks, Public Spaces and Multi-residential Properties**	**Question: How much of a priority is it that the City explore the following collection technologies in order to increase waste diversion and make collection more efficient?** **% participants selected:** **56%: use of alternate collection containers in parks, public spaces, and multi-residential properties** **52%: working towards a zero-emissions vehicle fleet** **24%: automated cart based collection for curbside garbage** **23%: RFID**			N/A - priority level similar across all survey demographics	Capital cost - $1M - $10M Operating cost - $500,000 - $1M Impact - Medium impact on operational efficiencies and small diversion potential Operational considerations - Implementation may need to align with collections contracts, especially if specialized vehicles are required.	Align planning and implementation with respective parks and public spaces and multi-residential actions that consider piloting options to address operation and resident ease of use concerns.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Working Towards a Zero Emissions Solid Waste Fleet	**Question: How much of a priority is it that the City explore the following collection technologies in order to increase waste diversion and make collection more efficient?** **% participants selected:** **56%: use of alternate collection containers in parks, public spaces, and multi-residential properties** **52%: working towards a zero-emissions vehicle fleet** **24%: automated cart based collection for curbside garbage** **23%: RFID**	**Question: The City considering looking at new technologies that will help us work towards zero waste emissions from the solid waste vehicle fleet. This includes switching collection trucks and landfill equipment to Renewable Natural Gas and hybrid or electric vehicles. How much of a priority is it to you that the City explores these opportunities in order to help reach our climate change goals?** **% participants selected:** 34%: very important 25% important 20%: somewhat important 8%: not important 12%: not at all important	- Wait until the technologies are proven - Perceived high cost is a concern	N/A - priority level similar across all survey demographics	Capital cost - <$500,000 Operating cost - $500,000 - $1M Impact - High GHG emissions reduction impact Operational considerations - Implementation will need to align with collections contracts and availability of appropriate technology and any necessary supporting infrastructure.	Recommended early and ongoing planning in line with engagement results and potential impact on GHG reductions emissions. Planning will be the focus for first 3 years with subsequent implementation occurring in line with proven technologies becoming available and appropriate infrastructure in place. Electric waste collection fleet is at least 6 to 10 years away from being proven for waste operations and Ottawa climate considerations.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	Automated Cart Collection for Curbside Garbage	**Question: How much of a priority is it that the City explore the following collection technologies in order to increase waste diversion and make collection more efficient?** **% participants selected:** **56%: use of alternate collection containers in parks, public spaces, and multi-residential properties** **52%: working towards a zero-emissions vehicle fleet** **24%: automated cart based collection for curbside garbage** **23%: RFID**		- Accessibility could be an issue, particularly handling the carts in winter months - Storage of carts on residential properties could be an issue	Automated carts were a lower priority for older adults	Capital cost - $10M - $100M Operating cost - $10M - $100M Impact - Potential high operational impact, low diversion impact Operational considerations - Action implementation will need to align with future waste collections contracts.	Recommended for implementation consideration in line with next collection contract (2031). This also aligns with the low priority of action from engagement feedback and due to cost.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
	RFID Technology on Waste Collection Containers	**Question: How much of a priority is it that the City explore the following collection technologies in order to increase waste diversion and make collection more efficient?** **% participants selected:** **56%: use of alternate collection containers in parks, public spaces, and multi-residential properties** **52%: working towards a zero-emissions vehicle fleet** **24%: automated cart based collection for curbside garbage** **23%: RFID**			N/A - priority level similar across all survey demographics	Capital cost - $1M - $10M Operating cost - $10M - $100M Impact - Potential high operational impact, low diversion impact Operational considerations - Action implementation will need to align with future waste collections contracts.	Recommend action piloted in multi-residential properties in year 5 and 6 of SWMP roll out. In line with low priority of action from engagement and Operational considerations. Recommend action planned in line with next curbside collection contract for curbside properties, in medium term of SWMP.

SWMP Objective	Action	What We Learned from the Survey		Frequently heard comments from survey and online discussions	Demographic priorities	Operational / Cost Considerations	Recommendation in SWMP
Develop a Zero Waste Culture Across the City	**Behavioural Change Management Strategy**	**Question: Please prioritize the approaches below to extend the life of the Trail Road Landfill:** **% participants selected:** **71%: focus on behaviour management programs and policies** **67%: all reasonable efforts should be made to extend life of landfill** **42%: use tipping fees** **40% expand landfill facility within current property** **24%: use private landfills**	**How willing are you to make big changes in your waste practices in order to help our community meet our goal of a Zero Waste Future?** % participants selected: 47%: very willing 22% - 4 15% - 3 8%- 2 7%- not willing at all	- Need to prioritize reduction and diversion actions as this is less expensive and encourages behaviour change - Generally willing to change behaviour as it's less expensive for people to sort waste than using a technology.	Higher public survey willingness to make big changes	Capital cost - <$500,000 Operating cost - <$500,000 Impact - no direct impact on reduction and diversion but supports success of many SWMP actions Operational considerations - N/A	Recommend implementing action early to encourage behaviour change required for success of many of the SWMP actions. This is in line with engagement, low cost of action and supports the overall vision of the SWMP.