



COMMERCIAL FOOD RESCUE & ORGANIC WASTE DIVERSION PILOT

Improving Organics Diversion & Surplus Food Recovery in Canada's Industrial, Commercial, and Institutional Sector

**Guelph-Wellington Region Pilot
Interim Report
April 2024**

Funded by:



**FOOD WASTE
REDUCTION
CHALLENGE**



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EXECUTIVE SUMMARY

Every year, over 50% of all food in Canada annually – worth \$49.5 billion CAD¹ – is lost to disposal. This represents a huge loss of nutrients, resources, and perpetuation of major environmental issues. Eliminating food loss and waste (FLW) across Canada’s food value chain plays a role in solving multiple critical interconnected local and global challenges simultaneously: the climate crisis, food insecurity and, when soil amendment is applied to land, regenerating healthy soils for sustainable food systems.

In a circular economy, food systems are designed to cycle, so the by-products from one point in the value chain provide input for the next. As population hubs, cities and communities have a significant opportunity to catalyze circular food systems, redistributing surplus edible food, while turning the remaining inedible by-products into new products; ranging from organic fertilisers for regenerative farming, biomaterials and bioenergy.

Converting organic waste into a valued resource begins with effective collection systems of end-of-life organics into clean, valuable material streams. New technology, supportive policy frameworks, and community leadership and engagement are all contributors in transforming current linear food systems to circular food systems.

Currently, businesses, industry and institutions are responsible for producing approximately 30% of wasted food and organic residues in Canada, an estimated 9 million tonnes annually.¹ Disposal of food and organics is predominantly attributable to two main issues: a lack of regulation and the significant cost premiums of organics collection and processing services as compared to the costs of disposal in landfill. Current market pricing disparity between landfill disposal and organic diversion also discourages investment in collection and processing infrastructure from both public or private sectors. Alongside the known issue of price disparity discouraging organic waste diversion, the capacity of Canadian landfills to continue accepting organic waste streams is very limited. For example, as of 2023, Ontario has just 10 years of landfill capacity left throughout the province for all waste disposal, despite increasing waste generation and no current organics landfill bans in place.² On top of this, organic waste in landfill is the principal generators of methane-dense landfill gas and leachate into the surrounding environment.²

Given the multiple and compounding environmental and social impacts of FLW, there is an urgent need to address the costs and inefficiencies that underpin surplus edible food rescue and organic waste diversion solutions that plagues Canada's industrial, commercial and institutional (IC&I) sector. With 1 in 6 households experiencing food insecurity across Canada and the estimated 56 million tonnes of greenhouse gases generated by wasted food in landfill disposal¹, the need for action is clear.

TRIALLING THIS PILOT

This pilot convenes municipal, private sector and non-profit partners to simplify food rescue and reduce the premium cost of organic materials diversion through consolidated and shared collection services between neighbouring businesses. This system reduces costs, waste, and greenhouse gas emissions, while increasing community access to nutritious food and converting valuable organic resources to high quality compost or bioenergy.

The pilot achieves the collection efficiencies of the municipal door-to-door residential collection model by providing regionally consolidated food and organic materials collection through shared services. Pilot participants include any facility or business that generates food and organic waste including the nine IC&I subsectors: grocery stores, restaurants, hotels, hospitals, schools, shopping plazas, manufacturing, office buildings, and multi-residential.

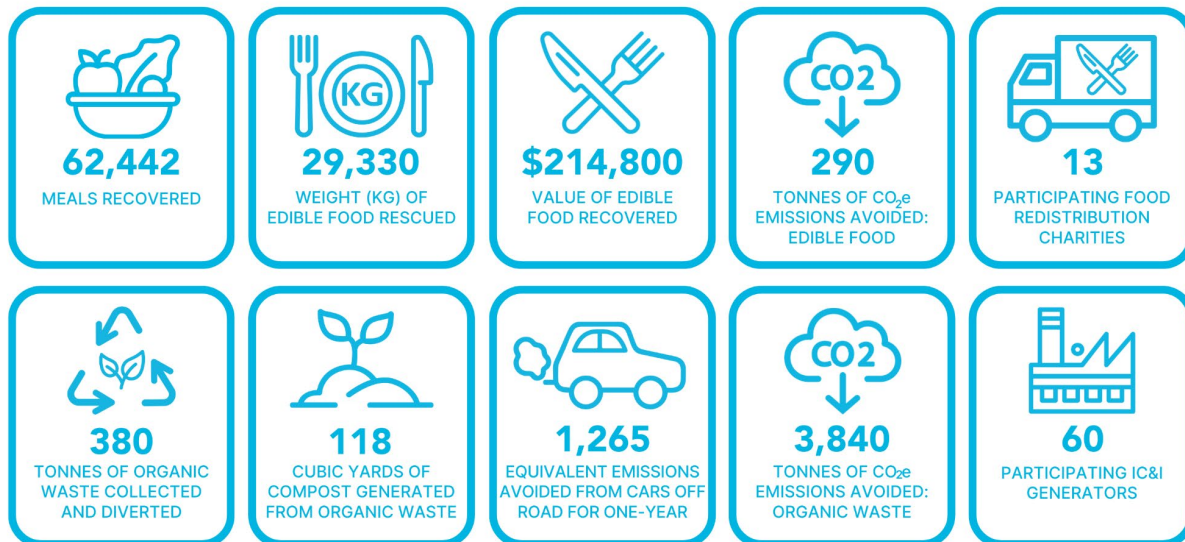
GOALS OF THE PILOT

1. **Optimize food waste diversion** in the Industrial, Commercial and Institutional (IC&I) sector by reducing service costs by redesigning regionally consolidated collection routes that improve efficiency.
2. **Reduce emissions** by diverting food waste away from landfill disposal through optimized routing and participant densification.
3. **Increase community food security** and social impact by recovering surplus edible food to local community service agencies for redistribution.
4. **Develop a first-of-its-kind financial model** designed to share costs and leverage collective business buying power, where organic material management

costs are shared between participants based on the amount of materials they generate.

5. **Create a template model** for collective IC&I food waste diversion that can be replicated in other communities across Canada.
6. **Test state-of-the-art technology** that provides real-time data to accurately measure organic waste diversion to better inform performance and costs and address the shortage of publicly available data.

2-YEAR IMPACTS



In 2 years, 60 participating businesses and institutions across the variety IC&I sector types collectively diverted nearly 410 tonnes of organic materials from local landfills in Guelph-Wellington.

- 380 tonnes of organic waste was processed into high-quality compost for local soil regeneration efforts.
- Over 62,000 meals of surplus edible food were donated and re-distributed through local community service agencies. This is equivalent to \$214,800 of food value recovered, keeping edible food at its highest value.
- 4,130 tonnes of greenhouse gas emissions were avoided by keeping food waste out of local landfills.

PILOT LEARNINGS TO-DATE

FOOD RESCUE

Key Findings

- Grocery Retail sector was the largest and most consistent contributor to edible surplus food donation.
- Up to 30% savings on diversion costs for medium-sized retailers that donate surplus edible food (keeps edible food at its highest value).
- Documenting successes and challenges of pilot's food rescue initiative facilitated dialogue with experts in the food rescue industry to improve model for non-grocer sectors.

Challenges

- Restaurants, hospitality, and catering sectors have surplus food, but require additional logistical support to accommodate internal challenges of high staff turnover, and variable donation volumes and types, and irregular availability of surplus food for donation.
- Logistical and infrastructure-related challenges of maintaining the hot / cold chain constrained participation of businesses wanting to donate and community service agency's ability to collect - e.g. limited business freezer/fridge storage, health and safety concerns, refrigerated collection trucks.

CONSOLIDATED ORGANICS COLLECTION - OPERATIONS

Key Findings

- A common organics collection model can effectively service various sized food waste generators in all 9 IC&I sub-sectors at one day per week collection frequency
- Highest IC&I diversion volumes: Long-term care & Hospital, Post-Secondary Institutions, and Grocery Retail (15-33 tonnes per generator annually).
- Medium diversion volume: Non-food Manufacturing, Hotels and Hospitality, and

Restaurant sub-sectors (3-4.5 tonnes per generator annually).

- Pilot simplified logistical and operational concerns that businesses had about starting organics collection by acting as an advisory service that tailored on-site workflow and diversion supplies (bins etc.) to businesses' needs.

Challenges

- Space limitations on-site constrained participation of some small generators - e.g. not enough space for cart storage or site too small for standard waste collection trucks to access carts.
- The pilot's collection frequency and processing partner constrained participation of some large generators - e.g. need for multi-day collections or extensive de-packaging services requested by some large grocery retailers.
- Grocery retail and some food and beverage manufacturers are increasingly diverting relevant organics (daily) to animal feed, given its cost competitiveness to disposal, and its higher value than composting/biogas on the food waste hierarchy. This has implications for volume available for processing and consolidated route efficiency, yet reinforces the value of consolidated collection of small and mid-sized generators, if organic waste haulers may not be able to count on large volume.

CONSOLIDATED ORGANICS COLLECTION - COSTS

Key Findings

- Consolidated route pricing, at the pilot's current phase with pricing at commercial cost, improves financial access for SMEs wanting to divert organics.
- Consolidated collection with a productivity of 10-12 carts per hour may achieve up to 30% cost-savings below regional average cost of organics diversion, based on preliminary results from a Request for Information.
- There is room for improved pricing through competitive procurement. Businesses with national or provincial scale are competitively negotiating prices below rates provided through the Request for Information.
- IC&I contamination rates were consistently below 5%, leading to favourable

processing rates.

- Collection costs represent approximately two-thirds of the total cost of organics diversion.

Challenges

- Even optimized and consolidated routing could not achieve the savings needed to have organics collection costs match landfill disposal costs - still 50-100% greater than the cost of disposal.
- Pilot model had 80% participant retention when transitioning from 'free' collection phase to the 'cost-share' phase (matching price of landfill disposal); whereas transitioning from 'cost-share' to 'commercial cost' phase, 25% withdrew due to price and 25% continued to divert organics through a different model.

BUSINESS AND FINANCIAL MODEL

Key Findings

- Consolidated collection pilot model of 'business buying consortium' helped SMEs access (afford) food waste diversion services.
- According to results from preliminary request for information (RFI), effectively consolidated route efficiency can achieve approx. 30% cost reduction below regional average cost of organics diversion.
- Financial sustainability of the pilot, managed by a local partner, appears achievable with 2-3 days of collections - based on many factors, with rate of IC&I recruitment success and negotiated collection rate through competitive bid being the most prominent.

Challenges

- Identifying a local non-profit partner that has both the skills and purpose alignment is not straightforward. In a non-regulated environment, a partner with regional operations may be required to achieve the scale needed for financial viability (assuming no ongoing grant support)
- Liner bags make collection of organics data using level sensors more challenging.

Conclusions cannot yet be drawn on the consistency of average weight density for organic materials in carts, and thus ability of level sensors to be a proxy for a weight based business model are being further explored.

POLICY

Key Findings

- In non-regulatory environments, municipal, organizational, and industry network connections are vital to recruit businesses and institutions willing to divert organics and rescue food.
- Main motivations for joining the pilot in a non-regulatory environment, reported by participants, were environmental impact, increasing staff engagement, and brand loyalty.
- Pilot data collected on food rescue donations and sub-sector organic waste diversion is a valuable tool for estimating needs of Canadian IC&I to inform food waste diversion policy and infrastructure development.

Challenges

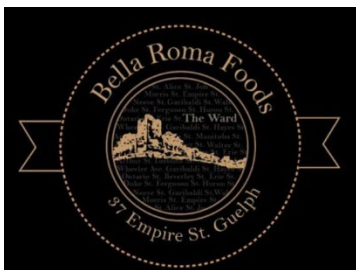
- Even with the pilot model lowering costs, there were often additional system-level challenges to SMEs' ability to participate in the pilot even if their values aligned with sustainability and social impact- e.g. needing to prioritize operational costs, impacts of COVID-19, limited staff time and high turnover.
- There is a need for more inter-jurisdictional dialogue regarding IC&I organic waste diversion to clarify the role of municipalities that currently appear to be taking the lead, and roles that provinces and federal government are best to lead.
- There is a need for more inter-jurisdictional dialogue regarding surplus food recovery and donation in IC&I sector to clarify roles of different stakeholder groups in addressing gaps in the system that require further infrastructure and support.

PARTICIPANT TESTIMONIALS



"We are pleased to see the savings in our garbage collection costs from diverting organics. Engaging with local food rescue agencies with the support of Second Harvest was worth it. We've now achieved ~30% reductions in the overall volume of food waste."

- **Tom Gorecki, Owner, Foodland Arthur**



"It was a no-brainer. Per bin, the cost to divert our waste is about half when compared to private haulers quotes. The pilot has created a space for small businesses to access these collections for a price we can afford."

- **Katherine Sowden, Owner Bella Roma Foods**

**WELLINGTON
TERRACE
LONG TERM CARE**

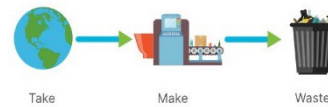
"Great project - staff have all bought in and are very positive about participating in the pilot project. They are proud that our organization is contributing to reducing our environmental impacts and contributing to a circular food system."

- **Rick Clark, Sustainability Mgr., Wellington Terrace**

1.0 WHAT IS A CIRCULAR ECONOMY?

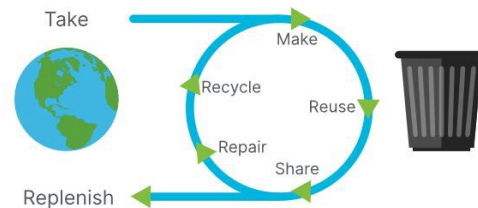
ABOUT THE CIRCULAR ECONOMY

Canada mainly operates on linear economies, where new resources are extracted, products are made, used, and then discarded at their end-of-life. This linear 'take-make-dispose' resource model causes unnecessary economic loss, unequal distribution and use of resources, and contributes to greenhouse gas emissions linked to the climate crisis.^{3,4}



Traditional model of production and consumption where resources are made into products and used until discarded as waste.

In recent years, the 'circular economy model' has emerged as a sustainable alternative in industrialized countries. It involves replacing the 'end of life' concept with reduction, alternative reuse, recycling, and recovery throughout the production, distribution, and consumption processes⁵.



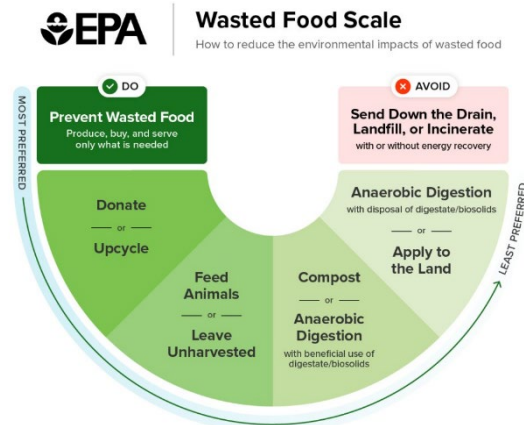
New model of production and consumption that keeps materials at their highest utility and value throughout their lifecycle, and recirculated into production cycles to avoid waste.

Circular economies prioritize resource efficiency by promoting material re-use, creating closed-loops where resources are re-distributed and recycled to create more sustainable and resilient resource systems.

The circular economy re-engages consumption and production beyond the linear model. It involves replacing the 'end of life' concept with reduction, alternative reuse, recycling, and material recovery throughout the design, production, distribution, and consumption processes⁵. Circularity has the ability to retain the value of natural resources, reduce carbon emissions, and eliminate waste. It redefines value and encourages innovation in product design and business delivery systems. Transitioning to a circular economy doesn't balance economic, environmental, and social priorities in isolation: it can deliver them simultaneously.

In relation to Canada’s food economy, processes within the different stages of the food value chain are often also linear in nature. From food production, distribution, processing, and manufacturing to retail, consumption, and end-of-life management, improvements can be made within the loops of these industries. Closing loops within our food value chain maximizes keeping food materials at their highest value throughout their lifecycle and minimizes food waste through prevention and re-circulation of resources when possible.

Source: <https://www.epa.gov/sustainable-management-food/wasted-food-scale>



ABOUT CIRCULAR INNOVATION COUNCIL



Circular Innovation Council – originally established as Recycling Council of Ontario in 1978 – believes that shifting production and consumption in a circular economy simultaneously supports environmental, economic, and social objectives of sustainable living. We are inclusive and collaborative among supply and value chains, and seek to advance business models, products, and services that can deliver on the values and benefits of a circular economy. Through better resource efficiency – reuse, share, repair, refurbish, remanufacture, recover in a closed-loop system – we can reduce waste, pollution, and carbon emissions. In doing so, we showcase innovation by putting circular economy concepts into action.

We believe the genuine catalyst to positive change is education and engagement. That’s why our outreach programs are built on two foundations: provide compelling information regarding issues and impacts of waste; and empower change through positive programming and campaigns. Environmental issues can seem overwhelming and while progress can seem challenging, we believe that simple changes to everyday living is the solution.

ABOUT OUR FOOD FUTURE



In 2019, the City of Guelph and Wellington County launched Our Food Future: a first-of-its-kind undertaking to build Canada's first modern circular food economy by 2025. Ten million dollars awarded from

Infrastructure Canada's Smart Cities Challenge officially launched this bold vision to advance circularity in the regional food system through **three goals**:

- **50% increase** in access to affordable, nutritious food;
- **50 new** circular food businesses, collaborations and social enterprises; and
- **50% increase** in economic benefit by unlocking the value of waste.

This initiative involved **multi-stakeholder partnerships** from across the food value chain to collaboratively share ideas, data, and technology to develop solutions that reimagine how we produce, distribute, sell, and consume food. Our Food Future transforms the current linear system to a sustainable and thriving circular food economy that creates new job opportunities, turns 'waste' into valuable resources, enhances access to nutritious food, and values the environment, health, equity and dignity for everyone.

2.0 WHY IC&I FOOD WASTE DIVERSION?

2.1 ECONOMIC, ENVIRONMENTAL, AND SOCIAL COSTS

Over 50% of all food in Canada is wasted every year¹, with unacceptable economic, environmental and social costs. Valued at more than \$49 billion annually, wasted food and organics creates more than 56 million tonnes of greenhouse gas emissions, primarily in the form of methane¹, which is 28 times more potent as greenhouse gas than carbon dioxide based on 100-year timescale (and 84 times more potent on a 20-year timescale) (IPCC report AR5). Furthermore, losing food waste to disposal in landfill means other losses including the energy, water, labour, and other valuable resources that go into food production.⁷

According to research, more than 11 million tonnes (32%) of the food disposed of annually in Canada is edible¹. Despite this, reports show 1-in-6 Canadians suffer from food insecurity⁸, not including the 31% of members from Indigenous Nations not living on reserves who are food insecure.⁶ Unfortunately, these numbers are likely to increase with current inflation rates and increasing food costs.

The economic, social, and environmental benefits to diverting surplus edible food and valuable organics waste diversion to higher value uses is clear.

2.2 ORGANIC WASTE IN THE CANADIAN IC&I SECTOR

A national food rescue organization, Second Harvest, reports **Canada’s Industrial, Commercial, Institutional (IC&I) sector generates up to 5 million tonnes of food waste per year** (Table 1), mostly coming from Distribution, Retail, and HRI sectors of the food value chain.⁹

Table 1. Estimated Food Waste in Canada⁹

Sectors in Canada’s Food Value Chain		Total Food Waste (Million tonnes)	% of Total Food Waste	Avoidable Food Waste (Million Tonnes)
Production		8.64	24	0.66
Processing		12.14	34	
IC&I SECTOR	Manufacturing	4.63	13	4.82
	Distribution	0.55	2	0.55
	Retail	1.31	4	1.31
	Hotels, Restaurants, Institutions (HRI)	3.11	9	1.44
Households		5.14	15	2.38
TOTAL		35.52	101	11.16

⁹ Adapted from: Nikkel, L., Maguire, M., Gooch, M., Bucknell, D., LaPlain, D., Dent, B., Whitehead, P., Felfel, A. (2019). The Avoidable Crisis of Food Waste: Roadmap; Second Harvest and Value Chain Management International; Ontario, Canada. Accessed from: www.SecondHarvest.ca/Research

CHALLENGES

A large amount of this unnecessary and avoidable food waste is mainly a consequence of the inefficiencies in the IC&I sector's food redistribution and waste management systems, and poor planning systems in the distribution, grocery retail, and HRI sectors of the food value chain.

Additionally, IC&I food waste generators in Canadian communities usually do not receive municipal source-separated organics collection services to combat unavoidable food waste being disposed of in landfill. Business or institutional locations have to find their own organic waste collection service provider, and small and medium-sized enterprises (SMEs) often pay premiums for the individual services. In other cases, they didn't generate enough organics to find a service provider. This uncoordinated individual approach causes collection inefficiencies and increased costs within the IC&I. Simultaneously, with limited regulatory requirements and higher costs for diverting food waste over landfill disposal, many IC&I establishments are throwing valuable edible food waste in the garbage.

Part of the problem is the lack of accurate data to help businesses manage and divert food waste. This lack of data on food waste generation and disposal rates in Canada's IC&I sectors further increases the difficulty of designing policy, regulations, and programs that will successfully reduce food waste while properly catering to the needs of IC&I establishments.¹⁰

In 2018, Circular Innovation Council ran a 4-month preliminary organics diversion pilot in Durham Region, Ontario. The pilot targeted small and medium-sized enterprises (SMEs), who make up the majority of the Canadian IC&I sector, and who have limited purchasing capacity to access cost-effective commercial organic waste collection and processing services.

These limitations result in a large amount of unavoidable food waste being disposed of in landfill, instead of re-purposed as soil amendment and biogas. The preliminary Durham region pilot revealed several barriers to source-separation for IC&I generators, confirming some of the challenges outlined in broader IC&I food waste literature in Canada:¹¹

- IC&I generators perceived organics collection would cost significantly more than other waste disposal practices.

- Many sites had additional non-financial logistical constraints to source-separating organic waste.
- There was difficulty for SMEs to financially and geographically access organics processing facilities and end markets for the soil amendment product.

In addition to challenges with unavoidable organic waste diversion, the Canadian IC&I sector also experiences challenges with diversion of *edible* surplus food from landfill.

- Of the food wasted in Canada's IC&I sectors, approximately 3.3 million tonnes (30%) of this food waste is avoidable (surplus edible food).
- This surplus edible food could be rescued to support food insecure communities and is valued at \$15.3 billion lost annually.
- In many urban centres, especially given high rates of inflation-driven food insecurity, there is not a lack of charitable organizations and food rescue partners, but lack of awareness, resources, and logistical barriers to connect food-generating businesses to these food rescue options as means of diverting and repurposing their surplus edible food.

OPPORTUNITIES

In recent years, there is increased recognition of these challenges for the IC&I sector being discussed at local, provincial, and national levels. This demonstrates renewed interest in improving food waste reduction and diversion systems for the IC&I sector to meet ongoing economic, social, and environmental goals in Canada. This increased recognition and knowledge of the challenges can be leveraged as opportunities to improve efficiencies and prioritize circularity within our food systems (both in edible surplus food rescue and unavoidable organic waste diversion from landfill).

The Food and Agriculture Organization (FAO) recently argued a business case to address the cost of food waste at the company-level and more broadly in other societal systems:¹²

- Reducing food waste can lead to potential higher profits and reduced waste disposal costs for food-generating businesses.

- Businesses donating edible surplus food potentially find savings in organics diversion costs as there would be lower volumes collected and processed. For the unavoidable waste, separating food waste from garbage disposal eliminates the heaviest component of mixed garbage for most businesses, resulting in potential garbage disposal savings.
- They also highlight broader economic benefits for society through effective edible surplus food waste management and diversion of unavoidable organic waste in the IC&I sector and other sectors across the food value chain.
- For example, keeping surplus food at its highest value through meal donation to food insecure community members, or unavoidable organic waste being diverted from landfill as soil amendment or biogas helps reduce economic loss within the system, and puts less strain on our current resource systems.

This IC&I pilot was designed to address the inefficiencies of organics diversion services and food rescue services that exist in the Canadian IC&I sector, and to test the feasibility of a regional consolidated IC&I collection system to improve food waste diversion rates. It is primarily targeting establishments in the grocery retail and food service industry including food distribution, hotels, hospitality, restaurants and other institutional subsectors (see Table 1 above), with some applicability to food manufacturers/processors, as well as small volumes from other non-food centric generators (e.g. office and medical buildings, non-food manufacturing).

2.3 EMERGING REGULATORY ENVIRONMENT FOR IC&I

This pilot was conceived as a mechanism for a financially viable, stand-alone model that supports businesses to accelerate IC&I surplus food and food waste diversion. However, the regulatory environment for IC&I organics diversion is changing rapidly, especially at the municipal level, in part because extended producer responsibility (EPR) policies are being developed and implemented in several provinces.

Below are some highlights of key regulatory requirements in Canada targeting IC&I organics diversion, prepared in 2021 by AET Group Inc. [“Overview of Organics Diversion Requirements and Practices for the Canadian Industrial, Commercial and Institutional Sector”](#).¹³ To meet urgent climate and waste diversion goals, many jurisdictions are actively considering or have recently passed regulatory requirements.

Provincial Regulations

- Ontario’s Food and Organic Waste Policy Statement includes targets to achieve 50-70% waste reduction and resource recovery of food and organic waste for certain IC&I generators by 2025.
- Nova Scotia and Prince Edward Island banned organic waste from landfill disposal in 1995, and in some municipalities (e.g. Halifax), this has led to IC&I organic waste diversion by-law requirements to complement the provincial ban.
- Quebec increased its landfill disposal levy to \$30/tonne in 2022, in part to provide funding to support its ambitious goal of managing organic waste in 100 per cent of industries, businesses and institutions by 2025.

Municipal Regulations

- City of Vancouver, BC banned organic waste from landfill disposal in combination with IC&I waste diversion by-law requirements in 2015.
- City of Calgary, AB began enforcing IC&I three-stream waste diversion by-laws in 2017, despite the absence of provincial IC&I diversion policies.
- Town of Banff, AB passed its non-residential waste by-law requiring source separation of organics in late 2022.
- Town of Canmore, AB recently passed its commercial food waste diversion by-law in 2023.
- City of Regina, SK recently passed IC&I three-stream waste diversion by-law to be enforced starting January 2026.
- City of Montréal and other municipalities in Quebec are now actively researching or developing IC&I waste diversion by-laws to achieve the provincial goals by 2025.

With the goal of optimizing surplus edible food recovery and organic waste diversion from landfill disposal at minimum costs, this pilot model aims to improve financial feasibility, logistical ease, and sustainability of diversion for businesses and institutions of all sizes in all jurisdictions, and thereby aims to encourage and accelerate Canada’s implementation of IC&I organic waste diversion policy interventions and regulations.

3.0 ABOUT THE PILOT

3.1 DESCRIPTION

The Commercial Food Waste Diversion Pilot project aims to offer a holistic food diversion solution to the institutional, commercial, and industrial (IC&I) sector to ensure no food or organic materials end up in landfill, by simplifying surplus edible food donations and reducing the cost of organic waste collection and processing.

To improve access and efficiency of regional surplus food donation, the pilot provides support to all types of participating businesses and institutions through education and engages on keeping surplus edible food out of organics carts, supported by the expertise of the pilot's food rescue partners. Additionally, the pilot leverages food rescue partner's technology to simplify connecting businesses with surplus food donations to local community partners.

To reduce the cost of organic waste diversion, the pilot mimics the collection efficiencies of the municipal door-to-door waste collection model by designing regionally consolidated waste collection services among neighbouring IC&I establishments. The aim is to demonstrate that the more IC&I establishments that participate within a consolidated service region, the greater the collection efficiency, leading to lower shared organic waste collection costs for all participants.

The pilot is taking a data-driven approach to innovation, by exploring the opportunity to develop a weight-based monetization model that incentivizes businesses and institutions to prevent food waste and thereby reduce their organic collection costs. Simultaneously, and given limited publicly available Canadian organic waste weight and volume data across the nine IC&I subsectors in Canada, **the pilot project is leveraging its engagement** with grocery retailers, hospitals, hotels, office buildings, manufacturers, multi-residential buildings, restaurants, schools, and shopping plazas to collect and share average organic waste weight data. **This data could be used to identify new food waste reduction solutions, better determine regional IC&I organics processing capacity, and advance policy and awareness initiatives in Canada and globally.**

The pilot will also inform and test a co-operative financial model where participants form buying consortiums or a similar mechanism, to effectively negotiate service contracts while benefiting all sizes of IC&I establishments that share collection service costs equitably across the collective. The co-operative financial model leverages

collective buying power and shares costs more equitably for smaller businesses, a model that can be replicated and scaled by communities across the country.

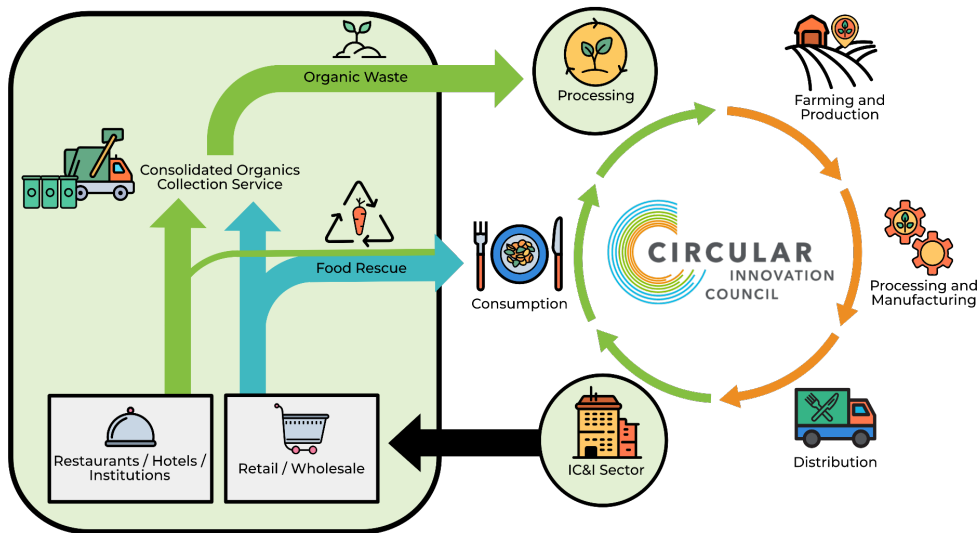


Figure 1. Flowchart of how IC&I food waste diversion pilot model improves circularity within our food system.

GUELPH-WELLINGTON PILOT

Following the initial Durham region pilot, CIC was awarded funding from Agriculture and Agri Food Canada’s (AAFC) Food Waste Reduction Challenge to launch a full iteration of the pilot in Guelph-Wellington Ontario in partnership with Our Food Future in 2021. This interim report will summarize methodologies and findings to-date of the Guelph-Wellington pilot. Over the past two years, 60 businesses and institutions in the region have participated in the pilot program. The pilot is currently partnered with Waste Management as the hauler for organic waste collection and transportation, AllTreat Farms (Walker Industries) as the processor for composting, and use of Second Harvest’s food rescue app to enable surplus food donation.

3.2 PILOT OBJECTIVES AND GOALS

This IC&I food waste diversion pilot was designed to address the inefficiencies of organic waste diversion services and food rescue services that exist in the Canadian IC&I sector, and to test the feasibility of a regional consolidated IC&I collection system to improve food waste diversion rates. It is primarily targeting establishments in the food service industry including distribution, grocery retail, and hotels, hospitality,

restaurants and other institutional subsectors (see Table 1 above), with some applicability to food manufacturers/processors, as well as small volumes from other non-food centric generators (e.g. office and medical buildings, non-food manufacturing).

The pilot model has two main objectives:

1. To reduce the cost of organics collection and processing through regionally-based organic waste collection services for IC&I establishments, especially small and medium-sized, and
2. To simplify surplus food donations by educating and connecting IC&I of all sizes to local surplus food rescue organizations.

By improving service efficiencies in both areas, the pilot is testing the efficacy of a regionally-based service model and the opportunity for neighboring participating businesses and institutions to share the costs. Additionally, the IC&I organic waste generation data reported here may be useful for designing policy, programs, and processing facilities that capture the majority of IC&I food waste and divert it from Canadian landfills.

Goals of the pilot include:

1. **Optimize food waste diversion** in the Industrial, Commercial and Institutional (IC&I) sector by reducing service costs by redesigning regionally consolidated collection routes that improve efficiency.
2. **Reduce emissions** by diverting food waste away from landfill disposal through optimized routing and participant densification.
3. **Increase community food security** and social impact by recovering surplus edible food to local community service agencies for redistribution.
4. **Develop a first-of-its-kind financial model** designed to share costs and leverage collective business buying power, where organic material management costs are shared between participants based on the amount of materials they generate.
5. **Create a template model** for collective IC&I food waste diversion that can be replicated in other communities across Canada.
6. **Test state-of-the-art technology** that provides real-time data to accurately measure organic waste diversion to better inform performance and costs and address the shortage of publicly available data.

3.3 PROJECT PARTNERS

Partnerships with municipalities, private sector and non-profit organizations have been essential to develop, implement and refine this collective pilot. Table 2 describes the wide range of partners and their main roles in the pilot.

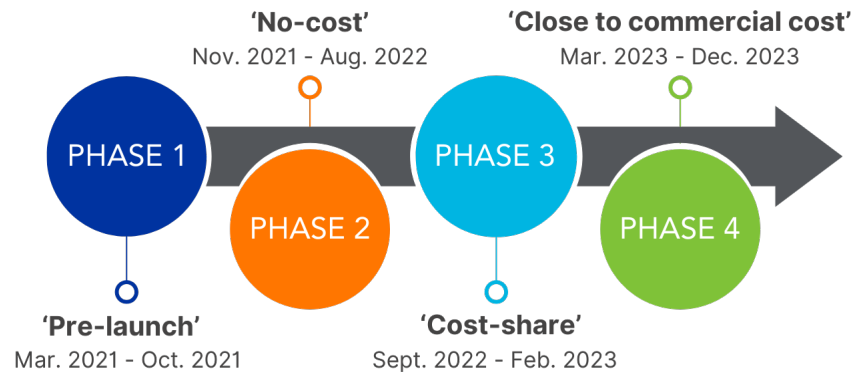
Table 2: Key partners for the Guelph-Wellington County IC&I Food Rescue and Waste Diversion Pilot

ORGANIZATION	PARTNERSHIP TYPE	ROLE DESCRIPTION
Our Food Future	Development Partner	Host Partner and Member of Advisory Committee. OFF provided a broad range of support including funding, outreach and communications, technology identification.
County of Wellington, City of Guelph	Development Partner	Municipal Partners and Members of our Advisory Committee. Significant design expertise (service boundary, collection logistics and costing). Support on communication of SSO, funding and some logistical support.
Longo's, Skyline Living, Grand River Agricultural Society	Development and Implementation Partners	Business Sponsors and Members of our Advisory Committee. Supporting design and development (providing feedback relevant to their IC&I subsector, as most are seeking cost-effective organics diversion solution). Their businesses have implemented organics diversion and (where applicable) food rescue, and are actively providing feedback on data collection tools, and assisting with recruitment.
Walker Industries (AllTreat Farms), Waste Management, Clean River	Development and Implementation Partners	Operational Sponsors and Members of our Advisory Committee. Walker Industries (AllTreat Farms) is our organic waste composting partner. Providing in-kind processing and reporting on organic waste weight and contamination. Waste Management (WM) is our waste collection sponsor and partner. Providing design guidance regarding options to improve route efficiency, and organic waste hauling service. Clean River sponsored our 'back of house' organic waste 8-gallon collection bins (Bevvy Bins) for participants, printed signage, and guidance on effective communications of food waste source separation.

The SEED	Operational and Implementation Partners	Operational Partner and Food Recovery Partner. The SEED is a social enterprise in Guelph-Wellington that focuses on innovative programs to improve community food system access. During Phase 4 of the pilot, they worked closely with us as an operational partner and provided food rescue advisory services to participants.
Second Harvest	Development and Implementation Partners	Food Recovery Partner and Member of Advisory Committee. We have partnered with Second Harvest to use the Food Rescue App for edible food donations. They worked closely with us to on-board new charities in Centre Wellington as none were previously registered on the app.
Ontario Cooperative Association	Development Partner	Member of Advisory Committee. Ontario Cooperative Association joined our advisory committee to support the development of our cooperative buying consortium model.
University of Guelph	Development and Implementation Partner	We have partnered with Dr. Kate Parizeau's research group in the Dept. of Geography, Environment, and Geomatics . They are a Member of the Advisory Committee, and a key partner supporting our KPI development, ongoing data collection, and analysis.
Centre Wellington Chamber of Commerce; Guelph Chamber of Commerce	Development Partner	A number of organizations are supporting our efforts to secure businesses in all 9 subsectors, including our host and municipal partners, our business sponsors, and Centre Wellington Chamber of Commerce and Guelph Chamber of Commerce.
COIL	Development Partner	COIL is a sister organization to Our Food Future. Actively supporting design and development of data (e.g wireless scale) collection technologies and analytics.
Glad	Implementation Partner	Sponsored the provision of compostable bags for multi-residential participants.

4.0 PILOT DESIGN AND OPERATIONS

4.1 TIMELINE OF PILOT PHASES



In 2021, Circular Innovation Council was awarded \$400,000 as a finalist of the Food Waste Reduction Challenge’s Business Model Streams, funded through Agriculture and Agri-Food Canada, to launch the pilot program in Guelph-Wellington. Over two years, the pilot was separated into four distinct phases:

- **Phase 1 ‘Pre-Launch’:** Partner engagement, advisory committee launch, service boundary selection, communications materials and outreach, participant recruitment and training.
- **Phase 2 ‘No-Cost’:** Launch of no-cost organics collection and processing, weight collection of organic waste per site, modifications to improve route productivity, RFI to secure commercial cost estimates and price reductions under existing and future higher efficiency scenarios.
- **Phase 3 ‘Cost-share’:** Additional recruitment with additional funding from Food Waste Reduction Challenge: Business Model Stream, transition to cost-sharing organics collection. ‘Cost-share’ price was similar to the average landfill disposal charges for SMEs (converted from dumpster cubic yards) of \$12 per 240L cart.
- **Phase 4 ‘Close to commercial cost’:** Additional recruitment with additional funding from Food Waste Reduction Challenge: Recruit local operational partner, transition to ‘close to commercial cost’ organics collection. ‘Close to commercial cost’ price was \$21-\$23 per 240L cart.

4.2 IMPACTS OF COVID-19 ON PARTICIPATION

It should be noted, during the earlier stages of the pilot project (mainly November 2021 – October 2022), the COVID-19 pandemic influenced recruitment of businesses and organic waste diversion rates across multiple IC&I sub-sectors, as well as identification of potential operational partners. **For example:**

- Restaurant and Hotels/Hospitality participants in the pilot experienced either temporary shut-downs or reductions in services (e.g. event cancellations, take-out meals over dine-in service) during mandated lock-downs and while social distancing was in effect, likely reducing the amount of organic waste generated.
- Financial losses experienced by food service sub-sectors over COVID-19 directly affected establishments' willingness to join and ability to participate (or continue participating) due to tight margins and staffing constraints.
- Transitions to hybrid or remote-working conditions affected non-service sub-sectors in the pilot. Participating office buildings reported that the prevalence of remote/hybrid work towards the end of 2021 to present likely affected the number of meals consumed by staff on-site (and consequently, food waste generated).

4.3 GEOGRAPHIC REGION & SERVICE BOUNDARY SELECTION

Our Food Future asked us to trial the pilot in the region of Guelph-Wellington as part of their “valuing waste as resource” component of their systems approach to creating a circular food system.

In consideration of the collection and processing partners' locations, a route was designed closely around Highway 6 as a major corridor between the City of Guelph and the other communities within Wellington County, including Fergus, Elora, Arthur, and Mt. Forest (see map in Figure 2 below). Creation of this service boundary guided recruitment within the region. The pilot specifically aimed its initial recruitment to include all nine IC&I subsectors, to confirm that the model being trialled could effectively service the widest range of business and institution types within one model.

The initial route design focussed on a main street in Guelph (Gordon St.) and the Highway 6 corridor which was then expanded slightly in later phases of the pilot. The Highway 6 corridor was in-part selected to test the initial premise of consolidated route efficiency

as a viable model for regional IC&I organics collection - the more neighbouring businesses and institutions that receive common organics collections within the smallest km radius, the higher the anticipated route efficiency and the lower the costs for its participants. In addition, the AllTreat Farms composting facility location (just off of Highway 6 in Arthur, ON) also informed the service boundary.

Figure 2. Two-year map of pilot project catchment area in Guelph-Wellington, Ontario (Credit: Adam Bonnycastle). Cumulative participating IC&I generators and processing partner are indicated by their associated sub-sector icon (see key in map). Note: 'Mount Forest Boundary' catchment area no longer serviced.



4.4 PILOT PARTICIPANTS

Throughout all phases of the pilot, participating IC&I establishments in the City of Guelph and Wellington County were recruited through referrals from partner organizations, cold calling/emailing, door-to-door engagement, as well as promoting the pilot through a range of partner social media accounts and media outreach. Participants were also made aware that organic waste collections were provided to them by Waste Management and the processing of their organic waste into soil amendment was provided by All Treat Farms. Surplus food rescue services were enabled by Second Harvest's Food Rescue app, and all food rescue participants were trained on the app and provided guidelines for surplus food donation criteria from Second Harvest.

During Phase 1 and 2, pilot participants were initially offered free ('no-cost') weekly organic waste collection services. Phase 3 offered a subsidized cost ('cost-share') for these weekly services, and Phase 4 transitioned to 'close to commercial cost' for these weekly services. Throughout all phases, collection of surplus food for donation was offered free-of-charge. The following benefits were additionally offered:

- Training from project staff and/or Second Harvest on donation of edible surplus food and how to use the Food Rescue App.
- Complimentary site visits as an advisory service to participants to support initial on-site management and training in organic source separation.
- In order to minimize potential logistical barriers to source-separation, participants were offered complimentary 8-gallon kitchen bins as collection containers to separate organic from other waste and recyclables, thanks to the support of Clean River. Multi-residential participants, based in the County of Wellington, were provided with kitchen catchers by the County of Wellington. Complimentary compostable bags were also offered for the kitchen bins during Phases 1, 2, and 3.
- Resources and high-quality signage on what food can be donated and how to source-separate unavoidable organic waste for green cart disposal.
- Organic waste diversion data and food rescue data report for each individual business on a bi-annual basis, and collective impacts of the pilot.

- Free marketing materials promoting participants' involvement in the program (e.g. print media, digital media, social media engagement, promotional templates for use on participants' marketing channels).

Immediately following recruitment, all participants were asked to complete a pre-pilot survey to provide baseline information on their establishment prior to beginning collections and donations. This information was used to estimate their needs for organic waste collection volume and corresponding number of carts, their motivations for participating, perceived barriers to organic waste diversion, and their current waste-related practices for both surplus food donation and source-separation.

In total, 60 generators have participated in the pilot thus far over two years. Table 3 below is a summary of how many generators per sub-sector participated in the organics collection aspect of the pilot, during each phase ('no-cost', 'cost-share', and 'close to commercial cost'). Participants numbers fluctuated between phases as participating businesses withdrew and/or joined throughout the 2 years.

Table 3. Number of organics collection participants by IC&I subsector during each phase over 2 years (November 2021 – October 2023).

	Phase 2 - 'No-cost'	Phase 3 - 'Cost-share'	Phase 4 - 'Close to commercial cost'	Cumulative Participants
IC&I Sub-sector	# Businesses	# Businesses	# Businesses	Cumulative # Businesses
Grocery Retail	7	3	3	7
Office Building	3	2	4	5
Restaurant	17	13	8	17
Shopping Plaza	3	2	1	3
Hotel + Hospitality	5	4	3	7
Multi-Residential	12	11	0	12
Hospital + Long-Term Care	2	2	2	2
School + Childcare	1	0	1	2
Post-Secondary Institutions	0	1	0	1
Food Manuf./Proc.	0	0	2	2
Non-Food Manufacturing	1	1	1	1
TOTAL				60

PARTICIPANT TRAINING AND EDUCATIONAL MATERIALS

Prior to launch, participants were provided with one training session, whereby owners were encouraged to invite general managers and other key managers as available. As the pilot was launched during COVID-19, training was online, and approximately 1 hour in length, including 30 minutes reviewing food rescue criteria and the food rescue app in partnership with Second Harvest, and the other 30-minutes reviewing collection and source separation criteria for organics. In addition, our hauling partner and processor were on the call to answer any detailed questions about organics collection and what could acceptably be included in the organic cart.

Separate training sessions were arranged for (1) grocery retailers in collaboration with brand owner (Sobeys), and (2) multi-residential participants given that food rescue was not relevant to this group.

Detailed guidelines were provided to each participating business, along with multiple copies of posters with food donation and source separation criteria. Compostable bags were dropped off monthly based on each site's usage, as an opportunity for ongoing engagement. The intention was to determine additional training requirements based on (1) reported contamination levels (from the processor AllTreat Farms), or (2) anecdotal feedback from participants. However, based on positive reports of low contamination (<5%), and feedback from business managers that staff were successfully separating organics presumably based on learnings at home, no additional source separation of organics training was required.

As further described below, it took longer to determine whether additional surplus food donation training was required, as this applied to fewer participants, and most tackled organics diversion first, followed by surplus food donation.

4.5 ORGANIC WASTE HAULER SELECTION

At the outset of the pilot, Circular Innovation Council was seeking a waste hauling partner that was willing to explore this innovative model and support pilot learnings with data collection (carts per site, transport route, etc), feedback on route productivity (efficiency) and suggestions to enhance efficiency based on types of businesses and institutions participating.

Two collection models are currently known to be available in Guelph-Wellington:

- **Cart replacement:** Private waste haulers offer cart replacement (one designed for 120L carts, the other for 240L carts), where full organics carts are collected and transported to a consolidation centre (to be tipped and washed) and replaced with cleaned carts.
- **Lined carts:** The second model provides mainly 240L carts (120L carts also available) lined with compostable bags that are tipped into the collection truck and delivered directly to the processor.

The pilot selected lined 240L (64 gallon) carts based in part on the advisory committee's assumption that this may be a more affordable model than the cart replacement model. This is the service model offered by Waste Management (WM) who generously provided initial sponsorship to launch the pilot as quickly as possible, as well as ongoing subsidized collection services as the pilot moved through various phases of cost recovery.

Specifically, WM used its rear-load, top dumping organics cart truck for collecting and transporting the organic waste.

WM supported the pilot with the following data, provided monthly:

- # carts collected weekly, per participant
- Total weight (tonnes) of organic waste collected weekly
- Estimate of tonnes per cart weekly
- Route productivity (# carts collected per hour)
- Total route time

4.6 ORGANIC WASTE PROCESSOR SELECTION

The pilot model is able to consider multiple options for organic waste processing, but location is a key factor. As we aim to minimize transport costs and emissions, the City of Guelph composting facility was the most obvious choice, given its location. However, the Guelph composting facility was at capacity, and so was the closest anaerobic digestion facility, BioEn.

AllTreat Farms, owned and managed by Walker Environmental, in the town of Arthur was selected as a processing partner both for their geographic proximity in Wellington County, as well as their well controlled compost production using a [Gore® Cover System](#)

that produces their high-quality AA compost product. Additionally, they expressed interest in supporting the learnings of the collective pilot model to advance IC&I organics diversion processes for Canada. Their generous processing sponsorship enabled the pilot to launch quickly.

Walker was willing and able to support the pilot in learning:

- Implications of de-packaging equipment to participant inclusion.
- Average contamination levels, through weekly contamination reports, essential feedback for determining additional training requirements in the early days of the pilot.
- Weekly collective organics waste weight (tonnes).
- Quantity and value of soil amendment produced from pilot organic waste.

Additionally, the connection to land application for carbon sequestration and regenerative agriculture techniques was also of interest.

4.7 SURPLUS FOOD RESCUE PARTNER SELECTION

Surplus food rescue was incorporated into the pilot model to offer businesses and institutions a holistic solution that makes it simple for participants to keep food at its highest value by re-distributing surplus edible food back into the community, and thereby reducing avoidable organic waste.

Fortunately, there was already extensive expertise in multiple markets in the region to support the IC&I sector to ensure surplus edible food was recovered. **The pilot partnered with national food rescue organization, Second Harvest, to leverage their expertise alongside their Food Rescue app technology.** The pilot was also interested in their data reporting capabilities, supported by the app, and regional reach in Guelph-Wellington. Second Harvest also supported the pilot in Centre Wellington (towns of Elora and Fergus) and North Wellington (town of Arthur) to identify and on-board additional registered charities that could collect surplus food from pilot participants in those regions. The City of Guelph already had many registered charities on the Food Rescue app as available for collection of surplus food donations.

Second Harvest also has an established and accessible app for pilot participants to use, which already services the Guelph-Wellington region. The app serves as a connection platform enabling local charitable agencies to collect food donations relevant to the community they serve from IC&I establishments of any size. The local charitable

partners handle the logistics of picking up and distributing the establishments' surplus food, at no cost to the business. Additionally, they have built-in capabilities and resources to provide support to participants on the app who may need additional guidance and provide training on clear food donation criteria regarding food type and best before dates.

4.8 BASELINE SURVEY FOR PARTICIPANTS

Following participant recruitment, each participant was asked to complete a 'Baseline Survey' to collect logistical information about the business including subsector-type and size, current waste disposal and food rescue operations, and qualitative data regarding perceived food rescue and organics diversion barriers, motivations for participation. This information also helped pilot staff and haulers determine the estimated number of carts needed for each establishment and their current waste disposal pricing of other streams prior to participation. **See Appendix A for a full overview of survey questions.**

4.9 CO-OPERATIVE FINANCIAL MODEL

One goal of the pilot is to test a co-operative financial model where costs are shared transparently by all users through a buying consortium. In the initial phase of the pilot, using the results of the baseline survey and information supplied by participants and our hauling and processing partners, the pilot investigated the current structure and pricing in the market, and in particular, opportunities to equalize service opportunities for small and medium sized generators of food waste.

In order to right-size costing for smaller generators of food waste, as well as incentivize food waste reduction at each site, **technology was explored to track the weight of food waste.** Due to COVID-19 global supply chain interruptions, the original technology partner was not able to deliver automated scales. As a result, for the first three months of the pilot, scales were rented to manually collect weights of organic waste at each participant in the 240L carts.

An important aspect of the pilot financial model is understanding how it will be managed, and the scale required, for financial viability post-pilot. Once the pilot was confirmed to be extended through its selection as a Finalist in the Food Waste Reduction Challenge, Circular Innovation Council began to engage organizations to partner with us as long-term model operators. **The role of the partner** would be to manage the business model long-term, which could include ongoing recruitment of businesses, ongoing training on food rescue and organic waste diversion, as well as contract management of

the vendor(s) selected through a competitive procurement process (undertaken in collaboration with Circular Innovation Council).

Some of the criteria identified for partner selection included:

- Locally based, with connection to business community
- Business engagement and sales skills
- Communications capabilities to promote the benefits of the pilot model, as well as develop collective marketing and promotion materials for the business participants
- Contract and relationships management
- Procurement experience (nice to have)
- Invoicing or invoicing review experience (nice to have)

Although profit status was not predetermined, **the primary focus was to identify a non-profit partner** as it was presumed that it might be more likely to maintain a focus on lowest cost for the benefit of achieving economic, environmental and social goals.

Collective procurement will be trialled in the next phase to capture consolidated collection efficiencies for the benefit of participating businesses. A collective membership revenue model will be co-designed based on the results of the sensor technology to enable a weight-based business model, as well as an evaluation of the administrative and risk implications of the preferred business model.

4.10 KEY PERFORMANCE INDICATORS

As the pilot is presented as a holistic solution to increasing efficiency, accessibility, and sustainability for food waste diversion in Canada's IC&I sector, **the three pillars of sustainable development were selected as a framework: environmental, social, and economic impacts.**

The following key performance indicators (KPIs) were selected to measure and track performance of the pilot in these three categories:

ENVIRONMENTAL

- Organic waste collected and diverted from disposal in landfill (tonnes)
- Greenhouse gas emissions avoided through organic waste diversion (tonnes CO₂e)

- Greenhouse gas emissions avoided through surplus food recovered (tonnes CO₂e)

SOCIAL

- Surplus food recovered (kg)
- Surplus food recovered (# of meals)
- Food recovery agencies supported (# involved in donation collections)

ECONOMIC

- Surplus food recovered (\$ value)
- Soil amendment (compost) produced yds³ (\$ value)
- Employment supported (# jobs)
- Average cost reduction below regional average with consolidated collection and transport (%)
- Average disposal costs avoided (\$/tonne)

DATA COLLECTION METHODS FOR MEASURING KPIS

Organic Waste Diverted: Total tonnes

- To determine total tonnes of organic material diverted to processing we relied on third-party data reports through weekly weigh scale tickets from the composting partner, AllTreat Farms.
- Periodic reports from AllTreat Farms also included photos and contamination level analysis. Through visual inspection and photos provided, quality control staff confirmed that materials were very low in contamination (less than 5%), allowing for favourable processing rates.
- Pilot's hauling partner, Waste Management (WM), also provided weekly collection reports of the number of carts set-out by participants for collection. WM trucks were weighed at the scale house upon entry and again when empty after exiting the facility upon tipping. Weekly weight tickets were emailed to the pilot manager and WM for tracking.

Greenhouse gas emissions avoided

- GHGs were calculated using Environment and Climate Change Canada's (ECCC) Organic Waste Greenhouse Gas Calculator ([version 1.1](#))¹⁴ using 100-year timescale as input (methane potency 28 times CO₂e). To enable pilot comparability across regions, emissions savings represent total methane emissions avoided by

diverting surplus food and organics from landfill. Pilot specific emissions (collection transportation emissions, fugitive emissions during composting, site specific landfill gas capture) have not been included as these will be variable and region specific. However, these would reduce total emissions avoided.

Soil amendment created

- The volume and value of the compost finished product was calculated by All Treat Farms, based on the pilot's tonnes as a percentage of total organic material processed each month. AllTreat Farms produces high quality compost (AA CQA) and provides the retail value of the bagged compost.

Organic waste diverted per sub-sector and generator: Tonnes, volume, average density (kg/L)

- There are two objectives for tracking information on a per generator level. Firstly, there is a lack of publicly available data regarding organic waste generation in the IC&I sector, and, more specifically, for each of its sub sectors. The pilot will collect such data, consolidate it, and make it publicly available. Secondly, having sub-sector weight-based measurements will help develop a co-operative financial model based on usage of organics carts per generator by sub-sector type. This encourages built-in incentives to reduce cost by reducing organic waste amounts that end up in the cart.
 - During the first 3 months of the pilot, participant carts were manually weighed and visual estimates of cart fill levels recorded for multiple data points per site, and used to determine average weekly weight (kg) and fill level per cart across all 9 IC&I subsectors in the pilot. Average weekly weight and average fill level per sub-sector was then calculated to determine average density of organic waste per cart (kg/L) for each sub-sector.
- During the subsequent phases, with support from one of our key partners in Guelph (COIL), wifi-enabled volumetric level sensors were secured from the technology vendor Superfy alongside its wireless telecom partner Telus. These sensors use optical and ultrasonic sensors to wirelessly send accurate cart fill-level measurements (volumes) to the cloud wirelessly every hour.
 - Twenty sensors have been installed (2 per site) at 10 participant sites. Manual weights are recorded weekly with a scale (prior to collection) for the carts containing sensors, to determine a more accurate average density of organic waste in the carts (kg/L) per site.

- With more data collection across additional sites (the carts with sensors are being moved to various sites after 3+ data points have been collected at each), the consistency of average density per site and across each IC&I subsector (e.g. average density consistency per grocery retailer) will determine whether the level sensors can be used as a reliable proxy for a weight-based business model.

Edible food rescued: Tonnes, number of meals, \$ value

- To facilitate food rescue for participants, we partnered with Second Harvest, a national charity that has designed a mobile app that connects donors with users with capacity to calculate the number of meals rescued and the respective value.
 - The app tracks food donations by weight and asks donors to estimate weights and submit food types. Validation of the donation is currently limited to information provided by the donor who manually enters the data by choosing from a list of food types.
 - Second Harvest emails monthly reported totals of food donations to the pilot manager. Rescued food economic value is estimated based on the national retail value of a 1 lb basket made up of categories and ratios of food types typically rescued by Second Harvest over the most recent 12-month period. To calculate the number of meals donated Second Harvest equates 1 lb of food to approximately one meal. Full guide can be viewed here: [Second Harvest Dollar Value Calculator](#).¹⁵

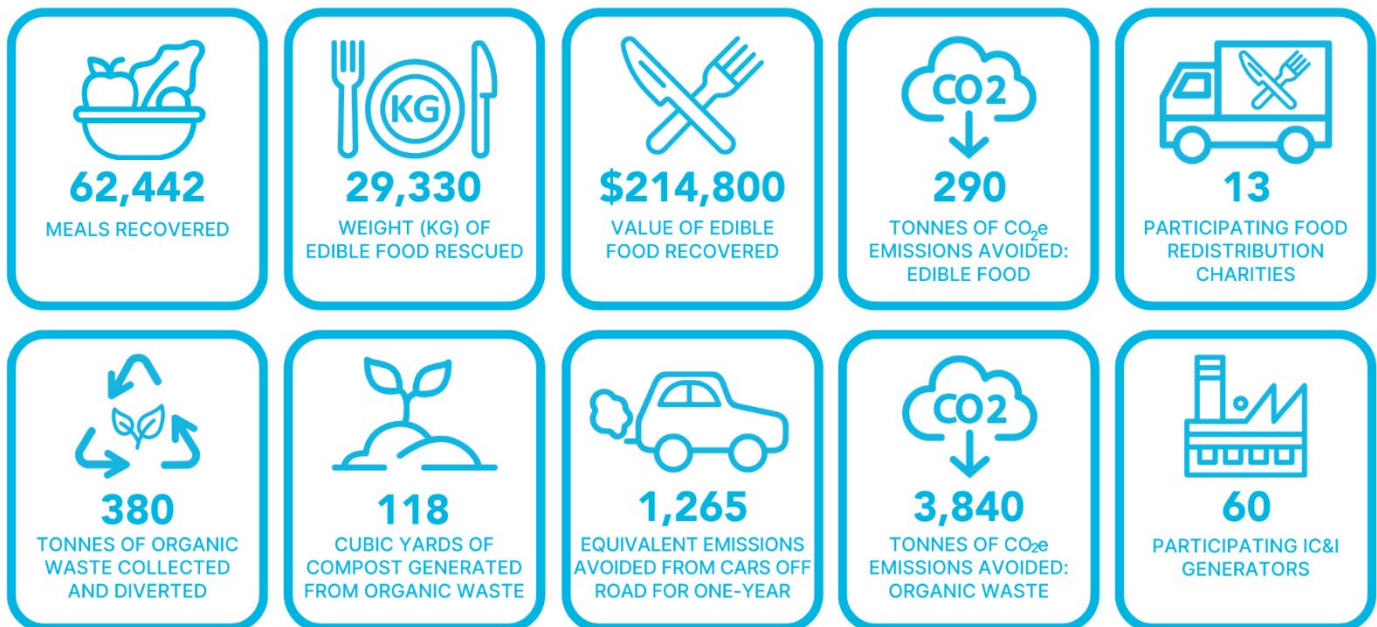
5.0 LEARNINGS TO DATE

5.1 OVERVIEW

Over 2-years, the pilot collected food waste and organic materials from 60 businesses and institutions in the Guelph-Wellington region. The consolidated organic waste collection model was able to effectively service small, medium, and large food waste generators from all 9 IC&I subsectors.

Figure 3 below summarizes the overall economic, social and environmental impacts for the 2-years of the pilot (Nov. 2021 – Oct. 2023). These results include impacts from the organic waste from participants collected and diverted through the consolidated organic waste route, and the edible surplus food donations from participants collected and recorded through Second Harvest’s Food Rescue app.

Figure 3. Guelph-Wellington pilot interim results (November 1, 2021 - October 31, 2023).



5.2 RESULTS OF KEY PERFORMANCE INDICATORS

The following key performance indicators (KPIs) were selected to track on-going performance of the pilot:

	12-Month Results	18-Month Results	2-Year Results
ENVIRONMENTAL			
Organic waste collected and diverted from disposal (tonnes)	231	303	380
Greenhouse gas emissions avoided through organic waste diversion (tonnes CO ₂ e)*	2360	3098	3,840
Greenhouse gas emissions avoided through surplus food recovered (tonnes CO ₂ e)**	182	228	290
SOCIAL			
Surplus food recovered (kg)	18,082	22,317	29,330
Surplus food recovered (# of meals)	38,920	48,134	62,442
Food recovery agencies supported (#)	13	13	13
ECONOMIC			
Surplus food recovered (\$ value)	\$129,627	\$160,900	\$214,800
Employment supported (# jobs)	<i>To be determined</i>		
Average cost reduction below regional average with consolidated collection and transport (%)	30% (reference from preliminary RFI)		
Average disposal costs avoided (\$/tonne)	<i>To be determined</i>		

*The GHG calculation method used was the updated Environment and Climate Change Canada (ECCC) Organic Waste GHG Calculator (v. Feb 2023). Given our solution only impacts end-of-life management of source-separated organic waste (and has no impact earlier in the food value chain) we have chosen to report only methane emissions avoided from landfill according to the ECCC GHG Calculator. For comparability to pilots in other regions, where transport routes and processors may be different, we did not include transport emissions nor fugitive processing emissions.

**For surplus edible food rescue, we similarly tracked the emissions avoided from landfill using the ECCC GHG Calculator, rather than the methodology chosen for the Second Harvest Food Rescue app that tracks the GHGs wasted along the entire food value chain, when food is thrown into the landfill.

5.3 LEARNINGS: GENERATOR RECRUITMENT

The pilot was marketed to potential participants as a dual-purpose simple and affordable solution to their food waste reduction and diversion. Complimentary surplus food collection was also offered through every pilot phase. Once-per-week consolidated organic waste collection was initially offered free-of-charge to potential participants, and then transitioned to a 'cost-share' phase and 'close to commercial cost' phase. Findings on motivators and barriers for generators joining the pilot were collected through an initial baseline survey of pilot participants and also collected anecdotally by the team during the process of recruiting generators throughout the pilot.

MOTIVATORS FOR GENERATORS

The following were **common motivators** to joining the pilot for generators:

- *The largest motivator* was making positive environmental impacts, followed by increasing staff engagement.
- Large food-generating businesses were interested in potential cost-savings by reducing waste volumes in garbage and recycling streams, and meeting corporate ESGs/increasing 'sustainable' brand value.
- Pilot offered more affordable organics collection services for SMEs compared to regional market prices.
- Generators who were already diverting organic waste but looking to change service providers saw the pilot as a convenient model that was easy to implement.
- Referral from trusted City or County partners to generators seeking organic waste collection services regarding the pilot as a trusted and impactful solution to IC&I food waste that businesses should be interested in.
- *Least common motivator* for joining was social impact through surplus food donation (but likely due to few participants having surplus food to donate).

BARRIERS FOR GENERATORS

Although organic waste and surplus food collections were offered at no-cost during the first 12-months of the pilot, recruitment required substantial effort with many businesses not responding to outreach.

The following are **common barriers** to joining the pilot for generators:

- Unable to pay pilot costs of organics collection services due to budget limitations. Once collections were not free, this impacted generators' ability to initially join or transition to paying 'close to commercial cost' for services. Largest participant drop-off and slowest recruitment rates were seen once cost of organics collection exceeded cost of landfill disposal.
- Staffing shortages and insufficient time to train staff on a new program (both source-separation and food rescue).
- Additional staffing limitations caused by the pandemic, particularly affecting the restaurant and hospitality sectors, key target sectors for the pilot project. See section 4.2 'Impacts of COVID-19' for further detail.
- Logistical limitations on-site for accommodating waste collection trucks (e.g. not enough room for truck to drive, downtown corridors with heavy public traffic).
- Logistical limitations of the pilot to service multi-day collection participants or to provide de-packaging services to large food generating businesses (e.g. large grocery retailers).
- Not producing enough food waste to justify source-separation or surplus food donation. This occurred most commonly in the Quick Service Restaurant sector, and Offices/Non-food manufacturers.
- Already diverting food waste through organic waste collection services and/or surplus food donation to charities or farmers for animal feed prior to being approached by pilot.
- Despite on-site managers and/or staff being interested, management/owner approval for participation was not secured with no reason provided.

ADDITIONAL RECRUITMENT STRATEGY LEARNINGS

- Approximately 40% of pilot participants have been acquired through municipal or inter-organizational connections mentioned above like these, compared to the low uptake rate for joining through cold-calling/emailing businesses.
- An additional 40% of pilot participants have been subsidiary businesses owned by a larger parent company that had been recruited onto the pilot.

From this, we learned the importance of utilizing partner networks and industry connections as strategy to scale participation in the pilot, compared to the lower recruitment rate seen from cold-calling potential participants without their prior knowledge of the pilot programs. In the next phase of the Guelph-Wellington pilot, we will be incorporating a broader communications campaign that leverages these networks and other community media outlets to increase awareness of the pilot as a local option for generators wanting to reduce food waste. Learnings from this campaign will be included in the final report.

5.4 LEARNINGS: PILOT DESIGN AND OPERATIONS

PRE-PILOT IC&I ORGANIC WASTE DIVERSION RATES

According to the **Food and Food Waste Flow Study**¹⁶ prepared for Our Food Future in 2021, it is estimated that in Guelph-Wellington local businesses' food waste amount to 16,500 tonnes generated annually. Of that:

- 7,600 tonnes are from the Retail/Wholesale/Distribution sectors
- 9,000 tonnes are from Hotels, Restaurants, Institutional (HRI) sectors; 2,500 tonnes unavoidable and 6,500 tonnes avoidable.

Although the above overview provides valuable data on IC&I organic waste generation rates, prior to launching the pilot, organic diversion rates were unknown for the IC&I sector in Guelph-Wellington (as is still the case for most of Canada). **Data collected through the pilot's initial baseline survey indicated 94% of participating businesses and institutions had not previously source separated organic waste.**

Through business engagement, it was observed that existing organics diversion activities in Guelph-Wellington were typically limited to large format grocery retailers, college and universities, and some institutional sites (e.g. one hospital). This may be due to the introduction of Ontario's Food and Waste Policy Statement (issued under section

11 of the *Resource Recovery and Circular Economy Act, 2016*)¹⁷ that includes targets for establishments producing over 300kg weekly for separation of food waste by 2025.

COMMON ORGANICS COLLECTION MODEL & SERVICE BOUNDARY

The first key objective of the pilot was 1) to determine if a regional consolidated collection model could service a variety of IC&I subsector types and generator sizes within a single route.

Based on the sizes and types of generators that have received organics collection services throughout the pilot, we concluded that one regional consolidated collection model can effectively serve a variety of generator sizes (small, medium, and large) in each of the 9 IC&I subsectors in Guelph-Wellington region. However, large generators requiring multi-day collection could not be serviced at this time due to the current scale of the pilot only serving one day per week. Additionally, the pilot was also not able to service some large food manufacturers whose primary byproduct is liquid (e.g. dairy) at this time due to the generator requiring an alternative diversion format.

CONSOLIDATED IC&I ORGANIC WASTE COLLECTION

The second key objective of the pilot was to test the efficacy of the regional consolidated collection model to optimize collection efficiency and thereby reduce diversion service costs for participants. Through running the pilot, we were able to test effectiveness of the design of the service route, measure tonnes collected within that route, and better understand what route efficiency was possible.

Productivity refers to the number of carts collected per hour by the hauler and is essentially a measure of route efficiency. As we aim to “fill up 1 day route” with IC&I participants and explore in the business model whether we could split the ‘fixed’ collection cost of a day’s route equitably amongst participants, we wanted to understand the highest route productivity achievable based on the service boundary selected. Productivity will be highest with all neighbouring businesses participating in as tight a geographically consolidated route as possible.

Productivity is based on a range of variables including overall route drive time, on site collection time, processing location, and shield time (defined as the driving time between consolidation centre (vehicle origin point) to active collections and returning from processing to the consolidation centre). As a result, productivity will always vary for different regions and for different haulers.

While the Shield time is fixed once the processing location has been selected, some productivity variables can be improved. In discussions with our hauler WM, we trialled reduction of on-site collection time by asking multi-residential participants (all of whom had on-site facility managers) whether they would be willing to roll carts to the curb. However, this was not deemed realistic by our multi-residential participants for multiple reasons and was not undertaken. Because the drive time became too long with the inclusion of the town of Mt. Forest (exceeded maximum 10-hour day), we had to reduce the service boundary to end at the town of Arthur. In addition, WM was willing to reduce frequency for smaller generators (e.g. office participants in COVID, quick service) to collection every 2 weeks, enabling us to fit more businesses on the route.

Given the relatively large service boundary selected, it was determined that a target **productivity rate of 10 to 12 carts per hour** was achievable within the (maximum) 10-hour collection time frame.

IC&I ORGANIC WASTE PROCESSING

Critical for any soil amendment application is a requirement to mitigate contamination of the inbound organic materials. For the first three months of the pilot, and periodically thereafter, contamination rates were estimated by our processing partner AllTreat Farms through weekly audit samples of tipped organics. Main key learnings are as follows:

- Pilot IC&I organic waste was found to have **<5% contamination rates**.
- Low contamination leads to **lower prices** from organics processors.

An additional key finding was that both a 'de-packaging' service (e.g. plastic wrapped or bagged produce) and ability to process paper (example: paper towel from kitchen handwashing stations or washrooms) are two valuable services for an organic waste processing partner to have for this pilot model, as a variety of sub-sector participants may otherwise be limited in their participation.

5.5 LEARNINGS: PARTICIPANT EXPERIENCES WITH ORGANICS COLLECTION

PARTICIPANT EXPERIENCES - SUCCESSES AND OPPORTUNITIES

Throughout the pilot, **participants anecdotally reported positive experiences** because of their involvement in the pilot:

- Two of our larger businesses reported up to 30% reduction in costs for their non-organics waste disposal.
- One long-term care facility reported that diverting organic waste out of their garbage compactor improved functionality of the compactor and reduced maintenance costs on compactor machinery.
- One grocery retailer reported further reduction in organics cost with the pilot after donating edible surplus food to local food banks through Second Harvest's Food Rescue app, since donation of edible food reduced the volume in their organics carts.
- Three SMEs from restaurant and food manufacturing sectors reported increased financial access and improved logistical support to source-separation of organic waste compared to the commercial pricing they had been quoted individually by waste haulers external to the pilot.
- Several pilot participants reported increased staff engagement after starting the organic diversion program, as staff were excited to be part of an impactful environmental initiative at their workplace.
- One multi-residential company (10 locations) used the pilot to trial organics diversion at their buildings, and following their participation in the pilot, the entire company went to national procurement for organics diversion for all of their multi-residential buildings across Canada.
- 'Brand-recognition' marketing provided at no-cost by the pilot was appreciated by participants, promoting their involvement in a 'community-led, sustainability initiative' associated with well-known local partners, such as Our Food Future, University of Guelph, and The SEED.
- Based on pilot processor reports of low contamination (<5%) in the organic waste collected, the initial training session and source-separation guideline booklet

provided to participating generators was sufficient and no additional source-separation training for generators was required.

PARTICIPANT EXPERIENCES - BARRIERS AND CHALLENGES

Throughout the pilot, **participants reported through the baseline survey or anecdotally common challenges** that arose as perceived concerns or actual experiences during their participation in the pilot.

- A perceived barrier of having odour/pests and mess created by organics carts. This barrier was overcome by the hauler lining organics carts with compostable liner bags following each collection; initial staff training and prompting helped ensure compostable liner bags did not fall in as organic waste was added to the cart. Despite less than 50% of sites having the ability to wash carts, only one multi-residential site complained of odors (some tenants complained to the property manager).
- For some smaller businesses, storage of organics carts was occasionally a challenge due to small waste storage spaces inside. This was overcome by either reducing their number of carts or replacing two small 35-gallon carts with one larger 64-gallon to save floor space.
- Some public-facing businesses (e.g. restaurants) in externally-managed plazas, experienced pushback from property managers on storage of organics carts outside due to 'lack of curbside appeal'. In combination with budget strain during the pilot transition to 'close to commercial cost' phase, this pushback did contribute to two businesses withdrawing.
- Some participating businesses experienced unmanageable staff turnover, which made consistent training on source-separation difficult to keep up with, either causing them to withdraw or affecting the consistency of waste volumes being diverted.
- Difficulty transitioning from 'cost-share' to 'close to commercial cost' phases of organics collection service. The 'cost-share' price was similar to the price of regional landfill disposal, while 'close to commercial cost' was nearly double the price, therefore making it difficult for participants to justify the additional cost once it exceeded cost of disposal. Participant retention between 'no-cost' and 'cost-share' phases was 80%, while retention between 'cost-share' and 'close to

commercial cost' phase was only 50%. Of the participants that withdrew, 25% withdrew due to cost and 25% withdrew due to wanting a different service model.

SUB-SECTOR LEARNINGS - GROCERY RETAIL

Grocery retailers play an outsized role in surplus edible food rescue and organic waste tonnage in the IC&I sector. Despite representing only 14% of pilot participants, grocery retailers produced approximately 45% of all the organics diverted, and grocers also provided the majority of surplus food donations.

The following was learned in Phase 1 and 2, through engagement and participation of grocery retailers in the pilot:

- In the Guelph-Wellington region, the only IC&I subsector requesting industrial de-packaging services was large grocery retailers. Note that not all grocery retailers require this type of service, as some (both small and large) have trained staff to de-package (e.g. remove overripe strawberries from clamshell containers) prior to adding food scraps to organic carts.
- As the pilot's compost processing partner had limited de-packaging equipment (focused primarily on plastic bag removal), we were not able to offer collection services to some large grocery retailers requesting comprehensive de-packaging as part of the scope of services within the pilot.
- Lack of the pilot's ability to offer de-packaging services also affected the amount of organic waste diverted by some of the participating grocery retailers, as staff time and energy de-packaging could not always be prioritized, thus food waste in packages was not always captured during collections.

Research was conducted during the pilot to determine capabilities of regional de-packaging services:

- Larger investments in de-packaging equipment are typically made by organics processors that use anaerobic digestion technologies.
- Two haulers of organic waste servicing the Guelph-Wellington region had invested in de-packaging equipment at their consolidation centre (which is outside Guelph Wellington).

Late in phase 4, we learned that a growing number of grocery retailers (and relevant food manufacturers like breweries) are diverting organics to local animal farmers (de-packaging at farm), at a cost similar to or less than the cost of disposal. This is a solution that is higher on the food waste hierarchy than composting or anaerobic digestion, and a number of grocers are leveraging this solution in Guelph Wellington as well as many other agrifood processing regions across the country.

Originally, we thought that high organic waste tonnages generated from grocery retailers may make them an essential participant to maximize efficiency in the consolidated collection route, especially in many smaller communities. However, it may now be useful to assume that the pilot model cannot depend on larger grocers and must be designed for consolidation of small and medium sized food waste generators, recognizing that this may place an upper limit on productivity for a given service area.

SUB-SECTOR LEARNINGS - MULTI-RESIDENTIAL

The pilot included 12 multi-residential buildings as participants, representing 25% of the total pilot participants. None of these buildings had previously offered organic waste diversion to residents and staff, although they were already offering mixed recycling. Tenants at every building were offered free 'kitchen catcher' bins, complimentary compostable bags, and guidelines with a poster specifying "what goes in/what stays out" for optimal food waste separation. Unfortunately, when the pilot was launched in November 2021, pandemic restrictions limited other broader efforts to bring tenants together for education and engagement, which may have been necessary to encourage and motivate full participation.

The following was learned through participation of multi-residential buildings in the pilot:

- Weights of organic waste collected from multi-residential buildings were low.
- Any increase in organic waste diversion from tenants was slow to increase.
- Some buildings had logistical site-specific barriers to source-separation and collection of organic waste.

As a result, a brainstorming session was held with building owners and facility managers to discuss opportunities for improvement, with valuable input from City of Guelph multi-residential coordinator as well as graduate students from Dr. Kate Parizeau's "Social Life of Waste" program in the Department of Geography, Environment, and Geomatics at the University of Guelph. It was concluded that:

- Clear and consistent signage, ongoing communications about the “why” of organic waste diversion as well as targeted incentives (what’s in it for the tenants) would be beneficial to increasing tenant uptake in the pilot program.
- Improvement of on-site logistics of diversion and collection is needed for multi-residential buildings (e.g. access point for waste collection vehicle, tenant accessibility to organic waste carts), but were clearly site-specific so general conclusions and solutions were difficult to draw at this time.

In summary, while the consolidated collection model is suitable to servicing weekly multi-residential collection needs, to be successful with new multi-residential buildings, increased and ongoing communications are required. This is a strategy that was not always necessary with other IC&I sub-sectors for which general guidelines and posters (and some management prompting over time) were sufficient.

5.6 LEARNINGS: WEIGHTS OF IC&I ORGANIC WASTE DIVERTED

As of present, there is limited data available on organic waste generation and disposal rates, and organic waste diversion practices of IC&I generators in Canada. Alongside trialling the consolidated model, the pilot also undertook data collection and analysis in order to help fill this gap. Verified quantifiable data detailing average weights of organic waste of IC&I sub-sectors can inform development of organic waste diversion policy interventions and facilitate potential investment interests in the food and organic waste diversion spaces.

Peer-reviewed report detailing the first 12-months of this pilot was written in collaboration with the University of Guelph and published in Cleaner Waste Systems.

Source article can be found here: <https://doi.org/10.1016/j.clwas.2023.100120>

ORGANIC WASTE GENERATED PER IC&I SUB-SECTOR

To understand how much organic materials each participating business generates, **several point-in-time measurements were taken of each participant’s carts.** This involved CIC representatives (or employees of a participant) going to the site the day before the organic waste was collected, recording the number of carts, providing a visually estimated ‘fill level’ of each cart, and the net weight of the carts. **This enabled us to calculate an average cart density (kg waste diverted/litre) for each participant site.** Combined with the number of carts collected weekly for each site (report provided

by the collection partner), we were able to extrapolate how much each site diverted to soil amendment and/or anaerobic digestion for the entire length of the pilot project.

- **This information was used to calculate estimates for total weights and rates of organic waste generated per sub-sector and within sub-sectors.** Table 4 below provides an overview of cumulative organic waste diverted for each sub-sector over 24-months of the pilot.
- It should be noted that some participants were not present in the pilot for the full 24-months, and sub-sectors with participants that did not span the full time period are noted with an asterisk*.
- **Additionally, ‘Post-secondary Institution’ sub-sector estimate received 5 days/week collection – 4 days from external provider, and 1 day from pilot.** Therefore, data from 1 day pilot collection was extrapolated to 5 days to calculate representative diversion weights**.

Table 4. Snapshot of organic waste diverted during 2-year pilot according to sub-sector.

2-YEAR ORGANIC WASTE DIVERTED PER SUBSECTOR			
IC&I Sub-Sector	Total # of participants per sub-sector over 2-years	Total weight (tonnes) of organic waste generated per sub-sector over 2 years based on average cart density (kg/L)	Average cart density (kg/L) (weight of bin / bin size / fill level)
Long-Term Care and Hospital	2	126.8 tonnes	0.48 kg/L
Grocery Retail	6	109.6 tonnes	0.32 kg/L
Small Food Manufacturing (6-months of data*)	2	0.98 tonnes	0.26 kg/L
Non-Food Manufacturing	1	8.5 tonnes	0.19 kg/L
Restaurant	14	31.5 tonnes	0.25 kg/L

Hotels and Hospitality	7	25.6 tonnes	0.32 kg/L
Shopping Plaza (multiple businesses within each plaza)	3 plazas (6 individual businesses)	6.6 tonnes	0.23 kg/L
Schools and Childcare (9-months of data)*	2	1.4 tonnes	0.21 kg/L
Post-Secondary Institutions (12-months of data)*	1	53 tonnes**	0.46 kg/L
Multi-Residential* (16-months of data)	12	14.9 tonnes	0.16 kg/L
Office Buildings	5	2.0 tonnes	0.11 kg/L

*Subsector had significantly less than 24 months of data used in calculating total organic waste diverted over duration of pilot

**Total extrapolated from existing pilot data on subsector

Using estimates for average organic waste density (kg/L) per cart for each sub-sector, combined with actual number of carts collected weekly, we calculated average annual organic waste generation rates within each sub-sector type (Figure 4). This represents how much organic waste (kg) the average business in each sub-sector generates every year in Guelph-Wellington.

The bar chart below (Figure 4) shows wide ranges in average annual organics diversion rates between IC&I sub-sectors. Each bar represents the average amount of organic waste diverted per business for the different IC&I sub-sectors. Key results included:

- Highest organic waste diversion rates was Post-Secondary Institution sub-sector (135 tonnes/year). Sub-sector received 5 days/week collection total, but pilot only collected for one of these days. Collected pilot data was extrapolated for average 5 days/week.
- Next highest organic waste diversion rates were in the Long-term Care and Hospital sub-sector (32 tonnes/year) and Grocery Retail (15 tonnes/year).

- <5 tonnes of organic waste diverted per year were participants in Non-food Manufacturing (4.3 tonnes/year), Hotels and Hospitality (3.5 tonnes/year), and Restaurant sub-sectors (3 tonnes/year).
- <2 tonnes of organic waste were diverted per year from participants of Shopping Plazas, Daycares (from Schools and Childcare sub-sector), Multi-residential buildings, and Small Food Manufacturing facilities. No data was collected for large or medium-sized food manufacturing facilities.
- The smallest amount of organic waste was diverted by Offices (approx. 360 kg/year).

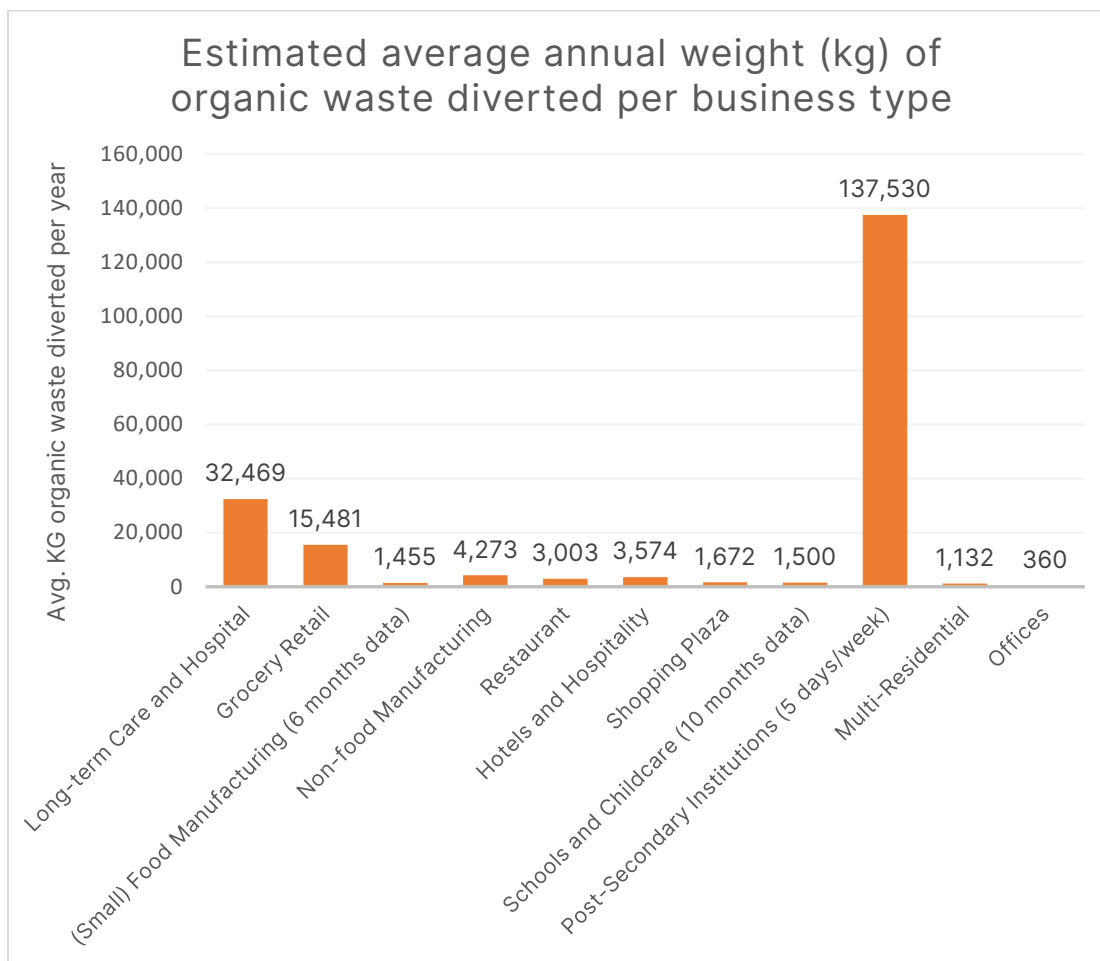


Figure 4. Average annual rate of organic waste diverted (kg) by participants per business type. Note: 'Post-secondary Institutions' is based on 5 days/week collection.

Table 5 below depicts average organic waste generated annually per subsector from pilot participants compared to a similar data report provided by AET Group Inc. for Environment and Climate Change Canada report of the Canadian IC&I sector.¹³ To the best of our knowledge, AET Group Inc's 2021 report is the only other publicly available data for the Canadian IC&I sector we have been able to identify that provides a direct measurement of organic waste generated annually per sub-sector. In both reports, normalizing factors of # persons (ie. employees, students) and facility size (ie. in square feet) have been included. For the reader, we have included AET (2021) as a comparison to our results, as there were several environmental and methodological factors that may explain the differences measured between some sub-sectors' organic waste generation rates in Table 5:

- Pilot experienced variation in organic waste generation data in 2021 and early 2022 due to COVID-19 shutdowns, which may have resulted in abnormal diversion rates for a period of time.
- Average subsector organic waste generation rates from pilot are based on smaller sample sizes than the AET 2021 report.
- Pilot data represents an average in sub-sector waste generation over a period of time (1-3 months), while AET (2021) captures sub-sector averages from a single point in time.
- As a result of the pilot's access to all 9 Canadian IC&I sub-sectors as participants, our data was able to fill some gaps in AET (2021) - e.g. grocery retail and multi-residential.
- Pilot has collected qualitative survey data on size of establishments that provided context into data trends - e.g. size differences in participating grocery retailers, restaurants, etc.
- Pilot has data availability of normalizing factors additional to square footage and employee # that are relevant to include for some sub-sectors - e.g. # residents in LTC & Hospital, # students in schools/daycares, # units in multi-residential.

From these findings, we conclude there is an opportunity and need to standardize normalizing factors in future publicly available IC&I waste generation data that are relevant to their respective sub-sectors and measurable across the industry.

Table 5. Average Rate of Organic Waste Diversion per pilot IC&I subsector with normalizing factors, compared to other published data.¹³

Annual average IC&I organics diversion rates per normalizing factors		
IC&I Sub-sector	Pilot organics diversion rate	Organics diversion rate for Canadian IC&I sub-sectors (Source: AET, 2021)
Grocery Retail	912 kg / 1000 ft ²	<i>no data***</i>
Office Building	<i>insufficient data***</i>	11 kg / employee
Restaurant	0.94 kg / ft ²	3.8 kg / ft ²
Shopping Plaza	<i>insufficient data***</i>	<i>not included in report</i>
Hotel & Hospitality	381 kg / 1000 ft ²	1,070 kg / 1000 ft ² (<i>measured for Hotels</i>)
Multi-Residential	30 kg / unit	<i>not included in report</i>
Hospital & Long-Term Care	69 kg / person (<i>employees & residents</i>)	33 kg / employee (<i>not including residents</i>)
School & Childcare	28 kg / person (<i>employees & students</i>)*	1 kg / student (<i>not including employees</i>)
Post-Secondary Inst.	<i>insufficient data***</i>	7 kg / student (<i>not including employees</i>)
Food Manuf./Processing	<i>insufficient data***</i>	2.5 tonnes / 1000 ft ²
Non-Food Manufacturing	7.1 kg / employee**	10 kg / employee

* Pilot data for sub-sector only includes average rate for Daycares (not Elementary or Secondary schools)

** Based on 1 participating business (not sub-sector average)

*** No data or insufficient data to make relevant calculation

5.7 LEARNINGS: FINANCIAL AND BUSINESS MODEL

To support the financial and business of the pilot, we needed to understand and/or trial:

- Current organics diversion market structure and average costs in Guelph-Wellington
- Technology options to support a weight-based business model that might incentivize food waste reduction at each participant, while supporting transparent, right-sizing of costs to smaller businesses.
- Operational partner identification and training to determine management costs, and implications for scale, of having the pilot model managed locally.
- Role of collective procurement to secure cost savings (from consolidated collection efficiencies) over the long term.

CURRENT MARKET STRUCTURE

Currently, in most of Canada, businesses and institutions search for their own organics collection service provider, whether individually or through a broker. **The pricing they receive is controlled by a number of variables, as outlined below, though businesses typically see one price: price per cart.** In jurisdictions that do not have IC&I organics diversion regulatory requirements and therefore low IC&I organics diversion, including Guelph and Wellington County, some haulers have minimum quantities to provide IC&I organics collection (3 carts per collection). This means that smaller food waste generators, despite representing the highest number of establishments in most regions, are typically not even offered the service, or are quoted what appears to be a very high rate (roughly equivalent to 3 carts per collection) if they require less than 3 carts weekly.

Variables impacting IC&I collection pricing include:

- Average volumes and weights of food waste for the type of business
- Frequency of collection
- Site logistics (drive time to site collection point, as carts are not curbside)
- Site safety (traffic visibility, power lines, etc.)
- Distance to processor/consolidation centre

- Type of processor (composting versus anaerobic digestion)

Businesses receiving collection services do not have visibility into their price per cart incorporating two components: a hauler collection fee as well as a fee for the processing of the organics based on weight (paid to the processor in dollars per tonne). In addition, the businesses are charged the same price per cart tip regardless of whether the cart is 25% or 100% full.

The pilot is designed to trial transparency of the weight of organic waste in order to:

- Incentivize food waste reduction (including surplus food donation) by making the processing cost visible, and
- Right size cost for businesses producing smaller volumes/weights of food waste.

CURRENT COLLECTION COSTS - GUELPH-WELLINGTON

The pilot aims to quantify cost reduction potential, **below the regional average for Guelph-Wellington**, by consolidating collection efficiency for a stand-alone route. The pilot gathered costing information through questions asking disposal and organics diversion costs in the baseline survey to participants, as well as through anecdotal discussions with a number of businesses and institutions in Guelph-Wellington, not all of whom participated in the pilot.

Nationally, the average Canadian fee to cover organics collection only is \$18 per 240 L (64 gallon) cart.¹³ The average national cost for organic waste processing in Canada is \$110 per tonne.¹³

The pilot revealed that in Guelph-Wellington, the total organics diversion costs (collection and processing) ranged from \$16 to \$25 per 240 L (64-gal) cart based on 2021 invoices provided by pilot participants, with median being \$23. Outliers in rural Wellington County could pay as much as \$50 per 240L cart. Using pilot average weight of organic waste of 45 kg per 240 L cart, the collection (only) cost ranges from \$12 – \$20 per 240 L cart.

Given inflation, the average total cost of organics diversion has increased since data was initially collected in 2021. **Average rates have increased to approximately \$26 per 240L cart in 2023.**

CONSOLIDATED ROUTE ECONOMICS - RFI LEARNINGS

After six months of collections, **Circular Innovation Council developed a Request for Information (RFI) to understand the cost savings potential** of the pilot consolidated collection route, at different scales of operation. The RFI was sent at this point to better understand the scale and efficiency required to achieve pilot cost reduction goals, as well as understand whether the lined cart service model was cost competitive or lower cost than cart replacement service models. The timing of the RFI helped the pilot determine if we should trial a different organics collection service model as we awaited confirmation of funding secured by being selected as a Finalist in AAFC's Food Waste Reduction Challenge.

The RFI was sent to three waste haulers currently offering organics collection in Guelph and Wellington County and two haulers responded. **The goal was to understand** 1) the potential reduction in collection prices below the average price in Guelph under different scenarios, and 2) determine if the haulers could provide the ability to weigh organic waste at each participant site during collection.

Waste haulers were asked to price out two collection scenarios in the RFI (refer to section 5.8 'Consolidated Route Economics - RFI Learnings' for information on determination of target productivity):

- 1-day stand-alone collection route with target productivity of 10 carts/hr; and
- 3 days stand-alone collection routes with target productivity of 10-12 carts/hr.

The RFI revealed that despite different collection models and vehicles, the total amount of organic waste each hauler was able to collect appeared to converge at **6 to 8 tonnes per collection day**.

Although only two haulers responded, the RFI also revealed that the lined cart service model was more cost effective for businesses with 2 or more 64-gallon (240L) carts than the cart replacement model.

Using information from the RFI (see Figure 5 below), **we learned that the consolidated pilot model can achieve approximately 30% cost reduction per cart (below the average regional cost per organics cart)**. Note that rates were not competitively negotiated in the RFI process, so it is possible greater savings can be achieved. Not surprisingly, the greatest savings can be achieved with greater scale, as at 3 days per week collection, haulers were able to propose split routes and serve the City of Guelph

and Wellington County on separate days, resulting in improved consolidated collection efficiency and cost reduction.

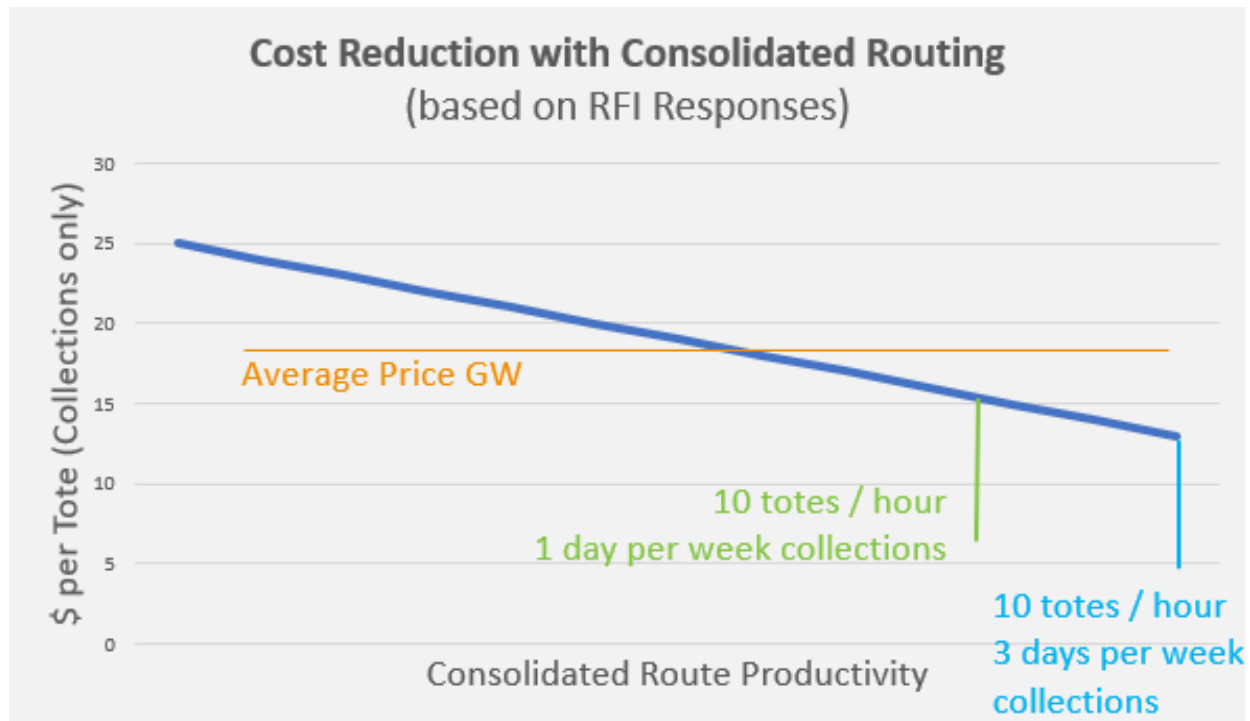


Figure 5. RFI Analysis: Cost reduction potential with increasing collection route productivity and scale.

The RFI to waste haulers also requested potential weigh-scale solutions at the collection vehicle, as this was assumed to be the most efficient method of organic waste weight collection per site. However, waste haulers did not have a readily-available solution to weigh organics carts on their existing cart-based collection vehicles. While this technology exists (primarily for front load collection of dumpsters), it is expensive to install on the collection vehicles. In addition, currently is not able to meet Measurements Canada tolerances for weight measuring equipment (as the basis for invoicing customers), preventing its use in a weight-based business model.

At the same time as the hauler RFI was released, an RFQ was also sent to two organic waste processors: one compost facility and one anaerobic digestion facility. The RFQ results indicated that anaerobic digestion offered some cost savings potential over composting for processing but may also impact pilot collection time and thereby reduce productivity as the anaerobic digestion facility was a further distance away.

TECHNOLOGY INNOVATION TO ENABLE WEIGHT-BASED BUSINESS MODEL

While the weights taken manually in the first six months, as described earlier, provided initial average participant organic waste generation data, the manual nature of the weigh-scales and visual estimates of fill levels did not enable a broader weight-based business model that we wanted to trial in the pilot. In addition, we had learned that businesses do not have the time nor incentive to manually weigh and record the volume of organic waste in the cart. As a result, **a technology solution that could record weight data with minimal to no business participation was sought, with the broader goal of right-sizing costing for smaller generators of food waste, as well as incentivizing food waste reduction at each site.**

With the support of partners Our Food Future and COIL (Circular Opportunity Innovation Launchpad) a call-out for technology solutions to enable accurate IC&I subsector organic waste weight data was undertaken. In late 2022, no sensors to directly measure weights (e.g. load cells) were identified to install in carts.

However, several vendors were identified with sensor technology to measure volume (level) of organic waste that could be trialled in a cart-based model. This was not their typical use-case. **After review of several proposals, we selected Telus' proposal of Superfy level sensor technology to determine:**

- (1) Could the sensors remain functional and withstand the wear-and-tear of organic waste roll carts?
- (2) What was the impact of compostable liner bags for accuracy of sensors measuring level?
- (3) Accurate average weights and volumes of organic waste per type of business (e.g. kg organic waste/week for an average dine-in restaurant).
- (4) Whether a volume-based sensor can be a proxy for a weight-based business model, if densities (weight/volume) demonstrate consistency within business types.

To start, sensors were installed on the lids of 240L carts supplied by City of Guelph. With both ultrasound and optical components, the sensors leverage Telus' network to send hourly signals to a data platform recording the level of organic waste in the cart. Superfy converts the level to volume in their data platform based on dimensions of the carts provided.



Figure 6: Image of Superfy sensor installed on the lids of 240L carts.

In addition, Circular Innovation Council worked with Superfy and Telus to identify a scale to weigh the carts. The weight, time and an approximate level check (to the nearest 25%) was recorded, with the goal of a minimum of 3 weights recorded for each business in both winter and summer. These weight-data points and level checks were compared to the level sensor data recorded automatically in the Superfy platform.

There are several key learnings to date:

- The sensors have been able to withstand the wear and tear of weekly collections.
- ~20% of the sensors batteries died after approximately 12 months of service.
 - This appears to be due to both some rural locations requiring more battery power to access cell tower signals, as well as using the default signal of once per hour, a frequency greater than required for this application.
- 240L carts can be heavy and difficult to weigh manually. 120L carts should be used.
 - Unfortunately, in order to safely measure large 240L carts that could often weigh 100-130kg, with outliers weighing up to 300kg, a low-profile (drum) scale with ramp was used. It was large and heavy - approximately 1m², weighing ~100 lbs. This slowed weight measurements collection as it required 2 staff.
- Compostable liner bags may not be compatible with use of level sensors for accurate data collection.
 - Compostable liner bags in the 240L carts have a tendency to billow out in the middle of the cart, confusing the level sensor. In general, this is

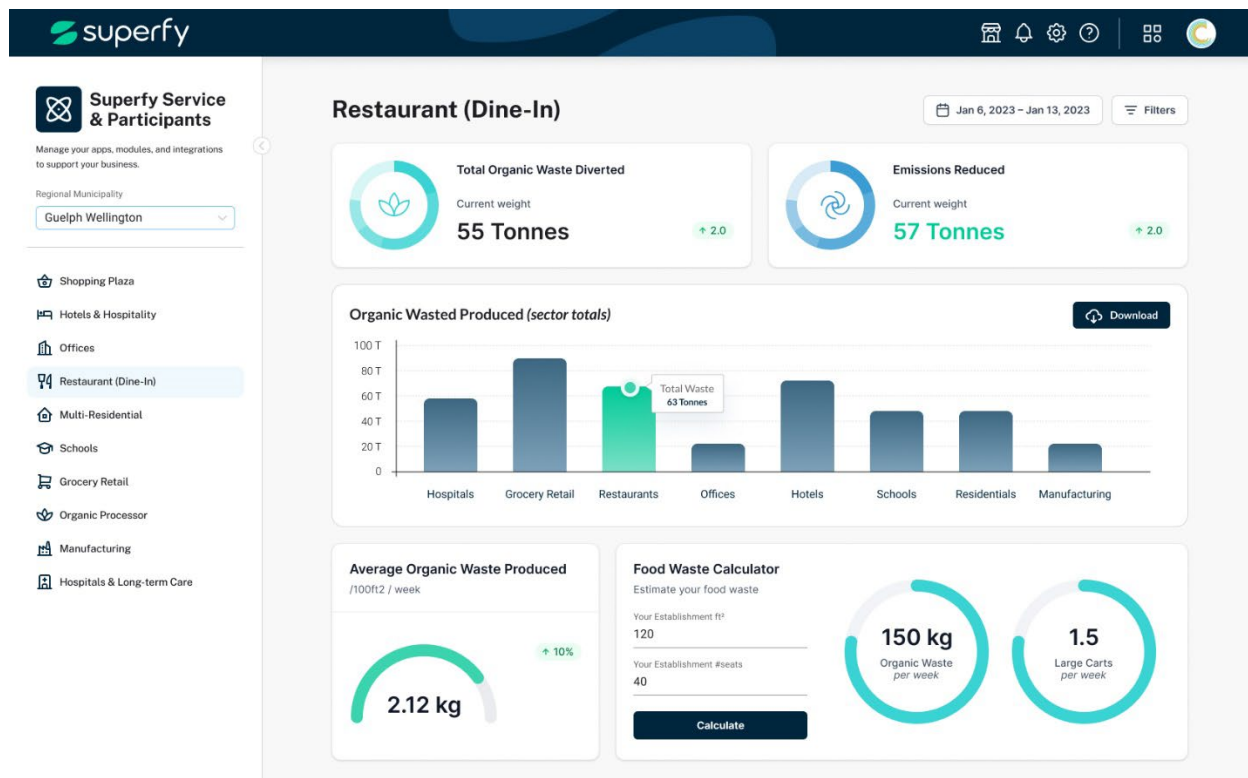
overcome once the first batch of organics is added to the cart, reducing the billing of the bag. However, Superfy also identified that sensors may have been dirty, so it is difficult to draw definitive conclusions.

In the next phase of the pilot:

- Sensors will be installed in 120L carts for ease of weight measurement with a small lightweight scale.
- Liner bags will not be used, to improve accuracy of level data being recorded.
- Level sensors will be cleaned at time of weight, so that this is excluded as a potential data quality concern.
- Sensor signals will be reduced from hourly to extend the battery life.

With these improvements, the pilot aims to summarize and share average weight and volume data per type of business, and per size of business in the future. In addition, conclusions can be drawn regarding the consistency of average density of organic waste per type of business, and thus the ability to use volume as a proxy for a weight-based business model.

A pilot goal is to develop a data set that is publically available with average organic weights, volumes and densities for different sub-sectors of IC&I generators (Figure 7 – Data platform mockup).



OPERATIONAL PARTNER LEARNINGS

The role of the partner and preferred skills is summarized in section 4.9 above.

Originally, a business membership organization was identified as the most likely candidate to manage the collective model longer term, given their regular engagement with the local business community. Several organizations, including the Guelph Business Improvement Area (BIA) were approached for potential interest. This was in mid-2022, when many organizations and businesses were just starting to recover from COVID, so their focus was elsewhere. We learned that individual Business Improvement Areas, which we thought would be an ideal fit, have geographic restrictions to which businesses can be members of the BIA, as well as potential restrictions on types of services they can manage on behalf of BIA members. **As a result, we looked for other partners** that might be willing and able to engage businesses on both food rescue and food waste diversion. Through the Our Food Future network, we were introduced to The SEED, a social enterprise of the Guelph Community Health Centre.

The SEED was interested in partnering as an opportunity to serve its primary mission of improving access to nutritious food in Guelph and Wellington County, by working with CIC to determine whether greater quantities of food could be rescued from pilot IC&I participants. They also had experience with building a business case, collective procurement and invoicing, communications, alongside engagement and relationship management of partners, so their skill set was well aligned.

The SEED is a project of the Guelph Community Health Centre with the mission of ensuring all community members in Guelph-Wellington have access to nutritious food. **The SEED uses a social enterprise business model to run its programs, including their participation as an operational partner for the pilot during Phase 4, from February 2023 - October 2023.** The SEED has programs that collect, store, and distribute surplus edible food, as well as collectively purchased food, to neighbourhood food pantries, schools, and local food access service agencies in Guelph-Wellington. The SEED works within the circular food economy in Guelph-Wellington to rescue edible surplus food before it enters the waste stream, thereby closing the loop for human consumption and recovering the value of surplus food that would have otherwise gone to disposal.

As a partnership, Circular Innovation Council and The SEED worked to co-develop the business model to determine the scale required for financial viability of the pilot model, so that a modest revenue stream would, at minimum, cover the costs of managing IC&I

organics diversion as well as surplus food rescued from pilot participants, while still keeping total costs to businesses below the regional average.

Through development of the business model, **it was determined that somewhere between 2-3 days per week would be needed to cover the management costs of the pilot model**, with key variables including the extent of ongoing IC&I recruitment (versus steady-state management of existing participants), as well as the success of the competitive procurement process to bring the collective route price down closer to the lower end of the range in Guelph-Wellington (see section Current Market Structure above).

As a result, the next stage of the pilot will focus on improved communications and business recruitment to scale the pilot to 2-3 days participation to refine the model and confirm that the model can be managed by a local operational partner with financial sustainability.

REVENUE MODEL

Our proposed collective financial model provides an innovative cost sharing mechanism to reduce fixed and variable rates for the IC&I generators of organic **waste**. The model is notionally based on a utility model that is user-pay, data-driven, and transparent approach that is proposed to include:

- Collection fee that shares fixed costs of each day's collection between the participants in the regional collective;
- User fee based on the variable amount of waste (e.g., weight, average density, or cart volume) that each participant generates to incentivize organic waste reduction;
- Management fee (per cart) to enable local management of collective membership, enabled through consolidated collection cost reductions.

Firstly, we will conclude the feasibility of a technology-based solution to enable a weight-based business model, prior to finalizing the model.

COLLECTIVE PROCUREMENT MODEL

This is currently under development, and learnings will be included in final report after the next phase of the pilot.

5.8 LEARNINGS: SURPLUS EDIBLE FOOD RECOVERY

Recovering surplus edible food for donation is a vital component of being able to keep food at its highest value within a circular food system, closing the loop to recover surplus, nutritious food for human consumption.

For two years, Second Harvest has been our primary partner, providing training, expertise, and data collection through their Food Rescue app. They continue to provide this support in the current phase of the pilot as well. After the two years, data analysis showed that only grocery retailers and only a few event/hospitality participants were donating surplus edible food. Circular Innovation Council was keen to understand why other businesses - smaller grocers, hotels and event spaces - were not leveraging the opportunity to donate food.

During Phase 4 of the pilot, alongside acting as an operational partner of the pilot (see section 5.8 'Operational Partner Learnings' for further description), The SEED also played a role in recruiting businesses into the pilot who were wanting to prioritize surplus food donations as a main method of reducing their edible food waste, and provided food rescue advisory services for participants who were experiencing challenges in donating.

PARTICIPATION AND RESULTS

During two years of the pilot, over 29,000 kg of surplus edible food was rescued from pilot participants. This is the equivalent of 62,699 meals being redistributed back into the community and \$217,279 of surplus edible food being kept at its highest value in Guelph-Wellington's regional food system. In addition to social and economic benefits, diverting this edible food from landfill and re-distributing back into the community avoided 290 tonnes of greenhouse gases (CO₂e) from entering the atmosphere. See key takeaways and Table 6 below for a summary of these results.

- This surplus edible food was donated by 5 different pilot participants from the 'grocery retail' and 'hospitality (catering)' subsectors.
- Through the food rescue initiative, it was determined that 'grocery retailers' generate the largest amount of edible surplus food for rescue using the pilot model.
- Over the two years, 13 local community service providers were involved in collection of the donations from the pilot project participants through Second Harvest's Food Rescue app.

- Keeping edible food at its highest value through food rescue reduced the cost of organic waste diversion by 30% at one mid-sized grocer.

Table 6. Summary of food rescue results from two years of pilot.

2-Year Results (Nov 2021 - Oct 2023)	
Total Weight Donations	29,446 kg
Total # Meals Recovered	62,699 meals
Dollar Value Food Recovered	\$217,279
Greenhouse Gas Emissions Avoided	290 tonnes CO ₂ e
Total # Participating Food Rescue Charities	13
Total # Pilot Participants	5

CHALLENGES TO FOOD RESCUE

The following is an overview of key challenges and barriers learnt during the pilot’s surplus food rescue initiative. These learnings were gathered during conversations with potential surplus food generators, advisory services provided to existing pilot participants by The SEED, and conclusions drawn by The SEED using the pilot’s model for food rescue services.

Cold storage - SMEs often lack available cold storage to hold donations, especially in the hospitality and catering sub-sectors. Without cold storage, the immediacy of donation pickup increases, which can be logistically challenging for both parties. This is a common challenge in restaurant, hospitality, and catering businesses.

Relational barriers - Many surplus food surplus generators preferred to build reliable, on-going donation relationships with trusted organizations in order to donate. While this would be ideal, the nature of food surplus donation is often sporadic and opportunistic, especially in restaurants, hospitality, and catering businesses; donation availability does not always align with the collection schedule of the desired food rescue charity.

High staff turnover - Many surplus food surplus generators and non-profit organizations experience high staff turnover, making it difficult to build and maintain relationships often needed to make logistics work. High staff turnover also means more time spent for pilot participants re-training staff on surplus food donation.

Additional tailored support to participants - Restaurants, hospitality, and catering businesses often need additional food rescue support and guidance to work through internal barriers specific to their business. These include:

- Complications with internal health and safety regulations they need to meet, which can clash with methods of storing food for donation.
- Hospitality food generators often lack available storage containers, and therefore need a solution to overcome the additional cost of non-plastic takeaway containers to store donated food for collection.
- Difficulties donating unconventional items (i.e., kohlrabi) or items in unconventional formats (i.e., 20 kg of yogurt). These items may not be accepted by the food rescue charities that are available at time of the donation being listed on the food rescue app.

Challenges specific to The SEED's ability to collect surplus food donations through the pilot's initiative:

- The SEED required medium-large volumes of surplus food for donation for it to be used within their internal food upcycling programs. Most pilot participants are SMEs with small volumes due to the nature of the pilot model. This mismatch in volume meant the cost of collection compared to the value of the donations being collected in most cases was unjustifiable, resulting in an unfavorable cost-to-value ratio.
- There were few generators able to provide a consistent donation offering, making it difficult for the SEED to plan staffing, transportation and logistics for donation pickups. The larger surplus food donors, grocery retailers, had existing relationships with local food banks that were meeting retailers needs.
- Lastly, recruitment was limited by using the regional County and City business directories as the main resource from which to draw a list of possible food surplus generators for pilot recruitment. The databases were often incomplete, out-of-date, or were vague in the sector categorization of the business, making it difficult to discern which businesses would be a viable fit for the pilot. Much limited staff time used for cold-contact (e.g. phone, email) could have been used more effectively had a clearer database been available.

PROPOSED SOLUTIONS

To address some of the challenges to food rescue listed above, below are proposed solutions to facilitate further dialogue around implementing solutions to improve IC&I access to food rescue services. Recommended solutions are relevant both to the pilot model and as broader experiences of businesses and organizations involved in recovering surplus edible food.

Advocacy for increasing community access to cold storage infrastructure - While the SEED is already providing this for many community organizations, regional generators do not have access to such a space. This would provide an opportunity for generators' donation storage, decrease time restrictions that currently limit surplus food donations, and provide a centralized location to collect donations from, which would help decrease the organizational cost of collecting food donations.

Investigating root causes of staff turnover in the food and non-profit sectors - This would help to address and advocate for system change that would improve staff retention in these sectors.

Identification of a Food Rescue Staff Champion at each business - potentially long-term (more senior staff) who is responsible for understanding the business's food donation logistics and can provide documentation to new staff for easy internal training and pass along contact information of any food rescue organizations they have built relationships with.

Addressing the unfavorable cost-to-value ratio for The SEED discussed above:

- Creating a consolidated pickup route similar to organic waste collection - the cost of picking up could be optimized to recoup several smaller donations at once.
- Extending the geographical parameters for recruiting food surplus generators - While these generators may be slightly further away, there is potential to target larger generators (e.g. wholesale and manufacturing) with more valuable donations outside the Guelph-Wellington pilot barriers.
- Diversifying main sources for information on regional businesses is important for efficient recruitment. While every database will have its shortcomings, by using several we can increase our certainty of having a reliable understanding of businesses in the region, and how to contact them.

6.0 LEARNING GOALS – NEXT PHASE

The pilot has demonstrated that a common collection service model is able to service most business types and sizes across all 9 IC&I subsectors and has provided preliminary indication that consolidated collection with productivity at 10-12 carts/hour or more can reduce cost of food waste diversion for SMEs. It has also shown that mixed IC&I organics diverted from a broad range of businesses and institutions achieved <5% contamination, resulting in favourable processing rates.

With its data-driven approach, the pilot has been able to measure and summarize average weights of organic waste for different types of IC&I, alongside quantifying the significant environmental and social benefits of food rescue and organics diversion. A summary of key learnings is provided in the executive summary.

There are several additional learnings the pilot is seeking to understand for the final phase of the pilot, as outlined below. Additional funding from the City of Guelph through the FCM Green Municipal Fund will enable continued trialling of the pilot in Guelph-Wellington region. Learnings will also be leveraged for a pilot launching in Westlock and Strathcona County, Alberta.

Consolidated Organics Collection - Recruitment

- **How can we improve communications** and storytelling to enhance business and institutional engagement and recruitment in a non-regulatory environment, to serve broader goals of (1) scaling up the pilot, and (2) identifying the limits of voluntary IC&I participation in the region.

Consolidated Organics Collection - Operations

- **What is the cost/benefit analysis of incorporating periodic cart washing service** option into the lined cart service model to deal with dirty carts (based on the reality that liner bags will occasionally fall in and thus carts do get dirty over time)?
- **What is the upper range of consolidated collection route productivity** (e.g. what are the pilot consolidated collection efficiency implications) if many large generators are transitioning to diverting organics to animal feed?

Business and Financial Model

- **What other local or regional organizations could effectively serve as operational partner?** If a non-profit organization is not identified, are there opportunities to engage a private sector partner that will maintain the benefits of a consolidated route for the benefit of SME participants? Alternatively, what are potential roles of the municipality in enabling IC&I organics diversion?
- **With improved measurement techniques, can level sensors enable a weight-based business model?** If not, what form of utility business model is able to right-size costs for SME businesses to equitably participate in a collective collection model?
- **What is the cost savings secured through competitive RFP?** What is the final collective pricing offered to participants to participate in model long-term?

Surplus Edible Food Rescue

- **Through continued dialogue with food rescue partners, what solutions can be put in place for hospitality and other donors with variable volume and frequency of surplus food donations so that charitable agencies secure sufficient value per collection, recognizing businesses' preference for a consistent, preferred partner?**

CONNECT WITH US



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APPENDICES

APPENDIX A - BASELINE SURVEY FOR PARTICIPANTS

BASELINE SURVEY FOR PILOT ON-BOARDING (adapted from Qualtrics platform version)

Introduction: Thank you for taking your time to respond to this survey. Please answer the following questions with your best estimates. Your answers will help us with pilot logistics and also help us determine the success of the pilot in reducing garbage disposal costs and food waste diversion costs. Note that we are using the terms 'food waste' and 'organic waste' interchangeably, and this would typically include anything you put in your green bin at home, including paper products. This survey will take approximately 15 minutes to complete. You can also save your responses and return to the survey at a later time using the same link you were provided. Please respond within one week of receiving the survey - thank you!

QUESTIONS

Section 1 – Basic Information

Q1 Please provide the **name and address** of your organization.

Q2 Please provide your **contact details** below.

Q3 Please provide the **Name and Email** of contact responsible for all waste and recycling for your organization if different from question above (e.g. property manager).

Section 2 – IC&I Type

Q4 Indicate which IC&I Type is the best category for your organization (please select from the dropdown list).

Dropdown list displayed:

Restaurant – Quick-service, Restaurant – Limited-service, Restaurant – Fine-dining, Restaurant – Casual-dining, Catering and Event Spaces, Grocery Retail, Shopping Complex, Food Redistributor or Wholesaler, Food Manufacturing Facility, Other Manufacturing Facility, Office Building, School, Daycare, University/College, Multi-Residential Building(s), Hotel / Motel - Limited food service (e.g. continental breakfast), Hotel / Motel - Full food service (e.g. restaurant/event space), Long Term Care Facility, Hospital.

Q5. Please help us understand the size of your organization. If you don't have exact numbers, please provide your best estimate.

- *Square feet of [subsector] space*
- *Capacity (# seats, units, beds available if applicable; ie. Restaurant, multi-res, hospital)*
- *Number of employees (and students, if applicable; ie. School, daycare)*
- *How many hours per day of your facility open? (e.g. 8 hours, 24 hours)*

Section 3 – Current Waste Practices 1

Q6 Separate from the pilot, how do you currently contract for waste collection services?

- *We pay a waste management company to pick up waste.*
- *We do not use a waste management company, but we pay a different service to pick up waste.*
- *Waste pick-up is part of my lease and I don't know what it costs.*
- *Waste pick-up is part of my lease and I know how much it costs.*
- *Other (please explain)*

Q7 Has your organization ever done a waste audit? *(Yes, No, I don't know)*

Q8 Prior to the pilot, did you already separate food (organic) waste from non-organic waste? *(Yes, No)*

If 'No',

- Q9 Of all waste (not including recycling) generated by your organization, on average what percentage would you estimate is food/organic waste? *(presented with 0-100 % sliding scale)*
- Q11 Prior to joining the pilot, **what were the main barriers** preventing you from separating organic waste collection from non-organic waste collection? Select all that apply.
- Q10 Prior to joining the pilot, approximately how much garbage (excluding recycling) did you put out for collection? (Examples: 0.5 garbage bags per day, 3 large bins weekly, 1 compactor monthly).
 - *Bin size (approximate bags or bin size from picture above)*
 - *# of bins (or garbage bags)*
 - *Frequency of collection (e.g. daily, weekly, twice per month)*
 - *Other disposal method(s) and size if applicable (e.g. 30 yd compactor, 8 yd bin, 5m cubed Molok bin)*
- Q11 Prior to joining the pilot, **what were the main barriers** preventing you from separating organic waste collection from non-organic waste collection? Select all that apply.

Dropdown list displayed: There are no barriers, Cost of collection, Odor of waste, Lack of space for bins, Risk of pests, Lack of transportation, Government or company regulations, Lack or resources for training staff, Lack of resources to create a Source

Separate Organics system, We haven't been presented the option of organic waste collection, Other (please explain).

If 'Yes',

- Q12 Before joining the pilot, how often was your organic waste collected? (*Times per week – 1, 2, 3, Other*)
- Q13 Please select from the list the type of organic waste bin(s) you used **prior to the pilot**. Refer to the pictures below to determine your bin size(s). (*Displays pictures of cart sizes with volume labels - Small, Medium, Large, Extra-Large, Other (please explain)*)
- Q14 Before the pilot, how many organic waste bins were picked up each time for collection? (*Please select from dropdown list*)
- Q15 Who collected your organic waste? (*Name(s) of waste collection service*)
- Q16 Approximately how much were you paying **per month** for organic waste collection service? (*open-ended*)
- Q17 If any, what are the main challenges you have previously (or currently) experienced when separating organic waste collection from non-organic waste collection? Select all that apply.

Dropdown list displayed: There are no barriers, Cost of collection, Odor of waste, Lack of space for bins, Risk of pests, Lack of transportation, Government or company regulations, Lack or resources for training staff, Lack of resources to create a Source Separate Organics system, We hadn't been presented the option of organic waste collection, Other (please explain).

Section 4 – Current Waste Practices 2

Q18 Before joining the pilot, how much were you paying **per month** for all waste collection services (including recycling)?

- *\$ Amount*
- *Included in rent*
- *Other (please explain)*

Q19 **If you did pay for waste collection**, please provide a waste management invoice from before joining the pilot by scanning and uploading the file below. No individual company information will be released. Information will be averaged for pilot evaluation purposes.

Q20 Did your organization already donate edible surplus food before joining the pilot? *(Yes/No)*

If 'Yes',

- Q21 What organizations do you donate surplus food to? *(open-ended)*
- Q22 Did your organization already use the Food Rescue app created by Second Harvest for food donations? *(No, Yes, I don't know, Other (please explain))*
- Q23 What type of edible food is donated? (E.g. Prepared meals, fresh produce, non-perishable foods). *(Open-ended)*

Q24 What are the main barriers to donating edible food your organization faces? Select all that apply.

Dropdown list displayed: There are no barriers, We generate no (or almost no) edible food for recovery, Limited fridge/freezer storage space, Do not know which organizations to partner with, Unsure about food donation criteria, Unsure about food safety laws, Time/resources to train staff, Time/resources to prep or set aside food for donation, Cost of takeaway containers, Lack of tax receipt for donation, Other (please explain).

Q25 Would your organization be interested in donating surplus food through our pilot program? *(We're already donating through the pilot, Yes, No, Unsure, Other)*

Q26 Are there any key questions you would like answered regarding criteria and/or process (e.g. timing) for edible surplus food donations? Please describe below.

Section 5 – Final Information

Q27 What are your motivations for participating in this pilot project? Please rate the importance of your motivations on a scale of 1-5 (1-Not important, 2-Slightly important, 3-Somewhat important, 4-Very important, 5-Extremely important).

(Options presented: Cost-saving (e.g. reduced garbage costs), Environmental (reduce greenhouse gas emissions), Social (food recovery), Staff engagement, Sustainability/ESG commitment, Stakeholder/Customer engagement and retention, Other (please explain))

Q22 Of all waste (not including recycling) generated by your organization, on average what percentage would you estimate is food/organic waste? *(Presented with 0-100% sliding scale)*

Q23 **Last question!** Is there any additional information or comments you would like to provide about your organization or participation in the pilot that we may have missed throughout the survey? *(open-ended)*

APPENDIX B - EDUCATIONAL GUIDELINES FOR PARTICIPANTS

Printed posters of source separation and organics collection guidelines distributed to pilot participants during on-boarding for staff training (e.g. posters often displayed in kitchens and other relevant waste workflow areas).

CIRCULAR FOOD RECOVERY AND WASTE DIVERSION PILOT

GREEN BIN: ACCEPTED



<p>FOOD</p> <ul style="list-style-type: none"> ✓ Fruits, vegetables (raw/cooked) ✓ Meats and fish (+ bones) ✓ Pasta, bread, cereals, rice ✓ Dairy products, eggs, shells ✓ Coffee/tea grounds <p>BIN LINER</p> <ul style="list-style-type: none"> ✓ Paper bags ✓ BPI Compostable Bags 	<p>PAPER</p> <ul style="list-style-type: none"> ✓ Coffee filters, muffin liners ✓ Butcher wrap and other bags (i.e., flour/sugar/potato) ✓ Plates, napkins, towels (not soiled with cleaning products) ✓ Pizza boxes (soiled with grease) ✓ Egg cartons <p>OTHER</p> <ul style="list-style-type: none"> ✓ Flowers, houseplants, soil ✓ Animal bedding (bird/hamster cages)
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COMPOSTABLE IN INDUSTRIAL FACILITIES
BPI

NOT ACCEPTED



<ul style="list-style-type: none"> ✗ Plastic bags ✗ Single-use take-out cups ✗ Single-use coffee pods ✗ Wine corks ✗ Glass, metal ✗ Meat/fish tray-liners 	<ul style="list-style-type: none"> ✗ Styrofoam™ trays ✗ Diapers, disinfectant/wet wipes, sanitary products ✗ Human waste (facial tissue, hair, etc.) ✗ Pet waste and kitty litter
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DIVERSION / COLLECTION INSTRUCTIONS

FOOD WASTE PILOT COLLECTION DAY: THURSDAY

- 1** Place the small green bin in an accessible place close to your food preparation station and/or where food waste is generated.

If you choose to line your green bin use paper or compostable liner bags certified with the Biodegradable Products Institute (BPI) logo.




USE PAPER OR BPI-CERTIFIED DO NOT USE PLASTIC BAGS
- 2** Place acceptable organic waste items in the green bin.

See accepted/not accepted list provided. Once green bin is full, fold or tie the liner bag and transfer contents to the larger green roll cart that is used for collections.

Every Thursday by 07:00 a.m. be sure that all green roll carts provided by Waste Management are outside and accessible for collection.
- 3**

 - Ensure that there is nothing that will block access to the carts for collection trucks.
 - Ensure the area is clear of all obstacles, snow, debris, and vehicles blocking access.



64 Gallon Cart

TIPS FOR SUCCESS!

- ✓ Only fill the green roll carts 3/4 full - otherwise they get too heavy to roll!
- ✓ Tie the liner bag when cart is full - this helps minimize odour and pests!
- ✓ Choose a 'Food Waste Champion' to take the lead during the pilot. This person can help keep food diversion on track and help other staff members keep engaged!

For collection inquiries contact Waste Management: [Live chat at WM.com](#); [email eca@WM.com](mailto:eca@WM.com); or call at 1-800-665-1898.

Guidelines for surplus food donation distributed to pilot participants during on-boarding for staff training. Guidelines provided by food rescue partner, Second Harvest, for use in participant information packages. Additional food rescue resources and training made available by Second Harvest can be found online in their '[Resource Library](#)'.

FOOD RESCUE INFORMATION



BEST BEFORE DATE *timetable*



Most people confuse the terms "expiry date" and "best before date." This confusion continues to be a major source of avoidable food waste in Canada. Only five foods should not be consumed past the expiry date: infant formula, meal replacements, formulated liquid diets (medical), very low-energy foods (medical), and nutritional supplements. Everything else is edible after the best before date has passed. Always use your senses to evaluate food quality if food is past the best before date.

While food may be edible past the best before date (BBD), non-profits cannot always use this type of food. Please try to donate food as fresh as possible.

FOOD CATEGORY	ITEMS	DONATE BY	CONSUME BY
Produce	Perishable fresh fruits and vegetables	No spoilage, blemishes, visible decay, mold, or bio-degrading smell	No spoilage, blemishes, visible decay, mold or bio-degrading smell
	Shelf stable canned fruits and vegetables, pickles, sauces, or pastes	6 months past BBD	1 year past BBD
Dairy	Perishable milk (including dairy alternatives), butter, yogurt, cheese, ice cream, sour cream	On or before BBD	2 weeks past BBD IF FROZEN 2-3 months past BBD
	Shelf stable evaporated, powdered, or milk alternatives	6 months past BBD	1 year past BBD
Meat & Fish Eggs & Soy Legumes / Nut Products	Shelf stable baby formula, supplemental beverages (i.e.: Ensure)	1 month prior to expiry date	Expiry date
	Raw meat and fish	Before BBD or FREEZE on or before BBD date to extend shelf life Sushi cannot be rescued	BBD or IF FROZEN : Beef, lamb, pork, whole poultry: 1 year past BBD Poultry pieces: 6 months past BBD Ground meat: 2-3 months past BBD Fish: 2-6 months past BBD
	Cooked luncheon meats, tofu, eggs	On or before BBD	1 week past BBD
	Shelf stable canned meat, fish, beans, chickpeas, nuts, nut butter, peanut butter, seeds, spam	6 months past BBD	1 year past BBD

FOOD RESCUE INFORMATION



BEST BEFORE DATE *timetable*



FOOD CATEGORY	ITEMS	DONATE BY	CONSUME BY
Bread / Crackers & Cereal Grain	Perishable bread, buns, bagels, pitas, tortillas, flat bread, na'an, matzah	No spoilage, blemishes, visible decay, mold, or bio-degrading smell	No spoilage, blemishes, visible decay, mold or bio-degrading smell
	Dry, shelf stable cereal, crackers, flour, oats, pasta, rice, quinoa, meals or sides, energy bars	6 months past BBD	1 year past BBD
Baked Goods / Snacks Desserts	Meal replacement or supplement bars	3 weeks prior to expiry date	Expiry date
	Perishable cakes, cookies, pies, danishes, chocolate, pudding	Before BBD or FREEZE on or before BBD date to extend shelf life	72 hours past BBD IF FROZEN 1 month past BBD
Prepared	Shelf stable cookies, chips, popcorn, bagged snacks, snack cakes, granola bars	6 months past BBD	1 year past BBD
	Pre-cooked or ready-to-eat meals; deli salads, pizza, sandwiches	Immediately or FREEZE to extend shelf life. Must not have been "plated", exposed to public touch, or temperature-abused	72 hours past BBD IF FROZEN 1 month past BBD
	Frozen dinners, microwavable meals	3 months past BBD	1 year past BBD
Shelf stable canned soups, stews, meals	6 months past BBD		
Condiments	Shelf stable baby food	1 month prior to BBD	6 months past BBD
	Frozen sauces, gravies	3 months past BBD	
Beverages	Shelf stable mustard, relish, ketchup, jam, margarine, mayonnaise, oil, salad dressing, vinegars, spices, sauces, toppings	6 months past BBD	1 year past BBD
	Juice, water, coconut water	30 days past BBD	3-6 months past BBD
Other drinks; coffee, tea, sport or energy drinks, crystals			

SECOND HARVEST IS CANADA'S LARGEST FOOD RESCUE ORGANIZATION
SOURCES: CANADIAN FOOD INSPECTION AGENCY (CFIA) AND TORONTO PUBLIC HEALTH | VERSION: 2.2 LAST UPDATED MAY 19, 2021

APPENDIX C – RECRUITMENT INFORMATION HANDOUT

Sample informational handout used during recruitment to provide overview of pilot project and how IC&I establishments can get involved. Example below used during Phase 4 of pilot project. Handout has since been updated for current phase. Provided in both pdf and print-form.




We invite you to join neighbouring businesses to participate in Guelph-Wellington's

COLLECTIVE IC&I FOOD RESCUE AND WASTE DIVERSION PILOT

We are seeking to make organics collection more affordable for local businesses & help community members access healthy food

HOW DOES THE PILOT WORK?

If you have food that is no longer sellable, but still edible, we can save it from the waste stream – free of charge! The SEED team coordinates a network of dedicated volunteers and agencies to collect surplus food from your business and delivers it to community serving partners to help feed local families in need of food.

If you have organic waste that needs to be composted, we provide once-per-week collection of your organics - as a Collective, our goal is to keep the price as low as possible. We consolidate collections among as many neighbouring businesses as possible to negotiate better pricing for participants. The collection service is similar to residential green bin collection. Efficient, consolidated collection lowers the cost of diverting food waste to compost.

BENEFITS OF JOINING THE PILOT:

100% free collection of surplus food donations

- We collect your surplus edible food for distribution to local community service agencies.
- Your business/organization is protected from liability through Canada's food donation law.

Once-per-week organics waste collection

- Your logistics and coordination are taken care of by our team! All you do is set out the bins on the designated day for collection.

Free indoor & outdoor organics bins

- We provide indoor and outdoor organics bins, sized to your business's needs.
- Compostable liner bags are replaced each collection to keep your outdoor bins clean.

Free staff training

- Guidelines & educational materials are provided for easy organics diversion.

Free marketing for your business - share your impact

- If requested, we provide optional materials for you to display in-store (and digitally) to show customers how you're diverting food waste.

PILOT HOSTS





PILOT PARTNERS











In partnership with Our Food Future, this pilot is helping build Canada's first modern circular food economy in Guelph-Wellington.

WHY DONATE YOUR SURPLUS FOOD?

Over 50% of Canada's food produced is wasted. Meanwhile, 1-in-10 families in Guelph-Wellington struggle to put food on the table. Donating surplus edible food through the pilot helps make healthy food available to community members experiencing food insecurity.

WHY IS FOOD WASTE A PROBLEM?

Guelph-Wellington's businesses & institutions generate over 16,000 tonnes of food waste yearly. Much of this ends up in landfill and creates harmful greenhouse gases. Diverting food waste from landfill reduces emissions & creates compost that improves soil health & promotes regenerative food systems.

WHO ARE WE?

We are non-profit organizations working to reduce the impacts of food waste on the planet and increase access to healthy food in our communities.

Circular Innovation Council is a national organization with over 40 years of experience delivering programs that educate & empower Canadians to take action on the circular economy and its environmental, economic and social benefits. Through research, policy, and programs we accelerate Canada's transition toward a circular economy by putting concepts into action.

The SEED is a project of the Guelph Community Health Centre with the mission of ensuring everyone in our community has enough food to eat. The SEED uses a social enterprise model to run this pilot, alongside other programs, by using business principles to achieve our social missions. We collect, store, and distribute food to neighbourhood food pantries, schools, and food access services in Guelph-Wellington. We also operate a sliding-scale online grocery store where customers choose their food, receive up to 33% off the cost of food, select free food items, and have it delivered to their doorstep. We work with local producers, suppliers, organizations and businesses to rescue edible food before it enters the waste stream & redistribute it back to community members through our innovative & socially impactful programs. [Learn more about our programs at TheSeedGuelph.ca](http://TheSeedGuelph.ca)

We have teamed up to offer this pilot program as a dual-purpose solution to businesses and organizations, ensuring no food becomes waste. The goal of this project is to find solutions for every business & organization - no matter the size and unique circumstances.

Together, we imagine a food system where everyone can access healthy food, no food is wasted, and communities work together to tackle our most complex food challenges.

Joining is easy!
Reach out to our team to get started today.

Katie Motta, Pilot Project Manager
Katie@CircularInnovation.ca

Maggie Bain, Pilot Operations Lead
MBain@GuelphCHC.ca



Or fill out our Enquiry Form and we'll be in touch shortly!

Learn more at: CircularInnovation.ca/GuelphWellingtonPilot

APPENDIX D - FULL LIST OF PILOT PARTICIPANTS

Below is our full list of IC&I establishments (or brands with multiple locations) that have participated in the Guelph-Wellington pilot program between November 2021 and October 2023. This list is comprehensive and includes participants who are currently active and participants that have withdrawn. *Note: For data privacy purposes, participating businesses that are the only participant in their IC&I sub-sector will not be named and have been given an anonymous identifier.*

FreshCo – Guelph and Fergus	State and Main
Mount Forest Foodland	The Keg
Arthur Foodland	Montana's
Park Eatery	Harvey's
Wellington County Administration	Swiss Chalet
Skyline Living – Head Office and Multi-Residential Locations	East Side Mario's
Delta Hotels and Conference Center	Hampton Inn & Suites
Borealis Grille Guelph	Italian Canadian Club
Choice REIT Plazas	Stonegate Plaza
Non-Food Manufacturer 1	OPP Station Aboyne
Groves Memorial Hospital	Breadalbane Inn (Egger Hospitality)
Grand River Agricultural Society -Event Centre & Raceway	Community Resource Centre Child Care
Wellington Terrace	Fraberts Fresh Food
Bella Roma Foods	Giant Tiger
Nutrasource	Bar Burrito
Einstein's Cafe	County Wellington Housing Services
Minnow Environmental Ltd	Longo's
Wellington Place Child Care and Learning Centre	Cutten Fields
Post-Secondary Institution 1	Polar Real Tropical Fruit Inc.

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