Addressing Single-use Packaging in The Blue Mountains

Laura Eagan - 20924274

School of Environment, Enterprise and Development, University of Waterloo

ENBUS 690A/B: Enterprise Sustainability Project

Professor Murray

June 30 2024

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Single-use packaging is produced and consumed in high quantities and at a high rate contributing to global sustainability issues such as resource depletion, waste generation, and pollution. The current focus has been on plastic packaging since plastic pollution has been identified as a global environmental crisis, with only 20% of plastic packaging being recycled in Canada (Canada Plastic Pact, 2023b) and foodservice packaging accounting for a significant portion of pollution found in beach clean-up and aquatic environments (Baxter et al., 2022; Morales-Caselles et al., 2021).

To address these concerns in their region, the Town of The Blue Mountains (TBM) is interested in developing a strategy for single-use packaging that is specific to their municipality to support their overall activity on advancing the circular economy. The scope of this study is to conduct a region-specific analysis on single-use foodservice packaging by identifying items to target for waste reduction and exploring barriers and opportunities to reduce consumption and waste of packaging.

A public space waste audit and survey to local foodservice businesses was conducted to understand the current situation on single-use packaging use and waste in the region. The results indicated a shift away from single-use plastic packaging and towards alternatives such as paper and plant-fibre packaging with paper cups and take-out containers showing up in the highest quantities in the waste stream and used by businesses. Paper take-out containers are often soiled which requires composting these products for waste diversion, however, the lack of public composting bins in the region is contributing to these products ending up in the waste stream.

Despite the shift away from single-use plastic packaging to alternatives, there are still persistent single-use plastic items that are not recyclable being used in the region. However, the degree to which these products are contributing to waste in the region is unknown.

Additional concerns identified in the survey showed a wide range of single-use packaging being used which includes compostable plastics, which are considered a contaminate to both the recycling and composting streams. Look-alike products which appear similar but have different end of life pathways, are also present and these include plastic vs compostable plastic and poly-lined paper take-out vs compostable take-out containers.

The businesses within the region are interested in reducing consumption and waste of single-use packaging in the next 1-3 years. The key barriers faced when shifting to more sustainable packaging is higher costs, difficulty sourcing, and lack of knowledge on alternatives. Of the measures by the municipality that would support local foodservice businesses, business resource guides, zero waste education and funding for zero waste projects ranked the highest with limited interest in reuse systems.

TBM can reduce the consumption and waste of single-use packaging and ensure the transition from single-use plastics does not cause other unintended consequences for the waste management systems through the recommendations relating to education, infrastructure, economic incentives, and municipal policies.

Recommendations

Education

- Updating waste wizard with guidance on waste disposal for compostable plastics, cup sleeves and stir sticks
- Developing a business resource guide to inform businesses on which products are preferred in the town

Infrastructure

- Add compost bins to public space receptacles to divert paper take-out containers from the waste stream
- Improve and standardize receptacle signage across the municipality

Short Term

Economic Incentives

- Funding for Zero waste projects, which may be leveraged to encourage dine-in reuse systems

Municipal Policies

- Update procurement and operations policies relating to town buildings and events to preferred single-use packaging types and resuse systems

Long Term

Education and infrastructure improvements can help reduce consumption and increase the diversion of single-use packaging from landfill and decrease contamination in the recycling and composting stream. Updating municipal policies to show leadership, providing economic incentives, and supporting the future of reuse systems can support the advancement of sustainable foodservice packaging over the long-term. Through taking meaningful action on single-use packaging, TBM can play a critical role in accelerating the transition to a circular economy in Canada.

1 INTRODUCTION

1.1 THE PROBLEM OF SINGLE-USE PACKAGING

Single-use foodservice packaging is produced and consumed in high quantities and at a high rate contributing to global sustainability issues such as resource depletion, waste generation, and pollution. To target these issues, the United Nations 12th sustainable development goal is focused on sustainable consumption and production which includes targets to improve efficient use of natural resources, and reduce waste generation through prevention, reduction, recycling, and reuse (United Nations, 2015). Single-use foodservice packaging is designed for serving or transporting food and beverages that are ready to be consumed and are disposed of after a one use. Single-use foodservice packaging is comprised of various materials including plastic, paper, glass, plant fiber and aluminum which consume natural resources in production and whose single-use nature contribute to waste generation and pollution.

The current focus is on plastic packaging since plastic pollution has been identified as a global environmental crisis, with the United Nations Environment Programme calling for urgent and collective action (United Nations Environment Programme (UNEP), 2021). In Canada it is estimated that 1% of plastic waste enters the environment and has become ubiquitous in the natural environment (Environment and Climate Change Canada & Health Canada, 2020). Plastic packaging contributes to a disproportionate amount of plastic waste (Environment and Climate Change Canada, 2019), with foodservice packaging accounting for a significant portion of pollution found in beach clean-up and aquatic environments (Baxter et al., 2022; Morales-Caselles et al., 2021). In Canada, only an estimated 20% of plastic packaging was recycled in 2022 (Canada Plastic Pact, 2023b).

To address these concerns the Government of Canada issued the Single-use Plastic Prohibition Regulation which banned the manufacture, import, sale and eventually export of checkout bags, cutlery, foodservice ware made from problematic plastics, ring carriers, stir sticks and straws (Government of Canada, 2022). However, with the reduction of an estimated 1.5 million tonnes of plastics from the waste stream there is also a potential increase of 2.9 million tonnes of waste from other materials from substituting these products (Environment and Climate Change Canada, 2022).

With the shift away from plastic packaging and towards more environmentally friendlier alternatives it is important to ensure that these products do not cause unintended consequences such as waste and pollution from other materials and shifting environmental burdens across product life cycles. Plastic products in particular are a concern, but the United Nations Environment Programme (UNEP) states that products intended for a single-use are a problem regardless of their material and encourages replacing these products with reusable alternatives (UNEP, 2021). The local context in which single-use products are produced and consumed is critical for understanding appropriate products and measures and should include aspects such as waste management systems and infrastructure (UNEP, 2021).

Municipalities play an important role in single-use packaging consumption and waste as they are responsible for bylaws, solid waste management and other local services that affect end of life

pathways, community partnerships, local economy, and business practices. The scope of this study is to conduct a region-specific analysis on single-use foodservice packaging by identifying items to target for waste reduction and exploring barriers and opportunities to reduce consumption and waste of packaging to inform the development of a strategy for the Town of the Blue Mountains. Through understanding the local context, what community wide and municipal measures would be most impactful and feasible, this report can be used as an example for local governments, foodservice businesses and community organizations to advance zero waste initiatives for foodservice packaging.

1.2 STUDY REGION

The Town of The Blue Mountains (TBM) is a municipality within Ontario located on the shores of Georgian Bay. With a vision to be recognized as stewards of a healthy environment and as champions of well-being, sociocultural diversity, innovation, and regeneration TBM strives to become the best place to live, work, and play for future generations (Town of the Blue Mountains, 2022). One aspect of this vision relates to how materials are used and managed within the community. As part of Bold Action 14 of the Integrated Community Sustainability Plan (Town of the Blue Mountains, 2022), TBM is developing a circular economy strategy which includes writing a recommendations report and expanding circular economy programming.

As part of their circular economy activity, the municipality is interested in addressing the environmental impacts of single-use packaging and developing a strategy specific to TBM to include in their recommendations report. A primary concern of TBM is properly assessing the environmental impact and feasibility of alternative products and systems to support local businesses to target consistency, circularity and waste diversion of packaging used in the region. The strategy must reflect the regional context such as what types of single-use packaging is being used in the community, local business needs, local waste and recycling systems, among other factors. A successful outcome for the TBM would be to meaningfully reduce environmental impacts of single-use packaging without negatively impacting the local economy or social fabric.

TBM includes several small towns, agricultural and rural areas, along with a vibrant tourism industry which provides a unique set of characteristics to identify measures in reducing consumption and waste of single-use packaging. Thornbury, Clarksburg, and Craigleith are among the towns in the region with popular tourist hubs in Blue Mountain Village which is the location of the Blue Mountain Resort. The tourism industry includes recreational activities such as downhill skiing and snowboarding, hiking, cycling, fishing, and water sports (The Blue Mountains, 2023). There are more than 30 foodservice establishments located within TBM, the majority of which are located in Blue Mountain Village, and in the downtown area of Thornbury.

The fragmented waste management systems in the region adds a challenge in understanding the current situation and assessing opportunities for reducing single-use packaging waste in TBM. The municipality of TBM is responsible for collection and disposal of residential and public spaces with limited collection for the industrial, commercial, and institutional (IC&I) sectors. Circular Materials, a producer responsibility organization (PRO) is responsible for recycling collection, primarily for residential properties. The Blue Box Transition, which is the shift to a 100% extended producer responsibility system for paper, packaging, products, and single-use items, occurred in

TBM in October of 2023 (Province of Ontario, 2021). The Blue Box Transition also expanded collection to include multi-unit residential buildings, schools, some public spaces and beverage containers in the IC&I sector (Province of Ontario, 2021), however this has not been completely implemented yet in the town yet (Jeffery Fletcher, Personal communication, February 15, 2024).

The IC&I sector, which includes foodservice businesses, uses both TBM waste management services and private waste management services, the breakdown of which was not included as part of this study. TBM offers waste management services to this sector for waste, recycling and organics, however waste is primarily collected at these locations with a fixed quantity collected and the ability to purchase additional bags (Jeffery Fletcher, Personal communication, February 15, 2024). Recycling collection by TBM for the IC&I sector is limited with the green bin program operating on the pilot scale (Jeffery Fletcher, Personal communication, February 15, 2024). The businesses in the tourist regions such as Blue Mountain Village and Blue Mountain Resort operate with private collection of waste, recycling and organics.

The total amount of waste generated from single-use food service packaging in the area is unknown. The residential waste diversion rate for TBM was 57% in 2022, with a total of 3,809 tonnes of materials (e.g. wood waste, compostable materials, concrete/asphalt, general recyclables) diverted across TBM managed systems such as curbside residential and multi-unit collection, and a public accessed waste segregation and recycling area (WSP Canada Inc., 2023). However, there is no breakdown of material classes with regards to packaging within the residential and multi-unit waste diversion and waste diversion figures. Circular Materials reports on the total materials recovered through the Blue Box Program, however 2023 data is not available for TBM as of the completion of this study.

1.3 Regional Activity Related to Single-use Packaging

The geographical and political characteristics of the region that TBM resides in will impact the extent of the problem and the nature of solutions. The activity taking place at a global, federal, provincial and county level are important factors in single-use packaging consumption and waste. Much of the government activity that addresses foodservice single-use packaging in Canada is focused on single-use plastics and broad zero waste strategies, with some activity at the local level targeting single-use packaging and items.

On the global level, a 2022 resolution was adopted at the UN Environment Assembly to develop an international legally binding instrument on plastic pollution, currently the comprehensive approach to address the full life cycle of plastic is being negotiated (UN Environment Programme, 2024). The resolution stressed the need for global coordination, cooperation, and governance to take immediate action towards the long-term elimination of plastic pollution (UN Environment Assembly, 2022).

The Government of Canada is taking broad measures to reduce plastic waste and pollution as part of their Zero Plastic Waste Agenda (Environment and Climate Change Canada, 2023c). Canada has the target of 100% reusable and recyclable plastics by 2030 and in collaboration with the Canadian Council of Ministers of the Environment (CCME), published the Canada-wide Strategy on Zero Plastic Waste that provided a framework for action on plastics in Canada (Canadian Council of Ministers of the Environment, 2018).

In addition to the prohibition on single use plastic items, the federal government initiated activity on a national plastic registry, recycled content mandates and recyclability and composability labeling. The plastic registry will require producers to report on plastics placed on the Canadian market which will improve data quality on both products on the market and recycling rates for plastics (Environment and Climate Change Canada, 2023a). The regulations on recycled content will mandate minimum levels of recycled post-consumer plastics in packaging to stimulate the demand for recycled materials (Environment and Climate Change Canada, 2023b). The regulations on recyclability and compostability labeling rules require accurate information to be communicated on recyclability and compostability of packaging which helps consumer understand product disposal and incentivizes design for circularity (Environment and Climate Change Canada, 2023b). The regulations on the plastic registry, recycled content, and recyclability and compostability labeling is expected to be published in 2024.

At the provincial level, as part of Made-in-Ontario Environment Plan the Province of Ontario has included broad measures to reduce the amount of waste that goes to landfill (Province of Ontario, 2022). Their activities include modernizing the Blue Box program, and consultations, working groups and regulations on things such as electronics, hazardous waste and food and organic waste.

TBM resides within Grey County, the county is responsible for upper tier services including community services, county roads, paramedic services, emergency preparedness and economic development (Grey County, n.d.). Grey County has not disclosed any strategies specific to the circular economy or single-use packaging but has in collaboration with the lower tier municipalities published a Climate Change Action Plan (CCAP) in 2022 that set a target of 10% by 2030 and 30% by 2050 of all solid waste to be diverted from landfill (Grey County, 2022). To achieve this target Grey County will collaborate with member municipalities and businesses on harmonization of waste collection streams, advancement of organic waste diversion, support and promote waste diversion initiatives, and recycling and re-use pathways (Grey County, 2022). Today, TBM participates in a Grey County waste working group to support collaborative solutions to reducing waste within the region (Jeffery Fletcher, Personal communication, February 15, 2024).

TBM currently has several strategies targeting waste diversion and sustainability within their community. Materials they segregate from the waste for diversion at the landfill and recycling depot includes Styrofoam, scrap metal, tires, wood waste as well as a drop-off and sale of items destined for landfill that are sold at a discount such as furniture items (Town of the Blue Mountains, 2022; WSP Canada Inc., 2023). A sustainability fund is available for non-profit groups to undertake environmental and sustainability projects (Town of the Blue Mountains, n.d.-b). To collaborate and facilitate networking to advance environmental sustainability TBM has set targets to facilitate a Green Economy Taskforce within the area (Town of the Blue Mountains, 2022). In ~2005 TBM prohibited the use of plastic water bottles in facilities with access to town water, and more recently a policy targeting single-use packaging was approved by the Town Council to phase out the distribution and sale of single-use plastic straws, bags, stir sticks and bottles at Town-owned facilities and events (Town of the Blue Mountains, 2021). With the Blue Box Transition, recent federal single-use plastic prohibitions, and unique characteristics, TBM is in a position to benefit from a tailor-made strategy that supports their circular economy vision to reduce the environmental impact of single-use packaging in their community.

2 LITERATURE REVIEW

2.1 FRAMEWORK, ACTION, AND BARRIERS OF LOCAL GOVERNMENT

2.1.1 Frameworks for Action

With the evolution of actions across all government levels supporting sustainable development goals there has been a recent focus on circular economy and zero waste strategies by local governments. While single-use packaging is just one aspect of resource consumption and waste to target, it ties in with the broader circular economy push in Canada and globally. Canada's unique geography and population distribution highlights the importance of regional circular economy strategies to support the national circular economy transition (Council of Canadian Academies, 2021).

In Canada, the Federation of Canadian Municipalities (FCM) has published a guide to catalyzing a circular economy in communities which presents best practices, processes and tools to support the municipalities (Federation of Canadian Municipalities, n.d.). The Circular Cities and Regions Initiative (CCRI) is another resource providing knowledge to accelerate the circular economy for local governments and was developed through a collaboration of National Zero Waste Council, the Federation of Canadian Municipalities, the Recycling Council of Alberta, and RECYC-QUÉBEC (Circular Cities & Regions Initiative, 2024). The member activity in CCRI workshops highlighted that each community had its own challenges, priorities and individual context that steered the circular economy activity (Circular Cities and Regions Initiative, 2023).

Steps for developing a circular economy strategy have also been developed by the European Investment Bank (EIB) to support the advancement of circular economy strategies for local governments in Europe (European Investment Bank, 2022). The frameworks presented by FCM and EIB are not identical, but both include defining & engaging stakeholders, assessing current situation, prioritizing focus area, defining goals, planning, defining roles & responsibilities, as well as monitoring and evaluating progress (European Investment Bank, 2022; Federation of Canadian Municipalities, n.d.).

There are limited frameworks in academic literature specific to municipal action on single-use plastics or single-use packaging. Only one academic paper applied a framework to cooperatively develop a strategy on single-use plastics on a touristic island which used a system based participatory approach with local stakeholders (Guittard et al., 2023). The steps included building knowledge to understand the system, stakeholder engagement and co-designing a roadmap with stakeholders and municipality which resulted in a set of actions to be implemented by municipality, hospitality industry and civil society (Guittard et al., 2023). One framework was presented for local governments circular economy activity and applied a theoretical framework for steering circular economy implementation which worked with stakeholders to identify challenges for execution of activity and drivers for steering solutions (Dagilienė et al., 2021).

Themes present in both grey literature and academic literature for local government circular economy strategies include encompassing the specific strengths, context and goals of the region along with strong engagement with stakeholders to form a plan based on a shared vision. The processes suggested for developing a comprehensive and custom strategy on circular economy are likely time consuming due to the level of stakeholder engagement recommended to develop

and implement a shared vision. While the process for developing circular economy and single-use plastic strategies for local governments can be applied to single-use packaging, there is no literature that explores single-use packaging specifically.

The Council of Canadian Academies believes that municipalities play a critical role in accelerating the transition towards the circular economy (Council of Canadian Academies, 2021). When it comes to single-use packaging, the waste management services that municipalities provide can affect the collection and end of life for these products. More broadly, the role of local governments in supporting the circular economy and zero waste activity is to incentivize sustainable practices, disincentivize unsustainable practices (Diprose et al., 2023), act as facilitator for coordinated efforts and stakeholder engagement (City of Copenhagen, 2024; European Investment Bank, 2022; Federation of Canadian Municipalities, n.d.), and to lead by example to build trust in policy-societal relationship (Guittard et al., 2023). Additionally, local actions have the potential to encourage large scale change as seen with the widespread adoption of plastic bag bans (Varkey et al., 2021).

2.1.2 Policy Approaches Targeting Single-use Packaging

Different policy approaches exist for governments at all levels to address single-use packaging, but the focus has been on reducing waste and pollution from plastic specifically and not single-use packaging. Blumhardt grouped different policy approaches for shifting to circular business models for plastic packaging into three categories: persuasive, legislative, and enabling measures (Blumhardt, 2023).

Persuasive measures are voluntary and include education campaigns, research, voluntary agreements, commitments, support networks and funding (Blumhardt, 2023; Cornago et al., 2021). While voluntary measures may result in less push-back from industry, the effectiveness of voluntary measures remains to be determined and are unlikely to generate meaningful shifts in consumption and waste (Blumhardt, 2023; Cornago et al., 2021).

Legislative measures include market based and regulatory approaches. Regulatory measures institute legal limits or requirement of sustainable practices and in the context of single-use packaging appear as bans or specify a material to be used (e.g. recycled materials) (Cornago et al., 2021). Market Based instruments are economic incentives to reduce pollution and waste through production adaptation and behavioural change (Cornago et al., 2021). Examples include taxes and mandatory charges on packaging items which could be applied to upstream materials such as polymers, products at point of sale, or downstream weight-based waste fees (Cornago et al., 2021). The context, complexity, enforcement, monitoring, and evaluation of legislative measures are important factors for the effectiveness of the policy, in addition comprehensive policies are important to minimize burden shifting (Cornago et al., 2021).

Enabling Measures are complementary action that seek to build the surrounding systems conditions for sustainable solutions and include standards development, and investment in shared infrastructure (Blumhardt, 2023). However, enabling measures on their own are not effective and should be used in conjunction with persuasive or legislative measures (Blumhardt, 2023).

2.1.3 Strategies of Local Governments

Circular economy activity by local governments has been observed to focus on waste management and within the bounds of a legal framework (Dagilienė et al., 2021), but local governments can

implement persuasive and enabling circular economy activity beyond legislative measures. Dagilienė proposed an expanded set of solutions at the local level which she categorized into education, shared vision, reflexive governance, regulation, and negotiations in networks (Dagilienė et al., 2021). Measures beyond legislation include sharing initiatives, green public procurement, supplementation of municipal environmental policies and plans, enhancing signage at collection points (Dagilienė et al., 2021), facilitating pilot programs (Guittard et al., 2023), developing best practice guides and training for businesses, and recognizing and rewarding sustainable business practices (Guittard et al., 2023; Varkey et al., 2021).

Several municipalities in Canada and Europe have published strategies or actions on single-use packaging, plastics or items and include Toronto, Hamilton, Vancouver, Victoria, Banff, Halifax, Prague, Brussels, and Copenhagen (City of Brussels, n.d.; City of Copenhagen, 2024; City of Hamilton, 2021; City of Prague, n.d.; City of Toronto, 2024a; City of Vancouver, 2018; City of Victoria, n.d.; Halifax Regional Municipality, 2018; Town of Banff, n.d.).

Table 1 overviews the various actions planned or implemented by the cities. Among these, strategies ranged from a ban on single-use plastics to a comprehensive multifaceted zero waste strategy. Most of the plans by local governments targeted more than just single-use plastics and included a single-use item reduction strategy. Although many cities have published strategies or actions on single-use packaging and items, in many regions it is unclear on what actions have been implemented or have proven effective. Notably, Vancouver repealed their single-use cup fee and requirement for businesses to accept customers reusable cups in 2023 after questions arose on the effectiveness of these measures (The Canadian Press, 2023).

Table 1: Overview of municipal measures to reduce single-use plastic, packaging and items. Red = repealed.

Municipal Measures	**Vancouver**	**Victoria**	**Toronto**	**Halifax**	**Banff**	**Hamilton**	**Copenhagen**	**Brussels**	**Prague**
Prohibitions on certain products	x			x	x			x	
Fee on single-use cups	X								
Businesses to only provide single-use items by request only		x	x		x				
Businesses must accept customers reusable cups or containers	X		x		x				
Businesses must provide reusable food ware for dine-in services		x			x				
Business resources and guides	x	x	x		x	x	x		
Zero wase education campaigns				x	x	x	x	x	x
Facilitating zero waste/circular economy networks							x		x
Encouraging and providing recognition for voluntary reduction measures			x	x					
Procurement and operation policies targeting reduction on city property and at city events				x		x		x	x
City infrastructure improvements (e.g. water fountains)						x			

There are many barriers to implementing circular economy activity in communities, human resources and lack of expertise to support sustainability initiatives is a key constraint, especially for smaller governments (Dagilienė et al., 2021). Comprehensive circular economy or zero waste strategies have been observed in larger cities such as Copenhagen (City of Copenhagen, 2024), but may not be feasible in rural communities due to resource limitations. However, partnerships can help bridge resource gaps (Guittard et al., 2023). Enforcement of regulatory measures may also face challenges due to resource constraints, impacting the effectiveness of these policies (Guittard et al., 2023). Residents' reluctance or lack of knowledge on sorting recyclables and waste can also present a barrier to increasing waste diversion (Dagilienė et al., 2021). Weak cooperation with local stakeholders, such as businesses, can limit strategies involving the broader community (Dagilienė et al., 2021). This challenge can be addressed, in part, by incorporating funding opportunities since financial incentives help bring people to the table (Federation of Canadian Municipalities, n.d.).

2.2 Foodservice Businesses

Foodservice businesses play an important role in reducing waste from single-use packaging through their purchasing decisions and business practices related to take-out packaging. Foodservice businesses can reduce their single-use packaging and items by taking inventory of the items used in their establishment, reviewing and working with waste management services to identify opportunities, setting goals for waste reduction, and measuring progress (Restaurants Canada, n.d.). Business associations can be leveraged to help facilitate the integration of new sustainable practices within many businesses (Guittard et al., 2023), and can act as a stakeholder on behalf of members during municipal engagement processes.

There are several challenges identified by foodservice businesses in reducing single-use plastics, but no studies that looked at single-use packaging beyond plastics. The key barriers identified include the high cost of alternative products, difficulty sourcing alternative products, and lack of consumer demand (Guittard et al., 2023; Varkey et al., 2021). Businesses have also indicated that they were confused about choosing alternatives and lack knowledge in this area (Varkey et al., 2021). The high cost of alternatives may drive consumers away, a survey on single-use plastic packaging found that Canadian consumers are eager to reduce single-use plastic food packaging but less willing to pay a premium for alternatives (Walker et al., 2021). Two important factors for shifting consumers intention towards avoiding single-use plastic were positive attitudes towards alternatives and societal norms with respect to single-use plastics (Herweyers et al., 2023).

2.3 Identifying Problematic Single-use Packaging

Identifying items to target for waste and pollution reduction has been done through assessing items found in litter clean-up activity, brand audits (Baxter et al., 2022), and those that are found in the waste stream (Province of Ontario, 2008). The federal government evaluated plastic items to target for policy measures by identifying those that are environmentally problematic due to their pollution and value-recovery problematic through their incompatibility with the recycling systems (Environment and Climate Change Canada, 2021). In beach clean up activity along the coast of Georgian Bay, it was identified that cigarette butts, paper/carboard, plastic fragments, plastic film and bottle caps were the most commonly collected items (Georgian Bay Forever, 2023). In TBM

specifically, fishing weights were also commonly found due to the location of collection in fishing hotspots (Georgian Bay Forever, 2023).

2.4 Measures to Reduce Consumption and Waste of Single-use Packaging

2.4.1 Scale of the challenge

The challenges associated with reducing single-use packaging are complex and require cooperation and action from governments, businesses, NGO's and other organizations to target the underlying drivers and dependence on disposable packaging. The complexity of the challenge also means that acting in one area might lead to negative consequences in other parts of the system. In an analysis of single-use plastic packaging policies on German household waste management, trade-offs between recycling rate and waste reduction were identified (Schmidt & Laner, 2021). The increase in recycling rate from bans, shifting to alternatives to plastic, and source separation led to increases in packaging waste from other material products (Schmidt & Laner, 2021). The multidimensional effects of strategies to reduce single-use plastic packaging highlight the need to understand systemic effects to identify optimal solutions (Schmidt & Laner, 2021).

2.4.2 Frameworks and Guiding Principles

The circular economy is a guiding principle for reducing consumption and waste and is defined as a system where materials never become waste and nature is regenerated (Ellen MacArthur Foundation, n.d.-b). It follows the three principles of eliminating waste and pollution, circulating products and materials at their highest value and regenerating nature (Ellen MacArthur Foundation, n.d.-b).

Zero Waste hierarchy is another framework to guide solutions for reducing single-use packaging through the conservation of all resources by means of responsible production, consumption, reuse and recovery (Zero Waste International Alliance, 2022). The hierarchy currently promoted by the Zero Waste International Alliance is shown in Figure 1, and prioritizes rethinking/redesigning, reducing and reuse over recycling and material recovery. Environment and Climate Change Canada use a similar waste management hierarchy to steer Canada's policy approaches (Environment and Climate Change Canada, 2021).

*Figure 1: Zero Waste Hierarchy. (*Add in reference to image based on APA guides).*

In evaluating and developing policies to reduce single-use plastics and packaging the United Nations Environment Programme (UNEP) calls for a life cycle approach to understanding the environmental impact of the possible solutions (UNEP, 2021). The UNEP provides guidance on incorporating a life cycle approach for policy makers that includes use of life cycle assessments (LCA) and robust data to understand the life cycle impacts, end of life scenarios, regional context,

environmental trade-offs, future technologies potential and recommends prioritizing reuse (UNEP, 2021).

2.4.3 Reduction

Based on the zero-waste hierarchy, steps that reduce waste through prevention are to be prioritized (Zero Waste International Alliance, 2022). Targeting consumption practices as appose to waste generation also allows for the avoidance of resources and upstream production impacts. Examples of ways to prevent the waste from single-use packaging in foodservice businesses include removing unnecessary items (Do et al., 2021; Restaurants Canada, n.d.), providing items on request instead of automatically offering (Restaurants Canada, n.d.), and choosing light-weight packaging to reduce material use. While prevention measures are prioritized, there are practical limits to these measures due to the critical function of single-use packaging in foodservice take-away.

Targeting the systemic problem of food packaging is a consideration, Charkori recommends a relocalization of food systems to target an underlying driver of single-use food packaging growth (Chakori et al., 2021). While this could be impactful for reducing single-use packaging in the supply chain it may have limited impact on the use of take-out packaging which is still required to serve the food at point of sale.

2.4.4 Reuse

Supporting the zero waste and circular economy principles, expert bodies and government agencies are all calling for the prioritization of reduction and reuse systems to circulate materials at the highest level possible (Ellen MacArthur Foundation, n.d.-a, 2019; Environment and Climate Change Canada, 2021; UNEP, 2021; Zero Waste International Alliance, 2022). Reuse systems facilitate the use and circulation of reusable packaging and food ware for the same purpose for which it was created (Moss et al., 2022). The core advantage of these systems is to allow the circulation of the packaging itself, and avoid the excess processing and manufacturing steps to clean and form the recycled materials back into the original or new packaging. Some of the potential benefits to businesses include increased brand loyalty, optimization in operations when shared across wider networks, and improved user experience as the costs of high-end products are divided over multiple uses (Ellen MacArthur Foundation, 2019). However, there is a lack of clarity on the net business benefits of reuse systems with the benefit depending on the specific product and systems leveraged (Canada Plastic Pact, 2023a).

Reuse is often included in quick service restaurants for dine-in services where reusable soiled food ware is cleaned in house (Restaurants Canada, n.d.). However, take-out reusable packaging systems are more difficult to implement and not widely adopted. There are different types of reuse systems used for take-out packaging, the ones most relevant include refill on the go and return on the go (Ellen MacArthur Foundation, 2019). On the go refillable products are designed to be refilled by consumers through an in-store dispensing system, while on the go returnable products have consumers return the packaging at a drop off point (Canada Plastic Pact, 2023a; Ellen MacArthur Foundation, 2019). Refillable on the go requires consumers to bring their own containers while return on the go requires the development of reverse logistics to collect the used packaging for cleaning, inspection and resale. In return on the go systems, foodservice providers often partner with a reuse system provider to establish reverse logistics (Canada Plastic Pact, 2023a). A successful example of a return on the go system is the coffee cup reuse system in the German city

of Freiburg which has been adopted by 60-70% of the local coffee shops (Canada Plastic Pact, 2023a; Freiburg Cup, 2024).

Most systems in use today are in the pilot or start-up stages with most located in North America and Europe (Moss et al., 2022). Within Canada, the majority of new pilot systems are located in larger urban centers like Vancouver, Montreal and Toronto (Canada Plastic Pact, 2023a). The systems most used in Canada today are take-out containers and cups, this may be because items used in foodservices are more likely to reach high levels of reuse due to their pervasiveness (Canada Plastic Pact, 2023a). These systems are often found in urban settings due to the lower environmental impact of shorter transportation distances and the ability to achieve system scale (Canada Plastic Pact, 2023a). The impact of high-density areas and low transportation distances on system and environmental performance make scaling reuse systems and their reverse logistics across Canada a challenge due to its size, low population density and climate (Council of Canadian Academies, 2021).

Shifting from the linear model of single-use packaging to a reuse model with reusable packaging is complex and requires system level changes to establish widespread system adoption and the development of return infrastructures. The significant collaboration and investment into return infrastructures cannot be accomplished by an individual organization and requires collective action (Diprose et al., 2023; Moss et al., 2022). Public private partnerships can be used to enable infrastructure and scale adoption of reuse in communities. An example of this is Seattle's pilot program, Reuse Seattle, which involves the collaboration of entertainment venues, restaurants, businesses, and PR3 to create systems of collection, transportation, washing and supporting infrastructure (Reuse Seattle, 2024).

Another factor for system performance is consumer adoption which can be impacted by awareness level (Moss et al., 2022), signs of wear and use on reusable packaging (Collis et al., 2023), system convenience and practicality (Matthews & Webb, 2023; Moss et al., 2022), and higher product costs (Valiante & Chartwell Grove Inc., 2022). Moss identified that lack of consumer awareness of the benefits and practice of reuse system was one of the top barriers for growth of reuse businesses based on engagement with reuse practitioners and experts (Moss et al., 2022). Engagement with reuse experts also highlighted that campaigns to normalize and promote reuse behaviour are enablers for reuse systems (Moss et al., 2022). For take-out packaging specifically, Collis found that signs of wear negatively affected consumers feelings and views on future purchases and engaging with reuse systems in the future (Collis et al., 2023). Consumers willingness to engage with the reuse system may be impacted by the additional effort to return the container and the convenience of collection points (Miao et al., 2023). Higher costs for consumers are a barrier, in one example a business reported a 25% premium to participate in reusable system, a cost which is often passed along to the consumer (Valiante & Chartwell Grove Inc., 2022). When systems are operated at a small-scale cost is a significant barrier, but when operated at scale the unit costs drop and the system is more viable (Valiante & Chartwell Grove Inc., 2022).

When it comes to the environmental benefit of reuse system, efficient return logistics and a high quantity of reuse cycles is required to realize the environmental benefit over single-use packaging (Pålsson & Olsson, 2023). Reusable containers require more energy and resources to manufacture (Coelho et al., 2020), which results in a higher number of use cycles to achieve a lower environmental impact than single-use packaging (Pålsson & Olsson, 2023). When assessing LCA

studies for take-away and tableware packaging, Pålsson & Olsson found that reusable packaging was preferred or lacks difference between the environmental impact of disposable and reusable packaging (Pålsson & Olsson, 2023). However, this was not the case in all types of packaging and more knowledge is necessary to be able to clearly state under what conditions and in what contexts disposable and reusable packaging is the environmentally friendlier option (Pålsson & Olsson, 2023). Transportation characteristics, reuse cycles, washing settings, packaging characteristics, end of life settings, and consumer behaviour are all important factors that have an influence on the environmental impacts across the life cycle of reusable packaging (Pålsson & Olsson, 2023).

The economic feasibility of reusable packaging systems cannot be assumed for all cases with several factors driving sustainability and viability of these systems (Valiante & Chartwell Grove Inc., 2022). It is recommended that reuse systems are assessed on a case-by-case basis (Canada Plastic Pact, 2023a). Factors for evaluating feasibility of reuse systems include transportation, scale and standardization, infrastructure, number of uses, labour, end of life, comparative materials, and consumer experience (Valiante & Chartwell Grove Inc., 2022). The return rate for reusable packaging affects the number of use cycles in the system, deposit return systems are critical for incentivizing consumers to return packaging to collection points (Šuškevičė & Kruopienė, 2021).

Policy and legislation play a role in accelerating and scaling infrastructure for reuse systems, these take the form of financial support and incentives, standardization, regulatory, collaboration, consumer awareness, and leveraging public services (Canada Plastic Pact, 2023a). Financial support and incentives are important to level the economic playing field between disposable and reusable packaging systems to attract businesses to adopt circular business models (Valiante & Chartwell Grove Inc., 2022), and were found as a key enabler for growth of reuse systems (Moss et al., 2022). In Canada there is a lack of policies specific to supporting reuse systems (Canada Plastic Pact, 2023a), but in some European countries there are regulations supporting the development of the ecosystem for reuse systems such as a mandatory percentage of reusable packaging for certain product segments (Canada Plastic Pact, 2023a).

2.4.5 Recycling and Composting

Improving or shifting to more recyclable or compostable packaging products is a common approach to increasing waste diversion from landfills. Assessing the characteristics of the local recycling and waste management systems is important for understanding the waste diversion potential of packaging. The benefit of switching to recyclable and compostable packaging over reusable packaging is the well established and improving recycling infrastructure in developed countries. While reuse systems have the package circulating multiple uses, recycling allows for the material itself to be collected, sorted and processed into recycled materials that can be reused in a variety of applications. The material resources remain at the highest level when they are upcycled or returned to the same product such as what is observed in Ontario's Ice River Springs PET bottle to bottle operation (Ice River Springs, 2021). Down cycling is when something is recycled into a lower value product than the original item and is less preferred due to the diminished material and product functionality and eventual end of life (Campbell-Johnston et al., 2020). Along with recycling, waste can be diverted to the organics stream which can result in the reuse of biomass

such as compost that is generated from industrial composting facilities or bio-gas generated in anaerobic digestion (Environment Canada, 2013).

At the product level, improving the recyclability of single use packaging can be accomplished through shifting to more recyclable materials, choosing packaging that follows design for recycling guidelines (Baxter et al., 2022; The Association of Plastic Recyclers, 2024) and those that are accepted for recycling within the target region. Measures that can support the overall adoption of the circular economy for packaging include choosing packaging that incorporates recycled materials to stimulate demand for these materials.

Improving the overall recycling and waste management infrastructure can increase the diversion of single-use packaging. Deposit return schemes are widely used for products such as beverage containers to incentivize the collection rate with well designed systems achieving >90% collection of post consumer packaging (Reloop, 2022). However, these systems are not typically applied to take-out food packaging outside of reuse systems. Standardizing the packaging in a region based on their size, weight and material is another method to increase waste diversion (Do et al., 2021).

Shifting to alternative products is an approach that is widely adopted, guidance for choosing alternatives is provided by Environment Climate Change Canada and the UNEP (Environment and Climate Change Canada, 2021; UNEP, 2021). It includes taking into consideration both the value recovery (recyclability/compostability) and environmental impact of the alternative packaging along its life cycle (Environment and Climate Change Canada, 2021; UNEP, 2021). While guidance exists, it remains at a high level with much investigation to be done at the local level on which products have better end of life and environmental characteristics. This has been addressed by local and provincial governments in some regions that have bans on single-use plastics by guidance documents on what types of alternative packaging are preferred (City of Victoria, n.d.; Province of British Columbia, 2024).

Paper and plant-based fibres are currently being used as an alternative for plastic packaging for foodservice take-out applications such as containers, plates, and bowls. These products can have different end of life options based on whether they contain a moisture barrier lining that is compostable or recyclable, or if they are contaminated with food.

Shifting to new alternative materials such as bio-based and biodegradable/compostable plastics is a developing field. Bio-based plastics are those derived from plant-based feedstocks and biodegradable plastic are those which have the capability to break down into natural elements (European Bioplastics, 2018). Bio-based plastics can mirror the chemical structure of a traditional plastic and their end of life characteristics or can biodegrade in certain conditions such as those in an industrial composting facility (European Bioplastics, 2018). Common feedstocks for bio-based plastic include agricultural related sources such as corn and sugarcane as well as wood (European Bioplastics, 2018). These materials allow a shift away from petroleum-based virgin plastics (European Bioplastics, 2018), and compostable plastics with high food-contact can help increase diversion of food scraps into organics processing (Closed Loop Partners, n.d.; Springle et al., 2022). While these materials show potential to reduce the carbon footprint of products (European Bioplastics, 2018), a systematic literature review of bio-based plastic food packaging showed the environmental impact to be inconclusive, complex and with many trade-offs when compared to other food packaging types (Kakadellis & Harris, 2020).

There are many ways to refer to bio-based and biodegradable plastics, to simplify naming in the context of this study, this family of products will be referred to as compostable plastics going forward. Many barriers currently exist to be able to realize the benefit of compostable plastics. Challenges exist in processing compostable plastics in industrial composting facilities, with some municipalities banning compostable plastics due to concerns over lower quality product output and not having a full breakdown of the package (Springle et al., 2022). The current lack of regulations on product labeling in Canada means that a package can be labeled as compostable with no requirement for the product to meet specific criteria, such as third-party certification, contributing to issues with non-compostable products entering the organics stream (Springle et al., 2022). Compostable plastics also have the potential to contaminate the recycling stream when look a like products are mistakenly recycled impacting the quality of the recycled plastic (Closed Loop Partners, n.d.; The Association of Plastic Recyclers, 2023). Several factors can improve the outlook on successful adoption of compostable plastics such as improving waste management infrastructure (Kakadellis & Harris, 2020), regulations on labeling and third-party certification (Springle et al., 2022), and using materials with feedstocks from waste (Closed Loop Partners, n.d.; Kakadellis & Harris, 2020).

There is no single solution or alternative that performs the best on environmental impact and circularity, the product must be analyzed based on a life cycle approach that takes into consideration the product details, system and geographic context (UNEP, 2021). This is highlighted in the inconclusive systematic literature reviews on packaging which show trade offs in environmental benefit across different alternatives and outcomes of which are largely impacted by the specific context of the product, region and study assumptions (Kakadellis & Harris, 2020; Pålsson & Olsson, 2023).

There is also no single set of strategies or policy measures to implement within a local community to reduce single-use packaging, each region houses a unique vision that shapes the actions for community. Existing academic studies focus on single use plastic and broader circular economy strategies for local and higher-level governments, while the activity by Canadian municipalities has shifted towards targeting single-use packaging and items more broadly. The aim of this study is to explore the unique context and potential strategies to reduce consumption and waste of single-use packaging in a rural municipality in Canada. The regional challenges and solutions identified can act as an example for other local governments and regions especially those located in rural areas or those that feature a tourism industry. Most importantly, TBM can benefit from participating in this study and the information compiled can help steer the generation of a roadmap for the community.

3 RESEARCH METHODOLOGY

3.1 RESEARCH FOCUS

The aim of the research was to determine what single-use packaging and items are being consumed and ending up in the waste stream within the region and which measures would be most impactful for the community. To further narrow the scope, the focus of the research was on single-use packaging and items from the foodservice industry, this was chosen to explore a sector that was likely responsible for a significant portion of single-use packaging waste. This was based on the high number of foodservice businesses in the region, which may be attributed to TBM's vibrant tourism industry. Additionally, take-out plastic packaging and items which include food containers, bottles and caps, cutlery, cups and lids, and straws account for roughly 40-65% of the waste found in beach cleanup activity in Canada (Baxter et al., 2022). These can be attributed, at least in part, to the foodservice industry.

Single-use items, which facilitate the consumption of ready to eat food and beverages that are commonly used in the foodservice industry, were included in the research to ensure that all single-use foodservice products that are contributing to waste are considered.

With the federal prohibitions on plastic items, the waste and pollution generated may shift to other single-use products as a result of businesses replacing plastic items with alternative products and for this reason the study included single-use packaging of all materials.

3.2 OVERVIEW AND FRAMEWORK

The research conducted in this study collected quantitative data on single-use packaging use and waste through a public space waste audit and an electronic survey to local foodservice businesses. Qualitative data on the business context associated with single-use packaging was also explored in the survey. The data collected from the two methods were interpreted and

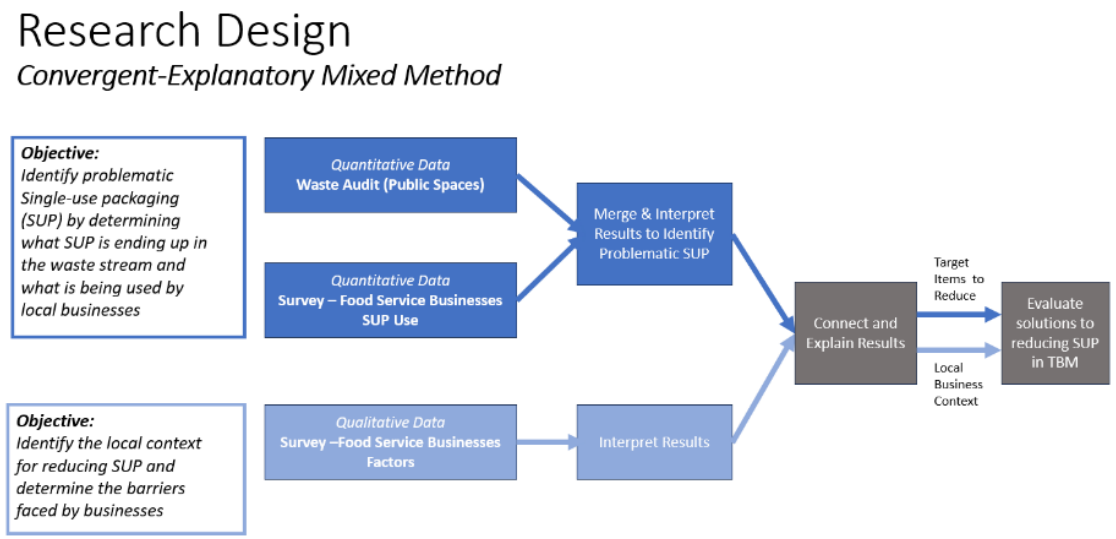

Figure 2: Research design framework.

connected to help inform what reduction measures would be most impactful and feasible in the community. A visual representation of the framework guiding this research is shown in Figure 2.

Similar methods merging and interpreting quantitative waste audits and qualitative exploration through interviews and surveys were used by Camilleri-Fenech (2020) who applied it to the hospitality industry in a touristic island, and Do et al (2021) in an analysis of single-use items in the fast food industry in Vietnam. Combining these methods allowed for an exploration of the contributing factors that helped explain the quantitative results they collected. In the Canadian context, Varkey (2021) studied the barriers to single-use plastic reduction among food-based businesses in Halifax using a survey to community members and businesses along with semi-structure interviews with interested businesses.

3.3 Public Space Waste Audit

Waste audits are used to identify how much waste is generated, the composition of the waste and how the amount of waste generated can be reduced (Ontario Ministry of the Environment & Association of Municipal Recycling Coordinators, 2006). They have been widely used for over a decade to support identification and reduction of waste in the IC&I sectors.

The objective of the waste audit in this study was to quantify how much and which categories of foodservice single-use packaging are ending up in the waste and recycling stream in public spaces in TBM. The waste audit also had the goal of highlighting opportunities to increase diversion of single-use packaging already considered compostable or recyclable that is found in the waste stream.

The waste audit was conducted in public spaces due to the likelihood of the consumption of take-out food and beverages in these local and tourist areas, and the ability to use small sample sizes to gain insight into the waste composition. Residential and IC&I waste was not included due to the challenges associated with collecting a sample size large enough to provide an adequate representation of the community waste generation with the resource and time constraints of this study.

The public space waste audit was conducted in the locations indicated in Table 2 and Figure 3, these were selected to represent both local hubs and tourist areas that are nearby to foodservice locations. For each location, a sample of garbage and recycling was taken. The collection took place between March 11-13th, with both Weekend and Weekday representation captured only in the Thornbury sample. The sites chosen were not located near parking lots to avoid car cleanout waste which may not be representative of the true waste composition in TBM public spaces.

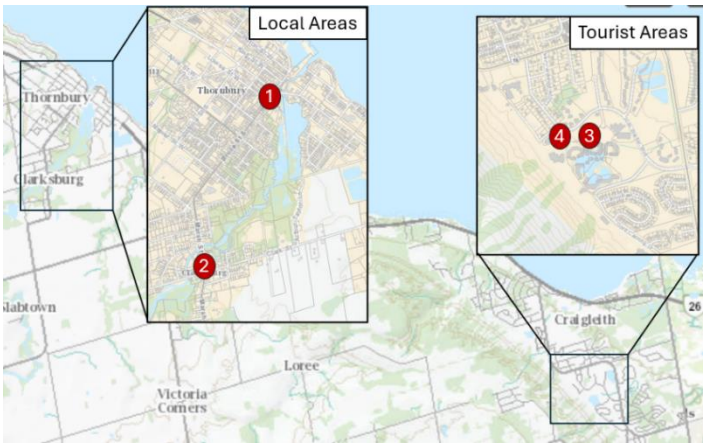

Figure 3: Map of public space waste audit locations.

Table 2: Public space waste audit location characteristics and collection dates.

Location	Characteristics	Waste Management
1. Thornbury	Downtown Thornbury near foodservice businesses such as a popular Bakery/Café	TBM
2. Clarksburg	Downtown Clarksburg, nearby one foodservice businesses	TBM
3. Blue Mountain Village	Tourist location with a high quantity of foodservice businesses 9 full service restaurants, 5 quick service restaurants	Private
4. Blue Mountain Resort	Tourist location with on resort foodservice businesses	Private

In traditional waste audits, the composition is broken into standard material classes such as glass, plastic, paper, metal, wood, etc (Ontario Ministry of the Environment & Association of Municipal Recycling Coordinators, 2006; Province of Ontario, 2008). To provide more granularity on single-use packaging, the categories of this waste audit were broken down into types of single-use packaging and further separated into categories of items that are recyclable/compostable vs waste. The categories and descriptions are listed below in Table 3, more detail can be found in the waste audit procedure and category breakdowns in Appendix A and B.

Single-use items were included as one category due to the difficulty associated with sorting and weighing small items, and the fact that they represent a small portion of the waste composition based on preliminary waste auditing of the samples. Once sorted the waste and recycling samples were weighed to provide a composition by weight.

Table 3: Public space waste audit categories.

Beverage Packaging	Recyclable pre-packaged beverage containers
	Non-recyclable prepackaged beverage containers
	Paper Cup & Lid (Coffee, Soda)
	Plastic Cup
	Styrofoam Cup
Single-use foodservice ware	Recyclable Plastic Take-out containers and lids
	Non-recyclable plastic take-out containers
	Compostable Plastic
	Recyclable/Compostable Paper and Plant-fibre take-out containers
	Aluminum take-out container
Single-use Items	
Residual Waste	

The public space waste audit has limitations in how it can be applied. The time frame for collection only highlights a window of waste generation in the community and cannot be assumed to represent summer or fall waste generation. The sample size of this waste audit is small in comparison to total waste generated and therefore the actual composition may vary. The waste generated and composition is only representative of public spaces and does not reflect residential or commercial waste. Due to the data limitations the results of the waste audit were not used to

draw conclusive outcomes, however, the results still provided valuable insight on the composition of the waste in regards to single-use packaging.

3.4 SURVEY

An electronic survey to foodservice businesses in TBM was conducted to explore the local business context of reducing single-use packaging and items. The survey aim was to collect quantitative data on what items are being used in the community as well as qualitative information on previous efforts, future intentions, and actual and perceived barriers to reducing single-use packaging. The survey also explored how the local businesses believe the municipality can best support them. A full list of the survey questions is found in Appendix C.

A survey was chosen to collect information from a high volume of businesses within a 1-month timeframe. The survey also provided the ability to perform data analysis on pre-generated survey options to help quantify which barriers are most prevalent in the community.

The options for business barriers for reducing single-use packaging listed in the survey were provided to the participant along with a “other” field with a text entry option to capture those not listed. The barriers compiled were identified by Varkey (2021) in his survey and interviews with businesses in Halifax, and Guittard (2023) in her stakeholder engagement in a small island tourism industry. Additional factors were included that are hypothesized to be barriers such as the impact of chain restaurant policies and standardization.

The participants targeted for the survey were foodservice businesses which include restaurants and quick service establishments of which TBM has >30 locations. The survey length was ~10-15 minutes and was open for responses between March 5 to April 5 2024. The survey was distributed through personal email correspondence with the Blue Mountain Resort, Blue Mountain Village Association, other business groups, and through the social media and website of TBM.

4 RESULTS

4.1 PUBLIC SPACE WASTE AUDIT

The total category weights for single-use packaging and items in all the waste and recycling samples is shown in Figure 4. The items with the highest weight found in both waste and recycling samples, respectively was beverage containers, paper cups, and paper and plant fibre take-out containers. Only a small number of plastic take-out containers were found in the samples. However, paper cups and paper take-out containers contributed to the highest amount of recyclable and compostable materials found in the waste samples.

The composition of the waste and recycling samples from public spaces are broken down into results for each location and shown in Figure 5 below. The signage of the bins located in the public spaces for the location collection point is shown in Table 4. The waste audit sample weight varied considerably, >40lbs of waste and recycling was collected in Blue Mountain Village with less than 6lbs collected in Clarksburg. The date of collection for the samples was within the same March 11-13th timeframe but represent a difference in weekend (March 11th) vs weekday (March 13th). Only the Thornbury samples were collected on both March 11th and 13th, but were combined due to the low sample weight.

The composition of the waste samples was predominantly residual waste but varied based on the location with the highest portion of 87% residual waste found in the Blue Mountain Village sample. The waste samples also included single-use packaging considered recyclable or compostable including beverage containers, paper cups, plastic cups and paper take-out containers. Some items were present within the waste and recycling samples but were unable to be separated from residual waste, these included heavily soiled plastic wrap and both large a small (e.g. cookie) paper take-out bags. Compostable plastics were difficult to detect, and if present in the audit samples, were most likely mistaken as plastic. A high volume of single-use plastic cutlery was visually observed in the single-use items category, of which it was difficult to find a resin code to determine the material.

The composition of the recycling samples varied based on location but beverage containers and paper cups were made up a significant share of the recycling in all locations. Plastic cups, paper and plant fibre take-out containers and single-use items were also present but in smaller quantities. Contamination from residual waste is present in all samples ranging from 10%-42% of the composition.

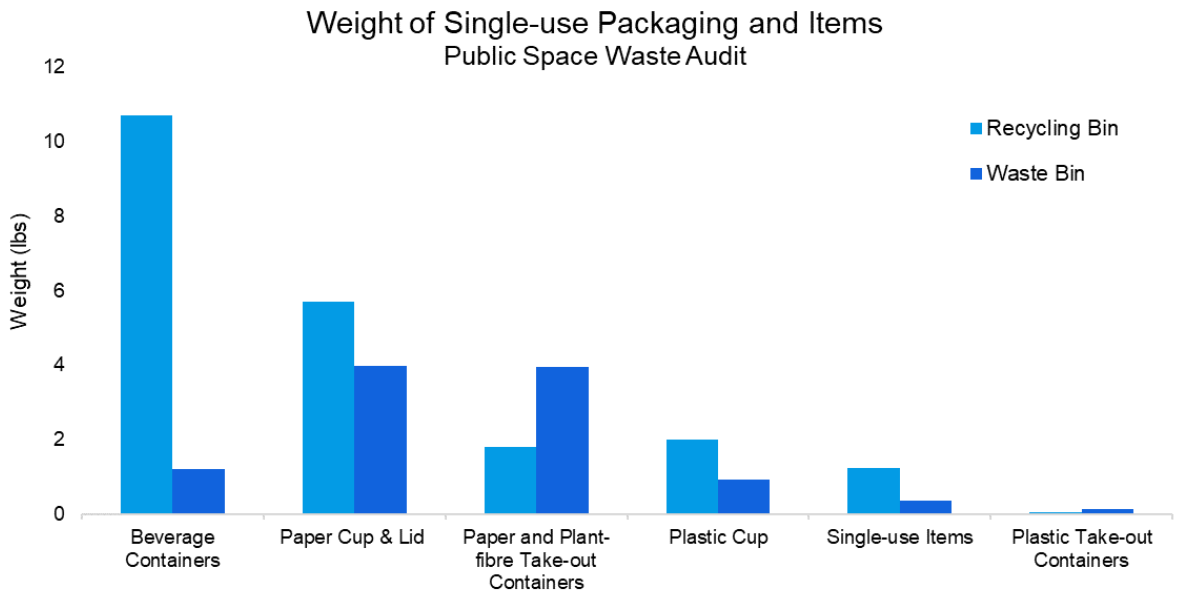

Figure 4: The weight of single-use packaging categories found in the public space waste audit, broken out into contributions from waste and recycling.

Table 4: Collection point signage.

Location	Waste and Recycling Bin Signage	Location	Waste and Recycling Bin Signage
Blue Mountain Resort		Thornbury Clarksburg	
Blue Mountain Village			

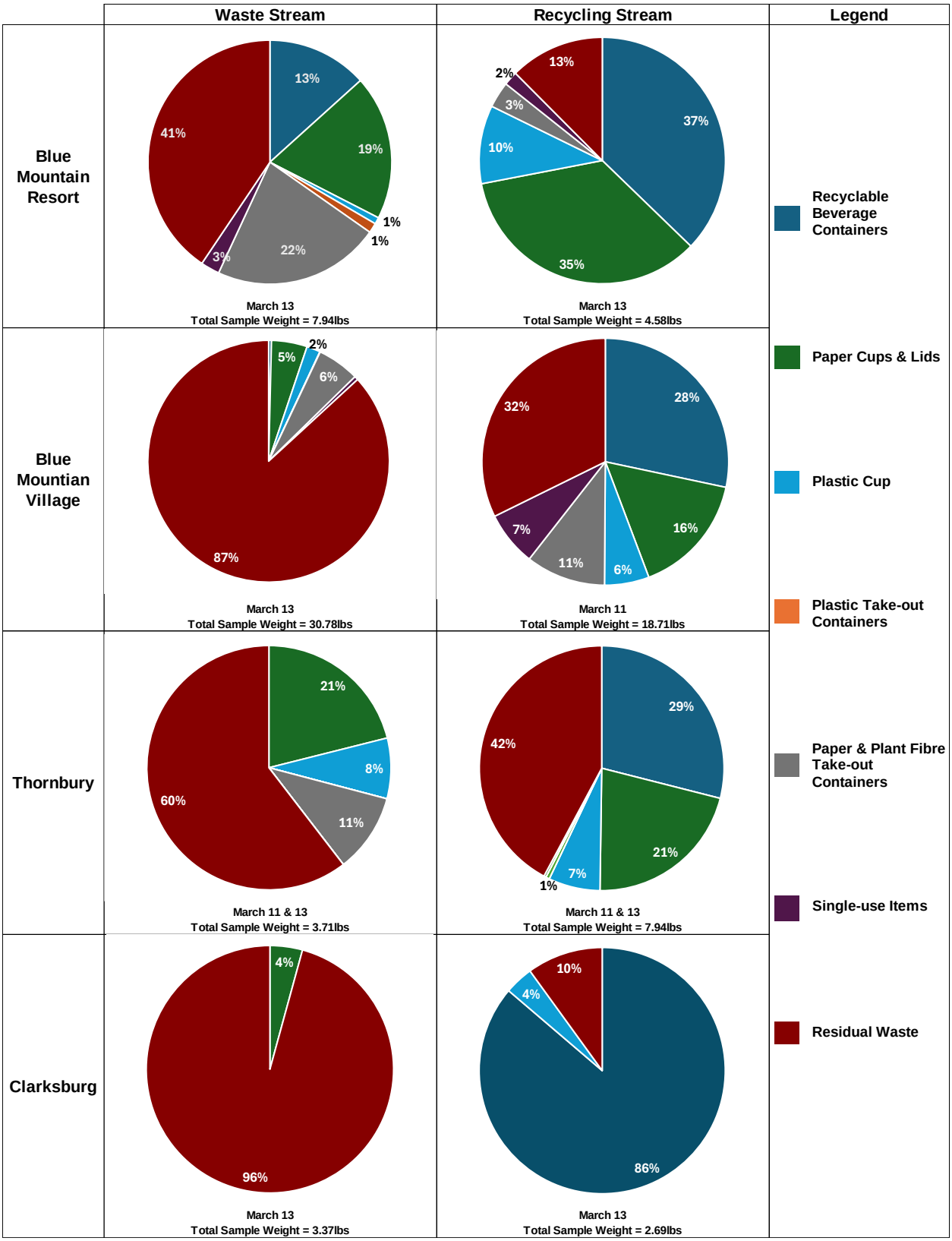

Figure 5: Public Space Waste and Recycling Audit Composition.

4.2 SURVEY

4.2.1 Business Profiles

The survey to food service businesses received 17 participants, which likely represents just under half of the food service businesses in the region. The responses representing the business profiles are shown in Figure 6 below. The respondents to the survey were mostly from owners and managers of the foodservice establishments. Responses were received in both local and tourist regions with six businesses located in Thornbury, ten located in the Blue Mountain Village and Resort area, and one was located in another area of the municipality.

The businesses included ten quick service restaurants and seven dine-in restaurants. All of the dine in restaurants indicated that they also provide the take-out or the ability to take the meal or leftovers home in single-use packaging. Three of the ten quick services restaurants indicated that they use reusable food ware for dine-in services. The majority of respondents were not part of a chain restaurant with only 5 respondents indicating that they were. Only 3 food service businesses indicated that they participate in food delivery services such as Uber Eats and SkipTheDishes.

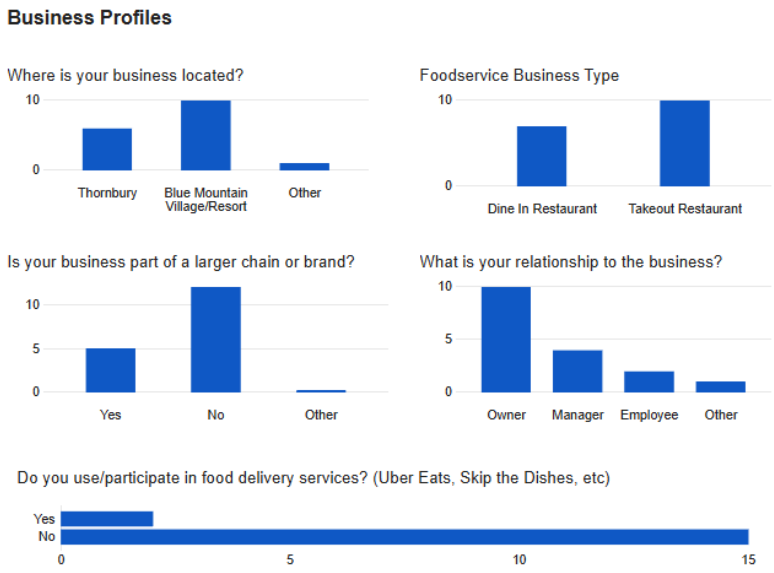

Figure 6: Business profile related responses to the survey to foodservice businesses.

4.2.2 Inventory of Single-use Plastics used by Foodservice Businesses

A summary of the single-use beverage packaging, foodservice ware and items is shown in Figure 7. The graphs show the responses broken into those from dine-in restaurants and those from quick service restaurants to help highlight any trends in these two different business types.

Both dine-in restaurants and quick service restaurants use single-use beverage packaging and foodservice ware. While all packaging types in the survey were indicated as being used, paper cups, lids, aluminum cans and plastic bottles are the highest indicated. Other beverage packaging types that the survey respondents identified were compostable cups/lids.

A wide variety of types of single-use foodservice ware is being used by the local businesses, plastic plates and styrofoam containers were the only types not being used. Among the top items indicated were comprised of paper such as paper bags, and paper/plant-fiber take-out containers. Difficult to recycle items also appeared such as plastic wrap. Foodservice ware with different end of life pathways were indicated as being used such as recyclable poly-lined paper containers, compostable paper containers, recyclable plastics and compostable plastics (PLA). The types of

foods being served in the take-out containers includes ice cream, sandwiches, baked goods, oatmeal, pizza, pasta, salads, burgers, fries and other hot ready to eat meals.

The responses from quick service restaurants for single-use items is not included due to an unknown issue with the survey. For the dine-in restaurants a variety of single-use items are being used, including plastic, paper, wood and plant-fiber based items, the majority of which are considered compostable. Plastic stir sticks and plastic bags were indicated as not being used. Compostable plastic (e.g. PLA) items were also indicated as being used.

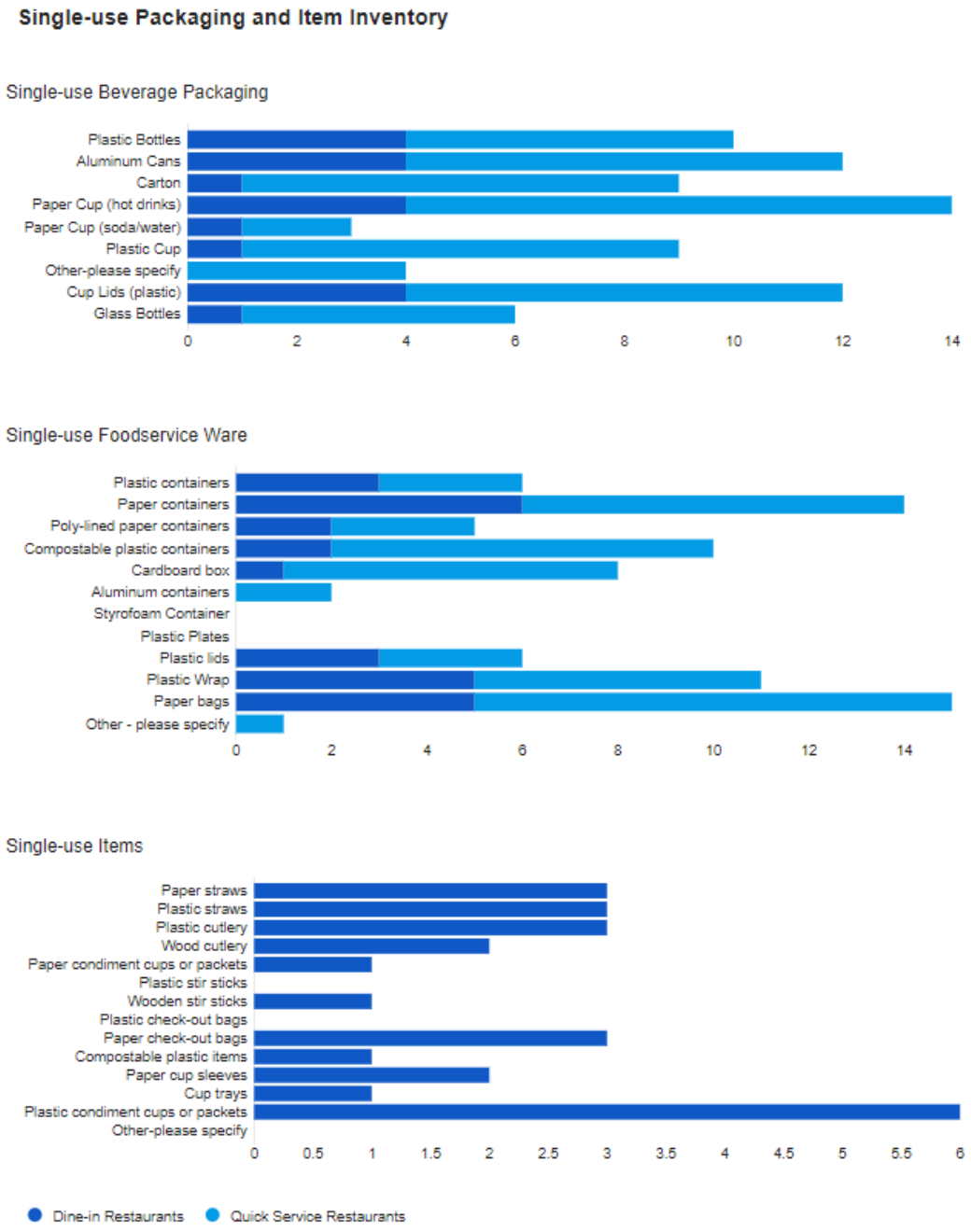

Figure 7: Inventory of single-use packaging and items used at foodservice establishments based on the survey responses

4.2.3 Actions to Reduce Single-use Packaging

The results of the survey related to previous and planned actions to reduce single-use packaging is shown in Figure 8. The majority of respondents indicated that they have taken previous measures to reduce single-use packaging consumption and waste at their establishments. All of the respondents who had taken previous measures indicated that they were planning on taking further actions within the next year, within 2-3 years, or over the long-term. Of the respondents who indicated they had not taken previous measures, only one was not planning on taking future action.

Reducing unnecessary single-use packaging, using an “ask first” approach, and switching to compostable packaging are the most popular actions previously taken and planned in the future. While switching to recyclable packaging was indicated as a measure that was previously taken, it is less popular choice for planned actions. Only a few respondents indicated that they have or will be switching to reusable packaging for dine-in or take-out and accepting customers reusable containers.

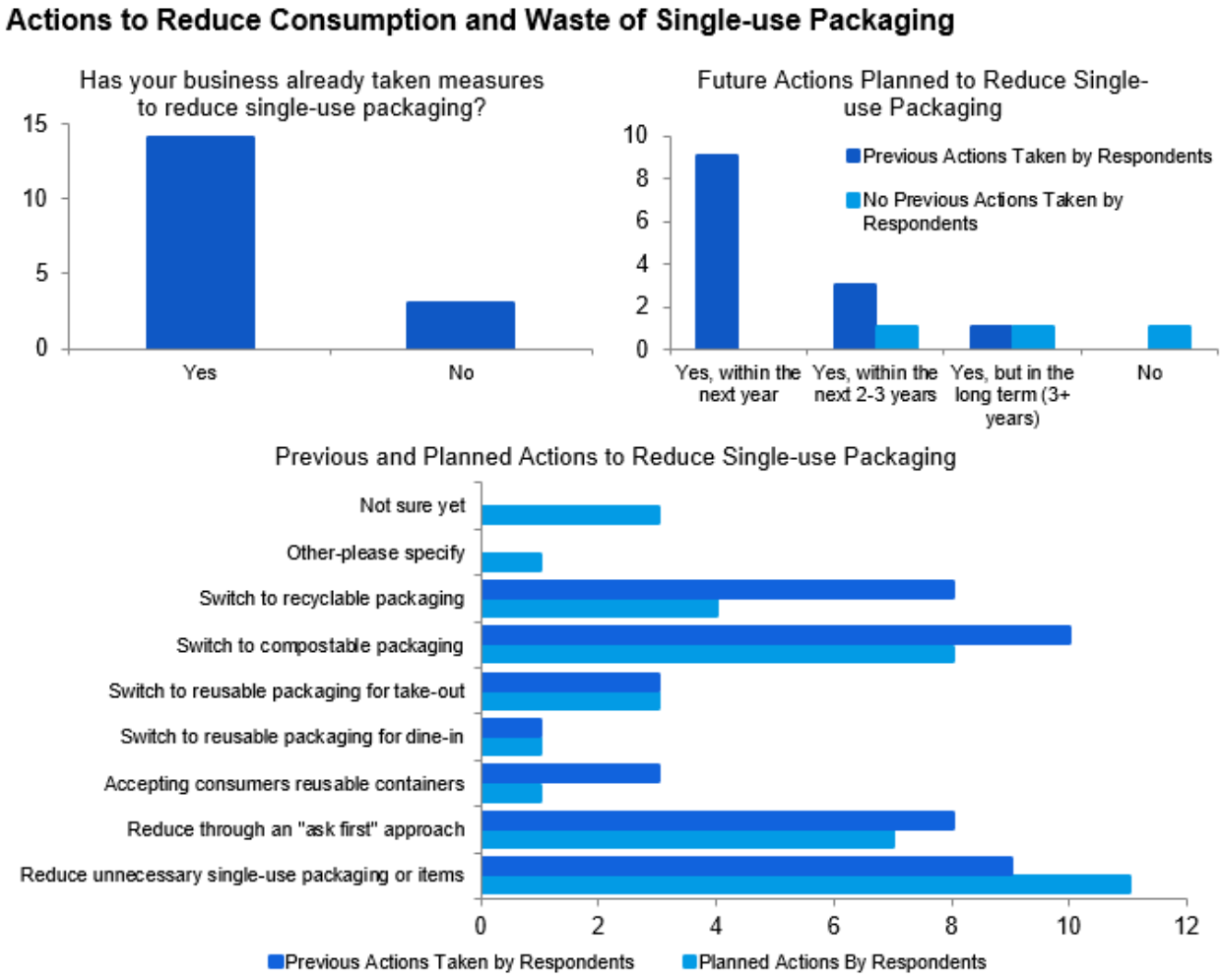

Figure 8: Actions to reduce consumption and waste based on the survey to foodservice businesses.

4.2.4 Barriers

The previous and anticipated barriers identified by respondents is shown in Figure 9. The previous and anticipated barriers were similar with the predominant barriers with the higher cost and difficulty sourcing of recyclable/compostable/reusable alternatives and the lack of knowledge on which alternatives or measures are best. The other barriers mentioned by respondents include lack of replacements for packaging such as plastic wrap.

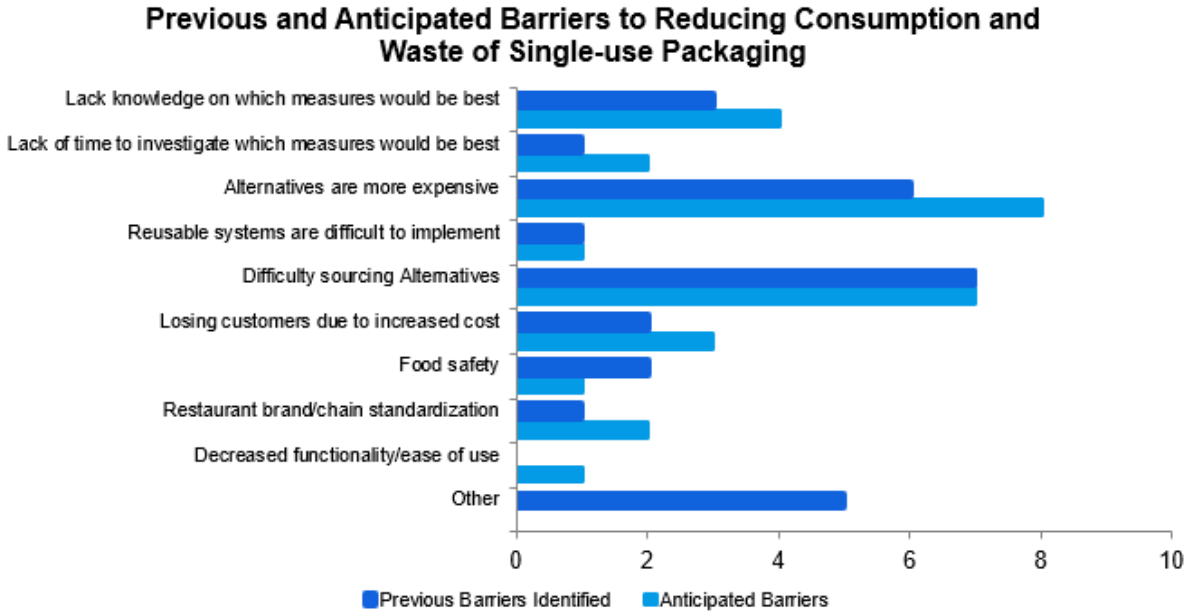

Figure 9: Previous and anticipated barriers identified by respondents in the survey to foodservice businesses.

4.2.5 Measures by the Town of the Blue Mountains to Support Local Foodservice Businesses in Reducing Single-use Packaging

When asked what measures would support local businesses in reducing consumption and waste of single-use packaging respondents indicated that business resources, community zero waste education and funding for zero waste projects were the highest ranked as shown in Table 5. By-laws and facilitating studies on a community wide reuse system were ranked among the lowest measures.

Table 5: Municipal measures ranked by local foodservice businesses.

How can TBM support you in reducing single-use packaging?	Rank
Business resources (e.g. guide for choosing alternatives to single-use packaging/items)	1
Community zero waste education	2
Funding for zero waste projects	2
Leading by example through implementing reduction measures on municipal sites and events	3
Providing recognition for businesses implementing reduction measures	4
Connecting businesses with each other to share experiences and/or best practices regarding materials selection, waste reduction/diversion, and opportunities to collaborate	5
Facilitating a study on community wide re-use systems for take-out food and/or beverage packaging	6
By-laws (e.g. prohibitions, mandating acceptance of customers reusable cups/containers)	7

5 DISCUSSION

5.1 SINGLE-USE PACKAGING AND ITEMS FOUND IN TBM

5.1.1 Public Space Waste Audit

The differences in composition between the locations can be attributed to a variety of factors such as nearby restaurants, local vs tourist population, bin signage, weekend vs weekday collection, and the size of the samples collected. The small sample size collected in Clarksburg does not represent the true waste composition, the recycling sample contained a heavy glass bottle and small overall sample weight which skewed the results. Additional samples would be required to understand the true composition in this location. A more distributed composition was observed in Blue Mountain Village, Resort and Thornbury samples, with notably higher weights captured in the Blue Mountain Village sample. The limited sample weights make drawing conclusions on waste composition challenging but the results can still provide an indication of what items are contributing to waste.

Varying levels of contamination were found in the recycling stream, common sources of the contamination were take-out paper bags and napkins soiled with food waste, wrappers and tea bags. Blue Mountain Resort had the lowest amount of contamination in the recycling stream, a contributing factor could be the enhanced signage at the point of collection which indicates which products are recycled. Recycling signage can improve recycling accuracy compared to receptacles with no signs (Austin et al., 1993).

The higher amount of paper cups and take-out containers found in waste and recycling compared to plastic alternatives supports the overall transition of businesses moving away from single-use plastic packaging. However, paper cups and paper take-out containers were found in greater quantities, by weight, in the waste stream resulting in missed opportunities for waste diversion. In the case of Blue Mountain Resort, the signage on the waste bin indicates that take-out containers are to be thrown in the garbage and not recycling, leading to 22% of its waste composition as paper take-out containers. Additionally, at Blue Mountain Village they do not recycle soiled paper products adding to the diversion challenges of these products (M. Barnes, personal communication. June 5, 2024). With the shift towards paper and plant fibre-based take-out containers, which are often meant to be composted, the lack of public compost bins means these products will remain in the waste stream. However, a key difference between the single-use plastics these products replaced is that and paper in the waste stream is the eventual decomposition of the paper under anaerobic conditions in the landfill environment (Ximenes et al., 2018).

The composition of the waste and recycling found in the region is difficult to compare to results of other waste audits due to the differences in the way they are conducted. Waste audits usually breakdown the categories into material classes as appose to the single-use packaging and item categories conducted in this research. However, many of the items found in this waste audit such

as bottles, food containers, cutlery, cups, and straws, have been found in varying amounts in the natural environment and in urban areas in Canada (Baxter et al., 2022).

Key Findings

- Highest amounts of single-use packaging, by weight, in the public space waste audit comes from paper cups and paper and plant fibre take-out containers.
- Lack of composting in public spaces may contribute to paper and plant-fibre take-out containers ending up in the waste stream.

5.1.2 Inventory of Single-use Packaging used by Foodservice Businesses

The number or respondents and the business profiles provide adequate representation for regional differences (local vs tourist), and restaurant types (dine-in vs quick service). While more businesses would have provided more confidence in the results, 17 respondents can still provide insight into business practices and preferences. The majority of respondents were owners or managers who would be well versed in the single-use packaging used and the previous and planned actions to reduce these items within their establishment.

The survey provided results on the categories of items that are currently being used by local foodservice businesses, however, it did not provide details on specific formats or the volume of single-use packaging. The results provide a general understanding of the types of products used in the region and how many businesses indicate they use each packaging type. It is important to note that the packaging types that are most indicated may not match up the products that are used at the highest volume. More quick service restaurants indicated that they used single-use beverage packaging and foodservice ware, but this is likely due to the higher number survey respondents compared to dine-in restaurants.

Most of the single-use beverage packaging identified by businesses are recyclable, aside from a few businesses indicating they used compostable cups. Beverage containers including bottles, and cans, generally have higher recycling rates compared to other packaging products. This is supported by the results of the public space waste audit that shows beverage containers make up a smaller composition of the single-use packaging found in waste, and a higher portion of the composition of the recycling samples. TBM may achieve more impactful results on waste diversion by focussing efforts on other single-use packaging categories.

Paper cups are used predominantly by quick service restaurants with a high number of respondents indicating use. Paper cups are the 2nd most prevalent item found in the recycling audit and top item found in the waste audit suggesting that these items could make an impact in waste reduction if targeted for diversion from landfills. Unlike paper take-out containers, paper cups are accepted in the recycling stream in TBM and can be captured in the existing public space recycling bins (Town of the Blue Mountains, n.d.-a). However, there are concerns with recycling paper cups in many regions since they are essentially a paper plastic laminate that contains a thin plastic coating which is challenging to separate in the recycling process (Bilek et al., 2021). Within the municipality itself there is differences in what is accepted in the recycling stream between private and town collection, in Blue Mountain Village wax-coated paper cups are not accepted (M. Barnes, personal communication. June 5, 2024). Even though paper cups are accepted in the recycling stream in TBM, further confirmation on the preference of these products in the recycling stream

should be confirmed now that the residential blue bin program has been taken over by Circular Materials.

Following the prohibition on single-use plastic items, plastic stir sticks and bags were not indicated as being used, suggesting they may have been successfully phased out in the region. It is also possible that businesses did not report on the use of these items to avoid perceived negative repercussions. However, several businesses indicated that they still use banned items such as plastic cutlery, straws and foodservice ware. This could be due to the uncertainty of the ban after a legal challenge overturned the ruling on adding plastic manufactured items to the toxic substance list in the Canadian Environmental Protection Act (CEPA) in November of 2023. While certain conditions and products relating to plastic straws and foodservice ware may not be specifically covered under the prohibition. Straws can be sold by request only and in bulk and plastic foodservice ware is still allowed if it does not contain problematic features and materials that render it non-recyclable (Environment and Climate Change Canada, 2022). However, several businesses have shifted towards wood cutlery and paper straws signalling an opportunity for more businesses to adopt these products.

Other single-use plastic items aside from those in the prohibitions, are being used by businesses in TBM. Plastic wrap is not recyclable in the region and is a high use item indicated in the survey, businesses have stated difficulty in finding alternatives to replace it. The research indicated that single-use plastic items that are difficult to recycle are still being used in TBM, but conclusions on the quantity of waste from these products is unknown.

There is a wide range of single-use packaging and items used by foodservice businesses within TBM, with the shift from single-use plastic there are many businesses shifting to recyclable and compostable paper or plant-based fiber foodservice ware. This is seen in both the results of the waste and recycling audit and the higher number of businesses using these products over plastic alternatives. For paper and plant fibre take-out containers there is a risk of incorrect disposal due to look-a-like products with different end of life streams. Businesses indicated that they used both poly-lined paper containers, which are considered recyclable, and compostable paper containers. Adding to the complexity, paper products that are considered recyclable but are soiled with food can contaminate the recycling stream, which may be why paper take-out containers are listed as compostable in TBM's waste wizard (Town of the Blue Mountains, n.d.-a). However, poly-lined paper products may contaminate the composting process with some organizations pointing to microplastics in the compost (Brinton et al., 2016). The industrial composting facility that processes the organic waste in the region does not state if poly-lined paper is a concern specifically but indicates ongoing issues with contamination in residential and commercial waste (H. Kalra, personal communication. March 26, 2024).

The recycling receptacles in all four locations were a single stream collection and did not include separate bins for paper and plastic/glass/aluminum. This aligns with the MRF that the Thornbury and Clarksburg recycling is routed to, which operates with a single stream recycling input. The impact of single stream collection on paper products was identified as a contributing factor to contamination of wet paper in the recycling stream in institutional waste receptables (Andrews et al., 2013). The comingled products, such as beverage containers and cups can soil the paper products when in the same bin.

Look-a-like product concerns are also present with compostable plastics such as PLA and foodservice ware made of traditional plastics. Ten businesses indicated that they used compostable plastic containers, which can contaminate the other plastic recycled materials if it mistakenly enters the recycling stream (The Association of Plastic Recyclers, 2023). Inline with the composting contamination concerns identified in literature (Springle et al., 2022), the composting facility used by the municipality for residential green bin program indicates that they do not accept these products without field testing (H. Kalra, personal communication. March 26, 2024). The concerns are based on the fact that they often take longer to breakdown, create more hard plastic contamination and may contain PFAS (H. Kalra, personal communication. March 26, 2024).

Dine-in restaurants indicated a wide variety of single-use items being used including those made of plastic, wood, paper and compostable plastic. While plastic items that are not recyclable, such as plastic condiment cups or packets are still being used, many businesses indicated they have shifted to compostable alternatives such as wood, paper and plant fibre straws, cutlery, stir sticks and condiment cups. The shift to compostable items over recyclable items is likely due to the challenges in sorting items with two dimensions less than 2 inches for recycling in material recovery facilities (Association of Plastic Recyclers, 2018). While these items were not present in significant amounts in the waste and recycling audit, they will continue to be present in the waste stream unless businesses shift to products that are accepted for recycling or composting in the region. Unfortunately, the information on what single-use items quick service restaurants are using was not collected, and would have provided a clearer picture on the status of these items in the region.

Key Findings

- Businesses are shifting away from single-use plastics and towards alternatives such as paper, fiber based and compostable plastic.
- Look-alike products used in the region pose a risk to contaminating recycling and composting streams.
- Single-use packaging and items that are destined for landfill, such as plastic wrap, plastic condiment cups or packets, plastic cutlery, plastic straws, and paper coffee cup trays are being used by local businesses.

5.2 Summary of the Public Space Waste Audit and Survey Results

A summary of the results and key challenges identified for single-use packaging in TBM based on the public space waste audit and survey to foodservice businesses is shown in Table 6. Of the key challenges summarized, targeting the waste and look-alike product concerns of paper and plant-fibre take-out containers may provide the greatest opportunity for waste diversion and reducing contamination in recycling and composting streams.

Table 6: Summary of the Public Space Waste Audit and Survey to Foodservice Businesses.

Single-use Packaging and Item Product Category		Weight in Recycling	Weight in Waste	# of Businesses Using	Intended End of Life Pathway	Key Challenges
Beverage Packaging	Beverage Containers	11	1	12	*Recycling	
	Paper Cup	6	4	14	**Recycling	• Contributing to public space waste
	Plastic Cup	2	1	9	Recycling	
Foodservice ware	Plastic Take-out Containers	0.04	0.1	6	*Recycling	
	Paper and Plant Fibre Take-out Containers	2	4	14	**Compost/ Recycling	• Contributing to public space waste • Potential for incorrect end of life and contamination
	Plastic Wrap	Residual Waste	Residual Waste	11	Waste	• Contribute to waste • No viable alternatives
	Paper Bags	Residual Waste	Residual Waste	15	**Compost	
Other	Compostable plastic	N/A	N/A	10	***Waste	• Contaminant in recycling • Potential contaminant in industrial composting facility
Single-use Items		1	0.4	N/A	Compost/Waste	• Alternatives available but waste items still being used

*Depends on specific packaging materials and features, some products not recyclable
**Recycling vs composting depends on moisture barrier lining and the degree to which it is soiled
*** Unless product has been field tested in local industrial composting facility

5.3 Survey to Foodservice Businesses

5.3.1 Actions, Barriers and Supporting Measures

The results of the survey indicate that the majority of the local foodservice business are supportive of the goal to reduce consumption and waste of single-use packaging since there is both past actions and future intentions to do so. Notably, the respondents who indicated they had taken previous actions were also those planning to take further measures in the near and medium term while those who did not were less interested in reducing in the near term suggesting a small set of businesses whose actions are unlikely to change. The results indicate that previous action is not a barrier to future action and there is still great interest from businesses to further reduce the impact of single-use packaging.

Reducing unnecessary single-use packaging and using a “ask first approach” was a key strategy by respondents and follows the reduction priorities of the Zero Waste Hierarchy. The focus of the

activity previously and going forward varies away from the Zero Waste Hierarchy when it comes to the preference of switching to recycle and compostable single-use packaging compared to the small number of respondents interested in reuse systems. These results are supported by the previous steps taken to reduce single-use plastic by businesses in Halifax (Varkey et al., 2021). This could be due to the challenges associated with system level changes required for reuse compared to switching to alternatives.

Even though many respondents indicated switching to recyclable/compostable alternatives as a key strategy, they also indicated that they face barriers in doing so such as higher costs, difficulty sourcing and the lack of availability of the alternatives that they prefer, and lack of knowledge on alternatives. These results are backed up by findings in literature on the main concerns identified in engagement to businesses reducing single-use plastic in Halifax Canada and a small Greek touristic island (Guittard et al., 2023; Varkey et al., 2021). Of the barriers identified, higher costs of alternatives and difficulty sourcing are challenging to address through measures at the municipal level. However, the lack of knowledge on alternatives and lack of time to investigate alternatives is something that can be addressed with education.

The results of the survey indicate that the impact of chain restaurant standardization and requirements for food delivery are minimal within TBM. The majority of respondents were not part of chain restaurants and did not use delivery services. The high volume of independently owned restaurants in the region is encouraging, any engagement on education interventions by the municipality can be focused on the local business owners and managers. The limited food delivery could be due to the both rural and tourism characteristics of the region. Food delivery services, while used commonly in urban areas, is still growing in rural regions. In the tourist area of Blue Mountain Village and Blue Mountain Resort the consumers may be partaking in predominantly dine-in and taking-out food and consuming nearby in hotels and vacation rentals. The small-scale use of food delivery services may reduce functional requirements for foodservice packaging and ultimately reduce the number of barriers in switching to sustainable alternatives in TBM.

Among the top municipal measures to support foodservice businesses were those related to education which included a business resource guide, community zero waste education. Funding for zero waste projects was also of high interest to businesses, positive economic incentives were also identified as the top factor for incentivizing businesses to move away from single-use plastic items in other research (Guittard et al., 2023). These findings suggest that businesses are looking for education and financial support to realize reductions as appose to efforts that will require additional participation or prescriptive measures. Unsurprisingly businesses do not want to have legal obligations relating to reducing single-use packaging, bylaws prohibiting or mandating business practices are ranked as the lowest preferred actions to reduce single-use packaging by local businesses.

The survey results indicate that there is limited interest in reuse systems within TBM. For dine-in reusables, only half of the quick-service restaurants that have seating provided reusable foodservice ware and few respondents indicated past or planned actions for offering dine-in reusable containers. For reusable take-out packaging, there was past and future planned actions by a few respondents, high costs were cited as a challenge in general for alternatives, but surprising only one respondent indicated challenges associated with reusable systems

specifically. Additionally, further studies on a community wide reuse system was ranked among the lowest activities that the municipality could do to support the reduction of single-use packaging for businesses in the region.

Key Findings

- Most of the local foodservice businesses are interested in reducing consumption and waste of single-use packaging in the near and medium term.
- The key barriers faced when shifting to more sustainable packaging is higher costs, difficulty sourcing, and lack of knowledge on alternatives.
- Limited interest in reuse systems and bylaws by local foodservice businesses.
- Interest in a business resources guide, community zero waste education and funding for zero waste projects.

6 RECOMMENDATIONS

6.1 RECOMMENDATION FRAMEWORK

TBM can reduce the consumption and waste of single-use packaging and ensure the transition from problematic single-use plastics does not cause other unintended consequences for the waste management systems through measures broken out into four categories; education, infrastructure, economic incentives, and municipal policies. The key challenges identified through this research, and which recommended measures apply to the challenges is shown in Table 7. Education and infrastructure measures are recommended over the short-term while municipal policies and economic incentives can be used over the long-term along with additional forward thinking on enabling collaboration and reuse systems.

Table 7: Key Challenges and Recommendations

	Short-term				***Long-term***	
Key Challenges	**Education**		**Infrastructure**		**Economic Incentives**	**Municipal Policies**
	Business Resource Guide	**Waste Wizard Updates**	**Receptacle Signage**	**Public Space Compost Bins**	**Funding for Zero Waste Projects**	**Reducing single-use packaging on city property and events**
Recyclable or Compostable Products such as paper cups and take-out containers contributing to waste	X	X	X	X	X	
Look-alike products with potential for incorrect end of life	X	X	X			X
Compostable plastics a potential contaminant in organics and recycling stream	X	X				X
Single-use packaging and items with no diversion potential contributing to waste	X	X			X	X

6.2 EDUCATION

Education for businesses and the community is an approach to encourage businesses to use sustainable practices and products and helping educate consumers on the appropriate end of life for certain packaging and items. The literature on the impact of municipal promotion and education campaigns on waste diversion is mixed, a 2014 study conducted on municipalities in Ontario showed no benefit of educational campaigns (Lakhan, 2014). For this reason, it may be more effective to prioritize business education to influence the recyclability and compostability of single-use packaging used within the region.

However, education to residents in the form of resources to inform which products go into which stream is already being done through the TBM waste wizard, and can be improved based on the single-use packaging currently used in the region. There are new products in the region for which there is no guidance in the waste wizard, such as compostable plastics. Adding guidance for these products is one way to reduce the contamination in the recycling and composting streams. The landscape for industrial composting these products is currently evolving, a conservative approach would be to assign these products to the waste stream to avoid contamination in diversion streams. The field testing of the industrial composting facility used by TBM for residential green bin

uses the Compost Manufacturing Alliance (CMA) to field test products at the facility (H. Kalra, personal communication. March 26, 2024). However, there are likely still many products on the market that are not field tested with the specific conditions of the local industrial composting facility. In the future, the Federal Government will bring forward the recycled content and labelling rules for plastics regulation which will phase in labelling requirements from 2026 to 2030 which will require compostable labeling to have approved third-party certification and field testing in a Canadian composting facility (Government of Canada, 2023). However, there is some uncertainty in the future publishing of this regulation due to the legal challenge in 2023 overturning of plastic manufactured items on the CEPA toxic substance list. If this regulation moves forward, within a 3-6 year time frame the risk of contamination could be assessed and updated based on the new regulatory requirements and landscape of compostable plastic products on the market. This guidance should be confirmed with the waste management service provider in the region prior to issuance.

Additional content to add to the waste wizard includes single-use items such as cup sleeves and wooden stir sticks. These items are not currently included and are used by businesses in the region and were found in the waste audit.

With the use of items destined for landfill, persistence of difficult to recycle single-use plastic items, look-alike products, and problematic compostable plastics, there is a need for education and guidance for local businesses. Additionally, survey respondents indicated that they lack knowledge in which measures are best and have listed a business resource guide as the highest ranked activity that would support them in reducing single-use packaging. TBM could increase waste diversion and standardization of single-use packaging and items by developing a guide outlining which products are preferred in the region which could include recommendations on business practices and which products are preferred in the region.

Examples of business guides by other Canadian municipalities include the City of Victoria's Sustainable Takeout Guide, and the City of Toronto's Reducing Single-Use & Takeaway Item Guide. The elements of these guides include resources and quick facts related to reuse as a preferred option, the challenges relating to poly-lined paper products and compostable plastics. TBM faces similar challenges and including the same content on paper-based products and compostable plastics would help reduce the issues related to contamination from look-alike products. The recommended business practices could include recommendations on ways to reduce single-use packaging such as reducing unnecessary items, accepting customer reusable cups and containers, offering reuse for dine-in services, and offering single-use items on request only. One common concern with consumers reusable containers is food safety, the City of Toronto has included guidance for safe handling of reusable cups and food containers to help mitigate this concern (City of Toronto, 2024b). Since the Blue Mountain Village and Blue Mountain Resort use

private waste management services, any business resource guide should be developed in conjunction with both the Blue Mountain Village Association and Blue Mountain Resort.

Education Recommendations

- ***Quick Win*** - Updating waste wizard to advise on compostable plastics, cup sleeves and wooden stir sticks. Monitor the situation with compostable plastics over the long-term.
- Develop a business resource guide indicating preferred single-use packaging for the region

6.3 INFRASTRUCTURE

Many businesses indicated that they use compostable packaging, however, there are no organics collection bins located in the public areas to effectively divert this waste from landfill. With shifting from plastic and plastic lined paper take-out containers to compostable paper take-out containers these products will contaminate the recycling stream or end up as waste. Adding composting bins to the public spaces could be an effective way to divert these products from landfill. However, there are likely challenges in adding organics collection bins to public spaces such as high compost contamination, attracting unwanted animals, bad odours, and the cost of composting processing compared to landfill. Contrary to this point, the challenges relating to odor and attracting animals are present with organic waste entering the public garbage bins already. Langely BC has implemented compost bins in public receptacles as part of their efforts to increase diversion in public spaces, suggesting that these issues could be overcome (Township of Langley, 2024). The composting bins could be implemented in a select number of locations close to quick service restaurants to target the most effective locations first such as the receptacles close to the main street of Thornbury and in Blue Mountain Village. An important step to reducing composting contamination would be to reduce or eliminate the amount of paper take-out packaging that has a plastic lining through educating businesses. If adding a composting bin along side the recycling bin, it is important to still include a waste bin which was identified as a factor for reducing recycling contamination (Andrews et al., 2013).

Better signage at the receptacles that visually indicate which products should go into which end of life stream could support single-use packaging reaching the correct pathway for diversion. This may be important in regions with high tourism since certain products, such as paper cups, have a regional variation in preferred end of life streams. This has been effective in reducing the amount of paper take-out containers that contaminate the recycling stream in Blue Mountain Resort. Improving signage may be more effective than educational campaigns in some areas due to the high volume and turnover of tourists visiting the restaurants in the Blue Mountain Village and Resort area. There may also be an opportunity to standardize the signage across the township in order to avoid confusion when tourists and residents visit different areas. The Town of Banff, who also has a high volume of tourists, provides standardized recycling receptable signage that businesses can download and use (Town of Banff, n.d.). Improving and standardizing the receptacle signage can help divert recyclable items from the waste stream and reduce the contamination in the recycling stream.

Water fountains can be used to reduce consumption of single-use beverage containers in public spaces and city buildings. Water fountains are already in place in the town office, and additional locations could be assessed for new fountains such as public parks.

Infrastructure Recommendations

- Add compost bins to public space receptacles to divert paper take-out containers from the waste stream
- Improve and standardize receptacle signage across the municipality

6.4 Economic Incentives

Funding for zero waste projects can be used to incentivize businesses to reduce consumption and waste of single-use packaging. Funding can be used to encourage businesses to adopt reuse systems which require more investment than the easier to implement measures such as switching to more recyclable or compostable packaging, which is the current focus of local businesses. Dine-in reuse systems are easier to implement than take-out reusable packaging due to the return infrastructure required. Dine-in reusable systems could be an avenue for funding, but business interest in this specific reuse system is unknown. Seven out of ten quick service restaurants that had seating for dine-in did not use reusable foodservice ware which suggests there is opportunity to implement this type of reuse system.

Economic Incentives Recommendations

- Funding for zero waste projects which may encourage the shift to dine-in reuse systems for quick service restaurants

6.5 Municipal Policies

Taking action within the municipalities policies on procurement and operations relating to city buildings and events can ensure the TBM leads by example. Procurement policies and city events could be limited to preferred single-use packaging types to improve diversion from landfill from city operations and events. Additionally, further requirements on purchasing products that include recycled materials can help stimulate demand for recycling collection and support the circular economy. By taking measures to ensure TBM's own consumption and waste of single-use packaging they can be a leader in the community and set an example for local businesses.

Municipal Policy Recommendations

- Procurement and operations policies relating to city buildings and events to preferred single-use packaging types and reuse systems

6.6 Other Considerations

The recommendations above do not include bylaws mandating sustainable business products or prohibitions on certain products. These measures may be necessary and effective in the future, but they come with negative perceptions from the business community. There are many voluntary

measures that can be undertaken first to improve the situation in the TBM before moving towards prescriptive measures. Collaboration with local businesses will be important for fostering long-term transition on sustainable packaging and ensuring a vibrant local economy.

TBM should encourage the shift to reuse systems and overall reduction of consumption to align with the Zero Waste Hierarchy. Future bylaws may be required when voluntary measures do not prove effective and should align with this long-term strategy. Examples of these bylaws include requiring customer reusable containers, dine-in reuse systems and by request requirements. Banff AB provided rebates to support the transition to dine-in reuse along side their bylaw (Chung, 2024), this is a strategy that could be mirrored in TBM. Further community engagement should be conducted for potential bylaws to avoid public pushback as seen in similar bylaws in Calgary and Vancouver which were enacted and then later repealed (Chung, 2024). Developing a shared vision with the business community is one way to gain better cooperation and buy-in on future strategies.

Persistent waste items such as plastic wrap, which do not have viable replacements currently may need to be replaced by reuse systems over the long-term. Despite the low interest in reuse systems by local businesses currently, TBM should monitor opportunities in this space. Reuse networks and NGO's such as reuse refill canada, and Circular Innovation Council could be leveraged when considering a pilot project in the region. The public space waste audit and survey to local businesses identified beverage containers, cups and take-out containers as potential high use items for the region to target. Even though paper cups and take-out containers can be diverted through recycling and composting streams, respectively, there are still inherent challenges with these products due to the contamination and separation of the various linings on these products. Reuse systems could be leveraged long-term to address lingering concerns with these laminate products. To create the right economic conditions for a reuse model, a shared pool system which standardizes containers and shares costs across participants may be required. Collaboration with the City of Collingwood may create opportunity to scale a reuse system in the region. To facilitate collaboration on future reuse systems, the forthcoming Green Economy Taskforce could play a role in identifying this opportunity and bringing stakeholders together. However, it will be important to assess the environmental impact through a life cycle assessment since the longer transportation distances in the region may have a negative impact on carbon emissions.

For any activity that is conducted in TBM with regards to foodservice single-use packaging, a standardized approach across the region with the various business associations representing the voice of the foodservice establishments in the region, including the differing end of life with private collection.

7 CONCLUSION

With the shift away from single-use plastic packaging towards alternatives such as paper and compostable plastic, there are several challenges with the effective diversion from landfill. These challenges include products ending up in the waste stream, consumer confusion with look-alike products, and contamination in recycling and composting streams. TBM has an opportunity to reduce the impact of these challenges through developing a strategy specific to their region. Education and infrastructure improvements can help ensure single-use packaging that is used in the region will be effectively diverted over the short-term, especially when it comes to paper cups and take-out containers. Updating municipal policies, providing economic incentives and supporting future reuse infrastructure and collaboration can support the transition to a circular economy for foodservice packaging over the long-term. Through taking meaningful action on single-use packaging, TBM can play a critical role in accelerating the transition to a circular economy in Canada.

REFERENCES

Andrews, A., Gregoire, M., Rasmussen, H., & Witowich, G. (2013). Comparison of recycling outcomes in three types of recycling collection units. *Waste Management*, *33*(3). https://doi.org/10.1016/j.wasman.2012.08.018

Association of Plastic Recyclers. (2018). *Size Sorting in the Plastics Recycling Process*. Size Sorting in the Plastics Recycling Process

Austin, J., Hatfield, D. B., Grindle, A. C., & Bailey, J. S. (1993). INCREASING RECYCLING IN OFFICE ENVIRONMENTS: THE EFFECTS OF SPECIFIC, INFORMATIVE CUES. *Journal of Applied Behavior Analysis*, *26*(2). https://doi.org/10.1901/jaba.1993.26-247

Baxter, L., Lucas, Z., & Walker, T. R. (2022). Evaluating Canada's single-use plastic mitigation policies via brand audit and beach cleanup data to reduce plastic pollution. *Marine Pollution Bulletin*, *176*. https://doi.org/10.1016/j.marpolbul.2022.113460

Bilek, M. A., Salem, H. J., Korehei, R., & Olson, J. A. (2021). Recycling Paper-Plastic laminate coffee cups using a Single-Disk Refiner: Energy requirements and recovered fiber quality. *Waste Management*, *136*, 104–112. https://doi.org/10.1016/J.WASMAN.2021.10.008

Blumhardt, H. (2023). Current and future approaches to shifting businesses towards plastic-free packaging systems based on reduction and reuse. *Cambridge Prisms: Plastics*, *1*. https://doi.org/10.1017/plc.2023.18

Brinton, W., Dietz, C., Bouyounan, A., & Matsch, D. (2016). *The Environmental Hazards Inherent in the Composting of Plastic-Coated Paper Products*. https://nrcne.org/wp-content/uploads/2019/12/microplastics_in_compost_white_paper.pdf

Campbell-Johnston, K., Vermeulen, W. J. V., Reike, D., & Brullot, S. (2020). The Circular Economy and Cascading: Towards a Framework. *Resources, Conservation & Recycling: X*, *7*, 100038. https://doi.org/10.1016/j.rcrx.2020.100038

Canada Plastic Pact. (2023a). *Report on Reuse and Refill of Plastic Packaging National Ecosystem Scan*. https://plasticspact.ca/wp-content/uploads/2023/04/CPP-Study-on-Reuse-and-Refill-of-Plastic-Packaging.pdf

Canada Plastic Pact. (2023b). *Working together for a Canada without plastic waste or pollution*. https://plasticspact.ca/

Canadian Council of Ministers of the Environment. (2018). *Strategy on Zero Plastic Waste*. https://ccme.ca/en/res/strategyonzeroplasticwaste.pdf

Chakori, S., Aziz, A. A., Smith, C., & Dargusch, P. (2021). Untangling the underlying drivers of the use of single-use food packaging. *Ecological Economics*, *185*. https://doi.org/10.1016/j.ecolecon.2021.107063

Chung, E. (2024, May 7). For cities and towns trying to cut out plastic, here's what's worked and what hasn't. *CBC News*. https://www.cbc.ca/news/canada/plastic-bans-by-city-town-1.7196086

Circular Cities & Regions Initiative. (2024). *Partners*. https://canadiancircularcities.ca/partners

Circular Cities and Regions Initiative. (2023). *Circular Cities and Regions Initiative Impact Report*. https://canadiancircularcities.ca/Documents/ccri-impact-story.pdf

City of Brussels. (n.d.). *Zero waste Brussels*. Retrieved February 13, 2024, from https://zero-waste.brussels.be/general-information

City of Copenhagen. (2024). *Circular Copenhagen Resource and Waste Management Plan 2024*. https://kk.sites.itera.dk/apps/kk_pub2/pdf/1991_245978ceff91.pdf

City of Hamilton. (2021). *Appendix "A" to Report PW21006: City of Hamilton Strategy to Reduce Single-Use Plastics*. https://www.hamilton.ca/sites/default/files/2024-01/rec-COH-strategy-single-use-plastics.pdf

City of Prague. (n.d.). *Circular Prague 2030*.

City of Toronto. (2024a). *Reducing Single-Use & Takeaway Items*. https://www.toronto.ca/services-payments/recycling-organics-garbage/long-term-waste-strategy/reducing-single-use-takeaway-items/

City of Toronto. (2024b). *Resources for Businesses Reducing Single-Use & Takeaway Items*. https://www.toronto.ca/services-payments/recycling-organics-garbage/long-term-waste-strategy/reducing-single-use-takeaway-items/resources-for-business-reducing-single-use-takeaway-items/

City of Vancouver. (2018). *Zero Waste 2040*. https://council.vancouver.ca/20180516/documents/pspc2a.pdf

City of Victoria. (n.d.). *Sustainable Takeout Guide Product and Purchasing Guidelines for Victoria's Food Service Businesses*.

Closed Loop Partners. (n.d.). *Navigating Plastic Alternatives In a Circular Economy*. Retrieved February 18, 2024, from https://www.closedlooppartners.com/research/navigating-plastic-alternatives-in-a-circular-economy/

Coelho, P. M., Corona, B., ten Klooster, R., & Worrell, E. (2020). Sustainability of reusable packaging–Current situation and trends. *Resources, Conservation & Recycling: X*, *6*, 100037. https://doi.org/10.1016/J.RCRX.2020.100037

Collis, B., Baxter, W., Baird, H. M., Meade, K., & Webb, T. L. (2023). Signs of Use Present a Barrier to Reusable Packaging Systems for Takeaway Food. *Sustainability (Switzerland)*, *15*(11). https://doi.org/10.3390/su15118857

Cornago, E., Börkey, P., & Brown, A. (2021). Preventing single-use plastic waste: Implications of different policy approaches. *OECD Environment Working Papers*, *182*.

Council of Canadian Academies. (2021). *Turning Point*.

Dagilienė, L., Varaniūtė, V., & Bruneckienė, J. (2021). Local governments' perspective on implementing the circular economy: A framework for future solutions. *Journal of Cleaner Production*, *310*. https://doi.org/10.1016/j.jclepro.2021.127340

Diprose, G., Lee, L., Blumhardt, H., Walton, S., & Greenaway, A. (2023). Reducing single use packaging and moving up the waste hierarchy. *Kotuitui*, *18*(3). https://doi.org/10.1080/1177083X.2022.2154230

Do, T. K. C., Herat, S., Khoa, L. Van, & Kaparaju, P. (2021). The current use and management of single-use items (SUIS) in the fast food industry in Ho Chi Minh City, Vietnam. *Nature Environment and Pollution Technology*, *20*(3). https://doi.org/10.46488/NEPT.2021.V20I03.006

Ellen MacArthur Foundation. (n.d.-a). *Our vision for a circular economy for plastics*. Retrieved February 20, 2024, from https://www.ellenmacarthurfoundation.org/plastics-vision

Ellen MacArthur Foundation. (n.d.-b). *What is a circular economy?* Retrieved March 29, 2024, from https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview

Ellen MacArthur Foundation. (2019). Reuse Rethinking Packaging. *Ellen MacArthur Foundation*.

Environment and Climate Change Canada. (2019). Economic Study of the Canadian Plastic Industry, Markets and Waste. In *Environment and Climate Change Canada*.

Environment and Climate Change Canada. (2021). *Guidance for selecting alternatives to the SUP in the proposed SUP prohibition regulations*.

Environment and Climate Change Canada. (2022). Single-use Plastics Prohibition Regulations: SOR/2022-138. In *Canada Gazette: Vol. Part II, Volume 156* (Issue Number 13). https://www.gazette.gc.ca/rp-pr/p2/2022/2022-06-22/html/sor-dors138-eng.html

Environment and Climate Change Canada. (2023a, May). *Developing a federal plastics registry*. https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/initiative-regulation/plastics-registry.html#toc4

Environment and Climate Change Canada. (2023b, May 5). *Recycled content and labelling rules for plastics*. https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/recycled-content-labelling-rules-plastics.html

Environment and Climate Change Canada. (2023c, June 13). *Canada's Zero Plastic Waste Agenda*. https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/canada-action.html

Environment and Climate Change Canada, & Health Canada. (2020). *Science Assessment of Plastic Pollution*. https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/science-assessment-plastic-pollution.html#toc1

Environment Canada. (2013). *Technical document on municipal solid waste organics processing*. https://publications.gc.ca/site/eng/436855/publication.html

European Bioplastics. (2018). *Face Sheet European Bioplastics*. https://docs.european-bioplastics.org/publications/fs/EuBP_FS_What_are_bioplastics.pdf

European Investment Bank. (2022). *Towards European Circular Cities: A Guide for Developing a Circular City Strategy*. https://circular-cities-and-regions.ec.europa.eu/support-materials/tools-and-methods/towards-european-circular-cities-guide-developing-circular-city

Federation of Canadian Municipalities. (n.d.). *A Guide to Catalyzing a Circular Economy in Your Community*. Retrieved February 20, 2024, from https://media.fcm.ca/documents/programs/gmf/a-guide-to-catalyzing-a-circular-economy-in-your-community_vy24x4.pdf

Freiburg Cup. (2024). *Was ist der FreiburgCup?* https://freiburgcup.de/de/was.php

Georgian Bay Forever. (2023). *2023 Shoreline Cleanup Report*. https://www.thebluemountains.ca/sites/default/files/2023-12/2023%20Shoreline%20Cleanup%20Report.pdf

Government of Canada. (2022, June 20). *Single-use Plastics Prohibition Regulations*. Canada Gazette, Part 2, Volume 156, Number13. https://www.gazette.gc.ca/rp-pr/p2/2022/2022-06-22/html/sor-dors138-eng.html

Government of Canada. (2023). *Recycled content and labelling rules for plastics: regulatory framework paper*. https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/recycled-content-labelling-rules-plastics.html#toc35

Grey County. (n.d.). *Local Municipal Services*. Retrieved January 3, 2024, from https://www.grey.ca/resident-services/local-municipal-services

Grey County. (2022). *Grey County Climate Change Action Plan*. https://www.grey.ca/government/climate-action

Guittard, A., Akinsete, E., Demian, E., Koundouri, P., Papadaki, L., & Tombrou, X. (2023). Tackling Single-Use-Plastic in small touristic islands to reduce marine litter: co-identifying the best mix of policy interventions. *Frontiers in Environmental Economics*, *2*. https://doi.org/10.3389/frevc.2023.1145640

Halifax Regional Municipality. (2018). *Single-use Item Reduction Strategy*. https://cdn.halifax.ca/sites/default/files/documents/city-hall/standing-committees/181206essc81.pdf

Herweyers, L., Moons, I., Barbarossa, C., De Pelsmacker, P., & Du Bois, E. (2023). Understanding who avoids single-use plastics and why: A cross-country mixed-method study. *Journal of Cleaner Production*, *414*. https://doi.org/10.1016/j.jclepro.2023.137685

Ice River Springs. (2021). *2021 Sustainability Report*. https://iceriversustainablesolutions.com/wp-content/uploads/2023/04/IRSS-Sustainability-Report.pdf

Kakadellis, S., & Harris, Z. M. (2020). Don't scrap the waste: The need for broader system boundaries in bioplastic food packaging life-cycle assessment – A critical review. In *Journal of Cleaner Production* (Vol. 274). https://doi.org/10.1016/j.jclepro.2020.122831

Lakhan, C. (2014). Exploring the relationship between municipal promotion and education investments and recycling rate performance in Ontario, Canada. *Resources, Conservation and Recycling*, *92*. https://doi.org/10.1016/j.resconrec.2014.07.006

Matthews, M., & Webb, T. L. (2023). Understanding Consumer's Willingness to Engage with Digital Reuse Systems. *Sustainability*, *15*(19), 14560. https://doi.org/10.3390/su151914560

Miao, X., Magnier, L., & Mugge, R. (2023). Switching to reuse? An exploration of consumers' perceptions and behaviour towards reusable packaging systems. *Resources, Conservation and Recycling*, *193*. https://doi.org/10.1016/j.resconrec.2023.106972

Morales-Caselles, C., Viejo, J., Martí, E., González-Fernández, D., Pragnell-Raasch, H., González-Gordillo, J. I., Montero, E., Arroyo, G. M., Hanke, G., Salvo, V. S., Basurko, O. C., Mallos, N., Lebreton, L., Echevarría, F., van Emmerik, T., Duarte, C. M., Gálvez, J. A., van Sebille, E., Galgani, F., … Cózar, A. (2021). An inshore–offshore sorting system revealed from global classification of ocean litter. *Nature Sustainability*, *4*(6). https://doi.org/10.1038/s41893-021-00720-8

Moss, E., Gerken, K., Youngblood, K., & Jambeck, J. R. (2022). Global landscape analysis of reuse and refill solutions. *Frontiers in Sustainability*, *3*. https://doi.org/10.3389/frsus.2022.1006702

Ontario Ministry of the Environment, & Association of Municipal Recycling Coordinators. (2006). *Waste Audit and Reduction Operations Training Project: Manual for Participants*.

Pålsson, H., & Olsson, J. (2023). Current state and research directions for disposable versus reusable packaging: A systematic literature review of comparative studies. In *Packaging Technology and Science* (Vol. 36, Issue 6). https://doi.org/10.1002/pts.2722

Province of British Columbia. (2024, January). *Plastics*. https://www2.gov.bc.ca/gov/content/environment/waste-management/zero-waste/plastics

Province of Ontario. (2008). *A Guide to Waste Audits and Waste Reduction Work Plans for Industrial, Commercial and Institutional Sectors*.

Province of Ontario. (2021, June 21). *A proposed regulation, and proposed regulatory amendments, to make producers responsible for operating blue box programs*. https://ero.ontario.ca/notice/019-2579

Province of Ontario. (2022, September 20). *A Made-in-Ontario Environment Plan*. https://www.ontario.ca/page/made-in-ontario-environment-plan

Reloop. (2022). *Deposit return systems: How they perform*. https://www.reloopplatform.org/wp-content/uploads/2022/09/Fact-Sheet-Performance-22Sept2022.pdf

Restaurants Canada. (n.d.). *Single-use Items Reduction Strategy Guide*. Retrieved March 29, 2024, from https://www.restaurantscanada.org/toolkit-single-use-items-reduction-strategy-guide/

Reuse Seattle. (2024). *The Reuse Seattle Partnerships*. https://reuseseattle.org/

Schmidt, S., & Laner, D. (2021). The multidimensional effects of single-use and packaging plastic strategies on German household waste management. *Waste Management*, *131*. https://doi.org/10.1016/j.wasman.2021.06.003

Springle, N., Li, B., Soma, T., & Shulman, T. (2022). The complex role of single-use compostable bioplastic food packaging and foodservice ware in a circular economy: Findings from a social innovation lab. *Sustainable Production and Consumption*, *33*, 664–673. https://doi.org/10.1016/J.SPC.2022.08.006

Šuškevičė, V., & Kruopienė, J. (2021). Improvement of packaging circularity through the application of reusable beverage cup reuse models at outdoor festivals and events. *Sustainability (Switzerland)*, *13*(1). https://doi.org/10.3390/su13010247

The Association of Plastic Recyclers. (2023). *Position Statements*. https://plasticsrecycling.org/position-statements

The Association of Plastic Recyclers. (2024). *APR Design® Guide*. https://plasticsrecycling.org/apr-design-guide

The Blue Mountains. (2023). *Experience The Blue Mountains*. https://www.exploreblue.ca/

The Canadian Press. (2023, March). *Vancouver city council votes to repeal 25 cent, single-use cup fee, effective May 1*. CBC News. https://www.cbc.ca/news/canada/british-columbia/single-use-cup-fee-vancouver-repealed-may-1-1.6794259

Town of Banff. (n.d.). *Single-Use Items Reduction Strategy*. Retrieved February 13, 2024, from https://banff.ca/1273/Single-Use-Items-Reduction-Strategy

Town of the Blue Mountains. (n.d.-a). *Curbside Garbage Collection*. Retrieved January 4, 2024, from https://www.thebluemountains.ca/resident-services/garbage-recycling-waste/curbside-garbage-collection#non-residential

Town of the Blue Mountains. (n.d.-b). *Sustainability & Environment*. Retrieved March 25, 2024, from https://www.thebluemountains.ca/planning-building-construction/sustainability-environment

Town of the Blue Mountains. (2021, May 21). *Notice- Clarification Regarding Single-Use Plastics*. https://www.thebluemountains.ca/town-hall/news-notices/notice-clarification-regarding-single-use-plastics

Town of the Blue Mountains. (2022). *The Blue Mountains Future Story: Our Integrated Community Sustainability Plan*. https://www.thebluemountains.ca/media/10694

Township of Langley. (2024). *Public Spaces Waste Management Program*. https://www.tol.ca/en/services/public-spaces-waste-management-program.aspx

UN Environment Assembly. (2022). *End plastic pollution: towards an international legally binding instrument: resolution 5/14*. https://wedocs.unep.org/bitstream/handle/20.500.11822/39812/OEWG_PP_1_INF_1_UNEA%20resolution.pdf

UN Environment Programme. (2024). *Intergovernmental Negotiating Committee on Plastic Pollution*. https://www.unep.org/inc-plastic-pollution

UNEP. (2021). Addressing single-use plastic products pollution using a life cycle approach. In *UN Document* (Vol. 3, Issue 7).

United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. Resolution adopted by the General Assembly on 25 September 2015. A/RES/70/1. *UN General Assembly, Seventieth Session. Agenda Items 15 and 116. New York: United Nations*. https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

United Nations Environment Programme (UNEP). (2021). From Pollution to Solution: A global assessment of marine litter and plastic pollution. In *New Scientist* (Vol. 237, Issue 3169).

Valiante, U., & Chartwell Grove Inc. (2022). *Barriers and opportunities for driving reuse in Canada*. https://static1.squarespace.com/static/60f6fa731be3360c5a67b2a6/t/62476a8654e1a603306e716f/1648847494149/rcc_driving-reuse-refill-canada-report.pdf

Varkey, P. S., Walker, T. R., & Saunders, S. J. (2021). Identifying barriers to reducing single-use plastic use in a coastal metropolitan city in Canada. *Ocean and Coastal Management*, *210*. https://doi.org/10.1016/j.ocecoaman.2021.105663

Walker, T. R., McGuinty, E., Charlebois, S., & Music, J. (2021). Single-use plastic packaging in the Canadian food industry: consumer behavior and perceptions. *Humanities and Social Sciences Communications*, *8*(1). https://doi.org/10.1057/s41599-021-00747-4

WSP Canada Inc. (2023). *2022 Annual Solid Waste Report: Town of The Blue Mountains Solid Waste Disposal Site*.

Ximenes, F. A., Cowie, A. L., & Barlaz, M. A. (2018). The decay of engineered wood products and paper excavated from landfills in Australia. *Waste Management*, *74*, 312–322. https://doi.org/10.1016/J.WASMAN.2017.11.035

Zero Waste International Alliance. (2022, May). *Zero Waste Hierarchy of Highest and Best Use 8.0*. https://zwia.org/zwh/

APPENDIX A:

Single-Use Packaging Public Space Waste Audit Procedure
Town of the Blue Mountains

Objective:
The objective of the waste audit is to quantify how much and which categories of food service single-use packaging/items are ending up in the waste and recycling stream in public spaces in the Town of the Blue Mountains (TBM). The results of the waste audit will be used to identify which single-use packaging should be targeted for reduction and diversion and will help identify what solutions would be most impactful in reducing waste associated with single-use foodservice packaging/items. It will also highlight to what degree single-use packaging that is found in the waste stream is recyclable and able to be diverted from landfill.

Sample Location and Frequency:
Sample Types:

- Waste bin
- Recycling bin

Locations:

- 1 Clarksburg downtown
- 1 Thornbury downtown
- 1 Blue Mountain Resort
- 1 Blue Mountain Village

Frequency:

- 1x Mid-week (represents work week)
- 1x Monday (represents weekend)

Time Frame: Between March 4-18th to have a consistent time frame for collection.

Resources:

- Bag Labels (Collection Method, Collection Location, Time, Date)
- Digital Weight Scale (+/- 200g)
- Containers for isolating, moving, sorting and weighing waste

Safety:
Personal Protective Equipment is required as per the requirements of the Town of the Blue Mountains waste handling procedures. It is recommended that you wear puncture resistant gloves, safety glasses, face shield, steel toe footwear and long sleeve/cover all suits.

Procedure:
For each sample collected:

1. Collect the waste and recycling sample and label the bag or container with the:
    a. Collection Location
    b. Time
    c. Date
2. Weigh entire waste sample 3 times and record on the waste audit data collection sheet found in Appendix A and indicate the unit of weight based on the digital scale used.
3. Sort the waste into the categories indicated in the waste audit data collection sheet.
4. Take a picture of the sub-categories and record any relevant information in the comment section such as if three was a high degree of food waste present in the sample set, if the majority of the sample was a certain product, and type of plastic contained in the sample (plastic resin #). Check the plastic cups and take-out containers for resin code 7 which may indicate a bio-based or compostable plastic.
5. Weigh the empty container to be used for holding the materials during weighing 3 times and record in the waste audit data collection sheet.
6. Determine the weight of each category by weighing the samples 3 times in the empty container using a digital scale and recording on the waste audit data collection sheet.
    a. For single-use items, paper cups, and paper snack bags, if weight is less than 0.2lbs please use the food scale
7. Record any deviations or additional sorting categories that you used in the comment section of the waste audit data collection sheet. Indicate if any measurements of the product categories did not use the bin.
8. Return the completed waste audit data collection sheet and picture to Laura Eagan (leagan@uwaterloo.ca).
9. Keep single-use packaging samples for 2 weeks to provide follow-up analysis by Laura Eagan if the need is identified.

Waste Audit Data Collection Sheet

Name of person(s) conducting waste audit	
Date of Collection	
Time of Collection	
Location of Collection	
Type: Recycling or Waste Bin	
Date of Sorting and Weighing Materials	

Material/Item Weight and Composition

Category	**Sub-Category**	W1 (lbs)	W2 (lbs)	W3 (lbs)	Comment
Empty Bin Weight					
Total Weight (no bin – in bag)					
Beverage Packaging	Recyclable pre-packaged beverage containers				
	Non-recyclable prepackaged beverage containers				
	Paper Cup & Lid (Coffee, Soda)				
	Plastic Cup				Plastic Resin #:
	Styrofoam Cup				
Single-use foodservice ware	Recyclable Plastic Take-out containers and lids				Plastic Resin #:
	Non-recyclable plastic take-out containers				
	Compostable Plastic & Bioplastic				
	Recyclable/Compostable Paper and Plant-fibre take-out containers				
	Paper snack bags				
	Aluminum take-out container				
Single-use Items					
Residual Waste (indicate if bin or no bin)					

Additional Comments:

APPENDIX B

Category Definitions

Category	Sub-Category	Item	Details/Comments	End-of life	Picture
Beverage Packaging	Recyclable pre-packaged beverage containers	Plastic bottles	Most beverage bottles are made out of PET, not going to distinguish #	Blue-Box	
		Glass Bottles		Blue-box	
		Aluminum Cans		Blue-box	
		Carton	Both aseptic and non-aspetic packaging is accepted for recycling	Grey-box	 
	Non-recyclable prepackaged beverage containers	Pouches		Garbage	
	Paper Cup (Coffee, Soda)	Paper Cup	Lids Separate	Grey-box	
		Plastic Cup Lids		Blue-box	
	Plastic Cup	Plastic Cup	Should indicate material type if can	Blue-box	
	Styrofoam Cup	Styrofoam Cup		Garbage	

Category	Sub-Category	Item	Details/Comments	End-of life	Picture
Single-use foodservice ware	Recyclable Plastic Take-out containers	Plastic take-out containers (bowl, tray, container, clamshell)	Indicate #	Blue-box	 
		Plastic take-out container lid	Goes onto paper or plastic bowls/containers	Most likely blue bin	
	Non-recyclable plastic take-out containers	Styrofoam Container		Garbage	
		Plastic Plates		Garbage	
	Compostable Plastic & Bioplastic	Compostable Plastic & Bioplastic	Marketed as compostable, examples include PLA	Most likely waste	 **Resin Code #7**

Category	Sub-Category	Item	Details/Comments	End-of life	Picture
Single-use foodservice ware	Recyclable/Compostable Paper and Plant-fibre take-out containers	Paper plate		Green bin	
		Paper take-out containers (compostable)	Most likely permitted to have compostable lining, not compostable with plastic liner Types – bowls, plates, clamshell, tray, container	Green bin in waste wizard, Unsoiled Carboard box, no lining, grey bin	
		Plant-fibre containers (compostable)	Most likely permitted to have a compostable lining. Ex. Sugarcane Bagasse fibre is marketed as compostable. Types – bowls, plates, clamshell, tray, container	Most likely compostable	
		Paper take-out containers Poly lined (not compostable)	Paper take-out lined with a coating that deems it not recyclable. Difficult for consumer to distinguish between	Most likely grey bin	
	Recyclable paper snack bags	Paper bag (sandwich, snack, cookie)	Unsoiled go into recycling, paper lined with plastic cannot be composted	Grey box	 
	Aluminum take-out container	Aluminum plate/container		Blue-bin	

Category	Sub-Category	Item	Details/Comments	End-of life	Picture
Single-use Items	Single-use Items	Plastic Straw		Garbage	
		Paper Straws		Green bin	
		Plant-fibre Straws	plant fibre examples include sugarcane bagasse, marketed as compostable	Most likely green bin	
		Plastic Cutlery		Garbage	
		Wood Cutlery		Green bin	
		Biodegradable or Compostable Plastic Straws, Cutlery, condiment cups or stir sticks	Marketed as compostable, examples PLA	Most likely garbage	Looks like plastic, **resin code #7**
		Paper or plant-fibre condiment cups or packets (compostable)	Size of packet or cup make it not capturable in MRF, if packets not recyclable	Most likely green bin	
		Plastic Condiment cups and packets	Types include small plastic cups multi-layer packets	Most likely garbage	
		Plastic stir sticks		Most likely garbage	
		Wooden stir sticks	popsicle sticks green bin item	Most likely green bin	
		Cup Sleeves		Most likely grey bin	
		Coffee Cup Trays		Garbage	
		Plastic check-out bags		Garbage	

		Paper check-out bags		Grey bin	

APPENDIX C

Survey on Single-use Packaging to Food Service Businesses in the Town of the Blue Mountains

Start of Block: Pre-Survey Consent

Q30 You are invited to participate in a survey I am conducting for a graduate course in Environment and Business (ENBUS 690) at the University of Waterloo. My project is exploring opportunities and barriers to reducing single-use packaging within food service businesses in the Town of the Blue Mountains.

We would appreciate it if you would

- Take about 10-15 minutes and complete the questionnaire.
- You may leave blank any question you prefer not to answer.
- You may withdraw from the project at any time by closing your browser window.
- Because this is an anonymous survey the researchers have no way of identifying you or getting in touch with you.
- The data collected through this study will be kept for a period of up to 12 months in a secure location then confidentially destroyed.
- There are no known or anticipated risks to participation in this study.

If you have any questions about this project please feel free to contact the course instructor, Dr Dan Murray by email at dan.murray@uwaterloo.ca

This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please contact the Chief Ethics Officer, Office of Research Ethics, at 1-519-888-4567, ext. 36005 or ore-ceo@uwaterloo.ca.

Thank you in advance for your participation in this project.

Laura Eagan
MEB Candidate
Leagan@uwaterloo.ca

- ○ Yes, I consent (1)
- ○ No, I do not consent (3)

Skip To: End of Survey If You are invited to participate in a survey I am conducting for a graduate course in Environment a... != Yes, I consent

End of Block: Pre-Survey Consent

Start of Block: Business Information

Q1 Where is your business located?

- ○ Thornbury (1)
- ○ Craigleith (2)
- ○ Clarksburg (3)
- ○ Blue Mountain Village/Resort (4)
- ○ Other (5)

Q6 Is your business part of a larger chain or brand?

- ○ Yes (1)
- ○ No (2)
- ○ Other (3) _____

Q7 What is your relationship to the business?

- ○ Owner (1)
- ○ Manager (2)
- ○ Employee (3)
- ○ Other (4) _____

Q2 What type of food service does your business primarily provide?

- ○ Dine In (Restaurant) (1)
- ○ Takeout (Quick Service Restaurant including Cafe) (2)

End of Block: Business Information

Start of Block: Dine-in Restaurant

Q4 Do you also provide take-out or the ability to take the meal or leftovers home in single-use packaging?

- ○ Yes (1)
- ○ No (2)

End of Block: Dine-in Restaurant

Start of Block: Food Delivery

Q31 Do you use/participate in food delivery services (Uber Eats, Skip the Dishes, etc)

- ○ Yes (1)
- ○ No (3)

End of Block: Food Delivery

Start of Block: SUP used

Q15 Do you use single-use beverage packaging at your establishment?

Single-use beverage packaging is designed for serving or transporting beverages that is ready to be consumed and is disposed of after one use. Examples include plastic bottles, cans, cartons and coffee cups.

- ○ Yes (1)
- ○ No (2)

Q16 Do you use single-use foodservice ware packaging at your establishment?

Single-use foodservice ware packaging is designed for serving or transporting food or beverage that is ready to be consumed and is disposed of after one use. Examples include take-out containers such as bowls, plates, trays, boxes, clamshells, and cookie bags.

- ○ Yes (1)
- ○ No (2)

Q17 Do you use any single-use items at your establishment?

Single-use items are those that facilitate the consumption of food and are used only once before being disposed as waste. Examples include utensils, straws, stir sticks, condiments, and cup sleeves.

- ○ Yes (1)
- ○ No (2)

End of Block: SUP used

Start of Block: SU Beverage Packaging

Q18 What types of single-use beverage packaging do you use at your establishment? (Select all that apply)

- ☐ Plastic Bottles (1)
- ☐ Glass Bottles (9)
- ☐ Aluminum Cans (2)
- ☐ Carton (3)
- ☐ Paper Cup (hot drinks) (4)
- ☐ Paper Cup (soda/water) (5)
- ☐ Plastic Cup (6)
- ☐ Cup Lids (plastic) (8)
- ☐ Other-please specify (7) _____

End of Block: SU Beverage Packaging

Start of Block: SU Foodservice Ware

Q19 What single-use foodservice ware packaging do you use at your establishment? (Select all the apply)

- ☐ Plastic Wrap (12)
- ☐ Plastic take-out containers (bowl, tray, clamshell) (1)
- ☐ Plastic Plates (8)
- ☐ Styrofoam Container (bowl, plate, clamshell, tray) (7)
- ☐ Paper or plant fiber take-out containers - lining compostable or no lining (bowl, plate, clamshell, tray) (plant fibre e.g. sugarcane bagasse fibre) (2)
- ☐ Poly lined paper or plant fibre take-out containers (bowl, plate, clamshell, tray) (plant fibre e.g. sugarcane bagasse fibre) (11)
- ☐ Take-out container plastic lids (13)
- ☐ Paper bags (sandwich, snack, cookie) (5)
- ☐ Cardboard box (3)
- ☐ Aluminum containers (bowls, plates, trays) (4)
- ☐ Compostable/Biodegradable Plastic (bowl, plate, tray, container, lid) - eg. PLA (9)
- ☐ Other - please specify (6) _____

End of Block: SU Foodservice Ware

Start of Block: Foodservice ware - type of food

Q24 What type of food is being consumed/transported in the foodservice ware?

_____

_____

_____

_____

_____

End of Block: Foodservice ware - type of food

Start of Block: SU other

Q20 What single-use items do you use at your establishment? (Select all that apply)

- ☐ Plastic straws (2)
- ☐ Paper or plant fiber straws (plant fiber e.g. sugarcane bagasse fiber) (1)
- ☐ Plastic cutlery (3)
- ☐ Wood or plant fiber cutlery (plant fiber e.g. sugarcane bagasse fiber) (4)
- ☐ Plastic condiment cups or packets (16)
- ☐ Paper or plant fiber condiment cups or packets (6)
- ☐ Plastic stir sticks (7)
- ☐ Wooden stir sticks (8)
- ☐ Paper cup sleeves (14)
- ☐ Cup Trays (15)
- ☐ Plastic check-out bags (9)
- ☐ Paper check-out bags (10)
- ☐ Compostable/biodegradable plastic straws, utensils, stir sticks or condiment cups (e.g. PLA) (13)
- ☐ Other-please specify (11) _____

End of Block: SU other

Start of Block: If actions have been taken

Q10 Has your business already taken measures to reduce consumption or waste of single use packaging/items?

- ○ Yes (1)
- ○ No (2)

End of Block: If actions have been taken

Start of Block: Measures Already Taken

Q11 What actions have you taken? (Select all that apply)

- ☐ Reduced unnecessary single-use packaging or items (1)
- ☐ Reduced through an "ask first" approach (2)
- ☐ Switched to reusable packaging for dine-in (3)
- ☐ Switched to reusable packaging for take-out (8)
- ☐ Switched to recyclable packaging (4)
- ☐ Switched to compostable packaging (5)
- ☐ Accepting consumers reusable containers (6)
- ☐ Other-please specify (7) _____

Q12 What barriers have you faced in reducing consumption and waste of single-use packaging/items at your establishment? (Select all that apply)

- [ ] I lacked knowledge on options and which measures would be best (1)
- [ ] I did not have the time to fully investigate which measures would be best (2)
- [ ] Reusable/Recyclable/Compostable alternatives are more expensive (3)
- [ ] Reusable systems were difficult or complex to implement (4)
- [ ] Difficulty sourcing Reusable/Recyclable/Compostable alternatives (5)
- [ ] Losing customers due to increased cost (6)
- [ ] Losing customers due to decreased functionality/ease of use (10)
- [ ] Food safety (7)
- [ ] I did not have power to implement measures due to restaurant brand/chain standardization (8)
- [ ] Other-please specify (9) _____

Q29 Do you plan on taking additional action in the future to reduce consumption and waste of single-use packaging/items?

- ○ Yes, within the next year (1)
- ○ Yes, within the next 2-3 years (2)
- ○ Yes, but in the long term (3+ years) (3)
- ○ No (4)

End of Block: Measures Already Taken

Start of Block: Actions that are planned

Q24 What actions are you considering to reduce consumption and waste of single-use packaging? (Select all that apply)

- [ ] Reduce unnecessary single-use packaging or items (1)
- [ ] Reduce through an "ask first" approach (2)
- [ ] Switch to reusable packaging for dine-in (3)
- [ ] Switch to reusable packaging for take-out (9)
- [ ] Switch to recyclable packaging (4)
- [ ] Switch to compostable packaging (5)
- [ ] Accepting consumers reusable containers (6)
- [ ] Other-please specify (7) _____
- [ ] Not sure yet (8)

End of Block: Actions that are planned

Start of Block: Anticipated Barriers

Q27 What do you anticipate the barriers to be in reducing consumption and waste of single-use packaging/items at your establishment? (Select all that apply)

- ☐ I do not have knowledge on what options are available and which measures would be best (1)
- ☐ I do not have time to investigate which measures would be best for my establishment (2)
- ☐ Reusable/Recyclable/Compostable alternatives are more expensive (3)
- ☐ Reusable systems are difficult or complex to implement (4)
- ☐ Difficulty sourcing Reusable/Recyclable/Compostable alternatives (5)
- ☐ I am concerned about losing customers due to increased cost (6)
- ☐ I am concerned about losing customers due to decreased functionality/ease of use (10)
- ☐ I am concerned about food safety (7)
- ☐ I do not have power to implement measures due to restaurant brand/chain standardization (8)
- ☐ Other-please specify (9) _____

End of Block: Anticipated Barriers

Start of Block: Barriers elaborate on

Q13 Please elaborate on the barriers that you have identified or anticipate.

_____

_____

_____

_____

_____

End of Block: Barriers elaborate on

Start of Block: No Action why - previous action taken

Q34 Why are you not planning on taking additional action in the future to reduce consumption and waste of single-use packaging/items? (Select all that apply)

- ☐ I believe I have reduced single use packaging as much as feasibly possible already (1)
- ☐ Because of the barriers I previously identified (2)
- ☐ Other (3) _____

End of Block: No Action why - previous action taken

Start of Block: If they plan on taking action and barriers

Q25 Do you plan on taking action in the future to reduce consumption and waste of single-use packaging?

- ○ Yes, within the next year (1)
- ○ Yes, within the next 2-3 years (2)
- ○ Yes, but in the long term (+3 years) (3)
- ○ No (4)

End of Block: If they plan on taking action and barriers

Start of Block: No Action - why?

Q33 Why are you not planning on taking additional action in the future to reduce consumption and waste of single-use packaging/items? (Select all that apply)

- ☐ I believe I have reduced single use packaging as much as feasibly possible already (1)
- ☐ I anticipate barriers (2)
- ☐ Other (4) _____

End of Block: No Action - why?

Start of Block: Municipal Support

Q23 Please rank in order how you think the municipality of the Town of the Blue Mountains can support you in reducing consumption and waste of single-use packaging/items? (Drag and drop)

_____ Community zero waste education (4)
_____ Business resources (e.g. guide for choosing alternatives to single-use packaging/items) (5)
_____ Providing recognition for businesses implementing reduction measures (7)
_____ Leading by example through implementing reduction measures on municipal sites and events (8)
_____ Connecting businesses with each other to share experiences and/or best practices regarding materials selection, waste reduction/diversion, and opportunities to collaborate (13)
_____ Funding for zero waste projects (16)
_____ Facilitating a study on community wide re-use systems for take-out food and/or beverage packaging (14)
_____ By-laws (e.g. prohibitions, mandating acceptance of customers reusable cups/containers) (15)

Q32 Do you have any suggestions or comments on ways you think the Town of the Blue Mountains can support you in reducing consumption and waste of single-use packaging/items? Or are there any other organizations, groups or business associations that you think could play a role?

_____

_____

_____

_____

_____

End of Block: Municipal Support

Start of Block: Take-out Quick Service Restaurant

Q5 Do you provide onsite dine in seating for customers to eat/drink?

- Yes (1)
- No (2)

End of Block: Take-out Quick Service Restaurant

Start of Block: Take-out with onsite seating

Q8 Do you provide reusable food ware for dine in?

- Yes (1)
- No (2)
- Other (3) _____

End of Block: Take-out with onsite seating