Waste Management Design Report

Prepared for:

Losani Homes

Development Project

127 Plains Road

Burlington, ON

Prepared by:

PragmaTech Waste Solutions

Losani Homes
430 McNeilly Road, Suite 203
Stony Creek,
ON L8E 5E3

Attention: Daniel Borrelli M.PL. – Planner and Project Coordinator October 23, 2024

RE: Waste Management Guidance for 127 Plains Rd Burlington

Thank you for the opportunity to prepare a report and provide guidance on the waste management design of the mixed use multi-residential building project, located at 127 Plains Rd Burlington, Ontario.

The PragmaTech team has completed a waste stream analysis for the mixed use multi-residential building based on the documents and architectural drawings provided. Using this information, the PragmaTech team has developed a comprehensive report that includes findings from our analysis with respect to service frequencies, room sizing and equipment considerations for all agreed upon waste storage and retrieval areas, with careful consideration for the perspectives of primary stakeholders, including tenants, operations staff and service providers.

The analysis, guidance and recommendations provided in this report are based on an optimized source-separated waste management program for multi-unit commercial building and have been developed within the legislative context of the province of Ontario and the Regional Municipality of Halton ("Halton Region").

PragmaTech is a full-service environmental sustainability consulting firm with over 30 years of experience in the waste management industry. Our team of Environmental Performance Consultants, Process and Project Managers, Certified Waste Auditors, Technicians and Analysts are well equipped to support the next stages of this waste management program and provide guidance for the implementation of well-executed waste management decisions throughout the course of the project. Subsequent sections of the Scope of Work will be delivered over the next three weeks.

We would be happy to provide additional information or participate in further discussion on how PragmaTech can continue to be of service during this project.

Best Regards,

Ron Billings, Certified Waste Auditor
Waste Management Consultant
519.575.8446
ronb@pragmatechltd.com

Table of Contents

1.0 Introduction 4
2.0 Waste Management Regulations 4
2.1 Halton Region 4
2.2 Waste Legislation Changes in Ontario 6
2.3 5 Year Implementation Plan – Strategy for a Waste-Free Ontario 6
2.4 Source Separation Programs– Ontario Regulation 103/94 7
2.5 Ontario Regulation 102/94 – Part IV – Large Construction Projects 7
3.0 Environmental Sustainability & Circular Economy Framework 8
4.0 Waste Generation Analysis (Residential) 12
Table 1: Estimated Weekly Generation Volumes (Residential) 12
4.1 Equipment Recommendations (Residential) 13
5.0 Waste Generation Analysis (Commercial/Retail) 15
Table 5: Estimated Weekly Generation Volumes (Commercial/Retail) 15
5.1 Equipment Recommendations (Commercial/Retail) 16
6.0 Design Recommendations from Halton Region 18
6.1 Waste Area Requirements 18
7.0 Other Waste Equipment Considerations (if applicable) 18
7.1 Biomedical Waste Consideration and Equipment 18
7.2 Common Area Waste and Recycling Containers (suggested) 19
7.3 Additional Equipment Recommendations and Considerations (optional) 20
8.0 Waste Room Considerations 21
9.0 Tenant Welcome Package 21
10.0 Signage Considerations 22

1.0 Introduction

PragmaTech Waste Solutions ("PragmaTech") was retained by Losani Homes to prepare a waste management design report and provide recommendations on the creation of an optimal waste management program pertaining to waste generation, equipment, space, optimal bin maneuvering, and regulations. Project direction, architectural drawings, and information regarding the proposed mixed use multi-unit development and waste management plans were provided by Daniel Borrelli (Losani Homes) and Claudia Maria Costa (Chamberlain Architect Services Limited). The analysis and recommendations provided in this report are based on an optimized source-separated waste management program and have been developed within the legislative context of Halton Region and the province of Ontario.

Disclaimer: During the preparation of this report, PragmaTech Waste Solutions has developed recommendations for appropriately sized equipment to adequately reach the goals of an optimal waste management program. Although recommendations have been provided with respect to specific pieces of equipment, these are simply suggestions to provide context to the report. Please note that PragmaTech holds no bias towards specific manufacturers *or* their equipment. Further, waste generation volumes may vary (e.g. increase) depending on building residential occupancy rates and the number of staff in each commercial/retail tenant's space.

2.0 Waste Management Regulations

127 Plains Rd Burlington, Ontario is located in Halton Region and must abide by the regional and provincial regulations for a mixed-use multi-unit residential complex containing more than six units.

2.1 Halton Region

Mandatory recycling of recyclable material- No person shall place any recyclable material with other garbage put out for collection. Every person shall dispose of all recyclable material in the matter set out in Section 18 herein. Section 18 - See below three main disposal programs. Section 19 - Every person who contravenes Section 17 or 18 of this By-law is guilty of an offence and is liable upon conviction to a maximum penalty of $2,000.00 exclusive of costs.

Halton Region offers three main disposal programs: (*private contractor acceptance criteria may differ*)

1. **Blue Box Recycling (Single Stream Recycling)**



2. Green Cart Recycling (Organic/Compost Materials)



3. Garbage (Non-Recyclable Waste Materials)



Halton Region offers a Waste Diversion Guide for detailing recycling solutions for other waste streams, such as:

- Household Hazardous Waste
- Medications and Sharps
- Battery Recycling
- Paints and Stains
- Electronics
- Tires
- Plastic Shopping Bags
- Waste Reduction Methods
- Donation drop-off locations for reusable items

2.2 Waste Legislation Changes in Ontario

Ontario is shifting to a waste management approach where waste is seen as a resource that can be recovered, reused and reintegrated back into the economy

Ontario is shifting to a circular economy with a new waste management approach, where waste is treated as a resource that can be recovered, reused and reintegrated into the economy and production stream. This will support the health of both Ontario's environment and communities. Our new approach will:

- reduce litter and waste in our communities
- protect the environment
- drive innovation, performance and competitiveness
- stimulate economic growth and development

Ontario's new waste management framework includes updated legislation and a strategy to guide progress that will protect the environment, drive innovation, enhance performance and competitiveness, and stimulate economic growth and development.

Bill 151, the Waste-Free Ontario Act, 2016 was passed on June 1, 2016, and enacts the Resource Recovery and Circular Economy Act 2016 and the Waste Diversion Transition Act 2016. Once fully implemented, the Bill, along with the Resource Recovery and Circular Economy Act will replace the existing waste diversion program requirements operating under the Waste Diversion Act (2002).

The Strategy for a Waste-Free Ontario: Building the Circular Economy will serve as the roadmap to divert more waste from landfills, create jobs, reduce greenhouse gas emissions responsible for climate change, save scarce resources and create a system where all resources, organic or non-organic materials are recovered, reused and integrated back into the economy. This is meant to ensure that nothing is wasted, and valuable materials destined for landfill create economic value without having negative effects on the environment.

The Food and Organic Waste Framework, released on April 30th, 2018 outlines actions for the province and municipalities to take and provides direction to the waste management industry and the IC&I sector to prevent and reduce food waste, rescue surplus food, recover food and organic waste from disposal, and support beneficial uses of end products such as compost, digestate and biogas.

Disposal bans for specific materials are currently being reviewed by the province and are included in public consultations. The primary materials considered for disposal bans include:

- food waste
- materials designated under existing waste diversion programs
- beverage containers
- corrugated cardboard and some paper materials
- fluorescent bulbs and tubes

The proposed Food and Organic Waste Framework, Strategy for a Waste-Free Ontario, and the 5-year Climate Change Action Plan were developed to work together to help fight climate change by reducing greenhouse gas emissions from landfilled materials that could otherwise be reduced, reused, recycled, composted and reintegrated into the economy.

2.3 5 Year Implementation Plan – Strategy for a Waste-Free Ontario

2020 – Interim goal of 30% diversion achieved. Complete the transition of existing waste diversion programs (except Blue Box) and designate additional materials under producer responsibility regulations (e.g. mattresses, carpets, furniture)

2021 – Begin implementing disposal bans on material under existing waste diversion programs

2022 – Implement a possible food waste disposal ban and release a progress report on the Waste-Free Ontario Strategy

2023 – Complete transition of Blue Box program and designate additional materials under the producer responsibility regulation

2024 – Develop and consult on additional policy statements

2025 – Begin review of Waste-Free Ontario Strategy and designate additional materials under the producer responsibility regulation

2.4 Source Separation Programs– Ontario Regulation 103/94

Recycling is mandatory in the province of Ontario. Ontario Regulation 103/94 is the Provincial legislation that requires property owners to operate a building recycling program if the building has six or more units, and it is located in a municipality with a population of at least 5,000. The legislation requires the implementation of a 'Source Separation' Program within multi-unit buildings.

A source separation program includes activities to separate recyclables from other waste at the source (point of generation). Activities must include the provision of facilities for the collection, handling and storage of recyclables, including suitable containers for tenants to deposit their recyclables. These containers must be conveniently located, properly sized, and adequately contain the recyclable materials. Reasonable effort must be made to ensure that full use of the program is made. The program must be communicated to all employees and tenants to ensure that source separation procedures, responsibilities and equipment use are properly understood and followed. New employees should be informed of the program and trained in its operation.

The Ministry of the Environment is responsible for enforcement of *O. Reg. 103/94*. Inspections of buildings are conducted by the Ministry's Compliance Branch, which has authority to issue fines to property owners for non-compliance.

For more information, please visit: https://www.ontario.ca/page/waste-management

2.5 Ontario Regulation 102/94 – Part IV – Large Construction Projects

The following section outlines the requirements governing large construction projects with respect to Waste Audits and Waste Reduction Work Plans under *O. Reg. 102/94*. The 1044 South Service Rd W project is *NOT* subject to the following section from https://www.ontario.ca/laws/regulation/940102.

Please Note: *PragmaTech specializes in conducting Waste Audits and preparing Waste Reduction Work Plans in accordance with Ontario legislation and would be happy to provide this service to ensure the project meets its provincial compliance obligations.*

PART IV
LARGE CONSTRUCTION PROJECTS

19. (1) This Part applies to a person who undertakes, on their own behalf or on behalf of another person, a construction project consisting of the construction of one or more buildings with a total floor area of at least 2,000 square meters.
(2) In this Part,
"builder" means a person described in subsection (1). O. Reg. 102/94, s. 19.

20. (1) The builder shall conduct a waste audit covering the waste that will be generated in the construction project. The audit shall also address the extent to which materials or products used consist of recycled or reused materials or products.
(2) After conducting the waste audit, the builder shall prepare a written report of the audit. O. Reg. 102/94, s. 20.

21. The builder shall prepare a written waste reduction work plan, based on the waste audit, to reduce, reuse and recycle waste generated in the construction project. O. Reg. 102/94, s. 21.

22. The builder shall implement the waste reduction work plan. O. Reg. 102/94, s. 22.

23. The waste reduction work plan shall include measures for communicating the plan to the workers at the construction site and, as a minimum, those measures shall require,
(a) that the plan or a summary be posted at the construction site in a place where most of the workers will see it; and
(b) if a summary is posted, that any worker who requests to look at the plan be allowed to do so. O. Reg. 102/94, s. 23.

24. (1) The report of the waste audit and the waste reduction work plan required under this Part shall be prepared before construction work begins at the site.
(2) If construction work has begun at the site before this Regulation comes into force, the following transitional rules apply with respect to the waste audit, the report and the plan:
1. The report and plan shall be prepared within six months after this Regulation comes into force.
2. The report and plan need not be prepared if all work is finished within six months after this Regulation comes into force.
3. The waste audit need not cover any waste generated within six months after this Regulation comes into force.
4. The plan need not address any waste generated within six months after this Regulation comes into force. O. Reg. 102/94, s. 24.

3.0 Environmental Sustainability & Circular Economy Framework

Effective resource management practices that consider the full life-cycle of materials are critical to environmental sustainability. The movement towards a circular economy is putting resource recovery and waste reduction at the forefront of effective waste management practices.

We recommend that you regularly review and revise your Waste Management and Procurement Policies and Practices to ensure that every effort is made to create integrated systems where nothing is wasted and waste (destined for landfill or incineration) is treated as a valuable resource for recovery and reuse and is put back into the economy without having negative effects on the environment.

In addition to environmental and social responsibility, companies have a legal obligation to demonstrate due diligence for waste management and resource recovery. To ensure compliance with these obligations, we recommend using continuous quality improvement and employee/tenant engagement best practices to develop innovative waste management programs and practices. We also recommend that you partake in regular monitoring and reporting of program performance indicators. For programs using contractors with policies and practices, we recommend continuous monitoring to ensure that transparency and integrity are maintained in their sustainable waste management practices.

Waste reduction and resource recovery should be the first consideration in product, processing and packaging design. Strive to purchase materials and equipment that can be recovered or recycled at their end of life, as well as those produced using recycled and/or recyclable materials. Ensure that items such as paper, paper towel, paper cups, and office equipment are addressed in the procurement policy. Encourage company employees, management responsible for product and/or space design and procurement personnel to source and purchase products containing recycled content and/or are recyclable after use.

Reduce, Reuse and Recycle

Continue to explore innovative ways to reduce or eliminate waste. There is a common misconception that recycling is the easiest, most cost-effective and most convenient form of waste diversion. In fact, REDUCTION is the most efficient waste management and environmental stewardship practice. Reducing waste production can lead to conserving natural resources, decreasing toxicity of wastes, and reducing the cost impact on communities, businesses, and consumers. Most waste reduction strategies fail because of using the 3Rs (REDUCE, REUSE and RECYCLE) in the reverse order.

Some of the costs associated with recycling could be reduced or eliminated by reducing the types and/or volume of materials generated. Some potential cost savings may be associated with material handling, equipment costs, disposal and contamination fees, floor space and storage areas, employee training, recycling program promotion and sourcing available end-markets.

Disposal

Environmental Sustainability and Stewardship legislation changes continue to target specific materials for reduction/removal from landfill disposal. In addition, landfill costs are increasing due to the shrinking availability of space. These costs and conditions are key drivers for companies to develop innovative solutions and alternatives to dispose of their waste.

In Canada, incineration or "waste to energy" is considered a *disposal alternative*, NOT a method of *waste diversion*. Incineration does not promote the 3Rs. An important distinction is that burning waste destroys resources; it does not reduce waste. In addition, burying or burning waste may discharge toxins or pollutants into land, water or air that could prove to have negative human and/or environmental consequences. It is therefore important to consider both the human and environmental impacts associated with all waste disposal methods.

Waste Legislation – Ontario

Ontario is shifting to a circular economy with a new waste management approach, where waste is seen as a resource that can be recovered, reused and reintegrated into the production stream. Ontario's new waste management framework includes new legislation and a strategy to guide progress that will protect the environment, drive innovation, performance and competitiveness, and stimulate economic growth and development.

Bill 151 of the Waste-Free Ontario Act, 2016, passed on June 1, 2016, enacted the Resource Recovery and Circular Economy Act 2016 and the Waste Diversion Transition Act 2016. Once fully implemented, Bill 151, along with the Resource Recovery and Circular Economy Act and Waste Diversion Transition Act will replace the existing waste diversion program requirements under the Waste Diversion Act (2002).

As a result, the Resource Productivity and Recovery Authority (RPRA) was created to help the province transition to a circular economy and Waste-Free Ontario. The RPRA receives direction from the Resource Recovery and Circular Economy Act to oversee and enforce the Individual Producer Responsibility (IPR) framework associated with products and packaging. The purpose of the IPR is to have producers be held responsible for the sustainable management of their products once these products are no longer used by the consumer.

Materials designated and to-be designated under the IPR framework include:

- Tires: Tires were the first material to be enforced under this framework as of January 1, 2019

- Batteries: Batteries will be the next product to be added to the IPR framework in July of 2020
- Electronics: Electronics will be added as of Jan 2021
- Hazardous or Special Waste: Hazardous or Special Waste will be added as of July 2021

The RPRA also receives direction from the Waste Diversion Transition Act to oversee the following programs:

- Blue Box Program (operated by Stewardship Ontario)
- Municipal Hazardous or Special Waste (MHSW) (Operated by Stewardship Ontario)
- Waste Electrical and Electronic Equipment (WEEE) program. (Program ending December 31, 2020)

The Strategy for a Waste-Free Ontario means building a circular economy to serve as a roadmap to divert more waste from landfills, create jobs, reduce greenhouse gas emissions responsible for climate change, conserve scarce resources, and create a system where all resources and materials (organic or inorganic) are recovered, reused and integrated back into the economy. The goal is to achieve a system where nothing is wasted, and valuable materials destined for landfill create economic value without having negative effects on the environment.

The Food and Organic Waste Framework released on April 30th, 2018 outlines actions for the province and its municipalities. It also provides direction to the waste management industry, as well as the IC&I sector to prevent and reduce food waste, recover organic waste from disposal and support beneficial uses of end products such as compost, digestate and biogas. https://www.ontario.ca/page/food-and-organic-waste-framework
Disposal bans for specific materials are currently being reviewed by the province and are included in public consultations. The first materials considered for disposal bans include:

- food waste
- materials designated under existing waste diversion programs
- beverage containers
- corrugated cardboard and some paper materials
- fluorescent bulbs and tubes

The Food and Organic Waste Framework, Strategy for a Waste-Free Ontario and the 5-year Climate Change Action Plan were developed to work together to help combat climate change by reducing

greenhouse gas emissions from landfilled materials that could otherwise be reduced, reused, recycled, composted and reintegrated into the economy.

5 Year Implementation Plan – Strategy for a Waste-Free Ontario

2020 – Interim goal of 30% diversion achieved. Complete the transition of existing waste diversion programs (except Blue Box) and designate additional materials under producer responsibility regulations (e.g. mattresses, carpets, furniture)

2021 – Begin implementing disposal bans on material under existing waste diversion programs

2022 – Implement a possible food waste disposal ban and release a progress report on the Waste-Free Ontario Strategy

2023 – Complete transition of Blue Box program and designate additional materials under the producer responsibility regulation

2024 – Develop and consult on additional policy statements

2025 – Begin review of Waste-Free Ontario Strategy and designate additional materials under the producer responsibility regulation

For more information please visit: https://www.ontario.ca/page/waste-management

The following table outlines implementation timelines for food waste prevention:

Action Number	Action Title	Currently Underway	Short-term (2018-2020)	Long-term (2021-beyond)
1.	Province to work with partners to develop promotion and education tools to support *food waste* prevention and reduction		✔	
2.	Province to enhance and incorporate *waste reduction* and *resource recovery* activities within schools		✔	
3.	Province to work with the Government of Canada on preventing *food waste*	✔		
4.	Province to work with partners to support innovative approaches and tools to rescue surplus food	✔	✔	
5.	Province to develop food safety guidelines to support the safe donation of surplus food		✔	
6.	Province to support research aimed at reducing and recovering *food and organic waste*	✔	✔	
7.	Province to develop data collection mechanisms for measuring progress in *waste reduction* and *resource recovery* of *food and organic waste*		✔	
8.	Province to amend the 3Rs Regulations to include *food and organic waste* and increase *resource recovery* across the IC&I sector		✔	✔
9.	Province to ban *food and organic waste* from ending up in disposal sites		✔ (consulting 2018-2019)	✔ (phased-in beginning 2022)
10.	Province to support *resource recovery* of *food and organic waste* in multi-unit residential buildings			✔
11.	Province to develop best management practices to support effective use of public waste receptacles		✔	
12.	Province to review existing approval processes and requirements for *resource recovery systems* using a modern regulator approach		✔	
13.	Province to require standardized training for *owners* and *operators* of *resource recovery systems* that undertake composting and *anaerobic digestion*		✔	
14.	Province to review its *D-Series Land Use Compatibility Guidelines* to support the development of *resource recovery systems*		✔	
15.	Province to support healthy soils with strong standards and clear requirements for the use of soil amendments, while protecting the environment and human health	✔		
A.	Province to review regulatory approaches related to soil amendments		✔	
B.	Province to promote the on and off-farm end-use of soil amendments made from recovered organic resources		✔	✔
C.	Province to promote the use of soil amendments as part of the Agricultural Soil Health and Conservation Strategy		✔	✔
16.	Province to support development of renewable natural gas including consideration for linkages to *food and organic waste*		✔	✔
17.	Province to support green procurement practices, including the use of end-products, such as *compost* and *digestate*	✔	✔	

Upcoming Federal Legislation on Single-use Plastics in Canada

Over the past several years, scientists and government authorities have studied the impacts of plastic pollution on wildlife and our natural environment. Research initiatives have provided plenty of evidence illustrating the detrimental impacts of plastic pollution on a global scale. In Canada alone, over 3 million tonnes of plastic waste are disposed of, 1/3 of which is single-use plastic. Although single-use plastics are durable and convenient for consumers and inexpensive to produce, purchase and landfill, they are difficult to capture and recycle due to their small size, light weight, and mixed plastic composition. Over the years, these plastics have accumulated in our environment at an alarming rate and now represent up to 43% of ocean-plastic pollution worldwide, including macro-plastics (pieces over 5mm in size) and microplastics (less than 5mm in size). As a result, the Government of Canada has proposed to use the Canadian Environmental Protection Act (CEPA) to enact legislation to regulate the manufacturing of all plastics.

A proposed integrated management approach to target zero plastic waste, aligned with the Ocean Plastics Charter and Canada-wide Strategy for Zero Plastic waste, will aim to achieve the following:

- Eliminate certain sources of plastic pollution, such as single-use plastics
- Strengthen domestic end-markets for recycled plastics
- Improve the value recovery of plastic products and packaging
- Support innovation and the scaling up of new technologies

These goals have been specifically set to overcome challenges associated to circular plastic economies.

Single-use plastic items that the Government of Canada is considering banning or restricting based on the analysis of a Management Framework of Single-use Plastics include:

- Stir sticks
- Six-pack rings

- Cutlery and Stir Sticks
- Straws
- Food service ware made from problematic plastics, such as clamshell expanded #6 containers

The analysis is based on a three-step process to assess whether management of the single-use plastic is necessary. Furthermore, scientific evidence and data are used to ensure validity of the results. Businesses in Canada are encouraged to act by sourcing sustainable alternatives for these materials to prepare for the upcoming ban/restriction of single-use plastics.

The Government of Canada further plans to reduce plastic pollution through the establishment of performance standards and by ensuring end-of-life responsibility. To establish performance standards, a "recycled content requirement" of 50% will be implemented to establish market demand. This ensures an end-market for recyclers, and a supply of recycled plastics for plastic manufacturers, creating a circular economy. The other measure, ensuring end-of-life responsibility, will aid in the recovery of plastics by increasing collection and recycling rates. In other words, the responsibility to collect and recycle plastics falls on the one who generated it, a concept well-known as Extended Producer Responsibility.

4.0 Waste Generation Analysis (240 Residential Units)

The following waste generation data were determined by calculating the volume of all waste materials generated on a weekly and annual basis. The analysis was conducted to determine the anticipated generation values for the following waste streams:

- Non-Recyclable Waste (Garbage)
- Co-mingled Containers/Cans/Bottles/Jars/Jugs
- Cardboard/Mixed Fibres
- Other Recycling (E-waste, batteries, scrap metals and light bulbs etc.)
- Organics/Compost

Table 1 & 2 below provides an estimate of the waste generated per waste stream on a weekly and annual basis, along with the total anticipated waste generation for each waste stream. Using these estimates, PragmaTech can determine the appropriate equipment needs and space requirements to maximize efficient handling and disposal of each waste stream program. Sample data using waste generation volumes for similar projects along with residential building waste audits for properties of a similar type were used by PragmaTech to perform calculations and determine the following estimates.

Table 1: Estimated Weekly Generation Volumes (Residential)

Materials	Weekly Kg's
Cans/Bottles/Plastic	292.73
Glass Bottles	16.95
Mixed Fibres (paper, boxboard, newsprint, magazines etc.)	368.86
Organic/Compost	569.92
E-waste, Light Bulbs, Scrap Metal, Batteries	2.35
Non-recyclable Waste	318.79
Total Generation	1,569.60

Table 2: Estimated Annual Generation Volumes (Residential)

Materials	Annual Kg's
Cans/Bottles/Plastic	15,221.98
Glass Bottles	881.49
Mixed Fibres (paper, boxboard, newsprint, magazines etc.)	19,180.51
Organic/Compost	29,635.93
E-waste, Light Bulbs, Scrap Metal, Batteries	122.43
Non-recyclable Waste	16,576.86
Total Generation	81,619.20

4.1 Equipment Recommendations (Residential)

The following section contains our professional recommendations on the equipment to house each waste stream, considerations for space. These guidelines have been developed based on our extensive industry experience. It is believed that implementing these suggestions will greatly enhance the efficiency and success of the waste management plan on behalf of the operational team.



4 Yard Bin



64 or 96-gallon Recycling Tote

Table 3: Waste and Recycling unit chart (Residential)

Waste Stream	Generation	kg per yard	Number Units	Unit Type
Cans/Bottles/Plastic	292.73	25	2.9	4-yard bin
Glass Bottles & Jars	16.95	35	0.48	95 Gallon Tote
Cardboard (Flatten)	221.31	35	1.58	4-yard bin
Mixed Fibres (mixed paper, boxboard, etc.)	147.54	30	1.23	4-yard bin
Organic/Compost	569.92	70	8.14	65 Gallon Tote
E-waste, Light Bulbs, Scrap Metal, Batteries	2.35	25	0.09	95 Gallon Tote
Non-recyclable waste (compacted)	318.79	35	2.28	4-yard bin

Table 4: Waste & Recycling Container Footprint Chart (Residential)

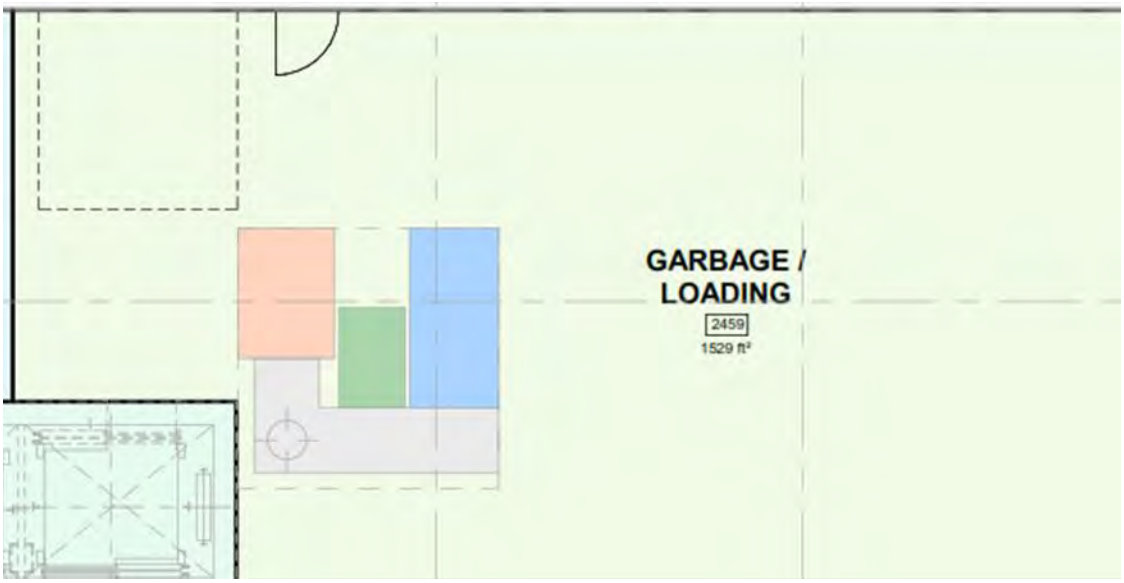
Streams	Equipment	Length (mt)	Width (mt)	Number of Units	M^2
Cans/Bottles/Plastic	4-yard Container	1.37	1.83	3	7.52
Glass Bottles & Jars	95 gallon/360 L Totes	0.89	0.69	1	0.61
Cardboard (Flatten)	4-yard Container	1.37	1.83	2	5.01
Mixed Fibres (mixed paper, boxboard)	4-yard Container	1.37	1.83	2	5.01
Organic/Compost	65 gallon/ 240 L Tote	0.72	0.69	8	3.97
E-waste	95 gallon/360 L Totes	0.89	0.69	1	0.61
Non-recyclable waste (compacted)	4-yard Container	1.37	1.83	3	7.52
Compactor (generic dimensions)	Bi Sorter	2.8	1.45	1	4.06
				TOTAL m^2	34.33

Waste & Recycling Equipment Specifications

PragmaTech Waste Solutions' recommendations of volumes and number of containers needed for a residential multi-unit optimal waste management are included in charts 3 & 4.

Please Note: The information presented in this report is based on optimal recycling practices by the tenants. All calculations are based on typical occupancy per unit and may change depending on number of occupants per unit. Further, these calculations do not take into consideration initial, one-time tenant move-in waste generation volumes or bulk pickups (large items).

Figure 1: Waste & Recycling Room (Residential)



Conclusion:

The waste/recycling room measures 142 m^2 (1,529 sq. ft.) the foot print for residential waste/recycling equipment is 34.33 m^2 (see table 4). It is recommended that the room size be 2 times the footprint for ease of use and maneuverability which would equal 68.33 m^2. The room also should have a dedicated 10m^2 area for bulky waste. The required size for the room to store all materials would equal 78.33 m^2. The room has plenty of additional space to store equipment such as a bin tugger or small tractor for moving container to the staging area.

5.0 Waste Generation Analysis (Commercial/Retail)

The following waste generation data were determined by calculating the volume of all waste materials generated on a weekly and annual basis. The analysis was conducted to determine the anticipated generation values for the following waste streams:

- Non-Recyclable Waste (Garbage)
- Co-mingled Containers/Cans/Bottles/Jars/Jugs
- Cardboard/Mixed Fibres
- Other Recycling (E-waste, batteries, scrap metals and light bulbs etc.)
- Organics/Compost

Table 5 & 6 below provides an estimate of the waste generated per waste stream on a weekly and annual basis, along with the total anticipated waste generation for each waste stream. At the time of this report the commercial/retail tenants types of businesses were not determined, therefore the report is based on 50% food services and 50% retail. Using these estimates, PragmaTech can determine the appropriate equipment needs and space requirements to maximize efficient handling and disposal of each waste stream program. Sample data using waste generation volumes for similar projects along with commercial/retail waste audits for properties of a similar type were used by PragmaTech to perform calculations and determine the following estimates.

Table 5: Estimated Weekly Generation Volumes (Commercial/Retail)

Materials Food Service Tenants	Weekly Kg's
Cans/Bottles/Plastic	42.96
Glass Bottles	2.56
Cardboard	7.60
Mixed Fibres (paper, boxboard, newsprint, magazines, etc.)	49.49
Organic/Compost	86.19
E-waste, Light Bulbs, Scrap Metal, Batteries	0.36
Non-recyclable waste	48.21
Total Generated	237.38

Table 6: Estimated Annual Generation Volumes (Commercial/Retail)

Materials Food Service Tenants	Annual Kg's
Cans/Bottles/Plastic	2,234.17
Glass Bottles	133.31
Mixed Fibres (paper, boxboard, newsprint, magazines, etc.)	2,573.62
Organic/Compost	4,481.92
E-waste, Light Bulbs, Scrap Metal, Batteries	18.52
Non-recyclable waste	2,506.96
Total Generated	11,948.51

Table 7: Estimated Weekly Generation Volumes (Commercial/Retail)

Materials Retail Tenants	Weekly Kg's
Cardboard	59.14
Cans/Bottles/Plastics	19.01
Mixed Fibres (paper, boxboard, newsprint, magazines etc.)	25.35
Organic/Compost	42.24
E-waste, Light Bulbs, Scrap Metal, Batteries	2.11
Non-recyclable Waste	63.36
Total Generated	211.21

Table 8: Estimated Annual Generation Volumes (Commercial/Retail)

Materials Retail Tenants	Annual Kg's
Cardboard	3,075.23
Cans/Bottles/Plastics	988.47
Mixed Fibres (paper, boxboard, newsprint, magazines etc.)	1,317.96
Organic/Compost	2,196.59
E-waste, Light Bulbs, Scrap Metal, Batteries	109.83
Non-recyclable Waste	3,294.89
Total Generated	10,982.97

5.1 Equipment Recommendations (Commercial/Retail)

The following section contains our professional recommendations on the equipment to house each waste stream, considerations for space. These guidelines have been developed based on our extensive industry experience. It is believed that implementing these suggestions will greatly enhance the efficiency and success of the waste management plan on behalf of the operational team.



4 Yard Bin



64 or 96-gallon Recycling Tote



Used Cooking Oil

Table 7: Waste and Recycling unit chart (Commercial/Retail)

Waste Stream Combine Food & Retail	Generation	kg per yard	Number Units	Unit Type
Cans/Bottles/Plastic	61.97	25	2.5	95 Gallon Tote
Glass Bottles & Jars	2.56	35	0.07	95 Gallon Tote
Cardboard (Flatten)	66.74	20	0.83	4-yard bin
Mixed Fibres (mixed paper, boxboard)	74.84	30	2.49	95 Gallon Tote
Organic/Compost	128.43	40	3.21	64 Gallon Tote
E-waste, Light Bulbs, Scrap Metal, Batteries	2.47	25	0.10	95 Gallon Tote
Non-recyclable waste (uncompacted)	111.57	30	0.93	4-yard bin

Table 8: Waste & Recycling Container Footprint Chart (Commercial/Retail)

Waste Stream Combine Food & Retail	Equipment	Length (mt)	Width (mt)	Number of Units	M^2
Mixed Containers	95 gallon/360 L Totes	0.89	0.69	3	1.84
Cardboard	4- yard Container	1.83	1.37	2	5.01
Mixed Fibres (All Mixed Paper, Boxboard, etc.)	95 gallon/360 L Totes	0.89	0.69	3	1.84
Organics	64 gallon/240 L Totes	0.72	0.69	4	1.99
Extra Organic Bins	64 gallon/240 L Totes	0.71	0.64	0	0.00
E-waste	95 gallon/360 L Totes	0.89	0.69	1	0.61
Waste	4- yard Container	1.83	1.37	2	5.01
Used Cooking Oil	Storage Tank (medium size)	1.55	1.1	1	1.71
				TOTAL m^2	18.02

Waste & Recycling Equipment Specifications

PragmaTech Waste Solutions' recommendations of volumes and number of containers needed for a commercial/retail optimal waste management are included in charts 7 & 8.

Please Note: The information presented in this report is based on optimal recycling practices by the tenants. All calculations are based on typical operations per unit and may change depending on types of businesses per unit. Further, these calculations do not take into consideration initial, one-time tenant move-in waste generation volumes or bulk pickups (large items).

Figure 2 : Waste & Recycling Room (Commercial & Retail)



Conclusion:

The waste/recycling room measures 29.26 m^2 (315 sq. ft.) the footprint for commercial/retail waste/recycling equipment is 18.02 m^2 (see table 8). It is recommended that the room size be 2 times the footprint for ease of use and maneuverability which would equal 36.02 m^2. The required size for the room to store all materials would equal 36.02 m^2. The room has an equipment to floor ratio of 1.62 (29.26m2/18.02 m2= 1.62)

6.0 Design Recommendations from Halton Region

6.1 Waste Area Requirements

Guidelines have been prepared in accordance with Section 192 of the ROP (Regional Official Plan).
The design for the internal management and handling of Waste, shall ensure:

- That Recyclable Material and Organic Waste systems are as convenient to use as Garbage systems;
- That Collection Point locations for Waste are accessible to all tenants/occupants and do not hinder tenants/occupants from participating in Recyclable Material and Organic Waste Programs and comply with Ontario's Accessibility for Ontarians with Disabilities Act;
- That all applicable health and safety considerations are incorporated into the design for workers handling or moving Waste Receptacles and comply with the Ontario Health and Safety Act; and
- That the Developer has established an ongoing Management and Maintenance Program for the proposed Waste Management System that will ensure the continued operation of the proposed system (i.e. cost considerations, sustainability).
- An example of an acceptable internal management and handling of Waste design would include:
- A central location on the ground floor that all recyclables and organic that will be safe for tenants to enter, this area will have no mechanical equipment that would pose any danger to tenant or untrained personnel.
- The dedicated storage area must be adequate to store Waste for a minimum of one week based on minimum capacity requirements.
- External storage shall be designed and constructed to store containerized waste according to collection type. There shall be no loose garbage permitted at any time
- The external waste storage area shell be self-contained with a well-maintained mechanism to lock the door/gate to prevent unauthorized access
- The external storage structure shall be maintained in good repair and have industrial quality hinges and closures on all door/gates to withstand frequent use and climate fluctuations
- The external storage structure shall be designed and constructed with the same design element and materials as the main building in terms of colour and external façade
- The Waste storage area shall be constructed to as per guideline of a height of 0.5 meters above collection bins
- <u>The applicant is advised to contact the zoning section of the local Municipality to ensure that the external storage of waste receptacles is permitted in accordance with property standard and by-laws</u>

7.0 Other Waste Equipment Considerations (if applicable)

7.1 Biomedical Waste Consideration and Equipment

<u>Biomedical Waste</u>

A "biomedical waste generating facility" refers to any facility where biomedical waste is likely to be generated, including, (a) a human health care and residential facility.

"Sharps waste" refers to blades, needles, syringes (including safety engineered needles), laboratory glass, and other materials capable of causing punctures or cuts and which have come into contact with human blood waste, animal blood waste, or other human and/or animal bodily fluids.

Disposing of Biomedical Waste

- Every facility should have a clear and accurate list of items that fall under the category of biomedical waste. This will make it easy for staff to identify waste and properly dispose of it in the appropriate red or yellow bag/container. Most facilities create a booklet or poster for this purpose.
- Note that urine, feces, and diapers are not considered biomedical waste unless they are visibly contaminated with blood, in which case they must be handled with care. Otherwise, they can be disposed of with regular waste.



Biomedical Containers



Sharps Container

7.2 Common Area Waste and Recycling Containers (suggested)

Waste and Recycling Considerations

Exterior

Several areas throughout the property will require three or four-stream disposal receptacles for both interior and exterior common areas to accommodate the disposal of non-recyclable waste (garbage) and single stream recycling (blue bin). The specific areas that will require a multi-stream disposal receptacle are:

- Outside the main lobby and entrances
- Underground Parking at elevator entrances (if applicable)



Interior

- All amenity spaces.
- Screening room

The receptacles can be located within the general vicinity of the above-mentioned areas to avoid obstructing or conflicting with other potential design elements and/or furniture design layouts. Interior lobby area receptacles are not warranted, as the exterior receptacles located at the lobby entrance negate the need for interior receptacles, thereby maintaining the aesthetics of the lobby. The use of external receptacles only has proven successful in many applications and helps maintain a clean and odorless interior lobby.

Placing exterior organic/compost disposal receptacles for use by the general public is not recommended and should be avoided due to potential pest issues.



Preferred locations for organic/compost bins are any areas where food is prepared and/or served, such as:

- BBQ Areas (if present)
- Amenity Areas/Rooms containing kitchens (e.g., Party Rooms)

The mail rooms (if any) will require a single stream “Paper Recycling Only” bin, as these areas will generate a considerable amount of paper recycling from mail/newspapers/flyers. The absence of a non-recyclable waste (garbage) bin will ensure that no recyclable paper material will enter the waste stream.



Pet Waste Disposal Considerations

Pet waste is considered non-recyclable waste in Halton Region and is required to enter into the non-recyclable waste stream (garbage). However, pet waste can cause odour issues when placed into common area non-recyclable waste bins, so a self-contained disposal bin specifically for pet waste is recommended.



Cigarette Disposal Considerations

Cigarette waste is considered non-recyclable waste in Halton Region and is required to enter the non-recyclable waste stream (garbage). Providing designated bins to capture cigarette butts will help to reduce the amount of litter on the grounds, lessening the need for constant property maintenance. Cigarette specific disposal bins also ensure that the contents are safely secured, minimizing the risk of fire that could occur using other standard disposal bins that may contain potentially flammable materials.



7.3 Additional Equipment Recommendations and Considerations (optional)

Consider additional space in the waste area to house a tractor/bin tugger that is used to move the garbage and recycling containers from the indoor storage area to the outdoor collection area for pickup. Waste and organic containers can be very heavy for personnel to move. An example of equipment is provided below. **These are recommended to move bins from the waste storage area to the loading dock staging area, especially the 4-yard open top containers.**



Bin Tugger



Tractor

Small tractors are very useful for moving bins around a property. They reduce the need to manually push bins, which can be difficult for site staff to handle safely. Bins can be attached to the back of the tractor and can be easily pulled to the Collection Area for pickup. A custom constructed hitch and tow bar will be required to attach to the containers, which will require a pull plate to be installed.

8.0 Waste Room Considerations

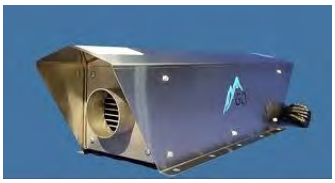
It is important to consider the functionality of the space for tenant needs. An area dedicated to large bulky items must be included in the design. This room should have proper lighting that is bright enough for all tenants to use the space safely. The space must not have access to the compactor by individuals who are not properly trained to use a compactor.

Signage that includes pictures and instructions on proper disposal and "what goes where" information should be strategically placed on the walls of this drop off room. Signage with pictures and directions will help to alleviate contamination rates and common communication issues, such as language barriers, terminology, and font size that may prevent tenants from understanding how to properly use the source-separation programs.

Waste/Recycling Building Considerations
In any garbage area, waste will start to decompose. The decomposition rate will increase as the temperatures increases. Ensure organics are picked up on a regular basis to decrease odors and animal intervention.

This area should have the following features (these are recommendations if applicable):

- Door opening to allow 3 to 6-yard bins to be easily maneuvered through.
- Proper ventilation and possible climate control
- Proper signage and sufficient lighting with motion sensors that is bright enough for all tenants and staff to use the space safely.
- Water supply and Floor drain
- Electrical connections (for bug zapper, deodorizer, power washer etc.)



Air Purification System



Pressure Washer

9.0 Tenant Welcome Package

It is highly recommended that each tenant be provided with a welcome package upon moving into their new space. The welcome package should include the reusable blue recycling bin, organic bags and kitchen catcher for each unit along with instructions on how to properly use these bins.

The package should also include the recycling guide that indicates which materials should be recycled, as well as instructions on proper usage of the chute system and the most up-do-date by-law showing the responsibilities of tenants living in the specific area**.** The more information that is provided, the easier it will be for tenants to participate in recycling and organics programs, thereby reducing non-recyclable waste generation and contamination rates. An example is provided below of information that should be included in the package:

Sample



Once the tenants move in, a welcome brief on recycling best practices can be completed in the lobby or common areas during peak times (usually between 4pm to 7pm). These meetings can include draws that people can enter to win various prizes, which is a proven method to encourage and engage people to pop by, listen to the information, and ask questions.

10.0 Signage Considerations

Developing signage for all waste stream equipment and receptacles that clearly identifies which materials can be deposited into the designated equipment and bins can greatly assist with reducing contamination and increasing diversion rates.



Signage should depict both images and words explaining the specific materials to be deposited into the equipment and bins so that all users are able to clearly understand program requirements. Use common terms that are easily recognizable to the public and colour-coded by program, both of which are very useful ways to help people easily identify different programs and the materials they accept. For example, the colour green is commonly used to depict organics and compost, whereas blue is often used for recycling (e.g., cans and bottles, etc.).

