Waste Management | Sustainability Services

Waste to Resource Assessment

Prepared for:

ST. MICHAEL'S
UNITY HEALTH TORONTO

Unity Health - St. Michael's Hospital
30 Bond St, Toronto, ON
May 25, 2023

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This assessment is designed to exceed the minimum guidelines for performing waste assessments as set forth by the US EPA and Canadian provincial regulatory authorities. This report has been prepared for the specific purpose(s) contained herein. To the extent that statements and information provided by the client, its representatives, or partners have been used in the preparation of this report, Sustainability Services and Waste Management of Canada Corporation relied upon the same to be accurate, and for which no assurances are intended, and no representations or warranties are made. Sustainability Services and Waste Management of Canada Corporation make no certification and gives no assurances except as explicitly set forth in this report. This report and the information contained herein, is produced for the expressed use of Unity Health - St. Michaels Hospital, Toronto, ON. Sustainability Services and Waste Management of Canada Corporation specifically prohibit redistribution of this report and the material contained herein in whole or part without expressed written permission of Sustainability Services and Waste Management of Canada Corporation.

Executive Summary

On May 25, 2023, Sustainability Services conducted a Waste to Resource™ assessment for Unity Health - St. Michael's Hospital located at 30 Bond St in Toronto, ON. A few goals of the assessment were as follows:

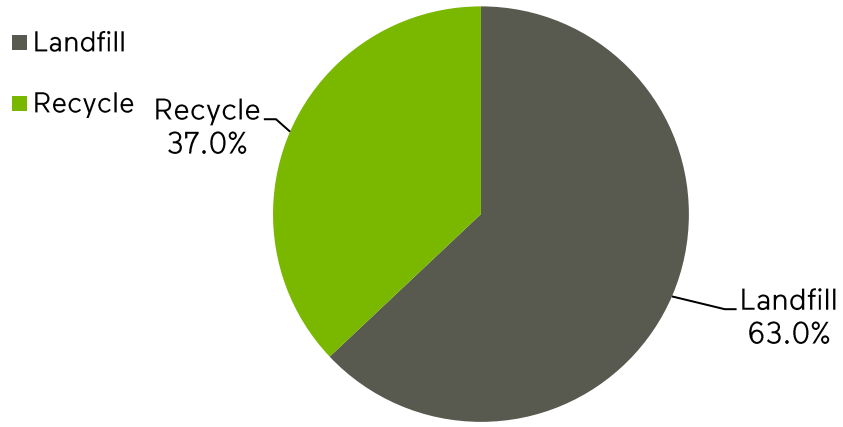
- **Update baseline inventories for waste generation at Unity Health - St. Michael's Hospital**
- **To identify and quantify waste composition and commodity**
- **To determine the recovery performance of existing programs**
- **Identify opportunities to further increase diversion and reduce cost**
- **Develop strategies that could be implemented throughout the facility**

Our goal is to provide Unity Health - St. Michael's Hospital with strategies that will maximize the efficiency of your waste management system. During the waste assessment conducted by Sustainability Services, visual inspections of waste generation points throughout the facility resulted in the discovery of additional diversion opportunities. The assessment identified four primary opportunities that should occur to improve your overall waste diversion rate. The following are our recommendations:

- **Increase Awareness of Current Diversion Programs**
- **Employee, Contractor and Visitor Education and Engagement**
- **Ensure Effective Diversion Infrastructure**
- **Continual Improvement and Additional Recommendations**

The facility generated a combined 1,663.99 tonnes of waste and diverted materials in the last year. The current diversion rate for your facility is 37.0%.

Figure 1– Current Diversion Rate at Unity Health - St. Michael's Hospital



A team of sustainability consultants performed an assessment that involved a walkthrough of the facility and a targeted sort and weigh analysis of the waste stream. The following is a summary of key findings identified during the assessment:

- **The current diversion rate is 37.0%**
- **Annually, it is estimated that 1,047.70 tonnes of waste and 616.29 tonnes of diverted materials will be generated from your facility**
- **Of all the material generated on site, up to 53.4% potentially could have been diverted through currently available diversion programs**
- **Plastics account for 23.5% of the waste sent to landfill**
- **Papers account for 22.1% of the waste sent to landfill**
- **Organics account for 9.5% of the waste sent to landfill**

Photographs 1 to 3 – Waste Sample Collected for Assessment Period



Assessment Findings and Goals Alignment

Facility Information

Table 1 – Facility Information

Item	Comments
Facility Name:	Unity Health - St. Michael's Hospital
Description:	St. Michael's Hospital is a leading teaching hospital and research centre based in downtown Toronto. The facility is 245,000 sq.ft. with over 460 patient beds.
Address:	30 Bond St, Toronto, ON
Contact Name:	Justin Carrozza
Contact Number:	416-360-4000

Table 2 – Assessment Summary

Item	Comments
Performed By:	Kirthan Sathananthan
Performed On:	May 25, 2023
Report Written:	Kirthan Sathananthan
Report Reviewed:	Christopher Doyle
Assessment Type:	Waste to Resource Assessment – Waste Audit
Assessment Level:	☑ Basic Material Characterization ☐ Detailed Material Characterization ☑ Basic Options Analysis ☑ Detailed Option Analysis ☐ Carbon Analysis ☐ Material Process Mapping ☑ Implementation Feasibility Analysis ☑ Action Plan
Account Manager:	Keira Toscan

Goals, Objectives, and Other Factors

The following is a list of company goals, objectives, or other factors considered during this assessment.

- **Apply findings from the waste audit to reduce waste, maximize collection of recycling materials and optimize waste management efficiencies**
- **Set goals, monitor waste generation and track recovery levels on a regular basis**
- **Streamline and standardize handling routines of materials throughout the facility**
- **Reduce waste spend and disposal costs**
- **Provide ongoing and improved employee training and education avenues**
- **Identify areas of new or enhanced diversion opportunity**
- **Increase capture rate of divertible materials and reduce overall generation of non-recyclable materials**

Regulatory Requirements

The facility took initiative to conduct a solid nonhazardous waste audit in effort to adhere to Ministry of the Environment, Conservation and Parks Regulations 102/94 and 103/94. Under O.Reg. 102/94, all waste audits must address:

- Identify the amount, nature and composition of the waste generated in designated functional areas of the facility;
- How the waste is produced, including relevant management decisions and policies;
- How the waste is managed; and
- The extent to which materials or products used or sold consist of recycled or reused materials or products.

According to O.Reg. 102/94, the Waste Reduction Work Plans or a summary of the plan must be posted at the facility in a place where it can be viewed. If a summary of the work plan is posted, the full Work Plan must be made available for review upon request by any employee.

- The waste audit report and waste reduction work plan must be retained on file for a minimum of five years;
- A waste audit report and waste reduction work plan must be conducted and updated annually.

Please see Appendix 6 – Ontario's 3Rs Regulations for more details or https://www.ontario.ca/laws/regulation/940103 and https://www.ontario.ca/laws/regulation/940102 for the full regulations. Excerpt below:

PART IX
HOSPITALS

46. This Part applies to the operator of a public hospital classified as a class A, B or F hospital in Regulation 964 of the Revised Regulations of Ontario, 1990. O. Reg. 102/94, s. 46.

47. (1) The operator shall conduct a waste audit covering the waste generated by the operation of the hospital. 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 operator shall prepare a written report of the audit.

(3) In every year following the initial waste audit, the operator shall update the audit and prepare an updated written report. O. Reg. 102/94, s. 47.

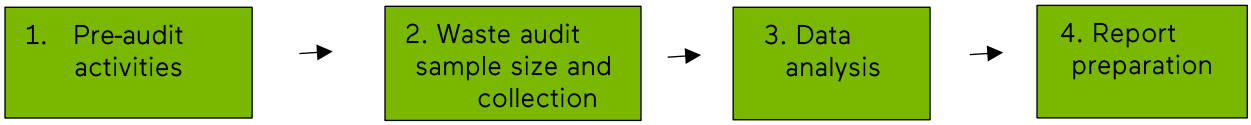
Options Overview

Four options were identified during the assessment. The table below lists key options that represent the most significant opportunities.

Table 3 – Options Summary Table

Option	Description	Benefit	Rationale
Increase Awareness of Current Diversion Programs	Stakeholders need to receive consistent messages about current diversion programs.	✓ Increase diversion and capture rates ✓ Reduced waste spend	Majority of the materials generated throughout the facility can be diverted from landfill though current diversion programs.
Employee, Contractor and Visitor Education and Engagement	All stakeholders need to receive consistent messages about current diversion programs available to them.	✓ Increase awareness on environmental programs and issues ✓ Increased efficiencies ✓ Ensure effective education is offered	All stakeholders need to be encouraged and re-educated regarding waste and recycling procedures within the facility. Dedicated and knowledgeable staff will create the opportunity for the facility to achieve superior capture rates and manage an effective program.
Ensure Effective Diversion Infrastructure	Ensure receptacles and signage is present.	✓ Increase efficiencies in program and reduce gaps	Take measures to help users and set up the diversion program for success.
Continual Improvement and Additional Recommendations	Continually improve waste management program on site. Monitor and effectively manage all programs and methods in place at the facility.	✓ Expand programs available ✓ Ensure the tools and infrastructure are in place to support waste management goals	Control decision-making and input regarding materials brought into the facility. Determine how best to capture non-traditional materials for recycling or reuse.

Sampling Methodology



1. **Pre-audit activities** - Collecting background information (such as identifying occupancy rate, changes in collection services), historical data, diversion reports, receptacle service information, etc. Establishing the plan for the assessment. Conducting a site tour of the facility to review procedures and current infrastructure.

2. **Waste audit and sample size** - To characterize the material stream, visual observations and waste samples were obtained from various collection areas throughout the facility. These collection areas were identified from labels placed on the waste bags or collection receptacle. For the purposes of this assessment, a sample **generation area** is a combination of a specific collection area or department and/or waste generating process. The sample material was collected in a safe, designated location separate from other waste collection areas for the assessment.

   During this assessment, samples were collected from 5 unique generation areas throughout the facility over a 24-hour period. For the purposes of this project is it assumed that the sample period chosen is a fair representation of typical activities and waste generation at the site, although daily variances are possible. The materials were sorted and divided into up to 10 waste categories and weights of each material sub-category (up to 90) were recorded.

3. **Data analysis** – Analysis of on and off-site data provided by WM and the client. Calculation of diversion and capture rate for the site.

4. **Report preparation -** Full report prepared including site specific recommendations and Ministry of the Environment, Conservation and Parks - Audit and Workplan forms.

Limitations

A portion of the collected sample was unlabeled; therefore, it was not possible to identify the origin of the sample from within the facility.

Not all Diverted Materials were available and collected during the sample period. Examples include confidential paper shredding which is collected on a sporadic basis.

Additionally, Hazardous, Industrial, and Liquid Industrial Wastes were not included within the scope of this assessment. These materials are not typically included in MOE Reg. 102/94 solid waste audits and specialized processes are required to handle these materials due to the health and safety concerns associated.

A portion of the sample bags included diapers and medical fluids, auditors conducted limited or simple sorting of these sample bags.

Material Composition Breakdown

Landfill Waste Material Comparison by Category

This section displays a breakdown of general material categories by weight and volume.

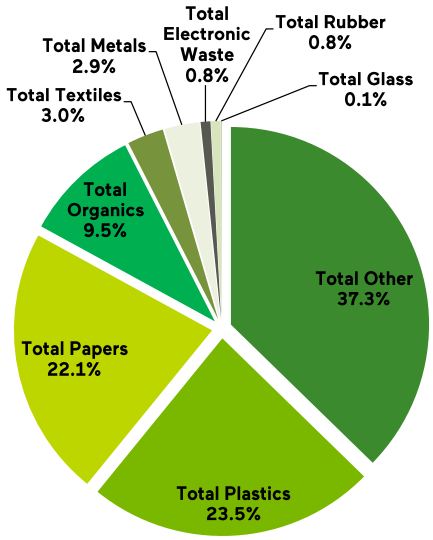
The largest category by weight was Other materials representing 37.3% of the landfill waste stream.

Table 4 – Landfill Waste Material Comparison

Waste Category	Total Audited Waste Material (kg)	Material Composition (%)	Annual Projected Volume Generated (kg)
Total Other	174.00	37.3%	390,916
Total Plastics	109.77	23.5%	246,614
Total Papers	103.19	22.1%	231,831
Total Organics	44.48	9.5%	99,931
Total Textiles	13.88	3.0%	31,183
Total Metals	13.34	2.9%	29,970
Total Electronic Waste	3.70	0.8%	8,313
Total Rubber	3.60	0.8%	8,088
Total Glass	0.38	0.1%	854
Total	**466.34**	**100.0%**	**1,047,700**

Figure 2, below represents the generation areas at the facility.

Figure 2 – Landfill Waste Material by Category



Audited Waste Material Composition by Sample Collection Area

The following table displays a breakdown of the waste sources during the Sustainability Services assessment. For further in-depth analysis of the generation areas identified, consult Appendices and Supplementary Data.

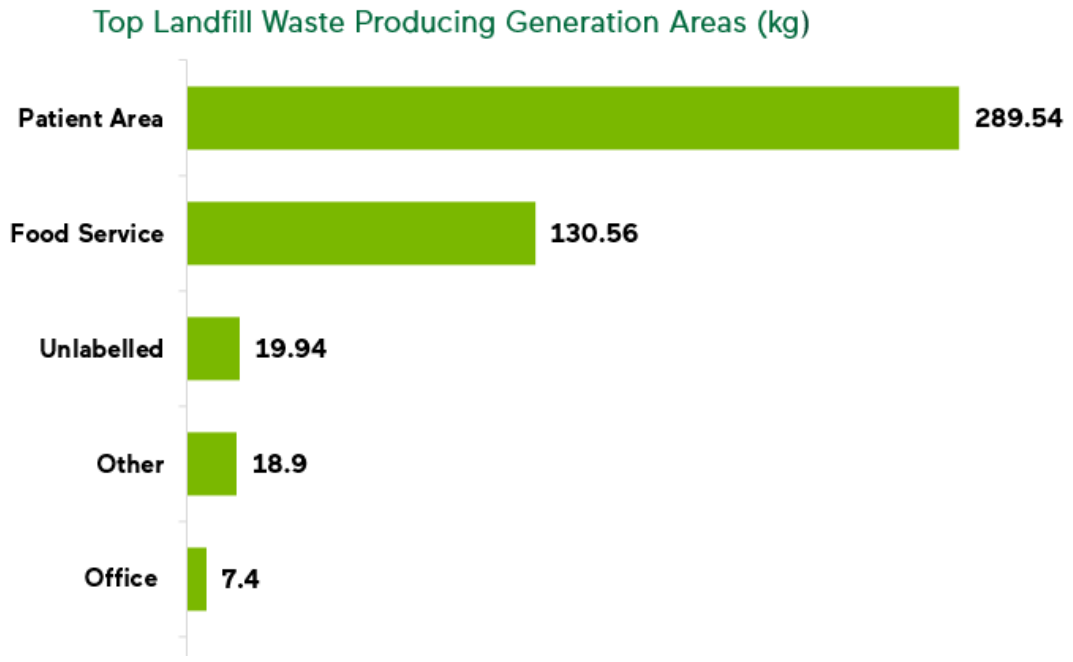
The largest generation area identified in the audit sample was the Patient Area generation area representing 62.1% of the audited sample.

Table 5 – Audited Waste Sources

Generation Area	Total Audited Waste (kg)	Generation Composition (%)	Annual Projected Volume (kg)
Patient Area	289.54	62.1%	650,493
Food Service	130.56	28.0%	293,322
Unlabelled	19.94	4.3%	44,798
Other	18.90	4.1%	42,462
Office	7.40	1.6%	16,625
Grand Total	**466.34**	**100.0%**	**1,047,700**

Figure 3, below represents the top five generation areas at the facility and some smaller areas are not specifically noted.

Figure 3 – Waste Generation by Collection Area



Diversion Opportunities

Increased diversion opportunities represent the largest potential cost savings and landfill diversion opportunity for Unity Health - St. Michael's Hospital. While diversion programs are currently in operation, the audit shows that they are not working at their optimal efficiency.

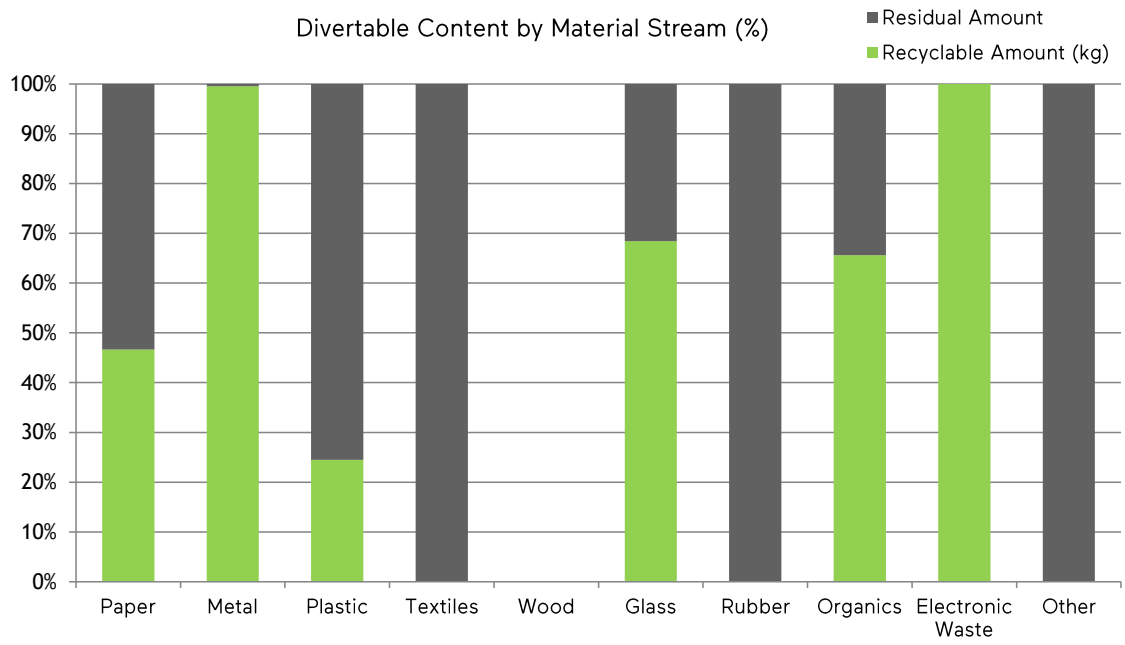
Diversion rate is calculated as follows:

$$\text{Diversion Rate} = \frac{\text{Weight of recovered material}}{\text{Total weight of material generated on-site}} \times 100\%$$

The current diversion rate at the site is 37.0%. Based on the diversion program currently in place 53.4% of the material generated at the facility is recyclable or divertible. Therefore, there is room for improvement within the diversion program where most employees in the facility handle their waste.

Figure 4, outlines the material in each category which could potentially be diverted.

Figure 4 - Diversion Opportunity by Material Category



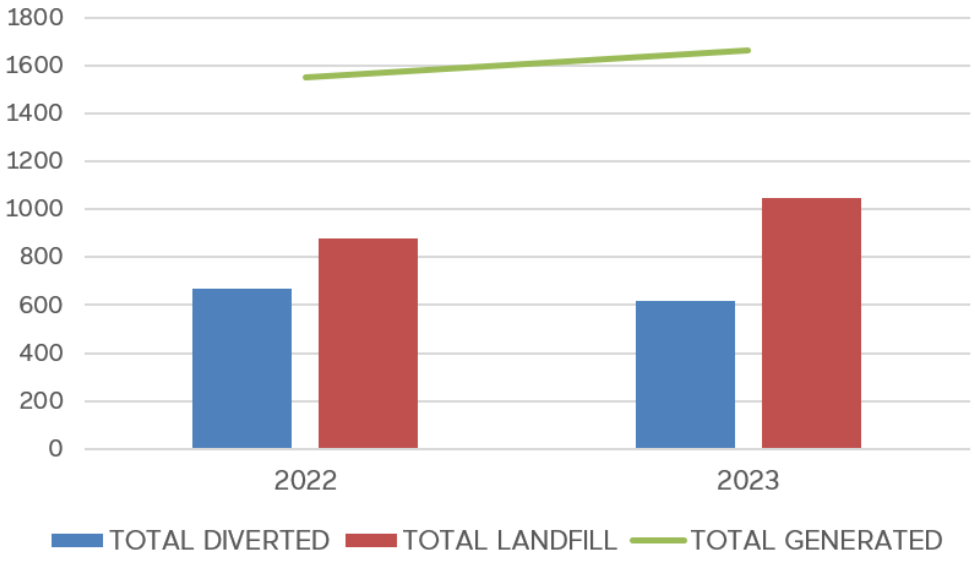
Year Over Year Audit Comparison

An assessment was completed at the facility in 2022, it was determined that the diversion rate has decrease from 43.1% in 2022 to 37.0% in the current assessment.

The facility increased the amount of landfill generated, the facility generated 1047.70 tonnes of landfill waste in 2023, compared to 880.58 tonnes in 2022.

The facility captured 616.29 tonnes of material for diversion, recycling or reuse in the current assessment compared to 668.31 tonnes in 2022.

Figure 5 – Comparison of 2022 to 2023 results (tonnes)



Diverted Material Comparison by Category

This following table displays a breakdown of assessed diverted, recycled, reused and composted materials. The facility currently has programs in place to capture the following waste streams:

Table 6 – Facility Service Information

Diversion Program	Service Provider/s	Container Type	Note
Single Stream Recycling	Waste Management	35-yard compactor	Includes cardboard
Organics	Waste Management	35-gallon totes	
Confidential Paper Shredding		Shredding console	Service information not available at the time of assessment.
E-Waste, Batteries	GB Scrap Metal Ltd		2022 report data
Scrap Metals	GB Scrap Metal Ltd		2022 report data
Skids	Pam Pallets		2022 report data
Light Tubes	Aevitas		2022 report data
PVC	Norwich Plastics		2022 report data

Landfill at the facility was collected in a 35-yard compactor and 40-yard open top bin.

Table 7 – Diverted Material Comparison

Diverted Material	Annual Projected Volume (kg)	Percentage of all Diverted Materials (%)
Mixed Paper and Beverage Containers	311,670	50.6%
Organics	254,270	41.3%
Skids	39,960	6.5%
Metal	5,220	0.8%
E-Waste, Batteries	3,490	0.6%
PVC	1,180	0.2%
Light Tubes, Ballasts	500	0.1%
Total	**616,290**	**100.0%**

Capture Rate

The **capture rate** indicates the percentage of a material (i.e. office paper, organics) that is being disposed of via one of the sites recovery programs (i.e. single stream, mixed recycling, organics). A 100% capture rate indicates that all recoverable materials being produced on-site has been placed in the correct receptacle and the landfill garbage contains no recoverable materials.

$$\text{Capture Rate} = \frac{\text{Recovered material (e.g. paper in mixed recycling)}}{\text{Recovered material (e.g. paper in mixed recycling)} + \text{Waste material (e.g. paper in garbage)}} \times 100\%$$

Based on the assessment findings, of the 1,663,990 kg of material generated at the facility in the last 12 months, 889,044 kg of that material is potentially divertible in the available diversion programs. As 616,290 kg of material was captured for diversion, the facility wide capture rate was determined to be 69.3%. Table 8 outlines the capture rate per material.

Table 8 – Capture Rate Calculations by Material

Diverted Material	Total Generated (kg)	Captured for Diversion (kg)	Landfilled (kg)	Capture Rate (%)
Aluminum cans	27,271	19,947	7,324	73.1%
Cardboard	154,569	137,135	17,434	88.7%
Fine paper	47,981	42,387	5,594	88.3%
Glass bottles/jars	3,347	2,493	854	74.5%
Newsprint	1,716	997	719	58.1%
Steel cans	29,991	7,480	22,511	24.9%
PET (#1) plastic	34,818	29,920	4,898	85.9%
HDPE (#2)	17,701	14,960	2,741	84.5%
LDPE (#4) plastic film	64,074	-	64,074	0.0%
PP (#5) plastic containers	6,301	3,740	2,561	59.4%
Polystyrene (#6)	50,718	1,247	49,471	2.5%
Organics	354,201	254,270	99,931	71.8%
Boxboard	52,207	29,920	22,287	57.3%
Glossy magazines, catalogues, flyers	3,069	1,496	1,573	48.8%
Steel	5,355	5,220	135	97.5%
Skids	39,960	39,960	-	100.0%
Paper towels	61,288	-	61,288	0.0%
E-waste, batteries	11,803	3,490	8,313	29.6%
Disposable food packaging (incl. polycoat)	84,830	19,947	64,883	23.5%
Diapers	69,511	-	69,511	0.0%
Clothing/textiles	31,183	-	31,183	0.0%
Other: Mixed medical materials, PPE, PVC, misc.	512,095	1,680	510,415	0.3%

Recommendations Overview

Several options have been identified that can help Unity Health - St. Michael's Hospital make its operations more sustainable. Each option should be carefully reviewed for operational, financial, social, and strategic fit.

- **Increase Awareness of Current Diversion Programs**
- **Employee, Contractor and Visitor Education and Engagement**
- **Ensure Effective Diversion Infrastructure**
- **Continual Improvement and Additional Recommendations**

Photographs 4 to 5 – Collection Receptacle and Signage Examples in Facility

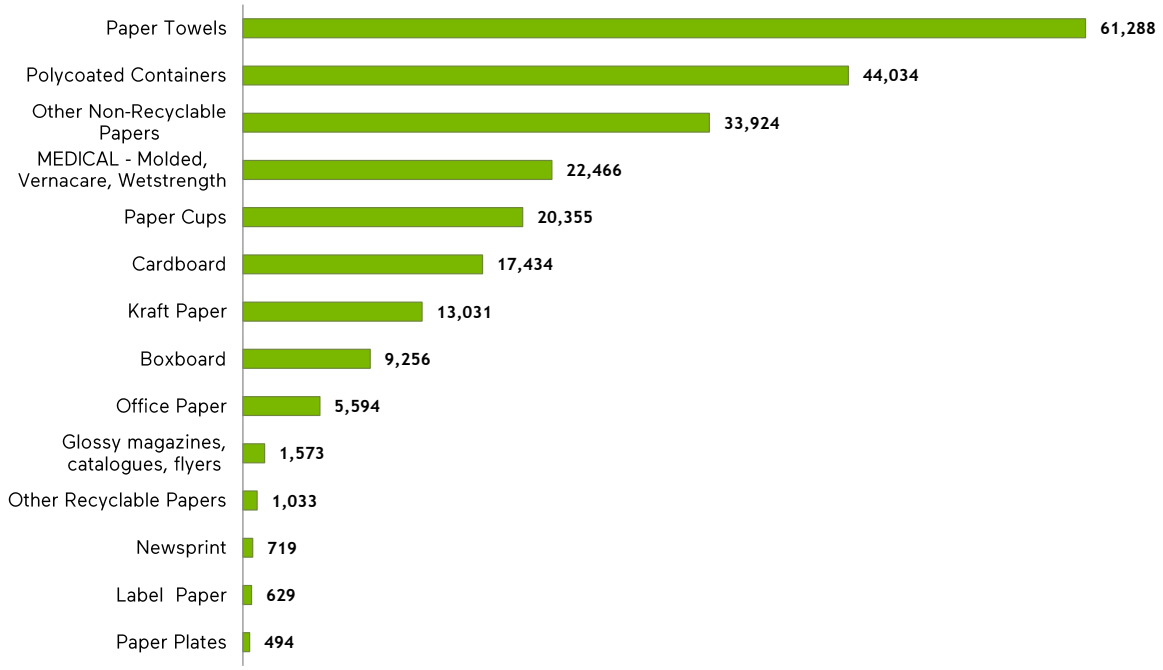
Landfill Sample Material Category Breakdown

Increase Awareness of Current Diversion Programs:
Below is a breakdown of the composition of the audited landfill material generated on site based on the analysis of the audited sample. As well as recommendations for selected sub-category material types.

Papers

Paper materials sent to landfill accounted for 22.1% of your total waste; nearly 231,831 kg of paper will be sent to landfill annually. The facility currently has programs in place to capture confidential paper shredding, cardboard and mixed paper collection for recycling.

Figure 6 - Annual Papers Disposed in Landfill (in kg)



The most predominant paper material found in the landfill was **paper towel** representing 5.8% of the landfill waste sample. This subcategory includes hand towels, facial tissue and similar materials. Paper towel is typically accepted in organic collection programs and could be included in the program already in place at the facility in certain areas.

The facility offers both hand towels and hand dryers in most washroom areas. The facility should consider reducing the hand towel dispensers and focusing on providing hand dryers to reduce these materials where generated.

Polycoated containers included 4.2% of the landfill sample. This included milk cartons and Tetra Paks. Education and signage should include these materials to increase awareness that they are recyclable.

Other non-recyclable paper identified in the landfill sample include contaminated food packaging and wax paper. This material subcategory represents 3.2% of the disposal weight.

Medical – Molded, Vernacare (e.g., bed pans) accounted for 2.1% of all landfilled materials. Some of these materials may be collected separately and sent for special handling.

Paper cups (e.g., coffee cups) were found throughout the sample and these items account for 1.9% of all landfill waste. Paper cups are not accepted in the diversion program in this jurisdiction.

Cardboard accounted for 1.7% of the landfill sample. The facility should continue to encourage staff to separate these materials throughout their workday and collect then place for collection.

Kraft paper (eg. brown paper bags) accounted for 1.2% of the landfill sample, in most cases these materials could be captured through existing programs.

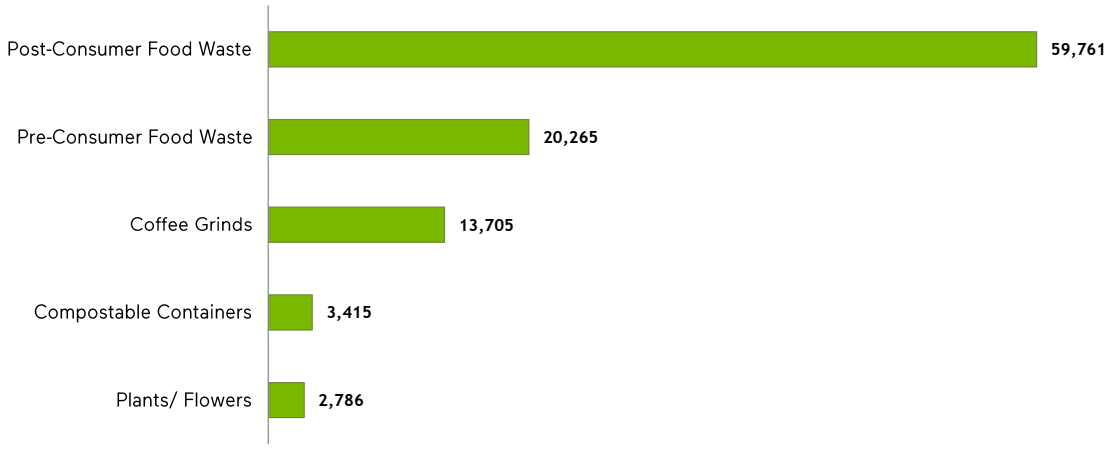
Also identified in the landfill sample was **boxboard** (e.g., tissue or nitrile glove boxes) accounting for 0.9%. These materials are accepted in the single stream recycling program.

Photographs 6 to 9 – Paper Material Examples in Landfill Sample (Polycoated Containers, Paper Cups, Cardboard, Bed Pans)

Organics

Organics materials sent to landfill accounted for 9.5% of your total waste; nearly 99,931 kg of Organics will be sent to landfill annually. A program currently exists at the facility to capture organic materials for compost, receptacles are found only in the Marketeria / Food Service area.

Figure 7 - Annual Organics Disposed in Landfill (in kg)



Organic material was identified primarily as **post-consumer food waste**, representing 5.7% of the entire landfill waste stream.

Pre-consumer food waste included pre-purchased food and prep waste accounted for 1.9% of the audited sample.

Also identified in this category was **coffee grinds** (1.3%) and **compostable containers** (0.3%).

These materials are accepted in the facility's organics compost program. The facility should review opportunities to expand the program to capture more material.

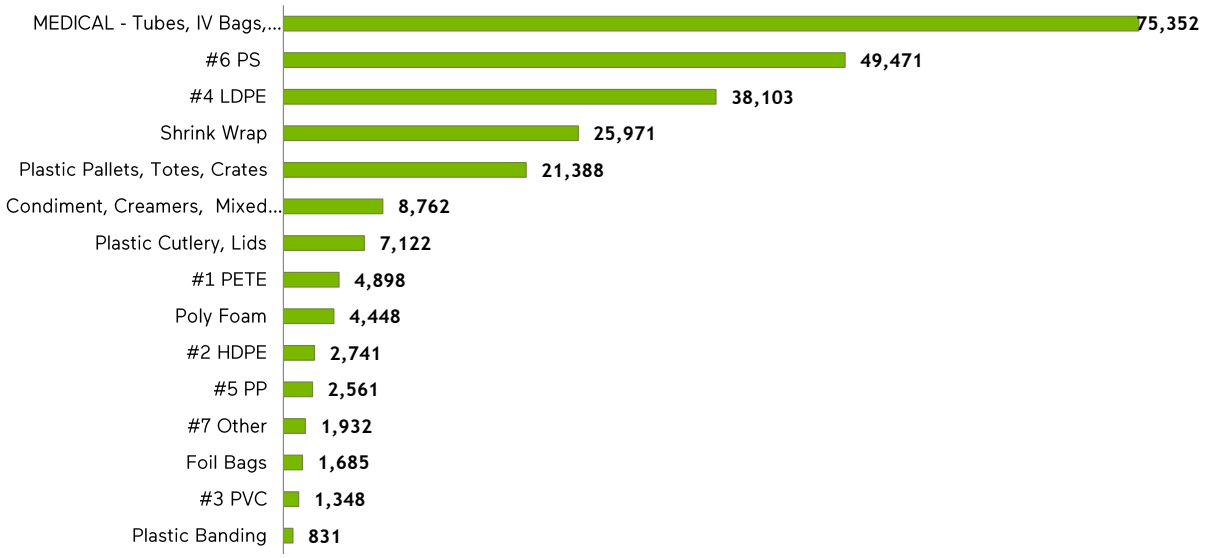
Photographs 10 to 11 – Organic Material Examples in Landfill Sample (Food Waste, Compostable Containers)

Plastics

Plastic materials account for 23.5% of your waste stream composition; 246,614 kg of plastic materials will be sent to landfill this year from your facility. The facility currently has programs in place to capture bottles and cans throughout the facility. All plastic material will be marked with a number indicating the type of plastic that was used to make the item.

Plastic is generally not a heavy material therefore the high weight generated indicated a huge volume of material. Utilizing current recycling programs will ensure this material is diverted. This number can be used to determine if recycling programs exist for that item. Most commonly, recycling programs will exist for #1, #2 & #5. Limited recycling programs exist for #3, #4 and #6 plastics.

Figure 8 - Annual Plastics Disposed in Landfill (in kg)



Medical Plastics – IV Bags, Syringes, Tubing represented 7.2% of the disposal weight. Due to health and safety issues most, medical plastics are single use plastics that are not accepted in the facility's diversion programs. These materials were identified in Patient Areas.

PS#6 representing 4.7% overall, this most often included food packaging, take out containers, beverage lids (excluding Styrofoam). If clean, these are often accepted as part of single stream recycling programs. Food vendors should be encouraged to provide recyclable or compostable options for the products they bring onto on facility.

#4 LDPE film bags & packaging accounted for 3.6% of landfilled materials, while **shrink wrap** represented 2.5% of the disposal weight. At this time, soft plastics materials are not accepted in mixed recycling programs.

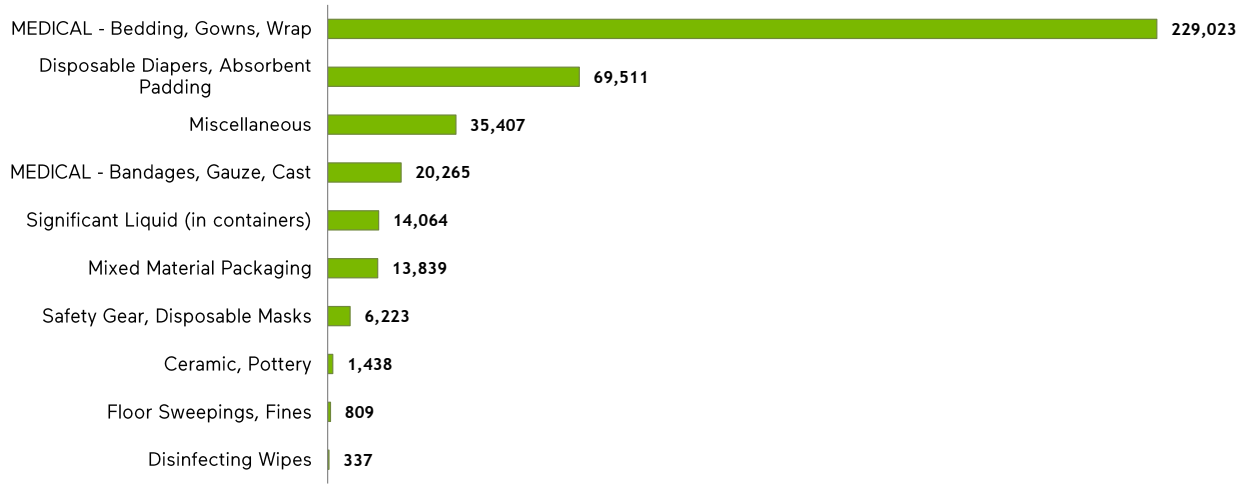
Plastic pallets, totes and crates represented 2.0% of the audited sample. This material may be collected separately and sent for special handling.

Photographs 12 to 15 – Plastic Material Examples in Landfill Sample (Medical Plastics, #6 PS, Shrink Wrap, Plastic Pallets)

Other Materials

Other materials sent to landfill accounted for 37.3% of your total waste; nearly 390,916 kg of this category of material will be sent to landfill annually. Currently there are no programs in place to capture most of these materials from landfill, programs may be available for construction & demolition on an as needed basis.

Figure 9 - Annual Other Disposed in Landfill (in kg)



Medical bedding, gowns and wrap accounted for 21.9% of the disposal weight. These materials are not accepted facility's diversion programs due to the material involved and contact with patients.

Disposable diapers, absorbent pads represented 6.6% of the landfill sample. Currently, no programs are available to divert this material.

Miscellaneous materials identified in the audited sample include air filters, toys, binders, stationary items and among other items. This material subcategory accounted for 3.4% of the audited sample.

Medical – bandages, gauze, cast represented 1.9% of the audited sample. These materials are not accepted in the facility's diversion programs.

Significant liquids (1.3%) represented a notable amount of the facility's disposal weight and included soaps, water and coffee and other beverages most often unfinished in the original containers.

Mixed material packaging identified in the audited sample include pharmaceutical packaging, composite cans and bubble mailer packaging. This material subcategory accounted for 1.3% of all landfilled materials.

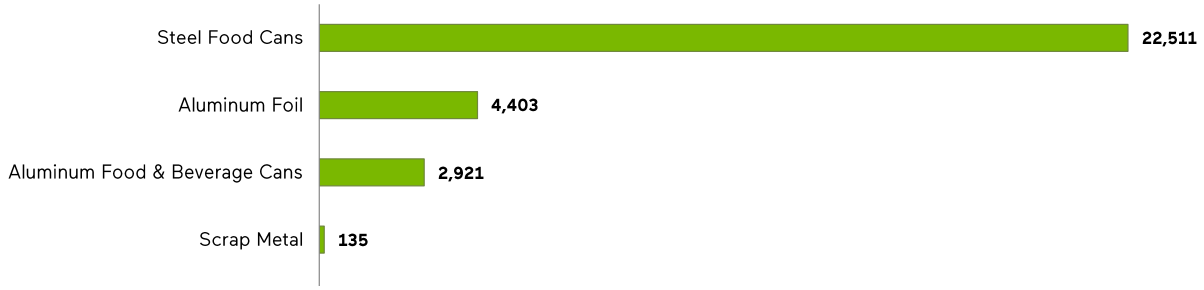
The facility should continually review opportunities to reduce or substitute the use of these materials in the landfill.

Photographs 16 to 19 – Other Material Examples in Landfill Sample (Bedding, Diapers, Binder, Air Filter)

Metal

Metal materials sent to landfill accounted for 2.9% of your total waste; nearly 29,970 kg of Metals will be sent to landfill annually. The facility has programs in place to capture scrap metal and most metal food and beverage containers.

Figure 10 - Annual Metals Disposed in Landfill (in kg)



Steel food cans accounted for 2.1% of the audited sample. Kitchen staff should be reminded that these materials are accepted in the facility's mixed recycling program.

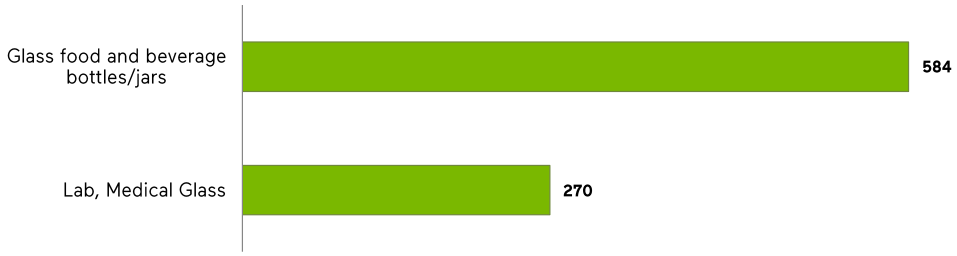
Also identified in the audited sample in minimal quantities was **aluminum foil** and **aluminum beverage cans**. If clean, these materials are also accepted in the mixed recycling program.

Photograph 20 to 21 – Metal Material Examples in Landfill Sample (Steel Cans, Aluminum Cans)

Glass

Glass materials sent to landfill accounted for 0.1% of your total waste; nearly 854 kg of Glass will be sent to landfill annually. The facility has programs in place to capture most glass food and beverage containers.

Figure 11 - Annual Glass Disposed in Landfill (in kg)

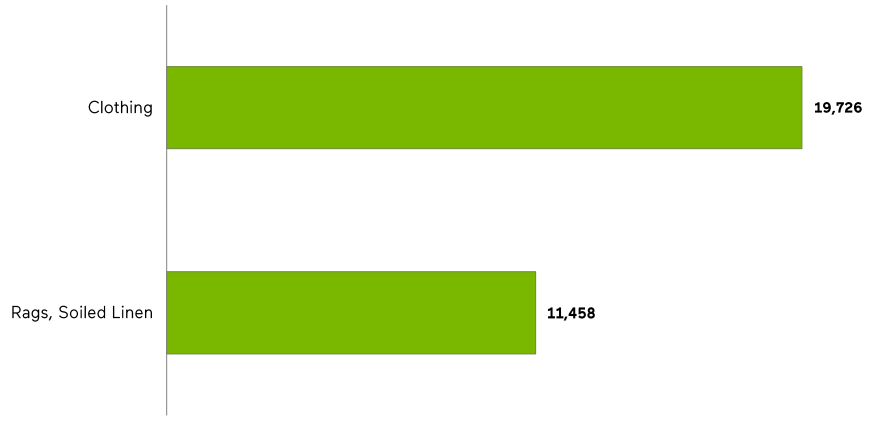


Glass beverage bottles are recyclable materials, clearly labeled and easily accessible recycling receptacles are key to ensure that employees and visitors can participate.

Textiles

Textiles materials sent to landfill accounted for 3.0% of your total waste; nearly 31,183 kg of Textiles will be sent to landfill annually. There is a program in place at the hospital to clean and reuse linens and uniforms.

Figure 12 - Annual Textiles Disposed in Landfill (in kg)



Textiles identified in the landfill waste stream are not currently recyclable. The facility should ensure the employees are trained to fully use all resources such as rags prior to disposal. As well, the facility should provide the opportunity to collect and donate clothing is the material is in good condition.

Rubber

Rubber materials sent to landfill accounted for 0.8% of your total waste; nearly 8,088 kg of Rubber will be sent to landfill annually. There are currently no programs in place to capture these items.

Figure 13 - Annual Rubber Disposed in Landfill (in kg)

This category was primarily composed of various work gloves, including **nitrile work gloves**.

The facility should consider implementing a targeted program from a supplier such as a Terracycle. Terracycle can offer programs for diverting unique materials not typically recycled.

Electronic Waste

Electronic Waste materials sent to landfill accounted for 0.8% of your total waste; nearly 8,313 kg of Electronic Waste will be sent to landfill annually. Programs are readily available for E-Waste, Batteries and Toner Cartridges through qualified haulers or through supplier take-back programs, efforts should be made to divert these materials from landfill to avoid negative environmental issues.

Figure 14 - Annual Electronic Waste Disposed in Landfill (in kg)

E-waste identified in the audited sample included a boombox stereo system and USB cables. The facility should remind employees to place these materials in the e-waste collection program.

Photograph 22 – Electronic Material Examples in Landfill Sample (E-Waste)

Employee, Contractor and Visitor Education and Engagement

The success of a Diversion Program is driven by user participation. If those who generated the waste are not utilizing diversion programs, success will never be achieved as it is not enough to simply implement programs and expect those programs to be effective. There are two critical factors necessary to ensure that diversion programs are effective. These factors are education and engagement.

As many different stakeholders are involved and contribute to the waste and diversion program it is important to target education towards each group.

1. Communication Program - The facility could maintain a communication program to communicate to educate all stakeholders. The following are all methods that can ensure stakeholders understand the steps that are being taken to achieve environmental sustainability within the facility and feel included in its successes.

   Promotion - The facility could use internal communication such as newsletters, internal emails and educational boards to relay their message. As well as Earth Day or Environment Days to promote the waste management program through promotional materials or information booths; Waste Reduction Week in October is another opportunity for communication around waste reduction.

   As well, the facility could create a **slogan or branding** to help promote their diversion program and create continuity for all promotional or educational materials.

   Information can be tailored to reflect the findings of this assessment. For example, create a campaign to encourage employees to take a moment to put their mixed paper in the correct receptacle, no matter where they are on site.

   Green information boards, similar to health and safety boards, can be a centralized place for relevant environmental information and reference material, example below.

Below, is an example of colour coded pictorial signage. Each provider should be able to provide similar material to educate stakeholders.

The following is an example of a customized signage in hospital cafeterias.

2. Training - Regular training of employees, custodial staff and contractors on diversion procedures help demonstrate the facility's commitment to diversion programs, update staff on policy changes and account for changes in workforce. Regular training has also been shown to aid in the elimination of inconsistency and complacency in diversion programs.
   - Training can be provided with power point presentations and examples of educational signage and recyclable materials;
   - Training can be just a few minutes during safety talks or weekly check-ins;
   - Ongoing training and education are critical due to turnover of employees and contractors as well as occasional program changes;
   - Management and supervisors could be trained on all aspects of the diversion program which will allow them to be an ambassador and a resource to support employees and visitors.

3. Maintenance/ Custodial Review – Facility management could regularly meet with the custodial manager and maintenance staff (custodians) as they may be able to provide hands on insight into aspects of the diversion program and areas of improvement.

   Custodial staff should be trained on the diversion program during their orientation and reminded on a regular basis by their managers. Input from custodians and custodial managers may prove beneficial as they have firsthand knowledge of the program.

Site Observations - It was identified throughout the assessment that there were inconsistencies in the types of receptacles used, location of receptacles and the availability of labelling; signage etc. The facility could strive to use a similar style of receptacles throughout the facility and ensure that all receptacles and collection bins are appropriately labelled.

- As shown in the photograph below, most public facing receptacle stations were equipped with labelling and signage.

- Some receptacle stations identified in the facility had labelling but lacked signage that list all the acceptable materials that staff, or visitors may handle during the workday.

- In the photo below a garbage receptacle was identified public areas without a recycling bin nearby. All garbage bins should be paired with a recycling bin. As described in this report materials identified in the audited sample are potentially recyclable and staff should have options to dispose of them easily.

Ensure Effective Diversion Infrastructure

The infrastructure of a diversion program, including the receptacles and education materials, play an integral role in its success. If containers are not present, or accessible to collect recyclable material, users will not be able to participate.

- Facility Managers should, as part of their duties, routinely tour the facilities to monitor the infrastructure. By ensuring recycling stations are available, clean, and orderly. This will aid in their effectiveness. Ensure that receptacles equipped with labelling and signage are in place for ease of use by employees, contractors, and visitors.

- Recycling receptacles should be accessible and the largest receptacles and the most available in terms of numbers.
    - As described in this report, most of the materials generated at the facility are recyclable; therefore, waste receptacles should be less prominent to encourage the use of the recycling receptacles.

- Apply a colour coding system (e.g., blue receptacles and blue labelling for mixed recycling) will help users recognize the recycling containers in different areas of the facility.

- Receptacles should be labeled (e.g., stickers, printing labels, posters, magnets) to identify what stream they are intended to collect.
    - This is an easy way to update current receptacles without the capital costs of new containers.

- Pictures, with simple easily recognizable images, should be used to indicate recyclable materials to those not familiar with the language or for young readers.

- Recycling receptacles should never be lined with black bags, as they may be confused for landfill and misplaced, during disposal; Request that the maintenance team use clear bags to collect recyclables to ensure that recyclable or compostable materials are directed to the correct receptacle. Different bags are not as easily confused in carts.

- Promotional materials help educate and increase awareness in the necessity of the 3 Rs. A green information board in common areas, can be a centralized place for relevant environmental information and reference material, example below.
    - The facility should create a slogan or branding to help promote their diversion program and create continuity for all promotional or educational materials.

Continual Improvement and Additional Recommendations

The following are suggested actions to help the facility improve their internal processes and strive to reach higher diversion rates while maintaining a strong, efficient Diversion Program.

It is recommended that the facility regularly check with their waste hauler to confirm what materials are recyclable in their jurisdiction. As some of these materials may be integral to the operations of the facility, it is recommended that you regularly review opportunities to reduce or substitute these materials in your operations.

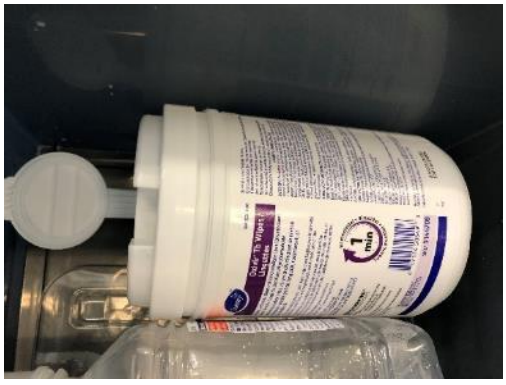
i. Educate Staff on 'Easy Targets' for Diversion

The hospital should target specific recyclable materials used throughout the facility, particularly in active patient areas.

Examples of materials include:

- Boxboard such as Kleenex boxes or latex gloves used by cleaning staff and medical staff.
- HDPE containers of cleaning products including sanitary wipe containers, soap dispensers, and other cleaning products used by cleaning staff, vendors and medical staff. Some of these containers may be unique to the hospital environment and may not be commonly understood as recyclable blue box items.

Examples of materials that could be easy targets for diversion (Boxboard, HDPE)



The following is an example of a customized signage used in a medical setting

ii. Capture Additional Materials

Some non-traditional recyclable materials were identified in the landfill waste sample. This included nitrile gloves and stationary items. Programs are available from companies like Terracycle in to provide the resources to set up a collection station at your facility, for such materials which can be dropped off at a nearby Staples location.

https://zerowasteboxes.terracycle.ca/collections/zero-waste-boxes

Example of a TerraCycle PPE collection box

In addition, Terracycle offer other recycling programs for common non-conventional materials which were identified primarily in break rooms during the audit. These include single use beverage pods, creamer containers, plastic wrappers, plastic cutlery and plates.

Example of non-conventional materials which can be recycled by Terracycle

iii. Material Substitutions: Paper Towel

When considering environmental and financial costs of paper towel manufacturing and disposal, alternatives such as High-Speed Energy Efficient (HSEE) hand dryers would be a favourable option for the facility.

a) The **environmental factor**. In comparing the carbon footprint of paper towel and hand dryers, material production, manufacturing, transportation, material use, and its end of life are considered. The carbon footprint for an HSEE hand dryers is estimated to be less than one third of paper towel even if produced from recycled materials.
b) The **cost factor**. Paper towel use involves continuous costs: purchasing, handling (custodial operations), disposal (both composting and landfilling have costs associated). The initial capital cost of hand dryers begins to see a payback within a reasonable timeframe.
c) The **hygiene factor**. Paper towels are typically determined to be more hygienically effective in comparison to hand dryers as the hands dry more quickly. However, this can be mitigated with measures such as ensuring antibacterial soaps and guidelines of drying length on hand dryers. There is no research connecting use of hand dyers to infection. The research suggests that thorough handwashing will not lead to the spread of bacteria with use of hand dryers.[1]

iv. Sustainability Goal Setting

It is recommended that the facility set specific diversion **goals** regarding their waste management program.

- Goals must be accompanied by a target date and progress reviewed at least once per year to maintain effectiveness.
- Through the process of goal setting, there is inherent motivation to meet those goals and it is believed that organizations who establish goals publicly are more likely to act with pressure from those who would like to see these goals met. Waste disposal represents a significant cost to the facility and all efforts to reduce disposal cost are beneficial.
- Managers and personnel may change but once the momentum is started and goals are set, new staff will be motivated to see projects through.

v. Purchasing Power

Unity Health - St. Michael's Hospital should use its purchasing power to influence its employees, suppliers and contactors to follow the same recommendations. A commitment to waste management should be a significant aspect within future contracts with service providers.

- The facility should establish a vendor selection protocol to reflect a commitment to the 3R's: reduction, reuse and recycling;
- The facility should conduct "vendor pre-qualifications" to evaluate the protocol and vendor environmental track records;
- Contract language should reflect the facility's objectives and allow periodic reviews to determine if those objectives are being met throughout the life of the contract;
- Get buy-in and support from contractors and service providers who work on site. All service providers, vendors or contractors should be aware of the environmental goals and be active participants, including education programs and purchasing decisions.

[1] Science based medicine

Waste Management Sustainability Services
2023 Recycling Benefits for St. Michael's Hospital

In 2023, we recycled 289 tons of cardboard, mixed paper, metal, glass and plastics.

These recycling efforts conserved the following resources/prevented these emissions:

4,949 Mature Trees
Represents enough saved timber resources to produce 84,129,900 sheets of printing and copy paper!

761 Cubic Yards of Landfill Airspace
Enough airspace to fulfill the annual municipal waste disposal needs for 884 people!

880,459 Kw-Hrs of Electricity
Enough power to fulfill the annual electricity needs of 80 homes!

Avoided 921 Metric Tons (MTCO2E) of GHG Emissions
That GHG reduction is equivalent to removing annual emissions from 195 passenger vehicles!

1,043,164 Gallons of Water
Represents enough saved water to meet the daily fresh water needs of 13,908 people!

Sources: U.S. Environmental Protection Agency, U.S. Energy Information Administration, Environmental Paper Network-Paper Calculator V4.0, Domtar Paper, Gaylord Corporation, U.S. Forest Products Laboratory, and Waste Management.
Notes: GHG = Greenhouse Gas; MTCO2E = Metric Tons of Carbon Dioxide Equivalent

Appendix 2 - Detailed Waste Breakdown by Generation Area

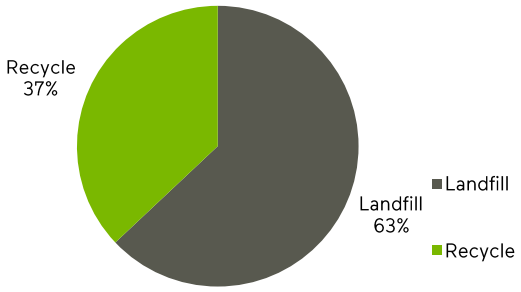
Area	Paper	Metal	Plastic	Textile	Glass	Rubber	Organic	Electric	Other	Total
Patient Area	42.71	1.64	59.96	11.62	0.38	3.60	10.76	0.48	158.39	289.54
Food Service	50.58	11.62	31.98	0.00	0.00	0.00	32.78	0.00	3.60	130.56
Unlabelled	2.72	0.00	7.74	2.26	0.00	0.00	0.50	3.22	3.50	19.94
Unlabelled / Other	3.60	0.00	9.52	0.00	0.00	0.00	0.00	0.00	5.78	18.90
Office	3.58	0.08	0.57	0.00	0.00	0.00	0.44	0.00	2.73	7.40
Grand Total	**103.19**	**13.34**	**109.77**	**13.88**	**0.38**	**3.60**	**44.48**	**3.70**	**174.00**	**466.34**

Appendix 3 – Diversion Report

Diversion Overview
Unity Health - St. Michael's Hospital, Toronto ON

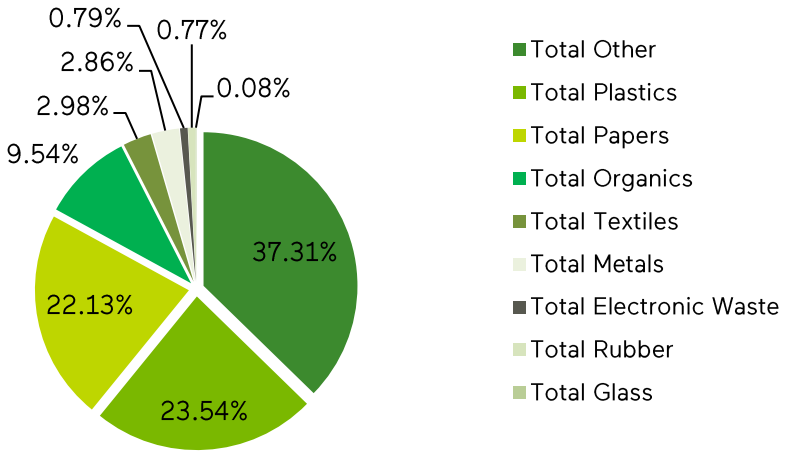
Diverted Materials	Annual Projected Volume (kg)	% of Diverted Materials
Mixed Paper and Beverage Containers	311,670	50.6%
Organics	254,270	41.3%
Skids	39,960	6.5%
Metal	5,220	0.8%
E-Waste, Batteries	3,490	0.6%
PVC	1,180	0.2%
Light Tubes, Ballasts	500	0.1%
Total	**616,290**	**100.0%**

Diversion Summary



Waste Category	Material Composition (%)	Annual Projected Volume (kg)
Total Other	37.3%	390,916
Total Plastics	23.5%	246,614
Total Papers	22.1%	231,831
Total Organics	9.5%	99,931
Total Textiles	3.0%	31,183
Total Metals	2.9%	29,970
Total Electronic Waste	0.8%	8,313
Total Rubber	0.8%	8,088
Total Glass	0.1%	854
Total	**100.0%**	**1,047,700**

Waste Material By Category



Appendix 4 – Six Steps to a Successful Sustainability Program

WM Sustainability Services has extensive experience in managing on-site sustainability programs safely, and in a manner that provides a framework for achieving our customers' waste reduction, continuous improvement and diversion goals. The following are several steps that we have found useful in implementing sustainability programs:

1. ***Make sure that you sustain your company's ability to compete.*** Any improvement or innovation should have economic *and* environmental benefit.
2. ***Make sure that your first recycling initiative provides a quick payback.*** It is important that the first initiative delivers a quick payback to get continued support from operational management.
3. ***Explore the entire value chain.*** For every dollar spent on disposal and transportation, another $3.00 - $10.00 is spent in generating the material in the first place.
4. ***Use quantitative analysis to identify the best opportunities.*** Typically, Pareto charts work best, i.e. 20% of by-products account for 80% of the cost or 80% of the cost savings.
5. ***Work with your vendors, tenants, suppliers and employees.*** Often times, the best ideas come from those working in a particular area every day. You should push vendors and suppliers to develop programs that positively impact your goals and ask your staff for input.
6. ***Win people over with enthusiasm.*** Enthusiasm and communication of goals and achievements are critical for sustaining a strong Program.

Source Reduction and Reuse Strategies

Studies indicate that between 2 and 5 percent of waste streams are reusable. There are many ways to prevent waste, at the source, and reuse products to reduce waste, including:

Implementing Purchasing Practices that Reduce Waste

- ✓ Purchase reusable, rather than disposable products
- ✓ Request that vendors deliver products in reusable containers, such as plastic totes, rather than cardboard boxes
- ✓ Purchase in bulk to reduce packaging, while purchasing only the amount that is needed
- ✓ Purchase products with minimal packaging
- ✓ Work with suppliers to minimize the packaging used to protect their products

Reducing the Amount of Material Used

- ✓ Establish a facility-wide, double-sided, copying policy
- ✓ Create scratch pads from used paper
- ✓ Use outdated letterhead for in-house memos
- ✓ Circulate documents, post on bulletin boards, or send electronically, rather than making multiple copies
- ✓ Use central files to reduce the number of hard copies that are made

Using Reusable Rather than Single-Use, or Disposable, Products

- ✓ Change to reusable dishes in the cafeteria
- ✓ Place reusable coffee mugs in break rooms
- ✓ Offer a discount on drink prices for using reusable beverage containers
- ✓ Use rechargeable batteries
- ✓ Install hot air dryers in public restrooms and remove paper towels

Reusing Materials for Other Purposes at Your Facility

- ✓ Reuse cardboard boxes and foam peanuts for shipping from your facility
- ✓ Use newspaper and shredded paper for packaging

Appendix 5 – Material Descriptions

Material	General Descriptions
#1 PETE	Polyethylene Terephthalate, Water Bottles, Soft Drink Bottles
#2 HDPE	High Density Polyethylene Containers, Chemical Containers or Jugs; High Density Polyethylene Bags or Film, Strong "crispy" Bags
#4 LDPE	Low Density Polyethylene Bags and Film, Garbage Bags, Shopping Bags
#5 PP	Poly Propylene, Yogurt Containers, Straws
#6 PS	Poly Styrene, Beverage Containers, Packaging Materials, Take-out Food Containers, Packing Popcorn
#7 Other	Products Labeled #7, Unlabeled Plastic Items
Aerosol Cans	Spray Cans
Air Filters	Furnace Filters, Vehicle Filters
Aluminum	Aluminum Parts and Products
Aluminum F & B Cans	Aluminum Food and Beverage Cans, Pop Cans
Aluminum Foil / Wrappers	Food Wrappers and Packaging
Batteries	Dry Cell Batteries, Large Batteries
Boxboard	Cereal, Tissue Box Material
Building Material	Construction Material, Drywall, Insulation
Bulbs	CFL, LED, Fluorescent Bulbs and Tubes
Ceramics	Objects Formed with Clay (e.g. Pottery)
Coffee Grounds	Used Coffee Grounds
Coloured Glass	Coloured Beverage Bottles and Jars
Cooking Grease	Fats, Oils and Grease
Compostable Containers	Compostable Take Out Containers, Paper Plates
Cores and Tubes	Paper-Based Cores and Tubes
Courier and Shipping Bags	Poly Mailer Bags
Clear Glass	Clear Beverage Bottles and Jars
Drinking Glass	Glass Cups, Wine Glass
Electronics	Cables, Computer Equipment, Toasters, TVs, Phones, Printers
Face Coverings	Surgical Masks, Dust Masks, N95 Masks
Floor Sweepings	Debris, Dust
Furniture	Chairs, Desks, Lamps, Shelves
Hygiene Materials	Feminine Hygiene Materials, Disposable Diapers, Cloth Diapers
Kraft Paper	Paper Bags, Heavy Brown Paper
Label Paper	Sticker Paper
Liquid in Container	Significant Liquid in Bottle, Container or Cup
Magazines	Glossy Magazines and Newspapers
Metal Banding	Metal Straps
Molded Pulp	Drink Trays, Egg Cartons, Product Packaging
Misc. Metals	Metal Shavings, Nuts and Bolts, Metal Clothes Hangers, Scrap Metal
Misc. Plastics	Plastic Utensils
Misc. Textiles	Rags, Mop Heads, Cloth Gloves

Mixed Material Packaging	Condiment Containers, Envelope with Window, Miscellaneous Product Packaging
Napkins	Paper Napkins and Tissues
Newsprint	Newspapers, Weekly Flyers
Nitrile and Latex Gloves	Nitrile and Latex Gloves
OCC	Old Corrugated Cardboard
Paint Cans	Empty Paint Cans
Pallets and Skids	Wooden Pallets and Skids
Paper Cups	Paper or Polycoated Cups
Paper Towels	Paper Hand Towels
Personal Clothing	Used Shirts, Uniforms, Hats
Photo Paper	Glossy Paper
Plants / Flowers / Yard Waste	Indoor and Outdoor Plants, Flowers, Leaves, Yard Waste
Plastic Cutlery	Plastic Forks, Spoons, Knives, Stirring Sticks
Plastic Strapping	Plastic Shipping Straps, Plastic Banding
Polycoat	Milk Cartons, Tetra Packs
Polyfoam	Foam Protective Packaging Materials, Styrofoam
Post-Consumer Waste	Scrap Food Waste
Pre-Consumer Waste	Food Preparation Waste
Rubber Tubing	Cable Protection, Metal Coverings, Pipe Fittings
Safety Gear	Safety Vests, Jackets, Harness, Safety Toe Covers, Work Gloves
Scrap Wood	Construction Materials, Misc. Wood Pieces
Shoes and Boots	Assorted Footwear
Shrink Wrap	Shrink Wrap, Plastic Film
Single Use Beverage Pods	K-Cups and Pods
Steel	Steel Food Cans, Steel Parts and Products
Stir or Chop Sticks	Wooden Stir or Chop Sticks
Tires	Car Tires, Forklift Tires
Tissue Paper	Thin Packing Paper
Wax Paper	Paper for Wrapping or Packaging
Wet Strength Paper	Wet Strength Kraft Paper, Medical Paper
White/ Ledger/ Office Paper	White Paper, Printer Paper
Wood Shavings	Scrap Construction Shavings and Debris
Wooden Crates	Shipping Crates

Appendix 6 – Ontario's 3R Regulations

Ontario's 3Rs Regulations

Ontario's 3Rs Regulations governing non-hazardous solid waste from residential, industrial, commercial and institution sources became law in March 1994. Designated IC&I organizations are now required to conduct annual waste audits and update annual waste reduction work plans. This documents overviews the regulatory requirements for IC&I sector organizations.

Regulation	Intent	Requirements	Who Must Comply
Ontario Regulation 102/94 ***Waste Audits*** ***Waste Reduction Work Plans***	To understand the amount and composition of all waste produced, how the waste is produced including relevant management policies and practices, and how the waste is managed A waste reduction work plan seeks to establish concrete goals to reduce waste	Annual waste audit must be completed in which the types of waste and quantities of waste are assessed. A waste reduction work plan must contain a strategy for reducing, reusing and recycling waste, identify who is responsible for implementation and provide a summary of timing and expected results from the waste reduction projects. This plan must be communicated with all employees	• Retail shopping complexes of 10,000+ m^2 floor area • Class A, B or F hospitals under Ontario Reg. 964 • Schools with 350+ students at a location or campus • Restaurants with gross annual sales of $3,000,000+ • Office buildings with 10,000m^2 of floor area • Hotels and motels with 75+ units • Building construction projects of 2,000+ m^2 • Building demolition projects of 2,000+ m^2 • Manufacturing sites with 16,000 employee hours per month
Ontario Regulation 103/94 ***Source Separation Programs***	To promote the source separation of materials throughout the facility	Handling and storage facilities must be provided for recyclable materials. Efforts must be made to ensure the system is used and that source-separated materials are reused or recycled. Employees must be instructed on the use of the program	
Ontario Regulation 104/94 ***Packaging Audits*** ***Packaging Reduction Work Plans***	To examine the impact of packaging on the waste management system and identify waste reduction plans. Packaging refers to all materials used to protect, contain or transport a product.	Bi-annual audit must address; types and quantities of packaging used, reusability or recyclability of packaging, the environmental impact of the waste and the lifecycle of the packaging materials. Reduction work plan must identify ways to reduce packaging used, increase reuse or recyclability content, reduce the environmental impact and reduce the burden of waste for the consumer.	• Manufactures or packagers of packaged food, beverage, paper or chemical products with total employee hours of 16,000+ per month • Importers of packaged food, beverage, paper or chemical products for sale in Ontario with value of goods imported $20,000,000 per year

THINK GREEN.®