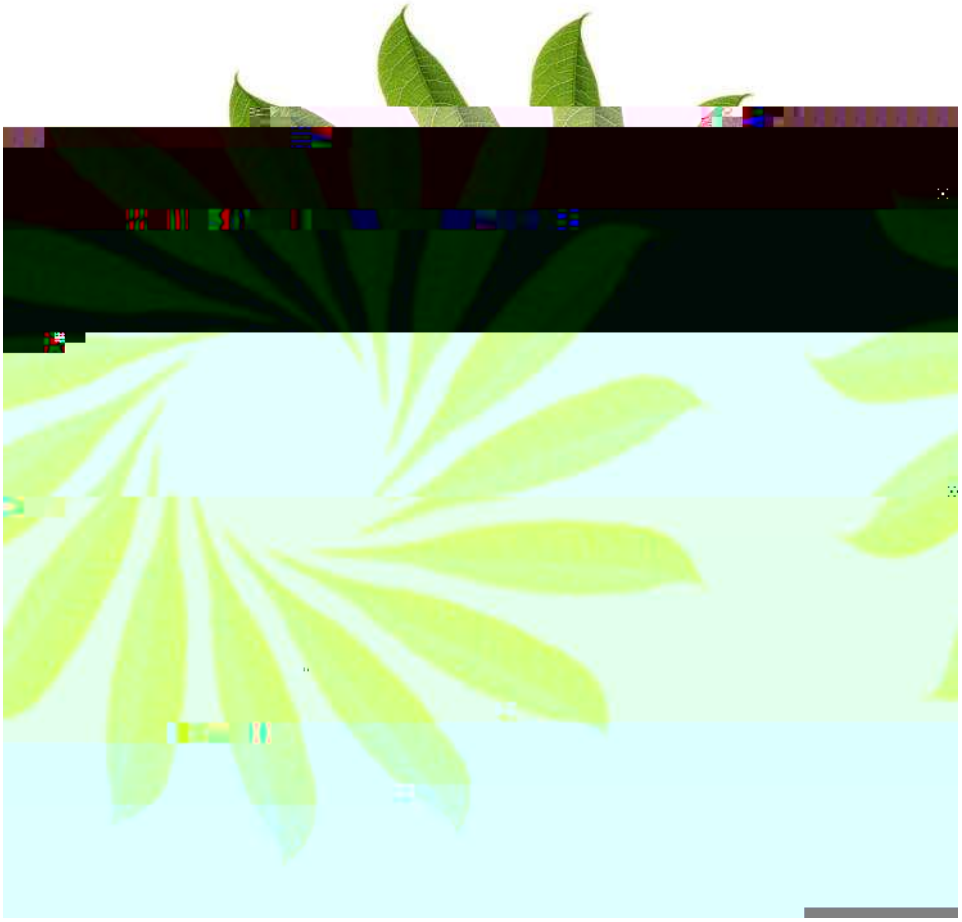
Waste Management of Canada

Waste to Resource Assessment



Prepared for:

Queen's University
207 Stuart Street, Kingston, Ontario
October 2, 2019

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Executive Summary

Overview

On October 2, 2019, Waste Management and Queen's University student volunteers conducted

Assessment Information

Table 1 – Facility Information

Item	Comments

Options Overview

Sampling Method

1. Pre-audit activities - Collecting historical data/diversion reports, service receptacle information, etc. Establishing the plan for the assessment. Conducting a site tour of the campus to review procedures and 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 campus. 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 waste collection area 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 source areas throughout the campus over a 24-hour period. The materials were sorted and divided into waste categories and weights of each material sub-category were recorded.

3.

Diversion Opportunities

Increased diversion opportunities represent the largest potential cost savings and landfill diversion opportunity for Queen's University. 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:

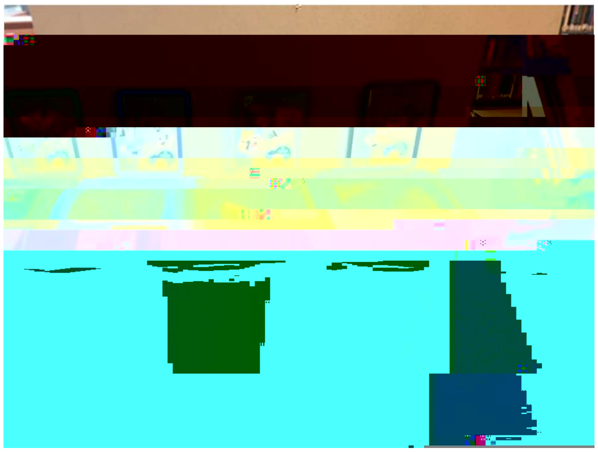
Based on the iey.

Diverted Material Information

Queen's University has programs to capture and reuse the following; but service and weight information was not available for these specific locations at the time of the assessment.

Cardboard
Mixed Papers
Bottles & Cans
Organics
Confidential Shredding
E-Waste
Batteries
Scrap Metals
Scrap Wood
Light Bulbs
Toner, Ink Cartridges
Grease

Photographs 3 to 4 – Receptacle and Signage Examples in Campus



♻ Contamination Identified in Recycling Stream

A sample of recycling and compost materials from the five audited source locations was

Diversion Recommendations

Recommendations Overview

Several options have been identified that can help Queen's University make its operations more sustainable. Each option should be carefully reviewed for operational, financial, social, and strategic fit.

- **Increase Awareness of Current Diversion Programs**
- **Student and Employee Education and Engagement**
- **Continual Improvement and Additional Recommendations**

Photographs 5 to 6 – Collection Receptacle and Signage Examples on Campus

Organics

Plastics

The campus currently has programs in place to capture bottles and cans throughout the campus. All plastic material will be marked with a number indicating the type of plastic that was used to make the item. 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.

#4 LDPE film bags & packaging was identified. At this time, LDPE materials are not accepted in mixed recycling programs. Much of the LDPE identified was contaminated with food or liquid waste.

Other Materials

Currently there are no programs in place to capture most of these materials from landfill,

Rubber

There are currently no programs in place to capture these items. This category was primarily composed of various work gloves, including nitrile style work gloves, most of which originated in a food preparation setting. A program is available at Queen's to collect nitrile gloves for diversion through Kimberly Clark.

Glass

The campus has programs in place to capture most glass food and beverage containers. Glass bottles (0.5%) all recyclable materials, clearly labeled and easily accessible recycling receptacles are key to ensure that students, employees and visitors can participate.

Wood

Scrap Wood materials may be captured through a select program in specific areas of the campus.

Wood was primarily identified as stir/chop sticks in the audited sample and these materials would be accepted in the organic collection program on site.

Textiles

There is currently no program in place to capture these materials.

Blue rags accounted for 0.3% of the audited sample much of these originated from a restaurant setting and would not be recyclable. The campus should consider if reusable materials are a viable option.

♻ Joseph S. Stauffer Library, Library Administration Overview

Note: green text indicates that the material is accepted in a diversion program on site.

It is estimated that the Library will generate over 22.85 tonnes of waste and divert 26.61 tonnes of recyclables annually.

The current diversion rate for this unit is 53.8%;
The potential diversion rate could have been 88.3% if all potentially recyclable or

Photographs 21 to 23 – Site Visit Photos
Below are examples of a few instances where landfill receptacles had no recycling receptacles

♻ AMS Office – Alma Mater Society Overview

It is estimated that the AMS Office – Alma Mater Society will generate over 1.44 tonnes of waste and divert 1.85 tonnes of recyclables annually.

- **The current diversion rate for this unit is 56.3%;**
- **The potential diversion rate could have been 84.3% if all potentially recyclable or compostable materials were captured and diverted through currently available diversion programs;**
- **The estimated capture rate at this unit was determined to be 66.8%;**
- **The most significant material category identified is Organics at 32.2% of the audited landfill waste stream, while Other accounted for 31.2%;**
- **The significant material subcategories identified in the waste stream are:**
    - **Organic Food Waste at 31.2%**
    - **Miscellaneous at 31.2%**
    - **Office Paper at 13.1%**
    - **Other Recyclable Paper at 6.7%**
    - **Paper Towels at 4.0%**
    - **Boxboard at 3.0%**

Table 9 – Landfill Audit Results – JDUC / AMS Office

Photographs 26 – Site Visit Photos

Below is an example where landfill receptacles were prominent, but no recycling receptacles were identified in the immediate area.

♻ Common Ground Overview

It is estimated that the Common Ground will generate over 1.33 tonnes of waste and divert 7.16 tonnes of recyclables annually. The sample from this location is specific to the back of

MacCorry Cafeteria Overview

It is estimated that the MacCorry Cafeteria will generate over 19.43 tonnes of waste and divert 17.81 tonnes of recyclables annually. The sample collected from this location was targeted at the back of house staff operations.

The current diversion rate for this unit is 47.8%;
Of all the material generated on site, up to 72% potentially could have been diverted through currently available diversion programs;
The estimated capture rate at this unit was determined to be 66.5%;
The most significant material category identified is Organics at 56.7% of the audited landfill waste stream, while Papers accounted for 21.8%;
The significant material subcategories identified in the waste stream are:
  Pre-Consumer Food Waste at 30.2%
  Coffee Grounds at 14.9%
  Organic Food Waste at 9.1%
  LDPE at 6.7%
  Boxboard at 7.7%
  Paper Towel at 5.9%

Student and Employee Education and Engagement

There are three critical factors to necessary to ensure that diversion programs are effective. These factors are education and engagement; as well as providing a program infrastructure that is set up for success.

For school staff (faculty):

Regular training demonstrates the University’s commitment to diversion programs, update staff on policy changes and accounts for changes in workforce.

- Staff should be trained on all the streams available in the campus diversion program and where they can access them, and staff should be able to communicate the program to students;
- Targeted training sessions and regular reminders, can ensure that staff understands the steps that are being taken to achieve environmental sustainability and their roles to achieve success;
- Staff should be trained to notify a point of contact if receptacles or signage is missing;

For students:

- The University should create a slogan or branding to help promote their recycling program and create continuity for all promotional or educational mat] p misral mr b

There are several activities, events and practices that educational institutions have implemented, which have proven to work well to promote environmental efforts in a campus setting. The following are some examples of campus wide activities involving students:

A. A student run Environmental Committee and <u>Campus Green Team</u> can take the lead and provide energy and ideas to the campus.
   a. Booth displays or events on campus can help engage students this may include an Orientation Week Promotion to educate new students. An Environmental Themed Day/ Assembly, for Earth Day in April or Waste Reduction Week in October are other examples to increase and maintain awareness on campus;

Continual Improvement and Additional Recommendations

The following are suggested actions to help the institution improve their internal processes and

iii. Data and Service Management

Building managers and facility operators around campus should continually review the waste services on site, including the number and the size of waste bins, location and frequency. Should the receptacles be found to be at less than capacity on their service day, or filled up before service day, services should be adjusted, as required, to match the amount of material generated and to be most cost effective.

Below are examples of recycling and organic collection totes on site. See example on below of material which could not fit in existing containers. Note: this is due notably to the collection of additional sample material for the waste audit.

v. Capture Additional Materials

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

https://www.terracycle.ca/en-CA/brigades/writing-instrument-retail-based-brigade

In addition, Terracycle offer other recycling programs for common non-conventional materials which were identified during the audit. These include single use beverage pods, creamer

vi. Bin Assessment

Facility Management should, as part of their duties, periodically and routinely tour the campus to monitor the infrastructure of the waste management program. By ensuring recycling stations are present, and conveniently available throughout the campus, the recycling participation rate will improve. Ensuring that there are recycling receptacles in every area of the campus, where waste is generated, will allow for the proper source separation of materials.

The team should ensure that all receptacles are clearly labelled, and pictorial guidelines are present to educate staff, as described above.

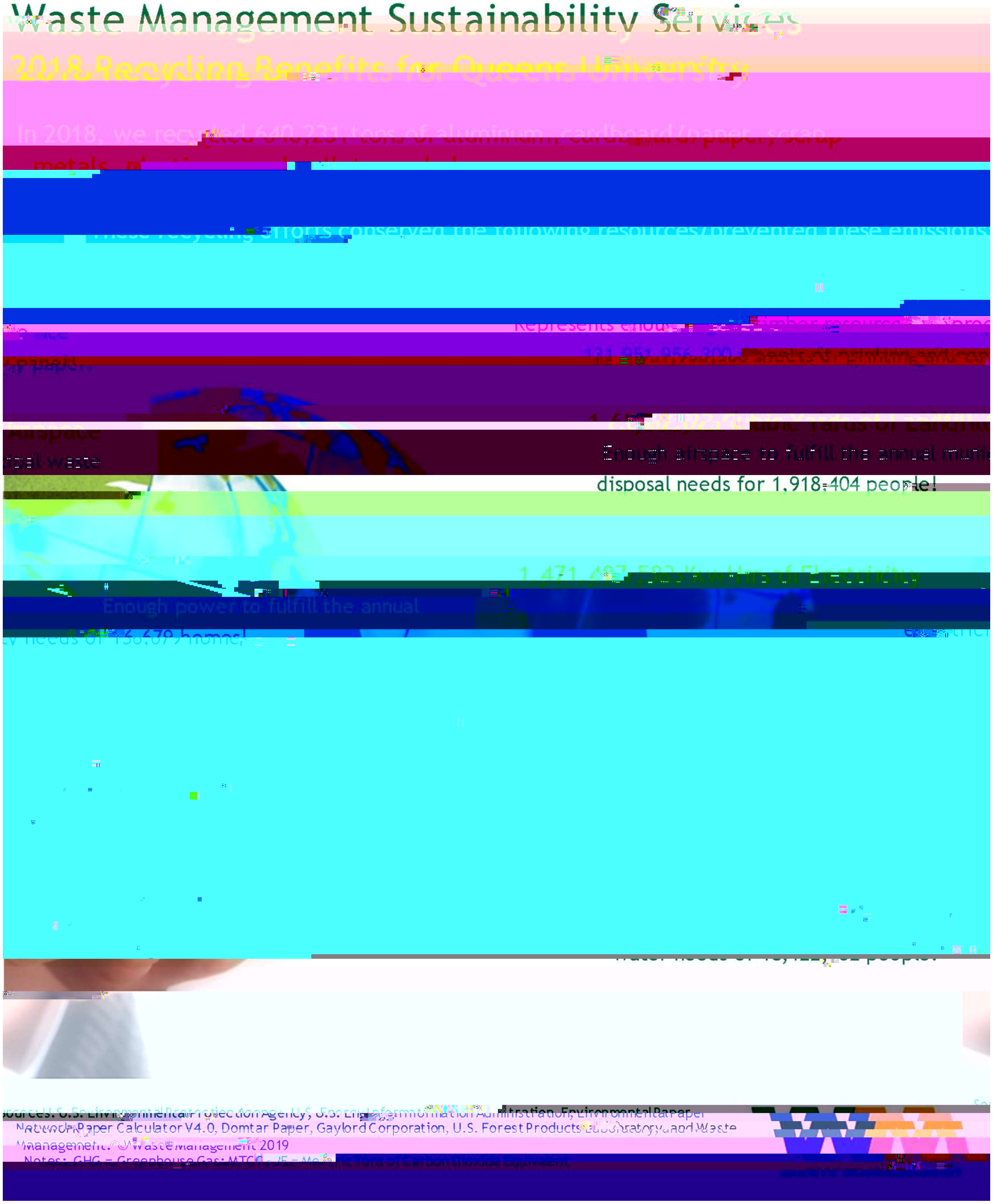
The university should consider offering an email address or phone number for students or staff to call to request that broken equipment or missing signage be updated.

Black bags should never be used in recycling receptacles as they can often be confused as landfill waste and there is a risk that already sorted recycling are disposed incorrectly. [illegible]

Photographs 37 to 38 – Site Visit Photos
Below are examples of receptacles which should have clear and consistent labels, most receptacles in the campus were labelled. Labels should be accompanied by guidelines that list all the acceptable materials that staff, and students may handle during the school day.

Photographs 39 to 40 – Site Visit Photos
Below is an example where landfill receptacles were identified, with no recycling receptacles

Supplementary Information
Appendix 1 – Recycling Benefits



Waste Management Sustainability Services

2018 Recycling Benefits for Queens University

In 2018, we recycled 640,231 tons of aluminum, cardboard/paper, scrap metals, [illegible]

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

Represents enough [illegible] timber resources [illegible] [illegible] 131,951,956,300 sheets of printing and [illegible] paper!

1,6[illegible] Cubic Yards of Landfill Airspace

Enough airspace to fulfill the annual municipal waste disposal needs for 1,918,404 people!

1,471,487,583 KwHrs of Electricity

Enough power to fulfill the annual electricity needs of 136,679 homes!

[illegible] water needs of [illegible] 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. © Waste Management 2019

Notes: GHG = Greenhouse Gas; MTCO2E = Metric Tons of Carbon dioxide Equivalent

Appendix 2 – Ontario’s 3Rs Regulations

Ontario’s 3Rs Regulations

Ontario’s 3Rs Regulations govern [illegible] ces became law in March 1994. Designated IC [illegible] reduction work plan [illegible] the regulatory requirements for ICI sector organizations.

Regulation	Intent	Requirements	Who Must
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 management policies and [illegible] how the waste is managed A waste reduction work plan seeks to establish concrete goals to reduce waste	Annual waste audit [illegible] which the types of [illegible] 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. [illegible] communicated w [illegible]	Retail shopping ce m² floor area Class A,B or C [illegible] Ontario Reg. 9 Schools with 3 location or car Restaurants w of $3,000,000 Office building floor area

Appendix 4 – Diversion Report

Please note: the following information represents the overall facility diversion information at the time of the assessment and is not exclusive to the samples used in this audit.

Appendix 5 – The Three R's Program

The three R's waste hierarchy gives an order of priority of actions to be taken to re ne overall amount of waste generated at the site

Studies indicate that between 2 and 5 percent of w eusable. There are many ways to prevent waste, at the source, and reuse produ , including:

Appendix 6 – Material Descriptions

Material	General Descriptions
#1 PETE	**Polyethylene Terephthalate, Water Bottles, Soft Drink Bottles**