

# University of Winnipeg 2018 Waste Audit: Final Report



**Prepared by the University of Winnipeg Campus Sustainability Office**

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THE UNIVERSITY OF  
WINNIPEG

Campus  
Sustainability Office

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## List of Abbreviations

<b>CSO:</b>	Campus Sustainability Office
<b>CRCBA:</b>	Canadian Beverage Container Recycling Association
<b>GFL:</b>	Green for Life
<b>MMSM:</b>	Multi Material Stewardship Manitoba

## EXECUTIVE SUMMARY

During the week of March 4, 2018, the University of Winnipeg conducted an internal waste audit to determine our waste profile contents and landfill diversion rates. Such audits are conducted roughly every three years as part of an ongoing commitment to improve environmental performance throughout our institution. Specific objectives of the audit included: identifying the amount of waste entering each of the three main streams (landfill, recyclable, and compostable materials) generated at our institution; determining the overall rates of wrongly disposed of waste within each of the three streams and comparing these rates by building and collection bin type; and providing suggestions for improving landfill diversion and reducing stream contamination across campus.

Data were collected for three buildings (Main Campus, the Richardson College for the Environment, and the Buhler Centre) each day for a five day period beginning on March 4, 2018. In order to generate useful data, auditors used a waste categorization system to guide weighing and sorting. Broad categories such as organics, paper and plastics provide insight into the amounts of recycling, compost and landfill waste produced on campus and the rates at which these materials end up in the correct stream. With the help of the UWinnipeg Facilities team and Bee Clean cleaning staff, we employed a labeling system that enabled auditors to identify each bag of garbage as by stream, source building, and source bin type. In all, auditors weighed 2030 kg of waste, meticulously sorting over 1100 kg over the five day auditing period. All figures and graphs presented in this report are based on an adjusted total weight of 2338 kg. For a detailed methodology regarding weight adjustments or for raw data, please contact the University of Winnipeg Campus Sustainability Office at [sustainability@uwinnipeg.ca](mailto:sustainability@uwinnipeg.ca).

Analysis revealed several important takeaways about waste production, disposal, and management at UWinnipeg. The most effective way for universities to reduce the amount of waste materials sent to landfills is by reducing the amount of waste produced on site. Steps taken by UWinnipeg in recent years, such as the cessation of plastic water bottle sales and the introduction of compostable food containers across campus are helping to reduce waste production on site. Yet the 2018 audit has revealed that large quantities of non-compostable and non-recyclable waste, like Tim Horton's and Starbucks coffee cups, are still making their way onto campus. Based on this finding, the CSO will consider ways to promote reusable mugs and food containers on campus. Similarly, we will continue working with staff and faculty to reduce paper consumption through our Green office Program.

The 2018 audit also showed us that UWinnipeg still struggles with the proper disposal of certain types of waste. According to the audit results, half of all plastic is improperly disposed of, with certain numbered varieties that can be recycled frequently ending up in the garbage. Only 46% of all paper and cardboard products made it into the correct recycling streams, while 40% of organic food waste was not disposed of in the compost stream. Much of this improper disposal stems from the campus community's failure to separate their waste materials. For example, the recyclable

lid is rarely separated from the non-recyclable body of a Tim Horton's disposable cup; similarly, leftover compostable food waste is often thrown away with non-compostable wrappers.

To address these challenges, the CSO will carry out more focused and intentional engagement and education with students beginning during fall orientation week and continuing throughout the year. Activities will include class talks, tabling with interactive displays and visual representations of garbage volumes that convey the importance of proper waste management, and bin-side waste volunteer ambassadors who will provide instructions for proper material separation. The CSO hopes to create a new part-time waste management staff position tasked with coordinating education and outreach as well as the monitoring and upkeep of waste collection infrastructure. Our office is also considering conducting a qualitative survey in the coming years to identify barriers to proper waste disposal behavior. This information would then help guide future education efforts. Finally, because some contamination and improper disposal result from the improper practices of cleaning staff, the CSO must provide trainings on an annual basis that accommodate language barriers and shift work.

The 2018 waste audit was coordinated by the UWinnipeg Campus Sustainability Office (CSO) with support from the Canadian Beverage Container Recycling Association (CRCBA). Approximately 30 students were hired to sort and weigh nearly all of the waste generated on campus during the five day auditing period. The CSO would like to thank the CBCRA for supporting the 2018 waste audit with financial resources and staff time, as well as Multi Material Stewardship Manitoba (MMSM), whose ongoing grants help maintain our waste management systems. Without support from our partners, this audit would not have been possible.

Several recent audits at UWinnipeg have been carried out by private contractors but in this year, we brought the study in house. Doing so not only saved our institution money, but also contributed to the fulfillment of one of UWinnipeg's core sustainability goals outlined in the 2017 Institutional Sustainability Strategy of helping students become environmental leaders by giving them experiential learning opportunities and hands-on skills development. For this reason, The CSO was pleased to provide nearly thirty students with hands-on employment experience in the field of sustainability management during the 2018 audit. Through this project, our office has set a solid foundation for future auditing work involving students and led by the CSO.

# 1. INTRODUCTION

During the week of March 4, 2018, the University of Winnipeg conducted an internal waste audit to gauge our landfill diversion rates and identify areas for improvement. Such audits are conducted roughly every three years as part of an ongoing commitment to improve environmental performance throughout our institution.. The audit was coordinated by the UWinnipeg Campus Sustainability Office (CSO) with support from the Canadian Beverage Container Recycling Association (CRCBA), and was conducted by twenty-five students who sorted and weighed nearly all of the waste generated on campus during the five day auditing period. This report outlines the methodology used during of the 2018 waste audit, analyses the audit findings. It also discusses challenges and opportunities for improving landfill diversion at UWinnipeg. The following introductory section provides an overview of UWinnipeg's current waste management system and clarifies the main purpose and objectives of the audit.

## 1.1. Definitions of Key Terms

<b>Waste stream:</b>	A waste stream refers to all of the infrastructure and human activities involved in the disposal, collection and transpiration of a given type of waste. It also refers to the aggregate amount of waste of a specific type generated within a waste management system, including how that waste it generated, transported treated and disposed of by that system. The primary waste streams examined during this audit were compost, recycling and landfill.
<b>Organics / Compost:</b>	The organic or compostable waste is identified as plant and animal products that recycles organic material through decomposition under certain conditions, thus being diverted from landfill. This audit considered two categories of organics, food product and packaging products made of organic materials.
<b>Recycling:</b>	Recycling refers to all materials generated within a waste management system that can be transformed into useable products or otherwise re-purposed and diverted from landfill. Recycling is a broad waste stream that contains sever other streams including, e-waste, paper, and co-mingled recycling.
<b>Landfill:</b>	Landfill waste is waste that is best disposed of at in landfill locations. This includes all items that are not recyclable, compostable or otherwise diverted by some element of a waste management system.
<b>Single-stream bin:</b>	Single-stream waste bins are containers for collecting waste that accommodate only one primary waste stream. They are typically marked to symbolize the stream that are designed to collect (i.e. blue bins are Recycling)

<b>Multi-stream bin:</b>	Multi-stream waste bins are containers for collecting garbage that accommodate three or four waste streams.
<b>Capture rate:</b>	The capture rate is the percentage of recyclable and compostable materials that were properly disposed of out of the total amount of these materials generated. It is an excellent indicator of how well a recycling or composting program is working for an institution.
<b>Diversion rate:</b>	The diversion rate is the percentage of the total waste generated that is diverted from landfill disposal into the various reuse and recycling programs available at the facility.
<b>Contamination rate:</b>	The percentage of waste material in the Recycling and Compost streams that should not be there, as it is not accepted in the program. This includes landfill materials in either stream, as well as compostables in the Recycling and recyclables in the Compost. A high contamination rate may lead to the hauler not accepting the material and redirecting the material for landfill disposal.
<b>Waste profile:</b>	A waste profile is the description of a given amount of waste as described by the weights and percentages of specific categories of waste found within, including landfill, compost, recycling, e-waste and hazardous waste. It is possible to determine waste profiles for both an individual bag of garbage and the waste generated at a specific building or collection bin type.

## 1.2. Purpose and Objectives

The overall purpose of the 2018 waste audit was to generate a clear picture of waste disposal practices across campus in order to identify areas for improvement as part of UWinnipeg's enduring commitment to reducing its environmental footprint. More specifically, the objectives of the audit were to:

- ✓ Identify and quantify the amount of reusable, recyclable, and compostable materials generated at the facility;
- ✓ Identify and quantify the specific types and quantities of waste materials generated within each of these broad categories;
- ✓ Determine rates of correctly versus incorrectly disposed of waste based on stream-type;



- ✓ Compare rates of correctly versus incorrectly disposed of waste among single-stream and multi-stream collection bins;
- ✓ Compare rates of correctly versus incorrectly disposed of waste among the Main Campus, Richardson, and Buhler buildings
- ✓ Identify opportunities for improving correct disposal and for reducing waste overall.

### 1.3. Facility Profile

The University of Winnipeg's campus complex is located in Downtown Winnipeg and contains 153,093 m<sup>2</sup> of owned floor space. However, the buildings that were examined during the 2018 waste audit contain 79,752 m<sup>2</sup> of floor space. UWinnipeg has a population equating to roughly 7,500 fulltime students and 850 fulltime staff and faculty.

### 1.4. Current Waste Management Practices

There are several core components making up the waste management system at the University of Winnipeg. Our institution contracts Green for Life (GFL) for collecting landfill as well as cardboard and co-mingled recycling at three centralized pick up locations across campus. Suitable recyclable materials include mixed paper, paper packaging, food and beverage containers (metal cans and plastics numbered #1 to #5).

Organic materials are also collected separately across the University, with The Forks Renewal Corporation providing regular pick up.

University policy mandates the use of compostable products where possible including tissues and toweling, as well as most of the to-go items distributed by Diversity Food Services. Multi-stream receptacles

such as the one seen in Figure 1 are designed to encourage the campus community to separate and correctly discard their waste. University cleaning staff ensure bins are emptied and brought to the correct pickup locations. UWinnipeg also maintains programs for recycling e-waste and batteries, although these collection points were not examined as part of the 2018 waste audit.



**Figure 1: One of the four-stream waste collection bins located at UWinnipeg's main campus.**

## 1.5. Audit Scope

The 2018 waste audit involved the physical examination of non-hazardous wastes, recyclables, and organics collected in standard receptacles (including stand-alone and multi-stream units) or dropped off directly at large centralized collections bins for most buildings on UWinnipeg's downtown campus. Specifically, the audit included waste generated in all buildings connected to the main campus complex located at 515 Portage Ave I, the Richardson College for the Environment located at 599 Portage, and the Buhler Centre found at 460 Portage Ave. The audit period spanned six days, including one Sunday, March 4<sup>th</sup>, and four week days, March 5<sup>th</sup> to 9<sup>th</sup>. Auditing on Sunday allowed our team to measure waste produced over the weekend.

## 2. METHODOLOGY

### 2.1. Location Selection and Sampling

Considering that time, resource and staffing constraints made it impossible to audit every UWinnipeg building, the CSO chose to examine campus spaces utilized by the most staff on students on a regular basis. The main campus complex located at 515 Portage avenue houses the majority of the UWinnipeg's academic departments as well as the UWinnipeg Collegiate, the library, three food service locations, and other high-traffic areas. In addition to examining main campus, the 2018 audit also included the Richardson College for the Environment, home to most UWinnipeg science programs, and the Buhler Centre, home to the Faculty of Business and Economics. Data were collected for all three buildings each day for a five day period beginning on March 4, 2018.

Having limited time and resources for the audit meant that it was not possible to completely sort and weigh every bag of garbage from every bin type from the selected buildings. Therefore, in order to gain a

**Table 1: Bag Sample Naming System**

Stream labels			
	Landfill Bag (L)	Recycling Bag (R)	Compost Bag (C)
Single-Stream Bin (1)	1-L	1-R	1-C
Three-Stream Bin (3)	3-L	3-R	3-C
Four-Stream Bin (4)	4-L	4-R	4-C
Building Labels			
Main Campus (MC)	Richardson Building (Rich)	Buhler Centre (Buh)	
Sample Name Examples			
Landfill bag, from a single stream bin, from Main campus:		MC-1-L	
Recycling bag, from a three-stream bin, from Richardson:		Rich-3-R	

complete picture of landfill diversion rates among different buildings and different types of collection bins, the CSO designed a sampling schedule to look at different data subsets as defined by three factors: bin location, bin type, and stream type. The schedule ensured that similar amounts of time were devoted to examining different bin type and stream combinations – such as recycling from single-stream bins and compost from tri-stream bins.

2018 Waste Audit Bag Tracking Label		
Building	Bag is from	Bag contains
<input type="checkbox"/> Main Campus	<input type="checkbox"/> Stand-alone bin	<input type="checkbox"/> Compost
<input type="checkbox"/> RCFE	<input type="checkbox"/> Tri-stream bin	<input type="checkbox"/> Recycling
<input type="checkbox"/> Buhler	<input type="checkbox"/> Four-stream bin	<input type="checkbox"/> Land fill
Place sticker on bag and check appropriate boxes. Place bag in designated area, NOT in collection bins.		

**Figure 2: 2018 Waste Audit Bag Label**

Switching between different waste samples required easy identification for all bags arriving at the auditing room. This is why the CSO trained cleaning staff to apply the label seen in Figure 2 and check the appropriate boxes. Cleaning staff, most of whom work overnight, were also instructed to bring labeled bags to designated holding locations in each building so that would not end up in the large collection bins and be taken off site prior to being processed by the audit team. Each morning, CSO staff would collect bags from the holding areas, taking them to the auditing room on main campus and sorting them into piles based on their sample type labels. Table 1 explains the naming system used in our data collection sheets to identify data by sample type. For future audits our labels will include a specific checkbox for bags coming out the bins specifically for beverage containers as this data is most useful for the CBCRA.

## 2.2. Collecting Data by Categorizing, Sorting and Weighing Waste Types

With sample types separated into piles, auditors were able to generate data through a combination of sorting and weighing bags of waste. Auditors used two calibrated digital scales accurate to within 0.01 kg to weigh sorted and bagged waste. For the first three days of the audit, waste from every bag was sorted into categories, and the each category was weighed. During the last two days of the audit, and towards the end of the first three days when time was running out, whole bags were weighed without sorting to ensure a larger sample set. The audit team applied the average category percentage breakdowns of previously sorted bags of the same sample type to these weighed-only bags in order to approximate their composition. Section 2.3 contains a detailed breakdown of the assumptions and calculations used generating quantitative data through sorting and weighing bag contents. In all, auditors weighed 2030 kg of waste, meticulously sorting over 1100 kg over the five day auditing period. All figures and graphs presented in this are based on an adjusted total weight of 2338 kg.

In order to generate useful data, auditors used a waste categorization system to guide sorting. Broad categories such as organics, paper and plastics provide insight into the amounts of recyclables, compostables, and landfill materials produced on campus and the rates at which these

materials end up in the correct stream. Sub-categories allow us to produce a more detailed institutional waste profile and to identify materials that are often disposed of incorrectly. Auditors sorted through bags and placed materials into labeled boxes situated around the room, with team leads periodically weighing the contents of the bins and recording these numbers on data sheets for each type of sample. Appendix A contains the full list of categories and sub-categories used during the 2018 waste audit. It is worth noting that we used more sub-categories as compared to previous years' audits, especially for glasses, polycoats, and plastics. This was done at the request of the CBCRA, who worked with us and provided funding for the audit. Their organization uses detailed information about glass, polycoat, and plastic beverage containers to help the beverage industry improve large-scale recycling practices. Ultimately, sorting waste based on specific categories and examining sort data based on the sample types explained in Section 2.1 helps us identify where infrastructure improvements and education might reduce contamination and increase landfill diversion.

*NOTE: Because of the collection and labeling challenges explained in Section 2.4, only a very limited amount of data from three-stream bins was generated. In response to this challenge, samples from three-stream and four-stream were combined to create a "multi-stream" sample type to compare with single-stream data.*

### 2.3. Assumptions and Calculations

The following section presents the assumptions, calculations and exceptions that were used during data collection and analysis.

#### **Bin Subtraction:**

Since the bins we used to weigh material weighed 1.500 kg, we subtracted 1.500 kg from every weight measured on the scale:

$$\text{actual weight} = \text{recorded weight} - (\text{number of bins} \times 1.500)$$

There were a few exceptions to using this calculation:

- ✓ Plastic utensils were weighed in a small cardboard bin weighing 0.160 kg which was used as the subtrahend for determining actual weights in these instances.
- ✓ Some of the unsorted bags were not weighed in a bin (ie. if the weight of bins was subtracted the value was negative or extremely low). In these cases, the bin weight was not subtracted.

**Accounting for unsorted waste on sort days:**

On some sort days, auditors did not get to sort all the waste for a given building. In these cases, team leads the percentage of weight in a sort category was calculated based on the total waste for the day in question. That percentage was applied to the unsorted waste and added to the sorted waste weights on the raw data sheets. For example, on Tuesday, there was 20.082 kg of unsorted waste left at the end of the day for sample type MC-1-L. The following calculation was used to determine “Actual weight including Unsorted” for the hot cups:

$$\begin{aligned} \text{Hot cup actual weight including Unsorted} &= [(\text{total MC hot cup actual weight} / \text{total weight all waste for MC}) \times \text{total weight of MC unsorted waste}] + \\ &\quad \text{hot cup actual weight} \\ &\quad \text{Or} \\ &[(5.321 \text{ kg} / 137.060 \text{ kg}) \times 20.820 \text{ kg}] + 5.321 \text{ kg} = 6.129 \text{ kg Hot Cups} \end{aligned}$$

**Averages**

Averages were calculated based on number of days data was actually collected for. For instance, if there were data for Tuesday and Thursday only for a given Sort Category, we divided the sum of these days by 2, not 5 for the week.

**Adjusted Weights and Containers**

Any building that did not have data for all five days was “adjusted.” For adjusted containers, the number of containers for any given category was augmented with the average daily number of containers for that category. For example, there was no container data available for MC-4-R on Thursday or Friday. The following calculation was used to determine the adjusted hot cup container value:

$$\begin{aligned} \text{Adjusted hot cup container value} &= (\text{daily average hot cup value} \times \text{number of days without data}) + \text{number of hot cups for days with data} \\ &\quad \text{or} \\ &(36 \text{ cups} \times 2 \text{ days}) + 108 \text{ cups} = 180 \text{ Adjusted Hot Cups} \end{aligned}$$

If there was unsorted waste for a given building on days when sorted weights were not recorded, the percentage of weight in a category based on the total waste for the building on days when data was available was calculated, and that percentage was applied to the unsorted waste weights. For example, there was no sorted weight data available for MC-4-R on Thursday or Friday, but waste was weighed unsorted. In these cases, the following calculation was used to determine the adjusted hot cup container value:

$$\begin{aligned} \text{Adjusted hot cup container value} &= [(\text{hot cup weight for days with data} / \text{total weight for days with data}) \times \text{total weight of unsorted waste}] + \\ &\quad \text{hot Cup weight for days with data} \\ &\quad \text{or} \\ &= [(3.459 \text{ kg} / 119.419 \text{ kg}) \times 88.366 \text{ kg}] + 3.459 \text{ kg} = 6.019 \text{ kg Adjusted Hot Cups} \end{aligned}$$

If there was no unsorted waste for a given building on a day when no sort weights were recorded, the weight for any given Sort Category was augmented with the average daily weight for that Sort Category. For example, there was no weight data available for Buh-1-R on Sunday. In these cases, the following calculation was used to determine the adjusted hot cup container value:

$$\begin{aligned} \text{Adjusted hot cup container value} &= (\text{daily average hot cup weight} \times \text{number of days without data}) + \text{weight of hot cups for days with data} \\ &\quad \text{or} \\ &= (.573 \text{ kg} \times 3 \text{ days}) + 1.145 \text{ kg} = 2.863 \text{ kg Adjusted Hot Cups} \end{aligned}$$

Anyone with questions about these methodologies or who would like to see the raw data can contact the CSO by emailing [sustainability@uwinnipeg.ca](mailto:sustainability@uwinnipeg.ca).

## 2.4. Data Collection Challenges

Both data quality and data quantity were negatively impacted by three challenges that emerged over the course of the audit: sample shortages, sample mislabeling, and sorting schedule inefficiencies. These challenges made it difficult to produce reliable data for some sample types, necessitating the use of averages to make up shortfalls and ultimately limiting accuracy. These issues affected our ability to generate trustworthy pictures of waste profiles (stream-by-stream breakdown) for each building. That said, we believe the data is accurate enough to make factual conclusions about UWinnipeg's waste profile and waste disposal practices. We were still able to generate a clear understanding of diversion and contamination rates within each waste stream, although ideally we would have had more data to for comparing contamination rates across bin types. In order to improve the statistical validity of multi-stream bin data, three- and four-stream data were merged into a single category, because the sample sizes for of each were insufficient on their own. As a consequence, the 2018 audit was not able to compare the effectiveness of these two bin types at capturing correct stream contents or reducing cross-stream contamination. Table 2 reviews the specifics impacts of these challenges and provides suggestions for avoiding and adapting to similar circumstance during future audits.

**Table 2: Challenges and Potential Improvements for Data Collection**

Challenge	Causes	Potential improvements for future audits
<p><b>Sample Shortages:</b></p> <p>Several sample sets were under-represented in the data.</p> <p>On two of the days there was little to no waste from both the Richardson and Buhler buildings.</p> <p>On Sunday's sorting day, the amount of main campus waste delivered was drastically less than what is actually produced at this location on the weekend.</p> <p>A disproportionately small number of bags of all types were collected from three-stream bins.</p>	<p>Several factors contributed to the shortage of bags at Richardson and Buhler.</p> <p>A large snowstorm occurred during the first two days of the audit which resulted in a) an abnormally small amount of garbage produced as a result of low attendance (particularly at Richardson, which was closed on Monday because of a power outage) and b) bags from Monday were missed on Tuesday's pickup because they were buried outside under the snow.</p> <p>There were three days where the waste removal contractor, GFL, took away garbage from the designated holding area at Buhler early in the morning before Audit staff arrived to collect the bags.</p> <p>Saturday is the off-day for the cleaning contractor so there is only a skeleton crew on site. This resulted in a shortage of bag samples from Main Campus on Sunday because garbage was not collected by cleaning staff the day before.</p> <p>In addition to the snow, cold weather resulted in many labels falling off bags during storage and transportation. A large number of bags arrived in the auditing room without labels, making it impossible to determine their source bin type.</p>	<p>In years to come, the CSO will block off more time for the waste audit or bring on more staff. Adequately sorting and weighing all bin and stream types requires more labor hours.</p> <p>Other choices that could lead to better data quality include auditing each building over a separate multi-day period, as well as conducting the audit in the fall or spring instead of during the winter</p>

Table 2 (continued): Challenges and Potential Improvements for Data Collection

Challenge	Causes	Potential improvements for future audits
<p><b>Sample Mislabeling:</b></p> <p>Language barriers among cleaning workforce made up of primarily new Canadians likely resulted in mislabeling of tags.</p>	<p>It is likely that bags from three and four stream bins were regularly marked as being from a single stream bin or not given a bin-type indication at all.</p> <p>This point is supported by the fact that the Richardson produced a much higher number of single-stream bags, and a smaller number of four-stream bags, than expected based on the number single- vs- three stream bins found inside this building.</p> <p>The main consequence of mislabeling was a reduced sample size for both three- and four-stream bins at all locations (but most noticeably for Richardson), such that these two bin types were merged into a single category.</p>	<p>The CSO plans to re-design the sticker bag label for future audits so it is easier to understand.</p> <p>While a detailed instruction page was given to each of the cleaning staff, it might be worthwhile to translate this document into a few different languages.</p>

Challenge	Causes	Potential improvements for future audits
<p><b>Sorting Schedule Inefficiencies:</b></p> <p>CSO staff under-estimated the time it would take to sort and weigh bags of certain sample types and did not manage time available for the audit for maximum efficiency.</p>	<p>To ensure enough time to sort sample-types with a larger amount of bags, auditors would often start with these piles. This resulted in more than enough sort data for larger samples (such as MC-1-L) and not enough sort data for smaller samples (such as Buh-4-C) as time would run out at the end of the day.</p>	<p>In the future, CSO staff will develop a detailed schedule for each day of the audit with specific start and stop times for the sorting of each sample type.</p> <p>We will also set quotas to ensure that auditors sample a set percentage of each sample type. This will ensure that enough sort data is produced for each bin design, stream type and building location.</p>



		More effort will also go toward training crew leaders on how to execute these schedules.
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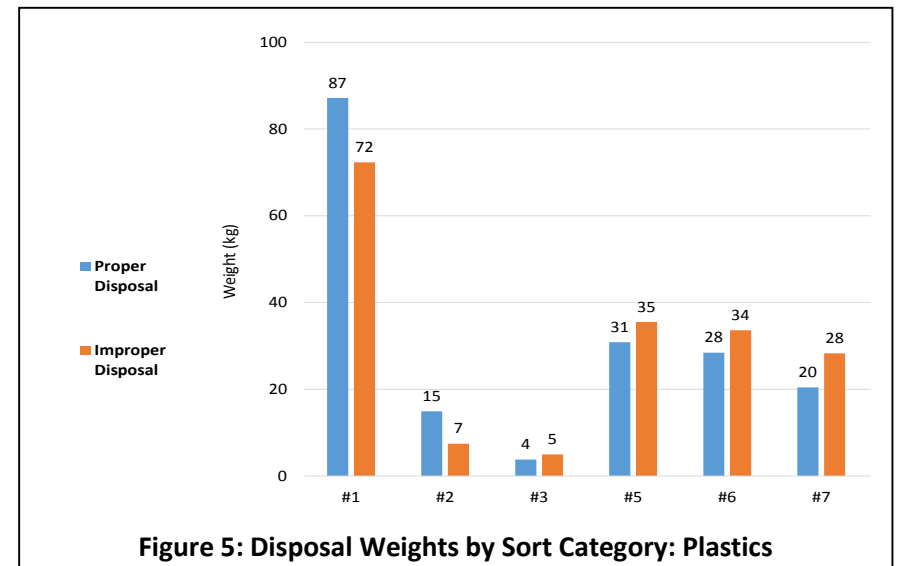
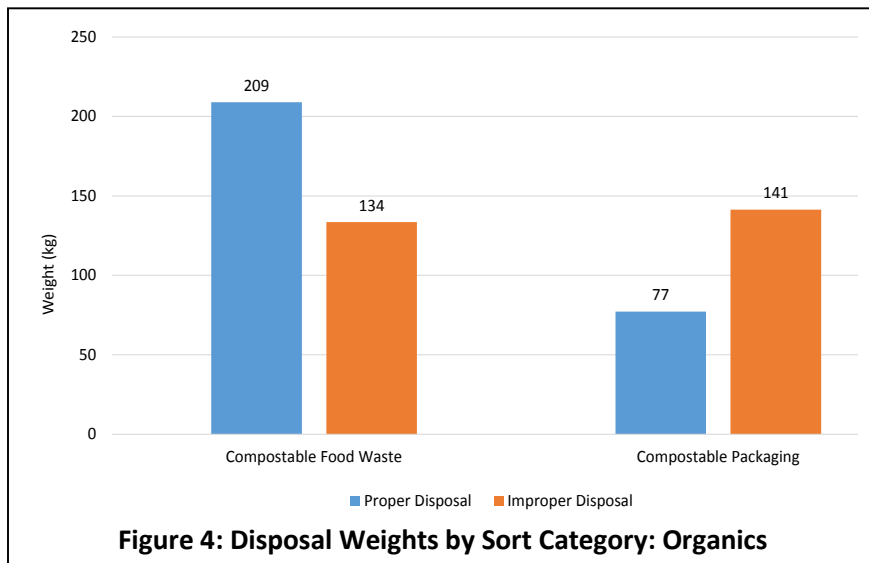
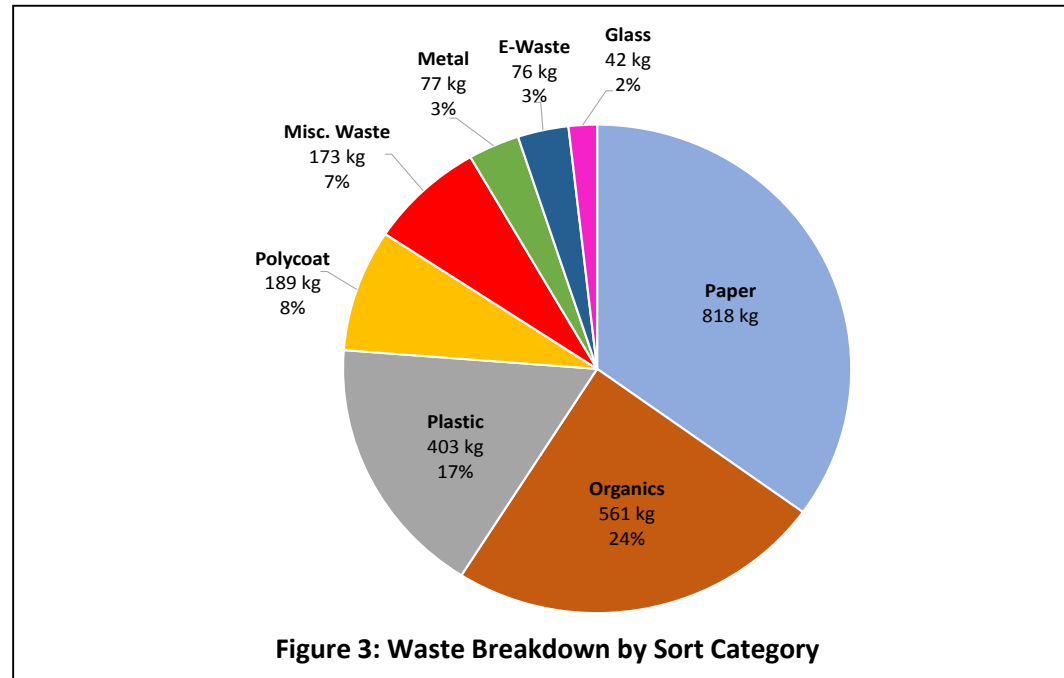
### 3. RESULTS AND DISCUSSION

The following section presents the findings of the 2018 waste audit through a series of charts. Key takeaways include:

- ✓ Glass (42 kg), metals (77 kg) and E-waste (76 kg) showed the smallest portion of waste materials within the University.
- ✓ The recyclable paper category, which included bags, plates, mixed, boxboard and cardboard, generated the highest portion of waste, with a total of 817 kg accounted for during the waste audit.
- ✓ Only 50% of plastics on campus were disposed of correctly.

#### 3.1. Overall Waste Profile

UWinnipeg's overall waste profile can be seen in Figure 3. Understanding the content breakdown of our institution's total waste production helps us identify areas where the most improvements can be made. Paper, organics and plastics account for roughly three quarters of all the waste generated on campus.. Not only are these materials largely recyclable and compostable, they are also frequently disposed of improperly. As seen in Figure 5, half of all plastics do not make it into the correct recycling stream.

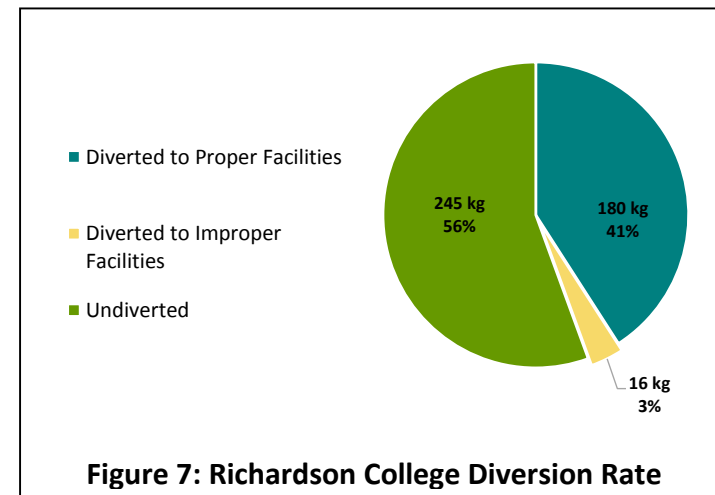
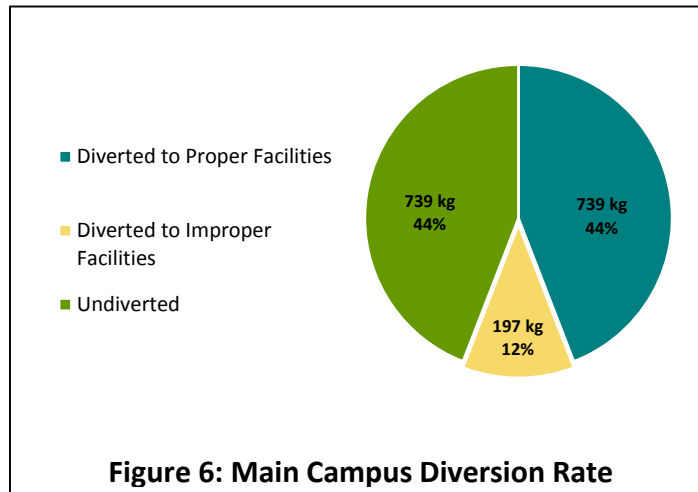


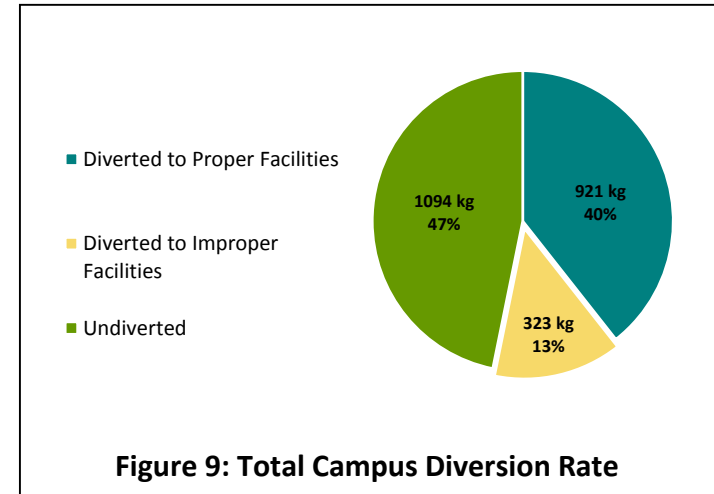
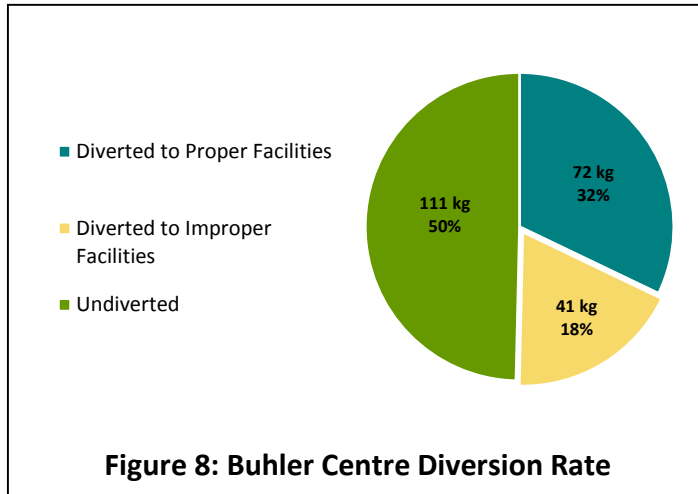
### 3.2. Diversion Rates

Diversion rates reflect the percentage of all waste that is not sent to a landfill. Inevitably, some diverted waste is not sent to the proper facility (e.g. landfill materials in recycling stream). The overall campus diversion rate for the 2018 audit was 53%, of which 13% were materials diverted to improper facilities. The following pie charts represent the diversion rates for all the campus spaces included in the audit, as well as for the individual buildings.

#### *Building Breakdown:*

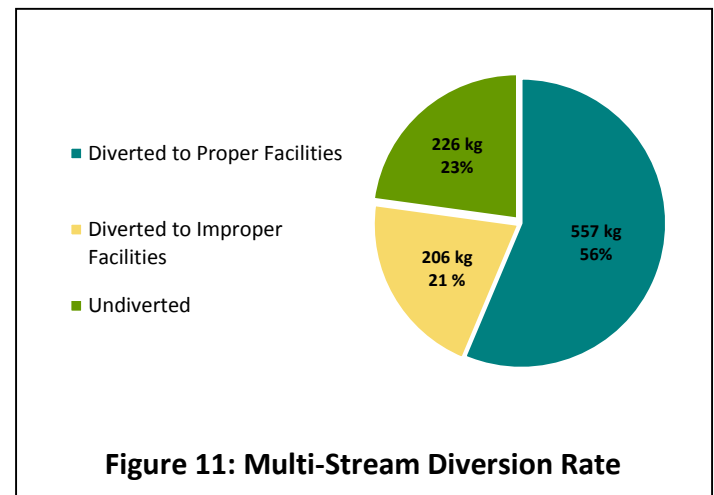
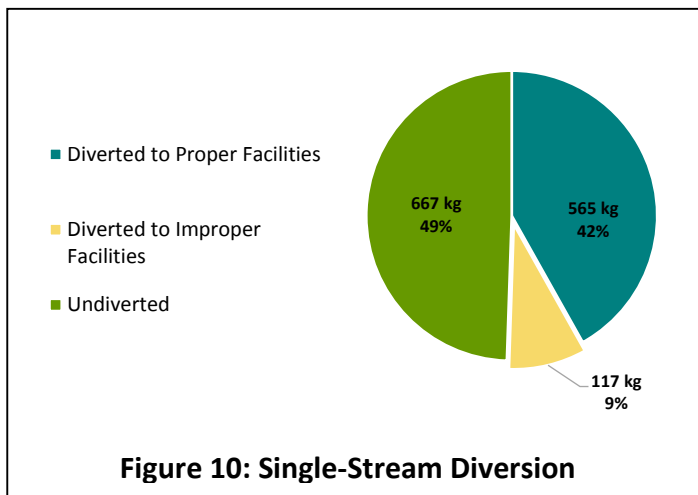
Main Campus had the highest diversion rate (52%), while the Richardson Building had the lowest rate of waste diverted to improper facilities (3%). The Buhler Centre had a markedly high rate of waste diverted to improper facilities, at 18%, and would most benefit from increased signage on recycling and composting bins.





**Stream Breakdown:**

Multi-stream bins were more effective at diverting waste from landfills (77% diversion rate) than single-stream bins (51%). That said, a high percentage (21%) of diverted materials in multi-stream bins were bound for improper facilities.

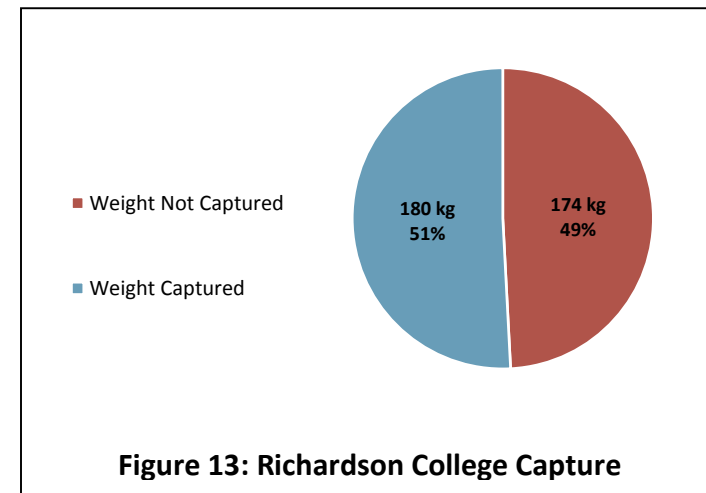
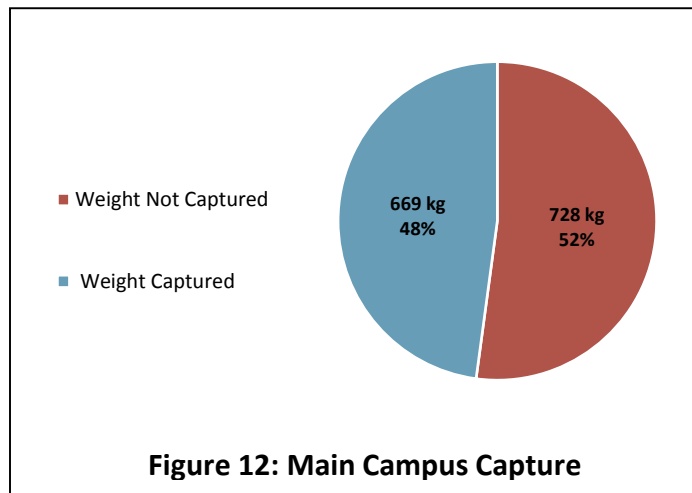


### 3.3. Capture Rates

Capture rates reflect the percentage of recyclable and compostable materials that are disposed of in the appropriate waste stream. Thus, graphs reflect the weight of recycling and compost materials in waste, recycling, and landfill streams; no landfill materials are accounted for in capture calculations. The overall campus capture rate for the 2018 waste audit was 48%. There is significant room for further gains on the part of the University as regards proper disposal of recycling and compostable waste.

#### *Building Breakdown:*

Main Campus and the Richardson Building exhibited similar capture rates, at 48% and 51% respectively. The Buhler Centre had a slightly lower rate (41%). Again, the need for increased signage around waste bins in the Buhler Centre is indicated.



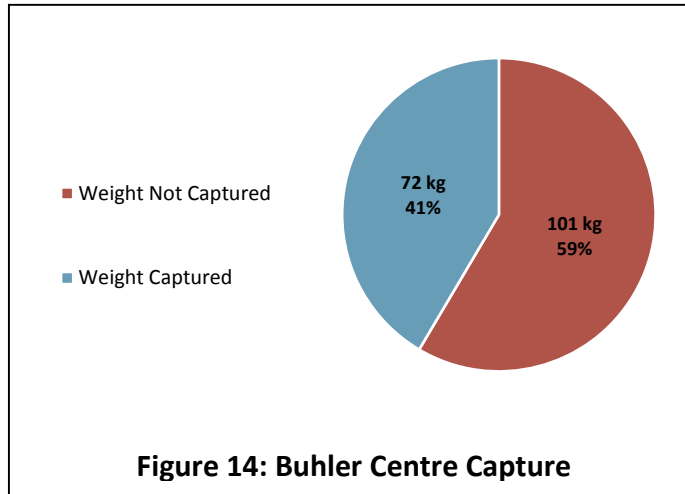


Figure 14: Buhler Centre Capture

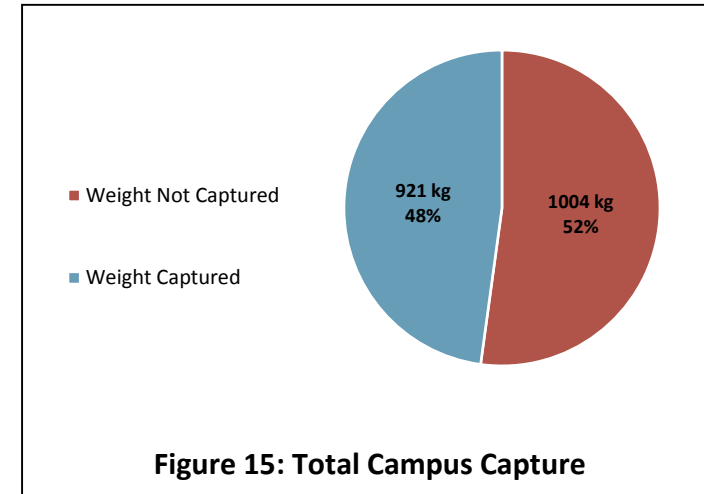


Figure 15: Total Campus Capture

### Stream Breakdown:

Single and multi-stream capture rates were the same, at 48%. However, single-stream bins account for almost twice as much captured weight as multi-stream bins.

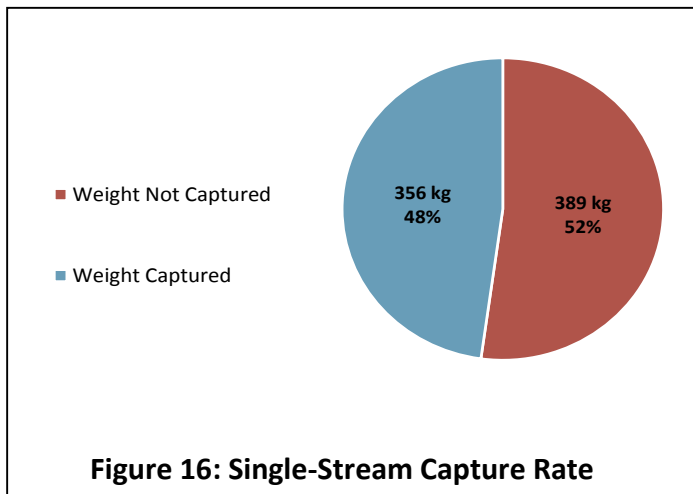


Figure 16: Single-Stream Capture Rate

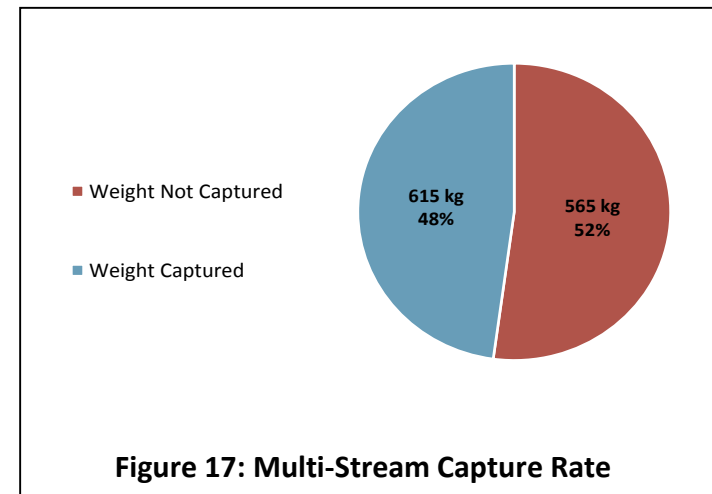


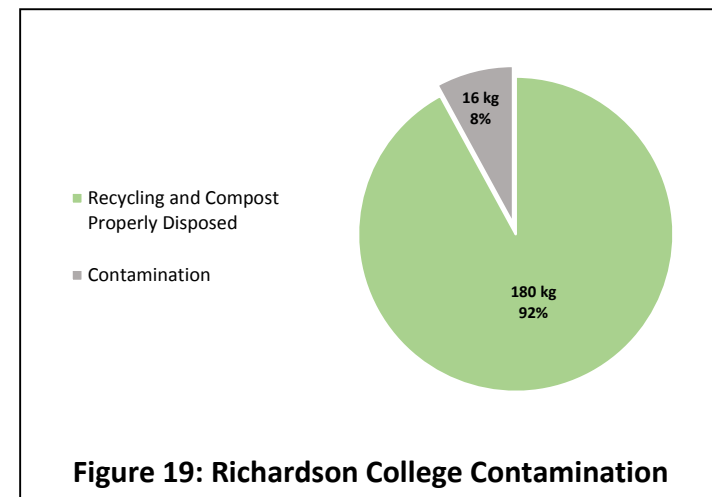
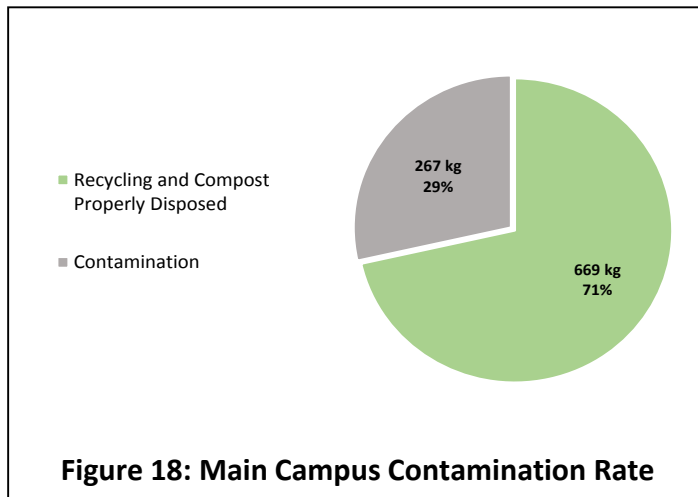
Figure 17: Multi-Stream Capture Rate

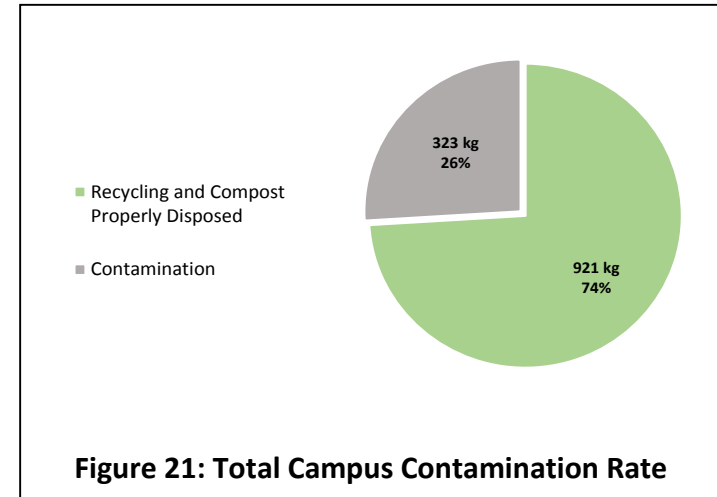
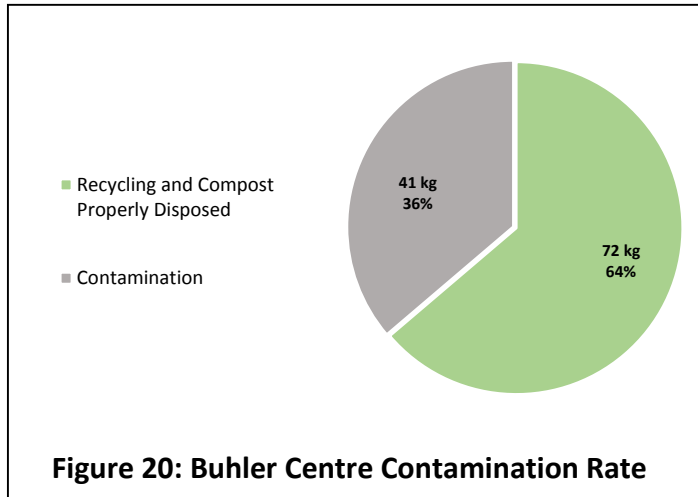
### 3.4. Contamination Rates

Contamination rates reflect the percentage of contents of recycling/compost bins that are not actually recycling/compost materials. This includes compost improperly disposed of in recycling streams and vice versa, as well as contamination by landfill materials. The overall campus contamination rate was 26% in the 2018 waste audit.

#### *Building Breakdown:*

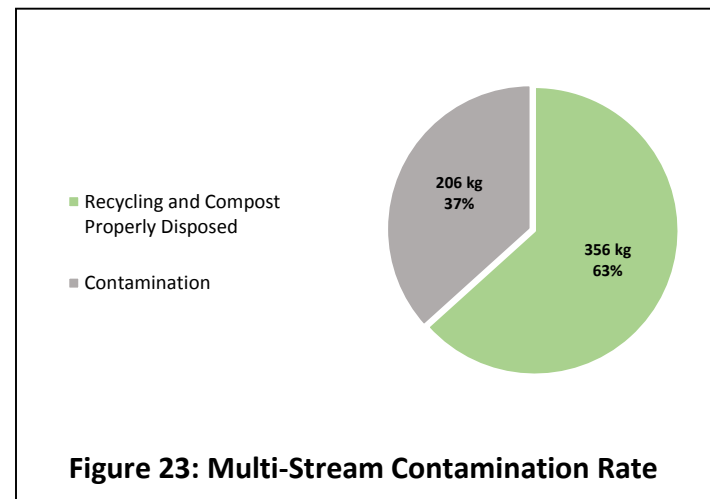
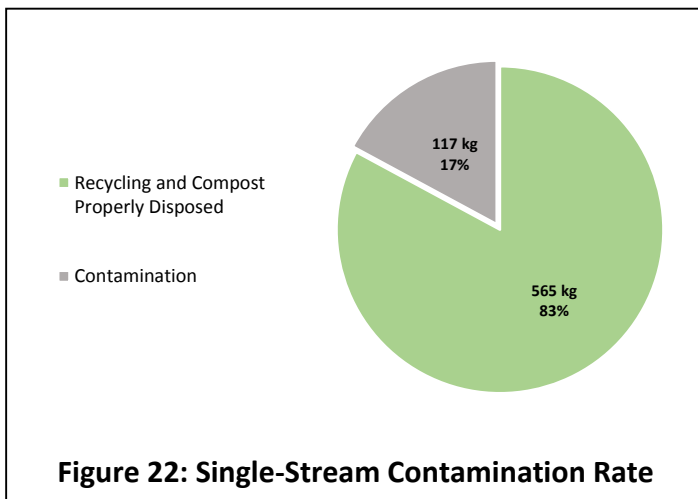
The Richardson Building had the lowest contamination rate, at just 8%. The Richardson Building has few single-stream bins, and the waste from Elements, which is presumably better-sorted than the waste in public bins, makes up a large proportion of the building's waste output. Main campus had a 29% contamination rate, and Buhler had the highest rate.





**Stream Breakdown:**

Single-stream contamination rates were markedly lower than those of multi-stream, at 17% and 37% respectively. This is somewhat unexpected, and might be explained by the presence of Diversity kitchen waste recorded as single-stream.





## 4. CONCLUSIONS AND RECOMMENDATIONS

The concluding section of this report outlines a series of recommendations and next steps that will help UWinnipeg address the waste management challenges exposed by the 2018 waste audit. Improvements in a) bin infrastructure, b) outreach and education, and c) policies and procedures, have the potential to reduce the production of waste on site and increase the correct disposal of recyclable and compostable materials.

### 4.1. Bin Infrastructure

In order to improve diversion and reduce contamination at UWinnipeg, our institution must continue investing in bin Infrastructure and other improvements to waste collection systems. There are several buildings on campus, including Helen Betty Osborne and the Asper Centre for Theatre and Film, where there are no multi-stream units because there are no exterior collection bins located outside. People in this buildings do not have the option to compost their organics, something that has become the norm across most of our campus.

The CSO will work with the Facilities department and the cleaning and collection contractors to remedy this situation either by installing new exterior collection bins for recycling and compost or by developing a plan for transferring material to other buildings. Multi-stream collection units containing an option for compost can then be placed inside these buildings. Our office will also look for funding opportunities that will allow us to purchase more multi-stream bins for main campus which will replace single stream bins that are still found in certain hallways and spaces. We will also be looking at how to update the signage on existing multi-stream bins that will encourage users practice proper disposal.

### 4.2. Outreach and Education

The 2018 waste audit shows us that UWinnipeg's waste management system still grapples with the improper disposal of certain types of waste. Much of this improper disposal stems from the campus community's failure to separate their waste materials. For example, the recyclable lid is rarely separated from the non-recyclable body of a Tim Horton's disposable cup; similarly, leftover compostable food waste is often thrown away with non-compostable wrappers.

To address these challenges, the CSO will carry out more focused and intentional engagement and education with students beginning during fall orientation week and continuing throughout the year. Activities will include class talks, tabling with interactive displays and visual representations

of garbage volumes that convey the importance of proper waste management, and bin-side waste volunteer ambassadors who will provide instructions for proper material separation. The CSO hopes to create a new part-time waste management staff position tasked with coordinating education and outreach as well as the monitoring and upkeep of waste collection infrastructure. Our office is also considering conducting a survey in the coming years to identify barriers to proper waste disposal behavior. This information would then help guide future education efforts.

Waste practices intuitively come to mind for most people as an important part of sustainability. Engaging members of the campus community with information on proper waste management is a simple and effective way to reduce our resource footprint. Beyond that, outreach focused on waste management may serve as an entry point to deeper conversations about sustainability with the campus community, resulting in more sustainably driven choices and involvement.

#### **4.3. Internal Policies and Procedures**

One of the major initiatives in the fall of 2019 will be replacing existing administrative policies related to sustainability with new, more robust guidelines that will strengthen and clarify responsibilities related to the sustainability impacts of building operations. Included in this process will be new guidelines for all waste streams, including construction and demolition waste. It is anticipated that these guidelines will play an important role in consolidating the team of waste managers at the UWinnipeg, ultimately supporting improved performance in this area.

## 5. Appendix A: Sort Categories and Sub-Categories used during the 2018 Waste Audit

<b>Organics</b>  Compostable Food Waste Compostable Packaging  <b>Paper</b>  Paper Bags Paper Plates Mixed Paper Boxboard Cardboard	<b>Metal</b>  Aluminum: non-beverage Steel: non-beverage Aluminum: non-alcoholic beverage Aluminum: beer Aluminum: other alcohol (0-1 L) Aluminum: other alcohol (>1 L) Steel: beverage (0-500 mL) Steel: beverage (501mL-1L) Steel: beverage (>1L)  <b>Miscellaneous</b>  E-Waste Batteries Hazardous Waste Bio-waste Garbage	<b>Plastic</b>  #1: Cups #1: non-alcoholic beverage (0-500 mL) #1: non-alcoholic beverage (501 mL-1L) #1: non-alcoholic beverage (>1 L) #1: beer (0-630 mL) #1: beer (>630 mL) #1: other alcohol (0-500 mL) #1: other alcohol (501 mL-1L) #1: other alcohol (>1 L) #1: Other #2: non-dairy beverage (0-500 mL) #2: non-dairy beverage (501 mL-1 L) #2: non-dairy beverage (>1 L) #2: dairy beverage (0-500 mL) #2: dairy beverage (501 mL-1 L) #2: dairy beverage (>1 L) #2: Other #3: beverage (0-500 mL) #3: beverage (501 mL-1 L) #3: beverage (>1 L) #3: Other #4: LDPE Plastic #5: Polypropylene Plastic #6: Polystyrene Beverage Cups #6: Polystyrene Non-beverage #7: Other Plastic Plastic Utensils Drink Pouches
<b>Glass</b>  Clear: non-alcoholic (0-500 mL) Clear: non-alcoholic (501 mL-1L) Clear: non-alcoholic (>1 L) Clear: beer Clear: other alcohol (0-100 mL) Clear: other alcohol (101 mL-630 mL) Clear: other alcohol (>630 mL) Coloured: non-alcoholic (0-500 mL) Coloured: non-alcoholic (501 mL-1L) Coloured: non-alcoholic (>1 L) Coloured: beer Coloured: other alcohol (0-100 mL) Coloured: other alcohol (101 mL-630 mL) Coloured: other alcohol (>630 mL) Clear: Other Coloured: Other	<b>Polycoat</b>  Juice Boxes Gable Top: non-dairy beverage (0-500 mL) Gable Top: non-dairy beverage (501 mL-1L) Gable Top: non-dairy beverage (>1 L) Gable Top: dairy beverage (0-500 mL) Gable Top: dairy beverage (501 mL-1L) Gable Top: dairy beverage (>1 L) Aseptic: non-dairy beverage (0-500 mL) Aseptic: non-dairy beverage (501 mL-1L) Aseptic: non-dairy beverage (>1 L) Aseptic: dairy beverage (0-500 mL) Aseptic: dairy beverage (501 mL-1L) Aseptic: dairy beverage (>1 L) Aseptic: Other Cold Cups Hot Cups	