UniversU

Single-Stream Contamination RateXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXɸHO
Multi-Stream Contamination RateXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXɸɸXXXXXXXXHO

: Campus Sustainability Office

Canadian Beverage Container Recycling Association

Green for Life

Multi Material Stewardship Manitoba

1.

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 sortied 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 overvie ø 2Ŧ ¦ ² ƛyƴƛLJŜƎΩă ŎdzℕℕŜyű ø l·ăűŜ Y l·yl·ƎŜY ŜyűŭăëăűŜY l·yŘ ŎfI·ℕΛŦΛŜă űKŜ Y l·ƛƴLJdzℕLJ2ăŜ l·yŘ 2ō?ŜŎűΛØŜă 2Ŧ űKŜ l·dzŘƛűΦ

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.

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.

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.

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.

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)

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 oy ¦ ² ɲyŷŷʎLJŜƎ⍰ă downtown campus. Specifically, the audit included waste generated in all buildings connected to the main campus complex located at 515 Portage Ave l, 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 4th, and four week days, March 5th to 9th. Auditing on Sunday allowed our team to measure waste produced over the weekend.

2.

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 ς such as recycling from single-stream bins and compost from tri-stream bins.

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

materials end up in the correct stream. Sub-

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 ά ! Ŏűdz l·f ø Ŝ ƛ Ǝ K ű including ¦ y ã 2 ₦ ű Ŝ Ř ε ₮ 2 ₦ ű K Ŝ Ƙ 2 ű Ŏ dz L J ă Ɣ
28(Ave)]TH7ted waste]

Hot cup actual weight including Unsorted = [(total MC hot cup actual weight /total weight all waste for MC) x total weight of MC unsorted waste] + hot cup actual weight

Or

[(5.321 kg / 137.060 kg) x 20.820 kg] + 5.321 kg = 6.129 kg Hot Cups

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.

Any building that did not have data for l·ff ₮ƛØŜ Řl·èă ø l· l' ø 9 dz ń ε Ř

Adjusted hot cup container value = [(hot cup weight for days with data / total weight for days with data) x total weight of unsorted waste] + hot Cup weight for days with data

or

[(3.459 kg / 119.419 kg) x 88.366 kg] + 3.459 kg = 6.019 kg Adjusted Hot Cups

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:

Adjusted hot cup container value = (daily average hot cup weight x number of days without data) + weight of hot cups for days with data

or

(.573 kg x 3 days) + 1.145 kg = 2.863 kg Adjusted Hot Cups

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

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 Ŏ2yŎfdzăλ2yã l·ō2dzű ¦ ² λyŸλLJŜΞΩå 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.

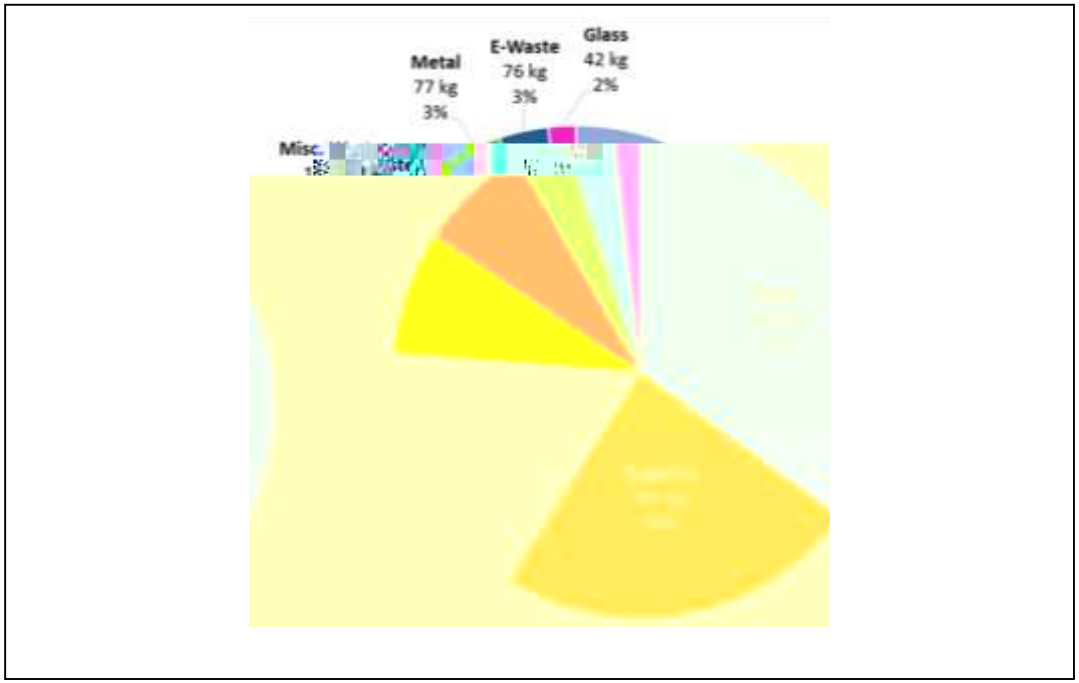
		More effort will also go toward training crew leaders on how to execute these schedules.

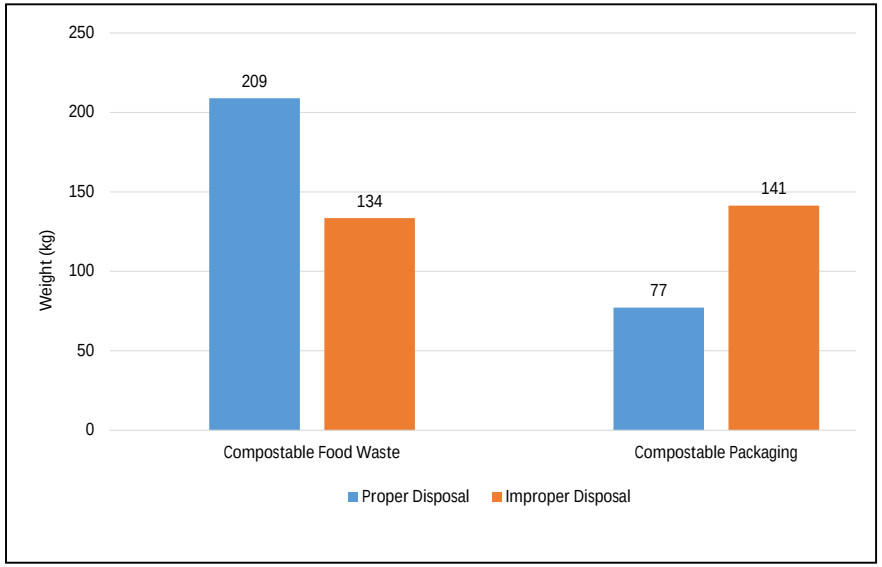
3.

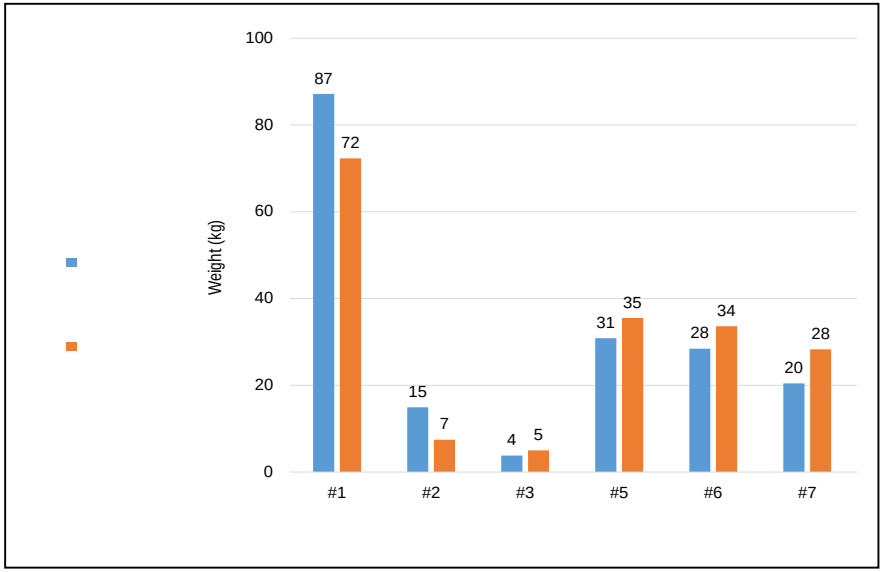
The following section presents the findings of the 2018 waste audit through a series of charts. Key takeaways include:

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.

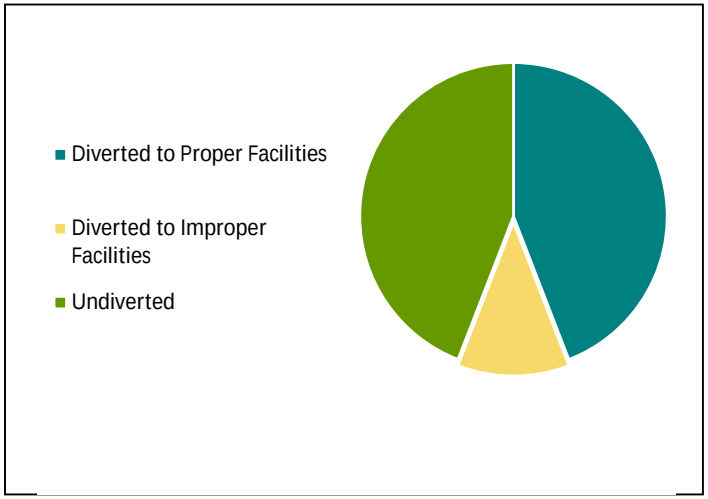

Metal
77 kg
3%
E-Waste
76 kg
3%
Glass
42 kg
2%
Misc.

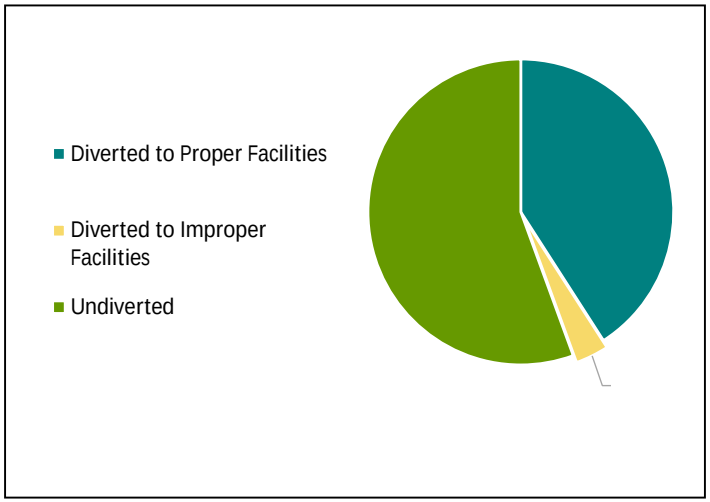

250
200
150
100
50
0
Weight (kg)
209
134
77
141
Compostable Food Waste
Compostable Packaging
Proper Disposal
Improper Disposal

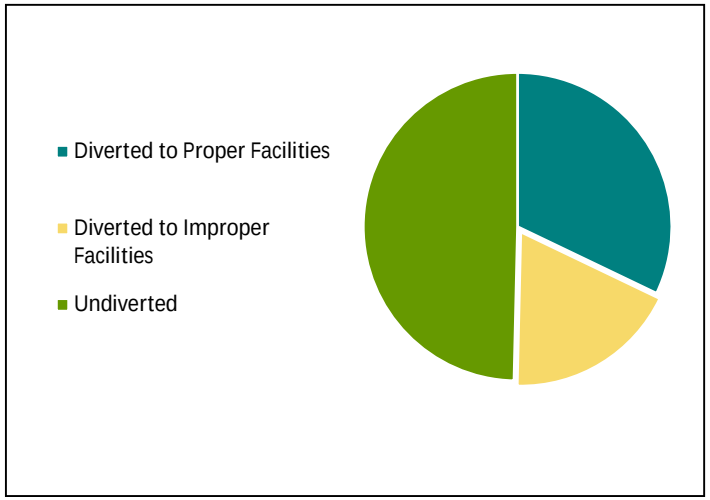

100
80
60
40
20
0
Weight (kg)
87
72
15
7
4
5
31
35
28
34
20
28
#1
#2
#3
#5
#6
#7

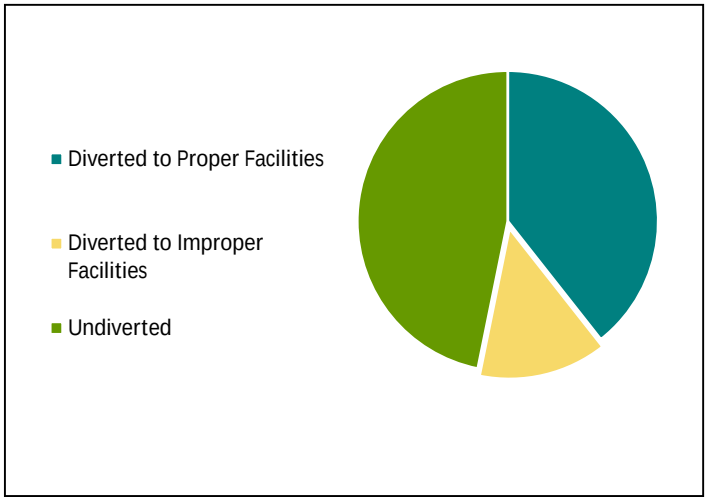
Diversion rates reflect the percentage of all waste that is not sent to a landfill. Inevitably, some diverted waste is not sent to the proper facility (e.g. landfill materials in recycling stream). The overall campus diversion rate for the 2018 audit was 53%, of which 13% were materials diverted to improper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

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.

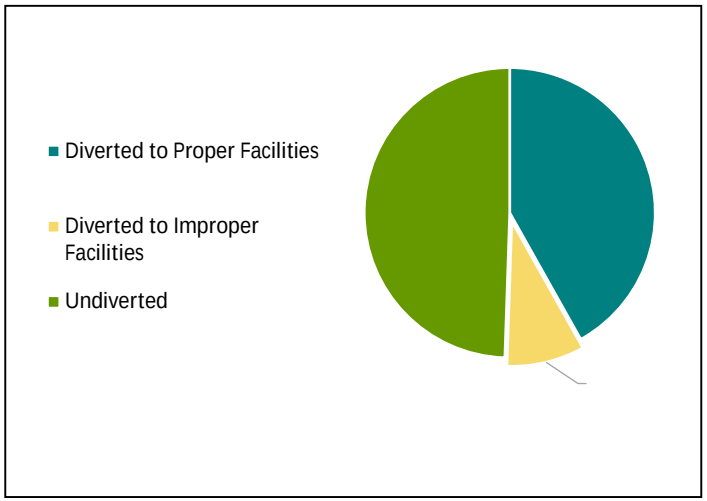


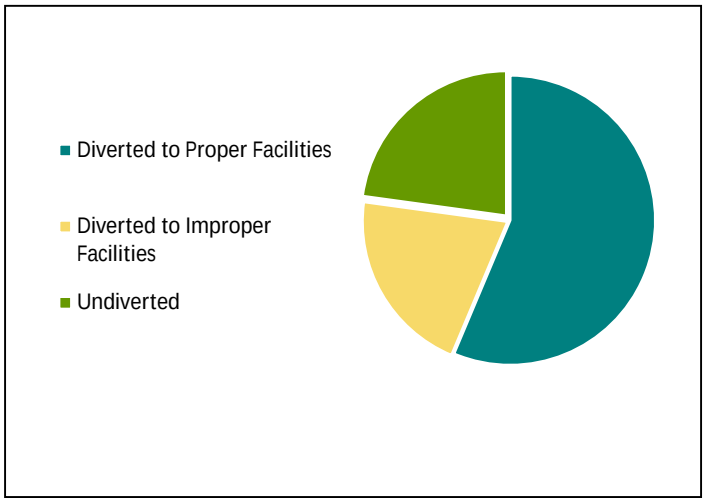






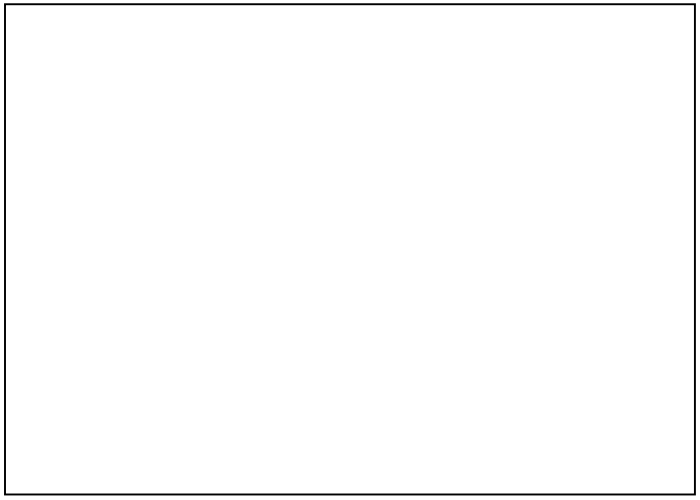
Multi-stream bins were more effective at diverting waste from landfills (77% diversion rate) than single-stream bins (51%). That said, a high percentage (21%) of diverted materials in multi-stream bins were bound for improper facilities.

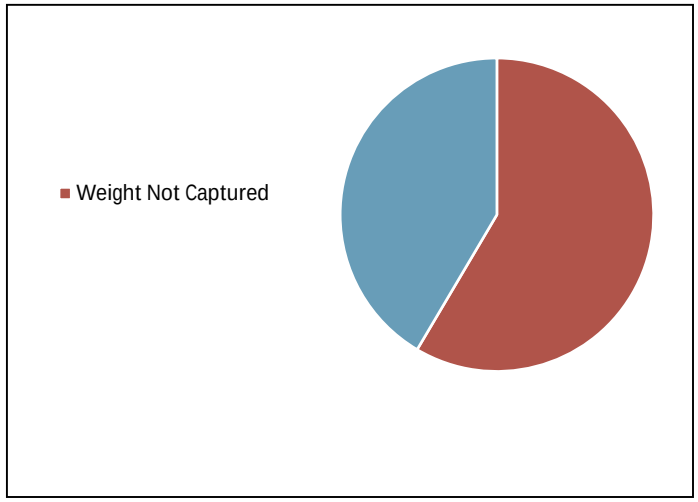


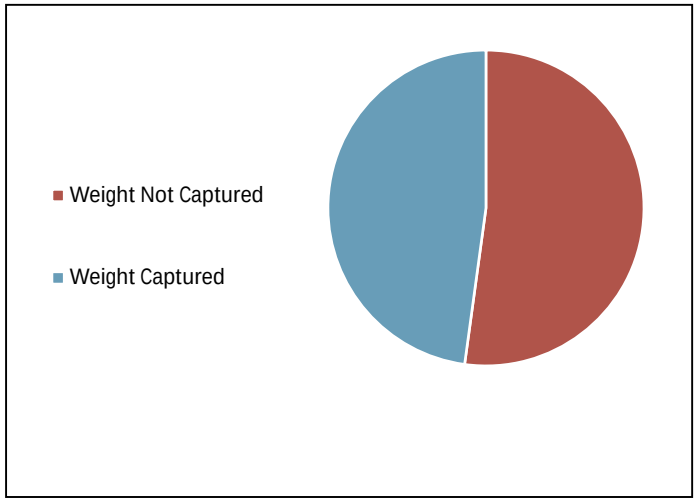


Capture rates reflect the percentage of recyclable and compostable materials that are disposed of in the appropriate waste stream. Thus, graphs reflect the weight of recycling and compost materials in waste, recycling, and landfill streams; no landfill materials are accounted for in capture calculations. 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.

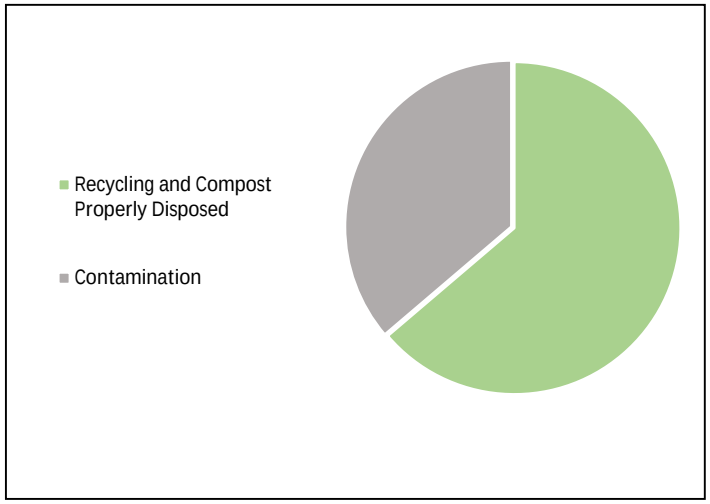
Main Campus and the Richardson Building exhibited similar capture rates, at 48% and 51% respectively. The Buhler Centre had a slightly lower rate (41%). Again, the need for increased signage around waste bins in the Buhler Centre is indicated.

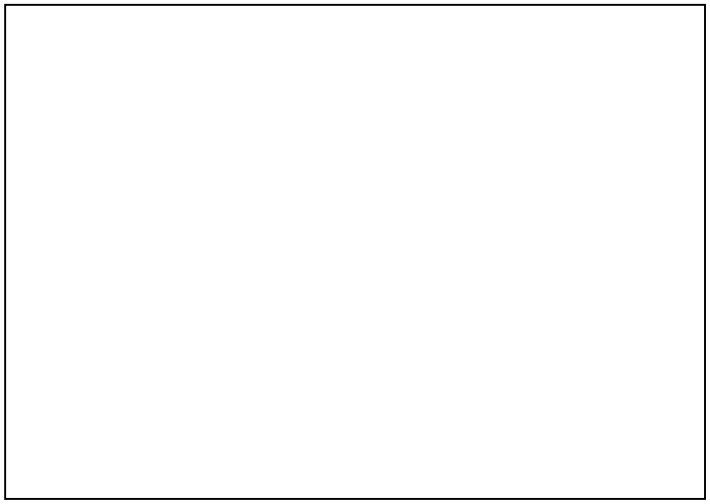




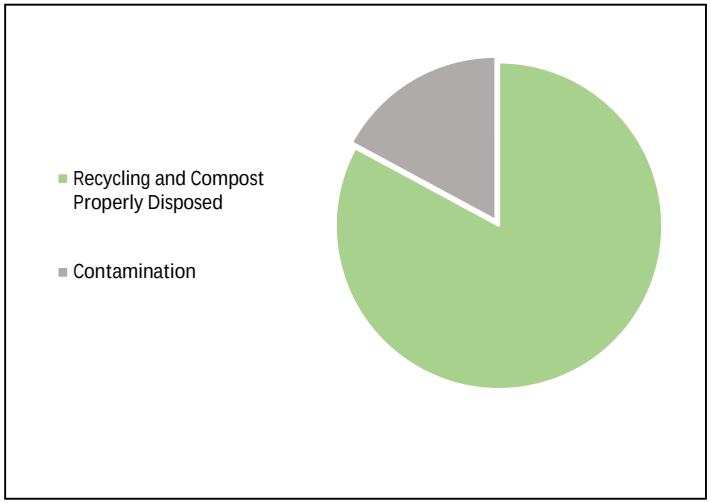


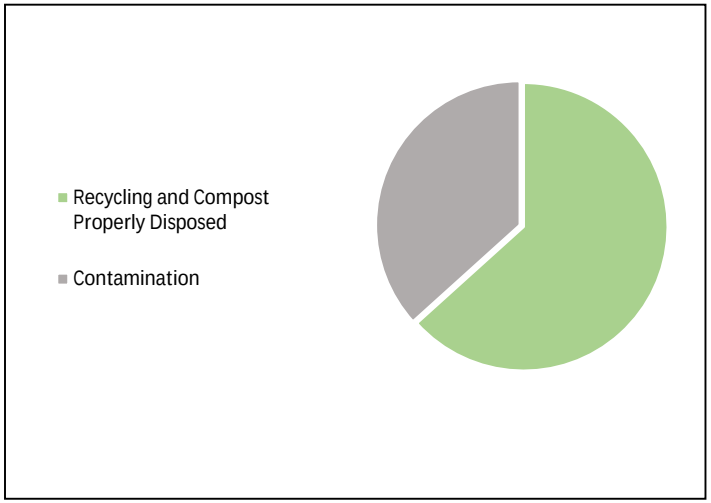
Single and multi-stream capture rates were the same, at 48%. However, single-stream bins account for almost twice as much captured weight as multi-stream bins.





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.

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.

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.

The 2018 waste audit shows us that UWinnipegŰă ǿǀ·ăűŜ management system still grapples with the improper disposal of certain types of waste. adžŎK 2₮ űKλă ʎYLJ№2LJŜ№ ŘλăLJ2ăǀ·f ăűŜYă ₮№2Y űKŜ ŎǀYLJdză Ŏ2YYdzyʎűèŰă ₮ǀ·ʎfdz№Ŝ ű2 ăŜLJǀ·№ǀ·ůŜ űKŜʎ№ ǿǀ·ăűŜ Yǀ·ůŜ№ʎǀ·fă₡ C2№ ŜÈǀ·YLJfŜΣ űKŜ recyclable lid is rarely separated from the non-№ŜŐèŎfǀ·ōfŜ ō2Řè 2₮ ǀ· ¢ʎY ǀ 2№ű2yŰă ŘλăLJ2ăǀ·ōfŜ ŎdzLJT ăʎYʎfǀ·№fèΣ fŜ₮ű2ØŜ№ Ŏ2YLJ2ăűǀ·ōfŜ ₮22Ř ǿǀ·ăűŜ ʎă 2₮ůŜyűK№2ǿyǀ·ǿǀ·è with non-compostable wrappers.

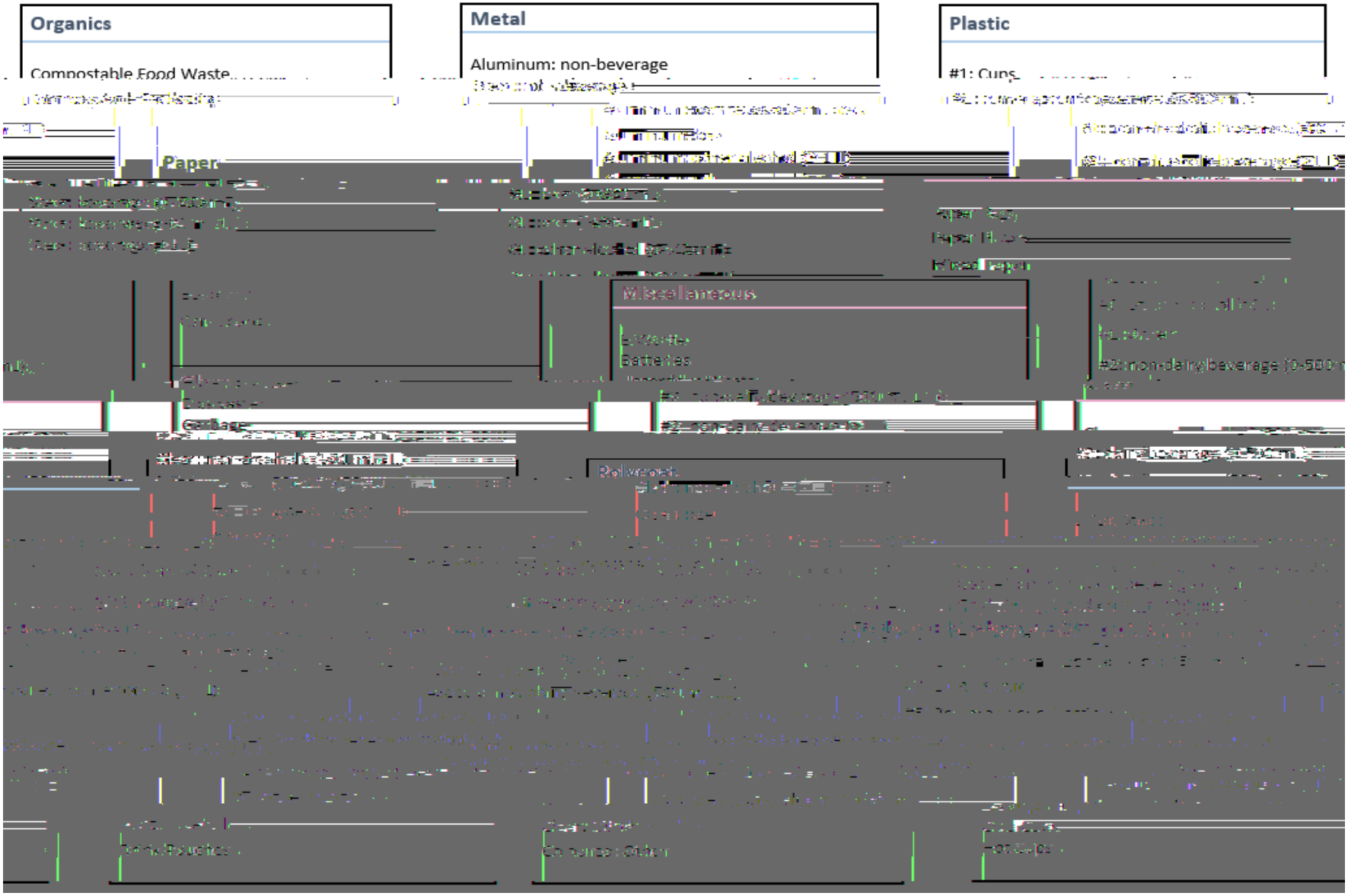
To address these challenges, the CSO will carry out more focused and intentional engagement and education with students beginning during fall orientation week and continuing throughout the year. Activities will include class talks, tabling with interactive displays and visual representations

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.

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.


Organics
Compostable Food Waste
Metal
Aluminum: non-beverage
Plastic
#1: Cups
Paper
Miscellaneous
Batteries