

University of the Fraser Valley

# An assessment of the 2019 Waste Audit results and directions for waste reduction at the University of the Fraser Valley

Center for Sustainability

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## Introduction

On October 16<sup>th</sup>, 2019 the Center of Sustainability conducted the fifth annual Waste Audit at the University of the Fraser Valley (UFV). The purpose of a waste audit is to quantify and analyze waste sorting practices on campus. Results from the 2018 UFV Waste Audit showed that students, staff, faculty and visitors to UFV were becoming familiar with the waste stations installed in the fall of 2017, and were meeting sorting expectations. SustainableUFV has used multiple social media platforms (Facebook, Instagram and Twitter) to provide waste sorting tips and insight as to what types of trash go in which waste station bins to students and faculty over the last year to help all users learn to use them effectively. The data collected from this year's 2019 waste audit will provide an idea of where we are exceeding in sorting efforts and also areas of sorting to focus on improving in the upcoming year.

## Location

The 2019 Waste Audit for the University of the Fraser Valley was held at UFV's Abbotsford campus on King Road, Abbotsford, BC. More specifically, the sorting of waste and materials took place on the green space centralized between the campus A, B, C, and D buildings.

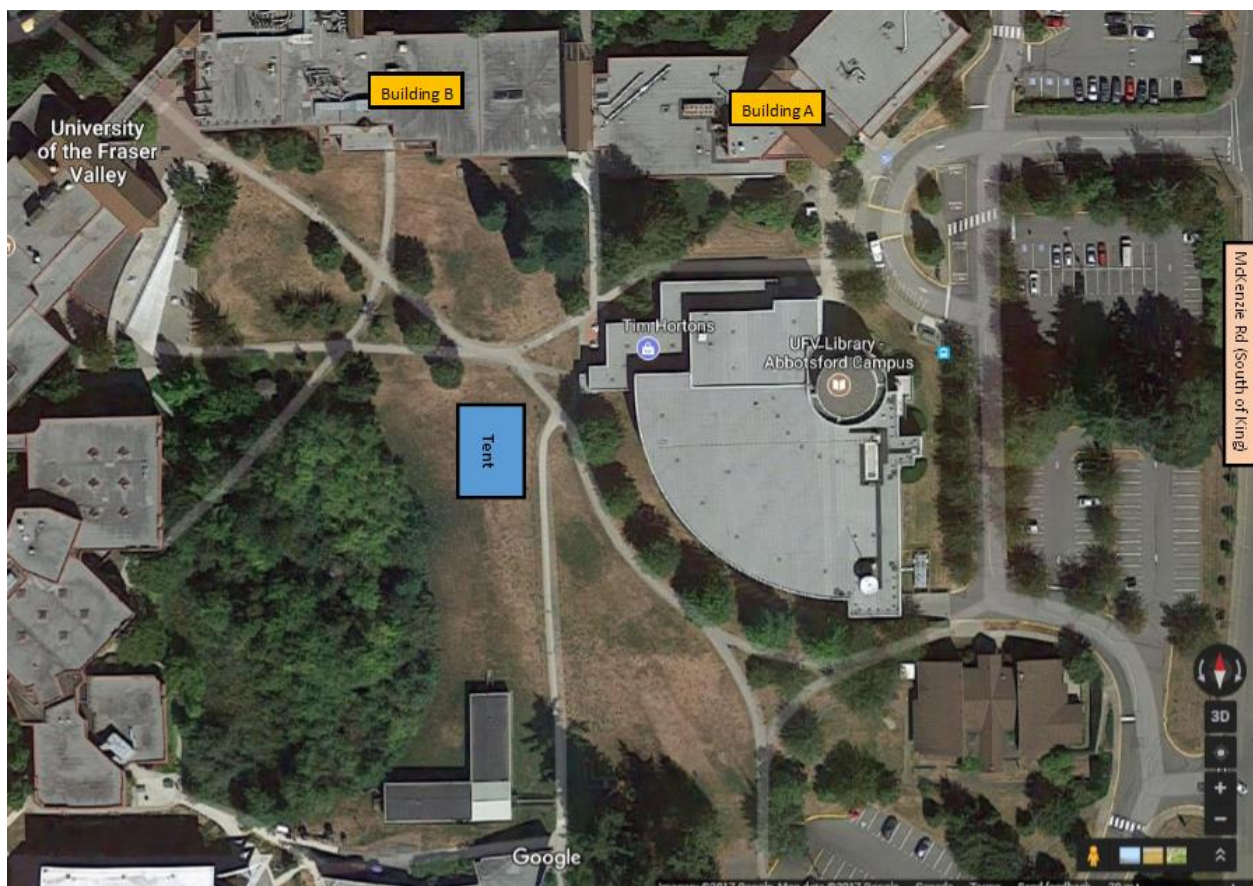


Figure 1: The tent for the waste audit was set up on the UFV green space outside of the Tim Horton's on Tuesday, October 15th prior to the Waste Audit.

## Methodology

### Materials

Waste and refundable beverage containers collected from A and B campus buildings

Waste collection bags (blue recycling bags, compost bags, and black garbage bags)

Nitrile gloves (size small, medium and large for volunteers)

3-4 collapsible tables for sorting waste on

Tent (rented from A-1 Party Rental Inc.)

13 tarps and signs for waste categories

Recording sheets and writing utensil

Hand sanitizer station

Scale

### Sample size

Only waste from buildings A and B located on the Abbotsford campus was collected. This sample reflects waste accumulation at these locations over a 24-hour period. Waste from laboratories was excluded in the Audit.

### Procedure

Waste was collected from A and B building the night prior to the waste audit. The morning of the 16<sup>th</sup> the waste was brought to the tent located on the green space outside Tim Horton's. Set up the morning of the waste audit involved laying out 13 tarps with signs that helped sorters identify which stream of waste each type of waste goes into. Folding tables were set up and covered with tarps to make cleaning efforts at the end of the day easier.



*Figure 2: Tables were set up and covered in tarps to reduce cleaning efforts at the end of the day.*





Figure 3: Tarps to place waste on were laid out beneath the tent. Signs were then staked into the ground to provide sorting guidance to volunteers.

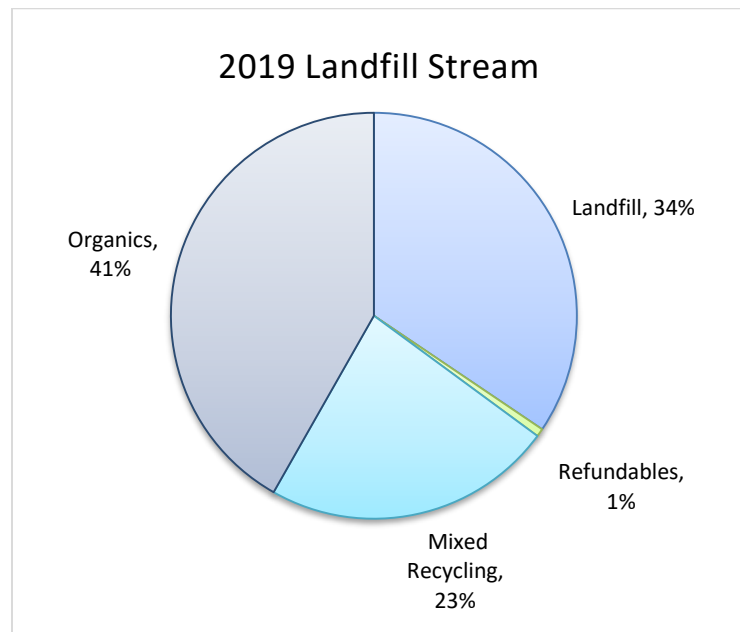
The landfill stream was the first to be audited. Black garbage bags were opened and sorted out on the tables. Waste was then carried over to the corresponding pile. Once all the landfill bags were opened, the sorted piles of waste were then collected into bags (to make the weighing process less difficult) and weighed individually. This method of dividing each of the four main stream into smaller categories allows a more precise and in-depth look as to which areas of sorting UFV students, staff and faculty may be struggling with. The mixed recycling and organics waste streams were audited in the same fashion.

### Categories and weighing

Table 1: The 4 different waste streams sorted during the 2019 UFV Waste Audit were the landfill, mixed recycling, refundable beverage containers, and organics streams. Each stream was divided into smaller sorting categories. This was to help possibly better identify exactly which form of waste UFV students, staff and faculty may be having difficulty sorting.

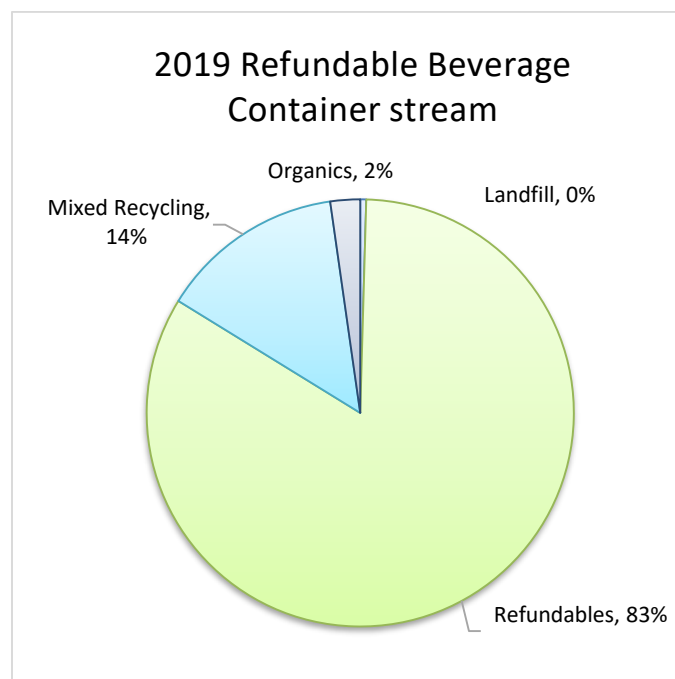
Landfill	Recyclable	Refundable	Organics
<ul style="list-style-type: none"> <li>3, 6, and 7 plastics (excluding any 7 plastics marked with "PLA."). This includes: Candy, chip, and granola wrappers, soiled Tim Horton's bags and wax paper wrappers</li> <li>Hazardous waste</li> <li>Styrofoam</li> </ul>	<ul style="list-style-type: none"> <li>Plastics labeled 1, 2, 4, or 5 within the recycling triangle (the 12:45 rule of recycling)</li> <li>Mixed paper, copy paper, Tim Horton bags and wrappers.</li> <li>Cardboard. box corrugated and card stock boxes</li> <li>Metal</li> </ul>	<ul style="list-style-type: none"> <li>Some tetra containers</li> <li>Glass beverage containers</li> <li>Aluminum cans</li> <li>Plastic bottles (check labels to see if refundable)</li> </ul>	<ul style="list-style-type: none"> <li>Compostable packaging and materials (7 plastics marked with "PLA"), or "Compostable" written on item.</li> <li>This includes: tea bags, coffee grounds, filters, all Dana product, and Triple O's paper</li> <li>Paper towel and napkins</li> </ul>

## Results



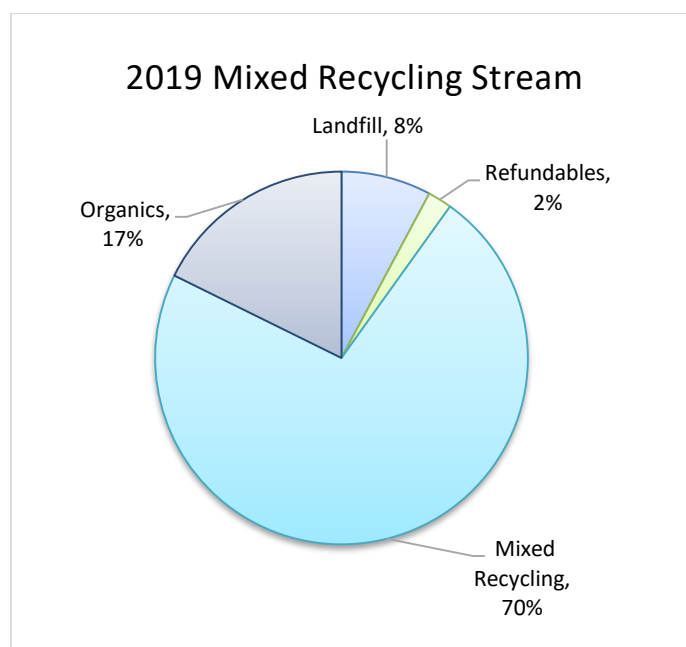
Landfill Stream	
Waste Type	Total Weight (kg)
Mixed Paper	9.5
Cardboard/Boxboard	1.1
Paper Towel	3.6
Disposable Cups	3.6
Plastics	2.0
Glass	0.0
Styrofoam	0.0
Metals	0.9
Hazardous	0
Electronic Waste	0.0
Refundable Containers	0.5
Compost	25.9
Garbage	24.3
Total	71.5

Figure 4: Waste audit results collected from the landfill stream. The largest source of contamination (by weight) was organic material. This is believed to be a problem because students may not be aware that many food packaging and utensil products on campus are compostable, as well as the fact that food waste typically weighs significantly more.



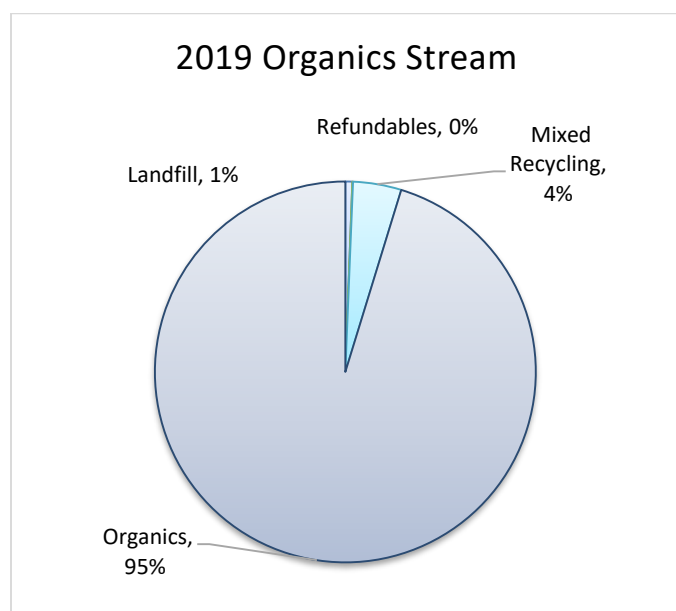
Refundable Stream	
Waste Type	Total Weight (kg)
Mixed Paper	0.0
Cardboard/Boxboard	0.0
Paper Towel	0.0
Disposable Cups	0.9
Plastics	0.5
Glass	0.0
Styrofoam	0.0
Metals	0.0
Hazardous	0
Electronic Waste	0.0
Refundable Containers	8.4
Compost	0.2
Garbage	0.0
Total	10.1

Figure 5: Waste audit results collected from the refundable beverage container stream. The main source of contamination was mixed recycling, mostly in the form of disposable Tim Horton and Starbucks coffee cups.



Mixed Recycling	
Waste Type	Total Weight (kg)
Mixed Paper	21.8
Cardboard/Boxboard	1.8
Paper Towel	0.9
Disposable Cups	5.7
Plastics	2.3
Glass	0.0
Styrofoam	0.0
Metals	1.4
Hazardous	0
Electronic Waste	0.0
Refundable Containers	0.9
Compost	6.8
Garbage	3.4
Total	45.0

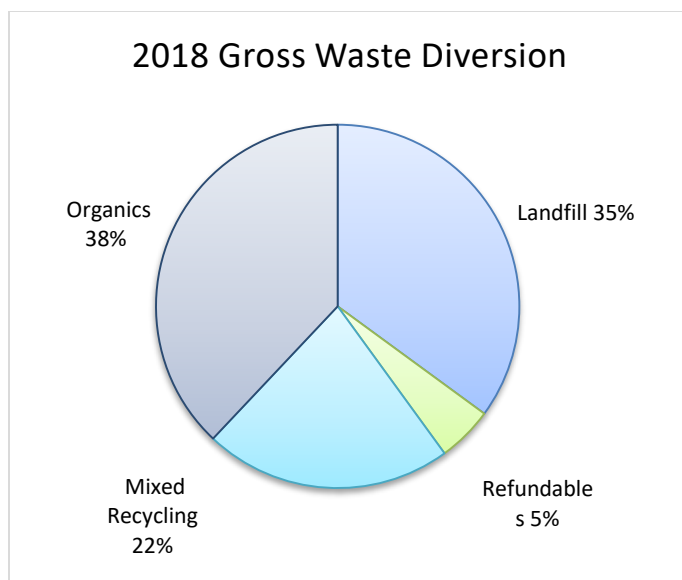
Figure 6: Waste audit results from the mixed recycling stream. The main source of contamination (by weight) was compostable material and food waste.



Organics	
Waste Type	Total Weight (kg)
Mixed Paper	2.5
Cardboard/Boxboard	0.0
Paper Towel	20.0
Disposable Cups	0.2
Plastics	0.5
Glass	0.0
Styrofoam	0.0
Metals	0.0
Hazardous	0
Electronic Waste	0.0
Refundable Containers	0.0
Compost	53.8
Garbage	0.5
Total	77.4

Figure 7: Waste audit results from the organics stream. The main source of contamination was mixed recycling, however level of contamination was minimal.





Waste Allocation	KG	%
Landfill	71.49	35%
Refundable	10.07	5%
Mixed Recycling	44.95	22%
Organics	77.43	38%
<b>Waste Diversion Rate</b>	<b>203.9</b>	<b>65%</b>

Figure 8: The gross waste diversion for each of the 4 streams collected at UFV during the waste audit. The total rate for waste diversion from the landfill was 65%.

## Discussion

Overall sorting compliance of the 4 different waste streams was found to be meeting expectations: Refundable beverage containers, mixed recycling, and organics, with 83%, 70%, and 95% compliance, respectively. The rate of waste diversion from the landfill was 65%. This represents how much waste UFV prevents from entering the landfill stream, and instead redirects it to a recycling or composting facility where it can be processed again for re-use. Here are a few notes regarding each waste stream during this year's audit:

**Landfill stream** – The main source of contamination in the landfill stream was organic material and mixed recycling. Organic material typically weighs more and therefore appears to be the larger contaminant. Disposable coffee cups from Tim Horton's, Starbucks and sources of mixed paper were also a large source of contamination.

**Mixed recycling stream** – The main source of contamination found in the mixed recycling stream was organic material. It was noted that most mixed recycling food containers still contained food remanence. Bits of plastic wrap and flexible plastic containers were the second largest contributor to contamination in the mixed recycling stream.

**Refundable beverage container stream** – The largest source of contamination in the refundable beverage container stream was disposable Tim Horton's and Starbucks cups. This may be because people associate 'beverages containers' with drinks, and therefore coffee, or simply because the sorting slot is circular, and so are coffee cups.

**Organics stream** – There was little contamination in the organics stream. Disposable cups were among one of the main contaminants. This is believed to be because Dana cups are fully compostable and student, staff, and faculty may be encouraged to believe that therefore all disposable cups are compostable.

## Comparison between 2018 and 2019

Compared to the 2018 Waste Audit results, more organics, and refundable beverage containers are being properly recycled and removed from the waste stream. However, there is decrease in the amount of mixed recycling material being properly recycled, and an increase in the amount of waste being collected in the landfill waste station bin.

*Table 2: The two tables below highlight the increases and decreases in weight of sorted waste from 2018 to 2019. There is more waste being put into the landfill in 2019 than the previous year, and a decrease in the amount of mixed recycling being diverted from the landfill (red).*

Waste Audit totals 2019		
Stream	KG	%
Landfill	71.5	35%
Refundable	10.1	5%
Mixed	45.0	22%
Organics	77.4	38%
<b>Total</b>	203.9	

Waste Audit totals 2018		
Stream	KG	%
Landfill	64	39%
Refundable	5.6	3%
Mixed	50.4	31%
Organics	43.6	27%
<b>Total</b>	163.6	

## Errors

Errors associated with this study include the issue that the % of waste in each stream is calculated based on the weight of materials. This causes a discrepancy between mass and volume. For example, coffee cups made up 5% (10.4 kg) of the total weight of waste collected during the waste audit. This may seem like a relatively small number, but considering how little a disposable coffee cup weighs, this is quite significant. This is the equivalent to approximately 600 disposable cups.

## Recommendations

### Future campaigns and education focal points

Future signage to encourage students to fully clean out containers and separate out food waste would help reduce the contamination of organics in the mixed recycling and landfill waste station bins.

To reduce the temptation of automatically placing something in the landfill bin when student and faculty are uncertain of which bin to use, lids could be installed on all of the landfill bins. This makes it less convenient and may encourage users more aware of sorting their waste.

It is encouraged that members of Sustainable UFV continue to use all teaching tools and social media outlets to help share sorting tips and tricks. Continuing to showcase certain materials that are often found disposed of in the wrong bin such as disposable cups and Dana products, may help educate students, staff and faculty.

### Design and comments for next year's waste audit

Recommendations developed from executing the 2019 Waste audit are primarily strategies to reduce the spread of waste and sorted materials on campus during **windy weather conditions**, as this was the main challenge at this year's waste audit. Materials that are light and easily carried off by the wind (waste types such as mixed paper, Styrofoam, paper towel) are less likely to be swept away if materials are sorted directly into the correct waste collection bags, as opposed to lying loose on the tarps. This

keeps waste organized, prevents the wind from carrying away individual pieces of waste, and reduces the number of times the waste must be handled, as placing waste types directly into bags eliminates a step from the weighing process. **Please check the weather conditions 3-4 days prior to the event** to ensure enough time for necessary preparation.

To increase time efficiency during sorting, instead of carrying materials to the corresponding pile on the tarps laid out, bags for the waste streams most dominant in unsorted piles were clipped to tables and filled directly at the sorting stations. This reduced the amount of walking back and forth from the tables to the waste piles and therefore sped up the sorting process. This method of sorting is highly recommended for the 2020 annual Waste Audit.