Waste and Recyclable Materials Audit 2017
Thompson Rivers University
Kamloops, British Columbia

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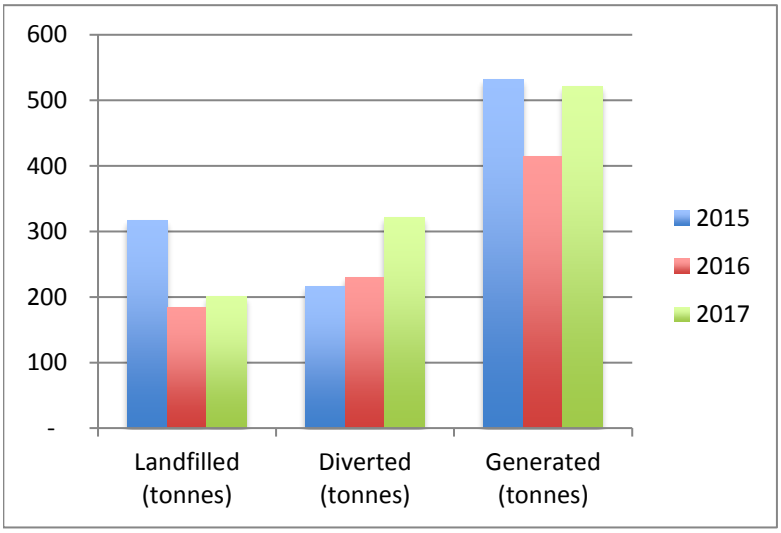
Executive Summary

Thompson Rivers University (TRU) engaged the services of Waste Naught BC in March 2017 to undertake a third waste audit of the university's solid waste stream. The purpose of performing the audit was to: 1) measure the university's current waste diversion performance, 2) compare current waste reduction and diversion performance to performance in 2015 and 2016, 3) determine the composition of waste going to landfill in order to determine the types and sources of waste generated on campus, and 4) identify waste diversion and reduction opportunities within the operations of the university.

From Summer 2016 through Winter 2017, TRU generated an estimated 522 tonnes of material, landfilling 200[1] tonnes and diverting 312 tonnes through various waste diversion initiatives. TRU's diversion rate increased from 55% in 2016 to 61% in 2017.

Weekly per capita landfill rates increased from 1.03 kg in 2016 to 1.10 in 2017. Weekly per capita diversion rates increased from 1.28 kg in 2016 to 1.75 kg in 2017. Total weekly per capita waste generation rate (landfill and diversion) decreased from 2.91 kg in 2015 to 2.31 kg in 2016.

Figure 1 - Total Annual Landfill and Diversion



Capture rates show the percent of materials diverted as the total amount diverted and landfilled for each waste stream. The average capture rates decreased from 90% in 2016 to 71% in 2017. Capture rates increased from 2016 to 2017 for compost (60% to 76%), mixed recycling (40% to 47%) and scrap metal (91% to 99%). Wood waste diversion increased from 79 kg per week in 2016 to 243 kg per week in 2017, but significantly more wood waste found during the audit (12 kg per week in 2016 to 540 kg per week in 2017) resulting in a decrease capture rate (87% to 37%). Capture rates for electronic waste significantly decreased from 100% in 2016 to 58% in 2017.

The audit measured total output and composition of materials in the landfill waste stream from several sources of waste (zero waste stations, offices, kitchen, etc.). Results are shown in kg per week for material categories.[2] The overall results show that 31% of the waste stream cannot be diverted through recycling or composting. The most abundant materials in the landfill waste stream by weight were food waste (1148 kg per week), landfill (garbage) (945 kg per week), wood (540 kg per week), compostable paper (483 kg per week), and liquids (463 kg per week).

[1] 2017 landfilled material data included sawdust waste from trades dumpster not captured in the 2016 audit.

[2] Compostable paper was moved into the landfill material category for all three audits, as this material is not readily compostable in current systems.

Recyclable materials (plastics, paper, metals, refundable beverage containers, coffee cups, e-waste, metals) accounted for 1682 kg per week of the total waste stream (4875 kg per week).

Enhanced waste diversion and reduction opportunities exist through policy, outreach and education, and infrastructure. Policy recommendations include centralized waste collection in offices, and language in contracts to support waste reduction targets supported by incentives or penalties.

Outreach opportunities exist across all audiences, and include educating all audiences (students, staff, contractors) to properly sort waste. Paper towel reduction campaign (washrooms), reusable coffee cup campaign, and source separating DLC waste (trades) are examples of outreach opportunities.

Infrastructure improvements include improved signage in zero waste stations, centralized waste collection in offices, wood waste and cardboard bins in trades, a student food bank to donate surplus foods in kitchen areas, introduce high efficiency hand dryers in all washrooms, and thrift store partnership for diverting reusable items.

Centralizing waste disposal and investigating options for compaction of waste streams prior to disposal are opportunities to improve data accuracy and reduce costs for disposal.

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1 Background and Introduction

Background

TRU Sustainability Office has a goal of becoming a zero waste campus. The office is also working towards Platinum rating through the Sustainability Tracking, Assessment & Rating Systems (STARS). In order to measure progress towards zero waste and to provide metrics for scoring credits towards the waste subcategory of operations in the STARS report, TRU engaged the services of Waste Naught BC (WNBC) to conduct a solid waste audit at the McGill campus in Kamloops, British Columbia in March 2017. WNBC conducted previous audits in March 2015 and March 2016.

Purpose

The purpose of the waste audit was to provide TRU with:

- Weekly measurements for each type of waste;
- Estimated total annual waste and recyclable material output, as well as per capita waste generation rates;
- Estimated the solid waste diversion rate for the facility by calculating the total weight of diverted materials as a percentage of the total waste stream for the materials audited;
- Composition of waste of each of the 13 sources of waste audited;
- Capture rates of diverted wastes audited, and
- Comparison of audit results with historic results.

Scope

To satisfy the purpose of the audit, the following scope of work was performed:

- Communication with TRU staff to acquire data pertaining to diverted wastes;
- Communication with TRU staff to obtain samples of waste pertaining to specific waste sources;
- Collection of waste from specific waste sources in order to obtain true and representative samples;
- Measure the main waste streams over a one-week period, including landfill, mixed recycling, cardboard, and refundable beverage containers;
- Audits of landfill and zero waste station samples; and
- Compiled information into spreadsheets and summarized into a written report with recommendations.

2 Methodology

Quantification of Waste Streams

Data about the entire campus waste output was estimated through a combination of direct sample measurements over the audit period (March-April 2017), actual measurements over the one-year period of the audit cycle, as well as estimations provided by staff.

Measured Over One-Week Period	Provided By Staff/ Contractor	Estimated By Staff/ Contractor
Garbage	Compost (on-site)	Compost (farmer)
Mixed Recycling	Scrap metal	Meat trimmings
Cardboard	Wood waste	Electronic waste
Refundables		Yard waste
Batteries[3]		Reusable items
Coffee grounds[4]		Styrofoam

Waste Sources

Waste from 13 different sources was audited for composition. The following sources of waste were included in the audit:

1. Stand-alone garbage bins;
2. Washrooms;
3. Stores;
4. Offices;
5. Kitchens:
    a) Culinary Arts;
    b) Campus Activity Centre;
6. Café operations;
7. Animal Health Technology (AHT);
8. Daycare;
9. Trades;
10. Zero waste station (landfill stream);
11. Zero waste stations:
    a) Mixed recycling,
    b) Compost,
    c) Plastic bags, and
    d) Refundable beverage containers.

Sampling

Samples for zero waste stations, stand-alone bins, washrooms and zero waste stations were collected from waste bins directly throughout several buildings across campus. Buildings with higher volumes of waste were selected for the sample.

Office waste is collected twice a week, on Tuesdays and Fridays. Samples from offices were obtained with the help of the janitorial staff. For offices, janitorial staff assisted with obtaining the sample by placing labels on waste from offices in several different buildings. The janitorial crew leader selected the buildings for the sample.

Samples from kitchens, cafes, and the daycare were obtained over a 24-hour period with the assistance of staff and contractors through a labeling system.

Trades, Animal Health Technology (AHT) and stores waste samples were obtained from the dumpsters used exclusively by these waste sources. The AHT sample was obtained by

[3] Batteries were measured over a one-month period.
[4] 2016 measurement used.

randomly selecting a sample from the dumpster. Trades waste was audited by sorting a 24-hour sample of loose waste from the trades dumpster.

Calculations

An Ohaus SD series bench scale was used to measure weights in kilograms during the audit. Volume measurements were estimated in both cubic yards (dumpster measurements) and in litres (waste composition measurements). Weight measurements are more accurate than volume measurements, however some volume units are provided in the report below.

Each sample of waste was sorted into 27 material categories. The samples were weighed and volumes recorded on data sheets. The data sheets were input into spreadsheets and the following calculations were performed.

Percent by Waste Source

Percent by waste source was used to calculate the weekly waste output of each source of waste (weight and volume). The weekly waste output for each source was multiplied by the percent of each material found in the source samples to give the total material output for the week.

Waste source percentages were estimated as follows:

1. The total weight and volume for each dumpster for the week was calculated to give the total material landfilled for each dumpster in kilograms per week. The total material landfilled for each dumpster was divided by the total material landfilled for all dumpsters to give the percent of each dumpster, as shown in Appendix A, Tables 6 and 7, Columns 1 and 2.

2. The percent of each dumpster was divided across the sources of waste identified in each dumpster to assign a percentage to each source of waste in each dumpster. The assignment to each source was based on estimates and available data. Appendix A, Tables 6 and 7, Columns 3 - 13 of shows the allocation to each source.

3. The total percent allocated to each source of waste was calculated by adding up the allocated percentages for each source of waste in each dumpster. Appendix A, Tables 6 and 7, Row 12 shows the total percent allocation to each source of waste by weight and volume.

4. The total percent allocation for each source of waste was multiplied by the total waste output for the week to provide the total weekly output for each source of waste. Appendix A, Tables 6 and 7, Row 13 shows the total waste landfilled for each source of waste in kilograms per week.

Total Annual Waste Output, Waste Generation and Diversion Rate Calculations

The following calculations were performed to determine the total annual waste output for the period from Summer 2016 through Winter 2017 for weight data only.

1. The weekly per-capita waste output (kg/person) was calculated by dividing the total weekly waste output (measured during the audit) by the total population in the winter semester.

2. The weekly per-capita waste diversion (kg/person) was calculated by dividing the total weekly diverted materials (estimated and actual) by the total population in the winter semester.
3. Weekly waste and diversion outputs for the fall and summer semesters were calculated by multiplying the per-capita waste diversion and output rates by the total population counts in each semester.
4. Waste and diversion outputs for each semester were calculated by multiplying the weekly waste and diversion outputs by the number of weeks in each semester.
5. The total annual waste output and waste diversion was calculated by adding the waste output and waste diversion for each semester.
6. The diversion rate was calculated by dividing the total weight of diverted materials by the total weight of waste and diverted materials.

Assumptions

The data gathered during the audit is a snapshot of the waste stream during the audit period. In estimating total annual waste output, it is assumed that the sample period is representative of the waste stream over the year.

Large items such as bulky furniture and items not be part of the typical waste stream were excluded from the audit, and totalled 1151 kg for the week. Materials that were found during the audit and excluded from the waste output calculations include office chairs, a set takedown from Fine-Arts (large volume of wood), a mattress, a large volume of renovation material found in a cardboard bin (removed and placed in garbage bin), and a large volume of welding rods that had been donated to Trades but were not fit for use.

Limitations and Sources of Error

Waste is variable and will fluctuate depending on the season and activities. The audit is a snapshot of the waste stream at the McGill Campus over a one-week period and therefore data should be applied with discretion. Variations in waste may occur as a result of different events and seasons. Construction and maintenance waste was excluded from the audit.

Cross-contamination of wastes was a source of error. Food waste tends to get on everything; high contamination was present in paper, plastic, and garbage bags. Actual quantities for paper, plastic and garbage bags would have been lower, and actual quantities for food waste and liquids would have been higher than reported due to cross-contamination.

The weather and topography were also sources of error. It rained during several days of the audit and in some cases material was very wet (specifically cardboard, but also bags of waste). The wind and topography (weighing material on a slope) would have also caused errors in weights.

The scale used for the audit measured to 0.1 kg. In cases where materials weighed less than 0.1 kg (such as batteries), weights were estimated. All volumes were estimated.

3 Waste Audit Results

Waste Outputs

Weight and volume measurements for each dumpster were recorded during the audit. Each dumpster was measured on collection day, prior to collection. Table 1 shows the results of the weights and volume measurements over the week for the 2016 and 2017 audit periods.

A total of 4893 kg and 111 cubic yards of landfill waste was generated over a one-week period across 11 dumpsters in 2017. The sawdust dumpster located outside the Trades building was not included in the 2016 audit, and accounts for an increase in weekly waste output by 385 kilograms in 2017.

Table 1 shows the capacity of the dumpsters based on the current collection schedule in cubic yards. The dumpsters located outside the Science and the Culinary Arts buildings had the highest utilization rates (94% and 84% respectively), while the Animal Heath Technology and Arts & Education dumpsters had low volumes of waste (13% and 18%).

The dumpster outside the Culinary Arts building receives the most waste and is the dumpster that is most efficiently utilized, receiving 978 kg and 26.5 cubic yards of material each week. With a capacity of 30 cubic yards per week, it the Culinary Arts dumpster has a utilization rate of 88%.

There was in an increase in average dumpster utilization rate from 63% in 2016 to 65% in 2017.

Table 1 - Weekly Waste Outputs by Dumpster

Dumpster location	Total weight (kg/week) 2016	Total weight (kg/week) 2017	Total volume (cu.y/week) 2016	Total volume (cu.y/week) 2017	Volume capacity (cu.y/week) 2017	Utilization rate 2017
Animal Health Technology	129.2	141.2	1.5	0.5	4	13%
Arts & Education	224.8	81.2	5.7	2.2	12	18%
Campus Activity Centre	705.4	580.0	15.3	15.4	24	64%
Culinary Arts	977.7	1123.0	26.5	25.3	30	84%
Daycare	426.9	332.4	7.5	7.5	12	63%
Old Main	802.9	560.2	22.5	19.5	30	65%
Science / Gym	287.4	588.4	8.5	11.3	12	94%
Stores	203.9	324.5	7	4.0	8	50%
Trades 1	222.6	220.7	7.8	12.2	18	68%
Trades 2	526.9	579.9	8	11.1	18	61%
Trades Sawdust	not measured	361.3	not measured	2.3	4	56%
Total	**4507.7**	**4892.8**	**110.3**	**111.1**	**172**	**65%**

Diverted Wastes

Figure 2 and Table 2 below show the quantity of materials diverted through recycling, composting, and conversion to energy in kg per week. Table 2 also shows the annual diversion for materials in kg/year, as well as the total tonnage of diversion materials used in the STARS reporting fields. Metal and yard waste are the largest diverted waste streams.

Figure 2 - Diverted materials 2015 - 2017 (kg/week)

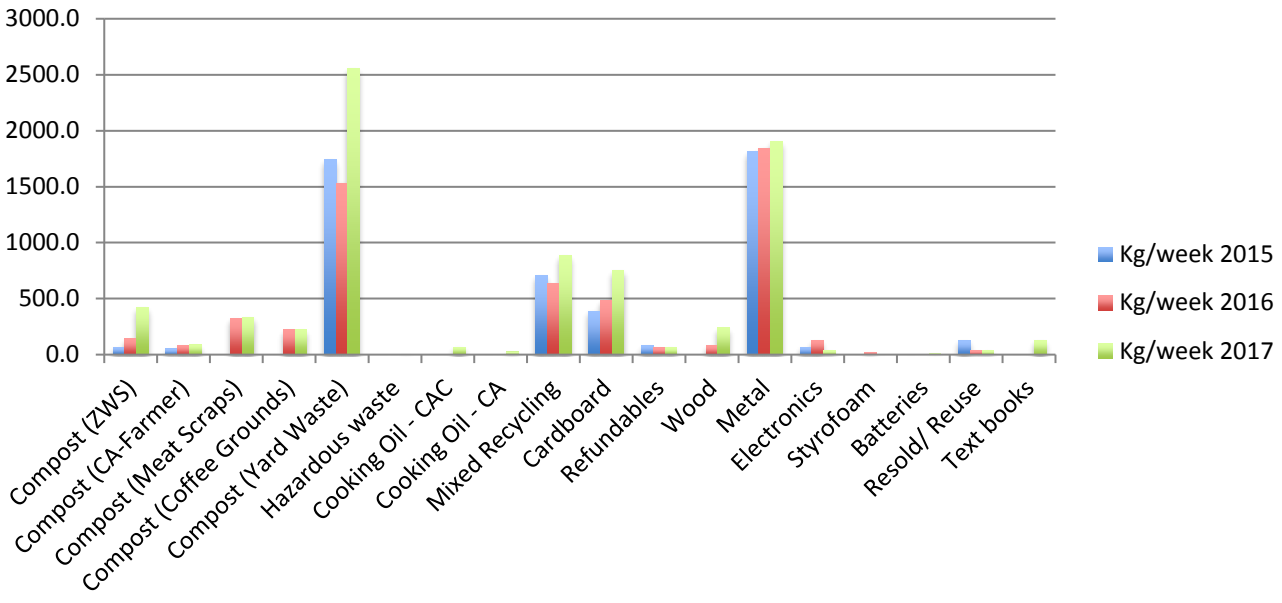


Table 2 - Diverted materials 2015 - 2017

		Kg/week 2015	Kg/week 2016	Kg/week 2017	Kg/year 2017	Tonnes/year 2017
Composted	Compost (ZWS)	67.5	140.5	425.0	16758	154.5
	Compost (CA-Farmer)	53.5	84.6	86.4	3110	
	Compost (Meat Scraps)	0.0	326.6	328.0	11808	
	Compost (Coffee Grounds)	0.0	220.8	220.8	8706	
	Compost (Yard Waste)	1745.0	1533.0	2551.6	114091	
Converted to energy	Hazardous waste	Not included	Not included	4.8	213	4.3
	Cooking Oil - CAC	Not included	Not included	67.1	3000	
	Cooking Oil - Culinary Arts	Not included	Not included	24.2	1080	
Recycled	Mixed Recycling	705.3	635.8	882.5	34797	164.8
	Cardboard	389.3	484.4	752.6	29675	
	Refundables	78.0	59.3	61.6	2429	
	Wood	0.0	79.2	243.3	10880	
	Metal	1812.7	1844.9	1901.0	85001	
	Electronics	67.5	128.3	37.1	1659	
	Styrofoam	0.0	22.0	2.3	101.7	
	Batteries	3.1	2.0	5.9	232	
Resold/ donated	Resold/ Reuse	121.8	35.7	35.7	1408	6.9
	Text books	Not included	Not included	122.0	5460	

Capture Rates

Capture rates compare the amount of each material diverted as a percent of the total amount of each material generated in kg per week. Table 3 below shows the amount of each material group diverted and landfilled as well as the capture rates from 2015 - 2017.

Capture rates for wood, electronics and reusable items decreased in 2017. These items are discarded on a variable basis compared to other waste streams and the capture rates reflect the variable nature of these items. Capture rates for mixed recycling, compost, and scrap metal have increased over 2016 levels, while refundable beverage containers increased in the landfill waste stream in 2017 compared to 2016 levels. Capture rates for cardboard and batteries did not change in 2017. Batteries were found in the landfill waste stream in very small quantities. Future audits should use a more sensitive scale to measure these small items.

Table 3 - Materials diverted and landfilled 2015 - 2017 (kg/week)

Materials	2015	2016	2017	Capture rate 2015	Capture rate 2016	Capture rate 2017
Batteries	**3.1**	**2.0**	**5.9**	**100%**	**100%**	**100%**
Diverted	3.1	2.0	5.9			
Landfilled	0.0	0.0	0.0			
Cardboard	**487.3**	**498.3**	**778.6**	**80%**	**97%**	**97%**
Diverted	389.3	484.4	752.6			
Landfilled	98.0	13.9	26.0			
Compost	**3922.0**	**3859.1**	**4771.2**	**48%**	**60%**	**76%**
Diverted	1866.0	2305.5	3611.8			
Landfilled	2056.0	1548.6	1159.4			
Electronic Waste	**117.2**	**128.3**	**64.0**	**58%**	**100%**	**58%**
Diverted	67.5	128.3	37.1			
Landfilled	49.7	0.0	26.9			
Mixed Recycling	**1838.0**	**1583.2**	**1890.1**	**38%**	**40%**	**47%**
Diverted	705.3	635.8	882.5			
Landfilled	1132.7	947.4	1007.6			
Refundable	**158.0**	**81.5**	**104.6**	**49%**	**73%**	**59%**
Diverted	78.0	59.3	61.6			
Landfilled	80.0	22.2	43.0			
Reusable (donated/sold)	**304.6**	**38.9**	**203.7**	**40%**	**92%**	**77%**
Diverted	121.8	35.7	157.8			
Landfilled	182.8	3.2	45.9			
Scrap metal	**1971.8**	**2036.0**	**1927.6**	**92%**	**91%**	**99%**
Diverted	1812.7	1844.9	1901.0			
Landfilled	159.1	191.1	26.6			
Wood	**Not measured**	**91.4**	**783.1**	**Not measured**	**87%**	**31%**
Diverted		79.2	243.3			
Landfilled		12.2	539.8			
Grand Total/ Average[5]	**8802.0**	**8318.7**	**10528.7**	**63%**	**82%**	**71%**

[5] Not all diverted materials are shown in the capture table. Items not shown include Styrofoam and cooking oil, which were not specifically measured in the landfill waste stream and hazardous waste, not found in the audit.

Total and Per-Capita Waste Output

Table 5 below shows the total waste stream for the audit year (Summer 2016 - Winter 2017) was approximately 521,687 kg, landfilling 200,286 kg and diverting 321,400 kg of materials through composting, recycling, and reuse resulting in an increased diversion rate of 61.6% in 2017 from 55.6% in 2016. Table 5 also shows weekly per capita landfill and diversion rates. The landfill diversion rate of 1.10 kg/person/week increased from 1.03 kg/person/week in 2016. Per capita diversion rate also increased from 1.28 kg/person/week in 2016 to 1.75 kg/person/week in 2017.

Table 5 - Population Waste and Diverted Materials By Semester

	Summer 2015 (staff only)	Summer 2015	Fall 2015	Winter 2016	Summer 2016 (staff only)	Summer 2016	Fall 2016	Winter 2017
Number of weeks	6	14	15	16	6	14	15	16
FTE students	0	1,500	3,374	3,265	0	1,500	3,374	3,265
FTE staff	1,099	1,099	1,099	1,099	1168	1168	1168	1168
Total population per period	**1,099**	**2,599**	**4,473**	**4,364**	**1168**	**2668**	**4654**	**4435**
Landfill waste (kg/week) [6]	860	2,599	4,473	4,507	976	2933	5117	4875
Diverted materials (kg/week)	1302	2042	5,815	5,595	1889	4664	8136	7752
Weekly per capita landfill rate (kg/person/week)	1.03	1.03	1.03	1.03	1.10	1.10	1.10	1.10
Weekly per capita diversion rate (kg/person/week)	1.28	1.28	1.28	1.28	1.75	1.75	1.75	1.75
Landfill waste (kg/semester)	5,162	37,478	69,294	72,112	5,855	41,064	76,755	5,855
Diverted materials (kg/semester)	7,811	46,574	86,021	89,520	11,336	65,293	122,043	11,336
Total generated (kg/semester)	**12,972**	**84,052**	**155,315**	**161,632**	**17,192**	**106,357**	**198,798**	**198,426**
Total landfill (kg/year)		**183,859**				**200,286**		
Total diversion (kg/year)		**229,786**				**321,400**		
Total generated (kg/year)		**413,646**				**521,687**		
Diversion rate		**55.6%**				**61.6%**		

[6] Landfilled waste per week in the 6-week staff only summer period reduced by 23% to account for lack of the waste generated through trades activities

Landfill Waste Stream

The following sections show the material measurements of the landfill (garbage) waste stream in units per week for weight and volume. Garbage weights measured 4875 kg/week in 2017, 4518[7] kg/week in 2016 and 6252 kg/week in 2015. The volume of garbage measured 84,557 L/week in 2017, 84,332 in 2016 and 84,215 in 2015.

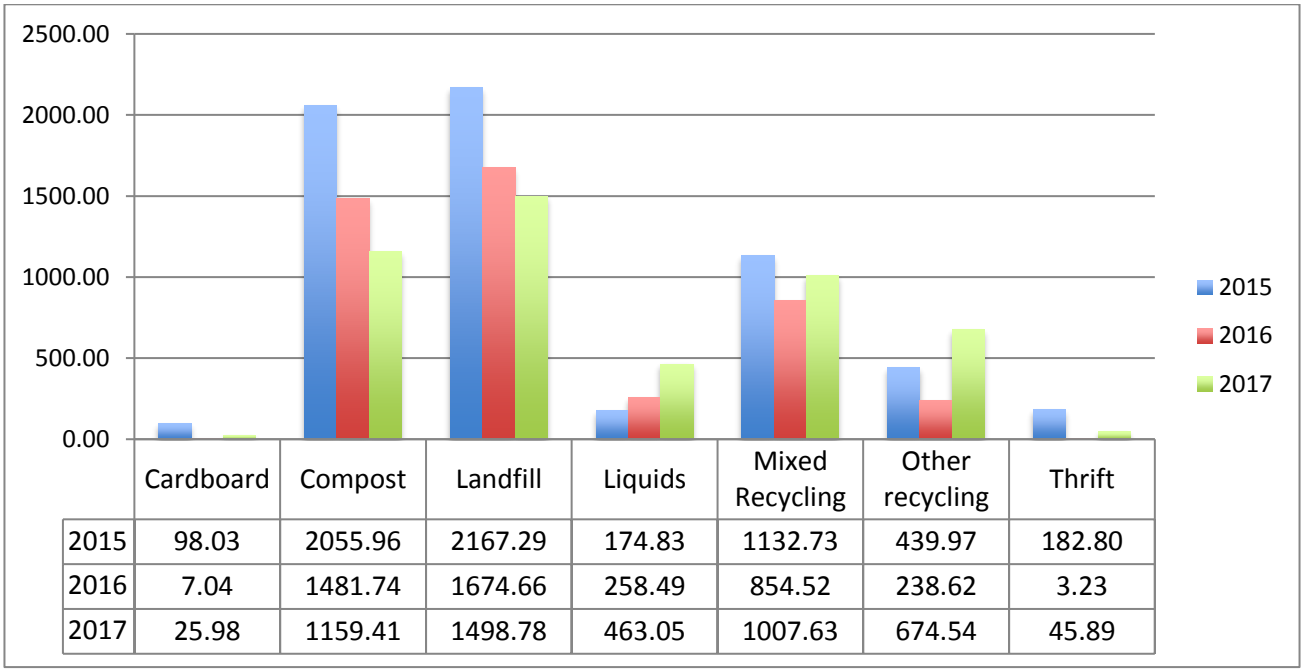
Materials were sorted into 27 categories. Figures below show various groupings of materials. See Appendix B for classification of material groups.

Overall Landfill Waste Stream

Figures 4 below show the estimated waste output of the garbage by material group in kg per week for the 2015 - 2017 audits. The landfill material group had the highest output by weight, with 1499 kg per week in 2017, which consisted of materials for which diversion programs are not readily available. The landfill material group has reduced by 45 percent since 2015.

The compost material group was second most abundant material in the garbage stream, with 1159 kg per week in 2017. Compost is the garbage stream has reduced each year since 2015. The compost waste stream has the highest potential for diversion based on weight.

Figure 3 - Overall landfill waste stream by material group 2015 - 2017 (kg/week) - weights

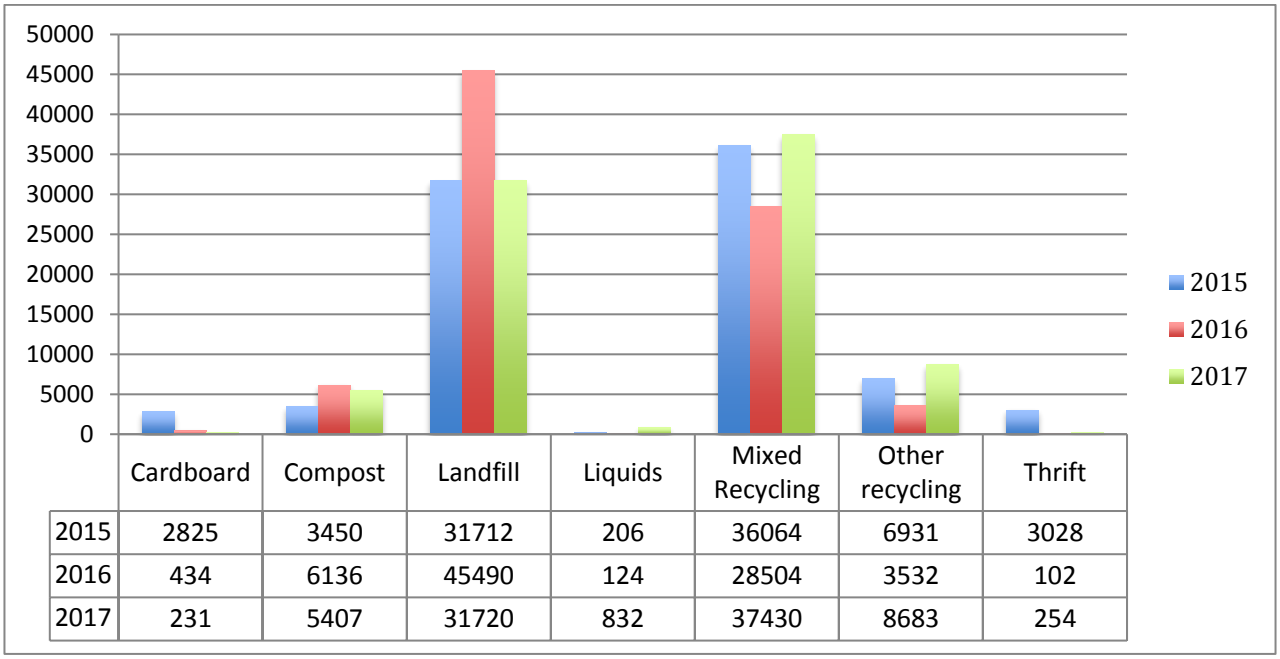


	Cardboard	Compost	Landfill	Liquids	Mixed Recycling	Other recycling	Thrift
2015	98.03	2055.96	2167.29	174.83	1132.73	439.97	182.80
2016	7.04	1481.74	1674.66	258.49	854.52	238.62	3.23
2017	25.98	1159.41	1498.78	463.05	1007.63	674.54	45.89

Figure 5 shows volume outputs of garbage by material group in L per week for the 2015 - 2017 audits. The mixed recycling material group was the most abundant material group by volume in 2017 and 2015, which increased from 28504 L per week in 2016 to 37430 L per week in 2017. The landfill material group was the most abundant material by volume in 2016, with 45490 L per week.

[7] The 2016 reported landfilling 4507 kg per week, however when the data was compiled with the 2017 results, adjustments to the samples of materials that showed a volume but not a weight were assigned a small weight (less than 0.05 kg) to account for their presence and resulted in total landfill increased to 4518 kg per week.

Figure 4 - Overall landfill waste stream by material group 2015 - 2017 (L/week) - volumes



	Cardboard	Compost	Landfill	Liquids	Mixed Recycling	Other recycling	Thrift
2015	2825	3450	31712	206	36064	6931	3028
2016	434	6136	45490	124	28504	3532	102
2017	231	5407	31720	832	37430	8683	254

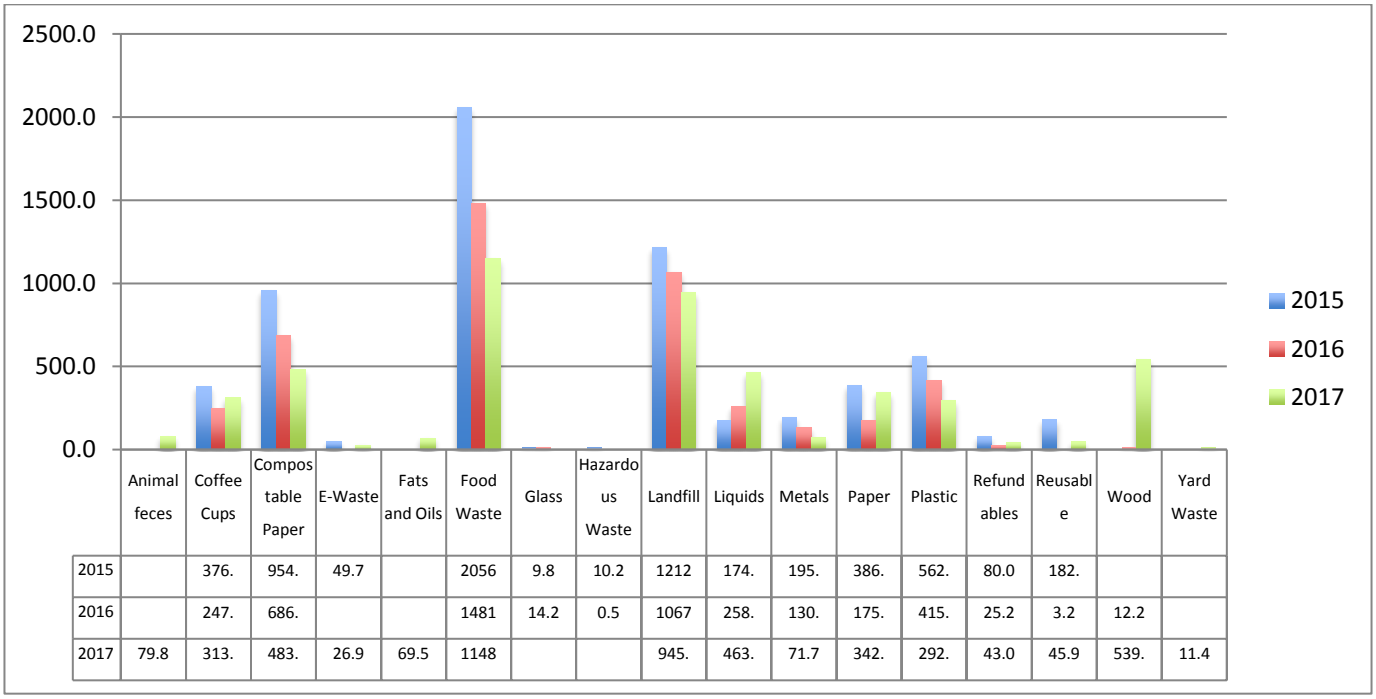
Figures 6 and 7 show expanded material groups of the garbage stream in waste outputs per week by weight and volume for 2015 - 2017. Food waste was the most abundant material by weight from 2015 - 2017, but decreased significantly from 2056 kg per week in 2015 to 1148 kg per week in 2017. The second most abundant materials by weight from 2015 to 2017 were the landfill material group, which decreased from 1212 kg per week in 2015 to 945 kg per week in 2017.

Wood waste significantly increased in 2017, with an estimate 540 kg per week from 12 kg per week in 2016, not measured in 2015. Although wood was present in 2015 and 2016, the sampling for the 2015 and 2016 audits did not capture wood, as this material is more variable and was not present during the sampling[8].

Compostable packaging is also a significant part of the waste stream but has reduced significantly, from 955 kg per week in 2015 to 483 kg per week in 2017.

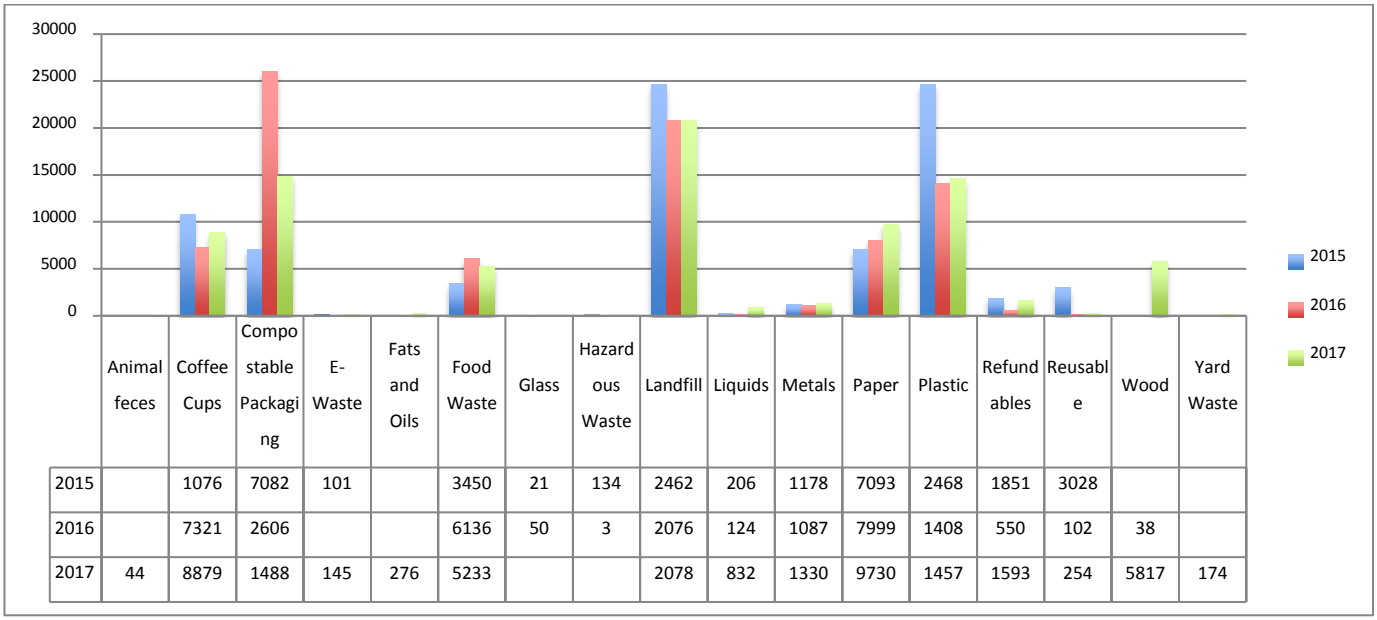
[8] Wood was also observed in the Old Main (a result of a set tear-down in Fine Arts) and Stores dumpsters.

Figure 5 - Overall landfill waste stream by expanded material group 2015 - 2017 (kg/week)



	Animal feces	Coffee Cups	Compostable Paper	E-Waste	Fats and Oils	Food Waste	Glass	Hazardous Waste	Landfill	Liquids	Metals	Paper	Plastic	Refundables	Reusable	Wood	Yard Waste
2015		376.	954.	49.7		2056	9.8	10.2	1212	174.	195.	386.	562.	80.0	182.		
2016		247.	686.			1481	14.2	0.5	1067	258.	130.	175.	415.	25.2	3.2	12.2	
2017	79.8	313.	483.	26.9	69.5	1148			945.	463.	71.7	342.	292.	43.0	45.9	539.	11.4

Figure 6 - Overall landfill waste stream by expanded material group 2015 - 2017 (litres/week)



	Animal feces	Coffee Cups	Compostable Packaging	E-Waste	Fats and Oils	Food Waste	Glass	Hazardous Waste	Landfill	Liquids	Metals	Paper	Plastic	Refundables	Reusable	Wood	Yard Waste
2015		1076	7082	101		3450	21	134	2462	206	1178	7093	2468	1851	3028		
2016		7321	2606			6136	50	3	2076	124	1087	7999	1408	550	102	38	
2017	44	8879	1488	145	276	5233			2078	832	1330	9730	1457	1593	254	5817	174

Landfill Waste Stream By Source

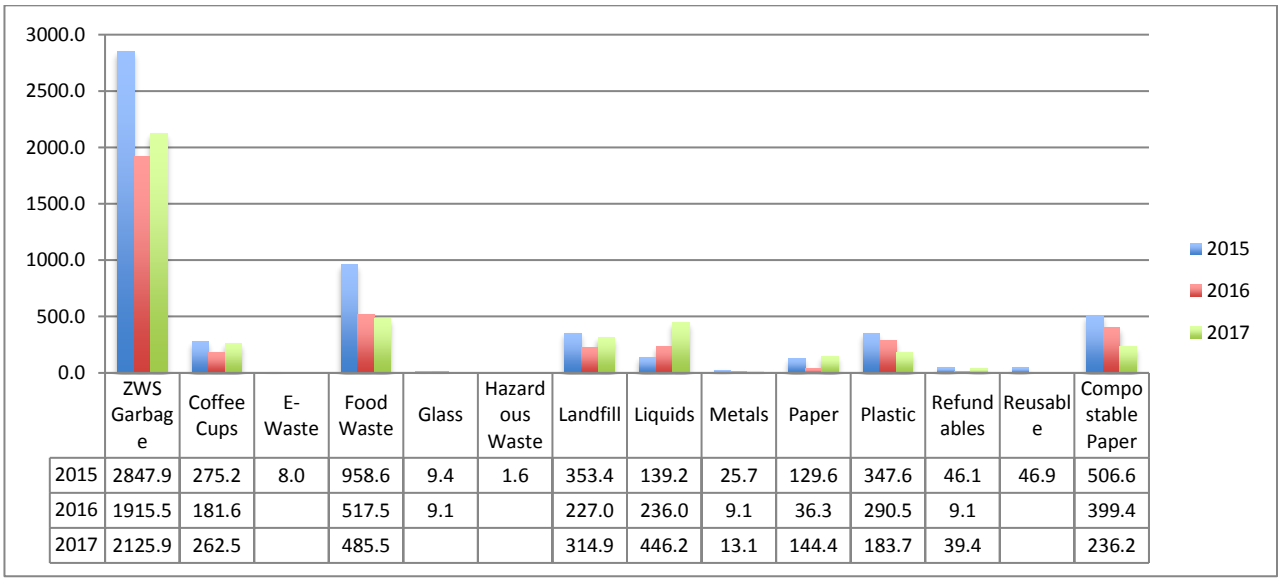
The overall garbage waste stream was divided into 12 sources. The following section shows the weekly output in kg per week of materials landfilled for each of the sources identified in the audit. Volume outputs for the sources were measured but are not shown because of the variable compaction of materials during sample sorting.

Zero Waste Station Landfill

Figures 8 shows the amount of material group landfilled each week from zero waste station landfill bins by weight. The most abundant material by weight landfilled in all three audits was food waste, with an estimated 486 kg per week in 2017, down from 518 kg per week in 2016. The second most abundant material by weight in zero waste stations in 2017 was liquids (446 kg per week), followed by landfill material group (315 kg per week). Compostable packaging reduced significantly in 2017, from 400 kg per week in 2016 to 236 kg per week in 2017.

Student education and outreach to engage in proper waste sorting has the greatest potential for waste diversion from the zero waste station landfill bins. Coffee cups are a significant contributor to the waste stream accounting for 263 kg per week in 2017, up from 182 kg per week in 2016. Coffee cup reduction campaigns targeting behaviour change would also help reduce waste in zero waste stations.

Figure 7 - Zero waste station landfill weekly weight outputs by material group (kg/week)



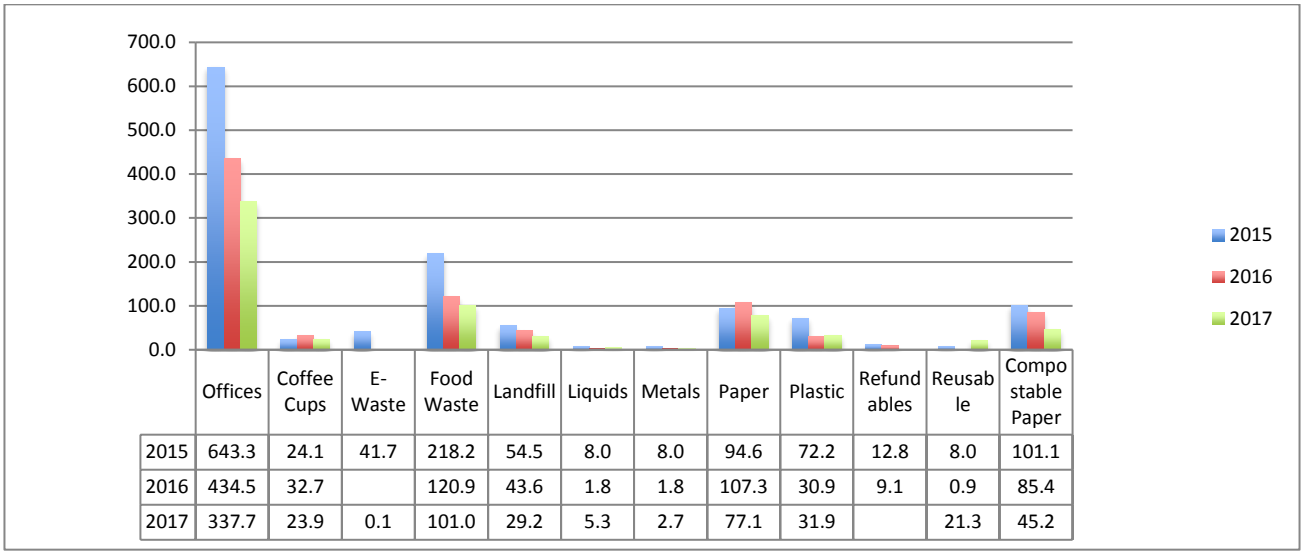
	ZWS Garbage	Coffee Cups	E-Waste	Food Waste	Glass	Hazardous Waste	Landfill	Liquids	Metals	Paper	Plastic	Refundables	Reusable	Compostable Paper
2015	2847.9	275.2	8.0	958.6	9.4	1.6	353.4	139.2	25.7	129.6	347.6	46.1	46.9	506.6
2016	1915.5	181.6		517.5	9.1		227.0	236.0	9.1	36.3	290.5	9.1		399.4
2017	2125.9	262.5		485.5			314.9	446.2	13.1	144.4	183.7	39.4		236.2

Offices Landfill

Figure 9 shows the amount of material landfilled from offices in kg per week for 2015 - 2017. The most abundant material discarded from offices in 2017 was food waste, with 101 kg per week, which has reduced significantly from 218 kg per week in 2015. Paper was the second most abundant material landfilled from offices in both 2016 and 2017, with an estimated 77 kg per week in 2017, down from 107 kg per week in 2016. Compostable paper reduced significantly in 2017 with 45 kg per week, down from 85 kg per week in 2016.

Centralizing waste collection in offices is a way to help increase diverted materials, promotes activity, and reduces need for checking and emptying small volumes of garbage when staff can very easily incorporate more movement in their day to dispose small amounts of waste.

Figure 8 - Office landfill weekly weight outputs by material group (kg/week)



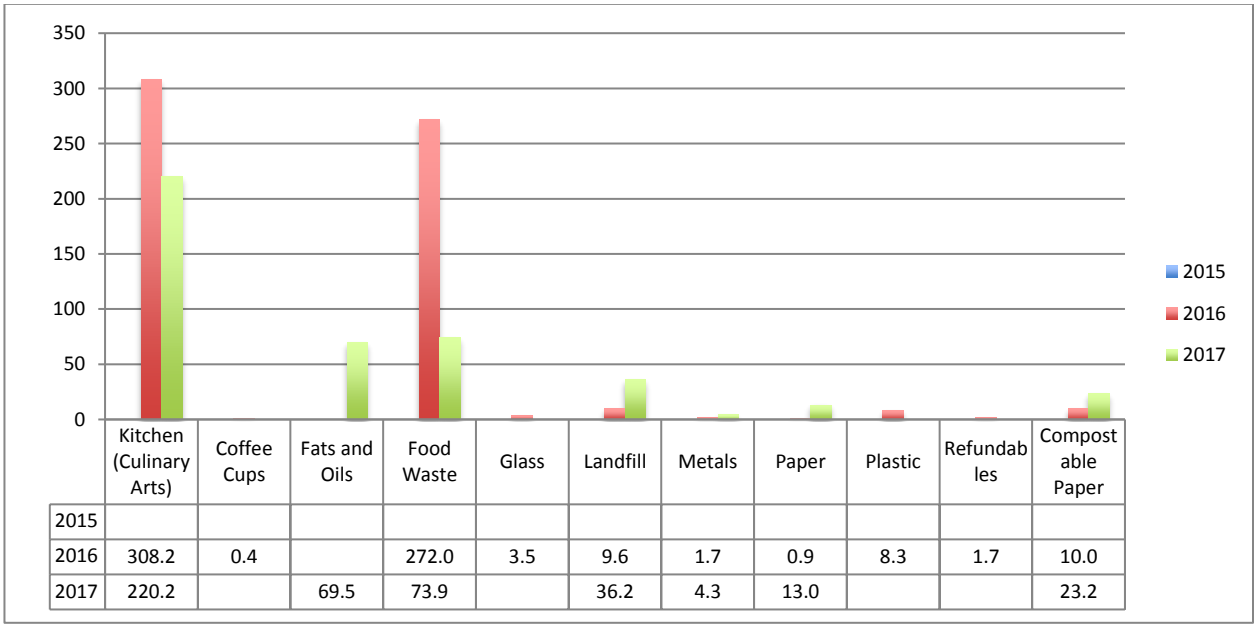
	Offices	Coffee Cups	E-Waste	Food Waste	Landfill	Liquids	Metals	Paper	Plastic	Refundables	Reusable	Compostable Paper
2015	643.3	24.1	41.7	218.2	54.5	8.0	8.0	94.6	72.2	12.8	8.0	101.1
2016	434.5	32.7		120.9	43.6	1.8	1.8	107.3	30.9	9.1	0.9	85.4
2017	337.7	23.9	0.1	101.0	29.2	5.3	2.7	77.1	31.9		21.3	45.2

Kitchen - Culinary Arts Landfill

Figure 10 shows the amount of material landfilled from the Culinary Arts kitchen in kg per week for 2015 - 2017. The most abundant material discarded from offices in 2017 was food waste, with 74 kg per week, which has reduced significantly from 272 kg per week in 2016 (grouped with the CAC kitchen in 2015). Fats and oils were included with food waste materials in 2016, but measured separately due to their significance in 2017 with 70 kg per week.

Culinary Arts showed significant improvements in diverting food waste. The only recyclable materials found in the audit were milk cartons. A significant source of the food waste was dough and flour batter. Investigating options to divert the fats and oils could improve diversion in the Culinary Arts.

Figure 9 - Kitchen Culinary Arts landfill weekly weight outputs by material group (kg/week)



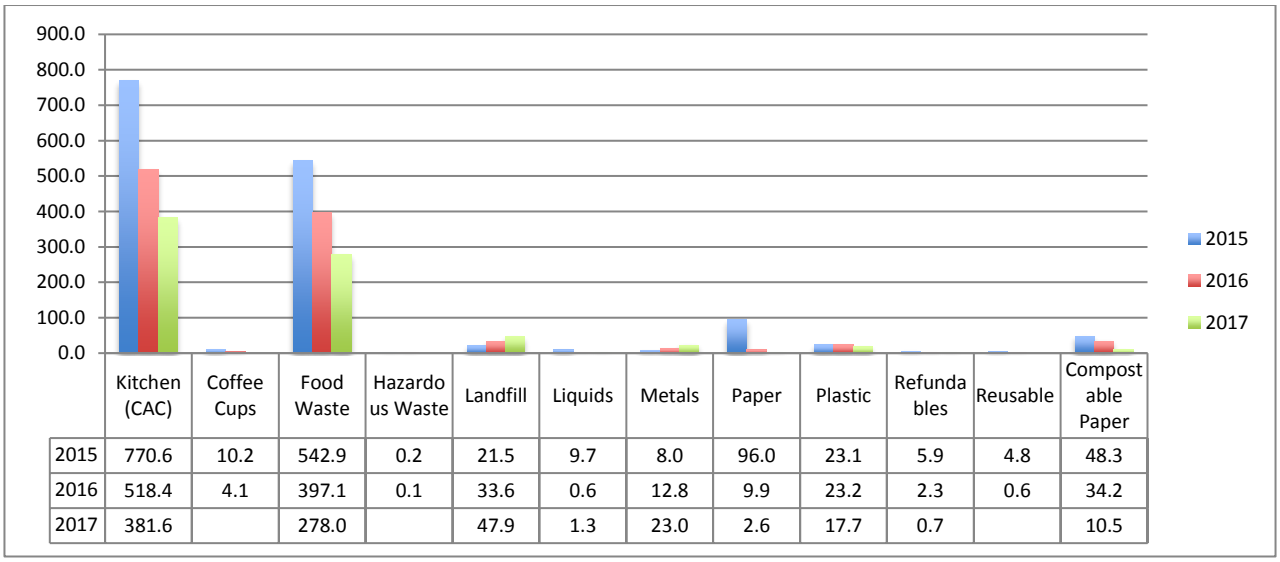
	Kitchen (Culinary Arts)	Coffee Cups	Fats and Oils	Food Waste	Glass	Landfill	Metals	Paper	Plastic	Refundables	Compostable Paper
2015											
2016	308.2	0.4		272.0	3.5	9.6	1.7	0.9	8.3	1.7	10.0
2017	220.2		69.5	73.9		36.2	4.3	13.0			23.2

Kitchen - Campus Activity Centre Landfill

Figure 11 shows the amount material landfilled from the Campus Activity Centre kitchen in kg per week for 2015 - 2017. The most abundant material discarded from the CAC in 2017 was food waste, with 278 kg per week, which has reduced significantly from 518 kg per week in 2016 (grouped with the CA kitchen in 2015).

Educating contract staff to divert food waste and recyclable plastics and metals from the kitchen area and incorporating waste diversion targets and incentives/ disincentives into contract language would improve waste diversion efforts in the campus activity centre kitchen area.

Figure 10 - Kitchen Campus Activity Centre landfill weekly weight outputs by material group (kg/week)



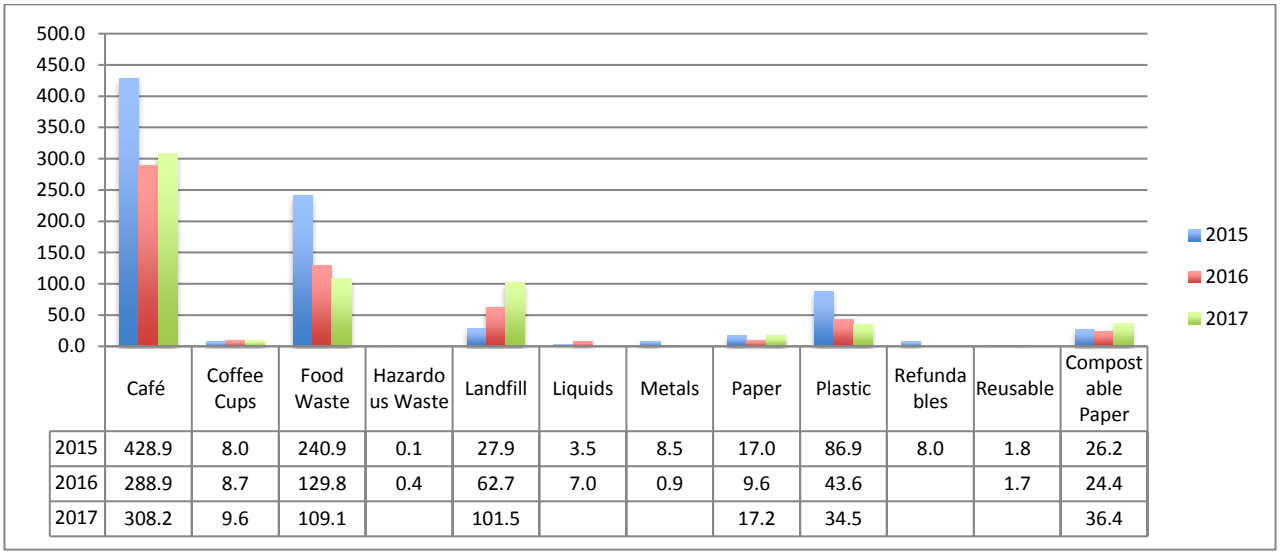
	Kitchen (CAC)	Coffee Cups	Food Waste	Hazardous Waste	Landfill	Liquids	Metals	Paper	Plastic	Refundables	Reusable	Compostable Paper
2015	770.6	10.2	542.9	0.2	21.5	9.7	8.0	96.0	23.1	5.9	4.8	48.3
2016	518.4	4.1	397.1	0.1	33.6	0.6	12.8	9.9	23.2	2.3	0.6	34.2
2017	381.6		278.0		47.9	1.3	23.0	2.6	17.7	0.7		10.5

Café Landfill

Figure 12 shows the amount material landfilled from the café landfill stream in kg per week for 2015 - 2017. The most abundant material discarded from cafés in 2017 was food waste, with 109 kg per week, which has reduced from 130 kg per week in 2016 and 241 kg per week in 2015. Landfill materials have increased in the waste stream and were the second most abundant material group in the café waste stream.

Engaging contract staff to divert food waste and recyclable paper and plastics from the cafés area and incorporating waste diversion targets and incentives/ disincentives into contract language would improve waste diversion efforts in the cafés.

Figure 11 - Café landfill weekly waste outputs by material group (kg/week)

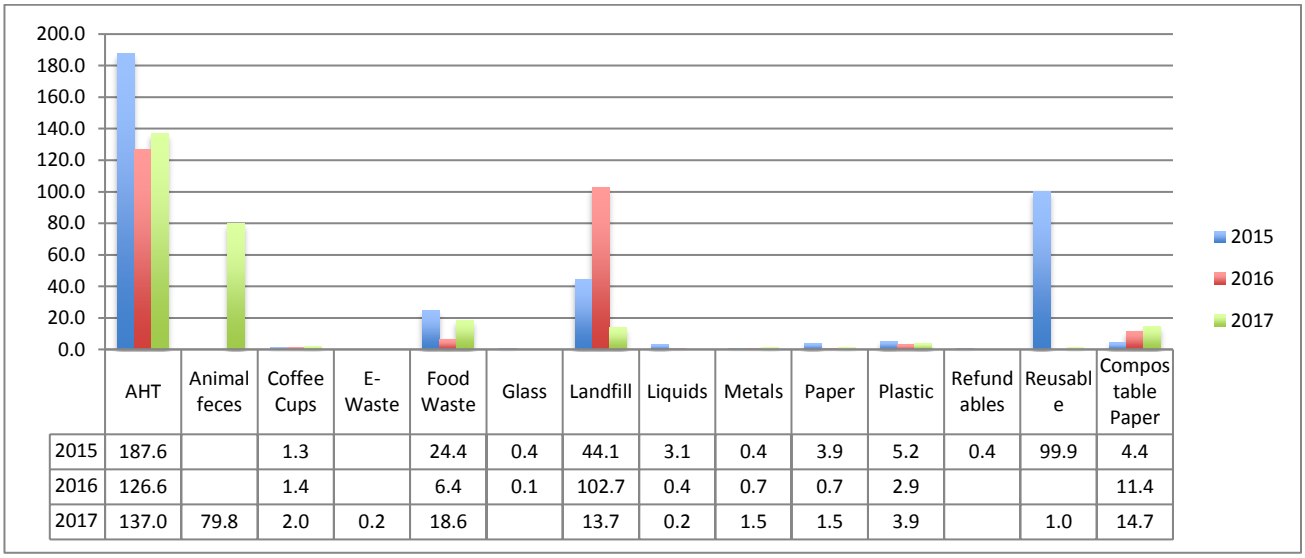


	Café	Coffee Cups	Food Waste	Hazardous Waste	Landfill	Liquids	Metals	Paper	Plastic	Refundables	Reusable	Compostable Paper
2015	428.9	8.0	240.9	0.1	27.9	3.5	8.5	17.0	86.9	8.0	1.8	26.2
2016	288.9	8.7	129.8	0.4	62.7	7.0	0.9	9.6	43.6		1.7	24.4
2017	308.2	9.6	109.1		101.5			17.2	34.5			36.4

Animal Health Technology Landfill

Figure 13 shows the amount material landfilled from Animal Health Technology in kg per week for 2015 - 2017. The most abundant material discarded in 2017 was animal feces, with 80 kg per week in 2016 and 2015. 2016 and 2015 audits grouped animal feces in the landfill material category.

Figure 12 - Animal Health Technology landfill weekly waste outputs by material group (kg/week)



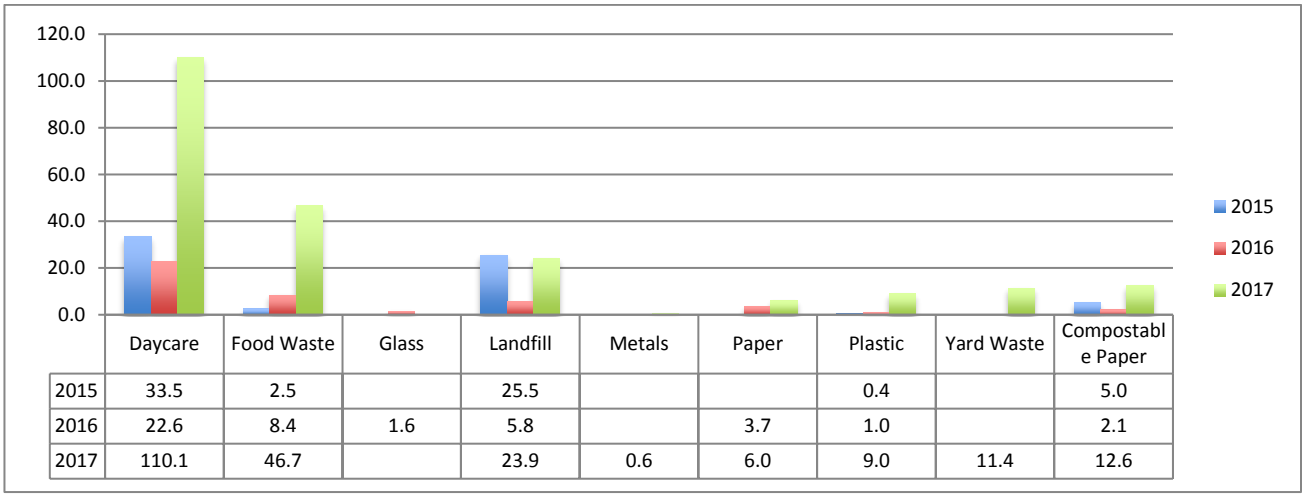
	AHT	Animal feces	Coffee Cups	E-Waste	Food Waste	Glass	Landfill	Liquids	Metals	Paper	Plastic	Refundables	Reusable	Compostable Paper
2015	187.6		1.3		24.4	0.4	44.1	3.1	0.4	3.9	5.2	0.4	99.9	4.4
2016	126.6		1.4		6.4	0.1	102.7	0.4	0.7	0.7	2.9			11.4
2017	137.0	79.8	2.0	0.2	18.6		13.7	0.2	1.5	1.5	3.9		1.0	14.7

Daycare Landfill

Figure 14 shows the amount material landfilled from the daycare landfill stream in kg per week for 2015 - 2017. The most abundant material discarded in 2017 was food waste, with 47 kg per week in 2017, followed by the landfill material group with 24 kg per week. The sample consisted of a large amount of recycling and a discarded plant - accounting for 27 kg per week in 2017.

The daycare waste stream increased significantly in 2017. In 2015 and 2016 daycare staff were notified about the audit and a day's worth sample was requested. In 2017 daycare staff were not engaged prior to the audit.

Figure 13 - Daycare landfill weekly waste output by material group (kg/week)



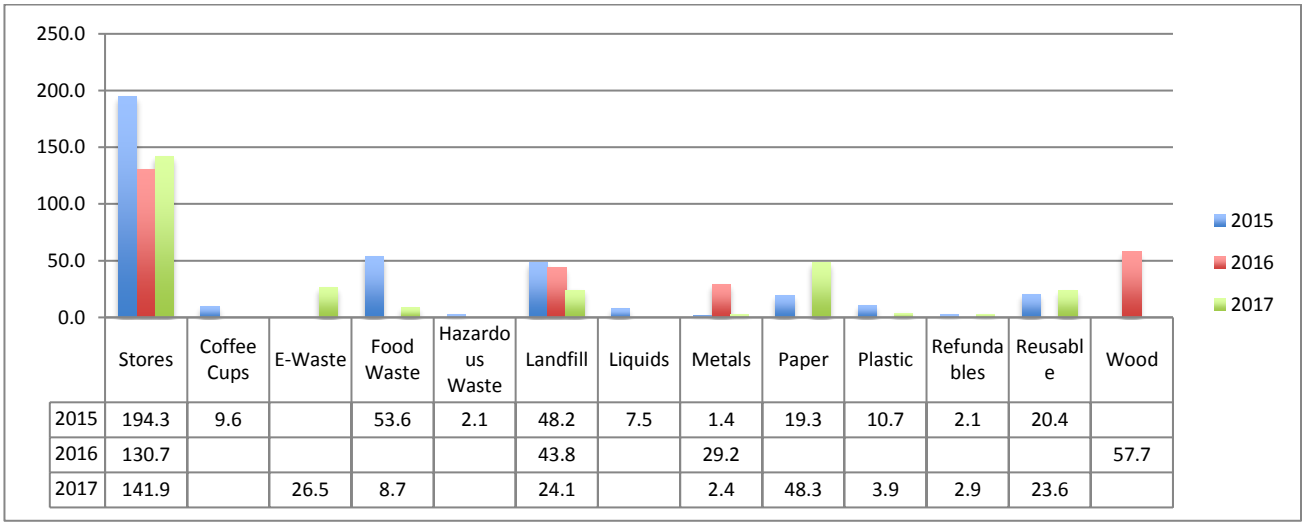
	Daycare	Food Waste	Glass	Landfill	Metals	Paper	Plastic	Yard Waste	Compostable Paper
2015	33.5	2.5		25.5			0.4		5.0
2016	22.6	8.4	1.6	5.8		3.7	1.0		2.1
2017	110.1	46.7		23.9	0.6	6.0	9.0	11.4	12.6

Stores Landfill

Figure 15 shows the amount material landfilled from the stores landfill stream in kg per week for 2015 - 2017. This waste stream is highly variable and unlikely that the sample shown below is representative of a week. Paper was the most significant material in the stores sample in 2017, followed by e-waste, landfill and reusable. Wood and metals reduced drastically since 2016.

Significant amounts of paper, reusable items and electronics were found during the audit. A system to divert reusable items from stores, and ensure that electronics and paper are recycled would improve waste reduction and diversion in stores.

Figure 14 - Stores weekly waste output by material group (kg/week)



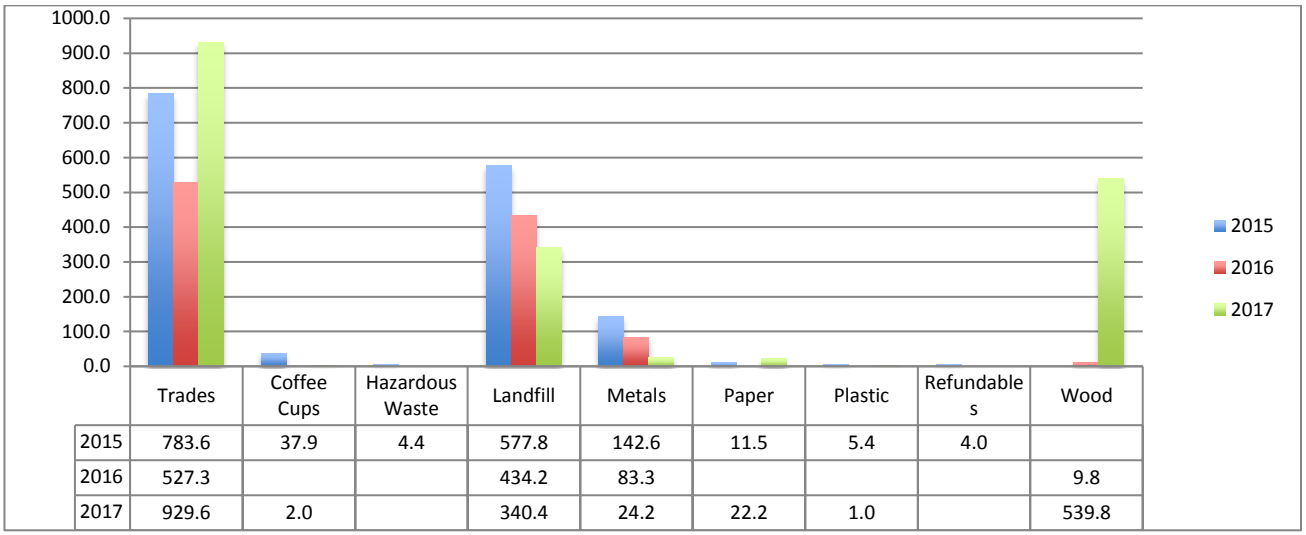
	Stores	Coffee Cups	E-Waste	Food Waste	Hazardous Waste	Landfill	Liquids	Metals	Paper	Plastic	Refundables	Reusable	Wood
2015	194.3	9.6		53.6	2.1	48.2	7.5	1.4	19.3	10.7	2.1	20.4	
2016	130.7					43.8		29.2					57.7
2017	141.9		26.5	8.7		24.1		2.4	48.3	3.9	2.9	23.6	

Trades Landfill

Figure 16 shows the amount material landfilled from the trades landfill stream in kg per week for 2015 - 2017. The trades sawdust dumpster was included in the 2017 audit only, and accounts for over 361 kg per week of the 540 kg per week of wood waste and driving up the total waste weekly waste output in the trades in 2017 to nearly a tonne per week.

Wood waste and cardboard bins would help increase diversion in trades.

Figure 15 - Trades landfill weekly waste output by material group (kg/week)



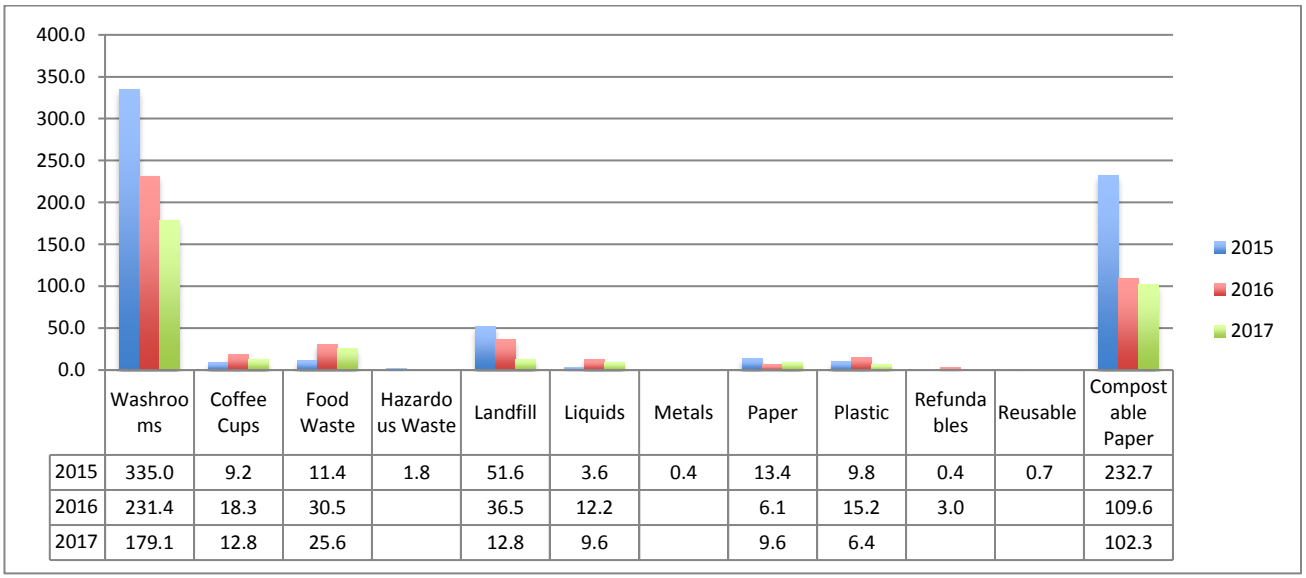
	Trades	Coffee Cups	Hazardous Waste	Landfill	Metals	Paper	Plastic	Refundables	Wood
2015	783.6	37.9	4.4	577.8	142.6	11.5	5.4	4.0	
2016	527.3			434.2	83.3				9.8
2017	929.6	2.0		340.4	24.2	22.2	1.0		539.8

Washrooms Landfill

Figure 17 shows the amount material landfilled from the washrooms landfill stream in kg per week for 2015 - 2017. Compostable paper was the most significant material found in washrooms with an estimated 102 kg per week. Recyclable material and food waste was also found in washrooms.

Installing hand dryers would reduce paper towel usage in washrooms. Where possible, placing zero waste stations adjacent to washrooms and eliminate washroom garbage bins to reduce single stream (garbage only) waste bins.

Figure 16 - Washrooms landfill weekly waste output by material group (kg/week)



	Washrooms	Coffee Cups	Food Waste	Hazardous Waste	Landfill	Liquids	Metals	Paper	Plastic	Refundables	Reusable	Compostable Paper
2015	335.0	9.2	11.4	1.8	51.6	3.6	0.4	13.4	9.8	0.4	0.7	232.7
2016	231.4	18.3	30.5		36.5	12.2		6.1	15.2	3.0		109.6
2017	179.1	12.8	25.6		12.8	9.6		9.6	6.4			102.3

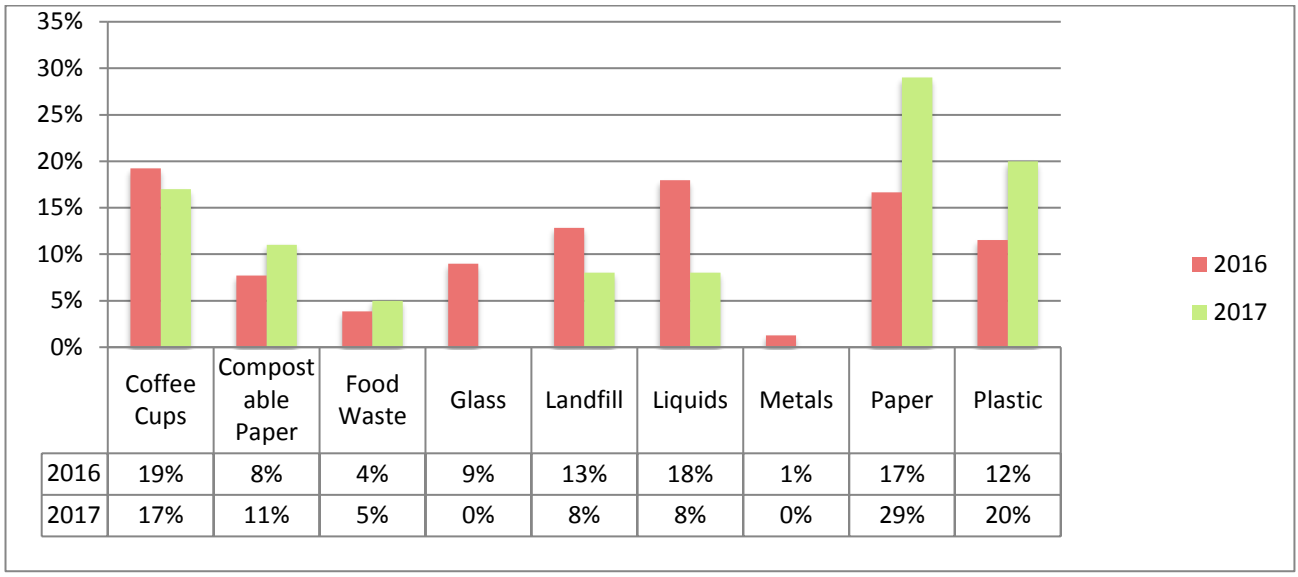
Diverted Materials Waste Composition

Samples from zero waste stations were also collected during the audit for mixed recycling, compost, plastic film and refundable beverage containers. Figures 18 to 21 shows the composition for zero waste station waste streams for mixed recycling, compost, plastic film and refundable beverage containers.

Figure 18 shows the composition of the mixed recycling stream from zero waste stations. Paper, plastics and coffee cups were the most abundant materials in the zero waste station mixed recycling stream, accounting for 29%, 20% and 17%, respectively.

The contamination rate (materials that are not accepted in mixed recycling as a percent of total materials) in mixed recycling from the zero waste stations in 2017 was 32%, down from 42% in 2016. This rate is quite high, although not likely representative of total mixed recycling.

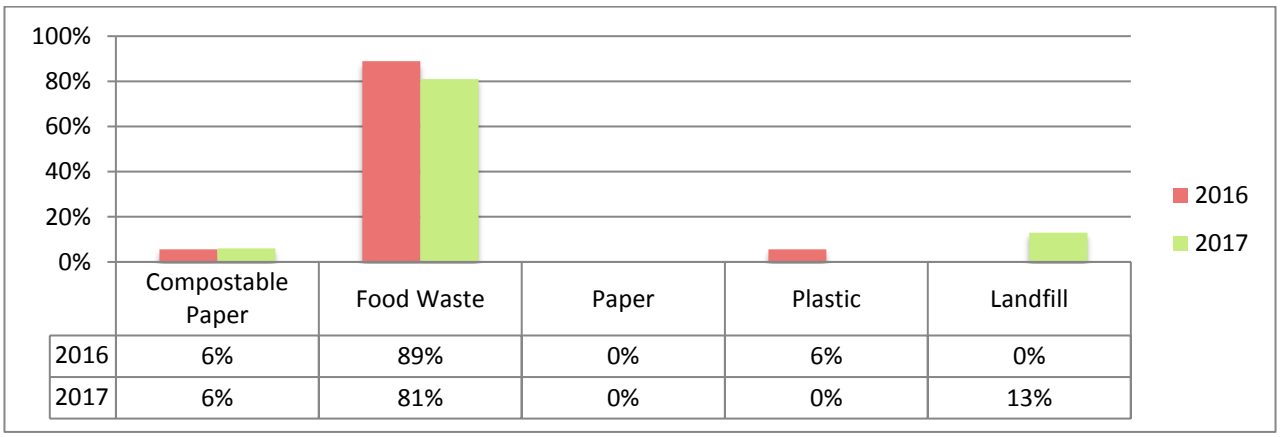
Figure 17 - Mixed Recycling Composition



	Coffee Cups	Compostable Paper	Food Waste	Glass	Landfill	Liquids	Metals	Paper	Plastic
2016	19%	8%	4%	9%	13%	18%	1%	17%	12%
2017	17%	11%	5%	0%	8%	8%	0%	29%	20%

Figure 19 shows the composition of the compost waste stream from zero waste stations. Contamination rates in the compost bins were 19% in 2017, up from 11% in 2016. The landfill material group included the garbage bags in 2017, however in 2016 the garbage bags weren't measured.

Figure 18 - Compost Composition

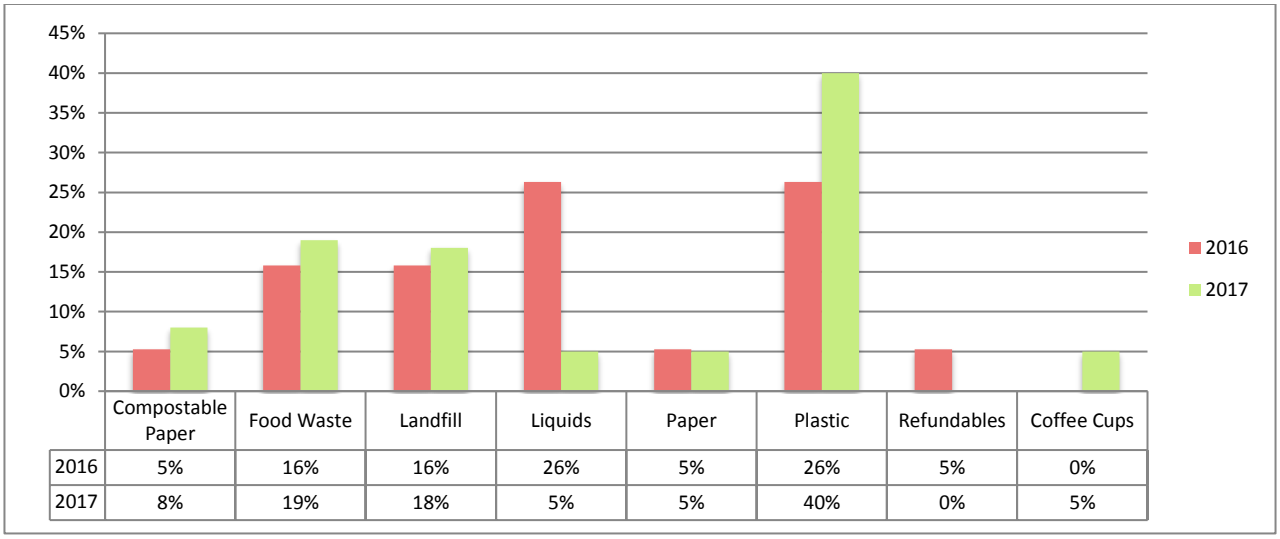


	Compostable Paper	Food Waste	Paper	Plastic	Landfill
2016	6%	89%	0%	6%	0%
2017	6%	81%	0%	0%	13%

Figure 20 shows the composition of the plastic film stream from zero waste stations. 16% of the materials found in the plastic film bins were plastic film, with food waste being the highest contaminant, followed by landfill materials and hard plastics. Contamination rate in the plastic film bins were 84%!

Removing plastic film bins from the zero waste stations and providing separate plastic bag recycling locations for people who truly want to recycle film (such as with battery boxes) may be worth trialing.

Figure 19 - Plastic Film Composition

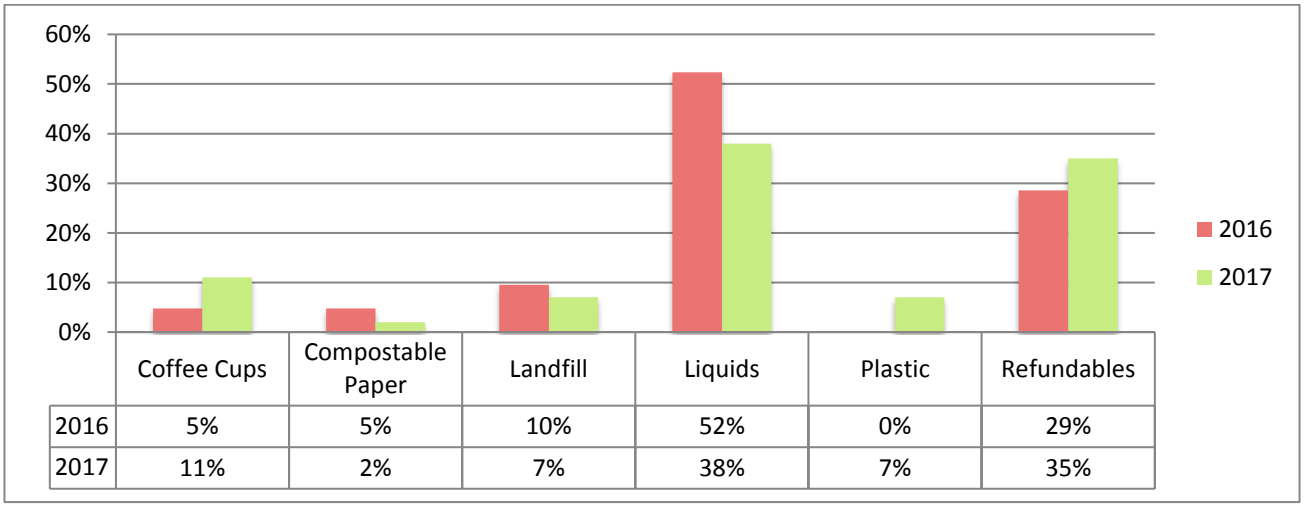


	Compostable Paper	Food Waste	Landfill	Liquids	Paper	Plastic	Refundables	Coffee Cups
2016	5%	16%	16%	26%	5%	26%	5%	0%
2017	8%	19%	18%	5%	5%	40%	0%	5%

Figure 21 shows the composition of the refundable beverage container bins from zero waste stations. Liquids were the most abundant materials, reducing from 52% in 2016 to 38% in 2017. Contamination rate in the refundable beverage container bins was 65% in 2017, down from 71% in 2016.

Liquid waste is a challenge to divert and appears in significant amounts in several waste streams. Campaigns to target liquid waste reduction would could impact overall waste reduction.

Figure 20 - Refundable Beverage Container Composition



	Coffee Cups	Compostable Paper	Landfill	Liquids	Plastic	Refundables
2016	5%	5%	10%	52%	0%	29%
2017	11%	2%	7%	38%	7%	35%

Conclusion and Recommendations

The 2017 audit showed that TRU has made improvements in waste management practices, and increasing diversion of compostable and recyclable materials. Total waste output increased in 2017, partly due to including materials not captured in the 2016 audit, such as the sawdust bin in trades and several diverted waste streams for donated text books, cooking oil and hazardous waste.

Recommendations discussed in the sources of waste sections above are summarized in table 5 below. This section provides recommendations to improve waste reduction and diversion at TRU through policy, education and outreach, and infrastructure for each source of waste identified in the audit.

Table 4 - Recommendations for improved waste reduction and diversion through policy, education and outreach by source

Source /target audience	Policy	Outreach	Infrastructure
Zero waste stations / students		- Waste station ambassadors at events and throughout the year educating on "what goes where" - Waste reduction week event (October) - themes could include reusable coffee cup, food waste reduction	- Change signage on zero waste stations using pictures (not icons) of most common materials - 3D signage in each building - Replace plastic film stream from zero waste stations with separate plastic film collection (such as with battery collection) - Remove bags from mixed recycling stream before placing in collection carts
Washrooms / students		- 'Save a tree' campaign (paper towel reduction) - Posters in washrooms reminding people to sort into zero waste stations (located outside washrooms?)	- Hand dryers in all washrooms and remove paper towel - Reduce number garbage bins in washrooms and where possible, place zero waste stations outside washrooms and remove garbage bins inside
Trades / trades administration		- Why source separating DLC waste matters - (Designing for deconstruction?)	- Wood waste collection bin (roll-off) - Cardboard collection bin (weekly collection) - Investigate diversion of sawdust bin

Offices / staff and administration	- 'Kick the can' - staff (not janitors) are responsible for taking waste to central collection.	- 'What goes where' - short video clips or presentations to staff and administration - Communicate results of waste audit for offices to all staff (i.e., email, poster in staff rooms, announcements at staff meetings)	- Centralized zero waste stations in offices - Remove garbage bins from desks and provide recycling bins as required
Kitchen & Café / Aramark	- Include language in new contracts for waste diversion targets - Create incentives or penalties for target thresholds	- Educate contract staff on 'what goes where' - Share results of waste audit for campus activity centre kitchen and cafés with contractor	- Engage and support contract staff to set up internal waste diversion systems - Donation system for surplus food (student food bank?)
Stores / Facility staff and administration		- Why waste matters presentation to staff	- Reuse system - donate usable items to non-profit reuse (i.e., Big Brothers and Sisters/ Habitat for Humanity ReStore)

In addition to the above-recommended strategies, opportunities to reduce costs associated with waste disposal and improve accuracy of waste reporting are discussed as follows:

1. Improved data collection for diverted waste streams. Diverted materials including: yard waste, electronic waste, reused materials, and Styrofoam were reported as estimates. Capturing weights for these materials would improve overall reporting.
2. The audit did not capture shredded paper diverted through TRU. Future audits should include this waste stream, as it is believed to be a significant source of diversion.
3. Centralizing waste disposal for landfill waste stream into a compactor would reduce costs associated with waste disposal, as well as improve reporting accuracy. Disposal of compacted waste includes a cost per weight for disposal.
4. Centralized collection and compaction of diverted waste streams would provide an opportunity to improve accuracy of data and potentially offset costs associated with waste handling by selling source separated materials to market. For example, TRU generates an estimated 30 tonnes of cardboard per year. This material could be baled and sold to markets.
5. CFL tubes were found throughout the audit across dumpsters. Facility staff should be reminded of the importance of diverting these materials, which are considered hazardous.

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Table 5 - Waste Output and Source Allocation by Weight

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
	Dumpster location	Waste output by weight (kg/week)	Percent weight	AHT	Zero Waste Stations	Offices	Kitchen	Café	Daycare	Washrooms	Trades	Stores	Stand Alone	Science labs
R1	AHT	141.2	2.9%	2.8%	-	0.05%	-	-	-	0.05%	-	-	-	-
R2	Arts & Education	81.2	1.7%	-	0.7%	0.5%	-	-	-	0.5%	-	-	-	-
R3	CAC	580.0	11.9%	-	2.9%	0.4%	7.8%	0.1%	-	0.8%	-	-	-	-
R4	CA	1123.0	23.0%	-	16.1%	0.8%	4.5%	-	-	0.8%	-	-	0.03%	-
R5	Daycare	332.4	6.8%	-	2.25%	0.7%	-	1.5%	2.25%	0.06%	-	-	0.03%	-
R6	Old Main	560.2	11.4%	-	8.1%	0.5%	-	1.8%	-	1.0%	-	-	0.02%	-
R7	SC/GYM	588.4	12.0%	-	9.2%	0.5%	-	1.5%	-	0.3%	-	-	-	0.5%
R8	Trades 1	220.7	4.5%	-	2.8%	0.3%	-	1.4%	-	0.05%	-	-	-	-
R9	Trades 2	579.9	11.9%	-	0.3%	-	-	-	-	-	11.6%	-	-	-
R10	Stores	324.5	6.6%	-	1.1%	2.4%	-	-	-	0.2%	-	2.9%	-	-
R11	Trades Sawdust	361.3	7.4%		-	-		-	-	-	7.4%	-	-	-
R12	**Total**	**4892.8**	**100.0%**	**2.8%**	**43.45%**	**6.9%**	**12.3%**	**6.3%**	**2.25%**	**3.7%**	**19.0%**	**2.9%**	**14.6%**	**0.5%**
R13	**Waste Output By Source (kg/week)**			**137.0**	**2125.9**	**337.6**	**601.8**	**308.24**	**110.1**	**179.1**	**929.6**	**141.89**	**3.9**	**24.5**

Table 6 - Waste Output and Source Allocation By Volume

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
	Dumpster location	Waste output by volume (cu.y/ week)	Percent volume	AHT	Zero Waste Stations	Offices	Kitchen	Café	Daycare	Washrooms	Trades	Stores	Stand Alone	Science labs
R1	AHT	0.5	0.5%	0.4%	-	0.1%	-	-	-	0.1%	-	-	-	-
R2	Arts & Education	2.2	1.9%	-	1.7%	0.1%	-	-	-	0.1%	-	-	-	-
R3	CAC	15.4	13.8%	-	3.5%	0.8%	7.9%	-	-	1.6%	-	-	-	-
R4	CA	25.3	22.8%	-	16.7%	1.9%	3.4%	-	-	0.8%	-	-	0.0%	-
R5	Daycare	7.5	6.8%	-	2.3%	0.8%	-	1.6%	2.0%	0.1%	-	-	0.0%	-
R6	Old Main	19.5	17.6%	-	12.2%	2.1%	-	2.1%	-	1.2%	-	-	0.0%	-
R7	SC/GYM	11.3	10.2%	-	7.6%	0.5%	-	1.2%	-	0.4%	-	-	-	0.5%
R8	Trades 1	12.2	11.0%	-	7.8%	1.0%	-	1.1%	-	1.1%	-	-	-	-
R9	Trades 2	11.1	9.9%	-	-	-	-	-	-	-	9.9%	-	-	-
R10	Trades Sawdust	2.3	2.0%	-	-	-	-	-	-	-	2.0%	-	-	-
R11	Stores	4.0	3.6%	-	0.4%	1.0%	-	-	-	0.2%	-	2.0%	-	-
R12	**Total**	**111.1**	**100%**	**0.4%**	**52.2%**	**8.2%**	**11.3%**	**6.0%**	**2.0%**	**5.5%**	**11.9%**	**2.0%**	**0.1%**	**0.5%**
R13	**Waste Output By Source (cu.y/ week)**			**0.4**	**58.0**	**9.1**	**12.6**	**6.7**	**2.2**	**6.1**	**13.2**	**2.2**	**0.1**	**0.6**

Appendix B - Material Group Classification

Material	Expanded Material Group	Material Group	Material Details
1.1. Paper	Paper	Mixed Recycling	(copy paper, envelopes, post-its, box board, newspaper, magazines, flyers, books, kraft paper)
1.2 Cardboard	Paper	Cardboard	(cardboard)
1.3. Coffee cups	Coffee Cups	Mixed Recycling	(not lids)
1.5. Other paper containers	Paper	Mixed Recycling	(soup bowls, microwave bowls, milk cartons)
2.1. Plastic packaging	Plastic	Mixed Recycling	(plastic containers and lids not including to-go from on-campus containers)
2.2. "To-go" plastic food containers	Plastic	Mixed Recycling	(plastic containers from on-campus food vendors)
2.3. Plastic film	Plastic	Other recycling	(shopping bags, polyethelyne film packging)
3.1. Metal food packaging	Metals	Mixed Recycling	(cans, foil, trays)
3.2. Metal products	Metals	Other Recycling	(other ferrous and non-ferrous metals products, but does not include electronic waste)
4.1. Glass food containers	Glass	Other Recycling	(jars and glass food packaging)
5.1 Electronic Waste	E-Waste	Other Recycling	(as defined in the Recycling Regulation)
6.1. Hazardous Waste	Hazardous Waste	Other Recycling	(CFL tubes, paints, solvents, pesticides, flammables, and other hazardous waste)
7.1. Refundable beverage containers	Refundables	Other Recycling	(plastic, glass, metal, aseptic {juice box}, and gable top beverage containers, including non-refundable beverage containers for milk and milk substitutes)
8.2. Food waste - scraps	Food Waste	Compost	(non-edible food scraps)
8.3. Food waste - preventable	Food Waste	Compost	(edible food waste)
8.4. Compostable paper	Compostable Packaging	Landfill	(paper towel and soiled paper from food packaging such as Subway wrappers napkins soiled with food)
8.5. "To-go" paper food containers	Compostable Packaging	Mixed Recycling	(packaging from “to-go” food containers generated on campus)
8.6. Yard waste	Yard Waste	Compost	(plants, soil, leaves, rocks)
8.7. Fats and oils	Fats and Oils	Landfill	(fats and oils)
8.8. Dog and cat feces	Animal feces	Landfill	(dog and cat feces, including kitty litter and bags)

9.1. Reusable	Reusable	Thrift	(items deemed in usable condition such as clothing, office supplies, unused toilet paper rolls, and other usable products not including food)
10.1. Garbage bags	Landfill	Landfill	(clear or black garbage bags)
10.2. Diapers	Landfill	Landfill	(diapers)
10.3. Liquids	Liquids	Liquids	(liquids)
10.4 k-cups	Landfill	Landfill	(kcups)
11.1. Wood	Wood	Other Recycling	(wood, sawdust)
10.5. Remainder / miscellaneous	Landfill	Landfill	(materials not included in any of the above categories, including textiles, wood, rubber, glass products, plastic products, pallet wrap, non-recyclable film plastic, straws, plastic utensils)