

**Waste and Recyclable Materials Report
Q3 2019
Thompson Rivers University
Kamloops, British Columbia**

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Executive Summary

Thompson Rivers University engaged the services of Waste Naught BC to compile and report quarterly updates on waste streams diverted and landfilled as well as associated costs of collection, handling and disposal. This Q3 report presents data from Q1-Q3 for most waste streams.

The table below is a summary of the weights and costs associated with each waste stream based on actual and estimated weights and costs for Q1 - Q3 2019. Total waste stream managed by TRU in the first three quarters was approximately 520,404 kgs, with a cost of \$112,027.18. The costs shown below are only for handling, sorting, hauling and bin rentals, and do not include capital costs, marketing or consulting fees associated with waste management.

	Sum of Weight	Sum of Cost
Q1 - 2019	142,508	\$36,052.00
Garbage	93,314	\$14,633.25
Packaging	17,337	\$14,484.25
Wood & metal	15,046	\$2,444.00
Food waste	14,318	\$4,490.50
Reuse	1705	\$0.00
Batteries, electronics and hazardous	788	\$0.00
Yard waste	0	\$0.00
Q2 - 2019	210,752	\$36,417.88
Garbage	86,339	\$12,216.08
Wood & metal	54,211	\$7,457.50
Yard waste	42,564	\$0.00
Packaging	15,956	\$15,012.80
Food waste	9280	\$1,731.50
Reuse	1485	\$0.00
Batteries, electronics and hazardous	917	\$0.00
Q3 - 2019	167,144	\$45,557.30
Garbage	72,713	\$12,628.84
Yard waste	31,387	\$0.00
Wood & metal	29,338	\$6,239.36
Packaging	22,522	\$15,127.30
Food waste	9412	\$5,561.80
Reuse	1473	\$0.00
Batteries, electronics and hazardous	299	\$0.00
Grand Total	520,404	\$112,027.18
Total Diverted	268,038	Diversion Rate
Total Garbage	252,366	52%

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1 Introduction

Background

Thompson Rivers University (TRU) has recognized the importance of leadership in environmental sustainability since making it a pillar of its Strategic Plan in 2007. Since adopting the strategic goal of becoming the 'University of Choice for Environmental Sustainability', TRU went on to create a department dedicated to improving campus sustainability. Through the TRU Sustainability Office, actions are continuously taken to increase campus sustainability.

In 2014, TRU adopted a goal of becoming a zero waste campus. To accomplish this goal, the Sustainability Office has implemented several waste reduction and diversion initiatives, such as diverting waste to composting, recycling and energy conversion. TRU collects and diverts a growing number of materials, and counts almost 20 separate waste streams.

A waste audit performed in March 2018 showed that TRU diverted roughly 60% of waste generated on campus through recycling and composting programs, a slight reduction over the 2017 audit diversion rate of 64%. In 2018 approximately 643 tonnes of waste was generated, an increase from 519 tonnes in 2017.

Deliverables

The objectives of the audit are to provide TRU with the following information:

- Types and quantities of waste generated on campus
- Financial costs associated with waste handling, collection, and disposal

Methodology and Assumptions

The data included in this report is based on actual records provided by TRU and its contractors as well as estimates based on limited actual records and/or historic estimations. Further details on data collection methodology are provided in the sections below for each waste stream.

2 Types of Waste

TRU diverts many types of waste generated on campus through reuse, recycling, composting and conversion to energy. The following section reports the quarterly diversion weights for 2019, and discusses the methods of diverting the many waste streams generated on campus.

Reuse

TRU has two reuse streams: textbooks and textiles.

Textbooks

Textbooks are collected from the on-campus community, and the general public. A textbook collection bin is located outside the campus bookstore. Ancillary Services collects the books from the bins on an as-needed basis and donates them to a program called Textbooks For Change. Approximately five pallets of books are donated through the program on an annual basis. For more information about the program, visit Textbooks For Change website [here](#).

Below are the quarterly weights for textbook diversion. There is no cost to divert this waste stream. Weights for Q1 and Q2 are estimated based on an assumed weight per pallet of 1092 kg. Q3 weights were reported based on an average weight per box of 45 lbs, with 72 boxes diverted on July 22.

Table 1 - Textbooks

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Textbooks	Jan-Mar 19	1356	\$-
Q2-19	Textbooks	Apr-Jun 19	1356	\$-
Q3-19	Textbooks	Jul-Sep 19	1473	\$-
YTD Total	Textbooks		4185	

Textiles and Reusable Items

In 2018, TRU partnered with Diabetes Canada to place two textile reuse and recycling bins on campus to help divert the usable items that make their way into the campus waste stream, such as clothing, shoes, books, office supplies, and other durable goods. The two outdoor bins are placed outside the Daycare and the Old Main building, and the two indoor bins are located in Student Street and on the first floor of the CAC.

Below are the monthly and quarterly weights for textile diversion. Q2 figures previously reported 710 kg, however it was discovered that those figures included the textile bin weights from campus housing, which have been removed from this report. Due to campus construction projects, the textiles bins were inaccessible and no weights reported for Q3. There is no cost to divert this waste stream. Weights are provided by Diabetes Canada on a monthly basis.

Table 2 - Textiles

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Textiles	Jan-Mar 19	340	\$-
Q2-19	Textiles	Apr-Jun 19	120	\$-
Q3-19	Textiles	Jul-Sep 19	0	\$-
YTD Total	Textiles		460	\$-

Food Waste Diversion

TRU diverts organic waste into several channels for composting or animal feed. The Culinary Arts and Meat Processing Departments send their scraps to local farmers. Yard waste from TRU Grounds is sent to the Cinnamon Ridge Composting Facility. Food scraps and coffee grounds collected through zero waste stations and kitchens by TRU janitors are processed into compost in one of the three in-vessel onsite composters.

Feed Animals - Culinary Arts

The Culinary Arts (CA) program has historically sent their pre-consumer food scraps to local farmers for animal feed. In January 2019, the farmer collecting CA food scraps started using it to feed black soldier fly larvae, which are used as feedstock for ducks that are sold back to the

CA program and local restaurants. The farmer did not initially weigh the material, but provided estimates based on the number of pickups and bins per pickup, which was in line with historic data; he has since started keeping more accurate weights of all pick-ups. The CA program runs from September until April.

Table 3 below shows aggregated total Food Waste for Q1 and Q2, which includes the weight of food scraps sent from the Culinary Arts Department to feed farm animals. No data for this waste stream was provided for the Q3 report.

Feed Animals - Meat Trimmings and Bones

The Retail Meat Processing Program (RMP) began sending their meat trimmings and bones to a local dog breeder in 2016. The trimmings are stored in their fridge and collected on a weekly basis on Friday. The RMP program does not currently track data but they estimated approximately 273 kg per week.

Data for meat trimmings was aggregated into a total Food Waste for Q1 and Q2. Meat trimmings for Q3 was 1417 kg, The program did not operate from Jul-Aug.

Compost – From Onsite Zero Waste Stations and Kitchens

TRU implemented onsite composting in 2014 with the purchase of a Jora 5100 in-vessel compost machine. In 2016, TRU expanded onsite-composting capacity with the purchase of a second Jora 5100, which began operating in 2017. Onsite composting further expanded in 2017 with the acquisition of another in-vessel composter, The Rocket, which was installed outside the Campus Activity Centre. In February 2019, the two Joras were moved to a new location and have not been operating since. In April 2019, the farmer collecting food scraps from the CA also began collecting food scraps from the CAC.

In Q3, coffee grounds were also send to the farmer, with a combined total weight of 7995 kg of food scraps and coffee grounds. Costs for collection by janitorial staff and the farmer are shown in Table 3 below.

Compost - Coffee Grounds

Historically, a TRU faculty member collected coffee grounds on a volunteer basis from the campus cafes to amend the soil on his farm. In January 2019, janitorial staff took over the operation of coffee ground collection from the campus cafes. Contractors provided weights for this waste stream for April, May and June, however January - March weights were estimated using historic data.

Data for coffee grounds is aggregated into total Food Waste for Q1, Q2 and Q3 below.

Table 3 - Food waste

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Food waste	Jan-Mar 19	13614	\$4490.50
Q2-19	Food waste	Apr-Jun 19	8741	\$1731.50
Q3-19	Food waste	Jul-Sep 19	9412	\$5561.80
YTD Total	Food waste		31767	\$11836.80

Compost - Yard Waste

The largest source of organic waste comes from maintaining the campus grounds. The head of the TRU Grounds crew estimated 500 loads of yard waste brought to the Bunker Road Yard Waste site over a year. Each load is estimated at 227 kilograms, based on an average estimated by the head of the grounds based on a series of loads weighed on a nearby scale.

Monthly data was estimated by dividing the total annual weight for yard waste based on 500 loads by eight months from Apr-Nov. Data is presented in table 4 below for Q1, Q2, and Q3. No cost data was provided.

Table 4 - Yard waste

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Yard waste	Jan-Mar 19	0	\$-
Q2-19	Yard waste	Apr-Jun 19	42564	\$-
Q3-19	Yard waste	Jul-Sep 19	31387	\$-
YTD Total	Yard waste		73951	\$-

Recycling

TRU diverts a number of waste materials through recycling. Trades and Technology Department and Facilities Services generate scrap metal. Scrap wood is also heavily recycled, with collection bins at the Warehouse and the Trades and Technology department. Mixed recycling and refundable beverage containers are collected across campus in zero waste stations. Cardboard is mostly generated by staff and recycled in bins outside, and also collected in carts. There are also bins to collect batteries, Styrofoam, and plastic bags in all buildings, as well as electronics recycling bins in two buildings (Old Main and CAC).

Recycling - Scrap Metal Trades & Facilities Services

Scrap metal is collected in the trades and facilities areas. The Trades and Technology Department has had a scrap metal recycling program through Richmond Steel for many years and uses several bins to sort different types of metals, for which they are compensated. In 2017, the Sustainability Office sourced a scrap metal bin for Facilities Services from Norewest Concrete, which charges bin rental and hauling fees. The bin is hauled to Mission Flats Landfill and put in the scrap metal pile.

Cost and weight data presented in the table 6 below for Q1-Q3. Revenue from trades scrap metal in Q3 was \$1625.70.

Table 5 - Metal recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Metal recycling	Jan-Mar 19	11271	\$940.00
Q2-19	Metal recycling	Apr-Jun 19	26420	\$1420.00
Q3-19	Metal recycling	Jul-Sep 19	18838	\$875.00
YTD Total	Metal recycling		56529	\$3,235.00

Recycling - Mixed Recycling

Mixed (co-mingled) recycling includes paper and packaging materials (plastic, paper, metal). Mixed recycling is collected across campus from zero waste stations and directly placed into recycling carts from offices, cafes, kitchens, and occasionally from events. Janitors are responsible for placing mixed recycling from the zero waste stations into 245-litre recycling carts distributed across campus. Carts are placed at the curb on a weekly basis by staff and contractors. Mixed recycling is also collected in a 6-yard bin outside the Campus Activity Centre (previously only collecting cardboard).

In January 2018, the world recycling markets were highly impacted by what is known as China's National Sword, a policy by the Chinese government which limited and then later stopped imports of foreign waste. This disruption has caused a great shift towards prioritizing reduced contamination in mixed recycling around the world. TRU's mixed recycling waste stream, specifically material collected from zero waste stations has shown high contamination rates, upwards of 50%. As a result, in December 2018 TRU employed a contractor to sort zero waste station material prior to collection.

Data presented in the table 8 was provided by TRU and based on measurements taken by contract staff for sorted recycling carts. Weights were adjusted to account for the number of carts tipped not accounted for by the sorting contractor based on records provided by the hauler for Q1 and Q2.

Q3 weights were provided by contract staff and include total sorted recycling set out for collection. Cost data presented includes both sorting contract and collection costs for the City and Waste Connections. There was a significant increase in the amount of recycling in Q3 due to improved sorting.

Data for the mixed recycling bin behind the CAC was estimated by Waste Connections and includes a significant amount of cardboard.

Table 6 - Comingle recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Comingle recycling	Jan-Mar 19	7764	\$13,279.40
Q2-19	Comingle recycling	Apr-Jun 19	7199	\$13,279.40
Q3-19	Comingle recycling	Jul-Sep 19	14552	\$13,317.90
YTD Total	Comingle recycling		29515	\$39,876.70

Recycling - Cardboard

Cardboard is collected in four and six yard bins outside five buildings on campus. Cardboard is placed in bins by staff and contractors. Cardboard was measured over a one-week period by the hauler. Monthly estimates are estimated by multiplying weekly measured data by four weeks.

Cost data for cardboard collection was in utility statement transactions provided by City of Kamloops staff.

The table below shows a summary of cost and estimated weights for cardboard diversion.

Table 7 - Cardboard recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Cardboard recycling	Jan-Mar 19	7872	\$932.85
Q2-19	Cardboard recycling	Apr-Jun 19	7056	\$1557.40
Q3-19	Cardboard recycling	Jul-Sep 19	6240	\$1557.40
YTD Total	Cardboard recycling		21188	\$4047.65

Recycling - Refund Beverage Containers

A special autism program class from Kamloops School of the Arts is responsible for collecting and recycling refundable beverage containers as part of their class curriculum. The students and staff collect beverage containers from zero waste stations, twice per week. In 2017 the group began collecting from Ancillary Services for event waste as well.

Data is not collected for this waste stream. Estimates presented in Table 9 below for Q1-Q3 are based on historic data.

Table 8 - Refundable beverage containers

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Refund containers	Jan-Mar 19	1644	\$-
Q2-19	Refund containers	Apr-Jun 19	1644	\$-
Q3-19	Refund containers	Jul-Sep 19	1644	\$-
YTD Total	Refund containers		4932	\$-

Recycling - Plastic Bags & Overwrap

In September 2017, TRU removed the bins for plastic bags from the other bins of the zero waste stations. This was done due to heavy contamination of the plastic bag bins. Once done, the contamination of these bins has improved to almost zero percent, according to TRU staff. TRU janitors collect the plastic bags monthly or as needed and brought to the Warehouse where it is stored until sufficient volume is amassed, at which time a truck from the Lorne Street Bottle Depot collects it for transport to the Lower Mainland for final recycling. Data for the plastic bags waste stream is based on an average weight per bag of 3 kg, with one bag of bags recycled each month. Costs for plastic bag are from collection by the janitors.

Table 9 - Plastic bag recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Plastic bag recycling	Jan-Mar 19	9	\$136.00

Q2-19	Plastic bag recycling	Apr-Jun 19	9	\$88.00
Q3-19	Plastic bag recycling	Jul-Sep 19	9	\$126.00
YTD Total	Plastic bag recycling		27	\$350.00

Recycling - Styrofoam

TRU began recycling Styrofoam in 2016. It's collected in bright yellow totes in key buildings around campus and then the janitorial or Facilities staff brings it to the Warehouse where its final life mirrors that of Styrofoam (mentioned above). Data for Styrofoam recycling is based on an average weight per bag of 1 kg, with an estimated 16 bags recycled per month. Costs for Styrofoam are from collection by the janitors.

Table 10 - Styrofoam recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Styrofoam recycling	Jan-Mar 19	48	\$136.00
Q2-19	Styrofoam recycling	Apr-Jun 19	48	\$88.00
Q3-19	Styrofoam recycling	Jul-Sep 19	77	\$126.00
YTD Total	Styrofoam recycling		173	\$350.00

Recycling - Batteries

Batteries are collected in 13 bins across all major buildings on campus. Batteries are emptied on a monthly (or so) basis by Facilities Services. Call2Recycle collects the batteries and sends reports with details of the types of batteries and total weights. The following table details the weights for collection of batteries, there is no cost for collection.

Table 11 - Battery recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Battery recycling	Jan-Mar 19	0	\$-
Q2-19	Battery recycling	Apr-Jun 19	32	\$-
Q3-19	Battery recycling	Jul-Sep 19	71	\$-
YTD Total	Battery recycling		103	\$-

Recycling - Electronics

In 2017, TRU partnered with the Electronics Recycling Association (ERA) to recycle the e-waste from campus. ERA set up two collection bins, one in the Campus Activity Centre and the other in the Old Main building. ERA also picks up TRU's e-waste that is collected by Facilities Services and brought to the Warehouse for storage until sufficient volume requires a ERA truck to

collect it. ERA provides certificates with descriptions and weights for material recycled through the program.

Data presented in the table below represents weights provided by the ERA. There is no cost for this waste stream.

Table 12 - Electronics recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Electronic recycling	Jan-Mar 19	601	\$-
Q2-19	Electronic recycling	Apr-Jun 19	405	\$-
Q3-19	Electronic recycling	Jul-Sep 19	228	\$-
YTD Total	Electronic recycling		1234	\$-

Converted to Energy

Several waste streams are converted to energy or incinerated, which includes wood waste and hazardous waste.

Wood Waste

In September 2016, the Sustainability Office placed a wood-recycling bin outside Facilities Services building, increasing the weekly recycling rate for diversion in 2017. In 2018, TRU further expanded the wood-collection program, sourcing woodbins for the Theatre and Fines Arts programs to fill at three or four times throughout the year (after each production performance).

In September 2019, a wood waste was placed at the trades building, at which time one of the garbage dumpsters was removed. The hauler, Norewest Concrete, takes the wood to Mission Flats Landfill where it is chipped and sent to an electricity co-generation plants in B.C. The hauler provides cost and weight data for wood waste, as presented in the table below.

Table 13 - Wood waste diversion

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Wood recycling	Jan-Mar 19	3775	\$1504.00
Q2-19	Wood recycling	Apr-Jun 19	27791	\$6037.50
Q3-19	Wood recycling	Jul-Sep 19	10500	\$5364.36
YTD Total	Wood recycling		42066	\$12,905.86

Cooking Oil

The Culinary Arts building and the Campus Activity Centre kitchens collect used cooking oil. The oil is collected by McLeod’s Byproducts in Armstrong and is used to make animal feed. The hauler provided weights for each collection. There are no costs for this waste stream. No cooking oil was collected in Q3.

Table 14 - Cooking oil diversion

Period	Item	Month/Year	Weight (kg)	Cost (\$)
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Q1-19	Cooking oil	Jan-Mar 19	704	\$-
Q2-19	Cooking oil	Apr-Jun 19	539	\$-
Q3-19	Cooking oil	Jul-Sep 19	0	\$-
YTD Total	Cooking oil		1234	\$-

Hazardous Waste

The TRU Safety Office manages the hazardous waste generated through various departments (trades, campus medical centre, and labs). Data provided in this report was provided on hazardous waste manifests. The liquids from the manifests recorded in volumes were converted to weights on a one to one ratio of litres to kilograms. No cooking oil was collected in Q3. Cost data is not provided.

Table 15 - Hazardous waste diversion

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Hazardous waste	Jan-Mar 19	187	\$-
Q2-19	Hazardous waste	Apr-Jun 19	480	\$-
Q3-19	Hazardous waste	Jul-Sep 19	0	\$-
YTD Total	Hazardous waste		667	\$-

Landfill

Landfill waste consists of material not diverted from the waste stream. The City of Kamloops and Waste Connections collects landfill waste from bins across campus on a daily basis. Data for the weights of city collection was measured over a one-week period. Costs were provided with utility statement reports.

Waste Connections collects landfill waste in one bin located at the CAC. Weights for this bin are estimated based on a volume to weight conversion factor of 161 kg/cu.y. In Q3, a wood bin hauled by Noremac was contaminated and therefore charged the mixed DLC rate and had to be landfilled.

Table 16 - Landfilled

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Landfill - City	Jan-Mar 19	80418	\$12,285.21
Q1-19	Landfill - Waste Connections	Jan-Mar 19	10143	\$2,348.04
Q2-19	Landfill - City	Apr-Jun 19	73443	\$9,868.04
Q2-19	Landfill - Waste Connections	Apr-Jun 19	10143	\$2,348.04
Q3-19	Landfill - City	Jul-Sep 19	62040	\$9,942.30
Q3-19	Landfill - Waste Connections	Jul-Sep 19	10143	\$2,386.54
Q3-19	Landfill - DLC (wood bin)	Jul-Sep 19	530	\$300.00
YTD	Landfill		252366	\$39,478.17

3 Recommendations

While the scope of this report was only to summarize and report data for waste streams on campus, staff requested some basic recommendations to help guide future initiatives. The following recommendations are from previous waste audit reports.

Source /target audience	Policy	Outreach	Infrastructure
Zero waste stations / students		<ul style="list-style-type: none"> - Waste station ambassadors at events and in classes - Educate international students about waste management in BC/ Kamloops/ TRU 	<ul style="list-style-type: none"> - 3D signage in each building
Trades / trades administration		<ul style="list-style-type: none"> - Why source separating DLC waste matters - Promote/ encourage lessons in deconstruction 	<ul style="list-style-type: none"> - Investigate diversion of sawdust bin
Offices / staff and administration	<ul style="list-style-type: none"> - ‘Kick the can’ - staff are responsible for taking waste to central collection 	<ul style="list-style-type: none"> - ‘What goes where’ - short video clips or presentations to staff and administration 	<ul style="list-style-type: none"> - Centralized zero waste stations in offices - Remove garbage bins from desks and provide recycling bins as required
Kitchen & Café / Aramark	<ul style="list-style-type: none"> - Include language in new contracts for waste diversion targets - Create incentives or penalties for target thresholds 	<ul style="list-style-type: none"> - Training contract staff on ‘what goes where’ - Presentations to contract staff (staff meetings) on “what goes where and why” - Encourage Scratch Café to become a Zero Waste Kitchen 	<ul style="list-style-type: none"> - Engage and support contract staff to set up internal waste diversion systems - Student food bank
Stores / Facility staff and administration		<ul style="list-style-type: none"> - Why waste matters presentation to staff - Host repair cafes in partnership with local repair café group 	