UNIVERSITY OF ALBERTA

Zero Waste Plan

2022–2032

Table of Contents

Executive Summary

The University of Alberta Zero Waste Plan sets out goals, targets, and actions that will move the University of Alberta campuses toward a zero waste vision. In the context of this plan, Zero Waste is being adopted both as a guiding principle and as an aspirational goal, where conservation of all resources by means of responsible production, consumptions, reuse, and recovery of products, packaging, and materials will lead to zero waste being produced in select University of Alberta campuses. This Zero Waste Plan focuses on our four main campuses which include North Campus, South Campus, Campus Saint-Jean, and Augustana Campus.

Recycling was first introduced at the University of Alberta almost fifty years ago with the establishment of a paper and cardboard recycling program and in 2018, the University of Alberta diverted just over 1,000 tonnes of recyclables and organics from landfill. Continuing today with processing our organics in the City of Edmonton's High Solids Anaerobic Digestion Facility (HSADF), the University of Alberta has maintained a position ahead of the curve by being proactive when it comes to dealing with the diversion of our institutional solid waste.

One important accomplishment of note for the University of Alberta was the recycling program redesign from 2013-2015, where the six-stream recycling system (Paper/Cardboard, Plastics, Glass/Light Metals, Beverage Containers, Organics, Landfill) was condensed into a new four stream system (Mixed Paper, Recyclables, Organics, Landfill) and rebranded as Zero Waste stations.

The University of Alberta has set a target to achieve a 90% waste diversion. This target will be achieved through the continued enhancement of the existing recycling and composting programs and with the introduction of new policies and initiatives over the next ten years. To date, the University of Alberta has reached halfway over the set target goal of 90% diveration. As of March 2021, a diversion rate of 48.4% was achieved. This was accomplished through the implementation of the Zero Waste program in 50 of the university's buildings that included all of the food services buildings, most labs, and a number of traditional lecture style buildings. With the implementation of the Zero Waste program into all food service buildings, the University of Alberta was able to capture an approximated 200 tonnes of organics annually, of which almost 35% was landfill-bound.

The University of Alberta's Zero Waste program sets us ahead of the ICI sector, but we have work to do to reduce our overall waste generation rates and achieve a fully integrated waste diversion and organics collection program. To achieve this, the University of Alberta has identified gaps in the existing Zero Waste program and set out goals and strategies in this Zero Waste Plan that focus on reducing waste and improving waste handling processes, outline how we will document our progress going forward, and help the University of Alberta to continue being a resilient leader by staying ahead of the curve on the road to zero waste.

The overarching goals of this plan are outlined below:

- Elevate awareness of the university's waste diversion goal and engage the campus community in the ambition to become a Zero Waste campus.
- Increase capture rate of organics to at least 50%
- Increase diversion rate to 90%
- Reduce total waste generated per year to 1950 tonnes (50% reduction from 2005 baseline)
- Reduce total waste generated per year to 46 kg per weighted campus user
- Increase diversion of construction, demolition, and renovation (CDR) waste to 90%
- Obtain BOMA BEST certification for all campus buildings

As the plan is implemented, the University of Alberta is expected to increase their organic production and to reduce their landfill waste production through bringing more buildings online with the new Zero Waste program in addition to implementing new strategies for waste reduction. The Government of Canada is moving to ban many single use plastics by 2022, and the City of Edmonton's 25 Year Waste Strategy clearly states that the institutional, commercial and industrial (ICI) sector will be expected to divert organics from landfill within the next five years. The University of Alberta's Zero Waste program sets us ahead of the ICI sector and with this Zero Waste Plan in action, the University of Alberta will be on the path to becoming a truly zero waste and sustainable institution. Through the continued efforts, the University of Alberta will continue to be a leader in waste reduction and sustainable community development.

1.0 INTRODUCTION

The Zero Waste Plan is a guiding document for the University of Alberta that addresses a zero waste approach to its waste management. Reducing the amount of waste generated every year is an important step in ensuring the long-term sustainability of our campus, our city, and our planet. The University of Alberta has been taking actions to reduce and divert waste away from landfills for almost fifty years. Beginning in the early 1970s with the establishment of a paper and cardboard recycling program, and continuing today with processing our organics in the City of Edmonton's High Solids Anaerobic Digestion Facility (HSADF), the University of Alberta has maintained a position ahead of the curve by being proactive when it comes to dealing with the diversion of our institutional solid waste.

The Zero Waste Plan will provide an overview of the background, development, and future directions of the University of Alberta's efforts to reduce the amount of waste generated and sent to landfills by our campuses and will ensure that the University of Alberta remains a leader in waste management efforts and sustainability among institutions of higher education.

2.0 SCOPE

This Zero Waste Plan focuses on our four main campuses which include North Campus, South Campus, Campus Saint-Jean, and Augustana Campus. Enterprise Square and the Calgary Centre were excluded from the Zero Waste Plan because they are not under the main waste collection contract with the rest of the campuses and have different waste diversion programs in place.

The Zero Waste Plan will cover all buildings and areas operated by the portfolio of the Vice President, Facilities & Operations (F&O) and includes the following departments:

- Asset Management and Operations
- Campus Services
- Integrated Planning and Partnerships
- Support and Recreation Services
- Utilities

3.0 BACKGROUND

The University of Alberta is a globally recognized leader in post-secondary education and research, and a leader in sustainability. It was established in Edmonton in 1908 and has expanded over time to comprise four campuses in Edmonton (North, South, Campus Saint-Jean, and Enterprise Square), one campus in Camrose (Augustana), and a centre in Calgary. The University of Alberta develops strategies to conserve resources, decrease the production of waste, minimize ecological footprints, decrease greenhouse gas emissions, and build a culture of sustainability at the institution and in the greater community of which it is a part. The University of Alberta has demonstrated its commitment to sustainability and has made progress in recent years to advance a broad campus sustainability initiative.

We demonstrate our achievement and commitment to continuous improvement by participating in several rating, ranking and certification programs related to sustainable operations and research:

- We are **STARS Gold**
- We are ranked **in the top 100 globally** in our inaugural submission to the Times Higher Education Impact Rankings for our work to advance the UN Sustainable Development Goals
- We have 33 **buildings certified** through the BOMA BEST program for green building operations and maintenance, and 18 buildings certified using LEED or Green Globes for green design and construction
- We participate annually in the **APPA Key Facilities Metrics Survey**
- We participate in the City of Edmonton **Building Energy Benchmarking** program and **Corporate Climate Leaders** program
- We are one of **Canada's Greenest Employers**

F&O is committed to taking a Zero Waste approach to reduce the amount of waste created and disposed of at this institution. By reducing our overall waste footprint, the University of Alberta:

- reduces its greenhouse gas emissions
- reduces the demand on virgin materials to produce new products
- avoids contributing to other harmful environmental of waste on our air, water, and land
- improves our social impact

3.1 Institutional Strategic Context

There are several important guiding documents that include sustainability and/or highlight the importance of taking a zero waste approach at the university.

For the Public Good	Our institutional strategic plan establishes five overarching pillars, one of which is to "Sustain our people, our work, and the environment by attracting and stewarding the resources we need to deliver excellence to the benefit of all Albertans." **Objective 20:** Continue to build and support an integrated approach to social, economic, and environmental sustainability that incorporates teaching and learning, research, outreach, capacity building, and the operations that support them. *Strategy II:* Embed social, economic, and environmental sustainability into the development and care of the university's natural and built environments.
Integrated Asset Management Strategy (IAMS)	The Zero Waste program supports achieving social, economic, and environmental sustainability by 'reducing our ecological footprint' a principle from the University of Alberta **Integrated Asset Management Strategy (IAMS, 2019-2035)**. IAMS is a guide to ensure all aspects of managing the physical assets of the university are considered and was approved by the U of A Board of Governors in May 2019.
F&O Mission, Vision, Values, and Behaviours (MVVB)	Zero Waste supports **the F&O mission** to support the University of Alberta's mission through safe, well-maintained, sustainable and inviting spaces, and by providing crucial services for the university community; and vision to drive organizational excellence in all we do, building stronger foundations for continued success at the University of Alberta.
*** The Sustainability Plan and GHG Emissions Reduction Plan** and their targets will be superseded by this Zero Waste Plan and the development of a Climate Action Strategy for the institution in 2021-22. They are provided here as relevant historical planning context.	
Sustainability Plan 2016-2020 *	**Goal** Divert 90% of waste from landfill and to continue reducing waste per campus user. **Strategies** 1. Increase source-separation and collection of organics to 1500 tonnes per year by 2017. 2. Introduce "Zero Waste" collection of mixed paper, other recyclables, organics, and landfill waste across university facilities. 3. Elevate awareness of the university's waste diversion goal and engage the campus community in ambition to become a "Zero Waste" campus. 4. Assess high-impact opportunities for reducing packaging waste for lab supplies and equipment. 5. Assess high-impact opportunities for reducing paper consumption and increasing the purchase of recycled-content paper. 6. Explore opportunities to reduce the chemical waste footprint of teaching and research activities.

	7. Increase diversion of CDR waste. 8. Expand the Reusable Dish Program to include more food vendors across North Campus. 9. Work with food vendors to eliminate polystyrene food service ware and replace it with recyclable or compostable alternatives. 10. Explore opportunities to reduce paper towel waste by installing hygienic, energy-efficient hand dryers.
Greenhouse Gas Emissions Reduction Plan 2020 *	The GHG Emissions Reduction Plan states a goal to reduce the university's GHG footprint by 17% from 2005 levels by 2020, with 1500 tonne reduction from diverting waste away from landfill.

3.2 Jurisdictional Review

Jurisdiction or Organization	Key Documents and Initiatives
City of Edmonton	• Longstanding 90% diversion from landfill goal • 25 year Waste Management Strategy approved by Council in 2019 • Edmonton joins surrounding municipalities by implementing a household organics diversion program in 2021 • Industrial, Commercial and Institutional sector will be expected to begin diverting organics in 2022 • Process to restrict and better manage single-use plastics/disposables in Edmonton by January 2021
City of Calgary	• 2025 70% waste diversion target adopted in 2015 • Bylaw banning organics from local landfills enacted in 2017
Recycling Council of Alberta	• Circular Economy and Zero Plastic Waste letter submitted to the Government of Alberta • Extended Producer Responsibility key principles framework submitted to the Government of Alberta
Government of Alberta	• Too Good to Waste Strategy approved in 2007 • Extended Producer Responsibility (EPR) discussion paper released in 2021
Government of Canada	• Canada-wide Strategy for Sustainable Packaging approved by the Canadian Council of Ministers of the Environment on October 29, 2009 • A vision for waste: Canada is a world leader in waste management was adopted by environment ministers in September 2014 • Canada-wide Strategy on Zero Plastic Waste endorsed by environment ministers in 2018 • Aspirational Canada-wide Waste Reduction Goal to reduce waste to 490 kg per capita by 2030, and to 350 kg per person by 2040 endorsed by environment ministers in 2018

	• Canada hosted World Circular Economy Forum 2021 (**WCEF2021**) virtually • Single use plastic ban comes into effect in 2022
United Nations	Sustainable Development Goals (SDGs) 2020-2030 Decade of Action 4 SDGs have direct Zero Waste linkages. • SDG 2 Zero Hunger • SDG 12 Responsible Consumption and Production • SDG 14 Life Below Water • SDG 15 Life on Land

Note: More detailed points from each jurisdiction are available in Appendix A.

3.3 Key Concepts in Zero Waste

3.3.1 Definition of 'Zero Waste'

The following definition of Zero Waste is widely used and accepted and has guided the development of the University of Alberta's ambitious 90% waste diversion goal.

> "Zero Waste: The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health.
>
> Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use.
>
> Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.
>
> Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health."
>
> Zero Waste International Alliance, 2018

3.3.2 Zero Waste Hierarchy

The concept of Zero Waste is linked to the Zero Waste Hierarchy which is defined as "a progression of policies and strategies to support the Zero Waste system, from highest and best to lowest use of materials."[2] It illustrates the activities we should prioritize when managing waste from most to least environmentally preferable while providing more depth to the internationally recognized 3Rs (Reduce, Reuse, Recycle). Rethink/Redesign are included at the top of the hierarchy to encourage policy change before products are even produced, and to ensure product durability and longevity. After Rethink/Redesign come the more familiar steps to reduce waste or the consumption of materials where possible, reuse what we can, and then recycle it with the last resort being landfill or incineration.

Zero Waste Hierarchy of Highest and Best Use 7.0

An increasing number of organizations have established Zero Waste as an ambitious goal, with supporting targets and an emphasis on procurement and design change. Along with the well-documented environmental benefits, pursuing a Zero Waste goal is likely to have financial advantages, for example by reducing landfill charges and discouraging unnecessary purchasing.

For these reasons, universities and colleges have been at the forefront of the Zero Waste movement. Institutions such as University of British Columbia, University of California, Davis, and University of California, Berkeley have specific Zero Waste goals, and have integrated the Zero Waste concept into their waste management programs from the outset. Others, such as Ohio State University and Simon Fraser University, are using the Zero Waste brand combined with concrete targets to incentivize change within their organizations. The University of Alberta too incorporated Zero Waste into its waste management system redesign in 2015.

3.3.3 Circular Economy

Zero Waste is also an integral part of a Circular Economy. A circular economy keeps products and materials circulating within the economy at their highest value for as long as possible, through re-use, recycling, remanufacturing, and delivering products as services. It shifts the paradigm of how we manage resources and moves away from the traditional linear economy, which ends with disposal.

New policies in Canada are beginning to support the circular economy and in 2021, Canada hosted the World Circular Economy Forum (**WCEF2021**), in partnership with Finnish Innovation Fund, Sitra. The economic potential of recovering and re-selling valuable materials represent new business opportunities that can help grow the circular economy.

By integrating the concepts of Zero Waste and Circular Economy, the University of Alberta can inspire greater community involvement, partnerships, innovations and sharing of materials.

3.4 Current University of Alberta Zero Waste System Overview

3.4.1 A history of program adaptation

Recycling was first introduced at the University of Alberta almost fifty years ago and in 2018, the University of Alberta diverted just over 1,000 tonnes of recyclables and organics from landfill.

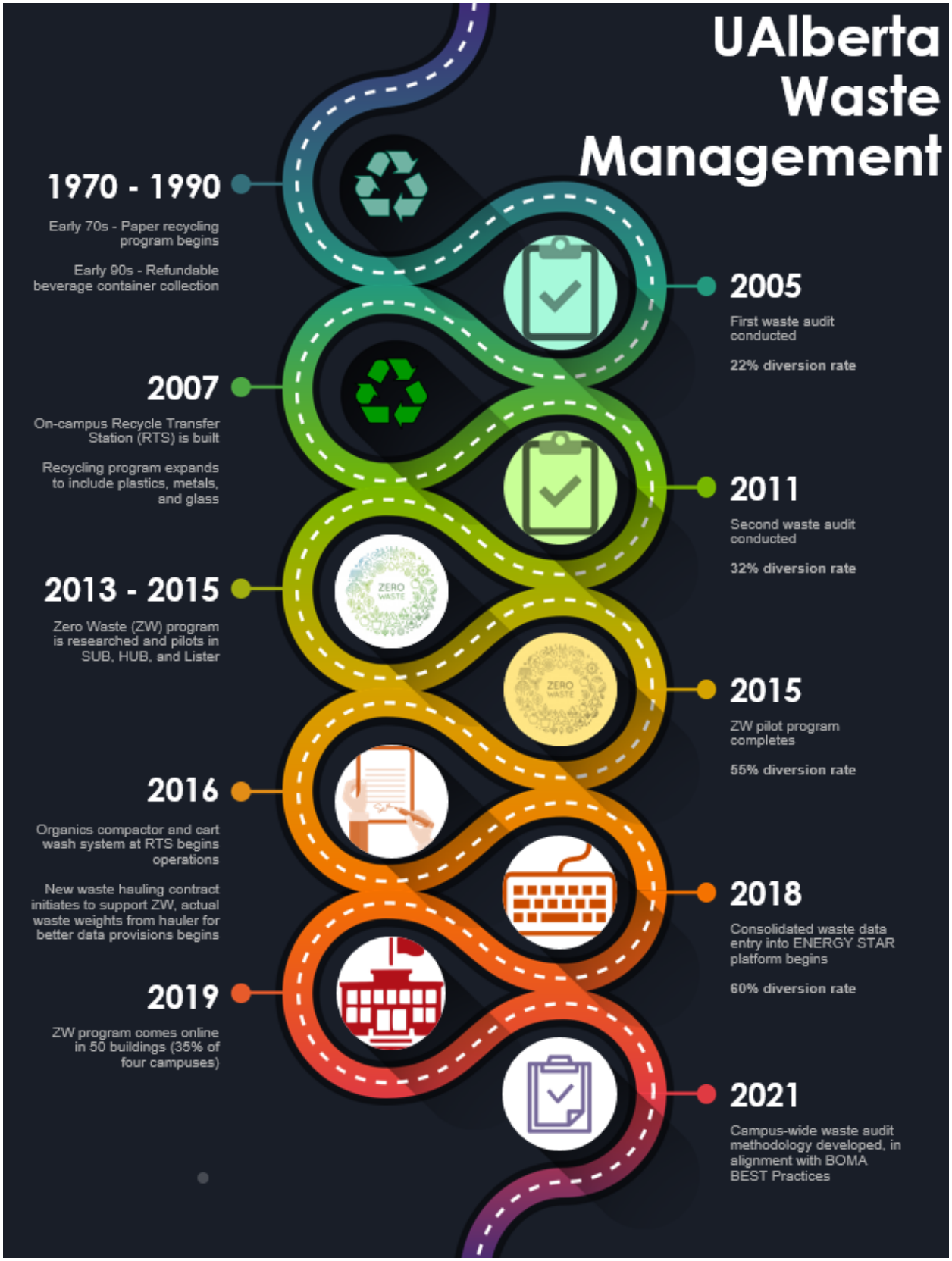
One important accomplishment of note for the University of Alberta was the recycling program redesign from 2013-2015, when the original six-stream recycling system (Paper/Cardboard, Plastics, Glass/Light Metals, Beverage Containers, Organics, Landfill) was condensed into a new four stream system (Mixed Paper, Recyclables, Organics, Landfill) and rebranded as Zero Waste stations. This was effectively the launch of the “Zero Waste” Program as it is now known.

In addition to collecting these standard four material streams, the Zero Waste program also targets several specialized recycling streams that are collected on campus such as:

- Electronics
- Scrap metal
- Fluorescent light tubes
- Dry cell batteries
- Ink and toner cartridges
- Writing instruments
- CDR waste

To oversee the progress of the waste management program, a Waste Diversion Working Group (WDWG) was developed in 2013. The WDWG brings together stakeholders in waste diversion programs across the University of Alberta to collaborate, to provide strategic guidance for the activities of these stakeholder groups, and to help develop a comprehensive waste diversion strategy for the University of Alberta.

The major events depicted below show the continuous improvement of the University of Alberta's Zero Waste program over time.


UAlberta Waste Management
1970 - 1990
Early 70s - Paper recycling program begins
Early 90s - Refundable beverage container collection
2005
First waste audit conducted
22% diversion rate
2007
On-campus Recycle Transfer Station (RTS) is built
Recycling program expands to include plastics, metals, and glass
2011
Second waste audit conducted
32% diversion rate
2013 - 2015
Zero Waste (ZW) program is researched and pilots in SUB, HUB, and Lister
2015
ZW pilot program completes
55% diversion rate
2016
Organics compactor and cart wash system at RTS begins operations
New waste hauling contract initiates to support ZW, actual waste weights from hauler for better data provisions begins
2018
Consolidated waste data entry into ENERGY STAR platform begins
60% diversion rate
2019
ZW program comes online in 50 buildings (35% of four campuses)
2021
Campus-wide waste audit methodology developed, in alignment with BOMA BEST Practices

3.4.2 Measurement and Evaluation

There are two main ways the Zero Waste program is measured and evaluated at the U of A:

1. Waste collections weights and volumes
2. Waste audits

Waste Collection Weights and Volumes

Total waste collection weights are provided by our primary hauling contractor, collated, and tracked using the online platform ENERGY STAR Portfolio Manager. This tracking enables continuous monitoring of total generation rates and diversion rates over time. For certain specialty recycling streams such as light tubes and ballasts, industry standards are used to estimate weights using a number of units or volume collected. This data is used to supplement the waste weights received from our hauler.

Of note, prior to the beginning of the most recent waste hauling contract in 2016, the waste data provided by the hauler was not consistent or comprehensive. Recognizing the importance of data for tracking program performance over time, the RFP team worked to ensure that the current contract stipulates that each front load bin and compactor is weighed at each pick up and RFID tagged for tracking purposes.

Waste Audits

Waste audits are an integral part of the waste management planning and evaluation process at the U of A. The university also receives recognition for its good waste auditing processes through rating and certification programs like STARS and BOMA BEST.

Waste Audits for Planning and Evaluation

The first comprehensive campus waste audit was done in 2005 by a consultant. The recommendations from that audit led to the collection of plastic, glass, light metals, and organics, and led to the construction of the Recycle Transfer Station (RTS) on North Campus near the R.E. Phillips building. Next, a Waste Audit Methodology committee was formed to address future campus waste audits and produce an audit methodology based on best practices from others in the waste management field, and specifically tailored to post-secondary institutions and the University of Alberta. This committee was unique in its make-up because it included F&O as well as a professor from Civil and Environmental Engineering who was also the Executive Director of the Edmonton Waste Management Centre of Excellence (EWMCE). His role was to provide expert oversight and research capacity to the committee. As part of that, one of his research associates put together a comprehensive literature review of large post-secondary institutions across the globe that would help to inform the University of Alberta's work.

Campus as a Living Lab

Waste diversion has also been integrated into the classroom. A professor sitting on the Waste Audit Methodology committee taught a Municipal Solid Waste Management class (EnvE 432 & CivE 628) and as part of the class project for two years, the students participated in waste audits. In 2011, they did a separate audit of one building and provided recommendations for improvement to F&O staff. In 2012, they participated in an organics waste audit and proposed plans for a theoretical organic waste handling facility. They designed both an anaerobic digestion facility and a windrow composting facility and presented their plans to F&O staff, who also acted as judges at a presentation and awards night at the end of the semester. In 2018, the Solid Waste Research Group in the Department of Civil & Environmental Engineering conducted a feasibility study of an on-site small-scale anaerobic digestion facility capable of treating the amount of organics generated at the University of Alberta.

Third-Party Ratings and Certification

Waste audits are recognized as good practice by various third party programs that the university participates in. STARS requires a description of quality control practices and any waste auditing practices that the university conducts as part of the Waste Minimization and Diversion credit. Since 2019 BOMA BEST has required waste audits be conducted as a prerequisite in any building we choose to certify using their program. The BOMA BEST certification program recognizes sustainable building operations and maintenance.

3.4.3 Current Program Status

In 2013, **the University of Alberta contributed to a successful funding application** with the City of Edmonton to construct a high solids anaerobic digestion facility (HSADF) at the **Edmonton Waste Management Centre (EWMC)**. This facility became operational in spring 2021 and the University of Alberta has an agreement to divert our organics to the HSADF. This agreement paved the way for an expanded organics collection program and the university can now benefit from its completion.

As of 2017-18, the University of Alberta had reached a diversion rate of 48%, over halfway to our ambitious 90% diversion goal. This was achieved because of two main factors: first, the Zero Waste program roll-out to all food service buildings was completed by 2015, accounting for approximately 200 tonnes of organics captured, and second, we benefited from additional sorting of our organics at the City of Edmonton Integrated Processing and Transfer Facility (IPTF), accounting for 35% of our otherwise landfill-bound waste. As of spring 2021 the new

Zero Waste station system had been implemented in 50 of the university's buildings (>30% complete).

Due to some unforeseen circumstances beyond the university's control, this diversion rate has suffered slightly in recent years but is on an upward trajectory coming out of the COVID-19 pandemic.

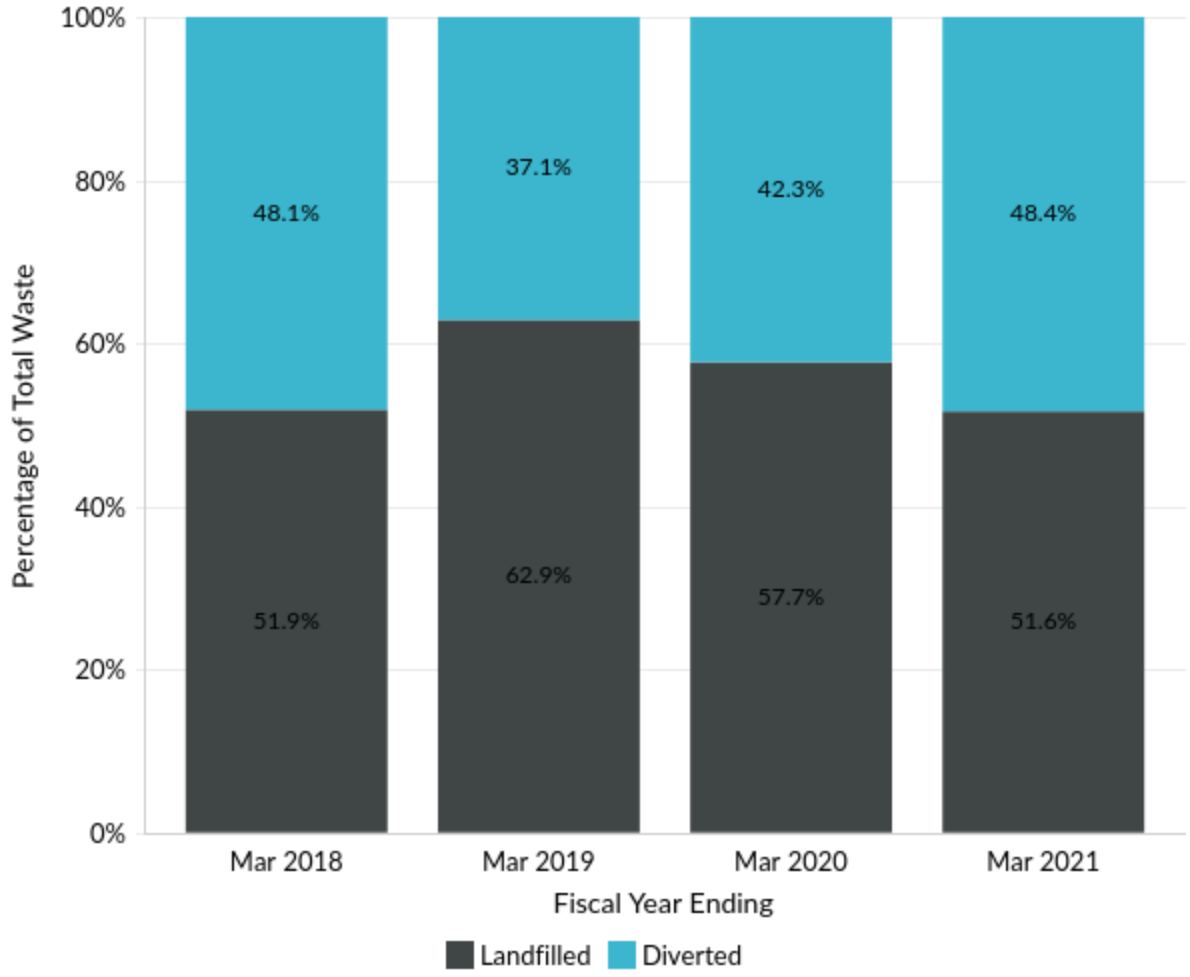


Figure 1. Waste diversion rate over time

Note 1: March 2021 represents the year most impacted by COVID-19
Note 2: University lost access to a local organics processing facility in 2018-19

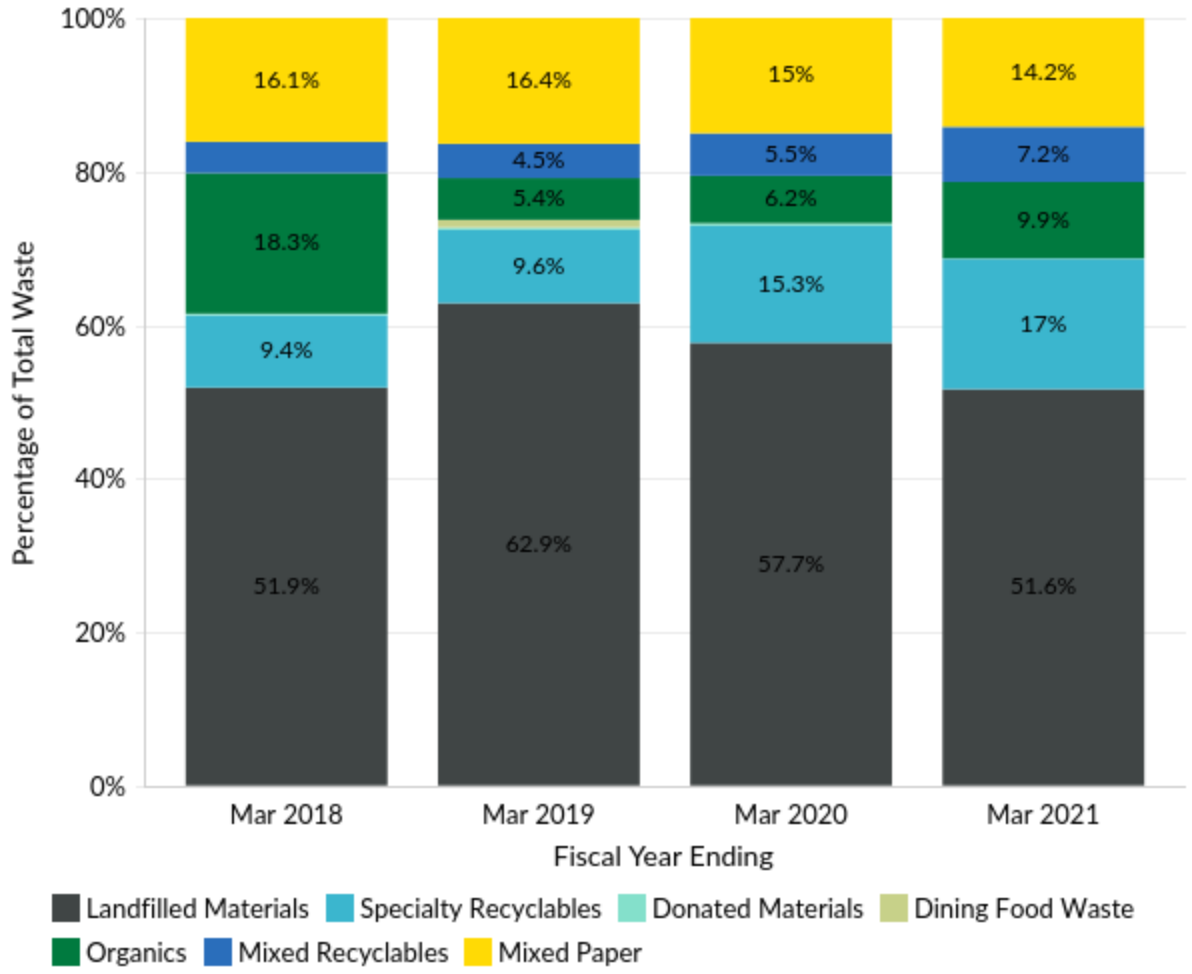


Figure 2. Proportion of each major material stream captured for diversion or sent to landfill as a percentage of the total amount of waste generated

Note 1: March 2021 represents the year most impacted by COVID-19
Note 2: University lost access to a local organics processing facility in 2018-19

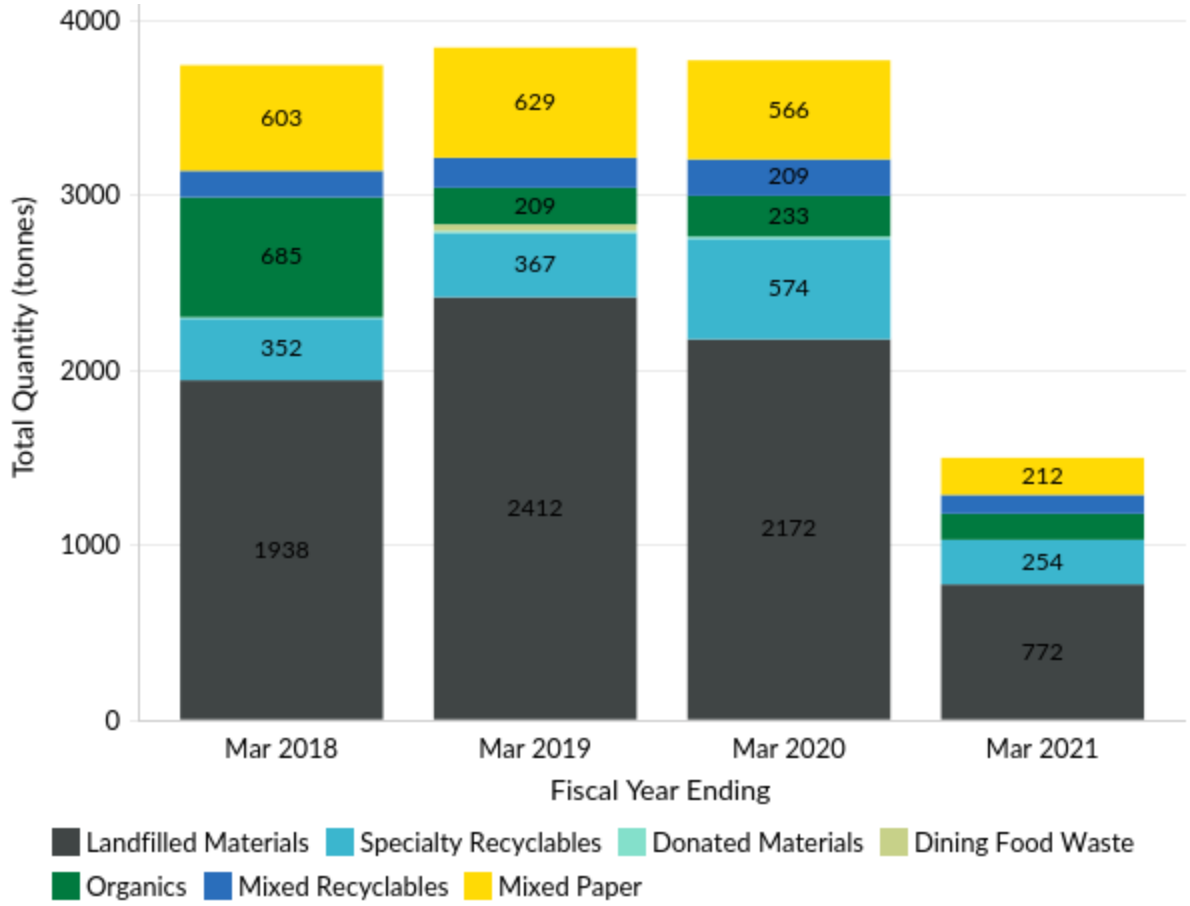


Figure 3. Weight of each major material stream captured for diversion or sent to landfill

Note 1: March 2021 represents the year most impacted by COVID-19
Note 2: University lost access to a local organics processing facility in 2018-19

3.4.4 Where do we go from here?

Over the course of 2021-22, the University of Alberta is undertaking a massive academic restructuring and service excellence transformation with the U of A for Tomorrow initiative. This initiative will see the centralization of many transactional processes at the university, including procurement, finance, and human resources. There are opportunities for more sustainable purchasing and waste reduction through this centralization of services.

The Government of Canada is moving to ban many single use plastics by 2022, and the City of Edmonton's 25 Year Waste Strategy clearly states that the institutional, commercial and industrial (ICI) sector will be expected to divert organics from landfill within the next five years.

Our Zero Waste program sets us ahead of the ICI sector, but we have work to do to reduce our overall waste generation rates and achieve a fully integrated waste diversion and organics collection program.

The goals and strategies outlined here address gaps in the existing Zero Waste program, focus on reducing waste and improving waste handling processes, outline how we will document our progress going forward, and help the University of Alberta to continue being a resilient leader by staying ahead of the curve on the road to Zero Waste.

4.0 ZERO WASTE PLAN FOR THE UNIVERSITY OF ALBERTA

The Zero Waste Plan intends to achieve the following goals and strategies in the short, medium and long term. The Plan identifies the timeframe as follows: short-term (0-2 years); medium-term (2-5 years); and long-term (5+ years).

4.1 Goals and Strategies

Overarching Goals		
Goal	**KPI**	**Timeline**
1. Elevate awareness of the university's waste diversion goal and engage the campus community in the ambition to become a Zero Waste campus.	# of engagement events, surveys, and connections	Medium-term
2. Increase capture rate of organics to at least 50%	Capture rate	Medium-term
3. Increase diversion rate to 90%	Diversion rate	Long-term
4. Reduce total waste generated per year to 1950 tonnes (50% reduction from 2005 baseline).	Total waste	Medium-term
5. Reduce total waste generated per year to 46 kg per weighted campus user.	Total waste per weighted campus user	Long-term

6.	Increase diversion of construction, demolition, and renovation waste to 90%.	Diversion rate	Medium-term
7.	Obtain BOMA BEST certification for all campus buildings	# of buildings certified	Long-term

Strategies			
Strategy	**KPI**	**Timeline**	**Responsible Group**
1. Complete the implementation of the Zero Waste waste collection system.			
a. Re-establish Waste Diversion Working Group as the umbrella governance body with roles and responsibilities defined for each member, that is responsible to provide directions for smaller subgroups/steering committees/or implementation teams that can be created for specific projects/specific buildings/faculties to solidify program buy-in.	Number of working groups/ committees and representation	Short-term	Facility Services EMSO
b. Develop comprehensive evaluation plans with clear performance metrics to improve the Zero Waste program.	Diversion, capture, and generation rate	Short-term	Facility Services EMSO
c. Explore feasibility of pursuing Zero Waste certification	Assessment completed (Y/N)	Short-term	Facility Services
d. Introduce 'Zero Waste' collection of mixed paper, other recyclables, organics and landfill waste across university facilities.	% of buildings implemented	Medium-term	Facility Services
e. Expand 'Zero Waste' collection	Every residence	Medium-term	Facility Services

	of mixed paper, other recyclables, organics and landfill waste across all university residences.	has an integrated collection program (Y/N)		CS EMSO
2. Optimize the Zero Waste collection system				
a.	Optimize outdoor bins to collect mixed paper, other recyclables, organics and landfill waste across university facilities.	Grounds (outdoor) bins optimized (Y/N)	Medium-term	Facility Services
b.	Assess feasibility of sorting waste on site before hauling off site, and implement if feasible	Assessment complete (Y/N) Implementation complete (Y/N)	Medium-term	Facility Services
c.	Complete a representative sample-style waste audit of each campus every 3 years	Audit complete min. every 3 years (Y/N)	Short-term	Facility Services EMSO
d.	Conduct a waste audit on all athletics facilities	Waste audit conducted (Y/N)	Medium-term	Facility Services SRS EMSO
e.	Develop a 'green athletics' program summary	Program outline complete (Y/N)	Medium-term	Facility Services SRS EMSO
f.	Assess ways to optimize the loading dock and compactor setup at SUB.	Assessment done (Y/N)	Medium-term	Facility Services
g.	Identify opportunities for alternative fuels (including biomass) in utilities renewals and expansions.	Assessment done (Y/N)	Long-term	Utilities
h.	Develop a process map for custodial staff to identify gaps and areas of improvement and	Reduced time spent on each task	Short-term	Facility Services EMSO

	to optimize tasks to achieve efficiency			
i.	Once outdoor bin placements are optimized, geo-map the collection routes of landscape/grounds staff when picking up from outdoor bins and optimize this	TBD	Long-term	Facility Services EMSO
j.	geo-map the routes that Bee-Clean uses for rolling cart collection and optimize where possible.	TBD	Long-term	Facility Services EMSO
k.	using the ECHA process map as a starting point, develop more detailed process maps (with times and # of people for each task) -- will need to select a software program that is capable of this to enable optimized process	TBD	stretch goal	Facility Services EMSO
3. Expand the collection of specialized recycling programs to increase waste diversion.				
a.	Update the CDR waste F&O contractor/consultant documents to reflect a minimum 75% diversion from the current 50% requirement, since 75% is regularly met and exceeded.	Document updated to reflect new 75% goal (Y/N) Diversion rate over time increases	Short-term	Facility Services Project/Planning group
b.	Increase compliance of CDR waste reporting to the Zero Waste Coordinator for both internal and major externally bid projects.	Compliance rate (# of projects tracked)	Medium-term	Facility Service Project/Planning group

c.	Review data for all specialty streams and work with haulers to identify and correct any gaps.	Good data for all waste streams (Y/N)	Short-term	EMSO Facility Services
d.	Review recycling programs for specialty items and expand where applicable.	# and types of specialty streams with active recycling program	Medium-term	Facility Services
e.	Investigate options for Alberta electronics recyclers with e-Stewards and/or Responsible Recycling (R2) certification.	e-waste recycler is certified (Y/N)	Short-term	Facility Services EMSO
f.	Review e-waste processes in light of institutional reorganization and identify gaps. Explore feasibility of using an R2 certified recycler as part of this.	Review completed (Y/N)	Medium-term	FPP, IST
g.	Expand the Reusable Dish Program to include more vendors across all campuses.	# of locations with RDP	Medium-term	SU CSJ Student Group(s)
h.	Develop a formal reuse system for the university to make surplus goods visible and accessible to the campus community; track uptake/reuse of surplus goods.	Program established (Y/N) Amount of material recovered/ reused (kg/#)	Stretch goal	Facility Services Procurement (FPP)
i.	Implement an expanded polystyrene (EPS; Styrofoam) recycling program for lab EPS.	Quantity recycled annually	Short-term	Facility Services
j.	Investigate battery recycling options that address current issues of bulk battery storage and transport.	Weight of batteries recycled	Short-term	Facility Services

4. Track and communicate progress clearly and consistently				
a.	Anytime Dining Waste Tracking and Feedback Loop (including: LeanPath data tracking, Visualization of LeanPath data on screens in Lister Market, and Potential expansion of this visualization to other locations if successful)	Number of screens tracking data on locations	Medium-term	CS (Dining Services)
b.	Report annual food waste weights from main dining halls using LeanPath data	Weight of food waste from main dining halls	Short-term	CS EMSO
c.	Conduct visuals audits periodically for food vendors with clear evaluation and reporting methods to encourage ongoing best zero waste practices	Lower contamination rate or higher capture rate	Medium-term	Facility Services
d.	Develop incentives and check-ins for vendors to continue encouraging best zero waste practices and peer-to-peer learning	Action items implemented	Medium-term	Facility Services EMSO
5. Expand waste reduction initiatives in targeted areas.				
a.	Explore the potential for supporting bulk purchasing for food service compostable ware for food vendors.	Assessment complete (Y/N)	Medium-term	CS FPP (SMS)
b.	Implement single-napkin dispensers in all food service areas.	Single-napkin dispensers are mandated (Y/N) All food vendors use single-napkin	Medium-term	CS SU

		dispensers (Y/N)		
c.	Create and implement a cohesive set of comms materials in all food service areas (e.g. stickers for food vendors, stamps for compostable containers).	Comms materials present in all food service areas (Y/N)	Medium-term	Facility Services EMSO Comms
d.	Provide all condiments in bulk in major dining halls and cafeterias to reduce the use of individually-wrapped packages.	All condiments bulk (Y/N)	Medium-term	CS EMSO SU
e.	Charge clients at coffee shops for not using a reusable mug instead of just providing a discount to those that do.	Charge in place (Y/N) Can uptake be tracked (Y/N)	Medium-term	CS EMSO SU
f.	Assess high-impact opportunities for reducing packaging waste for lab supplies and equipment.	Assessment complete (Y/N)	Medium-term	EMSO Procurement (FPP)
g.	Assess opportunities to reduce the chemical waste footprint of teaching and research activities.	Assessment complete (Y/N)	Medium-term	Facility Services EMSO
h.	Assess high-impact opportunities for reducing paper consumption and increasing the purchase of recycled-content paper.	Assessment complete (Y/N)	Medium-term	Procurement (FPP)
i.	Replace all paper towel dispensers with high efficiency hand dryers	$ spent on paper towels	Medium-term	EMSO Procurement (FPP)
j.	Reduce desktop printing and move to fewer and larger multi-function devices.	# of each type of device in IST inventory	Long-term	IST

k.	Align all campus food services with the federal single use plastics ban.	Single use plastics eliminated from food services (Y/N)	Short-term	Facility Services CS SU
l.	Meet or exceed the federal single use plastic ban for all university operations	Single-use ban Reduction in plastic waste	Medium-term	Facility Services
6. Encourage the campus community to participate in Zero Waste with strong communications, outreach and engagement activities.				
a.	Develop a comprehensive communications and marketing plan to accompany Green Spaces with Green Procurement practices/policies incorporated for all commercial retailers/tenants on campus and outsourced suppliers	Plan development with measurable goal Modified Green Spaces checklist	Medium-term	Facility Services EMSO Comms
b.	Mitigate waste at the university's major events and communicate these measures to participants.	Measure and report waste diverted from landfill	Short-term	Facility Services
c.	Develop and implement comprehensive education and outreach tools (e.g., community-based social marketing) for the staff, students, residences, and the general UofA community.	Number of effective tools for different audiences (cleaning staff, students, residence)	Short-term	Facility Services EMSO Comms
d.	Share green procurement guidelines with all retailers (food vendors and others) operating in university facilities	Guidelines shared with retailers (Y/N)	Short-term	CS FPP EMSO
e.	Determine (conduct survey?) how many retailers have implemented items in the green	# of retailers using the guidelines	Medium-term	CS FPP EMSO

	procurement guidelines.			
f.	Refresh the Green Labs program framework, including waste, water and energy initiatives.	Program outline complete (Y/N)	Short-term	EMSO Facility Services
7. Strengthen contract language to support Zero Waste.				
a.	Develop set parameters for acceptable contamination levels and its reduction methods in custodial and haulers contracts and provide necessary training to obtain goals	Lower levels of contamination	Short-term	Facility Services
b.	Review and update speciality materials stream contracts to ensure consistent data reporting.	Data provided on time (Y/N)	Short-term	Facility Services Procurement (FPP)
c.	Contract Incentives and Training – Residents. Update lease terms to require proper removal of materials (e.g. landfill, recyclable, and organic materials) at regular intervals to avoid pest issues.	lease terms updated? # of pest issues reported?	Medium-term	CS (Residence Services)
d.	Explore product "take-back" or "recycling" stewardship programs into new and existing contracts (at renewal date) and develop an education and outreach program to expand awareness about these programs	Successful implementation of these programs into contracts	Medium-term	Facility Services
e.	Standardize a specification clause in tenant leases outlining the expectations for tenants to fully participate in any and all building waste diversion efforts, including requirements for acceptable single use	All contracts updated (Y/N)	Short-term	Facility Services CS SU

containers and alignment with the federal single use plastics ban.			

4.2 Risks

- Despite the university's progress towards fully implementing the Zero Waste collection systems, we are still dependent on external processing facilities. When a local composting facility shut down, the only organics we could divert from landfill to a different local composting facility were very pure food scraps from certain dining facilities (e.g. Lister Centre).
- Funding availability for Zero Waste station infrastructure expansion.
- Resource availability (staff and other funding) for outreach and training.
- Buy-in from various groups who have responsibility for strategies identified in this plan.

5.0 CONCLUSION

The University of Alberta's Zero Waste Plan sets out a vision, goals, and strategies for its four campuses to move toward achieving a target 90% waste diversion from landfill. In order to meet this ambitious goal, this Plan outlines strategies for departments to come together to implement actions in their respective areas. These individual actions, when combined, will help move the entire University on the path to become virtually zero waste.

Acknowledgements

Authors and Contributors

Sobia Samad

Shannon Leblanc

Thomas Connelly

Michael Versteege

References

[1] http://zwia.org/zero-waste-definition/
[2] https://zerowastecanada.ca/zero-waste-hierarchy/
[3] https://www.energystar.gov/buildings/tools-and-resources/portfolio-manager-0
[4] https://www.appa.org/our-story/
[5] https://www.appa.org/appa-nacubo-key-facilities-metrics-survey-and-report/
[6] https://www.edmonton.ca/programs_services/garbage_waste/future-of-waste.aspx
[7] https://ccme.ca/en/res/state_waste_mgmt_in_canada-secured.pdf
[8] https://ccme.ca/en/resources#
[9] https://ccme.ca/en/current-activities/waste
[10] https://www.ellenmacarthurfoundation.org/explore/the-circular-economy-in-detail
[11] https://recycle.ab.ca/

Appendices

Appendix A - Jurisdictional Review

Jurisdiction or Organization	Key Documents/Initiatives	Key Points
City of Edmonton	**September 10, 2019** 25 year Waste Management Strategy approved by Council	• 90% waste diversion from landfill • Adopt a Zero Waste Framework • Expand source separated organics citywide • Enforce volume limits on residual garbage • Support the move of the multi-unit residential sector and the Industrial, Commercial, and Institutional (ICI) sector to implement a Source Separated Organics Program, effective fall 2022 • Cease commercial collections • Shift programming to support and inspire community-based waste reduction initiatives • Participate in efforts to promote Extended Producer Responsibility (EPR) policies • Enact a process to restrict and better manage single-use plastics/disposables in Edmonton by Q1 2022.
Edmonton Region	Municipalities with existing organics diversion programs	Sherwood Park, St. Albert, Spruce Grove, Stony Plain, Leduc, and Beaumont.
City of Calgary	**2015** New target approved **November 2, 2017** Bylaw enacted	• A revised target of 70% waste diversion by 2025 approved by council • A bylaw banning food and yard waste from City landfills enacted
Recycling Council of Alberta	Several recent policy recommendations related to waste management in Alberta.	Key Principles for Extended Producer Responsibility (EPR) framework: • Drive a circular economy • Be outcomes-based • Have performance standards that are ambitious, measurable and enforceable • Ensure a level playing field • Be implemented alongside complementary regulations

		Zero Plastic Waste 2018 letter calling for the concept of the circular economy to be applied to plastics in Alberta.
Government of Alberta	Too Good to Waste Strategy approved in 2007 Extended Producer Responsibility (EPR) discussion paper (2021)	• Reduce landfill waste to 500 kg per capita by 2010 (adjusted in 2008 as the target was not considered attainable) from residential, ICI and CDR sectors • Development of economic instruments to discourage waste generation and disposal • Development of disposal bans where necessary to facilitate waste reduction initiatives EPR discussion paper recommends that Alberta • Create an overarching EPR regulatory framework; • Develop an EPR approach for an initial list of residentially generated Packaging and Printed Paper and Single Use Plastics; • Develop an EPR approach for Hazardous and Special Products.
Government of Canada	Goal: reduce waste to 490 kg per capita by 2030, and to 350 kg per person by 2040 Canada-wide Strategy for Sustainable Packaging approved by the Canadian Council of Ministers of the Environment on October 29, 2009 A vision for waste: Canada is a world leader in waste management was adopted by environment ministers in September 2014 Aspirational Canada-wide Waste Reduction Goal endorsed by environment ministers in 2018 and approved in principle the Canada-wide Strategy on Zero Plastic Waste which	• Jurisdictions will focus on policies and programs to prevent and divert major waste streams such as organics and packaging • Built on the larger Canada-wide Action Plan for Extended Producer Responsibility to make producers responsible for end-of-life management of products and packaging • In 2021, Canada hosted the World Circular Economy Forum (**WCEF2021**), in partnership with Finnish Innovation Fund, Sitra. • New policies in Canada are beginning to support the circular economy. Circular economy keeps products and materials circulating within the economy at their highest value for as long as possible, through re-use, recycling, remanufacturing, and delivering products as services. • Federal government announces a ban of six single-use plastic items that are set to be phased out across the country by 2022. The list includes plastic grocery bags, straws, stir sticks, plastic cutlery, six-pack rings and food containers made from hard-to-recycle plastics.

	outlines a vision to keep all plastics in the economy and out of the environment.	
UN Sustainable Development Goals (SDGs)	**2020-2030 Decade of Action** to achieve the 17 SDGs	SDG 2 Zero Hunger calls on us to waste less food. SDG 12 Responsible Consumption and Production is about doing more and better with less, decoupling economic growth from environmental degradation, increasing resource efficiency, promoting sustainable lifestyles, and transitioning towards low-carbon and green economies. SDG 14 Life Below Water and SDG 15 Life on Land call for the prevention of marine and other ecosystem pollution by single use plastics and other common pollutants. SDG 17 Partnerships for the Goals is all about interdisciplinary and community collaboration to maximize our positive impact.