

Sustainable Procurement & Waste Management Plan

2020-2030 | VERSION 2 (UPDATED IN 2022)



DALHOUSIE
UNIVERSITY

- Newspapers
- Office paper
- Flyers & magazines
- Soft cover books
- Paper egg cartons
- Shredded paper



Download the Halifax Recycles app to search what goes where and receive weekly notifications.

HALIFAX

Acknowledgements

Prepared by the Office of Sustainability with engagement from custodial staff, students, faculty, staff, government, Divert NS, journals, government websites, and other professional sources. Between 2019 and 2022, additional focus groups, surveys, reporting frameworks, literature and plan reviews, and a new University Strategic Plan provided revised content for the plan. These processes engaged over 1,000 people on and off campus.

Land Acknowledgment

Dalhousie sits on the unceded territory of the Mi'kmaq people and recognizes the interconnectedness of all our relationships—to the environment and to each other—for generations to come.

We recognize that African Nova Scotians are a distinct people whose histories, legacies and contributions have enriched that part of Mi'kma'ki known as Nova Scotia for over 400 years.



Table of Contents

Acknowledgements	2
Executive Summary	4
1.0 Current Context	5
1.1 Sustainable Procurement	5
1.2 Waste Management in Nova Scotia	6
1.3 Management Drivers	6
2.0 Plan Development and Management Timeline	10
3.0 Dalhousie Management Structure	11
4.0 Vision, Principles and Scope	16
5.0 Goals, Actions and Targets	17
6.0 Implementation & Evaluation	18
7.0 References	18

This document provides a planning framework for advancing sustainable procurement and waste management goals in university operations. Academic and research interests are not captured in this plan; however, they are reflected in university-wide strategic plans and international reporting frameworks that Dalhousie participates in. The document supports and adheres to the vision and principles identified in the Dalhousie University Sustainability Plan and is primarily focused on, but not limited to, sustainable purchasing, natural resources reduction, pollution prevention, and solid waste management. Particular purchasing and waste policy directives are found in the University sustainability policy.

Dalhousie recognizes and reports on the UN Sustainable Development Goals through reporting frameworks. This plan addresses Goal 11 Sustainable Cities and Communities, Goal 12 Responsible Consumption and Production, Goal 13 Climate Action, and connects to all the other 14 goals.



Executive Summary

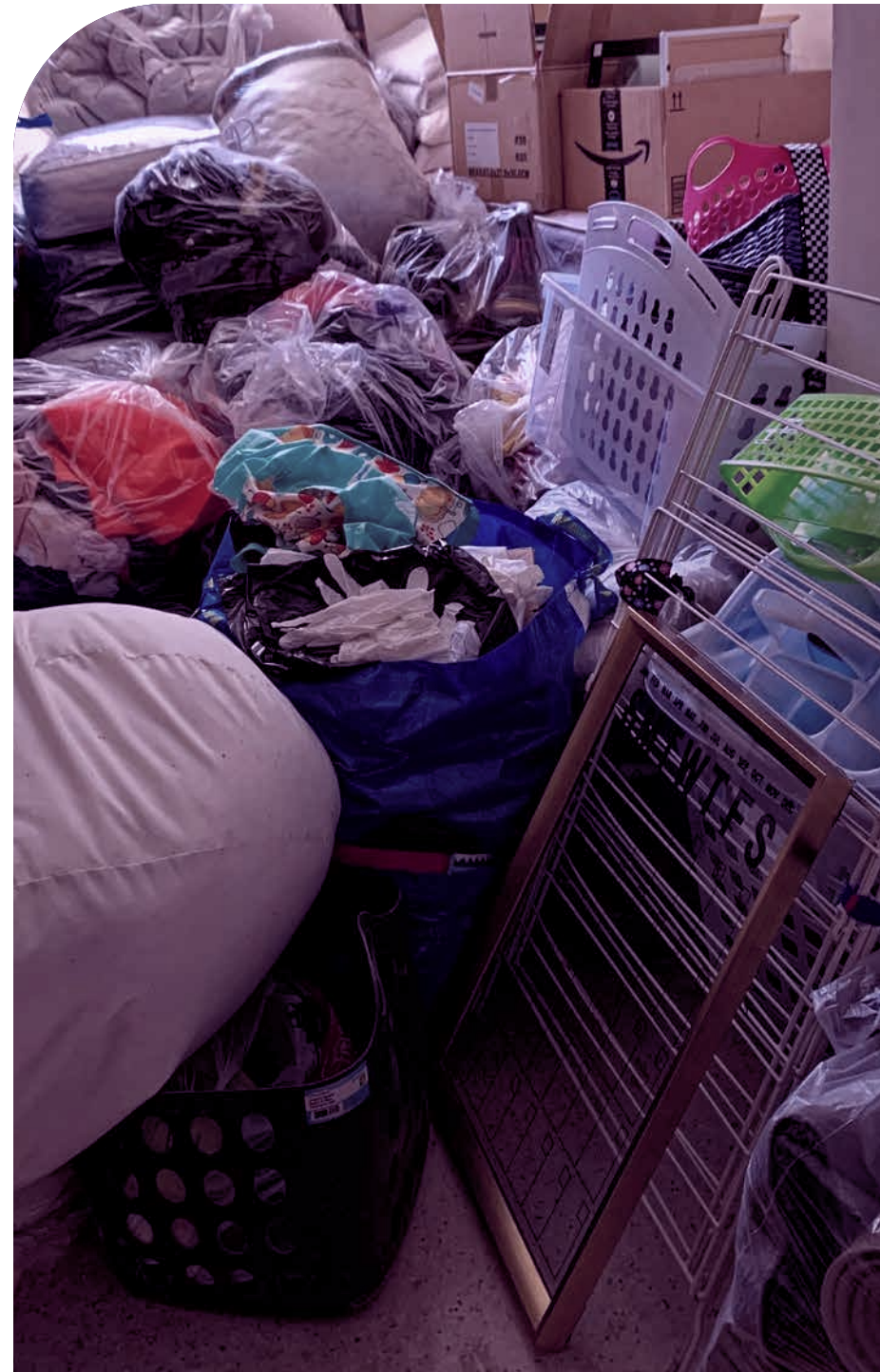
Sustainable procurement aims to guide purchasing decisions to reflect life cycle costs and environmental, social, and health impacts. Within higher education, sustainable procurement is an important strategy to advance sustainability goals through the good and services we produce or consume. Sustainable procurement is directly linked to waste management, as the end use of a product becomes a “waste material” that is slated for reuse, recycling, recovery, or disposal.

There are several challenges implementing sustainable procurement and waste management initiatives, such as a dynamic and changing population with diverse activities and purchasing needs; complexity and time required to assess multiple variables with sometimes little or no information on full product supply chains; hidden and changing ethical, social and environmental product impacts; budget restrictions; and perceived costs with a focus on first-time cost.

All levels of government have a legal role in procurement and waste management. Several regulations provide a framework for the university to manage material. Procurement data is examined to identify key campus purchasers by commodity group. These commodity analyses have been used to aid in the development of business cases for sustainable procurement governance or supply changes. Data from waste bills, scale weights and audits are used to monitor waste minimization and diversion goals.

Goals, actions, and targets focus on reducing waste with emphasis on problematic wastes, ethical and sustainable purchasing, and diversion from the landfill. Initiatives range from policy and university-wide directives, education and incentive programs, elimination of ineffective waste, purchasing or collection strategies, and deploying third-party certification and reporting frameworks,

Collected items from the residence move out program



1.0 Current Context

1.1 Sustainable Procurement

Sustainable procurement aims to guide purchasing decisions to reflect life cycle costs and environmental, social, and health impacts. The International Standards Association identifies sustainable procurement as “the process of making purchasing decisions that meet an organization’s needs for goods and services in a way that benefit not only the organization but society as a whole, while minimizing its impact on the environment.”¹

Some procurement initiatives focus on a core component of sustainable procurement such as social procurement or green procurement. Social procurement has been highlighted in recent years as a strategy to support strategic equity, social and workforce development goals.

In Canada, the Federal government has introduced policies and programs to support sustainable procurement efforts including the policy on green procurement, federal contractor program, and procurement strategy for Aboriginal business.² Indigenous, territorial, provincial and municipal government also feature sustainable purchasing guidance and/or policies as demonstrated by examples such as the University of Toronto’s social purchasing program.³ In Nova Scotia, sustainable procurement strategies are highlighted in policies and guidelines.⁴

Within businesses and organizations, including higher education, sustainable procurement is an important strategy for advancing sustainability goals through the goods and services we produce or consume. It connects to goals of reducing

natural resource consumption. It supports increased equity and ties into concepts of circular economy by purchasing products only if needed, that use less, might be shared, are easy to reuse or refurbish, or are easily recycled into another form while ensuring low energy usage and pollution.

Challenges implementing sustainable procurement initiatives have been documented in campus focus groups and meetings and by a variety of authors⁵ to include factors such as:

- ▶ knowledge and expertise;
- ▶ complexity and time required to assess multiple variables with little or no information on full product supply chains;
- ▶ hidden and changing product ethical, social and environmental impacts;
- ▶ budget restrictions;
- ▶ perceived costs with focus on first-time costs;
- ▶ lack of supportive policies, legislation, oversight and mandates;
- ▶ lack of product availability; and
- ▶ processes that are inaccessible for some social and/or environmental focused procurements.

Sustainable procurement is directly linked to waste management, as the end use of a product becomes a “waste material” that is slated for reuse, recycling, recovery or disposal.

Fair trade coffee served on campus



1.2 Waste Management in Nova Scotia

In 1995, the province of Nova Scotia introduced the *Solid Waste Management Strategy* in response to public concern regarding the social (such as environmental racism) and environmental issues associated with the implications of landfills and the incineration of waste. At that time, the provincial government officially adopted a solid waste diversion target of 50% by 2000 as identified in the *Environment Act* (1995). Major initiatives came into place including landfill bans on materials such as organics, the creation of Divert Nova Scotia (formerly the Resource Recovery Fund Board), creation of waste management regions and centralization of second-generation landfills, and the launching of enviro-depots, product stewardship programs, deposit refund systems, and centralized composting.

Nova Scotia achieved its diversion target of 50% by 2000. To further the commitment, a per capita waste disposal target of 300kg by 2015 was legislated in the *Environment Act* in 2006. This target is also recognized in the *Environmental Goals and Sustainable Prosperity Act (EGSPA)* (2007) and the *Environmental Goals and Climate Change Reduction Act* (2022). In 2011, the province released a revised strategy, *Our Path Forward*, that includes a commitment to future regulatory reviews to help meet waste objectives.

Scale and organics diversion at the university warehouse



1.3 Management Drivers

There are many factors, both external and internal, that impact waste management at the University (Figure 1).

Figure 1. External/Internal Influences⁶



(Davidson & Owen, 2011)

Global Trends

The 20th century experienced a widespread change in consumption and waste disposal patterns. The invention of new products (such as ready-to-serve meals) contributed to significant alterations in purchasing behaviour. In addition, the end of the century ushered in enhanced globalization, and emerging technology and science provided new opportunities for increased consumption and waste.⁷

Although a product's life cycle is typically considered in the product design stage, an important, but often overlooked consideration is the end-of-life cycle. Upon retiring, many products are sent for disposal, contributing to waste streams. Rather than accepting that products have a single life cycle, planning ensures products can have multiple life cycles through low energy recovery, reuse, refurbishment, remanufacture, or recycling.⁸

The concepts of a Circular Economy have been promoted “as a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling”.⁹

The success of a solid waste management strategy is highly dependent upon the type of goods purchased and consumer disposal decisions. Consumers may have positive intentions toward solid waste diversion and recycling; however, actual behaviour may not reflect these intentions.¹⁰

Public education is crucial for the success of the management plan. Behavioural instruments play a role in waste management strategies through initiatives that inform and educate. Examples of these types of initiatives include waste audits, school programs, advertising, training, and competitions.¹¹

Multi-language waste signs on campus



Federal, Provincial, and Municipal Solid Waste Legal Considerations

All levels of government have a legal role in waste management. Several regulations provide a framework for the university to manage waste material (Figure 2).

Figure 2. Key government acts and regulations relevant to waste management.

	ACTS	REGULATIONS
Federal	<ul style="list-style-type: none"> ▶ The Canadian Environmental Protection Act (1999) ▶ Transportation of Dangerous Goods Act (1992) 	<ul style="list-style-type: none"> ▶ Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (2005) ▶ Single-use Plastics Prohibition Regulations (2022)
Provincial	<ul style="list-style-type: none"> ▶ Environment Act (1995) ▶ Environmental Goals and Sustainable Prosperity Act (EGSPA) (2007) ▶ Environmental Goals and Climate Change Reduction Act (2022) 	<ul style="list-style-type: none"> ▶ Solid Waste-Resource Management Regulations (1996) ▶ Creation of the Resource Recovery Fund Board (RRFB), now Divert NS
Municipal	<ul style="list-style-type: none"> ▶ Municipal Government Act (1998) 	<ul style="list-style-type: none"> ▶ HRM By-law 600: Solid Waste Resource Collection and Disposal By-law ▶ Colchester County Solid Waste By-law ▶ HRM By-law 200: C&D Materials Recycling and Disposal License By-law ▶ Colchester County Construction and Demolition By-law

Federal Legislation

The Federal government's involvement in waste legislation is primarily related to the regulation and management of certain types of hazardous substances, pollutants, and wastes through transportation and pollution regulations.

*Transportation of Dangerous Goods Act (1992)*¹²

Regulates the transportation of hazardous waste over air, sea, rail, and road.

*The Canadian Environmental Protection Act (1999)*¹³

Establishes regulations for the management and control of certain toxic and hazardous waste.

In 2018, the federal, provincial, and territorial governments adopted a Canada-wide Strategy and Action Plan on Zero Plastic Waste.¹⁴ The first regulatory strategy launched is the *Single-use Plastics Prohibition Regulations (2022)*, which lays out the banning process to prohibit the manufacture, import, and sale of the certain food related plastic items.¹⁵

Provincial Legislation

Provincial government involvement in waste legislation provides specific guidelines and restrictions regarding the handling and disposal of solid waste in Nova Scotia.

*Environment Act (1995)*¹⁶

- ▶ Outlines specific targets for solid waste diversion in Nova Scotia
- ▶ 50% solid waste diversion target by 2000 (target established in 1996)
- ▶ 300kg per capita target by 2015 (target established in 2006)
- ▶ Permits the establishment of *Solid Waste-Resource Management Regulations*

*Solid Waste-Resource Management Regulations (SWRMR) (1996)*¹⁷

Permitted under section 102 of the Nova Scotia *Environment Act* (1995). These regulations are the basis for banning the disposal of certain items from disposal sites (Figure 3), prohibiting the open burning of waste, and establishing seven regional waste management areas in the province.

Established the Recovery Fund and the Resource Recovery Fund Board (RRFB, now Divert Nova Scotia) which is responsible for overseeing the Fund.

*EGSPA (2007)*¹⁸

Commits the provincial government to achieve a variety of environmental objectives by the year 2020, including the 300kg per person per year disposal rate, although *EGSPA* does not contain provisions that allow the government to enforce or regulate waste management.

*Environmental Goals and Climate Change Reduction Act (2022)*¹⁹

Identifies the expansion of extended producer responsibility and reduction of single use plastics; developing a plan and taking action to reduce solid waste disposal rates to no more than 300 kilograms per person per year by 2030.

Figure 3: *SWRMR Materials Banned from Nova Scotia Disposal sites*²⁰

- | | |
|--|---|
| ▶ Newsprint | ▶ Desktop, laptop, and notebook computers, including CPUs, keyboards, mice, cables and other components |
| ▶ Computer monitors | ▶ Corrugated cardboard |
| ▶ Ethylene glycol (automotive antifreeze) | ▶ Used tires |
| ▶ Televisions | ▶ Automotive lead-acid batteries |
| ▶ Redeemed beverage containers | ▶ Leaf and yard waste |
| ▶ Post-consumer paint products | ▶ Steel/tin food containers |
| ▶ Computer printers, including printers that have scanning or fax capabilities or both | ▶ Glass food containers |
| ▶ #2 HDPE non-hazardous containers (ice cream containers, plastic jugs, detergent bottles, etc.) | ▶ Low density polyethylene bags and packaging |
| | ▶ Compostable organic material (food waste, yard waste, soiled and non-recyclable paper) |
- (Government of Nova Scotia, 2014)

Divert Nova Scotia

Divert NS, formerly the RRFB, is charged with developing municipal or regional diversion programs; a deposit/refund system for beverage containers; industry stewardship programs; programs and materials to raise awareness for waste reduction, reuse, recycling, and composting; and value-added manufacturing in the province.²¹

Municipal Legislation

Section 325 of the *Municipal Government Act* (1998) permits the municipality to create by-laws regarding solid waste management. HRM and Colchester County have developed by-laws that influence solid waste management at each of Dalhousie's campuses.

SOLID WASTE BY-LAWS

HRM By-law 600: Solid Waste Resource Collection and Disposal By-law ²²

- ▶ States limits, restrictions, and eligibility requirements for private, industrial, commercial, and institutional disposal of waste.
- ▶ Identifies storage and bin standards, waste separation expectations, and appropriate transportation of waste.
- ▶ Outlines specifications (allowances) and preparation requirements for the collection.
- ▶ Highlights prohibitions, disposal fee structure, and penalties for violations of the By-law.

Colchester County Solid Waste By-law ²³

- ▶ States limits, restrictions, and eligibility requirements for the disposal of waste.
- ▶ Identifies storage and bin standards, waste separation expectations, and preparation requirements for collection.
- ▶ Identifies requirements and expectations of waste collectors.
- ▶ Highlights prohibitions, disposal fee structure, and penalties for violations of the By-law.

Construction and Demolition (C&D) By-laws ²⁴

- ▶ HRM has committed to a C&D diversion rate of 75%, Colchester County does not have specific C&D targets, and Dalhousie University abides by the 75% diversion target across all campuses.

Colchester County Construction and Demolition By-law ²⁵

- ▶ States license requirements and associated fees.
- ▶ Highlights the necessity for recording and reporting on the C&D load details.
- ▶ States offenses under the By-law and the associated penalties.

Challenges to waste reduction and diversion at Dalhousie include the size, scope, and diversity of players at the university, which results in products arriving on campus across many departments and specialized users. Dalhousie is a research-intensive university with hundreds of labs requiring specialized packaged products and the use of items such as disposable gloves and chemical wipes. Additionally, each year brings thousands of new people to campus from around the world.



2.0 Plan Development and Management Timeline

Dalhousie operational planning is an iterative process of major plan releases and three-year updates, ongoing research and action, and campus and community engagement (Figure 4).

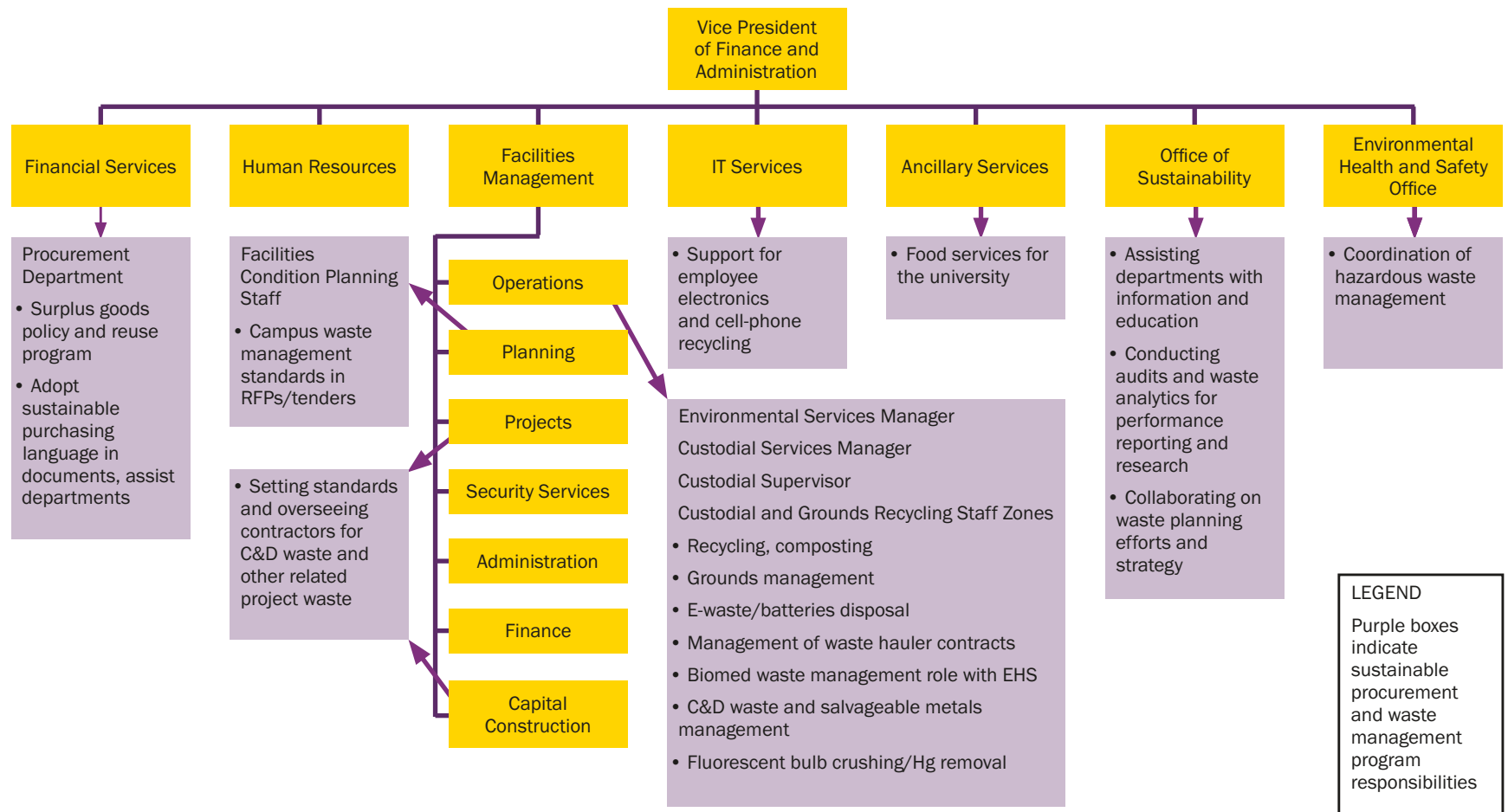
Figure 4. Timeline information.

2008–2009	2010–2011	2012–2013	2014–2015	2016–2017	2018–2019	2020–2021
<ul style="list-style-type: none"> ▶ Adoption of no trays in dining halls ▶ Added an electronic recycling program ▶ Waste audits 	<ul style="list-style-type: none"> ▶ Creation of sustainability criteria for the purchasing policy and promotion of sustainability purchasing tips ▶ Creation of sustainable purchasing and solid waste training ▶ Hosted MASH sector sustainable purchasing conference ▶ Became an ENERGY STAR partner ▶ Ecolympics launched with focus on waste, energy, water 	<ul style="list-style-type: none"> ▶ Development of a Chemical Stores facility with some bulk solvent dispensing and recycling ▶ Creating waste auditing methodology and classification system, research on C&D waste ▶ Refined protocols for organic waste diversion activities on campus ▶ Established a contract for waste vegetable oil recycling ▶ Paper policy introduced, take out plastic bags removed from bookstore 	<ul style="list-style-type: none"> ▶ Waste Committee created ▶ Created specific space waste bin guideline standards. This included having new signage designed and protocols established ▶ Created and updating a Dalhousie specific “What Goes Where Guide” ▶ Upgraded battery recycling program ▶ Implemented ENERGY STAR purchasing programs for fridges and other equipment 	<ul style="list-style-type: none"> ▶ Sustainable purchasing commodity analysis and changes made to procurement of items such as fuels, equipment ▶ Implemented the “Big Switch” — centralized waste sorting, enhanced C&D recycling, standardized all waste bins and signs — including removal of most single use garbage bins ▶ Implemented clear garbage bags ▶ Guidelines for reducing waste in food services ▶ Universal waste study and changes to bulb recycling 	<ul style="list-style-type: none"> ▶ Research into sustainable textiles purchasing and other social procurement strategies ▶ Single-use plastic and expanded polystyrene items reduced in food services ▶ Reusable mug program pilot in key food areas 	<ul style="list-style-type: none"> ▶ Updating sustainable purchasing policy ▶ Using more ozone based cleaning ▶ Study on problematic waste
<p>ONGOING Waste audits and tracking, waste research, embedding sustainability criteria in RFPs, tenders, and design guidelines, passing relevant policies, creating guides and educational initiatives, working in collaboration to advance initiatives</p>						

3.0 Dalhousie Management Structure

There are over 7,000 employees and 21,000 students at Dalhousie’s three urban campuses (Halifax) and agricultural campus (Bible Hill). Each year thousands of new students and visitors arrive to attend and visit the university. The university has residence accommodations, public library spaces, food services, athletics venues, research labs from multiple disciplines, a farm, agricultural lands, and thousands of offices. The breadth of the activity on campus results in a wide variety of waste types and volumes. Several departments are involved in aspects of sustainable purchasing and waste management on campus (Figure 5).

Figure 5: Dalhousie University—Sustainable Purchasing and Waste Management.



Procurement

Key commodity groups have been identified to help shape analysis and strategic action (Figure 6.)

Figure 6. Common university commodities categories.

STATIONERY	FOOD SERVICES	IT/TELECOM/AV
TRAVEL/FLEET	APPLIANCES	FURNITURE
PROFESSIONAL SERVICES	EQUIPMENT/SUPPLIES	TEXTILES
CUSTODIAL	ENERGY/WATER	BUILDING/SUPPLIES

The university is a public purchaser and as such follows specific requirements and regulations for public procurement.²⁶ There are standard methods for purchasing goods and services depending on the dollar value of the product. Methods include using a standing offer with a vetted vendor (e.g., stationery supplies); departmental purchasing card (e.g., credit card) or a sole source quote; issuing a Tender for a specific good or service in which the technical specifications are defined (e.g., piece of equipment); issuing a Request for Information (RFI) to gather information before issuing a Request for Quote (RFQ) (sent to specific vendors) or Request for Proposals (RFPs) sent to the open market looking for a product or service.

Sustainable procurement language and requirements are embedded in these methods through regulatory requirements, university policy (e.g., sustainability policy), reporting initiatives, education, and advice.

Waste Streams

A Material Categorization Guide was created that classifies material types for each of the following streams: fibre, organics, plastics, recyclables (plastics, metals, and glass), white goods, universal waste, C&D waste, and garbage (Table 1). The Dalhousie Office of Environmental Health and Safety provides specific information about hazardous and bio-medical waste.

The collection of material is categorized and communicated according to government programs and regulations. Materials streams for solid waste collection include paper, organics, recyclables, refundables (in some locations), and garbage. Other streams such as construction and demotion (C&D), universal waste, and hazardous waste have separate processes and protocols.

Collection and Processing of Streams

Recycling

Paper, cardboard, and recyclables are collected every day in and outside buildings from Dalhousie's four bin systems by Facilities staff and brought to a central warehouse in Halifax and at the building level at the agricultural campus. Paper is picked up by a local paper recycler. Cardboard and recyclables are picked up by the local hauler for transport to the Materials Recovery Facility 15 km away. Weights and numbers of carts are collected. At the AC campus, recyclables, paper, and cardboard are brought to the Colchester Materials Recovery Centre, approximately 20 km from campus.

Organics

Organic material is collected daily by custodians from the four-bin systems found in hallways and meeting rooms. In Halifax, organic material is picked up at the building by grounds staff (every day or every two days, depending on volume), brought to the warehouse, sorted to remove contaminants, and the remaining material is repacked into green carts and weighed on a scale. Green carts are picked up directly from Dalhousie kitchens once every couple of days to a week. Material is trucked to the Ragged Lake compost facility (HRM composting facility) 15 km from the university. On the AC, compost is trucked to the Colchester Composting Facility, roughly 20 km from campus.

Landscape waste is picked up by a commercial hauler regularly throughout the year with peak seasons being summer and fall. At the AC, landscape waste; biomass plant ash; and manure are composted for use on and off campus agricultural fields. Vegetable oil is picked up by a commercial hauler (every two to three months) at the Halifax and AC. The oil is used to make animal feed and soap.

Table 1: Summary Sheet from Material Categorization Guide²⁷**Fibre**

- ▶ Corrugated cardboard
- ▶ Office paper
- ▶ Miscellaneous paper
- ▶ Other mixed / composite paper

Organic

- ▶ Food
- ▶ Boxboard / soiled paper
- ▶ Agricultural crop residues
- ▶ Manures
- ▶ Cooking oil / grease
- ▶ Leaf and yard waste
- ▶ Remainder / composite organic

Plastic: Containers, Bags and Products

1. Polyethylene terephthalate
2. High-density polyethylene
3. Poly (vinyl chloride)
4. Low-density polyethylene
5. Polypropylene
6. Polystyrene
7. Any combination of plastics 1 through 6

Glass

- ▶ Glass bottles and containers (refundable)
- ▶ Glass bottles and containers (non-refundable)
- ▶ Remainder / composite glass

Metal

- ▶ Iron / steel
- ▶ Tin / steel cans
- ▶ Aluminum
- ▶ Aluminum cans
- ▶ Copper
- ▶ Other non-ferrous
- ▶ Remainder / composite metal

Construction and Demolition

- ▶ Concrete
- ▶ Asphalt paving
- ▶ Asphalt roofing
- ▶ Lumber
- ▶ Gypsum board
- ▶ Carpet
- ▶ Rocks and soils
- ▶ Remainder / composite

Hazardous

- Class 1 – explosives
- Class 2 – gases
- Class 3 – flammable and combustible liquids
- Class 4 – flammable solids
- Class 5 – oxidizing substances; organic peroxides
- Class 6 – poisonous (toxic) and infectious
- Class 7 – radioactive materials
- Class 8 – corrosives
- Class 9 – miscellaneous products, substances

Universal waste

- ▶ Fluorescent bulbs / lamps
- ▶ Paint
- ▶ Vehicle and equipment fluids
- ▶ Batteries (all types)
- ▶ Consumer household hazardous wastes
- ▶ Small appliances
- ▶ Regulated electronic goods

Composite & miscellaneous materials

- ▶ Textiles (such as clothing and blankets)
- ▶ Bulky appliances & non-regulated electronic devices
- ▶ Bulky furniture
- ▶ Special care waste (bio-medical)
- ▶ Disposable cups
- ▶ Composite packaging
- ▶ Soiled plastic wrap and foil
- ▶ End-of-life products

(Davidson & Owen, 2011)

Garbage

Waste is collected in and outside every day from Dalhousie buildings' four bin systems. At Halifax, Dalhousie staff bring the material to the warehouse where it is compacted. A hauler delivers the compacted material to a local landfill, 30-100 km away and to the Colchester Balefill approximately 20 km away. Tonnage is provided from the scale weights for Halifax. The waste at the AC is picked up from dumpsters and co-mingled with materials from other providers. Tonnage weights are provided based on the haulers industry average.

Universal Waste

Fluorescent light bulbs and lamps are recycled and disposed of by Facilities Management and/or external contractors. External contractors working at Dalhousie are required to show proof of recycling and proper disposal.

As part of Nova Scotia's Solid Waste Resource Management Regulations, paint is banned from disposal in provincial landfills. When consumers purchase paint, they pay a recycling fee to support the costs of collecting and processing unused paint. Leftover paint are returned to an ENVIRO-DEPOT facility. Battery boxes are placed throughout the Dalhousie campus. Material is sent to Call2 Recycle for battery recycling. On-Campus, Dalhousie printer cartridges are returned to the supplier. All Dalhousie employee-issued cell phones are returned to Dalhousie's Information and Technology Services (ITS) for reuse and recycling. On-Campus, Dalhousie employees request office-related electronic waste be picked up for hard drive-destruction and then recycled through the ENVIRO-DEPOT facility.

Construction and Demolition Debris

For small internal jobs, staff coordinate materials for a local hauler to bring to the local C&D recycling site or bring material back to a C&D bin on campus. For larger jobs, external contractors are required to meet the 75% diversion outlined by HRM and for LEED projects. C&D material is often source separated further to ensure recycling efforts are beyond landfill cover. Two C&D depots were created on campus to sort out clean wood, metal, and mixed C&D for recycling.

Hazardous Waste

The University has a comprehensive Hazardous waste management program. Annual reports are available for the breakdown of all classes of hazardous waste by tonnage.

Hazardous Waste includes:

Class 1: Explosives

Class 2: Gases

Class 3: Flammable and Combustible Liquids

Class 4: Flammable Solids

Class 5: Oxidizing Substances; Organic Peroxides

Class 6: Poisonous (Toxic) and Infectious

Class 7: Radioactive Material

Class 8: Corrosives

Details on on-campus hazardous waste programs are provided by the Environmental Health and Safety Office.



Baseline Estimation

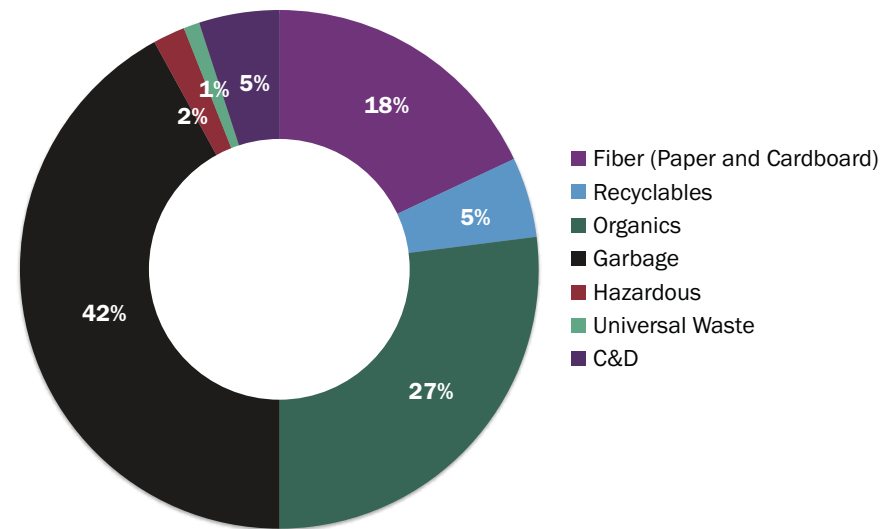
Procurement data is examined to identify key campus purchasers by commodity group. These commodity analyses have been used to aid in the development of a business case for sustainable procurement governance or supply changes (e.g., reducing single use printers for shared multi-functional devices, requiring 100% post-consumer certified paper). Some dollar value or quantity estimate targets have been applied in tracking purchasing in certain commodities such as food and through green building programs like LEED.

Several data sets were used to create Waste Stream Baseline Percentage Estimates (2013–2014) (Figure 6). For some streams like paper recycling, reliable and consistent weight data are available. For other streams such as garbage, weight data were not consistently provided from the hauler at this time. Waste audits, invoice data, and comparisons to other institutions have been used to create a reasonable estimation using tonnes as the metric.

To increase the reliability of data several measures were undertaken including adding an industrial scale at the Halifax campuses to weigh organic, recyclable and paper carts and requiring scale weights for compacted landfill material. The AC represents a population and campus size of about 10% of the Dalhousie campuses. The system relies on hauler pick-up at dumpsters and select buildings for other material. The weight data provided is an industry average and when compared to audit data shows higher weights than what is observed. The data validity from the set of data is less accurate than the Halifax campuses.

Materials tracking workbooks have been developed for reuse, fiber, recyclables, organics, C&D, garbage (landfill), biomedical, universal, and hazardous waste. Twenty data sets are used to create a comprehensive picture of the tonnages of waste streams.

Figure 6: Waste Stream Percentage Estimates (2013–2014).



4.0 Vision, Principles and Scope

Vision

Dalhousie University is actively minimizing waste, applying ethical and sustainable purchasing practices, reducing pollution and materials to landfill, and increasing knowledge of sustainable purchasing and waste management issues of students and employees.

Principles

Various waste management principles were considered in the development of this plan. The concept of zero-waste, cradle-to-cradle (closed loop systems), and eco-efficiency were assessed. The concept of zero-waste is a goal that Dalhousie will ultimately strive to achieve; however, until zero-waste is more attainable, efforts will focus on reducing and managing the waste created. The Four R's (rethink, reduce, reuse, recover) have been chosen as guiding principles for procurement and waste management approaches. Rethinking what we need and what we purchase focuses on principles of social equity, ecosystem health, and resource use.

In an institutional setting, products are most often used rather than created. A wide range of products are consumed. Hundreds of people are involved in procurement and sorting materials. Each year there is a large turn-over of students. Large volumes of a variety of material streams are processed. The Four R's provide the framework and flexibility for the university conditions.

Scope

The plan considers goods and services purchased by the university and the life-cycle use and management of materials.



5.0 Goals, Actions and Targets

To meet the university's sustainable procurement and solid waste management vision key goals, objectives, actions, and targets have been re-confirmed and expanded based on recent literature reviews, campus surveys, focus groups, and meetings (Table 2).

Table 2: Goals, Objectives, Actions and Targets

GOALS	OBJECTIVES	ACTIONS	TARGETS
Minimize waste generation	<ul style="list-style-type: none"> ▶ Reduce the quantity of materials purchased going to disposal ▶ Target problematic materials by volume, tonnage, pollution, contamination, and cost. 	<ul style="list-style-type: none"> ▶ Update and communicate comprehensive waste audit results for all campuses. ▶ Eliminate the use of problematic material if possible (e.g., avoid single-use plastics in food services, labs, and clinical areas) ▶ Explore strategies to reduce contamination. ▶ Explore user-pay models for contractor waste in areas like food and building projects. ▶ Enhance reuse and sharing programs where feasible (e.g., fleet, furniture, equipment, chemicals) ▶ Target education, behavioural programs and monitoring efforts in key areas with high volume and contamination rates. ▶ Avoid over producing physical reports, manuals, and documents. ▶ Support and enhance existing reuse and recycling programs (where they are more beneficial than disposal) for organics, fibre, C&D, recyclable material, electronics... ▶ Pilot incentives and governance projects by commodity type (e.g., take back program with vendors) 	<ul style="list-style-type: none"> ▶ Reduce campus disposal rate (per tonne); normalized by building type and population year over year. ▶ Increase diversion rate for solid, liquid, and hazardous waste from landfills. ▶ 75% by 2030.
Establish a management strategy that positively impacts human, environmental, and social health	<ul style="list-style-type: none"> ▶ Invite community feedback and adapt waste management plans as required 	<ul style="list-style-type: none"> ▶ Update ethical and sustainable purchasing and waste management policies and directives ▶ Maintain a waste management committee and ad hoc sustainable purchasing commodity groups ▶ Ongoing engagement, research, education, and participation of campus community ▶ Conduct staff training for key groups including custodial, grounds, health and safety, trades, purchasing and sustainability staff ▶ Identify targets and track progress through annual campus reports and higher education sustainability reporting frameworks ▶ Examine the cost/efficacy impact of additional resources in meeting waste management and sustainable purchasing goals ▶ Implement programs and initiatives such as best value and local and short supply chain purchasing 	<ul style="list-style-type: none"> ▶ Increase in the number of social and environmental purchasing initiatives that support equity, diversity, inclusivity, and accessibility goals ▶ Sustainable purchasing targets created for all commodities. ▶ Products and programs delivered ▶ Commodities that have traceable, verifiable sustainability features (e.g., third-party certified programs). ▶ Meeting high standards in sustainability reporting frameworks.

6.0 Implementation & Evaluation

Monitoring is an essential component to the continued success and growth of the plan. Monitoring also allows the expected impacts of the strategy to be measured against actual changes, and this can inform future revisions of the management plan. Evaluation and monitoring are typically conducted through

the use of waste and procurement characterization studies, bills, and weight tickets. Waste audits will be scheduled to understand flows and problematic waste. The results from monitoring will allow for the calculation of diversion rates, waste reduction, participation, and costs.

7.0 References

1. ISO. (2017). ISO 20400 Sustainable procurement. ISO. www.iso.org/files/live/sites/isoorg/files/store/en/ISO%2020400_Sustainable_procur.pdf
2. van den Berg, R. (2020). Socially responsible purchasing by Canada's Federal Government. *Loprespub*. illnotes.ca/2020/08/11/socially-responsible-purchasing-by-canadas-federal-government/
3. City of Toronto. (2022). Social procurement program. *City of Toronto*. www.toronto.ca/business-economy/doing-business-with-the-city/social-procurement-program/
4. Government of Nova Scotia. (2022). Sustainable procurement. *Government of Nova Scotia Policies and Processes*. procurement.novascotia.ca/policies-processes/sustainable-procurement.aspx
5. Leal Filho, W., Skouloudis, A., Brandli, L., Salvia, A., Avila, L., & Rayman-Bacchus, L. (2019). Sustainability and procurement practices in higher education institutions: Barriers and drivers. *Journal of Cleaner Production*, 231, 1267-1280. doi.org/10.1016/j.jclepro.2019.05.202
6. Davidson, G. & Owen, R. (2011). Sustainable waste management practices. *Dalhousie University*. cdn.dal.ca/content/dam/dalhousie/pdf/dept/sustainability/campus-initiatives/waste/Waste%20Sorting%20Guide-11x17%20Web.pdf
7. Bampilis, T. (2012). History of consumption and waste, world, 1900s. In *Encyclopedia of Consumption and Waste: The Social Science of Garbage*, 1-2, 381–385. Thousand Oaks, CA: Sage Publications, Inc.
8. Ryan, M.J. (2014). Design for system retirement. *Journal of Cleaner Production*, 70, 203–210. dx.doi.org/10.1016/j.jclepro.2014.01.092
9. Geissdoerfer, M., Savaget, P., Bocken, N.M.P. & Hultink, E.J. (2017). The circular economy a new sustainability paradigm? *Journal of Cleaner Production*, 143 (1), 757–768. [10.1016/j.jclepro.2016.12.048](https://doi.org/10.1016/j.jclepro.2016.12.048)
10. Buelow, S., Lewis, H., & Sonneveld, K. (2010). The role of labels in directing consumer packaging waste. *Management of Environmental Quality: An International Journal*, 21(2), 198–213. [10.1108/14777831011025544](https://doi.org/10.1108/14777831011025544)
11. McKenzie-Mohr, D., & Schultz, P. (2014). Choosing effective behaviour change tools. *Social Marketing Quarterly*, 20 (1), 35–46. [10.1177/1524500413519257](https://doi.org/10.1177/1524500413519257)
12. *Transportation of Dangerous Goods Act*, 1992, SC 1992, c 34, www.canlii.org/en/ca/laws/stat/sc-1992-c-34/latest/sc-1992-c-34.html
13. *Canadian Environmental Protection Act*, 1999, SC 1999, c 33, www.canlii.org/en/ca/laws/stat/sc-1999-c-33/latest/sc-1999-c-33.html
14. Government of Canada. (2022). Canada's zero plastic waste agenda. *Government of Canada*. www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/canada-action.html

15. Canada Gazette. (2022). Single-use plastics prohibition regulations: SOR/2022-138. *Canada Gazette*, 156 (13). www.gazette.gc.ca/rp-pr/p2/2022/2022-06-22/html/sor-dors138-eng.html
16. *Environment Act*, SNS 1994–95, c 1 canlii.ca/t/51zv1
17. Solid Waste-Resource Management Regulations, NS Reg 25/96, canlii.ca/t/lczr
18. *Environmental Goals and Sustainable Prosperity Act*, SNS 2007, c 7 canlii.ca/t/5225x
19. Nova Scotia Legislature. (2021). BILL NO. 57 Environmental goals and climate change reduction act. *Government of Nova Scotia*. nslslegislature.ca/legc/bills/64th_1st/1st_read/b057.htm
20. Government of Nova Scotia. (2014). Materials banned from disposal sites in Nova Scotia. *Government of Nova Scotia*. www.novascotia.ca/nse/waste/banned.asp
21. Government of Nova Scotia. (2022). Divert NS. *Government of Nova Scotia*. novascotia.ca/nse/waste/rfbns.asp
22. Halifax Regional Municipality. (2010). *HRM by-law 600: Solid waste resource collection and disposal by-law*. Retrieved from www.halifax.ca/legislation/bylaws/hrm/documents/By-LawS-600.pdf
23. Municipality of Colchester. (2011). *Colchester County solid waste by-law*. Retrieved from www.colchester.ca/124-solid-waste-by-law/file
24. Halifax Regional Municipality. (2012). *HRM By-law 200: C&D materials recycling and disposal license by-law*. www.halifax.ca/legislation/bylaws/hrm/documents/By-LawL-200.pdf
25. Municipality of Colchester. (2012). *Colchester County construction and demolition by-law*. Retrieved from www.colchester.ca/residents/bylaws
26. Dalhousie University. (2021). Procurement policies. *Dalhousie University*. www.dal.ca/dept/procurement/policies.html
27. *ibid*









DALHOUSIE
UNIVERSITY

Office of Sustainability, Dalhousie University
5th Floor, 1236 Henry Street, PO Box 15000
Halifax, Nova Scotia, Canada B3H 4R2
rethink@dal.ca

dal.ca/sustainability

 /DalhousieOfficeOfSustainability  /RethinkDalhousie
 @DalOfficeSust #DalhousieU  @sustainabilityatdal