Missouri State University

Sustainable Materials Management Plan

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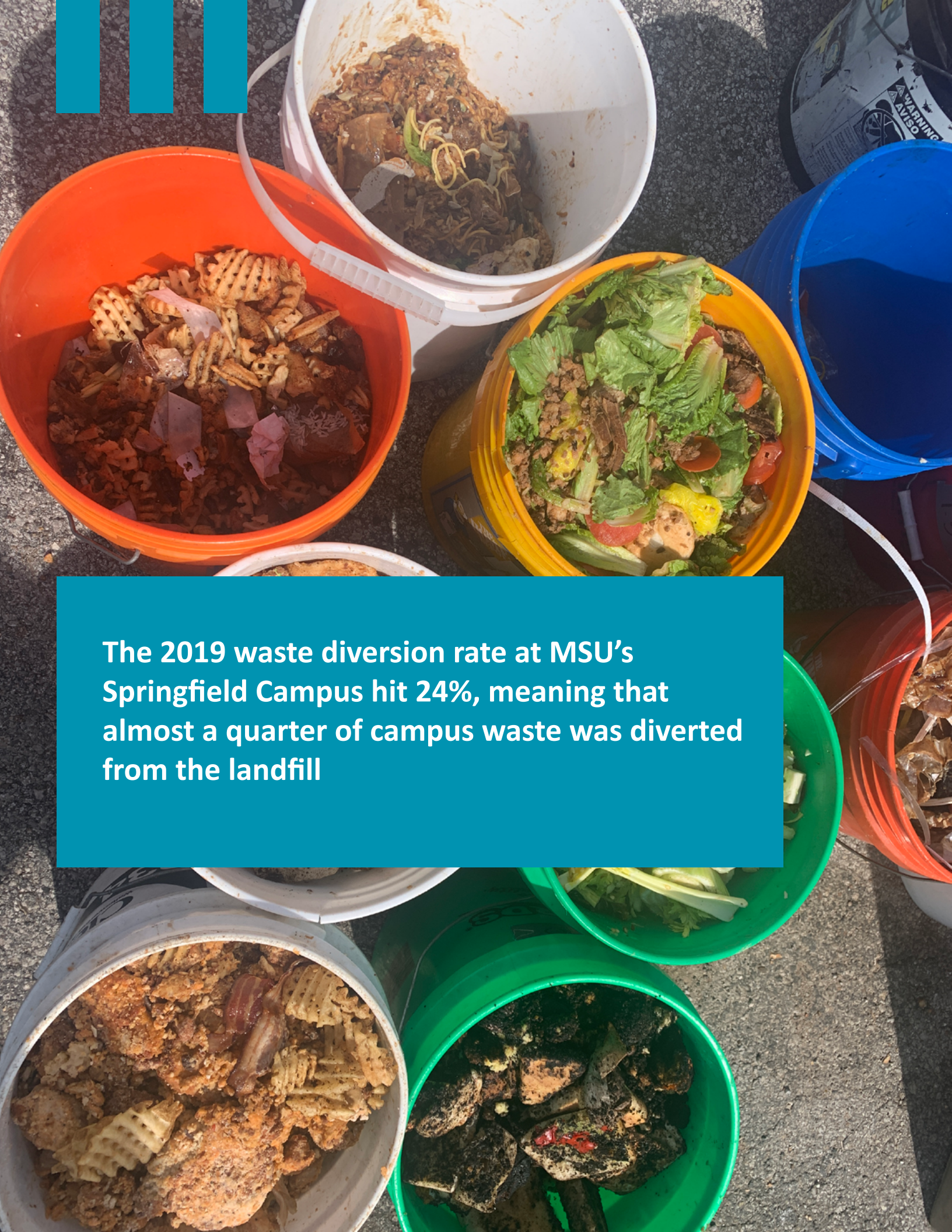


The 2019 waste diversion rate at MSU's Springfield Campus hit 24%, meaning that almost a quarter of campus waste was diverted from the landfill

Introduction

Project Origin

Missouri State University (MSU) is committed to incorporating sustainability into all aspects of campus operations and encouraging environmental stewardship among campus faculty, staff, and students. In the 2017 Sustainability Strategic Plan (SSP), MSU pledged its commitment to becoming a leader in campus sustainability over the next 10 years. Within the strategic plan, MSU outlines strategies and goals to reduce environmental impacts and foster a culture of sustainability in four major focus areas: Academics, Engagement, Operations/Planning, and Administration.

Improvements within these focus areas are measured through the Association for the Advancement of Sustainability in Higher Education (AASHE) Sustainability Tracking, Assessment & Rating System (STARS). MSU has begun work toward stated campus sustainability goals within each focus area, including Operations Goals and Strategies 19: Waste Minimization and Diversion. Throughout the first half of the 10-year SSP, implementation of waste-reduction strategies has included the increased recycling of appropriate materials, composting of organic materials, reuse of suitable materials, and donation of unneeded materials. As a result, the 2019 waste diversion rate at MSU's Springfield Campus hit 24%, meaning that almost a quarter of campus waste was diverted from the landfill.

In Fall 2019, the Student Government Association (SGA) received a proposal for funding an 'Integrated Waste Management Plan and Waste Characterization Study'. The proposal, written by MSU students with the support of faculty and staff, sought funding to begin a project in partnership with the Illinois Sustainable Technology Center (ISTC) aimed at 1) quantifying current recycling and waste minimization efforts on campus and 2) identifying opportunities for improvement. Since existing records for campus waste and recycling data did not provide a complete picture of current generation and recycling performance, and the SSP did not lay out concrete waste performance goals or expectations, further study and expertise was needed to address these existing gaps.

Project Funding

The proposal successfully obtained funding from the Student Sustainability Fund, a student-managed fund that uses student fees and matching administration donations amounting to over $100,000 annually. This funding empowers students to advance sustainability efforts on campus and allowed MSU to hire ISTC to complete a campus waste characterization study and create the resulting Sustainable Materials Management Plan.

The Sustainable Materials Management Plan below includes waste characterization data, establishes current conditions, identifies future opportunities, and details recommendations to improve the solid waste management practices throughout the campus through increased material diversion and overall waste reduction. To complete this plan, ISTC and MSU engaged students, faculty, and staff in the process of documenting and evaluating current waste and recycling streams and volumes, user experiences and behaviors, infrastructure requirements, limitations and improvement opportunities, cost effectiveness, and establishing a long-term plan for waste reduction. Through their participation in this process, MSU students have been afforded the opportunity to affect sustainable change on campus both today and into the future.

Impacts of Covid-19

The COVID-19 pandemic primarily impacted this project's timeline and choice of baseline dataset. ISTC's initial site visit occurred in March 2020 - shortly before COVID-19 shelter-in-place orders began in the US. Due to on-going travel and in-person engagement COVID-19 restrictions, the waste audit occurred over the course of 10-days in late-September to early October 2021, 1.5 years after the initial site visit. In addition, to avoid further delay of project completion, the original plan to conduct a 9-building spring audit and a 9-building fall audit was forgone for one 18-building fall audit. Lastly, FY19 campus waste generation and service is the baseline utilized in this plan because of potential COVID-19 impacts on 2020 and 2021 waste generation and service.

"Products and materials presently viewed as acceptable to throw away will increasingly be recognized as valuable."

US EPA, Sustainable Materials Management: The Road Ahead

Sustainable Materials Management

Recognizing MSU's commitment to improving the sustainability of its operations while also modeling sustainable behavior and encouraging students to adopt lifelong strategies for sustainable living (as identified in the 2017 SSP), it is important to introduce the concept of Sustainable Materials Management. This concept can inform the university's long-term approach to addressing waste generation and diversion on campus, as well as overall sustainability efforts.

The U.S. Environmental Protection Agency (EPA) defines Sustainable Materials Management (SMM) as "a systematic approach to using and reusing materials more productively over their entire life cycles." Considering a product's "life cycle," from the extraction of raw materials, through manufacture, distribution, use, and end-of-life management, allows for more thorough identification of opportunities to reduce negative environmental impacts and costs while also conserving natural resources. Figure 1 illustrates a product life cycle, and shows EPA's priorities for end-of-life management strategies for materials.

Figure 1: Product Life Cycle with EPA's Priorities for End-of-Life Management Strategies

Figure 2: EPA's Non-Hazardous Materials and Waste Management Hierarchy

These end-of-life management strategies, which are most relevant to this Sustainable Materials Management Plan, are often also represented as an inverted pyramid called the "Non-Hazardous Materials and Waste Management Hierarchy" (Figure 2). The hierarchy ranks strategies from most to least preferred, emphasizing the avoidance of waste generation through source reduction and reuse, followed by recycling or composting (depending on material type), and then energy recovery whenever it is impossible to avoid waste generation or recovery of materials through recycling. Treatment of waste materials and disposal in landfills is the least preferable approach to management and should be seen as a last resort.

As described in the document "Sustainable Materials Management: The Road Ahead," since 2002, EPA has recognized there is a need for our society to shift focus away from traditional waste management toward sustainable materials management. This is partially because a focus on waste management implicitly asserts that waste is inevitable and encourages people to consider certain materials as "wastes" rather than potentially valuable resources that need to be managed more effectively. "In a system that recognizes the true value of materials, and accounts for all the environmental impacts associated with materials use, the concept of waste is significantly changed. Products and materials presently viewed as acceptable to throw away will increasingly be recognized as valuable. Materials that used to 'go to waste' will be reused or become feedstocks for new products and processes. Biodegradable materials that are not reused will be returned to the Earth to renew natural systems.

Over time, as products and processes and ways of using things change, materials will begin to move in abundant sustainable cycles that nourish rather than deplete the Earth." (Sustainable Materials Management: The Road Ahead, Chapter 1, page 13).

A SMM approach thus strives to use materials in the most productive way possible, emphasizing the use of less whenever feasible. It particularly seeks to reduce toxic chemicals and environmental impacts throughout the material life cycle, so that in meeting society's needs today we do not inhibit the ability of future generations to have sufficient resources to meet their own needs.

As MSU works to improve campus solid waste management practices, it will seek to increase the diversion of materials from landfills through strategies such as recycling collection improvement, reduction of contamination in the campus recycling stream, and expansion of campus recycling programs whenever feasible.

However, in the long-term, sustainable materials management on campus will require strategies to reduce overall waste generation, in addition to increasing the campus landfill diversion rate. Efforts to reduce overall waste generation may include, but not be limited to:

- purchasing policies
- reduction of single-use materials on campus
- reuse of products/materials whenever possible
- fostering a culture of repair and reuse, etc.

The recommendations included later in this integrated solid waste plan include those geared toward waste avoidance (source reduction and reuse) as well as those focused on improving diversion of materials from landfill (recycling and composting).

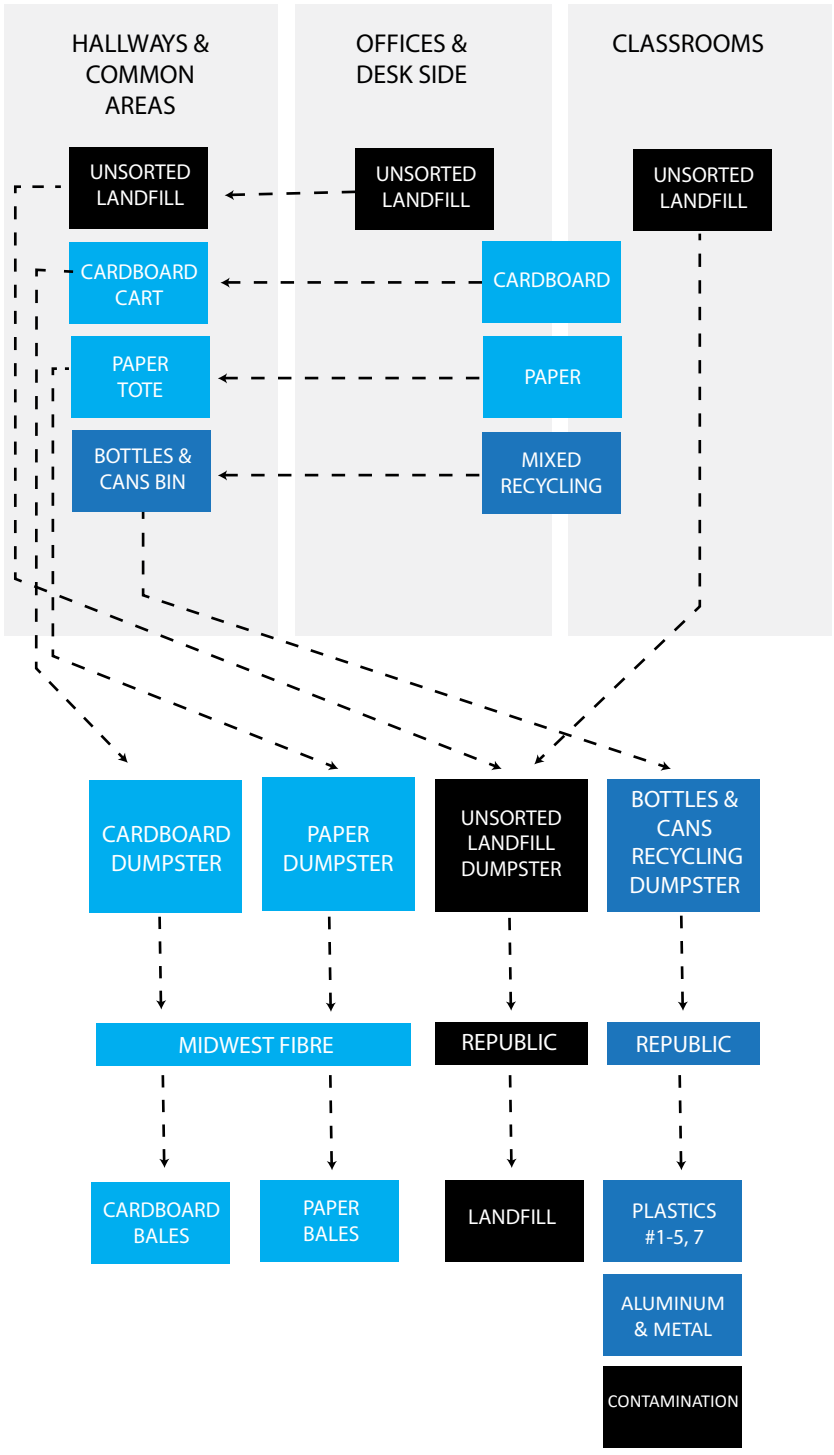
Overall sustainability efforts on campus may further incorporate SMM by considering the environmental impacts of products and materials used on campus during earlier phases in their life cycles (i.e. during material extraction, manufacturing, and distribution). For example, MSU might consider policies prioritizing the purchase of products that are manufactured domestically or regionally, or products manufactured with a certain percentage of post-consumer recycled content. Such strategies will be related to those focused on end-of-life material management and may necessitate revisions to end-of-life strategies in future iterations of this Sustainable Materials Management Plan. While many organizations begin their sustainability efforts by considering waste generation and management, the principles of SMM illustrate that other phases in the life cycle of products, services, and materials are important, and should be considered as the organizational sustainability journey continues.

MSU has made great strides toward incorporating sustainability into daily campus operations while working to meet the goals of the 2017 Sustainability Strategic Plan

Current Management Practices

Academic and Administrative

Academic and administrative buildings are serviced by Custodial Services team members who take care of the landfill stream, and Student Service Workers, who take care of the recycling stream. The general handling of waste and recyclables follow the process outlined in Figure 3.



When present in administrative offices, individual and shared deskside mixed-recycling bins are emptied in hallway and common area containers for paper and bottles & cans by desk occupants. Paper may also be taken to 95-gallon paper totes or secure shred bins. In some buildings, cardboard is taken by desk occupants and/or Custodial Services to cardboard carts, available in limited locations within the building. Landfill material generated by office occupants is emptied by Custodial Services team members. Landfill bins are lined with black or teal liners while mixed recycling bins are used without liners.

Classrooms may contain no bins, only recycling bins (paper or mixed), only landfill bins, or both recycling and landfill bins. Custodial Services empty unsorted landfill containers from classrooms, and collect any material students leave behind. Classroom occupants are responsible for emptying paper and mixed recycling containers located in classrooms, as well as transporting cardboard to cardboard carts. Landfill bins are lined with black or teal liners while mixed recycling bins are used without liners.

For common areas and hallways Custodial Services empties all landfill material. Student Service Workers and designated Custodial Staff empty all paper bins into the 95-gallon paper totes, service and combine bottle & can recycling bin materials, and flatten cardboard placed near containers and in cardboard carts until transport. Unsorted landfill containers and paper and bottle & can containers are serviced with black or teal liners.

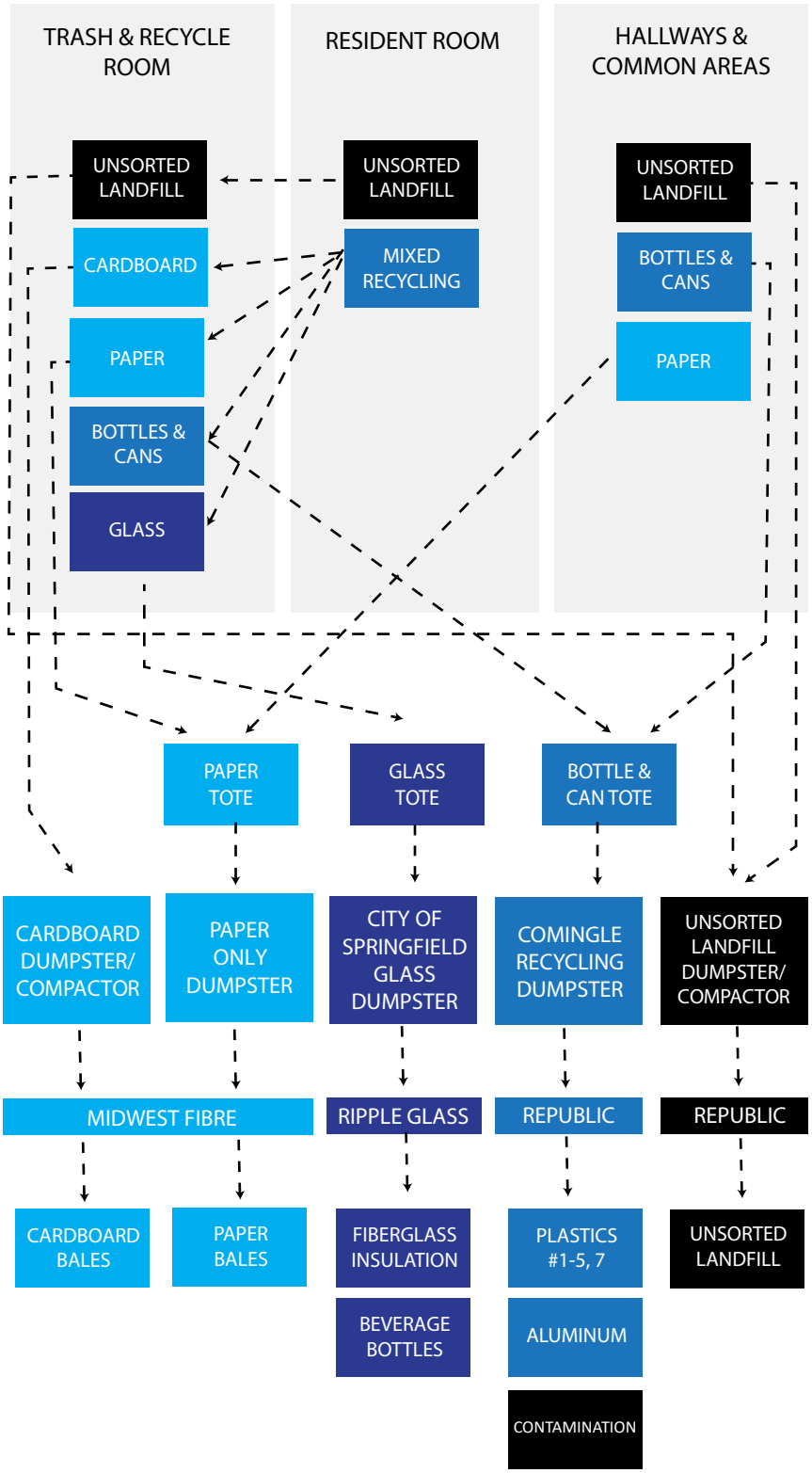
Custodial Services deposit collected bags of unsorted landfill material into nearby outdoor landfill dumpsters. Custodial Services empty the 95-gallon paper totes weekly on scheduled pick-up days or on-call into a campus-wide paper only dumpster. The collections of comingled bottles & cans and collections of cardboard are transported to respective central recycling and cardboard dumpsters by Student Service Workers. Occassionally cardboard is placed in unsorted landfill dumpsters by building occupants.

Republic Services collects material in each landfill and comingled recycling dumpster with stream respective trucks. Midwest Fibre collects material from cardboard dumpsters and the paper dumpster. At each Material Recovery Facility materials are sorted, bailed by commodity and sold. Unsorted materials and remnants from the sort-line are sent to the landfill. Cardboard and paper are bailed by commodity and sold.

Figure 3: Waste flow diagram for academic and administrative buildings on MSU campus

Residential Buildings

Figure 4 outlines the process for Residential buildings where Residential Life Custodial Services handles these materials. Detailed observations and process highlights are further described in the Collection Processes, Infrastructure & Communications section below.



Most residents are provided a small trash and comingled recycling bin upon move in. Paper, glass, bottles & cans and cardboard generated in residential rooms are transported by occupants to trash and recycle rooms located on every floor for sorting and disposal. Some residential halls have a small built in trash and recycling cupboard in each room. The bins are accessible both internally to room occupants and externally in the hallway to Residential Custodial Services via key.

In most residential buildings with trash and recycle rooms and common area containers, Residential Custodial Services collects bags of material and loose, flattened cardboard. In some residence halls custodial team members collect landfill and recycling from each room, while occupants still have the option to empty bins into communal paper, glass, bottles & cans and landfill bins as needed. Unsorted landfill bins are serviced with black liners while glass, paper and comingle containers are serviced with teal liners. For shared common areas Residential Custodial Services team members empty all containers.

Residential Custodial Services staff deposit collected bags of unsorted landfill in outdoor unsorted landfill dumpsters or compactors. Paper, glass and bottles & cans material are placed in respective 65 to 95-gallon totes or comingled recycling dumpsters behind the buildings. Collected cardboard is placed in cardboard dumpsters. Once full, Residential Custodial Services staff transports and empties the paper totes into campus-wide paper only dumpster, and bottles & cans totes into a sorted mixed recycling dumpster. Glass is taken to a city facility for recycling.

Republic Services collects material from each landfill and comingled recycling dumpster or compactor and with stream respective trucks. Midwest Fibre collects material from cardboard dumpsters and the paper dumpster. At each Material Recovery Facility materials are sorted, bailed by commodity and sold. Unsorted materials and remnants from the sort-line are sent to the landfill. Cardboard and paper are bailed by commodity and sold. Ripple Glass in Kansas City processes City of Springfield collected glass. At Ripple it is processed and sold to fiberglass insulation and beverage bottle manufacturers.

Figure 4: Waste flow diagram for residence halls buildings on MSU campus

Collection Processes, Infrastructure & Communications

The overall collection process for Academic, Administrative and Residential buildings observed during walkthroughs and in conversations with Facilities Management, Custodial Services, and Student Service Workers is outlined in Figure 3 and 4. The buildings that were surveyed by walkthroughs are listed in the below section, Walkthrough Building List. Overall collection processes observed were generally consistent, however minor deviations from, or modifications of, this process may occur from one building to another, or among different areas within the same building due to access restrictions (e.g. staff only/no student areas). Unique to MSU, there is a clear division of responsibility between Custodial Services, which primarily take care of the landfill stream in addition to other responsibilities, and Student Services Workers, which take care of the recycling streams.

Campus collection infrastructure (bins, totes) observed varied amongst the buildings and/or distinct functions of spaces (e.g. classrooms, offices, residential rooms, or common areas). Some, typically newer buildings, have streamlined collection infrastructure, while others had a mix of bins and sets of varying sizes and designs. These variations can be attributed to the fact that recycling bin sourcing and cost is a responsibility of the respective department or facility, and not dictated by campus wide policy or standards. Newly constructed facilities account for the cost of waste and recycling bins in overall building development costs, resulting in consistent bins, such as the "Valuta" multi-bins sets placed throughout Glass Hall and Foster Recreation Center (see Figure 20 for an example). In existing facilities, when the need for more recycling bins is identified, the onus to source and pay for the bins is on the department identifying the need, often leading to sourcing of various styles of bin in one building. Collection infrastructure for hauling (totes, dumpsters, compactors and open top containers) is relatively consistent based on facility functions, anticipated generation volumes and materials, and special events.

Collection communication (e.g. bin labels, signage, graphics, etc.) varies across campus. It is often based on the type of collection bins present and is occasionally spearheaded and streamlined by departments (i.e. Residence Life). Located in newer buildings, the Valuta bins all have waste stream labels and graphics on the front of the bins (most white, some colored; see Figure 20). Residential Life has created clear, consistent recycling bin signs and labels for shared bins (see Figures 27-30). On many small deskside or classroom recycling bins we found an imprinted recycling symbol. Many bins are accompanied by one or more DIY signs ranging from handwritten instructions, to detailed visuals and guidance, to inclusion of Boomer the mascot. "Paper only" recycling carts are all clearly labeled, as are "bottles & cans only" bins and a handful of other unique recycling and landfill bin units and sets (i.e. McQueary Hall - Figure 21, Meyer Library – Figure 32, Plaster Student Union – Figure 36). Labels and instructions accompany about half of the cardboard carts. Most other bins lack labeling and signage. Visuals of many of these introductory references are included below.

Figure 5: Numerous signs placed both on and above this recycling bin in Brick City 1.

Administrative Offices

Many individual offices were equipped with a landfill bin and a recycling bin. Some cubicles and open offices with multiple desks either shared a set of landfill and recycling bins, or had both landfill and recycling bins under each desk, while others had only a landfill bin, and still others only a recycling bin. Custodial Services typically service deskside landfill bins. Deskside recycle bins are serviced by the individual workspace occupants who take respective materials to 95-gallon totes designated for paper only, cardboard carts and/or hallway bin sets for bottles & cans and paper. Some office spaces had a small communal shredder which occupants empty into paper only totes. Copiers and printers were often paired with both, or either a recycling bin or landfill bin. These 5- or 7-gallons bins were black or grey if designated for landfill, and blue if designated for recycling. Landfill bins were lined and recycling bins unlined. Beyond the imprinted recycling symbol and label, bins were infrequently labeled and without signage. This is typical given normal out of sight placement and use by limited, consistent occupants.

Figure 6: 95-gallon paper totes

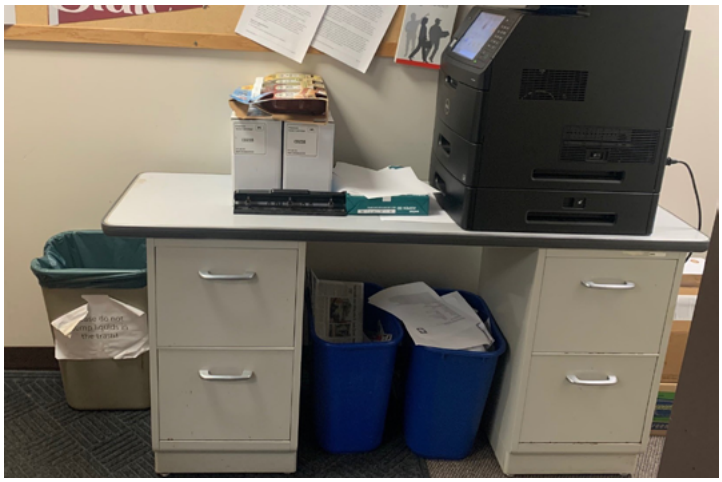


Figure 7: Bins at a printer

Figure 8: Deskside bin set and cardboard

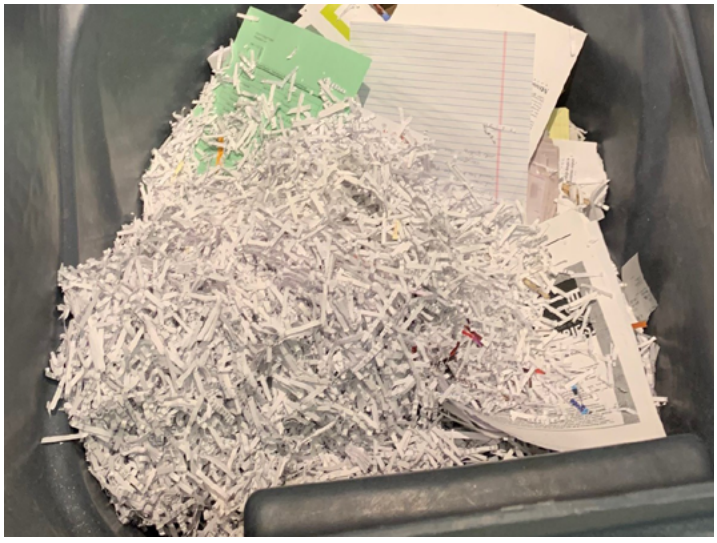


Figure 9: Shredded paper in paper tote

Academic Classrooms

Most classrooms observed were serviced only with landfill bins, often at the entry – inside or just outside - where all material is comingled. The second most common occurrence was to have no landfill or recycle bin in the classroom at all. On rare occasions classrooms had both a landfill and a recycling bin. Classroom bins were the same size or a few gallons larger than those found in administrative offices, were black or grey and lined, or were blue, stamped with a recycling symbol and unlined. In buildings where no bins were present in classrooms, Valuta multi-bin sets and standalone landfill bins were found in hallways for students and staff to utilize.

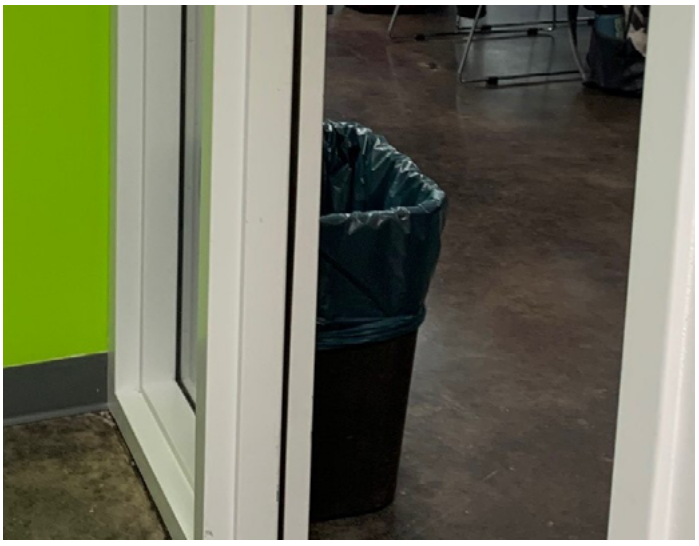


Figure 10: Classroom entrance landfill bin

Figure 11: Classroom entrance landfill bin

Figure 12: Classroom entrance landfill bin

Figure 13: Classroom landfill & recycle bin pair

Figure 14: Classroom standalone recycling bin

Academic with Laboratories, Studios and Kitchens

Lab, studio and kitchen spaces surveyed had varying types, sizes and frequency of containers. Some had paired landfill and recycle bins (i.e. side-by-side), while others had only landfill bins and others had no bins at all. Lab spaces surveyed were serviced with lined, 7-gallon and/or 23-gallon landfill bins. Typical lab policy does not permit food or beverages in lab spaces, thus most labs had landfill bins near the entrance to discard non-permitted waste upon entry. Some lab spaces had special collection containers for broken glass, which were serviced by students on an as-needed basis. Studio spaces surveyed often housed lined, 45-gallon landfill bins, pairs of landfill and recycle bins, and independent recycling bins for bottles & cans or paper. The jewelry studio housed multiple metal scrap bins for reuse in skills practice, maximizing the usefulness of the material. Kitchen spaces surveyed had lined, 23-gallon landfill bins. When signage was present it most often identified and provided instruction for recycling practices.

Figure 15: Laboratory landfill bins

Figures 16: Laboratory landfill bin and broken glass box

Figures 17: Studio landfill bin

Figure 18: Studio landfill and recycle bins

Figure 19: Kitchen landfill bin

Hallways, Common Areas, Cardboard Carts and Recycling Closets

Across academic and administrative buildings where walkthroughs were performed, hallways, common areas and recycling closets served as the centralized collection points for waste and recycling. Most often, consistent sets of bins were utilized to collect material in hallways and common areas building-wide. In some cases, standalone landfill or recycle bins were present and often not labeled. Rarely did these spaces lack bins completely. Placement and labeling for Valuta three-bin sets (20 and 40-gallons) was consistent and abundant in buildings where these were standard. Valuta bin labeling consists of stickers on the front of each bin indicating the stream - waste, paper, or recycling. Teal liners are used for these bins. Occasionally additional bins are paired with the set. Large, 95-gallon paper totes were present in many locations, often complementing other bins of various sizes, into which office occupants and students could empty paper. Occasionally a pair or a mix of bins were utilized in these highly traversed spaces. In a few cases unique signage was present on bins, or the wall behind the bins, indicating streams and listing acceptable and unacceptable materials.

Figure 20: Common Valuta bin set

Figure 21: Cardboard slid behind a paper totes with landfill and "plastic cans" recycle bin

Figure 22: Standalone landfill bin outside an office

Figure 23: Ad hoc hallway bin set and accompanying signage

Hallways, Common Areas, Cardboard Carts and Recycling Closets- Continued

Collection spaces located in tucked away corners or hallways housed cardboard carts, which were typically labeled. Where designated cardboard carts were present, signage instructed building users to flatten boxes before placing them in the cart. Alternatively, in common areas without designated cardboard carts, building users often slide flattened boxes and other cardboard behind the existing bin sets. Upon servicing building recycling bins and loose cardboard, Student Service Workers may aggregate materials in recycling closets until either volume necessitates or time allows for transport. Signage was inconsistent in these spaces. While the management of landfill and recycling is divided between Custodial Services and Student Service Workers, on occasion Custodial Services staff will transport cardboard placed behind bin sets and bags of bottles and cans - if the bin is full before scheduled service - to recycling closets.

Figure 25: Recycling closet

Figure 24: Cardboard recycling cart

Figure 26: Recycling corner

Residence Halls

Building infrastructure and equipment, and the processes and protocols for collecting waste varies among residence halls surveyed. Some halls provide residential rooms with small multi-gallon recycling and landfill bins or baskets, while other halls expect the occupants to supply their own. In either case, the resident is responsible for providing their individual liners should they choose to use them, cleaning their own individual bins as needed, and transporting material to the common area bins or trash and recycle closet. Uniquely, some residential halls have small built-in waste cupboards in each dorm room. The waste cupboard bins are accessible both internally to room occupants and externally in the hallway to Residential Life Custodial Services via key. In these halls Residential Custodial Services staff collect both landfill and recycling directly from student rooms through this external access. Residential room bins and cupboards are not supplied signage. Common area bins or trash and recycling closets are located on each floor of a residence hall. In this practice, paper, glass, bottles & cans and cardboard are comingled in resident rooms and must be sorted into the correct 23 or 45-gallon bins for each material type in the common areas or closets. These bins are frequently accompanied by clear signage. Common areas bins are also present for general use, overflow or disposal beyond scheduled service. Occasionally standalone landfill bins are found in common areas. See Figure 4 for a summary of the material flow process in residence halls. Consistent among Residential Life facilities, recycling bins are identified by signage on the bins or walls next to the bins, while landfill bins lacked signage entirely. Teal liners are used for all streams. Across residential halls Residential Life Custodial Service staff collect material from shared trash and recycling closets and common spaces.

Figure 27: Waste cupboard access from the hall
Figure 28: Trash and recycle closet bins

Figure 29: Common area bins

Figure 30: Hall entrance bins

Mixed Use

Mixed use facilities are unique spaces, housing a variety of bin styles, sizes and configurations, and are often managed in custom ways. In Meyer Library many 5 and 7-gallon 'deskside' grey, tan and black bins were scattered about each floor and 10-gallon bins were placed near internal doorways. Some bins had black liners, some had teal liners, and all bins lacked labels or signage. Standalone, unmarked, lidded grey bins, both round and square, were commonplace near entries and in hallways. Large paper totes were present at shared printers and paper generating hubs. A few different styles of labeled three-bin units with bins for waste, paper and bottles & cans were present near elevator banks and highly trafficked intersections. Recycling bins that are accessible to staff only are serviced by Custodial Services. Creative, educational recycling signage was present in some locations, suggesting engaged recycling advocates work in these spaces. In Plaster Student Union (PSU) the primary dining space contained numerous, large landfill bins topped with tray collection space. These are highly trafficked and frequently serviced by PSU Custodial Services team members during peak times. Common spaces contained large, round landfill bins and unique sandy-colored three-bin units labeled for paper, bottles & cans, and landfill streams. Nearly all landfill bins utilized teal or black bags, while clear liners were utilized for recycling. Large conference rooms and gathering spaces contained only landfill bins, all unlabeled. Offices contained deskside paper and landfill bins, both of which were emptied by custodial staff, whereas users emptied bottles & cans bins themselves into communal hallway bins. PSU has its own Custodial Services team that manage all these bins. Separate entities within PSU – such as the various food vendors, convenience store and bank – independently collect and manage material within their spaces and use the building's shared dumpsters. Union Club, the upstairs, buffet-style dining hall is managed entirely by Dining Services out of a neighboring building's dining services kitchen.

Figure 31: Meyer Library 'deskside' study space bins
Figure 32: 3-bin set near an elevator

Figure 33: Paper tote and small bin at a printer
Figure 34: Mascot themed DIY educational recycling signage

Figure 35: Plaster Student Union bins in dining space

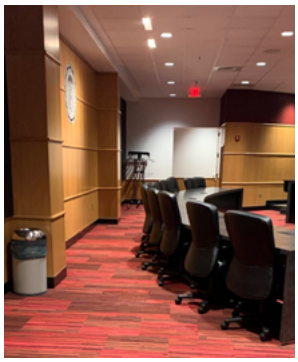


Figure 36: Plaster Student Union bins in common area
Figure 37: Plaster Student Union bins in conference room

Recreation, Athletic and Event Facilities

Recreation, athletic and event facilities typically have material collection equipment and systems consistent with those found in other campus facilities. The norm in these cases were widely present, standalone, grey 23-gallon bins and grey 45-gallon barrels, with recycling bins being uncommon or non-existent. The barrels are typically on dollies enabling nimble placement and use throughout a facility. Small deskside bins of various colors were present in office and conference rooms, whereas larger 10 to 23-gallon bins were present in suites and the few classrooms. Blue 23-gallon bins were dispersed sparingly in one complex. Campus' main Arena – hosting both MSU events and public concerts - hosts branded, independent bins as well as 45-gallon grey barrels on dollies. The new Foster Recreation Center has consistent Valuta bin sets enabling recycling collection. All other bins lacked labeling or signage. Teal or black liners were used in all bins. Day-to-day these spaces are typically managed by Custodial Services. During events with sizable attendance a contracted custodial group is utilized.

Figures 38 & 39: Omnipresent grey bins near racquet courts and barrels on dollies in the Arena.

Figure 40: Valuta bin set at the recreation center

Figure 41: General grey barrel on the pool deck
Figure 42: Great Southern Bank Arena branded bin

On-the-Go

Located primarily on internal campus walkways and restricted access streets, near building entrances, and in plazas, parking lots and parking structures, dozens of outdoor landfill and bottles & cans recycling bins are used by the campus community, and sparingly by the local community. Landfill bins are serviced weekly by Grounds staff and recycling by Student Service Workers when approximately 60-80% capacity is attained. These sizable, sandy colored bins are differentiated by their lids. Landfill bins have gray, open top caps and are not labeled. Recycling bins have labeled, green plastic caps and a green “chasing arrows” emblem on the stone body. The round, bottle-sized hole on the cap restricts the types of items that can be thrown into the bin, reinforcing the desired materials as stated by the label “Recycle, Bottles & Cans.”

Figure 43: Outdoor collection bins

Select Material Collection

Select materials are recycled or reused when individual departments or offices elect to take on the responsibility of material collection and management. Residence Life has organized glass, plastic bag, ink cartridge and battery recycling in resident halls. Collection bins are typically placed in highly trafficked hallways and common areas, often adjacent to entrances and exists. There is variation in bin size, labels and signage. While having environmental impacts, select collection programs are driven by social impact, such as the Health Sciences Department collecting plastic bags for creation of sleeping mats for homeless community members, or cost savings, such as laboratories consciously cleaning and storing supplies for potential reuse. In the case of food scraps, a significant amount of material is generated at dining centers. Kitchen staff at both Blair-Shannon Dining and Garst Dining separate food scraps and wasted food for composting. Observation showed the food scrap collection bins within kitchens for the sole use of food service staff contained a clean stream of material, while bins collecting diners' plate waste in dish return/washing area contained some contamination (e.g. saltine cracker wrappers, coffee sachets, single serving cream cheese cups and lids).

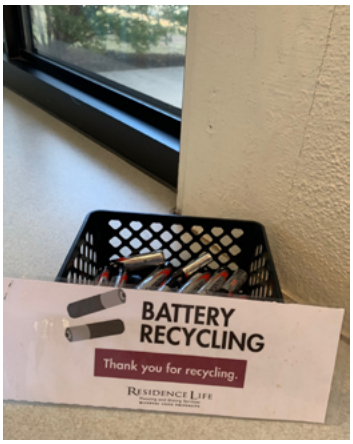


Figure 46 & 47: Ink cartridge and battery recycling bins in residence halls

Figure 48: Plastic bag collection at Kampeter Health Sciences Hall
Figure 49: Bags of food scraps

Figure 44 & 45: Glass & plastic bag recycling in residence halls

Figures 50 & 51: Meal prep scraps and diners' plates scraps from Blair-Shannon Dining

Centralized Material Collection

All landfill material collected by building Custodial Services and Dining Services staff is placed in the appropriate landfill dumpster or compactor—typically the dumpster or compactor closest to the building where the waste was generated. Wheeled carts or gondolas are used to collect and transport bags of material to the dumpsters safely and easily. Occasionally, especially in dense areas, buildings share a centralized landfill or cardboard dumpster or compactor. Dumpster and compactor size and service frequency have been determined over time by Custodial Services, Dining Services and Republic Services. In staff-only areas, totes designated for paper only and a few (7) bottles & cans bins are emptied by Custodial Services on scheduled pick up days or upon request. In academic and administrative spaces Student Service Workers collect paper from common area bins and deposit it in the appropriate paper only totes within the building. Student Service Workers also collect from bottles & cans bins in these spaces. Occasionally, they deposit material in recycling closets temporarily before transporting the material to the dedicated recycling dumpster in Lot 51. Additionally, Student Service Workers service the cardboard carts and cardboard stored in the recycling closets, depositing the material in the cardboard only dumpster at the Central Stores & Maintenance building. Facilities Management requests on-demand pick-ups of Custodial Services and Student Service Workers as needed. Residential Life Custodial Services and Dining Services staff manage the cardboard, mixed recycling and any unique streams collected at their facilities with respective dumpsters, compactors, carts or other storage containers. With the exception of Blair-Shannon House and Dining, all buildings surveyed appeared to have adequate or abundant collection capacity and scheduled pick-ups for materials currently collected. At Blair-Shannon Dining, staff reported the current commingled recycling dumpster and two cardboard recycling cages fill quickly and are often overflowing, requiring recyclables to be deposited in the landfill compactor.

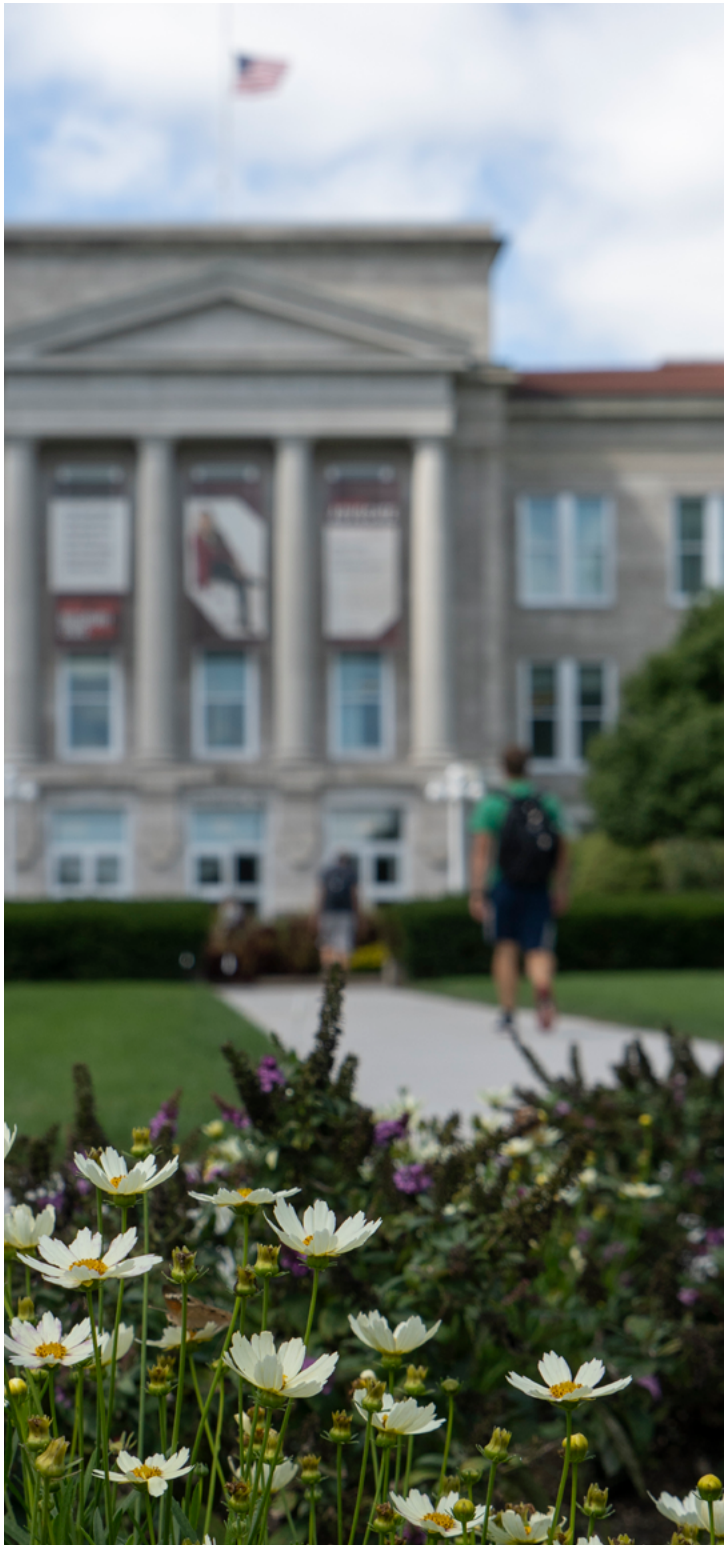
Figure 52: Strong and Glass Hall's shared landfill dumpster, Figure 53: Dumpsters for Craig, Karl, Ellis, Hill Hall, Power House and Art Annex

Figure 54: Freudenberger House's recycling carts
Figure 55: Landfill compactor at the Arena

Figure 56: Wheeled cart / gondola full of collected material.
Figure 57 & 58: Overflowing mixed recycling dumpster and cardboard cages at Blair-Shannon House and Dining.

Waste Management Infrastructure, Service and Partners

Hauling partners provide Missouri State with a wide variety of waste management infrastructure, including 90 and 96-gallon wheeled totes, 2, 3, 4, 6, and 8-cubic yard (cy) dumpsters, 10, 20, 30 and 40 cy open top containers, and 30 and 40 cy compactors. The selection and usage of each of these is based on numerous factors including material type collected, space availability, shared usage, co-location, container availability by hauling partner, anticipated generation and service frequency. Service frequency is typically scheduled for 1, 2, 3 or 5 pick-ups each week (weekdays). Service frequency can be set to 'on call', meaning service is based on MSU staff calling in the request as an alternative to scheduled or automated compactor capacity alert service. Temporary collection containers are typically placed during student move-in and move-out timeframes, home football games and other specialty activities. Each piece of infrastructure and hauling service has pros and cons, and incurs varying expenses. Visit the Waste Analysis Report webpage for the 2019 Republic Services Service & Tonnage Report for Landfill & Recycling for a relatively complete list of infrastructure and service provided by hauling partner Republic Services. Additional waste management partners include Midwest Fibre which specializes in paper and cardboard, Post Disposal for yard waste and food scraps, the City of Springfield for vegetable oil and glass, Commercial Metals Company for scrap metal and various other specialty partners and programs for electronics, ink cartridges, plastic bags, etc.



Walkthrough Building List

ISTC conducted walkthroughs of the following buildings during the March 2020 site visit:

Building Name	Abbrev.	Type of Building
Blair-Shannon House & Dining	BLSH	Residential Hall; Dining Space
Brick City 1	BRIK	Academic with Studio
Carrington Hall	CARR	Administrative
Cheek Hall	CHEK	Academic
Craig Hall	CRAG	Academic with Studio; Event Space
Freudenberger House	FRUH	Residential
Glass Hall, David D.	GLAS	Academic; Dining Space
Hammons Student Center, John Q.	HAMC	Athletic
Great Southern Bank Arena	ARNA	Event Space
Karls Hall	KARL	Academic with Lab
McQueary Family Health Centers Hall	MCQY	Academic with Lab
Meyer Alumni Center, Kenneth E.	ALUM	Administrative
Meyer Library	LIBR	Mixed-Use
Morris Center, Jim D.	JDMC	Administrative
O'Reilly Clinical Health Sciences Center	OCHS	Academic with Lab
Outdoor Cans	-	On the Go
Plaster Stadium & Sports Complex	PLAS	Mixed-Use
Plaster Student Union	PSU	Mixed-Use; Dining Space
Kampeter Health Sciences Hall	PROF	Academic with Lab
Pummill Hall	PUMM	Academic with Kitchen
Recreation Center, Bill R. Foster and Family	FFRC	Athletic
Siceluff Hall	SICL	Academic
Strong Hall	STRO	Academic
Sunvilla Tower	SUNV	Residential
Temple Hall	TEMP	Academic

2019 Republic Services Service & Tonnage Report for Landfill & Recycling

Visit the Waste Analysis Report webpage at this link for a relatively complete list of infrastructure and service provided by hauling partner Republic Services in FY2019.

Current Waste Reduction & Diversion Initiatives

MSU has made great strides toward incorporating sustainability into daily campus operations while working to meet the goals of the 2017 SSP. The strategies below highlight the efforts of MSU students, faculty, and staff to not only increase waste reduction and diversion, but also provide campus members with the tools and opportunities to effect the change they want to see on campus through funding for new sustainability-focused projects.

Student Service Workers

Each year a handful of Student Service Workers are hired to collect, transport and recycle source-separated materials from administrative and academic buildings across campus. Their important work helps MSU keep tons (literally!) of cardboard, paper, bottles and cans, electronics and toner cartridges out of the landfill.

Dining Hall Composting Program

Inedible food scraps from back-of-house food prep, as well as front-of-house food scraps left on plates of diners, are collected, picked-up and composted by Post Disposal Services.

Glass Recycling

Glass cannot be recycled in “Bottles & Cans” recycling bins across campus, which are meant for plastic beverage bottles and aluminum cans only. However, due to student interest and a dedicated effort by Residence Life, glass is collected for recycling in residence halls. Residence Life takes this material to a City of Springfield glass recycling drop-off.

Football Home Games Recycling

Student volunteers assist with recycling efforts at home football games utilizing 25 portable ClearStream recycling binswhich were purchased to provide additional recycling collection for these games as well as other events across campus.

Piloting Waste Not 2.0

Chartwells dining is piloting Waste Not technology which enables the measurement of food waste, providing valuable data to inform adjustments to food production.

Cooking Oil Recycling

Collected, spent cooking oil generated in the dining centers and by Plaster Student Union food vendors is transported to the City of Springfield's wastewater treatment plant for anerobic digestion. The biogas generated by the digester fuels combined heat and power generators which power a significant portion of plant operations.

Water Bottler Refill Stations

Hydration stations have been installed at over 60 locations across campus, empowering individuals to refill reusable water bottles as opposed to buying single-use water bottles.

Student Sustainability Fund

This fund - supported by a $2 sustainability fee per student each year - goes towards student led sustainability initiatives on campus. Students can tap into the over $100,000/year fund by submitting project proposals that are voted on and implemented by students.

Batteries, Electronics and Toner

Student Service Workers pick up these materials from across campus for proper recycling.

Plastic Bag Recycling

Residential Life collects clean plastic bags in ground floor common spaces of most campus residence halls. These bags are taken to a nearby Salvation Army for reuse by customers.

Surplus Property

Surplus equipment and supplies are stored and accessible for faculty and staff to use on campus for university use. Some items can be purchased through GovDeals.com. MSU recently signed a Memorandum of Understanding (MOU) with the Habitat for Humanity Restore to purchase surplus items that are not sold on GovDeals.com to help reduce landfill waste. Keeping these goods in productive use through reuse and resale reduces landfilled waste.

Compostable Straws

Chick-fil-A, one of the food vendors located in Plaster Student Union, has transitioned to compostable straws and food packaging which reduces their single-use plastic impact.

The Waste Audit Process

Why Characterize Waste?

Waste characterization studies (aka waste audits) involve the analysis of a solid waste stream - either a landfill-bound waste stream, recycling stream, or both - to identify the key material types and relative quantities of materials being disposed. This typically includes sorting a waste stream sample into pre-determined material categories (e.g. mixed paper, glass, plastic bottles, other plastic containers, etc.) and weighing the amounts of each category present in the sample. This allows for the calculation of the percentage of the total waste stream comprised by each material category, which in turn allows for informed identification of opportunities to avoid or reduce waste, improve the collection of recyclable materials, expand recycling programs, reduce contamination in the recycling stream, and otherwise divert materials from landfills (e.g. through reuse or redistribution).

Such data not only reveal new initiatives that might be pursued, but can also assist with setting priorities for which potential improvement strategies would have the greatest impact on waste reduction or diversion. This is particularly important when resources such as budget or staff capacity are limited. For example, the Student Government Association might want to work on reduction of single-use plastics. However, if a waste characterization revealed that the largest portion of their organization's landfill -bound waste stream consisted of compostable materials, followed by office paper, and then by single-use plastics, then introducing or expanding collection programs of compostable materials and implementing relevant education and outreach campaigns would be the most beneficial to reducing their campus's environmental impacts. Efforts to reduce single-use plastics would still be important, but given limited resources, they would be justified in focusing more immediate attention to composting.

The results of a waste characterization study can also provide a baseline against which improvement can be measured, and aid in evaluation of waste reduction and diversion strategies. Continuing the above example, imagine that the Student Government Association decided to initiate a composting program for their organization based on their waste characterization results. A few years after composting began, they could conduct another waste characterization study and quantify the reduction in compostable materials being sent to landfill. This might justify the continuation or expansion of their compost collection program efforts.

If a follow-up waste characterization conducted after the implementation of waste reduction or diversion strategy showed minimal or no impact on the amount of relevant material being sent to landfill, this would signal the need to evaluate the strategy for potential modification or replacement with alternative approaches.

Thus, waste characterization provides the information necessary to make informed decisions that allow for more sustainable materials management. Follow-up waste characterizations (after a baseline) can assist with evaluation of waste reduction and diversion strategies and targets, and inform modifications as needed.

Activity Zone Approach

To better provide building level generation data to guide change, as well as the ability to extrapolate to campus-wide generation, ISTC adopted an “activity zone” approach to waste characterization. An activity zone is a classification of a building according to its main function and services, while acknowledging there may be other service housed within buildings that differ from its main function. Working together, MSU and ISTC identified 10 activity zones on campus and selected 1 to 3 representative buildings or spaces per activity zone to include in the waste audit. Further, each campus building was classified into an activity zone.

These 10 activity zones, their definitions, and the respective buildings audited are introduced here. Landfill tonnage generation and material opportunity tonnage for each activity zone are included in section Study Results, Activity Zone Level Generation. The landfill composition and material opportunity of each activity zone are included in Appendix A: Activity Zone Data.

Activity Zones

Academic

Buildings that primarily serve as spaces for student classrooms and instruction. These buildings also may have offices, conference rooms, lounges, and computer labs.

Buildings Audited: Cheek Hall, Glass Hall and Strong Hall

Academic with Lab

These buildings house research and/or instructional laboratories. They may also house laboratories, offices, conference rooms, and lounges.

Buildings Audited: Kampeter Health Sciences Hall, Karl Hall and Temple Hall

Academic with Kitchen

Buildings that primarily serve as spaces for student classrooms and instruction and have kitchens where instruction, cooking and food preparation take place.

Buildings Audited: Pummill Hall

Academic with Studio

These buildings house artistic studios and/or creative development spaces. They may also house classrooms, offices, conference rooms, and lounges.

Buildings Audited: Brick City 1 & Craig Hall

Administrative

Buildings that primarily serve administrative functions and/or house office space for staff and faculty on campus.

Buildings Audited: University Hall and Carrington Hall

Dining Spaces

This includes facilities where the primary functions are to prepare and consume food.

Buildings Audited: Plaster Student Union dining vendors, Blair Shannon Dining and Einstein's Bagels in Glass Hall

Event Spaces

Buildings that serve the purpose of hosting both campus and public facing events.

Buildings Audited: Great Southern Bank Arena and a production at Craig Theater.

Mixed Use

Buildings that serve more than one substantial functional. This could be a combination of athletic facilities, study space, food services, etc.

Buildings Audited: Plaster Student Union and Meyer Library

Residence Halls

Buildings that primarily serve as on-campus student housing. These spaces include corridor, suite, and apartment style housing, and are occasionally co-located with campus food service operations.

Buildings Audited: Blair-Shannon, Sunvilla and Freudenberger Halls

On the Go

This includes landfill and recycle bins from across campus that are outdoors in publicly accessible spaces along walking paths, near building entry/exit, and in parking lots and structures.

Locations Audited: North Campus, Central Campus, South Campus and Parking Structures

Study Sample Selection

To capture adequate samples from the 10 activity zones and 18 buildings, ISTC conducted one nine-day sampling event from September 27th to October 7th, 2021. Samples were collected from each location for a two-day time span, and deposited in cardboard gaylord containers. In some cases where waste generation was low, materials were collected for multiple days to obtain a sufficient sample. The containers were placed on pallets in locations outside of buildings that were easy to access for Custodial Services team members and that did not block the flow of pedestrian or vehicle traffic. Throughout the study ISTC worked with the Custodial Services team, Residence Life, staff, and department stakeholders to coordinate sample collection. The samples collected during this time represented typical activities from a standard fall semester.

Collection timeframes were staggered throughout the week depending on when buildings would have typical generation and to facilitate systematic sorting. Collected materials were transported to the sorting site and gaylord boxes were replaced for continued collection or removed if an ample sample size was received. For some high-traffic locations collection containers were emptied multiple times as day, whereas for locations with less waste generation collection containers were picked up once a day. The collection containers were serviced over the course of the two-day period or until a sample of at least 200 pounds was obtained to ensure a representative waste profile of each building [per the ASTM standard test method for determination of the composition of unprocessed municipal solid waste through manual sorting, ASTM D5231-92 (2016)].

Material Categories

Together ISTC and MSU staff defined over 30 material categories into which waste audit samples would be hand sorted. These were identified based on materials currently accepted by MSU's waste, recycling and organics haulers, specific material streams MSU wanted to explore, and waste audit best practices. A detailed list of these categories can be found in Appendix B: Sorting Categories.

Potential Material Fates

To fully identify reduction and diversion opportunities, landfill material categories were grouped into potential fates. These will be referenced as potential material fates throughout this report. For landfilled material there were five potential material fates:

Avoidable
Items that can be eliminated from the material stream through policy, procurement, or behavioral change.

Recyclable
Items that can be recycled through the existing mixed recycling collection infrastructure and end markets.

Compostable
Items that can be recycled through the implementation of composting programs.

Potentially Recyclable
Items that could be recycled through the introduction of new source-separated recycling programs.

Landfill
Items that cannot be recycled due to logistical limitations or lack of current end market.

Material Fates for Recycling

Likewise, the dozen recycling material categories were grouped into five representative categories:

Fiber
Any fiber-based recyclable material, such as corrugated cardboard, office paper, etc.

Metal
Any metal-based recyclable material, such as aluminum cans, metal containers, etc.

Plastic
Any plastic-based recyclable material, such as plastic beverage bottles, laundry detergent bottles, etc.

Glass
* Any glass-based recyclable material, such as glass beverage bottles, glass salsa jars, etc.

Contamination
Any material not accepted in a recycling category listed above.

***** Glass is only recycled if source-separated in designated Residence Life containers. If present in co-mingled recycling streams, such as Bottles & Cans bins, glass is considered a contaminant.

Sorting the Sample

Over the course of 10 days in Fall 2021, ISTC, along with over 40 student, staff and faculty volunteers, completed the waste characterization study of landfill and comingled recycling streams by collecting multi-day samples from the 18 buildings selected. A total of 4,742 pounds of material was sorted into more than 30 categories using dozens of buckets and bins. For each sample, each material category was weighed, the data was recorded, and the bucket or bin tare weight was subtracted. ISTC adheres to the ASTM D5231-92 (2016) Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste.

Sorting was performed on the concrete pathway between Temple Hall and Central Stores and Maintenance, allowing for easy access to students and staff, a central location for sample transport, and ample space for samples awaiting sort. Staff and volunteers were outfitted in personal protective equipment and briefed on the sorting categories and process, before sorting materials. ISTC's custom sorting table provided an efficient workspace while filtering out liquids and fines, which were collected and weighed separately from the more substantial materials. A canopy tent helped shield the sorting teams from sun, wind and rain.

To encourage effective sustainability efforts, “the first step is to understand what we generate,” according to Sustainability Coordinator Douglas Neidigh

Study Results

Campus Level Generation

A total of 2,477.2 tons of non-hazardous material was generated at Missouri State University in fiscal year 2019 (FY19). Of the 2,477 tons generated, 595.9 tons were sent to be recovered through the various diversion programs mentioned in Current Initiatives. The remaining 1,881.3 tons were sent to the landfill. This results in a 24% diversion rate. A standard industry measure of recycling program success, a diversion rate is the amount of waste an entity diverts from landfill through recycling, composting and reuse, compared to the total amount of waste the entity generates.

Over the course of the last five years, tracking of campus-wide waste generation has continued to be refined. Hauler billing of tonnage disposed for compactors (five in FY19) and temporary open-top dumpsters (25) enables MSU to identify actual tonnage generation for limited, high-generation locations. This was about 1,000 tons in FY19. For 2 to 8-yard dumpsters and collection totes utilized across campus for most materials, tonnage is estimated based on container capacity and pick-up frequency, or historic tonnage reporting. This was estimated to be 900 tons in FY19. In some cases, ISTC estimated tonnage data for residence hall move-in, move-out, and tailgating dumpsters, since actual tonnage was not reported by the hauler for these dumpsters that were sourced, invoiced, and reported on specifically for those events. Total tonnage only reflects the Springfield Campus. Tonnage actuals are reported to MSU for the paper stream and the dedicated metals container, while internal departments manage and track collection of electronics, batteries and toner cartridges.

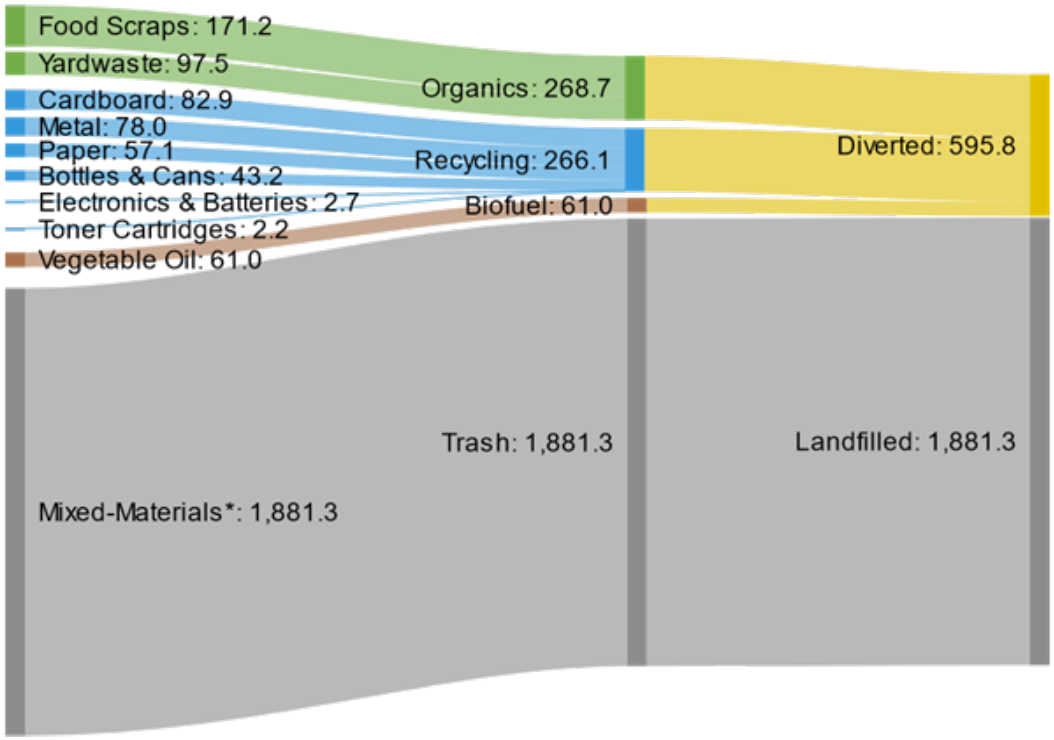


Figure 59: Campus diversion opportunity

*Mixed-materials includes items from all material fates - compostable, recyclable, landfill, avoidable and potentially recyclable – and material categories. Materials with the highest representation include food scraps, paper towels, office printer paper, trash bags, corrugated cardboard and food service paper.

Activity Zone Level Generation

Using FY19 building landfill generation data and identified activity zones, the study team sorted campus buildings by activity zones, aggregated the data and organized the activity zones by Campus Landfill Representation in Table 1: Landfill Generation by Activity Zone. In this table we see the residence halls activity zone generated the largest quantity of waste, roughly 667 tons/year, followed by mixed-use buildings at 433 tons/year, and academic buildings with lab at 189 tons/year. These three activity zones represent 68.6% of campus landfill generation. Thus, waste reduction and diversion efforts relevant to these three activity zones represent the greatest opportunity to reduce landfill generation.

Using waste audit data to identify the greatest opportunities for landfill diversion, we see the activity zones with the greatest opportunities are dining, generating 83.6% of material that could be diverted from landfill, followed by event spaces at 83.1% and academic buildings at 80.2%. Given the small range between the activity zones with the highest (83.6%) and lowest (69.6%) opportunities for diversion, prioritizing the largest landfill generators is still advised as their opportunity to divert is 76.7%, 76.5% and 76.9% respectively.

Activity Zone	Campus Landfill Representation	Material Fate Tons Landfilled	Material Opportunity in Tons					Opportunity to Divert from Landfill
			Avoidable	Compostable	Landfill	Potentially Recyclable	Recyclable	
Residence Halls	35.5%	667.53	42.63	296.39	155.25	34.88	138.38	76.7%
Mixed Use	23.1%	433.85	52.04	217.80	101.75	4.92	57.34	76.5%
Academic with Lab	10.1%	189.85	13.72	75.44	43.94	10.25	46.50	76.9%
Academic	8.9%	167.90	21.76	66.26	33.19	1.49	45.20	80.2%
Administrative	8.5%	160.22	9.26	58.90	37.05	10.02	45.00	76.9%
Event Spaces	6.7%	126.05	27.63	42.02	21.27	4.36	30.77	83.1%
Academic with Studio	3.3%	62.94	4.45	26.11	19.14	0.50	12.73	69.6%
Dining	2.5%	46.30	0.45	19.51	7.58	0.41	18.36	83.6%
On the Go	0.9%	16.40	4.07	4.87	4.32	0.38	2.77	73.7%
Academic with Kitchen	0.5%	10.25	0.62	5.35	2.36	0.20	1.71	76.9%
Total	100.0%	1881.31	176.61	812.65	425.85	67.42	398.77	77.4%

Table 1: Landfill Generation by Activity Zone

Building Level Generation

While MSU does have generation data for the five waste compactors on campus, four of the compactors are utilized by two to three buildings of differing activity zones, necessitating some allocation estimates. For example, Garst Dining and Blair-Shannon Dining each share a waste compactor with respective residence halls - Hutchens House and Hammons House, and the Blair-Shannon House - located in the same buildings. In addition, MSU must use generation estimates for all buildings with dumpsters and totes based on container capacity, pick-up frequency and whether the container is shared by one or more buildings. For example, the landfill dumpster utilized by Strong Hall is also utilized by Glass Hall, and the Einstein's Bagels located in Glass Hall, although generation is only allocated between Glass Hall and Strong Hall. It is common for dining spaces to be integrated in many buildings on campus, including those categorized in Academic, Academic with Kitchen, Mixed-Use and Event Space activity zones. In these cases, the waste generated by these dining spaces is not separated from overall building generation. With these considerations in mind, the study team used FY19 campus and compactor data, dumpster and tote generation estimates, and the results of the waste audit to identify opportunities for diversion on the building-level. Building level landfill generation estimates for a total of 60 campus buildings data can be found in Appendix C: Building Level Tonnage.

What is in the Waste?

Based on the 2021 waste characterization study, approximately 78% of materials in the current campus landfill stream can be potentially avoided or diverted from landfill through composting or recycling. Campus-wide landfill waste consisted of:

- **Compostable:** Over 42% of the campus landfill stream is comprised of compostable material, such as food scraps and paper towels.
- **Recyclable:** Over 25% of the campus landfill stream is composed of recyclable materials, such as paper and cardboard.
- **Avoidable:** Nearly 8% of the campus landfill stream on campus consists of avoidable materials, such as paper and plastic disposable beverage cups.
- **Potentially Recyclable:** Over 3% of the campus landfill stream is made up of potentially recyclable material, such as plastic film and gloves that could be diverted through source-separated streams.
- **Landfill:** The remaining 22% of the waste stream consists of materials that are currently non-recoverable, i.e. items for which recovery end markets do not yet exist, or for which solutions are not yet available at MSU, such as composite materials.

2021 Composition of Landfill Waste Campus-wide

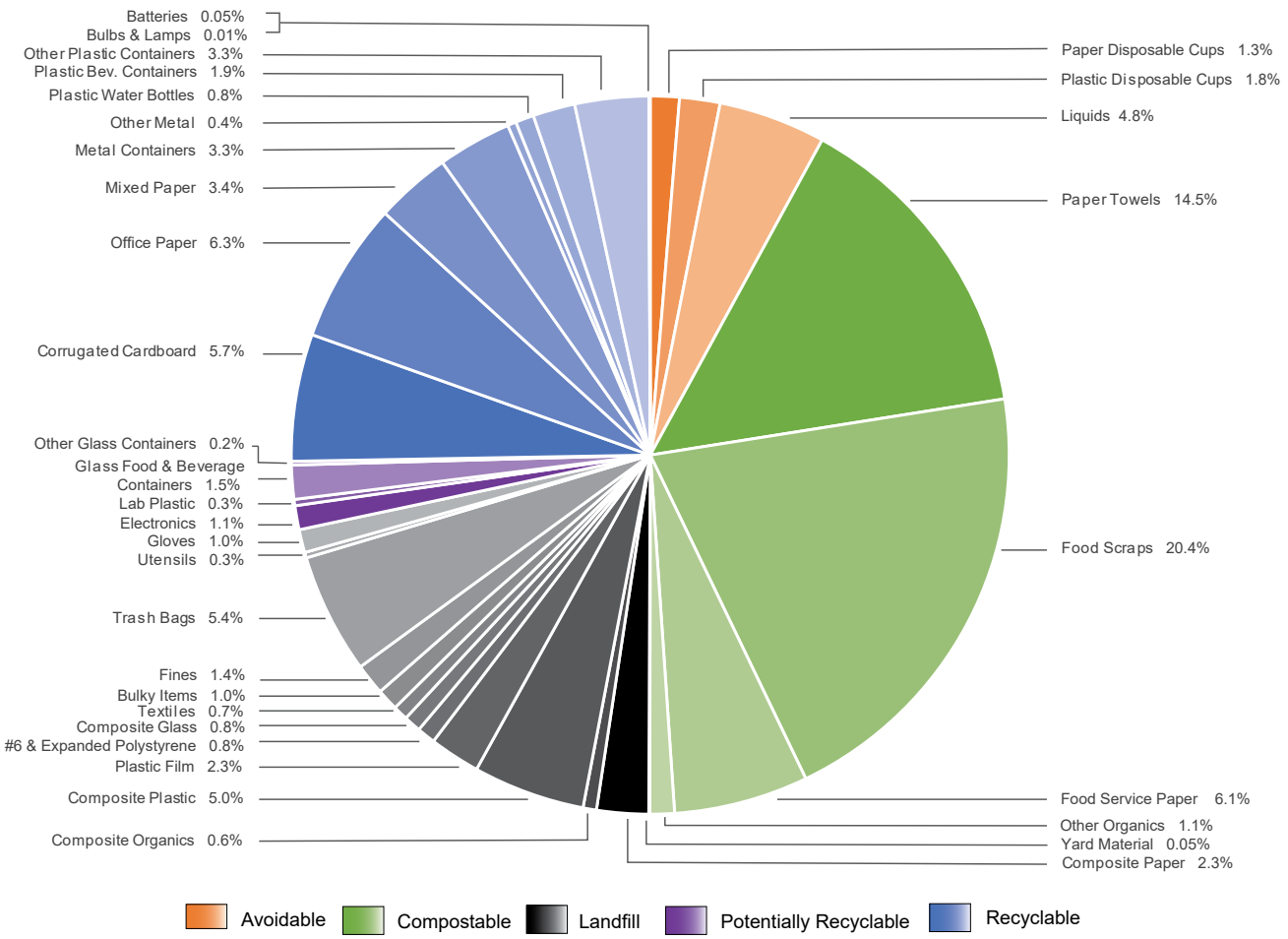


Figure 60: This pie chart represents the distribution of materials found in landfill bound waste across campus.

Potential Material Fate	Material Category	Tonnage
Compostable 42.1% of campus waste	Food Scraps*	383.21
	Paper Towels*	273.59
	Food Service Paper*	113.85
	Other Organics	20.75
	Yard Material	0.90
Recyclable 25.3% of campus waste	Office Printer Paper*	118.89
	Corrugated Cardboard*	107.57
	Mixed Paper*	64.07
	Metals & Aluminum*	62.80
	Other Plastic Containers	62.55
	Plastic Beverage Containers	35.74
	Plastic Water Bottles	15.53
	Other Metal	7.30
	Batteries	0.85
	Bulbs/Lamps	0.18
Landfill 21.6% of campus waste	Trash Bags*	101.89
	Composite Plastic*	94.80
	Composite Paper	43.86
	Plastic Film	42.98
	Fines	26.38
	Gloves	19.51
	Bulky Items	18.29
	#6 & Expanded Polystyrene	15.56
	Composite Glass	14.45
	Textiles	12.55
	Composite Organics	11.37
	Utensils	4.72
Avoidable 8.0% of campus waste	Liquids	90.79
	Plastic Disposable Cups	34.24
	Paper Disposable Cups	24.58
Potentially Recyclable 3.1% of campus waste	Glass Food & Beverage Containers	28.76
	Non-Regulated Electronics	20.32
	Lab Plastic	5.31
	Other Glass Containers	3.18
Total Tonnage		**1881.31**
* Top 10 Material Generation Category		

Table 2: Campus-wide Landfill Waste Composition Table

Campus-wide Potential Material Fates for Landfill Waste by Activity Zone

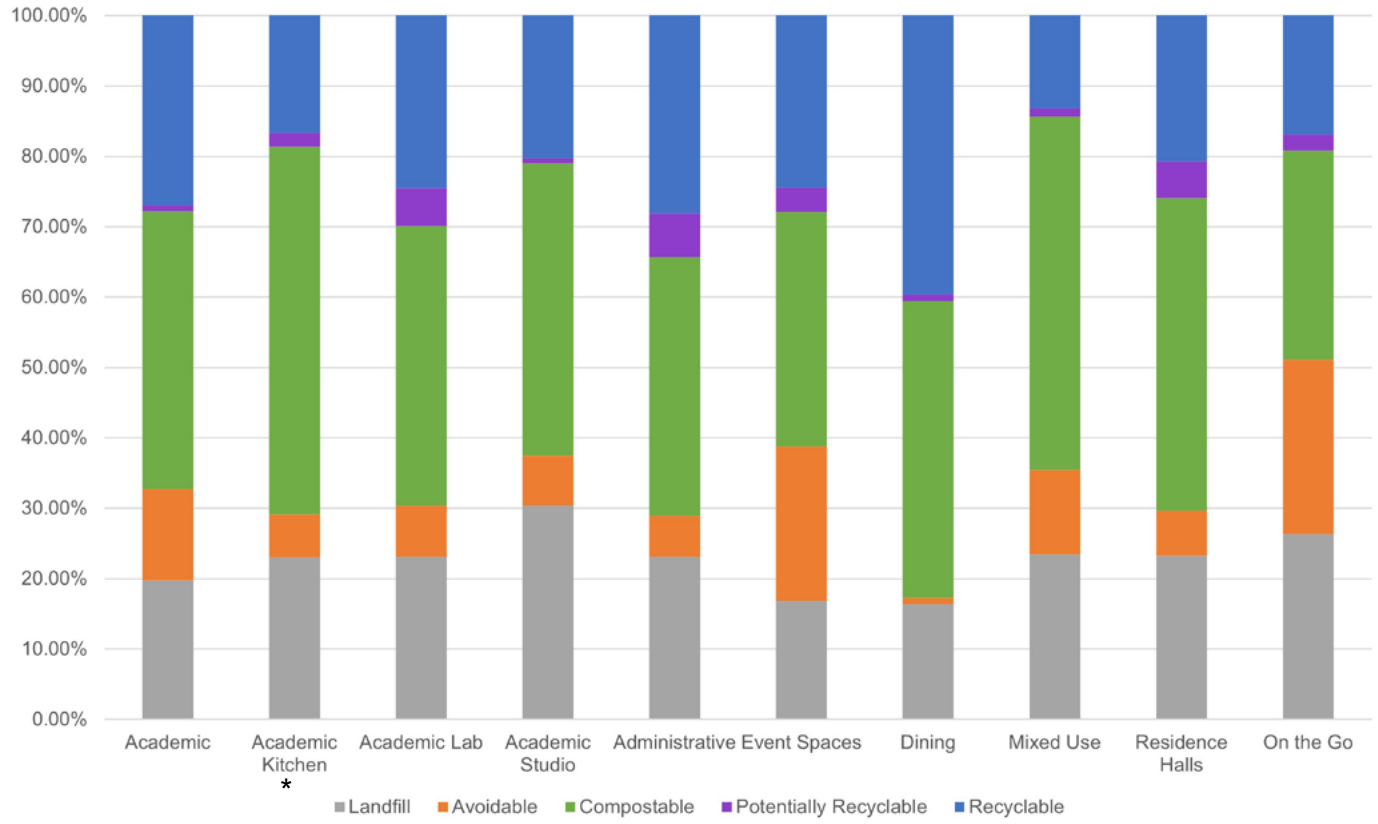


Figure 61: This chart represents the percentages of potential material fates for the landfill waste analyzed by Activity Zone. Detailed results for each Activity Zone can be found in Appendix A.
** Academic w/Kitchen data reflects only one building.*

What is in the Recycling?

According to the 2021 waste characterization study, 66.8% of the recycling stream across all samples collected consisted of items that are recyclable on campus and 33.2% consisted of contamination of the recycling stream. This sample does not represent campus-wide recycling, as samples collected consisted of commingled recycling only. Other recyclables - such as paper, corrugated cardboard and glass - are collected separately in various locations across campus. These source separated recycling streams are not reflected in the commingled recycling waste data presented in this report. Of all recycling samples collected, 22.1% was fiber material, 6.3% was metal, 33.8% was plastic and 4.6% was glass.

Material Composition for Commingled Recycled Waste

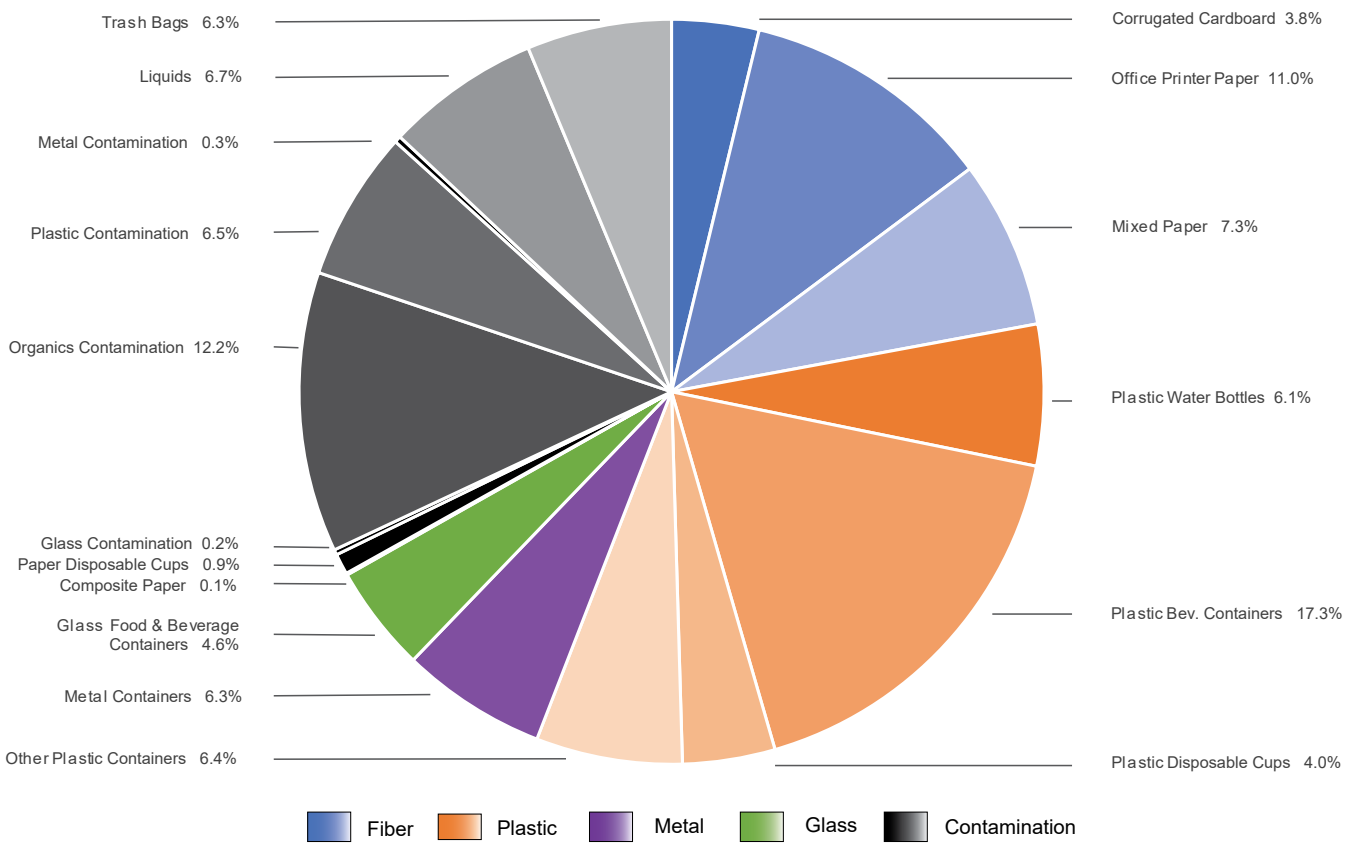


Figure 62: This chart represents the percentages of material categories found within waste destined for commingled recycling across all activity zones.

Sample Activity Zone Data

See Appendix A for full Activity Zone Landfill and Recycling Data

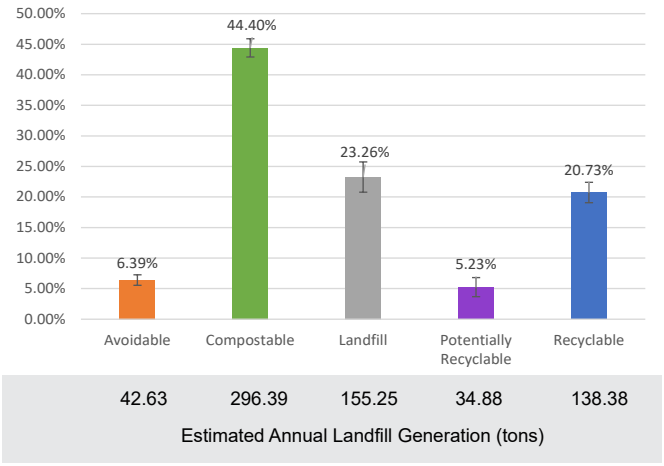
Residence Halls

Description: Buildings that primarily serve as on-campus student housing. These spaces include corridor, suite, and apartment style housing, and are occasionally co-located with campus food service operations.
Buildings Audited: Blair-Shannon, Sunvilla Tower and Freudenberger House.

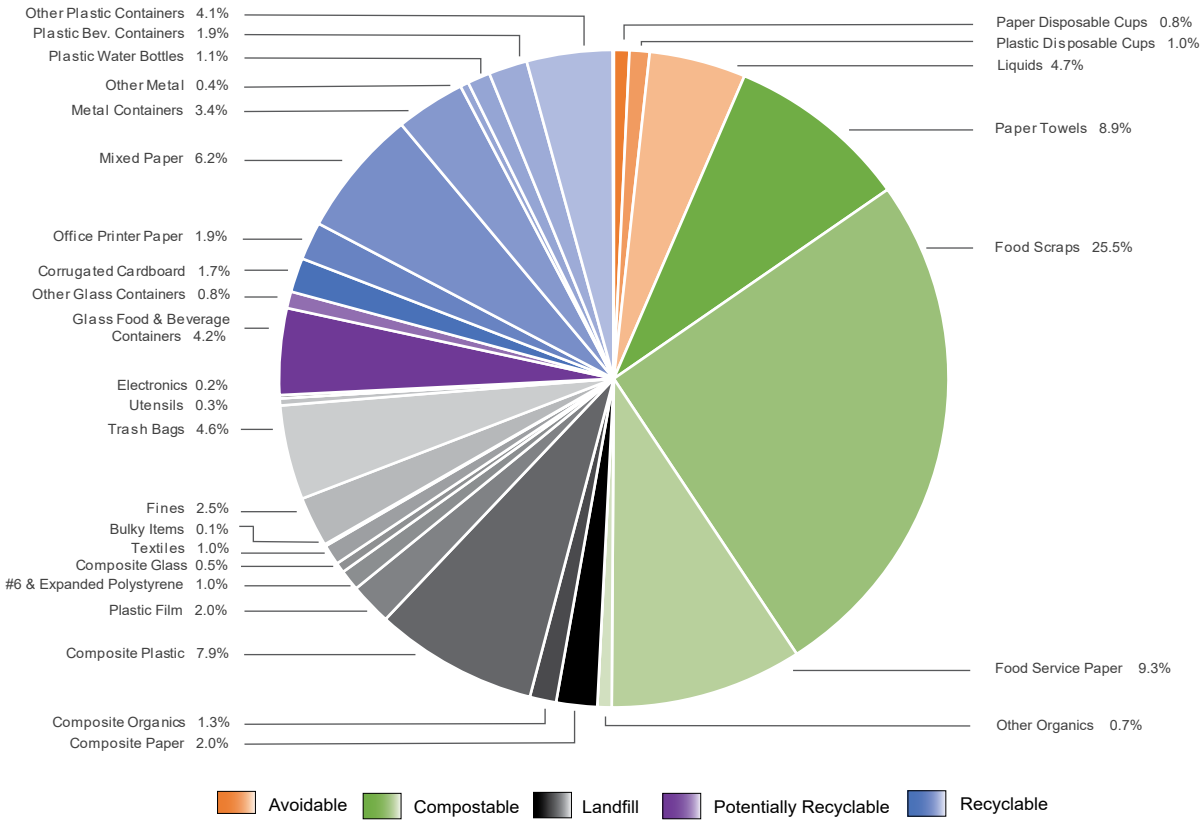
What is in the Waste?

Almost 77% (512.3 tons) of materials in the landfill waste stream for residence halls can potentially be diverted into other channels. The top 5 materials contributing to the overall amount of landfill waste generated in residence halls include: food scraps (25.5% or 170.6 tons), food service paper (9.3% or 62.1 tons), paper towels (8.9% or 59.1 tons), composite plastic (7.9% or 52.8 tons), and mixed paper (6.2% or 41.7 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream.

Material Opportunity of Landfill Waste in Residence Halls



2021 Composition of Landfill Waste in Residence Halls



Campus Community Feedback

In order to develop a successful sustainable materials management plan, campus stakeholders must be engaged to ensure consideration of everyday users' reflections, input, and priorities. Stakeholder input for this report was collected in structured and non-structured formats. Structured formats included focus groups that included faculty, staff, students and classroom discussions, while non-structured formats included informal conversations during facility walkthroughs, meetings, and other interactions. Over the course of these various engagement events, input was collected on the barriers and opportunities to improve the current waste management infrastructure and procedures, including what they might like to see improved or altered to maximize collection of divertable materials. The responses have been grouped by theme.

Interest in composting expansion, including the diversion of paper towels

Students and staff are eager to see the collection of compostable materials expand, requesting more information on what can be composted, suggesting compost bins be added to dining areas and restrooms, and expressing interest in composting paper towels generated in restrooms across campus. Stakeholders also noted the desire to explore the cost of compostable items compared to plastic items.

Increase the number of recycling bins, and improve bin consistency

One-third of the feedback received reflected on collection bins, involving the topics of quantity, placement, accessibility, labeling, signage and size. Many identified the need for more recycling bins, both indoors and outdoors, and the need to co-locate bins. It was stated that bin design standardization would improve compliance, prevent confusion and even improve visibility, and that sufficient labels, clear signage and directions near bins are desired. Likewise, consistent placement of bins, and accessibility of bins would support participation in recycling by all.

Recycling education and awareness is needed

Stakeholders expressed a lack of motivation to recycle, awareness of what can be recycled and information on the importance of recycling. This uncertainty can be addressed through campus-wide educational efforts. Suggestions included utilizing various platforms to reach students, including data and statistics, specifically engaging students to whom recycling is new, and even identifying items made of recycled content on campus.

Expand waste and recycling engagement opportunities

Feedback indicated a need to build on baseline education and awareness efforts by further engaging the campus community in a variety of ways. Strategies identified included developing incentive programs such as games, raffles or contests to encourage recycling. The campus community suggested empowering students to do more by offering community service hours involving recycling, polling students to determine barriers to recycling and talking about recycling and waste diversion in more classes or in a class of its own. Additional opportunities submitted included offering larger bins in the residence halls and whether rebates earned from recycling could support student engagement - to both further increase recycling and the generation of those rebates.

Additional large-scale material collection infrastructure is needed

When considering opportunities to improve recycling, staff clearly identified the need for additional large-scale infrastructure. This included a baler for cardboard and potentially paper (as an opportunity to increase funds for infrastructure improvements and improve diversion), increasing collection capacity for large volumes of mixed recycling from dining areas, and the need to better capture recyclables generated at tailgating.

Reduce dining hall and food service waste

The campus community has a desire to see to-go containers and their associated waste – whether a factor of the COVID-19 pandemic or a practice that is here to stay – thoughtfully considered. Are reusables, be it for to-go meals or even reusable cups for fountain drinks, realistic? Can Chartwells be further engaged to reduce and divert waste, especially food waste?

Engage campus purchasing on sustainable materials management strategies

From sourcing reusable items over single-use items, choosing plastic bottles and other alternatives over glass, and considering the cost differential of compostable items compared to plastic items, campus purchasing strategies and policies can have a significant impact on the materials generated on campus.

Collection limitations are both internal and external

Staff identified external limitations to recycling collection including timely pick-ups and the general lack of pick-ups (specific to dining hall recyclables), whereas internal limitations included the lack of staff to collect materials as well as funding to hire more staff, inconsistent collection service and the challenges to handling bulk materials.

Financial support

Faculty and staff advocated for a bigger budget to support recycling improvement opportunities. It must be acknowledged that this suggestion is not insular to one or two ideas but is an important variable to nearly all submitted suggestions. Without financial support, many of the ideas the campus community set forth will make little impact on waste reduction and diversion.

Analysis of Waste Audit Data

When coupling waste characterization data with feedback from stakeholders, the study team was able to provide both distinct insights into campus waste generation and makeup, as well as the opportunity to summarize trends across activity zones. Overarching insights stemming from campus-wide analysis include the following:

Material generation, characteristics, and use vary across the activity zones

Almost 40% of the materials thrown away in dining spaces could be recycled, while less than 17% of materials thrown away in on-the-go bins could be recycled. Conversely, materials that could potentially be avoided altogether are almost twice as common in on-the-go bins and event spaces than in other activity zones. Residence halls as an activity zone, generate more than four times the landfill tonnage than administrative buildings. Understanding these differences highlights the contribution of different activities to campus waste generation, as well as where potential intervention strategies might have the greatest impact on waste reduction and diversion.

Organics remain in landfill stream

Almost half of the campus-wide landfill stream is comprised of compostable materials, most commonly food scraps and paper towels. Compostable materials make up 30%-50% of the material sent to landfills in each of the activity zones. In one audited dining space that already has back-of-the house compost collection, compostable material still accounted for over 37% of the material sent to landfill. Stakeholder groups suggested increasing food scrap collection and initiating paper towel composting throughout campus, both of which could be invaluable to diverting organic materials from landfills.

Recyclables remain in landfill stream

Across the activity zones, materials currently accepted in the recycling program end up in the landfill. Over 25% of the campus landfill stream is composed of recyclable materials, most commonly paper and cardboard. This percentage varies greatly based on activity zone. Recyclables make up over a quarter of all the material sent to landfill from academic and administrative buildings and nearly 40% of all material sent to landfill from event spaces. In faculty and student focus groups, respondents indicated that there is a need for both increased education and expanded opportunities for campus community members to successfully recycle.

Reducing contamination in recycling

Over 33% of the audited commingled recycling stream consisted of materials considered to be non-recyclable contamination. Stakeholders expressed the need to educate the campus community as to what materials do and do not belong in the recycling stream, as well as the desire for signage and labeling, all of which should not only improve recycling participation, but also reduce contamination.

Waste avoidance and reduction opportunities

Waste avoidance and reduction for certain materials is an important complement to any diversion strategy. Materials that can be avoided, most commonly liquids and paper or plastic disposable beverage cups, make up almost 8% of material entering the landfill. Materials that can be reduced, such as plastic serviceware, also present an opportunity to limit the single-use plastic on campus. Waste avoidance and reduction requires the evaluation and enaction of policy interventions coupled with concerted engagement, often at a high investment of effort and resources.

Waste Reduction & Diversion Goals

MSU's Waste Management Team identified two waste diversion and reduction goals based on the insights gained from waste generation and characterization analysis, stakeholder engagement, and decades of experience with University processes and protocols. These scenarios utilize FY2019 tonnage generation and diversion rate, and incorporate waste characterization data in order to determine the impact each goal would have on campus waste generation and diversion.

Diverting 25% of Campus Waste By 2025

The first goal is to divert 25% of campus waste from landfill by FY2025, improving on the FY2019 diversion rate of 24%, and setting a new benchmark in pursuit of the 2030 goal. To achieve this MSU will need to increase waste diversion by about 24 tons in about two years (as of Spring 2022 plan publication).

Diverting 30% of Campus Waste By 2030

The second goal is to divert 30% campus waste from landfill by 2030, improving on the 2025 goal of 25% diversion. To achieve this, the MSU community would need to increase the current capture of recyclable materials and compostable organics currently being landfilled, potentially through program expansion, improved participation and proper sorting by students and staff, or by sourcing a few key pieces of collection infrastructure and maximizing their use by Dining Services, Custodial Services and Residence Life. Supplemental diversion and reduction initiatives will also support this goal.

Landfill Generation per FTE Student

MSU also chose to identify landfill generation per full-time equivalent (FTE) student, as the team acknowledges the capabilities to use this metric to add a level of accountability, personalize generation and challenge students to make mindful choices. This metric will help capture reductions in the landfill stream – both through increased diversion and reduced generation.

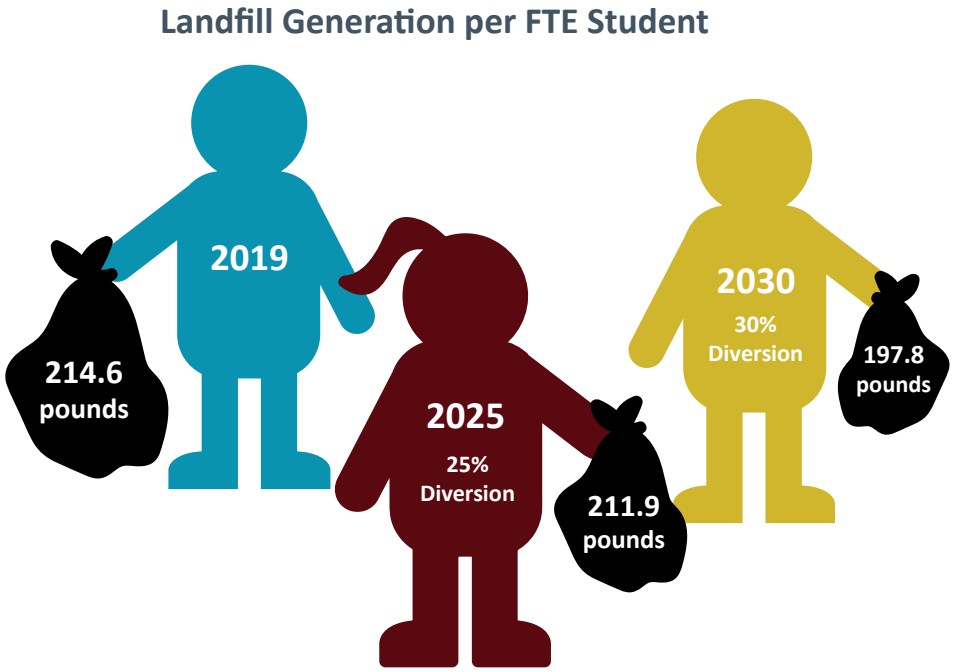


Figure 64: This visual displays the diversion goals set by MSU in terms of pounds of waste generated per full time equivalent student per year.

Strategies for Improvement

Implementation

The MSU Waste Management Team and ISTC study team have developed an initial list of strategies to further divert waste from the landfill and support MSU's 2025 and 2030 waste diversion and reduction goals. These strategies have been assigned a timeline and responsible department(s). In order to best leverage annual resources, the Waste Management Team will meet each year to develop an annual goals list using the strategies listed below and any additional opportunities identified during the process. No more than five goals will be focused upon annually to ensure limited resources are efficiently utilized to achieve results. The list of annual goals will be communicated to MSU departments, students, and posted on the MSU Sustainability website.

Results of implementing these annual goals will also be posted on the website. Actual waste diversion numbers will be provided annually as key performance indicators for the program.

Strategies

Over the following pages strategies are characterized by their

- **Impact***: 0-5 tons, 5-10 tons, or 10+ tons of waste diverted or reduced
- **Timeframe**: By FY2025, by FY2030, or by FY2035
- **Expense***: < $15,000, $15,000-$75,000, or > $75,000
- **Department(s) responsible for implementation**

**Potential impacts and expenses are estimates only based on current information. Actual impacts and expenses may vary upon implementation and upon approaching multiple recommendations at one time.*

Strategies are grouped into sets by theme, with the theme listed at the top of the set (in maroon) and the supporting, actionable strategies beneath.

Strategy	Impact*	Timeframe	Expense*	Responsible Department
Empower the Campus Community through Waste and Recycling Education				
Increase sustainable materials management awareness, literacy and practice participation through a comprehensive campuswide waste and recycling education campaign utilizing various platforms including signage, social media, emails, etc.	0-5 tons	By FY25	< $15,000	Sustainability
Annually conduct a “Recycling 101 at MSU” campaign each fall for any students and staff who are new to campus.	0-5 tons	By FY25	< $15,000	Sustainability
Create an online waste diversion dashboard to communicate performance data and diversion benefits. Update on an ongoing basis.	0-5 tons	By FY25	< $15,000	Sustainability
Create and maintain a public resource with information on where to purchase reusable items, items made of recycled content, and items that are made of materials that can be recycled on campus. Similarly, create and maintain a public resource with information on where students and staff could donate unwanted, unbroken items in the community.	0-5 tons	By FY30	< $15,000	Sustainability
Improve education and awareness of recycling and donation opportunities specific to student move-in and move-out.	0-5 tons	By FY25	< $15,000	Residence Life and Sustainability
Target paper use reduction strategies. Work with the IT department to make duplex/double-sided printing the default option on printers across campus and encourage staff to distribute materials electronically.	5-10 tons	By FY30	< $15,000	Departments Campus-wide
Target liquids disposal strategies. Where sinks exist, include signage encouraging people to pour out liquids prior to beverage container disposal. In break, kitchen and food service areas, consider bin signage reminding people to pour out liquids prior to container disposal.	5-10 tons	By FY25	< $15,000	Sustainability, Residence Life, Custodial Services
Develop a “waste reduction” kit consisting of reusable items and campus waste reduction resources to sell and award on campus.	0-5 tons	By FY30	< $15,000	Sustainability
Develop waste, recycling and composting training for custodial services, facilities, residential life, dining staff and venue-specific custodial services that is required and updated annually.	0-5 tons	By FY25	< $15,000	Sustainability
Develop incentive programs, contests, games and/or raffles to encourage on-campus recycling participation, reuse, and waste prevention.	0-5 tons	By FY30	< $15,000	Sustainable Materials Management Team
Develop curriculum/informational session on waste diversion that can be presented in various classes.	0-5 tons	By FY25	< $15,000	Sustainability and Sustainability Major/Minor
Continue annual sustainability survey and include questions on barriers to recycle and opportunities to reduce waste.	0-5 tons	By FY25	< $15,000	Sustainability
Modify the Sustainability Leadership program to include a focus on campus recycling ambassador work.	0-5 tons	By FY25	< $15,000	Sustainability
Conduct monthly/quarterly meetings with the Sustainable Materials Management Team to track strategy progress, address needs and prioritize next steps. Conduct meetings with an open invitation for anyone in the campus community to attend.	0-5 tons	By FY25	< $15,000	Sustainability

Strategy	Impact*	Timeframe	Expense*	Responsible Department
Pursue a Collection Container Improvement Plan				
Conduct a campuswide bin audit, identifying the bin type, size, quantity and material stream collected.	0-5 tons	By FY25	< $15,000	Sustainability
Using the bin audit create and codify collection bin placement standards for building entrances and exists, classrooms, offices, labs and bus stops. Adjust existing bins based on placement standards, potentially consolidate bins, and empower custodial services to help maintain placement to ensure consistency and accessibility.	0-5 tons	By FY25	< $15,000	Sustainable Materials Management Team
Redesign and standardize bin labels, bin signage and collection bins for clarity and consistency. Consider inclusion of pictures illustrating accepted materials to improve clarity. Create a few formats of labels and signs that apply to both new and existing bins. Update labels and signage for existing bins, and utilize said formats for all new bins. Make digital files available to the campus community for their use. Pilot a standard indoor and outdoor bin design for consistency and improved visibility to ease both recognition and use. Notify the campus community of the finalized standard bins. Codify the bin design standard to apply to any future bin sourcing.	5-10 tons	By FY25	< $15,000	Sustainable Materials Management Team
Incrementally source and install standardized bins throughout campus, replacing inconsistent bins and starting with high traffic areas. Pursue funding sources annually to support procurement.	10+ tons	By FY35	> $75,000	Sustainable Materials Management Team
Based on the bin audit work to pair all public-facing landfill and recycling bins, aiming for distribution equity of 1:1. Complement existing landfill bins with recycling bins, both indoors and outdoors. Codify a building standard that all new landfill bins must be paired with a recycling bin of equal capacity.	5-10 tons	By FY25	$15,000-$75,000	Sustainable Materials Management Team
Standardize collection bag color use across campus for recyclables and compost materials.	0-5 tons	By FY25	< $15,000	Sustainable Materials Management Team
Work on Internal and External Material Collection Limitations				
Negotiate next waste hauler contract to include recycling services.	0-5 tons	By FY25	< $15,000	Procurement and Sustainability
Work with the recycling hauler on optimizing collection containers and pick-up frequency for recyclables and trash.	0-5 tons	By FY25	< $15,000	Custodial Services and Sustainability
Consider requiring glass collection in future recycling contracts. If not possible, increase the number of collection locations.	5-10 tons	By FY25	< $15,000	Procurement
For outdoor trash and recycling bins explore installation of capacity sensors on Sensoneo, Enevo, etc. or Bigbelly bins to reduce staff time on pick-ups.	0-5 tons	By FY30	$15,000-$75,000	Sustainable Materials Management Team
Hire a Zero Waste Coordinator to support Facilities and Sustainability Department's responsible management of materials, engage and educate the campus community and expand waste reduction and diversion programs.	5-10 tons	By FY30	$15,000-$75,000	Sustainable Materials Management Team

Strategy	Impact*	Timeframe	Expense*	Responsible Department
Engage Purchasing and Dining Departments on Waste Reduction				
Engage purchasing to identify and consider waste reduction opportunities, such as selecting reusable items over single-use disposable items, working with vendors that do not use expanded polystyrene packaging wherever possible, etc.	0-5 tons	By FY30	< $15,000	Procurement and Sustainability
Annually engage with purchasing to identify which items procured include glass. Explore peer product alternatives that do not include glass. Work with departments on this transition if economically and logistically feasible. I.e. If a specific brand of beverage comes in glass containers, consider peer options in other brands that come in aluminum or plastic containers.	0-5 tons	By FY30	< $15,000	Procurement and Sustainability
Conduct a cost analysis of requiring vendors in the PSU to use compostable packaging for food and drinks.	0-5 tons	By FY25	< $15,000	Dining Services
Chartwells to build upon current food waste audit by performing a wasted food audit and education program in each dining hall in the fall each year.	0-5 tons	By FY25	< $15,000	Dining
Work with the campus bookstores and convenience stores to improve current offering of reusable items for sale as an alternative to single-use disposables.	0-5 tons	By FY30	$15,000-$75,000	Bookstore and Sustainability
Expand Infrastructure to Increase Collection				
Work with a baler representative to identify a central location to house a baler, store baled material and outline staff and transportation logistics for baling cardboard. Source a baler for on-site baling of cardboard, and potentially paper, to generate revenue from the materials. Develop staff management protocols for the respective materials.	10+ tons	By FY30	$15,000-$75,000	Sustainable Materials Management Team
Build on glass recycling in Residence Life for campus-wide application.	5-10 tons	By FY30	< $15,000	Sustainable Materials Management Team
Improve recycling for special events beyond tailgating. This would include events at the PSU.	5-10 tons	By FY30	< $15,000	Sustainable Materials Management Team
Work with Athletic/Entertainment and respective facilities on opportunities to reduce waste and improve recycling at venues and competitions.	0-5 tons	By FY30	< $15,000	Sustainable Materials Management Team
Require the design of new buildings to include adequate interior and exterior space for the collection, transport and storage of landfill, co-mingled recyclables and specialty recycling materials (i.e. cardboard, paper, organics, etc.). For inspiration, see the NYC Zero Waste Design Guidelines.	10+ tons	By FY25	< $15,000	Planning, Design & Construction, Residence Life
Begin expanded polystyrene reuse and recycling. Consider programs to reuse foam coolers or other foam lab packaging that cannot be eliminated.	0-5 tons	By FY30	< $15,000	Sustainability

Strategy	Impact*	Timeframe	Expense*	Responsible Department
Expand the Collection of Organic Materials for Composting				
Use campus community interest and waste audit data to justify pilot projects expanding the collection of organic material for composting at target locations. Beyond front-of-house collection in dining spaces, target locations could include the largest organics generators by tonnage (Residence Halls and Mixed-Use buildings), and/or buildings with the largest representation of compostables in the waste streams (Academic with Kitchen and Mixed-Use buildings).	10+ tons	By FY30	< $15,000	Sustainability
Collect paper towels from restrooms for composting. Begin by piloting collection in a few buildings that either already have organics hauling service or have limited audiences, such as Residence Halls.	10+ tons	By FY25	< $15,000	Sustainable Materials Management Team
In future dining service contracts require organics collection from all dining service locations.	10+ tons	By FY30	< $15,000	Procurement, Residence Life, PSU
Steps to Avoid the Creation of Waste				
Install hand dryers in 10 (high-traffic) restrooms or other locations where sinks are present, to reduce the number of paper towels used on campus.	5-10 tons	By FY30	$15,000-$75,000	Sustainable Materials Management Team
Install additional Water Bottler Refill Stations.	0-5 tons	By FY30	$15,000-$75,000	Departments Campus-wide
Explore development of a database for listing and requesting items stored in Surplus Property for reuse on campus. For inspiration, see Surplus Exchange or Rheaply.	0-5 tons	By FY30	< $15,000	Facilities and Property Management
Pilot linerless deskside collection bins in administrative buildings and academic buildings to foster a culture of plastic waste reduction.	0-5 tons	By FY30	< $15,000	Custodial Services
Develop guidance for donation of surplus food from catered events, student gatherings, and food vendors to area food pantries, food banks, and other hunger relief agencies/programs.	0-5 tons	By FY25	< $15,000	Sustainability and Dining Services
Institute quarterly Residence Life donation days for bulky items, housewares, and academic accessories. Partner with local non-profit resale shops or charities.	10+ tons	By FY30	< $15,000	Residence Life and Sustainability
Establish a clothing recycling or donation program for students and employees.	0-5 tons	By FY30	< $15,000	Sustainability, Residence Life, Community Engagement

Contributors

The Sustainable Materials Management Plan for Missouri State University was created by the Waste Management Team with assistance from Illinois Sustainable Technology Center at the University of Illinois at Urbana-Champaign. This project would not be possible without the leadership of alumni Rachel Smith and AJ Aumann, authors of the project proposal submitted to Student Government Association in Fall 2019.

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Appendix A: Activity Zone Data

Activity Zone Data

Activity Zone level results of the Waste Characterization Study can be found on the following pages. For each of the 10 Activity Zones this includes:

- Description of buildings categorized within the activity zone
- Respective buildings sampled for the waste audit
- A landfill waste composition summary of material generated in these buildings across campus
- A material opportunity chart – or optimal destination for the material – generated by this activity zone
- A pie chart displaying the composition of landfill waste generated by this activity zone

Following each landfill waste page is a recycling page with like content representing study results of the comingled recycling stream.

Waste Audit Data Table

All data collected during the waste audit – including data from each sample, from each building, and from both landfill and comingled recycling waste streams – can be accessed on the Waste Analysis Report webpage.

Academic

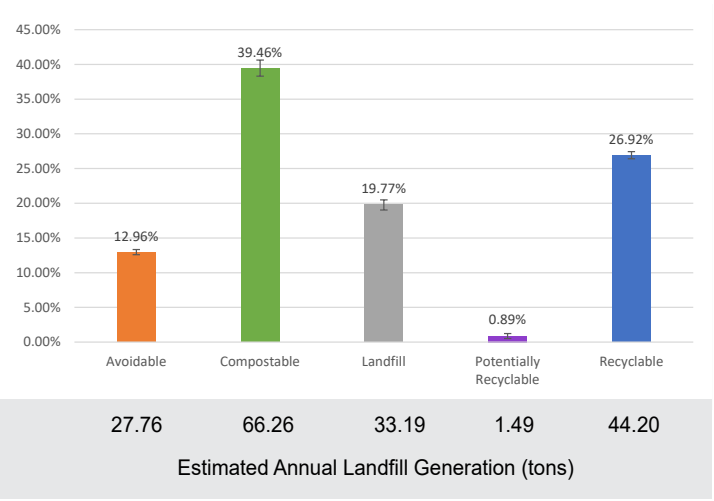
Description: Buildings that primarily serve as spaces for student classrooms and instruction. These buildings also may have offices, conference rooms, lounges, and computer labs.

Buildings Audited: Cheek Hall, Glass Hall and Strong Hall.

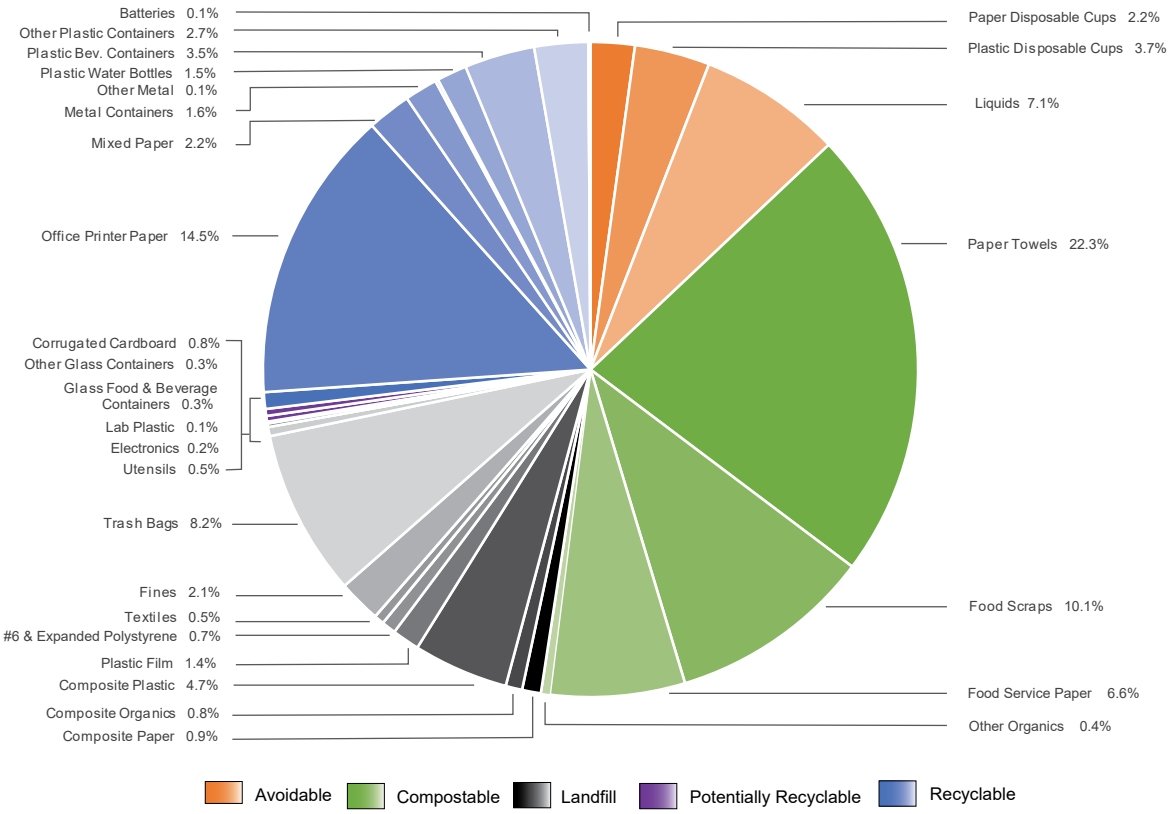
What is in the Waste?

According to the 2021 MSU waste characterization study, over 80% (134.7 tons) of materials in the landfill waste stream for academic buildings can potentially be diverted into other channels. The top five materials contributing to the overall amount of landfill waste generated in academic buildings include: paper towels (22.3% or 37.4 tons), office printer paper (14.5% or 24.3 tons), food scraps (10.1% or 16.9 tons), trash bags (8.2% or 13.8 tons), and liquids (7.1% or 11.9 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream.

Material Opportunity of Landfill Waste in Academic Buildings



2021 Composition of Landfill Waste in Academic Buildings

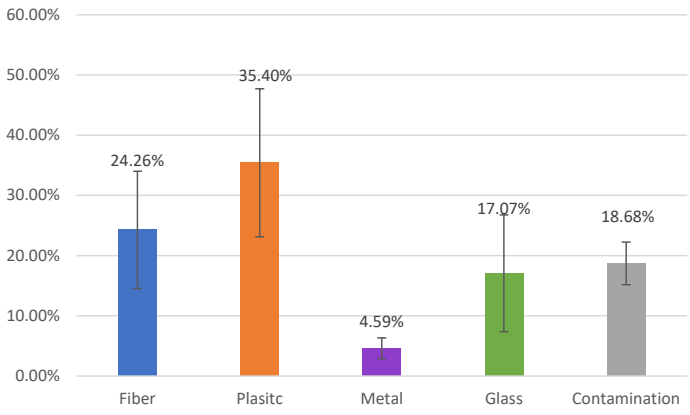


Academic

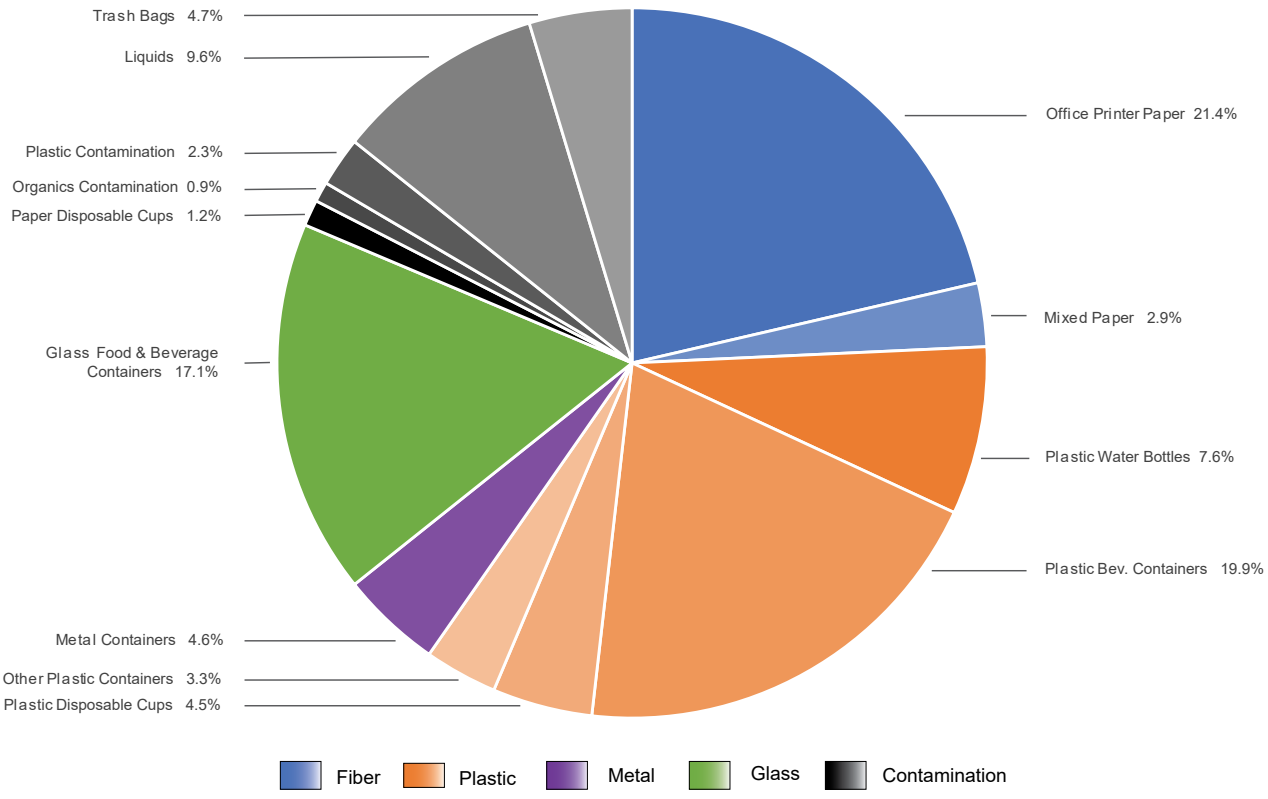
What is in the Commingled Recycling?

In the commingled recycling waste stream from academic buildings, 64.25% of material was currently accepted recyclables. Aside from correctly recycled materials, 18.7% of the recycling waste stream from academic buildings consists of materials considered to be mixed contamination and 17% was glass contamination. Top materials contributing to the overall amount of contamination within the recycling stream for academic buildings include: liquids (9.6%), trash bags (4.7%), plastic contamination (2.3%), and paper disposable cups (1.2%).

Material Opportunity of Commingled Recycling in Academic Buildings



2021 Composition of Commingled Recycling in Academic Buildings



Academic with Lab

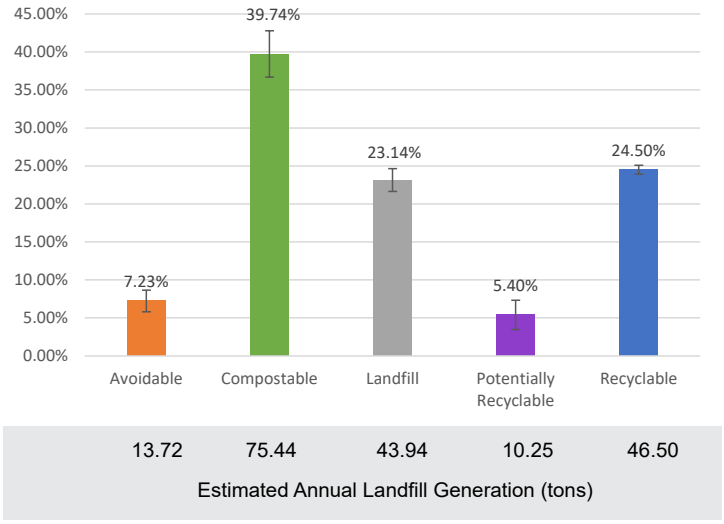
Description: These buildings house research and/or instructional laboratories. They may also house laboratories, offices, conference rooms, and lounges.

Buildings Audited: Kampeter Health Sciences Hall, Karl Hall and Temple Hall.

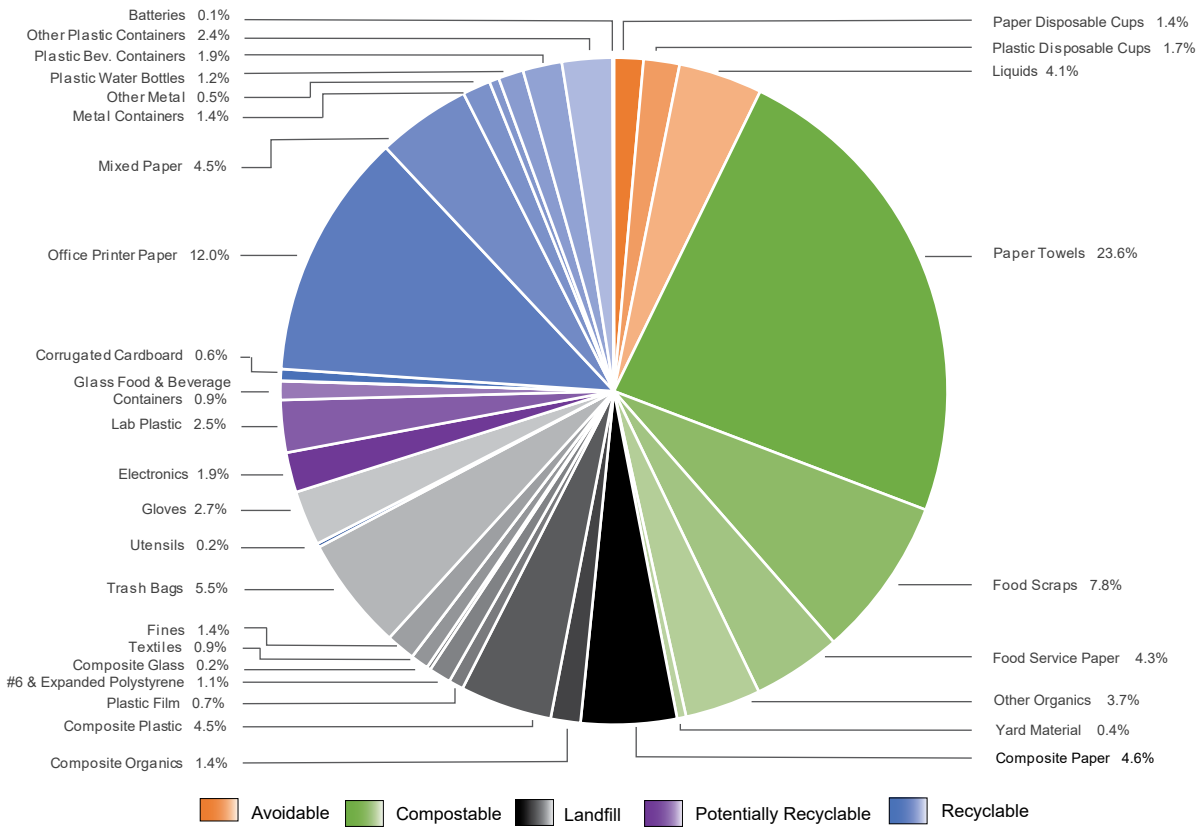
What is in the Waste?

Nearly 77% (145.9 tons) of materials in the landfill waste stream for academic buildings with labs can potentially be diverted into other channels. The top five materials contributing to the overall amount of landfill waste generated in academic buildings with labs include: paper towels (23.6% or 44.7 tons), office printer paper (12.0% or 22.7 tons), food scraps (7.8% or 14.7 tons), trash bags (5.5% or 10.4 tons), and composite paper (4.6% or 8.8 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream.

Material Opportunity of Landfill Waste in Academic Buildings with Labs



2021 Composition of Landfill Waste in Academic Buildings with Labs

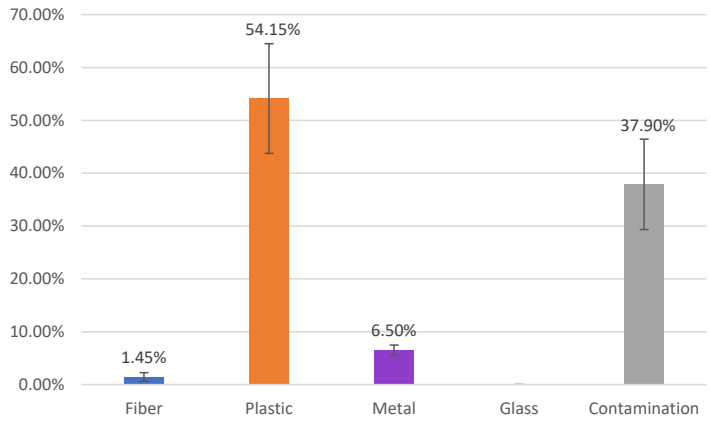


Academic with Lab

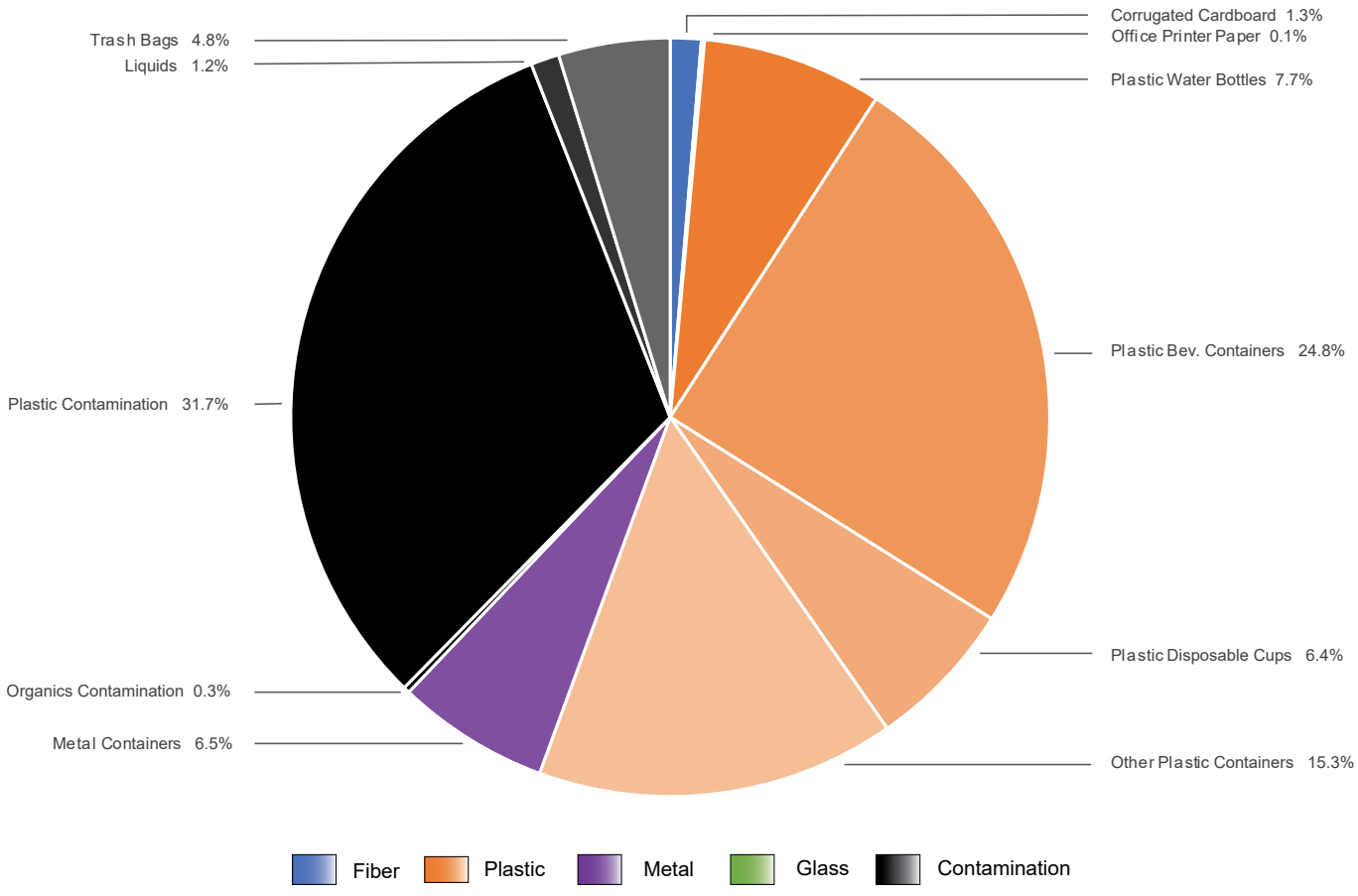
What is in the Commingled Recycling?

In the commingled recycling waste stream from academic buildings with labs, 62.1% of material was currently accepted recyclables. Aside from correctly recycled materials, 37.9% of the recycling waste stream from academic buildings with labs consists of materials considered to be mixed contamination. Top materials contributing to the overall amount of contamination within the recycling stream for academic buildings with labs include: plastic contamination (31.7%), trash bags (4.8%), and liquids (1.2%).

Material Opportunity of Commingled Recycling in Academic Buildings with Labs



2021 Composition of Commingled Recycling in Academic Buildings with Labs



Academic with Kitchen

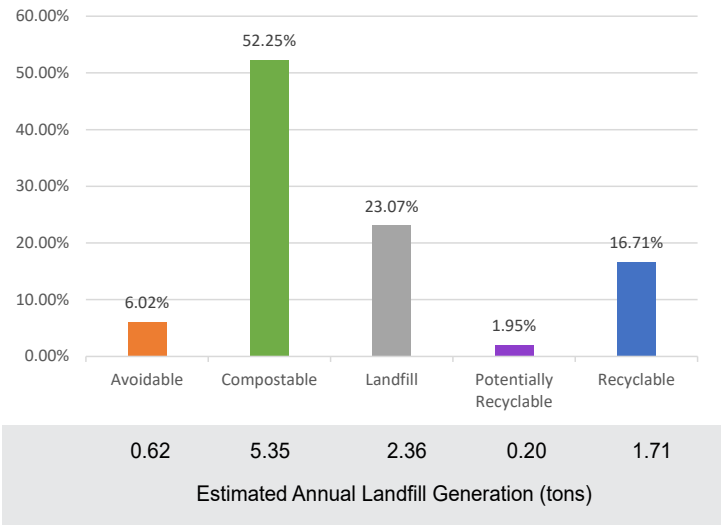
Description: Buildings that primarily serve as spaces for student classrooms and instruction and have kitchen where instruction, cooking and food preparation take place.

Buildings Audited: Pummill Hall

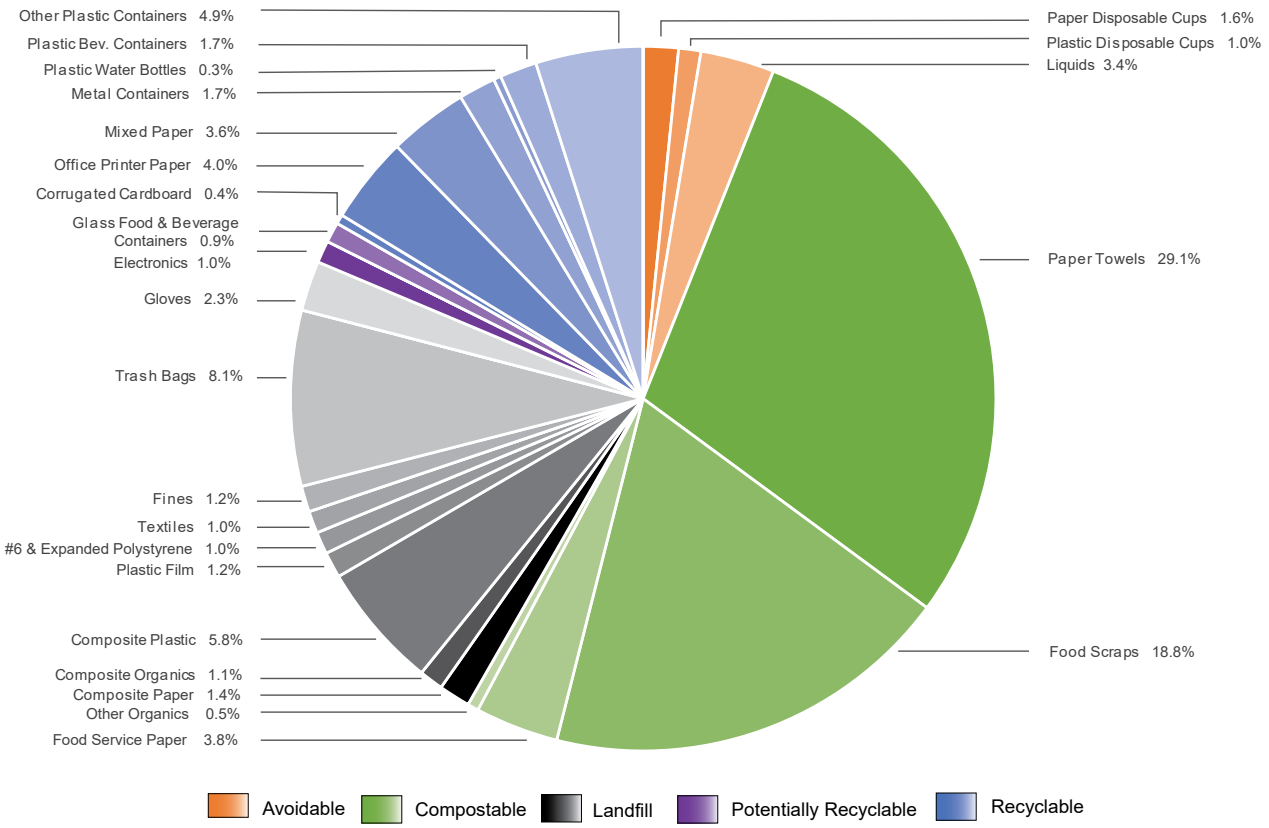
What is in the Waste?

Almost 77% (7.88 tons) of materials in the landfill waste stream for academic buildings with kitchen can potentially be diverted. The top five materials contributing to the overall amount of landfill waste generated in academic buildings with kitchen include: paper towels (29.1% or 2.9 tons), food scraps (18.8% or 1.9 tons), trash bags (8.1% or 0.8 tons), composite plastics (5.8% or 0.6 tons) and other plastic containers (4.9% or 0.5 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream.

Material Opportunity of Landfill Waste in Academic Buildings with Kitchens



2021 Composition of Landfill Waste in Academic Buildings with Kitchens

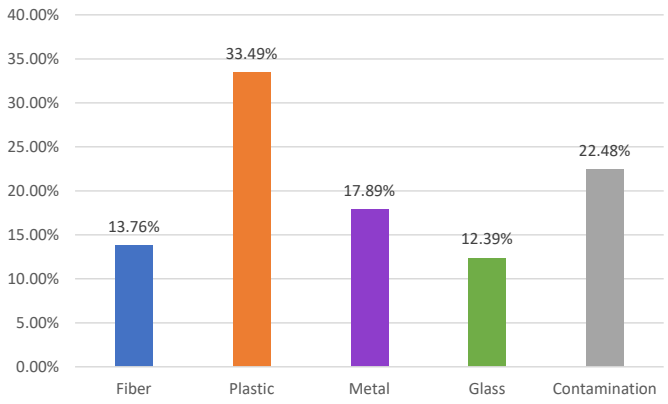


Academic with Kitchen

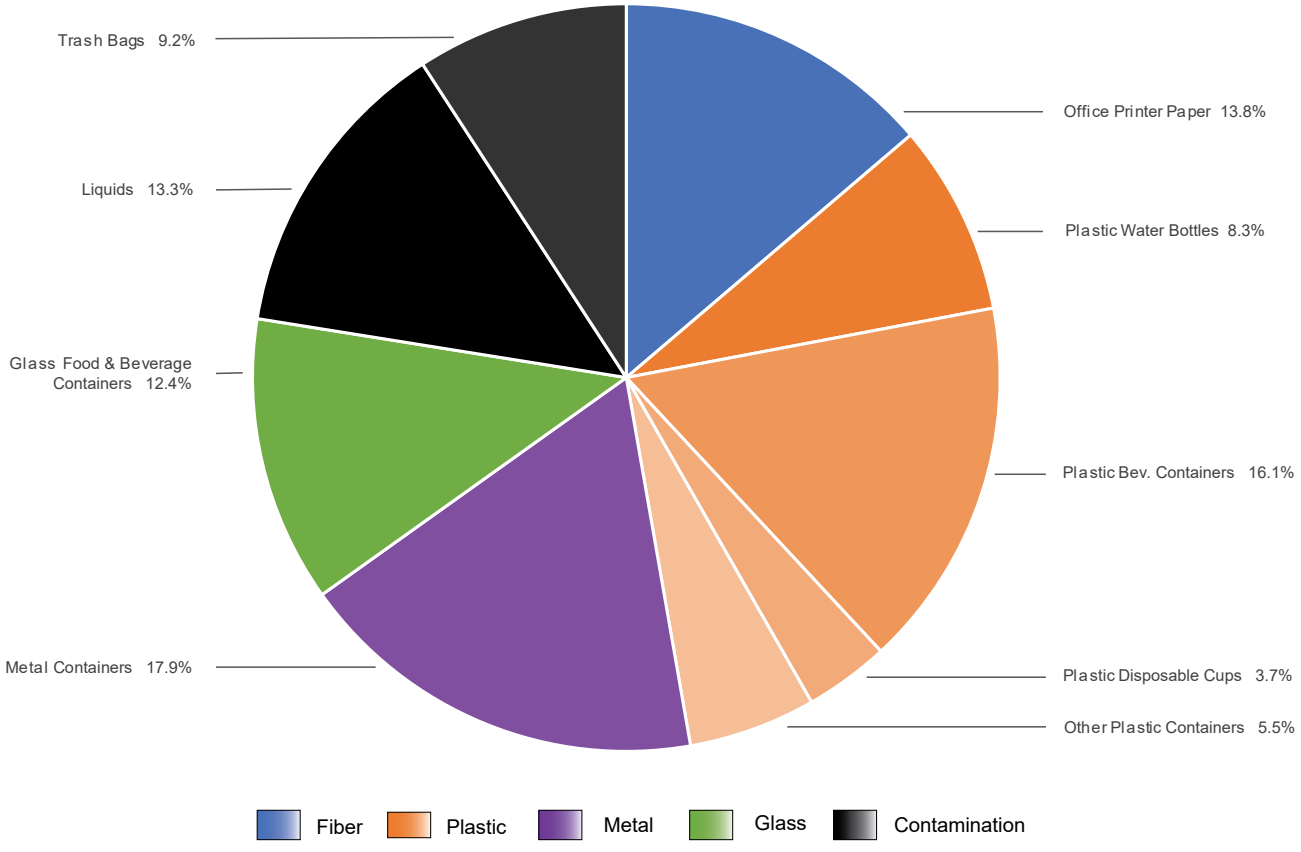
What is in the Commingled Recycling?

In the commingled recycling waste stream from academic buildings with kitchen, 65.13% of material was currently accepted recyclables. Aside from correctly recycled materials, 22.5% of the recycling waste stream from academic buildings with kitchen consists of materials considered to be mixed contamination and 12.39% was glass contamination. Top materials contributing to the overall amount of contamination within the recycling stream for academic buildings with kitchen include: liquids (13.3%) and trash bags (9.2%).

Material Opportunity of Commingled Recycling in Academic Buildings with Kitchens



2021 Composition of Commingled Recycling in Academic Buildings with Kitchens



Academic with Studio

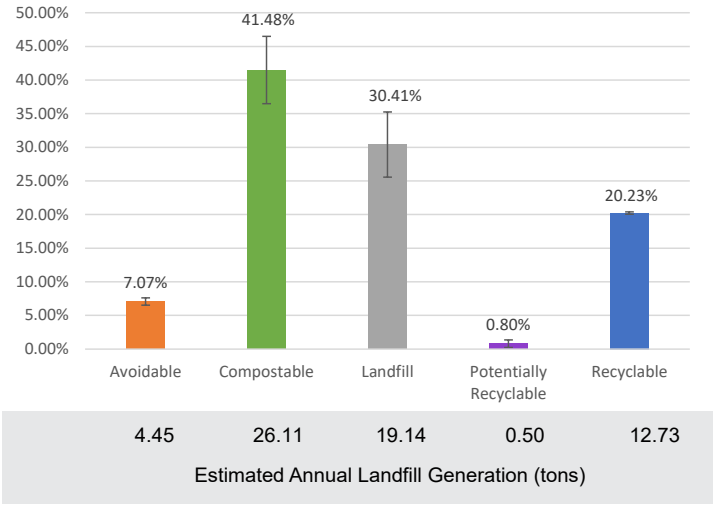
Description: These buildings house artistic studios and/or creative development spaces. They may also house classrooms, offices, conference rooms, and lounges.

Buildings Audited: Brick City 1 and Craig Hall.

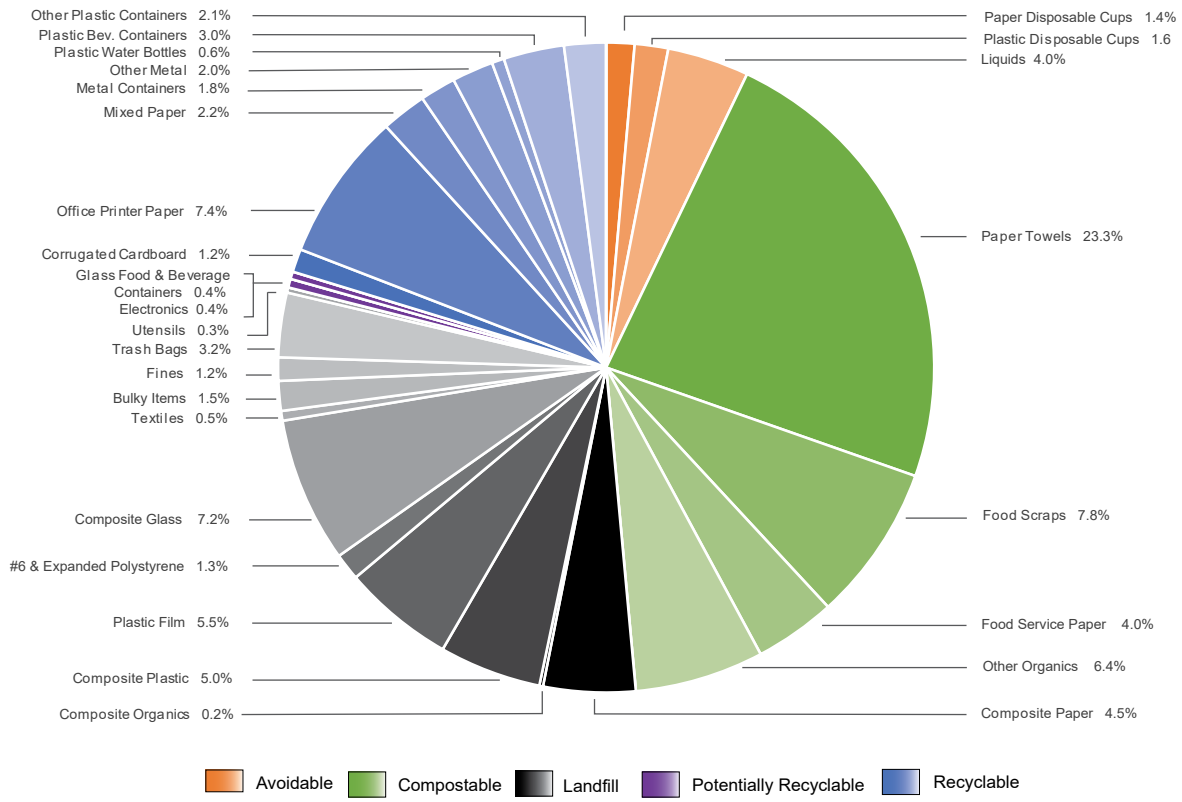
What is in the Waste?

Almost 70% (43.8 tons) of materials in the landfill waste stream for academic buildings with studios can potentially be diverted into other channels. The top five materials contributing to the overall amount of landfill waste generated in academic buildings with studios include: paper towels (23.3% or 14.7 tons), food scraps (7.8% or 4.9 tons), office printer paper (7.4% or 4.7 tons), composite glass (7.2% or 4.5 tons), and other organics (6.4% or 4.0 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream with the exception of composite glass.

Material Opportunity of Landfill Waste in Academic Buildings with Studios



2021 Composition of Landfill Waste in Academic Buildings with Studios

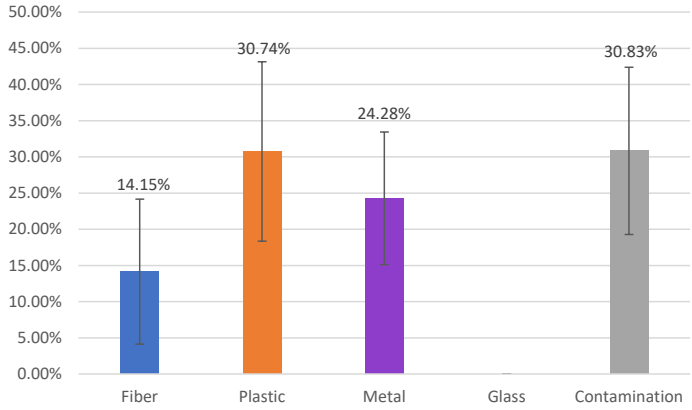


Academic with Studio

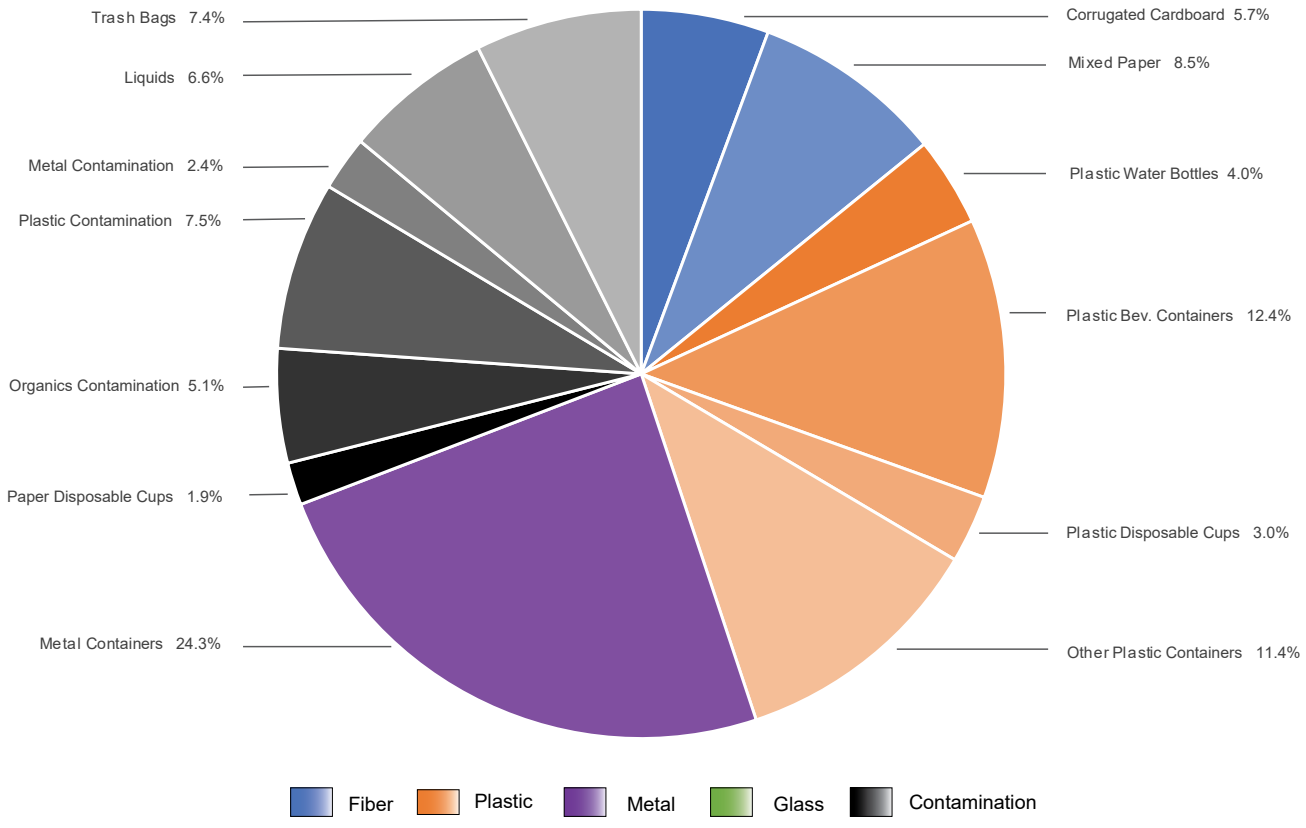
What is in the Commingled Recycling?

In the commingled recycling waste stream from academic buildings with studios, 69.2% of material was accepted recyclables. Aside from correctly recycled materials, 30.8% of the recycling waste stream from academic buildings with studios consists of materials considered to be mixed contamination. Top materials contributing to the overall amount of contamination within the recycling stream for academic buildings with studios include: trash bags (7.4%), plastic contamination (7.5%), liquids (6.6%), metal contamination (2.4%), and paper disposable cups (1.9%).

Material Opportunity of Commingled Recycling in Academic Buildings with Studios



2021 Composition of Commingled Recycling in Academic Buildings with Studios



Administrative

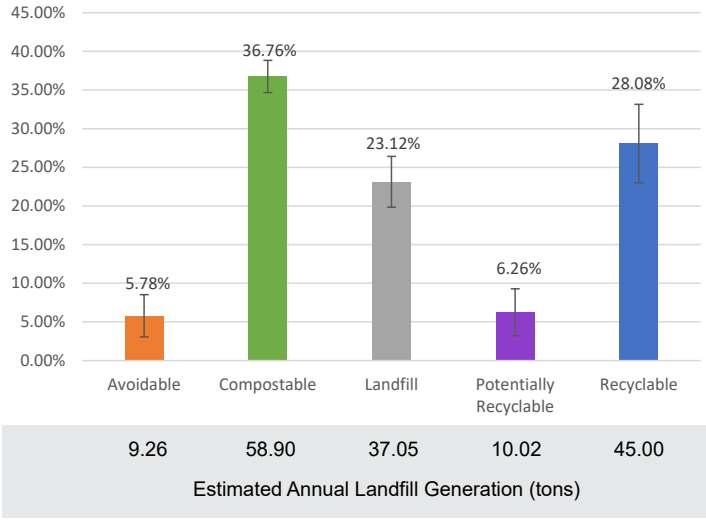
Description: Buildings that primarily serve administrative functions and/or house office space for staff and faculty on campus.

Buildings Audited: University Hall and Carrington Hall.

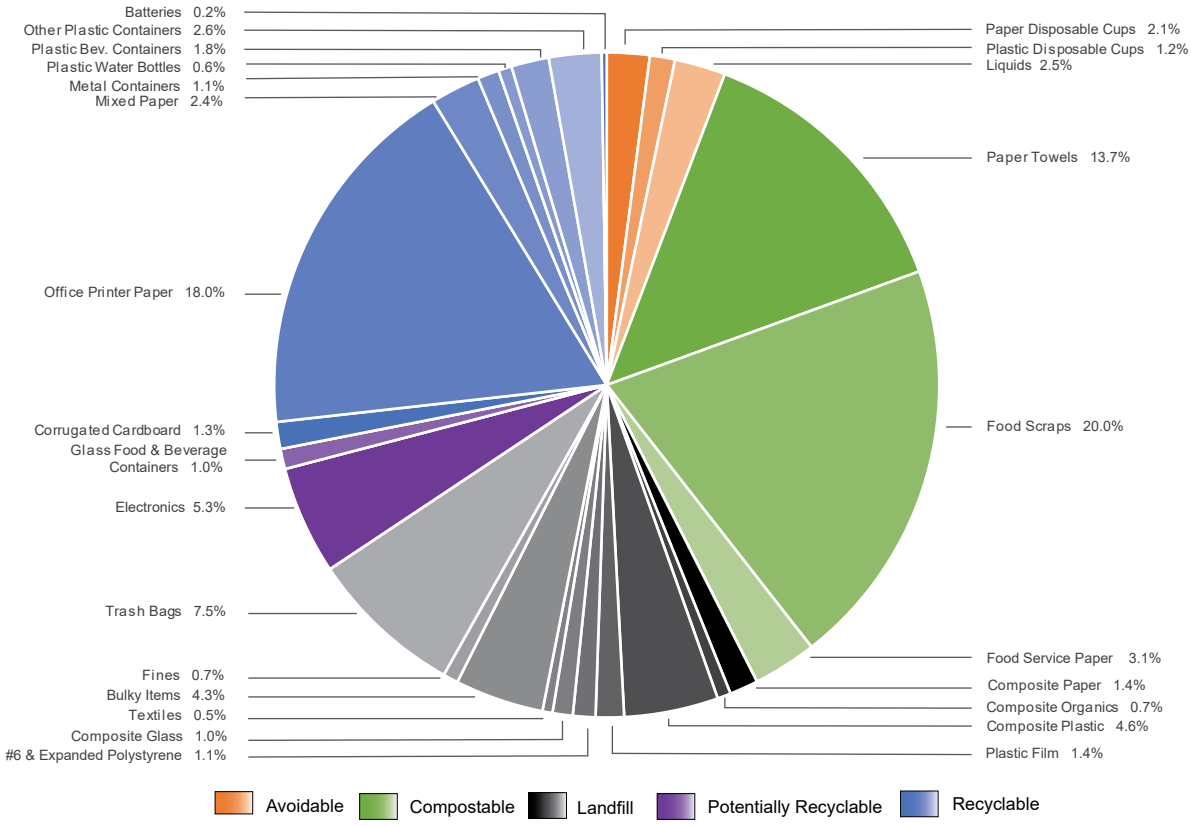
What is in the Waste?

Almost 77% (123.18 tons) of materials in the landfill waste stream for administrative buildings can potentially be diverted. The top five materials contributing to the overall amount of landfill waste generated in administrative buildings include: food scraps (20% or 32.0 tons), office printer paper (18% or 28.9 tons), paper towels (13.7% or 21.9 tons), trash bags (7.5% or 12.0 tons), and electronics (5.3% or 8.5 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream.

Material Opportunity of Landfill Waste in Administrative Buildings



2021 Composition of Landfill Waste in Administrative Buildings

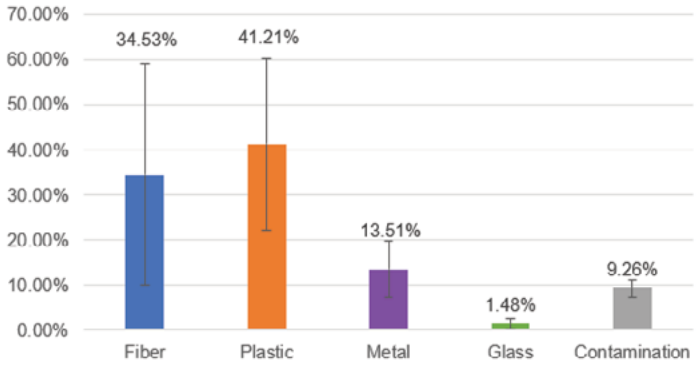


Administrative

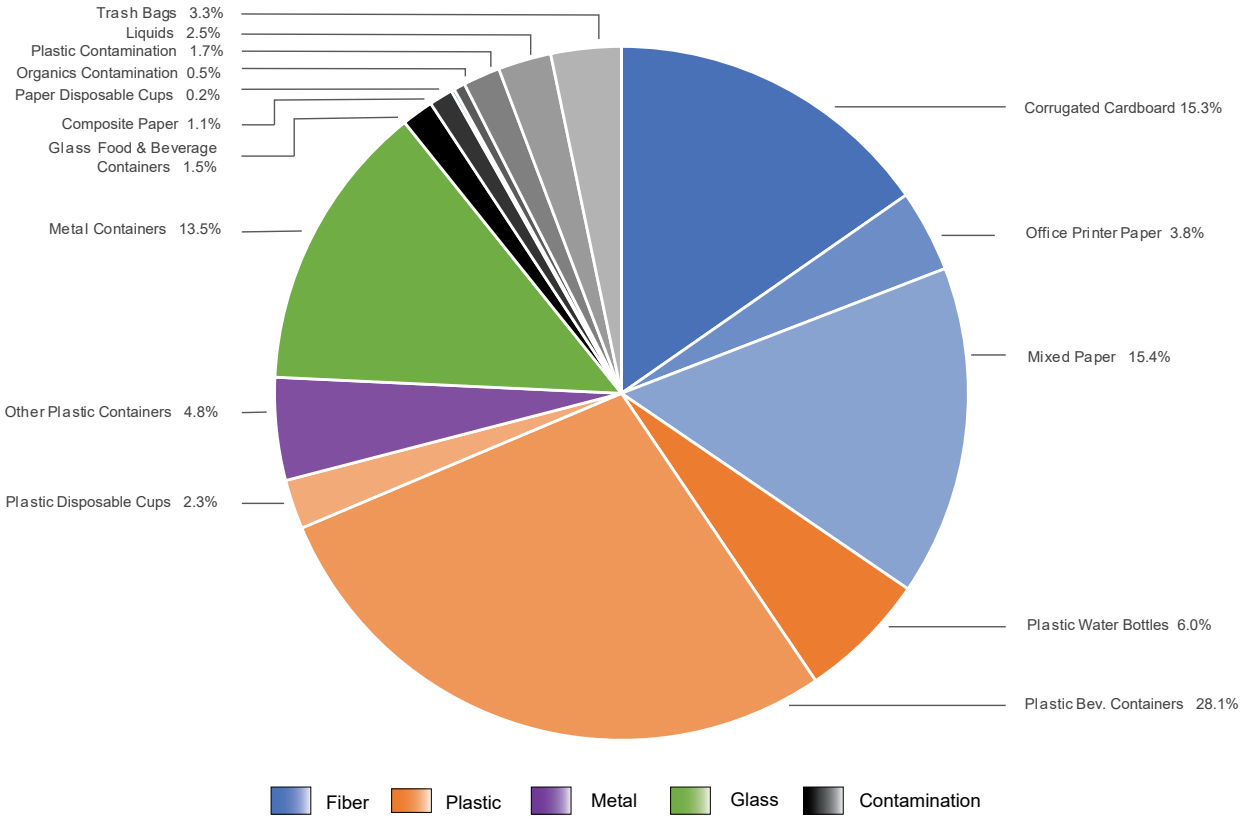
What is in the Commingled Recycling?

In the commingled recycling waste stream from administrative buildings 89.26% of material was accepted recyclables. Aside from correctly recycled materials, 9.26% of the recycling waste stream from administrative buildings consists of materials considered to be mixed contamination and 1.48% was glass contamination. Top materials contributing to the overall amount of contamination within the recycling stream for administrative buildings include: trash bags (3.3%), liquids (2.5%), plastic contamination (1.7%), and composite paper (1.1%).

Material Opportunity of Commingled Recycling in Administrative Buildings



2021 Composition of Commingled Recycling in Administrative Buildings



Event Spaces

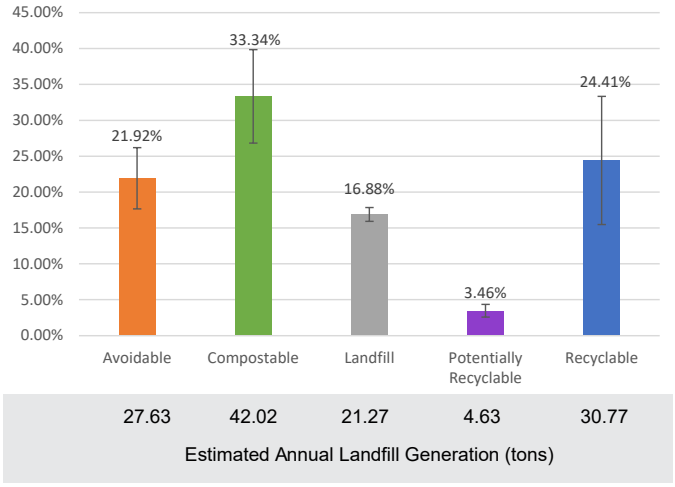
Description: Buildings that serve the purpose of hosting both campus and public facing events.

Buildings Audited: Great Southern Bank Arena and a performance at Craig Theater. Note: Audited recycling only represents materials from Craig Theater. There is no commingled recycling at the Arena. There is only cardboard recycling at the Arena, which was not audited.

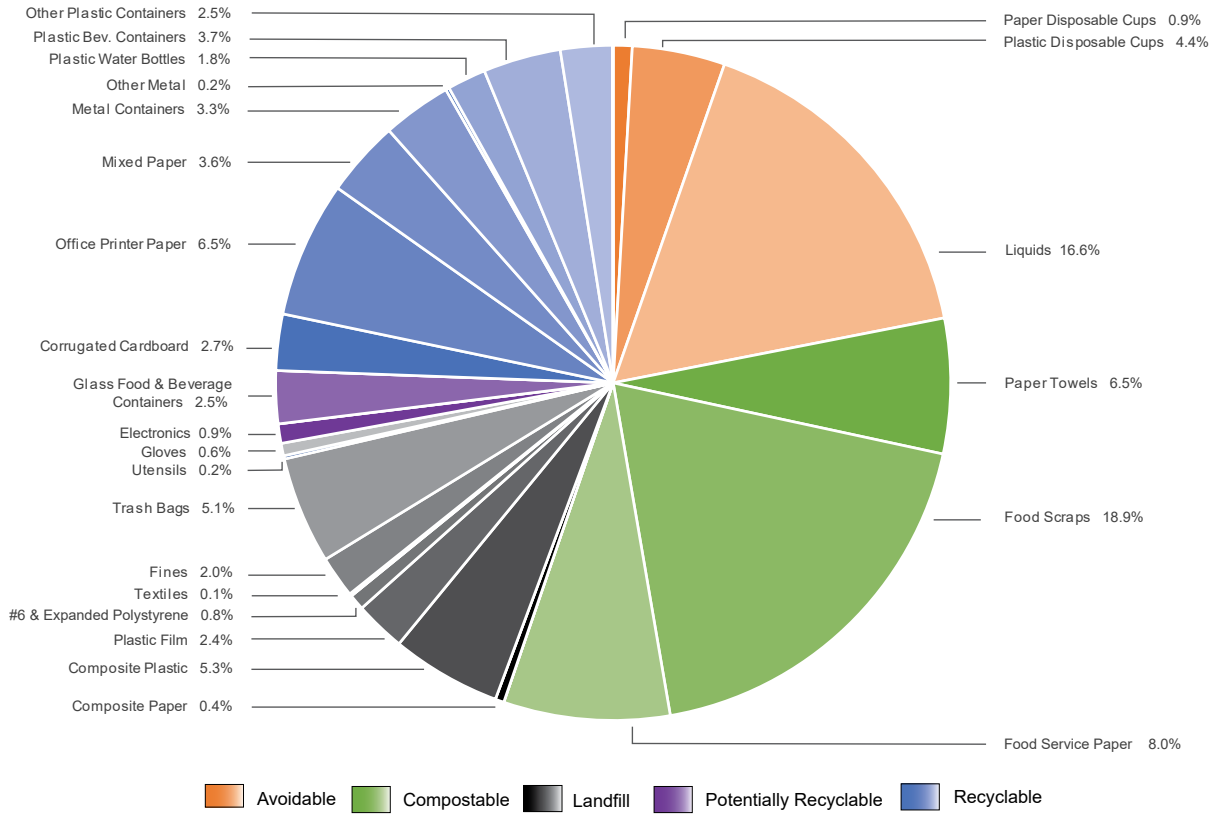
What is in the Waste?

Over 83% (104.8 tons) of materials in the landfill waste stream for event spaces can potentially be diverted into other channels. The top five materials contributing to the overall amount of landfill waste generated in event spaces include: food scraps (18.9% or 23.8 tons), liquids (16.6% or 20.9 tons), food service paper (8% or 10.0 tons), paper towels (6.5% or 8.2 tons), and office printer paper (6.5% or 8.2 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream.

Material Opportunity of Landfill Waste in Event Spaces



2021 Composition of Landfill Waste in Event Spaces

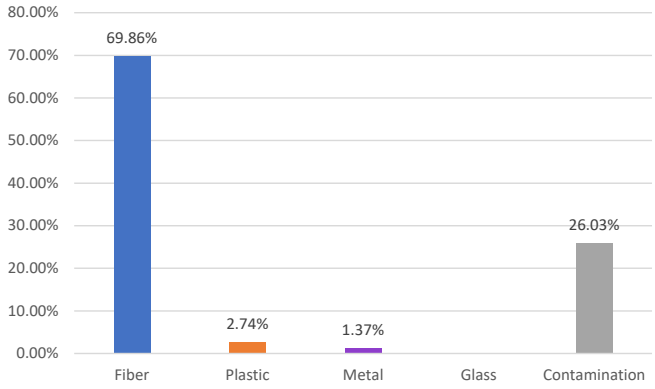


Event Spaces

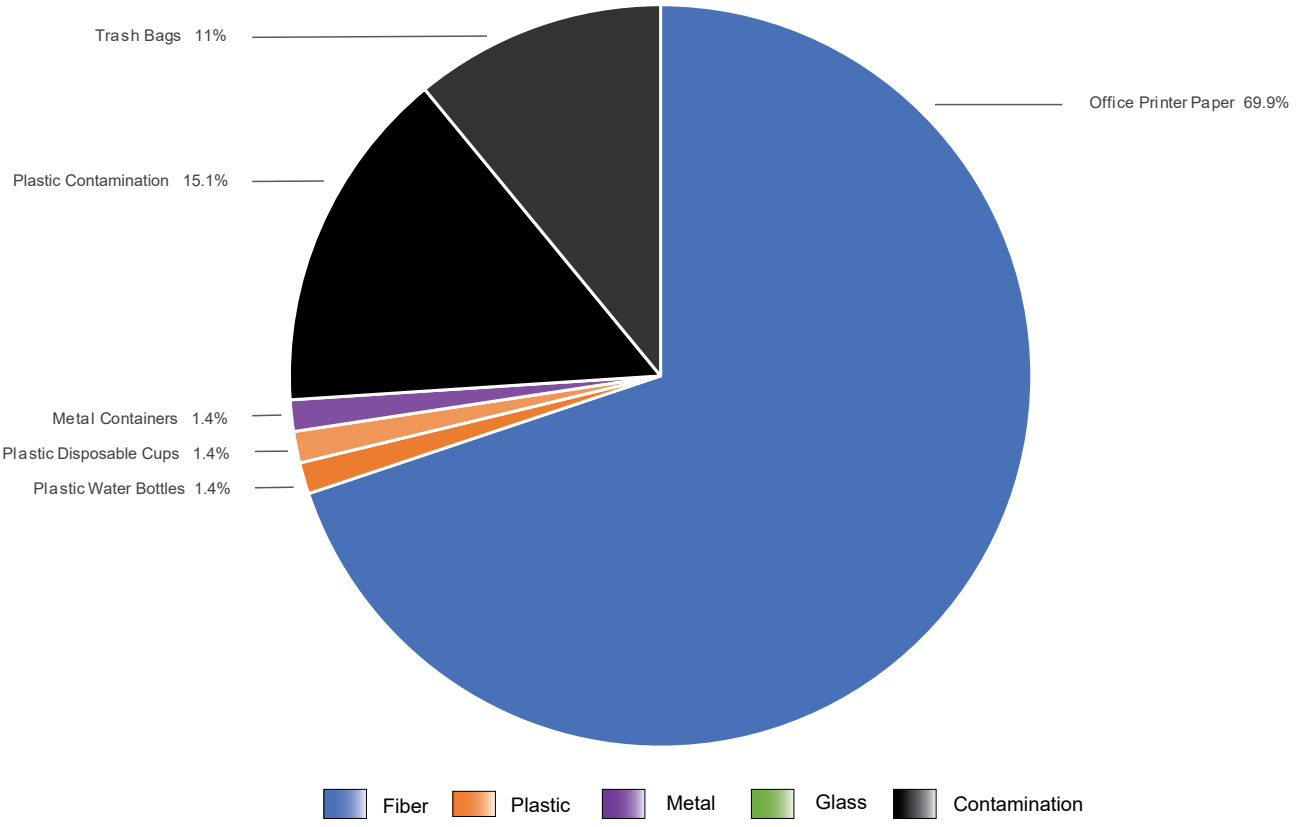
What is in the Commingled Recycling?

In the commingled recycling waste stream from event spaces 73.97% of material was accepted recyclables. Aside from correctly recycled materials, over 26% of the recycling waste stream from event spaces consists of materials considered to be mixed contamination. Top materials contributing to the overall amount of contamination within the recycling stream for event spaces include: plastic contamination (15.1%) and trash bags (11%).

Material Opportunity of Commingled Recycling in Event Spaces



2021 Composition of Commingled Recycling in Event Spaces



Dining

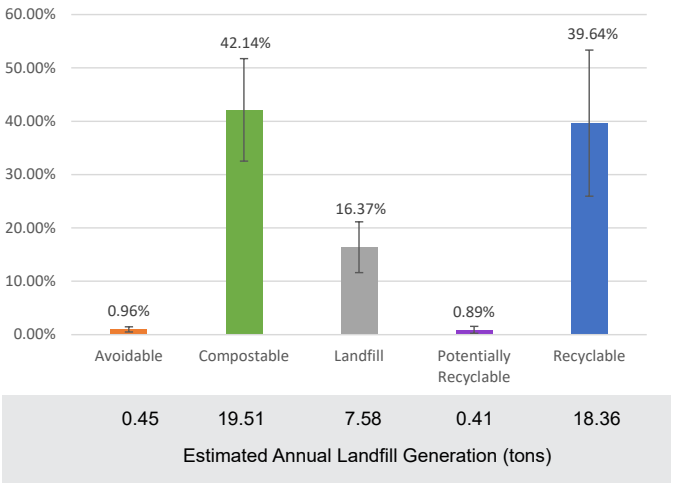
Description: This includes facilities where the primary functions are to prepare and consume food.

Buildings Audited: Plaster Student Union dining vendors, Blair-Shannon Dining and Einstein's Bagels in Glass Hall.

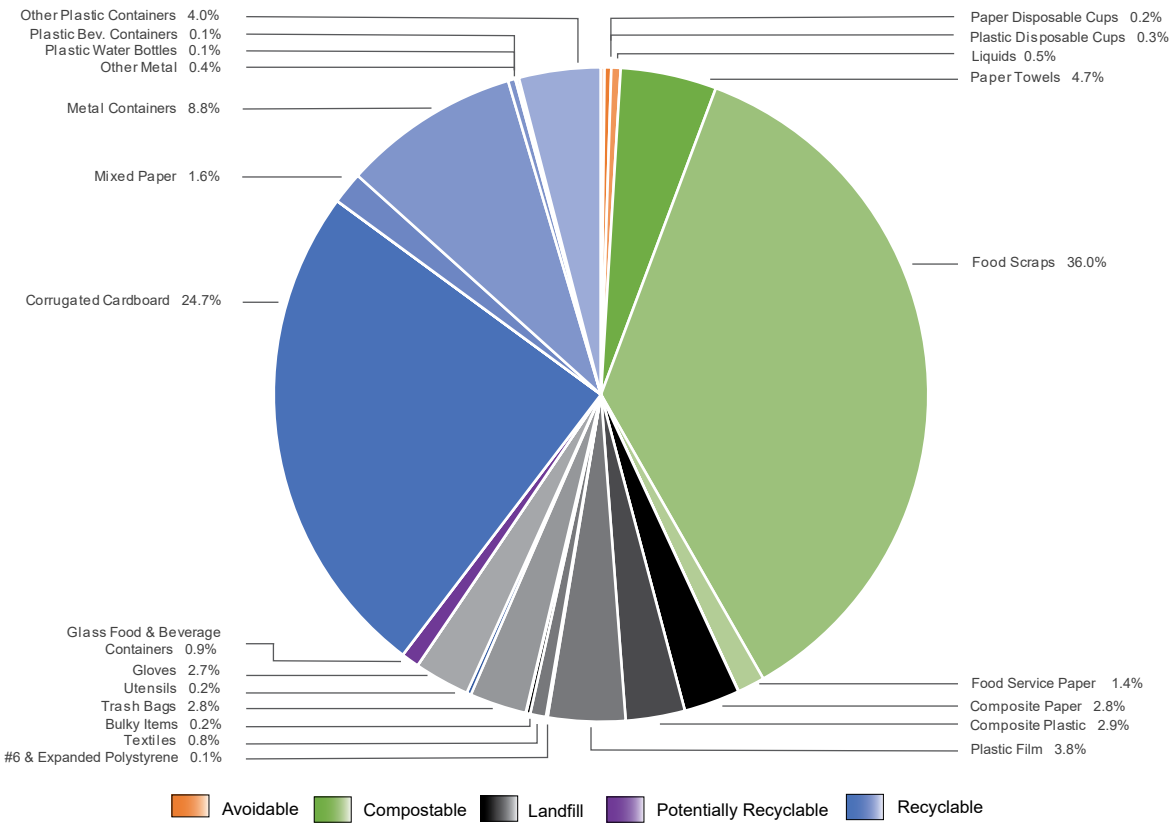
What is in the Waste?

Nearly 84% (38.7 tons) of materials in the landfill waste stream for dining spaces can potentially be diverted into other channels. The top five materials contributing to the overall amount of landfill waste generated in dining spaces include: food scraps (36% or 16.7 tons), corrugated cardboard (24.7% or 11.4 tons), metal containers (8.8% or 4.1 tons), paper towels (4.7% or 2.2 tons), and other plastic containers (4% or 1.9 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream.

Material Opportunity of Landfill Waste in Dining Spaces



2021 Composition of Landfill Waste in Dining Spaces

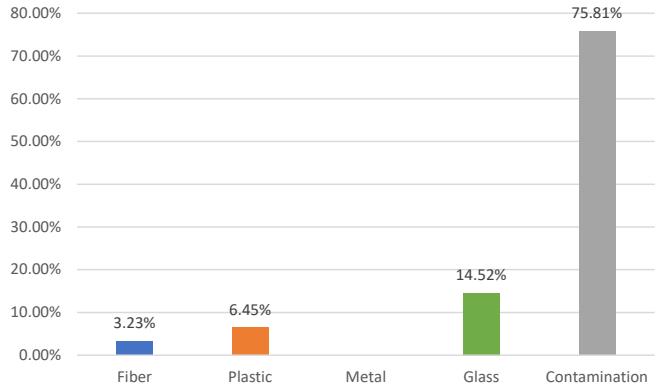


Dining

What is in the Commingled Recycling?

In the commingled recycling waste stream from dining spaces 9.7% of material was accepted recyclables. Aside from correctly recycled materials, 75.8% of the recycling waste stream from dining spaces consists of materials considered to be mixed contamination and 14.5% was glass contamination. Top materials contributing to the overall amount of contamination within the recycling stream for dining spaces include: organics (35.5%), plastic contamination (24.2%), and trash bags (16.1%).

Material Opportunity of Commingled Recycling in Dining Spaces



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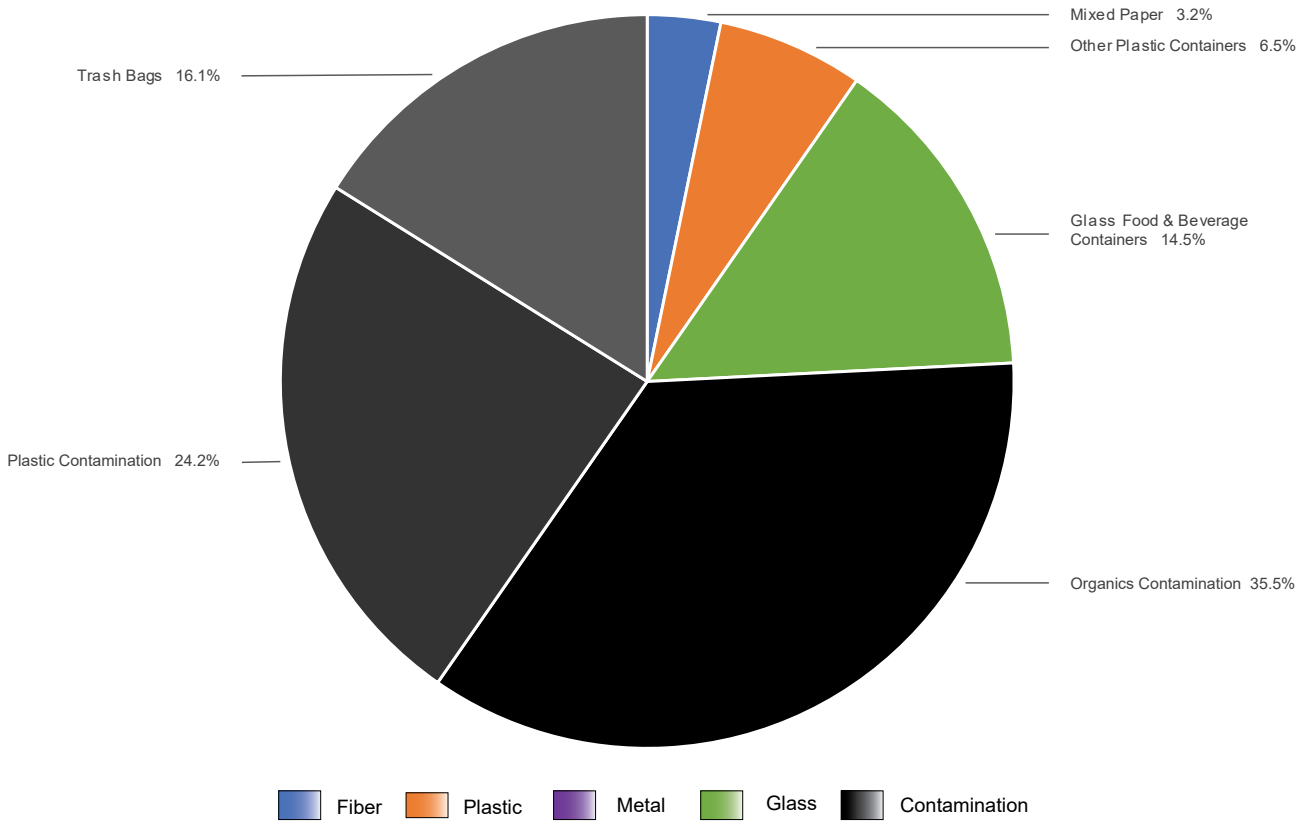


Mixed Use

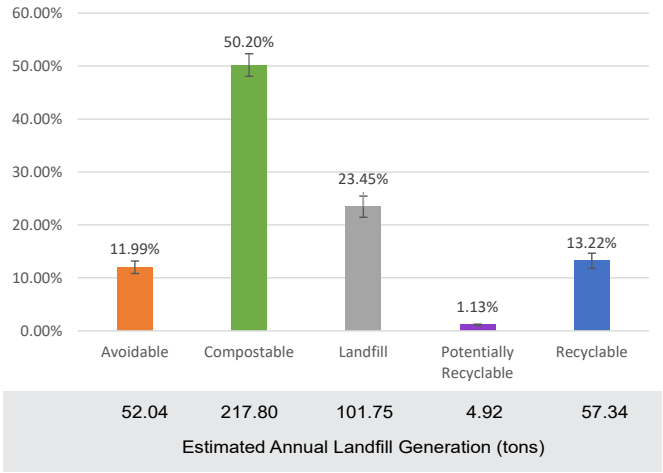
Description: Buildings that serve more than one substantial function. This could be a combination of athletic facilities, study space, food services, etc.

Buildings Audited: Plaster Student Union and Meyer Library.

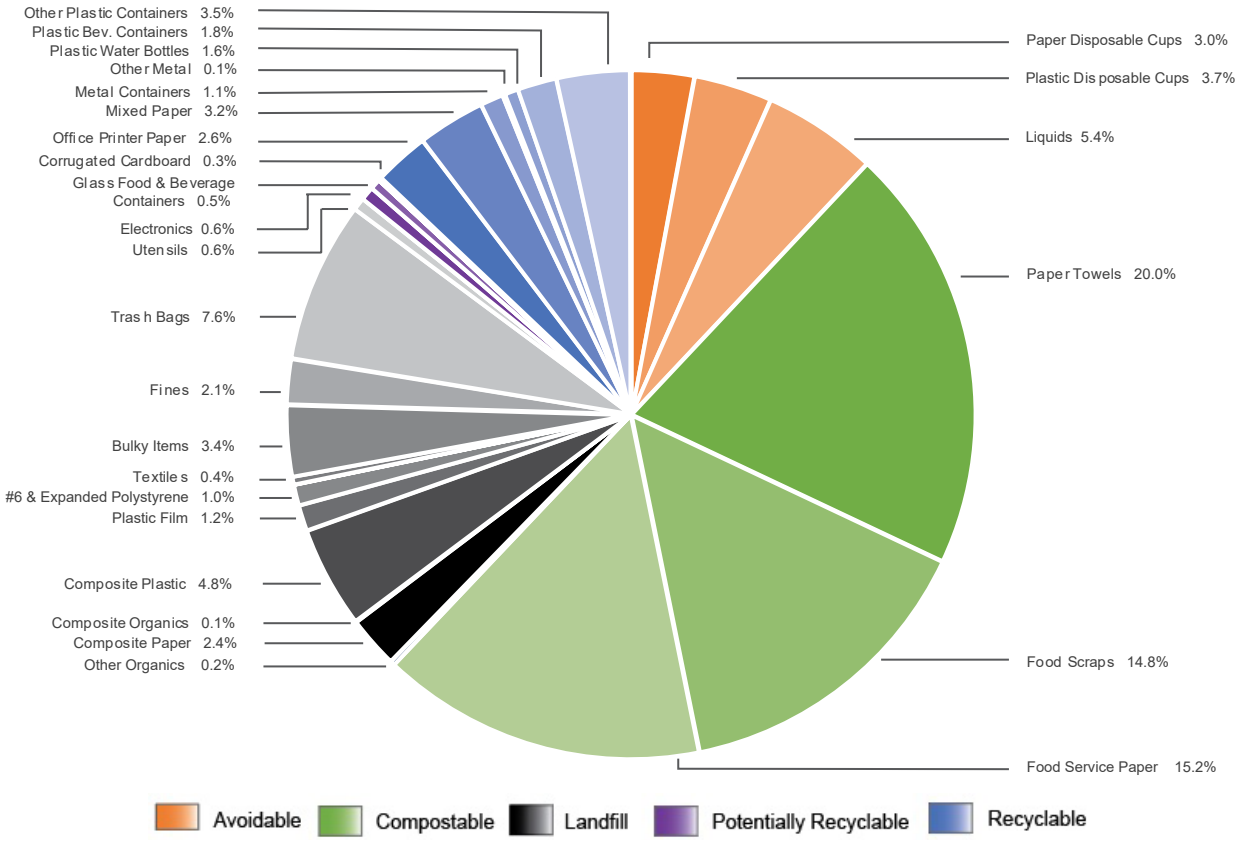
What is in the Waste?

Nearly 77% (332.1 tons) of materials in the landfill waste stream for mixed-use spaces can potentially be diverted into other channels. The top five materials contributing to the overall amount of landfill waste generated in mixed-use spaces include: paper towels (20% or 86.6 tons), food service paper (15.2% or 66.1 tons), food scraps (14.8% or 64.1 tons), trash bags (7.6% or 32.8 tons), and liquids (5.4% or 23.2 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream.

Material Opportunity of Landfill Waste in Mixed Use Buildings



2021 Composition of Landfill Waste in Mixed Use Spaces

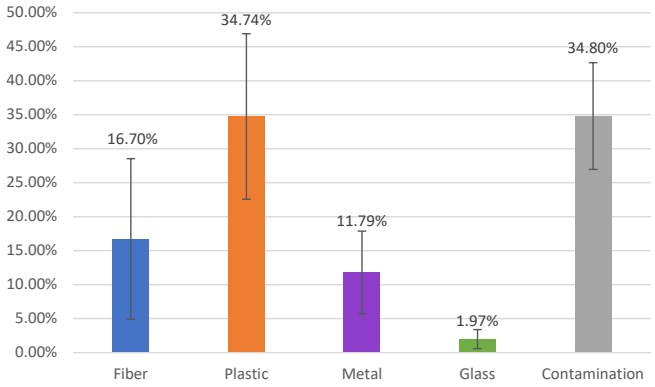


Mixed Use

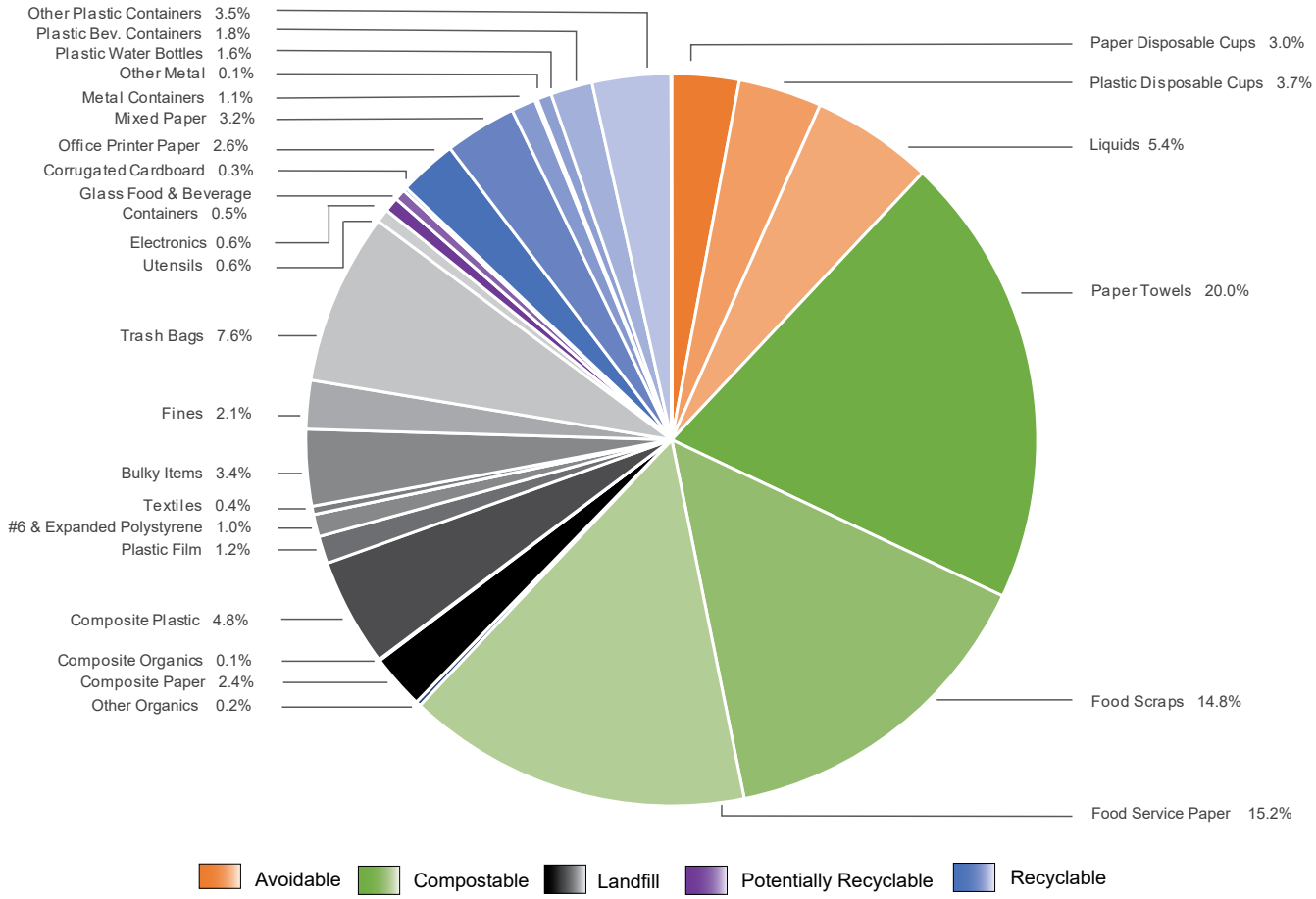
What is in the Commingled Recycling?

In the commingled recycling waste stream from mixed use buildings 63.2% of material was accepted recyclables. Aside from correctly recycled materials, almost 35% of the recycling waste stream from mixed-use spaces consists of materials considered to be mixed contamination and 2.0% was glass contamination. Top materials contributing to the overall amount of contamination within the recycling stream for mixed-use spaces include: trash bags (14%), organics (11.8%), plastic contamination (5.2%), liquids (2.3%), and paper disposable cups (1.1%).

Material Opportunity of Commingled Recycling in Mixed Use Spaces



2021 Composition of Commingled Recycling in Mixed Use Spaces



Residence Halls

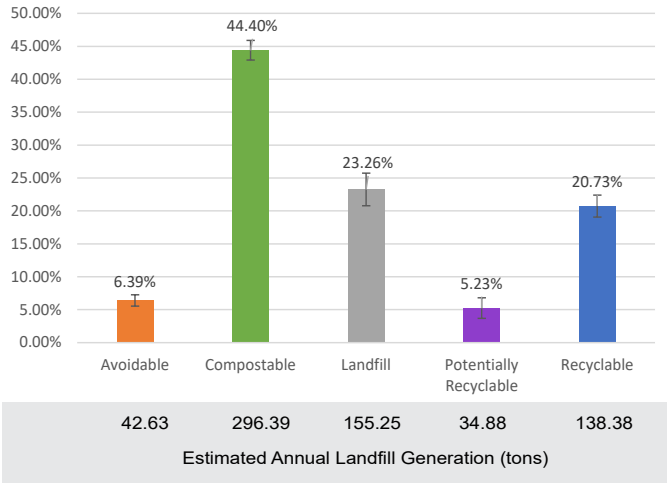
Description: Buildings that primarily serve as on-campus student housing. These spaces include corridor, suite, and apartment style housing, and are occasionally co-located with campus food service operations.

Buildings Audited: Blair-Shannon, Sunvilla Tower and Freudenberger House.

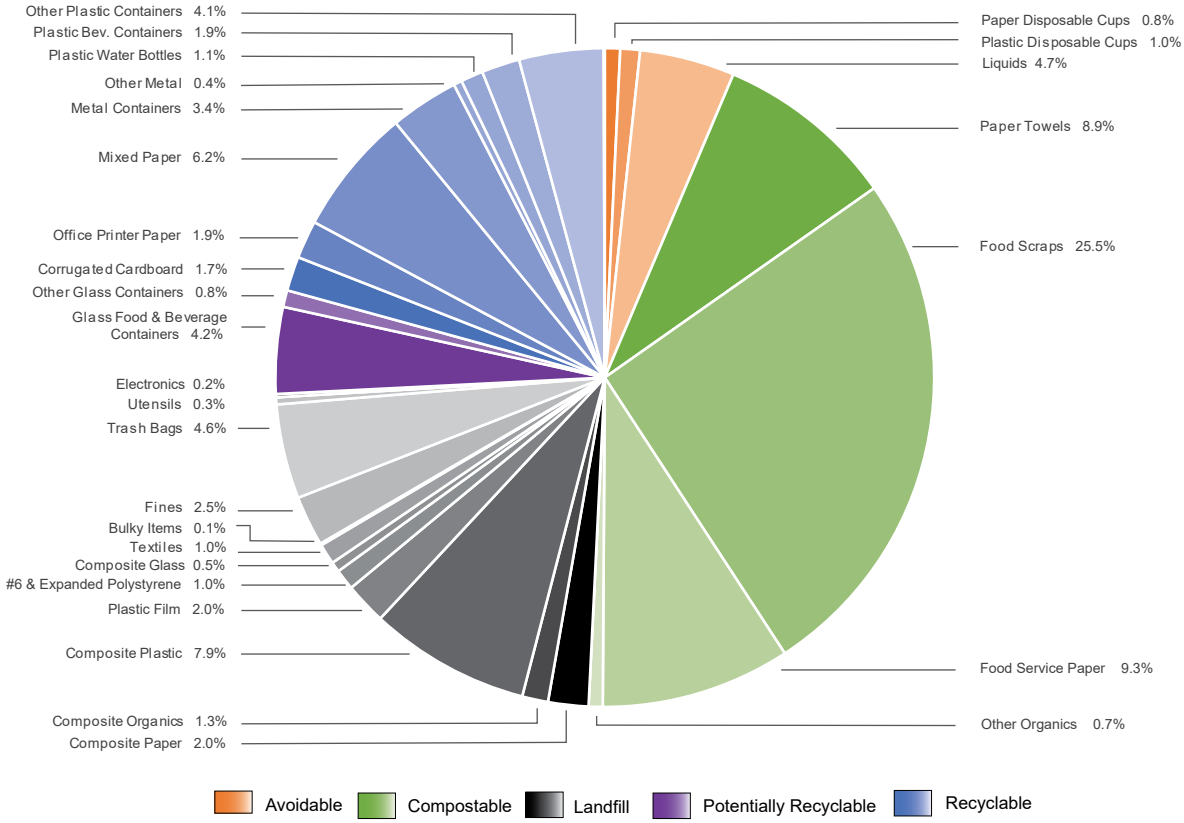
What is in the Waste?

Almost 77% (512.3 tons) of materials in the landfill waste stream for residence halls can potentially be diverted into other channels. The top five materials contributing to the overall amount of landfill waste generated in residence halls include: food scraps (25.5% or 170.6 tons), food service paper (9.3% or 62.1 tons), paper towels (8.9% or 59.1 tons), composite plastic (7.9% or 52.8 tons), and mixed paper (6.2% or 41.7 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream.

Material Opportunity of Landfill Waste in Residence Halls



2021 Composition of Landfill Waste in Residence Halls

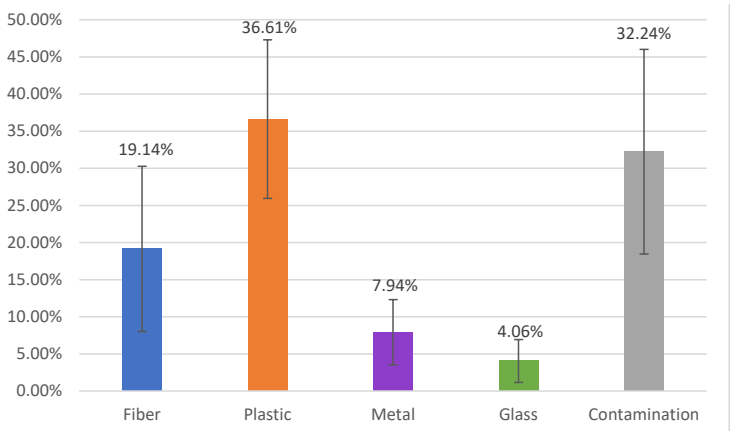


Residence Halls

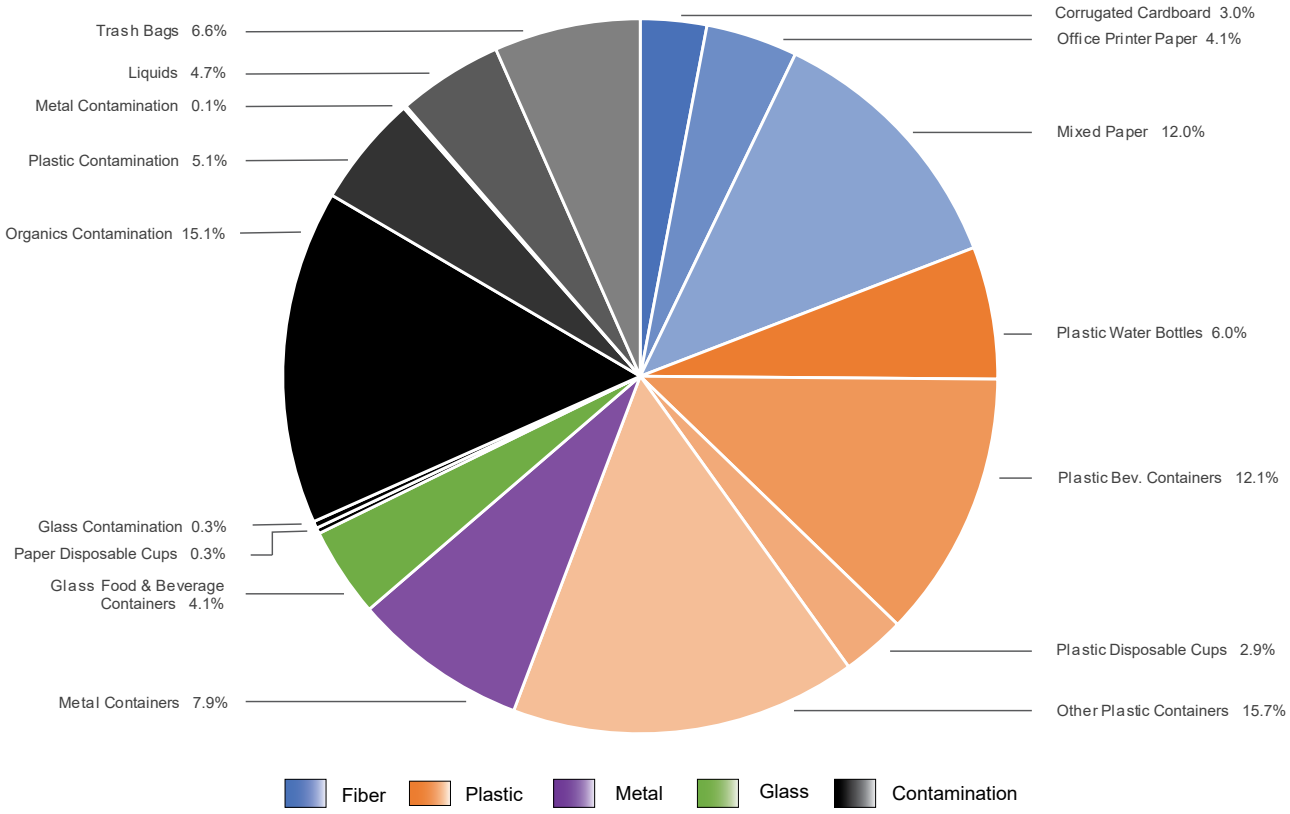
What is in the Commingled Recycling?

In the commingled recycling waste stream from residence halls, 63.7% of material was accepted recyclables. Aside from correctly recycled materials, 32.2% of the recycling waste stream from residence halls consists of materials considered to be mixed contamination and 4.1% was glass contamination. Top materials contributing to the overall amount of contamination within the recycling stream for residence halls include: organics contamination (15.1%), trash bags (6.6%), plastic contamination (5.1%), and liquids (4.7%).

Material Opportunity of Commingled Recycling in Residence Halls



2021 Composition of Commingled Recycling in Residence Halls



On the Go

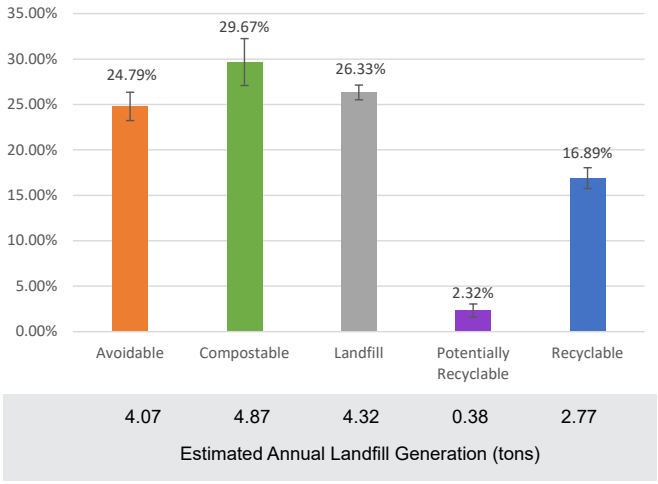
Description: This includes landfill and recycle bins from across campus that are outdoors in publicly accessible spaces along walking paths, near building entry/exit, and in parking lots and structures.

Locations Audited: North Campus, Central Campus, South Campus and Parking Structures

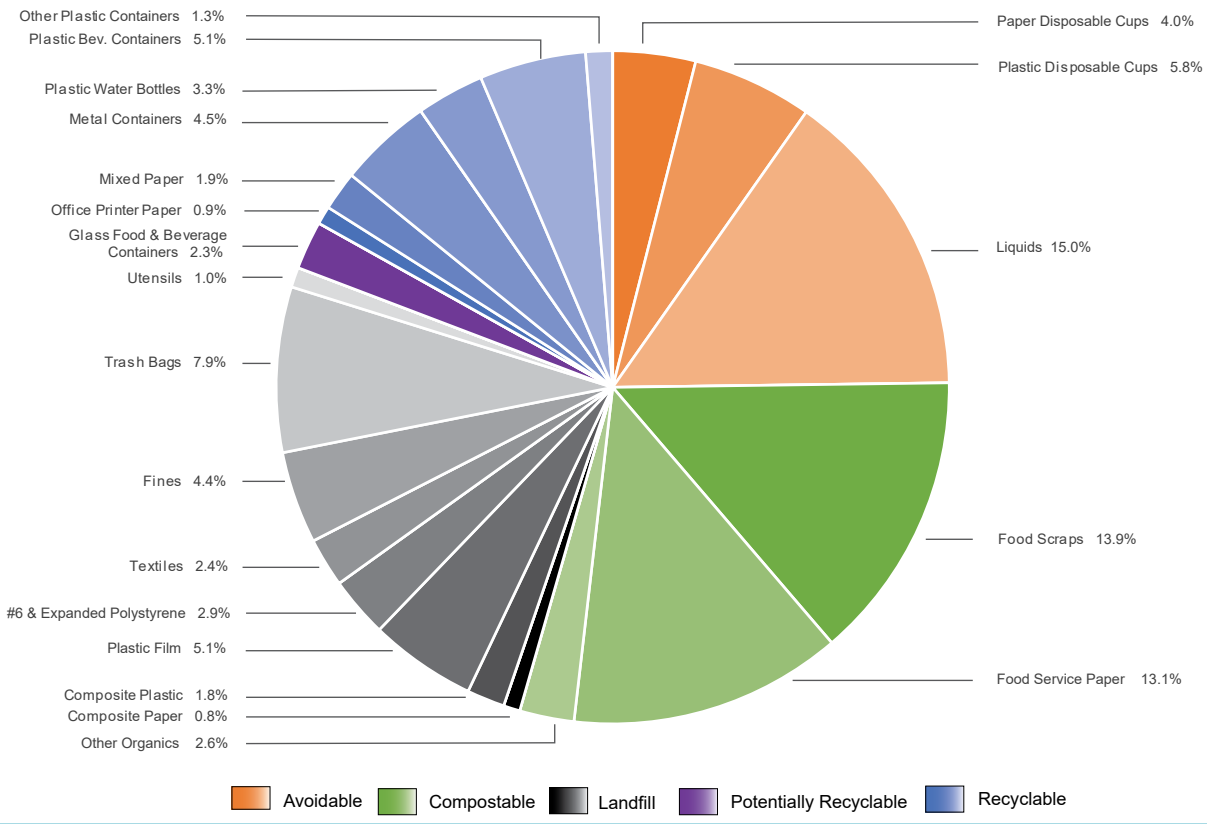
What is in the Waste?

Almost 74% (12.1 tons) of materials in the landfill waste stream for outdoor bins can potentially be diverted into other channels. The top five materials contributing to the overall amount of landfill waste generated outdoor bins include: liquids (15% or 2.5 tons), food scraps (13.9% or 2.3 tons), food service paper (13.1% or 2.2 tons), trash bags (7.9% or 1.3 tons), and plastic disposable cups (5.8% or 0.9 tons). Each of these materials has the potential to be reduced, eliminated or diverted from the waste stream.

Material Opportunity of Landfill Waste On the Go



2021 Composition of Landfill Waste On the Go

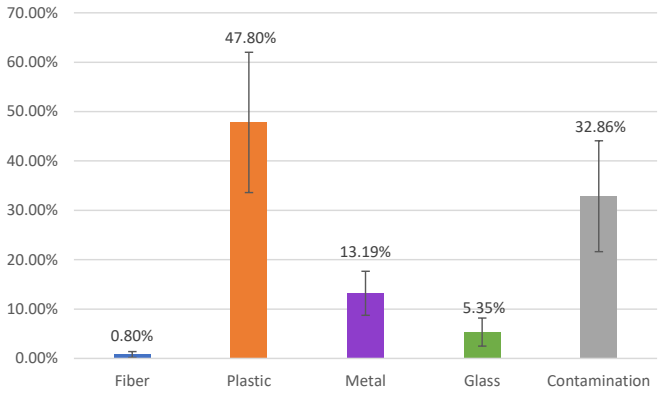


On the Go

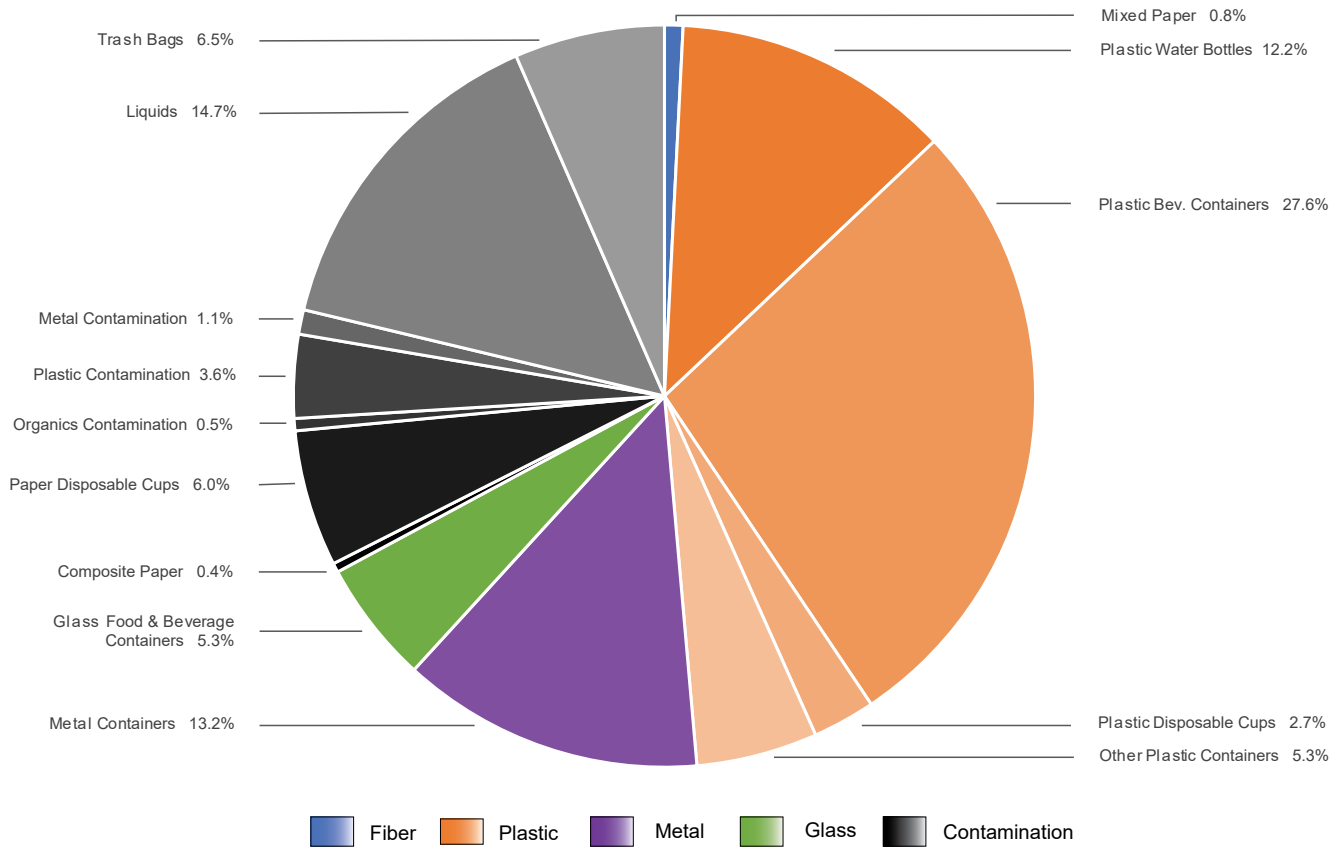
What is in the CommingledRecycling?

In the commingled recycling waste stream from outdoor bins 61.8% of material was accepted recyclables. Aside from currently accepted recyclables, 32.9% of the recycling waste stream from outdoor bins consists of materials considered to be mixed contamination and 5.4% was glass contamination. Top materials contributing to the overall amount of contamination within the recycling stream for outdoor bins include: liquids (14.7%), trash bags (6.5%), paper disposable cups (6%), and plastic contamination (3.6%).

Material Opportunity of Commingled Recycling On the Go



2021 Composition of Commingled Recycling On the Go



Appendix B: Sorting Categories

Landfill

Material	Description
Corrugated Cardboard	Examples include entire cardboard containers, such as shipping and moving boxes, computer packaging cartons, sheets and pieces of cardboard and unbleached paperboard, the flat, pressed, stiff paper used in cereal boxes. Only the clean portion of pizza boxes.
Office Printer Paper	Examples include standard office paper such as white paper used in photocopiers and laser printers, letter paper, and receipts.
Mixed Paper	Examples include colored paper, manila folders and envelopes, file folders, index cards, junk mail, white envelopes, white window envelopes, white or colored notebook paper, greeting cards, shredded paper, magazines, catalogs, brochures, newspapers and inserts, phone books, and carbonless forms.
Composite Paper	Examples include waxed corrugated cardboard, paper cups, tetra pack/ aseptic/gable top cartons, paper/hardback books, and photo paper.
Disposable Beverage Cups – Paper	Examples include paper plastic-lined coffee-cups, sleeves and lids, and fountain drink cold-cups, lids and straws.
Paper Towels	Paper or bathroom towels, tissues, and napkins.
Food Scraps	Food prep, peels, shells, scraps, and uneaten food portions.
Food Service Paper & Compostables	Fast food paper wrappers, food-soiled paper, all pizza boxes, compostable bowls, plates, and cups.
Other Organics	Cork, hemp rope, chopsticks, hair, cotton balls, paper tea bags, and pet waste.
Yard Material	Landscaping debris such as grass clippings, leaves, garden waste, brush, plants, and trees.
Composite Organics	Examples include leather items, rubber items, carpet padding, cigarette butts, diapers, feminine hygiene products, small wood products, K-Cups, and vacuum bags.
Metals & Aluminum Containers	Examples include aluminum beverage cans, tin and steel canned food, beverages, meat and pet food, clean balled aluminum foil, pie pans, loose metal jar lids, and steel bottle caps.
Other Metal	Coat hangers, empty spray paint and other aerosol containers (no caps), metal scraps, and other metal.
Plastic Water Bottles	Plastic water bottles and caps.

Material	Description
Plastic Beverage Containers	Examples include fruit juice, milk, sports drink, tea, or liquor containers. Caps are fine.
Plastic Containers #1-5	Examples include detergent, bleach, yogurt, shampoo, cleaning supply, and takeout containers.
Disposable Beverage Cups - Plastic	Examples include plastic cold drink cups, lids and straws.
Composite Plastic	Examples include parts made of plastic attached to metal, plastic drinking straws, utensils, chip bags, granola bar and candy bar wrappers, plastic strapping, plastic lids, handles, and knobs.
Plastic Film	Examples include grocery bags, dry cleaning bags, Ziploc bags, stretch wrap, and other soft plastic.
Polystyrene - #6 Plastic Containers & Foam	#6 plastic such as cookie trays and other rigid plastic containers. Foam meat, produce and pastry trays, foam packing blocks, packing peanuts, foam plates/bowls, and other expanded polystyrene products.
Lab Plastic	Pipette boxes, gloves, petri dishes, and other lab items.
Glass Beverage & Food Containers	Examples include whole or broken soda bottles, fruit juice bottles, wine cooler or beer bottles, and wine bottles, pickle jars, jam/jelly jars, peanut butter jars, salsa jars, and olive jars.
Other Glass Containers	Drinking vessels (pint, wine, mason jars), candle jars, cosmetic bottles, jars, windows, shower door, and tabletops (no frames).
Composite Glass	Examples include Pyrex, Corningware, and milkglass tableware, mirrors, auto windshields, laminated glass, and china/leaded glass.
Bulbs/Lamps	All kinds of bulbs and lamps.
Regulated Electronic Goods	Examples include Computers (desktop, laptop, netbook, notebook, tablet – anything with 4’ diagonal screen), electronic keyboards, monitors, and mice.
Non-Regulated Electronics	Printers, faxes, televisions, DVD players, VHS players, and game consoles, cords, headphones, small appliances, and other non-regulated items that operate using either a battery or power cord.
Textiles	Examples include clothes, towels, bedding and bed sheets, fabric trimmings, draperies, bandanas, and all natural and synthetic cloth fibers.
Bulky Items	Bulky Items means large hard-to-handle items that are not defined elsewhere in the material types list, including furniture, mattresses, couches, tires, garden hose, binders, umbrellas, and other large items.
Liquids	All kinds of liquids.
Fines	Remnants left after sorting is complete, typically consisting of dirt, sawdust, and small food scraps, etc.
Trash Bag Waste	Bags used to contain waste materials.
Batteries	All kinds of batteries.

Recycle

Material	Description
Office Printer Paper	Examples include standard office paper such as white paper used in photocopiers and laser printers, letter paper, and receipts.
Mixed Paper	Examples include colored paper, manila folders and envelopes, file folders, index cards, junk mail, white envelopes, white window envelopes, white or colored notebook paper, greeting cards, shredded paper, magazines, catalogs, brochures, newspapers and inserts, phone books, and carbonless forms.
Composite Paper	Examples include waxed corrugated cardboard, paper cups, tetra pack/ aseptic/gable top cartons, paper/hardback books, and photo paper.
Metal Containers	Examples include aluminum beverage cans, canned food, beverages, meat and pet food, clean balled aluminum foil, pie pans, loose metal jar lids and steel bottle caps, and art chemical containers.
Plastic Water Bottles	Plastic water bottles and caps.
Plastic Beverage Containers	Examples include fruit juice, milk, sports drink, tea, and liquor containers. Caps are fine.
Plastic Containers #1-5	Examples include detergent, bleach, yogurt, shampoo, cleaning supply, and takeout containers.
Disposable Beverage Cups – Paper Contamination	Examples include paper plastic-lined coffee-cups, sleeves and lids, and fountain drink cold-cups, lids and straws.
Disposable Beverage Cups – Plastic Contamination	Examples include plastic cold drink cups, lids and straws.
Plastic Art Chemical Containers	Art chemical / supplies plastic containers.
Glass Beverage & Food Containers	Examples include whole or broken soda bottles, fruit juice bottles, wine cooler or beer bottles, and wine bottles, pickle jars, jam/jelly jars, peanut butter jars, salsa jars, and olive jars.

Recycle- Continued

Material	Description
Other Glass Containers	Drinking vessels (pint, wine, mason jars), candle jars, cosmetic bottles, jars, windows, shower door, tabletop (no frames).
Glass Contamination	Glass of items that are not conventionally recyclable such as: Pyrex, Corningware, and milkglass tableware, mirrors, auto windshields, laminated glass, and china/leaded glass.
Organics Contamination	Organic material found in recycling stream that is not recyclable such as: Food prep, peels, shells, scraps and uneaten food portions, fast food wrappers, food-soiled paper, all pizza boxes, compostable bowls, plates, and cups, cork, hemp rope, chopsticks, hair, flowers, and landscaping debris.
Plastic Contamination	Plastic items that are not recyclable such as: lab plastics, #6 plastics, Styrofoam of any kind, shrink wrap and plastic bags, parts made of plastic attached to metal, plastic drinking straws, utensils, chip bags, granola bar and candy bar wrappers, plastic 6-pack holders, plastic strapping, plastic lids, handles, and knobs.
Metal Contamination	Coat hangers, empty spray paint, other aerosol containers (no caps), metal scraps and other metal discards.

Appendix C: Building Level Tonnage

Campus Buildings by Activity Zone	Material Fate Tons Landfilled	Material Opportunity in Tons				
		Avoidable	Compostable	Landfill	Recyclable	Potentially Recyclable
Academic Buildings						
Cheek Hall	**39.07**	5.06	15.42	7.72	10.52	0.35
Ellis Hall	**11.58**	1.5	4.57	2.29	3.12	0.1
Glass Hall	**36.6**	4.74	14.44	7.24	9.85	0.33
Hill Hall	**15.23**	1.97	6.01	3.01	4.1	0.14
King Street Annex	**7.34**	0.95	2.9	1.44	1.98	0.07
Sicelluf Hall	**28.65**	3.71	11.3	5.68	7.71	0.25
Strong Hall	**29.44**	3.82	11.62	5.82	7.92	0.26
Academic Buildings with Kitchen						
Pummill Hall	**10.25**	0.62	5.36	2.36	1.71	0.2
Academic Buildings with Labs						
Karls Hall	**11.24**	0.81	4.47	2.6	2.75	0.61
Kemper Hall	**65.52**	4.74	26.04	15.15	16.05	3.54
McQueary	**11.26**	0.81	4.48	2.6	2.76	0.61
O'Reilly	**14.97**	1.08	5.95	3.46	3.67	0.81
Kampeter Health Sciences Hall	**46.86**	3.39	18.62	10.84	11.48	2.53
Temple Hall	**40**	2.89	15.9	9.25	9.8	2.16
Academic Buildings with Studios						
Brick City 1	**16.9**	1.19	7.01	5.14	3.42	0.14
Brick City 3 & 4	**11.7**	0.83	4.85	3.56	2.37	0.09
Brick City 5	**0.92**	0.07	0.38	0.27	0.19	0.01
Craig Hall	**21.05**	1.49	8.73	6.4	4.26	0.17
Wehr Band Hall	**12.37**	0.87	5.13	3.77	2.5	0.1
Administrative Buildings						
Alumni Center	**37.95**	2.19	13.95	8.77	10.66	2.38
Art Annex	**4.79**	0.28	1.76	1.11	1.34	0.3
Burgess House	**1.64**	0.09	0.6	0.39	0.46	0.1
Carrington Hall	**26.57**	1.54	9.77	6.14	7.46	1.66
Clay Hall	**0.75**	0.04	0.28	0.17	0.21	0.05
Jim D. Morris Center	**27.66**	1.6	10.17	6.39	7.77	1.73
Police Officer's Substation	**1.28**	0.07	0.47	0.3	0.36	0.08
Power Plant	**4.27**	0.25	1.57	0.98	1.2	0.27
Central Stores & Maintenance	**49.21**	2.84	18.09	11.38	13.82	3.08
Transit Operations Facility	**1.07**	0.06	0.39	0.25	0.3	0.07
University Hall	**5.02**	0.29	1.85	1.16	1.41	0.31
Dining Spaces						
Blair-Shannon Dining	**35.65**	0.34	15.02	5.84	14.13	0.32
Garst Dining	**10.65**	0.1	4.49	1.75	4.22	0.09
Event Spaces						
Hammons Hall Performing Arts	**4.92**	1.08	1.64	0.83	1.2	0.17
Great Southern Bank Arena	**103**	22.58	34.34	17.38	25.14	3.56
Plaster Stadium East Grandstand	**18.14**	3.98	6.05	3.05	4.43	0.63

Campus Buildings by Activity Zone	Material Fate Tons Landfilled	Material Opportunity in Tons				
		Avoidable	Compostable	Landfill	Recyclable	Potentially Recyclable
Mixed Use						
Baker Book Store	**23.15**	2.78	11.62	5.43	3.06	0.26
Bill R. Foster Recreation Center	**6.55**	0.79	3.29	1.53	0.87	0.07
Bond Learning Center	**13.13**	1.57	6.59	3.08	1.74	0.15
Duane Meyer Library	**65.62**	7.87	32.94	15.4	8.67	0.74
Forsythe Athletic Center	**11.13**	1.33	5.59	2.61	1.47	0.13
Hammons Student Center	**7.07**	0.85	3.55	1.66	0.93	0.08
Jordan Valley Innovation Center	**26.24**	3.15	13.17	6.15	3.47	0.3
Magers Health & Wellness Center	**42.47**	5.09	21.32	9.97	5.61	0.48
McDonald Arena	**30.74**	3.69	15.43	7.21	4.06	0.35
Plaster Stadium	**78.74**	9.44	39.53	18.47	10.41	0.89
Plaster Student Union	**96.96**	11.63	48.67	22.74	12.82	1.1
Robert W. Plaster Center Free Enterprise	**26.24**	3.15	13.17	6.15	3.47	0.3
The Welcome Center	**5.82**	0.7	2.92	1.36	0.77	0.07
Residence Halls						
Blair House	**60.28**	3.85	26.76	14.02	12.5	3.15
Freudenberger Hall	**140.09**	8.95	62.2	32.57	29.04	7.33
Hammons House	**71.28**	4.55	31.65	16.57	14.78	3.73
Hutchens House	**71.67**	4.58	31.82	16.66	14.86	3.75
Kentwood Hall	**39.55**	2.53	17.56	9.19	8.2	2.07
Scholars House	**14.96**	0.96	6.64	3.48	3.1	0.78
Shannon House	**52.89**	3.38	23.48	12.3	10.96	2.77
Sunvilla Tower	**66.05**	4.22	29.32	15.37	13.69	3.45
The Monroe	**28.74**	1.84	12.76	6.68	5.96	1.5
Wells House	**53.61**	3.43	23.8	12.47	11.11	2.8
Woods House	**68.43**	4.37	30.38	15.91	14.19	3.58
On the Go						
Grounds	**16.4**	4.07	4.87	4.31	2.77	0.38