ILLINOIS SUSTAINABLE TECHNOLOGY CENTER
PRAIRIE RESEARCH INSTITUTE

Baseline Waste Stream Characterization Study

Alice Campbell Alumni Center
601 South Lincoln Avenue
Urbana, IL 61801
Building ID: #94

Henry Administration Building
506 South Wright Street
Urbana, IL 61801
Building ID: #46

Swanlund Administration Building
601 East John Street
Champaign, IL 61820
Building ID: #193

Illini Union Bookstore
807 and 809 South Wright Street
Champaign, IL 61820
Building ID: #106

For:
Facilities and Services, University of Illinois at Urbana-Champaign

Prepared by:
Illinois Sustainable Technology Center (ISTC)

September 2014

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

EXECUTIVE SUMMARY

ABOUT THE PROJECT

Since 2010, the University has taken several major steps toward achieving zero waste. In 2013, the University engaged the Illinois Sustainable Technology Center to conduct a campus-wide waste characterization study to better understand priorities and opportunities for waste reduction.

The Illinois Sustainable Technology Center (ISTC), a unit of the Prairie Research Institute at the University of Illinois, created a methodology for waste stream characterization and evaluation that provides building-level performance measures and achievable recommendations for improvement. The 2014 Campus Waste Characterization involved facility-level waste characterizations for four buildings throughout the University of Illinois at Urbana-Champaign.

Funding for this project was made available by University of Illinois, Facilities and Services (F&S).

The data collected through this waste characterization study will help the University of Illinois to fulfill the following objectives:

- Examine the composition and quantity of recyclable materials discarded;
- Evaluate the effectiveness of existing waste reduction and recycling programs;
- Provide baseline metrics for measuring progress toward zero waste;
- Identify opportunities for increased materials recovery.

PROJECT METHODOLOGY AND REPORTING

Facilities and Services provided a complete list of all the collection dates and locations of the dumpsters for each building to be sampled. ISTC worked with F&S to catalog the BSW personnel schedule to appropriately time each sort. Each sort for every building was conducted a day before the dumpster was scheduled to be picked up by F&S. To ensure that the sampling results were representative, samples were obtained after the building services personnel shift had ended and close to the end of the business day, this process was conducted for two separate weeks. The entire contents of the dumpster were sampled, sorted, categorized, weighted and summated to create the weekly generation profile.

In this report, the materials in the dumpsters are categorized as “Landfilled” materials; however, some recyclable materials were later pulled out through the Waste Transfer Station’s manual sorting operation.

The document “Baseline Waste Stream Characterization Study Methodology”, attached in appendix, describes the standard ISTC waste characterization methodology, terminology, and customizations made for this project. Customizations to the methodology and terminology were developed and agreed upon by ISTC and F&S during the project’s development phase. The methodology is applied in the same way for each facility involved in the study.

ISTC provided a waste characterization report for each individual building. These reports include data and observations related to each of the key project objectives listed above.

This report presents user survey results and recommendations for improvements based on waste characterization studies conducted at the **Alice Campbell Alumni Center, Henry Administration Building, Swanlund Administration Building, and Illini Union Bookstore.**

SUMMARY RESULTS

Waste profile

The waste profile of the individual buildings varied slightly. Organics (29%), Compostable materials (24%), and Paper (19%) were materials found in the largest percentages. The combined waste profile for the four buildings characterized is shown in Figure 1.

FIGURE 1 COMBINED WASTE PROFILE

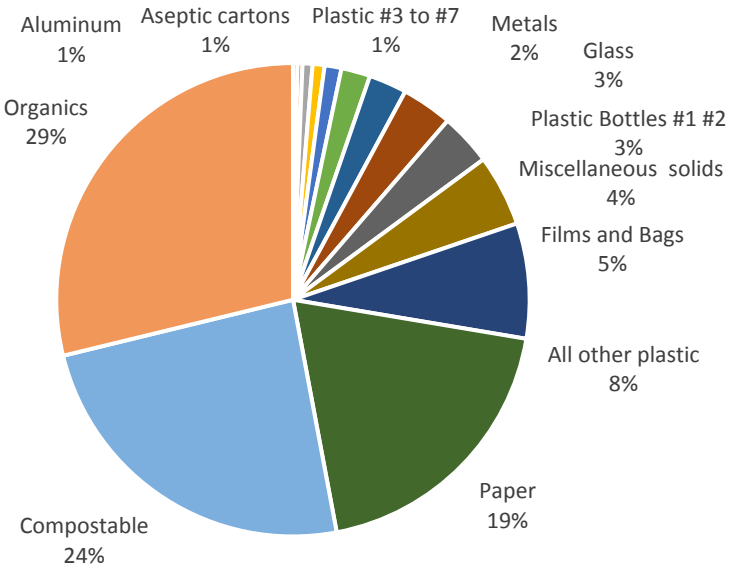
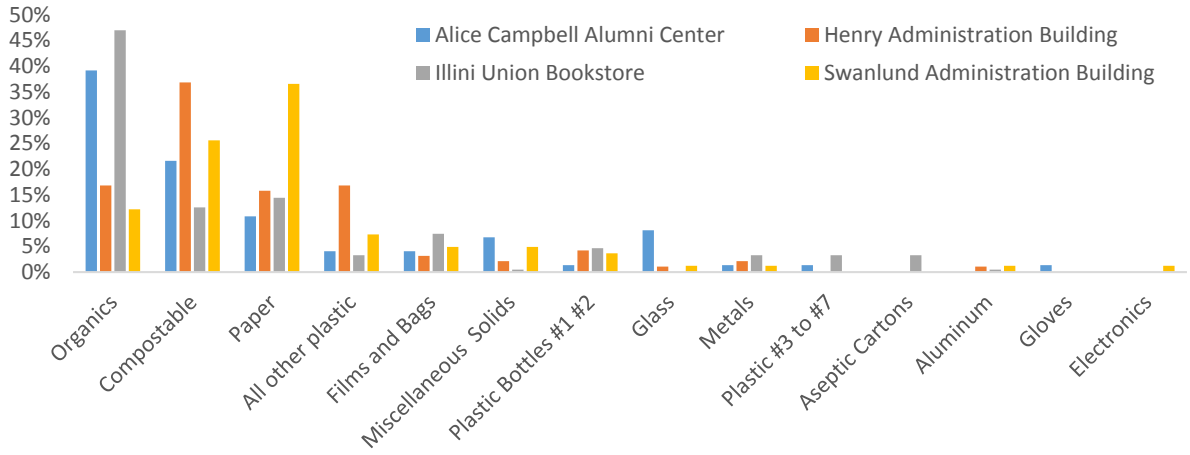


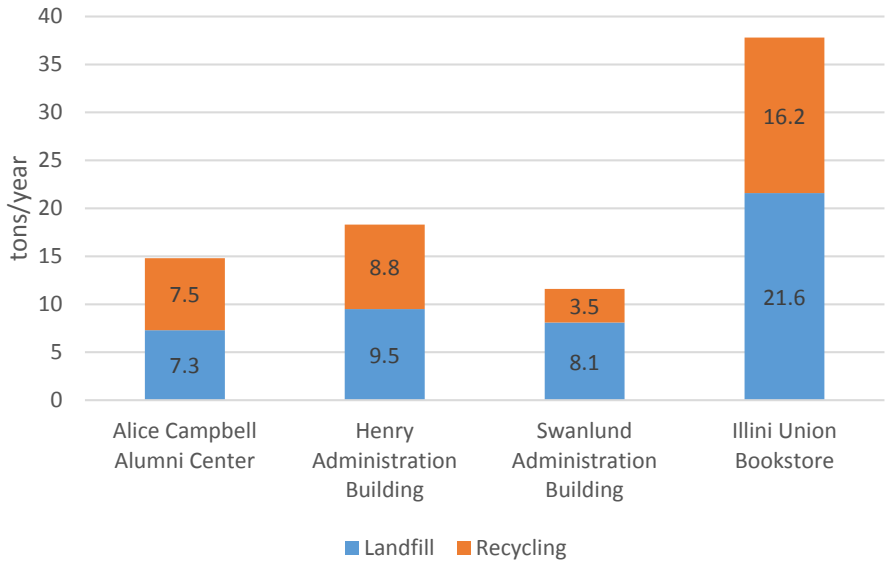
Figure 2 shows the variation in profiles within the four buildings.

FIGURE 2 PERCENT MATERIAL IN WASTE STREAM PER BUILDING



Waste generation and diversion

FIGURE 3 WASTE GENERATION AND DIVERSION (FROM SAMPLE DATA)



Because building level generation and diversion data for buildings is not collected at the University of Illinois, generation numbers were derived from the samples collected.

Waste generation at the four buildings ranged from 11 tons/year for Swanlund Administration Building to 38 tons/year for the Illini Union Bookstore.

Waste generations for the individual buildings between the individual samples were similar except for Alice Campbell Alumni Center. The difference in generation for Alice Campbell Alumni Center was due to events during one of the weeks audited and no events for the other week audited.

Waste diversion is the prevention and reduction of generated waste through source reduction, recycling, reuse, or composting. The diversion rate is the percentage of all municipal solid waste (MSW) generated that is recycled and recovered.

$$Diversion\ Rate = {}^{Total\ of\ MSW\ Recycled}/_{Total\ MSW\ generated}$$

Alice Campbell Alumni Center had the largest diversion of 50.6% from landfill, followed by Henry Administration Building at 48.0%, Illini Union Bookstore at 42.8%, and Swanlund Administration Building at 30.1%. The average diversion rate for all four buildings was 43.6%.

User Survey

Facilities and Services sent out individual surveys to all the full-time employees at each of the four buildings. The survey was issued to gauge the occupants' understanding of the current waste management system in the building, as well as their participation in recycling efforts while in the building.

Complete survey results for each building are in this report along with the results of the waste characterization audits, organized in the order of questions in the survey. Due to an insufficient number of respondents, there are no deliverable survey results for the Illini Union Bookstore.

Misconceptions about campus recycling

The building occupant surveys identified some troubling perceptions about the campus recycling program. Although almost 80% of the respondents claimed to be informed about the campus recycling policy, the responses did not clearly convey that claim (Figure 4). Even though only plastics #1 and #2 are accepted, almost all survey participants believed other plastic commodities are being accepted at the waste transfer station. In addition, at least 14% of the occupants of each building thought that all plastics are being recycled and at least 43% of the respondents believed glass is being recycled (Figure 5).

FIGURE 4 How well-informed are you regarding recycling at University?

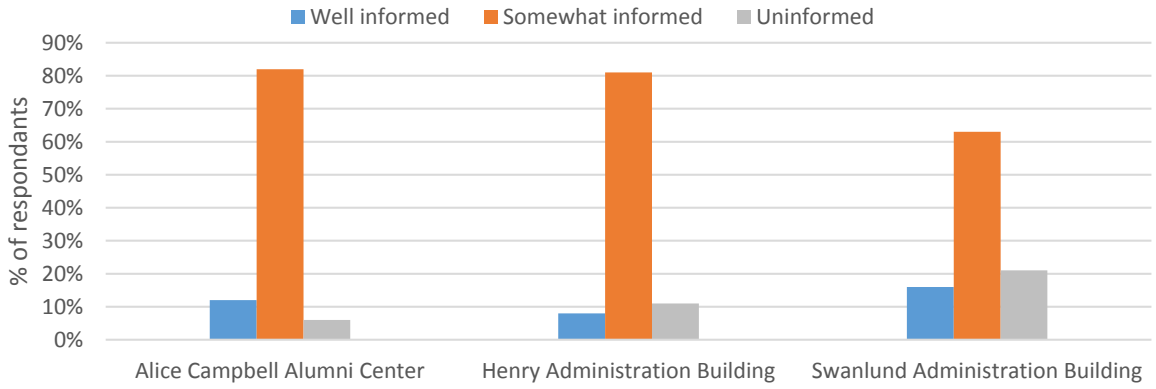
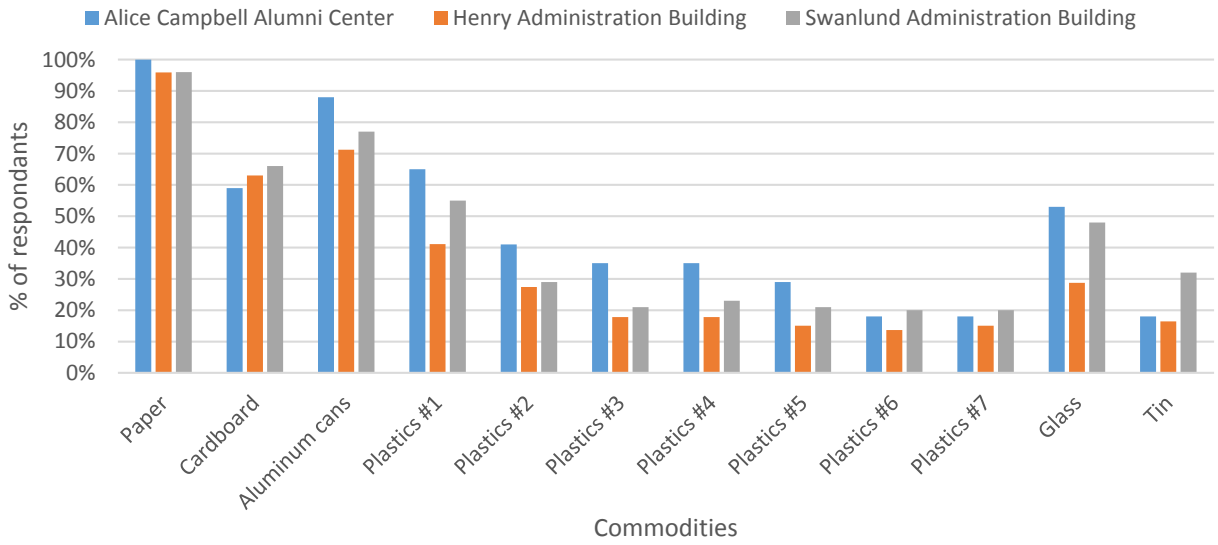


FIGURE 5 What materials do you think are recycled from bins in your building?



Recycling bins

The building occupant surveys for Henry Administration Building and Swanlund Administration Building identified a perception of insufficient number of bins for plastic bottles and cans, although some respondents from each building expressed concerns about limited space (Figure 6). Respondents also claimed to have sufficient bins for paper recycling throughout the buildings (Figure7).

FIGURE 6 Do you think there are enough aluminum can/plastic bottle recycling bins in your building?

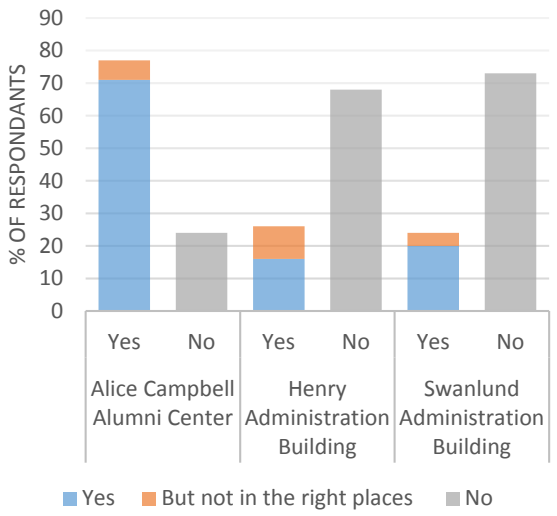
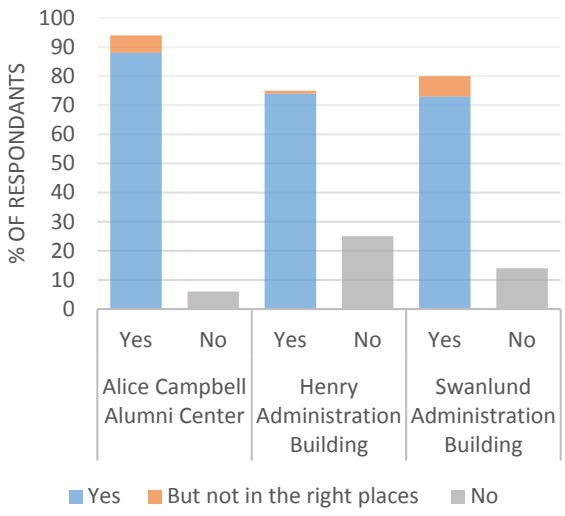


FIGURE 7 Do you think there are enough paper recycling bins in your building?



RECOMMENDATIONS

1. Conduct paper recovery

A significant percentage of materials generated in all the buildings is paper destined for landfills as shown in Figure 8. As the campus Waste Transfer Station already possesses the infrastructure and capacities to process recycled paper, a directed campaign in increasing paper recycling in offices would be a low-cost high-impact strategy to adopt.

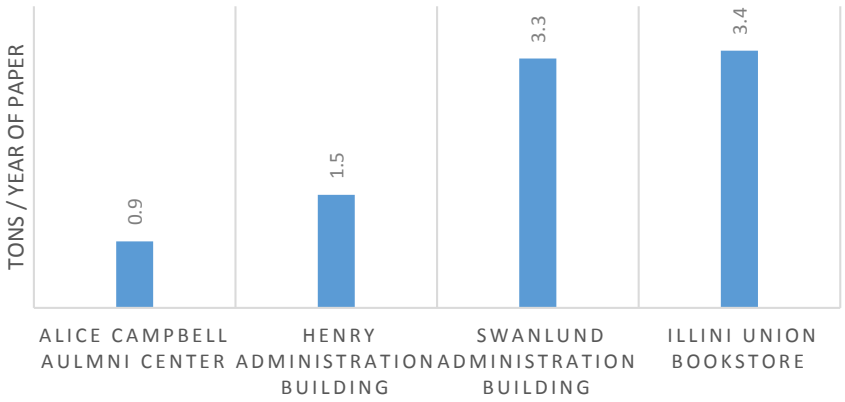


FIGURE 6 WASTE PAPER GENERATED IN EACH BUILDING

Focusing an outreach campaign on paper recovery will help disseminate information about campus's waste reduction efforts.

2. Increase acceptable recycling commodities

Over half of the buildings' users reside in the communities of Urbana and Champaign. Both of these communities have acceptable commodity lists that are more extensive than those offered by the Waste Transfer Station. Increasing the list of commodities at the Waste Transfer Station will allow for a higher diversion rate and reduction in landfilled material. For example, perceived loss of revenues from capturing additional types of plastics is due to

an anticipated reduction in the quality of bails. However, by accepting a greater variety of plastics, more volume for plastics bails will be generated. While the bails will generate less revenue per bail compared to the current system, there will be an increase in total quantities of bails generated. A sizeable increase in acceptable materials will inevitably reduce the materials destined for the landfill and thus reduce costs of transportation and tipping fees. By accepting all plastics, the message to community members would be simplified and more clearly understood. In addition, there would be clarity throughout campus leading to a decrease in landfilled materials. New signage would be needed but could convey a message that would be consistent and easily understood.

The campus could implement a building-by-building education program that includes informational presentations about what materials are recycled and the new signage that would need to be created. The signage could follow the Recycle Across America color scheme and include product pictures for clarity.

3. Standardize bin placement

Recycling bins and trash bins are placed in various patterns in the buildings audited. In most cases, trash bins outnumber the recycling bins placed. ISTC recommends that all trash bins throughout campus be paired with a recycling bin. Lone trash bins tend to accumulate recyclables and lone recycling bins accumulate trash. This problem is avoided by pairing bins and affixing proper signage and labeling.

Bin liners are another waste material that can be better managed. Bags containing very little dry inorganic material were found in the dumpster. Involving the Building Services Workers in the waste reduction process will help come up with solutions for these operational efficiency opportunities.

During waste sorting, ISTC found many bin liners that were near empty and filled with dry inorganic material. ISTC recommends that office trash bins only be emptied, or the bin liner removed, when the bin is at least a quarter full, or contains liquid or organic material. Working with Building Services Workers to create such a policy will help reduce bin liner purchases and needless landfilling of material.

4. Conduct pilot organics collection and processing

Food scraps, food soiled paper, paper towels, and other compostable items constituted a significant portion of the waste from these buildings. For these four buildings alone, the organics segment accounts for 17.2 tons annually.

Campuses across the country have started adopting alternative options to landfilling the above mentioned materials. Large-scale industrial composters or anaerobic digesters provide a cost-effective and environmentally sound method to divert organics.

TABLE 1 SIMILAR-SIZED CAMPUSES THAT CURRENTLY DIVERT ORGANICS

Campus	Type	Location
Iowa State University	Compost	Food scraps off campus/ rest on campus
University of Wisconsin-Madison	Compost	On campus
Michigan State University	Compost and Anaerobic Digestion	On campus
Purdue University	Anaerobic digester	Off campus/ Wastewater treatment plant

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ALICE CAMPBELL ALUMNI CENTER

Location: 601 S Lincoln Avenue
Urbana, IL

Square Footage: 68,859 sq. ft. (gross); 34,269 sq. ft. (net)

Maximum Occupancy: 975 persons

Waste Characterization 1: November 11-14, 2013

Waste Characterization 2: January 23-29, 2014

Report Completed: March 2014

BUILDING SUMMARY

The Alice Campbell Alumni Center houses the Campus Alumni Center. Building occupants are mostly transient partaking in events and conferences held at the premises.

The building's material generation profile matches that of an event space, with food -and food services- related waste being the most abundant material (51% of total generation) and the remainder a mix of plastics and paper. Although recycling bins are placed throughout the Alice Campbell Alumni Center, there are many locations where landfill and recycling bins are not paired together. As a lone bin will tend to attract a mix of materials, there is still a significant volume of recyclable material going into landfill bins at Alice Campbell Alumni Center. Nearly 20% of the material in Alumni Center's landfill stream consists of paper and beverage containers that are currently accepted in the University's recycling program.

Initial Kickoff Meeting

Prior to the commencement of the sampling a kickoff meeting was held with the administrators and building managers of each building. At Alice Campbell Alumni Center the kickoff meeting was held on Tuesday November 7th, with;

- James Runyan, Building Manager
- Seth Rients, Waste Research Specialist, Illinois Sustainable Technology Center

The following concerns were discussed:

- There are only 36 employees in the center - their trash volume is mostly from guests.
- The dumpster is filled up more than twice a week - resulting in a special collection taking place.
- Concerns about what the people are throwing into the trash– building representatives expressed a willingness to support a campus policy that eliminated plastic cups.

Building Walkthrough

A building walkthrough was held at the Alice Campbell Alumni Center on Tuesday, November 26th, with;

- James Runyan, Building Manager
- Seth Rients, Waste Research Specialist, Illinois Sustainable Technology Center
- Bart Bartels, Zero Waste Coordinator, Facilities and Services

General Waste and Recycling Areas of Concern:

- The general manager of the building is under the impression that glass goes into the blue bags with the cans/plastic bottles and gets sorted & recycled at the Waste Transfer Station (WTS).
- Individuals renting the space for events choose their own food service tools and containerization - some of them use reusable tableware, while some use disposable tableware.
- Some wedding functions have had upwards of 200 attendees.
- Kegs of beer/soda are not permitted for any event.
- Historically, January is the month with the least amount of bookings while April has the highest number of bookings, ranging from 30 to 40 events for that month.
- Some of their offices use an outside shredding company (Triad Shredding) to manage confidential documents. The volumes and pricing for that service will be made available at a later time.
- Receptacles in the building lack wall signage.

CURRENT WASTE MANAGEMENT SYSTEM

Table 1.1: Weekly pickup schedule

Material	Bin Size	Bin Qty	Pickup Days	Total Weekly Vol (CY)	Note
Landfill	8 CY	1	T Th	16	F&S diverts cardboard and blue recycling bags from stream
Paper	64 Gal	2	On-call	0.6	F&S collects both loose paper as well as shredder paper through this container

INTERIOR COLLECTION SYSTEM

The current waste management system at the facility was mapped out to determine the quantity and type of collection containers present. Each building, facility, or campus has a specific solid waste management system that is tailored to fit their needs; thus the map of the waste management system allows a survey of the generation patterns and user involvement. Table 1.2 to Table 1.5 shows the distribution of waste receptacles at the Alice Campbell Alumni Center by floor.

Table 1.2: Basement-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	6	21	**21**
	23 gal	Black	2	46	**46**
Paper	3.5 gal	None	2	7.5	**7.5**
Bottles and Cans	35 gal	Blue	1	35	**35**

Table 1.3: First Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	11	38.5	**199.5**
	23 gal	Black	7	161	
Paper	3.5 gal	None	4	15	**15**
Bottles and Cans	35 gal	Blue	4	150	**150**

Table 1.4: Second Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	25	87.5	**133.5**
	23 gal	Black	2	46	
Paper	3.5 gal	None	19	66.5	**112.5**
	23 gal	None	2	46	
Shredded paper	35 gal	Clear	1	35	**35**
Bottles and Cans	35 gal	Blue	1	35	**35**

Table 1.5: Third Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	30	105	**151**
	23 gal	Black	2	46	
Paper	3.5 gal	None	21	73.5	**165.5**
	23 gal	None	4	92	
Shredded paper	35 gal	Clear	2	70	**70**
Bottles and Cans	35 gal	Blue	1	35	**35**

WASTE CHARACTERIZATION PROCEDURE

Table 1.6 shows the amount of material present in the dumpster at the time of collection. All material present in the dumpster was hand-sorted by ISTC staff.

Table 1.6: Waste generations and sample size

	Sample 1 (11/18/2013 to 11/24/2013)		Sample 2 (02/10/2014 to 02/16/2013)	
Stream	M	W	M	W
Landfill	290.56 lb	168.5 lb	133.32 lb	44.84 lb
Paper/Cardboard	86.12 lb	273.57 lb	37 lb	252.8 lb
Mixed Recycling	0	0	0	0

A detailed methodology is provided in "Baseline Waste Stream Characterization Study Methodology."

WASTE CHARACTERIZATION RESULTS

The following sections outline the results of the waste characterization study. The waste stream composition and recycling stream composition is included in this section.

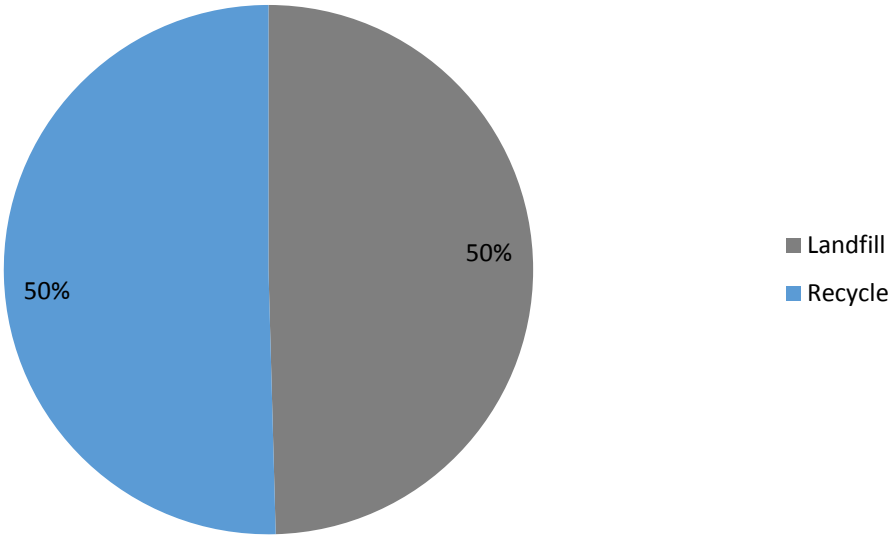
Table 1.7 illustrates the estimated overall material generated on a yearly basis. The upper and lower ranges delineate the variance between each sample taken at the Alice Campbell Alumni Center.

Table 1.7: Approximate annual generations

Stream	Component	**Mean (Tons/year)**	Range(tons/year)	
			Upper	Lower
Landfilled	Organics	**2.9**	4.7	1.1
	Compostable	**1.6**	2.1	1.1
	Paper	**0.8**	0.8	0.8
	Glass	**0.6**	1.1	0.1
	Miscellaneous Solids	**0.5**	0.7	0.3
	Films and Bags	**0.3**	0.5	0.2
	All other plastic	**0.3**	0.4	0.2
	Plastic Bottles 1 and 2	**0.1**	0.1	0.1
	Plastic 3 to 7	**0.1**	0.1	>0.1
	Gloves	**0.1**	0.1	>0.1
	Metals	**0.1**	>0.1	0.1
	Aluminum	**>0.1**	>0.1	0.0
	Landfill Total	**7.3**	10.6	4.1
Recycled	Paper	**6.0**	6.3	5.8
	Cardboard	**1.5**	2.0	0.9
	Mixed recycling	**n/a**	n/a	n/a
	Recycled Total	**7.5**	8.3	6.6
	Grand Total	**14.8**	18.9	10.7
	% Diversion from Landfill	**50.6%**		

According to the findings, Alice Campbell Alumni Center generates approximately 14.8 tons per year of non-hazardous solid waste. Of this total, 7.5 tons are recycled; 7.3 tons are sent to the landfill.

Figure 1.1: Overall waste diversion



As seen in Figure 1.1, this translates to a diversion rate of 50.6%.

Figure 1.2: Landfill waste stream composition

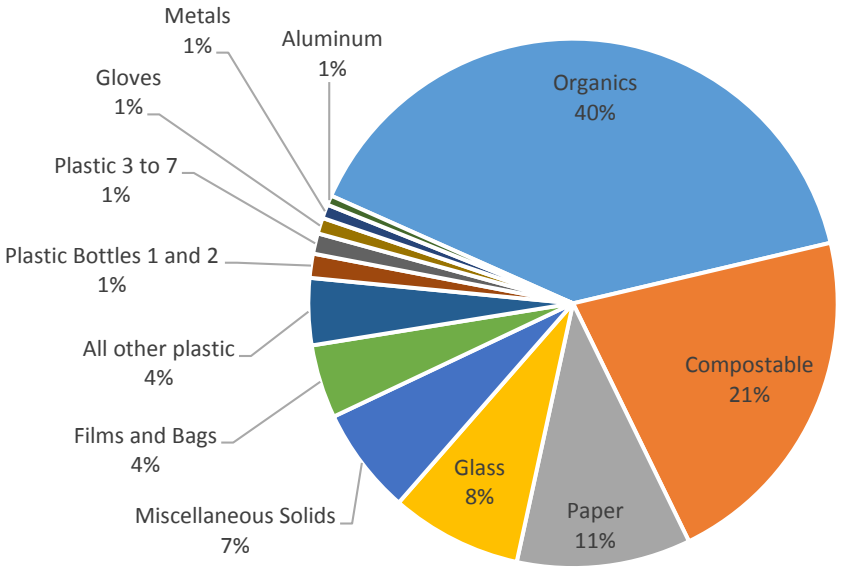
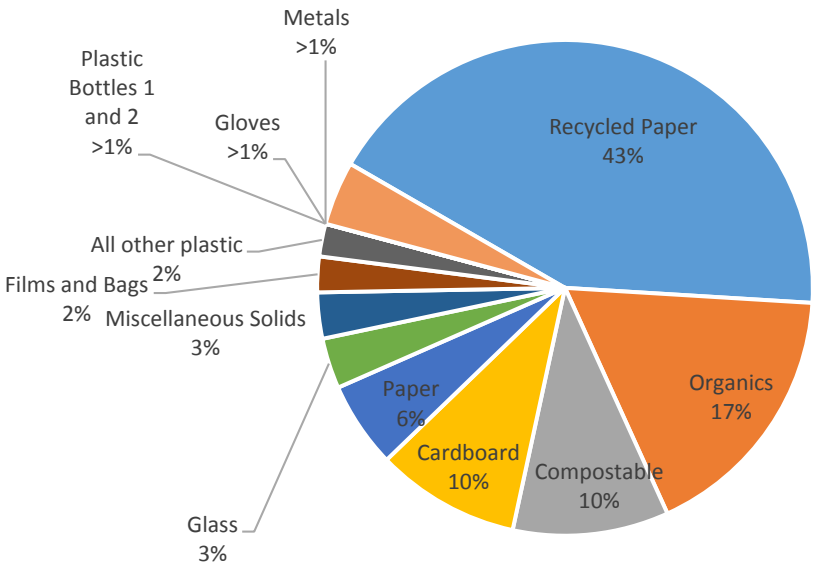


Figure 1.2 indicates that of the materials being sent to landfill "Organics" was the largest component of the overall waste stream at 40%. Compostable and paper was the next most significant contributor to the waste stream at 21% and 11% respectively. For a complete list of materials and associated weights, please refer to Table 1.7.

Figure 1.3: All regular waste stream composition



In the Alice Campbell Alumni Center, "Recycled paper" was the most significant component of the overall waste stream at 40%, "Other Compostable", "Organics" and "All other plastics" were also contributors to the waste stream.

Table 1.8: Percentage of Each Material Category

Waste component	Mean	Range
Recycled Paper	**43.4%**	±10.1%
Organics	**17.8%**	±7.1%
Compostable	**10.5%**	±0.6%
Cardboard	**9.7%**	±1.2%
Paper	**5.8%**	±1.7%
Glass	**3.4%**	±2.2%
Miscellaneous Solids	**3.1%**	±0.5%
All other plastic	**2.4%**	±0.3%
Films and Bags	**2.2%**	±0.2%
Plastic Bottles 1 and 2	**0.7%**	±0.1%
Gloves	**0.4%**	±0.3%
Metals	**0.4%**	±0.2%
Aluminum	**0.3%**	±0.1%

Table 1.8 depicts the associated percentages and confidence intervals of the regular waste stream in Alice Campbell Alumni Center.

SURVEY REPORT

On 19th, May, 2014, Facilities and Services sent out an online survey to all the full-time employees at Alice Campbell Alumni Center (N=37). The survey was issued to gauge the occupants understanding of the current waste management system in the building as well as their participation in recycling efforts while in the building. A total of 17 surveys were returned, for a response rate of 45%.

The intent of the survey results are only to improve Facilities and Services Zero Waste Coordination services. These results are not be used as generalizable knowledge.

Q1. What is your role on campus?

Role	Number (N)	Proportion
Faculty	0	0%
Staff	17	100%
Undergraduate student	0	0%
Graduate student	0	0%
Other	0	0%

Q2. How well-informed are you regarding recycling at U of I?

	Number (N)	Proportion
Well-informed	2	12%
Somewhat informed	14	82%
Uninformed	1	6%

Q3. The material in all of our building's bins are sorted for recycling so it doesn't matter what bin I use.

	Number (N)	Proportion
True	3	
False	14	

Q4. What materials do you think are recycled from bins in your building?

Material	Number (N)	Proportion
Paper	17	100%
Cardboard	10	59%
Aluminum cans	15	88%
Tin	3	18%
Plastics #1	11	65%
Plastics #2	7	41%
Plastics #3	6	35%
Plastics #4	6	35%
Plastics #5	5	29%
Plastics #6	3	18%
Plastics #7	3	18%
Glass	9	53%

Q5. If you have a plastic bottle or aluminum can, how often do you use the building's recycle bins to recycle it?

Frequency	Number (N)	Proportion
Always	8	47%
Occasionally (more than half the time)	4	24%
Rarely (less than half the time)	2	12%
Never	3	18%

Q6. If you have paper you need to discard, how often do use your building's recycling bins to recycle it?

Frequency	Number (N)	Proportion
Always	3	18%
Occasionally (more than half the time)	0	0%
Rarely (less than half the time)	0	0%
Never	3	18%

Q7. How convenient is recycling in your building?

Frequency	Number (N)	Proportion
Very convenient	11	65%
Somewhat convenient	4	24%
I don't know	0	0%
Somewhat inconvenient	1	6%
Very inconvenient	0	0%

Q8. Do you think there are enough paper recycling bins in your building?

Frequency	Number (N)	Proportion
Yes	15	88%
Yes, but not in the right places	1	6%
No	1	6%

Q9. Do you think there are enough aluminum can/plastic bottle recycling bins in your building?

Frequency	Number (N)	Proportion
Yes	12	71%
Yes, but not in the right places	1	6%
No	4	24%

Q10. If a recycling bin was placed next to each trash bin, how would it affect the amount you recycle?

Frequency	Number (N)	Proportion
Major Increase	6	35%
Minor Increase	8	47%
No	3	18%

Q11. Are the recycling bins easily distinguished from trash cans?

Frequency	Number (N)	Proportion
Yes	13	76%
Sometimes	3	18%
No	1	6%

Q12. Do you have any comments or concerns about the items recycled?

- We only have paper recycling bins.
- Our BSWs are always very helpful on this issue.

Q13. The waste diversion rate is defined as the volume of waste that is recycled or composted as a percent of the volume of waste that is sent to the landfill. To begin the discussion about your building's waste diversion rate, what would you guess the current diversion rate is? Pick a number from 0-100% that you think is closest to the percentage your building diverts from landfill.

Diversion	Number (N)	Proportion
100%	0	0%
90%	0	0%
80%	1	6%
70%	5	29%
60%	1	6%
50%	4	24%
40%	0	0%
30%	4	24%
20%	2	12%
10%	0	0%
0%	0	0

Q14. Do you have any recommendations to reduce waste and increase recycling in your building?

- There is no cardboard recycling and I receive a lot of boxes from our supply orders.
- Put out recycling bins at meetings & events, in addition to trash cans
- More communication on what can and can't be recycled (emails, posted signs, etc.)
- Staff education. Incentives: depart that recycles the most get a Lifesaver.
- I think we have a good setup.

RECOMMENDATIONS

ISTC recommends the following steps for Alice Campbell Alumni Center to increase overall diversion rates. These recommendations are focused on materials found in the building's landfill dumpster. Employee training and communication should accompany all actions taken. ISTC can assist with implementation of these recommendations upon request.

Material Category	Definition	Lbs./year	% of Current Landfill Stream
Organics	Food, wood-based material, liquid	6,393	40%
Compostable	Paper towels, Food-soiled paper (coffee cups, take out containers)	3,527	20%
Paper	All paper items	1,764	11%

Zero waste event services:

By enabling building users to host zero waste events at the building Alice Campbell Alumni Center could provide a value-added service to their clients. Ohio State University[1] provides the service to anyone that is interested in making their event zero-waste. At Ohio State University these services come at various pricing options, a similar set of services could be provided at the Alice Campbell Alumni Center.

Actions to divert organics and potential organics include:

Since organic waste is such a large portion of the landfill stream, implementing a food scraps collection would be an option to explore. We recommend working with your existing hauler to incorporate a separate food scrap collection. This would help divert that waste stream to a pilot organics collection. Material collection bins will need to be reconfigured in order to make it convenient for people to recycle and potentially compost. Employee training should be provided.

Actions to divert paper include:

Close to all the paper recycled in the building were program books. Reducing the number of program booklets and other one-time use pamphlets will help reduce the paper usage as a whole.

Making paper recycling available in the common areas of the building will drastically increase the diversion in the building.

[1] For more information on OSU's zero waste services: www.footprint.osu.edu/zero-waste-event-service/

HENRY ADMINISTRATION BUILDING

Location: 506 South Wright Street
Urbana, IL

Square Footage: 160,497 (gross); 82,656 (net)

Maximum Occupancy: 903 occupants

Waste Characterization 1: November 18-24, 2013

Waste Characterization 2: February 10-16, 2014

Report Completed: March 2014

BUILDING SUMMARY

The Henry Administration Building houses University Administration staff, and includes the offices of the University President and University legal counsel. Building occupants are mostly engaged in computer and office-based work.

The building's material generation profile matches that of a typical office environment, with paper being the most abundant material (51% of total generation) and the remainder a mix of typical recyclable items and food-service leftovers. Although recycling bins are placed throughout the Henry Administration Building, there are many locations where landfill and recycling bins are not paired together. Because a lone bin will tend to attract a mix of materials, there is still a significant volume of recyclable material going into landfill bins at Henry. Nearly 40% of the material in the building's landfill stream consists of paper and beverage containers that are currently accepted in the University's recycling program.

Initial Kickoff Meeting

On Tuesday November 5, 2013 ISTC convened a kickoff meeting among key building personnel in order to discuss waste characterization logistics and scheduling. The following individuals attended:

- Brenda Ankenbrand, Administrative Assistant, Academic Programs and Services, University Administration
- Carol Hannah, Business/Administrative Associate, University Counsel, University Administration
- Andrew Sestak, Assistant Director, University Office of Planning & Budgeting, University Administration
- Karen Greenwalt, Director Strategy Budget & Finance, Admin Info Technology Services, University Administration
- Carla Dickey, Business/Administrative Associate, Admin Info Technology Services, University Administration
- Alice Jones, Assistant Director, Admin Info Technology Services, University Administration
- Seth Rients, Waste Research Specialist, Illinois Sustainable Technology Center

The following concerns were discussed:

- Confidential paper is collected and shredded by an outside shredding company
- Waste Characterization Logistics
- Request for more recycling containers
- Acceptable plastics in the waste transfer station
- Acceptable bottles for recycling

Building Walkthrough

A building walkthrough was held at the Henry Administration Building on Friday December 6, 2013. The following individuals attended:

- Andrew Sestak, Assistant Director, University Office of Planning & Budgeting, University Administration
- Seth Rients, Waste Research Specialist, Illinois Sustainable Technology Center
- Bart Bartels, Zero Waste Coordinator, Facilities & Services

General Waste and Recycling Areas of Concern:

- The secured area of the basement has bins that they assume building service workers empty, but they do not, bins are often overflowing.
- Every user that uses shredding in their offices was very receptive to keeping that service within the university, if there was an option to do so.
- The first floor all use Monster Shred.
- The 2nd floor has multiple shredding systems in place:
    - In one department each user has a "box" at their desk, which is designated “shredder” - which goes into the large Iron Mountain shredding bin.
    - The other system uses the small blue bins as shredding only, and these are shredded on site by in-house staff.

CURRENT WASTE MANAGEMENT SYSTEM

Table 2.1: Weekly pickup schedule

Material	Bin Size	Bin Qty	Pickup Days	Total Weekly Vol (CY)	Note
Landfill	8 CY	1	M T W Th F	**40**	F&S diverts cardboard and blue recycling bags from stream
Paper	2 CY	1	M T W Th F	**10**	F&S collects both loose paper as well as shredder paper through this container

INTERIOR COLLECTION SYSTEM

The current waste management system at the facility was mapped out to determine the quantity and type of collection containers present. Each building, facility, or campus has a specific solid waste management system that is tailored to fit their needs; thus the map of the waste management system allows a survey of the generation patterns and user involvement. Table 2.2 to Table 2.6 show the distribution of waste receptacles at the Henry Administration Center by floor.

Table 2.2: Basement-collection containers distribution

	Volume	**Liner**	**Quantity**	**Collection Capacity (gal)**	**Total material capacity (gal)**
Trash	3.5 gal	Clear	43	150.5	**150.5**
Paper	3.5 gal	None	7	24.5	**93.5**
	23 gal	None	3	69	
Bottles and Cans	35 gal	Blue	2	70	**70**

Table 2.3: First Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	94	329	**421**
	23 gal	Black	4	92	
Paper	3.5 gal	None	66	231	**508**
	23 gal	None	9	207	
	35 gal	None	2	70	
Shredded paper	35 gal	Clear	4	140	**140**
Bottles and Cans	35 gal	Blue	2	70	**70**

Table 2.4: Second Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	88	308	**400**
	23 gal	Black	4	92	
Paper	3.5 gal	None	75	262.5	**515.5**
	23 gal	None	11	253	
Shredded paper	35 gal	Clear	7	245	**266**
	3.5 gal	None	6	21	
Bottles and Cans	35	Blue	2	70	**70**

Table 2.5: Third Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	56	196	**280**
	23 gal	Black	4	84	
Paper	3.5 gal	None	47	164.5	**302.5**
	23 gal	None	6	138	
Bottles and Cans	35 gal	Blue	1	35	**35**

Table 2.6: Fourth Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	11	38.5	**84.5**
	23 gal	Black	2	46	
Paper	3.5 gal	None	10	35	**63**
	23 gal	None	1	23	
Bottles and Cans	n/a	n/a	n/a	n/a	**n/a**

Waste Characterization Procedure

Table 2.7 shows the amount of material present in the dumpster at the time of collection. All material present in the dumpster was hand-sorted by ISTC staff.

Table 2.7: Waste generations and sample size

	Sample 1 (11/18/2013 to 11/24/2013)					Sample 2 (02/10/2014 to 02/16/2013)				
Stream	M	T	W	Th	F	M	T	W	Th	F
Landfill	50lb	85.5lb	74.5lb	120lb	161.2lb	82.95lb	118.94lb	36.34lb	93.97lb	n/a[2]
Paper/Cardboard	84lb	41lb	46lb	0lb	88.62lb	406.72lb	52.2lb	16.74lb	6.14lb	n/a
Mixed Recycling	0	0	0	0	0	0	0	0	0	0

Waste Characterization Results

The following sections outline the results of the waste characterization study. The waste stream composition and recycling stream composition is included in this section.

Table 2.8 illustrates the estimated overall material generated on a yearly basis. The upper and lower ranges delineate the variance between each sample taken at the Henry Administration Building.

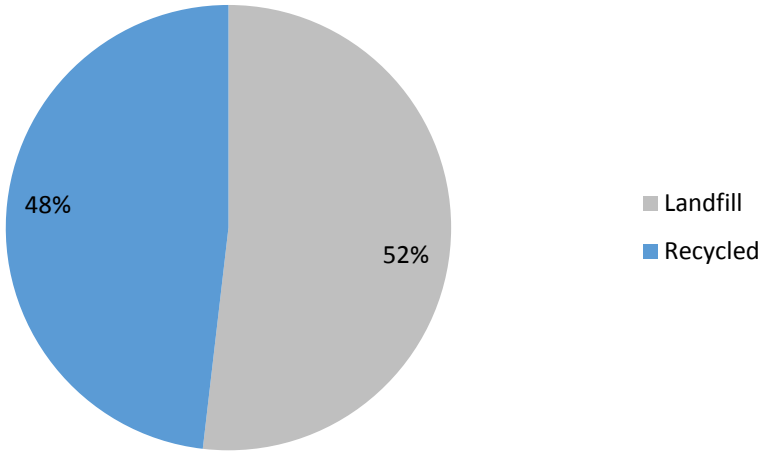
Table 2.8: Approximate annual generations

Stream	Component	**Mean (Tons/year)**	Range(tons/year)	
			Upper	Lower
Landfilled	Compostable	**3.5**	4.2	2.7
	All other plastics	**1.6**	2.2	1.0
	Organics	**1.6**	2.1	1.1
	Paper	**1.5**	1.6	1.4
	Plastic Bottles 1 and 2	**0.4**	0.5	0.4
	Films and Bags	**0.3**	0.3	0.3
	Metals	**0.2**	0.2	0.2
	Miscellaneous solids	**0.2**	0.2	0.1
	Aluminum	**0.1**	0.1	0.1
	Glass	**0.1**	0.2	0.1
	Landfill Total	**9.5**	11.3	7.6
Recycled	Paper	**7.9**	10.1	5.6
	Cardboard	**0.9**	0.9	0.9
	Mixed recycling	**n/a**	n/a	n/a
	Recycled Total	**8.8**	11.1	6.5
	Grand Total	**19.3**	22.4	14.1
	% Diversion from Landfill	**48%**		

[2] On Friday, 2/14, the weather was dismal, and 4 inches of snow had fallen within a few hours. The snow plows on campus had yet to begin clearing any side streets, so a decision was made to cancel the sorting activity for the day because attempting to get the truck and trailer into the Henry parking lot would have been a risk.

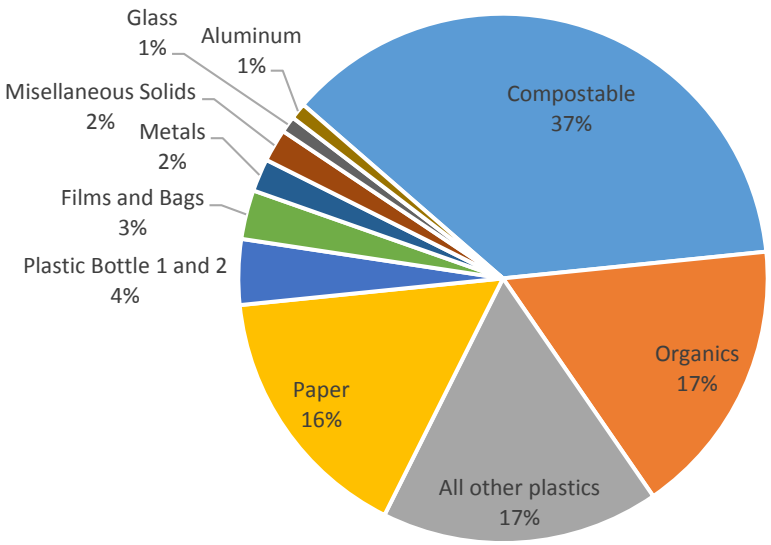
According to the waste characterization findings, Henry Administration Building generates approximately 19.3 tons per year of non-hazardous solid waste. Of this total, 8.8 tons are recycled and 9.5 tons are sent to the landfill.

Figure 2.1: Overall waste diversion



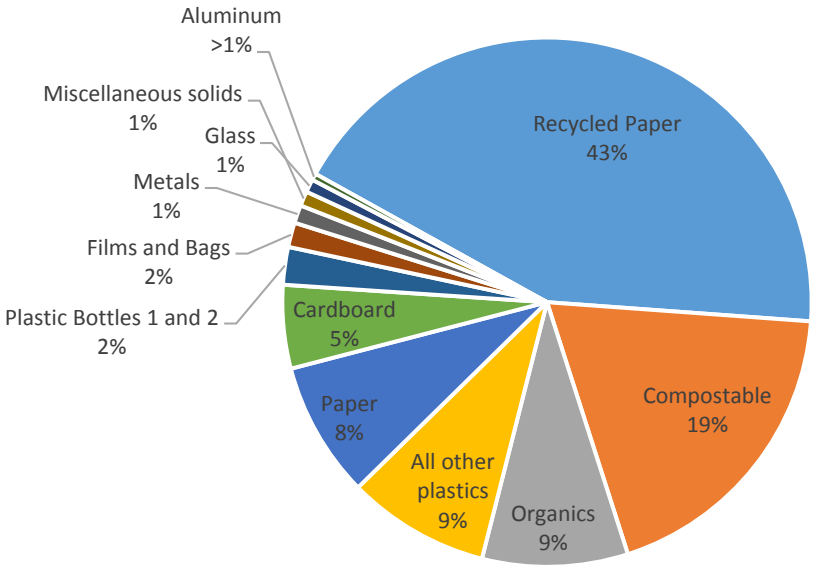
As seen in Figure 2.1, this translates to a diversion rate of 48%.

Figure 2.2: Landfill waste stream composition



As seen in Figure 2.2, “Other Compostable”-paper towels and food grade paper- is the largest component of the landfill waste stream at 37%. “Organics” and “All other plastics” were the next most significant contributors to the waste stream at 17% each. For a complete list of materials and associated weights, refer to Table 2.8.

Figure 2.3: All regular waste stream composition



In the Henry Administration Building, "Recycled paper" makes up the majority of material generated, at 43% Figure 2.3. "Compostable", "Organics", "All other plastics", and "Paper" (landfilled) make up another 45% of material generation.

Table 2.9: Percentage of each material category

Waste component	Mean	Range
Recycled Paper	**43.1%**	±11.7%
Compostable	**18.9%**	±4.8%
Organics	**8.9%**	±3.1%
All other plastics	**8.7%**	±3.4%
Paper	**8.3%**	±0.6%
Cardboard	**5.1%**	±0.1%
Plastic Bottles 1 and 2	**2.3%**	±0.3%
Films and Bags	**1.5%**	±0.1%
Metals	**1.1%**	±0.0%
Miscellaneous solids	**0.9%**	±0.4%
Glass	**0.8%**	±0.4%
Aluminum	**0.4%**	±0.0%

Table 2.9 depicts the associated percentages and confidence intervals of the regular waste stream in the Henry Administration Building.

SURVEY REPORT

On June 13, 2014 Facilities and Services sent out an online survey to all the employees at Henry Administration Building (N=**220**). The survey was issued to gauge the occupants understanding of the current waste management system in the building as well as their participation in recycling efforts while in the building. A total of 73 surveys were returned, for a response rate of 33%.

Q1. What is your role on campus?

Role	Number (N)	Proportion
Faculty	1	1%
Staff	69	95%
Undergraduate student	2	3%
Graduate student	0	0%
Other	1	1%

Q2. How well-informed are you regarding recycling at U of I?

	Number (N)	Proportion
Well-informed	6	8%
Somewhat informed	59	81%
Uninformed	8	11%

Q3. The material in all of our building's bins are sorted for recycling so it doesn't matter what bin I use.

	Number (N)	Proportion
True	13	18%
False	60	82%

Q4. What materials do you think are recycled from bins in your building?

Material	Number (N)	Proportion
Paper	17	100%
Cardboard	10	59%
Aluminum cans	15	88%
Tin	3	18%
Plastics #1	11	65%
Plastics #2	7	41%
Plastics #3	6	35%
Plastics #4	6	35%
Plastics #5	5	29%
Plastics #6	3	18%
Plastics #7	3	18%
Glass	9	53%

Q5. If you have a plastic bottle or aluminum can, how often do you use the building's recycle bins to recycle it?

Frequency	Number (N)	Proportion
Always	21	29%
Occasionally (more than half the time)	22	30%
Rarely (less than half the time)	11	15%
Never	16	22%

Q6. If you have paper you need to discard, how often do use your building's recycling bins to recycle it?

Frequency	Number (N)	Proportion
Always	51	70%
Occasionally (more than half the time)	13	18%
Rarely (less than half the time)	7	10%
Never	1	1%

Q7. How convenient is recycling in your building?

Frequency	Number (N)	Proportion
Very convenient	30	41%
Somewhat convenient	21	29%
I don't know	8	11%
Somewhat inconvenient	7	10%
Very inconvenient	6	8%

Q8. Do you think there are enough paper recycling bins in your building?

Frequency	Number (N)	Proportion
Yes	54	74%
Yes, but not in the right places	1	1%
No	18	25%

Q9. Do you think there are enough aluminum can/plastic bottle recycling bins in your building?

Frequency	Number (N)	Proportion
Yes	12	16%
Yes, but not in the right places	7	10%
No	50	68%

Q10. If a recycling bin was placed next to each trash bin, how would it affect the amount you recycle?

Frequency	Number (N)	Proportion
Major Increase	41	56%
Minor Increase	18	25%
No	12	16%

Q11. Are the recycling bins easily distinguished from trash cans?

Frequency	Number (N)	Proportion
Yes	40	55%
Sometimes	23	32%
No	9	12%

Q12. Do you have any comments or concerns about the items recycled?

- We have been told: The material in all of our building's bins are sorted for recycling so it doesn't matter what bin I us BUT I hear from F/S that often isn't the case. That our good scores on recycling come from including animal waste from the South farms. Overall, the messaging from campus regarding waste is weak and this creates uncertainty about the contribution of each individual.
- I think it would be better if you could recycle any plastic, not just bottles.
- I would like to know if '3. The material in all of our building's bins are sorted for recycling so it doesn't matter what bin I use.' is true or false.
- To my knowledge, there are no recycling bins in our building.
- Why not cardboard?
- Unaware of options for recycling cans/bottles
- I was told all trash gets sorted for recycling
- The administrative recycling is very different from student recycling (Southside classrooms).
- I don't know what all the plastics #1 mean.
- We used to recycle all of our paper in the white rolling bins in our office, however, there have been several times that staff in the building have found numerous papers discarded outside on the pavement where the paper was taken to the trucks and a bunch fell out. The papers that were found had staff and faculty social security numbers on them and other private information. This has happened more than once. After finding these papers the last time, Pat Patterson who is the head of out unit instructed us to stop using the recycling for these papers and we had to buy shredders for our unit.
- Would be nice to know that plastic other than bottles are okay in bins. Battery recycling bins need to be widely available.
- I frequently see plastic bottles & aluminum cans in the 3rd floor bathroom.
- Currently I take all my cans and plastics home to recycle.
- I think recycling is good - but we need the bins.
- There are no bins anywhere in our office space for anything but paper recycling. I've heard that the trash might be sorted through, but don't trust this.
- We don't have bins for cardboard
- I am not aware of any recycling bins for aluminum, plastic, or glass on our floor (second).
- We thought that our trash was sorted for recycling...maybe incorrect information!
- We already have paper recycling bins next to trash bins.

Q13. The waste diversion rate is defined as the volume of waste that is recycled or composted as a percent of the volume of waste that is sent to the landfill. To begin the discussion about your building's waste diversion rate, what would you guess the current diversion rate is? Pick a number from 0-100% that you think is closest to the percentage your building diverts from landfill.

Diversion	Number (N)	Proportion
100%	0	0%
90%	2	3%
80%	4	5%
70%	4	5%
60%	6	8%
50%	16	22%
40%	10	14%
30%	14	19%
20%	5	7%
10%	7	10%
0%	0	0%

Q14. Do you have any recommendations to reduce waste and increase recycling in your building?

- The campus should consider getting a more serious partner for handling and hauling waste. It might be cheapest when looking narrowly at hauling waste to alternate between two small local haulers. Instead one could consider a more advanced partner to actually increase recycling rates, to speed up process of looking into generating power from waste.
- More recycling bins that are clearly labeled and perhaps education on what is and is not recyclable (i.e. cardboard)
- More promotions needed to inform people on the recycling policy. More recycle bins with proper labels needed as well.
- provide a map of designated recycle bins which can be posted in break rooms
- We recycle paper/cardboard in our office and that is very easy. Other recycling requires more effort but the volume from offices is a lot lower.
- Update the recycling bin labels, clean them up. Also, there is a contracted secure document shredding service that some of our recyclable paper goes to that won't be reflected in our recycling efforts.
- need more can and plastic bins on each floor
- Place designated recycling bins near major trash cans on every floor
- Our blue 'recycle' containers are never emptied. We have been told, if the blue tubs are emptied, they are dumped into containers with regular trash. I put shredded paper in the tub on our floor and trust that will be sorted into recycled paper. I try to take other recyclable cardboard and plastic home with me where I know it will be re-cycled.
- We only have recycle containers in our office for paper, file folders, etc. We also have a place where our office puts our plastic containers and aluminum can's - when it's full I place it in our hallway for recycling. I'm unsure where our BSW places it - maybe the garbage since our only recycle bin outdoors is a paper-only dumpster?

- Have color coded bins that are clearly marked
- Every office should be equipped with the cans/glass/plastic recycling bins.
- Place recycling bins in all the suites that accept plastic and aluminum. Everyone recycles paper because it's easy, so please make plastic and aluminum easy too.
- Add battery recycling. Add multi-plastic type recycling.
- Put aluminum can/plastic bottle recycling bins in the bathrooms.
- I didn't even know that we had recycling in the building for cans/ pop bottles
- I don't have a good feel for what can be recycled. Can you recycle the plastic dishes from frozen meals? Can the packaging from those meals be recycled? Can napkins be recycled? Do you have a guideline for what can and can't be recycled?
- no recommendations
- We need recycle bins for paper, glass and cans
- Placement of recycle bins in kitchen areas, and in other convenient locations
- Send out reminders every now and then.
- Encourage reduction of printing, buying items with green packaging
- More bins for aluminum, glass, and plastic
- I haven't seen a can recycle container. I always bring them home to recycle
- Have recycling bins for all types of materials on each floor in at least two locations per floor.

RECOMMENDATIONS

ISTC recommends the following steps for Henry Administration Building to increase overall diversion rates. These recommendations are focused on materials found in the building's landfill dumpster. Employee training and communication should accompany all actions taken. ISTC can assist with implementation of these recommendations upon request.

Material Category	Definition	Lbs./year	% of Current Landfill Stream
Compostable	Paper towels, Food soiled paper (coffee cups, take out containers)	7,716	37%
Organics	Food, wood based material, liquid	3,527	17%
All other plastics	All other plastic items	3,527	17%

Reduce collection pickups:

During both weeks of the characterization audits the dumpster had sufficient free space. We recommend reducing the daily pick schedule to 3 times a week. This will not only save the building with disposal costs but help reduce the fuel costs for the transfer station.

Actions to divert organics and potential organics include:

Since organic waste is such a large portion of the landfill stream, implementing a food scraps collection would be an option to explore. We recommend investigating options for implementing a food scrap collection system. This would help divert that waste stream to a pilot organics collection. Material collection bins will need to be reconfigured in order to make it convenient for people to recycle and potentially compost. Employee training should be provided.

Actions to divert all other plastics include:

Increasing the commodities accepted for recycling in the building will help divert the additional plastics from the waste stream.

Actions to divert paper include:

Using both sides of paper can reduce use by up to 50%. Ensure that all printers are set to double-sided format as default. Put reminder notices near printers and photocopiers.

Reduce the number of printers, particularly desk printers because they are expensive to run and, as they are easy to reach, people tend to print items unnecessarily and wouldn't do this if they had to walk to centralized printers.

Buy at least 30% recycled content 20# bond paper for internal letter printing. Buying recycled paper not only helps the University of Illinois meet its iCAP goals but also expands the market for recycled paper thus closing the resource loop.

SWANLUND ADMINISTRATION BUILDING

Location: 601 East John Street
Champaign, IL

Square Footage: 68,859 (gross); 34,269 (net)

Maximum Occupancy: 287 occupancy

Waste Characterization 1: November 7-14, 2013

Waste Characterization 2: January 23-29, 2014

Report Completed: March 2014

BUILDING SUMMARY

The Swanlund Administration Building houses Campus Administration staff. Building occupants are mostly engaged in computer and office-based work.

The building's material generation profile matches that of a typical office environment, with paper being the most abundant material (45% of total generation) and the remainder a mix of typical recyclable items and food-service leftovers. Although recycling bins are placed throughout the Swanlund Administration Building, there are many locations where landfill and recycling bins are not paired together. Because a lone bin will tend to attract a mix of materials, there is still a significant volume of recyclable material going into landfill bins at Swanlund Administration Building. Nearly 40% of the material in the building's landfill stream consists of paper and beverage containers that are currently accepted in the University's recycling program.

Initial Kickoff Meeting

Prior to the commencement of the sampling a kickoff meeting was held with the administrators and building managers of each building. At the Swanlund Administration building the kickoff meeting was held on Tuesday, November 5th, with;

- Seth Rients, Waste Research Specialist, Illinois Sustainable Technology Center
- Andrea Fain, Office Administrator, Office of the Chancellor
- Karen Bilbo, Office Support Specialist, Office of the Chancellor
- Tracy Osby, Coordinator Of Campus Waste Management, Facilities and Services
- Morgan Johnston, Associate Director of Sustainability, Facilities and Services
- Jack Dempsey, Associate Director, Center for Sustainable Environment
- Bart Bartels, Academic Hourly, Illinois Sustainable Technology Center

The following concerns were discussed:

- Confidential papers in the waste stream – Osby stated that the confidential collection containers have a lock, and are not going to be opened during the study.
- Expressed that the building users believe that the waste is sorted at the Waste Transfer Station and that recyclable materials are removed and sorted there.

Building Walkthrough

A building walkthrough was held at the Swanlund Administration Building on Wednesday, November 26th. The following individuals attended:

- Jack Dempsey, Associate Director, Center for Sustainable Environment
- Bart Bartels, Academic Hourly, Illinois Sustainable Technology Center
- Seth Rients, , Waste Research Specialist, Illinois Sustainable Technology Center
- Shantanu Pai, Waste Research Specialist, Illinois Sustainable Technology Center

General Waste and Recycling Areas of Concern:

- Occupants asked for more plastic recycling options.
- Conference spaces rarely had recycling containers

CURRENT WASTE MANAGEMENT SYSTEM

Table 3.1: Weekly pickup schedule

Material	Bin Size	Bin Qty.	Pickup Days	Total Weekly Vol. (CY)	Note
Landfill	8 CY	1	W	8	F&S diverts cardboard and blue recycling bags from stream
Paper	2 CY	1	M W F	6	F&S collects both loose paper as well as shredder paper through this container

INTERIOR COLLECTION SYSTEM

The current waste management system at the facility was mapped out to determine the quantity and type of collection containers present. Each building, facility, or campus has a specific solid waste management system that is tailored to fit their needs; thus the map of the waste management system allows a survey of the generation patterns and user involvement. Table 3.2 to Table 3.7 shows the distribution of waste receptacles at the Swanlund Administration Building by floor.

Table 3.2: Basement-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	7	24.5	**47.5**
	23 gal	Black	1	23	
Paper	3.5 gal	None	7	24.5	**47.5**
	23 gal	None	1	23	
Shredded paper	35 gal	Clear	1	35	**35**

Table 3.3: First Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	22	77	**146**
	23 gal	Black	3	69	
Paper	3.5 gal	None	20	70	**162**
	23 gal	Clear	4	92	
Shredded paper	35 gal	Clear	1	35	**35**

Table 3.4: Second Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	23	80.5	**103.5**
	23 gal	Black	1	23	
Paper	3.5 gal	None	20	70	**93**
	23 gal	None	1		

Table 3.5: Third Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	20	70	**139**
	23 gal	Black	3	69	
Paper	3.5 gal	None	18	63	**86**
	23 gal	None	1		

Table 3.6: Forth Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	21	73.5	**96.5**
	23 gal	Black	1	23	
Paper	3.5 gal	None	19	66.5	**112.5**
	23 gal	None	2		

Table 3.7: Fifth Floor-collection containers distribution

	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	23	80.5	**103.5**
	23 gal	Black	1	23	
Paper	3.5 gal	None	17	59.5	**59.5**

WASTE CHARACTERIZATION PROCEDURE

Table 3.8 shows the amount of material present in the dumpster at the time of collection. All material present in the dumpster was hand-sorted by ISTC staff.

Table 3.8: Waste generations and sample size

Stream	Sample 1 (11/18/2013 to 11/24/2013)	Sample 2 (01/23/2014 to 01/29/2014)
Landfill	421.6lb	285.5lb
Paper/Cardboard	130lb	170lb
Mixed Recycling	0lb	0lb

WASTE CHARACTERIZATION RESULTS

The following sections outline the results of the waste characterization study. The waste stream composition and recycling stream composition is included in this section.

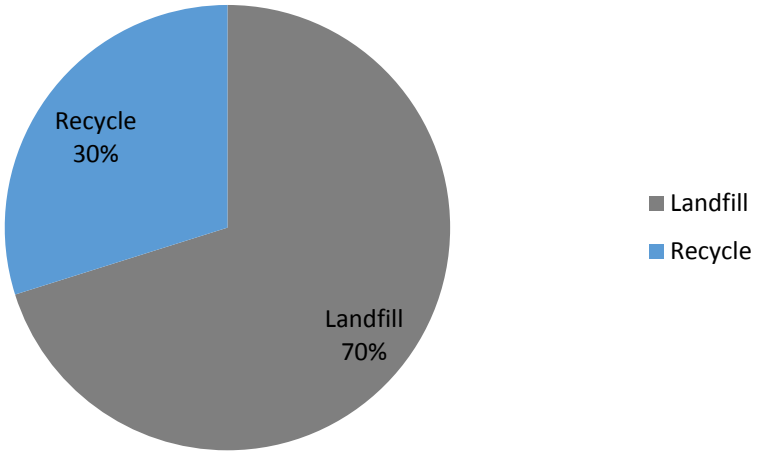
Table 3.9 illustrates the estimated overall material generated on a yearly basis. The upper and lower ranges delineate the variance between each sample taken at the Swanlund Administration Building.

Table 3.9: Approximate annual generations

Stream	Component	**Mean (Tons/year)**	Range(tons/year)	
			Upper	Lower
Landfilled	Paper	**3.0**	4.6	1.5
	Compostable	**2.1**	2.3	1.8
	Organics	**1.0**	1.2	0.8
	All other plastic	**0.6**	0.7	0.6
	Miscellaneous Solids	**0.4**	0.5	0.3
	Films and bags	**0.4**	0.4	0.3
	Plastic Bottles 1 and 2	**0.3**	0.3	0.2
	Electronics	**0.1**	0.3	0.0
	Metals	**0.1**	0.2	0.0
	Aluminum	**0.1**	0.1	0.1
	Glass	**0.1**	0.1	0.0
	Landfill Total	**8.1**	9.7	6.6
Recycled	Paper	**2.4**	2.5	2.3
	Cardboard	**1.1**	1.5	0.7
	Mixed recycling	**n/a**	n/a	n/a
	Recycled Total	**3.5**	3.9	3.0
	Grand Total	**11.6**	12.7	10.5
	% Diversion from Landfill	**30%**		

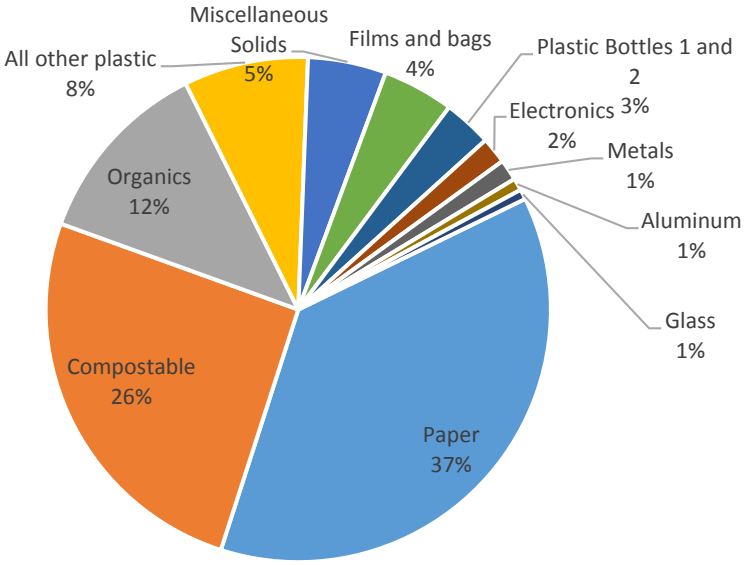
According to the findings, Swanlund Administration Building generates approximately 11.6 tons per year of non-hazardous solid waste. Of this total, 3.5 tons are recycled; 8.1 tons are sent to the landfill.

Figure 3.1: Overall waste diversion



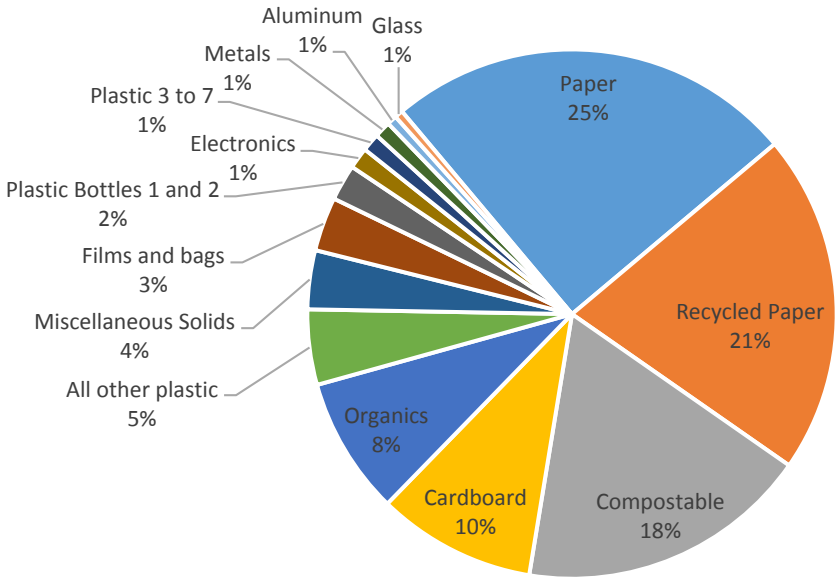
As seen in Figure 3.1, this translates to a diversion rate of 30%.

Figure 3.2: Landfill waste stream composition



As seen in Figure 3.2, of the materials being sent to landfill "Paper" was the largest component of the overall waste stream at 37%. Other Compostable and Organics were the next most significant contributors to the waste stream at 26% and 12% each. For a complete list of materials and associated weights, please refer to Table 3.9.

Figure 3.3: All regular waste stream composition



In Swanlund Administration Building, “Paper” was the most significant component of the overall waste stream at 26%, “Recycled Paper”, “Compostable” and “Organics” were also contributors to the waste stream.

Table 3.10: Percentage of each material category

Waste component	Mean	Range
Paper	25.0%	±10.9%
Recycled Paper	20.8%	±2.6%
Compostable	17.9%	±0.4%
Cardboard	9.7%	±4.3%
Organics	8.4%	±1.1%
All other plastic	4.6%	±0.3%
Miscellaneous Solids	3.6%	±1.3%
Films and bags	3.3%	±0.6%
Plastic Bottles 1 and 2	2.2%	±0.2%
Electronics	1.3%	±1.3%
Plastic 3 to 7	1.1%	±1.1%
Metals	1.0%	±0.7%
Aluminum	0.6%	±0.1%
Glass	0.5%	±0.1%

Table 3.10 depicts the associated percentages and confidence intervals of the regular waste stream in the Swanlund Administration Building.

SURVEY REPORT

On 13th June 2014, Facilities and Services sent out an online survey to all the employees at Swanlund Administration Building (N= 95). The survey was issued to gauge the occupants understanding of the current waste management system in the building as well as their participation in recycling efforts while in the building. A total of 56 surveys were returned, for a response rate of 59%.

Q1. What is your role on campus?

Role	Number (N)	Proportion
Faculty	2	4%
Staff	53	95%
Undergraduate student	0	0%
Graduate student	0	0%
Other	1	2%

Q2. How well-informed are you regarding recycling at U of I?

	Number (N)	Proportion
Well-informed	9	16%
Somewhat informed	35	63%
Uninformed	12	21%

Q3. The material in all of our building's bins are sorted for recycling so it doesn't matter what bin I use.

	Number (N)	Proportion
True	22	39%
False	34	61%

Q4. What materials do you think are recycled from bins in your building?

Material	Number (N)	Proportion
Paper	54	96%
Cardboard	37	66%
Aluminum cans	43	77%
Tin	18	32%
Plastics #1	31	55%
Plastics #2	16	29%
Plastics #3	12	21%
Plastics #4	13	23%
Plastics #5	12	21%
Plastics #6	11	20%
Plastics #7	11	20%
Glass	27	48%

Q5. If you have a plastic bottle or aluminum can, how often do you use the building's recycle bins to recycle it?

Frequency	Number (N)	Proportion
Always	16	29%
Occasionally (more than half the time)	14	25%
Rarely (less than half the time)	14	25%
Never	10	18%

Q6. If you have paper you need to discard, how often do use your building's recycling bins to recycle it?

Frequency	Number (N)	Proportion
Always	38	68%
Occasionally (more than half the time)	14	25%
Rarely (less than half the time)	3	5%
Never	1	2%

Q7. How convenient is recycling in your building?

Frequency	Number (N)	Proportion
Very convenient	19	34%
Somewhat convenient	18	32%
I don't know	13	23%
Somewhat inconvenient	4	7%
Very inconvenient	2	4%

Q8. Do you think there are enough paper recycling bins in your building?

Frequency	Number (N)	Proportion
Yes	41	73%
Yes, but not in the right places	4	7%
No	8	14%

Q9. Do you think there are enough aluminum can/plastic bottle recycling bins in your building?

Frequency	Number (N)	Proportion
Yes	11	20%
Yes, but not in the right places	2	4%
No	41	73%

Q10. If a recycling bin was placed next to each trash bin, how would it affect the amount you recycle?

Frequency	Number (N)	Proportion
Major Increase	37	66%
Minor Increase	7	13%
No	11	20%

Q11. Are the recycling bins easily distinguished from trash cans?

Frequency	Number (N)	Proportion
Yes	31	55%
Sometimes	20	36%
No	5	9%

Q12. Do you have any comments or concerns about the items recycled?

- We do not have room for extra bins for recycle in our area.
- Recycling plastic has some concerns, if lunch items are recycled it may become a bacteria issue, if all do not rinse prior to using plastic bins.
- there is only recycling on certain floors in this building and most of the time is inconvenient to recycle
- We only have a paper recycle container on our floor.
- I think that we need to publicize what can be recycled via deposit in the bins. I think most people think it is just paper.
- I have a recycling bin for paper at my desk so it makes it easy to recycle paper items. But it would be nice to have a place to recycle water bottles and cans in the main lobby. There are some receptacles in common break rooms but not all of us have access to the break rooms. Also we are losing the break room on the 1st floor of SAB so there will be nowhere to dispose of plastics/cans.
- I was told that the trash is sorted for recycling, but it's hard to know whether that is really the case. I often feel uncomfortable throwing things away that would be recycled, and I often just take it home.
- A central used toner cartridge bin would be awesome!
- Aluminum can/plastic bottle bins could be a little bigger
- We have not had a bin for recycled products on our floor other than paper products. Is it true that if we put recyclable items in the trash they will be sorted through to retrieve the recycled items?
- I have not seen a bottle or can recycling bin in my building ever. If I did I would use it. I used them always in other places I have worked.
- At the moment there small blue bins in each office and one big recycle bin in the copy room. However, I am not aware there being a recycling bin for plastic bottles, and aluminum cans.
- I'm uncertain what plastics get recycled on campus and whether Styrofoam is recycled. Our BSW doesn't know either, but he was happy to accommodate my request to add a bin for plastic, glass and aluminum.
- Only recycle things that are efficient to recycle.
- I do not know that the receptacles are sorted through or not, I would much rather have a bin for recycling (or departmental bins nearby for metal, plastic, paper, and cardboard) and a bin for trash

Q13. The waste diversion rate is defined as the volume of waste that is recycled or composted as a percent of the volume of waste that is sent to the landfill. To begin the discussion about your building's waste diversion rate, what would you guess the current diversion rate is? Pick a number from 0-100% that you think is closest to the percentage your building diverts from landfill.

Diversion	Number (N)	Proportion
100%	0	0%
90%	1	2%
80%	6	11%
70%	7	13%
60%	2	4%
50%	11	20%
40%	8	14%
30%	7	13%
20%	4	7%
10%	6	11%
0%	0	0%

Q14. Do you have any recommendations to reduce waste and increase recycling in your building?

- Add more can and bottle bins. Or make them easier to find.
- Communicate better to building occupants. I think the campus needs to do a much better job of promoting recycling. I recycle everything I possibly can, at work and at home. I constantly find trash in the recycle bin I put in here when I started my position. Education about recycling is key, but so is making it easier for people to recycle. Recycle bins should be easily accessible to everyone and faculty, staff and students should all be educated and encouraged to use the facilities. It is mindboggling how much recyclable material goes into the trash.
- Encourage electronic files to reduce waste; more prominent posting of acceptable items to recycle
- enforce recycling if possible, more bins too, there is a 'rumor' here saying even it is put in a recycle bin it is thrown in a trash pile
- hand dryers in the bathrooms, more electronic filing rather than paper filing
- Have janitorial staff empty every recycling bin rather than big ones on each floor
- Having recycling containers for cans and bottles would be great.
- I like there is the ability for the items to be sorted so that's recyclable. But if there was a more convenient way to have a recycling area without wasting much more space would be great.
- If we are to recycle anything but paper (not from foods) we need containers and instructions; I believe we would all participate in the program.
- increase awareness of policies per building, add more receptacles
- More educational emails, quick facts, and frequent reminders on recycling and bins for plastic bottles and aluminum cans be place in visible areas on campus and in buildings.
- More recycle bins designating plastic/cans
- Our 3rd floor multipurpose room does not have a recycle bin for plastic or cans. There is not enough space to allow for more bins. One would need to go to the basement level to

participate which would mean electric to run elevators up and down. Not a wise ecological option.

- Our waste bins are our recycling bins so if we should be sorting on our end we should have the individual recycling bins.
- Publicize what people should do. Give us directions on how to handle box lunches, for example.
- Reduce paper workflows, move to PDF/electronic for everything possible.
- We currently use recycling bins for only paper. It is my understanding that F & S have individuals who go through the remaining waste and pull out recyclable products. We really do not have space for recycling bins for cans, bottles, etc.

RECOMMENDATIONS

ISTC recommends the following steps for Henry Administration Center to increase overall diversion rates. These recommendations are focused on materials found in the building's landfill dumpster. Employee training and communication should accompany all actions taken. ISTC can assist with implementation of these recommendations upon request.

Material Category	Definition	Lbs./year	% of Current Landfill Stream
Paper	**All paper items**	**6,614**	**37%**
Compostable	**Paper towels, Food soiled paper (coffee cups, take out containers)**	**4,630**	**26%**
Organics	**Food, wood based material, liquid**	**2,205**	**12%**

Actions to divert paper include:

A directed campaign to reduce paper waste should be conducted in this building.

An effort should be made to explore paperless processes.

Using both sides of paper can reduce use by up to 50%. Ensure that all printers are set to double-sided format as default. Put reminder posters near printers and photocopiers.

Reduce the number of printers, particularly desk printers because they are expensive to run and, as they are easy to reach, people tend to print items unnecessarily and wouldn't do this if they had to walk to centralized printers.

Buy at least 30% recycled content 20# bond paper for internal letter printing. Buying recycled paper not only helps the University of Illinois meet its iCAP goals but also expands the market for recycled paper thus closing the resource loop.

Actions to divert organics and potential organics include:

Since organic waste is such a large portion of the landfill stream, implementing a food scraps collection would be an option to explore. We recommend investigating options for implementing a food scrap collection system. This would help divert that waste stream to a pilot organics collection. Material collection bins will need to be reconfigured in order to make it convenient for people to recycle and potentially compost. Employee training should be provided.

ILLINI UNION BOOKSTORE

Location: 807 and 809 South Wright Street Champaign, IL

Square Footage: 96,407 sq. ft. (gross); 64,944 sq. ft. (net)

Maximum Occupancy: 703

Waste Characterization 1: 31 March, 2014

Waste Characterization 2: 10 April, 2014

Report Completed: April, 2014

BUILDING SUMMARY

The Illini Union Bookstore houses both administrative suites as well the campus bookstore. Building occupants are both transient partaking in retail-related actives as well as static in the departments in the remaining floors of the premises.

The building's material generation profile matches that of a mixed usage facility, with food-and food services-related waste being the most abundant material (58% of total generation) and the remainder a mix of plastics and paper. Although recycling bins are placed throughout the Illini Union Bookstore, there are many locations where landfill and recycling bins are not paired together. As a lone bin will tend to attract a mix of materials, there is still a significant volume of recyclable material going into landfill bins at Illini Union Bookstore. Nearly 20% of the material in the Illini Bookstore's landfill stream consists of paper and beverage containers that can be currently diverted through the University's recycling program.

Initial Kickoff Meeting

Prior to the commencement of the sampling a kickoff meeting was held with the administrators and building managers of each building. At Illini Union Bookstore the kickoff meeting was held on Friday, January 17th, with;

- Barbara Russell, Office Manager, Office of Public Engagement
- Deborah Lust, Chief Clerk, Capital Programs and Real Estate Services
- David Guth, Assistant Director for Facilities, Illinois Union
- Jessica Maring, Office Support Specialist, Center for Advising and Academic Services
- Keith Marshall, Director, Center for Advising and Academic Services
- Rita McCoy, Administrative Assistant, Office of Public Engagement

The following concerns were discussed:

- Having ISTC conduct the Waste Characterization in early February would not have been feasible due to the high level of activity in the building due to the book buyback program.
- The new Starbucks in the building might modify the current waste profile of the building and capturing that data would be useful to planning waste reduction for the building.

Building Walkthrough

A building walkthrough was held at the Illini Union Bookstore on Wednesday, April 23rd, with;

- David Parker, Assistant Director for Facilities, Illini Union
- Jeff Jobe, Building Service Worker, Illini Union
- Seth Rients, Waste Research Specialist, Illinois Sustainable Technology Center
- Shantanu Pai, Waste Research Specialist, Illinois Sustainable Technology Center

General Waste and Recycling Areas of Concern:

- There are two separate sets of staff that collect the waste in the building; the Illini Union Bookstore section has one team and there is a separate team for the suites on the upper levels.
- Occupants in the suites indicated that a broader plastics recycling initiative would be received well.
- The bookstore indicated that the paper dumpster is inadequately sized and source- separated paper often is disposed of in the dumpster.
- Waste receptacles in the building lack uniform signage.

CURRENT WASTE MANAGEMENT SYSTEM

Table 4.1: Weekly pickup schedule

Material	Bin Size	Bin Quantity	Pickup Days	Total Weekly Volume (CY)	Note
Landfill	30 CY	1	T Th	60	F&S diverts cardboard and blue recycling bags from stream
Paper	2 CY	1	M W F	6	F&S collects both loose paper as well as shredder paper through this container. [3]

INTERIOR COLLECTION SYSTEM

The current waste management system at the facility was mapped out to determine the quantity and type of collection containers present. Each building, facility, or campus has a specific solid waste management system that is tailored to fit their needs; thus the map of the waste management system allows a survey of the generation patterns and user involvement. Table 4.2 to Table 4.7 shows the distribution of waste receptacles at the Illini Union Bookstore by floor.

Table 4.2: Basement-collection containers distribution

Stream	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	8	28	**249**
	23 gal	Black	2	46	
	35 gal	Black	5	175	
Paper	3.5 gal	None	6	21	**79**
	23 gal	None	1	23	
	35 gal	None	1	35	
Shredded Paper		None	1	n/a	**n/a**
Bottles and Cans	23 gal	Blue	2	46	**46**

Table 4.3: First Floor-collection containers distribution

Stream	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	5	17.5	**595.5**
	23 gal	Black	16	368	
	35 gal		6	210	
Paper	3.5 gal	None	2	7	**53**
	23 gal		2	46	
Shredded paper	35 gal	Blue	3	105	**105**
Corrugated Cardboard	400 gal	None	2	800	**800**

Table 4.4: Second Floor-collection containers distribution

Stream	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	23	80.5	**150.5**
	23 gal	Black	0	0	
	35 gal		2	70	
Paper	3.5 gal	None	21	73.5	**293.5**
	23 gal		5	115	
	35 gal	None	3	105	
Corrugated Cardboard	400 gal	None	1	400	**400**

[3] There is no identifier on the bin indicating its material stream. BSW staff indicated that the space allocated is inadequate and the remaining paper has to be disposed of in the landfill stream due to lack of space.

Table 4.5: Third Floor-collection containers distribution

Stream	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	43	150.5	**360.5**
	35 gal	Black	6	210	
Paper	3.5 gal	None	39	136.5	**182.5**
	23 gal	None	2	46	
Shredded Paper	35 gal	Clear	3	105	**105**
Bottles and Cans	23 gal	Blue	1	23	**23**

Table 4.6: Forth Floor-collection containers distribution

Stream	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	35	122.5	**214.5**
	23 gal	Black	4	92	
Paper	3.5 gal	None	32	112	**147**
	35 gal	None	1	35	
Shredded paper	35 gal	Clear	1	35	**35**
Bottles and Cans	23 gal	Blue	1	23	**23**

Table 4.7: Fifth Floor-collection containers distribution

Stream	Volume	Liner	Quantity	Collection Capacity (gal)	Total material capacity (gal)
Trash	3.5 gal	Clear	25	87.5	**133.5**
	23 gal	Black	2	46	
Paper	3.5 gal	None	28	98	**179**
	23 gal	None	2	46	
	35 gal	Clear	1	35	
Shredded paper	35 gal	Blue	1	35	**35**
Bottles and Cans	23 gal	Blue	2	46	**46**

WASTE CHARACTERIZATION PROCEDURE

Table 4.8 shows the amount of material present in the dumpster at the time of collection. All material present in the dumpster was hand-sorted by ISTC staff.

Table 4.8: Waste generations and sample size

	Sample 1 (11/18/2013 to 11/24/2013)	Sample 2 (02/10/2014 to 02/16/2013)
Stream	M	Th
Landfill	538.06	420.1
Paper/Cardboard	548.0[4]	374.2
Mixed Recycling	0	0

A detailed methodology is provided in "Baseline Waste Stream Characterization Study Methodology."

WASTE CHARACTERIZATION RESULTS

The following sections outline the results of the waste characterization study. The waste stream composition and recycling stream composition is included in this section.

Table 4.9 illustrates the estimated overall material generated on a yearly basis. The upper and lower ranges delineate the variance between each sample taken at the Illini Union Bookstore.

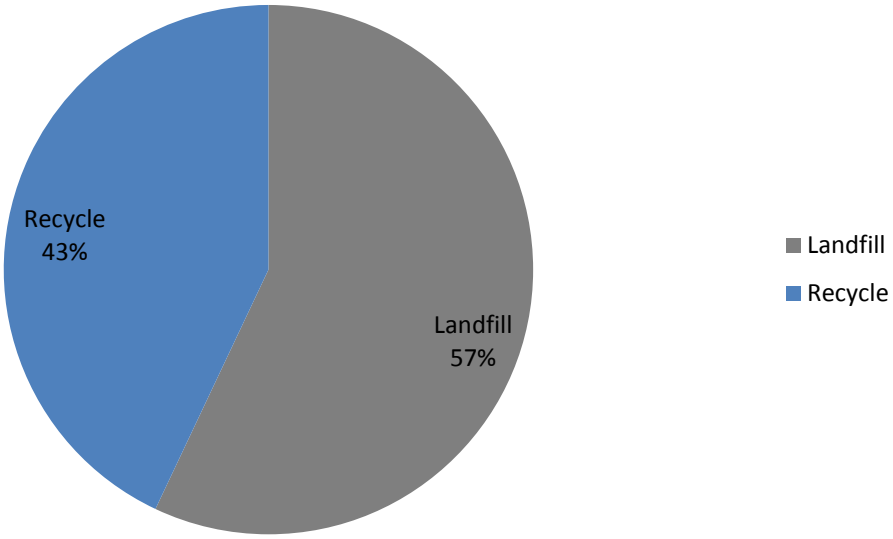
Table 4.9: Approximate annual generations

Stream	Component	**Mean (Tons/year)**	Range(tons/year)	
			Upper	Lower
Landfilled	Organics	**10.1**	10.1	10.1
	Paper	**3.1**	4.4	1.9
	Compostable	**2.7**	3.6	1.9
	Films and bags	**1.6**	1.8	1.5
	Plastic Bottles #1 #2	**1.0**	1.2	0.2
	All other plastic	**0.7**	1.0	0.4
	Metals	**0.7**	1.3	0.6
	Aseptic Cartons	**0.7**	0.7	0.6
	Plastic #3 to #7	**0.7**	0.7	0.6
	Miscellaneous Solids	**0.1**	0.2	0.1
	Aluminum	**0.1**	0.1	0.0
	Landfill Total	**21.6**	25.0	18.1
Recycled	Paper	**10.9**	11.3	10.6
	Cardboard	**5.3**	5.6	5.0
	Mixed recycling	**n/a**	n/a	n/a
	Recycled Total	**16.2**	16.8	15.7
	Grand Total	**37.8**	22.4	14.1
	Diversion from Landfill	**43%**		

[4] Close to 400lbs of this stream was corrugated cardboard relating to the construction activities in the buildings. For the purpose of annual approximations 112lbs of corrugated cardboard was utilized.

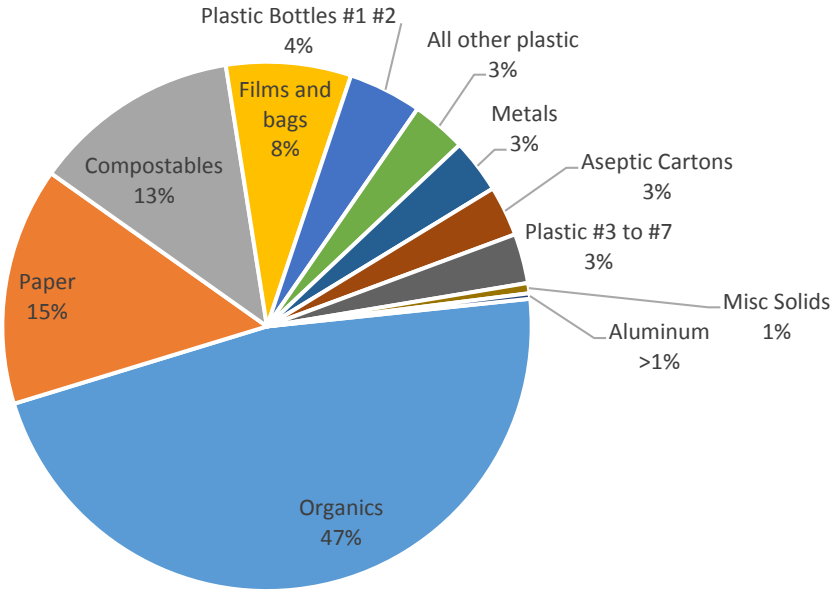
According to the findings, Illini Union Bookstore generates approximately 37.8 tons per year of non-hazardous solid waste. Of this total, 16.2 tons are recycled; 21.6 tons are sent to the landfill.

Figure 4.1: Overall waste diversion



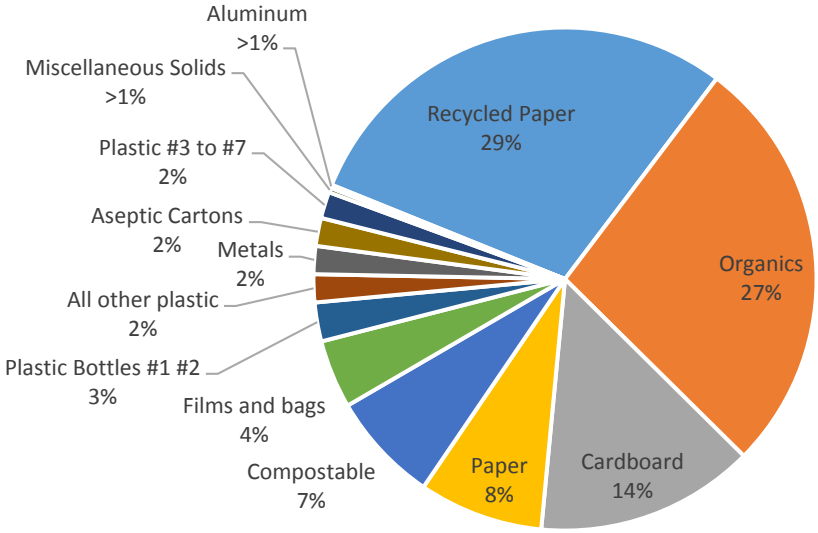
As seen in Figure 4.1, this translates to a diversion rate of 43%.

Figure 4.2: Landfill waste stream composition



As seen in Figure 4.2, of the materials being sent to landfill "Organics" was the largest component of the overall waste stream at 47%. Paper and compostable items were the next most significant contributors to the waste stream at 15% and 13% respectively. For a complete list of materials and associated weights, please refer to Table 4.9.

Figure 4.3: All regular waste stream composition



In the Illini Union Bookstore, "Recycled paper" was the most significant component of the overall waste stream at 29%, "Other Compostable", "Organics" and "All other plastics" were also contributors to the waste stream.

Table 4.10 depicts the associated percentages and confidence intervals of the regular waste stream in the Illini Union Bookstore.

Table 4.10: Percentage of Each Material Category

Waste component	Mean	Range
Recycled Paper	29.2%	±2.3%
Organics	27.1%	±2.8%
Cardboard	14.1%	±0.8%
Paper	8.0%	±2.4%
Compostable	7.1%	±1.4%
Films and bags	4.4%	±0.1%
Plastic Bottles #1 #2	2.5%	±0.6%
All other plastic	1.8%	±0.5%
Metals	1.8%	±1.1%
Aseptic Cartons	1.8%	±0.1%
Plastic #3 to #7	1.7%	±0.1%
Miscellaneous Solids	0.3%	±0.1%
Aluminum	0.2%	±0.1%

SURVEY REPORT

On 28th May 2014, Facilities and Services sent out an online survey to all the employees at the Union Bookstore. The survey was issued to gauge the occupants understanding of the current waste management system in the building as well as their participation in recycling efforts while in the building. There were an insufficient number of survey respondents to be able to report any findings.

RECOMMENDATIONS

Material Category	Definition	Lbs./year	% of Current Landfill Stream
Organics	Food, wood based material, liquid	22,267	47%
Paper	All paper items	6,834	15%
Compostable	Paper towels, Food soiled paper (coffee cups, take out containers)	5,952	13%

Actions to divert organics and potential organics include:

Since organic waste is such a large portion of the landfill stream, implementing a food scraps collection would be an option to explore. We recommend incorporating a separate food scrap collection through existing waste collection routes. This would help divert that waste stream to a pilot organics recovery program.

Material collection bins will need to be reconfigured in order to make it convenient for people to recycle and potentially compost. Employee training should be provided.

Increase paper dumpster capacity:

Illini Union Bookstore could benefit from an additional pickup of the paper dumpster. The 2 yard paper dumpster located to the south of the building is in need of adequate signage indicating that it is a paper only dumpster.

Actions to divert all other plastics include:

Increasing the commodities accepted for recycling in the building will help divert the additional plastics from the waste stream.

Actions to increase recycling at Starbucks:

A large portion of the organic and plastic portion of the waste was through the use and operation of a Starbucks Coffee Company location at the Bookstore. Dedicated recycling containers for similar establishments throughout campus would increase plastics recovery throughout the university campus.