2023
Zero Waste Report

Contents

Overview

In June 2022, Swarthmore College adopted a formal **Zero Waste Plan**, which outlines new goals that will lead the campus to become zero-waste by 2035. Our zero waste goals are as follows:

- Embed zero waste into **campus culture** through a series of behavioral, operational, and policy changes
- Reduce our per capita waste **15% by 2030** and **25% by 2035**
- Achieve **80% diversion by 2030** and **90% diversion by 2035**

Our Annual Zero Waste Report will allow us to benchmark and track our zero-waste efforts. Annual reports will be published each academic year and made available to the entire campus community.

Looking Back

Following the publication of the **2022 Annual Zero Waste Report**, Swarthmore College implemented a campus-wide waste data tracking system that allowed the Office of Sustainability to calculate campus and per capita waste numbers for the first time. During the **2022-23 academic year**, the Swarthmore community produced 394.3 tons of waste on campus. We diverted **69 tons of compost** and **92.4 tons of recycling**, but sent **232.9 tons of trash** to the Covanta Incinerator in Chester, Pennsylvania, a rate of **361.5 pounds per person (or capita)**.

The 2022-23 academic year data will serve as our baseline year for measuring progress towards our per capita waste reduction goal. Please note that this total only refers to waste placed in the tri-bin systems (compost, recycling, and trash) inside campus buildings and residence halls. We plan to track additional sources of waste, such as electronic waste and construction and demolition waste in the future.

In addition, although these metrics represent a 41% diversion rate (as opposed to the 43% diversion rate we observed in the **2022 Annual Zero Waste Report**), this real-time data confirms many of the findings of last year's Waste Characterization Study (WCS). Our annual WCS allows us to dive deeper into these larger data points, crafting a snapshot of our waste across campus buildings.

Waste Characterization Study

2023 Key Findings

While we identified a number of interesting statistics during this year's WCS, our key findings focus specifically on data connected to areas for improvement found in our campus' waste system.

- Our 2023 Waste Characterization Study results indicate an **actual diversion rate of 46%**, the highest it's ever been since we began data tracking in 2016.

- Our study also shows a **potential diversion rate of 78%**, which is similar to historical rates.

- **Compost is the largest waste stream (51%)** with food waste (26%), other accepted compostables (14%), and paper (13%) as the biggest sources of waste.

- **Single-use takeout containers account for 14% of our waste stream**, however nearly one-third (36%) of them are placed in the wrong stream.

- **Disposing of waste into the recycling and compost streams is a challenge** for the campus community, particularly when sorting aluminum cans and plastic bottles.

- **Student residence halls divert the least amount of waste** away from incineration. This is demonstrated by comparing the actual and potential diversion rates in Willets (39% vs. 74%) and PPR Apartments (21% vs. 80%) in relation to Eldridge Commons (65% vs. 86%), Trotter (56% vs. 78%), and 101 South Chester (55% vs. 78%).

Background

Since 2016, Swarthmore College has been collecting waste data primarily through the annual Waste Characterization Study (WCS), along with other data sources. Through tracking, analyzing, and benchmarking zero waste data, we can see where we stand towards achieving our 2035 zero waste goals and how aggressively we need to progress forward to meet them. A report on the **Waste Characterization Studies from 2016-2019** can be found on the Office of Sustainability's website. These studies took a pause in the fall of 2020 due to the COVID-19 pandemic but resumed in 2021 with **a special report** highlighting how the pandemic affected on-campus waste streams. In 2022, the Office of Sustainability published the college's **first annual Zero Waste Report**.

The WCS is completed each year by collecting bags of compost, recycling, and trash waste from different locations across campus, tracking the contents of each waste stream, and then sorting items into correct streams as needed. Waste is categorized by the stream and different types of common categories, such as aluminum, paper, or food waste. This information allows us to learn about the diversion rate, the capture rate of recyclables and compost, and much more.

The 2023 WCS had support from thirty-three students, staff, and faculty, who sorted over 1,000 pounds of waste over the course of seven hours. This work would not be possible without the help of all of the people who assisted with this data collection.

Methodology

Diversion Rate

In this study, **diversion** refers to the amount of waste that was put in a waste stream other than trash, which is sent to the incinerator. The diversion rate is calculated by adding up the weight of compost sorted into the compost stream with the weight of recycling sorted into the recycling stream and dividing by the total weight of all the sorted waste (including trash). We also calculate potential diversion, or the best possible diversion possible if all waste was sorted correctly, by taking the weight of all of the compost and recycling (including those improperly sorted) and dividing it by the total weight of the waste collected.

actual diversion:
$$\frac{\text{compost in the compost bin} + \text{recycling in the recycling bin}}{\text{waste in all bins}}$$

potential diversion:
$$\frac{\text{compost in all bins} + \text{recycling in all bins}}{\text{waste in all bins}}$$

Buildings

Since waste looks different in every building, we identified several "building types" that have commonalities in their waste streams, such as residence halls versus administrative buildings. This allows us to see how these categories differ in their diversion rates and track this over several years by maintaining consistency in selected buildings. The building types, along with the selected buildings, are as follows:

Willets Hall
residence hall, primarily
1st & 2nd years

PPR Apartments
residence hall, primarily
3rd & 4th years

Trotter Hall
academic building

Eldridge Commons
campus eatery

101 S. Chester
administrative building

Methodology

Categories

Within each of the three waste streams (Compost, Recycling and Trash), there are categories that provide additional insight into where sorting issues exist and where zero waste efforts should be focused. The categories are as follows:
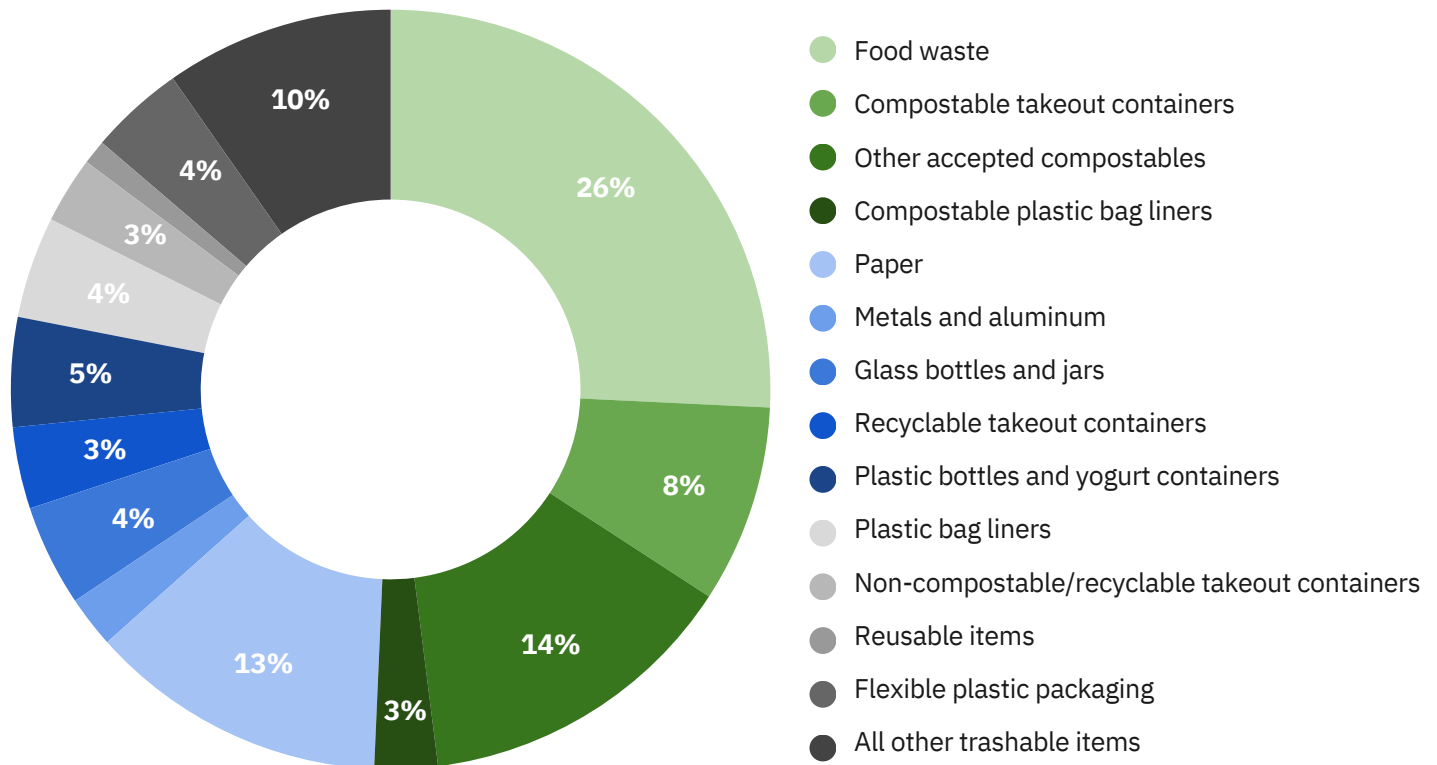
Compost	Recycling	Trash
- food waste - compostable takeout containers & utensils - other accepted compostable items	- paper & cardboard - metals & aluminum - recyclable takeout containers - plastic & glass bottles	- flexible plastic packaging - non-compostable/ recyclable takeout containers - items to donate and e-waste - all other trash items

Results

Waste Breakdown

2023 Complete Waste Breakdown by Category (All Streams)

Legend:
- Food waste
- Compostable takeout containers
- Other accepted compostables
- Compostable plastic bag liners
- Paper
- Metals and aluminum
- Glass bottles and jars
- Recyclable takeout containers
- Plastic bottles and yogurt containers
- Plastic bag liners
- Non-compostable/recyclable takeout containers
- Reusable items
- Flexible plastic packaging
- All other trashable items

Looking at the entire campus waste stream, our study finds that 51% of our waste is compost, 27% is recycling, and 22% is trash. The biggest contributors to our waste stream are food waste (26%), other accepted compostables (14%), paper (13%), and all other trashable items (10%).

In addition, this chart highlights two significant contributors to our waste stream, other accepted compostables and takeout containers, two categories we've identified as potential areas for improvement in the future.

Other accepted compostables, a subset category that includes paper towels, increased significantly since last year's study. We attribute this high percentage to introducing paper towel collection in academic and administrative buildings during the fall 2023 semester.
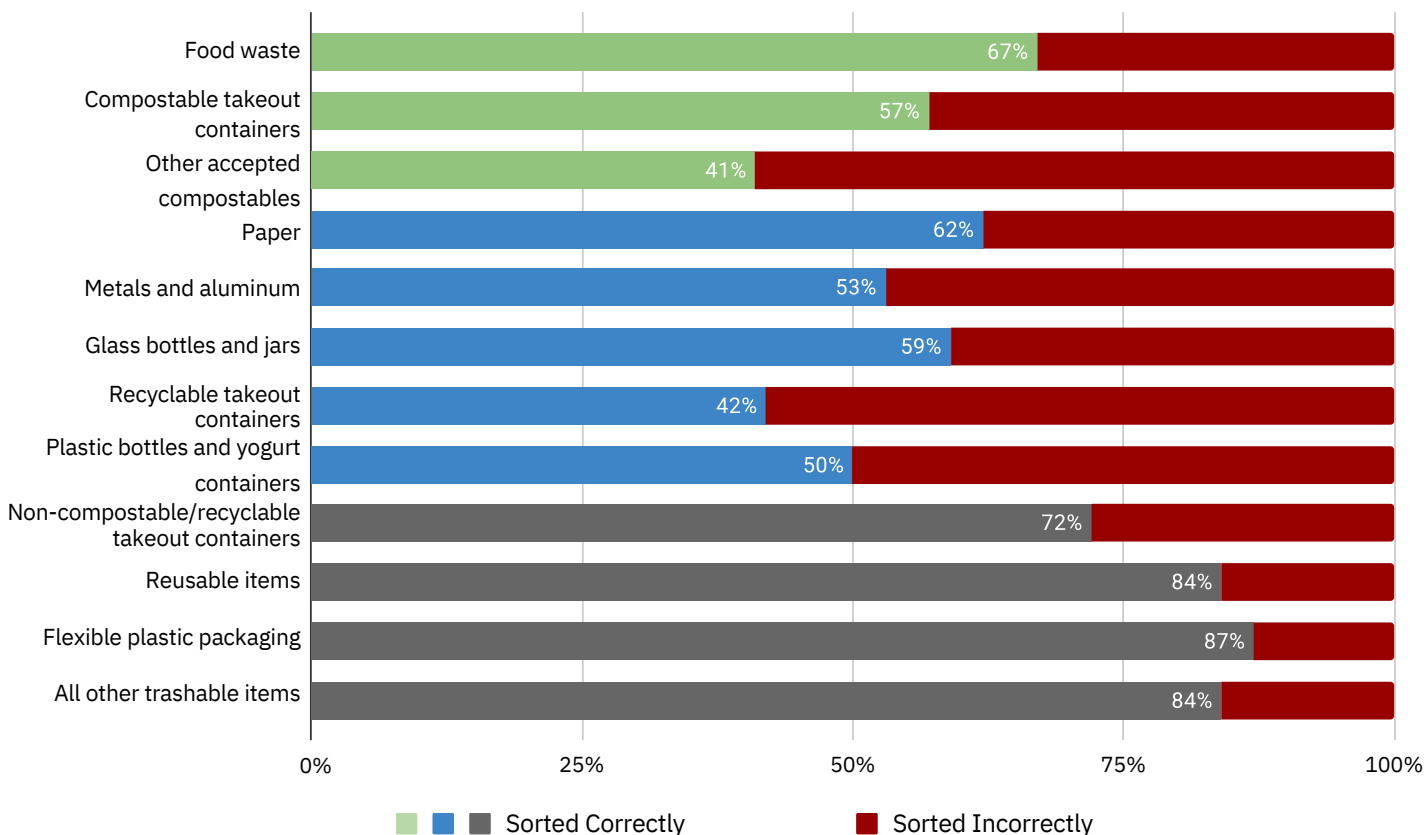
Similarly, all single-use takeout containers account for 14% of our waste stream when combined. These statistics demonstrate the importance of continued campus-wide composting and waste reduction efforts, especially as the campus shifts to the use of reusable takeout containers for students at the Dining and Community Commons in the fall 2024 semester.

Results

Sorting Accuracy

When analyzing sorting accuracy across all streams, results highlight that sorting items into the correct waste bins is a challenge for the campus community. Most trash items were accurately sorted, while recyclable and compostable items had lower accuracy rates. Specifically, one-third of all food waste (33%) was placed into the wrong bins. Similarly, some recyclable products were only correctly placed into the recycling bin about half of the time, including aluminum cans (53%) and plastic bottles (50%).

Sorting Accuracy Across Different Waste Categories

Category	Sorted Correctly
Food waste	67%
Compostable takeout containers	57%
Other accepted compostables	41%
Paper	62%
Metals and aluminum	53%
Glass bottles and jars	59%
Recyclable takeout containers	42%
Plastic bottles and yogurt containers	50%
Non-compostable/recyclable takeout containers	72%
Reusable items	84%
Flexible plastic packaging	87%
All other trashable items	84%

Legend: Sorted Correctly / Sorted Incorrectly

In addition, all types of takeout containers, including those purchased from on-campus eateries and off-campus restaurants, were consistently missorted. Although non-compostable/recyclable takeout containers were placed appropriately in the trash bin 72% of the time, less than half of recyclable (42%) and compostable (43%) takeout containers were sorted accurately.
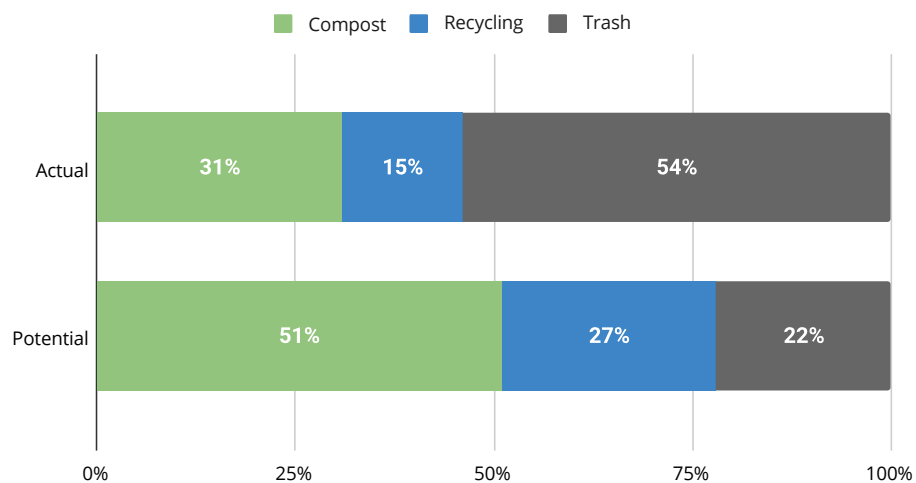
Overall, these findings illustrate the need for greater education efforts regarding waste sorting, reinforce the need for standardized procurement of takeout containers on campus, and highlight the importance of our reusable takeout container program.

Results

Diversion Rates

Looking at our campus waste stream, 46% of our total waste output was diverted away from incineration, with 31% hauled to our community composter and 15% collected by our recycling hauler. When properly sorted, 78% of our campus' waste could be diverted, increasing our total waste output to 51% compost and 27% recycling. As we move closer to achieving zero waste, please note that our actual diversion rate might decrease in the future, but our overall waste output will decrease as well. This could be attributed to the reduction of food waste as a result of efforts to expand food recovery, as well as a reduction in single-use take-out containers as the campus shifts to the use of reusable takeout containers campus-wide.
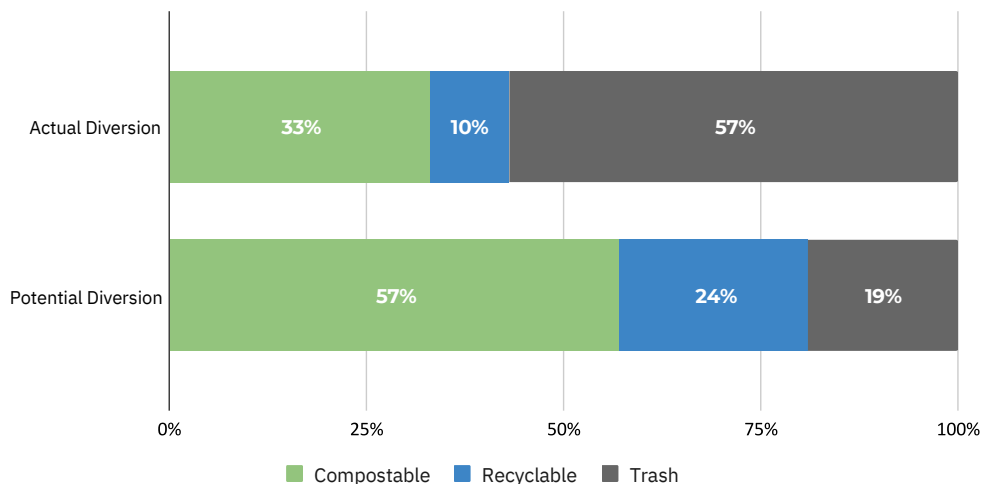
Actual vs. Potential Diversion Rate

Compost Recycling Trash

	Compost	Recycling	Trash
Actual	31%	15%	54%
Potential	51%	27%	22%

0%   25%   50%   75%   100%

Takeout Containers

Although single-use takeout containers make up 14% of our waste stream, these products are rarely sorted correctly. Through subtracting the actual diversion rate from the potential diversion rate, we estimate that placing an additional 24% of compostable and 12% of recyclable takeout containers into the correct streams will increase the total amount of waste diverted from incineration.

**Actual vs. Potential Diversion Rate
for Single-Use Takeout Containers**

	Compostable	Recyclable	Trash
Actual Diversion	33%	10%	57%
Potential Diversion	57%	24%	19%

0%   25%   50%   75%   100%

Compostable Recyclable Trash

Results

Diversion Rates Across Building Type

Looking across five different buildings, Eldridge Commons has the highest actual diversion rate (65%), demonstrating the continued success of waste diversion efforts in our campus dining locations. 101 South Chester (55%) and Trotter (56%), an administrative and academic building respectively, are diverting nearly half of their trash away from incineration. These numbers greatly differ from Willets (39%) and NPPR (21%), two student residence halls with the lowest actual diversion rates of the group.

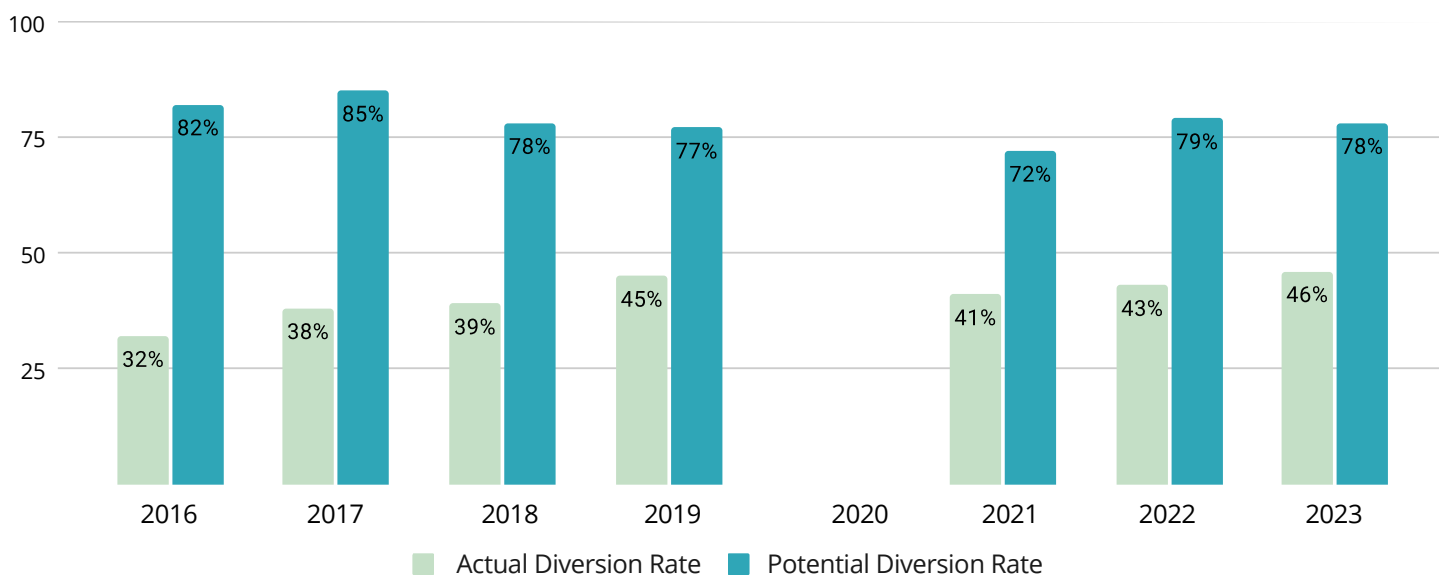**Diversion Rates Across Different Building Types**
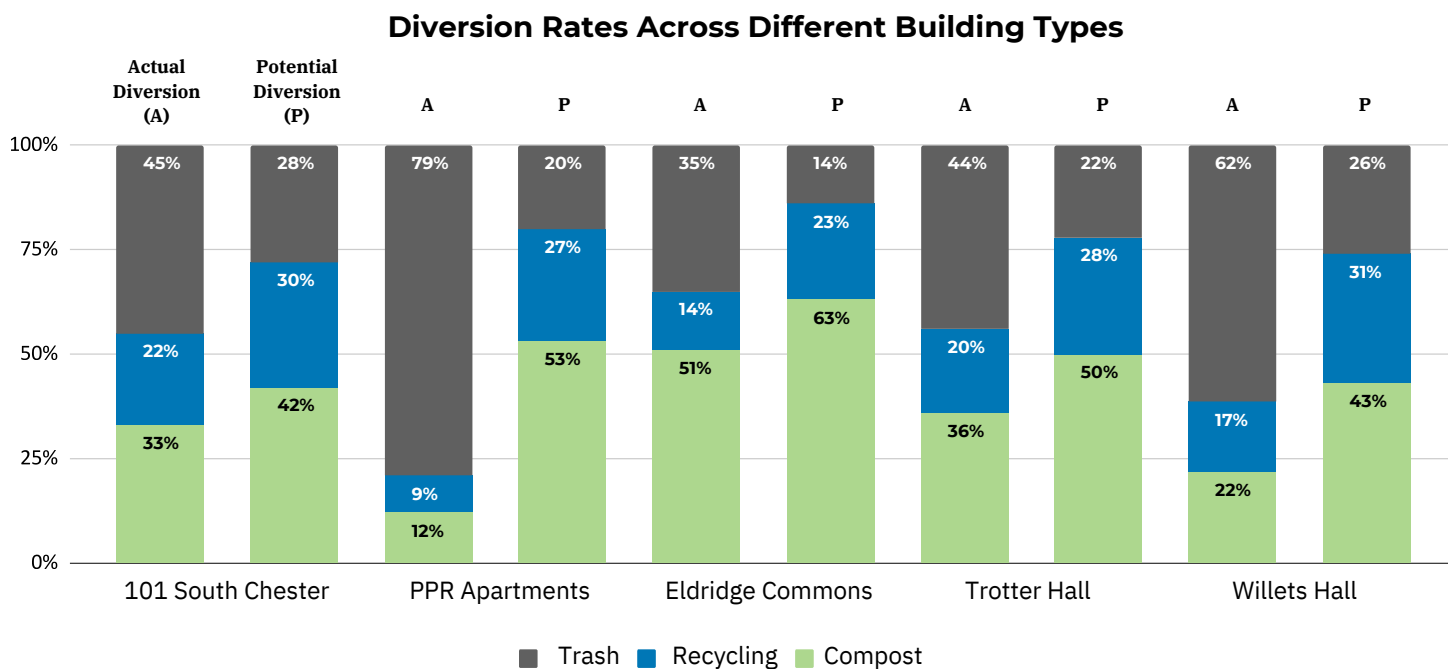
These different rates demonstrate the need for a refocused waste sorting strategy in residence halls through an initiative that the Office of Sustainability has committed to pilot during the spring 2024 semester. Similarly, NPPR's low diversion rate reiterates the importance of continued monitoring and evaluation of the building's waste disposal system, as around 80% of the building's waste is presently sent to the incinerator. Across the board, all buildings could improve their actual diversion rate by increasing the amount of waste items that are sorted into their proper waste bins.

Results

Diversion Rates Over Time

Looking at our historical diversion rates from 2016 to 2022, this year's actual diversion rate (46%) is the highest it's ever been, surpassing our previous peak of 45% in 2019. Although we experienced a slight drop in 2021 due to the COVID-19 pandemic (as discussed in the **2021 Waste Characterization Study Report**), since 2016 this rate has steadily increased over time. Our potential diversion rate (78%) is on par with previous years, a trend that has stayed fairly consistent over time.

Annual Waste Diversion Rates

Legend: Actual Diversion Rate, Potential Diversion Rate

Chart data:
Year	Actual Diversion Rate	Potential Diversion Rate
2016	32%	82%
2017	38%	85%
2018	39%	78%
2019	45%	77%
2020		
2021	41%	72%
2022	43%	79%
2023	46%	78%

Looking Ahead

Recommendations

In order to ensure that we continue moving toward our zero-waste goals, the Office of Sustainability has the following recommendations for the community:

- If you are eating food from an **on-campus dining location**, check to see if the item is **compostable** by seeing if the words **GREENWARE or ECOWARE** are printed on the item. Currently, all wooden cutlery, takeout clamshells, plates, bowls, straws, hot & cold cups, and lids used at campus dining locations or catered events are compostable.

- If you are ordering takeout from an on-campus eatery or an off-campus restaurant, check the bottom of the **plastic takeout container** for a recycling symbol with numbers **#1, #2, or #5**. If the container has these markings, you can place it in the recycling. If not, place the container and any black plastic in the trash.

- In academic and administrative buildings, place **lightly soiled paper towels** in the restroom's **compost bin**. If your bathroom does not have a compost bin, please take your paper towels to the nearest tri-bin and place it into the compost bin. Any paper towels with cleaning spray should be placed in the trash bin.

- **Use reusables whenever possible** and avoid single-use items. All Swarthmore community members are provided with a reusable utensil set at the beginning of their time with the college. In addition, starting in fall 2024, the Dining Center will be switching from single-use to reusable takeout containers, which will be available for all students.

- Please note that **flexible plastic packaging** (chip bags, granola bar wrappers, etc.) and **single-serve coffee pods** (K-Cups, Nespresso pods, Tayst coffee pods, etc.) must all be placed in the trash, as the plastic wrappers, tops, and casings are neither recyclable nor compostable.

Achieving Zero Waste by 2035

In our efforts to achieve the goals outlined in our Zero Waste Plan, the Office of Sustainability and the Zero Waste Working Group have established ten main strategies to reduce our per capita waste, increase our diversion rate, and embed a zero waste campus culture over the next several years. Below you can find a list of these priorities, as well as actions we're taking now to help create a zero waste campus by 2035.

Strategy 1: Participation
Provide regular campus communication about waste updates and provide campus-wide zero waste engagement opportunities.

Strategy 2: Reduction & Reuse
Encourage incentives for material reduction by providing reusable utensils, continuing the Worthmore Free Store and move-out program, and promoting initiatives like double-sided printing.

Strategy 3: Diversion to Recycling & Composting
Create specific educational campaigns targeting the recycling of plastic bottles, aluminum cans, and paper, as well as the composting of GREENWARE and ECOWARE products.

Strategy 4: Data Tracking & Reporting
Continue to publish zero waste metrics and implement a campus-wide data tracking system.

Strategy 5: Reusable Infrastructure & Systems
Collaborate with campus partners on donation and repair programs.

Strategy 6: Diversion Infrastructure & Systems
Cultivate sustainable operations by maintaining our waste-hauling contracts and developing efficient waste management systems.

Strategy 7: Staffing
Regularly assess zero waste operations and address staffing needs when necessary.

Strategy 8: Institutionalize Zero Waste at Swarthmore
Continue developing tangible, impact-based measurements for achieving zero waste.

Strategy 9: Policies to Promote Reduction First, Then Diversion
Craft policies that incentivize sustainable purchasing, including regulating the use of plastic packaging and single-use plastics.

Strategy 10: External Community Engagement & Role in the Just Transition
Work together with local, regional, and national stakeholders to build zero waste infrastructure and address environmental injustice.

**For more information about zero waste,
please visit our website or email zerowaste@swarthmore.edu.**