UNIVERSITY OF CANTERBURY
*Te Whare Wānanga o Waitaha*
CHRISTCHURCH NEW ZEALAND

# WASTE AUDIT REPORT

## University of Canterbury Campus

***October 2023***

Sustainably.

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# EXECUTIVE SUMMARY

This executive summary provides an overview of the University of Canterbury (UC) Waste Audit 2023 conducted by Sustainably in October 2023. The purpose of the The UC Waste Audit 2023 was to provide insights into progress on achieving targets 1,2,3 and 5 within the ***UC Waste Plan 2022-2030***. In addition, a time-and-motion was conducted to inform the potential benefit of waste sorting the UC Landfill waste stream to recover materials for recycling or organics composting.

The key findings from the Waste Audit include:

- **20%** of Comingled Recycling taken from site is contaminated, this meets the goal of **Target 2: Contamination of Comingled Recycling stream to be no greater than 25% by 2024**, however is higher than the acceptable contamination rate for Eco Central, indicating that decontamination remains a requirement.
- **5%** of Organics taken from site is contaminated, this meets the goal of **Target 3: Retain or Improve on 94% Clean organics stream by 2024,** however the quantity of materials observed present a risk to the composting process, indicating that decontamination remains a requirement.
- **41%** of Landfill Waste had an onsite diversion pathway (Comingled Recycling or Organics) this is below the goal of **Target 1: Landfill waste stream to be composed of at least 75% 'clean landfill' by 2024 (<25% divertible).** A further 3% were goods suitable for reuse through donation.
- Single-Use beverages (Cans, Plastic Bottles and Glass Bottles) contribute the greatest volume and weight of Comingled Recycling. Plastic Bottle disposal is lower than Cans and Glass Bottles, supporting progression towards **Target 5: Single use plastic bottle disposal drops by 20% by 2025 and 50% by 2030.**
- Key materials in high volume within the Landfill Waste included **Compostable Packaging, mostly Coffee Cups** (Compostable Fibre-Mix), and **Soft Plastics, mostly bin liners** (#4 LDPE), which do not have diversion pathways in place.
- Observations of Comingled Recycling and Organics contamination indicate that most of the contamination is contributed from Tenants.
- The time-and-motion was inconclusive due to a poor waste sample, and further targeted analysis would be recommended.

The above results identify that there is an opportunity to improve waste reduction, specifically targeting contamination and diversion on Campus, with the greatest opportunity being Landfill waste diversion. A full waste system assessment is recommended as a next step for further understanding of the challenges and opportunities for improvement in waste reduction and enabling change to deliver actions under the ***UC Waste Plan 2022-2030***.

# INTRODUCTION

Sustainably is pleased to present the *University of Canterbury - Waste Audit Report 2023* (UC waste audit). Sustainably is a waste minimisation consultancy based in Ōtautahi, Christchurch that specialises in identifying opportunities and addressing challenges within a business's waste system. Sustainably are motivated by waste minimisation and landfill diversion and recognise the need for considering the most important part of a waste system – people! Sustainably specialise in identifying ways to reduce waste, recover recyclable resources, and identify circular alternatives to sending waste to landfill.

Sustainably is a new service provider for this project and is excited to join UC in its waste journey. In order to comprehensively understand the UC waste system, the UC waste audit has been conducted following a thorough review of historical waste audit reports. Where possible, the methodology employed for the UC waste audit aligns with that of past waste audits. This will allow for data and results that are comparable, opportunities for pattern identification, and progress tracking.

Sustainably has recommended that a full system assessment is undertaken to gain greater understanding of challenges and opportunities for achieving the waste targets set out within the ***UC Waste Plan 2022-2030*** and waste minimisation action detailed in the ***Sustainability Policy v. 3.01***.

The UC waste audit was conducted with support from UC's waste provider, EnviroNZ. Sustainably would like to thank both UC and EnviroNZ for their support and professionalism throughout the waste audit process.

## Background

To align with the government's ***Waste Reduction Work Programme***, the University of Canterbury (UC) has begun to consider waste generated at its UC City Campus, with a specific focus on cleaning up its waste streams, eliminating plastics, and strengthening diversion pathways. UC has a clear commitment to sustainability and has demonstrated efforts towards creating a sustainable community and campus, as well as contributing towards solving global sustainability challenges as outlined in the ***Sustainability Policy v. 3.01*****.**

The UC Sustainability Policy includes the following actions specific to waste minimisation and landfill diversion:

**Sustainable Operating Practices**

- ensure that the University follows best practice regarding waste minimisation, including the safe and sustainable disposal of hazardous waste; and
- minimise the use of plastics (especially single-use plastics).

**Partnerships for Sustainability**

- minimise the use of disposable single-use items, including through any outsourced services and the wider supply chain; and
- take measures to reduce the overall amount of waste sent to landfill, noting that waste minimisation efforts extend to any outsourced suppliers and the wider supply chain.

To support these actions, the ***UC Waste Plan 2022-2030*** has identified priority areas for campus waste which are detailed within five targets:

- **Target 1** - Landfill waste stream to be composed of at least 75% 'clean landfill' by 2024 (i.e., a maximum of 25% of this stream to be made up of items that could have been diverted) (measured by annual audit).
- **Target 2** - Contamination of comingled recycling stream to be no greater than 25% by 2024 (measured by annual audit)
- **Target 3** - Retain or improve on 94% clean organics stream by 2024 (measured by annual audit).
- **Target 4** - Clean landfill rate drops by 25% by 2026 (measured against EFTS).
- **Target 5** – Single-use plastic bottle disposal drops by 20% by 2025 and 50% by 2030 (measured by annual audit against EFTS)

UC has commissioned several previous waste audits and supporting waste project reports (i.e. *UC Composting Options 2022*, and *UC Recycling Signage Options 2022*). The UC Waste Audit 2023 will capture data which will provide insights into progress on achieving targets 1,2,3 and 5 within the ***UC Waste Plan 2022-2030***. In addition, it will provide data which will inform the future potential of waste sorting the UC Landfill waste stream.

## Waste Audit Details

Below are full details about the UC waste audit including timeframes and locations, key representatives, health and safety, scope and objectives, methodology, limitations, and disclaimer information.

**Timeframe and Location:**

The UC waste audit took place at the EnviroNZ Christchurch branch site at 21 Francella Street in Bromley, over two non-consecutive days.

Waste was collected from the UC Campus on Tuesday 10 (103.4kg of Comingled Recycling and 110.1kg of Organics) and Tuesday 17 October (750kg Landfill) via the standard EnviroNZ procedures. This waste was placed in a suitable location at the site for the waste audits. Feedback from EnviroNZ was that the volumes for each waste stream were typical of the Tuesday collection volumes.

The Comingled Recycling and Organics waste audits took place on Wednesday 11 October 20234 between 9am and 3pm, and the Landfill waste audit took place on Wednesday 18 October 2023 between 11am and 4pm.

**Key Representatives:**

The following representatives were present at, and/or contributed towards the UC waste audit:

| Company | Representative |
|---|---|
| **UC** | Matt Morris – Sustainability Advisor |
| **EnviroNZ** | Dan Redmond – Christchurch Branch Manager |
| | Jacob Stapleton – Business Manager |
| | Darren – EnviroNZ Driver |
| **Sustainably** | Aimy East – Services Director |
| | Kat Ralph-Triebels – Waste Minimisation Consultant |
| | Kate Gislason – Waste Minimisation Consultant |

**Health and Safety:**
The health, safety, and well-being of all people are of the utmost importance to Sustainably. Sustainably includes stringent health and safety processes within their waste audit process to ensure all activities comply with the ***Health and Safety at Work Act 2015***. This includes, but is not limited to:

- Liaising with the client and/or any sub-contractors during the planning phase to identify risks and define roles and responsibilities.
- The use of PPE, where appropriate, including non-slip shoes, cut-resistant gloves, hi-vis jackets, ear protection, eye protection, overalls/aprons, and medical-grade face masks.
- Engaging in open communication with the client and/or sub-contractors to advise of any on-site processes, potential risks, site/process hazards, incidents, and near misses.
- Complete all required health and safety documentation, where applicable, including a *Site-Specific Safety Plan* (SSSP), *Emergency Evacuation Plan,* and *Incident Reports.*

**Scope and Objectives:**
The scope of the project included Sustainably conducting a waste audit on the three waste streams generated at the UC City Campus: Landfill, Comingled Recycling, and Organics. Data was collected on waste volumes and material composition predominantly as a means of providing insights into progress on targets 1, 2, 3, and 5 within the ***UC Waste Plan 2022-2030***.

Data collection and analysis relating to target 4 within the ***UC Waste Plan 2022-2030*** is excluded from the scope of services and this report.

In addition, there is specific interest in gathering data in relation to future opportunities for waste sorting the UC City Campus Landfill waste stream in collaboration with EnviroNZ.

Sustainably have recommended UC engage them to conduct a further waste system assessment which will provide a comprehensive report on all aspects of the UC waste system include infrastructure, environment, practices, and user engagement.

## Audit Methodology

The Sustainably waste audit process follows a set format to ensure consistency, transparency, and the delivery of meaningful data. Details of Sustainably's waste audit methodology follows:

**Audit Input Data:**
Where possible, the UC waste audit methodology is aligned with the Ministry for the Environment (MfE) Solid Waste Analysis Protocol (SWAP) established in 2002. A SWAP involves a sort-and-weigh methodology whereby waste is hand-sorted into a series of categories and sub-categories and weighed to collect statistically accurate data[1]. The UC waste audit is not classified as a SWAP as there was only one assessment of each waste stream, rather than repeated assessments.

The UC waste audit incorporated waste from the three waste streams at UC –, Comingled Recycling, Organics, and Landfill. The accepted materials and material sub-categories for each of the waste streams at UC are as follows:

[1] Ministry for the Environment, 2002 - https://environment.govt.nz/publications/solid-waste-audits-for-ministry-for-the-environment-waste-data-programme-200708/2-methodology/

| UC Waste Stream | Accepted Material | Material Sub-Category |
|---|---|---|
| **Comingled Recycling** | Fibre | Paper |
| | Fibre | Cardboard |
| | Metals | Steel Cans |
| | Metals | Aluminium Cans |
| | Glass | Bottles, Jars & Other |
| | Plastics | PET #1 (bottles) |
| | Plastics | PET #1 (containers) |
| | Plastics | HDPE #2 (bottles and containers) |
| | Plastics | PP #5 (bottles and containers) |
| **Organics** | Food Scraps | Food Waste |
| | Fibre | Pizza Boxes |
| | Fibre | Paper Towels |
| **General Waste** | Compostables | Coffee Cups |
| | Compostables | Compostable Packaging |
| | Plastics | PLA #7 (plant-based cups) |
| | Plastics | Bottle Caps/Lids |
| | Plastics | LDPE #4 (soft plastics packaging) |
| | Plastics | Heavily Contaminated Recyclables |
| | Mixed Material | Tetra Paks |
| | Mixed Material | All Other Residual Waste Materials (e.g. non-recyclable plastics) |

The current UC waste stream categories are aligned with key municipal waste streams in Ōtautahi, Christchurch.

It should be noted that significant changes are being made to the New Zealand kerbside collections, with a standardised approach being introduced in February 2024[2]. Because of this, it is recommended that alignment to the standardised approach be applied for specific material diversion pathways.

**Data Metrics:**
Data is reported by weight (i.e. actual weight of waste), as well as a percentage of overall weight (i.e. calculated by the waste divided by the total weight of all waste sorted).

**Audit Process:**
The process for all three waste audits was unchanged. What differed was the data collection usage. The specific waste audit process for each waste stream, as well as what the data was used for, is detailed in the findings section of this report.

[2] Ministry for Environment, 2023 - https://environment.govt.nz/publications/standard-materials-for-kerbside-collections-guidance-for-territorial-authorities/

## Limitation and Disclaimer

**Limitations:**
The waste audit process can encounter limitations due to constraints such as resource and data availability. The limitations identified for the UC waste audit are as follows and should be considered when reviewing the report:

- All waste audits were completed at a single point in time; therefore, they provide a limited snapshot of waste volumes and composition.
- Only 24% of the Landfill Waste was sorted due to the large volume and inefficiencies with the waste sample provided.
- Several high-risk bags were identified during the Landfill waste audit. These were rejected due to health and safety concerns, including but not limited to, bags that contained body fluids (nappies, medical treatment materials) or presented with heavy leakage and strong odours from decomposing organic material.
- As Sustainably are a new service provider, to UC and this project, the approach and terminology may differ from previous waste audit processes and reports.

**Disclaimer:**
While every effort has been made to ensure the data collected and information presented is both comprehensive and accurate, Sustainably is in no way responsible for unavoidable discrepancies such as scale irregularities.

It should be noted that, given the evolving nature of the waste industry, Sustainably takes no responsibility for the availability of any solutions or recommendations made within the report.

The report and its findings are deemed relevant for 12 months.

# WASTE AUDIT FINDINGS

## Comingled Recycling Waste Audit Findings

**Comingled Recycling Waste Audit Purpose:**
The Comingled Recycling waste audit was conducted to gather data relating to target 2 of the ***UC* Waste Plan 2022-2030:**

> ***Target 2*** *- Contamination of comingled recycling stream to be no greater than 25% by* 2024.

The audit results provide data for determining any significant changes within the Comingled Recycling waste stream from previous waste audits. The data will support decision-making and identify opportunities for introducing measures which might continue progress and/or improve results within the Comingled Recycling waste stream.

**Comingled Recycling Waste Audit Process:**
Following are details regarding the audit process taken for the Comingled Recycling waste audit:

- All Comingled Recycling waste collected by EnviroNZ on Tuesday 10 October from the UC City Campus was brought to the EnviroNZ Christchurch branch site at 21 Francella Street in Bromley. There was a total of 32 weighing a total of 103.4kg.
- All Comingled Recycling waste was sorted on Wednesday 11 October by three Sustainability representatives via the following process:
    - Each bag was individually weighed, and the weight recorded.
    - Each bag was opened and tipped onto a dedicated waste sorting table.
    - Materials and items were hand-sorted according to applicable sub-categories.
    - 240L wheelie bins and small containers were used to sort waste according to volume i.e. 240L wheelie bins were used to sort materials/items found in large volumes and small containers were used for materials/items found in small volumes.
    - Once all Comingled Recycling waste had been sorted the sub-categories within the 240L wheelie bins and smaller containers were weighed and recorded.
    - Following this process, the waste was disposed of accordingly.

**Comingled Recycling Waste Audit Key Insights:**

- Target 2 has been achieved with an improvement on 2022 waste audit results (2023 = 20%, 2022 = 24%).
- As the acceptance threshold for contaminated Comingled Recycling is 10% these results suggest the current de-contamination process is necessary for acceptance of Comingled Recycling at the Eco Central.
- The main contaminants within the Comingled Recycling were similar to those identified in the 2022 waste audit – lids, compostables, food scraps, soft plastics, other Landfill assorted materials.

**Comingled Recycling Pre-Audit Data:**

Below is a breakdown of the Comingled Recycling pre-audit data including total bag count, maximum bag weight, minimum bag weight, average bag weight, and total bag weight:

| Total Bags (Count) | Maximum Bag Weight (kg) | Minimum Bag Weight (kg) | Average Weight (kg) | Total Weight (kg) |
|---|---|---|---|---|
| 32 | 9.3 | 0.7 | 3.30 | 103.4 |

**Comingled Recycling Post-Audit Data:**

Below is a breakdown of the Comingled Recycling waste stream composition following post-audit. Materials have been categorised in relation to the correct UC waste stream and then further classified into materials and material sub-categories:

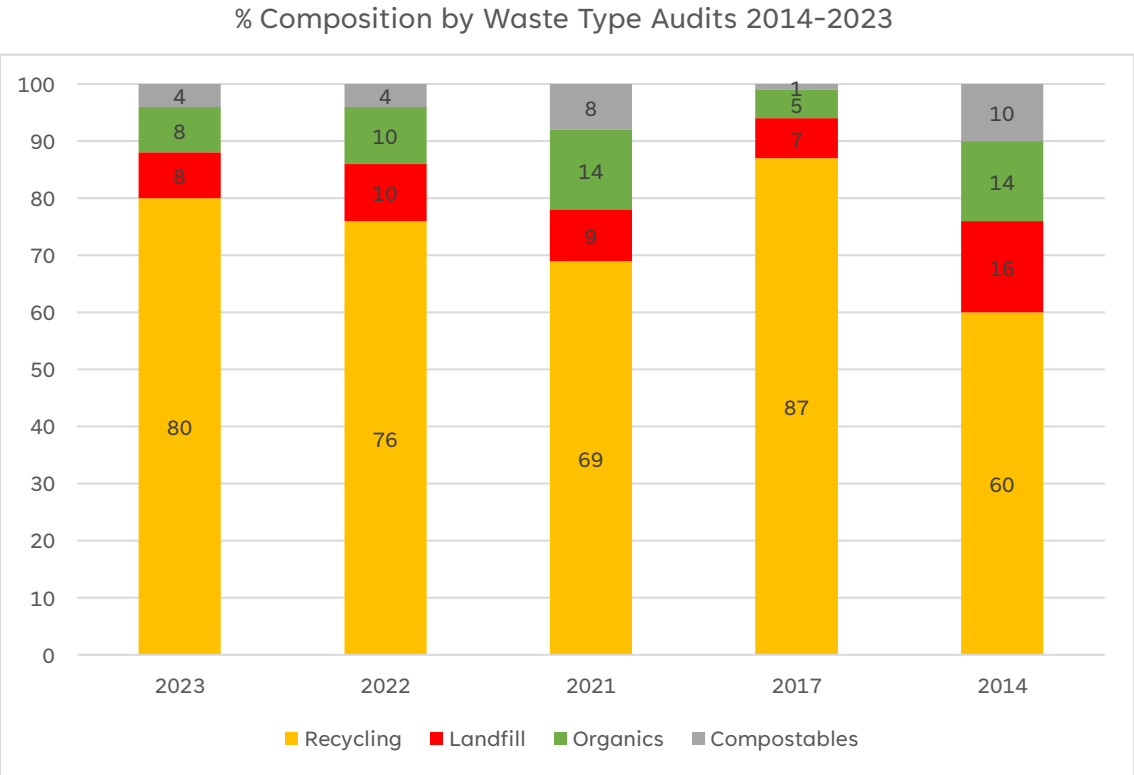
| Correct UC Waste Streams | Material | Material Sub-Category | Weight (kg) | Weight (%) | Additional Information |
|---|---|---|---|---|---|
| Comingled Recycling | Fibre | Paper | 17.6 | 17% | |
| Comingled Recycling | Fibre | Cardboard | 10.1 | 10% | |
| Comingled Recycling | Metals | Steel Cans | 2.9 | 3% | |
| Comingled Recycling | Metals | Aluminium Cans | 19.1 | 18% | |
| Comingled Recycling | Glass | Bottles, Jars & Other | 19.1 | 18% | |
| Comingled Recycling | Plastics | PET #1 (bottles) | 9.1 | 9% | |
| Comingled Recycling | Plastics | PET #1 (containers) | 1.3 | 1% | |
| Comingled Recycling | Plastics | HDPE #2 (bottles and containers) | 2.2 | 2% | |
| Comingled Recycling | Plastics | PP #5 (bottles and containers) | 1.5 | 1% | |
| **Correct Comingled Recycling Disposal** | | | **82.9** | **80%** | |
| Organics | Food Scraps | Food Waste | 4.9 | 5% | |
| Organics | Fibre | Pizza Boxes | 3.0 | 3% | Diversion pathway at risk/may change |
| Organics | Fibre | Paper Towels | 0.4 | 0.4% | |
| General Waste | Compostable Fibre Mix | Coffee Cups | 1.1 | 1% | Diversion pathways not available in System |
| General Waste | Compostable Fibre Mix | Compostable Packaging | 2.7 | 3% | |
| General Waste | Plastics | PLA #7 (plant-based cups) | 0.1 | 0.1% | |
| General Waste | Plastics | Bottle Caps/Lids | 1.9 | 2% | |
| General Waste | Plastics | LDPE #4 (soft plastics) | 2.3 | 2% | |
| General Waste | Plastics | Dirty Recyclables | 1.2 | 1% | Heavily contaminated |
| General Waste | Mixed Material | Tetra Pak | 0.7 | 1% | |
| General Waste | Mixed Material | All Other Residual Waste Materials | 2.3 | 2% | |
| **Contaminants (Organics + General Waste)** | | | **20.5** | **20%** | |
| **TOTAL WEIGH** | | | **103.4** | **100%** | |

**NB:** All plastic containers deemed acceptable at Eco Central are included in Comingled Recycling. This approach differs from the 2022 waste audit.

The composition by waste type within the Comingled Recycling waste stream was as follows:


**Comingled Recycling Waste Audit results compared to prior years:**

A year-on-year comparison of the Comingled Recycling composition is as follows:




The rank of material composition within Comingled Recycling was similar to prior audit results, however, plastic bottles have shifted from number three to four. Paper has increased which is possibly a result of the removal of dedicated paper bins since the 2022 waste audit took place:

**2022 Comingled Recycling Material - Composition Ranking by Weight**

1. Cans (31%)
2. Glass (24%)
3. Plastic Bottles (19%)
4. Paper (17%)
5. Cardboard (7%)
6. Tin (2%)

**2023 Comingled Recycling Material - Composition Ranking by Weight**

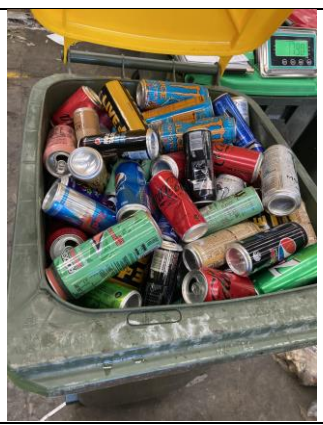
1. Cans (25%)
2. Glass (23%)
3. Paper (21%)
4. Plastic Bottles (16%)
5. Cardboard (12%)
6. Tin (3%)

**Comingled Recycling Waste Audit Observations:**

Below are the key observations made throughout the Comingled Recycling waste audit process:

- Single-Use Beverages (Cans, Plastic Bottles and Glass Bottles) contribute the greatest volume and weight of Comingled Recycling.
- Compostable packaging, cans, coffee cups, and soft plastics were observed in high volumes, however, as the data collected is based on weight, the waste audit data do not sufficiently represent this finding. Conversely, Glass was in reasonably low volumes but recorded high weight.
- Bin liners were excluded from the data, (approx. 8% of total composition), to represent the system practice or removal during the decontamination process, however, it should be noted that these are disposed of as Landfill. Bin liners were observed as being over-used e.g., liners inside liners and/or, or containing small volume of recyclables.
- Some Comingled Recycling materials which appeared to come from tenants were observed as having high levels of contamination (e.g., food residue on plastic milk bottles). These materials were considered Landfill (1%).
- High volumes of loose plastic container lids and bottles which still included lids were observed from multiple sources (tenants and students) – lids are not recyclable at Eco Central.
- Tetra Paks from tenants were observed in reasonable volumes– Tetra Paks are not recyclable at Eco Central.
- Pizza boxes were observed in reasonable volumes even though the current diversion pathway for these in Christchurch is via the Organics.
- Coffee pods were observed in high volumes in one bin liner.

**Comingled Recycling Waste Audit Images:**

| | | |
|---|---|---|
|  |  |  |
| Comingled Recycling pre-sort | Bin liners excluded from the data | Cans (one of three full bins) |

| | | |
|---|---|---|
|  |  |  |
| Glass | Excluded bin liners | Multiple bin liners inside each other |
|  |  |  |
| Contaminated materials (tenants) | Bottle lids removed | Loose container lids |
|  |  |  |
| Lids on bottles (tenants) | Tetra Paks (tenants) | Increased volumes of paper |
|  |  |  |
| Increased volumes of paper | Pizza boxes | Plastics |

| | | |
|---|---|---|
|  |  |  |
| Paper towels | Food contaminations | Example of Comingled Recycling pre-sort |

## Organics Waste Audit Findings

**Organics Waste Audit Purpose:**
The Organics waste audit was conducted to gather data relating to target 3 of the ***UC* Waste Plan 2022-2030:**

> ***Target 3*** - *Retain or improve on 94%* clean organics stream by 2024.

The audit results provide data for determining any significant changes within the Organics waste stream from previous waste audits. The data will support decision-making and help identify opportunities for introducing measures which might continue progress and/or improve results within the Organics waste stream.

**Organics Waste Audit Process:**
Following are details regarding the audit process taken for the Organics waste audit:

- All Organics waste collected by EnviroNZ on Tuesday 10 October from the UC City Campus was brought to the EnviroNZ Christchurch branch site at 21 Francella Street in Bromley. There was a total of 21 weighing a total of 110.1kg.
- All Organics waste was sorted on Wednesday 11 October by three Sustainability representatives via the following process:
    - Each bag was individually weighed, and the weight recorded.
    - Each bag was opened and tipped onto a dedicated waste sorting table.
    - Materials and items were hand-sorted according to applicable sub-categories.
    - 240L wheelie bins and small containers were used to sort waste according to volume i.e. 240L wheelie bins were used to sort materials/items found in large volumes and small containers were used for materials/items found in small volumes.
    - Once all Organics waste had been sorted the sub-categories within the 240L wheelie bins and smaller containers were weighed and recorded.
    - Following this process, the waste was disposed of accordingly.

**Organics Waste Audit Key Insights:**

- Target 3 has been achieved with 5% of the Organics deemed contaminated.
- 95% of Organics was made up of food scraps, compostable bin liners and pizza boxes.
- Contamination was predominantly from non-compostable bin liners (3.9%).
- Reasonable volumes of consumable food were observed within tenant bins (e.g. short-dated and packaged food).

**Organic Pre-Audit Data:**
Below is a breakdown of the Organics pre-audit data including total bag count, maximum bag weight, minimum bag weight, average bag weight, and total bag weight:

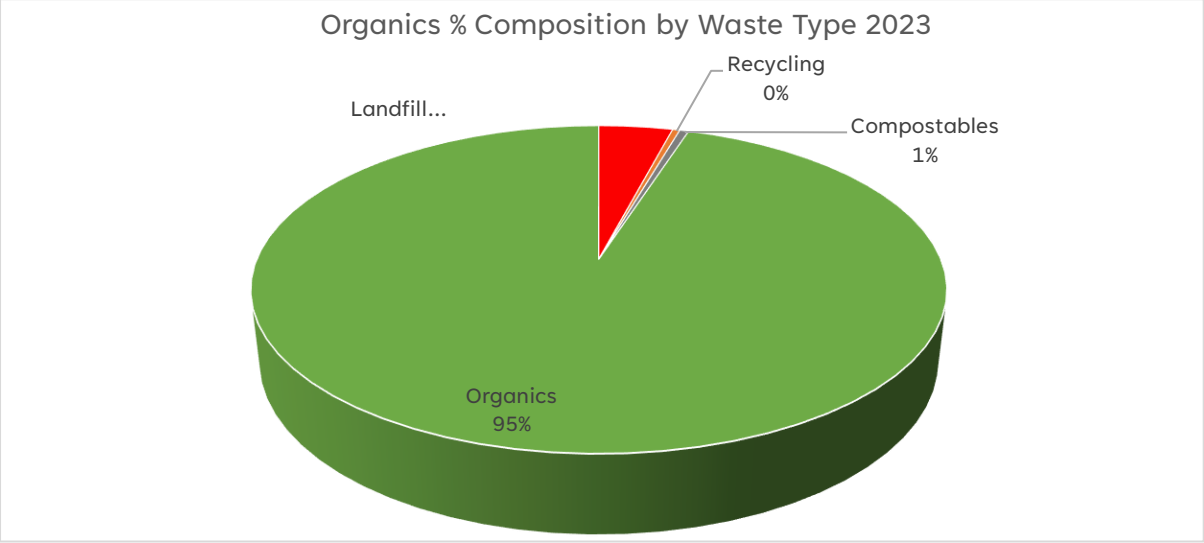
| Total Bags (Count) | Maximum Bag Weight (kg) | Minimum Bag Weight (kg) | Average Weight (kg) | Total Weight (kg) |
|---|---|---|---|---|
| 21 | 24.5 | 0.8 | 5.3 | 110.1 |

**Organics Post-Audit Data:**

Below is a breakdown of the Organics waste stream composition post-audit. Materials have been categorised in relation to the correct UC waste stream and then further classified into materials and material sub-categories:

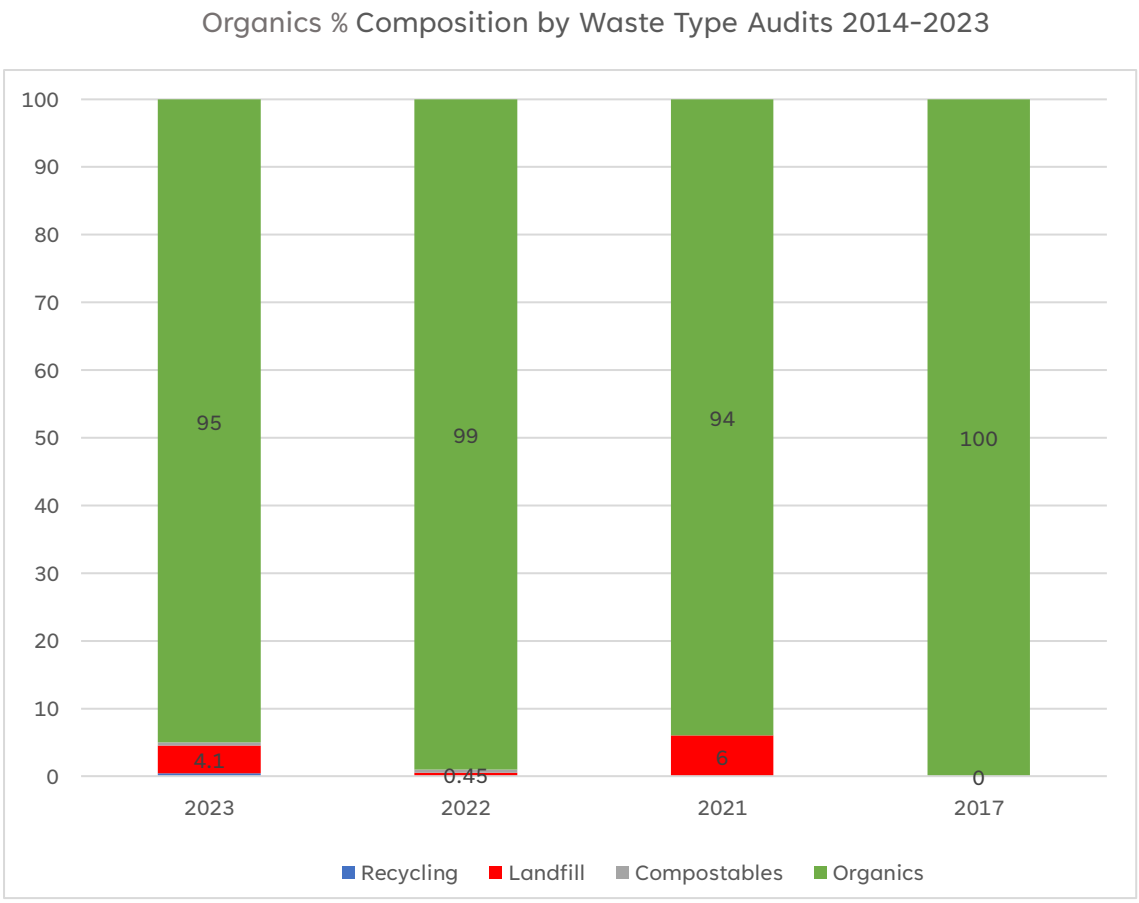
| Correct UC Waste Stream | Material | Material Sub-Category | Weight (kg) | Weight (%) | Additional Information |
|---|---|---|---|---|---|
| Organics | Food Scraps | Food Waste | 103.8 | 94.3% | |
| Organics | Fibre | Pizza Boxes | 0.8 | 0.7% | Pathway may change |
| ***Correct Organics Disposal*** | | | ***104.6*** | ***95%*** | |
| Comingled Recycling | Various | Various | 0.4 | 0.4% | |
| General Waste | Compostable Fibre Mix | Coffee Cups | 0.6 | 0.5% | Diversion pathway not currently available |
| | Compostable Fibre Mix | Compostable Packaging | | | Diversion pathway not currently available |
| General Waste | Plastics | LDPE #4 (soft plastics packaging) | 0.2 | 0.2% | Diversion pathway not currently available |
| General Waste | Plastics | Non-compliant bin liners | 4.3 | 3.9% | Diversion pathway not currently available |
| **Contaminants (Comingled Recycling + General Waste)** | | | **5.5** | **5%** | |
| | | **TOTAL WEIGH** | **110.1** | **100.0%** | |

The % composition by waste type within the Organics waste stream was as follows:




**Organics Waste Audit results compared to prior years:**

A year-on-year comparison of the Organics composition is as follows:




**Organics Waste Audit Observations:**

- The Organics included high volumes of various types of non-compostable bin liners.
- Following non-compostable bin liners (3.9%), cardboard (0.8%) and compostables (0.6%) were the next most prevalent contaminants.
- Most contamination within the Organics appeared to be from tenants. This included soft plastic food packaging, non-compostable bin liners, and the inclusion of Comingled Recycling materials.
- Reasonable volumes of coffee grounds were observed.
- Compostable bin liners were observed in high volumes with many only containing a small amount of food scraps.
- Reasonable volumes of consumable food were observed within tenant bins (e.g. short-dated and packaged food).

**Organics Waste Audit Images:**

| | | |
|---|---|---|
|  |  |  |
| Compostables | Soft plastic contamination & consumable food (tenants) | Coffee grounds |

| | | |
|---|---|---|
|  |  |  |
| Non-compostable bin liners | Consumable food (tenants) | Soft plastic contamination |
|  |  |  |
| Hard to see contamination | Soft plastics | Hard to see contamination |

## Landfill Waste Audit Findings

**Landfill Waste Audit Purpose:**
The Landfill waste audit was conducted to gather data relating to target 1 of the ***UC* Waste Plan 2022-2030:**

> ***Target 1*** *- Landfill waste stream to be composed of at least 75% 'clean landfill' by 2024 (i.e., a maximum of 25% of this stream to be made up of items that could have been diverted).*

The audit results provide data for determining any significant changes within the Landfill waste stream from previous waste audits. The data will support decision-making and identify opportunities for introducing measures which might continue progress and/or improve results within the Landfill waste stream.

In addition, the Landfill waste audit was conducted concurrently with the time-and-motion trial. The purpose of the time-and-motion trail was to gain insights into opportunities for sorting Landfill waste in the future. This meant that the Landfill waste audit differed from the others in that it took place during a fixed period – three hours. This impacted the ability of the Sustainably representatives to sort all the waste set aside for the audit.

Data and insights for the time-and-motion trial are detailed in a separate section of the report.

**Landfill Waste Audit Process:**
Following are details regarding the audit process taken for the Landfill waste audit:

- All Landfill waste collected by EnviroNZ on Tuesday 17 October from the UC City Campus was brought to the EnviroNZ Christchurch branch site at 21 Francella Street in Bromley. There was a total of 750kg of Landfill set aside to audit. Only 181.3kg of waste was sorted (24%).
- All Landfill waste was sorted on Wednesday 18 October by three Sustainability representatives via the following process:
    - Each bag was individually weighed, and the weight recorded.
    - Each bag was opened and tipped onto a dedicated waste sorting table (**NB:** some bags were rejected due to health and safety concerns).
    - Materials and items were hand-sorted according to applicable sub-categories.
    - 240L wheelie bins and small containers were used to sort waste according to volume i.e. 240L wheelie bins were used to sort materials/items found in large volumes and small containers were used for materials/items found in small volumes.
    - Once all Landfill waste had been sorted the sub-categories within the 240L wheelie bins and smaller containers were weighed and recorded.
    - Following this process, the waste was disposed of accordingly.

**Landfill Waste Audit Key Insights**

- Target 1 was not achieved with 41% of Landfill deemed divertible via Comingled Recycling or Organics (target specifies <25% to be divertible).
- Many of the sub-material categories had between 2-4% compositions, demonstrating that divertible materials within the Landfill waste stream are largely dispersed across material types.

**Landfill Pre-Audit Data:**

Below is a breakdown of the Landfill pre-audit including total bag count, maximum bag weight, minimum bag weight, average bag weight, and total bag weight:

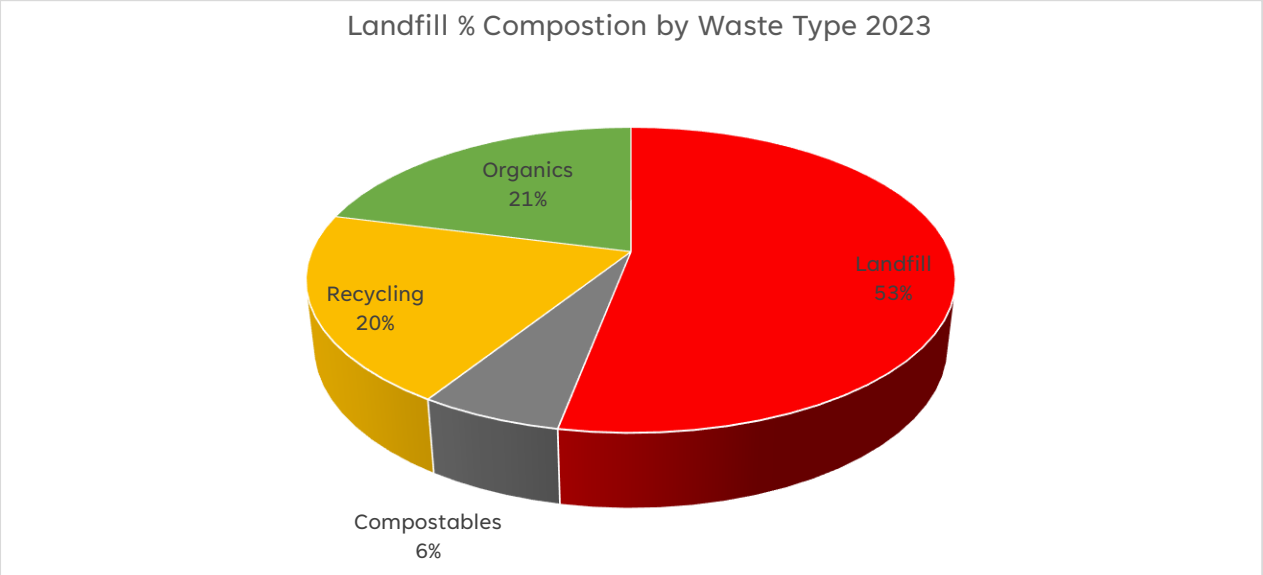
| Total Bags (Count) | Maximum Bag Weight (kg) | Minimum Bag Weight (kg) | Average Weight (kg) | Total Weight (kg) |
|---|---|---|---|---|
| 35 | 11.1 | 0.6 | 5.2 | 181.3 |

**Landfill Post-Audit Data:**

Below is a breakdown of the Landfill waste stream composition following post-audit. Materials have been categorised in relation to the correct UC waste stream and then further classified into materials and material sub-categories:

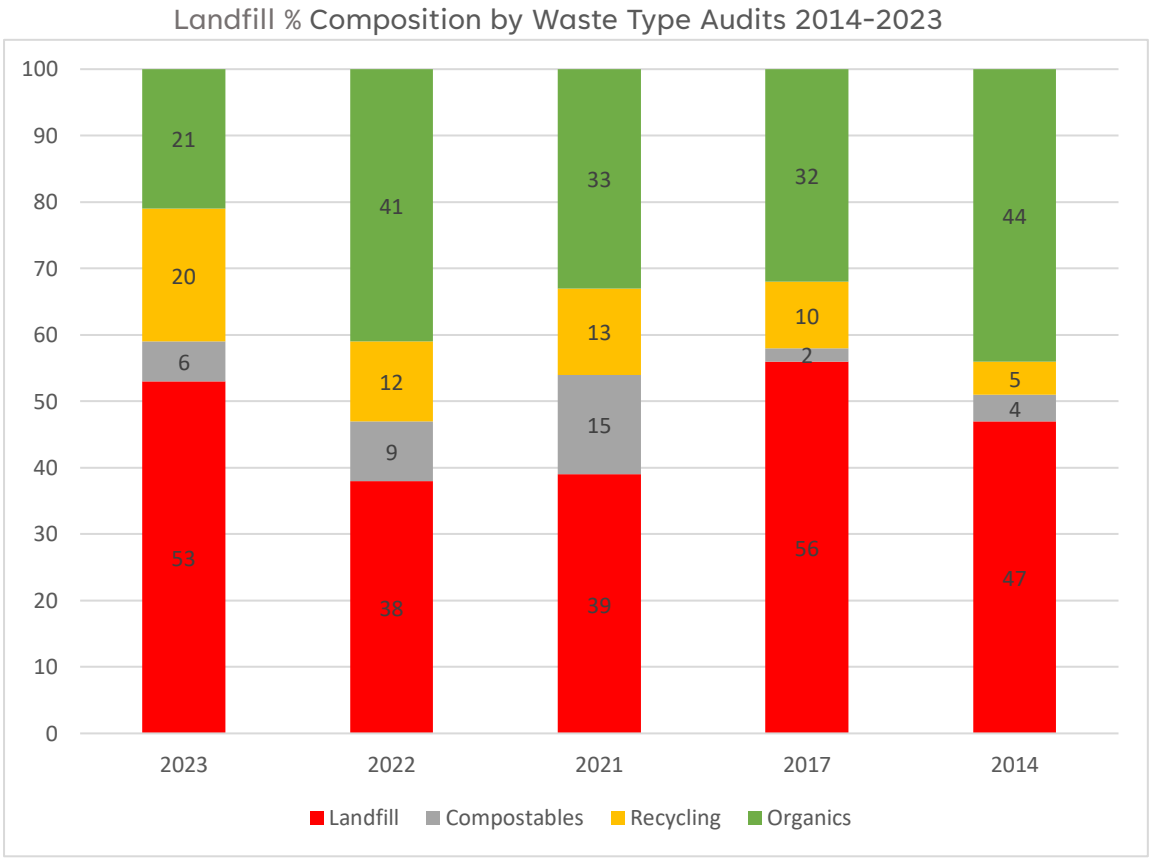
| Correct UC Waste Stream | Material | Material Sub-Category | Weight (kg) | Weight (%) | Additional Information |
|---|---|---|---|---|---|
| General Waste | Compostable Fibre Mix | Coffee Cups | 5.10 | 3% | Diversion pathway not currently available |
| General Waste | Compostable Fibre Mix | Compostable Packaging | 5.70 | 3% | Diversion pathway not currently available |
| General Waste | Plastics | LDPE #4 (Soft Plastics) | 6.10 | 3% | Diversion pathway not currently available |
| General Waste | Mixed Material | All Other Residual Waste Materials | 84.5 | 47% | Not suitable for diversion |
| **Total Non-Divertible Materials** | | | **101.4** | **56%** | |
| Comingled Recycling | Fibre | Paper | 6.50 | 4% | |
| Comingled Recycling | Fibre | Cardboard | 11.10 | 6% | |
| Comingled Recycling | Metals | Steel Cans/Tins | 1.40 | 1% | |
| Comingled Recycling | Metals | Aluminium Cans | 3.00 | 2% | |
| Comingled Recycling | Glass | Bottles, Jars & Other | 3.80 | 2% | |
| Comingled Recycling | Plastics | PET #1 (bottles) | 4.60 | 3% | |
| Comingled Recycling | Plastics | PET #1 (containers) | 5.50 | 3% | |
| Comingled Recycling | Plastics | HDPE #2 (bottles and containers) | | | |
| Comingled Recycling | Plastics | PP #5 (bottles and containers) | 1.60 | 1% | Boba cups and other plastics |
| Organics | Food Scraps | Food Waste | 34.30 | 19% | |
| Organics | Fibre | Pizza Boxes | 4.00 | 2% | Diversion pathway at may change |
| Other | Mixed Material | Clothing and homewares in good condition | 5.70 | 3% | Reusable items suitable for donation |
| **Total Divertible Materials** | | | **79.9** | **44%** | |
| **TOTAL WEIGH** | | | **181.3** | **100%** | |

The % composition by waste type within the Landfill waste stream was as follows:




**Landfill Audit results compared to prior years:**

A year-on-year comparison of the Landfill composition is as follows:




**Landfill Waste Audit Observations:**

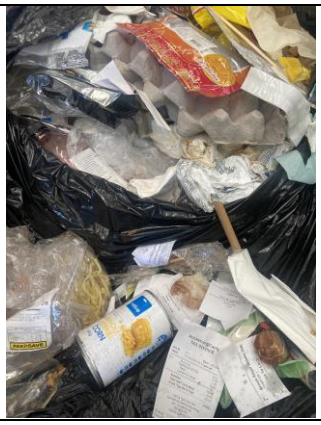
- A total of 750kg of Landfill waste was set aside by EnviroNZ to be audited.
- 181.3kg (24%) of all Landfill waste set aside was sorted for the waste audit.
- Six bags were rejected (25kg) due to health and safety concerns such as bags that contained body fluids (nappies, medical treatment materials) or presented with heavy leakage and strong odours from decomposing food waste.

- Several of the heavy bags rejected appeared to contain high volumes of food waste from tenants.
- A high proportion of 'low-weight' bags were observed - >50% were less than 5kg.
- Food scraps were observed as the highest divertible material (19%) with the next closest being cardboard (6%). Most of the other sub-material categories represented between 2-4% of divertible materials – plastic bottles (3%), cans (2%), plastics (3%), paper (4%), glass (2%), soft plastics (3%), pizza boxes (2%), compostables (3%), coffee cups (3%).
- The lowest sub-category represented was tin cans (1%).
- Reasonable volumes of reusable materials/items which had rehome opportunities (3%) were observed e.g. clothing, a skateboard, stationery, homewares, and personal items.
- A banned polystyrene container was observed; however, this is likely to have come from off-site.
- High volumes of tissues and paper towels were observed.
- Quarter-full toilet rolls and high volumes of unused tampons were present (the latter is consistent with the 2022 audit data).
- Branded Boba cups (#5 plastic) were observed which were deemed unsuitable for recycling due to food residue and mixed materials packaging (soft plastic film lid and straws).

**Landfill Waste Audit Images:**

| | | |
|---|---|---|
|  |  |  |
| Landfill waste set aside to audit | Food scraps | Cardboard |
|  |  |  |
| Plastic bottles | Cans | Plastics |

| | | |
|---|---|---|
|  |  |  |
| Paper | Glass | Soft plastics |
|  |  |  |
| | | |
|  |  |  |
| Coffee cups | Tins | Reusable |
|  |  |  |
| Polystyrene container (banned) | Paper towels | Quarter-full toilet rolls |

| | | |
|---|---|---|
|  |  |  |
| Boba branded cups (#5) | Landfill pre-sort (assumed from residence) | Landfill post-sort |

# ADDITIONAL FINDINGS

## Landfill Time-and-Motion Findings

**Landfill Time-and-Motion Purpose:**
As well as providing insights into target 1, the Landfill waste audit also served as an opportunity to conduct a time-and-motion trial. The purpose of the time-and-motion trail was to gain insights into benefits of sorting Landfill waste from the UC City Campus in the future.

**Landfill Time-and-Motion Process:**
Following are details regarding the Landfill time-and-motion trial:

- The time-and-motion process was completed as part of the ***Landfill Waste Audit Process*** section. Additional process information includes:
    - The Landfill time-and-motion trial took place over a fixed period of three hours.
    - Sustainably representatives rotated the sorting duties each hour with two sorters and one observer.

**Landfill Time-and-Motion Key Insights:**

- The time-and-motion was inconclusive to support waste sorting, mostly due to a poor waste sample (low recoverable material volumes).
- The waste sample included residential, child-care and medical waste much of which was unable to be sorted.
- A targeted time-and-motion (Tenant/Catering Waste) would be recommended to ensure greater waste value.

**Landfill Time-and-Motion Data:**
Below is an hourly breakdown of the Landfill time-and-motion data including bag quantity and weight sorted, and bag value insights:

| Hours | Bag Qty. | Weight (kg) |
|---|---|---|
| 1 | 11 | 71.8 |
| 2 | 13 | 59.3 |
| 3 | 11 | 50.2 |
| **Total** | **35** | **181.3** |
| **Average** | **11.7** | **60.4** |

| Bag Values | Weight (kg) |
|---|---|
| **Mean** | 5.2 |
| **Median** | 4.7 |
| **Mode** | 2 |
| **Min** | 0.6 |
| **Max** | 11.1 |

**Landfill Time-and-Motion Observations:**

- Low recoverable value materials/items (no existing diversion pathways) were in high volumes e.g. coffee cups, soft plastics, compostable packaging.
- High recoverable value materials/items (existing diversion pathways in place) were in low volumes e.g. food scraps, cardboard, cans, plastics #1, #2 #5.
- Residential household waste was present, as was child-care, and medical-specific waste, all of which have low recoverability.
- 6 bags (25kg / 14%) were rejected due to health risk – used medical treatment items, nappies from childcare facility, and large amount of partially decomposing food matter.

- Considerable volumes of 'situational' material/items were present e.g. art/design classroom clean-out waste (old rags, mixed-media materials etc.), and general election collateral.
- Divertible materials/items were heavily contaminated with food residue and, therefore, unrecoverable e.g. soft plastics, hard plastics, and other food packaging (Uber eats).
- Additional time-and-motion assessments would be required to provide clarity on whether waste sorting of the UC City Campus Landfill waste stream is viable. Such audits may include the exclusion of household, child-care, and medical waste and instead a focus on tenant /foodservice waste where more recoverability is likely. Require confirmation on fibre/compostable allowances and any further changes to acceptance as part of the National Kerbside Standardisation (Feb 24).[3]

**Recovered Material Value Volume vs Weight Images**

The following materials have higher recoverable value, but were in low volumes:


The following materials were in high volumes but have low recoverable value (no current diversion pathways):


**Further Landfill Time-and-Motion Images:**

| | | |
|---|---|---|
|  |  |  |
| Sustainably representatives conducting time-and-motion trial | Sustainably representatives conducting time-and-motion trial | Sustainably representatives conducting time-and-motion trial |

[3] MInistry for Environment, Standard Materials for Kerbside

## Plastic Bottle Disposal Findings

**Plastic Bottle Disposal Purpose:**
Both the Comingled Recycling and Landfill waste audits provided data to provide progress of target 5 of the ***UC* Waste Plan 2022-2030:**

***Target 5 –*** *Single-use plastic bottle disposal drops by 20% by 2025 and 50% by 2030*

The data collected will be used to quantify the number of plastic bottles being disposed of at the UC City Campus.

**Plastic Bottle Disposal Process:**
Data relevant to Single-Use Beverages (SUBs) was collected during the Comingled Recycling and Landfill waste audits to better understand disposal of Plastic Bottles. The additional Single-Use beverages included Cans and Glass bottles.

**Plastic Bottle Disposal Key Insights:**

Findings support considerations for Plastic Bottle restrictions on campus as follows:

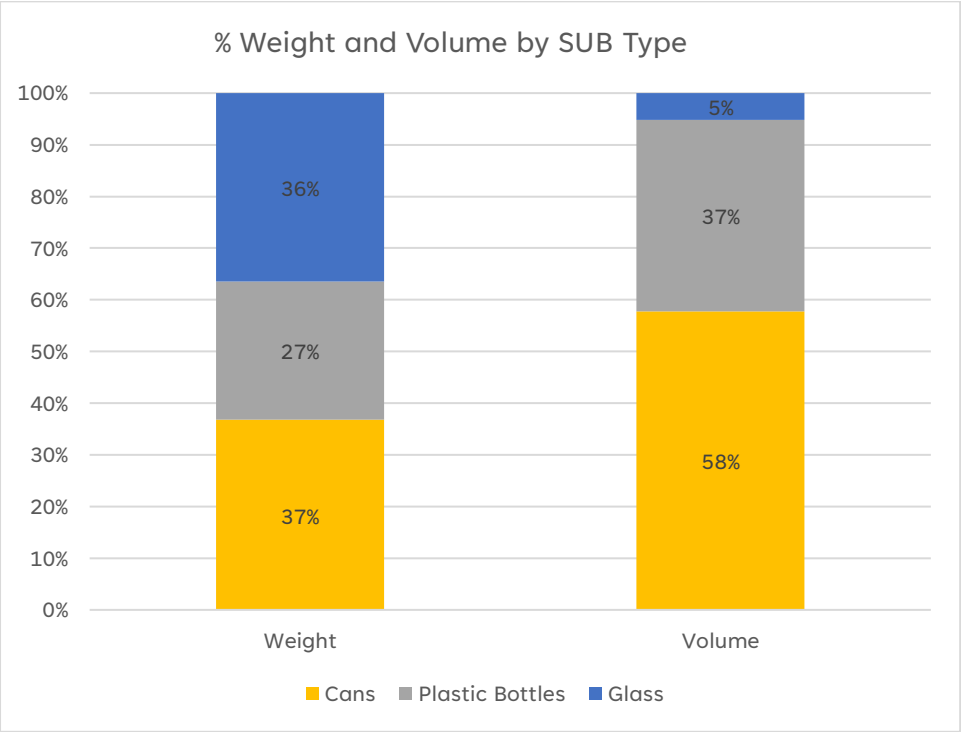
- Plastic Bottles continue to be lower in volume to Cans, indicating a consumer preference for Cans on the Campus.
- A greater proportion of Plastic Bottles were disposed of incorrectly (lids on / contents present) in Comingled Recycling indicating they present a higher contamination risk.
- More Plastic Bottles were disposed of as General Waste/Landfill than Cans and Glass.
- Most Plastic Bottle products have a same or similar Can-based alternative.

**Plastic Bottle Disposal Data:**
Below is a table indicating the Single-Use Beverages weights and approximate volume[4]:

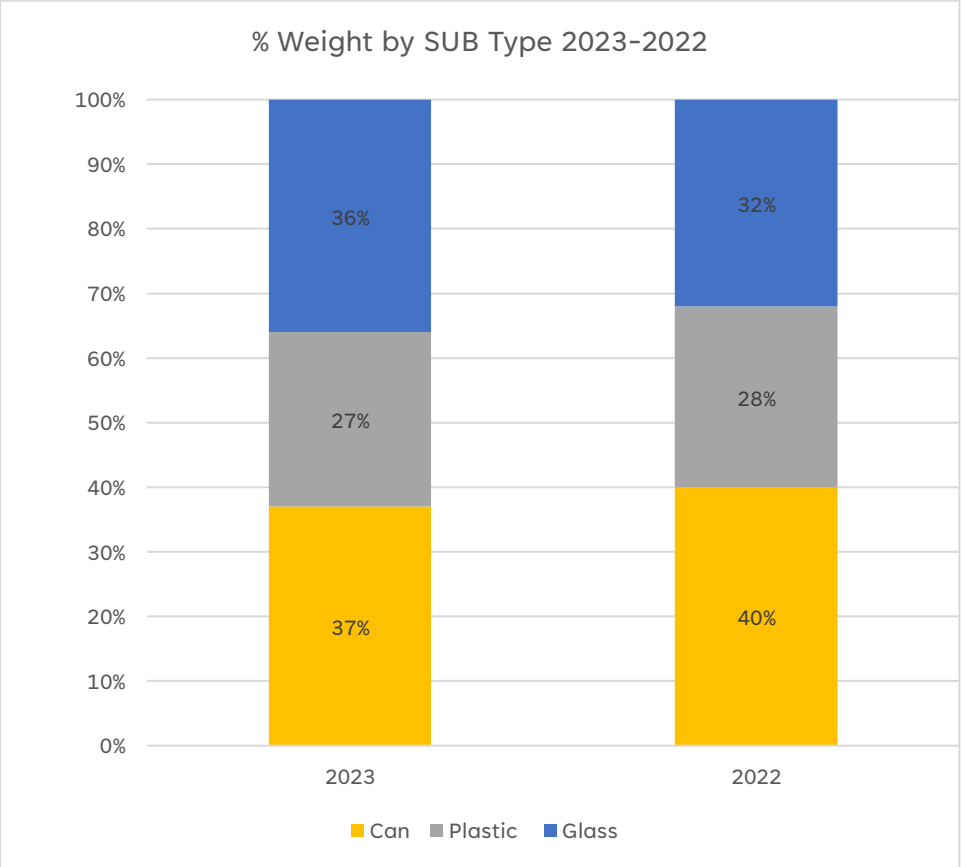
| | Weight Comingled Recycling | Weight Landfill | Total Weight | Total Volume |
|---|---|---|---|---|
| Plastic Bottles | 11.3 | 4.5 | 15.8 | 540L |
| Cans | 18.8 | 2.9 | 21.7 | 840L |
| Glass Bottles | 18.7 | 2.8 | 21.5 | 75L |

The above table shows that that Plastic Bottles are lower in disposal numbers (weight and volume) than cans, and lower in volume than glass.
As glass is a heavier material, it over-indexes in weight vs volume, therefore volume is a more accurate measure for comparing disposal behaviours for Single-Use Beverages. The following graph depicts the weigh and volume % by Single-Use Beverage type.

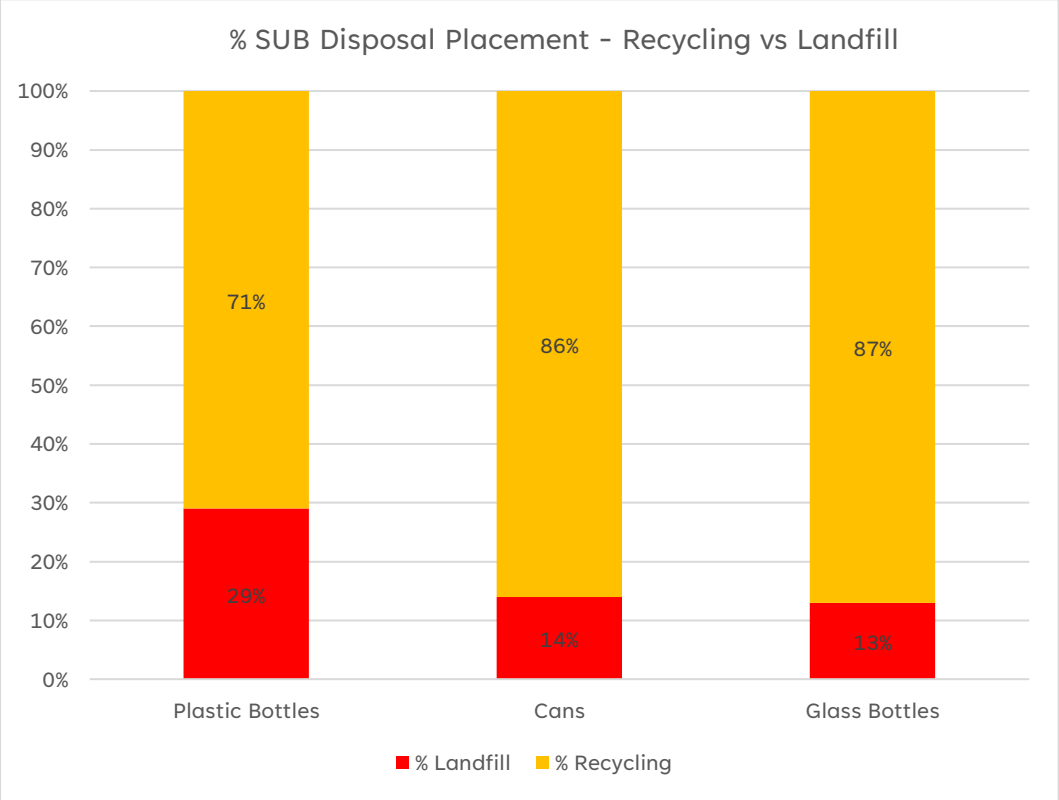
[4] Volumes are visual calculation based on volume within bin. For Plastic Bottles and Cans, 240L wheelie-bins were used, for Glass, a 54 litre bin was used.




In the 2022 Waste Audit volumes by each Single-Use Beverage type was not measured (valuable anecdotal feedback was provided on count of wheelie-bins), therefore a comparison cannot be made. The weights were measured, and the following graph illustrates the similarity in the weight findings with the 2022 Waste Audit:



The findings also identified that Landfill disposal of Plastic bottles was higher than that of Cans and Glass Bottles. The following table illustrates the percentage of Single-Use Beverage disposal into Comingled Recycling vs Landfill.




**Plastic Bottle Observations:**

- SUB's represented 47% of the weight of Comingled Recycling 6% of Landfill Waste sorted, and 21% of combined Comingled Recycling and Landfill Waste.
- Plastic Bottle volume was 2.25 wheelie-bins (540L) vs 3.5 wheelie bins (840L) for Cans.
- A reasonable number of Plastic Bottles within Comingled recycling contained lids and beverage contents which are contamination risks.
- Most Plastic Bottle products were functional (e.g., PowerAde, V), carbonated (e.g., Coca-Cola) or a milk/juice-based product (e.g, Just Juice, Barista Bros). Most of these products have a can-alternative option. The only exception is non-carbonated Juice and Powerade.
- Less than 20% were single-use water bottles.

# CONCLUSION

The UC Waste Audit 2023 has identified that there are opportunities for greater waste reduction on the Campus through improved diversion and reduced contamination. 44% of the Landfill waste sample was recoverable, and 20% of the Comingled Recycling was contaminated, indicating that correct pathways are not being utilised.

The UC Waste Audit 2023 only reviewed waste materials, therefore a full system assessment is recommended to better understand challenges and opportunities to further reduce and divert waste from landfill.

A full system assessment will consider all aspects of the UC waste system, including:

- Physical Environment
- Infrastructure
- User practices
- Waste Collection data

A full system assessment will identify deliverable opportunities in line with the Ministry for Environment Waste Reduction Programme Circular Waste Hierarchy and the ***UC Waste Plan 2022-2030***. A scope to provide this service has been presented.