



REPORT PRODUCED FOR:
Queanbeyan-Palerang Regional Council

Household Kerbside Bin System Audit 2023



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Report: November 2023

(v1312-23)

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Executive summary

Queanbeyan-Palerang Regional Council (QPRC) engaged EC Sustainable Pty Ltd (EC Sustainable) to conduct a bin composition audit of the kerbside residential bins, including all bin systems: residual waste, recycling and organics. The audit was conducted in spring 2023 during September. This audit follows the expansion of the Food Organics and Garden Organics (FOGO) service to all urban 3-bin areas in December 2022. EC Sustainable has completed previous audits in 2015 and 2018.

Council has a variety of waste collection services implemented by contractors and Council:

- **Area A – Urban Single Unit Dwellings (SUDs):** 3-bin system for residual waste, recycling and organics (FOGO).
- **Area B – Urban Multi Unit Dwellings (MUDs):** 3-bin system for residual waste, recycling and optional organics (GO)¹.
- **Area C – Rural SUDs:** 2-bin system for residual waste and recycling (audited) and some 1-bin systems for recycling only (not audited).
- **Area D – Rural SUDs:** 1-bin system for recycling only (audited) and some 2-bin system for residual waste and recycling (not audited).

Council conducted this audit to update its characterisation of bin streams, plan for future services and provide additional data for ‘eligible containers’ in the Container Deposit Scheme (CDS). This is the second audit since the introduction of the ‘Return and Earn’ program, which commenced on 1 December 2017. This is also the second audit since the amalgamation of the City of Queanbeyan Council and Palerang Council in 2016.

This audit was generally designed to conform to the NSW residential waste auditing guidelines known as the “NSW EPA (previous OEH) Guidelines” or the “*Guidelines for Conducting Household Kerbside Residual Waste, Recycling and Garden Organics Audits in NSW Local Government Areas*” (NSW EPA, 2008) and “*Addendum 2010*” (NSW EPA, 2010).

¹ MUDs with shared bins have an optional GO service, however, the contents are sent to the same processing facility as the FOGO bins and therefore the acceptance criteria are the same as the FOGO service.

This audit involved:

- A target sample size of 400 households, with 384 households for the waste stream, 415 households for the recycling stream and 318 households for the organics stream audited.
- Matched waste and recycling bins, whereby the pair of waste and recycling bins were targeted from the same household that presented both streams. Organics bins were targeted at the same households in the other week of the fortnight collection cycle, where a bin service was available.
- A visual inspection survey of the bins and bin contents at the kerbside prior to collection.
- Individual household bag collection and sorting of the bin contents inspected.
- A total of 99 material sorting categories, including the NSW Guidelines plus CDS and some additional sorting categories to assist with contamination, resource recovery and diversion rates reporting.
- Detailed data analysis as provided in this report. Data was reported by service type and as an overall Council-wide weighted average.

The objective of this audit was to provide the data indicators, as shown in the following Table. A comparison with the previous audit results is provided in Appendix 4.

Key data indicators – 2023

| Data indicator | | Unit of measurement | Area A | Area B | Area C | Area D | Overall > |
|---------------------------------|--------------------------|-------------------------|--------------|-------------|--------------|-------------|--------------|
| Presentation rate | Percentage (%) | Waste stream | 79.3 | 95.0 | 79.2 | - | 80.0 |
| | | Recycling stream | 76.7 | 85.0 | 77.6 | 72.1 | 76.7 |
| | | Organics stream | 70.3 | - # | - | - | 70.3 |
| Generation rate | By weight (kg/hh/wk) | Waste stream | 9.50 | 5.57 | 9.03 | - | 8.90 |
| | | Recycling stream | 3.24 | 1.60 | 3.52 | 3.97 | 3.05 |
| | | Organics stream | 8.73 | 0.07 | - | - | 7.43 |
| | | All streams | 21.47 | 7.24 | 12.55 | 3.97 | 19.38 |
| | By volume (bin % full) | Waste stream | 66.3 | 63.1 | 67.9 | - | 65.8 |
| | | Recycling stream | 73.5 | 54.5 | 61.6 | 76.8 | 70.1 |
| | | Organics stream | 61.5 | 10.0 | - | - | 53.8 |
| Resources in the waste stream ^ | By weight (kg/hh/wk) | Compliant recyclables * | 1.17 | 0.90 | 1.07 | - | 1.13 |
| | | Garden organics < | 0.20 | 0.15 | 0.42 | - | 0.20 |
| | | Food < | 2.82 | 1.79 | 2.46 | - | 2.65 |
| | | Other organics | 1.07 | 0.34 | 1.15 | - | 0.97 |
| | Percentage (% by weight) | Compliant recyclables * | 12.4 | 16.2 | 11.8 | - | 12.7 |
| | | Garden organics < | 2.1 | 2.8 | 4.6 | - | 2.3 |
| | | Food < | 29.7 | 32.2 | 27.2 | - | 29.8 |
| | | Other organics | 11.2 | 6.2 | 12.7 | - | 10.9 |
| Contamination | Weight (kg/hh/wk) | Recycling stream | 0.34 | 0.34 | 0.71 | 0.46 | 0.37 |
| | | Organics stream | 0.20 | 0.00 | - | - | 0.17 |
| | Rate (% by weight) | Recycling stream | 10.4 | 21.3 | 20.1 | 11.6 | 12.0 |
| | | Organics stream | 2.3 | 0.0 | - | - | 2.3 |
| Resource recovery ^ | Rate (% by weight) | Recycling stream | 71.2 | 58.2 | 72.5 | 100.0 | 70.3 |
| | | Organics stream | 73.7 | 3.1 | - | - | 71.6 |
| Diversion | Rate (% by weight) | Current | 53.3 | 18.3 | 22.4 | 88.4 | 51.3 |
| | | Potential ^^ | 72.8 | 57.7 | 53.8 | - | 71.8 |
| Eligible CDS containers | Weight (kg/hh/wk) | Recycling stream | 0.23 | 0.02 | 0.39 | 0.69 | 0.22 |
| | | All streams | 0.31 | 0.09 | 0.54 | 0.69 | 0.30 |
| | | Recycling stream | 4.0 | 0.5 | 5.4 | 6.3 | 3.7 |
| | | All streams | 6.1 | 1.7 | 7.3 | 6.3 | 5.6 |

> Result based on households with a bin service. This result does not allow for households without a service.

* Material which should be placed into recycling bins for recovery. Refer to Table 3 for detailed material types.

< Material which should be placed into organics bins for recovery. Refer to Table 3 for detailed material types.

Only one MUD presented an organics bin so the presentation rate could not be calculated.

^ At the kerbside for kerbside performance data based on accepted material in each service type.

^^ Potential diversion rates, if the material is recovered from the residual waste stream.

The overall results show that:

- **Generation and contamination:**

- Waste stream – 8.90kg/hh/wk, with 12.7% accepted recyclables (1.13kg), 2.3% accepted garden organics (0.20kg) and 29.8% accepted food waste (2.65kg/hh/wk).
- Recycling stream – 3.05kg/hh/wk, with 12.0% contamination (0.37kg/hh/wk).
- Organics stream – 7.43kg/hh/wk, with 2.3% contamination (0.17kg/hh/wk).

- **Resource recovery rate and diversion rate ²:**

- The resource recovery rate for recyclables was high at 70.3%.
- The resource recovery rate for accepted compostable organics high at was 71.6%.
- The diversion rate was 51.3%.
- The potential diversion rate, with current bin system, if all unrecovered recyclable material and compliant organics in the waste stream was recovered, was 71.8%.

- **CDS eligible containers:**

- A total of 5.6 eligible CDS containers/hh/wk in all bin streams, weighing 0.30kg/hh/wk. Approximately 72.3% by weight and 65.9% by count of these items were in recycling stream.
- A value of approximately \$0.67 million of eligible CDS containers per year in all bin streams, with approximately 65.9% of this value, \$0.45 million, in the recycling stream.

The results by area type show that Area D had higher diversion rate but this was due to the bin system (1-bin service, recycling only). Area A had the second highest diversion rate at 53.3% which was likely due to a variety of reasons, including the 3-bin system and the lower recycling and organics bins contamination rates.

² These results are based on households with a bin service. When allowing for households without a bin service (i.e. no organics bins in Areas B, C, D, and households without a residual waste service in Areas C and D) the recycling resource recovery remains stable at 70.9%, the organics resource recovery rate decreases to 66.8% and the diversion rate decreases slightly to 50.4%. As the 2-bin service in Area D was not audited as part of the scope of this project, the council-wide result was calculated based on the assumption that Area D had the same average residual waste generation as Area C. As the number of MUDs with an optional organics service was unknown, it was assumed that no households in Area B (MUDs) had organics bins.

The following recommendations are made. Council could consider to:

Waste reduction and diversion.

1. Commend residents and stakeholders for achieving reasonable diversion rate and high resource recovery rates, as well as low recycling and organics stream contamination rates.
2. Consider further initiatives to increase diversion. This could include:
 - Recovering more recyclables, particularly items which were heavier ³ or had lower resource recovery rates ⁴.
 - Recovering more organics like food, where an organics bin is available.
3. Consider further initiatives to avoid resource loss into the waste stream, particularly recyclables, food and garden organics.
4. Continue to educate residents and encourage the correct recovery of food in the organics stream (where available) rather than the waste stream; food in Area A and Area B, which have a FOGO service, comprised 29.7% (22.82kg/hh/wk) and 32.2% (1.79kg/hh/wk) of the waste stream respectively. This provides Council with an opportunity to recover more organics.
5. Continue to promote the Community Recycling Centre (CRC) and recycling programs for recovery of textiles, C&D, e-waste and plastic bags / films.

Contamination in recycling and organics bins

6. Education should focus on the main contaminants:
 - Recycling: non-recyclable plastics, non-recyclable glass and non-recyclable paper.
 - Organics: other putrescible, oversized garden vegetation, ceramics / dust / dirt / rock / inert / ash and compostable packaging.
7. Conduct a community consultation survey to determine the reasons for contamination, such as resident understanding of recyclables types and if they had sufficient recycling bin capacities, particularly for residents in Area B and Area C who presented recycling bins with higher levels of contamination.
8. Conduct bin inspections and bin stickering programs to identify contamination hotspots and provide feedback to the community.

³ Items such as glass bottles and paper/cardboard items, even though they had the higher resource recovery rates.

⁴ Items such as liquid paperboard, plastics containers (except PET and HDPE) and metal.

CDS containers recovery

9. Commend residents for the high recovery of CDS eligible containers in the recycling stream and use of Return and Earn drop-off locations.
10. Consider further initiatives to recover the remaining CDS containers into the recycling stream from the waste stream targeting aluminium, PET and glass.

Waste strategy and processing

11. Consider the potential initiatives to improve at source separation and post-collection recovery. Without making a conclusion in this study, this data assists Council to consider the optimum system which should be considered in a model alongside the impacts on collection, processing and disposal.

Conduct further auditing

Council could consider developing an audit program to get a comprehensive look at the yearly generation and capture seasonal data. The minimum standard for kerbside audits based on recommendations by NSW EPA (2015) are for audits to be conducted:

- a. Within eight (8) months of a service commencement date.
- b. At a representative time of year, excluding public holidays, school holidays or special events. In general, autumn is usually a representative time of year when the quantity of garden organics typically matches the annual average.
- c. Every two (2) years at approximately the same time of year as previous audits.

Periodic audits will allow Council to track performance (i.e. resource recovery, contamination levels etc.), reassess priorities and set priorities for action. Additional audits could be conducted to capture seasonal data, assess the effectiveness of trials or new services, and monitor contractual agreements. Since bin compositions and quantities can vary based on the season, weather and events, it is beneficial to capture this data to make informed decisions on waste strategies, processing and minimisation.

When developing a financial model for an audit program, Council should establish audit objectives and determine the level of detail and accuracy required to achieve the desired results. This ensures cost and accuracy alignment with budget and informational needs:

- Load method sampling is less resource intensive than individual bag collection.
- Review sample size and the degree of accuracy for result.
- The number of sorting categories could be decreased or increased according to the requirements of an audit. Less categories will reduce costs.
- Focus on relevant bin streams, such as omitting the need to audit other streams if the purpose of the audit is to assess contamination levels in the recycling stream.
- Consider the cost benefits of a long-term audit contract.

1 Introduction

1.1 Background

Queanbeyan-Palerang Regional Council (QPRC) engaged EC Sustainable Pty Ltd (EC Sustainable) to conduct a bin composition audit of the kerbside residential bins, including all bin systems: residual waste, recycling and organics. The audit was conducted in spring 2023 during September. EC Sustainable has completed previous audits in 2015 and 2018.

This is the second audit since the amalgamation of the Queanbeyan City Council and Palerang Council in 2016. Prior to this, each former council had a similar bin service, with urban (3-bin system) and rural (2-bin system) services. Former Palerang rural areas also had an additional 1-bin (recycling only) system. Prior to the amalgamation, Palerang residents were also provided with a FOGO service, whereas Queanbeyan residents were provided with a GO service. In December 2022, the FOGO service was expanded to all urban 3-bin areas.

Council has a variety of waste collection services implemented by contractors and Council:

- **Area A – Urban Single Unit Dwellings (SUDs):** 3-bin system for residual waste, recycling and organics (FOGO).
- **Area B – Urban Multi Unit Dwellings (MUDs):** 3-bin system for residual waste, recycling and optional organics (GO)⁵.
- **Area C – Rural SUDs:** 2-bin system for residual waste and recycling (audited) and some 1-bin systems for recycling only (not audited).
- **Area D – Rural SUDs:** 1-bin system for recycling only (audited) and some 2-bin system for residual waste and recycling (not audited).

Council conducted this audit to update its characterisation of bin streams, plan for future services and provide additional data for 'eligible containers' in the Container Deposit Scheme (CDS). This is the second audit since the introduction of the 'Return and Earn' program, which commenced on 1 December 2017.

⁵ MUDs with shared bins have an optional GO service, however, the contents are sent to the same processing facility as the FOGO bins and therefore the acceptance criteria are the same as the FOGO service.

1.2 Objectives

The objectives of this report are to provide the following data indicators:

- Generation rates, based on weight (kg/hh/wk) and volume (L/hh/wk and bin % full)
- Resources in the waste stream
- Contamination rates and types in the recycling and organics streams
- Kerbside resource recovery rates
- Kerbside diversion rates
- CDS eligible containers in all streams

The data indicators assist Council to identify the current performance of the bin system at the kerbside, measure trends to plan for future services including reductions in waste to landfill and consider waste minimisation options.

1.3 Council information

Queanbeyan-Palerang Regional Council (QPRC) is a Local Government Authority (LGA) located in the Southern Tablelands region of New South Wales (NSW). QPRC was formed on 12 May 2016 following the merger of Queanbeyan City Council and Palerang Council. Council has a population of 63,304 people (ABS, 2021) and provides waste services to a total of 23,391 households. Out of these households, 77.8% (18,204) were urban SUDs, 13.7% (3,199) were urban MUDs and 8.5% (1,988) were rural SUDs (Council, 2023).

The threshold for the inclusion of MUDs in the NSW EPA Guideline audits is when 10% or more of dwellings are MUDs. This threshold was exceeded by the demographics of the area. Therefore it was agreed that MUDs were to be included in the sampling.

Tables 1 and 2 show the bin services provided by Council.

Table 1 - Bin services provided by Council

| Area | Waste | Recycling | Organics |
|--|---------------|---------------|---------------|
| Collection frequency | | | |
| Area A | Weekly | Fortnightly | Fortnightly |
| Area B | Weekly | Weekly | Fortnightly |
| Area C * | Fortnightly | Fortnightly | No service |
| Area D ^ | No service | Fortnightly | No service |
| Bin size | | | |
| Area A | 140L / 240L | 240L | 240L |
| Area B | 240L | 240L | 240L |
| Area C * | 240L | 240L | - |
| Area D ^ | - | 240L | - |
| Number of services provided by Council < | | | |
| Area A | 18,204 | 18,204 | 18,204 |
| Area B | 3,199 | 3,199 | 3,199 |
| Area C * | 1,268 | 1,724 | - |
| Area D ^ | 62 | 264 | - |
| Total | 22,733 | 23,391 | 21,403 |
| Proportion of services provided by Council < | | | |
| Area A | 0.80 | 0.78 | 0.85 |
| Area B | 0.14 | 0.14 | 0.15 |
| Area C * | 0.06 | 0.07 | - |
| Area D ^ | 0.00 | 0.01 | - |
| Total | 1.00 | 1.00 | 1.00 |

< Number of services (and percentage), as provided by Council, were used to calculate the weighting of the Council-wide average. | * Area C also includes 456 rural SUD households with a 1-bin recycling service only. | ^ Area D includes 62 rural SUD households with a 2-bin recycling service (waste and recycling). The waste bin in Area D was not sampled in this audit.

Table 2 - Waste services in Council area

| Area | Suburbs | Properties serviced | Residual waste | Commingled recyclables | FOGO |
|------|--|---------------------|----------------|------------------------|-----------------------|
| A | Queanbeyan (urban) SUD, Jerrabomberra (urban) SUD, Googong (urban) SUD | 15,868 | Yes | Yes | Yes |
| | Bungendore (urban) SUD | 1,444 | Yes | Yes | Yes |
| | Braidwood (urban) SUD | 658 | Yes | Yes | Yes |
| | Captains Flat (urban) SUD | 234 | Yes | Yes | Yes |
| B | Queanbeyan / Googong (urban) MUD | 3,199 | Yes | Yes | No service (optional) |
| C | Araluen / Majors Creek (rural) | 206 | Yes | Yes | No service |
| | Burra / Urila / Royalla / Williamsdale / Googong (rural) | 1,062 | Yes | Yes | No service |
| | Carwoola (former Palerang) (rural) | 456 | No service | Yes | No service |
| D | Carwoola (former Queanbeyan) (rural) | 62 | Yes | Yes | No service |
| | Primrose Valley (rural) | 43 | No service | Yes | No service |
| | Sutton Acres (rural) | 159 | No service | Yes | No service |

1.4 Document structure

This report provides:

- Section 2 – Methods used to obtain the data
- Section 3 – Assumptions and limitations
- Section 4 – The results of the audit
- Section 5 – Comments and recommendations
- Section 6 – Audit photos

Appendices provide additional information:

- Appendix 1 – CDS eligibility
- Appendix 2 – CDS eligible containers data
- Appendix 3 – Additional material sub-sort
- Appendix 4 – Comparison with previous audits
- Appendix 5 – Raw data in a separate Excel file.

2 Project methods

This section provides the project methods for the kerbside residential bin audit.

2.1 Guidelines

This audit was designed to conform to the NSW residential waste auditing guidelines known as the “NSW EPA Guidelines” or the “*Guidelines for Conducting Household Kerbside Residual Waste, Recycling and Garden Organics Audits in NSW Local Government Areas*” (NSW, 2008) and “*Addendum 2010*” (NSW EPA, 2010). However, some changes were agreed such as more detailed sorting categories to allow for more detail related to CDS eligibility, including weights and counts, and FOGO services.

2.2 Sampling

A sample size of 400 households was audited. This meets the requirement of a minimum target of 220 households in the NSW EPA Guideline Addendum 2010 (NSW EPA, 2010).

Table 3 provides the sample size in streets and households for each stream. Samples were developed using clustered random sampling of streets within the agreed service areas.

Where a selected household did not present a bin, as identified in the pre-collection bin survey, the next appropriate household in the street was selected. If there were no suitable households available in the street, additional households were selected from a street on the reserve list.

2.3 Audit

2.3.1 Timing

The audit collection was conducted over four weeks from Monday 4 September to Friday 29 September 2023. The four weeks incorporated the waste, recycling and organics bins within Areas A, B, C and D.

Table 3 - Sample frame

| Audit week | Collection day | Collection date | Waste * | | | Recycling * | | | Organics * | | |
|--------------|----------------|-----------------|------------------------------------|----------------|-------------------|------------------------------------|----------------|-------------------|------------------------------------|----------------|-------------------|
| | | | Suburb(s) | No. of streets | No. of households | Suburb(s) | No. of streets | No. of households | Suburb(s) | No. of streets | No. of households |
| Week 1 | Mon | 04/09/23 | - | - | - | Queanbeyan | 1 | 12 | Queanbeyan, Karabar | 3 | 25 |
| | Tues | 05/09/23 | Queanbeyan | 1 | 12 | - | - | - | Karabar | 3 | 25 |
| | Wed | 06/09/23 | Googong | 3 | 25 | Googong | 3 | 25 | - | - | - |
| | Thurs | 07/09/23 | - | - | - | Queanbeyan | 2 | 28 | - | - | - |
| | Fri | 08/09/23 | Queanbeyan, Majors Creek | 5 | 29 | Queanbeyan, Karabar | 3 | 25 | - | - | - |
| Week 2 | Mon | 11/09/23 | Queanbeyan, Karabar | 3 | 25 | Karabar | 3 | 25 | - | - | - |
| | Tues | 12/09/23 | Karabar | 3 | 25 | - | - | - | - | - | - |
| | Wed | 13/09/23 | - | - | - | - | - | - | - | - | - |
| | Thurs | 14/09/23 | - | - | - | - | - | - | Queanbeyan | 1 | 12 |
| | Fri | 15/09/23 | Queanbeyan | 1 | 12 | Majors Creek, Sutton | 9 | 44 | - | - | - |
| Week 3 | Mon | 18/09/23 | Queanbeyan, Karabar, Jerrabomberra | 6 | 50 | Queanbeyan, Karabar, Jerrabomberra | 6 | 50 | - | - | - |
| | Tues | 19/09/23 | Tralee, Jerrabomberra | 3 | 25 | Tralee, Jerrabomberra | 3 | 25 | Queanbeyan West, Queanbeyan | 3 | 25 |
| | Wed | 20/09/23 | Queanbeyan West, Crestwood | 3 | 25 | Queanbeyan West, Crestwood | 3 | 25 | Bungendore | 4 | 31 |
| | Thurs | 21/09/23 | Queanbeyan, Crestwood | 3 | 25 | Queanbeyan, Crestwood | 3 | 25 | Jerrabomberra | 3 | 25 |
| | Fri | 22/09/23 | Googong | 3 | 25 | Googong | 3 | 25 | Greenleigh, Queanbeyan East | 3 | 25 |
| Week 4 | Mon | 25/09/23 | - | - | - | - | - | - | Queanbeyan, Karabar, Jerrabomberra | 6 | 50 |
| | Tues | 26/09/23 | Queanbeyan West, Queanbeyan | 3 | 25 | Queanbeyan West, Queanbeyan | 3 | 25 | Tralee, Jerrabomberra | 3 | 25 |
| | Wed | 27/09/23 | Bungendore | 4 | 31 | Bungendore | 4 | 31 | Queanbeyan West, Crestwood | 3 | 25 |
| | Thurs | 28/09/23 | Jerrabomberra | 3 | 25 | Jerrabomberra | 3 | 25 | Queanbeyan, Crestwood | 3 | 25 |
| | Fri | 29/09/23 | Greenleigh, Queanbeyan East | 3 | 25 | Greenleigh, Queanbeyan East | 3 | 25 | Googong | 3 | 25 |
| Total | | | - | 47 | 384 | - | 52 | 415 | - | 38 | 318 |

* For waste and recycling bins matched pairs were targeted where both services were provided. Organics bins were targeted at the same households in the other week of the fortnight collection cycle.

Table 3 (cont.) - Sample frame

| Number of households | | | | | |
|----------------------|--------|--------|--------|--------|---------|
| Stream | Area A | Area B | Area C | Area D | Overall |
| Waste | 306 | 40 | 38 | - | 384 |
| Recycling | 306 | 40 | 38 | 31 | 415 |
| Organics | 306 | 12 | - | - | 318 |

2.3.2 Pre-collection bin survey

A pre-collection bin survey, or inspection, of selected households was completed just prior to the collection of the bin contents. The bin survey of each selected household included:

- Presentation rate
- Number of bins presented, or the number stored within the bin rooms
- Bin size for each bin
- Bin capacity used (i.e. bin percentage full)

2.3.3 Collection

Collection was conducted using an individual bag collection system to collect the contents of each bin separately. This allowed individual results to be collected for each household where they had individual bins.

The bin contents were collected from bins presented to the kerbside on the household's usual collection day. Collections were conducted 1-2 hours prior to Council's regular collection contractor servicing bins to minimise the impact on Council's regular collection systems and maximise the potential to collect the targeted samples prior to the regular Council collection truck.

The materials were delivered to the sorting site for sorting.

2.3.4 Sorting

The materials were sorted and classified for analysis using the categories shown in Table 4.

A safe undercover sorting site was provided by Council at Bungendore Waste Transfer Station on Tarago Road, Bungendore. The sorted waste and recycling was disposed or recycled at the sorting site.

Table 4 - Material categories and recoverability

| Material category | | Acceptable in recycling bins | Acceptable in organics bins |
|----------------------------|---|------------------------------|-----------------------------|
| Paper and Cardboard | Newspaper | ■ | - |
| | Magazines / brochures | ■ | - |
| | Miscellaneous packaging | ■ | - |
| | Corrugated cardboard | ■ | - |
| | Cardboard / packaging board | ■ | - |
| | Liquid paperboard containers | ■ | - |
| | Disposable paper product – coffee cups * | - | - |
| | Disposable paper product – general * | ■ | - |
| | Print / writing / office paper | ■ | - |
| | Composite (mainly paper) | - | - |
| | AHW / nappies | - | - |
| | Contaminated soiled paper | - | - |
| | | | |
| Organics | Food / kitchen (loose) ^ | - | ■ |
| | Garden / vegetation + | - | ■ |
| | Other putrescible | - | - |
| | Wood / timber – treated * | - | - |
| | Wood / timber – untreated * | - | - |
| | Textile / rags | - | - |
| | Leather | - | - |
| | Rubber | - | - |
| | Oils | - | - |
| Glass | Glass beverage containers | ■ | - |
| | Glass non beverage containers / other packaging glass | ■ | - |
| | Mixed glass / fines | - | - |
| | Miscellaneous / other glass | - | - |
| Plastics | PET beverage containers | ■ | - |
| | PET packaging (excl. beverage containers) | ■ | - |
| | PET other non-beverage/ non-packaging | - | - |
| | HDPE beverage containers | ■ | - |
| | HDPE packaging (excl. beverage containers) | ■ | - |
| | HDPE other non-beverage / non-packaging | - | - |
| | PVC beverage containers | ■ | - |
| | PVC packaging (excl. beverage containers) | ■ | - |
| | PVC other non-beverage / non-packaging | - | - |
| | LDPE packaging | ■ | - |
| | LDPE non-packaging | - | - |
| | PP packaging | ■ | - |
| | PP non-packaging | - | - |
| | PS packaging | ■ | - |

Table 4 (cont.) – Material categories and recoverability

| Material category | | Acceptable in recycling bins | Acceptable in organics bins |
|-----------------------|---|------------------------------|-----------------------------|
| Plastics | EPS packaging | - | - |
| | PS and EPS non-packaging * | - | - |
| | Other plastics – packaging | ■ | - |
| | Other plastics – other | - | - |
| | Plastic bags * | - | - |
| | Plastic film * | - | - |
| | Composite (mostly plastic) | - | - |
| Ferrous | Steel beverage containers | ■ | - |
| | Steel packaging (excl. beverage containers) | ■ | - |
| | Steel other non-packaging | - | - |
| | Composite (mostly ferrous) | - | - |
| Non-ferrous | Aluminium beverage containers | ■ | - |
| | Aluminium packaging (excl. beverage containers) | ■ | - |
| | Alu. Non-packaging | - | - |
| | Non-ferrous other non-packaging | - | - |
| | Composite (mostly ferrous) | - | - |
| Hazardous | Paint | - | - |
| | Fluorescent tubes | - | - |
| | Dry cell batteries (non-rechargeable) | - | - |
| | Dry cell batteries (rechargeable) | - | - |
| | Vehicle batteries | - | - |
| | Household chemicals | - | - |
| | Asbestos / building materials | - | - |
| | Clinical pathogenic infectious | - | - |
| | Gas bottles | - | - |
| | Hazardous other | - | - |
| Building waste | Building materials and fittings | - | - |
| Earth based | Ceramics, dust, dirt, rock, inert, ash | - | - |
| E-waste | Computer equipment | - | - |
| | TVs | - | - |
| | Mobile phones | - | - |
| | Electrical items and peripherals | - | - |
| | Toner cartridges | - | - |
| Other | Containerised food and liquid * | - | - |
| | Other waste | - | - |

■ Compliant material in the recycling stream. | ■ Compliant material in the organics stream. | * Additional categories audited by EC Sustainable above the requirements of the NSW EPA Guidelines. | The blue text indicates categories sub-sorted to determine beverage containers eligible for the Container Deposit Scheme (CDS). | ^ Food / kitchen was further sorted into veg and plant based, meat, dairy and staples categories. These are provided in the raw data, Appendix x. | + Garden / vegetation was categorised into woody, fleshy and oversized garden organics. Oversized garden organics were deemed contamination in the organics stream. These are provided in the raw data, Appendix x.

2.4 Management systems

2.4.1 Quality control

The following quality control factors were implemented:

- **Material weighing** – Each weight was verified by a second person for accuracy.
- **Scale servicing** – Each scale was serviced prior to the audit and calibrated for accuracy to within 0.5% of an interval for use.
- **Scale calibration** – Scales were externally serviced and calibrated if they did not calibrate based on internal calibrations.
- **Purity audits** – A team leader conducted a purity audit of selected sorted material to ensure quality control standards were met.
- **Data form back-up** – All data forms were created in duplicate in the field using electronic back-up. The original and back-up resided in two separate secure locations until data entry.
- **Monitoring** – A management staff member was assigned the role of monitoring the audit for WHS compliance, sorting accuracy, conducting equipment checks, managing stakeholders and data verification.

2.4.2 Work Health and Safety

A detailed WHS plan was made for the audit including:

- Safe Work Method Statement (SWMSs)
- Hazard Assessment Checks (HACs)
- Site inductions
- Training permits to work
- Personal Protective Equipment (PPE)
- Manual handling aids

2.5 Analysis

This report presents results by Area, and the council-wide overall average results. The weighting factors were determined by number of services as agreed with Council and shown in Table 1.

3 Assumptions and limitations

The following assumptions and limitations of the study are noted:

- The audit was designed to meet at least a Council-wide confidence level of 90% with a maximum interval of +/-10% on the main aggregated categories and data indicators within the Executive Summary. The main aggregated categories include:
 - Organics
 - Paper
 - Plastics
 - Earth based
 - Metals
 - Glass
 - Hazardous
 - Other

This confidence level should also apply to the main data aggregated indicators of resources in the waste bins, diversion, resource recovery, bin percentage used, contamination and presentation. The data for each dwelling type, suburb and area is indicative, but not designed to the same level of confidence.

- Data is reported up to three (3) decimal places for weights and up to two (2) decimal places for percentages. Figures that are average values such as values per household or per bin, may have a decimal place rounding discrepancy due to the number of decimal places used.
- Bin compositions and quantities can vary seasonally and based on time-specific factors such as weather and events. Seasonal and weather impacts are particularly applicable for garden organics, which can be affected by plant growth rates and gardening activity.
- Bin composition for this audit was recorded by weight, meeting the NSW Guidelines. However, some materials are present in small amounts by weight due to their comparative low densities, for example plastic films and Expanded Polystyrene (EPS). However, materials like these can consume large amounts of the bin volume. A weight-based analysis was used for this audit because it is:
 - The NSW Guideline approach.
 - The most accurate method to collect data, particularly with individual household sorting and a large number of sorting categories.

Council could consider collecting volume-based composition data through load audits, where the amount of material per sample is greater.

- Area C in this audit includes a small selection of households with a 1-bin service (recycling only), however, this was not included in the sampling. Similarly, Area D in this audit includes a small number of households with a 2-bin service (waste and recycling) but the waste bin was not sampled for this Area.

4 Results

This section provides the results for this audit. Appendix 4 provides the results comparison of key data indicators for previous audits with this audit.

The reported overall result only considers households that have a bin service, excluding those without. Therefore, it does not account for households without a bin service unless otherwise stated.

4.1 Presentation rate

Table 5 provides the bin presentation rate for each bin stream. The bin presentation rate is the percentage of bins placed out on the kerbside for collection to the total number of bins available at those properties, as defined in the Glossary section. The data shows the presentation rates were:

- **Waste:** overall presentation rate of 80.0%.
 - This was highest for Area B at 95.0%.
 - This was lowest for Area C at 79.2%.
- **Recycling:** overall presentation rate of 76.7%.
 - This was highest for Area B at 85.0%.
 - This was lowest for Area D at 72.1%.
- **Organics:** overall presentation rate of 70.3%.
 - Area C and Area D do not have an organics service.
 - In Area B, only one MUD collection point (out of three) presented an organics bin.

Table 5 - Bin presentation rate

| Presentation rate (%) | | | | | |
|-----------------------|--------|--------|--------|--------|---------|
| Stream | Area A | Area B | Area C | Area D | Overall |
| Waste | 79.3 | 95.0 | 79.2 | - | 80.0 |
| Recycling | 76.7 | 85.0 | 77.6 | 72.1 | 76.7 |
| Organics | 70.3 | - | - | - | 70.3 |

[^] Only one MUD collection point presented an organics bin out of a total three MUD collection points visited.

It is possible that the presentation rate may be increased further between the audit truck sampling and the regular truck completing its collection. Samples were normally collected 1-2 hours before the regular collection trucks or the night before the early morning collection.

4.2 Generation rates

4.2.1 By weight

This section provides the average generation rate per household by weight for the audit period. The results are converted to generation rate per week and provided based on two scenarios:

- The average generation rate when a bin was presented (i.e. per bin collected).
- The average generation rate allowing for non-presentation (i.e. per household Council-wide including zero weights for bins that were not presented). This could also be used to estimate the annual generation rate and to validate the weighbridge data at the waste receiving facilities.

Where a bin is presented

Figure 1 and Table 6 show that an average household generated a total of 19.38kg material per week where bins were presented, consisting:

- **Waste:** 8.90kg/hh/wk – this was highest for Area A at 9.50kg/hh/wk and lowest for Area B at 5.57kg/hh/wk
- **Recycling:** 3.05kg/hh/wk – this was highest for Area D at 3.97kg/hh/wk and lowest for Area B at 1.60kg/hh/wk.
- **Organics:** 6.14kg/hh/wk for Area A.

Allowing non-presentation

The total generation rate was 14.68kg/hh/wk, assuming a mean bin weight of zero for non-presented bins. The extrapolated council-wide annual generation rate was 17,358 tonnes per year:

- **Waste:** 8,417 tonnes.
- **Recycling:** 2,763 tonnes.
- **Organics:** 6,179 tonnes.

Figure 1 - Generation rate – by weight

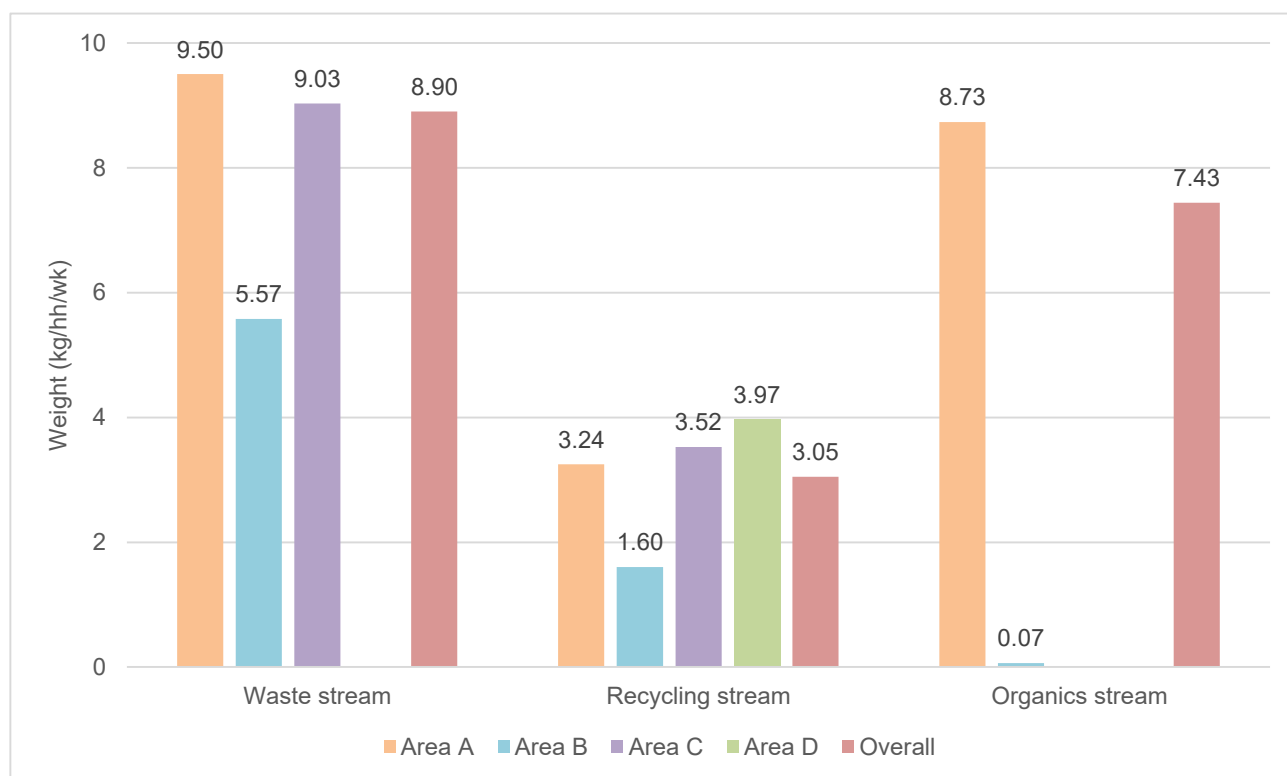


Table 6 - Generation rate – by weight

| Generation rate by weight | | | Area A | Area B | Area C | Area D | Overall |
|--|---------------------------------|--------------|---------------|--------------|---------------|--------------|---------------|
| Average weekly generation per household (kg/hh/wk) | when a bin was presented | Waste | 9.497 | 5.573 | 9.026 | - | 8.900 |
| | | Recycling | 3.244 | 1.597 | 3.520 | 3.967 | 3.047 |
| | | Organics | 8.730 | 0.065 | - | - | 7.435 |
| | | Total | 21.471 | 7.235 | 12.546 | 3.967 | 19.382 |
| | allowing for non-presentation * | Waste | 7.531 | 5.294 | 7.149 | - | 7.120 |
| | | Recycling | 2.488 | 1.357 | 2.732 | 2.860 | 2.337 |
| | | Organics | 6.137 | - | - | - | 5.227 |
| | | Total | 16.156 | 6.652 | 9.880 | 2.860 | 14.684 |
| Extrapolated annual generation council-wide (tonnes/yr) ^ | allowing for non-presentation * | Waste | 7,129 | 881 | 471 | - | 8,417 |
| | | Recycling | 2,355 | 226 | 180 | 9 | 2,763 |
| | | Organics | 5,810 | - | - | - | 6,179 |
| | | Total | 15,294 | 1,107 | 651 | 9 | 17,358 |

* Assumes a mean bin weight of zero for non-presented bins.

^ Based on a the service numbers provided by Council and shown in Table 1.

4.2.2 By volume

This section provides the average generation rate per household by volume for the audit period. The results are based on the bin percentage full survey and reported as: the mean bin percentage full at the time of collection, and the mean litres generated per household per week.

Figure 2 and Table 7 show that an average household generated a total of 241L bin contents per week, when bins were presented, consisting:

- **Waste:** 94L/hh/wk, with the highest for Area A at 99L/hh/wk and the lowest for Area B at 71L/hh/wk.
- **Recycling:** 83L/hh/wk, with the highest for Area D at 92L/hh/wk and the lowest for Area C at 72L/hh/wk.
- **Organics:** 64L/hh/wk, with the highest for Area A at 92L/hh/wk and the lowest for Area B at 1L/hh/wk.

Table 6 also shows the mean bin percentage full at the time of collection:

- **Waste:** 65.8%, with the highest for Area C at 67.9% and the lowest for Area B at 63.1%.
- **Recycling:** 70.1%, with the highest for Area D at 76.8% and the lowest for Area B at 54.5%.
- **Organics:** 53.8%, with the highest for Area C at 61.5% and the lowest for Area B at 10.0%.

Table 8 provides the bin percentage full distribution. The data shows that the percentage of households that used 90+% of their available bin capacity was 31.4% for waste, 38.9% for recycling and 27.0% for organics.

The households, who used more than 90% of their bin capacity, appeared to have insufficient bin capacity based on the current generation.

- The lack of remaining waste bin capacity for some households may lead to overflow of waste into the recycling and organics bins, causing contamination and potentially litter.
- The lack of remaining recycling and organics bin capacity for some households may lead to recoverable material being placed in the waste bins, although this may still be recovered by post-collection recovery if available.

Households that filled their bins to 90%+ may require additional bin capacity, with further study on bin usage. However, it may be that the bins were full because they were not presented for every collection event. To consider whether a lack of capacity is an issue, Council should study the set-out rate of those households as well as the bin percentage full for each collection. The set-out rate is the number of times a bin is presented over a series of collection events, such as four or more collections.

Figure 2 - Generation rate – by volume

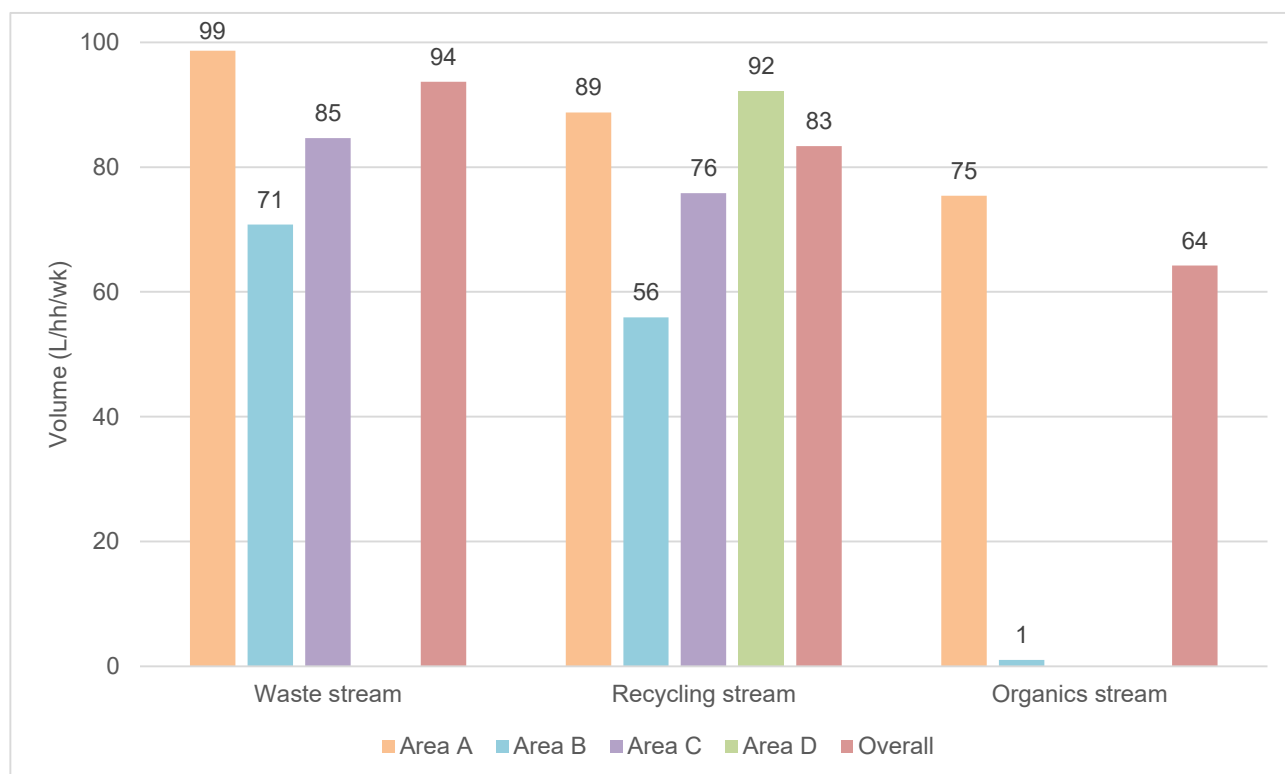


Table 7 - Generation rate – by volume

| Generation rate by volume | | | Area A | Area B | Area C | Area D | Overall |
|---|--------------------------|--------------|------------|------------|------------|-----------|------------|
| Average weekly generation per household (L/hh/wk) * | when a bin was presented | Waste | 99 | 71 | 85 | - | 94 |
| | | Recycling | 89 | 56 | 76 | 92 | 83 |
| | | Organics | 75 | 1 | - | - | 64 |
| | | Total | 263 | 128 | 160 | 92 | 241 |
| Average bin percentage full (% by volume) | | Waste | 66.3 | 63.1 | 67.9 | - | 65.8 |
| | | Recycling | 73.5 | 54.5 | 61.6 | 76.8 | 70.1 |
| | | Organics | 61.5 | 10.0 | - | - | 53.8 |

* Based on bin sizes and collection frequencies as shown in Table 1 in Section 1.3, as well as bin percentage full results from bin surveys.

Table 8 - Bin usage – percentage full distribution

| Stream | bin % full range | Number of collection points | | | | | Percentage of collection points | | | | |
|-----------|------------------|-----------------------------|----------|-----------|-----------|------------|---------------------------------|--------------|--------------|--------------|--------------|
| | | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Waste | 0-49 | 90 | 2 | 9 | - | 123 | 29.4 | 66.7 | 23.7 | - | 35.4 |
| | 50-69 | 58 | 0 | 8 | - | 73 | 19.0 | 0.0 | 21.1 | - | 21.0 |
| | 70-89 | 48 | 0 | 9 | - | 42 | 15.7 | 0.0 | 23.7 | - | 12.1 |
| | 90+ | 110 | 1 | 12 | - | 109 | 35.9 | 33.3 | 31.6 | - | 31.4 |
| | Total | 306 | 3 | 38 | - | 347 | 100.0 | 100.0 | 100.0 | - | 100.0 |
| Recycling | 0-49 | 51 | 1 | 13 | 5 | 109 | 16.7 | 33.3 | 34.2 | 16.1 | 28.8 |
| | 50-69 | 70 | 1 | 7 | 6 | 67 | 22.9 | 33.3 | 18.4 | 19.4 | 17.7 |
| | 70-89 | 50 | 0 | 6 | 4 | 55 | 16.3 | 0.0 | 15.8 | 12.9 | 14.6 |
| | 90+ | 135 | 1 | 12 | 16 | 147 | 44.1 | 33.3 | 31.6 | 51.6 | 38.9 |
| | Total | 306 | 3 | 38 | 31 | 378 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Organics | 0-49 | 104 | 1 | - | - | 141 | 34.0 | 100.0 | - | - | 45.9 |
| | 50-69 | 63 | 0 | - | - | 58 | 20.6 | 0.0 | - | - | 18.9 |
| | 70-89 | 53 | 0 | - | - | 25 | 17.3 | 0.0 | - | - | 8.1 |
| | 90+ | 86 | 0 | - | - | 83 | 28.1 | 0.0 | - | - | 27.0 |
| | Total | 306 | 1 | - | - | 307 | 100.0 | 100.0 | - | - | 100.0 |

* The number of collection points does not add up to the number of households, because some MUDs were counted as one collection point.

4.3 Composition

The composition of each stream is provided at two levels:

- Overview of resources in each stream based on material recoverability in Table 3.
- Composition by sorting categories (excl. CDS sub-sorting), as shown in Table 3.

4.3.1 Resources in each stream – overview

This section provides the resources summary, based on suitability for particular uses:

- **Compliant recyclable** – materials that can be placed into the kerbside recycling bins.
- **Potentially recyclable** – metals that are not compliant in the kerbside recycling bin, but that may be recovered by a MRF or AWT due to their value or other factors.
- **Compliant organics** – materials that can be placed into the kerbside organics bins. This includes compliant garden organics, loose food and food in compostable liners.
- **Potentially compostable** – other materials that can be composted, such as in an AWT, excluding materials that are compliant in the recycling and organics bins. This includes untreated wood / timber, contaminated soiled paper, other putrescible and other compostable.
- **MGB non-recyclable** – materials that cannot be placed into the kerbside recycling bins and are not compostable or potentially recyclable. This includes some materials that can be recovered but are not recoverable in the Council MGB system, such as textiles at a clothes bank or e-waste at a drop-off centre, mobiles in MobileMuster.

The resource details are provided in Section 4.4 for unrecovered resources and Section 4.6 for contamination rates.

Figure 3 and Tables 9 to 11 show resources summary in each stream. Compliant recyclables in each stream that should be placed in the recycling stream accounted for approximately:

- **Waste:** 12.7% of the stream.
- **Recycling:** 88.0% of the stream, which was correctly recovered in recycling bins.
- **Organics:** 0.0% of the stream.

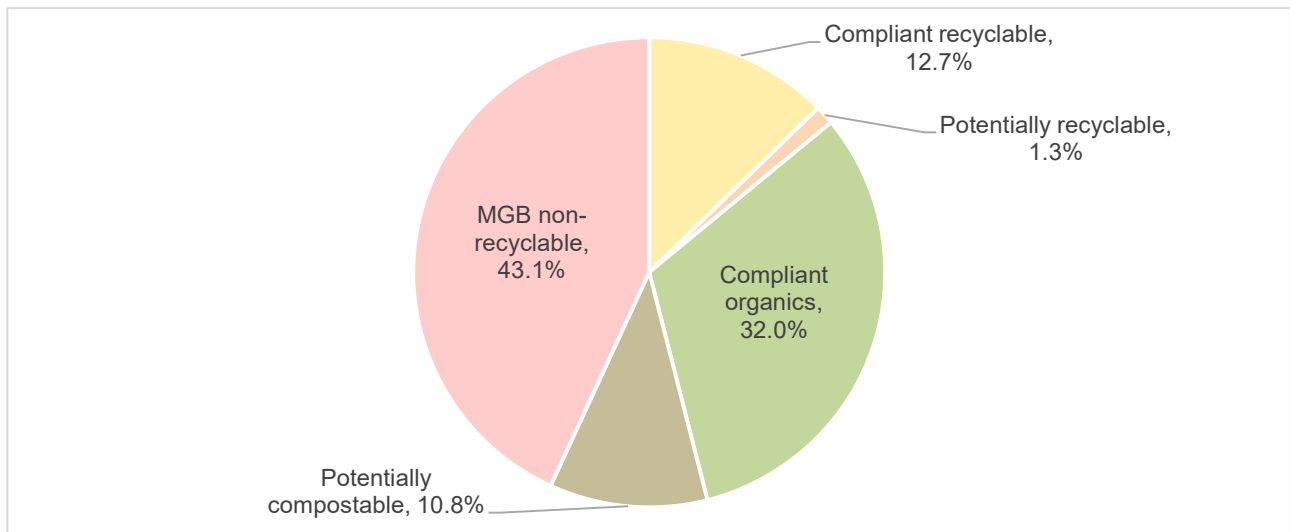
Compliant organics (i.e. garden organics and loose food) in each stream that should be placed in the organics stream accounted for approximately:

- **Waste:** 32.0% of the stream.
- **Recycling:** 0.9% of the stream.
- **Organics:** 97.7% of the stream, which was correctly recovered in the organics stream.

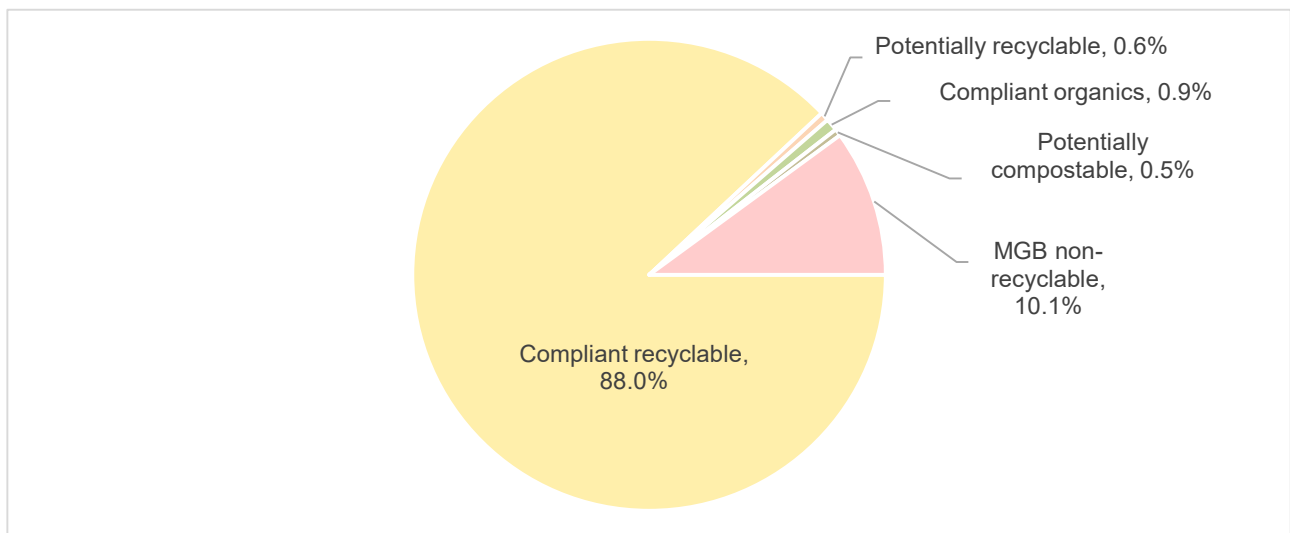
The detailed sorting categories included in each recovery category is provided in Table 3 in section 2.4.4.

Figure 3 - Overview of resources in each stream

Waste stream



Recycling stream



Organics stream

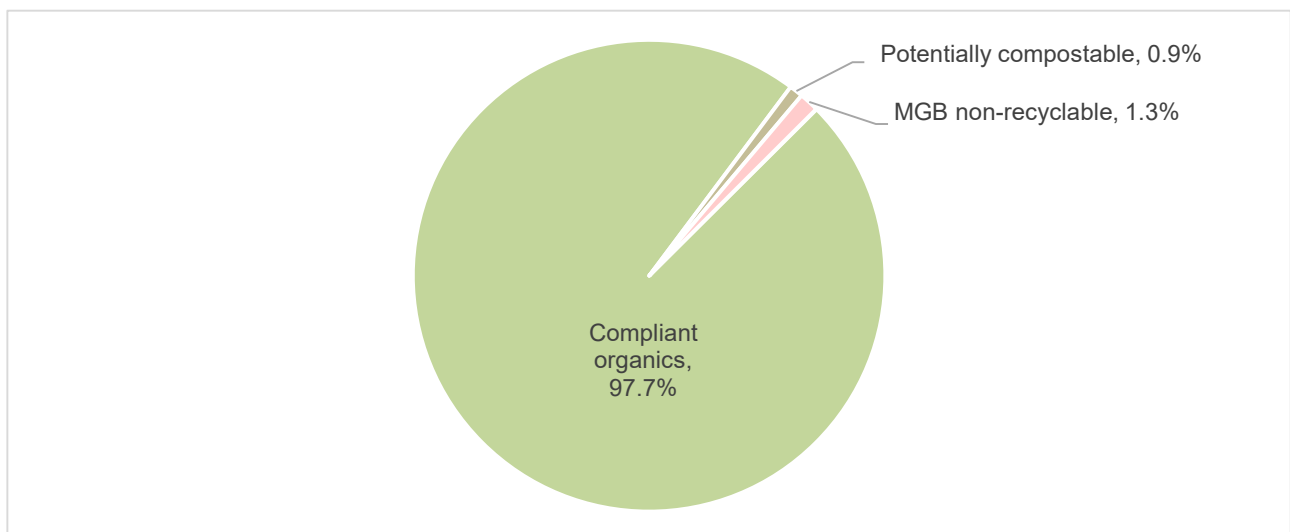


Table 9 - Overview of resources – waste stream

| Recoverability category | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|-----------------------------|-------------------|--------------|--------------|--------|--------------|--------------------------|---------------|---------------|--------|---------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Compliant recyclable | 1.173 | 0.902 | 1.065 | - | 1.130 | 12.35 | 16.19 | 11.80 | - | 12.70 |
| Potentially recyclable | 0.122 | 0.069 | 0.118 | - | 0.115 | 1.28 | 1.24 | 1.31 | - | 1.29 |
| Compliant organics | 3.020 | 1.947 | 2.878 | - | 2.852 | 31.80 | 34.94 | 31.89 | - | 32.04 |
| Potentially compostable | 1.064 | 0.344 | 1.143 | - | 0.964 | 11.20 | 6.17 | 12.66 | - | 10.83 |
| MGB non-recyclable | 4.118 | 2.311 | 3.822 | - | 3.839 | 43.36 | 41.47 | 42.34 | - | 43.13 |
| Total | 9.497 | 5.573 | 9.026 | - | 8.900 | 100.00 | 100.00 | 100.00 | - | 100.00 |

Table 10 - Overview of resources – recycling stream

| Recoverability category | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|-----------------------------|-------------------|--------------|--------------|--------------|--------------|--------------------------|---------------|---------------|---------------|---------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Compliant recyclable | 2.907 | 1.257 | 2.814 | 3.507 | 2.681 | 89.61 | 78.71 | 79.94 | 88.40 | 87.99 |
| Potentially recyclable | 0.014 | 0.011 | 0.074 | 0.020 | 0.018 | 0.43 | 0.69 | 2.10 | 0.50 | 0.59 |
| Compliant organics | 0.016 | 0.061 | 0.073 | 0.005 | 0.026 | 0.49 | 3.82 | 2.07 | 0.13 | 0.86 |
| Potentially compostable | 0.017 | 0.001 | 0.017 | 0.008 | 0.015 | 0.52 | 0.06 | 0.48 | 0.20 | 0.48 |
| MGB non-recyclable | 0.290 | 0.267 | 0.542 | 0.427 | 0.307 | 8.94 | 16.72 | 15.40 | 10.76 | 10.07 |
| Total | 3.244 | 1.597 | 3.520 | 3.967 | 3.047 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Table 11 - Overview of resources – organics stream

| Recoverability category | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|---------------------------|-------------------|--------------|--------|--------|--------------|--------------------------|---------------|--------|--------|---------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Compliant recyclable | 0.003 | 0.000 | - | - | 0.003 | 0.03 | 0.00 | - | - | 0.03 |
| Potentially recyclable | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Compliant organics | 8.528 | 0.065 | - | - | 7.263 | 97.69 | 100.00 | - | - | 97.69 |
| Potentially compostable | 0.083 | 0.000 | - | - | 0.071 | 0.95 | 0.00 | - | - | 0.95 |
| MGB non-recyclable | 0.116 | 0.000 | - | - | 0.099 | 1.33 | 0.00 | - | - | 1.33 |
| Total | 8.730 | 0.065 | - | - | 7.435 | 100.00 | 100.00 | - | - | 100.00 |

4.3.2 Composition – waste stream

The top categories by weight of the waste stream were:

1. Food / kitchen, 29.8%
2. Containerised food and liquid, 8.6%
3. AHW / nappies, 8.4%
4. Other putrescible, 6.5%
5. Textile / rags, 5.2%
6. Contaminated soiled paper, 4.1%
7. Plastic film, 4.0%
8. Ceramics / dust / dirt / rock / inert / ash, 3.2%
9. Building materials and fittings (NEC), 2.5%
10. Garden / vegetation, 2.5%
11. Plastic bags, 1.9%
12. Cardboard / package board , 1.5%
13. PP packaging, 1.5%
14. Household chemicals, 1.2%
15. Composite (mostly plastic), 1.2%

Table 12 provides the detailed composition by sorting category (excl. CDS sub-sorting categories). The CDS container analysis is provided in Section 4.9.

A sub-sort of the following categories is provided in Appendix 3:

- Garden / vegetation – compliant
- Food / kitchen
- AHW / nappies

Table 12 - Waste stream composition (excl. CDS sub-categories)

| Material categories | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|---|-------------------|--------------|--------------|----------|--------------|--------------------------|--------------|--------------|----------|--------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Newspaper | 0.021 | 0.031 | 0.010 | - | 0.022 | 0.22 | 0.56 | 0.11 | - | 0.25 |
| Magazines / brochures | 0.040 | 0.037 | 0.048 | - | 0.040 | 0.42 | 0.66 | 0.53 | - | 0.45 |
| Miscellaneous packaging | 0.048 | 0.052 | 0.027 | - | 0.047 | 0.51 | 0.93 | 0.30 | - | 0.53 |
| Corrugated cardboard | 0.055 | 0.106 | 0.049 | - | 0.062 | 0.58 | 1.90 | 0.54 | - | 0.70 |
| Cardboard / packaging board | 0.128 | 0.138 | 0.139 | - | 0.130 | 1.35 | 2.48 | 1.54 | - | 1.46 |
| Liquid paperboard containers | 0.024 | 0.010 | 0.012 | - | 0.022 | 0.25 | 0.18 | 0.13 | - | 0.25 |
| Tetrapak containers | 0.012 | 0.001 | 0.008 | - | 0.011 | 0.13 | 0.02 | 0.09 | - | 0.12 |
| Disposable paper product – coffee cups | 0.008 | 0.007 | 0.013 | - | 0.008 | 0.08 | 0.13 | 0.14 | - | 0.09 |
| Disposable paper product – general | 0.146 | 0.048 | 0.107 | - | 0.130 | 1.54 | 0.86 | 1.19 | - | 1.46 |
| Print / writing / office paper | 0.073 | 0.036 | 0.051 | - | 0.066 | 0.77 | 0.65 | 0.57 | - | 0.74 |
| Composite (mainly paper) | 0.037 | 0.027 | 0.027 | - | 0.035 | 0.39 | 0.48 | 0.30 | - | 0.39 |
| AHW / nappies | 0.786 | 0.429 | 0.985 | - | 0.745 | 8.28 | 7.70 | 10.91 | - | 8.37 |
| Contaminated soiled paper | 0.396 | 0.180 | 0.345 | - | 0.362 | 4.17 | 3.23 | 3.82 | - | 4.07 |
| Sub-total: Paper | 1.774 | 1.102 | 1.821 | - | 1.680 | 18.68 | 19.77 | 20.18 | - | 18.88 |
| Food / kitchen | 2.822 | 1.793 | 2.458 | - | 2.648 | 29.71 | 32.17 | 27.23 | - | 29.75 |
| Garden / vegetation – compliant | 0.196 | 0.154 | 0.418 | - | 0.202 | 2.06 | 2.76 | 4.63 | - | 2.27 |
| Garden / vegetation – oversized | 0.022 | 0.000 | 0.002 | - | 0.018 | 0.23 | 0.00 | 0.02 | - | 0.20 |
| Other putrescible | 0.645 | 0.157 | 0.785 | - | 0.582 | 6.79 | 2.82 | 8.70 | - | 6.54 |
| Wood / timber – treated | 0.116 | 0.000 | 0.067 | - | 0.097 | 1.22 | 0.00 | 0.74 | - | 1.09 |
| Wood / timber – untreated | 0.023 | 0.007 | 0.013 | - | 0.020 | 0.24 | 0.13 | 0.14 | - | 0.22 |
| Textile / rags | 0.496 | 0.330 | 0.365 | - | 0.464 | 5.22 | 5.92 | 4.04 | - | 5.21 |
| Leather | 0.027 | 0.027 | 0.046 | - | 0.028 | 0.28 | 0.48 | 0.51 | - | 0.31 |
| Rubber | 0.053 | 0.007 | 0.109 | - | 0.050 | 0.56 | 0.13 | 1.21 | - | 0.56 |
| Oils | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Sub-total: Organics | 4.400 | 2.475 | 4.263 | - | 4.109 | 46.33 | 44.41 | 47.23 | - | 46.17 |
| Glass beverage containers | 0.081 | 0.081 | 0.142 | - | 0.084 | 0.85 | 1.45 | 1.57 | - | 0.94 |
| Glass non beverage containers / other packaging glass | 0.098 | 0.059 | 0.099 | - | 0.092 | 1.03 | 1.06 | 1.10 | - | 1.03 |
| Miscellaneous / other glass | 0.025 | 0.003 | 0.023 | - | 0.022 | 0.26 | 0.05 | 0.25 | - | 0.25 |
| Mixed glass / fines | 0.014 | 0.000 | 0.001 | - | 0.011 | 0.15 | 0.00 | 0.01 | - | 0.12 |
| Sub-total: Glass | 0.218 | 0.143 | 0.265 | - | 0.209 | 2.30 | 2.57 | 2.94 | - | 2.35 |

Table 12 (cont.) - Waste stream composition (excl. CDS sub-categories)

| Material categories | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|---|-------------------|--------------|--------------|----------|--------------|--------------------------|--------------|--------------|----------|--------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| PET beverage containers | 0.019 | 0.012 | 0.027 | - | 0.019 | 0.20 | 0.22 | 0.30 | - | 0.21 |
| PET packaging (excl. beverage containers) | 0.098 | 0.070 | 0.084 | - | 0.093 | 1.03 | 1.26 | 0.93 | - | 1.04 |
| PET other non-beverage / non-packaging | 0.006 | 0.014 | 0.007 | - | 0.007 | 0.06 | 0.25 | 0.08 | - | 0.08 |
| HDPE beverage containers | 0.008 | 0.013 | 0.005 | - | 0.008 | 0.08 | 0.23 | 0.06 | - | 0.09 |
| HDPE packaging (excl. beverage containers) | 0.046 | 0.034 | 0.018 | - | 0.043 | 0.48 | 0.61 | 0.20 | - | 0.48 |
| HDPE other non-beverage / non-packaging | 0.005 | 0.000 | 0.001 | - | 0.004 | 0.05 | 0.00 | 0.01 | - | 0.04 |
| PVC beverage containers | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| PVC packaging (excl. beverage containers) | 0.003 | 0.000 | 0.003 | - | 0.003 | 0.03 | 0.00 | 0.03 | - | 0.03 |
| PVC other non-beverage / non-packaging | 0.032 | 0.000 | 0.034 | - | 0.028 | 0.34 | 0.00 | 0.38 | - | 0.31 |
| LDPE packaging | 0.002 | 0.000 | 0.000 | - | 0.002 | 0.02 | 0.00 | 0.00 | - | 0.02 |
| LDPE non-packaging | 0.059 | 0.037 | 0.091 | - | 0.058 | 0.62 | 0.66 | 1.01 | - | 0.65 |
| PP packaging | 0.139 | 0.084 | 0.100 | - | 0.129 | 1.46 | 1.51 | 1.11 | - | 1.45 |
| PP non-packaging | 0.018 | 0.014 | 0.025 | - | 0.018 | 0.19 | 0.25 | 0.28 | - | 0.20 |
| PS packaging | 0.007 | 0.022 | 0.007 | - | 0.009 | 0.07 | 0.39 | 0.08 | - | 0.10 |
| EPS packaging | 0.003 | 0.001 | 0.004 | - | 0.003 | 0.03 | 0.02 | 0.04 | - | 0.03 |
| PS and EPS non-packaging | 0.019 | 0.033 | 0.016 | - | 0.021 | 0.20 | 0.59 | 0.18 | - | 0.24 |
| Other plastics beverage containers | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Other plastics packaging | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Other plastics – other | 0.072 | 0.001 | 0.008 | - | 0.058 | 0.76 | 0.02 | 0.09 | - | 0.65 |
| Plastic bags | 0.168 | 0.171 | 0.169 | - | 0.168 | 1.77 | 3.07 | 1.87 | - | 1.89 |
| Plastic film – compostable | 0.002 | 0.000 | 0.002 | - | 0.002 | 0.02 | 0.00 | 0.02 | - | 0.02 |
| Plastic film – other | 0.391 | 0.185 | 0.330 | - | 0.358 | 4.12 | 3.32 | 3.66 | - | 4.02 |
| Composite (mostly plastic) | 0.119 | 0.034 | 0.052 | - | 0.103 | 1.25 | 0.61 | 0.58 | - | 1.16 |
| Sub-total: Plastics | 1.216 | 0.725 | 0.983 | - | 1.134 | 12.80 | 13.01 | 10.89 | - | 12.74 |
| Steel beverage containers | 0.000 | 0.001 | 0.000 | - | 0.000 | 0.00 | 0.02 | 0.00 | - | 0.00 |
| Steel packaging (excl. beverage containers) | 0.084 | 0.043 | 0.076 | - | 0.078 | 0.88 | 0.77 | 0.84 | - | 0.88 |
| Steel other non-packaging | 0.051 | 0.036 | 0.068 | - | 0.050 | 0.54 | 0.65 | 0.75 | - | 0.56 |
| Composite (mostly ferrous) | 0.036 | 0.008 | 0.031 | - | 0.032 | 0.38 | 0.14 | 0.34 | - | 0.36 |
| Sub-total: Ferrous | 0.171 | 0.088 | 0.175 | - | 0.160 | 1.80 | 1.58 | 1.94 | - | 1.80 |

Table 12 (cont.) - Waste stream composition (excl. CDS sub-categories)

| Material categories | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|--|-------------------|--------------|--------------|----------|--------------|--------------------------|---------------|---------------|----------|---------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Aluminium beverage containers | 0.014 | 0.010 | 0.013 | - | 0.014 | 0.15 | 0.18 | 0.14 | - | 0.16 |
| Aluminium packaging (excl. beverage containers) | 0.027 | 0.014 | 0.040 | - | 0.026 | 0.28 | 0.25 | 0.44 | - | 0.29 |
| Aluminium non-packaging | 0.017 | 0.006 | 0.011 | - | 0.015 | 0.18 | 0.11 | 0.12 | - | 0.17 |
| Non-ferrous other non-packaging | 0.001 | 0.000 | 0.000 | - | 0.001 | 0.01 | 0.00 | 0.00 | - | 0.01 |
| Composite (mostly ferrous) | 0.017 | 0.019 | 0.008 | - | 0.017 | 0.18 | 0.34 | 0.09 | - | 0.19 |
| Sub-total: Non-ferrous | 0.076 | 0.049 | 0.072 | - | 0.073 | 0.80 | 0.88 | 0.80 | - | 0.82 |
| Paint | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Fluorescent tubes | 0.001 | 0.000 | 0.000 | - | 0.001 | 0.01 | 0.00 | 0.00 | - | 0.01 |
| Dry cell batteries (non-rechargeable) | 0.007 | 0.016 | 0.017 | - | 0.009 | 0.07 | 0.29 | 0.19 | - | 0.10 |
| Dry cell batteries (rechargeable) | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Vehicle batteries | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Household chemicals | 0.124 | 0.043 | 0.086 | - | 0.110 | 1.31 | 0.77 | 0.95 | - | 1.24 |
| Asbestos / building materials | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Clinical pathogenic infectious | 0.026 | 0.030 | 0.002 | - | 0.025 | 0.27 | 0.54 | 0.02 | - | 0.28 |
| Gas bottles | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Hazardous other | 0.046 | 0.002 | 0.002 | - | 0.037 | 0.48 | 0.04 | 0.02 | - | 0.42 |
| Sub-total: Hazardous | 0.204 | 0.091 | 0.107 | - | 0.182 | 2.15 | 1.63 | 1.19 | - | 2.04 |
| Building materials and fittings (NEC) | 0.270 | 0.000 | 0.100 | - | 0.222 | 2.84 | 0.00 | 1.11 | - | 2.49 |
| Ceramics / dust / dirt / rock / inert / ash | 0.346 | 0.035 | 0.068 | - | 0.286 | 3.64 | 0.63 | 0.75 | - | 3.21 |
| Computer equipment | 0.011 | 0.031 | 0.000 | - | 0.013 | 0.12 | 0.56 | 0.00 | - | 0.15 |
| TVs | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.00 | 0.00 | 0.00 | -- | 0.00 |
| Mobile phones | 0.000 | 0.000 | 0.002 | - | 0.000 | 0.00 | 0.00 | 0.02 | - | 0.00 |
| Electrical items and peripherals | 0.056 | 0.073 | 0.162 | - | 0.064 | 0.59 | 1.31 | 1.79 | - | 0.72 |
| Toner cartridges | 0.000 | 0.002 | 0.000 | - | 0.000 | 0.00 | 0.04 | 0.00 | - | 0.00 |
| Sub-total: E-waste | 0.067 | 0.106 | 0.164 | - | 0.077 | 0.71 | 1.90 | 1.82 | - | 0.87 |
| Containerised food and liquid – cooking oil | 0.007 | 0.000 | 0.000 | - | 0.006 | 0.07 | 0.00 | 0.00 | - | 0.07 |
| Containerised food and liquid – non-cooking oil | 0.748 | 0.759 | 0.982 | - | 0.761 | 7.88 | 13.62 | 10.88 | - | 8.55 |
| Other (specify) | 0.000 | 0.000 | 0.026 | - | 0.001 | 0.00 | 0.00 | 0.29 | - | 0.01 |
| Sub-total: Miscellaneous | 0.755 | 0.759 | 1.008 | - | 0.768 | 7.95 | 13.62 | 11.17 | - | 8.63 |
| Grand total | 9.497 | 5.573 | 9.026 | - | 8.900 | 100.00 | 100.00 | 100.00 | - | 100.00 |

4.3.3 Composition – recycling stream

The top categories by weight of the recycling stream were:

1. Corrugated cardboard , 20.8%
2. Glass beverage containers, 17.1%
3. Cardboard / package board , 9.8%
4. Glass non-beverage containers / other packaging glass, 7.4%
5. Magazines/ brochures, 7.1%
6. Print/ writing/ office paper, 3.7%
7. Newspaper, 3.4%
8. Steel packaging (excl. beverage containers), 2.7%
9. PET packaging (excl. beverage containers), 2.4%
10. HDPE beverage containers, 2.4%
11. Misc. packaging , 2.2%
12. PP packaging, 2.0%
13. HDPE packaging (excl. beverage containers), 1.9%
14. PET beverage containers, 1.8%
15. Mixed glass / fines, 1.4%

Table 13 provides the detailed composition by sorting category (excl. CDS sub-sorting categories). The CDS container analysis is provided in Section 4.9.

A sub-sort of the following categories is provided in Appendix 3:

- Garden / vegetation – compliant
- Food / kitchen
- AHW / nappies

Table 13 - Recycling stream composition (excl. CDS sub-categories)

| Material categories | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|---|-------------------|--------------|--------------|--------------|--------------|--------------------------|--------------|--------------|--------------|--------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Newspaper | 0.108 | 0.052 | 0.156 | 0.040 | 0.103 | 3.33 | 3.26 | 4.43 | 1.01 | 3.38 |
| Magazines / brochures | 0.228 | 0.191 | 0.130 | 0.287 | 0.216 | 7.03 | 11.96 | 3.69 | 7.23 | 7.10 |
| Miscellaneous packaging | 0.078 | 0.009 | 0.052 | 0.096 | 0.067 | 2.40 | 0.56 | 1.48 | 2.42 | 2.19 |
| Corrugated cardboard | 0.688 | 0.444 | 0.447 | 0.471 | 0.634 | 21.21 | 27.80 | 12.70 | 11.87 | 20.82 |
| Cardboard / packaging board | 0.342 | 0.073 | 0.265 | 0.313 | 0.299 | 10.54 | 4.57 | 7.53 | 7.89 | 9.82 |
| Liquid paperboard containers | 0.021 | 0.010 | 0.016 | 0.028 | 0.019 | 0.65 | 0.63 | 0.45 | 0.71 | 0.63 |
| Tetrapak containers | 0.022 | 0.003 | 0.009 | 0.064 | 0.019 | 0.68 | 0.19 | 0.26 | 1.61 | 0.62 |
| Disposable paper product – coffee cups | 0.004 | 0.001 | 0.006 | 0.010 | 0.004 | 0.12 | 0.06 | 0.17 | 0.25 | 0.12 |
| Disposable paper product – general | 0.040 | 0.010 | 0.028 | 0.036 | 0.035 | 1.23 | 0.63 | 0.80 | 0.91 | 1.15 |
| Print / writing / office paper | 0.127 | 0.045 | 0.081 | 0.096 | 0.112 | 3.91 | 2.82 | 2.30 | 2.42 | 3.68 |
| Composite (mainly paper) | 0.035 | 0.033 | 0.019 | 0.034 | 0.034 | 1.08 | 2.07 | 0.54 | 0.86 | 1.10 |
| AHW / nappies | 0.003 | 0.000 | 0.033 | 0.025 | 0.005 | 0.09 | 0.00 | 0.94 | 0.63 | 0.17 |
| Contaminated soiled paper | 0.007 | 0.001 | 0.016 | 0.008 | 0.007 | 0.22 | 0.06 | 0.45 | 0.20 | 0.22 |
| Sub-total: Paper | 1.703 | 0.872 | 1.258 | 1.508 | 1.554 | 52.50 | 54.60 | 35.74 | 38.01 | 51.01 |
| Food / kitchen | 0.014 | 0.061 | 0.073 | 0.005 | 0.025 | 0.43 | 3.82 | 2.07 | 0.13 | 0.81 |
| Garden / vegetation – compliant | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 |
| Garden / vegetation – oversized | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 |
| Other putrescible | 0.010 | 0.000 | 0.000 | 0.000 | 0.008 | 0.31 | 0.00 | 0.00 | 0.00 | 0.26 |
| Wood / timber – treated | 0.014 | 0.000 | 0.006 | 0.000 | 0.011 | 0.43 | 0.00 | 0.17 | 0.00 | 0.37 |
| Wood / timber – untreated | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 |
| Textile / rags | 0.006 | 0.002 | 0.013 | 0.002 | 0.006 | 0.18 | 0.13 | 0.37 | 0.05 | 0.19 |
| Leather | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rubber | 0.002 | 0.000 | 0.004 | 0.000 | 0.002 | 0.06 | 0.00 | 0.11 | 0.00 | 0.06 |
| Oils | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sub-total: Organics | 0.048 | 0.063 | 0.097 | 0.007 | 0.053 | 1.48 | 3.94 | 2.76 | 0.18 | 1.75 |
| Glass beverage containers | 0.534 | 0.185 | 0.902 | 1.183 | 0.521 | 16.46 | 11.58 | 25.63 | 29.82 | 17.09 |
| Glass non beverage containers / other packaging glass | 0.254 | 0.064 | 0.225 | 0.251 | 0.226 | 7.83 | 4.01 | 6.39 | 6.33 | 7.41 |
| Miscellaneous / other glass | 0.013 | 0.000 | 0.023 | 0.000 | 0.012 | 0.40 | 0.00 | 0.65 | 0.00 | 0.39 |
| Mixed glass / fines | 0.042 | 0.019 | 0.085 | 0.058 | 0.042 | 1.29 | 1.19 | 2.41 | 1.46 | 1.38 |
| Sub-total: Glass | 0.843 | 0.268 | 1.235 | 1.492 | 0.801 | 25.99 | 16.78 | 35.09 | 37.61 | 26.27 |

Table 13 (cont.) - Recycling stream composition (excl. CDS sub-categories)

| Material categories | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|---|-------------------|--------------|--------------|--------------|--------------|--------------------------|--------------|--------------|--------------|--------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| PET beverage containers | 0.058 | 0.017 | 0.086 | 0.065 | 0.055 | 1.79 | 1.06 | 2.44 | 1.64 | 1.79 |
| PET packaging (excl. beverage containers) | 0.083 | 0.025 | 0.066 | 0.115 | 0.074 | 2.56 | 1.57 | 1.88 | 2.90 | 2.43 |
| PET other non-beverage / non-packaging | 0.004 | 0.004 | 0.007 | 0.002 | 0.004 | 0.12 | 0.25 | 0.20 | 0.05 | 0.14 |
| HDPE beverage containers | 0.072 | 0.069 | 0.075 | 0.102 | 0.072 | 2.22 | 4.32 | 2.13 | 2.57 | 2.37 |
| HDPE packaging (excl. beverage containers) | 0.064 | 0.029 | 0.043 | 0.096 | 0.058 | 1.97 | 1.82 | 1.22 | 2.42 | 1.90 |
| HDPE other non-beverage / non-packaging | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.03 | 0.00 | 0.00 | 0.03 | 0.03 |
| PVC beverage containers | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 |
| PVC packaging (excl. beverage containers) | 0.002 | 0.000 | 0.001 | 0.000 | 0.002 | 0.06 | 0.00 | 0.03 | 0.00 | 0.05 |
| PVC other non-beverage / non-packaging | 0.001 | 0.000 | 0.011 | 0.000 | 0.002 | 0.03 | 0.00 | 0.31 | 0.00 | 0.05 |
| LDPE packaging | 0.001 | 0.000 | 0.016 | 0.001 | 0.002 | 0.03 | 0.00 | 0.45 | 0.03 | 0.06 |
| LDPE non-packaging | 0.013 | 0.001 | 0.017 | 0.118 | 0.013 | 0.40 | 0.06 | 0.48 | 2.97 | 0.42 |
| PP packaging | 0.068 | 0.017 | 0.067 | 0.090 | 0.061 | 2.10 | 1.06 | 1.90 | 2.27 | 2.01 |
| PP non-packaging | 0.018 | 0.013 | 0.060 | 0.001 | 0.020 | 0.55 | 0.81 | 1.70 | 0.03 | 0.66 |
| PS packaging | 0.002 | 0.001 | 0.002 | 0.005 | 0.002 | 0.06 | 0.06 | 0.06 | 0.13 | 0.06 |
| EPS packaging | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 |
| PS and EPS non-packaging | 0.002 | 0.006 | 0.006 | 0.004 | 0.003 | 0.06 | 0.38 | 0.17 | 0.10 | 0.09 |
| Other plastics beverage containers | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other plastics packaging | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 |
| Other plastics – other | 0.022 | 0.000 | 0.063 | 0.014 | 0.022 | 0.68 | 0.00 | 1.79 | 0.35 | 0.72 |
| Plastic bags | 0.001 | 0.005 | 0.004 | 0.001 | 0.002 | 0.03 | 0.31 | 0.11 | 0.03 | 0.06 |
| Plastic film – compostable | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 |
| Plastic film – other | 0.014 | 0.015 | 0.012 | 0.018 | 0.014 | 0.43 | 0.94 | 0.34 | 0.45 | 0.46 |
| Composite (mostly plastic) | 0.007 | 0.003 | 0.004 | 0.019 | 0.006 | 0.22 | 0.19 | 0.11 | 0.48 | 0.21 |
| Sub-total: Plastics | 0.435 | 0.205 | 0.540 | 0.656 | 0.414 | 13.41 | 12.84 | 15.34 | 16.54 | 13.58 |
| Steel beverage containers | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Steel packaging (excl. beverage containers) | 0.090 | 0.010 | 0.113 | 0.117 | 0.081 | 2.77 | 0.63 | 3.21 | 2.95 | 2.66 |
| Steel other non-packaging | 0.007 | 0.011 | 0.069 | 0.000 | 0.012 | 0.22 | 0.69 | 1.96 | 0.00 | 0.40 |
| Composite (mostly ferrous) | 0.003 | 0.000 | 0.002 | 0.019 | 0.003 | 0.09 | 0.00 | 0.06 | 0.48 | 0.09 |
| Sub-total: Ferrous | 0.100 | 0.021 | 0.184 | 0.136 | 0.096 | 3.08 | 1.31 | 5.23 | 3.43 | 3.14 |

Table 13 (cont.) - Recycling stream composition (excl. CDS sub-categories)

| Material categories | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|--|-------------------|--------------|--------------|--------------|--------------|--------------------------|---------------|---------------|---------------|---------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Aluminium beverage containers | 0.025 | 0.003 | 0.033 | 0.045 | 0.023 | 0.77 | 0.19 | 0.94 | 1.13 | 0.75 |
| Aluminium packaging (excl. beverage containers) | 0.010 | 0.000 | 0.007 | 0.006 | 0.008 | 0.31 | 0.00 | 0.20 | 0.15 | 0.27 |
| Aluminium non-packaging | 0.002 | 0.000 | 0.002 | 0.001 | 0.002 | 0.06 | 0.00 | 0.06 | 0.03 | 0.06 |
| Non-ferrous other non-packaging | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 |
| Composite (mostly ferrous) | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.03 | 0.00 | 0.03 | 0.00 | 0.03 |
| Sub-total: Non-ferrous | 0.039 | 0.003 | 0.043 | 0.052 | 0.035 | 1.20 | 0.19 | 1.22 | 1.31 | 1.13 |
| Paint | 0.000 | 0.000 | 0.013 | 0.000 | 0.001 | 0.00 | 0.00 | 0.37 | 0.00 | 0.03 |
| Fluorescent tubes | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Dry cell batteries (non-rechargeable) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Dry cell batteries (rechargeable) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vehicle batteries | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Household chemicals | 0.009 | 0.001 | 0.037 | 0.008 | 0.010 | 0.28 | 0.06 | 1.05 | 0.20 | 0.33 |
| Asbestos / building materials | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Clinical pathogenic infectious | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Gas bottles | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hazardous other | 0.002 | 0.000 | 0.000 | 0.000 | 0.002 | 0.06 | 0.00 | 0.00 | 0.00 | 0.05 |
| Sub-total: Hazardous | 0.011 | 0.001 | 0.050 | 0.008 | 0.012 | 0.34 | 0.06 | 1.42 | 0.20 | 0.41 |
| Building materials and fittings (NEC) | 0.000 | 0.000 | 0.021 | 0.000 | 0.002 | 0.00 | 0.00 | 0.60 | 0.00 | 0.05 |
| Ceramics / dust / dirt / rock / inert / ash | 0.028 | 0.000 | 0.008 | 0.004 | 0.022 | 0.86 | 0.00 | 0.23 | 0.10 | 0.74 |
| Computer equipment | 0.000 | 0.161 | 0.000 | 0.000 | 0.022 | 0.00 | 10.08 | 0.00 | 0.00 | 0.72 |
| TVs | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mobile phones | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Electrical items and peripherals | 0.001 | 0.000 | 0.008 | 0.085 | 0.002 | 0.03 | 0.00 | 0.23 | 2.14 | 0.08 |
| Toner cartridges | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sub-total: E-waste | 0.001 | 0.161 | 0.008 | 0.085 | 0.024 | 0.03 | 10.08 | 0.23 | 2.14 | 0.80 |
| Containerised food and liquid – cooking oil | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Containerised food and liquid – non-cooking oil | 0.036 | 0.003 | 0.076 | 0.019 | 0.034 | 1.11 | 0.19 | 2.16 | 0.48 | 1.12 |
| Other (specify) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sub-total: Miscellaneous | 0.036 | 0.003 | 0.076 | 0.019 | 0.034 | 1.11 | 0.19 | 2.16 | 0.48 | 1.12 |
| Grand total | 3.244 | 1.597 | 3.520 | 3.967 | 3.047 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

4.3.4 Composition – organics stream

The top categories by weight of the organics stream were:

1. Garden / vegetation, 92.5%.
2. Food / kitchen, 5.9%.
3. Other putrescible, 0.9%.
4. Ceramics / dust / dirt / rock / inert / ash, 0.3%.
5. Plastic film, 0.2%.

Table 14 provides the detailed composition by sorting category (excl. CDS sub-sorting categories). The CDS container analysis is provided in Section 4.9.

A sub-sort of the following categories is provided in Appendix 3:

- Garden / vegetation – compliant
- Food / kitchen
- AHW / nappies

Table 14 - Organics stream composition (excl. CDS sub-sorting)

| Material categories | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|---|-------------------|--------------|----------|----------|--------------|--------------------------|---------------|----------|----------|--------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Newspaper | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Magazines / brochures | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Miscellaneous packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Corrugated cardboard | 0.001 | 0.000 | - | - | 0.001 | 0.01 | 0.00 | - | - | 0.01 |
| Cardboard / packaging board | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Liquid paperboard containers | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Tetrapak containers | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Disposable paper product – coffee cups | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Disposable paper product – general | 0.001 | 0.000 | - | - | 0.001 | 0.01 | 0.00 | - | - | 0.01 |
| Print / writing / office paper | 0.001 | 0.000 | - | - | 0.001 | 0.01 | 0.00 | - | - | 0.01 |
| Composite (mainly paper) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| AHW / nappies | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Contaminated soiled paper | 0.003 | 0.000 | - | - | 0.003 | 0.03 | 0.00 | - | - | 0.03 |
| Sub-total: Paper | 0.006 | 0.000 | - | - | 0.005 | 0.07 | 0.00 | - | - | 0.07 |
| Food / kitchen | 0.513 | 0.000 | - | - | 0.436 | 5.88 | 0.00 | - | - | 5.87 |
| Garden / vegetation – compliant | 7.999 | 0.065 | - | - | 6.813 | 91.63 | 100.00 | - | - | 91.64 |
| Garden / vegetation – oversized | 0.078 | 0.000 | - | - | 0.066 | 0.89 | 0.00 | - | - | 0.89 |
| Other putrescible | 0.080 | 0.000 | - | - | 0.068 | 0.92 | 0.00 | - | - | 0.92 |
| Wood / timber – treated | 0.007 | 0.000 | - | - | 0.006 | 0.08 | 0.00 | - | - | 0.08 |
| Wood / timber – untreated | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Textile / rags | 0.003 | 0.000 | - | - | 0.003 | 0.03 | 0.00 | - | - | 0.03 |
| Leather | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Rubber | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Oils | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Sub-total: Organics | 8.680 | 0.065 | - | - | 7.392 | 99.43 | 100.00 | - | - | 99.43 |
| Glass beverage containers | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Glass non beverage containers / other packaging glass | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Miscellaneous / other glass | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Mixed glass / fines | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Sub-total: Glass | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |

Table 14 (cont.) - Organics stream composition (excl. CDS sub-categories)

| Material categories | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|---|-------------------|--------------|----------|----------|--------------|--------------------------|-------------|----------|----------|-------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| PET beverage containers | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| PET packaging (excl. beverage containers) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| PET other non-beverage / non-packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| HDPE beverage containers | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| HDPE packaging (excl. beverage containers) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| HDPE other non-beverage / non-packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| PVC beverage containers | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| PVC packaging (excl. beverage containers) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| PVC other non-beverage / non-packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| LDPE packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| LDPE non-packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| PP packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| PP non-packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| PS packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| EPS packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| PS and EPS non-packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Other plastics beverage containers | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Other plastics packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Other plastics – other | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Plastic bags | 0.001 | 0.000 | - | - | 0.001 | 0.01 | 0.00 | - | - | 0.01 |
| Plastic film – compostable | 0.016 | 0.000 | - | - | 0.014 | 0.18 | 0.00 | - | - | 0.18 |
| Plastic film – other | 0.001 | 0.000 | - | - | 0.001 | 0.01 | 0.00 | - | - | 0.01 |
| Composite (mostly plastic) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Sub-total: Plastics | 0.018 | 0.000 | - | - | 0.015 | 0.21 | 0.00 | - | - | 0.21 |
| Steel beverage containers | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Steel packaging (excl. beverage containers) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Steel other non-packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Composite (mostly ferrous) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Sub-total: Ferrous | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |

Table 14 (cont.) - Organics stream composition (excl. CDS sub-categories)

| Material categories | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|--|-------------------|--------------|----------|----------|--------------|--------------------------|---------------|----------|----------|---------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Aluminium beverage containers | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Aluminium packaging (excl. beverage containers) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Aluminium non-packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Non-ferrous other non-packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Composite (mostly ferrous) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Sub-total: Non-ferrous | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Paint | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Fluorescent tubes | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Dry cell batteries (non-rechargeable) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Dry cell batteries (rechargeable) | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Vehicle batteries | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Household chemicals | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Asbestos / building materials | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Clinical pathogenic infectious | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Gas bottles | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Hazardous other | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Sub-total: Hazardous | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Building materials and fittings (NEC) | 0.001 | 0.000 | - | - | 0.001 | 0.01 | 0.00 | - | - | 0.01 |
| Ceramics / dust / dirt / rock / inert / ash | 0.024 | 0.000 | - | - | 0.020 | 0.27 | 0.00 | - | - | 0.27 |
| Computer equipment | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| TVs | 0.000 | 0.000 | -- | -- | 0.000 | 0.00 | 0.00 | -- | -- | 0.00 |
| Mobile phones | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Electrical items and peripherals | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Toner cartridges | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Sub-total: E-waste | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Containerised food and liquid – cooking oil | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Containerised food and liquid – non-cooking oil | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 |
| Other (specify) | 0.001 | 0.000 | - | - | 0.001 | 0.01 | 0.00 | - | - | 0.01 |
| Sub-total: Miscellaneous | 0.001 | 0.000 | - | - | 0.001 | 0.01 | 0.00 | - | - | 0.01 |
| Grand total | 8.730 | 0.065 | - | - | 7.435 | 100.00 | 100.00 | - | - | 100.00 |

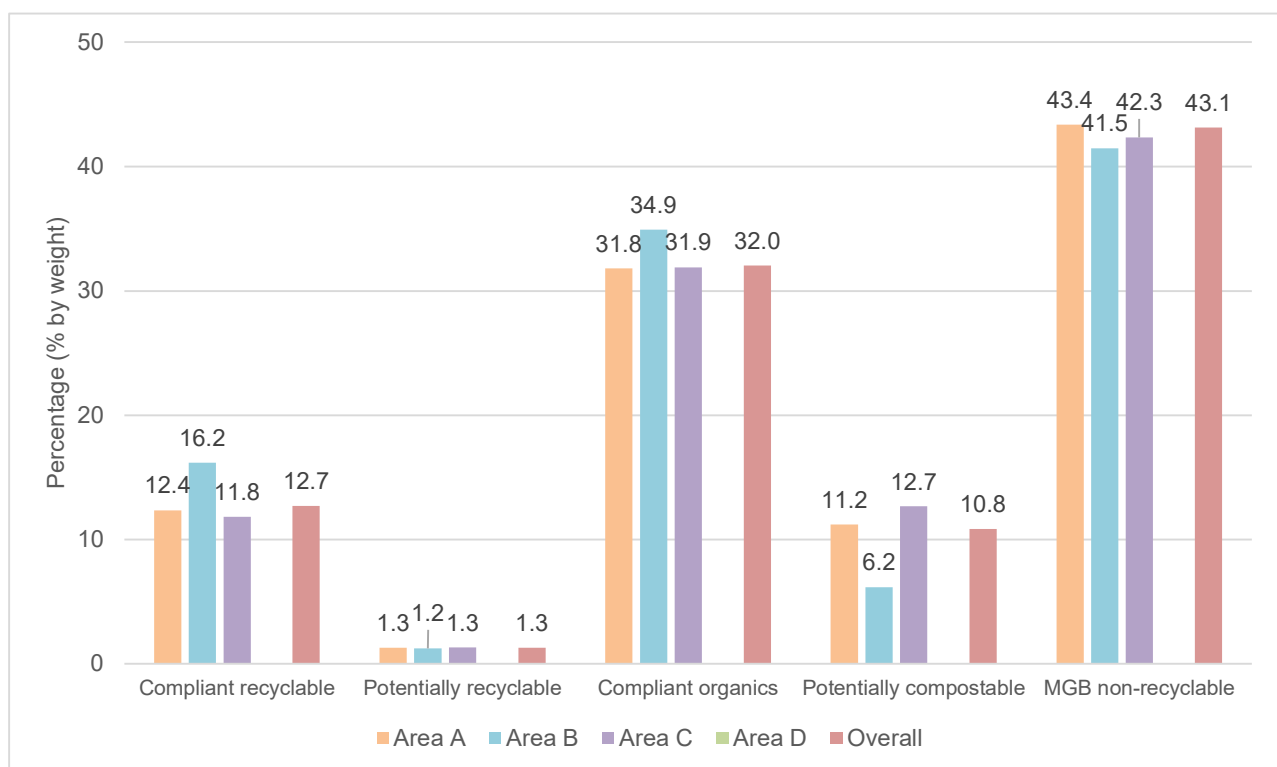
4.4 Resources in the waste stream – detail

This section provides the amount (by weight and by percentage) of resources in the waste stream, based on suitability for particular uses as shown in Section 4.3.1. Figure 4 shows the summary categories, with the categories provided in more detail in Figure 5 and Table 15.

The data shows:

- Compliant recyclable materials were 12.7% of the waste stream. These materials could be recovered in the recycling bins. Therefore, education should focus on the main unrecovered recyclables such as:
 - Recyclable paper at 6.0% of the stream
 - Recyclable plastics at 3.4% of the stream
 - Recyclable glass at 2.0% of the stream
- Compliant organics materials were 32.0% of the waste stream. These materials could be recovered in the organics stream:
 - Garden organics at 2.3% of the stream
 - Food waste at 29.8% of the stream
 - Compostable liners at 0.02% of the stream

Figure 4 - Resources in the waste stream – summary



The 'total other' category includes other materials that could potentially be recovered but not within the Council MGB system. This includes items that can mainly be recovered in resident drop-off systems such as textiles / rags, oils, wood, ceramics / dust / dirt / rock / inert / ash, mobile phones, computer equipment and ash / earth based. However, the Guidelines sorting requirements do not include sub-segregation of which parts of these items are recoverable and which parts are not recoverable. For example, some textiles may be contaminated beyond recovery, while others can be re-used without re-processing (such as in charity shops) and some may be re-usable with re-processing.

Figure 5 - Resources in the waste stream – detailed

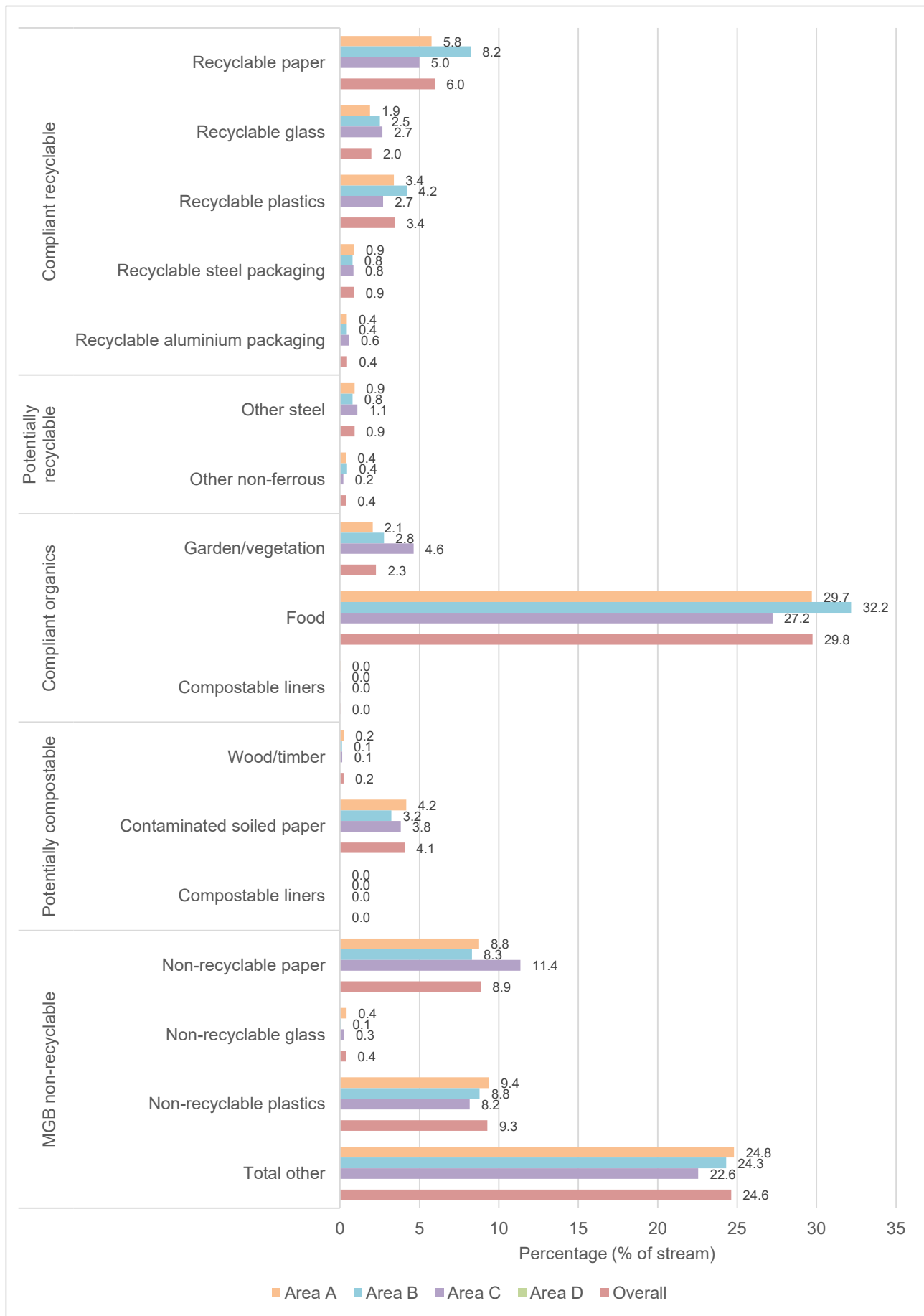


Table 15 - Resources in the waste stream – detailed

| Recoverability category | Weight (kg/hh/wk) | | | | | Percentage (% by weight) | | | | |
|--------------------------------|-------------------|--------------|--------------|----------|--------------|--------------------------|---------------|---------------|----------|---------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Recyclable paper | 0.547 | 0.459 | 0.451 | - | 0.530 | 5.76 | 8.24 | 5.00 | - | 5.96 |
| Recyclable glass | 0.179 | 0.140 | 0.241 | - | 0.176 | 1.88 | 2.51 | 2.67 | - | 1.98 |
| Recyclable plastics | 0.322 | 0.235 | 0.244 | - | 0.306 | 3.39 | 4.22 | 2.70 | - | 3.44 |
| Recyclable steel packaging | 0.084 | 0.044 | 0.076 | - | 0.078 | 0.88 | 0.79 | 0.84 | - | 0.88 |
| Recyclable aluminium packaging | 0.041 | 0.024 | 0.053 | - | 0.040 | 0.43 | 0.43 | 0.59 | - | 0.45 |
| Compliant recyclable | 1.173 | 0.902 | 1.065 | - | 1.130 | 12.35 | 16.19 | 11.80 | - | 12.70 |
| Other steel | 0.087 | 0.044 | 0.099 | - | 0.082 | 0.92 | 0.79 | 1.10 | - | 0.92 |
| Other non-ferrous | 0.035 | 0.025 | 0.019 | - | 0.033 | 0.37 | 0.45 | 0.21 | - | 0.37 |
| Potentially recyclable | 0.122 | 0.069 | 0.118 | - | 0.115 | 1.28 | 1.24 | 1.31 | - | 1.29 |
| Garden organics | 0.196 | 0.154 | 0.418 | - | 0.202 | 2.06 | 2.76 | 4.63 | - | 2.27 |
| Food | 2.822 | 1.793 | 2.458 | - | 2.648 | 29.71 | 32.17 | 27.23 | - | 29.75 |
| Compostable liners | 0.002 | 0.000 | 0.002 | - | 0.002 | 0.02 | 0.00 | 0.02 | - | 0.02 |
| Compliant organics | 3.020 | 1.947 | 2.878 | - | 2.852 | 31.80 | 34.94 | 31.89 | - | 32.04 |
| Wood / timber | 0.023 | 0.007 | 0.013 | - | 0.020 | 0.24 | 0.13 | 0.14 | - | 0.22 |
| Contaminated soiled paper | 0.396 | 0.180 | 0.345 | - | 0.362 | 4.17 | 3.23 | 3.82 | - | 4.07 |
| Other putrescible | 0.645 | 0.157 | 0.785 | - | 0.582 | 6.79 | 2.82 | 8.70 | - | 6.54 |
| Potentially compostable | 1.064 | 0.344 | 1.143 | - | 0.964 | 11.20 | 6.17 | 12.66 | - | 10.83 |
| Non-recyclable paper | 0.831 | 0.463 | 1.025 | - | 0.788 | 8.75 | 8.31 | 11.36 | - | 8.85 |
| Non-recyclable glass | 0.039 | 0.003 | 0.024 | - | 0.033 | 0.41 | 0.05 | 0.27 | - | 0.37 |
| Non-recyclable plastics | 0.892 | 0.490 | 0.737 | - | 0.826 | 9.39 | 8.79 | 8.17 | - | 9.28 |
| Total other ^ | 2.356 | 1.355 | 2.036 | - | 2.192 | 24.81 | 24.31 | 22.56 | - | 24.63 |
| MGB non-recyclable | 4.118 | 2.311 | 3.822 | - | 3.839 | 43.36 | 41.47 | 42.34 | - | 43.13 |
| Total | 9.497 | 5.573 | 9.026 | - | 8.900 | 100.00 | 100.00 | 100.00 | - | 100.00 |

^ Total other was mainly containerised food, textile / rags, ceramics / dust / dirt / rock / inert / ash.

4.5 Hazardous materials

This section provides analysis on hazardous materials disposed in the waste stream.

Figure 6 and Table 16 provide the hazardous materials in the waste stream, which includes Sorting categories classified as hazardous and e-waste, as shown in Table 3.

Hazardous material was 0.26kg/hh/wk (2.9% of the waste stream), with the top materials being:

1. Household chemical, 42.5% of total hazardous material
2. Electrical items and peripherals, 24.7% of total hazardous material
3. Hazardous other, 14.3% of total hazardous material, including items such as:
 - Engine oil – one sample in Area A presented 8.8kg of engine oil
 - Ice packs – two samples in Area A presented 1.1kg and 2.6 kg of ice packs
4. Computer equipment, 5.0% of total hazardous material
5. Dry cell batteries (non-rechargeable), 3.5% of total hazardous material

Table 17 provides the counts of each hazardous item requiring a count in the NSW EPA Guideline. This data is provided as a count of items disposed in the audit and per household per week (item/hh/wk).

The data shows:

- A total of 303 hazardous items were disposed in the audit samples.
- The most common hazardous wastes disposed by count were dry cell batteries (non-rechargeable) (144 items) and electrical items and peripherals (134 items). These two categories accounted for approximately 91.7% of the hazardous items by count.
- An average of 0.34 dry cell batteries are disposed per household per week, which equates to approximately 1 dry cell battery for every 3 households. This is equivalent to 18 dry cell batteries being disposed by one household per year.

Figure 6 - Hazardous material composition – waste stream

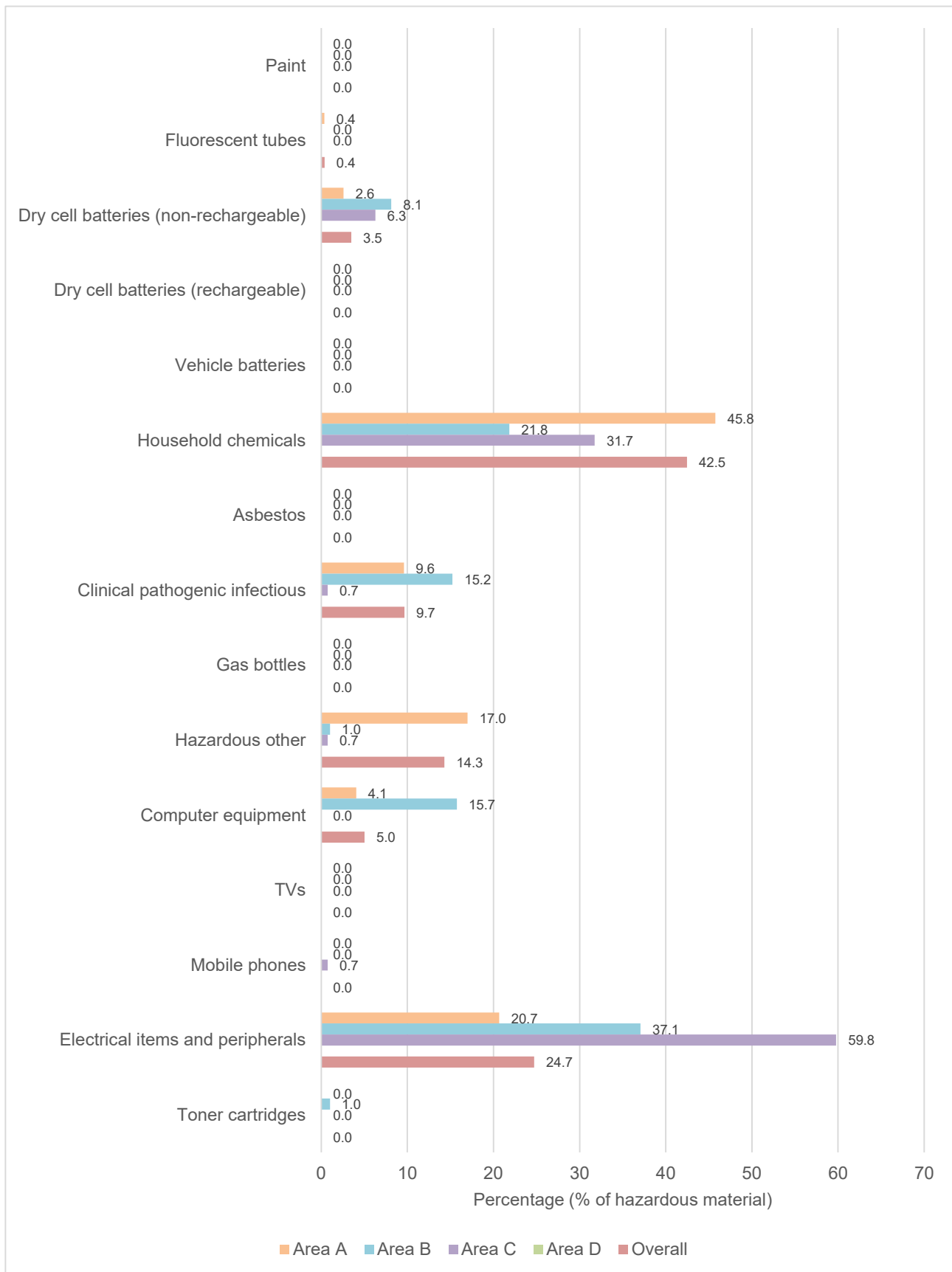


Table 16 - Hazardous material composition – waste stream

| Hazardous categories | Weight (kg/hh/wk) | | | | | Percentage (% by weight) of total hazardous | | | | |
|---------------------------------------|-------------------|--------------|--------------|----------|--------------|---|---------------|---------------|----------|---------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Paint | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Fluorescent tubes | 0.001 | 0.000 | 0.000 | - | 0.001 | 0.37 | 0.00 | 0.00 | - | 0.39 |
| Dry cell batteries (non-rechargeable) | 0.007 | 0.016 | 0.017 | - | 0.009 | 2.58 | 8.12 | 6.27 | - | 3.47 |
| Dry cell batteries (rechargeable) | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Vehicle batteries | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Household chemicals | 0.124 | 0.043 | 0.086 | - | 0.110 | 45.76 | 21.83 | 31.73 | - | 42.47 |
| Asbestos | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Clinical pathogenic infectious | 0.026 | 0.030 | 0.002 | - | 0.025 | 9.59 | 15.23 | 0.74 | - | 9.65 |
| Gas bottles | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Hazardous other | 0.046 | 0.002 | 0.002 | - | 0.037 | 16.97 | 1.02 | 0.74 | - | 14.29 |
| Computer equipment | 0.011 | 0.031 | 0.000 | - | 0.013 | 4.06 | 15.74 | 0.00 | - | 5.02 |
| TVs | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Mobile phones | 0.000 | 0.000 | 0.002 | - | 0.000 | 0.00 | 0.00 | 0.74 | - | 0.00 |
| Electrical items and peripherals | 0.056 | 0.073 | 0.162 | - | 0.064 | 20.66 | 37.06 | 59.78 | - | 24.71 |
| Toner cartridges | 0.000 | 0.002 | 0.000 | - | 0.000 | 0.00 | 1.02 | 0.00 | - | 0.00 |
| Total | 0.271 | 0.197 | 0.271 | - | 0.259 | 100.00 | 100.00 | 100.00 | - | 100.00 |

Table 17 - Hazardous item counts – waste stream

| Hazardous categories | Item count as collected (No. of items) | | | | | Item count per household per week (No. /hh/wk) | | | | |
|---------------------------------------|--|-----------|-----------|----------|------------|--|-------------|-------------|----------|-------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Fluorescent tubes | 5 | 0 | 1 | - | 6 | 0.02 | 0.00 | 0.01 | - | 0.01 |
| Dry cell batteries (non-rechargeable) | 85 | 25 | 34 | - | 144 | 0.28 | 0.63 | 0.45 | - | 0.34 |
| Dry cell batteries (rechargeable) | 0 | 0 | 0 | - | 0 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Vehicle batteries | 0 | 0 | 0 | - | 0 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Gas bottles | 0 | 0 | 0 | - | 0 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Computer equipment | 7 | 4 | 0 | - | 11 | 0.02 | 0.10 | 0.00 | - | 0.03 |
| TVs | 0 | 0 | 0 | - | 0 | 0.00 | 0.00 | 0.00 | - | 0.00 |
| Mobile phones | 0 | 0 | 1 | - | 1 | 0.00 | 0.00 | 0.01 | - | 0.00 |
| Electrical items and peripherals | 78 | 16 | 40 | - | 134 | 0.25 | 0.40 | 0.53 | - | 0.29 |
| Toner cartridges | 3 | 4 | 0 | - | 7 | 0.01 | 0.10 | 0.00 | - | 0.02 |
| Total | 178 | 49 | 76 | - | 303 | 0.58 | 1.23 | 1.00 | - | 0.69 |

4.6 Contamination rate and types

4.6.1 Recycling stream

Figure 7 provides a summary level of the contamination in the recycling stream based on the materials accepted by Council for recycling. All of the data results in this report, are based on bagged materials in the recycling stream being opened and sorted to their material category. This follows the NSW Guideline process. However, the bagged material weights were recorded and provided in the raw data file in the Appendix section.

The data shows that contamination rate was 12.01% of the recycling stream, compared to the benchmarks available:

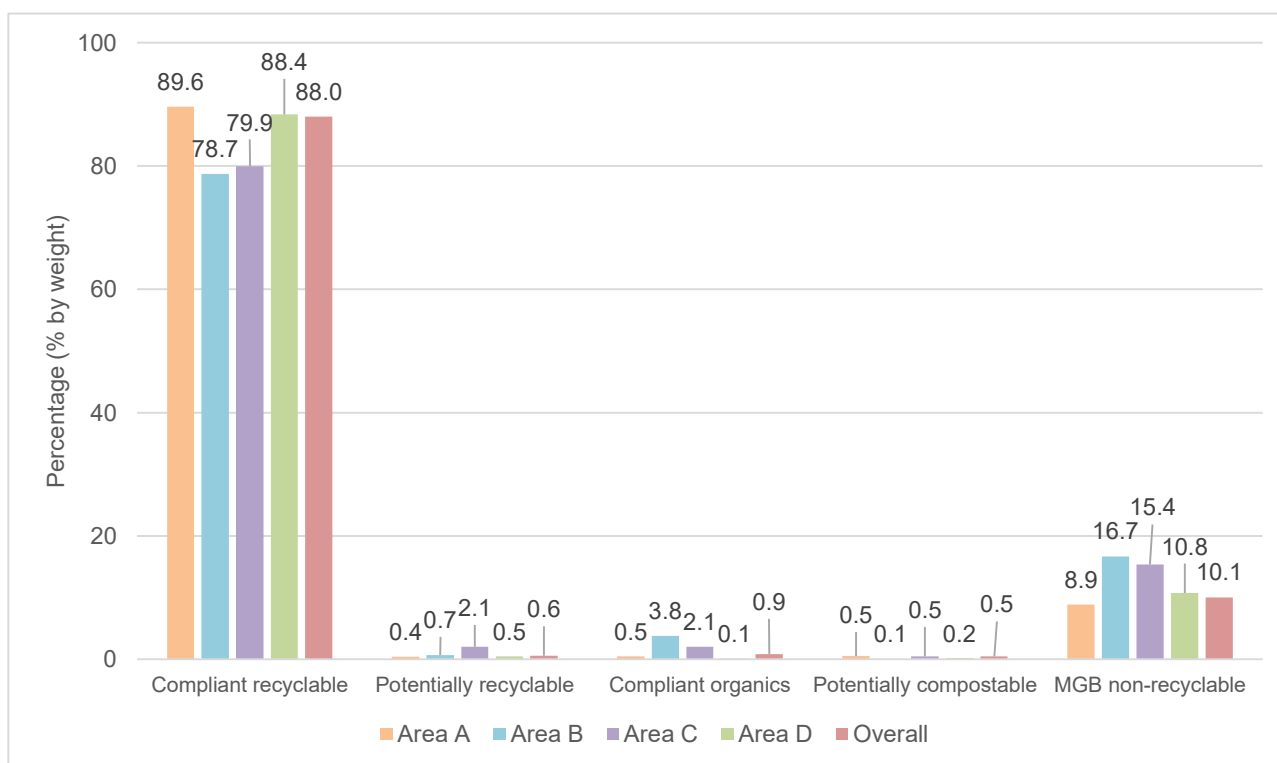
- The NSW EPA audits across the MLA:
 - 5.4% based on audits in 2007-2008 (NSW EPA, 2011, p22).
 - 7.3% based on audits in 2011 (NSW EPA, 2014, p11).
- The 2011 NSW EPA audits across the MLA including 25 Councils audited by EC Sustainable was 7.2% (EC Sustainable, 2012), and approximately 16% for MUDs only.

Although these benchmarks are the most recent results reported, the current results for the MLA may be higher than the 2011 result reported in the NSW EPA (2014). There has been a general decrease in compliant recycling weights. This contributes to the effect of increasing contamination.

Bagged material

Bagged material was 0.76% by weight of the recycling stream bin contents. Approximately 36.28% by weight of bagged material was recyclable. The contamination rate would increase to 12.77% if all bagged material was deemed to be contamination.

Figure 7 - Recycling stream contamination rate



| Percentage (% by weight) | | | | | |
|---------------------------|---------------|---------------|---------------|---------------|---------------|
| Recoverability category | Area A | Area B | Area C | Area D | Overall |
| Compliant material | 89.61 | 78.71 | 79.94 | 88.40 | 87.99 |
| Potentially recyclable | 0.43 | 0.69 | 2.10 | 0.50 | 0.59 |
| Compliant organics | 0.49 | 3.82 | 2.07 | 0.13 | 0.86 |
| Potentially compostable | 0.52 | 0.06 | 0.48 | 0.20 | 0.48 |
| MGB non-recyclable | 8.94 | 16.72 | 15.40 | 10.76 | 10.07 |
| Contamination | 10.39 | 21.29 | 20.06 | 11.60 | 12.01 |
| Total stream | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Weight (kg/hh/wk) | | | | | |
| Compliant material | 2.907 | 1.257 | 2.814 | 3.507 | 2.681 |
| Potentially recyclable | 0.014 | 0.011 | 0.074 | 0.020 | 0.018 |
| Compliant organics | 0.016 | 0.061 | 0.073 | 0.005 | 0.026 |
| Potentially compostable | 0.017 | 0.001 | 0.017 | 0.008 | 0.015 |
| MGB non-recyclable | 0.290 | 0.267 | 0.542 | 0.427 | 0.307 |
| Contamination | 0.337 | 0.340 | 0.706 | 0.460 | 0.366 |
| Total stream | 3.244 | 1.597 | 3.520 | 3.967 | 3.047 |

The results show that the contamination rates were higher for Area B at 21.29% and lowest for Area A at 10.39%. The differences were mainly caused by food, total other contamination and non-recyclable paper as shown in Figure 8 and Table 18.

Figure 8 and Table 18 provide the types of contamination in the recycling stream based on the materials not accepted by Council for recycling. The data shows the top contamination types were:

1. Total other, 31.40% of contamination. This mainly comprises of:
 - Containerised food not in film, 7.38% of contamination
 - Ceramics / dust / dirt / rock / inert / ash, 5.89% of contamination
 - Wood / timber – treated, 2.96% of contamination
 - Household chemicals, 2.89% of contamination
 - Containerised liquid (not Cooking oils), 2.31% of contamination
2. Non-recyclable plastics, 23.67% of the contamination
3. Non-recyclable glass, 14.76% of contamination
4. Non-recyclable paper, 14.04% of contamination

Figure 8 - Recycling stream contamination types



Table 18 - Recycling stream contamination types

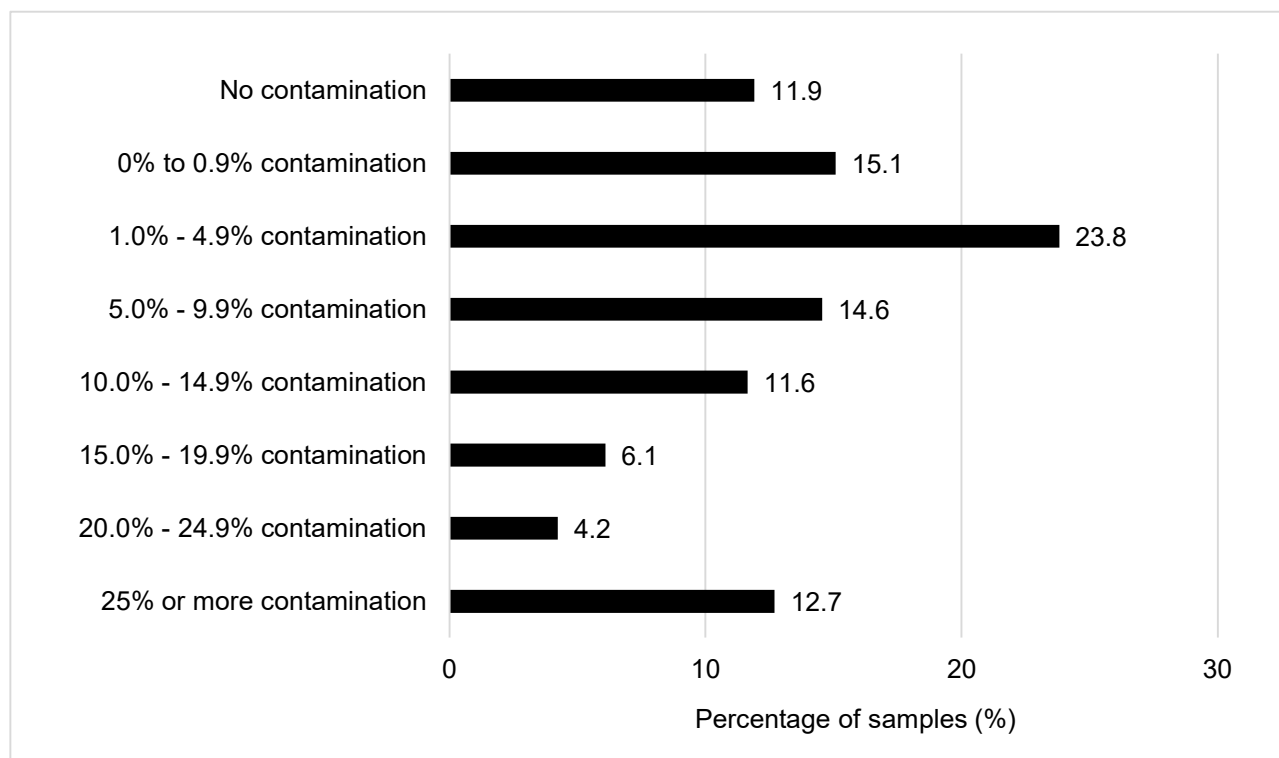
| Recoverability category | Weight (kg/hh/wk) | | | | | Percentage (% by weight of the stream) | | | | | Percentage (% by weight of contamination) | | | | |
|--------------------------------|-------------------|--------------|--------------|--------------|--------------|--|--------------|--------------|--------------|--------------|---|---------------|---------------|---------------|---------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Other steel | 0.010 | 0.011 | 0.071 | 0.019 | 0.015 | 0.31 | 0.69 | 2.02 | 0.48 | 0.48 | 2.97 | 3.24 | 10.06 | 4.13 | 4.03 |
| Other non-ferrous | 0.004 | 0.000 | 0.003 | 0.001 | 0.003 | 0.12 | 0.00 | 0.09 | 0.03 | 0.11 | 1.19 | 0.00 | 0.42 | 0.22 | 0.91 |
| Potentially recyclable | 0.014 | 0.011 | 0.074 | 0.020 | 0.018 | 0.43 | 0.69 | 2.10 | 0.50 | 0.59 | 4.15 | 3.24 | 10.48 | 4.35 | 4.94 |
| Garden organics | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 | 0.30 | 0.00 | 0.00 | 0.00 | 0.21 |
| Food | 0.014 | 0.061 | 0.073 | 0.005 | 0.025 | 0.43 | 3.82 | 2.07 | 0.13 | 0.81 | 4.15 | 17.94 | 10.34 | 1.09 | 6.74 |
| Compostable liners | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 | 0.30 | 0.00 | 0.00 | 0.00 | 0.21 |
| Compliant organics | 0.016 | 0.061 | 0.073 | 0.005 | 0.026 | 0.49 | 3.82 | 2.07 | 0.13 | 0.86 | 4.75 | 17.94 | 10.34 | 1.09 | 7.17 |
| Wood / timber | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 | 0.02 |
| Contaminated soiled paper | 0.007 | 0.001 | 0.016 | 0.008 | 0.007 | 0.22 | 0.06 | 0.45 | 0.20 | 0.22 | 2.08 | 0.29 | 2.27 | 1.74 | 1.87 |
| Other putrescible | 0.010 | 0.000 | 0.000 | 0.000 | 0.008 | 0.31 | 0.00 | 0.00 | 0.00 | 0.26 | 2.97 | 0.00 | 0.00 | 0.00 | 2.13 |
| Potentially compostable | 0.017 | 0.001 | 0.017 | 0.008 | 0.015 | 0.52 | 0.06 | 0.48 | 0.20 | 0.48 | 5.04 | 0.29 | 2.41 | 1.74 | 4.02 |
| Non-recyclable paper | 0.053 | 0.034 | 0.064 | 0.069 | 0.051 | 1.63 | 2.13 | 1.82 | 1.74 | 1.69 | 15.73 | 10.00 | 9.07 | 15.00 | 14.04 |
| Non-recyclable glass | 0.055 | 0.019 | 0.108 | 0.058 | 0.054 | 1.70 | 1.19 | 3.07 | 1.46 | 1.77 | 16.32 | 5.59 | 15.30 | 12.61 | 14.76 |
| Non-recyclable plastics | 0.083 | 0.047 | 0.184 | 0.182 | 0.087 | 2.56 | 2.94 | 5.23 | 4.59 | 2.84 | 24.63 | 13.82 | 26.06 | 39.57 | 23.67 |
| Total other | 0.099 | 0.167 | 0.186 | 0.118 | 0.115 | 3.05 | 10.46 | 5.28 | 2.97 | 3.77 | 29.38 | 49.12 | 26.35 | 25.65 | 31.40 |
| MGB non-recyclable | 0.290 | 0.267 | 0.542 | 0.427 | 0.307 | 8.94 | 16.72 | 15.40 | 10.76 | 10.07 | 86.05 | 78.53 | 76.77 | 92.83 | 83.87 |
| Total contamination | 0.337 | 0.340 | 0.706 | 0.460 | 0.366 | 10.39 | 21.29 | 20.06 | 11.60 | 12.01 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Note: Rounding of figures could lead to slight differences after two decimal places.

Figure 9 provides a count of the extent of contamination in each sample and shows the distribution of contamination. The data shows:

- 11.9% of samples have no contamination
- 15.1% of samples have less than 1% contamination
- 12.7% of samples have 25% or more contamination

Figure 9 - Recycling contamination level distribution



| Percentage of contamination | Number of samples | % of samples | Weight of contamination (kg) | % of total contamination |
|-----------------------------|-------------------|--------------|------------------------------|--------------------------|
| None | 45 | 11.9 | 0.0 | 0.0 |
| Up to 0.9% | 57 | 15.1 | 1.8 | 0.3 |
| 1.0% to 4.9% | 90 | 23.8 | 21.5 | 3.8 |
| 5.0% to 9.9% | 55 | 14.6 | 49.7 | 8.7 |
| 10.0% to 14.9% | 44 | 11.6 | 85.8 | 15.0 |
| 15.0% to 19.9% | 23 | 6.1 | 110.7 | 19.3 |
| 20.0% to 24.9% | 16 | 4.2 | 133.9 | 23.4 |
| 25% or more | 48 | 12.7 | 169.3 | 29.6 |
| Total | 378 | 100.0 | 572.6 | 100.0 |

4.6.2 Organics stream

Figure 10 provides a summary level of the contamination in the organics stream based on the materials accepted by Council for recovery. All of the data results in this report, are based on bagged materials in the organics stream being opened and sorted to their material category. This follows the NSW EPA Guideline process. However, the bagged material weights were recorded and provided in the raw data file in the Appendix section.

The data shows that contamination rate was 2.31% of the organics stream. This result compares to the following benchmarks available for the average FOGO contamination rates:

- NSW EPA (2018, p22) average of 2.6% for all bin configuration from 26 councils across NSW.
- NSW EPA (2018, p22) average of 1.5% for the bin configuration of a weekly FOGO bin and weekly 240L general waste bins.
- NSW EPA (2020, p24) average of 1.6% for the bin configuration of a weekly FOGO bin and fortnightly 240L general waste bins.

Bagged material

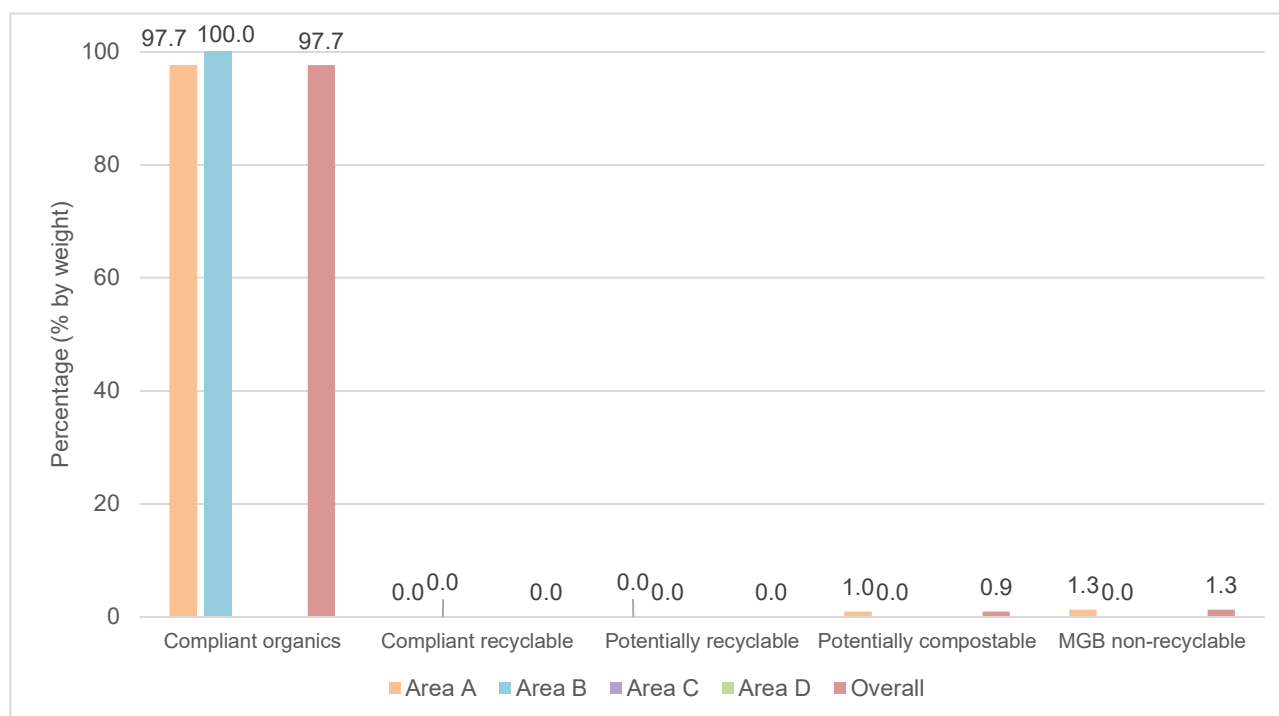
Bags were opened and the bagged contents were sorted into each sorting category.

Non-compostable bags weighed approximately 0.17% of the organics stream, with 100% by weight being contamination. As a result, the contamination rate would remain the same at 2.31% if compostable bags were not opened and assumed to be contamination.

Figure 11 and Table 19 provide the types of contamination in the organics stream based on the materials not accepted by Council for recovery. The data shows the top contamination types were:

1. Total other, 56.44% of contamination. This mainly comprises of:
 - Garden / vegetation – oversized, 38.03% of contamination.
 - Ceramics / dust / dirt / rock / inert / ash, 11.55% of contamination.
 - Wood / timber – treated, 3.60% of contamination.
2. Other putrescible, 36.60% of the contamination
3. Recyclable paper, 1.49% of contamination
4. Contaminated soiled paper, 1.49% of contamination
5. Non-recyclable plastics, 0.99% of contamination

Figure 10 - Organics stream contamination rate



| Percentage (% by weight) | | | | | |
|---------------------------|---------------|---------------|--------|--------|---------------|
| Recoverability category | Area A | Area B | Area C | Area D | Overall |
| Compliant organics | 97.69 | 100.00 | - | - | 97.69 |
| Compliant recycling | 0.03 | 0.00 | - | - | 0.03 |
| Potentially recyclable | 0.00 | 0.00 | - | - | 0.00 |
| Potentially compostable | 0.95 | 0.00 | - | - | 0.95 |
| MGB non-recyclable | 1.33 | 0.00 | - | - | 1.33 |
| Contamination | 2.31 | 0.00 | - | - | 2.31 |
| Total stream | 100.00 | 100.00 | - | - | 100.00 |
| Weight (kg/hh/wk) | | | | | |
| Compliant organics | 8.528 | 0.065 | - | - | 7.263 |
| Compliant recycling | 0.003 | 0.000 | - | - | 0.003 |
| Potentially recyclable | 0.000 | 0.000 | - | - | 0.000 |
| Potentially compostable | 0.083 | 0.000 | - | - | 0.071 |
| MGB non-recyclable | 0.116 | 0.000 | - | - | 0.099 |
| Contamination | 0.202 | 0.000 | - | - | 0.172 |
| Total stream | 8.730 | 0.065 | - | - | 7.435 |

Figure 11 - Organics stream contamination types

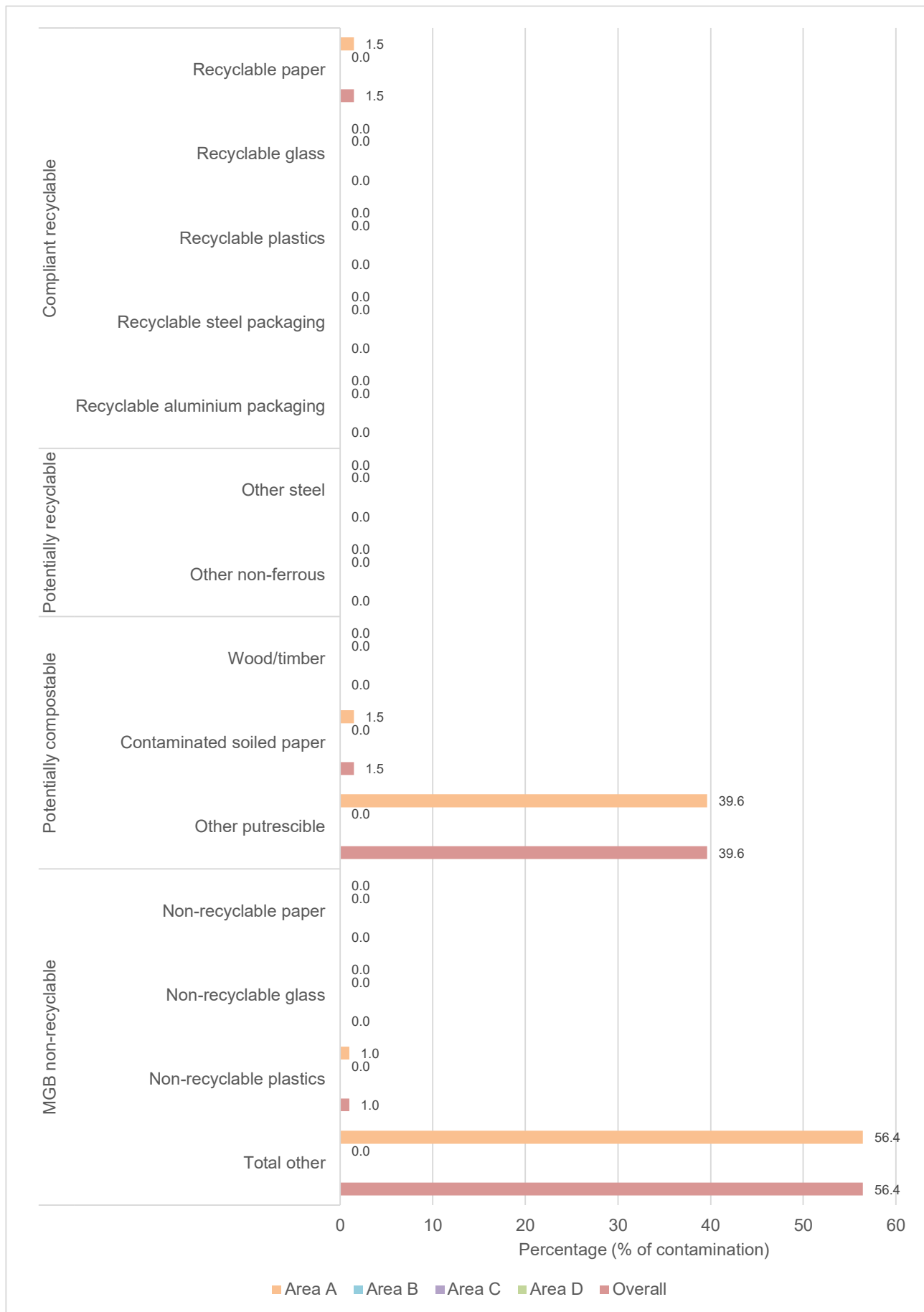


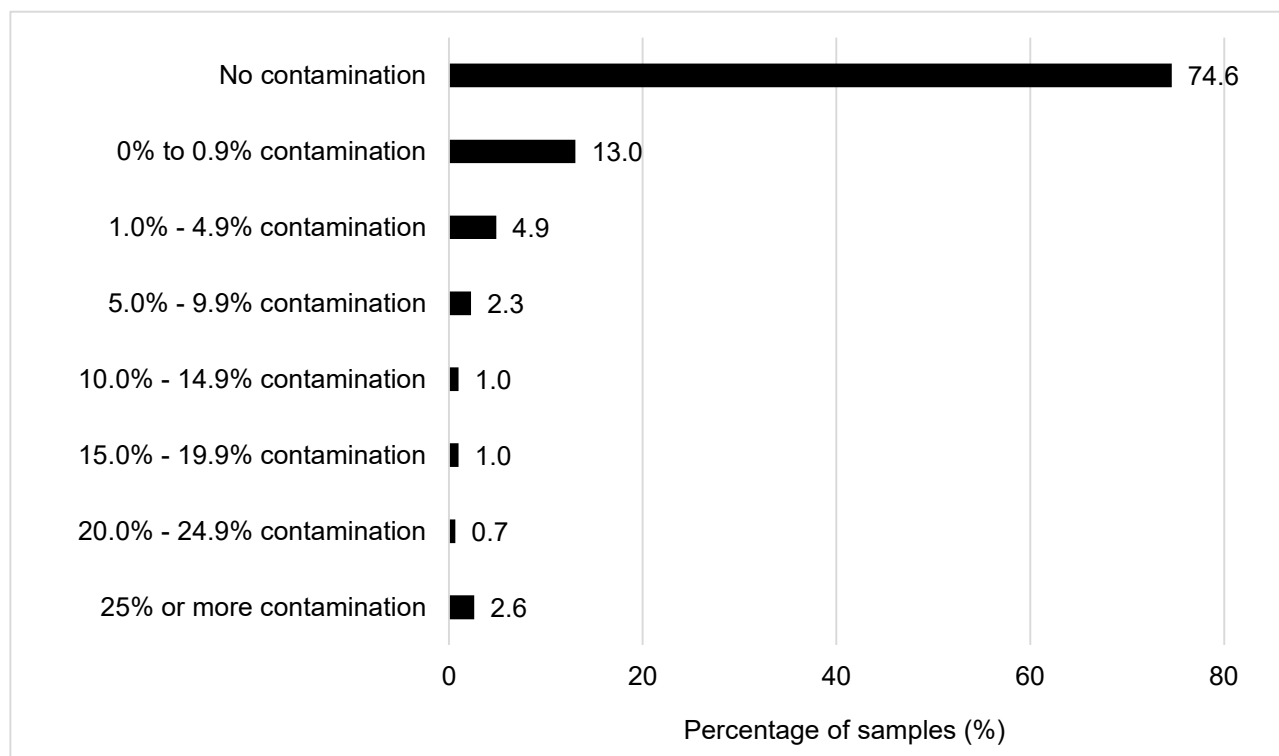
Table 19 - Organics stream contamination types

| Recoverability category | Weight (kg/hh/wk) | | | | | Percentage (% by weight of the stream) | | | | | Percentage (% by weight of contamination) | | | | |
|--------------------------------|-------------------|--------------|----------|----------|--------------|--|-------------|----------|----------|-------------|---|----------|----------|----------|---------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Recyclable paper | 0.003 | 0.000 | - | - | 0.003 | 0.03 | 0.00 | - | - | 0.03 | 1.49 | - | - | - | 1.49 |
| Recyclable glass | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 | 0.00 | - | - | - | 0.00 |
| Recyclable plastics | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 | 0.00 | - | - | - | 0.00 |
| Recyclable steel packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 | 0.00 | - | - | - | 0.00 |
| Recyclable aluminium packaging | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 | 0.00 | - | - | - | 0.00 |
| Recycling bin accepted | 0.003 | 0.000 | - | - | 0.003 | 0.03 | 0.00 | - | - | 0.03 | 1.49 | - | - | - | 1.49 |
| Other steel | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 | 0.00 | - | - | - | 0.00 |
| Other non-ferrous | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 | 0.00 | - | - | - | 0.00 |
| Potentially recyclable | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 | 0.00 | - | - | - | 0.00 |
| Wood / timber | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 | 0.00 | - | - | - | 0.00 |
| Contaminated soiled paper | 0.003 | 0.000 | - | - | 0.003 | 0.03 | 0.00 | - | - | 0.03 | 1.49 | - | - | - | 1.49 |
| Other putrescible | 0.080 | 0.000 | - | - | 0.068 | 0.92 | 0.00 | - | - | 0.92 | 39.60 | - | - | - | 39.60 |
| Potentially compostable | 0.083 | 0.000 | - | - | 0.071 | 0.95 | 0.00 | - | - | 0.95 | 41.09 | - | - | - | 41.09 |
| Non-recyclable paper | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 | 0.00 | - | - | - | 0.00 |
| Non-recyclable glass | 0.000 | 0.000 | - | - | 0.000 | 0.00 | 0.00 | - | - | 0.00 | 0.00 | - | - | - | 0.00 |
| Non-recyclable plastics | 0.002 | 0.000 | - | - | 0.002 | 0.02 | 0.00 | - | - | 0.02 | 0.99 | - | - | - | 0.99 |
| Total other | 0.114 | 0.000 | - | - | 0.097 | 1.31 | 0.00 | - | - | 1.30 | 56.44 | - | - | - | 56.44 |
| MGB non-recyclable | 0.116 | 0.000 | - | - | 0.099 | 1.33 | 0.00 | - | - | 1.33 | 57.43 | - | - | - | 57.43 |
| Total contamination | 0.202 | 0.000 | - | - | 0.172 | 2.31 | 0.00 | - | - | 2.31 | 100.00 | - | - | - | 100.00 |

Figure 12 provides a count of the extent of contamination in each sample and shows the distribution of contamination. The data shows:

- 74.6% of samples have no contamination
- 13.0% of samples have less than 1% contamination
- 2.6% of samples have 25% or more contamination

Figure 12 - Organics contamination level distribution



| Percentage of contamination | Number of samples | % of samples | Weight of contamination (kg) | % of total contamination |
|-----------------------------|-------------------|--------------|------------------------------|--------------------------|
| None | 229 | 74.6 | 0.0 | 0.0 |
| Up to 0.9% | 40 | 13.0 | 2.4 | 1.1 |
| 1.0% to 4.9% | 15 | 4.9 | 12.9 | 5.8 |
| 5.0% to 9.9% | 7 | 2.3 | 21.6 | 9.7 |
| 10.0% to 14.9% | 3 | 1.0 | 26.4 | 11.8 |
| 15.0% to 19.9% | 3 | 1.0 | 33.5 | 15.0 |
| 20.0% to 24.9% | 2 | 0.7 | 44.4 | 19.9 |
| 25% or more | 8 | 2.6 | 81.9 | 36.7 |
| Total | 307 | 100.0 | 223.2 | 100.0 |

4.7 Resource recovery rates

Resource recovery rate is the percentage of a material type that is recovered compared to the overall amount of that material in all streams, as defined in the Glossary section.

4.7.1 Recycling stream

Figure 13 and Table 20 provide the resource recovery rates of recyclable materials at the kerbside, based on the bin systems provided at the kerbside. This is the household performance based on the bin system available, and does not account any additional recovery that may occur after collection, through processing arrangements.

Table 21 shows the data used for the calculation of resource recovery rate:

- Total generation in all streams.
- Correctly recovered in recycling stream.

The data show that the average household recovered a total of 70.30% of compliant recyclables (a total of 3.81kg/hh/wk of recyclable material generated in all streams, with 2.68kg/hh/wk correctly recovered in the recycling stream) at the kerbside.

The materials with the highest resource recovery rates were:

1. Recyclable cardboard, 83.85%
2. Glass packaging, 80.92%
3. HDPE (plastic 2) packaging, 71.85%

Glass, cardboard and paper have high bulk densities and therefore increase the resource recovery rate. However, the generation rates of glass and paper are typically in decline. This may be due to a greater use of plastics and liquid paperboard for containers and more electronic materials instead of paper.

Further initiatives should be considered to increase the recovery of recyclables, particularly for materials with a low resource recovery rate such as liquid paperboard and plastics (excl. HDPE).

Figure 13 - Recycling resource recovery rates

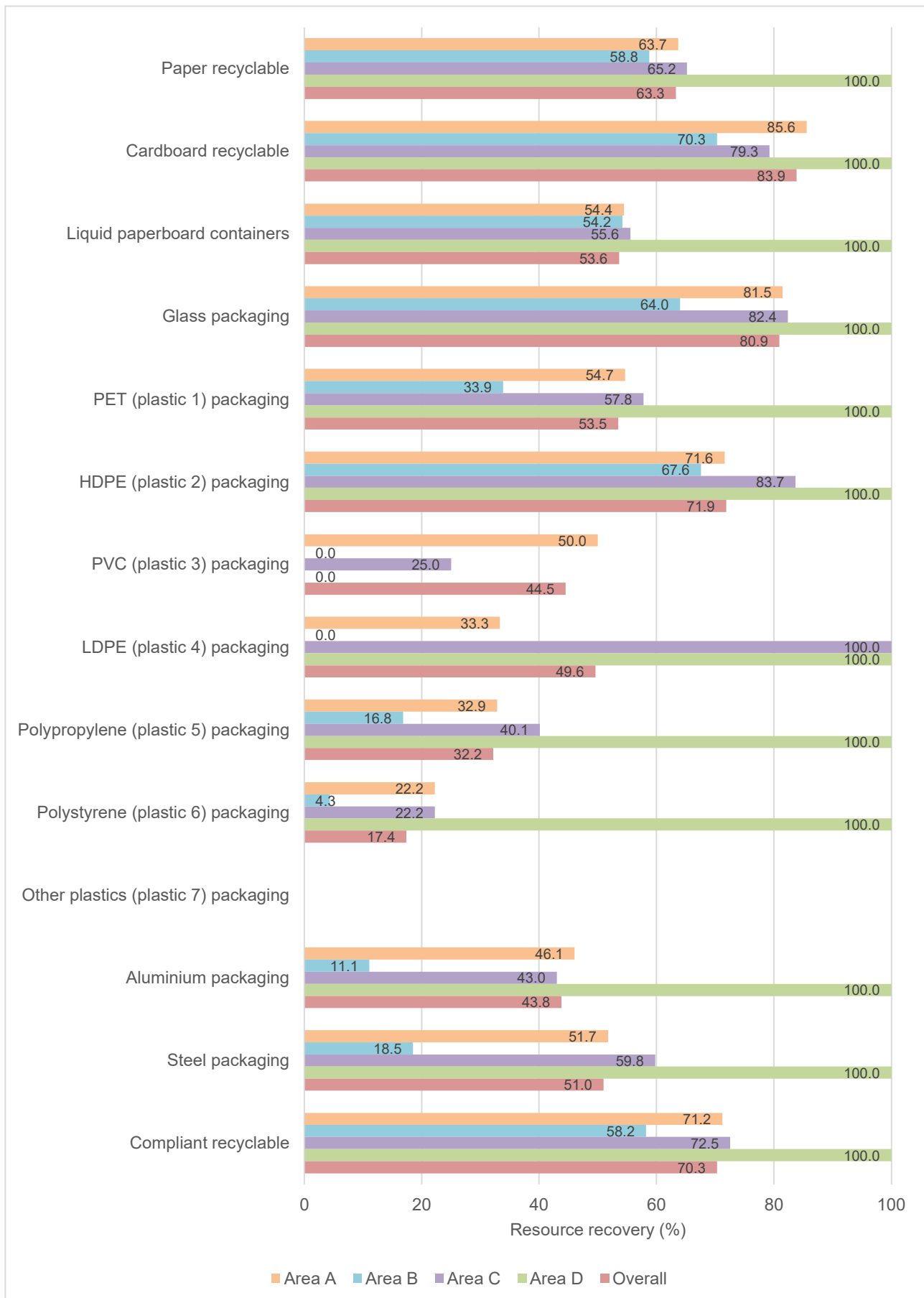


Table 20 - Recycling resource recovery rates

| Material category | Resource recovery rate (% by weight) | | | | |
|---|--------------------------------------|--------------|--------------|---------------|--------------|
| | Area A | Area B | Area C | Area D | Overall |
| Recyclable paper | 63.70 | 58.78 | 65.21 | 100.00 | 63.30 |
| Recyclable cardboard | 85.58 | 70.29 | 79.27 | 100.00 | 83.85 |
| Liquid paperboard containers | 54.43 | 54.17 | 55.56 | 100.00 | 53.60 |
| Glass packaging | 81.49 | 64.01 | 82.38 | 100.00 | 80.92 |
| PET (plastic 1) packaging | 54.65 | 33.87 | 57.79 | 100.00 | 53.47 |
| HDPE (plastic 2) packaging | 71.58 | 67.59 | 83.69 | 100.00 | 71.85 |
| PVC (plastic 3) packaging | 50.00 | - ^ | 25.00 | - ^ | 44.53 |
| LDPE (plastic 4) packaging | 33.33 | - ^ | 100.00 | 100.00 | 49.61 |
| Polypropylene (plastic 5) packaging | 32.85 | 16.83 | 40.12 | 100.00 | 32.18 |
| Polystyrene (plastic 6) packaging | 22.22 | 4.35 | 22.22 | 100.00 | 17.41 |
| Other plastics (plastic 7) packaging | - ^ | - ^ | - ^ | - ^ | - ^ |
| Aluminium cans and foil | 46.05 | 11.11 | 43.01 | 100.00 | 43.80 |
| Steel packaging | 51.72 | 18.52 | 59.79 | 100.00 | 50.96 |
| Total | 71.20 | 58.22 | 72.54 | 100.00 | 70.30 |
| Council-wide, allowing for households without a bin service < | 71.20 | 58.22 | 78.23 | 93.34 | 70.93 |

^ These materials were not observed in the kerbside system in this audit.

< Based on calculating the average Council-wide tonnage for each area (dependent on the number of services provided in each waste stream). It was assumed that the 62 households in Area D with a waste service had the same average waste stream generation rate as Area C. It was also assumed that no households in Area B (MUDs) had organics bins.

Table 21 - Recycling stream compliant material – recovered vs total generation

| Material category | Correctly recovered in recycling bin (kg/hh/wk) | | | | | Total generation in all bin streams (kg/hh/wk) | | | | |
|--------------------------------------|---|--------------|--------------|--------------|--------------|--|--------------|--------------|--------------|--------------|
| | Area A | Area B | Area C | Area D | Overall | Area A | Area B | Area C | Area D | Overall |
| Recyclable paper | 0.609 | 0.358 | 0.476 | 0.616 | 0.565 | 0.956 | 0.609 | 0.730 | 0.616 | 0.893 |
| Recyclable cardboard | 0.991 | 0.466 | 0.677 | 0.723 | 0.893 | 1.158 | 0.663 | 0.854 | 0.723 | 1.065 |
| Liquid paperboard containers | 0.043 | 0.013 | 0.025 | 0.092 | 0.038 | 0.079 | 0.024 | 0.045 | 0.092 | 0.071 |
| Glass packaging | 0.788 | 0.249 | 1.127 | 1.434 | 0.747 | 0.967 | 0.389 | 1.368 | 1.434 | 0.923 |
| PET (plastic 1) packaging | 0.141 | 0.042 | 0.152 | 0.180 | 0.129 | 0.258 | 0.124 | 0.263 | 0.180 | 0.241 |
| HDPE (plastic 2) packaging | 0.136 | 0.098 | 0.118 | 0.198 | 0.130 | 0.190 | 0.145 | 0.141 | 0.198 | 0.181 |
| PVC (plastic 3) packaging | 0.003 | 0.000 | 0.001 | 0.000 | 0.002 | 0.006 | 0.000 | 0.004 | 0.000 | 0.005 |
| LDPE (plastic 4) packaging | 0.001 | 0.000 | 0.016 | 0.001 | 0.002 | 0.003 | 0.000 | 0.016 | 0.001 | 0.004 |
| Polypropylene (plastic 5) packaging | 0.068 | 0.017 | 0.067 | 0.090 | 0.061 | 0.207 | 0.101 | 0.167 | 0.090 | 0.190 |
| Polystyrene (plastic 6) packaging | 0.002 | 0.001 | 0.002 | 0.005 | 0.002 | 0.009 | 0.023 | 0.009 | 0.005 | 0.011 |
| Other plastics (plastic 7) packaging | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Aluminium cans and foil | 0.035 | 0.003 | 0.040 | 0.051 | 0.031 | 0.076 | 0.027 | 0.093 | 0.051 | 0.071 |
| Steel packaging | 0.090 | 0.010 | 0.113 | 0.117 | 0.081 | 0.174 | 0.054 | 0.189 | 0.117 | 0.159 |
| Total | 2.907 | 1.257 | 2.814 | 3.507 | 2.681 | 4.083 | 2.159 | 3.879 | 3.507 | 3.814 |

4.7.2 Organics stream

Figure 14 and Table 22 provide the resource recovery rates of organic materials at the kerbside. This is the household performance based on the bin system available, and does not account for any additional recovery that may occur after collection, through processing arrangements.

Table 23 shows the data used for the calculation of resource recovery rate:

- Total generation in all streams.
- Correctly recovered in the organics stream.

The data show that the average household recovered a total of 71.62% of organics material (a total of 10.14kg/hh/wk of compliant organics material generated in all streams, with 7.26kg/hh/wk correctly recovered in the organics stream) at the kerbside.

The resource recovery rate was high for garden organics, 97.11%.

Figure 14 - Organics resource recovery rates

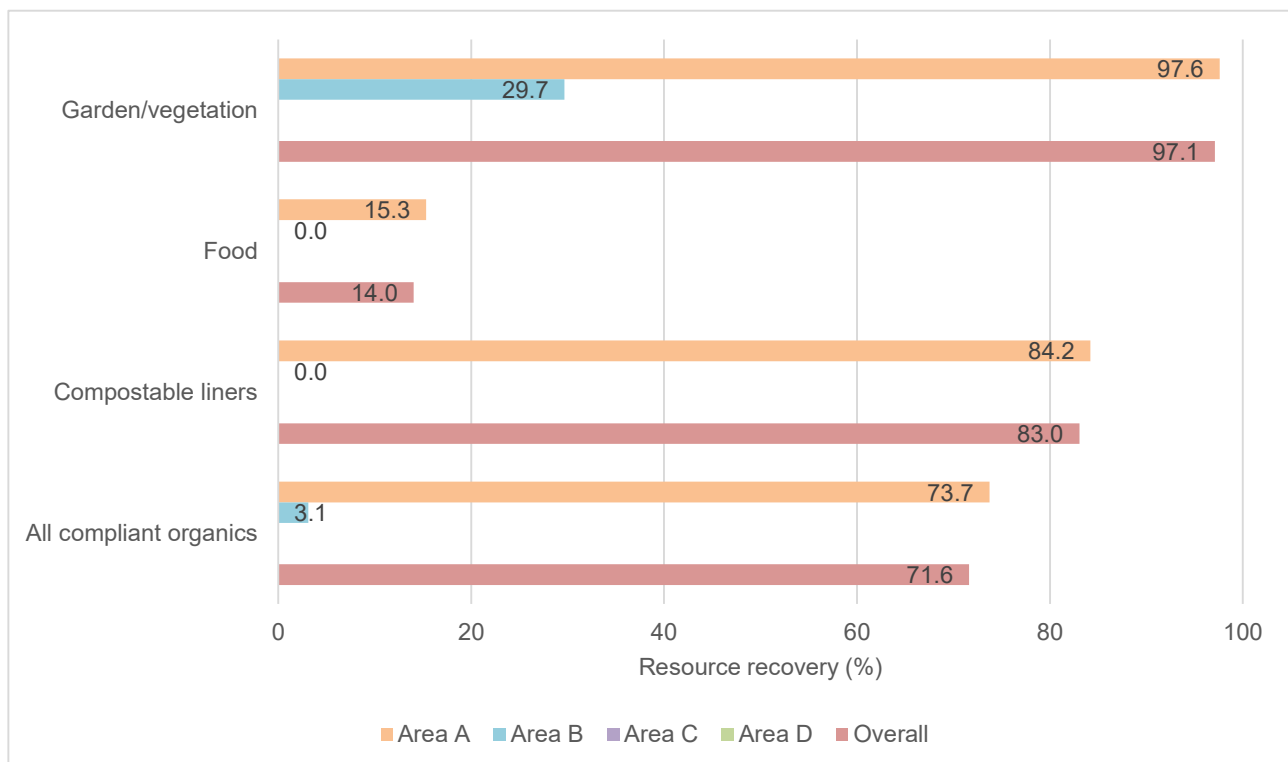


Table 22 - Organics stream resource recovery rates

| Material category | Resource recovery rate (% by weight) | | | | |
|---|--------------------------------------|------------------|----------|----------|--------------|
| | Area A | Area B | Area C | Area D | Overall |
| Garden / vegetation | 97.60 | 29.68 | - | - | 97.11 |
| Food | 15.32 | 0.00 | - | - | 14.03 |
| Compostable liners | 84.21 | - | - | - | 83.05 |
| Total | 73.75 | 3.14 > | - | - | 71.62 |
| Council-wide, allowing for households without a bin service < | 73.75 | - | - | - | 66.83 |

> This result is based on the assumption that food waste was accepted in the optional garden organics bin at MUDs, however, while food is accepted by the processor this material is not advertised as accepted in the garden organics bins.
 < Based on calculating the average Council-wide tonnage for each area (dependent on the number of services provided in each waste stream). It was assumed that the 62 households in Area D with a waste service had the same average waste stream generation rate as Area C. It was also assumed that no households in Area B (MUDs) had organics bins.

Table 23 - Organics stream compliant material – recovered vs total generation

| Material category | Area A | Area B | Area C | Area D | Overall |
|--|---------------|--------------|--------------|--------------|---------------|
| Correctly recovered in organics stream (kg/hh/wk) | | | | | |
| Garden / vegetation | 7.999 | 0.065 | 0.000 | 0.000 | 6.813 |
| Food | 0.513 | 0.000 | 0.000 | 0.000 | 0.436 |
| Compostable liners | 0.016 | 0.000 | 0.000 | 0.000 | 0.014 |
| Total | 8.528 | 0.065 | 0.000 | 0.000 | 7.263 |
| Total generation in all streams (kg/hh/wk) | | | | | |
| Garden / vegetation | 8.196 | 0.219 | 0.418 | 0.000 | 7.016 |
| Food | 3.349 | 1.854 | 2.531 | 0.005 | 3.109 |
| Compostable liners | 0.019 | 0.000 | 0.002 | 0.000 | 0.016 |
| Total | 11.564 | 2.073 | 2.951 | 0.005 | 10.141 |

4.8 Diversion rates

Diversion rate is the percentage of the total waste stream diverted from landfill, as defined in the Glossary section. Table 24 and Figure 15 provide the current kerbside bin diversion rate and potential for improvement based on the implementation of various initiatives. The results have taken into consideration of different collection services.

Current kerbside diversion rate

The average household diverted 51.31% of material at the kerbside based on the current kerbside bin systems. This is the household performance based on the bin system available, and does not account any additional diversion that may occur after collection through processing arrangements.

Further recovery: with current bin system, the diversion rate could increase by:

- 5.83%, if recyclables from the waste stream were recovered
- 1.04%, if compliant garden organics from the waste stream were recovered
- 13.66%, if food material from the waste stream were recovered
- 0.01% if compostable liners from the waste stream were recovered

This will achieve a potential diversion rate of 71.85%.

Figure 15 - Diversion rates

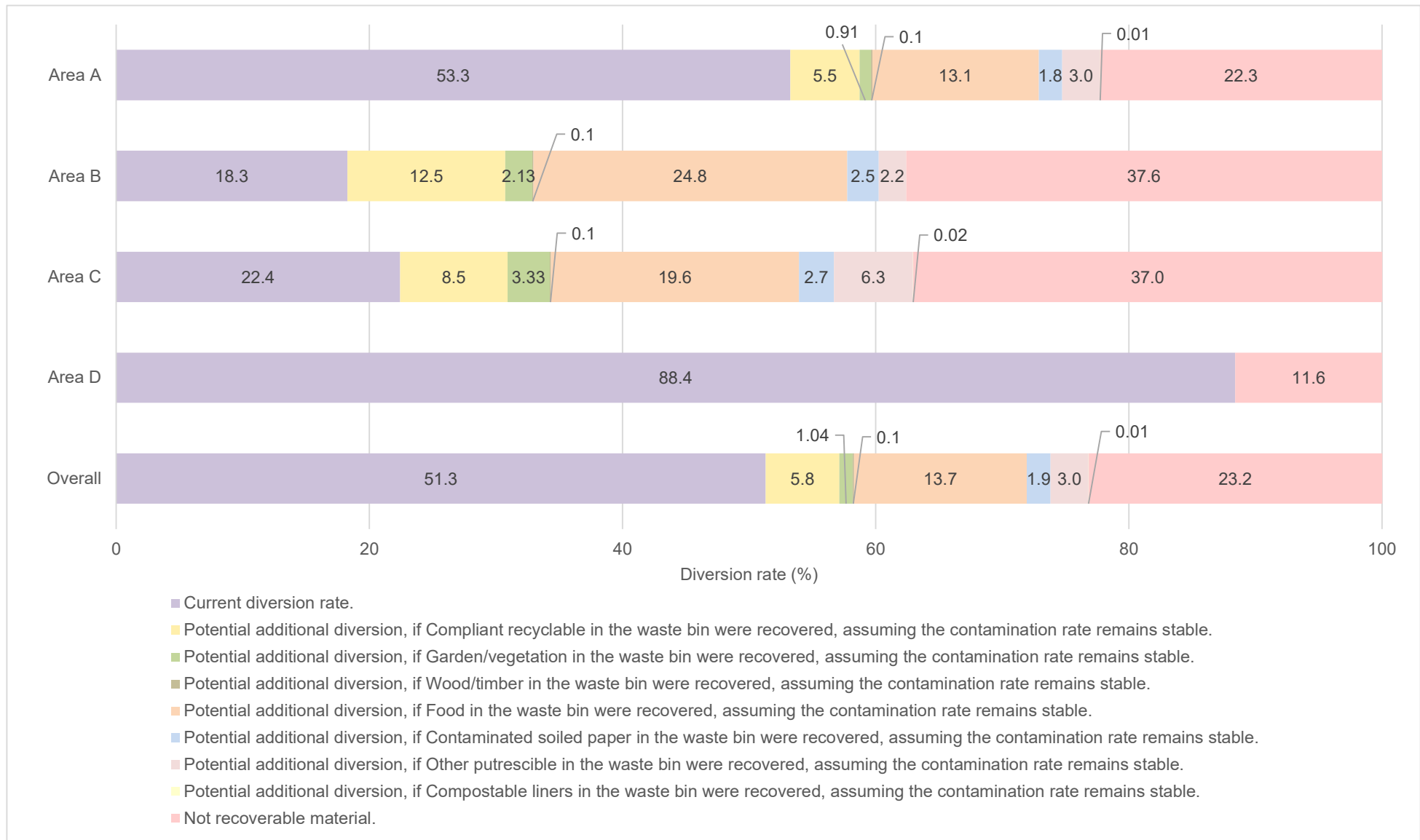


Table 24 - Diversion rates

| Diversion rates | Contributor – % of all streams | | | | | | |
|--|---------------------------------|--------------|--------------|--------------|--------------|--------------|---|
| | Recoverability category | Area A | Area B | Area C * | Area D ^ | Overall | Council-wide, allowing for households without a bin service < |
| Kerbside diversion rate by recovering material in the recycling and organics streams | Recyclables | 13.54 | 17.37 | 22.43 | 88.40 | 13.83 | 14.49 |
| | Garden organics | 37.25 | 0.90 | - | - | 35.15 | 33.64 |
| | Food | 2.39 | 0.00 | - | - | 2.25 | 2.16 |
| | Compostable liners | 0.07 | 0.00 | 0.00 | 0.00 | 0.07 | 0.07 |
| | Kerbside diversion rate | 53.26 | 18.27 | 22.43 | 88.40 | 51.31 | 50.35 |
| Potential diversion rate With the current bin systems, by recovering this material from the waste stream | Recyclables | 5.46 | 12.47 | 8.49 | - | 5.83 | 5.93 |
| | Garden organics | 0.91 | 2.13 | 3.33 | - | 1.04 | 1.07 |
| | Food | 13.14 | 24.78 | 19.59 | - | 13.66 | 13.95 |
| | Compostable liners | 0.01 | 0.00 | 0.02 | - | 0.01 | 0.01 |
| | Total additional | 19.53 | 39.38 | 31.43 | - | 20.54 | 20.95 |
| | Potential diversion rate | 72.79 | 57.65 | 53.86 | - | 71.85 | 71.30 |

* Area C only has a waste and recycling service and therefore, the kerbside diversion rate only considers compliant recyclables.

^ Area D audited households only had a recycling service and therefore, the kerbside diversion rate only considers compliant recyclables. The potential diversion rate cannot be calculated.

< Based on calculating the average Council-wide tonnage for each area (dependent on the number of services provided in each bin stream). It was assumed that the 62 households in Area D with a waste service had the same average waste stream generation rate as Area C. It was also assumed that no households in Area B (MUDs) had organics bins

Table 25 - Resources summary: weights correctly recovered and not recovered

| Contributor | Weight (kg/hh/wk) | | | | |
|--|-------------------|--------|----------|----------|---------|
| | Area A | Area B | Area C * | Area D ^ | Overall |
| Resources correctly recovered in the recycling bins | | | | | |
| Recyclables | 2.907 | 1.257 | 2.814 | 3.507 | 2.681 |
| Resources correctly recovered in the organics bins | | | | | |
| Garden organics | 7.999 | 0.065 | 0.000 | - | 6.813 |
| Food | 0.513 | 0.000 | 0.000 | - | 0.436 |
| Compostable liners | 0.016 | 0.000 | 0.000 | - | 0.014 |
| Resources not recovered in the waste bins > | | | | | |
| Recyclables | 1.173 | 0.902 | 1.065 | - | 1.130 |
| Garden organics | 0.196 | 0.154 | 0.418 | - | 0.202 |
| Food | 2.822 | 1.793 | 2.458 | - | 2.648 |
| Compostable liners | 0.002 | 0.000 | 0.002 | - | 0.002 |

* Area C only has a waste and recycling service and therefore, the kerbside diversion rate only considers compliant recyclables.

^ Area D audited households only had a recycling service and therefore, the kerbside diversion rate only considers compliant recyclables.

> In addition, there can be further "not recovered" material in the incorrect recovery bin, e.g. organics in the recycling and recycling in the organics.

4.9 Sub-sorting – CDS eligibility

This section shows the composition of beverage containers in each stream, taking CDS eligibility into consideration.

- Figure 16 – waste stream
- Figure 17 – recycling stream
- Figure 18 – organics stream

Appendix 2 provides the detailed weight and count for each CDS eligible container category.

The average household disposed of:

- Waste: 0.14kg/hh/wk of beverage containers, which was 1.57% of the stream.
- Recycling: 0.70kg/hh/wk of beverage containers, which was 22.84% of the stream.
- Organics: A total of 0.35kg of PET and aluminium beverage containers were observed in the organics stream. Due to rounding, this equates to less than 0.00kg/hh/wk.

CDS eligible containers were:

- Waste: 61.49% of all beverage containers (0.08kg/hh/wk).
- Recycling: 34.05% of all beverage containers (0.22kg/hh/wk).
- Organics: 100% of beverage containers in the organics stream were CDS eligible.

Figure 16 - Waste stream beverage containers composition – CDS eligibility

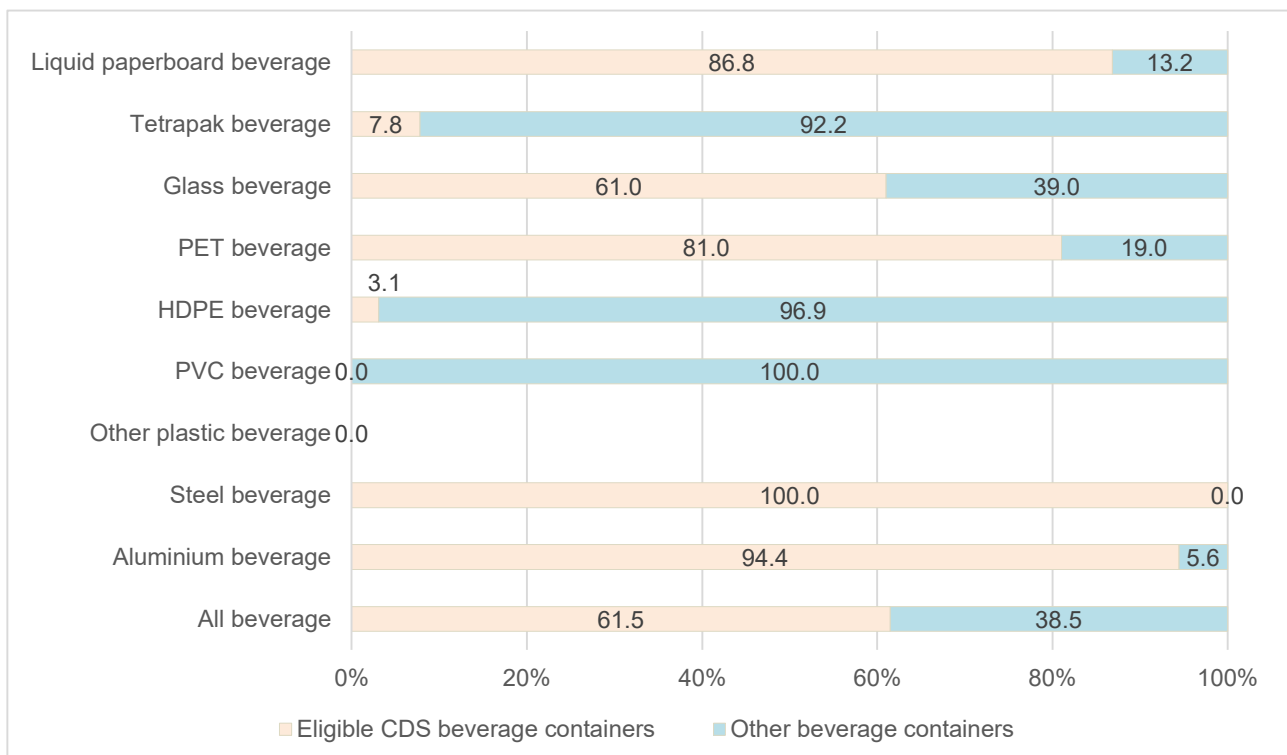


Figure 17 - Recycling stream beverage containers composition – CDS eligibility

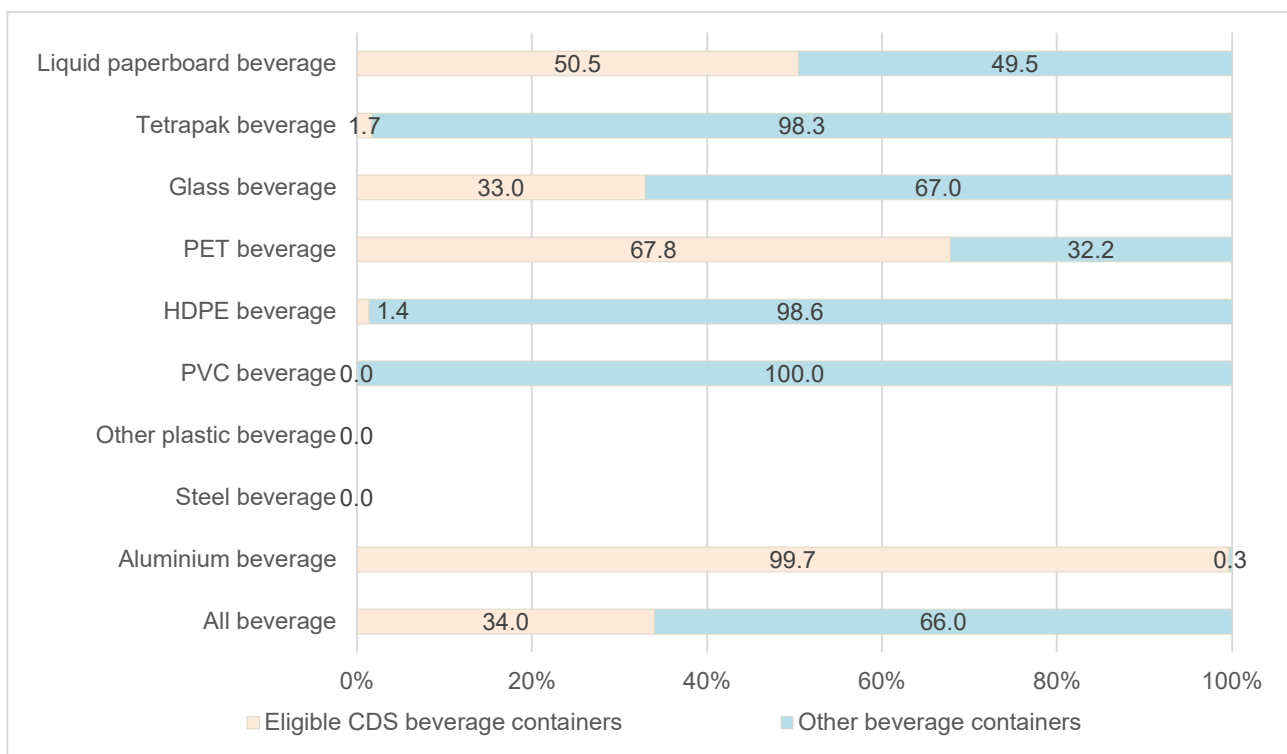


Figure 18 - Organics stream beverage containers composition – CDS eligibility

100% of aluminium and PET beverage containers in the organics stream were CDS eligible.

5 Recommendations

Based on the results of this audit, and experience in waste auditing and waste minimisation initiatives, the following recommendations are made. Council could consider to:

Waste reduction and diversion.

1. Commend residents and stakeholders for achieving reasonable diversion rate and high resource recovery rates, as well as low recycling and organics stream contamination rates.
2. Consider further initiatives to increase diversion. This could include:
 - Recovering more recyclables, particularly items which were heavier ⁶ or had lower resource recovery rates ⁷.
 - Recovering more organics like food, where an organics bin is available.
3. Consider further initiatives to avoid resource loss into the waste stream, particularly recyclables, food and garden organics.
4. Continue to educate residents and encourage the correct recovery of food in the organics stream (where available) rather than the waste stream; food in Area A and Area B, which have a FOGO service, comprised 29.7% (22.82kg/hh/wk) and 32.2% (1.79kg/hh/wk) of the waste stream respectively. This provides Council with an opportunity to recover more organics.
5. Continue to promote the Community Recycling Centre (CRC) and recycling programs for recovery of textiles, C&D, e-waste and plastic bags / films.

Contamination in recycling and organics bins

6. Education should focus on the main contaminants:
 - Recycling stream: non-recyclable plastics, non-recyclable glass and non-recyclable paper.
 - Organics stream: other putrescible, oversized garden vegetation, ceramics / dust / dirt / rock / inert / ash and compostable packaging.
7. Conduct a community consultation survey to determine the reasons for contamination, such as resident understanding of recyclables types and if they had sufficient recycling bin

⁶ Items such as glass bottles and paper/cardboard items, even though they had the higher resource recovery rates.

⁷ Items such as liquid paperboard, plastics containers (except PET and HDPE) and metal.

capacities, particularly for residents in Area B and Area C who presented recycling bins with higher levels of contamination.

8. Conduct bin inspections and bin stickering programs to identify contamination hotspots and provide feedback to the community.
9. Measure any changes in the contamination rate and types through regular composition audits.

CDS containers recovery

10. Commend residents for the high recovery of CDS eligible containers in the recycling stream and use of Return and Earn drop-off locations.
11. Consider further initiatives to recover the remaining CDS containers into the recycling stream from the waste stream targeting aluminium, PET and glass.

Waste strategy and processing

12. Consider the potential initiatives to improve at source separation and post-collection recovery. Without making a conclusion in this study, this data assists Council to consider the optimum system which should be considered in a model alongside the impacts on collection, processing and disposal.

Conduct further auditing

Council could consider developing an audit program to get a comprehensive look at the yearly generation and capture seasonal data. The minimum standard for kerbside audits based on recommendations by NSW EPA (2015) are for audits to be conducted:

- a. Within eight (8) months of a service commencement date.
- b. At a representative time of year, excluding public holidays, school holidays or special events. In general, autumn is usually a representative time of year when the quantity of garden organics typically matches the annual average.
- c. Every two (2) years at approximately the same time of year as previous audits.

Periodic audits will allow Council to track performance (i.e. resource recovery, contamination levels etc.), reassess priorities and set priorities for action. Additional audits could be conducted to capture seasonal data, assess the effectiveness of trials or new services, and monitor contractual agreements. Since bin compositions and quantities can vary based on the season, weather and events, it is beneficial to capture this data to make informed decisions on waste strategies, processing and minimisation.

When developing a financial model for an audit program, Council should establish audit objectives and determine the level of detail and accuracy required to achieve the desired results. This ensures cost and accuracy alignment with budget and informational needs:

- Load method sampling is less resource intensive than individual bag collection.
- Review sample size and the degree of accuracy for result.
- The number of sorting categories could be decreased or increased according to the requirements of an audit. Less categories will reduce costs.
- Focus on relevant bin streams, such as omitting the need to audit other streams if the purpose of the audit is to assess contamination levels in the recycling stream.
- Consider the cost benefits of a long-term audit contract.

6 Audit photos

Figures 19 and 20 provide some photos for this audit.

Figure 19 - Photos of sorting site



5. Sorting site supplied by Council. 2. Collected kerbside bin contents were sorted into the category-labelled bins and weighed.

Figure 20 - Photos of bin contents – waste stream



1. Unrecovered resources: food organics. 2. Unrecovered resources: recyclable paper. 3. Unrecovered resources: recyclable plastic. 4. Unrecovered resources: garden organics. 5. AHW – feminine hygiene. 6. Containerised food / liquid. 7. Hazardous: electrical items and peripherals. 8. Hazardous: household chemicals.

Figure 21 - Photos of bin contents – recycling stream



1. Contamination: non-recyclable plastic.
2. Contamination: non-recyclable glass.
3. Contamination: non-recyclable paper.
4. Hazardous: paint.
5. Corrugated cardboard.
6. Glass beverage containers (not-CDS).
7. Magazines.
8. PET beverage containers (CDS eligible).

Figure 22 - Photos of bin contents – organics stream



1-2. Compliant garden organics. 3. Food organics. 4. Organics in compostable bags. 5. Contamination: oversized garden organics. 6. Contamination: other putrescible. 7. Contamination: ceramics / dust / dirt / rock / inert / ash. 8. Contamination: treated wood / timber.

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NSW EPA (2018), "*Analysis of NSW Food and Garden Bin Audit Data*", NSW Environment Protection Authority (EPA), Sydney.

Abbreviations

| | |
|---------------|----------------------------------|
| ABS | Australian Bureau of Statistics |
| AHW | Absorbent Hygiene Waste |
| CDS | Container Deposit Scheme |
| E-waste | Electronic waste |
| HDPE | High Density Polyethylene |
| LDPE or LLDPE | Low Density Polyethylene |
| LPB | Liquid Paperboard |
| MGB | Mobile Garbage Bin |
| MRF | Materials Recovery Facility |
| MUD | Multiple Unit Dwelling |
| NSW | New South Wales |
| PET | Polyethylene Terephthalate |
| PP | Polypropylene |
| PPE | Personal Protective Equipment |
| PS | Polystyrene |
| PVC | Polyvinyl Chloride |
| SUD | Single Unit (Occupancy) Dwelling |
| WHS | Work Health and Safety |

Glossary

This section defines the main terms in the report and provides the formulae used for calculations. All formulae are based on the properties in the study and are based on the kerbside results, excluding any other improvements that may occur after collection, such as at a processing facility.

Contamination rate: The percentage of the recycling bin (or organics bins) contents not accepted.

$$= \frac{\text{Weight of material not accepted in the recycling bins (or organics bins)}}{\text{Total weight of recycling bins (or organics bins) contents}} \times 100$$

Diversion rate: The percentage of the total waste stream diverted from landfill.

$$= \frac{\text{Weight of materials accepted in the recycling bins and organics bins}}{\text{Total weight of contents of all bins}} \times 100$$

Generation rate: The amount of material generated in a timeframe such as a week, provided by household as weight or volume. The generation rates in this report are based on the contents of the bins presented, not only the compliant material in the bins.

Non-recyclable material: Material that is not accepted for recycling by Council, which is contamination when placed into the recycling bins.

Organics stream: The contents of the green-lidded organics, or Food and Garden Organics (FOGO) bins. Collectively known as the organics stream. Council does not have this bin type.

Presentation rate: The percentage of bins placed out on the kerbside for collection compared to the total number of bins available at those properties

$$= \frac{\text{Bins presented}}{\text{All bins available}} \times 100$$

Recyclable material: Material that is accepted for recycling by Council.

Recycling stream: The contents of the yellow-lidded recycling bins. Collectively known as the recycling stream.

Residual waste bin: The contents of the red-lidded waste bins, also known as also known as garbage or Municipal Solid Waste (MSW). Collectively known as the waste stream.

Resource recovery rate: The percentage of a material type that is recovered compared to the overall amount of that material in all bins in the study.

$$= \frac{\text{Weight of a recyclable material in the correct bin}}{\text{Total weight of that material in all bins}} \times 100$$

Resources in the waste stream: Recoverable material in the residual waste bins.

Appendix 1 – CDS eligibility

Table 26 indicates the criteria required for a container to be eligible for the CDS.

Table 26 - CDS eligibility

| Container types | Container sizes | | | | | | | |
|--|-----------------|--------------|----------|----------|--------|----------|--------|--------|
| | 0-150ml | 151-500 ml | 501ml-1L | 1.1-1.5L | 1.6-2L | 2.1-2.5L | 2.6-3L | >3.1 L |
| Alcoholic sodas and spirit mixers | | | | | | | | |
| Beer | | | | | | | | |
| Cider/fruit based | | | | | | | | |
| Flavoured water/soft drink (carbonated) | | | | | | | | |
| Flavoured water/soft drink/ sports drink (non-carbonated) | | | | | | | | |
| Plain milk | | | | | | | | |
| Flavoured milk | | | | | | | | |
| Pure fruit/veg juice (> 90%) | | | | | | | | |
| Other fruit juice | | | | | | | | |
| Drink pouches | | | | | | | | |
| Plain water (incl. carbonated) | | | | ** | | | | |
| Wine * | | * | | ** | | | | |
| Wine cooler | | | | | | | | |
| Spirit ^ | | Unless glass | | | | | | |
| Other | | | | | | | | |
| * Containers that are plastic and/or foil and 150ml-250ml are not deemed ineligible. | | | | | | | | |
| ^ Containers between sizes 151ml – 3L are eligible, except if glass. | | | | | | | | |
| ** Casks for wine, wine-based beverage or water that are greater than 1L are ineligible. | | | | | | | | |

| Key |
|------------|
| Eligible |
| Ineligible |

Appendix 2 – CDS eligible containers data

This section provides the eligible CDS beverage containers weights and counts. All of the data results in this report, are based on bagged materials in streams being opened and sorted to their material category. This follows the NSW EPA Guideline process. However, the MRF would usually dispose of bagged material in the recycling and garden organics streams to landfill.

By weight

Table 27 provides the weekly generation rate by weight in the three streams and total, as well as the percentage by weight. The results show each household generated 0.30kg/wk of eligible CDS beverage containers in the kerbside bin system:

- 72.33% of eligible CDS beverage containers by weight were in the recycling stream.
- Based on the number of households in the Council area and assuming complete bin presentation, the total weight is equivalent to 362 tonnes of eligible containers per year Council-wide, based on the number of services in the Council area.
- Most of the eligible CDS beverage containers by total weight were glass (67.33%), PET (16.67%) and Aluminium (12.00%).

Table 27 - Eligible CDS beverage containers weights

| Material type | Weight (kg/hh/wk) | | | | Percentage (% by weight) | | | |
|---------------------|-------------------|--------------|--------------|--------------|--------------------------|---------------|----------|---------------|
| | Waste | Recycling | Organics | Total | Waste | Recycling | Organics | Total |
| Liquid Paperboard | 0.006 | 0.004 | 0.000 | 0.010 | 7.23 | 1.84 | - | 3.33 |
| Tetrapak | 0.001 | 0.000 | 0.000 | 0.001 | 1.20 | 0.00 | - | 0.33 |
| Glass | 0.049 | 0.153 | 0.000 | 0.202 | 59.04 | 70.51 | - | 67.33 |
| PET (P1) | 0.014 | 0.036 | 0.000 | 0.050 | 16.87 | 16.59 | - | 16.67 |
| HDPE (P2) | 0.000 | 0.001 | 0.000 | 0.001 | 0.00 | 0.46 | - | 0.33 |
| PVC (P3) | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | - | 0.00 |
| Other plastics (P7) | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | - | 0.00 |
| Steel | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | - | 0.00 |
| Aluminium | 0.013 | 0.023 | 0.000 | 0.036 | 15.66 | 10.60 | - | 12.00 |
| Total | 0.083 | 0.217 | 0.000 | 0.300 | 100.00 | 100.00 | - | 100.00 |

Note: CDS eligible beverage containers (only PET and aluminium) in the organics stream were less than 0.000kg/hh/wk.

By count

Table 28 provides the weekly generation rate by count in the three streams and total, as well as the percentage by count. The results show each household generated approximately 5.57 eligible CDS beverage containers per week in the kerbside bin system:

- 65.87% of eligible CDS beverage containers by count were in the recycling stream.
- Based on the number of households in the Council area and assuming complete bin presentation, the total count is equivalent to 6.7 million eligible containers per year Council-wide, based on the number of services in the Council area.
- Most of the eligible CDS beverage containers by total count were aluminium (42.01%), PET (29.26%) and glass (17.68%).

Table 28 - Eligible CDS beverage containers counts

| Material type | Count (items/hh/wk) ^ | | | | Percentage (% by count) | | | |
|---------------------|-----------------------|-------------|-------------|-------------|-------------------------|---------------|---------------|---------------|
| | Waste | Recycling | Organics | Total | Waste | Recycling | Organics | Total |
| Liquid Paperboard | 0.34 | 0.18 | 0.00 | 0.52 | 18.14 | 4.83 | 0.00 | 9.32 |
| Tetrapak | 0.04 | 0.02 | 0.00 | 0.06 | 2.22 | 0.59 | 0.00 | 1.14 |
| Glass | 0.27 | 0.72 | 0.00 | 0.98 | 14.22 | 19.54 | 0.00 | 17.68 |
| PET (P1) | 0.42 | 1.20 | 0.01 | 1.63 | 22.37 | 32.66 | 58.33 | 29.26 |
| HDPE (P2) | 0.00 | 0.02 | 0.00 | 0.02 | 0.18 | 0.56 | 0.00 | 0.43 |
| PVC (P3) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other plastics (P7) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Steel | 0.01 | 0.00 | 0.00 | 0.01 | 0.46 | 0.00 | 0.00 | 0.16 |
| Aluminium | 0.80 | 1.53 | 0.01 | 2.34 | 42.40 | 41.81 | 41.67 | 42.01 |
| Total | 1.88 | 3.67 | 0.02 | 5.57 | 100.00 | 100.00 | 100.00 | 100.00 |

The number of containers equates to a value of approximately \$0.67 million of eligible CDS containers per year in all streams, with approximately 65.9% of this value, \$0.45 million, in the recycling stream.

Appendix 3 – Additional material sub-sorts

This Appendix provides the results for the sub-sorts of the following categories by weight and percentage:

- Tables 29 and 30: Garden / vegetation – compliant
- Tables 31 and 32: Food / kitchen
- Tables 33 and 34: AHW / nappies

Table 29 - Garden / vegetation – compliant sub-sort by weight (kg/hh/wk)

| Material category | Area A | Area B | Area C | Area D | Overall |
|--------------------------|--------------|--------------|--------------|--------------|--------------|
| Waste stream | | | | | |
| Garden organics – woody | 0.036 | 0.000 | 0.010 | - | 0.029 |
| Garden organics – fleshy | 0.160 | 0.154 | 0.408 | - | 0.173 |
| Total | 0.196 | 0.154 | 0.418 | - | 0.202 |
| Recycling stream | | | | | |
| Garden organics – woody | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Garden organics – fleshy | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 |
| Total | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 |
| Organics stream | | | | | |
| Garden organics – woody | 0.889 | 0.000 | - | - | 0.756 |
| Garden organics – fleshy | 7.110 | 0.065 | - | - | 6.057 |
| Total | 7.999 | 0.065 | - | - | 6.813 |

Table 30 - Garden / vegetation – compliant sub-sort by percentage of stream (% by weight)

| Material category | Area A | Area B | Area C | Area D | Overall |
|--------------------------|--------------|--------------|-------------|-------------|--------------|
| Waste stream | | | | | |
| Garden organics – woody | 0.38 | 0.00 | 0.11 | - | 0.33 |
| Garden organics – fleshy | 1.68 | 2.76 | 4.52 | - | 1.94 |
| Total | 2.06 | 2.76 | 4.63 | - | 2.27 |
| Recycling stream | | | | | |
| Garden organics – woody | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Garden organics – fleshy | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 |
| Total | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 |
| Organics stream | | | | | |
| Garden organics – woody | 10.18 | 0.00 | - | - | 10.17 |
| Garden organics – fleshy | 81.44 | 100.00 | - | - | 81.47 |
| Total | 91.57 | 91.63 | - | - | 91.64 |

Table 31 - Food / kitchen sub-sort by weight (kg/hh/wk)

| Material category | Area A | Area B | Area C | Area D | Overall |
|-------------------------|--------------|--------------|--------------|--------------|--------------|
| Waste stream | | | | | |
| Veg and plant based | 1.271 | 0.509 | 0.789 | - | 1.133 |
| Meat | 0.239 | 0.038 | 0.333 | - | 0.215 |
| Dairy | 0.057 | 0.047 | 0.052 | - | 0.055 |
| Staples | 1.255 | 1.199 | 1.284 | - | 1.245 |
| Total | 2.822 | 1.793 | 2.458 | - | 2.648 |
| Recycling stream | | | | | |
| Veg and plant based | 0.003 | 0.006 | 0.050 | 0.000 | 0.007 |
| Meat | 0.002 | 0.000 | 0.006 | 0.000 | 0.002 |
| Dairy | 0.001 | 0.000 | 0.011 | 0.000 | 0.002 |
| Staples | 0.008 | 0.055 | 0.006 | 0.005 | 0.014 |
| Total | 0.014 | 0.061 | 0.073 | 0.005 | 0.025 |
| Organics stream | | | | | |
| Veg and plant based | 0.349 | 0.000 | - | - | 0.297 |
| Meat | 0.054 | 0.000 | - | - | 0.046 |
| Dairy | 0.005 | 0.000 | - | - | 0.004 |
| Staples | 0.105 | 0.000 | - | - | 0.089 |
| Total | 0.513 | 0.000 | - | - | 0.436 |

Table 32 - Food / kitchen sub-sort by percentage of stream (% by weight)

| Material category | Area A | Area B | Area C | Area D | Overall |
|-------------------------|--------------|--------------|--------------|-------------|--------------|
| Waste stream | | | | | |
| Veg and plant based | 13.38 | 9.13 | 8.74 | - | 12.73 |
| Meat | 2.52 | 0.68 | 3.69 | - | 2.42 |
| Dairy | 0.60 | 0.84 | 0.58 | - | 0.62 |
| Staples | 13.21 | 21.51 | 14.23 | - | 13.99 |
| Total | 29.72 | 32.17 | 27.23 | - | 29.75 |
| Recycling stream | | | | | |
| Veg and plant based | 0.09 | 0.38 | 1.42 | 0.00 | 0.22 |
| Meat | 0.06 | 0.00 | 0.17 | 0.00 | 0.07 |
| Dairy | 0.03 | 0.00 | 0.31 | 0.00 | 0.05 |
| Staples | 0.25 | 3.44 | 0.17 | 0.13 | 0.47 |
| Total | 0.43 | 3.82 | 2.07 | 0.13 | 0.81 |
| Organics stream | | | | | |
| Veg and plant based | 4.00 | 0.00 | - | - | 3.99 |
| Meat | 0.62 | 0.00 | - | - | 0.62 |
| Dairy | 0.06 | 0.00 | - | - | 0.06 |
| Staples | 1.20 | 0.00 | - | - | 1.20 |
| Total | 5.88 | 0.00 | - | - | 5.87 |

Table 33 - AHW / nappies sub-sort by weight (kg/hh/wk)

| Material category | Area A | Area B | Area C | Area D | Overall |
|-------------------------------|--------------|--------------|--------------|--------------|--------------|
| Waste stream | | | | | |
| Disposable nappies – adult | 0.056 | 0.000 | 0.007 | - | 0.045 |
| Disposable nappies – children | 0.656 | 0.391 | 0.955 | - | 0.634 |
| Feminine hygiene | 0.074 | 0.038 | 0.023 | - | 0.066 |
| Total | 0.786 | 0.429 | 0.985 | - | 0.745 |
| Recycling stream | | | | | |
| Disposable nappies – adult | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 |
| Disposable nappies – children | 0.002 | 0.000 | 0.032 | 0.020 | 0.004 |
| Feminine hygiene | 0.000 | 0.000 | 0.000 | 0.005 | 0.000 |
| Total | 0.003 | 0.000 | 0.033 | 0.025 | 0.005 |
| Organics stream | | | | | |
| Disposable nappies – adult | 0.000 | 0.000 | - | - | 0.000 |
| Disposable nappies – children | 0.000 | 0.000 | - | - | 0.000 |
| Feminine hygiene | 0.000 | 0.000 | - | - | 0.000 |
| Total | 0.000 | 0.000 | - | - | 0.000 |

Table 34 - AHW / nappies sub-sort by percentage of stream (% by weight)

| Material category | Area A | Area B | Area C | Area D | Overall |
|-------------------------------|-------------|-------------|--------------|-------------|-------------|
| Waste stream | | | | | |
| Disposable nappies – adult | 0.59 | 0.00 | 0.08 | - | 0.51 |
| Disposable nappies – children | 6.91 | 7.02 | 10.58 | - | 7.12 |
| Feminine hygiene | 0.78 | 0.68 | 0.25 | - | 0.74 |
| Total | 8.28 | 7.70 | 10.91 | - | 8.37 |
| Recycling stream | | | | | |
| Disposable nappies – adult | 0.03 | 0.00 | 0.03 | 0.00 | 0.03 |
| Disposable nappies – children | 0.06 | 0.00 | 0.91 | 0.50 | 0.14 |
| Feminine hygiene | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 |
| Total | 0.09 | 0.00 | 0.94 | 0.63 | 0.17 |
| Organics stream | | | | | |
| Disposable nappies – adult | 0.00 | 0.00 | - | - | 0.00 |
| Disposable nappies – children | 0.00 | 0.00 | - | - | 0.00 |
| Feminine hygiene | 0.00 | 0.00 | - | - | 0.00 |
| Total | 0.00 | 0.00 | - | - | 0.00 |

Appendix 4 – Comparison with previous audits

This Appendix provides a comparison of key data indicators with the previous audits where data is available.

- 2015 audit (Australian National University, 2015) – waste, recycling and organics streams for Queanbeyan City Council (pre-merger).
- 2015 audit (EC Sustainable, 2015) – waste and organics streams for Palerang Council (pre-merger).
- 2018 audit (EC Sustainable, 2018) – waste, recycling and organics streams for Queanbeyan-Palerang Regional Council (post-merger).
- 2023 audit – waste, recycling and organics streams (this audit).

This audit follows a previous audit in 2018. A major change since then was the expansion of the FOGO bin service to all urban 3-bin areas:

- The former GO service in Queanbeyan and Googong is now FOGO.
- The FOGO service remains the same in Braidwood, Bungendore and Captains Flat.
- MUDs with shared bins have a GO bin service, however, the contents are sent to the same processing facility as FOGO and therefore the acceptance criteria is the same as the FOGO service.

Table 35 shows a comparison of the key data indicators:

- **Presentation rate:** remained stable across the 2018 and 2023 audits for waste at 80.4% (2018) and 80.0% (2023), and organics at 71.2% (2018) and 70.3% (2023). The recycling stream presentation rate has increased from 70.9% (2018) to 76.7% (2023).
- **Generation rates:**
 - The waste stream generation rate decreased from 10.4kg/hh/wk (Queanbeyan – 2015) and 10.2kg/hh/wk (Palerang – 2015) to 8.4kg/hh/wk (2018) and has remained stable at 8.9kg/hh/wk (2023).
 - The recycling stream generation rate has shown a decreasing trend from 5.0kg/hh/wk (Queanbeyan – 2015) to 4.1kg/hh/wk (2018) and 3.1kg/hh/wk (2023).

- The organics stream generation rate has fluctuated from 9.5kg/hh/wk (Palerang – 2015) to 4.7kg/hh/wk (2018) and 7.4kg/hh/wk (2023). This may be due to seasonal factors influencing the generation of organics, particularly garden organics.
- **Unrecovered resources in the waste stream:**
 - There has been a general decrease in the recycling in the waste stream by weight and percentage from 1.3kg/hh/wk or 14.9% (2018) to 1.1kg/hh/wk or 12.7% (2023).
 - There has been a large decrease in food in the waste stream by weight and percentage from 3.6kg/hh/wk or 43.2% (2018) to 2.7kg/hh/wk or 29.8% (2023).
- **Recycling contamination:** contamination in the recycling stream has fallen by weight and percentage from 0.6kg/hh/wk or 14.3% (2018) to 0.4kg/hh/wk or 12.0% (2023).
- **Organics contamination:** contamination in the organics stream has remained stable by weight at 0.2kg/hh/wk (2018 and 2023) but, due to an increase in the organics stream generation rate, has decreased by percentage from 3.7% (2018) to 2.3% (2023).
- **Resource recovery rates:** the recycling resource recovery rate has remained stable at 73.9% (2018) and 70.3% (2023), however, this is a decrease from 87.7% (Queanbeyan – 2015). The organics resource recovery rate has increased from 49.3% (2018) to 71.6% (2023). Similarly, this is a decrease from 88.9% (Palerang – 2015), however, this may reflect changes in the acceptable materials in the organics stream across different audits.
- **Diversion rate:** the current diversion rate has increased from 46.7% (2018) to 51.3% (2023).

The audit results also show the number of beverage containers eligible for CDS 10c refund available in the kerbside bin system has decreased since the 2018 audit. This may be due to factors such as varying seasonal generation, or proximity of household to a return point.

Table 35 - Historic key results comparison

| Data indicator | | Unit of measurement | 2015 | | 2018 | 2023 |
|---------------------------------|--------------------------|-------------------------|-------------|-------------|--------------|--------------|
| | | | Queanbeyan | Palerang | | |
| Presentation rate | Percentage (%) | Waste stream | - | - | 80.4 | 80.0 |
| | | Recycling stream | - | - | 70.9 | 76.7 |
| | | Organics stream | - | - | 71.2 | 70.3 |
| Generation rate | By weight (kg/hh/wk) | Waste stream | 10.4 | 10.2 | 8.42 | 8.90 |
| | | Recycling stream | 5.0 | - | 4.13 | 3.05 |
| | | Organics stream | - | 9.5 | 4.69 | 7.43 |
| | | All streams | 15.4 | 19.7 | 17.24 | 19.38 |
| | By volume (bin % full) | Waste stream | 58.5 | 69.0 | 67.7 | 65.8 |
| | | Recycling stream | 45.3 | - | 74.1 | 70.1 |
| | | Organics stream | - | 71.3 | 69.3 | 53.8 |
| Resources in the waste stream ^ | By weight (kg/hh/wk) | Compliant recyclables * | 1.2 + | 1.4 | 1.25 | 1.13 |
| | | Garden organics < | 4.4 + | 5.8 | 0.09 | 0.20 |
| | | Food < | | | 3.64 | 2.65 |
| | | Other organics | | | 0.58 | 0.97 |
| | Percentage (% by weight) | Compliant recyclables * | 11.6 + | 13.7 | 14.9 | 12.7 |
| | | Garden organics < | 42.6 + | 57.0 | 1.1 | 2.3 |
| | | Food < | | | 43.2 | 29.8 |
| | | Other organics | | | 6.9 | 10.9 |
| Contamination | Weight (kg/hh/wk) | Recycling stream | 0.9 | - | 0.59 | 0.37 |
| | | Organics stream | - | 0.1 | 0.17 | 0.17 |
| | Rate (% by weight) | Recycling stream | 17.1 | - | 14.3 | 12.0 |
| | | Organics stream | - | 1.8 | 3.7 ^A | 2.3 |
| Resource recovery ^ | Rate (% by weight) | Recycling stream | 87.7 | - | 73.9 | 70.3 |
| | | Organics stream | - | 88.9 | 49.3 | 71.6 |
| Diversion ^^ | Rate (% by weight) | Current | 26.3 # | - | 46.7 > | 51.3 |
| | | Potential | - | - | 78.2 > | 71.9 |
| Eligible CDS containers | Weight (kg/hh/wk) | Recycling stream | NA | NA | 0.88 | 0.22 |
| | | All streams | NA | NA | 1.04 | 0.30 |
| | Count (count/hh/wk) | Waste stream | NA | NA | 3.0 | 1.9 |
| | | Recycling stream | NA | NA | 8.8 | 3.7 |
| | | Organics stream | NA | NA | 0.0 | 0.0 |
| | | All streams | NA | NA | 11.8 | 5.6 |

* Recycling bin compliant material, which should be placed into recycling bins for recovery. Refer to Table 3 for detailed material types.

< Organics bin compliant material, which should be placed into organics bins for recovery. Refer to Table 3 for detailed material types.

^ At the kerbside for kerbside performance data based on accepted material in each service type.

^^ Diversion rate based on households with a bin service only. Potential diversion rates, if the material is recovered from the residual waste stream.

+ Calculated by EC Sustainable based on the results provided in 2015 Queanbeyan report (Figure 1 and Table 9) (Australian National University, 2015).

The organics stream was not audited and therefore not included in the calculation. The actual diversion rate in 2015 at Queanbeyan could be higher than reported if recovered organics in the organics bins are taken into consideration.

> For comparison purposes, the 2018 result was based on garden organics, not all FOGO accepted material recovered at the kerbside.

*^ In comparison to the Palerang 2015 audit, the 2018 audit and 2023 audits have fewer accepted materials in FOGO bins. These changes have been reflected in the audit results.

Appendix 5 – Raw data

This Appendix provides the raw data in a separate Excel file.