



REPORT PRODUCED FOR:  
Queanbeyan-Palerang Regional Council

# Household Kerbside Bin System Audit 2018



Report: March 2018

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# Table of contents

List of figures .....	v
Executive summary .....	vi
<b>1 Introduction.....</b>	<b>1</b>
1.1 Background .....	1
1.2 Objectives.....	2
1.3 Council information .....	2
1.4 Document structure .....	3
<b>2 Project methods.....</b>	<b>4</b>
2.1 What is a waste audit?.....	4
2.2 Guidelines.....	4
2.3 Sampling.....	4
2.4 Audit .....	6
2.4.1 Timing.....	6
2.4.2 Pre-collection bin survey .....	6
2.4.3 Collection.....	6
2.4.4 Sorting .....	6
2.5 Data analysis .....	9
2.6 Management systems.....	10
2.6.1 Quality control.....	10
2.6.2 Work Health and Safety .....	10
<b>3 Assumptions and limitations .....</b>	<b>11</b>
<b>4 Results.....</b>	<b>12</b>
4.1 Presentation rate .....	12
4.2 Generation rates .....	14
4.2.1 By weight .....	14
4.2.2 By volume.....	14
4.3 Composition.....	18
4.3.1 Waste bin.....	18
4.3.2 Recycling bin .....	27
4.3.3 Organics bin .....	36
4.4 Unrecovered resources.....	45
4.5 Hazardous materials .....	49
4.6 Contamination rate and types .....	53
4.6.1 Recycling bin .....	53
4.6.2 Organics bin .....	59
4.7 Resource recovery rates at the kerbside.....	64
4.7.1 Recycling bin .....	64
4.7.2 Organics bin .....	67
4.8 Diversion rates at the kerbside.....	69
<b>5 Recommendations.....</b>	<b>71</b>
<b>6 Audit photos.....</b>	<b>73</b>
<b>References .....</b>	<b>79</b>
<b>List of abbreviations.....</b>	<b>80</b>
<b>Glossary .....</b>	<b>81</b>
<b>Appendix 1 – CDS assumption .....</b>	<b>82</b>
<b>Appendix 2 – CDS eligible containers data.....</b>	<b>83</b>
<b>Appendix 3 – Comparison with previous audits.....</b>	<b>86</b>
<b>Appendix 4 – Raw data.....</b>	<b>88</b>

# List of tables

Table 1 - Council bin systems and services.....	3
Table 2 - Sample frame.....	5
Table 3 - Material categories and Australian Waste Database (AWD) codes .....	7
Table 4 - Weighting factor (%) .....	9
Table 5 - Bin presentation rate (%) .....	13
Table 6 - Generation rate – by weight.....	15
Table 7 - Generation rate – by volume .....	15
Table 8 - Bin percentage full (%) .....	17
Table 9 - Waste bin composition – weight (kg/hh/wk) .....	20
Table 10 - Waste bin composition – percentage (% by weight).....	22
Table 11 - Compliant materials in the recycling bin – percentage (% by weight) .....	28
Table 12 - Recycling bin composition – weight (kg/hh/wk) .....	30
Table 13 - Recycling bin composition – percentage (% by weight) .....	32
Table 14 - Compostable materials in the organics bin – percentage (% by weight) .....	37
Table 15 - Organics bin composition – weight (kg/hh/wk) .....	39
Table 16 - Organics bin composition – percentage (% by weight) .....	41
Table 17 - Hazardous item counts in the waste bin .....	52
Table 18 - Organics bin contamination rate – percentage (% by weight).....	60
Table 19 - Recycling resource recovery rates .....	66
Table 20 - Organics resource recovery rates.....	67
Table 21 - Diversion rates – current and potential .....	69
Table 22 - CDS eligibility.....	82
Table 23 - Eligible CDS beverage container weights .....	83
Table 24 - Eligible CDS beverage container counts .....	84
Table 25 - Key data indicators – by year .....	87

# List of figures

Figure 1 - Waste bin composition NSW EPA summary categories – percentage (% by weight) .....	18
Figure 2 - Waste bin additional sub-sorts, overall .....	25
Figure 3 - Waste bin sub-sorts for CDS beverage eligibility, overall .....	26
Figure 4 - Recycling bin composition NSW EPA summary categories – percentage (% by weight) .....	27
Figure 5 - Recycling bin additional sub-sorts, overall .....	34
Figure 6 - Recycling bin sub-sorts for CDS beverage eligibility, overall .....	35
Figure 7 - Organics bin composition NSW EPA summary categories – percentage (% by weight) .....	36
Figure 8 - Organics bin additional sub-sorts, overall .....	43
Figure 9 - Organics bin sub-sorts for CDS beverage eligibility, overall .....	44
Figure 10 - Unrecovered resources in the waste bin – summary .....	46
Figure 11 - Unrecovered resources in the waste bin – detailed .....	47
Figure 12 - Hazardous materials in the waste bin .....	50
Figure 13 - Recycling bin contamination rate – percentage (% by weight) .....	54
Figure 14 - Recycling bin contamination types – percentage (% of contamination) .....	56
Figure 15 - Recycling overall contamination level distribution .....	58
Figure 16 - Organics bin contamination types – percentage (% of contamination) .....	61
Figure 17 - Organics overall contamination level distribution .....	63
Figure 18 - Recycling resource recovery rates .....	65
Figure 19 - Organics resource recovery rates .....	68
Figure 20 - Diversion rates – current and maximum potential .....	70
Figure 21 - Photos of waste bin contents – unrecovered compostable materials .....	73
Figure 22 - Photos of waste bin contents – unrecovered recyclables .....	74
Figure 23 - Photos of waste bin contents – hazardous items .....	75
Figure 24 - Photos of waste bin contents – other items .....	76
Figure 25 - Photos of recycling bin contents – contamination .....	77
Figure 26 - Photos of organics bin contents – contamination .....	78
Figure 27 - CDS eligible beverage container, all bin streams – percentage by count .....	85

## Executive summary

Queanbeyan-Palerang Regional Council engaged EC Sustainable Pty Ltd (EC Sustainable) to conduct a Council-wide audit of the kerbside residential bins, including all bin systems: residual waste, recycling, and organics. The audit was conducted in summer 2018, during February.

Council conducted this audit to measure the current performance of the various bin systems:

- 3-bin system: waste, recycling and organics:
  - Garden Organics [GO] in Queanbeyan and Googong.
  - Food and Garden Organics [FOGO] in Braidwood, Bungendore and Captains Flat.
- 2-bin system: waste and recycling.
- 1 bin system: recycling only.

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 was the first audit conducted of the amalgamated Councils of Queanbeyan and Palerang. It was also the first audit since the introduction of the CDS, also known as Return and Earn, which commenced on 1 December 2017.

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).

This involved:

- A target sample size of 264 households.
- Matched waste and recycling bins sampled in 2-bin system areas. This means the pair of waste and recycling bins were collected from the same household that presented both streams. For 3-bin system areas, the organics bin was targeted at the same households in the alternative collection week of the collection fortnight cycle.
- A visual survey of the bins at the kerbside prior to collection.
- Individual household bag collection method of the bin contents inspected.
- Approximately 90 material sorting categories, the NSW EPA Guidelines, plus CDS.
- Detailed data analysis as provided in this report.

The objective of this audit was to provide the data indicators, as shown in the following Table. A comparison with the previous audit years is provided in Appendix 3.

## Key data indicators – 2018

Data indicator	Unit of measurement		Queanbeyan		Palerang			Overall >
			Urban #	Rural	Urban	Rural		
				2 bins	3 bins	1 bin <	2 bins	
Generation rate by weight when a bin is presented	Waste	kg/hh/wk	8.52	8.57	8.07	-	7.31	8.42
	Recycling	kg/hh/wk	3.86	5.41	4.90	6.77	5.79	4.13
	Organics	kg/hh/wk	4.45	-	6.69	-	-	4.69
	All	Kg/hh/wk	16.82	13.99	19.66	6.77	13.10	17.24
Generation rate by volume	Waste	Bin % full	68.4	71.3	60.3	-	70.7	67.7
	Recycling	Bin % full	73.4	82.5	76.0	86.7	74.3	74.1
	Organics	Bin % full	69.3	-	68.7	-	-	69.3
Unrecovered resources in the waste bin ^	Recyclables	kg/hh/wk	1.27	0.73	1.28	-	0.85	1.25
		% by weight	15.0	8.5	15.9	-	11.7	14.9
	Compostable	kg/hh/wk	4.41	2.84	3.72	-	4.10	4.31
		% by weight	51.8	33.1	46.1	-	56.1	51.2
Contamination rate	Recycling	kg/hh/wk	0.55	0.45	0.63	1.80	0.71	0.59
		% by weight	14.2	8.4	12.8	26.6	12.3	14.3
	Organics *	kg/hh/wk	0.17	-	0.19	-	-	0.17
		% by weight	3.9	-	2.8	-	-	3.7
Resource recovery rate ^	Recycling	% by weight	72.3	87.4	76.4	100.0	85.9	73.9
	Organics *	% by weight	98.5	-	63.4	-	-	49.3
Diversion rate ^	All bins	% by weight	45.1	35.5	54.8	73.4	38.8	46.7
Eligible CDS containers	Recycling bins	kg/hh/wk	0.83	1.57	1.19	1.06	0.75	0.88
		Count/hh/wk	8.0	12.2	15.1	16.0	3.6	8.8
	All bins	kg/hh/wk	0.99	1.63	1.39	1.06	0.95	1.04
		Count/hh/wk	11.0	13.1	18.5	16.0	5.4	11.8

Note: organics stream refers to garden organics collection for Queanbeyan-Urban area and FOGO for Palerang-Urban area. Rural areas are not provided with organics collection service.

\* Organics contamination rate and resource recovery rate are calculated based on acceptable material for the actual service provided for each area: garden organics for Queanbeyan and FOGO for Palerang.

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

> The overall result is the region wide average, weighted based on the number of services provided for each area.

< Recycling bin only provided in the rural 1 bin system.

# 3-bin system for SUDs and 2-bin system for MUDs.

The results show in the 2018 audit were:

- **Waste bin generation** – 8.4kg/hh/wk, with 14.9% unrecovered recyclables (1.3kg), 51.2% unrecovered organics (4.3kg).
  - The average waste bin weight ranged from 7.3kg/hh/wk for Palerang – Rural – 2-bin area to at 8.6kg/hh/wk for Queanbeyan – Rural area.

Council could continue seeking further initiatives to:

- Reduce unrecovered resources in the waste bins.
- Avoid waste to reduce the amount of waste to landfill.
- Investigate the possibility to introduce food and garden organics collection or compost bins, considering the high amount of unrecovered food in the waste bin.



- **Recycling bin generation** – 4.1kg/hh/wk, with 14.3% contamination (0.6kg/hh/wk).
  - The contamination rates were highest for Palerang – Rural – 1-bin area (26.6%), where residents were not provided with a waste bin to dispose the unrecoverable material at the kerbside; and lowest for Queanbeyan – Rural area (8.4%).

Council should continue seeking further initiatives to:

- Consider providing waste bins at Palerang – Rural – 1-bin area or reducing contamination in this area through other means.
- Reduce contamination in the recycling bins in all areas, such as through education.
- **Organics bin generation** – 4.7kg/hh/wk, with 3.7% contamination (0.2kg/hh/wk).
  - The contamination rate was 3.9% for Queanbeyan – Urban area, where a garden organics bin collection service is provided.
  - The contamination rate was 2.8% for Palerang – Urban area, where a FOGO bin collection service is provided. This is a low contamination rate for FOGO.
- **Resource recovery rate and diversion rate**
  - The average resource recovery rate for recyclables was high at 73.9%:
    - 100% at Palerang – Rural – 1-bin area, although recyclable materials may be disposed by residents outside of the kerbside bin system.
    - 87.4% at Queanbeyan – Urban area, where three-bin system was provided.
    - 85.9% at Palerang – Rural – 2-bin area.
  - The average resource recovery rate for organics was 49.3%:
    - 98.5% at Queanbeyan – Urban area with garden organics service.
    - 63.4% at Palerang – Urban area with FOGO service.
  - The average diversion rate was 46.7%.
    - The potential diversion rate, if all unrecovered MGB recyclable material and FOGO compliant organics in the waste bins was recovered, was 78.2%.
- **CDS eligible containers:**
  - A total of 12 eligible CDS containers/hh/wk in all bin streams, weighing 1.0kg/hh/wk:
    - Waste stream: 3 containers/hh/wk (0.17kg/hh/wk).
    - Recycling stream: 9 containers/hh/wk (0.88kg/hh/wk).
    - Organics stream: 0.01 containers/hh/wk (0.0015kg/hh/wk).
  - A value of approximately \$1.5 million of eligible CDS containers per year in all bin streams, with approximately 75% of this value, \$1.125m, in the recycling bins.

Seasonal audits could be conducted, which may indicate variations in organics generation and bin performance by season. Audits could also be conducted as the NSW progresses and after the introduction of the CDS in ACT to measure the impacts on bin generation and composition.



# 1 Introduction

## 1.1 Background

Queanbeyan-Palerang Regional Council (QPRC) engaged EC Sustainable Pty Ltd (EC Sustainable) to conduct a Council-wide audit of the kerbside residential bins, including all bin systems: residual waste, recycling, and Garden Organics (GO) / Food and Garden Organics (FOGO). The audit was conducted in summer 2018, during the month of February.

Council conducted this audit to measure the current performance of the various bin systems and update its characterisation of bin streams for the amalgamated Council. This is the first audit conducted for the amalgamated Councils of Queanbeyan and Palerang.

In May 2016, the NSW Government announced the formation of a new Local Government Area (LGA) known as Queanbeyan-Palerang Regional Council. This involved a merger of the former Queanbeyan City Council and Palerang Council.

Each former council has a similar bin collection system with urban and rural services, whereby urban households have a 3-bin system and rural houses have a 2-bin system of waste and recycling. There are two main differences between the former Queanbeyan and Palerang Councils for households with a bin service:

- Palerang residents are provided with a FOGO bin, while Queanbeyan residents are provided with a garden organics bin.
- Palerang rural area has an additional classification of 1-bin system households, which involves a recycling bin only system.

The audit included sampling each of these bin systems. The audit excluded any non-service areas.

The 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).

Additional analysis was also provided for the Container Deposit Scheme (CDS) for ‘eligible containers’, as specified by the NSW EPA for the Return and Earn Scheme. The CDS commenced on 1 December 2017.

## 1.2 Objectives

The objectives of this report are to provide the following six data indicators for each of five bin system types:

### **Data indicators**

1. Generation rates, based on weight (kg/hh/wk) and volume (bin percentage full).
2. Unrecovered resources in the waste bins.
3. Contamination rates and types in the recycling and organics bins.
4. Resource recovery rates.
5. Diversion rates.
6. CDS eligible containers in all bin streams.

### **Bin system types**

1. Queanbeyan – urban 3-bin system area
2. Queanbeyan – rural 2-bin system area (waste and recycling only)
3. Palerang – urban 3-bin system area
4. Palerang – rural 1-bin system area (recycling only)
5. Palerang – rural 2-bin system area (waste and recycling only)

These data indicators assist Council to identify the current performance of the bin systems, measure trends through time, plan for future reductions in waste to landfill and consider waste minimisation options.

## 1.3 Council information

Queanbeyan-Palerang Regional Council is a Local Government Authority (LGA) located in the Southern Tablelands region of New South Wales. The Council was formed on 12 May 2016 through a merge of the City of Queanbeyan and Palerang Council.

The Council area has a population of 56,027 people residing in 23,983 households, with an average of 2.6 people per household (Australian Bureau of Statistics, 2016). Households comprised of 12% Multi-Unit Dwellings (MUDs) and 88% Single-Unit Dwellings (SUDs).

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 met by the demographics of the area, therefore it was agreed that MUDs were to be sampled, which complies with the NSW EPA Guidelines.

Table 1 provides a summary of the current Council bin collection services

**Table 1 - Council bin systems and services**

Area	Waste	Recycling	Organics
<b>Collection frequency</b>			
Queanbeyan – urban ^	Weekly	Fortnightly ^	Fortnightly GO
Queanbeyan – rural	Fortnightly	Fortnightly	-
Palerang – urban	Weekly	Fortnightly	Fortnightly FOGO
Palerang – rural 1-bin area	-	Fortnightly	-
Palerang – rural 2-bin area	Fortnightly	Fortnightly	-
<b>Bin size</b>			
Queanbeyan – urban	140L and 240L	240L	240L
Queanbeyan – rural	240L	240L	-
Palerang – urban	140L	240L	240L
Palerang – rural 1-bin area	-	240L	-
Palerang – rural 2-bin area	240L	240L	-
<b>Number of services &lt;</b>			
Queanbeyan – urban	20,322	20,322	20,322
Queanbeyan – rural	869	869	0
Palerang – urban	2,484	2,484	2,484
Palerang – rural 1-bin area	0	544	0
Palerang – rural 2-bin area	1,004	1,004	0

^ MUD bins may be collected more frequently, i.e. weekly or twice weekly. | < Number of services were used for household numbers, as provided by Council. These numbers were similar and agreed as suitable for reporting extrapolation as used for weighting in the overall Council average.

## 1.4 Document structure

This report provides:

- Section 2 – The methods used to obtain the data.
- Section 3 – Assumptions and limitations.
- Section 4 – The results of the residual waste, recycling and organics bin audit.
- Section 5 – Comments and recommendations.
- Section 6 – Audit photos.

Appendices provide additional information:

- Appendix 1: CDS assumptions.
- Appendix 2: Additional data for CDS eligible beverage containers.
- Appendix 3: Results comparison with previous audits.
- Appendix 4: the raw data in a separate Excel file.

## 2 Project methods

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

### 2.1 What is a waste audit?

A waste audit is an examination of a particular waste stream including the waste materials within that stream. It includes using classification methods to determine the physical waste stream composition, measurement of the size of the waste stream and verification of other statistics related to the waste stream for planning and decision-making purposes.

### 2.2 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:

- Waste and recycling bins collected were not matched pairs for all samples.
- More detailed sorting categories to allow for more detail related to;
  - Container Deposit Scheme (CDS) eligibility including weights and counts.
  - Food and Garden Organics (FOGO services)

### 2.3 Sampling

A sample size of 260 households was targeted, with 264 completed. This meets the requirement of a minimum of 220 households in the NSW EPA Guideline Addendum 2010 (NSW EPA, 2010).

Samples were developed using clustered random sampling of streets within the agreed service areas. Table 2 provides the sample size in streets and households for each service.

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.

**Table 2 - Sample frame**

Area	Waste	Recycling	Organics
<b>Households</b>			
Queanbeyan – urban	113	113	113
Queanbeyan – rural	16	16	-
Palerang – urban	91	91	91
Palerang – rural 1-bin area *	-	30	-
Palerang – rural 2-bin area	14	14	-
<b>Total</b>	<b>234</b>	<b>264</b>	<b>204</b>
<b>Number of streets</b>			
Queanbeyan – urban	19	14	14
Queanbeyan – rural	2	2	-
Palerang – urban	12	12	12
Palerang – rural 1-bin area *	-	4	-
Palerang – rural 2-bin area	2	3	-
<b>Total</b>	<b>35</b>	<b>36</b>	<b>26</b>
<b>Suburbs</b>			
Queanbeyan – urban	Greenleigh, Jerrabomberra, Karabar, Queanbeyan, Queanbeyan East, Queanbeyan West		
Queanbeyan – rural	Googong		
Palerang – urban	Braidwood, Bungendore, Captains Flat		
Palerang – rural 1-bin area *	-	Sutton	-
Palerang – rural 2-bin area	Majors Creek		

\* Palerang – rural 1-bin area only had recycling bin collection service.

## **2.4 Audit**

### **2.4.1 Timing**

The audit sampling was conducted over two weeks to incorporate the waste, recycling and organics bins and represent areas in the week A and week B Council collections. The fieldwork component of the auditing was completed from Monday 5 February to Friday 16 February 2018.

### **2.4.2 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).

### **2.4.3 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 and each MUD block where they had shared 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 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.

### **2.4.4 Sorting**

The materials were sorted and classified for analysis using the categories shown in Table 3. These are the NSW EPA Guideline sorting categories, plus some additional categories and sub-categories added by EC Sustainable for additional information, as shown in the second part of the table.

**Table 3 - Material categories and Australian Waste Database (AWD) codes**

Material category			AWD	Material category			AWD	
Paper	Newspaper	<div><div></div><div></div></div>	A01	Plastic	PP non-pack.	-	E05	
	Magazines/ brochures	<div><div></div></div>	A02		PS pack.	<div><div></div></div>	E06	
	Miscellaneous pack.	<div><div></div></div>	A03		EPS pack.	-		
	Corrugated cardboard	<div><div></div></div>	A04		PS and EPS non-pack. ^	-		
	Cardboard/ pack. board	<div><div></div></div>	A05		Other plastics	<div><div></div></div>	E07	
	Liquid paperboard cont.	<div><div></div></div>	A06		Plastic bags ^	-	E072	
	Disp. paper product	<div><div></div></div>	A07		Plastic biofilm ^	<div><div></div></div>	-	
	Print / writing / office paper	<div><div></div></div>	A08		Plastic film ^	-	E073	
	Composite (mainly paper)	-	A09		Composite (mostly plastic)	-	E08	
	Absorbent Hygiene Waste (AHW) / nappies	-	A90		Ferrous	Steel bev. cont.	<div><div></div></div>	F01
	Contaminated soiled paper	<div><div></div></div>	A092			Steel pack. (excl. bev. cont.)	<div><div></div></div>	
	Organic	Food / kitchen	<div><div></div></div>			B01	Composite (mostly ferrous)	-
Garden / vegetation		<div><div></div></div>	B02	Steel other non-pack.		-	F02	
Other putrescible		-	B03	Non-ferrous	Alu. bev. cont.	<div><div></div></div>	G01	
Wood / timber		-	C01		Alu. pack. (excl. bev. cont.)	<div><div></div></div>		
Textile / rags		-	C02		Alu. non-pack.	<div><div></div></div>		
Leather		-	C03		Composite (mostly ferrous)	-	G03	
Rubber		-	C04		Non-ferrous other non-pack.	-	G02	
Oils		-	C05	Hazardous	Paint	-	H01	
Glass	Glass bev. cont.	<div><div></div></div>	D01		Fluorescent tubes	-	H02	
	Glass non bev. cont. / other pack. glass	<div><div></div></div>			Dry cell batteries (non-rechargeable)	-	H03	
	Mixed glass / fines	-	D050		Dry cell batteries (rechargeable)	-		
	Miscellaneous / other glass	-	D02		Vehicle batteries	-	H04	
Plastic	PET bev. cont.	<div><div></div></div>	E01		Household chemicals	-	H05	
	PET pack. (excl. bev. cont.)	<div><div></div></div>			Asbestos / building materials	-	H061	
	PET other non-bev./ non-pack.	-			Clinical pathogenic infectious	-	H07	
	HDPE bev. cont.	<div><div></div></div>	E02		Gas bottles	-	-	
	HDPE pack. (excl. bev. cont.)	<div><div></div></div>			Hazardous other	-	-	
	HDPE other non-bev. / non-pack.	-			Building waste	Building materials and fittings	-	I50
	PVC bev. cont.	<div><div></div></div>	Earth based			Ceramics, dust, dirt, rock, inert, ash	-	I0
	PVC pack. (excl. bev. cont.)	<div><div></div></div>		E-waste		Toner cartridges	-	Y57
	PVC other non-bev. / non-pack.	-				Computer equipment	-	-
	LDPE pack.	<div><div></div></div>				Mobile phones	-	-
	LDPE non-pack.	-			Electrical items and peripherals	-	-	
	PP pack.	<div><div></div></div>	E05		TVs	-	-	
				Misc	Containerised food and liquid ^	-	-	
					Other waste	-	XX00	

☐ Marks materials compliant in the recycling bin. | ☐ Marks materials compliant in the Food Organics and Garden Organics bin. Garden organics bin only accept category "garden/vegetation".

^ Additional categories audited by EC Sustainable above the requirements of the NSW EPA Guidelines.

Key: Alu.= Aluminium, bev.= beverage, cont.= container, pack.= packaging, disp.= disposable.



**Table 3 (cont.) – Sub-categories requested by Council**

Categories in NSW EPA Guideline Addendum 2010		Sub-categories ^		
Paper	Absorbent Hygiene Waste (AHW) / nappies	AHW / nappies – adult’s	-	
		AHW / nappies – children’s	-	
		AHW / nappies – feminine hygiene	-	
Organics	Food/ kitchen	Food – vegetable and plant-based	<input type="checkbox"/>	
		Food – meat	<input type="checkbox"/>	
		Food – dairy	<input type="checkbox"/>	
		Food – staples	<input type="checkbox"/>	
	Garden/ vegetation	Garden organics – woody	<input type="checkbox"/>	
		Garden organics – fleshy	<input type="checkbox"/>	
	Wood / timber	Wood/ timber – untreated	<input type="checkbox"/>	
		Wood/ timber – treated	-	
Misc.	Containerised food and liquid	Containerised food (not in film)	-	
		Containerised food (not cooking oil)	-	
		Containerised food (cooking oil)	-	
Categories in NSW EPA Guideline Addendum 2010		Sub-categories for CDS eligibility ^		
Paper	Liquid paperboard containers	LPB beverages containers – CDS (10c eligible)	<input type="checkbox"/>	
		LPB beverages containers – non-CDS	<input type="checkbox"/>	
		Liquid paperboard packaging	<input type="checkbox"/>	
Glass	Glass beverage containers	Glass beverage containers – CDS eligible (10c eligible)	<input type="checkbox"/>	
		Glass beverage containers – non-CDS	<input type="checkbox"/>	
Plastic	PET beverage containers	PET beverage containers – CDS (10c eligible)	<input type="checkbox"/>	
		PET beverage containers – non-CDS	<input type="checkbox"/>	
	HDPE beverage containers	HDPE beverage containers – CDS (10c eligible)	<input type="checkbox"/>	
		HDPE beverage containers – non-CDS	<input type="checkbox"/>	
	PVC beverage containers	PVC beverage containers – CDS (10c eligible)	<input type="checkbox"/>	
		PVC beverage containers – non-CDS	<input type="checkbox"/>	
	Other plastic	Other plastics pack.	beverage CDS (10c eligible)	<input type="checkbox"/>
			beverage non-CDS	<input type="checkbox"/>
Other plastics non-pack.		non-beverage/ non-packaging	-	
Ferrous	Steel beverage containers	Steel beverage containers – CDS (10c eligible)	<input type="checkbox"/>	
		Steel beverage containers – non-CDS	<input type="checkbox"/>	
Non-ferrous	Aluminium beverage containers	Aluminium beverage containers – CDS (10c eligible)	<input type="checkbox"/>	
		Aluminium beverage containers – non-CDS	<input type="checkbox"/>	

A safe undercover sorting site was provided at Bungendore waste transfer station, on Tarago Road, Bungendore. The sorted waste and recycling was disposed or recycled at the sorting site.

## 2.5 Data analysis

This audit included areas with various bin systems, including:

### Queanbeyan

- SUDs at urban area – waste, recycling and organics (GO) bins.
- MUDs at urban area – shared waste and recycling bins.
- Rural area – waste and recycling bin; or recycling bin only.

### Palerang

- Urban area – waste, recycling and organics (FOGO) bins. With over 90% of households being SUDs, MUDs are not sampled.
- Rural area – waste and recycling bin; or recycling bin only.

GO and FOGO organics streams are both referred to as organics stream in the following sections. This will not be stated in each table repetitively.

The overall council-wide results are weighted based on number of services provided in each area type. Table 4 shows the weighting factors based on number of services by stream at each area.

**Table 4 - Weighting factor (%)**

Stream	Queanbeyan		Palerang			Total
	Urban	Rural	Urban	Rural		
				1-bin	2-bin	
Number of services						
Waste	20,322	230	2,484	0	1,004	24,040
Recycling	20,322	268	2,484	544	1,004	24,622
Organics	20,322	0	2,484	0	0	22,806
Weighting factor (%)						
Waste	84.5	1.0	10.3	0.0	4.2	100.0
Recycling	82.5	1.1	10.1	2.2	4.1	100.0
Organics	89.1	0.0	10.9	0.0	0.0	100.0

The results were converted to weekly equivalents for each bin system for analysis.

## 2.6 Management systems

### 2.6.1 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.

### 2.6.2 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.

### 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, as specified in the NSW EPA Guidelines. The main aggregated categories include:
  - food organics
  - paper
  - plastics
  - metals
  - garden organics
  - glass

This confidence level should also apply to the main data aggregated indicators of unrecovered resources (resource loss), 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.

- 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 EPA 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 since it is:
  - The NSW EPA Guideline approach.
  - The most accurate method to collect data, particularly with individual household sorting and a large number of sorting categories.

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

## 4 Results

This section provides the results for audits conducted in 2018. Appendix 3 provide key data indicators from previous audits.

### 4.1 Presentation rate

Table 5 provides the bin presentation rate for each bin stream audited. The bin presentation rate is the percentage of households that presented their bins to the kerbside for collection.

The data shows that there was:

- Waste: 80.4 % of bins presented.
- Recycling: 70.9 % of bins presented.
- Organics: 71.2 % of bins presented.

The presentation rates were generally higher in urban areas compared to rural areas.

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.

**Table 5 - Bin presentation rate (%)**

Area	Waste		Recycling		Organics	
	Count *	% presented	Count *	% presented	Count *	% presented
Queanbeyan – urban	84 (out of 102)	82.8	80 (out of 101)	78.8	71 (out of 102)	70.0
Queanbeyan – rural	8 (out of 16)	50.0	11 (out of 16)	68.8	-	-
Palerang – urban	73 (out of 91)	80.2	66 (out of 91)	72.5	66 (out of 91)	72.5
Palerang – rural – 1-bin	-	-	12 (out of 30)	40.0	-	-
Palerang – rural – 2-bin	14 (out of 14)	100.0	10 (out of 14)	71.4	-	-
<b>Overall</b>	<b>179 (out of 223)</b>	<b>80.4</b>	<b>179 (out of 252)</b>	<b>70.9</b>	<b>137 (out of 193)</b>	<b>71.2</b>

\* The number of bins may not add up to the sampled number of households as not all properties have one bin per household, such as shared MUDs. This value assumes that there should be one bin presented per two MUD households.

## **4.2 Generation rates**

### **4.2.1 By weight**

Table 6 (in next section) provides the average generation rate per household by weight for the audit period. The results are converted to generation rate per week. The results are 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).

The data shows that overall an average household generated a total of 17.236kg/hh/wk when bins were presented. The overall average generation ranged from Palerang – Rural – 1-bin area at 6.766kg/hh/wk to Palerang – Urban area at 19.663kg/hh/wk. The generation rate was lower allowing for non-presentation rate with a total of 13.734kg/hh/wk.

The data shows an average household generated:

- Waste bin: 8.420kg of bin contents per week.
- Recycling bin: 4.126kg of bin contents per week.
- Organics bin: 4.690kg of bin contents per week.

### **4.2.2 By volume**

Table 7 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, as well as the mean litres generated.

The data shows that overall an average household generated a total of 249.6L/hh/wk when bins were presented. The overall average generation ranged from to Palerang – Rural – 1-bin area at 104.0L/hh/wk to Palerang – Urban area at 262.9L/hh/wk.

The data shows an average household used:

- Waste: 67.7% of their bin capacity. This equates to 96.3L per week.
- Recycling: 74.1% of their bin capacity. This equates to 82.8L per week.
- Organics: 69.3% of their bin capacity. This equates to 70.4L per week.



**Table 6 - Generation rate – by weight**

Area	Mean household generation							
	When a bin was presented (kg/hh/wk)				Allowing for non-presentation (kg/hh/wk) *			
	Waste	Recycling	Organics	Overall	Waste	Recycling	Organics	Overall
Queanbeyan – urban	8.517	3.861	4.445	16.823	7.141	3.108	3.336	13.586
Queanbeyan – rural	8.573	5.414		13.987	3.374	3.808		7.182
Palerang – urban	8.067	4.904	6.692	19.663	6.722	3.435	4.779	14.937
Palerang – rural – 1-bin		6.766		6.766		2.213		2.213
Palerang – rural – 2-bin	7.308	5.788		13.096	7.308	4.145		11.452
<b>Overall</b>	<b>8.420</b>	<b>4.126</b>	<b>4.690</b>	<b>17.236</b>	<b>7.069</b>	<b>3.171</b>	<b>3.493</b>	<b>13.734</b>

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

**Table 7 - Generation rate – by volume**

Area	Mean household generation							
	Mean L/hh/wk				Mean bin % full			
	Waste	Recycling	Organics	Overall	Waste	Recycling	Organics	Overall
Queanbeyan – urban	98.1	80.5	68.8	247.5	68.4	73.4	69.3	
Queanbeyan – rural	85.5	102.8		188.3	71.3	82.5		
Palerang – urban	86.9	92.4	83.6	262.9	60.3	76.0	68.7	
Palerang – rural – 1-bin		104.0		104.0		86.7		
Palerang – rural – 2-bin	84.9	89.1		174.0	70.7	74.3		
<b>Overall</b>	<b>96.3</b>	<b>82.8</b>	<b>70.4</b>	<b>249.6</b>	<b>67.7</b>	<b>74.1</b>	<b>69.3</b>	

Table 8 provides the bin percentage full distribution. The data shows that:

- Households that had used 90+% of their available bin capacity was:
  - Waste: 32.4% of households overall, highest for Queanbeyan – Urban at 39.1%; lowest for Palerang – Urban at 24.2%.
  - Recycling: 49.4% of households overall, highest for Palerang – Rural – 1-bin at 63.3%; Palerang – Rural – 2-bin households used least bin space at 42.9%.
  - Organics: 33.3% of households overall. Results were similar where organics bin collection service was available.
- Households appeared to have insufficient bin capacity, based on the percentage of households used more than 90% of their bin capacity. These households may require additional bin capacity, with further study on bin usage.
  - The lack of remaining waste bin capacity for some households may lead to overflow of residual waste into the recycling and organics bins, causing contamination.
  - The lack of remaining recycling and organics bin capacity for some households may lead to recoverable material being placed in the waste bins, causing resource loss in the waste stream and inhibiting further resource recovery.
- Households, filled their bins to 90%+ full, may require additional bin capacity, with further study on bin usage. However, it may be that the bins were full because they are 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.
- More bin capacity could be created by:
  1. Reducing the amount of contamination in recycling and organics bins.
  2. Reducing the amount of unrecovered resources in the waste bin, with:
  3. The bin users could also increase the compaction rate of recycling based on a qualitative survey of the auditors, although the compaction rate was not audited quantitatively.
  4. Waste avoidance initiatives.

**Table 8 - Bin percentage full (%)**

Bin stream	Bin percentage full (%)	Number of collection points *						Percentage of collection points					
		Queanbeyan		Palerang			Overall	Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Waste	0-49	23	2	27		1	53	25.0	12.5	29.7		7.1	24.9
	50-69	22	6	30		6	64	23.9	37.5	33.0		42.9	30.0
	70-89	11	2	12		2	27	12.0	12.5	13.2		14.3	12.7
	90+	36	6	22		5	69	39.1	37.5	24.2		35.7	32.4
	<b>Total</b>	<b>92</b>	<b>16</b>	<b>91</b>		<b>14</b>	<b>213</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>		<b>100.0</b>	<b>100.0</b>
Recycling	0-49	15	0	13	0	2	30	16.3	0.0	14.3	0.0	14.3	12.3
	50-69	25	4	18	8	4	59	27.2	25.0	19.8	26.7	28.6	24.3
	70-89	9	4	16	3	2	34	9.8	25.0	17.6	10.0	14.3	14.0
	90+	43	8	44	19	6	120	46.7	50.0	48.4	63.3	42.9	49.4
	<b>Total</b>	<b>92</b>	<b>16</b>	<b>91</b>	<b>30</b>	<b>14</b>	<b>243</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Organics	0-49	18		13			31	19.6		14.3			16.9
	50-69	29		33			62	31.5		36.3			33.9
	70-89	13		16			29	14.1		17.6			15.8
	90+	32		29			61	34.8		31.9			33.3
	<b>Total</b>	<b>92</b>		<b>91</b>			<b>183</b>	<b>100.0</b>		<b>100.0</b>			<b>100.0</b>

\* The number of collection points does not add up to the sampled number of households as not all properties have one bin per household, such as shared MUDs. The current NSW EPA Guidelines requires these shared facilities to be aggregated and reported as one result.

## 4.3 Composition

The mean composition of each bin stream audited is provided as both summary and detailed category levels. The summary categories used the NSW EPA Guideline summary categories by material type. The summary categories do not relate to their recyclability. These summary results are only provided to comply with the NSW EPA Guidelines and provide an overview of the composition. Therefore, the summary results are only provided at the overall Council level.

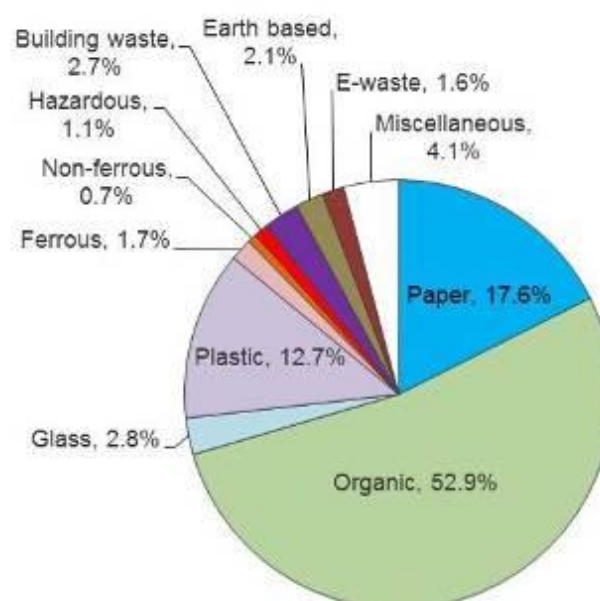
### 4.3.1 Waste bin

#### Summary composition

Figure 1 provides the NSW EPA summary composition of the waste bin contents by percentage (% by weight) graphically. This is not based on recyclability, which is analysed in Section 4.4. Figure 1 is based on the NSW EPA summary categories which are based on material type, as shown in the methods section Table 3 and following in Tables 9 and 10. Figure 1 is a graphic representation of the sub-total data provided in Table 9.

The NSW EPA summary composition data shows that overall more than half of the waste bin contents was organics at 52.9%. The other main materials were paper (17.6%), plastic (12.7%) and miscellaneous (4.1%).

**Figure 1 - Waste bin composition NSW EPA summary categories – percentage (% by weight)**



### **Detailed composition**

Table 9 and 10 provide the mean waste bin composition by weight (kg/hh/wk) and percentage (% by weight) respectively. The detailed data shows:

- Overall the main categories were:
  1. Food/ kitchen at 43.19% of the bin content.
  2. Absorbent Hygiene Waste (AHW) / nappies at 6.07% of the bin content.
  3. Textile/ rags at 4.30% of the bin content.
  4. Containerised food and liquid at 4.24% of the bin content.
  5. Contaminated soiled paper at 3.83% of the bin content.
  6. Plastic bags at 3.60% of the bin content.
  7. Plastic film at 3.21% of the bin content.
  8. Building materials and fittings at 2.79% of the bin content.
  9. Cardboard / package board at 2.40% of the bin content.
  10. Ceramics / dust / dirt / rock / inert / ash at 2.13% of the bin content.
- The main categories outlined above could be focused on with education and systems.

**Table 9 - Waste bin composition – weight (kg/hh/wk)**

Material category		Mean weight (kg/hh/wk)					Overall
		Queanbeyan		Palerang			
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Paper	Newspaper	0.028	0.054	0.019	0.000	0.004	0.027
	Magazines / brochures	0.085	0.024	0.069	0.000	0.016	0.080
	Miscellaneous pack.	0.011	0.013	0.003	0.000	0.006	0.010
	Corrugated cardboard	0.034	0.018	0.108	0.000	0.048	0.042
	Cardboard/ package board	0.214	0.080	0.133	0.000	0.162	0.202
	Liquid paperboard containers	0.023	0.013	0.026	0.000	0.011	0.023
	Disposable paper product	0.108	0.115	0.137	0.000	0.080	0.110
	Print/ writing/ office paper	0.134	0.068	0.080	0.000	0.062	0.124
	Composite (mostly paper)	0.027	0.005	0.016	0.000	0.163	0.031
	AHW / nappies	0.501	0.834	0.661	0.000	0.261	0.511
	Contaminated soiled paper	0.323	0.260	0.254	0.000	0.479	0.322
	Sub-total	1.488	1.483	1.505	0.000	1.293	1.482
Organic	Food / kitchen	3.769	2.114	2.987	0.000	2.924	3.637
	Garden / vegetation	0.063	0.079	0.121	0.000	0.662	0.094
	Other putrescible	0.115	0.356	0.288	0.000	0.000	0.130
	Wood / timber	0.143	0.029	0.063	0.000	0.031	0.129
	Textile / rags	0.372	0.387	0.309	0.000	0.281	0.362
	Leather	0.087	0.013	0.084	0.000	0.021	0.083
	Rubber	0.013	0.008	0.012	0.000	0.021	0.013
	Oils	0.000	0.000	0.000	0.000	0.000	0.000
	Sub-total	4.562	2.985	3.862	0.000	3.940	4.448
Glass	Glass bev. cont.	0.113	0.052	0.230	0.000	0.178	0.127
	Glass non-bev. cont./ other pack.	0.068	0.025	0.084	0.000	0.051	0.069
	Miscellaneous / other glass	0.041	0.005	0.006	0.000	0.000	0.035
	Mixed glass / fines	0.001	0.003	0.000	0.000	0.000	0.001
	Sub-total	0.223	0.085	0.320	0.000	0.229	0.232
Plastic	PET bev. cont. (P1)	0.037	0.007	0.034	0.000	0.008	0.035
	PET pack. (excl. bev. cont.) (P1)	0.101	0.060	0.081	0.000	0.041	0.096
	PET other non-bev./ non-pack. (P1)	0.016	0.005	0.002	0.000	0.000	0.014
	HDPE bev. cont. (P2)	0.025	0.008	0.016	0.000	0.002	0.023
	HDPE pack. (excl. bev. cont.) (P2)	0.026	0.010	0.013	0.000	0.012	0.024
	HDPE other non-bev./ non-pack. (P2)	0.000	0.000	0.003	0.000	0.000	0.000
	PVC bev. cont. (P3)	0.001	0.000	0.003	0.000	0.000	0.001
	PVC pack. (excl. bev. cont.) (P3)	0.006	0.005	0.000	0.000	0.000	0.005
	PVC other non-bev./ non-pack. (P3)	0.000	0.062	0.016	0.000	0.000	0.002
	LDPE pack. (P4)	0.005	0.001	0.007	0.000	0.000	0.005
	LDPE non-pack. (P4)	0.010	0.009	0.004	0.000	0.068	0.011
	PP pack. (P5)	0.096	0.095	0.102	0.000	0.030	0.094
	PP non-pack. (P5)	0.005	0.003	0.022	0.000	0.005	0.006
	PS pack. (P6)	0.005	0.003	0.003	0.000	0.000	0.005

**Table 9 (cont.) - Waste bin composition – weight (kg/hh/wk)**

Material category		Mean weight (kg/hh/wk)					
		Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Plastic (continued)	EPS pack. (P6)	0.019	0.014	0.027	0.000	0.023	0.020
	PS and EPS non-pack. (P6)	0.022	0.024	0.005	0.000	0.103	0.024
	Other plastics (P7) pack.	0.000	0.000	0.002	0.000	0.000	0.001
	Other plastics (P7) non-pack.	0.060	0.028	0.102	0.000	0.115	0.066
	Plastic bags	0.305	0.258	0.277	0.000	0.323	0.303
	Plastic film	0.273	0.369	0.282	0.000	0.149	0.270
	Composite (mostly plastic)	0.065	0.012	0.065	0.000	0.101	0.066
	<b>Sub-total</b>	<b>1.077</b>	<b>0.974</b>	<b>1.067</b>	<b>0.000</b>	<b>0.981</b>	<b>1.071</b>
Ferrous	Steel bev. cont.	0.002	0.000	0.002	0.000	0.000	0.002
	Steel pack. (excl. bev. cont.)	0.105	0.047	0.080	0.000	0.067	0.100
	Steel other non-pack.	0.025	0.020	0.036	0.000	0.040	0.026
	Composite (mostly ferrous)	0.002	0.084	0.045	0.000	0.071	0.010
	<b>Sub-total</b>	<b>0.134</b>	<b>0.152</b>	<b>0.163</b>	<b>0.000</b>	<b>0.178</b>	<b>0.139</b>
Non-ferrous	Aluminium bev. cont.	0.026	0.003	0.018	0.000	0.023	0.025
	Aluminium pack. (excl. bev. cont.)	0.005	0.012	0.019	0.000	0.033	0.008
	Aluminium non-pack.	0.015	0.017	0.009	0.000	0.018	0.015
	Non-ferrous other	0.004	0.000	0.027	0.000	0.000	0.006
	Composite (mostly non-ferrous)	0.002	0.000	0.001	0.000	0.000	0.002
	<b>Sub-total</b>	<b>0.052</b>	<b>0.032</b>	<b>0.074</b>	<b>0.000</b>	<b>0.075</b>	<b>0.055</b>
Hazardous	Paint	0.000	0.004	0.000	0.000	0.000	0.000
	Fluorescent tubes	0.000	0.010	0.004	0.000	0.000	0.001
	Dry cell batteries (non-rechargeable)	0.011	0.003	0.004	0.000	0.003	0.010
	Dry cell batteries (rechargeable)	0.000	0.002	0.002	0.000	0.001	0.000
	Vehicle batteries	0.000	0.000	0.000	0.000	0.000	0.000
	Household chemicals	0.074	0.049	0.030	0.000	0.000	0.066
	Asbestos	0.000	0.013	0.000	0.000	0.000	0.000
	Clinical pathogenic infectious	0.013	0.001	0.000	0.000	0.000	0.011
	Gas bottles	0.000	0.000	0.000	0.000	0.000	0.000
	Hazardous other	0.005	0.000	0.000	0.000	0.031	0.005
	<b>Sub-total</b>	<b>0.102</b>	<b>0.081</b>	<b>0.041</b>	<b>0.000</b>	<b>0.035</b>	<b>0.093</b>
Building Waste	Building materials and fittings	<b>0.256</b>	<b>0.843</b>	<b>0.095</b>	<b>0.000</b>	<b>0.000</b>	<b>0.235</b>
Earth Based	Ceramics, dust, dirt, rock, inert, ash	<b>0.139</b>	<b>1.407</b>	<b>0.422</b>	<b>0.000</b>	<b>0.130</b>	<b>0.180</b>
E-waste	Computer equipment	0.004	0.000	0.000	0.000	0.000	0.003
	TVs	0.000	0.000	0.000	0.000	0.000	0.000
	Mobile phones	0.000	0.000	0.025	0.000	0.262	0.013
	Electrical items and peripherals	0.119	0.285	0.053	0.000	0.066	0.112
	Toner cartridges	0.001	0.000	0.000	0.000	0.003	0.001
	<b>Sub-total</b>	<b>0.124</b>	<b>0.285</b>	<b>0.078</b>	<b>0.000</b>	<b>0.331</b>	<b>0.129</b>
Misc.	Containerised food and liquids	0.360	0.247	0.440	0.000	0.117	0.357
	Other waste	0.000	0.000	0.000	0.000	0.000	0.000
	<b>Sub-total</b>	<b>0.360</b>	<b>0.247</b>	<b>0.440</b>	<b>0.000</b>	<b>0.117</b>	<b>0.357</b>
<b>Grand total</b>		<b>8.517</b>	<b>8.573</b>	<b>8.067</b>	<b>0.000</b>	<b>7.308</b>	<b>8.420</b>

Key: bev.=beverage, cont.=container, pack.=packaging.



**Table 10 - Waste bin composition – percentage (% by weight)**

Material category		Percentage (% by weight)					Overall
		Queanbeyan		Palerang			
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Paper	Newspaper	0.33	0.62	0.23	-	0.05	0.32
	Magazines / brochures	1.00	0.28	0.85	-	0.22	0.95
	Miscellaneous pack.	0.13	0.15	0.04	-	0.09	0.12
	Corrugated cardboard	0.40	0.21	1.33	-	0.65	0.50
	Cardboard/ package board	2.51	0.93	1.64	-	2.22	2.40
	Liquid paperboard containers	0.27	0.15	0.33	-	0.15	0.27
	Disposable paper product	1.27	1.34	1.70	-	1.09	1.30
	Print/ writing/ office paper	1.57	0.80	0.99	-	0.85	1.48
	Composite (mostly paper)	0.31	0.06	0.20	-	2.23	0.37
	AHW / nappies	5.89	9.72	8.19	-	3.57	6.07
	Contaminated soiled paper	3.80	3.03	3.15	-	6.55	3.83
	Sub-total	17.48	17.30	18.65	-	17.69	17.60
Organic	Food / kitchen	44.25	24.66	37.03	-	40.02	43.19
	Garden / vegetation	0.74	0.92	1.50	-	9.06	1.12
	Other putrescible	1.35	4.15	3.57	-	0.00	1.55
	Wood / timber	1.67	0.34	0.78	-	0.42	1.53
	Textile / rags	4.37	4.51	3.83	-	3.84	4.30
	Leather	1.02	0.15	1.04	-	0.29	0.99
	Rubber	0.16	0.09	0.14	-	0.29	0.16
	Oils	0.00	0.00	0.00	-	0.00	0.00
	Sub-total	53.56	34.82	47.88	-	53.91	52.83
Glass	Glass bev. cont.	1.33	0.61	2.85	-	2.43	1.51
	Glass non-bev. cont./ other pack.	0.80	0.29	1.05	-	0.70	0.81
	Miscellaneous / other glass	0.48	0.06	0.07	-	0.00	0.41
	Mixed glass / fines	0.01	0.03	0.00	-	0.00	0.01
	Sub-total	2.61	0.99	3.97	-	3.13	2.75
Plastic	PET bev. cont. (P1)	0.43	0.08	0.43	-	0.11	0.42
	PET pack. (excl. bev. cont.) (P1)	1.19	0.70	1.00	-	0.56	1.14
	PET other non-bev./ non-pack. (P1)	0.18	0.06	0.03	-	0.00	0.16
	HDPE bev. cont. (P2)	0.29	0.10	0.20	-	0.03	0.27
	HDPE pack. (excl. bev. cont.) (P2)	0.31	0.11	0.16	-	0.17	0.29
	HDPE other non-bev./ non-pack. (P2)	0.00	0.00	0.03	-	0.00	0.00
	PVC bev. cont. (P3)	0.01	0.00	0.04	-	0.00	0.01
	PVC pack. (excl. bev. cont.) (P3)	0.07	0.06	0.00	-	0.00	0.06
	PVC other non-bev./ non-pack. (P3)	0.00	0.72	0.19	-	0.00	0.03
	LDPE pack. (P4)	0.06	0.01	0.09	-	0.00	0.06
	LDPE non-pack. (P4)	0.11	0.10	0.04	-	0.93	0.13
	PP pack. (P5)	1.13	1.11	1.27	-	0.41	1.12
	PP non-pack. (P5)	0.05	0.04	0.27	-	0.06	0.08
	PS pack. (P6)	0.06	0.03	0.04	-	0.00	0.06

**Table 10 (cont.) - Waste bin composition – percentage (% by weight)**

Material category		Percentage (% by weight)					
		Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Plastic (continued)	EPS pack. (P6)	0.22	0.17	0.34	-	0.32	0.23
	PS and EPS non-pack. (P6)	0.26	0.29	0.06	-	1.41	0.28
	Other plastics (P7) pack.	0.00	0.00	0.02	-	0.00	0.00
	Other plastics (P7) non-pack.	0.71	0.33	1.27	-	1.57	0.79
	Plastic bags	3.59	3.01	3.43	-	4.42	3.60
	Plastic film	3.21	4.31	3.49	-	2.04	3.21
	Composite (mostly plastic)	0.77	0.14	0.81	-	1.38	0.79
	<b>Sub-total</b>	<b>12.65</b>	<b>11.36</b>	<b>13.23</b>	<b>-</b>	<b>13.42</b>	<b>12.72</b>
Ferrous	Steel bev. cont.	0.02	0.00	0.03	-	0.00	0.02
	Steel pack. (excl. bev. cont.)	1.23	0.55	0.99	-	0.91	1.19
	Steel other non-pack.	0.29	0.23	0.44	-	0.55	0.31
	Composite (mostly ferrous)	0.03	0.98	0.56	-	0.98	0.12
	<b>Sub-total</b>	<b>1.57</b>	<b>1.77</b>	<b>2.02</b>	<b>-</b>	<b>2.44</b>	<b>1.65</b>
Non-ferrous	Aluminium bev. cont.	0.30	0.04	0.22	-	0.32	0.29
	Aluminium pack. (excl. bev. cont.)	0.06	0.13	0.24	-	0.45	0.09
	Aluminium non-pack.	0.18	0.20	0.11	-	0.25	0.17
	Non-ferrous other	0.05	0.00	0.34	-	0.00	0.07
	Composite (mostly non-ferrous)	0.02	0.00	0.01	-	0.00	0.02
	<b>Sub-total</b>	<b>0.61</b>	<b>0.37</b>	<b>0.92</b>	<b>-</b>	<b>1.02</b>	<b>0.65</b>
Hazardous	Paint	0.00	0.05	0.00	-	0.00	0.00
	Fluorescent tubes	0.00	0.11	0.05	-	0.00	0.01
	Dry cell batteries (non-rechargeable)	0.12	0.03	0.05	-	0.04	0.11
	Dry cell batteries (rechargeable)	0.00	0.03	0.03	-	0.01	0.00
	Vehicle batteries	0.00	0.00	0.00	-	0.00	0.00
	Household chemicals	0.87	0.57	0.37	-	0.00	0.79
	Asbestos	0.00	0.15	0.00	-	0.00	0.00
	Clinical pathogenic infectious	0.15	0.01	0.00	-	0.00	0.13
	Gas bottles	0.00	0.00	0.00	-	0.00	0.00
	Hazardous other	0.06	0.00	0.00	-	0.42	0.07
	<b>Sub-total</b>	<b>1.20</b>	<b>0.95</b>	<b>0.50</b>	<b>-</b>	<b>0.48</b>	<b>1.10</b>
Building Waste	Building materials and fittings	<b>3.01</b>	<b>9.83</b>	<b>1.18</b>	<b>-</b>	<b>0.00</b>	<b>2.79</b>
Earth Based	Ceramics, dust, dirt, rock, inert, ash	<b>1.63</b>	<b>16.41</b>	<b>5.23</b>	<b>-</b>	<b>1.78</b>	<b>2.13</b>
E-waste	Computer equipment	0.05	0.00	0.00	-	0.00	0.04
	TVs	0.00	0.00	0.00	-	0.00	0.00
	Mobile phones	0.00	0.00	0.31	-	3.58	0.16
	Electrical items and peripherals	1.40	3.32	0.65	-	0.90	1.33
	Toner cartridges	0.01	0.00	0.00	-	0.05	0.01
	<b>Sub-total</b>	<b>1.46</b>	<b>3.32</b>	<b>0.96</b>	<b>-</b>	<b>4.53</b>	<b>1.54</b>
Misc.	Containerised food and liquids	4.23	2.88	5.46	-	1.60	4.24
	Other waste	0.00	0.00	0.00	-	0.00	0.00
	<b>Sub-total</b>	<b>4.23</b>	<b>2.88</b>	<b>5.46</b>	<b>-</b>	<b>1.60</b>	<b>4.24</b>
<b>Grand total</b>		<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>-</b>	<b>100.00</b>	<b>100.00</b>

Key: bev.=beverage, cont.=container, pack.=packaging.

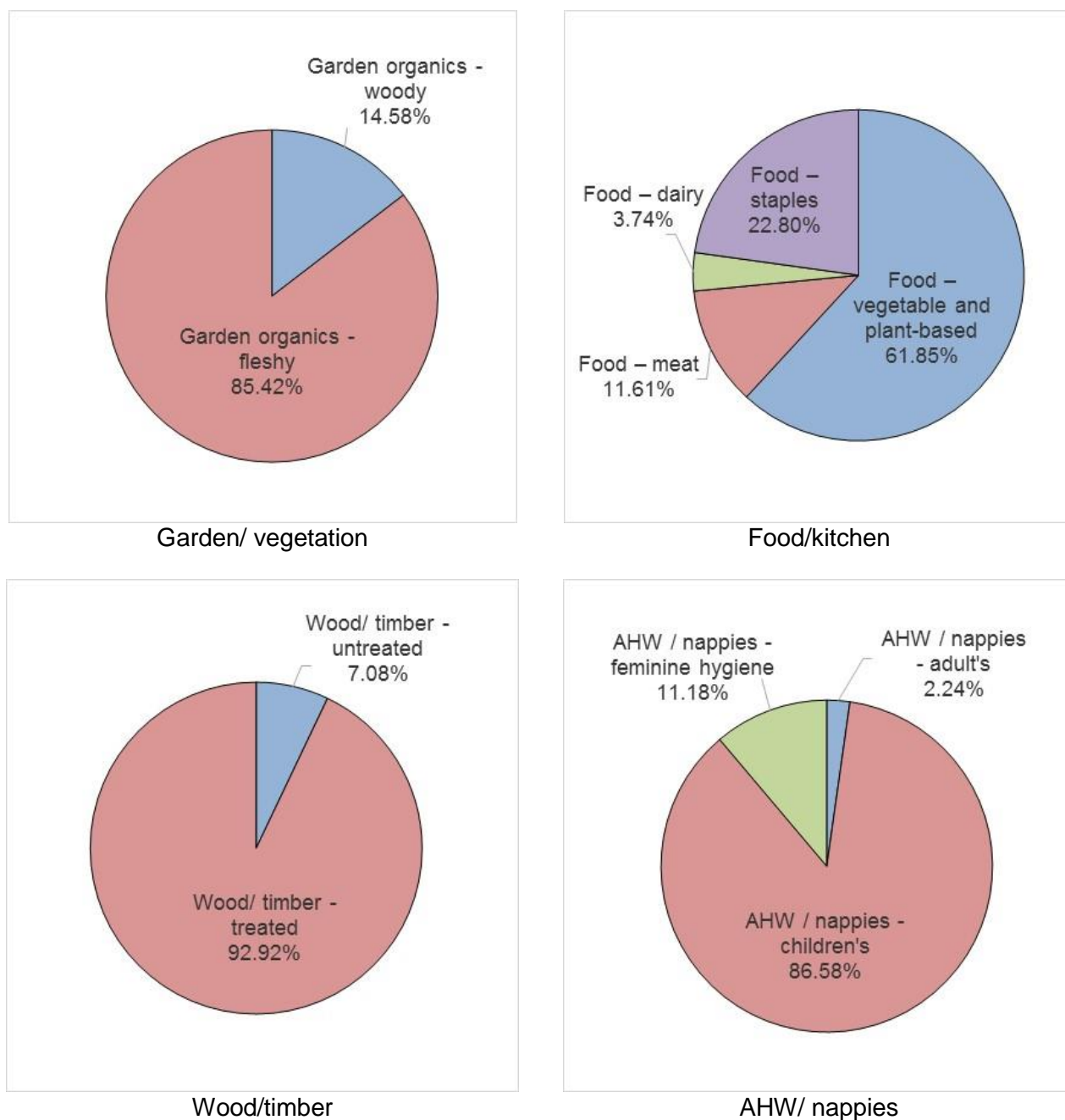
Figure 2 shows the sub-sorts for garden/vegetation, food/kitchen, wood/timber and Absorbent Hygiene Waste (AHW)/nappies.

- Garden/vegetation, total of 0.094kg/hh/wk (1.12% of bin contents), comprised of:
  - 14.58% woody.
  - 85.42% fleshy.
- Food/kitchen, total of 3.637kg/hh/wk (43.19% of bin contents), comprised of:
  - 22.80% food – staples.
  - 3.74% food – dairy.
  - 11.61% food – meat.
  - 61.85% food – vege and plant-based.
- Wood/timber, total of 0.129kg/hh/wk (1.53% of bin contents), comprised of:
  - 7.80% untreated
  - 92.92% treated.
- Absorbent Hygiene Waste (AHW)/nappies, total of 0.511kg/hh/wk (6.07% of bin contents), comprised of:
  - 2.24% adult's nappies.
  - 86.58% children's nappies.
  - 11.18% feminine hygiene.

Figure 3 shows the sub-sorts based on CDS eligibility. Additional detail provided in Appendix 2 by weight and count.

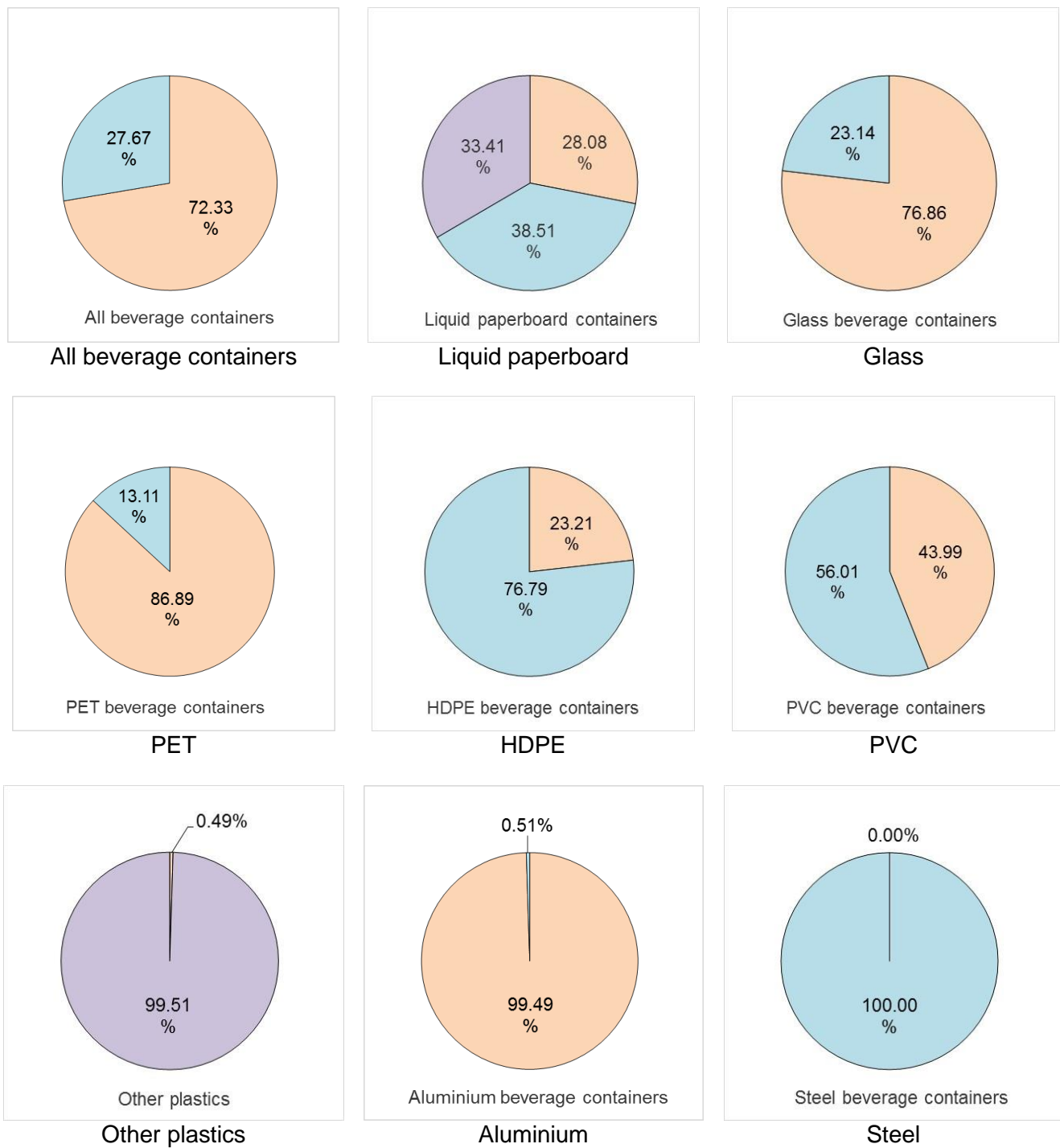
- 2.71% of the waste bin were beverage containers, 0.228kg/hh/wk.
- 72.33% of all beverage containers in the waste bin were CDS eligible, 0.165kg/hh/wk.

**Figure 2 - Waste bin additional sub-sorts, overall**



**NSW EPA Guideline categories sub-sorted as requested by Council – % by weight**

**Figure 3 - Waste bin sub-sorts for CDS beverage eligibility, overall**



**Categories sub-sorted based on CDS eligibility – % by weight**

■ Eligible CDS beverage containers 
 ■ Other beverage containers 
 ■ Other non-beverage

## 4.3.2 Recycling bin

### Summary composition

Figure 4 provides the NSW EPA summary composition of the recycling bin contents by percentage (% by weight). This is a graphic representation of the sub-total data provided in Table 12. It does not relate to material recyclability, which is analysed in Table 11.

Figure 4 shows nearly 90% by weight of recycling bin contents were paper (40.2%), glass (34.2%) and plastics (13.4%).

**Figure 4 - Recycling bin composition NSW EPA summary categories – percentage (% by weight)**

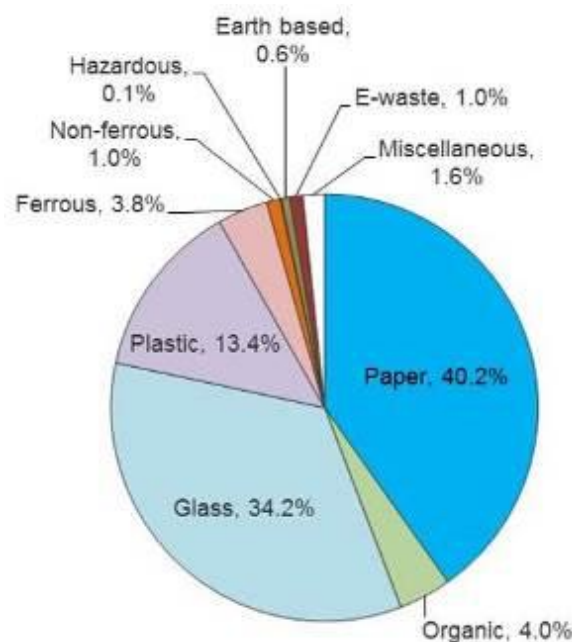


Table 11 provides a summary of compliant material types in the recycling bin. The summary data shows compliant recycling was 85.69% of the recycling bin contents overall, ranging from 73.36% at Palerang – Rural – 1-bin area to 91.60% at Queanbeyan – Rural area.

Approximately 21.39% of the overall recycling was CDS material and 64.40% was other recyclable material.

Materials with a high bulk density accounted for most of the recycling weight with more than half of the recycling bin contents being recyclable paper and cardboard (39.33%) and recyclable glass (32.98%) overall. Council may find that these materials decrease in future through the use of more

plastics instead of glass for bottles and less printed matter like newspapers and magazines. This could effectively increase the percentage of contamination and reduce the diversion rate.

**Table 11 - Compliant materials in the recycling bin – percentage (% by weight)**

Summary category	Percentage (% by weight) of total bin contents					
	Queanbeyan		Palerang			Overall
	Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Recyclable paper and cardboard	40.69	34.65	37.58	26.99	33.67	39.33
Recyclable glass	32.57	45.21	35.50	32.93	30.24	32.98
Recyclable plastic	9.42	8.84	9.38	9.83	20.02	10.03
Recyclable steel	2.27	1.60	2.78	2.14	3.06	2.36
Recyclable aluminium	0.83	1.31	1.95	1.47	0.73	0.99
<b>Sub-total MGB recyclable – CDS</b>	<b>21.51</b>	<b>29.04</b>	<b>24.21</b>	<b>15.61</b>	<b>13.00</b>	<b>21.39</b>
<b>Sub-total MGB recyclable – other</b>	<b>64.27</b>	<b>62.57</b>	<b>62.98</b>	<b>57.75</b>	<b>74.71</b>	<b>64.40</b>
<b>MGB recyclable (compliant) *</b>	<b>85.78</b>	<b>91.60</b>	<b>87.19</b>	<b>73.36</b>	<b>87.71</b>	<b>85.69</b>
<b>Contamination</b>	<b>14.22</b>	<b>8.40</b>	<b>12.81</b>	<b>26.64</b>	<b>12.29</b>	<b>14.31</b>
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

\* Compliant materials in the recycling bin.

### Detailed composition

Table 12 and 13 provide the mean recycling bin composition by weight (kg/hh/wk) and percentage (% by weight), respectively. The detailed data shows:

- Overall the main categories were:
  1. Glass beverage containers at 29.66% of the bin content.
  2. Corrugated cardboard at 11.29% of the bin content.
  3. Magazines/ brochures at 9.42% of the bin content.
  4. Cardboard / package board at 6.93% of the bin content.
  5. Newspaper at 5.62% of the bin content.
  6. PET beverage containers at 4.15% of the bin content.
  7. Print/ writing/ office paper at 3.85% of the bin content.
  8. Glass non-beverage containers / other packaging glass at 3.32% of the bin content.
  9. Steel packaging (excl. beverage containers) at 2.29% of the bin content.
  10. HDPE beverage containers at 2.10% of the bin content.



Figure 5 shows the sub-sorts for garden/vegetation, food/kitchen, wood/timber and Absorbent Hygiene Waste (AHW)/nappies.

- Garden/vegetation, total of 0.004kg/hh/wk (0.08% of bin contents), comprised of:
  - 21.19% woody.
  - 78.81% fleshy.
- Food/ kitchen, total of 0.057kg/hh/wk (1.37% of bin contents), comprised of:
  - 39.34% food – staples.
  - 8.71% food – dairy.
  - 6.98% food – meat.
  - 44.97% food – vege and plant-based.
- Wood/timber, total of 0.054kg/hh/wk (1.31% of bin contents), comprised of:
  - 2.76% untreated
  - 97.24% treated.
- Absorbent Hygiene Waste (AHW)/nappies, total of 0.005kg/hh/wk (0.13% of bin contents), comprised of:
  - 59.86% children's nappies.
  - 43.14% feminine hygiene.

Figure 6 shows the sub-sorts based on CDS eligibility. Additional detail provided in Appendix 2 by weight and count.

- 37.56% of the recycling bin were beverage containers, 1.550kg/hh/wk.
- 56.56% of all beverage containers in the recycling bin were CDS eligible, 0.876kg/hh/wk.

Contamination in the recycling bin is analysed in Section 4.6.1.

**Table 12 - Recycling bin composition – weight (kg/hh/wk)**

Material category		Mean weight (kg/hh/wk)					Overall
		Queanbeyan		Palerang			
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Paper	Newspaper	0.223	0.121	0.230	0.259	0.431	0.232
	Magazines / brochures	0.390	0.730	0.342	0.378	0.385	0.389
	Miscellaneous pack.	0.024	0.003	0.025	0.008	0.025	0.023
	Corrugated cardboard	0.465	0.528	0.449	0.502	0.493	0.466
	Cardboard/ package board	0.274	0.364	0.346	0.362	0.320	0.286
	Liquid paperboard containers	0.025	0.022	0.055	0.050	0.046	0.029
	Disposable paper product	0.037	0.020	0.054	0.040	0.056	0.039
	Print/ writing/ office paper	0.134	0.089	0.341	0.227	0.192	0.159
	Composite (mostly paper)	0.004	0.031	0.004	0.003	0.021	0.005
	AHW / nappies	0.006	0.002	0.002	0.005	0.001	0.005
	Contaminated soiled paper	0.023	0.017	0.040	0.063	0.017	0.025
	Sub-total	1.604	1.926	1.889	1.898	1.988	1.659
Organic	Food / kitchen	0.055	0.022	0.095	0.059	0.000	0.057
	Garden / vegetation	0.003	0.000	0.007	0.003	0.000	0.004
	Other putrescible	0.000	0.000	0.002	0.037	0.000	0.001
	Wood / timber	0.061	0.000	0.022	0.011	0.017	0.054
	Textile / rags	0.042	0.001	0.027	0.087	0.043	0.041
	Leather	0.004	0.000	0.015	0.043	0.007	0.006
	Rubber	0.002	0.000	0.005	0.013	0.000	0.002
	Oils	0.000	0.000	0.000	0.000	0.000	0.000
	Sub-total	0.168	0.023	0.172	0.252	0.067	0.164
Glass	Glass bev. cont.	1.136	2.153	1.517	1.921	1.656	1.224
	Glass non-bev. cont./ other pack.	0.122	0.294	0.224	0.307	0.095	0.137
	Miscellaneous / other glass	0.019	0.026	0.025	0.548	0.003	0.031
	Mixed glass / fines	0.015	0.026	0.042	0.061	0.000	0.019
	Sub-total	1.292	2.499	1.808	2.838	1.754	1.410
Plastic	PET bev. cont. (P1)	0.135	0.137	0.151	0.239	0.919	0.171
	PET pack. (excl. bev. cont.) (P1)	0.044	0.080	0.067	0.107	0.066	0.049
	PET other non-bev./ non-pack. (P1)	0.010	0.001	0.016	0.012	0.000	0.010
	HDPE bev. cont. (P2)	0.082	0.130	0.117	0.148	0.070	0.087
	HDPE pack. (excl. bev. cont.) (P2)	0.055	0.040	0.045	0.079	0.041	0.054
	HDPE other non-bev./ non-pack. (P2)	0.002	0.029	0.001	0.008	0.005	0.002
	PVC bev. cont. (P3)	0.002	0.000	0.011	0.000	0.006	0.003
	PVC pack. (excl. bev. cont.) (P3)	0.007	0.017	0.001	0.002	0.000	0.006
	PVC other non-bev./ non-pack. (P3)	0.000	0.013	0.000	0.001	0.007	0.001
	LDPE pack. (P4)	0.002	0.001	0.005	0.001	0.000	0.002
	LDPE non-pack. (P4)	0.016	0.000	0.003	0.007	0.001	0.014
	PP pack. (P5)	0.033	0.072	0.057	0.075	0.039	0.037
	PP non-pack. (P5)	0.012	0.004	0.004	0.015	0.014	0.011
	PS pack. (P6)	0.004	0.001	0.004	0.013	0.017	0.005

**Table 12 (cont.) - Recycling bin composition – weight (kg/hh/wk)**

Material category		Mean weight (kg/hh/wk)					Overall
		Queanbeyan		Palerang			
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Plastic (continued)	EPS pack. (P6)	0.003	0.000	0.004	0.005	0.003	0.003
	PS and EPS non-pack. (P6)	0.005	0.000	0.005	0.006	0.006	0.005
	Other plastics (P7) pack.	0.000	0.000	0.002	0.000	0.000	0.000
	Other plastics (P7) non-pack.	0.026	0.017	0.032	0.045	0.146	0.032
	Plastic bags	0.021	0.008	0.023	0.022	0.006	0.021
	Plastic film	0.019	0.019	0.025	0.053	0.050	0.021
	Composite (mostly plastic)	0.016	0.017	0.025	0.099	0.055	0.020
	Sub-total	0.494	0.587	0.599	0.938	1.452	0.554
Ferrous	Steel bev. cont.	0.003	0.000	0.003	0.024	0.000	0.003
	Steel pack. (excl. bev. cont.)	0.085	0.087	0.133	0.121	0.177	0.094
	Steel other non-pack.	0.009	0.021	0.008	0.068	0.000	0.010
	Composite (mostly ferrous)	0.045	0.022	0.033	0.045	0.197	0.050
	Sub-total	0.142	0.130	0.177	0.257	0.375	0.158
Non-ferrous	Aluminium bev. cont.	0.030	0.050	0.082	0.073	0.040	0.037
	Aluminium pack. (excl. bev. cont.)	0.001	0.018	0.005	0.025	0.001	0.002
	Aluminium non-pack.	0.000	0.003	0.008	0.003	0.001	0.001
	Non-ferrous other	0.000	0.000	0.001	0.003	0.000	0.000
	Composite (mostly non-ferrous)	0.002	0.000	0.000	0.000	0.000	0.001
	Sub-total	0.034	0.071	0.097	0.103	0.042	0.042
Hazardous	Paint	0.000	0.000	0.000	0.000	0.000	0.000
	Fluorescent tubes	0.000	0.000	0.000	0.000	0.000	0.000
	Dry cell batteries (non-rechargeable)	0.000	0.000	0.000	0.000	0.001	0.000
	Dry cell batteries (rechargeable)	0.000	0.000	0.000	0.000	0.000	0.000
	Vehicle batteries	0.000	0.000	0.000	0.000	0.000	0.000
	Household chemicals	0.001	0.013	0.003	0.023	0.000	0.002
	Asbestos	0.000	0.000	0.000	0.000	0.000	0.000
	Clinical pathogenic infectious	0.000	0.000	0.000	0.000	0.000	0.000
	Gas bottles	0.000	0.115	0.000	0.000	0.000	0.001
	Hazardous other	0.000	0.000	0.000	0.000	0.000	0.000
	Sub-total	0.001	0.129	0.004	0.023	0.001	0.003
Building Waste	Building materials and fittings	0.001	0.000	0.000	0.000	0.000	0.001
Earth Based	Ceramics, dust, dirt, rock, inert, ash	0.021	0.000	0.027	0.152	0.068	0.026
E-waste	Computer equipment	0.000	0.000	0.002	0.000	0.000	0.000
	TVs	0.000	0.000	0.000	0.000	0.000	0.000
	Mobile phones	0.000	0.000	0.000	0.002	0.000	0.000
	Electrical items and peripherals	0.037	0.000	0.049	0.241	0.006	0.041
	Toner cartridges	0.000	0.000	0.000	0.000	0.000	0.000
	Sub-total	0.037	0.000	0.051	0.243	0.006	0.041
Misc.	Containerised food and liquids	0.067	0.050	0.080	0.062	0.036	0.067
	Other waste	0.000	0.000	0.000	0.000	0.000	0.000
	Sub-total	0.067	0.050	0.080	0.062	0.036	0.067
Grand total		3.861	5.414	4.904	6.766	5.788	4.126
Key: bev.=beverage, cont.=container, pack.=packaging.							

Key: bev.=beverage, cont.=container, pack.=packaging.

**Table 13 - Recycling bin composition – percentage (% by weight)**

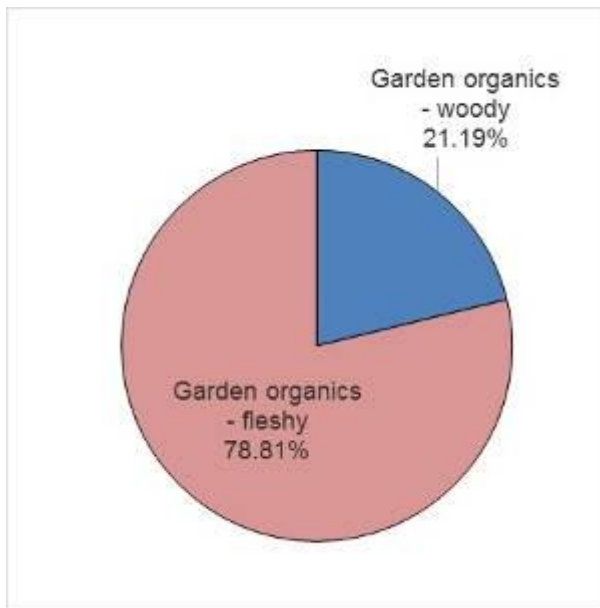
Material category		Percentage (% by weight)					Overall
		Queanbeyan		Palerang			
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Paper	Newspaper	5.78	2.24	4.68	3.82	7.45	5.62
	Magazines / brochures	10.11	13.49	6.98	5.59	6.66	9.42
	Miscellaneous pack.	0.61	0.05	0.52	0.12	0.43	0.56
	Corrugated cardboard	12.04	9.75	9.16	7.42	8.52	11.29
	Cardboard/ package board	7.09	6.72	7.05	5.35	5.53	6.93
	Liquid paperboard containers	0.64	0.40	1.13	0.75	0.79	0.70
	Disposable paper product	0.95	0.36	1.11	0.59	0.96	0.95
	Print/ writing/ office paper	3.48	1.64	6.95	3.35	3.33	3.85
	Composite (mostly paper)	0.11	0.58	0.08	0.04	0.36	0.12
	AHW / nappies	0.16	0.04	0.04	0.08	0.01	0.13
	Contaminated soiled paper	0.60	0.31	0.82	0.94	0.30	0.62
	Sub-total	41.55	35.58	38.52	28.05	34.34	40.20
Organic	Food / kitchen	1.43	0.41	1.93	0.87	0.00	1.37
	Garden / vegetation	0.09	0.00	0.14	0.04	0.00	0.08
	Other putrescible	0.00	0.00	0.04	0.54	0.00	0.03
	Wood / timber	1.59	0.00	0.45	0.16	0.29	1.31
	Textile / rags	1.10	0.01	0.55	1.29	0.73	1.00
	Leather	0.09	0.00	0.30	0.63	0.12	0.14
	Rubber	0.05	0.00	0.11	0.20	0.00	0.06
	Oils	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-total	4.34	0.42	3.52	3.72	1.15	3.98
Glass	Glass bev. cont.	29.42	39.77	30.93	28.39	28.61	29.66
	Glass non-bev. cont./ other pack.	3.15	5.44	4.57	4.54	1.63	3.32
	Miscellaneous / other glass	0.50	0.48	0.51	8.10	0.06	0.75
	Mixed glass / fines	0.40	0.48	0.86	0.91	0.00	0.45
	Sub-total	33.47	46.16	36.87	41.95	30.30	34.19
Plastic	PET bev. cont. (P1)	3.51	2.53	3.07	3.53	15.87	4.15
	PET pack. (excl. bev. cont.) (P1)	1.15	1.47	1.36	1.58	1.14	1.20
	PET other non-bev./ non-pack. (P1)	0.25	0.02	0.33	0.18	0.00	0.24
	HDPE bev. cont. (P2)	2.11	2.40	2.39	2.18	1.22	2.10
	HDPE pack. (excl. bev. cont.) (P2)	1.42	0.74	0.92	1.17	0.72	1.30
	HDPE other non-bev./ non-pack. (P2)	0.04	0.54	0.02	0.12	0.09	0.05
	PVC bev. cont. (P3)	0.06	0.00	0.22	0.00	0.11	0.08
	PVC pack. (excl. bev. cont.) (P3)	0.17	0.31	0.02	0.03	0.00	0.14
	PVC other non-bev./ non-pack. (P3)	0.01	0.25	0.00	0.01	0.12	0.02
	LDPE pack. (P4)	0.04	0.03	0.11	0.02	0.00	0.05
	LDPE non-pack. (P4)	0.41	0.00	0.06	0.11	0.02	0.33
	PP pack. (P5)	0.85	1.33	1.16	1.11	0.67	0.89
	PP non-pack. (P5)	0.31	0.07	0.09	0.22	0.25	0.27
	PS pack. (P6)	0.11	0.02	0.08	0.20	0.29	0.12

**Table 13 (cont.) - Recycling bin composition – percentage (% by weight)**

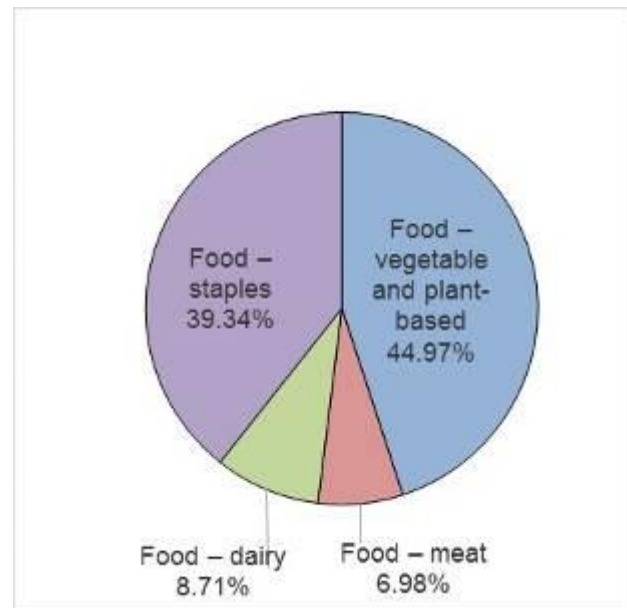
Material category		Percentage (% by weight)					
		Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Plastic (continued)	EPS pack. (P6)	0.07	0.00	0.08	0.07	0.05	0.07
	PS and EPS non-pack. (P6)	0.13	0.00	0.09	0.08	0.10	0.12
	Other plastics (P7) pack.	0.00	0.00	0.05	0.00	0.00	0.00
	Other plastics (P7) non-pack.	0.68	0.31	0.65	0.67	2.52	0.78
	Plastic bags	0.56	0.15	0.48	0.33	0.11	0.51
	Plastic film	0.48	0.34	0.51	0.79	0.87	0.52
	Composite (mostly plastic)	0.41	0.32	0.51	1.47	0.94	0.49
	<b>Sub-total</b>	<b>12.78</b>	<b>10.83</b>	<b>12.21</b>	<b>13.86</b>	<b>25.08</b>	<b>13.43</b>
Ferrous	Steel bev. cont.	0.07	0.00	0.06	0.35	0.00	0.08
	Steel pack. (excl. bev. cont.)	2.20	1.60	2.72	1.79	3.06	2.29
	Steel other non-pack.	0.24	0.39	0.16	1.00	0.00	0.24
	Composite (mostly ferrous)	1.17	0.41	0.67	0.66	3.41	1.21
	<b>Sub-total</b>	<b>3.68</b>	<b>2.40</b>	<b>3.61</b>	<b>3.80</b>	<b>6.47</b>	<b>3.82</b>
Non-ferrous	Aluminium bev. cont.	0.78	0.92	1.68	1.07	0.68	0.90
	Aluminium pack. (excl. bev. cont.)	0.04	0.33	0.10	0.37	0.02	0.06
	Aluminium non-pack.	0.01	0.06	0.17	0.04	0.02	0.03
	Non-ferrous other	0.00	0.00	0.03	0.05	0.00	0.01
	Composite (mostly non-ferrous)	0.05	0.00	0.00	0.01	0.00	0.04
	<b>Sub-total</b>	<b>0.87</b>	<b>1.31</b>	<b>1.98</b>	<b>1.53</b>	<b>0.73</b>	<b>1.03</b>
Hazardous	Paint	0.00	0.00	0.00	0.00	0.00	0.00
	Fluorescent tubes	0.00	0.00	0.00	0.00	0.00	0.00
	Dry cell batteries (non-rechargeable)	0.00	0.00	0.01	0.01	0.02	0.01
	Dry cell batteries (rechargeable)	0.00	0.00	0.00	0.00	0.00	0.00
	Vehicle batteries	0.00	0.00	0.00	0.00	0.00	0.00
	Household chemicals	0.03	0.24	0.07	0.34	0.00	0.05
	Asbestos	0.00	0.00	0.00	0.00	0.00	0.00
	Clinical pathogenic infectious	0.00	0.00	0.00	0.00	0.00	0.00
	Gas bottles	0.00	2.13	0.00	0.00	0.00	0.03
	Hazardous other	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Sub-total</b>	<b>0.04</b>	<b>2.37</b>	<b>0.07</b>	<b>0.35</b>	<b>0.02</b>	<b>0.08</b>
Building Waste	Building materials and fittings	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.02</b>
Earth Based	Ceramics, dust, dirt, rock, inert, ash	<b>0.53</b>	<b>0.00</b>	<b>0.54</b>	<b>2.24</b>	<b>1.18</b>	<b>0.63</b>
E-waste	Computer equipment	0.00	0.00	0.05	0.00	0.00	0.01
	TVs	0.00	0.00	0.00	0.00	0.00	0.00
	Mobile phones	0.00	0.00	0.00	0.03	0.00	0.00
	Electrical items and peripherals	0.95	0.00	0.99	3.56	0.11	0.99
	Toner cartridges	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Sub-total</b>	<b>0.95</b>	<b>0.00</b>	<b>1.05</b>	<b>3.59</b>	<b>0.11</b>	<b>0.99</b>
Misc.	Containerised food and liquids	1.75	0.92	1.63	0.92	0.62	1.63
	Other waste	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Sub-total</b>	<b>1.75</b>	<b>0.92</b>	<b>1.63</b>	<b>0.92</b>	<b>0.62</b>	<b>1.63</b>
<b>Grand total</b>		<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Key: bev.=beverage, cont.=container, pack.=packaging.

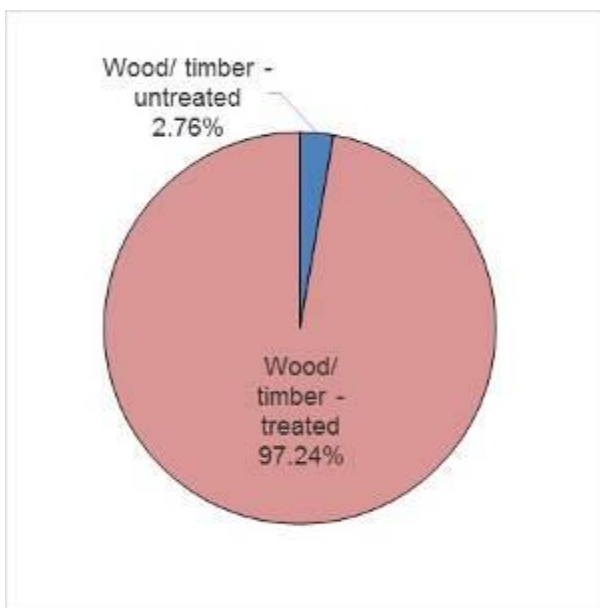
**Figure 5 - Recycling bin additional sub-sorts, overall**



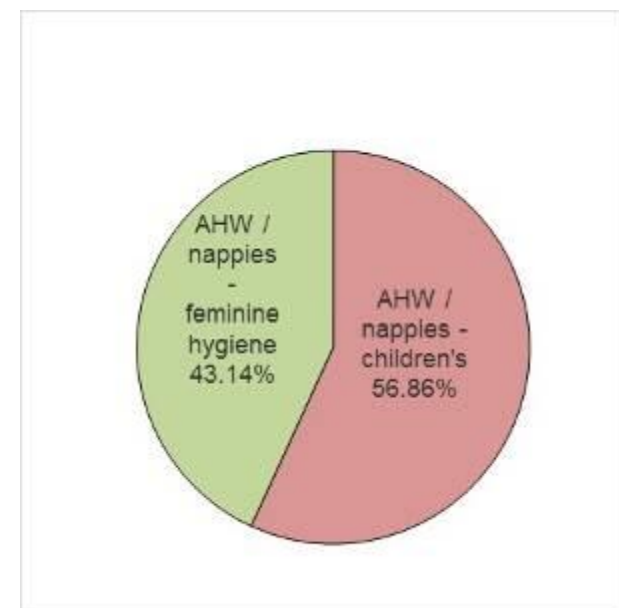
Garden organics



Food/kitchen



Wood/timber

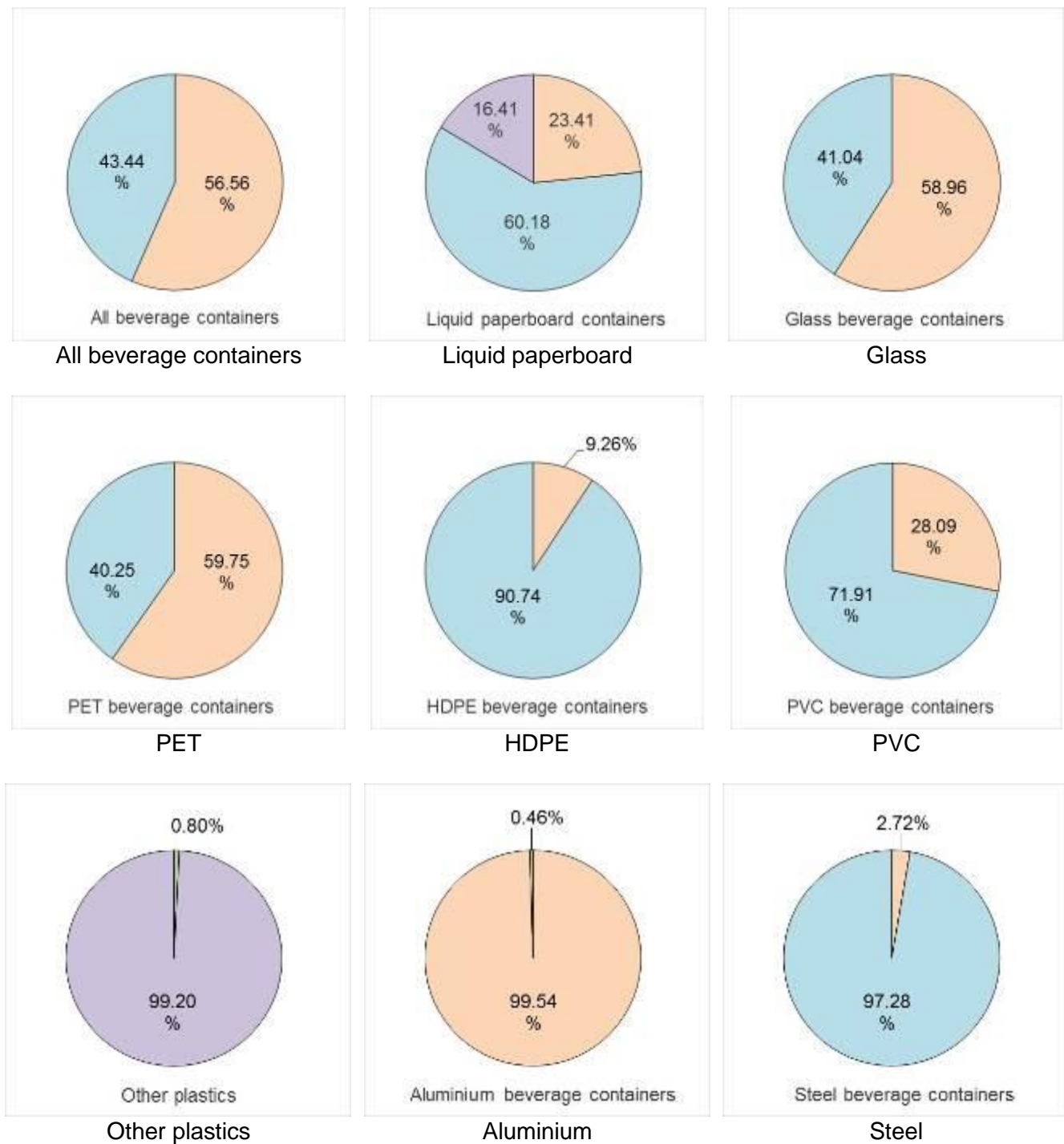


AHW/ nappies

**NSW EPA Guideline categories sub-sorted as requested by Council- % by weight**



**Figure 6 - Recycling bin sub-sorts for CDS beverage eligibility, overall**



**Categories sub-sorted based on CDS eligibility – % by weight**

Eligible CDS beverage containers Other beverage containers Other non-beverage

### 4.3.3 Organics bin

#### Summary composition

Figure 7 provides the NSW EPA summary composition of the organics bin contents by percentage (% by weight) graphically. This is a graphic representation of the sub-total data provided in Table 15. It does not relate to material recyclability, which is analysed in Table 14.

Figure 7 shows over 98% by weight of the organics bin contents was garden organics.

**Figure 7 - Organics bin composition NSW EPA summary categories – percentage (% by weight)**

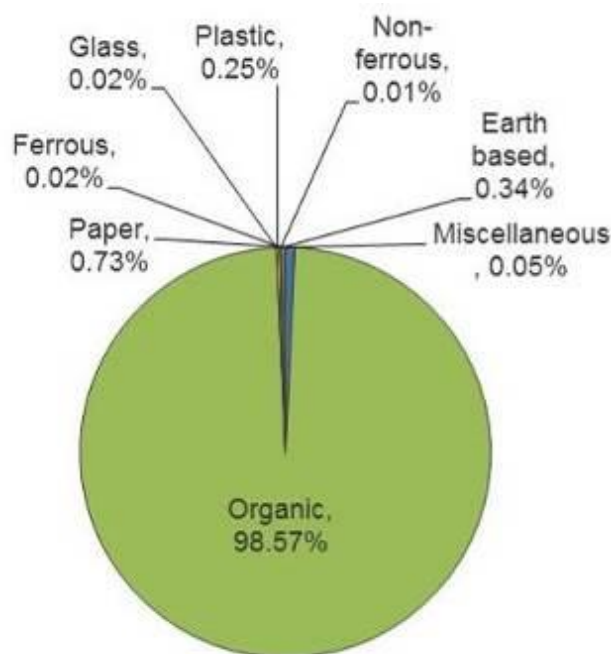


Table 14 provides a summary of compliant material types in the organics bin. The summary data shows compliant material was 96.27% of the organics bin contents overall. The remaining material was contamination at 3.73% overall.

- Palerang – Urban area had the contamination rate of 2.81%, where the organics bin accept garden organics, food, and other material such as contaminated soiled paper, as well as compostable bags and newspaper used to wrap food waste.
- Queanbeyan – Urban area had a contamination rate of 3.90%, with the organics bin accept garden organics only.



**Table 14 - Compostable materials in the organics bin – percentage (% by weight)**

Summary category	Percentage (% by weight) of total bin contents					
	Queanbeyan		Palerang			Overall
	Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Food	1.01	-	2.97	-	-	1.32
Garden/ vegetation	96.10	-	93.71	-	-	95.73
Other compostable organics #	0.13	-	0.52	-	-	0.19
Potentially compostable organics <	0.77	-	1.83	-	-	0.93
Compostable – accepted for garden organics bin (compliant) *	96.10	-		-	-	96.27 >
Compostable – accepted for FOGO bin (compliant) *		-	97.19	-	-	
Contamination ^	3.90	-	2.81	-	-	3.73
Total	100.0	-	100.0	-	-	100.0

\* Compliant materials in the organics bin. For detailed material types refer to Table 3.

^ This figure includes: compostable material not accepted (contamination) in the organics bin, and non-compostable material.

# Including contaminated soiled paper, newspaper and compostable bags. These material types are compliant to FOGO bin, but are contamination for garden organics bin.

< Including material such as other putrescible and wood/timber. These are contamination for organic bin.

> Calculated based on the estimated council-wide tonnage of compliant and contamination. This figure does not equal to total of percentage for food, garden/vegetation and other as listed above, due to different service type at each area.

### Detailed composition

Table 15 and 16 provide the mean organics bin composition by weight (kg/hh/wk) and percentage (% by weight), respectively. The detailed data shows garden/ vegetation was 95.73% of the bin contents, or 4.490kg/hh/wk.

Figure 8 shows the sub-sorts for garden/vegetation, food/kitchen, wood/timber and Absorbent Hygiene Waste (AHW)/nappies.

- Garden/vegetation, total of 4.490kg/hh/wk (95.73% of bin contents), comprised of:
  - 1.53% woody.
  - 98.47% fleshy.
- Food/ kitchen, total of 0.062kg/hh/wk (1.32% of bin contents), comprised of:
  - 12.95% food – staples.
  - 5.40% food – meat.
  - 81.65% food – vege and plant - based.
- Wood/timber, total of 0.036kg/hh/wk (0.77% of bin contents), comprised of:

- 2.76% untreated
- 97.24% treated.
- Absorbent Hygiene Waste (AHW)/nappie, total of 0.0001kg/hh/wk (0.002% of bin contents), all being feminine hygiene.

Figure 3 shows the sub-sorts based on CDS eligibility. Additional detail provided in Appendix 2 by weight and count.

- 0.03% of the organics bin were beverage containers, 0.0015kg/hh/wk.
- 97.92% of all beverage containers in the recycling bin were CDS eligible, 0.00149kg/hh/wk.

Contamination in the organics bin is analysed in Section 4.6.2.

**Table 15 - Organics bin composition – weight (kg/hh/wk)**

Material category		Mean weight (kg/hh/wk)					Overall
		Queanbeyan		Palerang			
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Paper	Newspaper	0.004	-	0.019	-	-	0.005
	Magazines / brochures	0.001	-	0.003	-	-	0.002
	Miscellaneous pack.	0.000	-	0.000	-	-	0.000
	Corrugated cardboard	0.000	-	0.000	-	-	0.000
	Cardboard/ package board	0.001	-	0.003	-	-	0.002
	Liquid paperboard containers	0.000	-	0.009	-	-	0.001
	Disposable paper product	0.000	-	0.000	-	-	0.000
	Print/ writing/ office paper	0.002	-	0.005	-	-	0.002
	Composite (mostly paper)	0.001	-	0.001	-	-	0.001
	AHW / nappies	0.000	-	0.001	-	-	0.000
	Contaminated soiled paper	0.002	-	0.008	-	-	0.003
	Sub-total	0.012	-	0.049	-	-	0.016
Organic	Food / kitchen	0.045	-	0.199	-	-	0.062
	Garden / vegetation	4.272	-	6.271	-	-	4.490
	Other putrescible	0.002	-	0.053	-	-	0.008
	Wood / timber	0.032	-	0.069	-	-	0.036
	Textile / rags	0.006	-	0.004	-	-	0.006
	Leather	0.000	-	0.000	-	-	0.000
	Rubber	0.000	-	0.000	-	-	0.000
	Oils	0.000	-	0.000	-	-	0.000
	Sub-total	4.357	-	6.597	-	-	4.601
Glass	Glass bev. cont.	0.000	-	0.001	-	-	0.000
	Glass non-bev. cont./ other pack.	0.000	-	0.000	-	-	0.000
	Miscellaneous / other glass	0.000	-	0.000	-	-	0.000
	Mixed glass / fines	0.000	-	0.000	-	-	0.000
	Sub-total	0.000	-	0.001	-	-	0.000
Plastic	PET bev. cont. (P1)	0.000	-	0.000	-	-	0.000
	PET pack. (excl. bev. cont.) (P1)	0.000	-	0.000	-	-	0.000
	PET other non-bev./ non-pack. (P1)	0.000	-	0.000	-	-	0.000
	HDPE bev. cont, (P2)	0.000	-	0.000	-	-	0.000
	HDPE pack. (excl. bev. cont.) (P2)	0.000	-	0.000	-	-	0.000
	HDPE other non-bev./ non-pack. (P2)	0.000	-	0.000	-	-	0.000
	PVC bev. cont. (P3)	0.000	-	0.000	-	-	0.000
	PVC pack. (excl. bev. cont.) (P3)	0.000	-	0.000	-	-	0.000
	PVC other non-bev./ non-pack. (P3)	0.000	-	0.000	-	-	0.000
	LDPE pack. (P4)	0.000	-	0.000	-	-	0.000
	LDPE non-pack. (P4)	0.000	-	0.000	-	-	0.000
	PP pack. (P5)	0.000	-	0.001	-	-	0.000
	PP non-pack. (P5)	0.000	-	0.000	-	-	0.000
	PS pack. (P6)	0.000	-	0.000	-	-	0.000

**Table 15 (cont.) - Organics bin composition – weight (kg/hh/wk)**

Material category		Mean weight (kg/hh/wk)					
		Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Plastic (continued)	EPS pack. (P6)	0.001	-	0.000	-	-	0.001
	PS and EPS non-pack. (P6)	0.000	-	0.000	-	-	0.000
	Other plastics (P7) pack.	0.000	-	0.000	-	-	0.000
	Other plastics (P7) non-pack.	0.000	-	0.000	-	-	0.000
	Plastic bags	0.002	-	0.003	-	-	0.002
	Plastic film	0.002	-	0.010	-	-	0.003
	Composite (mostly plastic)	0.000	-	0.001	-	-	0.000
	<b>Sub-total</b>	<b>0.007</b>	<b>-</b>	<b>0.017</b>	<b>-</b>	<b>-</b>	<b>0.008</b>
Ferrous	Steel bev. cont.	0.000	-	0.000	-	-	0.000
	Steel pack. (excl. bev. cont.)	0.001	-	0.002	-	-	0.001
	Steel other non-pack.	0.000	-	0.000	-	-	0.000
	Composite (mostly ferrous)	0.000	-	0.000	-	-	0.000
	<b>Sub-total</b>	<b>0.001</b>	<b>-</b>	<b>0.002</b>	<b>-</b>	<b>-</b>	<b>0.001</b>
Non-ferrous	Aluminium bev. cont.	0.000	-	0.000	-	-	0.000
	Aluminium pack. (excl. bev. cont.)	0.000	-	0.000	-	-	0.000
	Aluminium non-pack.	0.000	-	0.000	-	-	0.000
	Non-ferrous other	0.000	-	0.000	-	-	0.000
	Composite (mostly non-ferrous)	0.000	-	0.000	-	-	0.000
	<b>Sub-total</b>	<b>0.000</b>	<b>-</b>	<b>0.001</b>	<b>-</b>	<b>-</b>	<b>0.000</b>
Hazardous	Paint	0.000	-	0.000	-	-	0.000
	Fluorescent tubes	0.000	-	0.000	-	-	0.000
	Dry cell batteries (non-rechargeable)	0.000	-	0.000	-	-	0.000
	Dry cell batteries (rechargeable)	0.000	-	0.000	-	-	0.000
	Vehicle batteries	0.000	-	0.000	-	-	0.000
	Household chemicals	0.000	-	0.000	-	-	0.000
	Asbestos	0.000	-	0.000	-	-	0.000
	Clinical pathogenic infectious	0.000	-	0.000	-	-	0.000
	Gas bottles	0.000	-	0.000	-	-	0.000
	Hazardous other	0.000	-	0.000	-	-	0.000
	<b>Sub-total</b>	<b>0.000</b>	<b>-</b>	<b>0.000</b>	<b>-</b>	<b>-</b>	<b>0.000</b>
Building Waste	Building materials and fittings	<b>0.000</b>	<b>-</b>	<b>0.000</b>	<b>-</b>	<b>-</b>	<b>0.000</b>
Earth Based	Ceramics, dust, dirt, rock, inert, ash	<b>0.068</b>	<b>-</b>	<b>0.023</b>	<b>-</b>	<b>-</b>	<b>0.063</b>
E-waste	Computer equipment	0.000	-	0.000	-	-	0.000
	TVs	0.000	-	0.000	-	-	0.000
	Mobile phones	0.000	-	0.000	-	-	0.000
	Electrical items and peripherals	0.000	-	0.000	-	-	0.000
	Toner cartridges	0.000	-	0.000	-	-	0.000
	<b>Sub-total</b>	<b>0.000</b>	<b>-</b>	<b>0.000</b>	<b>-</b>	<b>-</b>	<b>0.000</b>
Misc.	Containerised food and liquids	0.000	-	0.003	-	-	0.000
	Other waste	0.000	-	0.000	-	-	0.000
	<b>Sub-total</b>	<b>0.000</b>	<b>-</b>	<b>0.003</b>	<b>-</b>	<b>-</b>	<b>0.000</b>
<b>Grand total</b>		<b>4.445</b>	<b>-</b>	<b>6.692</b>	<b>-</b>	<b>-</b>	<b>4.690</b>
Key: bev.=beverage, cont.=container, pack.=packaging.							

**Table 16 - Organics bin composition – percentage (% by weight)**

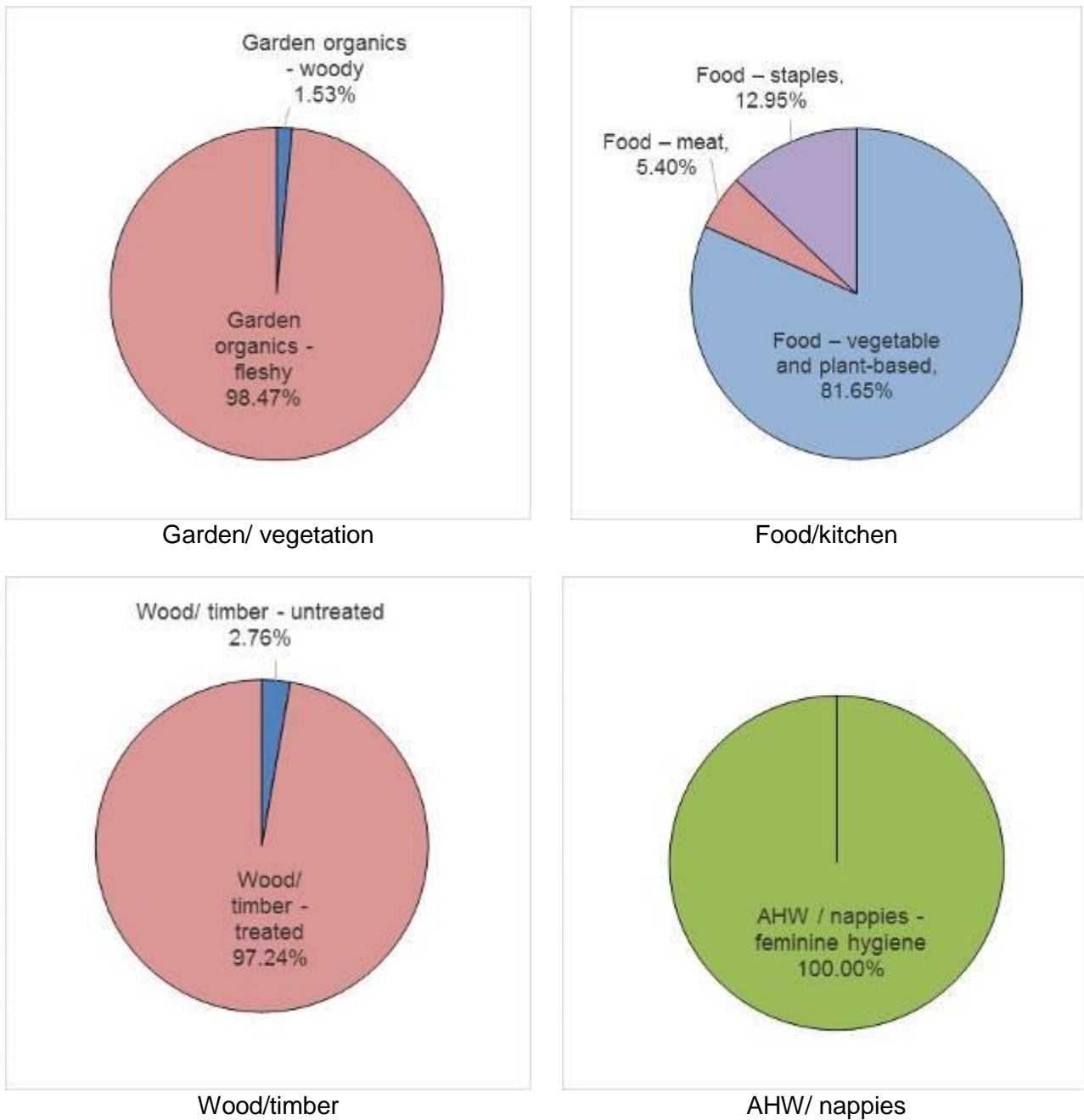
Material category		Percentage (% by weight)					Overall
		Queanbeyan		Palerang			
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Paper	Newspaper	0.08	-	0.28	-	-	0.11
	Magazines / brochures	0.03	-	0.05	-	-	0.04
	Miscellaneous pack.	0.00	-	0.00	-	-	0.00
	Corrugated cardboard	0.01	-	0.00	-	-	0.01
	Cardboard/ package board	0.03	-	0.05	-	-	0.03
	Liquid paperboard containers	0.01	-	0.13	-	-	0.03
	Disposable paper product	0.01	-	0.00	-	-	0.01
	Print/ writing/ office paper	0.03	-	0.07	-	-	0.04
	Composite (mostly paper)	0.02	-	0.01	-	-	0.02
	AHW / nappies	0.00	-	0.01	-	-	0.00
	Contaminated soiled paper	0.05	-	0.12	-	-	0.06
	Sub-total	0.27	-	0.73	-	-	0.34
Organic	Food / kitchen	1.01	-	2.97	-	-	1.32
	Garden / vegetation	96.10	-	93.71	-	-	95.73
	Other putrescible	0.05	-	0.80	-	-	0.16
	Wood / timber	0.72	-	1.04	-	-	0.77
	Textile / rags	0.13	-	0.07	-	-	0.12
	Leather	0.00	-	0.00	-	-	0.00
	Rubber	0.01	-	0.00	-	-	0.01
	Oils	0.00	-	0.00	-	-	0.00
	Sub-total	98.02	-	98.57	-	-	98.10
Glass	Glass bev. cont.	0.00	-	0.02	-	-	0.00
	Glass non-bev. cont./ other pack.	0.00	-	0.00	-	-	0.00
	Miscellaneous / other glass	0.00	-	0.00	-	-	0.00
	Mixed glass / fines	0.00	-	0.00	-	-	0.00
	Sub-total	0.00	-	0.02	-	-	0.00
Plastic	PET bev. cont. (P1)	0.01	-	0.00	-	-	0.01
	PET pack. (excl. bev. cont.) (P1)	0.01	-	0.01	-	-	0.01
	PET other non-bev./ non-pack. (P1)	0.00	-	0.00	-	-	0.00
	HDPE bev. cont. (P2)	0.00	-	0.00	-	-	0.00
	HDPE pack. (excl. bev. cont.) (P2)	0.00	-	0.00	-	-	0.00
	HDPE other non-bev./ non-pack. (P2)	0.00	-	0.00	-	-	0.00
	PVC bev. cont. (P3)	0.00	-	0.00	-	-	0.00
	PVC pack. (excl. bev. cont.) (P3)	0.00	-	0.00	-	-	0.00
	PVC other non-bev./ non-pack. (P3)	0.00	-	0.00	-	-	0.00
	LDPE pack. (P4)	0.00	-	0.00	-	-	0.00
	LDPE non-pack. (P4)	0.01	-	0.00	-	-	0.01
	PP pack. (P5)	0.01	-	0.01	-	-	0.01
	PP non-pack. (P5)	0.01	-	0.01	-	-	0.01
	PS pack. (P6)	0.00	-	0.00	-	-	0.00

**Table 16 (cont.) - Organics bin composition – percentage (% by weight)**

Material category		Percentage (% by weight)					
		Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Plastic (continued)	EPS pack. (P6)	0.03	-	0.00	-	-	0.03
	PS and EPS non-pack. (P6)	0.00	-	0.00	-	-	0.00
	Other plastics (P7) pack.	0.00	-	0.00	-	-	0.00
	Other plastics (P7) non-pack.	0.00	-	0.00	-	-	0.00
	Plastic bags	0.03	-	0.05	-	-	0.04
	Plastic film	0.04	-	0.16	-	-	0.06
	Composite (mostly plastic)	0.00	-	0.01	-	-	0.00
	<b>Sub-total</b>	<b>0.15</b>	<b>-</b>	<b>0.25</b>	<b>-</b>	<b>-</b>	<b>0.16</b>
Ferrous	Steel bev. cont.	0.00	-	0.00	-	-	0.00
	Steel pack. (excl. bev. cont.)	0.01	-	0.02	-	-	0.01
	Steel other non-pack.	0.00	-	0.00	-	-	0.00
	Composite (mostly ferrous)	0.01	-	0.00	-	-	0.01
	<b>Sub-total</b>	<b>0.02</b>	<b>-</b>	<b>0.02</b>	<b>-</b>	<b>-</b>	<b>0.02</b>
Non-ferrous	Aluminium bev. cont.	0.00	-	0.00	-	-	0.00
	Aluminium pack. (excl. bev. cont.)	0.00	-	0.01	-	-	0.00
	Aluminium non-pack.	0.00	-	0.01	-	-	0.00
	Non-ferrous other	0.00	-	0.00	-	-	0.00
	Composite (mostly non-ferrous)	0.00	-	0.00	-	-	0.00
	<b>Sub-total</b>	<b>0.00</b>	<b>-</b>	<b>0.01</b>	<b>-</b>	<b>-</b>	<b>0.01</b>
Hazardous	Paint	0.00	-	0.00	-	-	0.00
	Fluorescent tubes	0.00	-	0.00	-	-	0.00
	Dry cell batteries (non-rechargeable)	0.00	-	0.00	-	-	0.00
	Dry cell batteries (rechargeable)	0.00	-	0.00	-	-	0.00
	Vehicle batteries	0.00	-	0.00	-	-	0.00
	Household chemicals	0.00	-	0.00	-	-	0.00
	Asbestos	0.00	-	0.00	-	-	0.00
	Clinical pathogenic infectious	0.00	-	0.00	-	-	0.00
	Gas bottles	0.00	-	0.00	-	-	0.00
	Hazardous other	0.00	-	0.00	-	-	0.00
	<b>Sub-total</b>	<b>0.00</b>	<b>-</b>	<b>0.00</b>	<b>-</b>	<b>-</b>	<b>0.00</b>
Building Waste	Building materials and fittings	<b>0.00</b>	<b>-</b>	<b>0.00</b>	<b>-</b>	<b>-</b>	<b>0.00</b>
Earth Based	Ceramics, dust, dirt, rock, inert, ash	<b>1.53</b>	<b>-</b>	<b>0.34</b>	<b>-</b>	<b>-</b>	<b>1.35</b>
E-waste	Computer equipment	0.00	-	0.00	-	-	0.00
	TVs	0.00	-	0.00	-	-	0.00
	Mobile phones	0.00	-	0.00	-	-	0.00
	Electrical items and peripherals	0.00	-	0.00	-	-	0.00
	Toner cartridges	0.00	-	0.00	-	-	0.00
	<b>Sub-total</b>	<b>0.00</b>	<b>-</b>	<b>0.00</b>	<b>-</b>	<b>-</b>	<b>0.00</b>
Misc.	Containerised food and liquids	0.00	-	0.05	-	-	0.01
	Other waste	0.00	-	0.00	-	-	0.00
	<b>Sub-total</b>	<b>0.00</b>	<b>-</b>	<b>0.05</b>	<b>-</b>	<b>-</b>	<b>0.01</b>
<b>Grand total</b>		<b>100.00</b>	<b>-</b>	<b>100.00</b>	<b>-</b>	<b>-</b>	<b>100.00</b>

Key: bev.=beverage, cont.=container, pack.=packaging.

**Figure 8 - Organics bin additional sub-sorts, overall**



**NSW EPA Guideline categories sub-sorted as requested by Council- % by weight**

**Figure 9 - Organics bin sub-sorts for CDS beverage eligibility, overall**



**Categories sub-sorted based on CDS eligibility – % by weight**

■ Eligible CDS beverage containers 
 ■ Other beverage containers 
 ■ Other non-beverage

^ Glass containers have a zero weight to 3 decimal places. The actual weight was 0.0001kg/hh/wk.

# PET containers have a zero weight to 3 decimal places. The actual weight was 0.0004kg/hh/wk.

\* HDPE containers have a zero weight to 3 decimal places. The actual weight was 0.0003kg/hh/wk.



## 4.4 Unrecovered resources

This section provides the unrecovered resources, or resource loss, in the waste bin based on suitability for particular uses:

- **MGB recyclable** – materials that can be placed into Council's kerbside recycling bins.
- **Potentially recyclable** – metals that are not compliant in Council's kerbside recycling bin, but that may be recovered by a MRF or AWT due to their value or other factors.
- **Compostable** – materials that can be composted in an AWT excluding materials that are compliant in the Council's kerbside recycling bin. For example, some paper could be composted but is compliant in the kerbside recycling bin and is therefore excluded from this category.
- **MGB non-recyclable** – materials that cannot be placed into Council's kerbside recycling bins and are not AWT compostable or potentially recyclable. This includes some materials that can be recovered (such as textiles at a clothes bank or e-waste at a drop-off centre, mobiles in MobileMuster) but that are not recoverable in the Council MGB system.

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 NSW EPA 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.

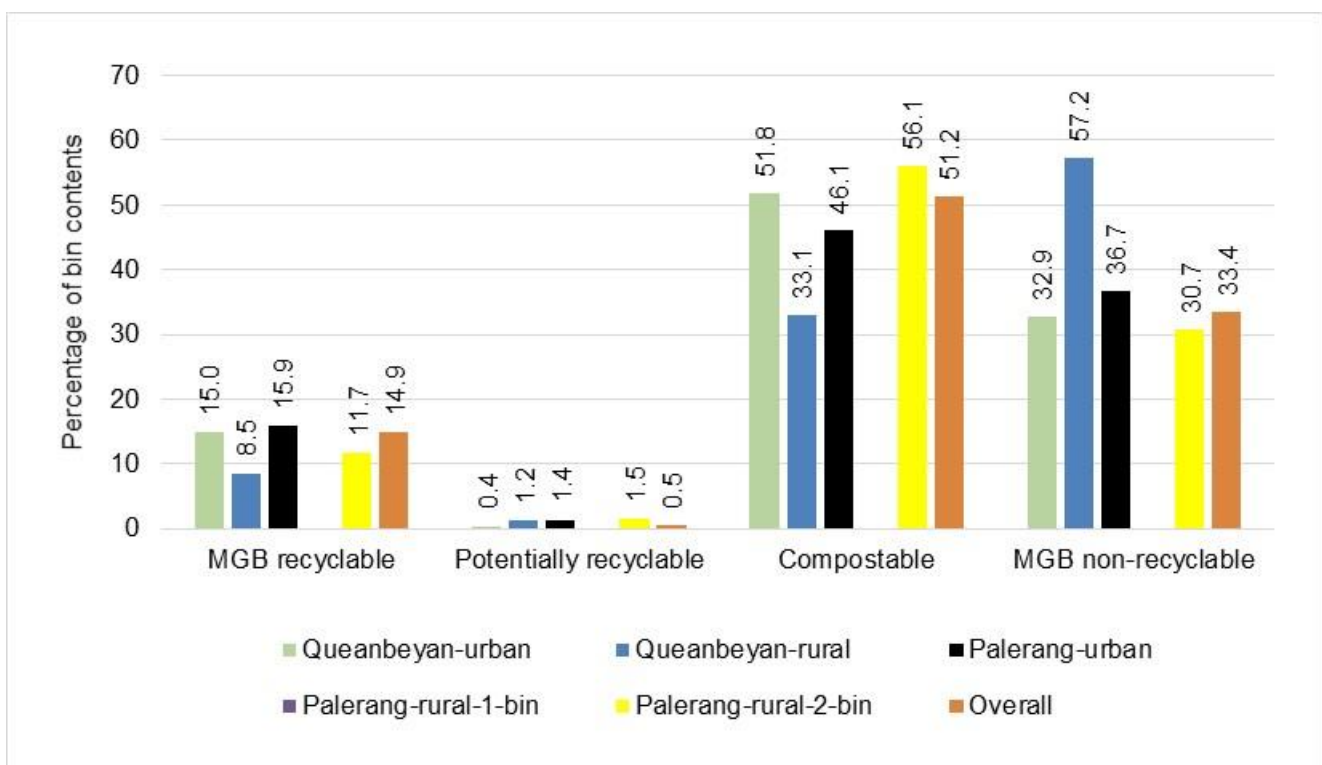
Figure 10 provides the summary categories by percentage (% by weight), with the categories provided in more detail in Figure 11.

The data shows:

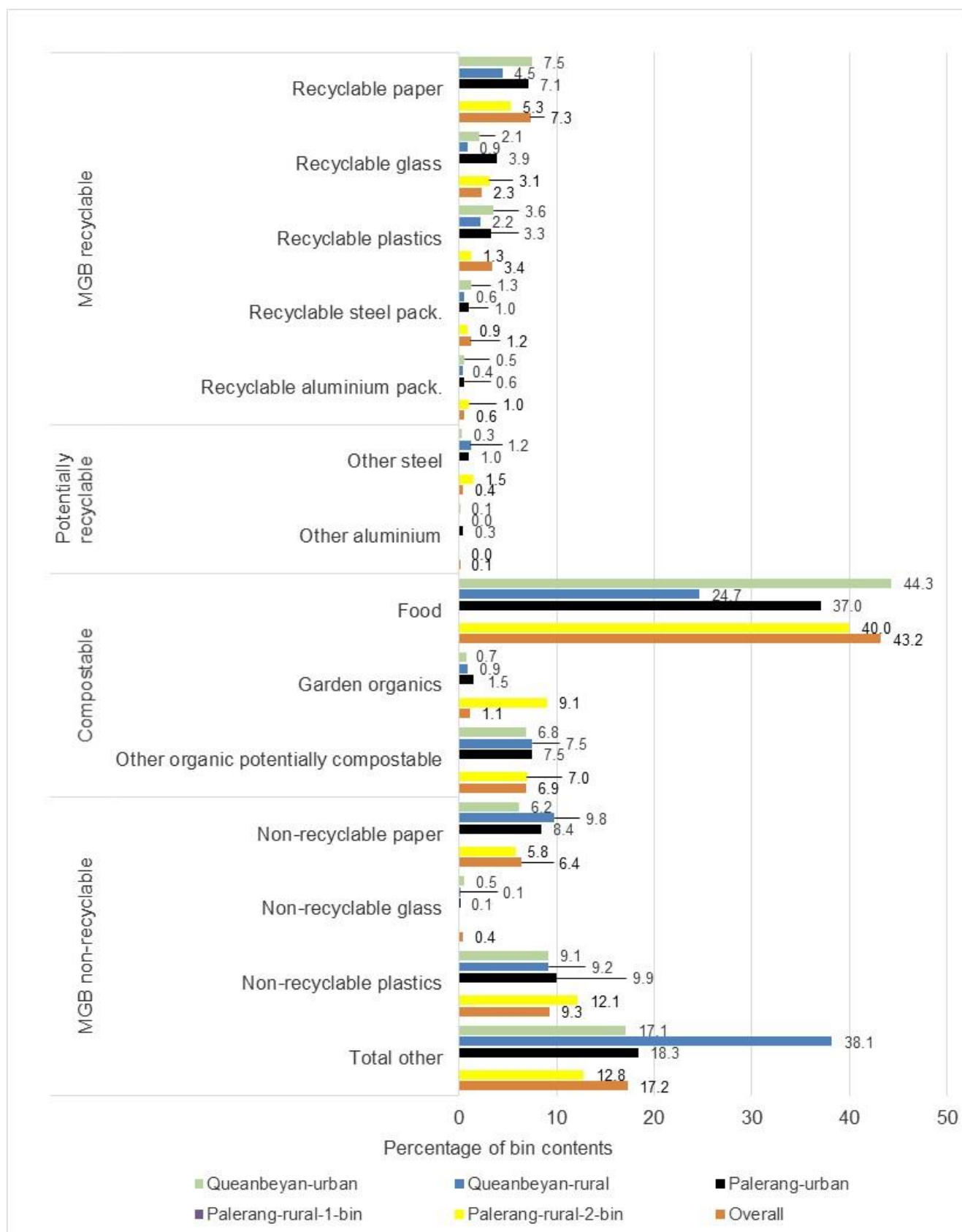
- MGB recyclables were 14.86% of the waste bin contents, with the highest result at Palerang – Urban area (15.86%) whereas the lowest result at Queanbeyan – Rural area (8.53%). These materials could be recovered in the recycling bin. Therefore, education should focus on the main unrecovered recyclables such as:
  - Recyclable paper at 7.34% of the bin contents.

- Recyclable plastics at 3.43% of the bin contents.
- Recyclable glass at 2.33% of the bin contents.
- Compostable materials were 51.21% of the waste bin contents, with the highest result at Palerang – Rural – 2-bin area (56.05%) whereas the lowest result at Queanbeyan – Rural area (33.10%).
  - 1.12% of the bin contents was garden organics. This could be recovered in the organics bin.
  - 43.19% of the bin contents was food waste. This could be recovered in the FOGO bin.

**Figure 10 - Unrecovered resources in the waste bin – summary**



**Figure 11 - Unrecovered resources in the waste bin – detailed**



**Figure 11 (cont.) – Unrecovered resources in the waste bin – detailed**

Material category	Percentage (% by weight)					Overall
	Queanbeyan		Palerang			
	Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Recyclable paper	7.48	4.49	7.12	-	5.34	7.34
Recyclable glass	2.12	0.90	3.90	-	3.13	2.33
Recyclable plastics	3.55	2.20	3.26	-	1.28	3.43
Recyclable steel packaging	1.25	0.55	1.02	-	0.91	1.21
Recyclable aluminium packaging	0.54	0.37	0.57	-	1.02	0.56
<b>Sub-total MGB recyclable – CDS</b>	<b>1.89</b>	<b>0.73</b>	<b>2.43</b>	<b>-</b>	<b>2.75</b>	<b>1.96</b>
<b>Sub-total MGB recyclable – other</b>	<b>13.07</b>	<b>7.80</b>	<b>13.43</b>	<b>-</b>	<b>8.94</b>	<b>12.90</b>
<b>MGB recyclable</b>	<b>14.96</b>	<b>8.53</b>	<b>15.86</b>	<b>-</b>	<b>11.69</b>	<b>14.86</b>
Other steel	0.31	1.22	1.00	-	1.52	0.44
Other non-ferrous	0.07	0.00	0.35	-	0.00	0.09
<b>Potentially recyclable</b>	<b>0.38</b>	<b>1.22</b>	<b>1.35</b>	<b>-</b>	<b>1.52</b>	<b>0.53</b>
Food	44.25	24.66	37.03	-	40.02	43.19
Garden organics	0.74	0.92	1.50	-	9.06	1.12
Other organic	6.82	7.53	7.53	-	6.98	6.90
<b>Compostable</b>	<b>51.81</b>	<b>33.10</b>	<b>46.06</b>	<b>-</b>	<b>56.05</b>	<b>51.21</b>
Non-recyclable paper	6.20	9.78	8.39	-	5.80	6.44
Non-recyclable glass	0.49	0.09	0.07	-	0.00	0.43
Non-recyclable plastics	9.10	9.16	9.93	-	12.14	9.29
Total other ^	17.07	38.14	18.34	-	12.79	17.25
<b>MGB non-recyclable</b>	<b>32.85</b>	<b>57.16</b>	<b>36.73</b>	<b>-</b>	<b>30.73</b>	<b>33.40</b>
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>		<b>100.0</b>	<b>100.0</b>

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

## 4.5 Hazardous materials

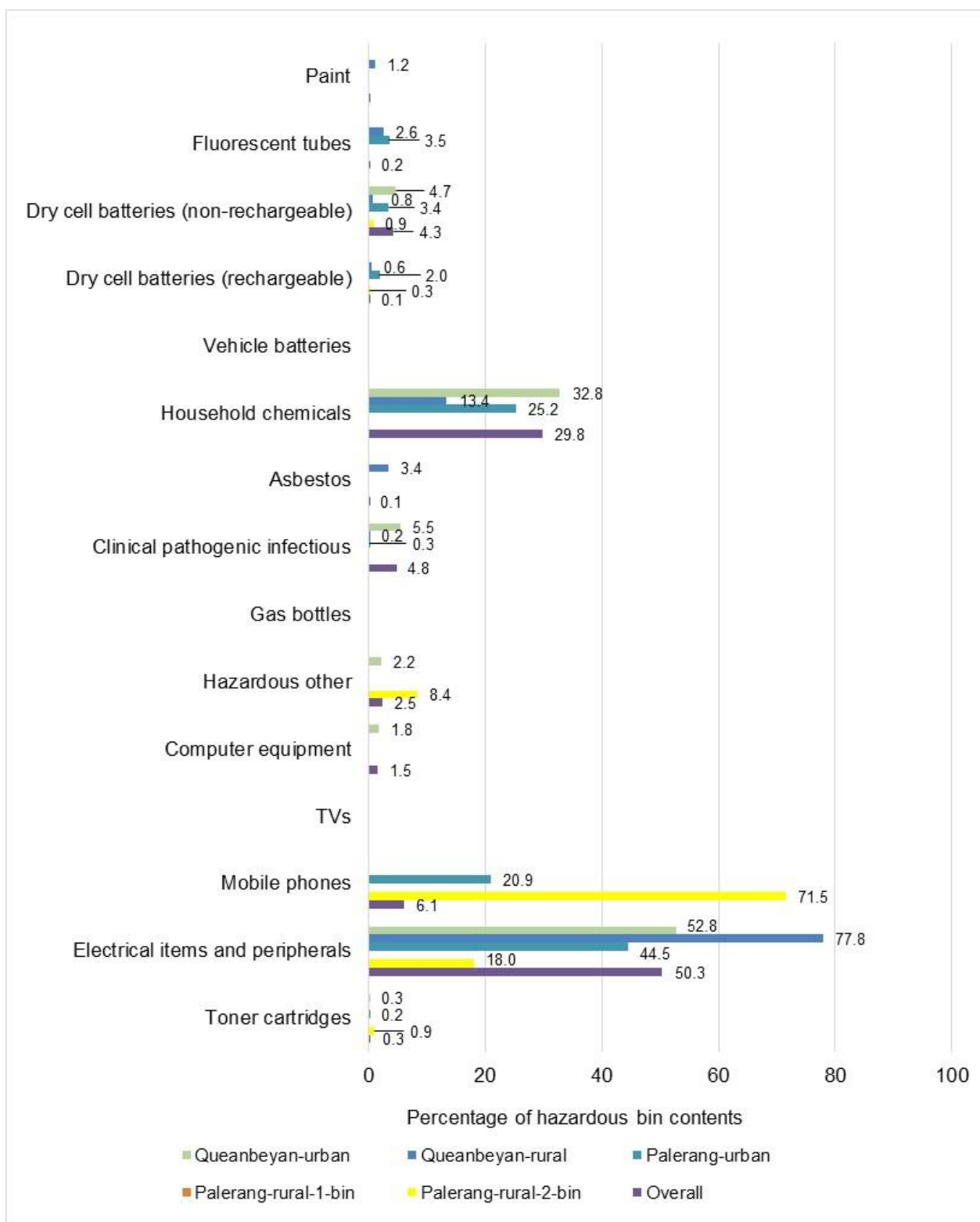
This section provides analysis on hazardous materials disposed in the waste bin.

Figure 12 provides the hazardous materials in the waste bin, which includes NSW EPA Guideline categories classified as hazardous and e-waste, as shown in Table 3. The data shows:

- The largest category was electrical items and peripherals at 50.32% of total hazardous material, ranging from Palerang – Rural -2-bin area at 18.05% to Queanbeyan – Rural at 77.84%.
- Other main categories were:
  - Household chemicals at 29.81% of total hazardous material.
  - Mobile phones at 6.06% of total hazardous material.

Electrical items and peripherals in the audit included items such as earphones, dry cell batteries, cables, chargers, a kettle, a microphone, a trimmer, an electric pump, a light set, remotes, a toaster, headphones, a power board, a light bulb, a radio, a watch, a vacuum, a microwave, a torch, a blender, a hairdryer, a speaker, toys and toothbrushes. This category also includes light globes which were agreed with EPA to be sorted as electrical rather than glass.

**Figure 12 - Hazardous materials in the waste bin**



**Figure 12 (cont.) - Hazardous materials in the waste bin**

Hazardous categories	Percentage (% by weight) of total hazardous					
	Queanbeyan		Palerang			Overall
	Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Paint	0.00	1.17	0.00	-	0.00	0.02
Fluorescent tubes	0.00	2.61	3.51	-	0.00	0.23
Dry cell batteries (rechargeable)	4.68	0.80	3.42	-	0.89	4.29
Dry cell batteries (non-rechargeable)	0.00	0.60	1.95	-	0.26	0.13
Vehicle batteries	0.00	0.00	0.00	-	0.00	0.00
Household chemicals	32.78	13.35	25.22	-	0.00	29.81
Asbestos	0.00	3.42	0.00	-	0.00	0.05
Clinical pathogenic infectious	5.53	0.21	0.31	-	0.00	4.78
Gas bottles	0.00	0.00	0.00	-	0.00	0.00
Hazardous other	2.19	0.00	0.00	-	8.37	2.46
Computer equipment	1.78	0.00	0.00	-	0.00	1.53
TVs	0.00	0.00	0.00	-	0.00	0.00
Mobile phones	0.00	0.00	20.89	-	71.50	6.06
Electrical items and peripherals	52.77	77.84	44.51	-	18.05	50.32
Toner cartridges	0.27	0.00	0.19	-	0.93	0.30
Total	100.00	100.00	100.00	-	100.00	100.00

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 overall data shows:

- A total of 196 hazardous items were disposed.
- The most common hazardous wastes disposed were non-rechargeable batteries (91 items) and electrical items and peripherals (71 items) which comprise of approximately 83% of hazardous items by count.
- An average of 0.54 dry cell batteries are disposed per household per week, which equates to approximately 1 dry cell battery for every 1.9 households. This is equivalent to 28.1 dry cell batteries being disposed by one household per year.

**Table 17 - Hazardous item counts in the waste bin**

Hazardous Item		Item count						Item/hh/wk					
		Queanbeyan		Palerang			Overall	Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Fluorescent tubes		0	3	5	-	0	8	0.00	0.19	0.05	-	0.00	0.01
Dry cell batteries	Non-rechargeable	69	4	15	-	3	91	0.61	0.25	0.16	-	0.21	0.54
	Rechargeable	0	2	11	-	1	14	0.00	0.13	0.12	-	0.07	0.02
Car batteries		0	0	0	-	0	0	0.00	0.00	0.00	-	0.00	0.00
Gas bottles		0	0	0	-	0	0	0.00	0.00	0.00	-	0.00	0.00
Computer equipment		1	0	0	-	0	1	0.01	0.00	0.00	-	0.00	0.01
TVs		0	0	0	-	0	0	0.00	0.00	0.00	-	0.00	0.00
Mobile phones		0	0	4	-	3	7	0.00	0.00	0.04	-	0.21	0.01
Electrical items and peripherals		37	5	22	-	7	71	0.33	0.28	0.24	-	0.50	0.33
Toner cartridges		2	0	1	-	1	4	0.02	0.00	0.01	-	0.07	0.02
Other		0	0	0	-	0	0	0.00	0.00	0.00	-	0.00	0.00
<b>Total</b>		<b>109</b>	<b>14</b>	<b>58</b>	<b>-</b>	<b>15</b>	<b>196</b>	<b>0.96</b>	<b>0.84</b>	<b>0.64</b>	<b>-</b>	<b>1.07</b>	<b>0.93</b>



## 4.6 Contamination rate and types

### 4.6.1 Recycling bin

Figure 13 provides a summary level of the contamination in the recycling bin 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 bin 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 Appendix 4.

The data shows:

- Overall – 14.31% of contamination in bins.
- Queanbeyan – Rural area had the lowest contamination rate at 8.40%.
- Palerang – Rural – 1-bin area had the highest contamination rate at 26.64%.

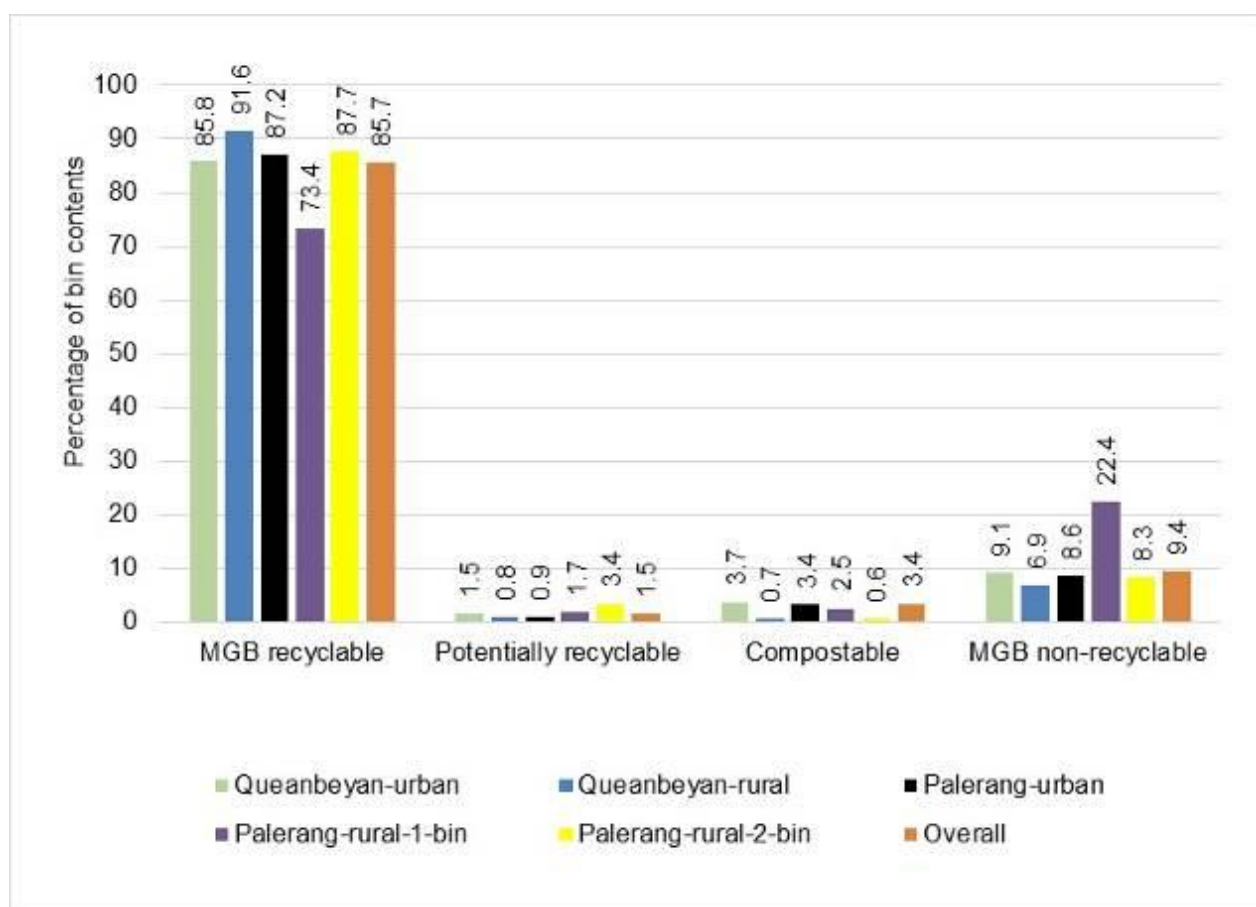
Therefore, the results of this audit showed a less effective performance level compared to the following benchmarks available for the average recycling contamination rates:

- The NSW EPA audits across the SMA and ERA:
  - 5.4% based on audits in 2007-2008 (NSW EPA, 2011).
  - 7.3% based on audits in 2011 (NSW EPA, 2014).
- The 2011 NSW EPA audits across the SMA and ERA 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 SMA and ERA 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.

However, if bagged materials in the recycling bin were assumed to be contamination the overall contamination rate would increase by 1.81 percentage points to 16.12% of contamination in bins. The results show that bagged material comprised of 25.25% recyclable material, with the remaining material contamination.

**Figure 13 - Recycling bin contamination rate – percentage (% by weight)**

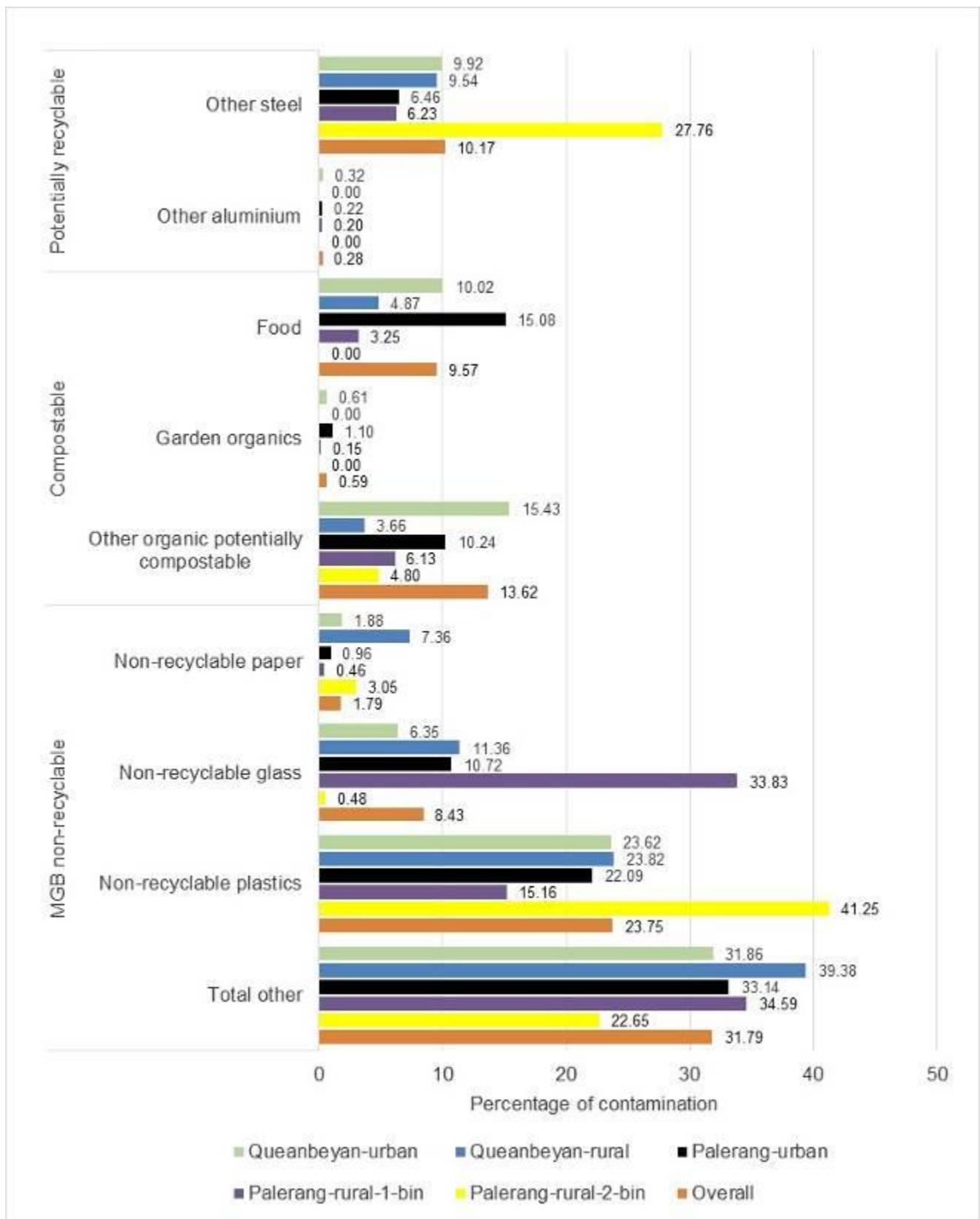


Summary category		Percentage (% by weight) of total bin contents					
		Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Compliant	MGB recyclable	85.78	91.60	87.19	73.36	87.71	85.69
Contamin- ation	Potentially recyclable	1.46	0.80	0.86	1.71	3.41	1.50
	Compostable	3.70	0.72	3.38	2.54	0.59	3.40
	MGB non-recyclable	9.06	6.88	8.57	22.39	8.28	9.41
	Total contamination	14.22	8.40	12.81	26.64	12.29	14.31

Figure 14 provides the types of contamination in the recycling bin based on the materials not accepted by Council for recycling. The data shows:

- The largest category of contamination was 'total other' at 31.79% of the contamination overall. The overall 'total other' was mainly:
  1. Containerised food at 11.38% of the contamination.
  2. Textile/rags at 7.00% of the contamination.
  3. Electrical items and peripherals at 6.90% of the contamination.
- The second largest category of contamination overall was non-recyclable plastics at 23.75% of contamination.
- The other main types of contamination overall were:
  - Other organic potentially compostable at 13.62% of the contamination.
  - Other steel at 10.17% of the contamination.

**Figure 14 - Recycling bin contamination types – percentage (% of contamination)**



**Figure 14 (cont.) – Recycling bin contamination types – percentage (% of contamination)**

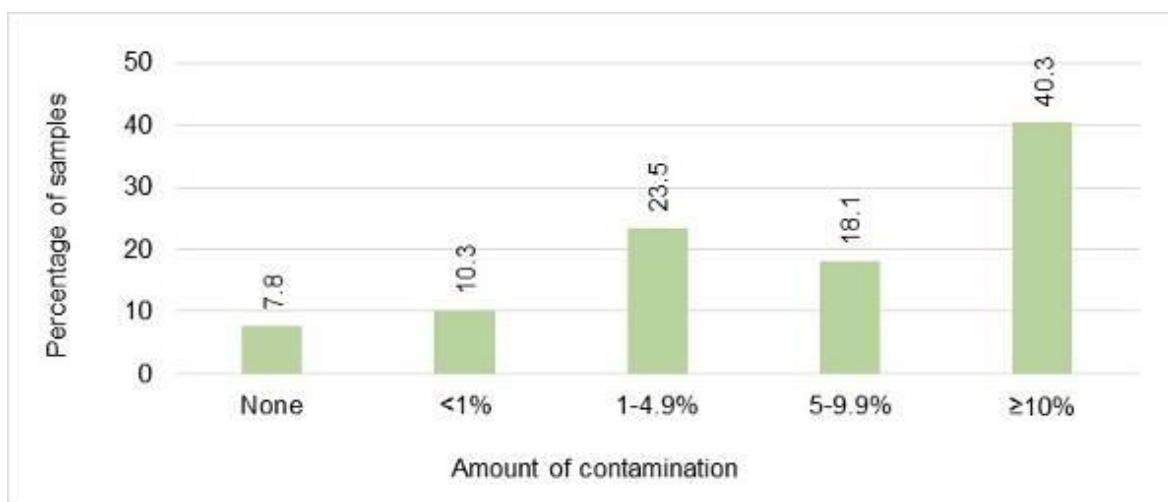
Material category		Percentage of contamination (% by weight)					
		Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Contamination	Other steel	9.92	9.54	6.46	6.23	27.76	10.17
	Other non-ferrous	0.32	0.00	0.22	0.20	0.00	0.28
	Potentially recyclable	10.24	9.54	6.68	6.43	27.76	10.45
	Food	10.02	4.87	15.08	3.25	0.00	9.57
	Garden organics	0.61	0.00	1.10	0.15	0.00	0.59
	Other organic potentially compostable *	15.43	3.66	10.24	6.13	4.80	13.62
	Compostable	26.06	8.54	26.42	9.53	4.80	25.16
	Non-recyclable paper	1.88	7.36	0.96	0.46	3.05	1.79
	Non-recyclable glass	6.35	11.36	10.72	33.83	0.48	8.43
	Non-recyclable plastics	23.62	23.82	22.09	15.16	41.25	23.75
	Total other	31.86	39.38	33.14	34.59	22.65	31.79
	MGB non-recyclable	63.71	81.92	66.91	84.04	67.43	63.79
	Total	100.0	100.0	100.0	100.0	100.0	100.0

\* Other organic potentially compostable material was mainly contaminated soiled paper, wood/timber and other putrescibles.

Figure 15 provide a count of the extent of contamination in each sample and shows the distribution of contamination. The data shows:

- 7.8% of samples have no contamination
- 10.3% of samples have less than 1% contamination.
- 40.3% of samples have 10% or more contamination.

**Figure 15 - Recycling overall contamination level distribution**



Amount of contamination	Number of samples *	% of samples	Weight of contamination (kg)	% of total contamination
No contamination	19	7.8	0.0	0.0
Up to 0.9% contamination	25	10.3	0.7	0.4
1.0% contamination to 4.9% contamination	57	23.5	9.0	4.7
5.0% contamination to 9.9% contamination	44	18.1	14.3	7.5
10.0% or more contamination	98	40.3	166.5	87.4
<b>Total</b>	<b>243</b>	<b>100.0</b>	<b>190.5</b>	<b>100.0</b>

\* The number of samples does not add up to the sampled number of households as not all properties have one bin per household, such as shared MUDs. The current NSW EPA Guidelines requires these shared facilities to be aggregated and reported as one result.

#### 4.6.2 Organics bin

Table 18 provides a summary level of the contamination in the organics bin 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 bin 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 Appendix 4.

The data shows:

- Overall – 3.73% of contamination in bins.
- Queanbeyan – Urban area had garden organics collection services with the contamination rate at 3.90%.
- Palerang – Urban area had FOGO collection services with the contamination rate at 2.81%.

Therefore, the results of this audit showed a less effective performance level compared to the following benchmarks available for the average garden organics contamination rates:

- The NSW EPA audits across the SMA and ERA:
  - 3.3% based on audits in 2007-2008 (NSW EPA, 2011).
  - 2.1% based on audits in 2011 (NSW EPA, 2014)
- The former Queanbeyan Council audits:
  - 2.1% based on an audit in 2013 (Queanbeyan Council, 2013).
- The former Palerang Council audits:
  - 1.8% based on an audit in 2015 (Palerang Council, 2015).

Compostable bags and non-compostable bags were opened and the bagged contents were dispersed into each sorting category.

Compostable bags weighed approximately 0.26% of organics bin weight, with over 99% by weight being organics contents.

Non-compostable bags weighed approximately 0.14% of organics bin weight, with no organics contents inside.

**Table 18 - Organics bin contamination rate – percentage (% by weight)**

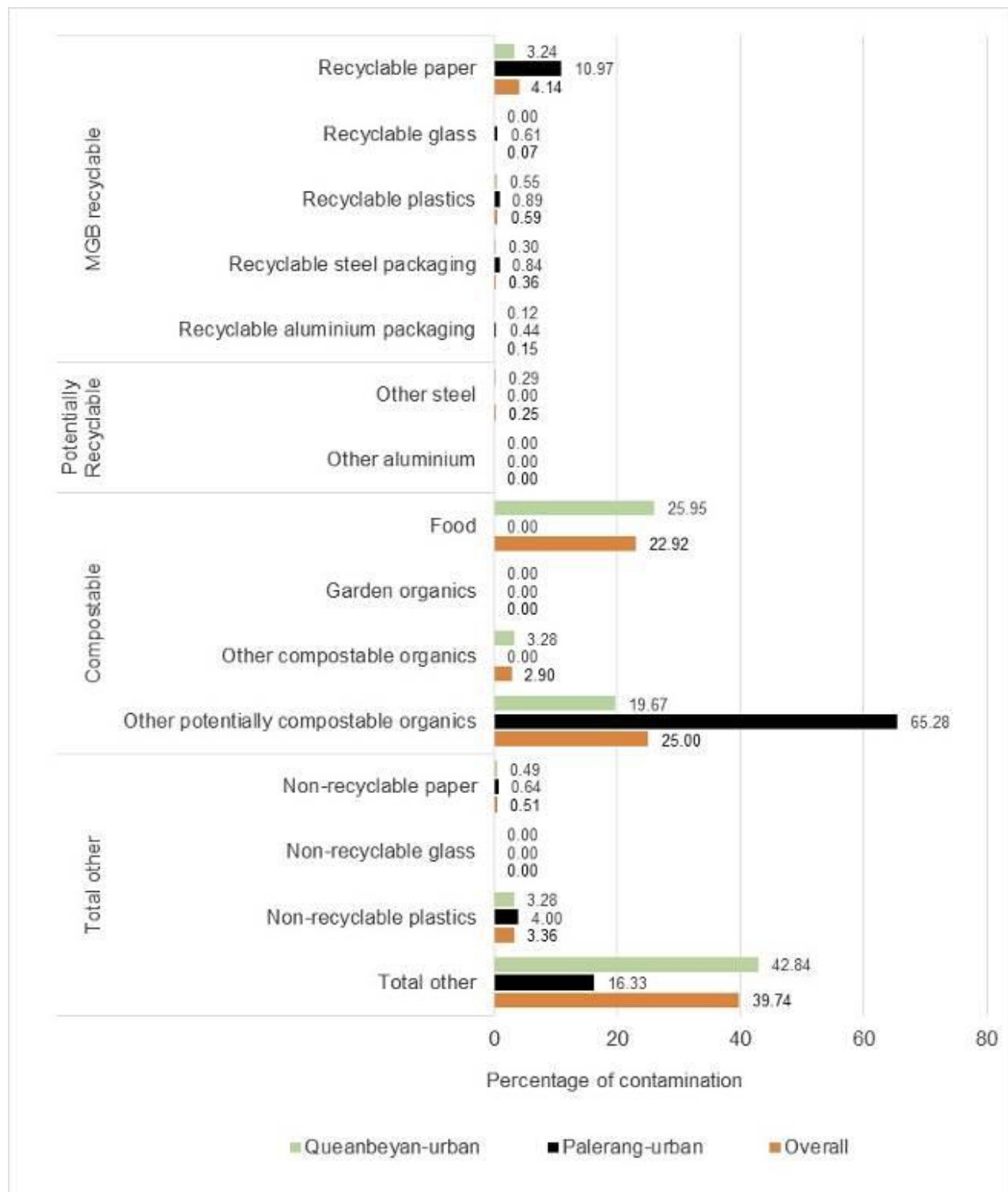
Summary category		Percentage (% by weight) of total bin contents					
		Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Compliant	Garden organics bin	96.10	-		-	-	96.27
	FOGO bin		-	97.19	-	-	
Contamin- ation	MGB recyclable	0.16	-	0.39	-	-	0.20
	Potentially recyclable	0.01	-	0.00	-	-	0.01
	Other	3.72	-	2.42	-	-	3.52
	Contamination total	3.90	-	2.81	-	-	3.73

Figure 16 provides the types of contamination in the organics bin based on the materials not accepted by Council for recovery. The data shows:

- The largest category of contamination was ‘total other’ at 39.74% of the contamination overall. The overall ‘total other’ was mainly:
  1. Ceramics / dust / dirt / rock / inert / ash at 36.10% of the contamination.
  2. Textile/ rags at 3.27% of the contamination.
- The second largest category of contamination overall was other potentially compostable organics at 25.00% of contamination.
  - For FOGO collection service - this was wood/timber and other putrescible material.
  - For garden organics collection service - this also includes food, newspaper and contaminated soiled paper.
- The other main types of contamination overall were:
  - Food at 22.92 % of the contamination.
  - Recyclable paper at 4.14% of the contamination.



**Figure 16 - Organics bin contamination types – percentage (% of contamination)**



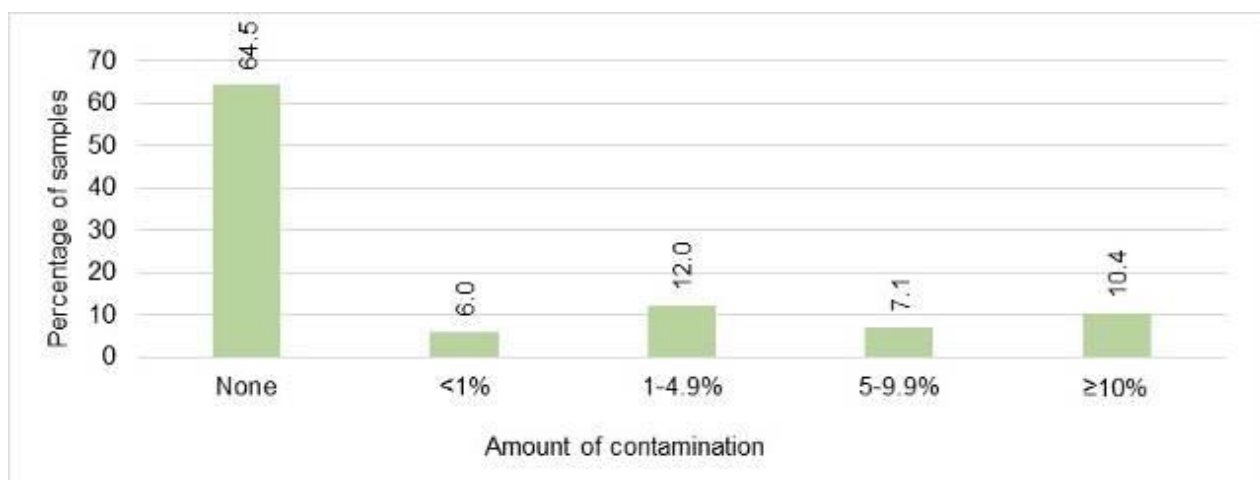
**Figure 16 (cont.) – Organics bin contamination types – percentage (% of contamination) – percentage (% of contamination)**

Material category		Percentage of contamination (% by weight)		
		Queanbeyan Urban – Garden organics bin	Palerang Urban – FOGO bin	Overall
Contamination	Recyclable paper	3.24	10.97	4.14
	Recyclable glass	0.00	0.61	0.07
	Recyclable plastics	0.55	0.89	0.59
	Recyclable steel packaging	0.30	0.84	0.36
	Recyclable aluminium packaging	0.12	0.44	0.15
	<b>MGB recyclable</b>	<b>4.21</b>	<b>13.75</b>	<b>5.32</b>
	Other steel	0.29	0.00	0.25
	Other non-ferrous	0.00	0.00	0.00
	<b>Potentially recyclable</b>	<b>0.29</b>	<b>0.00</b>	<b>0.25</b>
	Food	25.95		22.92
	Garden organics			
	Other compostable organics	3.28		2.90
	Other organic potentially compostable	19.67	65.28	25.00
	<b>Compostable – not accepted</b>	<b>48.90</b>	<b>65.28</b>	<b>50.82</b>
	Non-recyclable paper	0.49	0.64	0.51
	Non-recyclable glass	0.00	0.00	0.00
	Non-recyclable plastics	3.28	4.00	3.36
	Total other	42.84	16.33	39.74
	<b>MGB non-recyclable</b>	<b>46.61</b>	<b>20.97</b>	<b>43.61</b>
	<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Figure 17 provides a count of the extent of contamination in each sample and shows the distribution of contamination. The data shows:

- 64.5% of samples have no contamination
- 6.0% have less than 1% contamination.
- 10.4% of samples have 10% or more contamination.

**Figure 17 - Organics overall contamination level distribution**



Amount of contamination	Number of samples	% of samples	Weight of contamination (kg)	% of total contamination
No contamination	118	64.5	0.0	0.0
Up to 0.9% contamination	11	6.0	0.3	0.8
1.0% contamination to 4.9% contamination	22	12.0	2.6	7.1
5.0% contamination to 9.9% contamination	13	7.1	7.1	19.3
10.0% or more contamination	19	10.4	26.7	72.7
<b>Total</b>	<b>183</b>	<b>100.0</b>	<b>36.7</b>	<b>100.0</b>

\* The number of samples does not add up to the sampled number of households as not all properties have one bin per household, such as shared MUDs. The current NSW EPA Guidelines requires these shared facilities to be aggregated and reported as one result.

## **4.7 Resource recovery rates at the kerbside**

### **4.7.1 Recycling bin**

Figure 18 and Table 19 provide the resource recovery rates of recyclable materials at the kerbside, based on the bins 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.

The data show that the average household recovered a total of 73.9% of MGB recyclables at the kerbside.

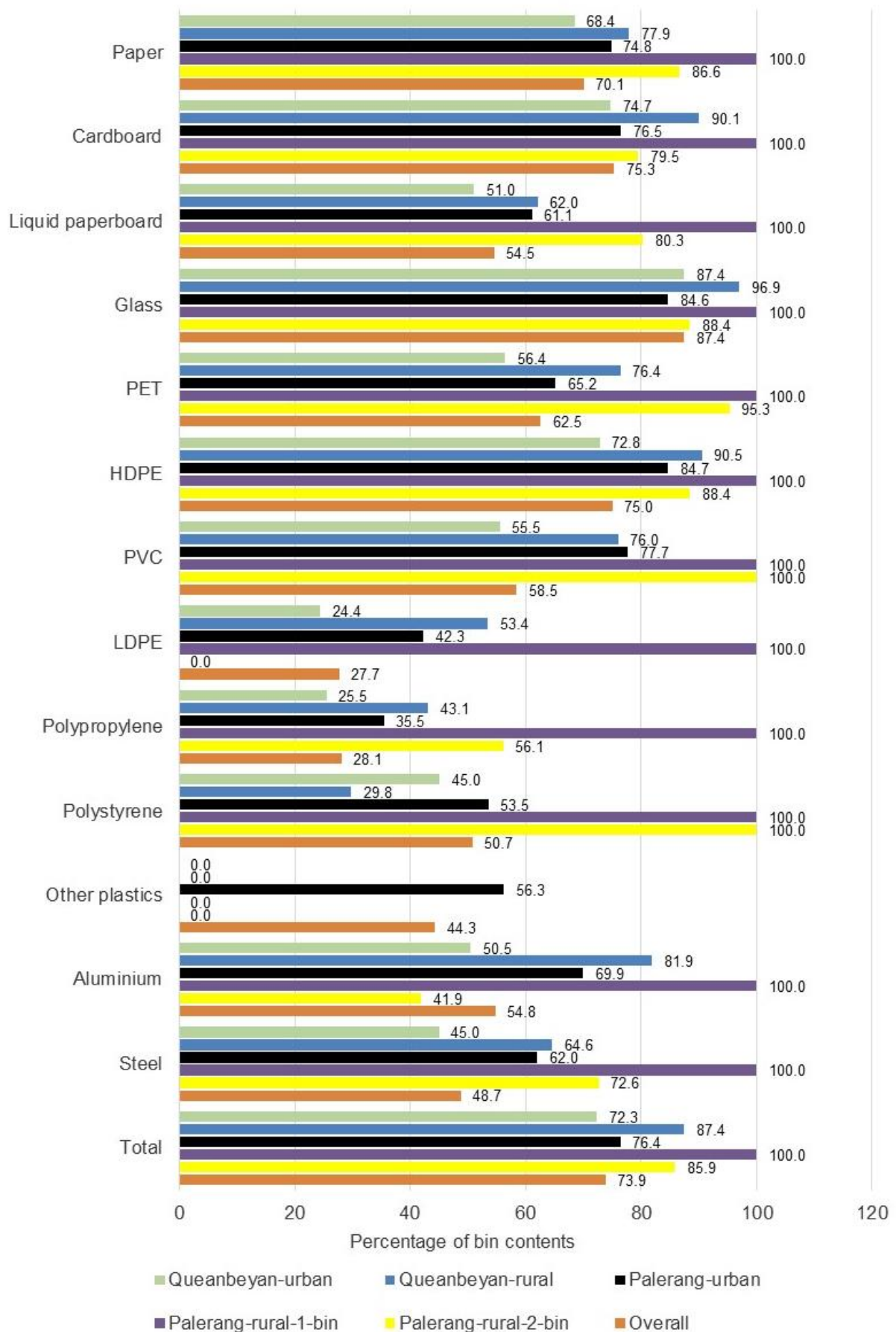
The materials with the highest resource recovery rates were:

- Glass packaging, 87.4% overall.
- HDPE (plastic 2) packaging, 75.0% overall.
- Cardboard recyclable, 75.3% overall.

Glass, cardboard and paper, have high bulk densities and therefore increase the overall 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, aluminium and steel cans as well as plastic containers (except HPDE).

**Figure 18 - Recycling resource recovery rates**



**Table 19 - Recycling resource recovery rates**

Material category	Resource recovery rate (% by weight)					Overall
	Queanbeyan		Palerang			
	Urban	Rural	Urban	Rural – 1-bin ^	Rural – 2-bin	
Paper recyclable	68.4	77.9	74.8	100.0	86.6	70.1
Cardboard recyclable	74.7	90.1	76.5	100.0	79.5	75.3
Liquid paperboard containers	51.0	62.0	61.1	100.0	80.3	54.5
Glass packaging	87.4	96.9	84.6	100.0	88.4	87.4
PET (plastic 1) packaging	56.4	76.4	65.2	100.0	95.3	62.5
HDPE (plastic 2) packaging	72.8	90.5	84.7	100.0	88.4	75.0
PVC (plastic 3) packaging	55.5	76.0	77.7	100.0	100.0	58.5
LDPE (plastic 4) packaging	24.4	53.4	42.3	100.0	0.0	27.7
Polypropylene (plastic 5) packaging	25.5	43.1	35.5	100.0	56.1	28.1
Polystyrene (plastic 6) packaging *	45.0	29.8	53.5	100.0	100.0	50.7
Other plastic (plastic 7) packaging	0.0	-	56.3	-	0.0	44.3
Aluminium cans and foil	50.5	81.9	69.9	100.0	41.9	54.8
Steel cans	45.0	64.6	62.0	100.0	72.6	48.7
Total	72.3	87.4	76.4	100.0	85.9	73.9

\* Calculated based on only Polystyrene (PS) plastic 6 containers being accepted. Expanded Polystyrene (EPS) was excluded from the calculations.

^ There wasn't waste or organics bin collection service provided in this area.

## 4.7.2 Organics bin

Table 20 and Figure 19 provide the resource recovery rates of organic materials at the kerbside, based on the bins systems provided 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.

The overall organics resource recovery rate was 49.3%, with garden organics having the highest resource recovery rate at 97.2%. This has taken into consideration that these audited areas had different organics collection services.

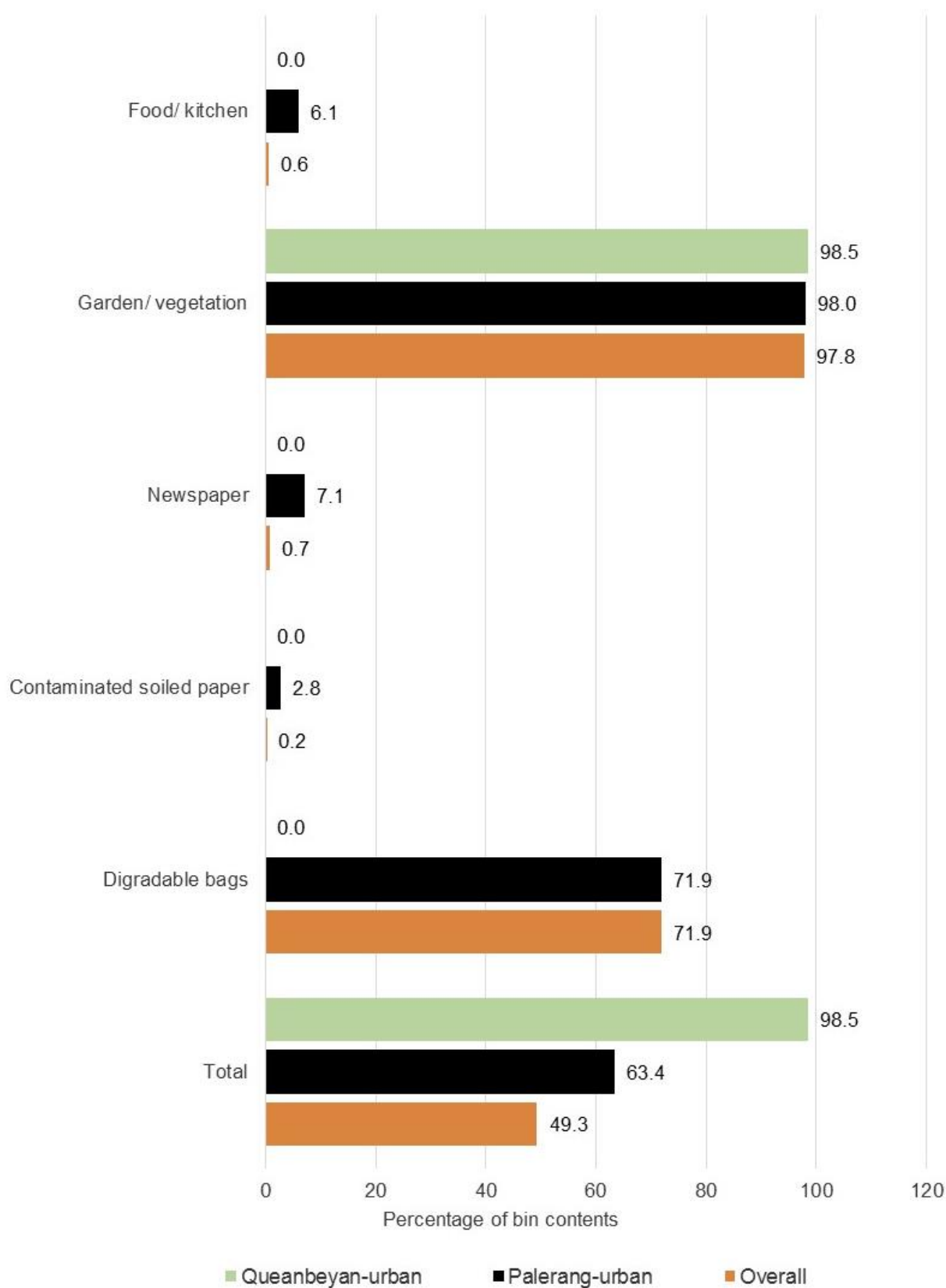
- Queanbeyan – Urban area had garden organics collection service, with the resource recovery rate at 98.5%.
- Palerang – Urban area had FOGO collection service, with a total resource recovery rate at 63.4%. Garden organics had the highest resource recovery rate at 98.0%.
- The other areas didn't have organics collection services. This means zero organics were recovered from these areas.

**Table 20 - Organics resource recovery rates**

Material category	Resource recovery rate (% by weight)					Overall *
	Queanbeyan		Palerang			
	Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Food/ kitchen			6.1			0.6
Garden/ vegetation	98.5		98.0			97.2
Newspaper			7.1			0.7
Contaminated soiled paper			2.8			0.2
Compostable bags			71.9			71.9
Total	98.5		63.4	-	-	49.3

\* Taken into consideration of different organics collection services at each area.

**Figure 19 - Organics resource recovery rates**





## 4.8 Diversion rates at the kerbside

Table 21 provides 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.

Figure 20 provides the diversion rate data graphically.

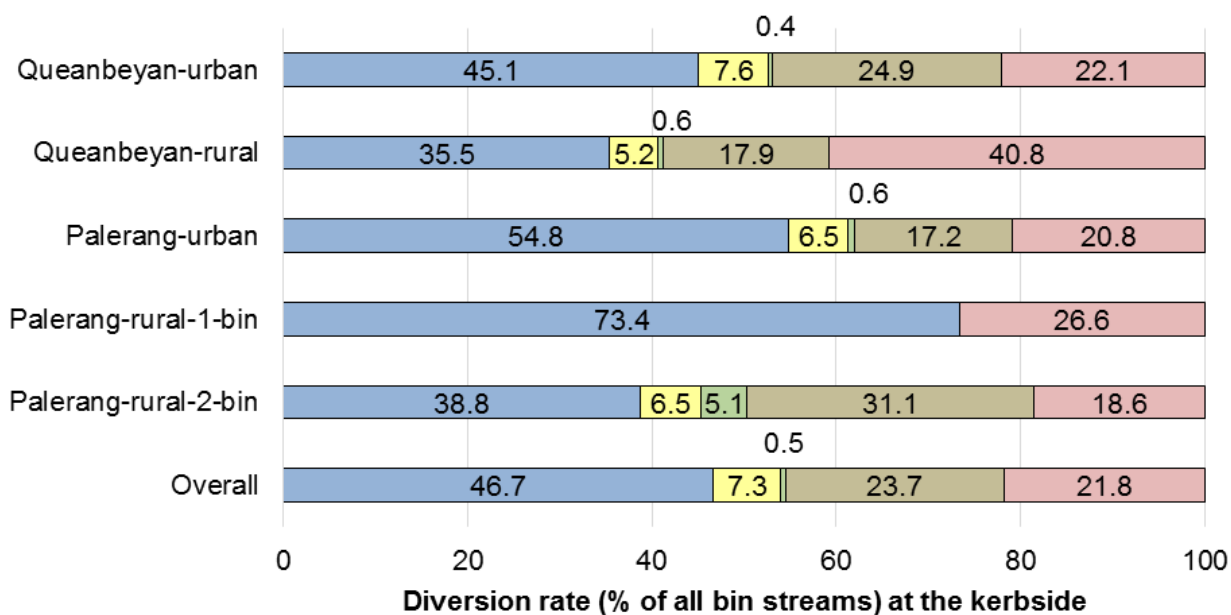
The average household diverted 46.7% of material at the kerbside based on the current kerbside bin systems. This is the household performance based on the bin system available, and does not account any additional diversion that may occur after collection, through processing arrangements. The results were highest for Palerang – Rural – 1-bin area (73.4%) and lowest for Queanbeyan – Rural area (35.5%).

Table 21 also shows the current diversion rate could potentially increase by 31.5% in the current bin systems by recovering all recyclables and FOGO compliant organics from the waste bin. This would achieve a potential diversion rate of 78.2%.

**Table 21 - Diversion rates – current and potential**

Diversion rate type		Diversion rate (% by weight)					
		Queanbeyan		Palerang			Overall
		Urban	Rural	Urban	Rural – 1-bin	Rural – 2-bin	
Current kerbside diversion rate		45.1	35.5	54.8	73.4	38.8	46.7
With additional recovery of these material types from the waste bins	Recyclables	52.7	40.7	61.3		45.3	54.0
	Garden organics	45.5	36.0	55.4		43.8	47.3
	Other FOGO compliant material	69.9	53.4	72.0		69.8	70.4
	All above	77.9	59.2	79.2		81.4	78.2

**Figure 20 - Diversion rates – current and maximum potential**



■ Current kerbside diversion rate.

■ Potential additional diversion if all recyclables in the waste bin were recovered, assuming the contamination rate remains stable.

■ Potential additional diversion if all garden organics in the waste bin were recovered, assuming the contamination remains stable.

■ Potential additional diversion if all other compliant organics in the waste bin were recovered when FOGO bin is available for all area, assuming contamination remains stable.

■ Not recoverable in current kerbside systems, or post-collection processing.

## 5 Recommendations

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

- **Waste reduction and diversion**

Council should consider further initiatives to increase diversion. This could include:

- Recovering more recyclables, particularly:
  - The heavier items like glass and paper, even though they had the higher resource recovery rates.
  - The items that had lower resource recovery rates like liquid paperboard, aluminium and steel containers.
- Recovering more organics like food, garden organics and contaminated soiled paper. The waste bin composition appears to be suitable for the following initiatives:
  - Council could consider providing FOGO bins for Queanbeyan and Palerang-Rural areas.
  - Recovering food waste through a FOGO bin service or a Council wide home composting program, with over 40% of the waste bin weight food waste overall.
- Avoiding waste from the garbage bins, particularly:
  - Food, garden organics and other compostable material.
  - Recyclables.
  - Nappies.
  - Other key materials like plastic film/bags, textiles, earth-based material (ceramics, dust, dirt, rock, inert, ash) and e-waste.
- Consider providing waste bins at Palerang – Rural – 1-bin area or reducing contamination in this area through other means.

- **Contamination in recycling**

- Reduce the recycling contamination rate. Education should focus on the main contaminants, such as total other (e.g. containerised food, textiles, e-waste, etc.), non-recyclable plastics and non-recyclable glass.
- Conduct a community consultation survey to determine the reasons for contamination and resident understanding of recyclables types.
- Conduct bin inspections and bin stickering programs to identify hotspots and provide feedback to the community.

- Consider whether the bin sizes were impacting contamination rates i.e. available space within each bin type. The contamination may relate to overflow from the waste bins at some households.
- **CDS containers recovery**
  - Council should consider initiatives to recover more CDS containers into the recycling bins from the kerbside bin system, such as providing educational material (i.e. flyers identifying the items included as CDS containers) to residents.
  - Council should negotiate a rebate a portion of the value of containers from the MRF.
- **Auditing**
  - Conduct audits annually and seasonally to build up trend data. Bin composition and quantity can vary seasonally, especially for the organic components.
  - Further audits could be conducted as the NSW progresses and after the introduction of the CDS in ACT to measure the impacts on bin generation and composition.
  - Council should also monitor the performance of any waste reduction programs implemented.
  - Council could consider conducting volume-based audits of detailed categories along with weight-based audits. This would give Council a greater understanding of the bin composition, as materials that have a lower weight (e.g. plastic) may take up more space than materials with a higher weight (e.g. glass). This will assist to understand the volume of material being recovered at processing facilities or disposed at landfill and determine infrastructure needs.

## 6 Audit photos

Figures 21 to 26 provide photos for unrecovered resources, other items of interest in the residual waste stream, hazardous items, and contamination in the recycling stream.

**Figure 21 - Photos of waste bin contents – unrecovered compostable materials**



1. Garden organics. 2. Garden organics in bags. 3-6. Food organics.



**Figure 22 - Photos of waste bin contents – unrecovered recyclables**

1.



2.



3.



4.



5.



6.



7.



8.



1. Recyclable steel packaging. 2. Recyclable cardboard – pizza boxes. 3. Recyclable cardboard packaging. 4. Recyclable plastic beverage containers. 5. Recyclable aerosol containers. 6. Recyclable aluminium beverage containers. 7. Recyclable aluminium foil. 8. Recyclable glass beverage containers.

**Figure 23 - Photos of waste bin contents – hazardous items**

1.



2.



3.



4.



5.



6.



7.



8.



1. Batteries. 2. Cords. 3. Lights. 4. Gas bottle. 5. Pharmaceutical waste. 6. Charger. 7. Toaster. 8. LED lights



**Figure 24 - Photos of waste bin contents – other items**

1.



2.



3.



4.



5.



6.



7.



8.



1. EPS foams. 2. Contaminated soiled paper. 3. Nappies. 4. Textile. 5. Carpet. 6. Wood/ timber. 7. Unconsumed food and liquid. 8. Shoes.



**Figure 25 - Photos of recycling bin contents – contamination**

1.



2.



3.



4.



5.



6.



7.



8.



1. Bagged material. 2. Containerised food and liquid. 3. Light bulb. 4. Handbag. 5. Nappies. 6. Cords and E-waste. 7. Cartridges. 8. E-waste

**Figure 26 - Photos of organics bin contents – contamination**



1. Plastic container. 2. Cardboard. 3. Contaminated soiled paper. 4. Plastic film. 5. Plastic bags. 6. Textile. 7. Building waste. 8. Glass containers.

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# List of abbreviations

ABS	Australian Bureau of Statistics
AHW	Absorbent Hygiene Waste
AWD	Australian Waste Database
AWT	Alternative Waste Treatment (or Technology)
AS	Australian Standard
C&R	Collect and Return
CDS	Container Deposit Scheme
EPA	Environment Protection Authority
E-waste	Electronic waste
HDPE	High Density Polyethylene
LDPE or LLDPE	Low Density Polyethylene
LGA	Local Government Authority
LPB	Liquid paperboard
MGB	Mobile Garbage Bin
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
MUD	Multiple Unit Dwelling
NSW	New South Wales
OHSMS	Occupational Health and Safety Management System
PET	Polyethylene Terephthalate
PP	Polypropylene
PPE	Personal Protective Equipment
PS	Polystyrene
PVC	Polyvinyl Chloride
SMA	Sydney Metropolitan Area
SUD	Single Unit (Occupancy) Dwelling
WaSIP	Waste and Sustainability Improvement Payment
WEEE	Waste Electronic and Electrical Equipment
WHS	Work Health and Safety
WLRM	Waste Less, Recycle More

# 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.

<b>Contamination rate:</b>	<p>The percentage of the recycling bin (or organics bins) contents not accepted.</p> $\frac{\text{Weight of material not accepted in the recycling bins (or organics bins)}}{\text{Total weight of recycling bins (or organics bins) contents}} \times 100$
<b>Diversion rate:</b>	<p>The percentage of the total waste stream diverted from landfill.</p> $\frac{\text{Weight of materials accepted in the recycling bins and organics bins}}{\text{Total weight of contents of all bins}} \times 100$
<b>Generation rate:</b>	<p>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.</p>
<b>Non-recyclable material:</b>	<p>Material that is not accepted for recycling by Council, which is contamination when placed into the recycling bins.</p>
<b>Organics bin:</b>	<p>The contents of the green-lidded organics, or Food and Garden Organics (FOGO) bins. Collectively known as the organics stream.</p>
<b>Presentation rate:</b>	<p>The percentage of bins placed out on the kerbside for collection compared to the total number of bins available at those properties</p> $\frac{\text{Bins presented}}{\text{All bins available}} \times 100$
<b>Recyclable material:</b>	<p>Material that is accepted for recycling by Council.</p>
<b>Recycling bin:</b>	<p>The contents of the yellow-lidded recycling bins. Collectively known as the recycling stream.</p>
<b>Residual waste bin:</b>	<p>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.</p>
<b>Resource recovery rate:</b>	<p>The percentage of a material type that is recovered compared to the overall amount of that material in all bins in the study.</p> $\frac{\text{Weight of a recyclable material in the recycling bins and organics bins}}{\text{Total weight of that material in all bins}} \times 100$
<b>Unrecovered resources:</b>	<p>Recoverable material in the residual waste bins, which is also known as resource loss.</p>

## Appendix 1 – CDS assumption

Table 22 indicates the criteria required for a container to be eligible for the CDS.

**Table 22 - CDS eligibility**

Container types	Container sizes							
	0-150ml	151-500ml	501ml-1L	1.1-1.5L	1.6-2L	2.1-2.5L	2.6-3L	>3.1L
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 [including ACT notes cordial containers and containers with concentrated juice intended for dilution and health tonic containers]								
* 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 container weights and counts. All of the data results in this report, are based on bagged materials in bins 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 bins to landfill.

### By weight

Table 23 provides the weekly generation rate by weight in the three bin streams and overall, as well as the percentage by weight. The results show each household generates 1.043kg/wk of eligible CDS beverage containers in the kerbside bin system:

- Most of the eligible CDS beverage containers by weight, 84.0%, were in the recycling bins.
- Based on the number of services in the Council area and assuming complete bin presentation, the total weight is equivalent to:
  - 1,330 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 (78.6%), PET (12.8%) and Aluminium (5.9%).

**Table 23 - Eligible CDS beverage container weights**

CDS eligible container types	Weight (kg/hh/wk)				Percentage (% by weight)			
	Waste	Rec.	Org.	Total	Waste	Rec.	Org.	Total
Liquid Paperboard Beverage	0.006	0.007	0.001	0.014	3.90	0.78	64.30	1.36
Glass Beverage	0.098	0.722	0.000	0.819	59.22	82.33	8.37	78.56
PET Beverage (P1)	0.031	0.102	0.000	0.133	18.47	11.67	27.33	12.77
HDPE Beverage (P2)	0.005	0.008	0.000	0.013	3.17	0.92	0.00	1.27
PVC Beverage (P3)	0.000	0.001	0.000	0.001	0.30	0.10	0.00	0.13
Other plastics (P7) Beverage	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00
Steel Beverage	0.000	0.000	0.000	0.000	0.00	0.01	0.00	0.01
Aluminium Beverage	0.025	0.037	0.000	0.061	14.93	4.19	0.00	5.89
<b>Total</b>	<b>0.165</b>	<b>0.876</b>	<b>0.001</b>	<b>1.043</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Note: Rec. = recycling | Org. = organics.

## By count

Table 24 provides the weekly generation rate by count in the three bin streams and overall, as well as the percentage by count. Figure 27 provides this data graphically by percentage. The results show each household generates 12 eligible CDS beverage containers per week in the kerbside bin system:

- Most of the eligible CDS beverage containers by count, 74.4%, are in the recycling bins.
- Based on the number of services in the Council area and assuming complete bin presentation, the total count is equivalent to:
  - 15 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 glass (32.3%), PET (31.6%) and Aluminium (27.9%).

**Table 24 - Eligible CDS beverage container counts**

CDS eligible container types #	Counts (items/hh/wk)				Percentage (% by count)			
	Waste	Rec.	Org.	Total	Waste	Rec.	Org.	Total
Liquid Paperboard Beverage	0.39	0.29	0.00	0.67	12.90	3.26	6.18	5.72
Glass Beverage	0.46	3.33	0.00	3.80	15.48	38.08	6.18	32.29
PET Beverage (P1)	0.86	2.85	0.01	3.72	28.60	32.60	87.64	31.63
HDPE Beverage (P2)	0.10	0.17	0.00	0.27	3.26	1.91	0.00	2.25
PVC Beverage (P3)	0.01	0.01	0.00	0.02	0.25	0.16	0.00	0.18
Other plastics (P7) Beverage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Steel Beverage	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02
Aluminium Beverage	1.19	2.10	0.00	3.28	39.52	23.96	0.00	27.91
<b>Total</b>	<b>3.00</b>	<b>8.75</b>	<b>0.01</b>	<b>11.76</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Note: Rec. = recycling | Org. = organics.

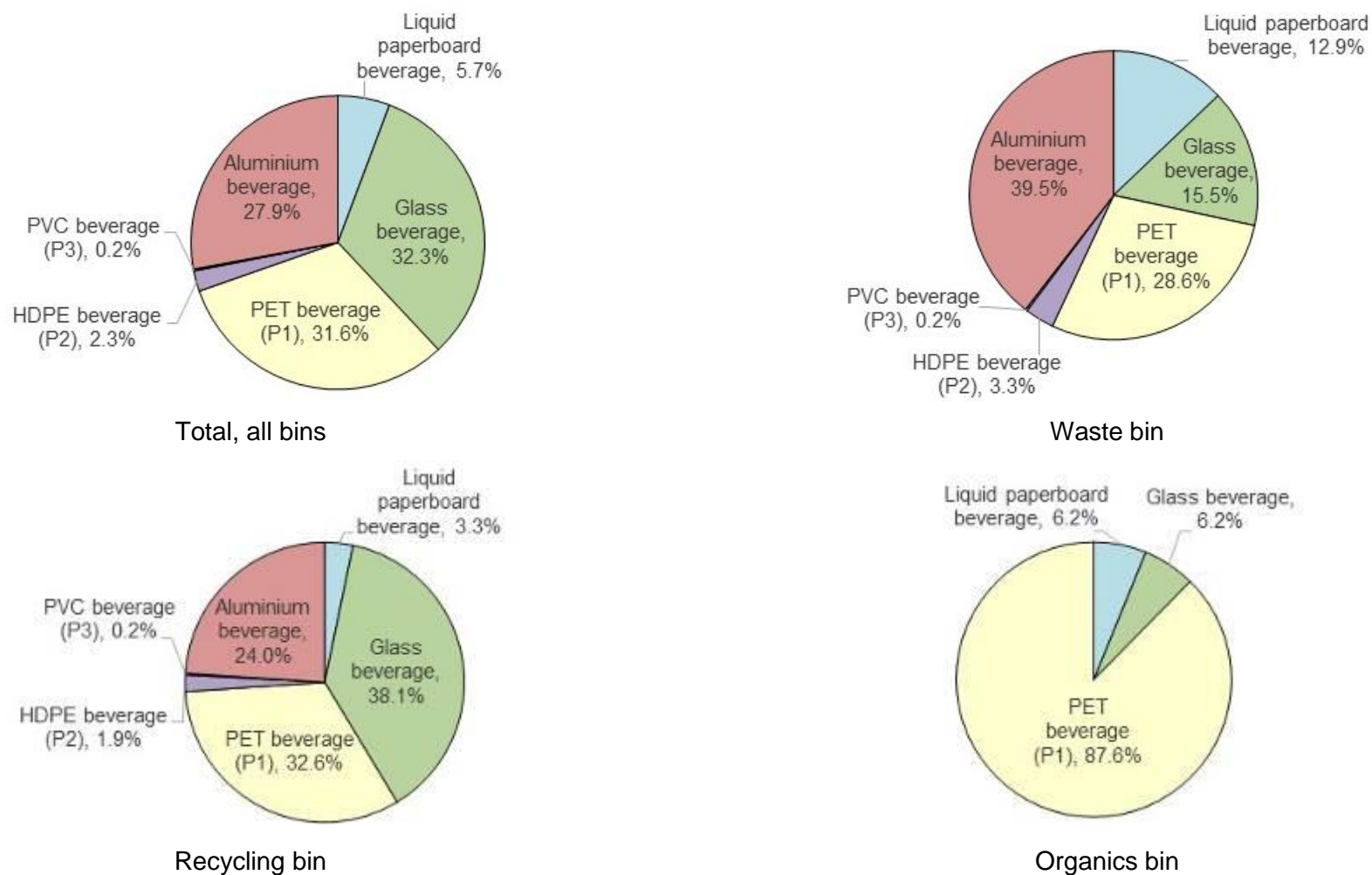
# Eligible beverage containers contained within:

- Bagged materials were included in the count for recycling and garden. However, the MRF would usually dispose of these as contamination to landfill. Therefore, 0.11 item/hh/wk eligible beverage containers were contained within bags, 141K eligible containers Council-wide per year.
- Containerised food and liquid containers are excluded in the count. A further 0.08 item/hh/wk eligible beverage containers were containerised food and liquid, a further 104K eligible containers Council-wide per year.

The number of containers equates to a value of approximately \$1.5 million of eligible CDS containers per year in all bin streams, with approximately 75% of this value, \$1.125m, in the recycling bins.



**Figure 27 - CDS eligible beverage container, all bin streams – percentage by count**



**CDS eligible beverage containers counts – % by count**

## ***Appendix 3 – Comparison with previous audits***

This Appendix provides a comparison of key data indicators for the Council area with the previous audits. Audits have been conducted:

Previous audits were conducted in 2013 and 2015 at former Queanbeyan Council area, by APC and Australian National University respectively, for the following bin streams:

- Waste bin – 2013 and 2015 audits.
- Recycling bin – 2013 and 2015 audits.
- Organics – 2013 audit.

Previous audits were conducted in 2008 and 2015 at former Palerang Council area, by EC Sustainable, for the following bin streams:

- Waste bin – 2008 and 2015 audit.
- Recycling bin – not audited.
- Organics – 2015 audit.

Table 25 provides the summary results by year. Summary result in Table 25 as well as detailed results in the executive summary table show the following key trends:

- There was a decrease in the waste bin weight at each former council area in the 2018 audit, compared to the 2015 audit. The decrease was due to the reduction of the weight per household of:
  - Unrecovered organics in waste bin, in Queanbeyan rural area and Palerang urban area.
  - Unrecovered recyclables in waste bin, in Queanbeyan rural area and Palerang urban area.
- The resource recovery rate for recycling stream at Queanbeyan reduced slightly by percentage from the 2015 audit to the 2018 audit, mainly due to organics stream was audited in 2018 but not in 2015. Therefore, the resource loss of recyclables in the organics bins were not considered in the 2015 audit.
- The resource recovery rate for garden organics increased at each former council area from the 2013 Queanbeyan audit (96.9%) and 2015 Palerang audit (88.9) to the 2018 audit (97.8% overall).

**Table 25 - Key data indicators – by year**

Data indicator	Unit of measurement		Result >				
			Queanbeyan		Palerang		Queanbeyan/ Palerang 2018
			2013	2015	2008	2015	
Generation rate by weight	Waste	kg/hh/wk	8.7	10.4	10.4	10.2	8.4
	Recycling	kg/hh/wk	4.9	5.0	NA	NA	4.1
	Organics	kg/hh/wk	2.2	NA	NA	9.5	4.7
	Total	kg/hh/wk	15.8	15.4	10.4	19.7	17.2
Generation rate by volume	Waste	Bin % full	72 <	58.5	50.5	69.0	67.7
	Recycling	Bin % full	90 <	45.3	NA	NA	74.1
	Organics	Bin % full	90 <	NA	NA	71.3	69.3
Unrecovered resources in the waste bin	Recyclables	kg/hh/wk	1.2	1.2 *	2.3	1.4	1.3
		% by weight	13.5	11.6 *	22.4	13.7	14.9
	Compostable ^	kg/hh/wk	3.7	4.4 *	5.9	5.8	4.3
		% by weight	42.4	42.6 *	56.8	57.0	51.2
Contamination rate	Recycling	kg/hh/wk	1.0	0.9	NA	NA	0.59
		% by weight	20.2	17.1	NA	NA	14.3
	Organics	kg/hh/wk	0.05	NA	NA	0.1	0.17
		% by weight	2.1	NA	NA	1.8	3.7
Resource recovery rate at the kerbside	Recycling	% by weight	NA	87.7	NA	NA	73.9
	Garden organics	% by weight	96.9	NA	NA	88.9	97.8 +
Diversion rate	All bins	% by weight	38.4	26.3 #	NA	NA	46.7

> Rounding of figures might cause slight differences after decimal places

< Calculated by EC Sustainable, based on the results provided for SUDs and MUDs (APC, 2013).

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

.^ Unrecovered compostable materials in the waste bin incl. food, garden organics and other organic potentially compostable.

+ For comparison purposes, the 2018 result was for garden organics, rather than allowing all material types actually recovered at the kerbside.

# Organics stream was not audited, therefore not included in the calculation. The actual diversion rate in 2015 at Queanbeyan should be higher than reported, taking into consideration of recovered organics in the organics bins.

- "NA": Data not available from the data source. Data source listed as below:

- o Palerang 2008 & 2015 figures: 2015 report (EC Sustainable, 2015).
- o Queanbeyan 2013 & 2015 figures: 2013 (APC, 2013) and 2015 reports (Australian National University, 2015).

Note: there were less material types allowed as acceptable in the FOGO bins at Palerang in 2018 compared to 2015, based on educational material provided by Council. These changes have been reflected in the 2018 audit results.

## ***Appendix 4 – Raw data***

This Appendix provides the raw data, in a separate Excel file, providing the raw data for this current audit.