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## Leicester City Kerbside Waste Composition Analysis

Leicester City Council

Summary Report  
October 2017



Leicester  
City Council

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Page - 0 -

<b>Project details and acknowledgements</b> .....	<b>- 3 -</b>
Acknowledgements.....	- 3 -
Accuracy Statement .....	- 3 -
<b>Introduction</b> .....	<b>- 4 -</b>
Background.....	- 4 -
Objectives .....	- 4 -
<b>Executive Summary</b> .....	<b>- 5 -</b>
Key findings.....	- 5 -
Kerbside residual waste .....	- 5 -
Kerbside mixed recycling – Orange Sacks.....	- 12 -
<b>Residual Waste</b> .....	<b>- 13 -</b>
<b>Sample selection</b> .....	<b>- 13 -</b>
<b>Set out rates and waste generation levels</b> .....	<b>- 14 -</b>
<b>Compositional analysis of residual waste</b> .....	<b>- 16 -</b>
Organic Waste .....	- 21 -
Paper .....	- 23 -
Card & Cardboard .....	- 25 -
Plastics.....	- 27 -
Metals .....	- 29 -
Glass.....	- 31 -
Textiles .....	- 33 -
Hazardous Items (HHW) & WEEE.....	- 35 -
<b>Potential recyclability of the residual waste</b> .....	<b>- 36 -</b>
<b>Dry recycling waste</b> .....	<b>- 39 -</b>
<b>Set out rates and waste generation</b> .....	<b>- 39 -</b>

**Compositional analysis of orange recycling sacks..... - 41 -**

    Paper Capture..... - 45 -

    Card & Cardboard Capture..... - 46 -

    Plastics Capture ..... - 47 -

    Metals Capture ..... - 48 -

    Glass Capture..... - 49 -

**Recycling Contamination ..... - 50 -**

**Overall Waste Generation & Diversion.....53**

**Total waste generation levels & diversion.....53**

## Project details and acknowledgements

<b>Title</b>	Leicester City Kerbside Waste Composition Analysis
<b>Client</b>	Leicester City Council
<b>Project number</b>	17106
<b>Client reference</b>	-
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### Acknowledgements

M-E-L Research would like to thank Local Authority officers and staff who participated and helped in the setup and fieldwork stages of the project, and those who provided additional data and other information to inform the project. This report highlights key results, presents the results in tables and charts and discusses the findings. The views and opinions expressed in this report are those of M.E.L Research Ltd. and are not necessarily shared by officers from Leicester City Council.

### Accuracy Statement

Results from the standard M-E-L sampling protocol for compositional analysis can be taken as accurate for each material category to within error bands of +/-10% at the 95% confidence level (2 standard deviations), assuming a normal statistical distribution. At the data entry stage, 1 in 10 parts of data that is inputted are checked with the data sheets and if errors are found all the data is then rechecked.

# Introduction

## Background

Leicester City currently has a combined recycling and composting rate of 41.6% (2015/16) and now wishes to study the composition of the domestic kerbside collected residual and recycling waste streams to provide current baseline data and to help inform future communication campaigns. As well as giving indications as to the current levels of waste and recycling being generated, this report also provides observations on the levels of materials that are currently recyclable at the kerbside and those which could potentially be recyclable via future schemes.

This report presents results from an analysis of kerbside collected residual and recycling waste collected during a two-week period in September 2017. The sampling regime involved the direct collection and compositional analysis of waste from a target of 650 properties representing each of the five main socio-demographic categories (Acorns). Results could therefore be weighted to give a better picture of the waste being collected within the City as a whole. Knowledge of the waste in these differing areas will help develop strategies to increase the efficiency with which its residents are recycling their waste.

## Objectives

Specific aims of the work were to:

- Understand, using socio-demographic profiling which sectors of the community are producing which types of waste and which are using the recycling provision most effectively
- Detect capture rates for individual materials which are already collected separately for recycling
- Determine the amount of overall waste diverted by each recycling collection and overall
- Evaluate the amount of specific materials collected in the residual bins that could potentially be collected separately for recycling
- Evaluate the use of the receptacles used for collecting waste and recycling

# Executive Summary

## Key findings

### Kerbside residual waste

- Weighted across all Acorn samples, the average weekly set out rate for residual waste at the time of sampling was 61%.
- In terms of waste generation, households were setting out an average of 7.95kg/hh/wk (13.11kg/hh/wk for those presenting bins).
- Food waste was seen to be the major component of residual waste forming 38.4% of the total, equating to 3.05kg/hh/wk. Of this food waste 32.6% is deemed to be packaged with 42.4% home compostable.
- Paper items made up 6.2% of the residual waste; 41.6% of this (0.20g/hh/wk) was alternatively recyclable at the kerbside.
- Card and cardboard made up around 3.7% of collected residual waste; 76.5% of this (0.23kg/hh/wk) was alternatively recyclable at the kerbside.
- Plastics formed 8.7% of the residual waste; 59.1% of all plastic waste (0.41kg/hh/wk) was due to recyclable plastic bottles and containers.
- 2.2% of residual waste was metallic; 74.2% of this (0.13kg/hh/wk) was recyclable.
- Around 2.7% of residual waste was seen to be glass; 80.3% of this (0.17kg/hh/wk) was due to glass bottles and jars.
- 5.2% of residual waste was due to textiles; 83.7% of these items (0.35kg/hh/wk) were seen to consist of reusable clothing and linen.
- 1.4% of residual waste was deemed to be either Hazardous or WEEE. An additional 6.7% consisted of disposable nappies and AHP waste.
- 11.9% of residual waste was found to be garden waste; 80% of this was recyclable vegetation.
- Overall, 14.4% of collected residual waste could have been placed into the orange recycling sacks available– the equivalent of 1.14kg/hh/wk.
- Overall, 9.5% of collected residual waste could have been placed into the garden recycling bins available– the equivalent of 0.76kg/hh/wk.
- In total 23.9% of residual waste collected could have been recycled alternatively at the kerbside – 1.90kg/hh/wk.

## Kerbside mixed recycling – Orange Sacks

- Weighted across all Acorn samples, the average weekly set out rate for orange recycling sacks at the time of sampling was 52%.
- In terms of waste generation, all kerbside households were setting out an average of 2.03kg/hh/wk of recycling.
- Overall, 10.4% of all recycling waste collected from all properties was classified as contamination – the equivalent of 0.22kg/hh/wk.
- 37% of contamination was due to non-recyclable paper and card with 30% being non-recyclable plastics.
- Around 73% of recyclable paper and 62% of recyclable card was correctly captured
- 59% of plastic bottles were recycled along with 44% of plastic containers and 21% of acceptable film.
- 43% of recyclable drink cans were captured along with 54% of food tins, 40% of aerosols and 20% of foil.
- 78% of recyclable glass bottles were captured along with 58% of jars.
- Overall, 18.2% of kerbside waste is being diverted through orange sack recycling collections.

**Table E1: Kerbside waste composition**

COMPOSITION KERBSIDE WASTE	KG/HH/WK		
	RESIDUAL	ORANGE SACK	TOTAL
GARDEN BIN RECYCLABLE	0.76	0.00	0.76
<b>ORANGE SACK RECYCLABLE</b>	<b>1.14</b>	<b>1.82</b>	<b>2.96</b>
FOOD WASTE	3.05	0.02	3.07
OTHER GENERAL REFUSE	2.99	0.19	3.19
TOTAL	7.95	2.03	9.97

= 61% CAPTURED

- Each household generates 9.97kg/hh/wk of residual waste and orange sack recycling.
- Of this, 29.7% or 2.96kg/hh/wk of waste disposed of consists of materials compatible with orange recycling sacks
- Ideally all of the recyclable material would be placed into the orange sacks; therefore 100% would be captured. From the survey it was seen that 61% of all the recyclable materials were placed into orange sacks (captured). This meant that 39% of the recyclable material or 1.14kg/hh/wk remained in residual bins.

**Figure E1: Distribution of all recyclable materials**

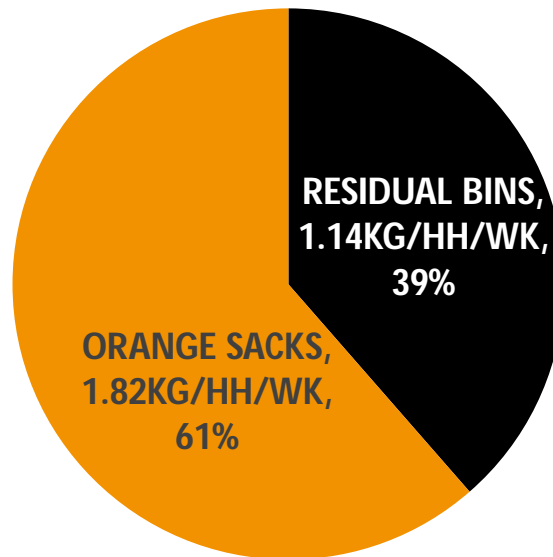
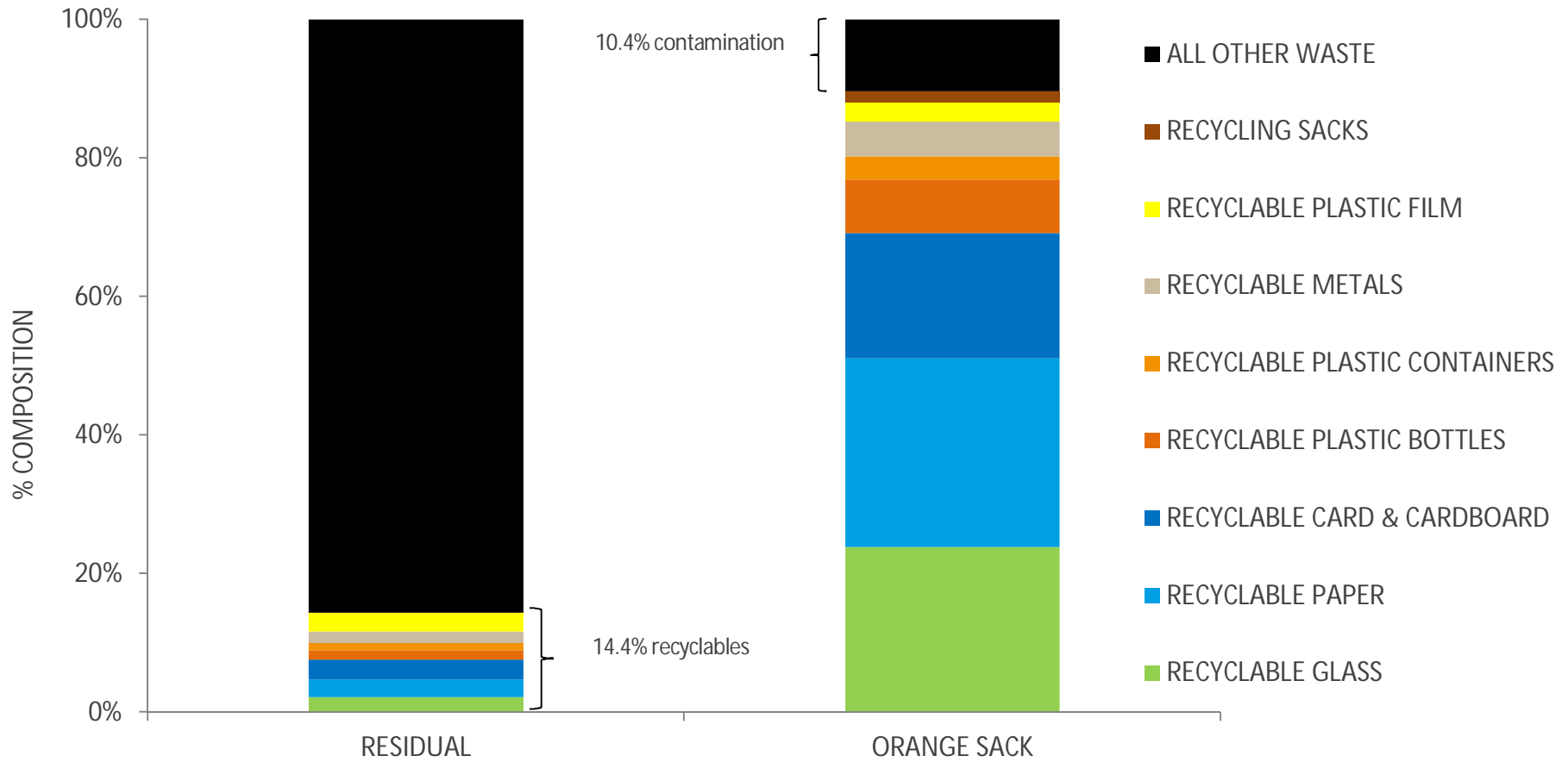


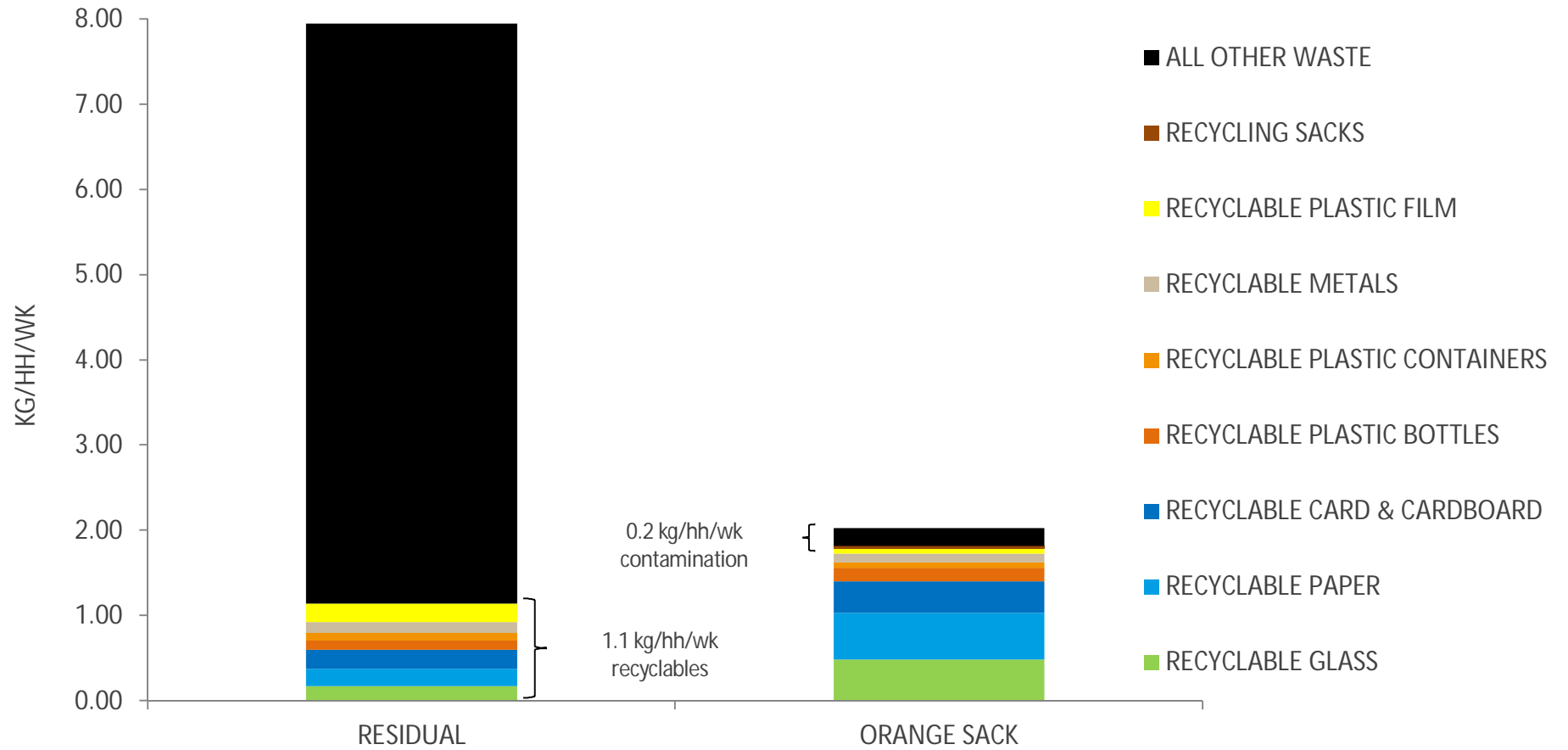


Figure E2: Distribution of recyclables (%)



- The residual bins contain an average of 1.1kg/hh/wk of material compatible with orange recycling sacks; 14.4% of the total
- The orange sacks contain around 0.2kg/hh/wk of contamination which should be in residual bins; 10.4% of the total

Figure E3: Distribution of recyclables (kg/hh/wk)



**Table E2: Distribution of recyclables**

DISTRIBUTION OF RECYCLABLES	KG/HH/WK			%
	RESIDUAL	ORANGE SACK	TOTAL	CAPTURE
RECYCLABLE GLASS	0.17	0.48	0.66	73.7%
RECYCLABLE PAPER	0.20	0.55	0.76	73.0%
RECYCLABLE CARD & CARDBOARD	0.23	0.37	0.59	62.0%
RECYCLABLE PLASTIC BOTTLES	0.11	0.16	0.26	59.4%
RECYCLABLE PLASTIC CONTAINERS	0.09	0.07	0.15	44.0%
RECYCLABLE METALS	0.13	0.10	0.23	43.9%
RECYCLABLE PLASTIC FILM	0.22	0.06	0.27	20.7%
RECYCLING SACKS	0.00	0.03	0.03	100.0%

- It has been seen that 61% of all the materials compatible with recycling collections are correctly recycled (captured) at the kerbside using orange sacks.
- Households generated an average of 0.66kg/hh/wk of glass bottles and jars. These were the most effectively recycled material with 73.7% of the total placed into orange recycling sacks. Therefore 26.3% of glass bottles and jars are placed into residual bins accounting for 0.17kg/hh/wk.
- Households generated an average of 0.76kg/hh/wk of recyclable paper. Of this, 73.0% of the total was placed into orange recycling sacks. Therefore 27.0% of recyclable paper is placed into residual bins accounting for 0.20kg/hh/wk.
- Households generated an average of 0.59kg/hh/wk of recyclable card and cardboard. Of this, 62.0% of the total was placed into orange recycling sacks. Therefore 38.0% of recyclable card and cardboard is placed into residual bins accounting for 0.23kg/hh/wk.
- Households generated an average of 0.26kg/hh/wk of plastic bottles. Of these, 59.4% were placed into orange recycling sacks. Therefore 40.6% of plastic bottles are placed into residual bins accounting for 0.11kg/hh/wk.
- Households generated an average of 0.15kg/hh/wk of plastic containers. Of these, 44.4% were placed into orange recycling sacks. Therefore 55.6% of plastic containers are placed into residual bins accounting for 0.09kg/hh/wk.
- Households generated an average of 0.23kg/hh/wk of recyclable metals. Of these, 43.9% were placed into orange recycling sacks. Therefore 56.1% of recyclable metals are placed into residual bins accounting for 0.13kg/hh/wk.
- Households generated an average of 0.27kg/hh/wk of recyclable plastic film. This was the least effectively recycled material with 20.7% of the total placed into orange recycling sacks. Therefore 79.3% of plastic film is placed into residual bins accounting for 0.22kg/hh/wk.

Figure E4: Distribution of recyclables (kg/hh/wk)

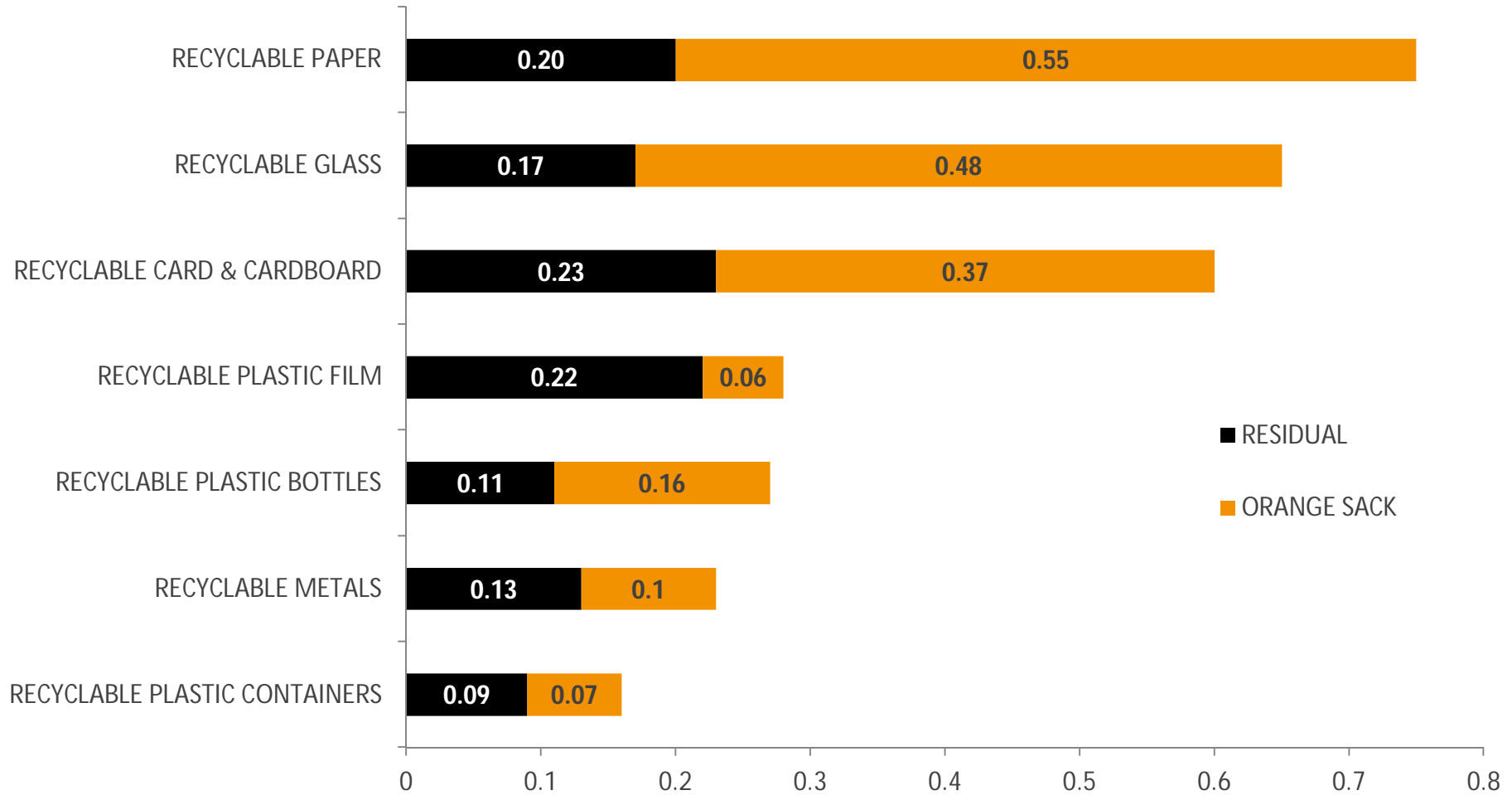
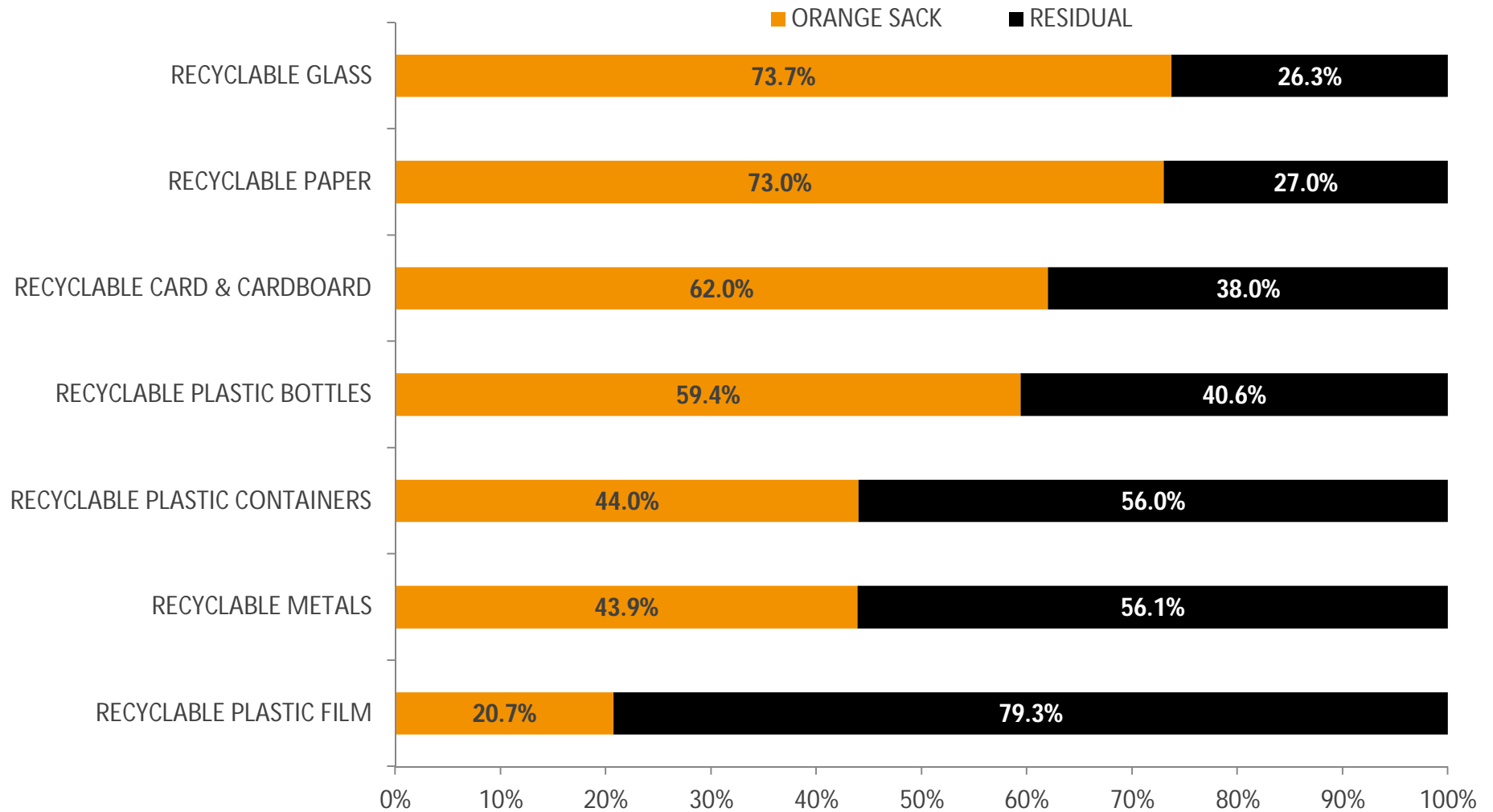


Figure E5: Distribution of recyclables (%)



# Residual Waste

## Sample selection

An Acorn profile was determined for Leicester with all five Acorn categories selected for sampling. From within these categories the most prevalent household types for Leicester were identified for kerbside analysis, these are shown in the table below. For each sample a set of 50 households were surveyed.

ACORN	DEMOGRAPHIC TYPE	% FOR LEICESTER
<b>ACORN 1</b>	<b>AFFLUENT ACHIEVERS</b>	6.3%
1.B.8	Prosperous suburban families	
1.C.11	Settled suburbia, older people	
<b>ACORN 2</b>	<b>RISING PROSPERITY</b>	2.8%
2.E.19	First time buyers in small, modern homes	
<b>ACORN 3</b>	<b>COMFORTABLE COMMUNITIES</b>	24.1%
3.G.25	Larger family homes, multi-ethnic areas	
3.H.27	Suburban semis, conventional attitudes	
3.J.32	Educated families in terraces, young children	
<b>ACORN 4</b>	<b>FINANCIALLY STRETCHED</b>	34.3%
4.K.36	Educated young people in flats and tenements	
4.L.40*	High occupancy terraces, many Asian families	
4.M.43	Families in right-to-buy estates	
<b>ACORN 5</b>	<b>URBAN ADVERSITY</b>	32.3%
5.O.51	Young people in small, low cost terraces	
5.P.56	Low income large families in social rented semis	
5.Q.58	Singles and young families, some receiving benefits	

\*For Acorn 4.L.40 two samples were taken. One was from a predominantly Muslim area with the other being largely Hindu.

## Set out rates and waste generation levels

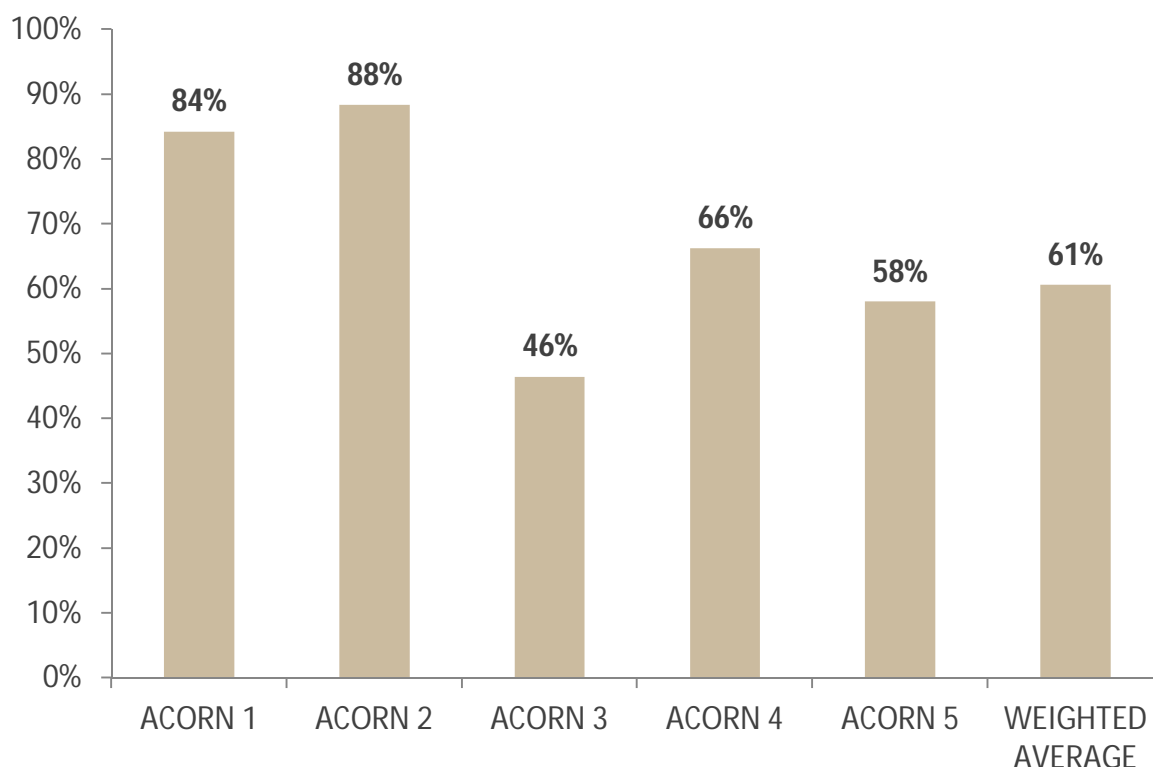
Table 1 and Figure 1 highlight the average set out rates for residual waste observed at the time waste was collected for compositional analysis. Table 2 and Figure 2 show the average amount of residual waste generated in kg/hh/wk. Figures are averaged for each Acorn category with the overall rate weighted by the proportional contribution of each. The figures from all 13 individual samples are contained in a separate data appendix.

The amount of waste in kilograms per household per week is calculated from each sample of 50 households, not just those that are participating. The number of households setting out each waste container across all 50 households is recorded with the aim of collecting all presented waste and recycling. In some instances it is not possible to collect all presented waste (resident refuses, bins have H&S issues or total collected waste exceeds vehicle capacity). The collected waste is bulked for sorting as a single sample. The amount of collected waste can then be adjusted by the set out rate for any sample where not all presented waste was collected.

Leicester residents have access to a weekly collection of residual waste using wheeled bins. From this survey between 46% (Acorn 3) and 88% (Acorn 2) of households presented residual waste for collection at an average of 61%.

**Table 1: Kerbside residual waste set out rates for each Acorn sample**

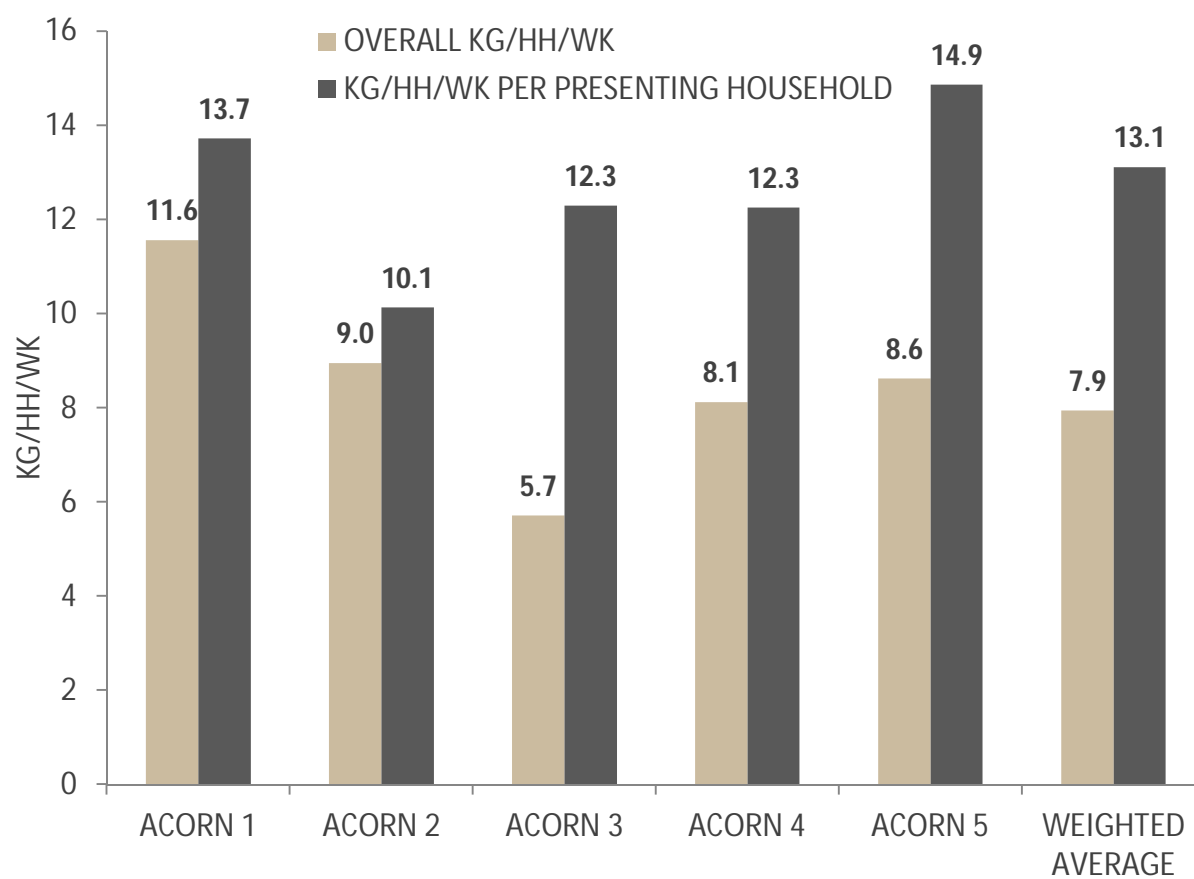
SAMPLE	% SET OUT
ACORN 1	84%
ACORN 2	88%
ACORN 3	46%
ACORN 4	66%
ACORN 5	58%
WEIGHTED AVERAGE	61%

**Figure 1: Kerbside residual waste set out rates by Acorn (%)****Table 2: Kerbside residual waste generation rates for each Acorn sample (kg/hh/wk)**

ACORN	OVERALL KG/HH/WK	KG/HH/WK PER PRESENTING HOUSEHOLD
ACORN 1	11.56	13.73
ACORN 2	8.95	10.13
ACORN 3	5.71	12.30
ACORN 4	8.13	12.26
ACORN 5	8.63	14.86
WEIGHTED AVERAGE	7.95	13.11

From observed results, the level of residual waste being disposed of at the kerbside ranged between 5.71kg/hh/wk in Acorn 3, to 11.56kg/hh/wk in Acorn 1. On average 7.95kg/hh/wk of residual waste is being disposed of by households throughout Leicester. Solely considering presenting households, the average amount of waste generated is 13.11kg/hh/wk.



**Figure 2: Average residual waste generation rates by Acorn**

## Compositional analysis of residual waste

This section looks at the average amount and composition of the residual waste presented by various socio-demographic households sampled throughout Leicester. Hand sorting of the residual waste gave concentration by weight figures for the fifteen main categories of waste as well as the more detailed sub-categories. Looking at the concentration percentages gives an indication as to the proportions of each waste category. This can be translated into a figure relating to the average waste generation expected for each waste category; this is given in kilograms per household per week (kg/hh/wk). By knowing the composition of waste from the various Acorn samples it is possible to gain an insight into the make-up and volumes of the residual waste that can be expected as a whole. Detailed residual composition tables can be found in a separate data appendix. Table 3 and Figure 3 show residual waste data in terms of percentage composition with Table 4 and Figure 4 showing generation rates for major materials in terms of kg/hh/wk. All residual waste will contain a proportion that is classified as potentially recyclable. That is to say that it should have been placed into one of the recycling receptacles provided:-

Residents currently have orange sacks for the collection of their mixed recyclables. This is collected on a weekly basis and acceptable items include:-

- Plastic bottles and plastic food containers
- Plastic film and plastic carrier bags
- Food tins and foil trays
- Drink cans
- Empty aerosols
- Drink/food cartons
- Glass bottles/jars
- Newspapers, magazines, catalogues
- Paper
- Junk mail and envelopes
- Wrapping paper and greeting cards
- Telephone directories
- Cereal boxes
- Cardboard packaging



Residents also have the option to opt in to a fortnightly garden waste collection service (March – November) using a green wheelie bin. This is a subscription based collection costing £45 per year and covers general garden waste clippings and prunings.

- Leaves
- Small twigs/branches
- Hedge trimmings
- Grass cuttings
- Weeds
- Garden and house plants
- Flowers
- Bark



**Table 3: Average residual waste composition weighted by Acorn (%)**

WASTE MATERIAL (%)	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
PAPER	7.65%	7.02%	7.42%	6.30%	5.01%	6.19%
CARD	2.48%	4.22%	3.16%	4.43%	3.51%	3.70%
PLASTIC FILM	3.25%	5.14%	3.74%	4.04%	3.99%	3.93%
DENSE PLASTIC	2.80%	5.01%	4.18%	4.97%	5.35%	4.77%
TEXTILES	2.24%	5.86%	4.15%	5.71%	6.01%	5.23%
MISC COMBUSTIBLES	10.52%	8.29%	11.46%	17.79%	14.34%	14.51%
MISC NON-COMBUSTIBLES	0.05%	0.25%	0.93%	2.87%	1.44%	1.69%
GLASS	1.92%	1.96%	2.44%	2.58%	3.23%	2.70%
FERROUS METAL	0.58%	0.78%	1.06%	2.08%	0.94%	1.32%
NON-FERROUS METAL	0.84%	0.89%	1.04%	0.94%	0.86%	0.92%
GARDEN WASTE	39.39%	0.29%	20.14%	3.28%	10.17%	11.86%
PUTRESCIBLES	26.12%	57.09%	37.78%	41.37%	42.11%	40.10%
FINES	1.03%	1.35%	1.94%	1.67%	1.77%	1.68%
HHW	0.11%	0.01%	0.04%	0.07%	0.92%	0.36%
WEEE	1.03%	1.85%	0.53%	1.88%	0.34%	1.03%
TOTAL	100%	100%	100%	100%	100%	100%

**Table 4: Average residual waste generation weighted by Acorn (kg/hh/wk)**

WASTE MATERIAL (KG/HH/WK)	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
PAPER	0.88	0.63	0.42	0.51	0.43	0.49
CARD	0.29	0.38	0.18	0.36	0.30	0.29
PLASTIC FILM	0.38	0.46	0.21	0.33	0.34	0.31
DENSE PLASTIC	0.32	0.45	0.24	0.40	0.46	0.38
TEXTILES	0.26	0.53	0.24	0.46	0.52	0.42
MISC COMBUSTIBLES	1.22	0.74	0.65	1.45	1.24	1.15
MISC NON-COMBUSTIBLES	0.01	0.02	0.05	0.23	0.12	0.13
GLASS	0.22	0.18	0.14	0.21	0.28	0.21
FERROUS METAL	0.07	0.07	0.06	0.17	0.08	0.10
NON-FERROUS METAL	0.10	0.08	0.06	0.08	0.07	0.07
GARDEN WASTE	4.55	0.03	1.15	0.27	0.88	0.94
PUTRESCIBLES	3.02	5.11	2.16	3.36	3.63	3.19
FINES	0.12	0.12	0.11	0.14	0.15	0.13
HHW	0.01	0.00	0.00	0.01	0.08	0.03
WEEE	0.12	0.17	0.03	0.15	0.03	0.08
TOTAL	11.56	8.95	5.71	8.13	8.63	7.95

Figure 3: Average residual waste composition weighted by Acorn (%)

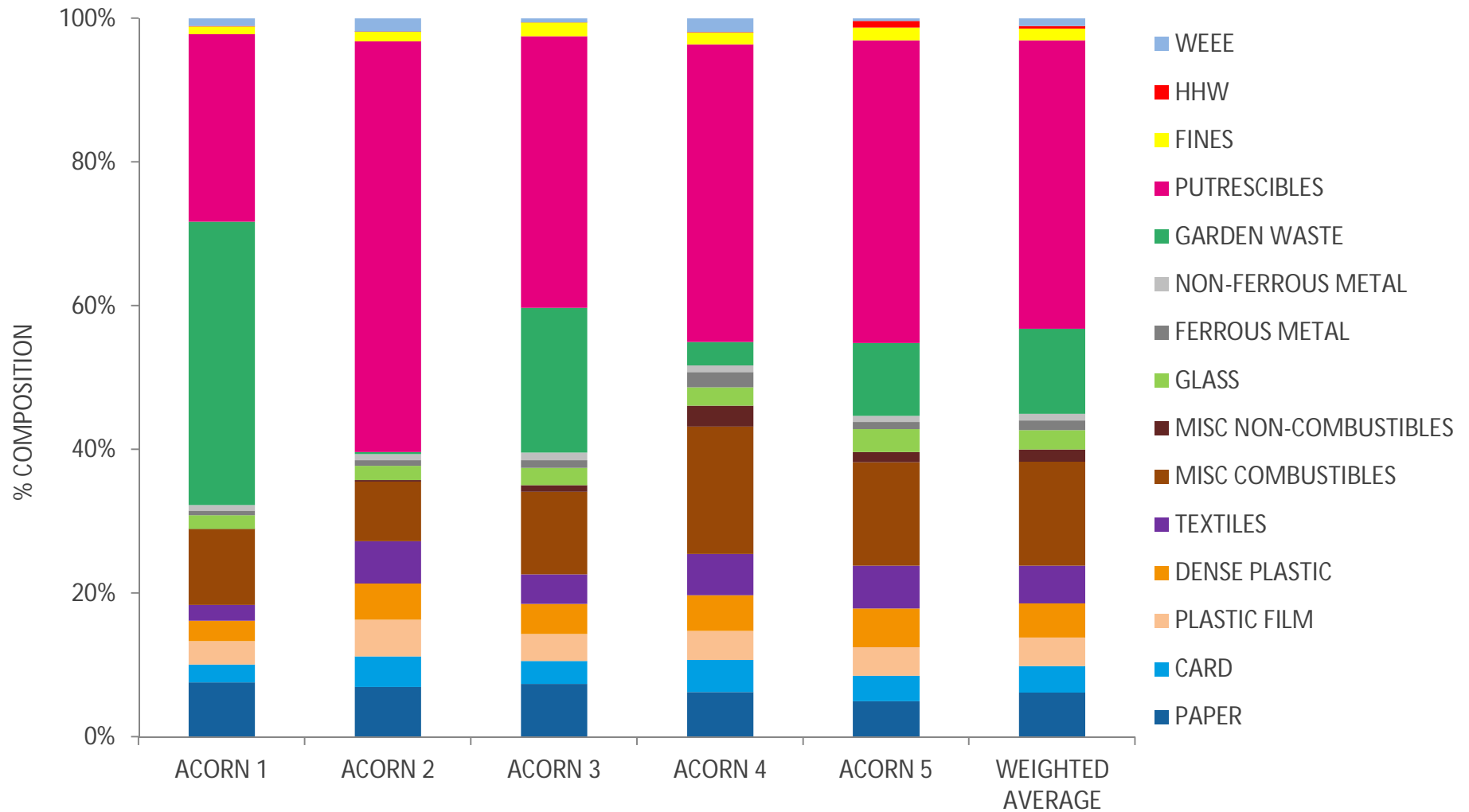
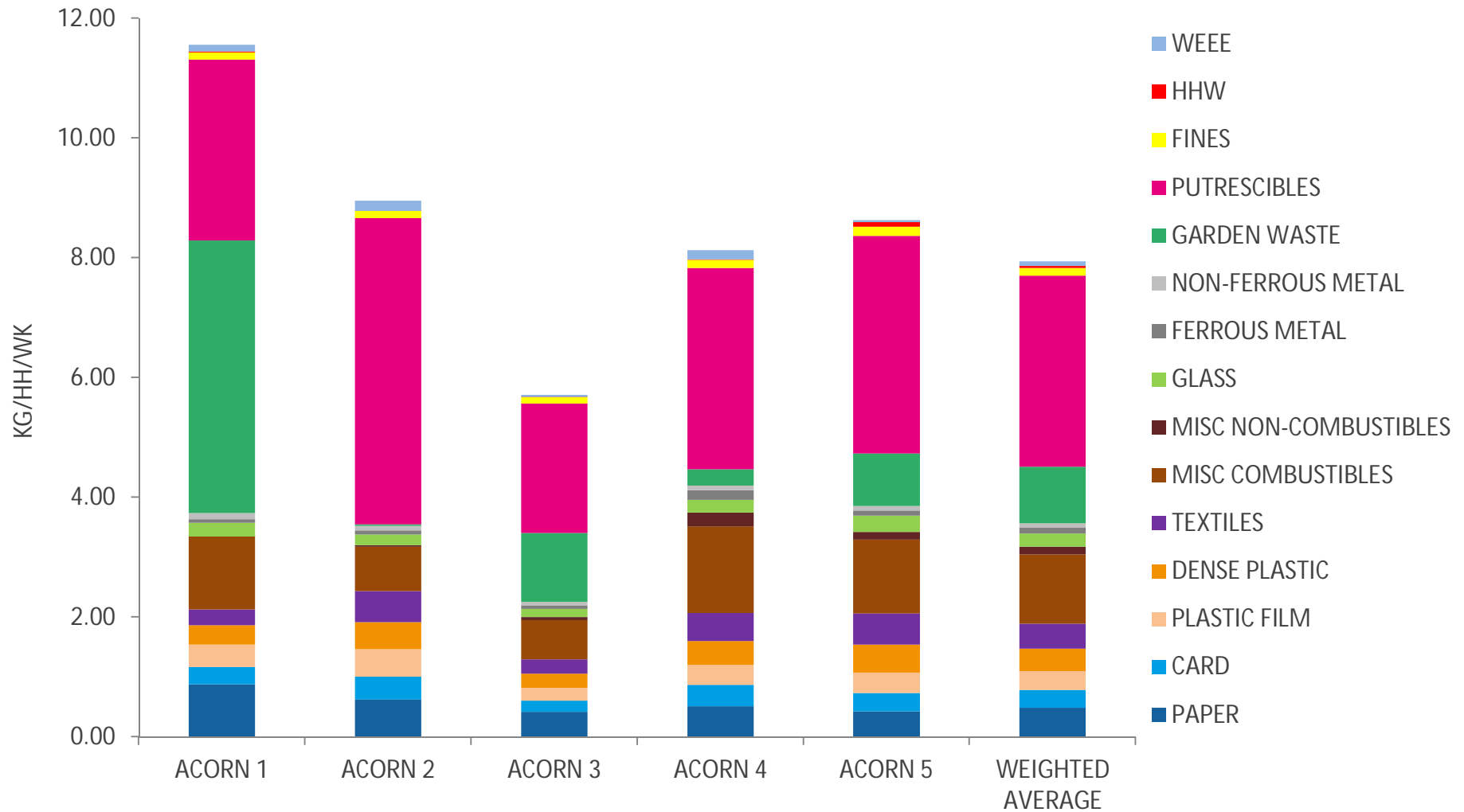


Figure 4: Average residual waste generation weighted by Acorn (kg/hh/wk)



## Organic Waste

Organic waste, which includes garden and food waste (putrescibles), formed the greatest weight concentration of the primary waste categories for all Acorns. Ranges seen were from 44.7% from Acorn 4 households to 65.5% in Acorn 1 households. Across Leicester as a whole around 52% of all residual waste (4.13kg/hh/wk) is classified as organic waste. Food waste accounted for between 25.0% (Acorn 1) and 54.9% (Acorn 2) of residual waste. As a whole, around 38.4% of all residual waste (3.05kg/hh/wk) is classified as food waste. Currently Leicester residents are unable to recycle food waste at the kerbside. Residents from Acorn 2 placed the most food into their residual bins at 4.92kg/hh/wk.

Food waste was further categorised as to whether it was home compostable and/or packaged. Overall around 42.4% of all food in the residual waste was deemed home compostable; this equates to 1.30kg/hh/wk. Additionally, 32.6% of the food waste is packaged food which is responsible for 1.00kg/hh/wk.

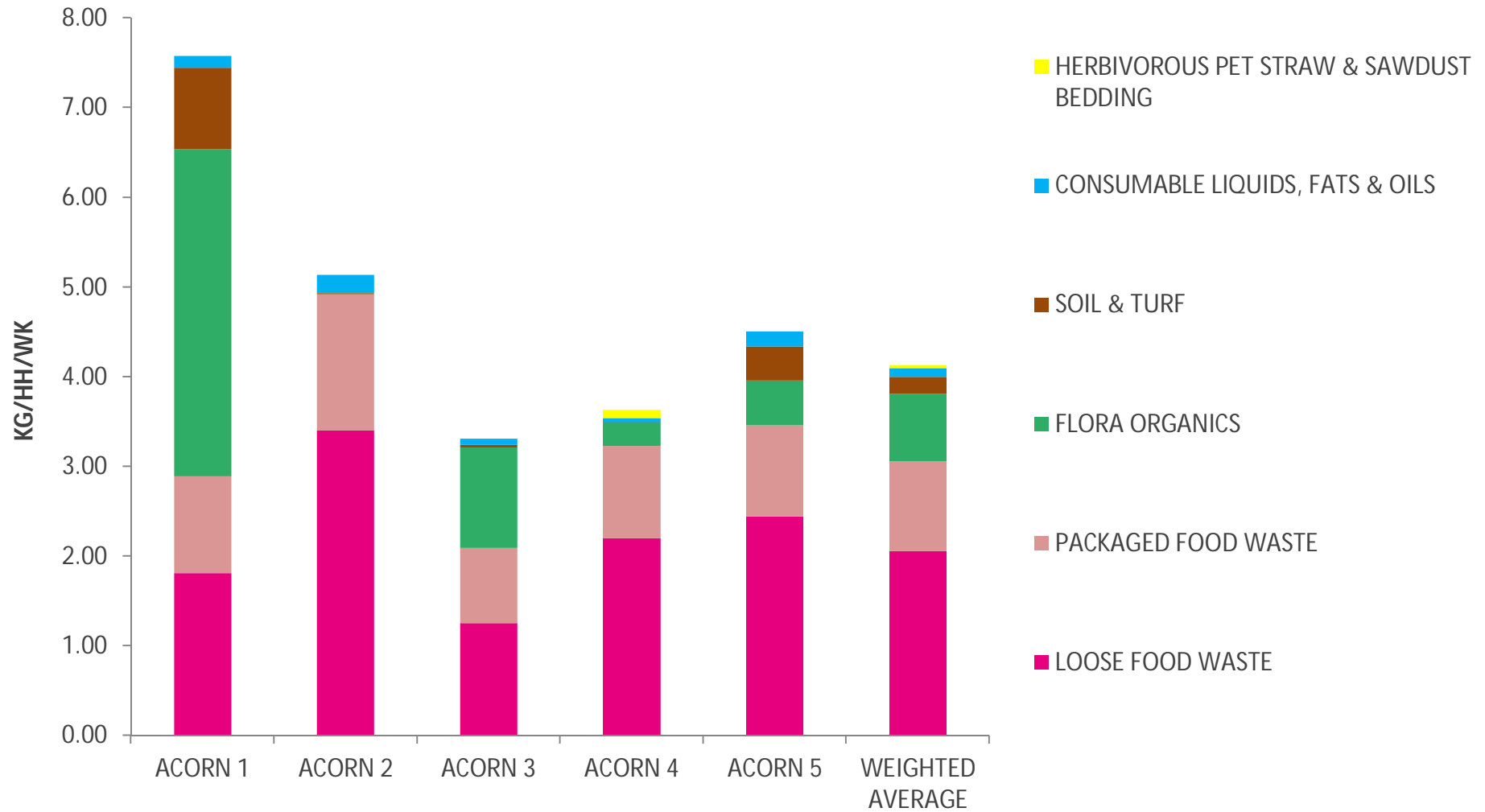
**Table 5: Levels of organic wastes within residual waste of each Acorn (kg/hh/wk)**

RESIDUAL ORGANICS (KG/HH/WK)	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
FLORA ORGANICS	3.65	0.01	1.12	0.27	0.50	0.76
SOIL & TURF	0.91	0.02	0.03	0.00	0.38	0.19
LOOSE FOOD WASTE	1.81	3.40	1.25	2.20	2.44	2.06
PACKAGED FOOD WASTE	1.08	1.51	0.84	1.02	1.02	1.00
HERBIVOROUS PET STRAW & SAWDUST BEDDING	0.00	0.00	0.00	0.09	0.01	0.03
CONSUMABLE LIQUIDS, FATS & OILS	0.13	0.20	0.07	0.04	0.17	0.10
KG/HH/WK ORGANICS	7.57	5.14	3.31	3.63	4.51	4.13
% ORGANICS	65.51%	57.38%	57.92%	44.65%	52.28%	51.96%
KG/HH/WK FOOD WASTE	2.89	4.92	2.09	3.23	3.46	3.05
% FOOD WASTE	24.97%	54.91%	36.61%	39.70%	40.11%	38.43%

Residents throughout Leicester can recycle garden waste at the kerbside if they have registered for collections and the service is not over subscribed. Levels of garden waste in residual bins varied greatly between the samples.

Whereas just 0.3% of Acorn 2 and 3.3% of Acorn 4 residual waste consisted of garden material, rates of 20.1% (Acorn 3) and 39.4% (Acorn 1) were also observed. On average 11.9% or 0.94kg/hh/wk of residual waste was due to garden waste with 80% of this being vegetation as opposed to soil & turf. Acorn 1 households placed as much as 3.65kg/hh/wk of recyclable garden vegetation in their residual bins

Figure 5: Levels of organics within residual waste of each Acorn (kg/hh/wk)



## Paper

On average, Acorn 1 residents had the highest concentrations of this type of waste (7.65%), also disposing of the most at 0.88kg/hh/wk. In comparison 5% or 0.43kg/hh/wk of residual waste from Acorn 5 was due to paper based materials. Across Leicester it was seen that around 6.19% or 0.49kg/hh/wk of residual waste consisted of discarded paper.

A proportion of this paper is available for recycling at the kerbside. Leicester residents can use their orange sacks for recycling paper such as newspapers, junk mail, envelopes and directories. It was found that between 30.61% (Acorn 1) and 49.39% (Acorn 3) of paper could have been placed into recycling sacks as opposed to the residual bins.

When accounting for all of the various types of paper within the residual waste, it is seen that 41.62% of residual paper was recyclable which accounted for 2.58% of all the residual waste or 0.20kg/hh/wk.

Table 6 and Figure 6 show the amounts of the different forms of paper waste for each Acorn.

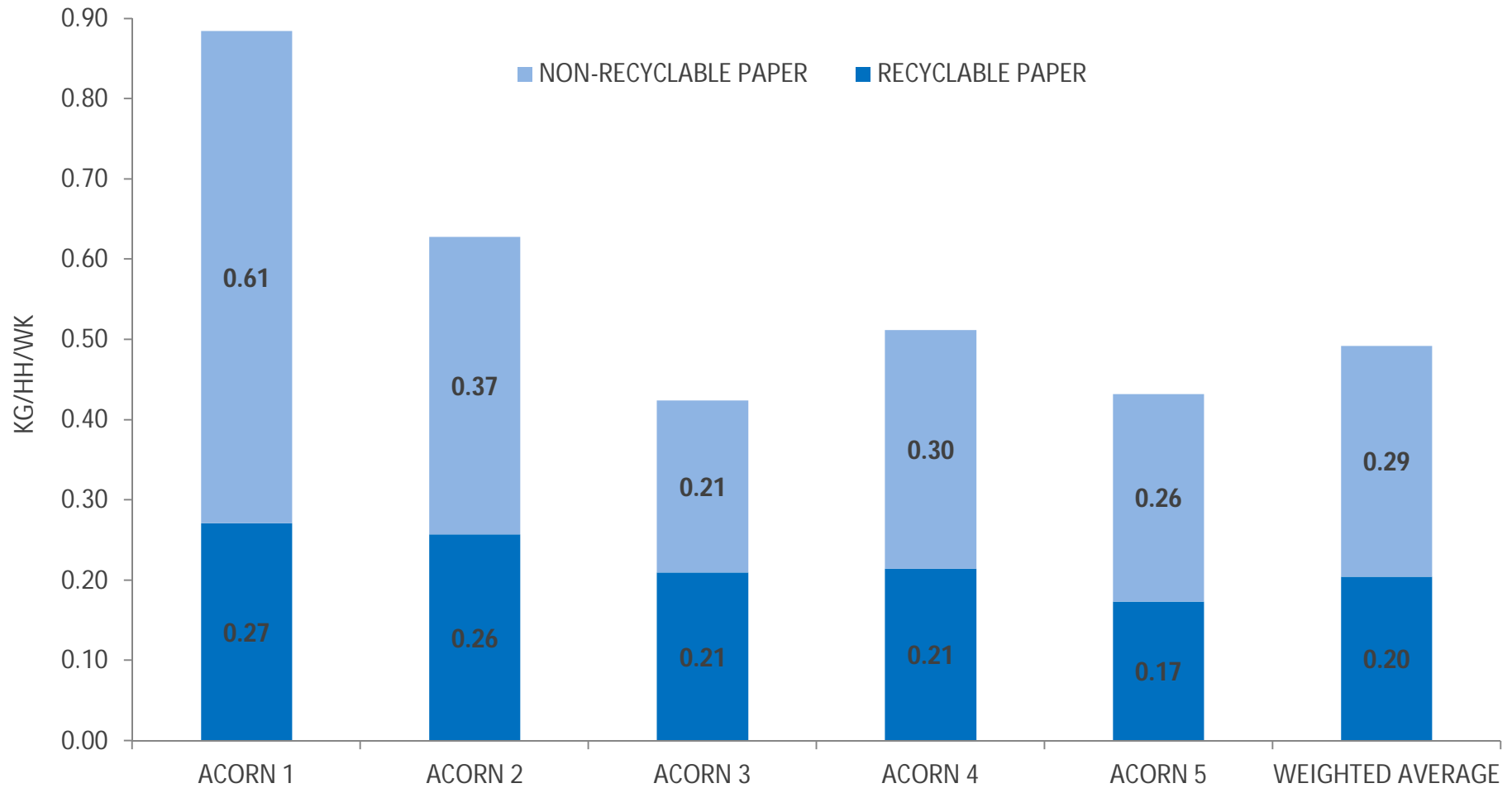
**Table 6: Levels of paper wastes within residual waste of each Acorn (kg/hh/wk)**

RESIDUAL PAPER	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
RECYCLABLE PAPER	0.27	0.26	0.21	0.21	0.17	0.20
NON-RECYCLABLE PAPER*	0.61	0.37	0.21	0.30	0.26	0.29
KG/HH/WK TOTAL PAPER	0.88	0.63	0.42	0.51	0.43	0.49
% PAPER RECYCLABLE	30.61%	40.91%	49.39%	41.86%	40.12%	41.62%

*\*All paper that would be deemed contamination if placed into the recycling sacks. Examples would be tissue paper, wipes, shiny wrapping paper, greaseproof & fast food wrapping etc.*



Figure 6: Levels of paper wastes within residual waste of each Acorn (kg/hh/wk)



## Card & Cardboard

On average, Acorn 4 residents had the highest concentrations of this type of waste (4.43%), with Acorn 2 disposing of the most at 0.38kg/hh/wk. In comparison 0.13kg/hh/wk of residual waste from Acorn 3 was due to card and cardboard based materials. Across Leicester it was seen that around 3.7% or 0.29kg/hh/wk of residual waste consisted of discarded card and cardboard.

A proportion of this card & cardboard is available for recycling at the kerbside. Leicester residents can recycle card, cartons and cardboard in (or alongside) their orange sacks. It was found that between 62.85% (Acorn 5) and 93.66% (Acorn 2) of card and cardboard could have been recycled rather than disposed of in residual bins. Across Leicester, 76.5% of residual card and cardboard was compatible with recycling collections which accounted for 2.83% of all the residual waste or 0.23kg/hh/wk.

Table 7 and Figure 7 show the amounts of the different forms of card and cardboard waste for each Acorn.

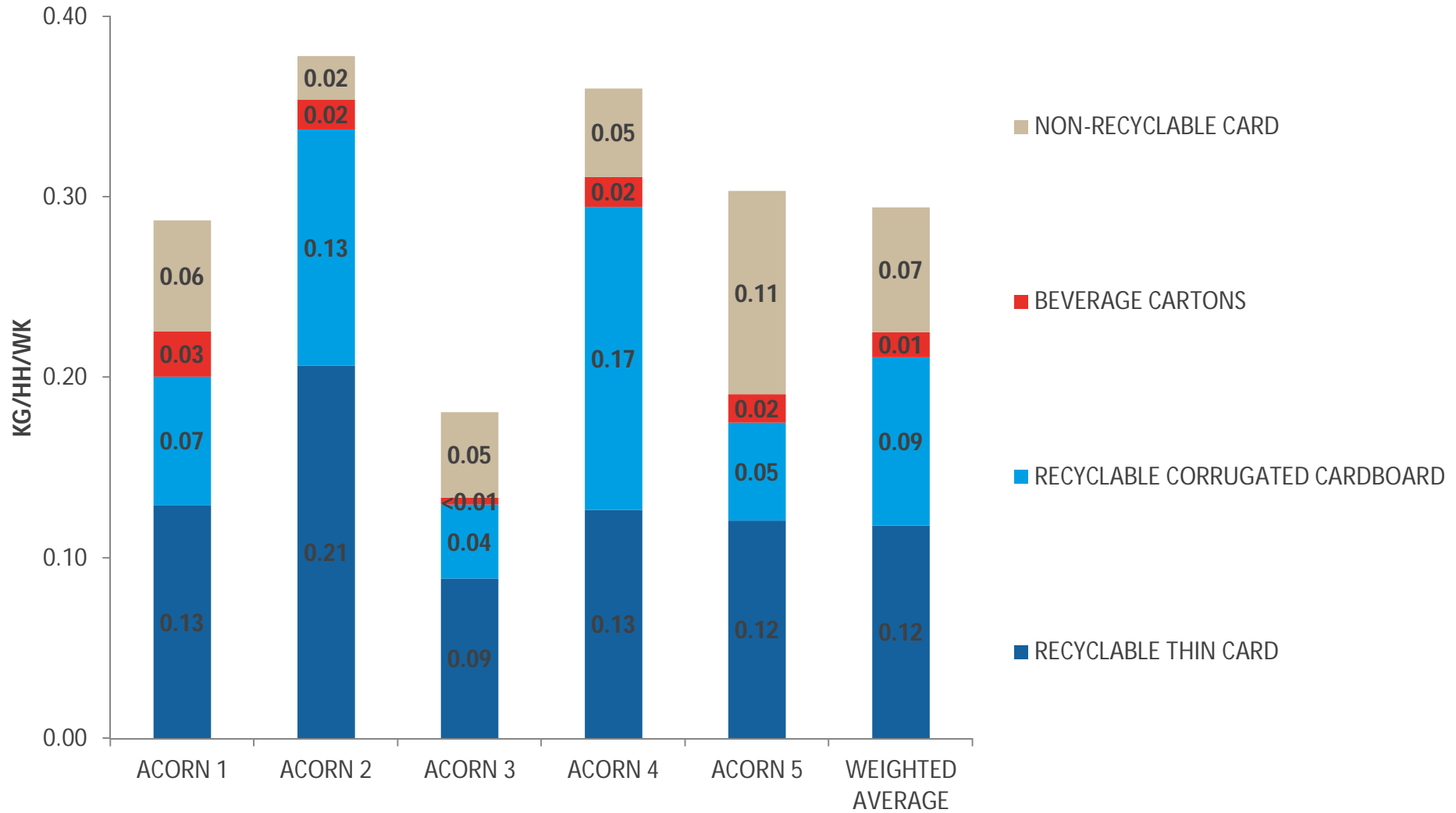
When combining paper and card together it is estimated that 54.67% of that present in residual bins could have been recycled via kerbside recycling collections. This amounts to 5.41% of all the residual waste being collected – a total of 0.43kg/hh/wk.

**Table 7: Levels of card wastes within residual waste of each Acorn (kg/hh/wk)**

RESIDUAL CARD	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
RECYCLABLE THIN CARD	0.13	0.21	0.09	0.13	0.12	0.12
RECYCLABLE CORRUGATED CARDBOARD	0.07	0.13	0.04	0.17	0.05	0.09
BEVERAGE CARTONS	0.03	0.02	0.00	0.02	0.02	0.01
NON-RECYCLABLE CARD*	0.06	0.02	0.05	0.05	0.11	0.07
KG/HH/WK TOTAL CARD & CARDBOARD	0.29	0.38	0.18	0.36	0.30	0.29
KG/HH/WK RECYCLABLE CARD & CARDBOARD	0.23	0.35	0.13	0.31	0.19	0.23
% CARD KERBSIDE RECYCLABLE	78.62%	93.66%	73.88%	86.39%	62.85%	76.48%

*\*All card and cardboard that would be deemed contamination if placed into the recycling sacks. Examples would generally be card that is heavily laminated or mixed material (attached to other non-card materials)*

Figure 7: Levels of card wastes within residual waste of each Acorn (kg/hh/wk)



## Plastics

As a UK average approximately 12% of the waste disposed of by households is plastic. In this sampling campaign average ranges seen were 6.0% total plastic by weight from Acorn 1 households to 10.1% in the waste from Acorn 2 households. Leicester residents currently recycle plastic bottles and selected containers and plastic film as part of their orange sack collections. Across the City as a whole, 8.70% of residual waste was classified as plastic which equates to 0.69kg/hh/wk. On the whole plastic material, although not heavy in itself, can produce large volumes of waste.

Figure 8 clearly shows the levels of recyclable plastics within the residual waste. On average, around 59.06% of the plastic waste present in the residual was recyclable, equating to 0.41kg/hh/wk.

Plastic film made up 53% of the recyclable plastics with bottles forming 26% and containers the remaining 21%.

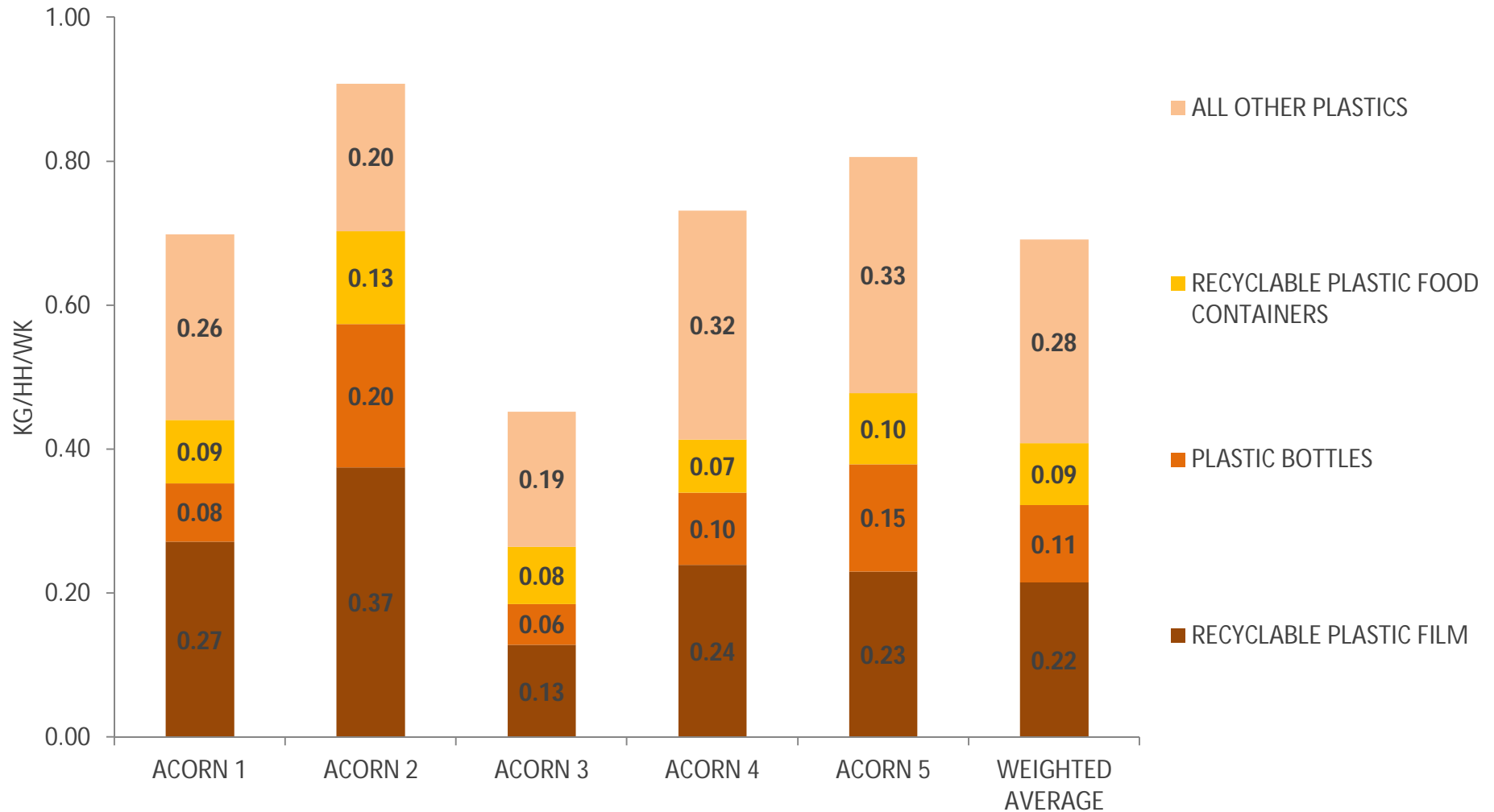
Table 8 and Figure 8 show the amounts of the different forms of plastic waste found within the residual samples from each Acorn.

**Table 8: Levels of plastics within residual waste of each Acorn (kg/hh/wk)**

RESIDUAL PLASTICS	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
RECYCLABLE PLASTIC FILM	0.27	0.37	0.13	0.24	0.23	0.22
PLASTIC BOTTLES	0.08	0.20	0.06	0.10	0.15	0.11
RECYCLABLE PLASTIC FOOD CONTAINERS	0.09	0.13	0.08	0.07	0.10	0.09
ALL OTHER PLASTICS	0.26	0.20	0.19	0.32	0.33	0.28
KG/HH/WK TOTAL PLASTIC	0.70	0.91	0.45	0.73	0.81	0.69
KG/HH/WK RECYCLABLE PLASTIC	0.44	0.70	0.26	0.41	0.48	0.41
% PLASTIC RECYCLABLE	63.15%	77.44%	58.46%	56.50%	59.28%	59.06%

*\*All plastics that would be deemed contamination if placed into the recycling sacks. Examples would be polystyrene, perspex, miscellaneous dense plastic items (toys, kitchenware, garden pots, hose, rubber etc.)*

Figure 8: Levels of plastics within residual waste of each Acorn (kg/hh/wk)



## Metals

In this sampling campaign average concentrations of residual metals were seen to be 1.42% total metal by weight from Acorn 1 households to 3.02% in the waste from Acorn 4 households, averaging 2.24% overall. Leicester residents have access to a recycling collection of food and drink cans as well as aerosols and clean foil via their orange sack service. The average weight of metals in the residual waste from Acorn 3 was 0.12kg/hh/wk rising to 0.25kg/hh/wk in Acorn 4.

A proportion of this metal waste is available for recycling at the kerbside. It was found that 63.46% of Acorn 4 metals were recyclable rising to 98.61% for the metals in Acorn 2 residual waste. Across Leicester an average of 74.16% or 0.13kg/hh/wk of residual metal is classified as recyclable, this equates to 1.66% of all collected residual waste.

On the whole 59.0% of metals were non-ferrous, accounting for 0.10kg/hh/wk, with non-ferrous metals contributing 0.07kg/hh/wk.

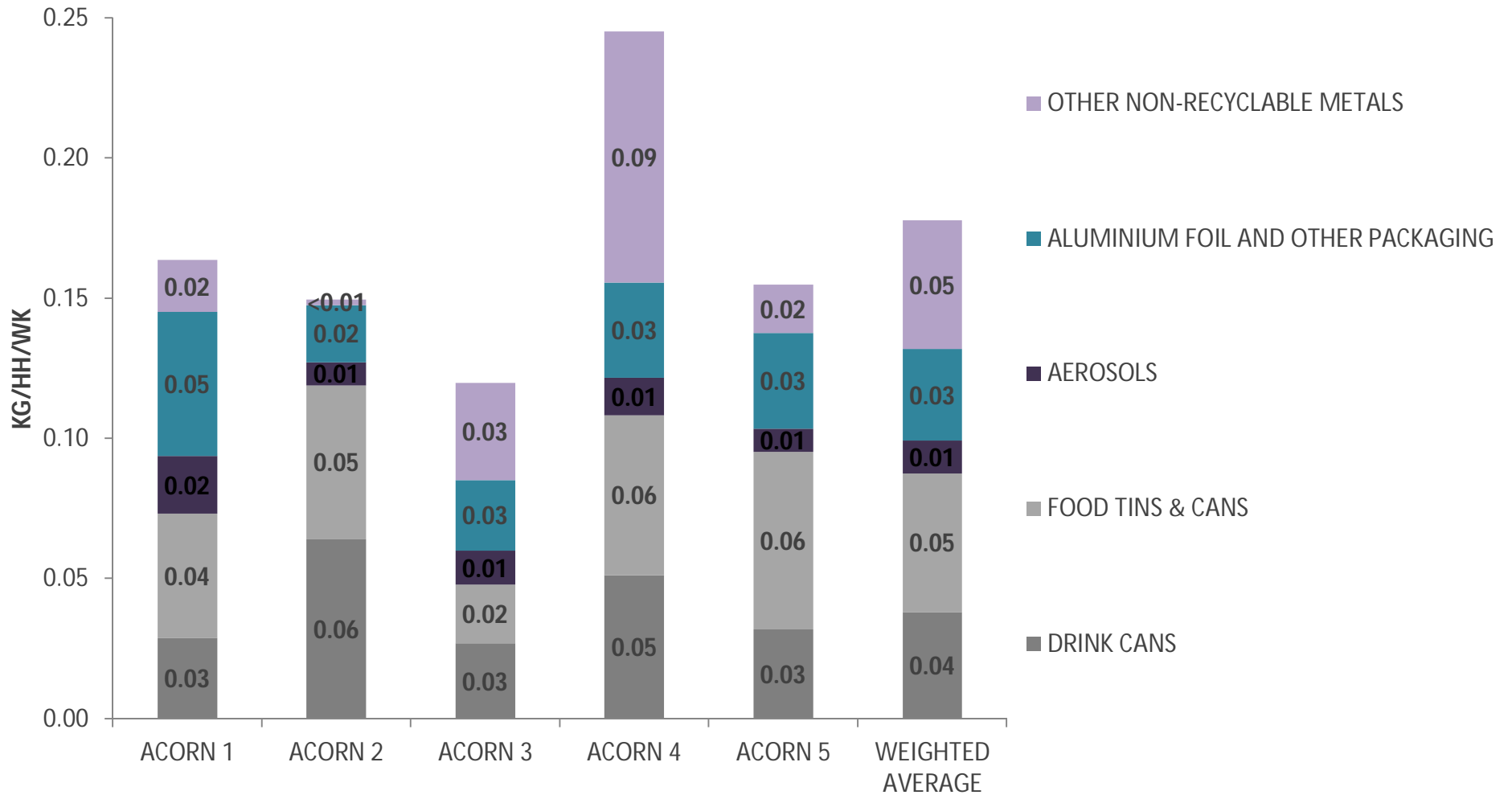
Table 9 and Figure 9 show the amounts of the different forms of metallic waste found within the samples from each Acorn. Food cans tend to require a degree of washing before being placed into recycling containers and as such are often less well diverted than cleaner drinks cans.

**Table 9: Levels of metals within residual waste of each Acorn (kg/hh/wk)**

RESIDUAL METALS	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
DRINK CANS	0.03	0.06	0.03	0.05	0.03	0.04
FOOD TINS & CANS	0.04	0.05	0.02	0.06	0.06	0.05
AEROSOLS	0.02	0.01	0.01	0.01	0.01	0.01
ALUMINIUM FOIL AND OTHER PACKAGING	0.05	0.02	0.03	0.03	0.03	0.03
OTHER NON-RECYCLABLE METALS	0.02	0.00	0.03	0.09	0.02	0.05
RECYCLABLE METALS	0.15	0.15	0.09	0.16	0.14	0.13
TOTAL METALS	0.16	0.15	0.12	0.25	0.15	0.18
% FERROUS	40.64%	46.69%	50.32%	68.92%	52.11%	58.99%
% RECYCLABLE	88.68%	98.61%	71.07%	63.46%	88.90%	74.16%

*\*All metal that would be deemed contamination if placed into the recycling sacks. Examples would be cutlery, DIY tools, ironmongery, general scrap metal etc.*

Figure 9: Levels of metals within residual waste of each Acorn (kg/hh/wk)



## Glass

In this sampling campaign the average concentration of residual glass was seen to be 1.92% total glass by weight from Acorn 1 households, rising to 3.23% in the waste from Acorn 5 residual bins. Leicester residents are able to recycle glass bottles and jars at the kerbside in their orange sacks. The weight of glass in the residual waste from Acorn 3 was just 0.14kg/hh/wk rising to 0.28kg/hh/wk for Acorn 5. This represented a City wide average of 2.70% or 0.21kg/hh/wk.

A proportion of this glass consists of bottles and jars which could have been recycled rather than placed into residual bins. It was found that across Leicester an average of 80.27% or 0.17kg/hh/wk of residual glass is classified as recyclable, this equates to 2.17% of all collected residual waste.

Overall, 68.0% of recyclable glass was clear, accounting for 0.12kg/hh/wk of residual waste. Almost half of the clear glass was due to jars as opposed to bottles. Jars often need more cleaning than bottles and are generally less effectively recycled.

Table 10 and Figure 10 show the amounts of the different forms of glass waste found within the samples from each Acorn.

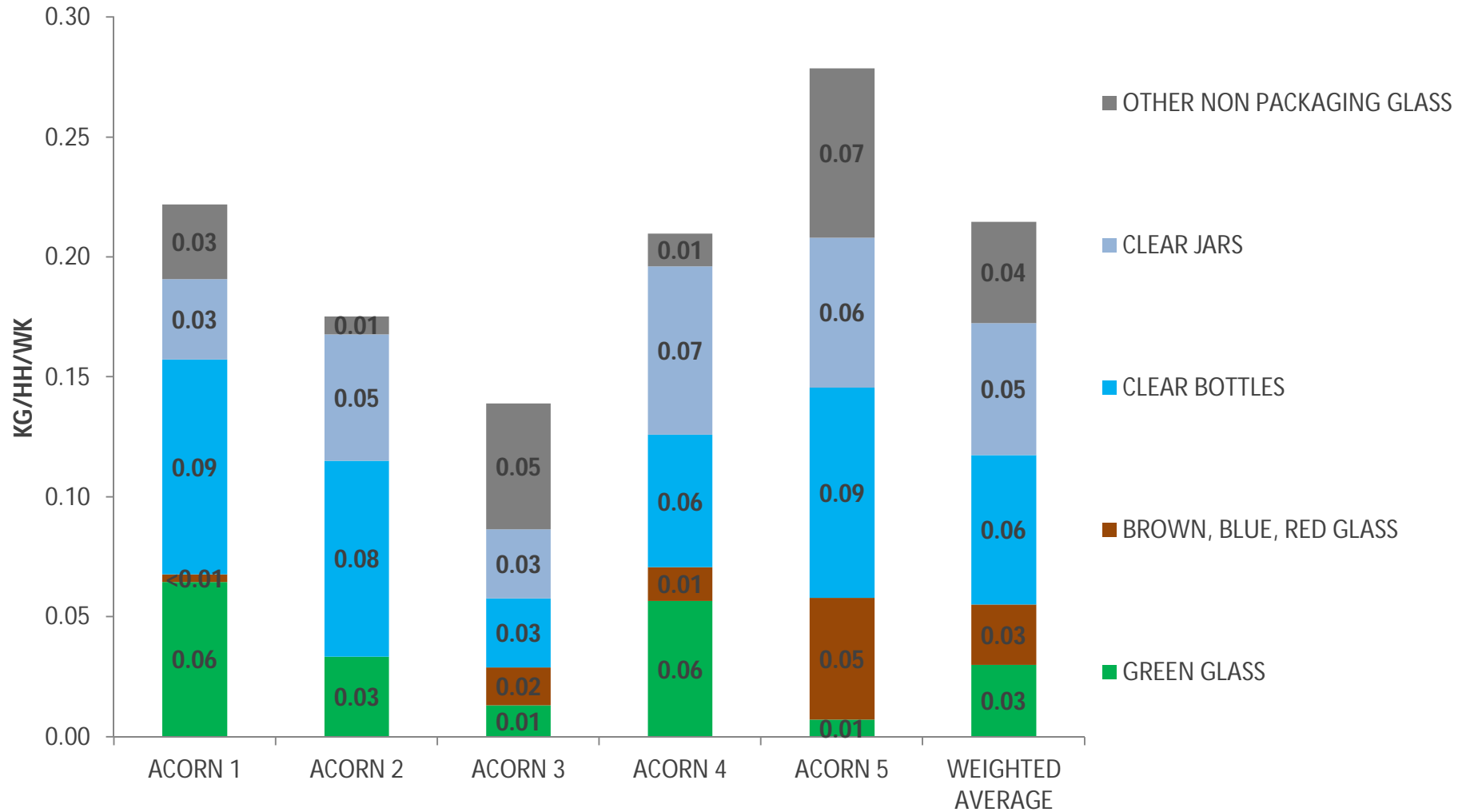
**Table 10: Levels of glass within residual waste of each Acorn (kg/hh/wk)**

RESIDUAL GLASS	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
GREEN GLASS	0.06	0.03	0.01	0.06	0.01	0.03
BROWN, BLUE, RED GLASS	0.00	0.00	0.02	0.01	0.05	0.03
CLEAR BOTTLES	0.09	0.08	0.03	0.06	0.09	0.06
CLEAR JARS	0.03	0.05	0.03	0.07	0.06	0.05
OTHER NON PACKAGING GLASS	0.03	0.01	0.05	0.01	0.07	0.04
KG/HH/WK TOTAL GLASS	0.22	0.18	0.14	0.21	0.28	0.21
KG/HH/WK RECYCLABLE GLASS	0.19	0.17	0.09	0.20	0.21	0.17
% RECYCLABLE	85.98%	95.83%	62.17%	93.44%	74.72%	80.27%
% OF RECYCLABLE GLASS - CLEAR	64.47%	80.12%	66.53%	63.98%	72.22%	67.98%

*\*All glass that would be deemed contamination if placed into the recycling sacks. Examples would be Pyrex glass, ovenware, sheet glass, spectacles, ornaments, crockery etc.*



Figure 10: Levels of glass within residual waste of each Acorn (kg/hh/wk)



## Textiles

The concentration of residual textile waste was seen to be 2.24% from Acorn 1 households to 6.01% in the waste from Acorn 5 households. Leicester residents do not have a kerbside collection of textiles but are encouraged to use bring banks or charity shops within the City. The average weight of textile waste in the residual waste from Acorn 3 was 0.24kg/hh/wk rising to 0.53kg/hh/wk in Acorn 2. On average 5.23% or 0.42kg/hh/wk of residual waste is classified as textile waste.

A proportion of this textile waste is available for recycling as clean clothing or linen. It was found that between 45.7% (Acorn 3) and 100% of Acorn 1 textile waste was of this potentially recyclable type. Up to 0.45kg/hh/wk (Acorn 4) of recyclable textiles are being placed into the residual waste. Across the Council area an average of 83.72% or 0.35kg/hh/wk of residual textiles is classified as reusable, this equates to 4.38% of all collected residual waste.

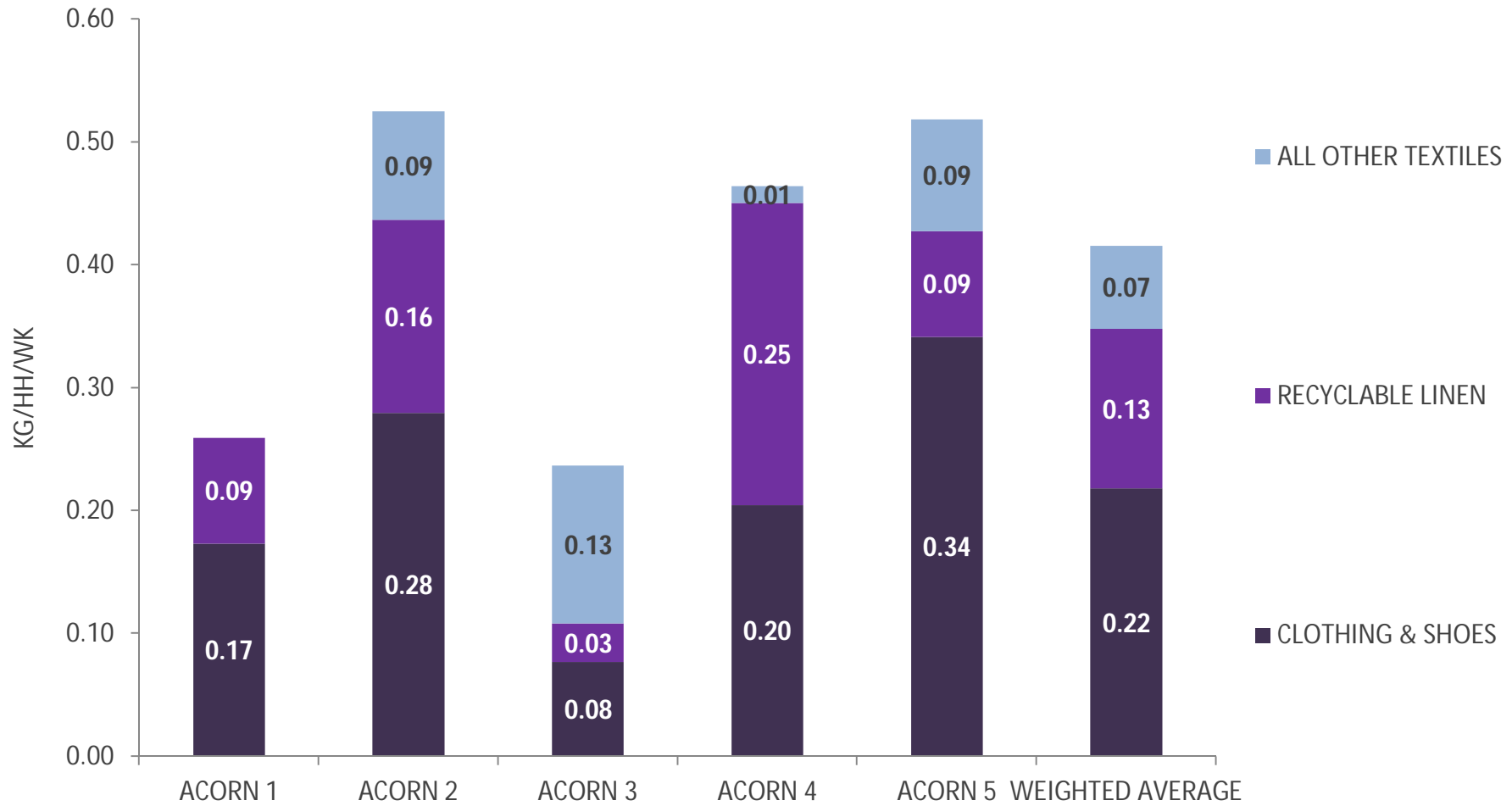
Table 11 and Figure 11 show the amounts of the different forms of textile waste found within the samples from each Acorn.

**Table 11: Levels of textiles within residual waste of each Acorn (kg/hh/wk)**

RESIDUAL TEXTILES	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
CLOTHING & SHOES	0.17	0.28	0.08	0.20	0.34	0.22
RECYCLABLE LINEN	0.09	0.16	0.03	0.25	0.09	0.13
ALL OTHER TEXTILES	0.00	0.09	0.13	0.01	0.09	0.07
KG/HH/WK TOTAL TEXTILES	0.26	0.53	0.24	0.46	0.52	0.42
KG/HH/WK REUSABLE TEXTILES	0.26	0.44	0.11	0.45	0.43	0.35
% REUSABLE TEXTILES	100.00%	83.22%	45.72%	97.03%	82.47%	83.72%

*\*Other textiles not normally acceptable for reusesuch as accessories, rags, stuffed textiles, canvas sheeting etc.*

Figure 11: Levels of textiles within residual waste of each Acorn (kg/hh/wk)



## Hazardous Items (HHW) & WEEE

In this sampling campaign the average overall concentration of hazardous and WEEE waste was seen to be 1.39% which equates to around 0.11kg/hh/wk. Acorn 4 households disposed of the most HHW and WEEE waste, where it was responsible for 0.16kg/hh/wk or 1.95% of waste. Table 12 shows the amounts of HHW and WEEE within the samples from each Acorn.

**Table 12: Levels of HHW and WEEE within each Acorn (kg/hh/wk)**

RESIDUAL HHW & WEEE	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
HHW	0.01	0.00	0.00	0.01	0.08	0.03
WEEE	0.12	0.17	0.03	0.15	0.03	0.08
TOTAL	0.13	0.17	0.03	0.16	0.11	0.11
% HHW & WEEE	1.13%	1.86%	0.56%	1.95%	1.27%	1.39%

### WEEE

Keyboards, PC Mouse, Headphones, Speakers, Plugs & Leads, Toothbrushes, Toys, Printer, Torch, Curling Tongs, Stereo, Phone, Digi Box, Coffee Blender, Iron, Hair Tongs, Motor, Steamer, Coffee Machine.

### HHW

Batteries, Halogen Bulbs, Paint, Clinical Waste, Needles.

## Disposable Nappies & AHP waste

The profile of this type of waste has increased in recent years and nappy levels within the residual waste of households with babies can be extremely high. In this survey the concentrations of disposable nappies & AHP waste ranged between 4.26% in Acorn 1 up to 8.78% in Acorn 4 where the residual waste contained around 0.71kg/hh/wk of this waste. Throughout Leicester as a whole around 6.70% of collected residual waste consists of disposable nappies and AHP waste, which equates to 0.53kg/hh/wk.

## Potential recyclability of the residual waste

The overall recyclability of the residual waste relates to all the items present that could have been accepted into the kerbside recycling schemes currently running in Leicester. Results from the survey showed that the overall recyclability of the residual waste was highest in Acorn 1 households at 42.56%, and lowest in Acorn 2 at 18.32%. Across Leicester it is expected that 23.88% of all residual waste being disposed of is recyclable at the kerbside.

Overall around 14.38% of residual waste was compatible with orange sack collections with a further 9.50% acceptable in garden recycling bins.

**Table 13: Proportion of residual waste currently recyclable relative to current schemes (%)**

% RECYCLABLES IN RESIDUAL WASTE	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
ORANGE SACK RECYCLABLE	11.01%	18.20%	13.64%	15.89%	13.77%	14.38%
GARDEN BIN RECYCLABLE	31.55%	0.12%	19.65%	3.28%	5.79%	9.50%
TOTAL RECYCLABLE	42.56%	18.32%	33.29%	19.16%	19.55%	23.88%

In terms of the amount of recyclables disposed of it is seen that Acorn 4 householders place 1.56kg/hh/wk of materials in residual bins that could be placed into the various kerbside recycling containers. This compares with 4.92kg/hh/wk for Acorn 1. Across Leicester around 1.90kg/hh/wk of recyclable material is being disposed of in the residual waste.

**Table 14: Kg/hh/wk of residual waste currently recyclable relative to current schemes**

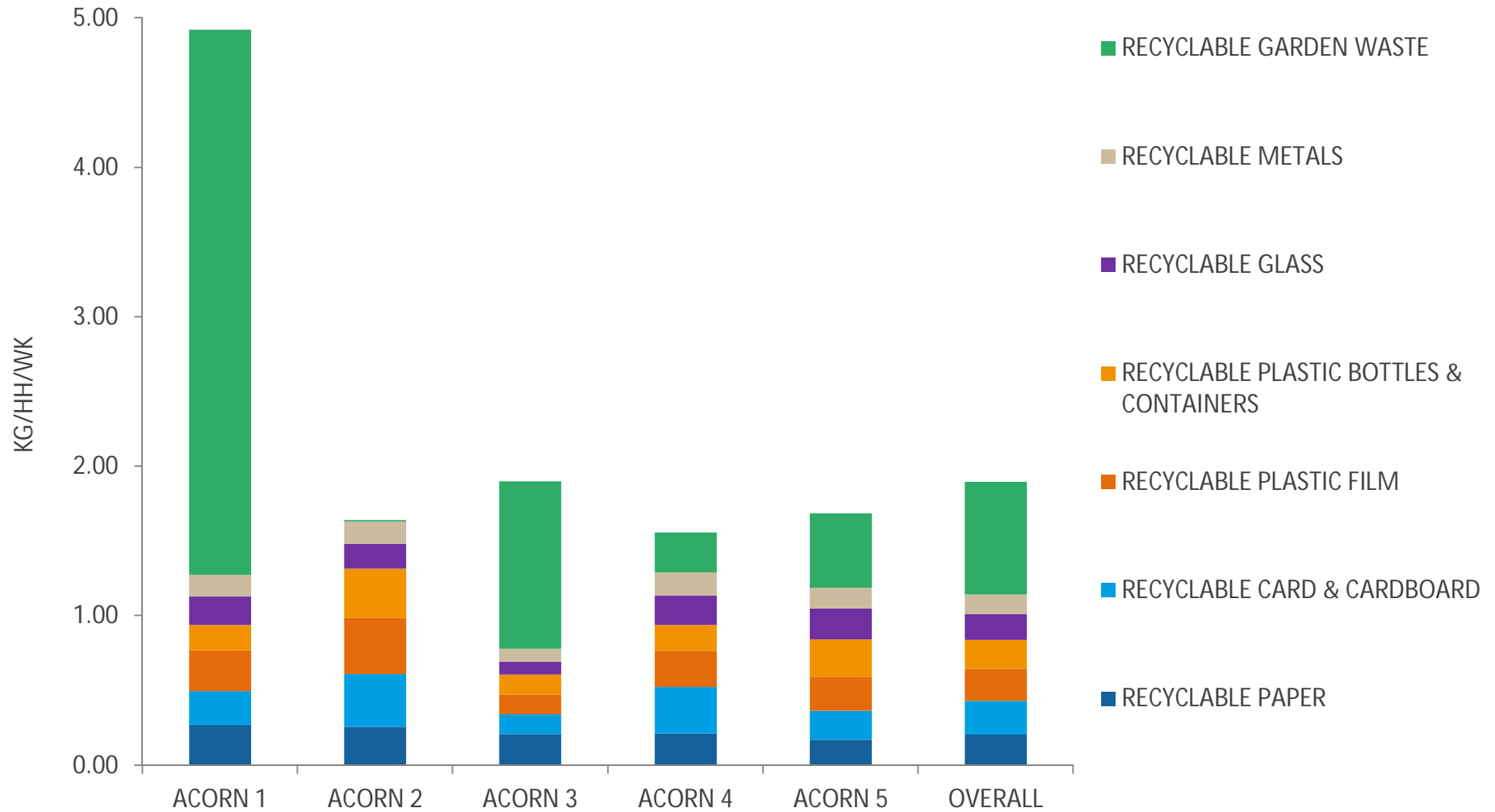
KG/HH/WK RECYCLABLES IN RESIDUAL WASTE	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
ORANGE SACK RECYCLABLE	1.27	1.63	0.78	1.29	1.19	1.14
GARDEN BIN RECYCLABLE	3.65	0.01	1.12	0.27	0.50	0.76
TOTAL RECYCLABLE	4.92	1.64	1.90	1.56	1.69	1.90

Figure 12 clearly shows the levels of residual materials currently collectable in the recycling collections available in Leicester. Different households were seen to dispose of differing levels of recyclable materials, both in terms of volume and composition (Table 15). For example levels of recyclable garden waste are far greater in the waste collected from Acorn 1 and 3 households.

**Table 15: Kg/hh/wk of residual waste potentially recyclable relative to Acorn (Kg/hh/wk)**

KG/HH/WK MATERIALS WITHIN RESIDUAL WASTE	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
RECYCLABLE PAPER	0.27	0.26	0.21	0.21	0.17	0.20
RECYCLABLE CARD & CARDBOARD	0.23	0.35	0.13	0.31	0.19	0.23
RECYCLABLE PLASTIC FILM	0.27	0.37	0.13	0.24	0.23	0.22
RECYCLABLE PLASTIC BOTTLES & CONTAINERS	0.17	0.33	0.14	0.17	0.25	0.19
RECYCLABLE GLASS	0.19	0.17	0.09	0.20	0.21	0.17
RECYCLABLE METALS	0.15	0.15	0.09	0.16	0.14	0.13
RECYCLABLE GARDEN WASTE	3.65	0.01	1.12	0.27	0.50	0.76
TOTAL RECYCLABLE	4.92	1.64	1.90	1.56	1.69	1.90

Figure 12: Kg/hh/wk of residual waste potentially recyclable relative to Acorn (Kg/hh/wk)



## Dry recycling waste

### Set out rates and waste generation

Table 16 and Figure 13 highlight the set out rates for kerbside orange recycling sacks observed at the time waste was collected for compositional analysis. Table 17 and Figure 14 show the amount of this recycling waste generated in kg/hh/wk. The same houses were sampled as those included in the residual survey above. As for the residual waste analysis, the overall amount of waste in kilograms per household per week is derived from the number of households who could set out waste and not just those that are participating. These aggregated figures for the recycling waste are shown in tables and figures with additional information relating to individual household samples given where relevant.

Recycling is also presented on a weekly basis and Acorn 1 had the highest set out rate averaging 69% with just 41% of Acorn 3 households presenting orange sacks. On average, just over half (52%) of households had orange sacks presented for collection.

**Table 16: Average Set Out for kerbside recycling waste (%)**

SAMPLE	% SET OUT
ACORN 1	69%
ACORN 2	65%
ACORN 3	41%
ACORN 4	57%
ACORN 5	50%
WEIGHTED AVERAGE	52%

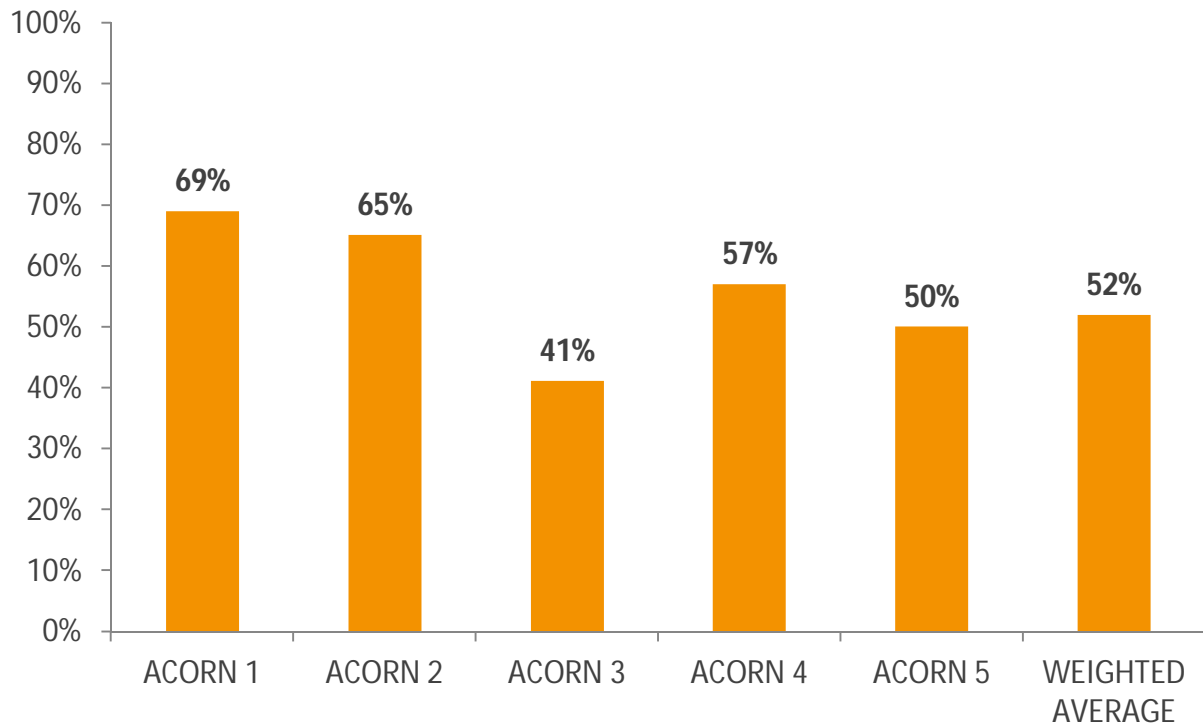
**Table 17: Average Kerbside Recycling generation rates (kg/hh/wk)**

SAMPLE	OVERALL KG/HH/WK	KG/HH/WK PER PRESENTING HOUSEHOLD
ACORN 1	2.90	4.20
ACORN 2	2.09	3.21
ACORN 3	1.81	4.41
ACORN 4	1.67	2.92
ACORN 5	2.40	4.79
WEIGHTED AVERAGE	2.03	3.91

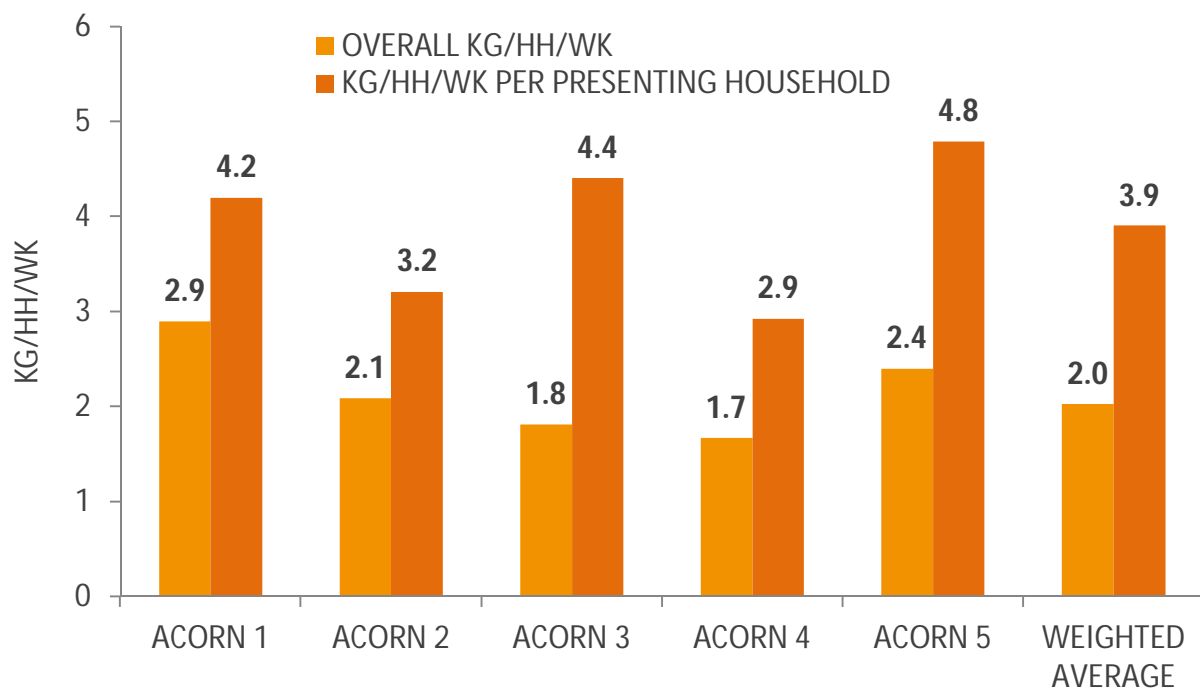


On average 2.03kg/hh/wk of recycling in orange sacks was generated by Leicester households. Levels ranged between 1.67kg/hh/wk for Acorn 4 up to 2.90kg/hh/wk for Acorn 1. Solely considering presenting households, the average amount of generated recycling was 3.91kg/hh/wk.

**Figure 13: Average Set Out for mixed recycling waste (%)**



**Figure 14: Average kerbside recycling waste generation rates (kg/hh/wk)**



## Compositional analysis of orange recycling sacks

This section looks at average amounts and composition of the orange recycling sacks presented by households sampled throughout Leicester. Hand sorting of the recycling waste gave concentration by weight figures for the fifteen main categories of waste as well as the more detailed sub-categories. Results can again be expressed in terms of percentage concentration and kg/hh/wk for individual samples and in relation to the household Acorn type surveyed. Table 18 and Figure 15 show orange sack recycling data in terms of percentage composition with Table 19 and Figure 16 showing generation rates for major materials in kg/hh/wk across all households in each sample area.

As residual waste will contain a proportion that is classified as recyclable; then recycling waste will contain a fraction that is deemed to contamination. That is to say that it is not compatible with the materials currently acceptable to the recycling container it is placed into.

**Table 18: Composition of orange sack recycling (% concentration) by Acorn**

ORANGE SACK RECYCLING (%)	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
RECYCLABLE PAPER	33.05%	20.48%	20.30%	21.70%	34.47%	27.27%
RECYCLABLE CARD & CARDBOARD	16.07%	30.59%	22.03%	18.85%	14.77%	18.07%
RECYCLABLE PLASTIC FILM	2.82%	2.10%	3.04%	2.83%	2.60%	2.77%
RECYCLABLE PLASTIC BOTTLES & CONTAINERS	11.31%	13.24%	10.21%	11.74%	10.80%	11.05%
RECYCLABLE GLASS	21.05%	8.47%	28.94%	24.36%	22.31%	23.80%
RECYCLABLE METALS	4.51%	3.34%	4.19%	7.16%	4.31%	5.08%
RECYCLING SACKS	1.66%	1.73%	1.25%	1.74%	1.56%	1.56%
TOTAL ORANGE SACK RECYCLABLE	90.47%	79.95%	89.94%	88.39%	90.83%	89.60%
CONTAMINATION	9.53%	20.05%	10.06%	11.61%	9.17%	10.40%

Figure 15: Composition of orange sack recycling (%) by Acorn

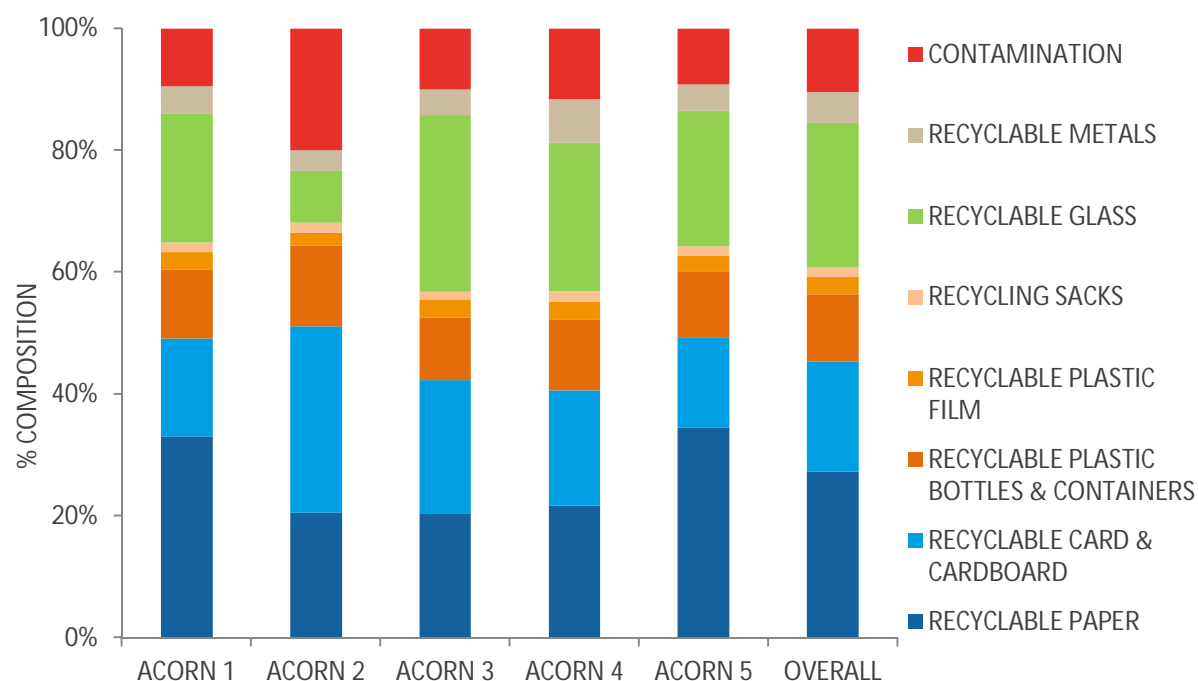
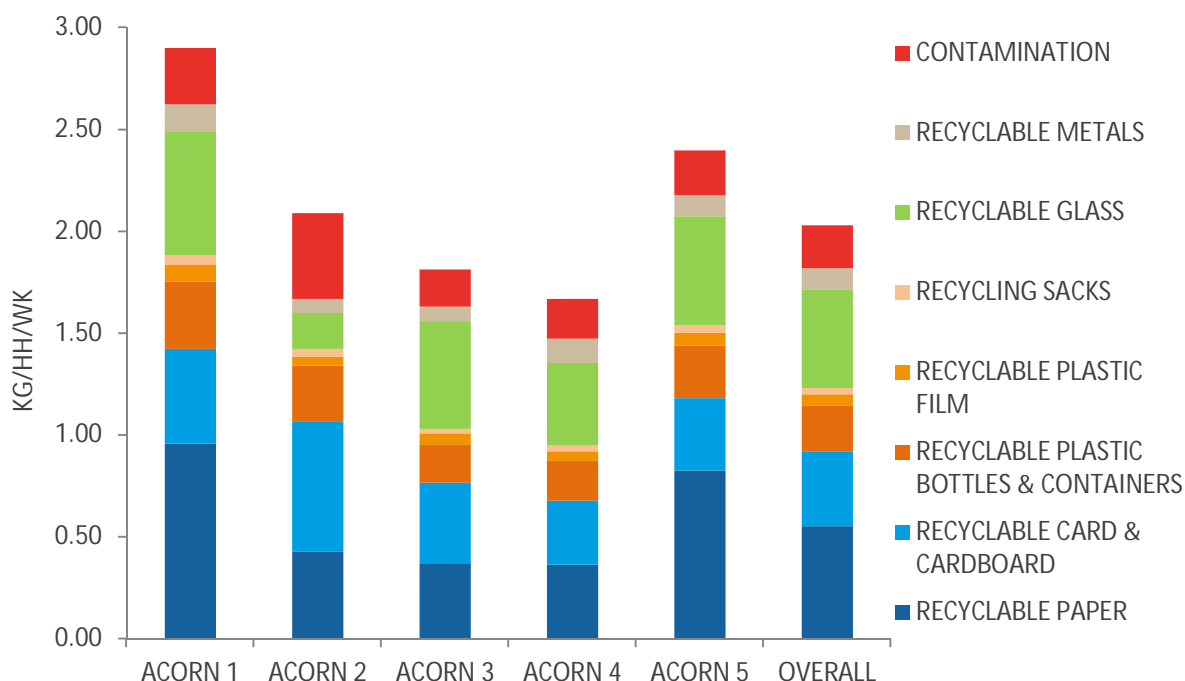


Table 19: Composition of orange sack recycling (kg/hh/wk) by Acorn

ORANGE SACK RECYCLING (KG/HH/WK)	ACORN 1	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
RECYCLABLE PAPER	0.96	0.43	0.37	0.36	0.83
RECYCLABLE CARD & CARDBOARD	0.47	0.64	0.40	0.31	0.35
RECYCLABLE PLASTIC FILM	0.08	0.04	0.06	0.05	0.06
RECYCLABLE PLASTIC BOTTLES & CONTAINERS	0.33	0.28	0.19	0.20	0.26
RECYCLABLE GLASS	0.61	0.18	0.52	0.41	0.53
RECYCLABLE METALS	0.13	0.07	0.08	0.12	0.10
RECYCLING SACKS	0.05	0.04	0.02	0.03	0.04
TOTAL ORANGE SACK RECYCLABLE	2.62	1.67	1.63	1.47	2.18
CONTAMINATION	0.28	0.42	0.18	0.19	0.22

Figure 16: Level of orange sack recycling (kg/hh/wk) by Acorn



This section looks in more detail at the individual materials placed out for orange sack recycling collections and highlights the effectiveness with which this scheme is capturing these items. Looking at the relationship between the residual and recycling waste streams presented will additionally give indications as to the overall diversion being achieved in the Leicester samples.

Table 20 summarises the capture rates seen for the range of materials collected in orange sacks. These figures are calculated by determining the distribution of recyclables across all waste streams for all households surveyed.

It can be seen that households are recycling an average of 61.0% of all the materials acceptable for orange sacks. Acorn 2 and 4 households recycled just over half whilst Acorns 1 and 3 managed to recycle over two thirds of those available.

Recyclable paper and glass were the most effectively captured with around three quarters of that disposed of placed into orange sacks.

Just over 62% of all the recyclable card and cardboard was correctly recycled along with 59.4% of plastic bottles.

Less than half (44%) of both recyclable metals and plastic containers were placed into orange sacks. Just 21% of recyclable plastic film was recycled.

**Table 20: Summary table for material capture rates (%) orange sack kerbside recycling**

% CORRECTLY RECYCLED IN ORANGE SACKS	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	AV.
RECYCLABLE PAPER	78.0%	62.5%	63.7%	62.8%	82.7%	73.0%
RECYCLABLE CARD & CARDBOARD	67.4%	64.3%	75.0%	50.3%	65.0%	62.0%
RECYCLABLE PLASTIC FILM	23.1%	10.5%	30.0%	16.5%	21.3%	20.7%
RECYCLABLE PLASTIC BOTTLES	74.4%	55.8%	70.1%	56.9%	54.4%	59.4%
RECYCLABLE PLASTIC CONTAINERS	51.1%	16.4%	39.9%	46.3%	45.1%	44.0%
RECYCLABLE GLASS	76.2%	51.3%	85.8%	67.4%	72.0%	73.7%
RECYCLABLE METALS	47.4%	32.1%	47.1%	43.4%	42.9%	43.9%
TOTAL ORANGE SACK RECYCLABLE	66.9%	50.1%	67.4%	52.8%	64.3%	61.0%

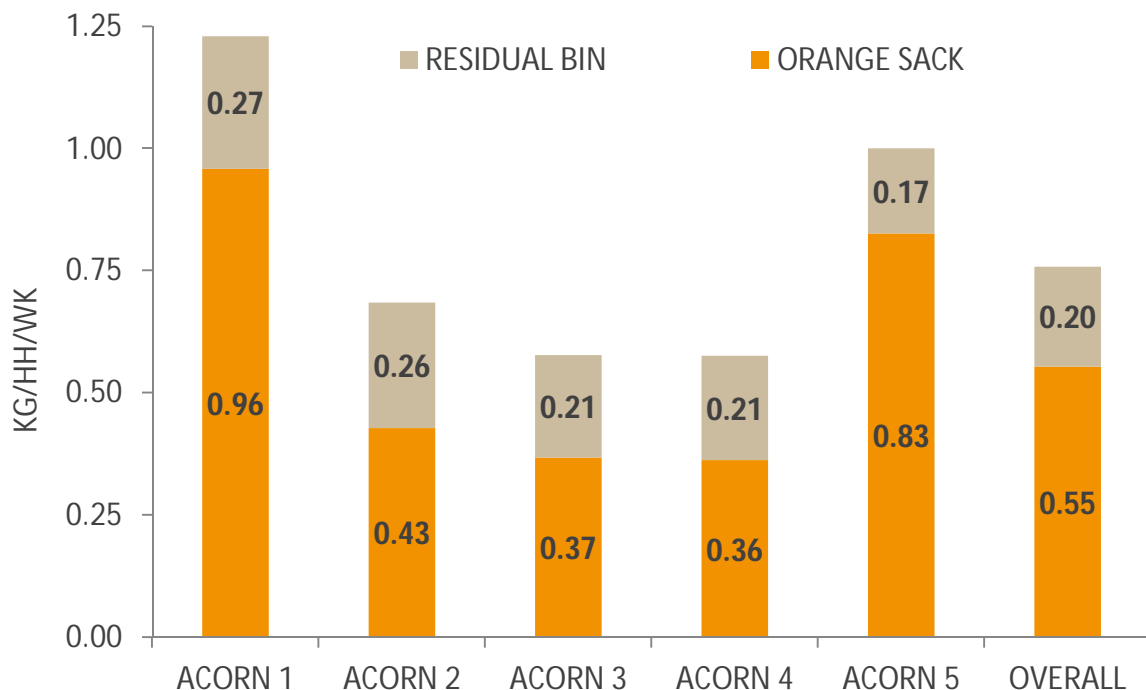
## Paper Capture

Acorn 5 residents captured the highest proportion of their recyclable paper with 82.7% correctly being recycled in orange sacks. Acorn 1 households also generated the most recyclable paper at 1.23kg/hh/wk. Residents in Acorn 2 areas captured the least at 62.5%, With Acorns 3 and 4 disposing of the smallest amount at 0.58kg/hh/wk.

Across Leicester it is estimated that 0.76kg/hh/wk of recyclable paper compatible with orange sacks is generated with around 73.0% being correctly recycled.

There are many different forms of paper and therefore decisions have to be made by residents as to whether a particular piece is to go into the recycling or residual waste. In all sample areas, the majority of all recyclable forms of paper are being correctly diverted. There is, however, around 0.20kg/hh/wk of potentially recyclable paper not disposed of in orange sacks. Figure 17 shows the distribution of recyclable paper throughout the residual and recycling waste by Acorn category.

**Figure 17: Distribution of recyclable paper within residual and recycling samples (kg/hh/wk)**

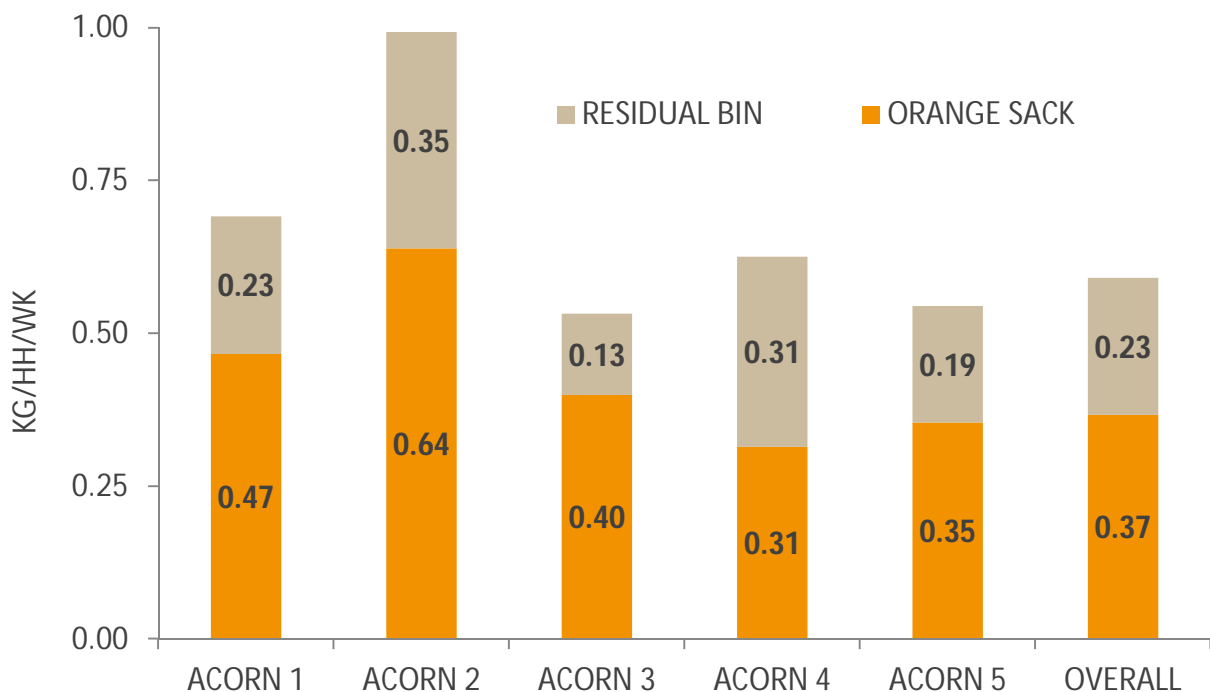


## Card & Cardboard Capture

Acorn 3 residents captured the highest proportion of their recyclable card & cardboard with 75.0% correctly being recycled; also generating the least of this waste at 0.53kg/hh/wk. Residents in Acorn 4 areas captured the least at 50.3% with Acorn 2 households generating almost 1.0kg/hh/wk of recyclable card & cardboard. Across Leicester it is estimated that 0.59kg/hh/wk of recyclable card & cardboard is generated with around 62.0% being correctly placed into (or alongside) orange sacks.

There are many different forms of card & cardboard and therefore decisions have to be made by residents as to whether a particular piece is to go into the recycling or residual waste. The majority of all recyclable forms of card & cardboard are being correctly diverted by the residents surveyed although there is around 0.23kg/hh/wk of potentially recyclable card & cardboard not being recycled. Results from this survey indicated that liquid cartons recycled most efficiently with 71.9% captured in orange sacks. In comparison 67.9% of corrugated cardboard is recycled along with 66.4% of thin card. Figure 18 shows the distribution of recyclable card & cardboard throughout the residual and recycling waste by Acorn category.

**Figure 18: Distribution of recyclable card within residual and kerbside recycling samples (kg/hh/wk)**



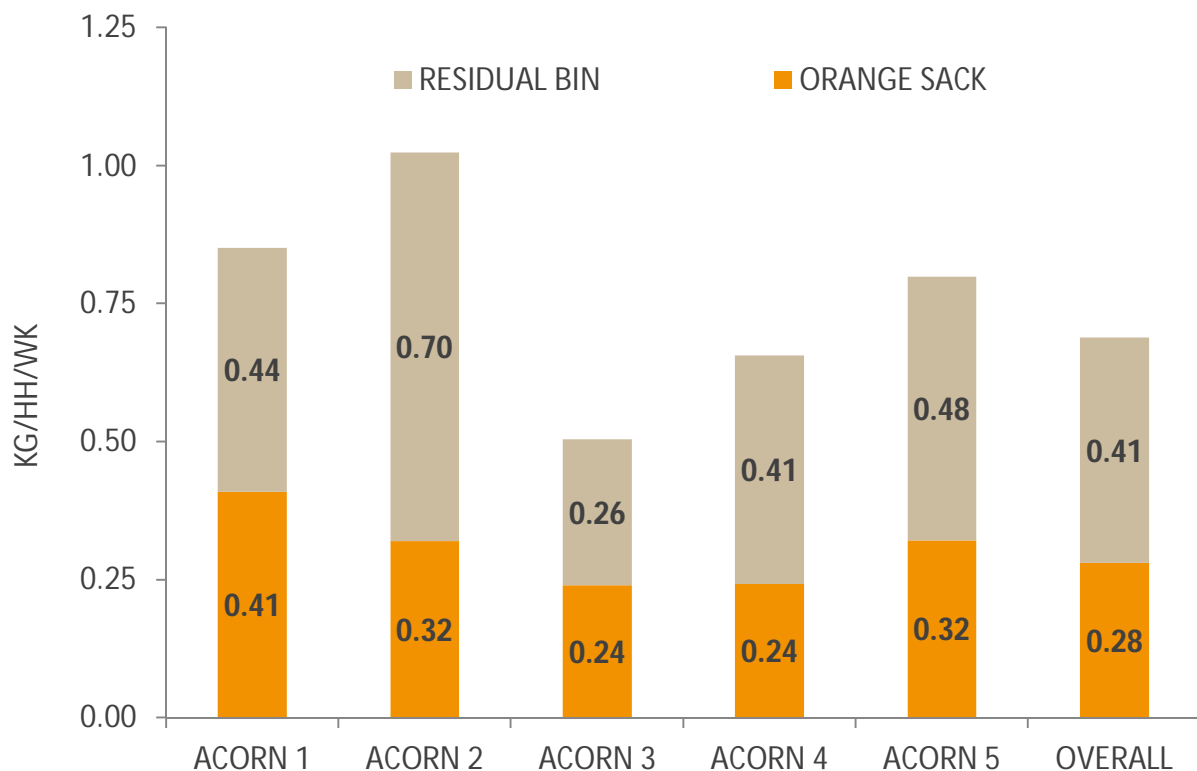
## Plastics Capture

Acorn 1 residents captured the highest proportion of their recyclable plastics with 48.2% correctly being recycled. Acorn 2 households generated the most at 1.02kg/hh/wk of this material but captured the lowest proportion at 31.3%. Across Leicester, it is estimated that 0.69kg/hh/wk of recyclable plastics are generated with around 40.7% being correctly placed into the orange sacks.

There are many different forms of plastic waste and therefore decisions have to be made by residents as to whether a particular piece is to go into the recycling or residual waste. The majority of all recyclable forms of plastic (0.41kg/hh/wk) remain unrecycled in residual bins.

Results from this survey indicated that plastic bottles are recycled most efficiently with 59.4% captured in orange sacks. All sample areas captured the majority of their plastic bottles. In comparison, just 44.0% of plastic containers and 20.7% of acceptable plastic film is recycled.

**Figure 19: Distribution of recyclable plastics within residual and kerbside recycling samples (kg/hh/wk)**



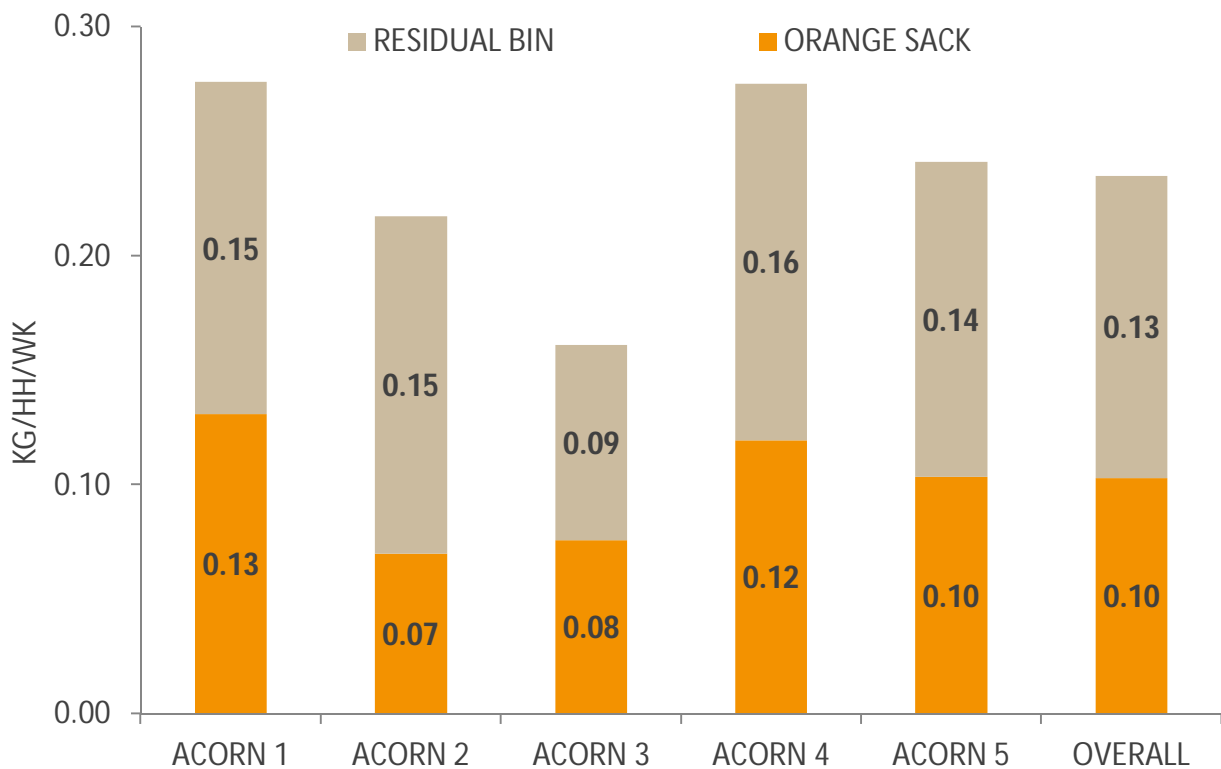


## Metals Capture

Acorn 1 residents captured the highest proportion of their recyclable metals with 47.4% correctly being recycled. They also generated the most at 0.28kg/hh/wk. Acorn 2 households captured less than a third (32.1) with Acorn 3 generating less than 0.16kg/hh/wk. On average, 43.9% of all recyclable metals are being correctly diverted by Leicester residents sampled with around 0.23/hh/wk being generated.

The majority of all recyclable forms of metal are not being correctly diverted by the residents surveyed with 0.13kg/hh/wk in residual bins. Results from this survey indicated that food tins are recycled most efficiently with 54.2% correctly captured. In comparison 43.0% of drink cans are recycled along with 39.9% of aerosols and just 19.6% of foil and other packaging. Figure 20 shows the distribution of recyclable metals throughout the residual and recycling waste by Acorn category.

**Figure 20: Distribution of recyclable metals within residual and kerbside recycling samples (kg/hh/wk)**

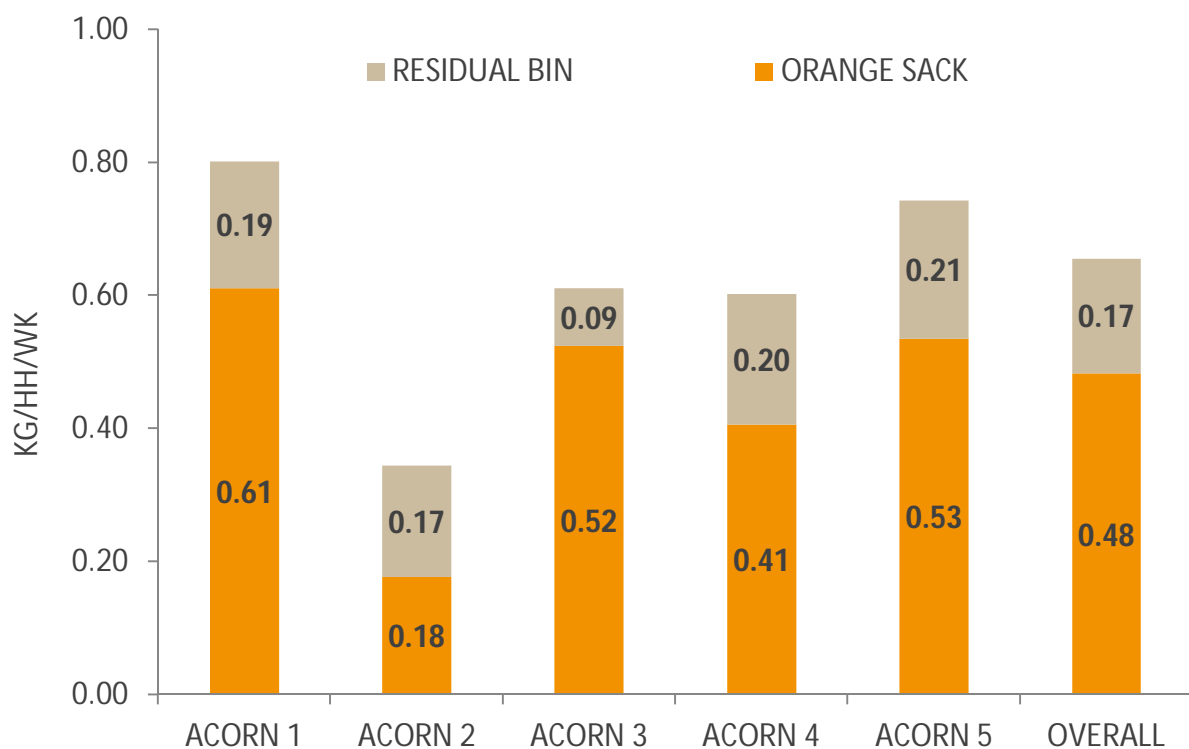


## Glass Capture

Acorn 3 residents captured the highest proportion of their recyclable glass with 85.8% correctly being recycled, while residents from Acorn 2 captured 51.3%. Acorn 1 users produced the most recyclable glass in their combined kerbside waste at 0.80kg/hh/wk compared with 0.34kg/hh/wk from Acorn 2. On average, 73.7% of all recyclable glass is being correctly diverted by Leicester residents sampled with around 0.66kg/hh/wk being generated.

The majority of all recyclable forms of glass are being correctly diverted by the residents surveyed with 0.17kg/hh/wk remaining in the residual waste. Results from this survey indicated that glass bottles are recycled most efficiently with 77.6% correctly captured compared with 57.9% of glass jars. Whereas bottles tend mainly to contain liquids that leave the bottle clean once empty; jars often contain sauces and preserves etc. These require cleaning once empty which often impacts on the efficiency of recycling. Figure 21 shows the distribution of recyclable glass throughout the residual and kerbside recycling waste.

**Figure 21: Distribution of recyclable glass within residual and kerbside recycling samples (kg/hh/wk)**



## Recycling Contamination

Table 21 shows that on average 0.21kg/hh/wk of the items present in orange recycling sacks are made up of contamination. This equates to around 10.4%. This section looks to breakdown the amounts and concentrations of various contaminants being placed into the orange recycling sacks in Leicester,

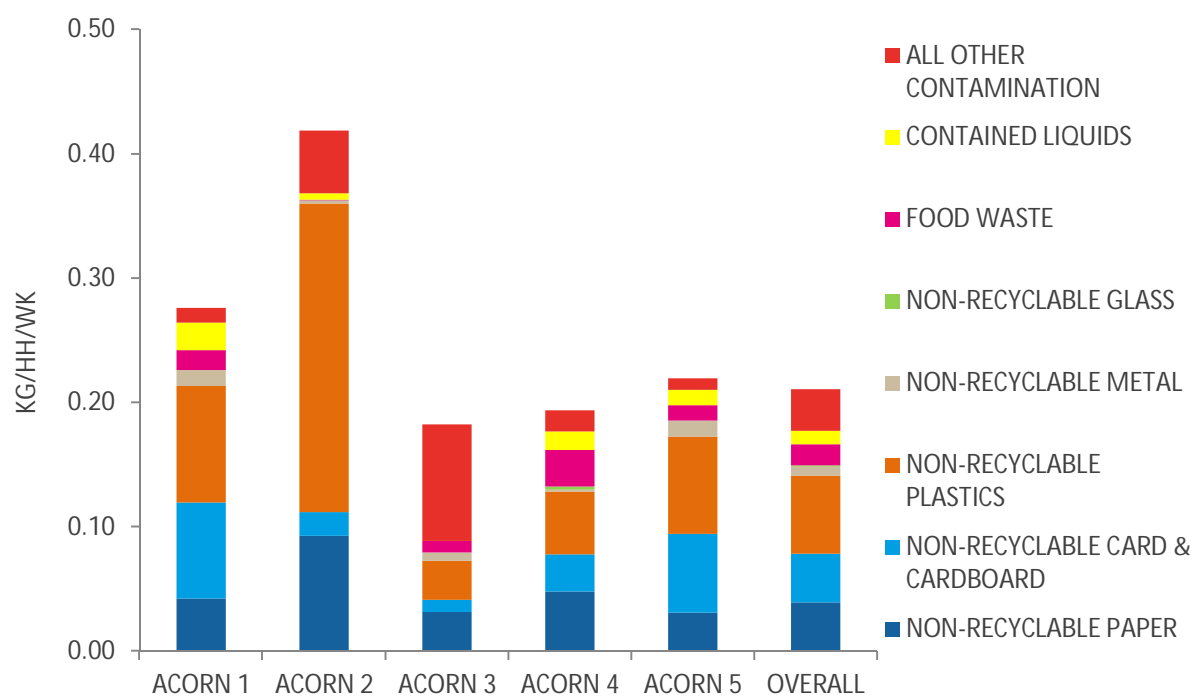
Some forms of contamination may be due to residents' lack of knowledge in relation to the recycling scheme. For example a householder may be unable to differentiate between various types of plastic film. Other contamination will be formed from waste that is totally unrelated to the materials collected (i.e. disposable nappies, wood or food waste). Table 21 and Figure 22 show the amounts of contamination materials recovered from the orange recycling sacks.

Across the samples the collected recycling contained between 0.18kg/hh/wk (Acorn 3) and 0.42kg/hh/wk (Acorn 2) of contamination. Over a fifth of the recycling collected from Acorn 2 was deemed to be contamination.

Examples of non-recyclable forms of paper, card, plastic, metal and glass are shown under Tables 6 – 10. Over 5% of Acorn 3 recycling was due to other contamination. Almost half of this was due to disposable nappies with the remainder mainly due to tinned paint, clothing and batteries.

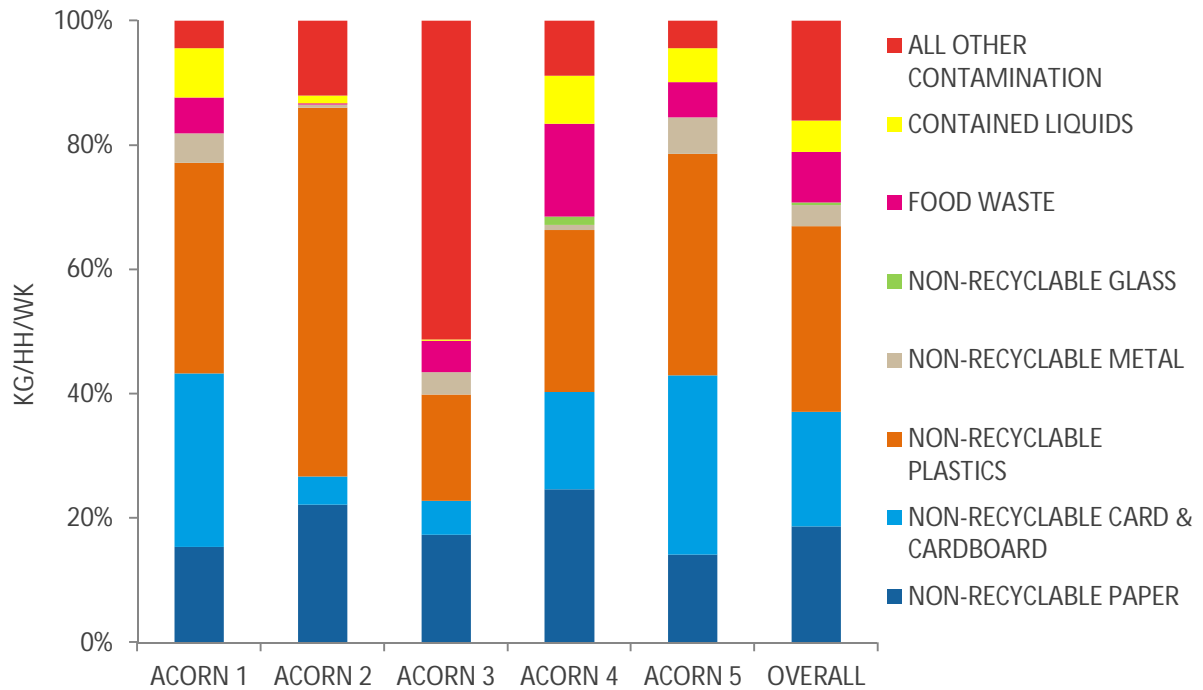
**Table 21: Unacceptable materials within orange recycling sacks (kg/hh/wk)**

ORANGE SACK CONTAMINATION (KG/HH/WK)	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
NON-RECYCLABLE PAPER	0.04	0.09	0.03	0.05	0.03	0.04
NON-RECYCLABLE CARD & CARDBOARD	0.08	0.02	0.01	0.03	0.06	0.04
NON-RECYCLABLE PLASTICS	0.09	0.25	0.03	0.05	0.08	0.06
NON-RECYCLABLE METAL	0.01	0.00	0.01	0.00	0.01	0.01
NON-RECYCLABLE GLASS	0.00	0.00	0.00	0.00	0.00	0.00
FOOD WASTE	0.02	0.00	0.01	0.03	0.01	0.02
CONTAINED LIQUIDS	0.02	0.01	0.00	0.02	0.01	0.01
ALL OTHER CONTAMINATION	0.01	0.05	0.09	0.02	0.01	0.03
<b>TOTAL CONTAMINATION</b>	<b>0.28</b>	<b>0.42</b>	<b>0.18</b>	<b>0.19</b>	<b>0.22</b>	<b>0.21</b>

**Figure 22: Breakdown of contamination materials present within orange recycling sacks (kg/hh/wk).****Table 22: Breakdown of orange sack contaminants (% of contamination)**

ORANGE SACK CONTAMINATION (%)	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	WEIGHTED AVERAGE
NON-RECYCLABLE PAPER	1.46%	4.45%	1.75%	2.87%	1.29%	1.94%
NON-RECYCLABLE CARD & CARDBOARD	2.66%	0.90%	0.55%	1.82%	2.65%	1.91%
NON-RECYCLABLE PLASTICS	3.23%	11.90%	1.72%	3.02%	3.26%	3.11%
NON-RECYCLABLE METAL	0.45%	0.11%	0.36%	0.10%	0.54%	0.35%
NON-RECYCLABLE GLASS	0.00%	0.00%	0.00%	0.15%	0.00%	0.04%
FOOD WASTE	0.55%	0.03%	0.51%	1.74%	0.52%	0.85%
CONTAINED LIQUIDS	0.75%	0.26%	0.02%	0.90%	0.50%	0.52%
ALL OTHER CONTAMINATION	0.42%	2.40%	5.16%	1.02%	0.40%	1.66%
<b>TOTAL CONTAMINATION</b>	<b>9.53%</b>	<b>20.05%</b>	<b>10.06%</b>	<b>11.61%</b>	<b>9.17%</b>	<b>10.40%</b>

Figure 23: Breakdown of contaminants present within orange recycling sacks (% of contamination).



- Overall, it was seen that the most prevalent single contaminant in the orange recycling sacks was non-recyclable paper and card, which formed around 37.1% of the contamination (0.08kg/hh/wk or 3.9% of recycling).
- Non-recyclable plastics made up 29.9% of the contamination; 3.1% of collected recycling.
- General residual material made up 16.0% of the contamination; and included textiles, nappies, wood and ceramics
- Food and drink waste contributed 13.2% of the contamination or 1.4% of the collected recycling.

## Overall Waste Generation & Diversion

### Total waste generation levels & diversion

Capture rates determine how much of a material that should be recycled actually is being recycled. Diversion rates show the percentage of total generated waste produced from an area that is being 'Diverted' via the available recycling stream(s). Table 23 and Figure 24 show the total waste generation (residual & dry recycling) for each of the areas sampled. Table 24 and Figure 25 show the overall proportion of material that is being correctly diverted. Acorn 3 produced the lowest levels of total waste at 7.52kg/hh/wk with the households from Acorn 1 generating the most at 14.46kg/hh/wk. Across Leicester it is estimated that the weekly output of kerbside is 9.97kg/hh/wk.

**Table 23: Average waste generation levels by Acorn (kg/hh/wk) and overall diversion**

TOTAL WASTE KG/HH/WK	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	AV.
RESIDUAL BIN	11.56	8.95	5.71	8.13	8.63	7.95
ORANGE SACKS	2.90	2.09	1.81	1.67	2.40	2.03
TOTAL	14.46	11.04	7.52	9.79	11.03	9.97

**Table 24: Overall % diversion by Acorn**

% DIVERSION RATES	ACORN 1	ACORN 2	ACORN 3	ACORN 4	ACORN 5	AV.
TOTAL DIVERSION	18.14%	15.12%	21.67%	15.05%	19.75%	18.22%

When combining the diversion achieved from all recycling streams (excluding garden collections which were not part of this survey) it is estimated that households within Leicester are diverting around 18.22% of their kerbside waste. This represents around 1.82kg/hh/wk of the 9.97kg/hh/wk being generated. Were all of the recyclable materials disposed of in the desired recycling container the maximum achievable diversion would be 29.7%. Data from this survey suggests a level of 415kg/hh/yr for residual waste and 520kg/hh/yr for total kerbside waste (excluding garden collections).

Figure 24: Total waste generation levels by Acom (kg/hh/wk)

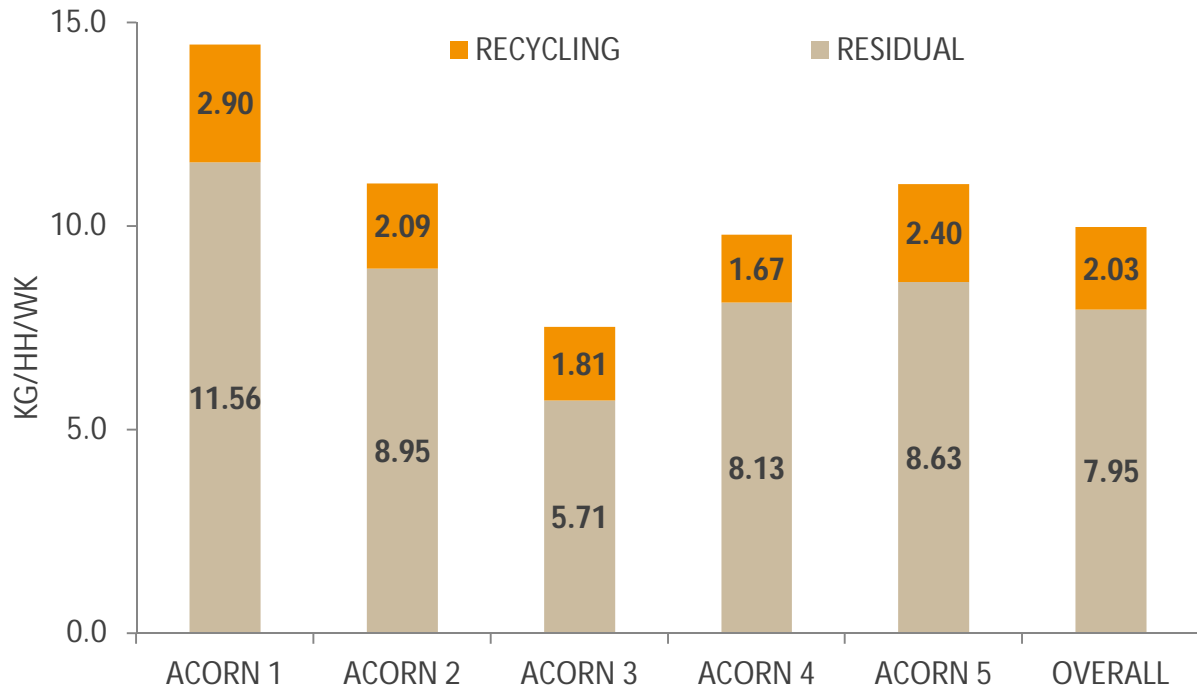


Figure 25: Overall % diversion by Acom

