

Report on kerbside household waste analysis and  
Sort It Centre residual waste analysis.

South Gloucestershire District Council

RF Project no:RF499

# Report on kerbside household waste analysis Sort It Centre residual waste analysis.

South Gloucestershire District Council

Prepared for Bruce Kent

RF project no: RF499

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## Executive summary

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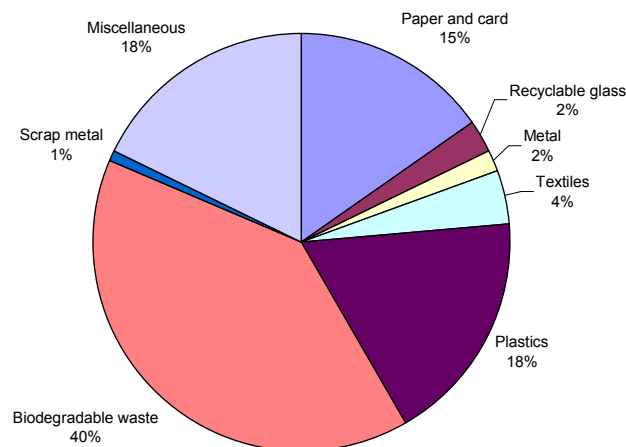
In October 2008 Resource Futures conducted the 11th phase of an ongoing composition study of kerbside residual waste on behalf of South Gloucestershire Council, in addition to auditing a sample of residual waste from the Thornbury Sort It Centre.

The research aimed to provide the authority with accurate and comprehensive data on quantities and composition of residual waste collected from the kerbside and the Sort it Centre in Thornbury.

The key findings from the study indicate the following:

### Kerbside residual waste

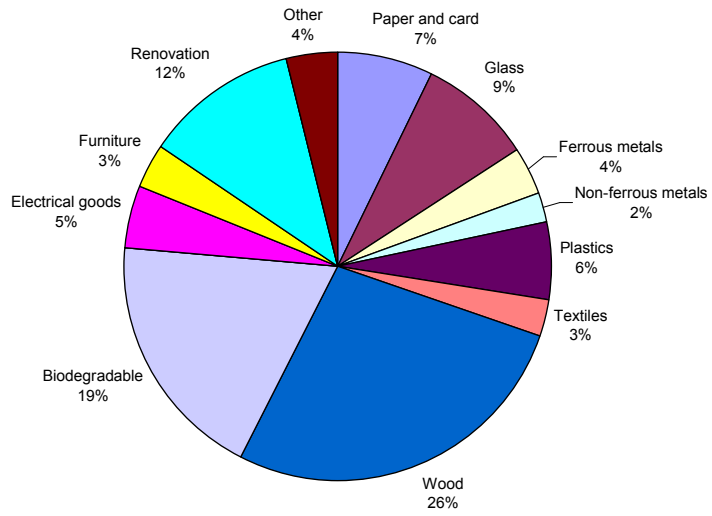
- A sample of 196 households stratified on the basis of Council Tax Bands was included in the study.
- During the study, 3,527kg of kerbside residual waste was sorted.
- The average kg per household per fortnight, weighted to reflect the population of the area, was 17.54 kg.



- Biodegradable waste accounted for 40% of the residual waste, plastics 18% and paper and card 15%.
- The average estimated volume of the contents of the wheelie bin at the point of collection was 83%.
- Following a weight:volume conversion exercise the estimated volume based on the average fortnightly composition was 185 litres/fortnight.

### Thornbury Sort It Centre

- 905 kg of residual waste was sorted.
- 72% of the waste was categorised as bulky, 4% as non bulky and 27% as black sack (figures have been rounded).
- 26% of waste was found to be wood and 19% was biodegradable waste.



## Introduction

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In October 2008, Resource Futures carried out the eleventh phase of an ongoing analysis of residual waste on behalf of South Gloucestershire District Council, with the aim of providing the local authority with accurate and comprehensive data on the quantity and composition of kerbside collected waste produced by households. The previous phases were carried out in July 2003, October 2003, January 2004, October 2004, March 2005, July 2005, October 2005, June 2006, October 2006 and November 2007. This report presents the research findings and analysis of the results.

Residents in South Gloucestershire are provided with three containers for collecting waste; a 240 litre black wheeled bin for general household residual waste, a green 240 litre wheeled bin for garden waste and cardboard and a 55 litre box for kerbside recycling. Residual waste is collected fortnightly with garden and dry recyclables being collected on the alternate week. It was not within the scope of the study to include the garden waste or dry recyclable materials in the analysis.

## 1. Methodology

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The sample was selected by the client and included households not included in previous audits. The sampling strategy was slightly different in this phase compared with that employed previously. In this phase the aim was to obtain a stratified sample based on Council Tax bands, obtaining approximately 25 households from each band.

Table 1 indicates the make up of the population of South Gloucestershire according to council tax band and indicates the number of households from each band selected for analysis. The list of areas included in the analysis is available in Appendix 1.

**Table 1: Population of South Gloucestershire according to council tax band**

Council Tax Band	Band A	Band B	Band C	Band D	Band E	Band F	Band G	Band H	Total
Percentage of population	11%	30.3%	23.9%	17.8%	10.2%	4.9%	1.7%	0.2%	100%

### 1.1 Sample collection method

The residual waste from the selected households was collected separately from the usual collection round. At the point of collection an estimate of the percentage bin fullness was made and noted on the collection sheet. Resource Futures staff conducted the collections with assistance from Council officers. Refuse was collected from approximately 30 households per day and taken to the Sort It Centre in Thornbury for analysis. Resource Futures would like to thank the Sort It staff for their co-operation and assistance.

### 1.2 Sort methodology

The waste collected from households was hand sorted into the agreed categories by a team of five Resource Futures staff. The waste was analysed on the day of collection to minimise the absorption of the liquid content of the waste stream by porous materials such as paper. Weights were obtained for each category of material using digitally calibrated scales. A description of the sort categories used in the analysis is available in Appendix 2. The definitions for the category list were prescribed by the client, based on providing them with information that will inform their future planning decisions.

## 2. Results

For detailed tables of results please see the separate Excel file.

In total waste was collected from 196 households during the course of the study.

**Table 2: Number of households included in the sample**

Council Tax Band	Band A	Band B	Band C	Band D	Band E	Band F	Band G	Band H	Total
Number of households	24	27	29	29	30	24	27	6	196

In total 3,527 kg of residual waste was sorted. An average fortnightly household arising of 18.0 kg/hh/fn was calculated from the audited data.

### 2.1 Weighted data to be representative of the whole district

The data was weighted by Council tax band; the weighted fortnightly figure was calculated as 17.54 kg/hh/fn. As can be seen this is very similar to the straight average worked out from the audited data. However, as the weighted data takes account of the proportion of Council Tax bands across the authority, the following summary combined data will be based on the weighted data set.

In the combined weighted data paper and card accounted for 15%, plastics 18% and biodegradable waste 40% of the waste.

**Figure 1: Weighted data representative of the authority percentage composition**

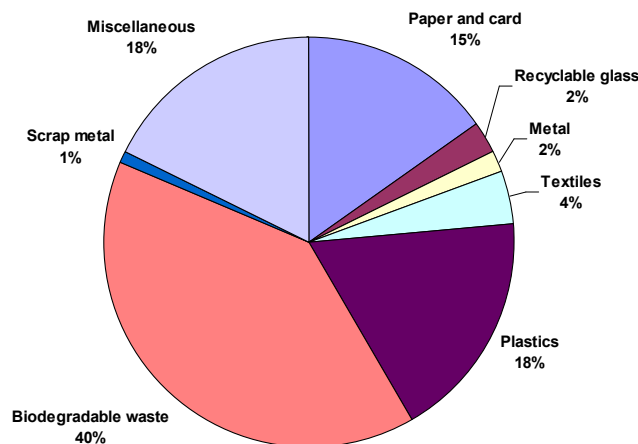


Figure 2 illustrates the detailed composition of the paper and card portion of the residual waste stream. It shows that over half (52%) of this material could be recycled (this accounts for 8% of the total residual waste).

**Figure 2: Percentage composition breakdown of the paper and card element of the residual waste stream**

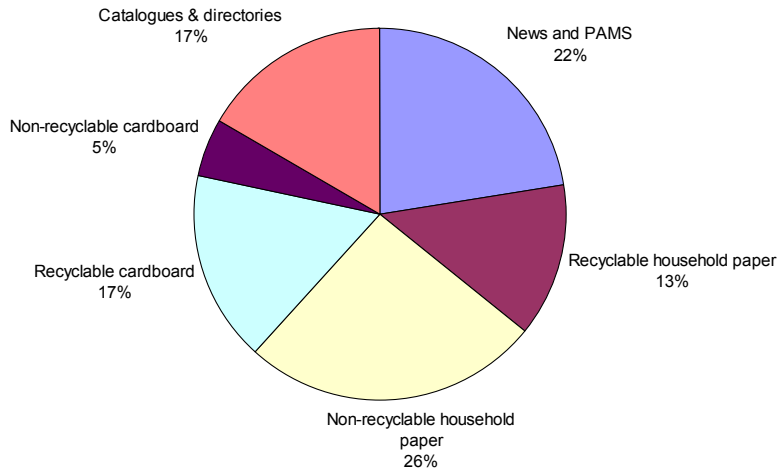


Figure 3 shows the breakdown of the recyclable glass in the residual waste stream. It shows the prevalence of clear glass remaining in the residual waste; however, recyclable glass only accounted for 2% of the residual waste stream.

**Figure 3: Percentage composition breakdown of the glass element of the residual waste stream**

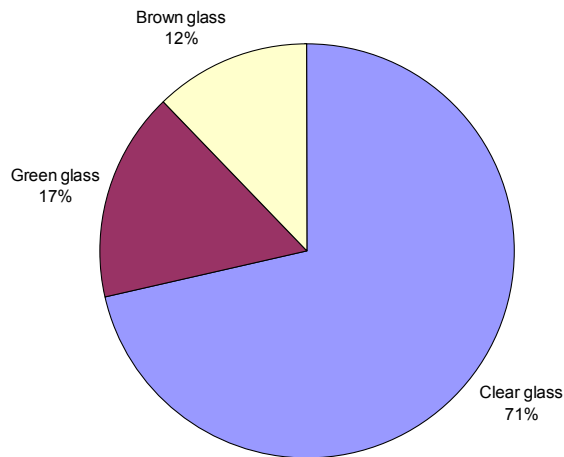


Figure 4 illustrates the breakdown of the recyclable metals in the residual waste. It clearly shows that 48% was made up of steel cans, which are predominantly food cans. Again, it should be noted that recyclable metals only made up 2% of the residual waste stream.

**Figure 4: Percentage composition breakdown of the metal element of the residual waste stream**

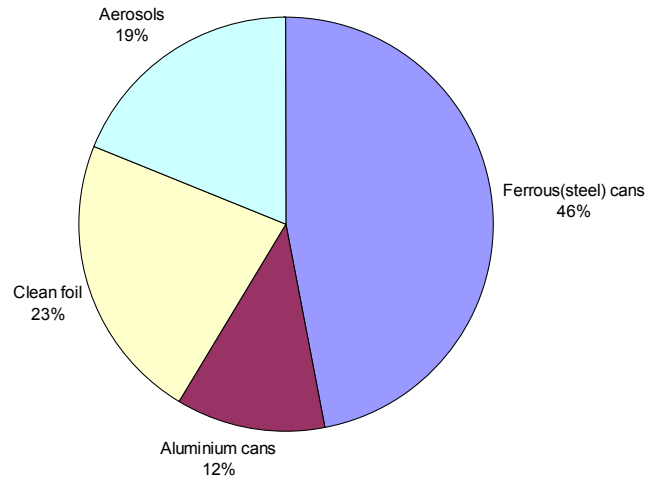


Figure 5 shows the proportions of different plastics in the residual waste, and shows that 23% of the plastics are potentially recyclable (bottles). This accounts for 4.8% of the overall residual waste stream.

**Figure 5: Percentage composition breakdown of the plastics element of the residual waste stream**

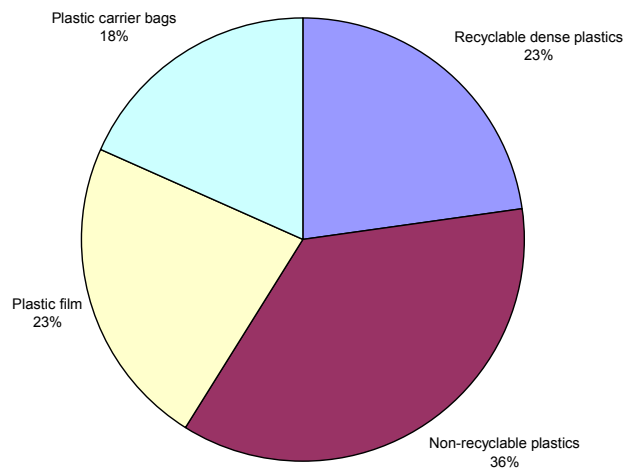
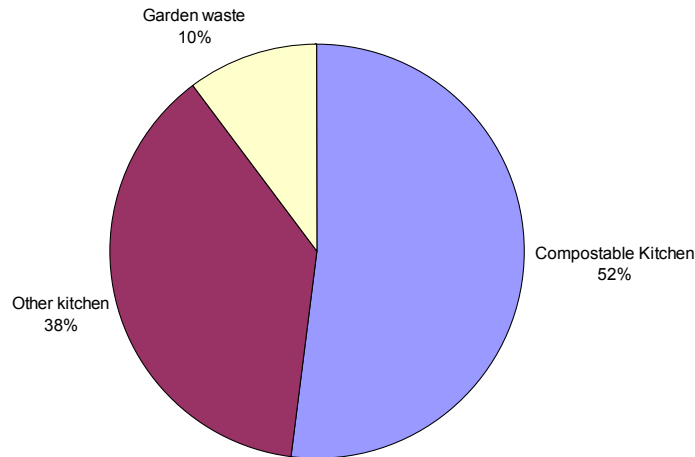


Figure 6 shows the breakdown of the biodegradable element of the residual waste. It shows that 52% is compostable kitchen waste (peelings etc.) and 38% is other kitchen waste (meat, cooked food etc). The compostable part of the kitchen waste accounts for 20.7% of all residual waste.

**Figure 6: Percentage composition breakdown of the biodegradable element of the residual waste stream**



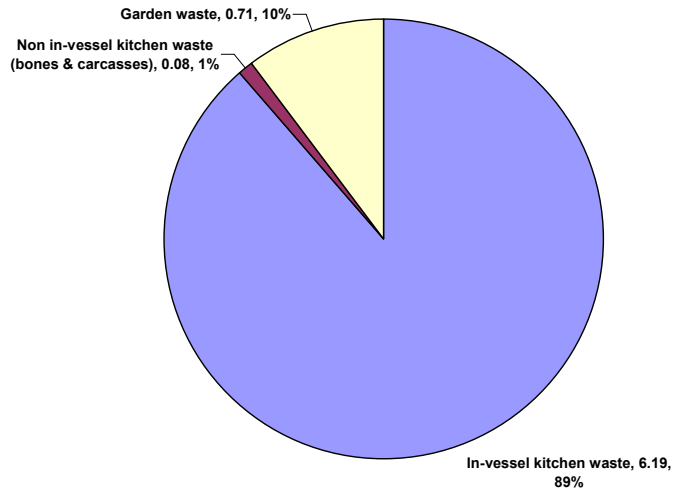
Previously, (Oct 2006) at the request of the client, the amount of bones and carcasses was recorded separately, in the 2006 report this was categorised as non in-vessel kitchen waste. All other kitchen waste, whether it was cooked, raw or dairy etc. was categorised as in-vessel kitchen waste. The non in-vessel kitchen waste category of material is part of the 'other kitchen' waste in Figure 6 above. The 2008 total kitchen waste data has been proportioned to the same amount of non in-vessel kitchen waste as 2006, and the data is shown in Table 3 and Figure 7.

**Table 3: the split of kitchen organics showing non in-vessel material**

	kg/hh/fn	% organics
In-vessel kitchen waste	6.19	89%
Non in-vessel kitchen waste (bones & carcasses)	0.08	1%
Garden waste	0.71	10%
<b>Combined organics</b>	<b>6.98</b>	

Figure 7 shows the split of organics when non in-vessel (bones and carcasses) are shown separately to all other kitchen organic waste. The data is in kg/hh/fn and as a percentage of total organics (including garden waste).

**Figure 7: the split of kitchen organics showing non in-vessel material**



## 2.2 Results from the volume analysis

### 2.2.1 Collected bins estimated volume of contents

At the point of collection an estimate was made on how full the bin was (i.e. 25% full, 75% full, 100% full etc). The average figure for the whole sample (omitting the few samples that were collected from either 360 litre or 140 litre bins) was 83% full at the time of collection. There were seven 140 litre bins collected over the course of the research, often in conjunction with the 240 litre containers. On average these were 88% full at time of collection. It should be noted that the estimate is based on a rudimentary visual estimate.

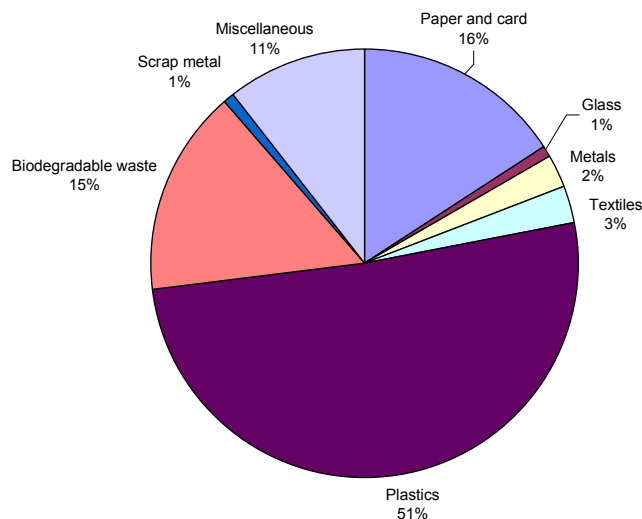
### 2.2.2 Volume:weight calculations

As an addition to the weight-based analysis, Resource Futures carried out weigh offs of materials in 55 litre kerbside boxes and 240 litre wheeled bins, noting the estimated percentage fullness of the containers. This was to produce weight to volume ratios. Due to the nature of the exercise and the material the results are only an approximation. It should be noted that the estimates are made on percentage fullness following a rudimentary visual estimation of the containers. As we are dealing with material that is not uniform in shape, a visual estimate of container fullness is likely to return an over estimate.

The conversion factors (expressed as kg per litre of material) are shown along with average fortnightly household arisings in Table 4 below.

The conversion to volume using these ratios suggests that a typical household produces 185 litres of residual waste per fortnight (reasonably in line with the 199 litre estimate taken from observation of the 240 litre bins). When the composition by volume is viewed as a pie chart (Figure 7), it looks very different from the waste composition by weight. Plastics account for around 51 per cent of the residual waste volume, while food and garden waste combined account for only around 15 per cent<sup>1</sup>.

**Figure 8: Percentage composition based on volume estimate**



<sup>1</sup> The data provided refers to the volume of uncompacted material only. Compaction in an RCV would change the relative volumes calculated in this report, as some materials (plastic bottles, cans) lose far more volume upon compaction than others, such as paper and food waste. It should also be borne in mind that such analysis will overstate the actual "containment volume" of a typical bin, as it takes no account of interstitial material occupying spaces between larger objects and the weigh off occurs following a sorting separation process.

The following table sets out the summary results from the research.

**Table 4: Summary weight:volume measurements**

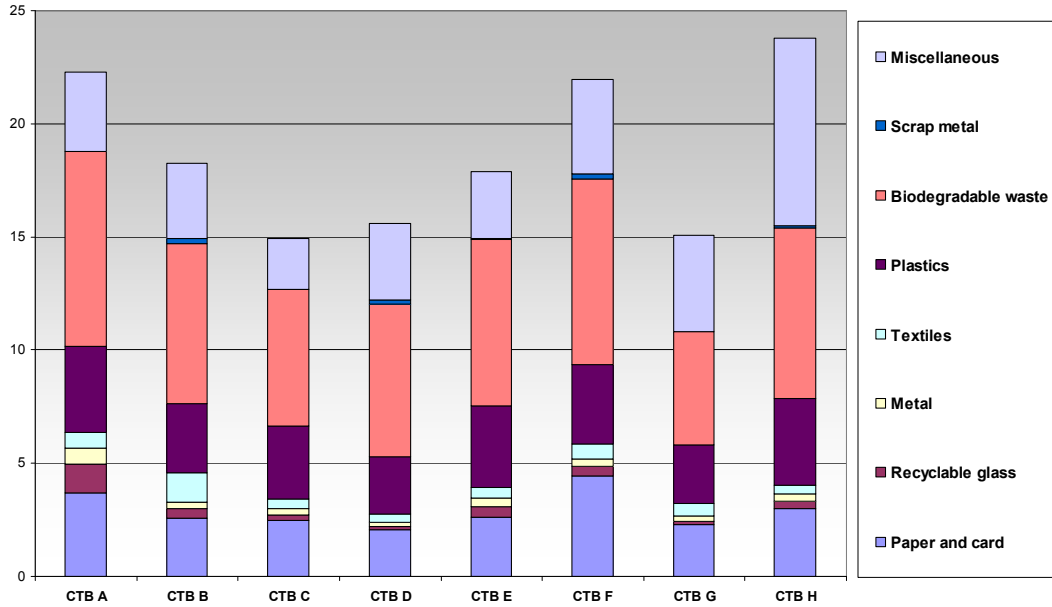
	Number of readings	Average kg/liter	kg/hh/fn	Volume Litres
News and PAMS	8	0.2	0.6	3.1
Recyclable household paper	11	0.1	0.4	3.0
Non-recyclable household paper	13	0.1	0.7	7.4
Recyclable cardboard	9	0.0	0.4	10.5
Non-recyclable cardboard	7	0.0	0.1	4.1
Catalogues & directories	6	0.3	0.4	1.4
<b>Sub-total paper and card</b>			<b>2.7</b>	<b>29.4</b>
Clear glass	3	0.3	0.3	0.9
Green glass	1	0.3	0.1	0.2
Brown glass	2	0.2	0.1	0.3
Mixed glass	1	0.3		
<b>Sub total glass</b>			<b>0.4</b>	<b>1.4</b>
Ferrous(steel) cans	8	0.1	0.1	1.9
Aluminium cans	6	0.1	0.0	0.7
Clean foil	7	0.1	0.1	1.2
Aerosols	5	0.1	0.1	0.6
<b>Sub total glass</b>			<b>0.3</b>	<b>4.4</b>
Textiles/Shoes	10	0.1	0.7	5.5
<b>Sub total textiles</b>			<b>0.7</b>	<b>5.5</b>
Recyclable dense plastics	14	0.0	0.8	21.0
Non-recyclable plastics	17	0.0	1.1	37.5
Plastic film	10	0.0	0.9	27.0
Plastic carrier bags	9	0.0	0.4	8.9
<b>Sub total plastics</b>			<b>3.1</b>	<b>94.4</b>
Compostable Kitchen	28	0.3	3.6	13.5
Other kitchen	26	0.3	2.6	10.4
Garden waste	7	0.2	0.7	4.6
<b>Sub total biodegradable waste</b>			<b>7.0</b>	<b>28.5</b>
Scrap metal	1	0.1	0.1	1.4
<b>Sub total scrap metal</b>			<b>0.1</b>	<b>1.4</b>
Tetrapaks	4	0.1	0.1	1.5
Engine oil			0.0	
WEEE	3	0.1	0.2	1.0
Batteries	1	0.4	0.0	0.0
Jumble sale items			0.0	
Renovation waste	6	0.2	0.7	3.2
Nappies	8	0.2	1.1	4.3
Sanitary material	4	0.1	0.0	0.2
Non-recyclable glass	4	0.3	0.1	0.2
Multi-layer packaging	5	0.0	0.1	1.0
Animal waste	7	0.2	0.5	2.3
Miscellaneous other	2	0.2	0.3	1.3
Fines	4	0.1	0.1	0.8
<b>Sub total miscellaneous</b>	<b>48</b>	<b>0.2</b>	<b>3.1</b>	<b>19.7</b>
<b>Total</b>	257		<b>17.5</b>	<b>184.8</b>

\*Figures have been rounded to one decimal place.

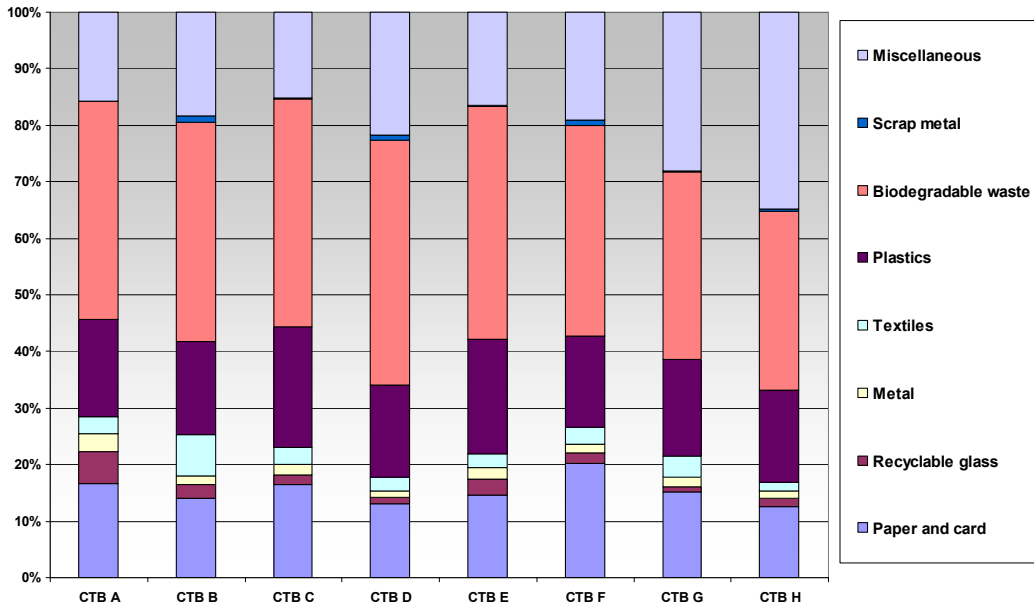
### 2.3 Average arisings by Council Tax Band

The figures below show arisings and percentage composition by Council Tax Band. While there is considerable difference between council tax bands, there is no clear pattern or trend to the data presented.

**Figure 9: Kg/hh/wk fortnightly residual arisings by Council Tax Band**



**Figure 10: Kg/hh/wk percentage composition fortnightly residual arisings by Council Tax Band**



## 2.4 Sort It Centre Residual Waste Composition

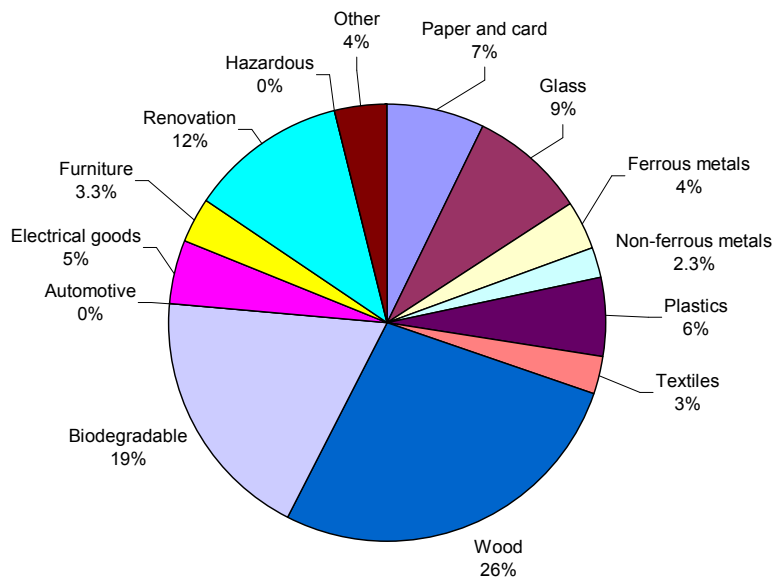
A team of Resource Futures staff spent one day analysing waste from the residual presented at the Thornbury SORT IT!\* Centre. This material was hand sorted in a three stage process:

- stage 1 - categorised and sorted bulky items (larger than a house brick)
- stage 2 - non bulky items (smaller than a household brick)
- stage 3 - black sack domestic type waste.

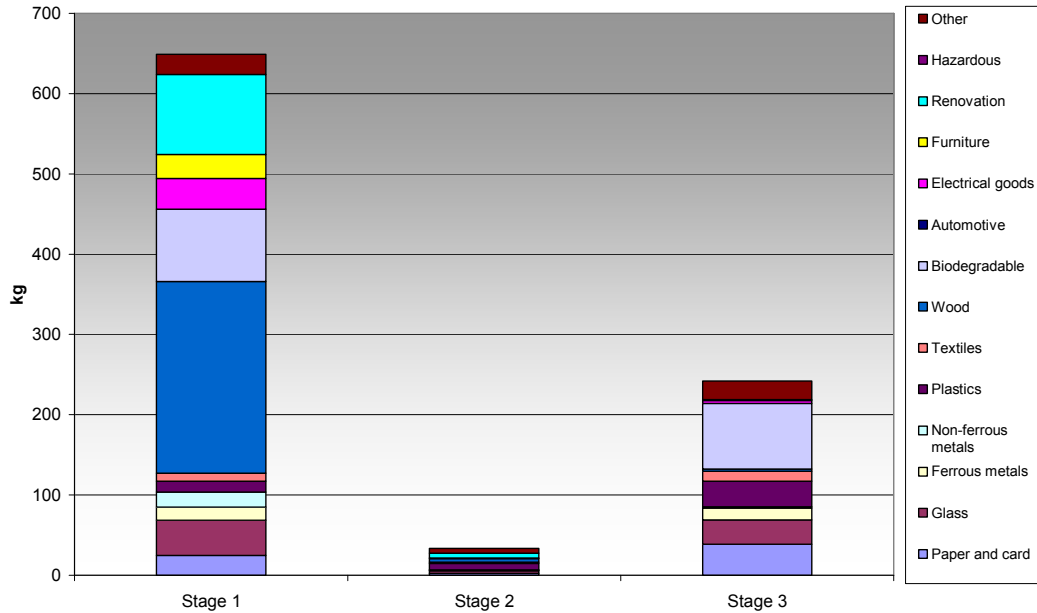
### 2.4.1 Results

In total 904.64 kg of residual waste from the Thornbury Sort It centre was categorised. 72% of the waste was categorised as bulky, 4% as non bulky and 27% as black sack (figures have been rounded).

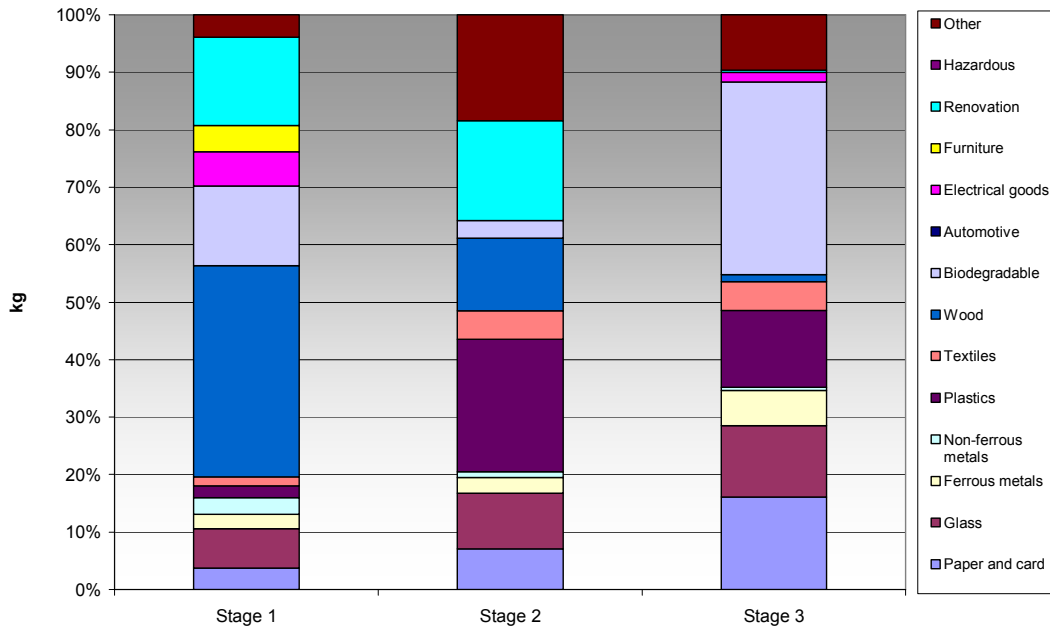
**Figure 11: Combined composition for residual waste from Thornbury Sort It Centre**



**Figure 12: Arisings by Stage from Thornbury Sort It Centre Residual Waste**



**Figure 13: Percentage composition of residual waste by Stage**



The figures above show that renovation and wood type waste accounted for 38% of the residual waste audited. Moreover, 19% of waste was biodegradable.

### 3. Key Findings

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The key findings from the study indicate the following:

#### **Kerbside residual waste**

- 196 households were included in the study. It was a stratified sample based on Council Tax Band.
- The average kg per household per fortnight, weighted to be representative of the District was 17.54 kg.
- Biodegradable waste accounted for 40% of the residual waste, plastics 18% and paper and card 15%.
- The average estimated volume of the contents of the wheelie bin at the point of collection was 83%.
- Following a weight:volume conversion exercise the estimated volume based on the average fortnightly composition was 185 litres/fortnight.

#### **Thornbury Sort It Centre**

- 904.64 kg of residual waste was sorted.
- 72% of the waste was categorised as bulky, 4% as non bulky and 27% as black sack (figures have been rounded).
- 26% of waste was found to be wood and 19% was biodegradable waste.