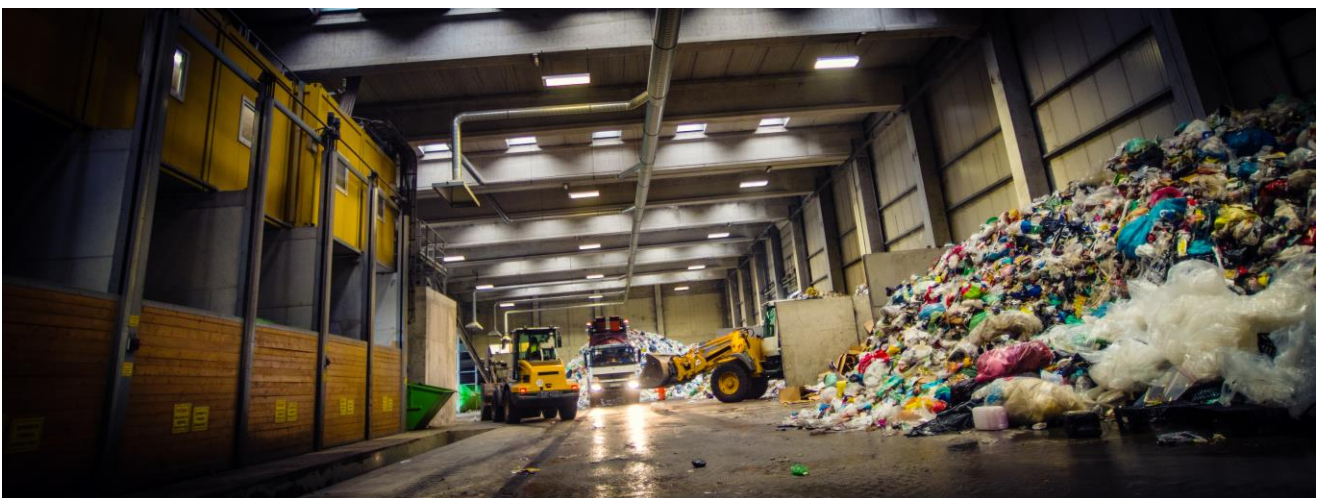


# NATIONAL MUNICIPAL COMMERCIAL WASTE COMPOSITION, ENGLAND 2017

This report presents compositional estimates for LA collected and non-LA collected municipal waste arising from commercial sector businesses in England in 2017.



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WRAP, 2019, National municipal commercial waste composition, England 2017,  
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## UK Local Authority Collected Waste Composition Estimates 2017

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## Glossary

LA	Local Authority
HWRC	Household Waste and Recycling Centre
WCA	Waste Compositional Analysis
WDF	WasteDataFlow
DRS	Deposit Return Scheme
C&I	Commercial and Industrial

## Acknowledgements

We would like to thank all of the local authorities, organisations and companies that provided waste compositional data to assist with this project. In particular, we would like to thank Resource Futures for their work on the compositional analysis of C&I waste.

# 1.0 Aims and Scope

This report presents composition and arisings estimates for materials in commercial waste that is similar in nature to household waste collected by both Local Authorities and through commercial collections arising from commercial sector businesses in England, for the calendar year 2017. The study forms part of a wider data synthesis project (RCY105-016)<sup>1</sup> which has estimated the quantity of a wide range of materials in the household residual waste and household recycling streams. It also follows on from previous work to establish the composition of local authority collected commercial waste in England for 2010/11.<sup>2</sup>

The objective of this study is to estimate the quantity of different materials in commercial municipal waste in England. The data will be used to support policy development, to track progress against pre- and post-EU exit policy goals, and to prepare for different EU exit scenarios.

The UK Government has adopted a definition of municipal waste that includes both household waste and waste from other sources that is similar in nature and composition. Under this definition, municipal waste includes a significant proportion of waste generated by businesses and not collected by local authorities. There is very limited information about such waste.

There is a growing interest in establishing a baseline for the quantity and types of materials entering the commercial municipal waste collection system for a number of reasons:

- *To support the nations of the UK in their pursuit of ambitious municipal waste recycling targets through the 2020s and 2030s.* An understanding of the most prevalent types of plastic in residual waste streams will help governments and local authorities better target interventions to meet these objectives.
- *To provide a baseline against which to monitor the impact of changes in manufacturers' and waste producers' practices.* Numerous changes are expected to arise, both as a result of new policy interventions, such as extended producer responsibility for packaging, and changes in the legal duties on businesses regarding their handling of the waste they produce.

It is important to note that, due to the shortcomings of the available data, there are a number of significant limitations to this analysis (see Section 2.3). Results should be treated as indicative and interpreted with caution.

<sup>1</sup> WRAP, 2019, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd

<sup>2</sup> Defra, EV0801, National compositional estimates for local authority collected waste and recycling in England, 2010/11, prepared by Resource Futures

## 2.0 Methodology

### 2.1 Total Commercial Municipal Arisings

A figure for total municipal waste arisings from commercial sector businesses in England for 2017 was not readily available. Therefore, a methodology was developed to estimate the total tonnes for:

- commercial municipal waste collected by local authorities (“LA-collected”); and
- commercial municipal waste collected by organisations other than local authorities (“non-LA collected”).

The following steps were taken, which are explained in more detail in Appendix 1:

1. 2016 commercial waste arisings, categorised by primary level material streams<sup>3</sup>, were obtained from Defra’s *UK Statistics on Waste*<sup>4</sup> and rescaled using the 2017 total arisings from the same dataset. This data included both municipal and non-municipal waste.
2. Non-municipal material was removed from total arisings to obtain an estimate of total **municipal** commercial waste arisings. This involved the application of several assumptions (e.g. the percentage of municipal waste in metallic waste categories).
3. An assumed 35% recycling rate (based on WRAP bottom up analysis)<sup>5</sup> was applied to provide an estimate of:
  - a) total commercial municipal residual arisings; and
  - b) total commercial municipal recycling arisings.
4. LA-collected commercial waste arisings for 2017 were extracted from WasteDataFlow (WDF) for both residual and recycling/reuse. Non-municipal material was removed (e.g. rubble, tyres, scrap metal other than metal packaging) to obtain an estimate of:
  - a) total LA-collected commercial municipal residual arisings; and
  - b) total LA-collected commercial municipal recycling arisings.

<sup>3</sup> See Appendix 3: for a full list of material categories.

<sup>4</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/784263/UK\\_Statistics\\_on\\_Waste\\_statistical\\_notice\\_March\\_2019\\_rev\\_FINAL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784263/UK_Statistics_on_Waste_statistical_notice_March_2019_rev_FINAL.pdf)

<sup>5</sup> [https://consult.defra.gov.uk/environmental-quality/consultation-on-consistency-in-household-and-busin/supporting\\_documents/recycleconsistencyconsultia.pdf](https://consult.defra.gov.uk/environmental-quality/consultation-on-consistency-in-household-and-busin/supporting_documents/recycleconsistencyconsultia.pdf) (page 29)

5. LA-collected residual arisings were subtracted from **total** residual arisings to leave non-LA collected residual arisings.
6. LA-collected recycling arisings were subtracted from **total** recycling arisings to leave non-LA collected recycling arisings.

The output of this analysis is presented in Table 1. A diagram of the above methodology is shown in Figure 1.

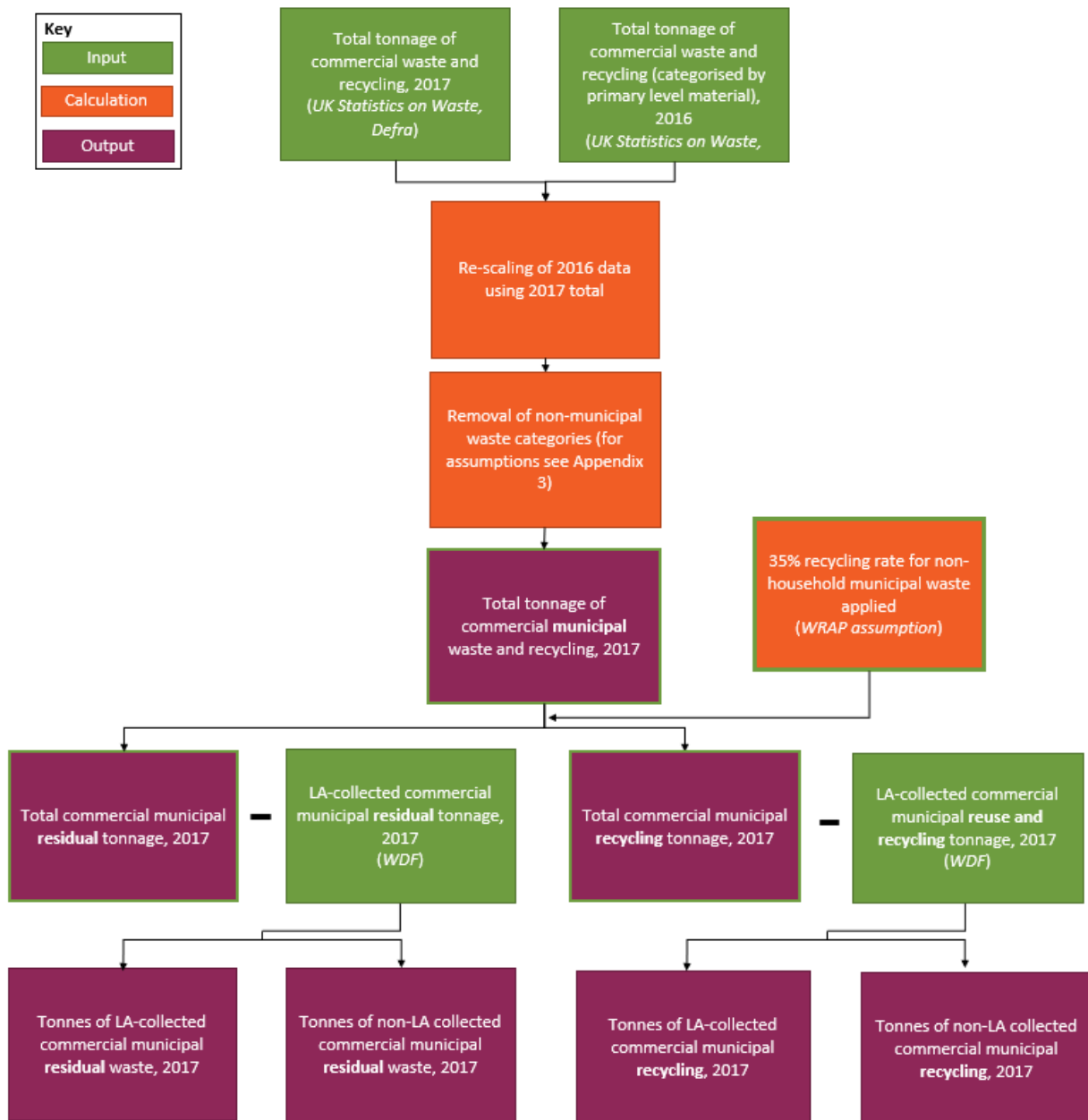
Table 1: Municipal waste arisings from commercial sector businesses in England, 2017 (tonnes)

Type of Waste	Tonnes
<b>Residual</b>	11,944,984
<i>LA-collected</i>	1,129,218
<i>Non-LA collected</i>	10,815,766
<b>Recycling</b>	6,431,914
<i>LA-collected</i>	135,652
<i>Non-LA collected</i>	6,296,263
<b>Total</b>	<b>18,376,899</b>

The data used to arrive at the arisings estimates was the best available at the time that the work was carried out. Several assumptions have been applied, as detailed in Appendix 1:. These include, for example, the assumptions used to strip out non-municipal material. While reliance on assumptions is unavoidable in this area, it is recognised that the results presented are only as reliable as the assumptions used. The limitations of the analysis are discussed further in section 2.3.



Figure 1: Diagram of the method used to estimate LA-collected and non-LA collected commercial municipal residual waste and recycling arisings, England, 2017



## 2.2 Composition of Commercial Municipal Residual Waste and Recycling

This section describes the data and methodology used to estimate the composition of:

- Overall commercial municipal residual waste and recycling, England, 2017
- LA-collected commercial municipal residual waste and recycling, England, 2017
- Non-LA collected commercial municipal residual waste and recycling, England, 2017

More detail on these aspects of the study is provided in Appendix 1.

### 2.2.1 Data

#### Residual Composition

WRAP commissioned Resource Futures to gather a sample of waste compositional analyses (WCAs) for commercial municipal residual waste collected in 2017. The outputs of that work were:

- An average composition for LA-collected commercial municipal residual waste; and
- An average composition for non-LA collected commercial municipal residual waste.

The data sources and methods used are described in the report *Compositional analysis of LA collected and non-LA collected non-household municipal waste (England)*

#### Recycling Composition

No new WCAs for commercial municipal recycling were available.

- The composition of LA-collected recycling was estimated by extracting tonnages from WDF, 2017. Materials that did not meet the definition of municipal waste were excluded from the analysis (e.g. rubble, tyres, most scrap metal).
- No data source comparable with WDF was available for non-LA collected commercial municipal recycling. An alternative methodology was therefore developed, which deduced the composition of this material from information regarding the overall composition of commercial waste and the composition of residual waste, referenced above – with material that is not found in the residual waste stream being assumed to be recycled.

Ideally, the commercial composition would have been presented using the same category list as in the 2017 national household waste composition estimates, but this was not possible. The

limited data available to produce a recycling composition estimate meant it was necessary to group together some of the material categories used in the report Compositional analysis of LA collected and non-LA collected non-household municipal waste (England) in their residual waste estimates so as to allow a consistent presentation of categories across residual and recycling. For example, it was necessary to group the “paper” and “card” categories together into a single combined “paper and card” category, because this combined category was used in some of the source data that was relied upon to produce the recycling estimate and no reliable source was available to disaggregate the combined figure.

However, some additional work has been done to reconcile the residual composition estimates with the category list used in the recent household composition estimates. This is presented in Appendix 4.

## 2.2.2 Methodology

### **Overall Composition (LA-collected and non-LA collected)**

The methodology used to estimate the composition of overall commercial municipal residual waste and recycling is shown in Figure 2. The main steps were as follows:

1. The overall composition of commercial municipal waste (i.e. LA-collected and non-LA collected; residual and recycling combined) was derived from two data sources:
  - a) The *Defra UK Statistics on Waste*<sup>6</sup> dataset (which was adjusted to provide 2017 arisings for non-municipal commercial waste, categorised into primary level material streams); and
  - b) LA-collected commercial waste composition from the *Updated compositional estimates for local authority collected waste and recycling in England, 2010/11 - EV0801*<sup>7</sup> study.
2. The Defra material categories were used as a starting point, as they provide the most up to date indication of overall commercial waste composition. However, the data uses relatively high-level categories and 40.3% of commercial waste reported in the Defra data was categorised as mixed waste (under the categories ‘Household & similar wastes’ and ‘Mixed & undifferentiated materials’). This mixed material was disaggregated by applying the 2010/11 LA-collected composition, as this was the most recent available composition that includes both residual waste and recycling. It also includes more detailed material categories than the Defra data. The disaggregated materials were then added into the relevant material

<sup>6</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/784263/UK\\_Statistics\\_on\\_Waste\\_statistical\\_notice\\_March\\_2019\\_rev\\_FINAL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784263/UK_Statistics_on_Waste_statistical_notice_March_2019_rev_FINAL.pdf)

<sup>7</sup> <http://randd.defra.gov.uk/Default.aspx?Module=More&Location=None&ProjectID=18237>

category within the *UK Statistics on Waste* data to produce total arisings by material type.

3. The composition of commercial municipal **residual** waste was estimated by applying the residual composition profiles for LA-collected and non-LA collected waste to the residual tonnages for each. The residual arisings per material category were summed to provide an overall residual composition profile (i.e. for LA-collected and non-LA collected combined).
4. The residual waste composition was deducted from the total composition, on a stream-by-stream basis. Any remaining arisings (i.e. the material **not** collected in the residual stream) were assumed to have been recycled.

### ***Adjustment***

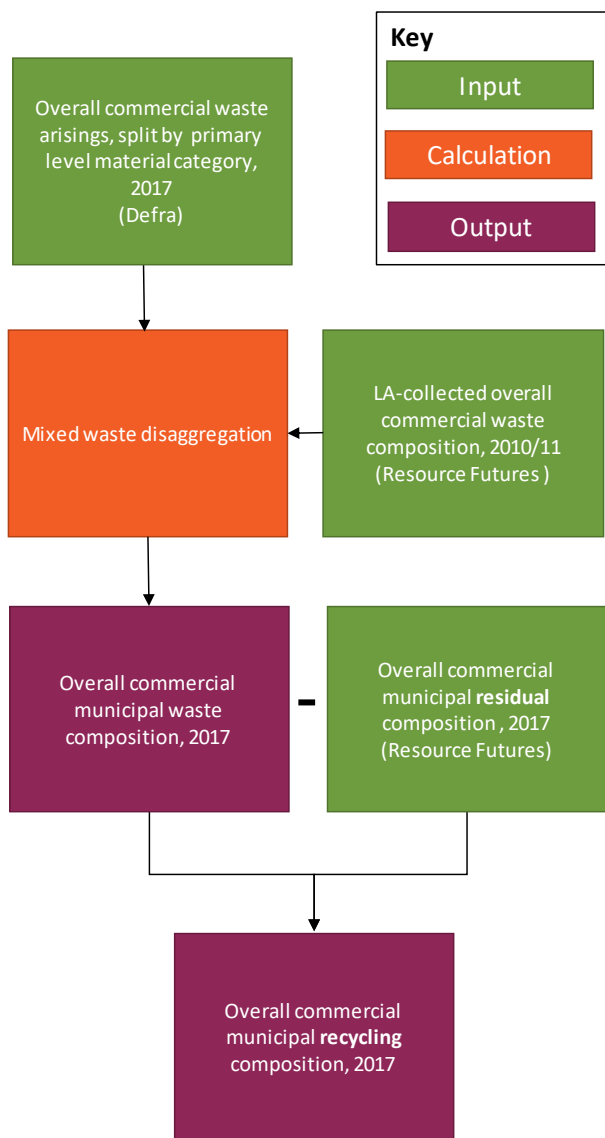
The methodology described above initially resulted in a negative number for plastics, textiles and hazardous waste arisings in the recycling stream. It is assumed this may be due to one or more of the following reasons:

- Textiles (167,552 tonnes, 0.9%) and hazardous waste (41,056 tonnes, 0.2%) are a small proportion of total arisings. This leaves relatively little margin for error and makes the estimates susceptible to sampling errors in the underlying compositional data.
- The arisings in the overall composition may be underestimated, either in the figures given by Defra in *UK Statistics on Waste*, or in the relatively old estimates (from 2010/11) used to disaggregate the mixed waste streams reported by Defra.
  - It is likely that the composition of commercial waste has changed somewhat in the period between 2010/11 and 2017. The composition of kerbside collected household waste has changed over the same period,<sup>8</sup> with a key trend highlighted in the household estimates report being a decline in paper arisings at the kerbside (3.9 percentage point decrease) and a substantial increase in card (2.5 percentage points) between 2010/11 and 2017. Notably, the increase in card arisings was not enough to offset the decline in paper arisings, and therefore arisings of ‘paper and card’ declined overall (both absolutely, and as a proportion of overall arisings). If this trend was mirrored in commercial waste over the same time period, it is possible that the paper and card arisings in the overall composition estimates are overstated, and other materials (such as plastics) are understated.
- The residual composition profiles produced by WRAP may have overestimated arisings of plastics, textiles and hazardous waste in the commercial residual waste stream.

<sup>8</sup> WRAP, 2019, Bristol, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd.

Additional analysis (explained further in Appendix 2:) was conducted in order to address this issue. The adjusted values are presented in the main results section; the unadjusted values are presented in Appendix 2:.

Figure 2: Diagram of methodology used to estimate the composition of overall commercial municipal residual waste and recycling, England, 2017



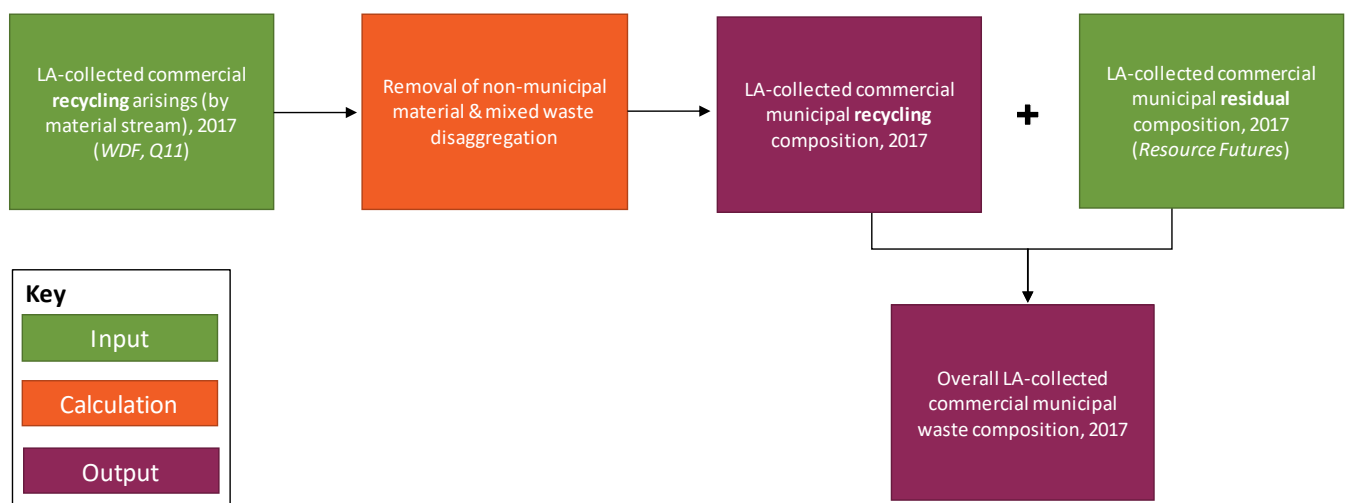
### LA-collected Composition

The methodology used to estimate the composition of LA-collected commercial municipal residual waste and recycling is shown in Figure 3. The main steps were as follows:

1. The LA-collected residual composition profile for 2017 was applied to the residual tonnages for LA-collected waste in order to produce estimates of residual arisings per material category.

2. The composition of LA-collected recycling was estimated by extracting information from question 11 of WDF. Materials that did not fall within the definition of municipal waste (e.g. rubble, tyres, most scrap metal) were excluded from the analysis.
  - a) The largest portion of the remaining material was recorded as mixed recycling; in addition, a minority of material was also recorded as mixed food and garden waste.
  - b) These mixed materials were disaggregated using the compositional assumptions developed for the 2017 household waste estimates.<sup>9</sup>
3. LA-collected residual arisings and recycling arisings were summed in order to produce an overall composition for LA-collected commercial municipal waste.

Figure 3: Diagram of methodology used to estimate the composition of LA-collected commercial municipal residual waste and recycling, England, 2017



### Non-LA Collected Composition

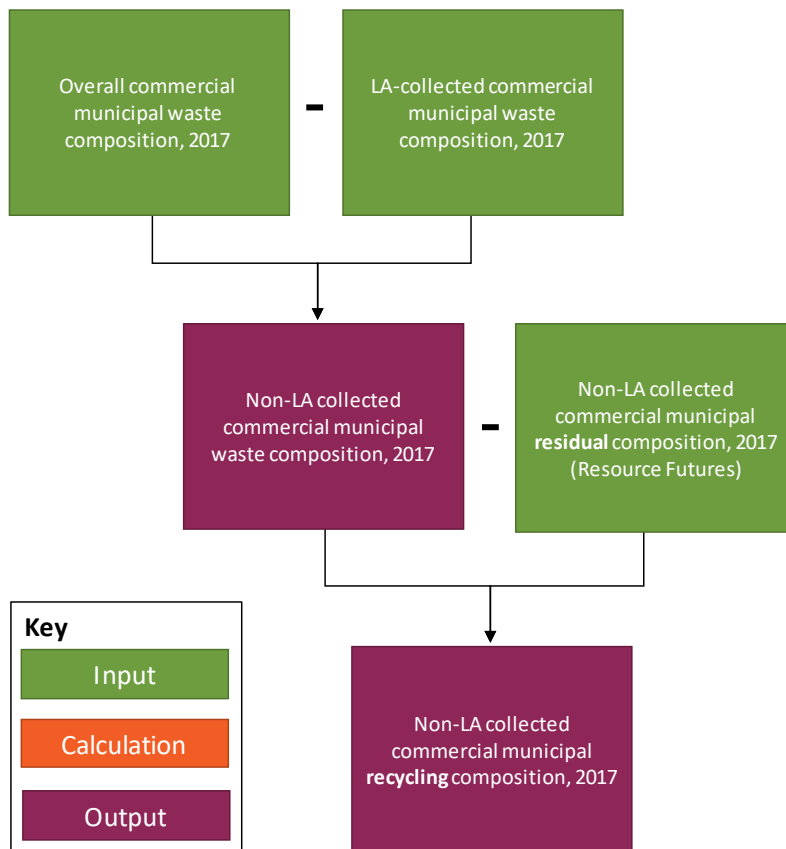
The methodology used to estimate the composition of non-LA collected commercial municipal residual waste and recycling is shown in Figure 4. It uses outputs from the previous stages of analysis in order to deduce the recycling composition. The main steps were as follows:

1. The overall composition for non-LA collected commercial municipal waste was calculated by subtracting the stream-by-stream estimates of waste collected by local authorities from the total commercial waste stream-by-stream estimates.

<sup>9</sup> WRAP, 2019, Bristol, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd.

2. The non-LA collected residual composition profile for 2017 was applied to the residual tonnages for non-LA collected waste in order to produce estimates of residual arisings per material category.
3. The recycling composition was estimated by subtracting the stream-by-stream estimates of residual waste from the overall non-LA collected composition.

Figure 4: Diagram of methodology used to estimate the composition of Non-LA collected commercial municipal residual waste and recycling, England, 2017



## 2.3 Limitations of the Analysis

There were several limitations to the analysis, which are likely to have impacted on the accuracy of the results:

- Despite recent refinements of Defra's estimates regarding commercial and industrial waste, the total tonnage of arisings remains a matter of some uncertainty.
- Defra waste arising data from 2016 (split into primary level material categories) was rescaled to Defra's 2017 total tonnage figure. There may have been changes in the overall composition of this waste between 2016 and 2017, which have not been accounted for in the analysis.
- A large proportion (40%) of arisings reported in the Defra data were categorised as mixed waste streams. This material was disaggregated based on reference composition data from 2010/11 for LA-collected commercial waste. The composition of commercial waste may have changed in the years since 2010/11 (especially given that the composition of kerbside collected waste has changed over the same time period).<sup>10</sup> Data derived from analysis of LA-collected waste may not be representative of all commercial municipal waste; for example, given the customer base of local authority commercial waste collections, it may disproportionately reflect the composition of waste from smaller businesses, which may differ from larger businesses.
- A number of assumptions were required in order to strip out non-municipal waste from the Defra data. There was a lack of published evidence available to inform these assumptions, and the 2010/11 reference data was used as a guide as to what approach might be reasonable assumptions.
- The 35% recycling rate applied to the overall commercial tonnage, while based on ongoing WRAP bottom-up analysis, is not robust.<sup>11</sup> Recognising the uncertainty over the figure, WRAP has used it as a "central case" to inform recent a Defra consultation, while also conducting sensitivity analysis on assumptions of recycling rates of 30% and 40%.
- The disaggregation of mixed recycling streams collected by local authorities was undertaken using figures relating to household waste. Alternatives were considered – principally, the LA-collected commercial recycling compositional analysis produced by Resource Futures for Defra based on 2010/11 data. However, these figures would have included both mixed and source separated recycling, and so would not have reflected mixed commercial recycling. Ultimately, no alternative was considered to be more reliable than the latest household estimate.

<sup>10</sup> WRAP, 2019, Bristol, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd.

<sup>11</sup> [https://consult.defra.gov.uk/environmental-quality/consultation-on-consistency-in-household-and-busin/supporting\\_documents/recycleconsistencyconsultia.pdf](https://consult.defra.gov.uk/environmental-quality/consultation-on-consistency-in-household-and-busin/supporting_documents/recycleconsistencyconsultia.pdf)



- 
- It was only possible to present results at a primary category level. This is because much of the analysis is based on the Defra C&I arisings data, which was itself categorised at a high level. There was no available data that provides a reasonable rationale for performing further decomposition of the arisings data into detailed categories.
  - The estimates regarding the composition of non-LA collected recycling are derived by deducting the residual composition from the overall composition. This is a less than ideal means of estimating recycling. Material that does not appear in the residual waste stream may not have been captured in the correct (or any) recycling stream. For example, some of the food waste *not* collected in the residual stream may appear in the dry recycling stream as contamination, rather than being captured in separate food waste collections. The tonnage estimates for recycled material should therefore be treated with still greater caution than the overall recycling estimate.

## 3.0 Results

### 3.1 Municipal Waste Arisings from Commercial Sector Businesses

#### 3.1.1 Overall Results

The estimated composition and arisings of all municipal waste from commercial sector businesses in England (2017) is presented in Table 2. This data combines both LA-collected and non-LA collected waste. Total arisings are estimated to be 18.4 million tonnes, of which 11.9 million tonnes was collected as residual and 6.4 million tonnes was collected as recycling. Overall arisings are predominantly paper and card (39.4% of total arisings); food waste (17.9% of total arisings); and plastics (15.1% of total arisings). A similar pattern is evident in the residual composition. In comparison, paper and card accounts for 56.2% of recycling arisings, and glass (14.6%) is the next most prevalent material.

#### 3.1.2 LA-collected and Non-LA Collected Results

Separate composition and arising estimates for LA-collected and non-LA collected waste and recycling are presented in Table 3 and Table 4, respectively. The estimated overall arisings of non-LA material (17.1 million tonnes) are much higher than are those of LA-collected material (1.3 million tonnes). This reflects the fact that by no means every LA routinely offers commercial waste collections, while private sector collectors operate throughout the country.

The analysis indicates that private sector collections achieve a significantly higher recycling rate than LA collections. The LA recycling rate of 10.7% for municipal commercial waste is reasonably reliable, and reflects the tendency of local authority services to be focused (in some cases exclusively) on residual waste collections. The recycling rate for non-LA collected material (36.8%) is rather less reliable, but it is plausible that commercial collectors achieve a higher level of recycling than do LAs. This is in part because commercial collectors more consistently offer recycling collections, and because their clients more often include large businesses that have greater opportunity and financial incentive to recycle.

A comparison of the residual waste stream composition between LA-collected and non-LA collected municipal commercial waste is presented in Figure 5. The principal materials found in both LA-collected and non-LA collected residual waste are food waste, paper & card, and plastics. The greatest differences between the composition of the residual waste streams are in respect of food waste and plastics:

- 
- There is a higher proportion of food waste in the LA-collected residual waste stream (33.4%) than in the non-LA collected waste stream (23.6%).
  - There is a lower proportion of plastic in the LA-collected residual waste stream (13.3%) than in the non-LA collected waste stream (20.0%).

A comparison of the recycling waste stream composition between LA-collected and non-LA collected municipal commercial waste is presented in Figure 6.

- Paper & card is the predominant material category across both LA-collected and non-LA collected recycling.
- There is a higher proportion of other organic & garden waste in the LA-collected recycling stream (15.4%) than in the non-LA collected recycling stream (3.8%).
- There is a higher proportion of other glass in the LA-collected recycling stream (23.9%) than in the non-LA collected recycling stream (14.4%).

Table 2: National waste composition estimates for England, municipal waste collected from businesses in the commercial sector (2017) - adjusted

Material category	Total composition (LA-collected & non-LA collected)		Residual (LA-collected & non-LA collected)		Recycling (LA-collected & non-LA collected)	
	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes
Food waste	17.9%	3,295,025	24.5%	2,928,375	5.7%	366,650
Other organic & garden waste	2.5%	450,894	1.6%	193,961	4.0%	256,933
Paper & card	39.4%	7,243,053	30.4%	3,628,256	56.2%	3,614,796
Plastic	15.1%	2,773,739	19.4%	2,313,562	7.2%	460,177
Metals	3.1%	573,021	4.1%	485,354	1.4%	87,668
Glass	6.6%	1,210,521	2.3%	272,420	14.6%	938,101
Textiles	2.1%	379,794	3.2%	379,767	0.0%	27
Wood	4.6%	847,678	3.2%	388,038	7.1%	459,639
WEEE	0.7%	120,908	0.9%	108,796	0.2%	12,112
Hazardous	0.3%	47,378	0.4%	47,346	0.0%	33
Miscellaneous	7.8%	1,434,888	10.0%	1,199,109	3.7%	235,779
	<b>100%</b>	<b>18,376,899</b>	<b>100.0%</b>	<b>11,944,984</b>	<b>100.0%</b>	<b>6,431,914</b>

Table 3: National waste composition estimates for England, LA-collected municipal waste collected from businesses in the commercial sector (2017) – adjusted

Material category	Total composition LA-collected		Residual LA-collected		Recycling LA-collected	
	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes
Food waste	30.4%	384,522	33.4%	377,163	5.4%	7,359
Other organic & garden waste	3.6%	45,946	2.2%	25,124	15.4%	20,823
Paper & card	28.9%	365,730	27.5%	310,053	41.0%	55,677
Plastic	12.6%	158,768	13.3%	150,696	6.0%	8,072
Metals	3.5%	44,019	3.5%	39,581	3.3%	4,438
Glass	6.3%	79,736	4.2%	47,295	23.9%	32,441
Textiles	2.2%	28,193	2.5%	28,165	0.0%	27
Wood	2.3%	29,356	2.1%	23,248	4.5%	6,108
WEEE	1.3%	16,406	1.4%	15,843	0.4%	563
Hazardous	0.2%	3,159	0.3%	3,127	0.0%	33
Miscellaneous	8.6%	109,033	9.6%	108,922	0.1%	111
	<b>100.0%</b>	<b>1,264,870</b>	<b>100.0%</b>	<b>1,129,218</b>	<b>100.0%</b>	<b>135,652</b>

Table 4: National waste composition estimates for England, non-LA collected municipal waste collected from businesses in the commercial sector (2017) – adjusted

Material category	Total composition Non-LA collected		Residual Non-LA collected		Recycling Non-LA collected	
	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes
Food waste	17.0%	2,910,503	23.6%	2,551,212	5.7%	359,291
Other organic & garden waste	2.4%	404,947	1.6%	168,837	3.8%	236,110
Paper & card	40.2%	6,877,323	30.7%	3,318,203	56.5%	3,559,119
Plastic	15.3%	2,614,971	20.0%	2,162,866	7.2%	452,105
Metals	3.1%	529,002	4.1%	445,773	1.3%	83,230
Glass	6.6%	1,130,784	2.1%	225,124	14.4%	905,660
Textiles	2.1%	351,602	3.3%	351,602	0.0%	0
Wood	4.8%	818,321	3.4%	364,790	7.2%	453,531
WEEE	0.6%	104,502	0.9%	92,953	0.2%	11,549
Hazardous	0.3%	44,219	0.4%	44,219	0.0%	0
Miscellaneous	7.7%	1,325,855	10.1%	1,090,187	3.7%	235,668
	<b>100.0%</b>	<b>17,112,029</b>	<b>100.0%</b>	<b>10,815,766</b>	<b>100.0%</b>	<b>6,296,263</b>

Figure 5: Comparison of residual waste stream composition – LA-collected and non-LA collected municipal commercial waste, England 2017 (% of residual arisings)

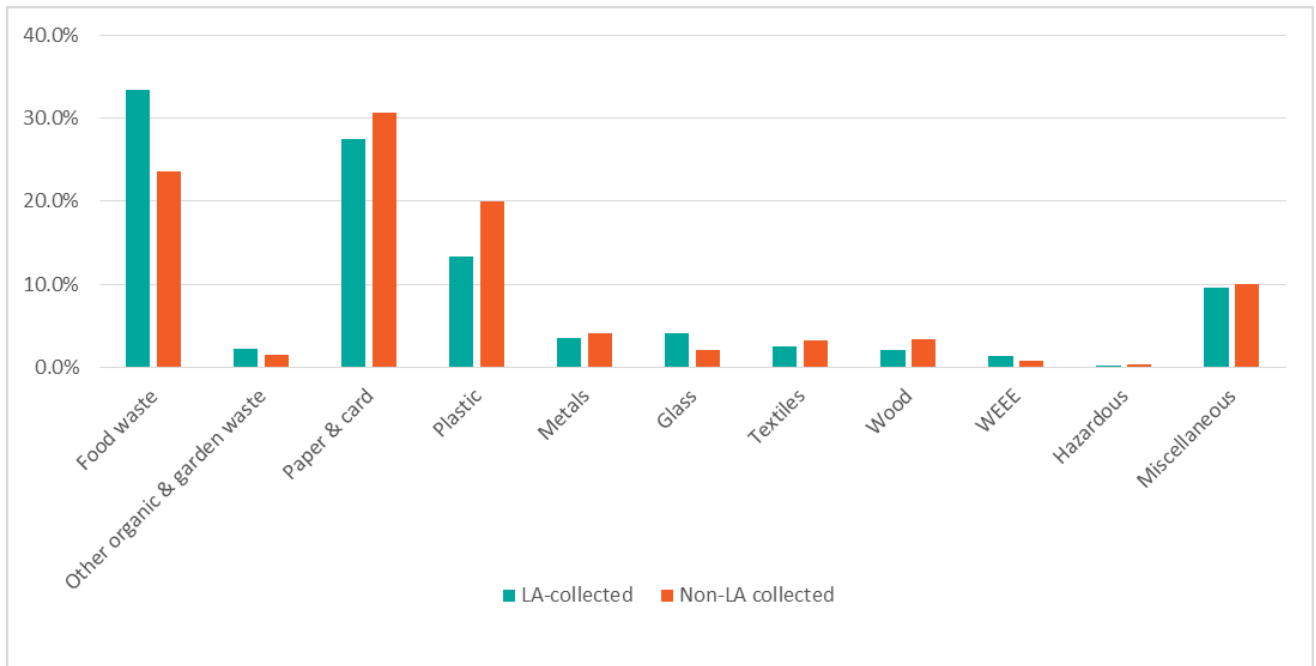
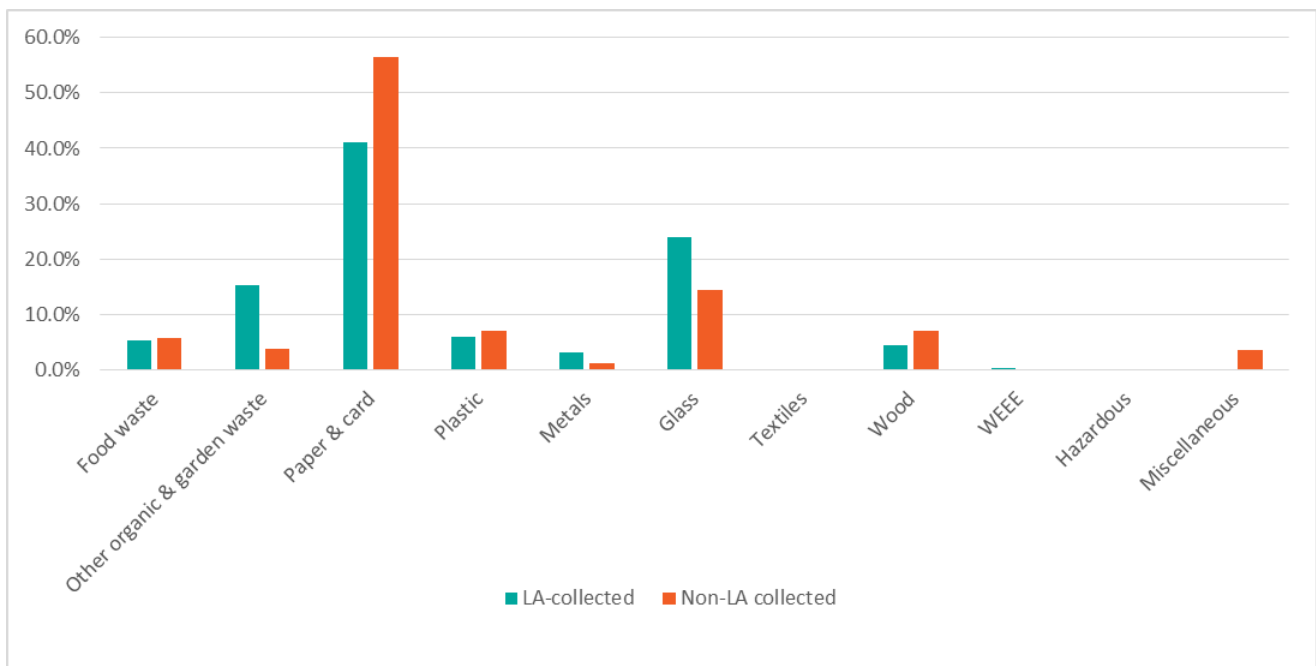


Figure 6: Comparison of recycling waste stream composition – LA-collected and non-LA collected municipal commercial waste, England 2017 (% of recycling arisings)



## 4.0 Conclusion

This report presents composition and arisings estimates for materials in municipal waste produced by commercial sector businesses in England, for the calendar year 2017. Separate results are presented for LA collected and non-LA collected commercial waste.

The results are based on the best available data at the time of writing:

- A sample of WCAs for LA-collected and non-LA collected commercial municipal waste (data collected in 2019)
- Defra *UK Statistics on Waste*
- LA collected commercial waste (total) composition from the *Updated compositional estimates for local authority collected waste and recycling in England, 2010/11 - EV0801* study.

There are a number of limitations associated with this analysis, presented in more detail in Section 2.3. As such, all results should be treated as indicative only and interpreted with caution.



# Appendix 1: Methodological Notes

## Estimating Total Municipal Waste Arisings from Commercial Sector Businesses

A figure for total municipal waste arisings from commercial sector businesses was not readily available. The best dataset available was the 2019 edition of Defra's *UK Statistics on Waste*<sup>12</sup> which included an estimate of total waste generation from the commercial and industrial (C&I) sectors for England, 2017. The commercial total was 27.1 million tonnes; however, this included both municipal and non-municipal waste. Non-municipal waste was not within the scope of this project, and therefore it was removed using the method described below.

### Stripping out Non-municipal Waste

As well as a C&I total arisings figure, Defra provided data on total C&I waste generation, split by economic activity and broad waste material categories (EWC categories). The latest available data in this format was for 2016. The economic activity '*Services (except wholesale of waste and scrap)*' was assumed to represent the commercial sector, as this reflects Defra's approach in producing commercial and industrial waste estimates. Other economic activities represented in the data clearly related to manufacturing (industrial), primary production (agriculture, mining, quarrying), construction and demolition. Little if any of the waste from these sectors would be classed as municipal.

The following method was used to strip out non-municipal waste from the total commercial tonnage data:

- The 2016 waste generation data for '*Services (except wholesale of waste and scrap)*', which summed to 23.6 million tonnes, was rescaled to reflect the 2017 commercial waste total (27.1 million tonnes).
- Any arisings from non-municipal EWC categories were removed. This was done using the assumption that any material streams that would not be expected to arise in any significant quantity in household waste (e.g. 'acid, alkaline or saline wastes', 'chemical wastes', 'used oils') would not meet the municipal waste definition ("household waste and that from other sources which is similar in nature and composition"). A full list of categories assumed to include only non-municipal waste is provided below.

<sup>12</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/784263/UK\\_Statistics\\_on\\_Waste\\_statistical\\_notice\\_March\\_2019\\_rev\\_FINAL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784263/UK_Statistics_on_Waste_statistical_notice_March_2019_rev_FINAL.pdf)

- For EWC categories likely to include both municipal and non-municipal waste, assumptions were applied to remove the non-municipal fraction of the waste. These assumptions are clearly detailed in Table 5.

Table 5: Defra EWC categories - % municipal assumptions

EWC Category	% Municipal	Justification
Metallic wastes, ferrous	5%	<ul style="list-style-type: none"> <li>• The commercial sector includes activities such as vehicle maintenance that are likely to give rise to scrap metals that would not be municipal; there are fewer activities that give rise to large amounts of the types of metals (e.g. food and drink cans) that arise from households.</li> <li>• At 5% municipal, total commercial municipal arisings of ferrous metals are similar to the proportion of household arisings that is ferrous packaging.</li> <li>• The assumption of 5% municipal gives rise to a similar figure for ferrous metals to the 2010/11 LA-collected commercial waste estimate.</li> <li>• Due to the definition of municipal waste, a high proportion of commercial municipal ferrous waste is likely to be packaging.</li> </ul>

EWC Category	% Municipal	Justification
Metallic wastes, non-ferrous	25%	<ul style="list-style-type: none"> <li>• The commercial sector includes activities such as vehicle maintenance that are likely to give rise to scrap metals that would not be municipal; there are fewer activities that give rise to large amounts of the types of non-ferrous metals (e.g. food and drink cans) that arise from households.</li> <li>• At 25% municipal, total commercial municipal arisings of non-ferrous are similar to the proportion of household arisings that is non-ferrous packaging.</li> <li>• The assumption of 25% municipal gives rise to a similar figure for non-ferrous metals to the 2010/11 LA-collected commercial waste estimate.</li> <li>• Due to the definition of municipal waste, a high proportion of commercial municipal non-ferrous metal waste is likely to be packaging.</li> </ul>
Wood wastes	30%	<ul style="list-style-type: none"> <li>• Some wood arises in household waste, and it is therefore inappropriate to exclude all wood from a municipal estimate. However, much of the wood waste from commercial sources (e.g. pallets and other transport packaging) is not commonly found in household waste.</li> <li>• The data is likely to include a large proportion of wood not typically found in household waste.</li> <li>• The assumption of 30% municipal, gives rise to a similar figure for wood to the 2010/11 LA-collected commercial waste estimate.</li> </ul>

EWC Category	% Municipal	Justification
Discarded equipment	30%	<ul style="list-style-type: none"> <li>The data is likely to include a large proportion of equipment not typically found in household waste.</li> <li>The assumption of 30% municipal gives rise to a similar figure for WEEE to the 2010/11 LA-collected commercial waste estimate.</li> </ul>
Batteries & accumulators wastes	10%	<ul style="list-style-type: none"> <li>The data is likely to include a large proportion of material not typically found in household waste.</li> <li>The assumption of 10% municipal gives rise to a similar figure for batteries to the 2010/11 LA collected commercial waste estimate.</li> </ul>

After the above assumptions were applied and non-municipal waste was stripped out, the remaining tonnage (18.4 million tonnes) was taken forward as a best estimate of total commercial municipal waste produced in England in 2017.

**Applying a Recycling Rate**

A 35% recycling rate was applied in order to reach tonnage total for residual (11.9 million tonnes) and recycling (6.4 million tonnes), respectively. This recycling rate was based on ongoing WRAP bottom-up analysis (i.e. subsector profiling of waste generation per material and type of business). There are uncertainties associated with this estimate, though there is perhaps greater confidence that the recycling rate within the range between 30% and 40%.<sup>13</sup>

**LA-collected & Non-LA Collected**

The total tonnage of LA-collected commercial residual waste was extracted from WDF for the calendar year 2017 (1.1 million tonnes).<sup>14</sup> Figures for LA-collected commercial recycling and reuse were also extracted from WDF.<sup>15</sup> The total recycling figure of 195,879 tonnes was adjusted to remove non-municipal material (e.g. rubble, soil, tyres), leaving a total of 135,652 tonnes.

The LA-collected totals were deducted from the overall arising estimates to arrive at a non-LA collected estimate for residual (10.8 million tonnes) and recycling (6.3 million tonnes).

<sup>13</sup> [https://consult.defra.gov.uk/environmental-quality/consultation-on-consistency-in-household-and-busin/supporting\\_documents/recycleconsistencyconsultia.pdf](https://consult.defra.gov.uk/environmental-quality/consultation-on-consistency-in-household-and-busin/supporting_documents/recycleconsistencyconsultia.pdf)  
<sup>14</sup> Q23, tonnes reported by WCAs, UAs and Waste Partnerships  
<sup>15</sup> Q11, tonnes reported by WCAs, UAs and Waste Partnerships

Table 6 shows the estimated municipal waste arisings from commercial sector businesses, split by LA-collected and non-LA collected and recycling / residual.

Table 6: Municipal waste arisings from commercial sector businesses in England, 2017 (tonnes)

Type of Waste	Tonnes
Residual	11,944,984
<i>LA-collected</i>	1,129,218
<i>Non-LA collected</i>	10,815,766
Recycling	6,431,914
<i>LA-collected</i>	135,652
<i>Non-LA collected</i>	6,296,263
Total	18,376,899

## Estimating the Composition of Municipal Waste Arisings from Commercial Sector Businesses

Residual composition profiles for 2017 (Compositional analysis of LA collected and non-LA collected non-household municipal waste (England)) were applied to the residual tonnages for LA-collected and non-LA collected waste in order to produce estimates of residual arisings per material category.

As there were no new WCAs for the recycling portion of commercial municipal waste, a more complex approach was necessary in order to estimate a recycling composition. As a result of the limited data available to produce a recycling estimate, it was necessary to group together some of the material categories used by so as to allow a consistent presentation of categories across residual and recycling. For example, the “paper” and “card” categories were grouped together into

a single combined “paper and card” category that was used in some of the source data that was relied upon to produce the recycling estimate.

### **LA-collected Commercial Municipal Recycling**

The composition of LA-collected recycling was estimated by extracting information from question 11 of WDF.

- A total of 195,879 tonnes of material from commercial resources was recorded by local authorities as having been collected for recycling.
- Materials that did not meet the definition of municipal waste (e.g. rubble, tyres, most scrap metal) were excluded from the analysis, reducing the total to 135,652 tonnes.
- The largest portion of the remaining material (65,225 tonnes) was recorded as mixed recycling; in addition, there were 1,844 tonnes of mixed food and garden waste. These mixed materials were disaggregated using the compositional assumptions developed for the 2017 household waste estimates.<sup>16</sup>

### **Non-LA Collected Commercial Municipal Recycling**

No data source comparable with WDF was available for municipal waste collected for recycling by organisations other than local authorities. An alternative methodology was therefore developed, which deduced the composition of this material from available information regarding the overall composition of commercial waste and the composition of residual waste.

- An overall composition of all commercial municipal waste was derived from two data sources:
  1. The Defra *UK Statistics on Waste*<sup>17</sup> dataset
  2. The LA-collected commercial waste (total) composition from the *Updated compositional estimates for local authority collected waste and recycling in England, 2010/11 - EV0801*<sup>18</sup> study.
- The Defra material categories were used as a starting point, as they provide the most up to date indication of commercial waste composition. However, the data uses relatively high-level categories and 40.3% of commercial waste reported in the Defra data was categorised as mixed waste (under the categories ‘Household & similar wastes’ and ‘Mixed & undifferentiated materials’). This mixed material was disaggregated by applying the

<sup>16</sup> WRAP, 2019, Bristol, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd.

<sup>17</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/784263/UK\\_Statistics\\_on\\_Waste\\_statistical\\_notice\\_March\\_2019\\_rev\\_FINAL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784263/UK_Statistics_on_Waste_statistical_notice_March_2019_rev_FINAL.pdf)

<sup>18</sup> <http://randd.defra.gov.uk/Default.aspx?Module=More&Location=None&ProjectID=18237>

2010/11 LA-collected composition, as this was the most recent available composition that includes both residual waste and recycling.

- The disaggregated materials were then added into the relevant EWC category from *UK Statistics on Waste* to produce total arisings by material type.
- Despite being several years out of date and likely to disproportionately reflect the composition of waste from smaller businesses (since larger businesses are more likely to use private contractors for commercial waste collections), the 2010/11 LA-collected composition estimate was considered the best available data to use to disaggregate the mixed material. This was because:
  - It is the most recent commercial compositional estimate that spans both residual waste and recycling.
  - The mixed waste categories in the Defra data are likely to be mostly made up of residual waste and some dry mixed recycling (DMR). Any separately collected recycling is likely to have been reported under the relevant material category e.g. glass, metals, fibres. Similarly, the LA-collected commercial waste is likely to be heavily weighted towards residual waste (especially given the data was collected several years ago), but will include some dry mixed recycling.
- To avoid giving a false sense of precision, rather than undertaking any further disaggregation, the overall composition was presented at the primary level category only (as used in *UK Statistics on Waste*).
- The overall composition of municipal waste from commercial sources collected by organisations other than local authorities was estimated by deducting the stream-by-stream estimates of waste collected by local authorities from the total stream-by-stream estimates.
- The recycling composition was estimated by calculating the remaining arisings within the non-LA collected stream (i.e. the material **not** collected in the residual stream).

## Appendix 2: Adjustment

As explained in the main body of the report, the methodology for estimating the overall composition of commercial municipal waste resulted in a negative number for textiles, plastics and hazardous waste arisings in the recycling stream. The initial estimate of arisings in the residual stream was greater than the estimate for the overall stream). It is assumed this may be due to one or more of the following reasons:

- Textiles (167,552 tonnes, 0.9%) and hazardous waste (41,056 tonnes, 0.2%) are a small proportion of total arisings. This leaves relatively little margin for error and makes the estimates susceptible to sampling errors in the underlying compositional data.
- The arisings in the overall composition may be underestimated, either in the figures given by Defra in *UK Statistics on Waste*, or in the relatively old estimates (from 2010/11) used to disaggregate the mixed waste streams reported by Defra.
  - (1) It is likely that the composition of commercial waste has changed somewhat in the period between 2010/11 and 2017. The composition of kerbside collected household waste has changed over the same period,<sup>19</sup> with a key trend highlighted in the household estimates report being a decline in paper arisings at the kerbside (3.9 percentage point decrease) and a substantial increase in card (2.5 percentage points) between 2010/11 and 2017. Notably, the increase in card arisings was not enough to offset the decline in paper arisings, and therefore arisings of ‘paper and card’ declined overall (both absolutely, and as a proportion of overall arisings). If this trend was mirrored in commercial waste over the same time period, it is possible that the paper and card arisings in the overall composition estimates are overstated, and other materials (such as plastics) are understated.
- The residual composition profiles may have overestimated arisings of plastics, textiles and hazardous waste in the commercial residual waste stream.

The following additional analysis has been conducted in order to address this issue:

- Plastic arisings in the overall composition were adjusted in order to achieve a target recycling rate:
  - (1) The overall commercial recycling rate (35.0%) was 3.3 times greater than the LA-collected recycling rate (10.7%). This is a reflection of the higher recycling rate for non-LA collected material in comparison to LA-collected material.

<sup>19</sup> WRAP, 2019, Bristol, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd.



- (2) In the absence of any better reference data it was assumed that the overall plastics recycling rate should also be 3.3 times greater than the LA-collected plastics recycling rate (following from point (1) above).
  - (3) The plastics recycling rate in LA-collected commercial waste was 5.1%, multiplying this by 3.3 gave a target overall recycling rate of 16.6%.
  - (4) In order to achieve a higher recycling rate, either the overall plastic arisings had to be increased, or the residual plastic arisings decreased. The residual tonnage of plastics in the overall composition was not adjusted, as it was assumed that the Compositional analysis of LA collected and non-LA collected non-household municipal waste (England) work to establish the composition of commercial residual waste is likely to be more accurate than the older data used to disaggregate the mixed waste streams in the overall compositional analysis.
  - (5) Therefore, the overall arisings of plastics were increased (from 2.3 million tonnes to 2.8 million tonnes). Because the recycling figure is derived by deducting the residual waste estimate from the overall estimate, the plastics recycling estimate increased from -29,209 tonnes to 460,177 tonnes, producing a 16.6% recycling rate.
  - (6) Every other category in the overall arisings was proportionally reduced in order to maintain the overall arisings total (18.9 million tonnes). Because the largest category of material was paper and card, a proportionate reduction had the greatest impact on estimated arisings of this category of material.
- A different approach was taken for the textiles and hazardous waste arisings. While plastic is relatively commonly recycled, it is rare to see a separate commercial waste collection for textiles and hazardous waste (particularly in municipal collections, which is what this work focuses on). This is not to say that commercial textiles and hazardous waste arisings are not recycled; but that when they are, it is by other routes. Hazardous waste may be collected by highly specialised collection services; while many clothing businesses may manage their own textile waste through reverse logistics.
  - Therefore, we assume that all municipal textiles and hazardous waste collected from commercial businesses is captured in the residual stream, apart from the small amount collected in LA-collected commercial recycling (based on WDF).
  - As with the plastics adjustment, the composition of commercial residual waste was kept constant. Therefore, the overall arising figures for textiles and hazardous waste were adjusted upwards to match the estimate for arisings within the residual waste stream (plus the LA-collected recycling). Every other category was proportionally reduced in order to maintain the overall arisings total.

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The adjusted results are reported in the main body of the report. The unadjusted results are presented in Table 7.

Table 7: National waste composition estimates for England, all municipal waste collected from businesses in the commercial sector (2017) – unadjusted

Material category	Total composition (LA-collected & non-LA collected)		Residual (LA-collected & non-LA collected)		Recycling (LA-collected & non-LA collected)	
	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes
Food waste	18.8%	3,448,736	24.5%	2,928,375	8.1%	520,360
Other organic & garden waste	2.6%	471,928	1.6%	193,961	4.3%	277,967
Paper & card	41.3%	7,580,937	30.4%	3,628,256	61.5%	3,952,680
Plastic	12.4%	2,284,353	19.4%	2,313,562	-0.5%	-29,209
Metals	3.3%	599,752	4.1%	485,354	1.8%	114,399
Glass	6.9%	1,266,991	2.3%	272,420	15.5%	994,571
Textiles	0.9%	167,552	3.2%	379,767	-3.3%	-212,215
Wood	4.8%	887,221	3.2%	388,038	7.8%	499,183
WEEE	0.7%	126,548	0.9%	108,796	0.3%	17,752
Hazardous	0.2%	41,056	0.4%	47,346	-0.1%	-6,290
Miscellaneous	8.2%	1,501,825	10.0%	1,199,109	4.7%	302,716
	<b>100%</b>	<b>18,376,899</b>	<b>100.0%</b>	<b>11,944,984</b>	<b>100.0%</b>	<b>6,431,914</b>

## Appendix 3: Defra *UK Statistics on Waste EWC Categories*

Table 8: Defra UK Statistics on Waste EWC Categories - Municipal and non-municipal split

EWC category	Type	% Municipal
Spent solvents	Non-municipal	0%
Acid, alkaline or saline wastes	Non-municipal	0%
Used oils	Non-municipal	0%
Chemical wastes	Non-municipal	0%
Industrial effluent sludges	Non-municipal	0%
Sludges & liquid wastes from waste treatment	Non-municipal	0%
Health care & biological wastes	Non-municipal	0%
Metallic wastes, ferrous	Split	5%
Metallic wastes, non-ferrous	Split	25%
Glass wastes	Municipal	100%
Paper & cardboard wastes	Municipal	100%
Rubber wastes	Non-municipal	0%
Plastic wastes	Municipal	100%
Wood wastes	Split	30%
Textile wastes	Municipal	100%
Waste containing PCB	Non-municipal	0%
Discarded equipment	Split	30%
Discarded vehicles	Non-municipal	0%
Batteries & accumulators wastes	Split	10%
Animal & mixed food waste	Municipal	100%
Vegetal wastes	Municipal	100%
Animal faeces, urine & manure	Non-municipal	0%
Household & similar wastes	Municipal	100%
Mixed & undifferentiated materials	Municipal	100%
Sorting residues	Non-municipal	0%
Common sludges	Non-municipal	0%
Mineral waste from construction & demolition	Non-municipal	0%
Other mineral wastes	Non-municipal	0%
Combustion wastes	Non-municipal	0%
Soils	Non-municipal	0%
Dredging spoils	Non-municipal	0%
Mineral waste from waste treatment & stabilised waste	Non-municipal	0%

## Appendix 4: Residual Waste Composition

As a result of the limited data available to produce a recycling composition estimate, it was necessary to group together some of the material categories used by Resource Futures in the residual composition profiles so as to allow a consistent presentation of categories across residual and recycling. For example, the “paper” and “card” categories were grouped together into a single combined “paper & card” category that was used in some of the source data that was relied upon to produce the recycling estimate. This means that some of the detail of the residual composition has been lost (though it is reported in full in Compositional analysis of LA collected and non-LA collected non-household municipal waste (England) (Compositional analysis of LA collected and non-LA collected non-household municipal waste (England))

So far as possible, we have reconciled the Resource Futures category list with the category list used in the household phase of this work. This provides the opportunity to compare the composition of household and non-household municipal residual waste, even if it is not possible to compare the recycling composition. .

In Table 9, we present the residual waste composition for LA-collected and Non-LA Collected municipal residual waste. In Table 10, we break down the residual waste composition to the maximum level of detail enabled by the compositional profile developed by Resource Futures.

The Resource Future’s category list is presented in Table 11. The category list used in the household estimates is presented in Table 12.

For the most part, it was possible to reconcile the lists at a tier 1, tier 3 and tier 3 level. However, in a number of instances, the Resource Future’s category list included categories which were broader than the categories in the household estimates.

For example, the following sub-categories from the Resource Futures list span both the paper and card tier 1 category in the household estimates:

- Food contaminated paper and card
- Waxed/laminated/wet strength paper and card
- Other non-recyclable paper and card

In order to split the associated percentage composition between paper and card, reference splits from the 2017 England kerbside-collected household residual estimates were applied<sup>20</sup>.

Commercial municipal residual waste arisings presented using the same category list as in the household residual waste estimates are shown in Table 9.

<sup>20</sup> WRAP, 2019, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd

Table 9: National waste composition estimates for England, municipal residual waste collected from businesses in the commercial sector (2017) – Adjusted category list

	LA-collected		Non-LA collected		All	
	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes
Food Waste	33.4%	377,163	23.6%	2,551,212	24.5%	2,928,375
Garden waste	1.1%	12,127	1.0%	105,926	1.0%	118,053
Other organic	1.2%	12,997	0.6%	62,911	0.6%	75,908
Paper	18.2%	205,772	21.5%	2,329,380	21.2%	2,535,152
Card	9.2%	104,281	9.1%	988,823	9.2%	1,093,104
Glass	4.2%	47,295	2.1%	225,124	2.3%	272,420
Ferrous metals	2.5%	28,124	3.0%	323,502	2.9%	351,625
Non-ferrous metals	1.0%	11,457	1.1%	122,271	1.1%	133,728
Dense plastic	6.4%	72,449	8.7%	940,240	8.5%	1,012,689
Plastic film	6.9%	78,247	11.3%	1,222,626	10.9%	1,300,873
Textiles	2.5%	28,165	3.3%	351,602	3.2%	379,767
WEEE	1.4%	15,843	0.9%	92,953	0.9%	108,796
Hazardous	0.3%	3,127	0.4%	44,219	0.4%	47,346
Wood	2.1%	23,248	3.4%	364,790	3.2%	388,038
Misc combustible	3.7%	41,879	5.0%	536,503	4.8%	578,382
Misc non-combustible	3.3%	37,384	2.2%	232,758	2.3%	270,142
Fines	2.6%	29,659	3.0%	320,926	2.9%	350,585
Other wastes	0.0%	0	0.0%	0	0.0%	0
<b>Total</b>	<b>100.0%</b>	<b>1,129,218</b>	<b>100.0%</b>	<b>10,815,766</b>	<b>100.0%</b>	<b>11,944,984</b>

Table 10: National waste composition estimates for England, municipal residual waste collected from businesses in the commercial sector (2017) – Detailed category list

Category Tier → Material Category ↓	LA-collected						Non-LA collected						All					
	Tier 1		Tier 2		Tier 3		Tier 1		Tier 2		Tier 3		Tier 1		Tier 2		Tier 3	
	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes	% composition	Tonnes
<b>Food Waste</b>	33.4%	377,163					23.6%	2,551,212					24.5%	2,928,375				
Avoidable food waste					20.9%	236,427					14.9%	1,609,067					15.4%	1,845,494
Unavoidable food waste					12.5%	140,736					8.7%	942,145					9.1%	1,082,881
Consumable liquids, fats & oils					0.0%	0					0.0%	0					0.0%	0
<b>Garden waste</b>	1.1%	12,127					1.0%	105,926					1.0%	118,053				
<b>Other organic</b>	1.2%	12,997					0.6%	62,911					0.6%	75,908				
Pet excrement and bedding					1.1%	12,961					0.6%	62,741					0.6%	75,702
Other organic					0.0%	35					0.0%	170					0.0%	205
<b>Paper</b>	18.2%	205,772					21.5%	2,329,380					21.2%	2,535,152				
Recyclable paper			6.2%	69,781				8.1%	876,720					7.9%	946,500			
Packaging paper					0.9%	10,725					0.7%	77,163					0.7%	87,888
News, mags, brochures, catalogues & directories					3.6%	40,886					5.1%	553,560					5.0%	594,446
Other recyclable paper					1.6%	18,169					2.3%	245,997					2.2%	264,167
Non-recyclable paper			12.0%	135,992				13.4%	1,452,660					13.3%	1,588,652			
Non-recyclable paper					12.0%	135,992					13.4%	1,452,660					13.3%	1,588,652
<b>Card</b>	9.2%	104,281					9.1%	988,823					9.2%	1,093,104				
Thin card					2.1%	23,318					2.3%	252,509					2.3%	275,827
Thick and corrugated card					6.5%	72,993					5.9%	633,997					5.9%	706,990
Cartons (including Tetrapak)					0.2%	2,428					0.4%	42,687					0.4%	45,114
Other card					0.5%	5,543					0.6%	59,630					0.5%	65,173
<b>Glass</b>	4.2%	47,295					2.1%	225,124					2.3%	272,420				
Packaging glass					3.8%	42,885					1.8%	191,675					2.0%	234,560
Non-packaging glass					0.4%	4,411					0.3%	33,449					0.3%	37,860
<b>Ferrous metals</b>	2.5%	28,124					3.0%	323,502					2.9%	351,625				
Ferrous cans, all			1.3%	14,537				1.0%	109,875					1.0%	124,413			
Ferrous drink cans					0.1%	1,472					0.1%	11,123					0.1%	12,594
Ferrous food cans					1.2%	13,066					0.9%	98,753					0.9%	111,818
Ferrous non-cans			1.2%	13,586				2.0%	213,627					1.9%	227,213			
Ferrous aerosols					0.1%	934					0.1%	8,206					0.1%	9,140
Other ferrous packaging					0.1%	1,384					0.2%	22,478					0.2%	23,863
Other ferrous non-packaging					1.0%	11,268					1.7%	182,943					1.6%	194,210
<b>Non-ferrous metals</b>	1.0%	11,457					1.1%	122,271					1.1%	133,728				
Non-ferrous cans, all			0.5%	5,750				0.5%	50,875					0.5%	56,625			
Non-ferrous drink cans					0.4%	4,947					0.4%	43,770					0.4%	48,716
Non-ferrous food cans					0.1%	803					0.1%	7,105					0.1%	7,908
2nd tier: Non-ferrous non-cans			0.5%	5,708				0.7%	71,396					0.6%	77,103			
Non-ferrous aerosols					0.0%	346					0.1%	5,459					0.0%	5,804
Aluminium foil					0.3%	3,769					0.4%	41,468					0.4%	45,238
Other non-ferrous					0.1%	1,593					0.2%	24,469					0.2%	26,061
<b>Dense plastic</b>	6.4%	72,449					8.7%	940,240					8.5%	1,012,689				
Plastic bottles			1.8%	20,488				2.4%	257,870					2.3%	278,358			
PET bottles					1.0%	11,071					1.3%	139,337					1.3%	150,407
HDPE bottles					0.7%	7,407					0.9%	93,232					0.8%	100,640
Other plastic bottles					0.2%	2,010					0.2%	25,301					0.2%	27,311

Dense plastic non-bottles			4.6%	51,961			6.3%	682,370				6.1%	734,331		
Pots, tubs & trays					1.9%	21,172			2.8%	307,719				2.8%	328,890
Other dense plastic packaging					0.8%	9,348			1.1%	113,754				1.0%	123,102
Other dense plastic non-packaging					1.9%	21,441			2.4%	260,898				2.4%	282,338
Polystyrene					0.0%	0			0.0%	0				0.0%	0
Plastic film	6.9%	78,247					11.3%	1,222,626				10.9%	1,300,873		
Carrier bags					0.6%	7,253			0.5%	57,766				0.5%	65,020
Other packaging plastic film					4.3%	48,619			7.5%	809,880				7.2%	858,499
Non-packaging plastic film					2.0%	22,375			3.3%	354,979				3.2%	377,354
Textiles	2.5%	28,165					3.3%	351,602				3.2%	379,767		
Clothing, shoes, bags & belts			1.6%	18,165					1.4%	151,635				1.4%	169,800
Clothing					1.2%	14,001			0.9%	97,961				0.9%	111,962
Shoes, bags & belts					0.4%	4,164			0.5%	53,674				0.5%	57,838
All non-clothing textiles			0.9%	10,001					1.8%	199,966				1.8%	209,967
Carpet & underlay					0.1%	1,336			1.0%	111,950				0.9%	113,286
Other non-clothing textiles					0.8%	8,665			0.8%	88,016				0.8%	96,681
WEEE	1.4%	15,843					0.9%	92,953				0.9%	108,796		
Large WEEE					0.6%	6,331			0.3%	37,146				0.4%	43,477
Small WEEE					0.8%	9,512			0.5%	55,807				0.5%	65,319
Hazardous	0.3%	3,127					0.4%	44,219				0.4%	47,346		
Household batteries					0.0%	222			0.0%	4,339				0.0%	4,561
Points and varnishes					0.1%	699			0.0%	4,167				0.0%	4,865
Other household hazardous waste					0.2%	2,206			0.3%	35,713				0.3%	37,920
Wood	2.1%	23,248					3.4%	364,790				3.2%	388,038		
Treated wood					1.3%	15,176			2.2%	238,125				2.1%	253,301
Non-treated wood					0.7%	8,072			1.2%	126,665				1.1%	134,737
Misc combustible	3.7%	41,879					5.0%	536,503				4.8%	578,382		
AHPs					1.3%	14,675			1.0%	113,558				1.1%	128,232
Other sanitary					0.0%	0			0.0%	0				0.0%	0
Furniture					0.1%	1,413			0.4%	45,528				0.4%	46,941
Mattresses					0.0%	0			0.1%	11,551				0.1%	11,551
Other misc combustible					2.3%	25,790			3.4%	365,867				3.3%	391,657
Misc non-combustible	3.3%	37,384					2.2%	232,758				2.3%	270,142		
Soil					0.5%	6,091			0.4%	45,061				0.4%	51,151
Rubble					0.0%	0			0.0%	0				0.0%	0
Plasterboard					0.0%	0			0.0%	0				0.0%	0
Other misc non-combustible					2.8%	31,293			1.7%	187,698				1.8%	218,991
Fines	2.6%	29,659					3.0%	320,926				2.9%	350,585		
Other wastes	0.0%	0					0.0%	0				0.0%	0		
<b>TOTAL</b>	<b>100.0%</b>	<b>1,129,218</b>					<b>100.0%</b>	<b>10,815,766</b>				<b>13.3%</b>	<b>11,944,984</b>		



Table 11: Material categories applied in Resource Futures' commercial residual composition analysis

Main Categories	Sub-categories	Packaging = P
Paper and Card	Recyclable paper packaging	P
	Recyclable paper non packaging	
	Thin card packaging	P
	Thin card non packaging	
	Corrugated card packaging	P
	Corrugated card non packaging	
	Drink cartons (Tetra packs)	P
	Kitchen roll and tissues	
	Food contaminated P&C	
	Waxed/laminated/wet strength P&C	P
Plastic Film	Other non recyclable paper and card	
	Carrier bags	
	Black bags and sacks	
	Other plastic film packaging	P
Dense Plastic	Other plastic film non packaging	
	Plastic bottles	P
	PTTs	P
	Black plastic PTT	P
	Other dense plastic	
Textiles	Bio plastics	
	Clothing	
	Shoes, bags, belts	
Other Combustible	Non clothing textiles	
	Carpet and underlay	
	Furniture	
	Mattresses	
	Absorbent hygiene products (AHPs)	
	Wood and cork packaging	P
Other Non-Combustible	Wood and cork non packaging	
	Other combustible	
Glass	Other non-combustible	
	Non combustible, non food liquid	
Putrescible	Glass bottles and jars	P
	Glass non-packaging	
	Garden waste	
	Soil	
	Edible food waste	
Ferrous Metal	Inedible food waste	
	Other organic	
	Ferrous cans and tins	P
	Ferrous aerosols	P
Non Ferrous Metal	Other ferrous items	
	Non Ferrous cans	P
	Non Ferrous aerosols	P
	Alu foil	P
WEEE	Other non ferrous	
	WEEE	
	Empty Paint Tins	
	Full Paint Tins	
	HHW	
Potentially Household Hazardous Waste Items	Batteries	
	Fine Material	
	<10 mm Fines	

Table 12: Material categories applied in the National Household Waste Composition Estimates 2017

Tier 1	Tier 2	Tier 3	Packaging = P
Food Waste	n/a	Avoidable food waste	
		Unavoidable food waste	
		Consumable liquids, fats & oils	
Garden waste	n/a	Garden waste	
Other organic	n/a	Pet excrement and bedding	
		Other organic (tier 3)	
Paper	Recyclable paper	Packaging paper	P
		Newspapers, magazines, brochures, catalogues & directories	
	Other recyclable paper		
	Non-recyclable paper	Non-recyclable paper	
Card	n/a	Thin card	P
		Thick and corrugated card	P
		Cartons (including Tetrapak)	P
		Other card	P
Glass	n/a	Packaging glass	P
		Non-packaging glass	
Ferrous metals	Ferrous cans, all	Ferrous drink cans	P
		Ferrous food cans	P
	Ferrous non-cans	Ferrous aerosols	P
		Other ferrous packaging	P
Non-ferrous metals	Non-ferrous cans, all	Other ferrous non-packaging	
		Non-ferrous drink cans	P
	Non-ferrous non-cans	Non-ferrous food cans	P
		Non-ferrous aerosols	P
Dense plastic	Plastic bottles	Aluminium foil	P
		Other non-ferrous	
		PET bottles	P
	Dense plastic non-bottles	HDPE bottles	P
		Other plastic bottles	P
		Pots, tubs & trays	P
Plastic film	n/a	Other dense plastic packaging	P
		Other dense plastic non-packaging	
		Polystyrene	P
Textiles	Clothing, shoes, bags & belts	Carrier bags	P
		Other packaging plastic film	P
	Non-clothing textiles	Non-packaging plastic film	
WEEE	n/a	Clothing	
		Shoes, bags & belts	
Hazardous	n/a	Carpet & underlay	
		Other non-clothing textiles	
		Large WEEE	
Wood	n/a	Small WEEE	
		Household batteries	
Misc combustible	n/a	Paints and varnishes	
		Other household hazardous waste	
		Treated wood	
		Non-treated wood	
		AHPs	
Misc non-combustible	n/a	Other sanitary	
		Furniture	
		Mattresses	
		Other misc combustible	
Fines	n/a	Soil	
		Rubble	
		Plasterboard	
Other wastes	n/a	Other misc non-combustible	
		Fines	
		Other wastes	

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Our mission is to accelerate the move to a sustainable resource-efficient economy through re-inventing how we design, produce and sell products; re-thinking how we use and consume products; and re-defining what is possible through re-use and recycling.

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