

BULKY HOUSEHOLD WASTE MANAGEMENT IN A UK LOCAL AUTHORITY AREA

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Abstract:

Charnwood Borough Council (CBC), an English local authority, recently introduced a Zero Waste Strategy encompassing targets for waste minimisation and recycling of household waste above UK Government baselines. To achieve these targets various areas of household waste management need to be amended to improve recycling performance. The bulky waste collection service, collecting large items such as furniture and electrical goods was identified as an area to target for improvement. A case study approach was adopted using data collected on a daily basis by CBC to quantify the number and type of items in the bulky waste stream. Current practices of managing bulky household waste are explored; identifying challenges in dealing with this waste stream such as financial and logistical challenges in identifying, collecting, repairing and storage. However, there is potential to increase recycling of some discarded items, particularly the large numbers of mattresses and some wooden furniture unsuitable for reuse.

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1. Introduction

The term “Bulky waste” refers to items that are too large for standard household waste collections and includes items of furniture and white goods. Local Authorities (LAs) can make a charge, if they wish, for the separate collection of these items (Environmental Protection Act, 1990, section 45, 3b). As such, 77% of LAs charge householders a collection charge for removing bulky waste items (APSE, 2009). It is recognised that the bulky waste stream offers valuable opportunities to reduce and recycle waste (Chung et al., 2010). However, many household items that are disposed of before they reach the end of their useful lives could be used or repaired for reuse (Charnwood Borough Council, 2009).

The revised Waste Framework Directive 2008/98/CE (2008) places increased emphasis on reuse of waste and preparing for reuse and provides the following definitions:

Re-use is “any operation by which products or components that are not waste are used again for the same purpose for which they were conceived” (Waste Framework Directive, 2008, Article 3.13).

“Preparing for re-use” means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing” (Waste Framework Directive, 2008, Article 3.16).

Most English LAs support or operate reuse projects for furniture and white goods, with the bulky waste stream offering valuable opportunities to reuse and recycle waste (Chung et al., 2010). Reuse and preparation for reuse of bulky waste items in the UK is carried out via 400 reuse organisations that help divert 90,000 tonnes of bulky waste from landfill annually (Furniture Reuse Network, 2011). It is estimated that between 20-70% of the bulky waste stream could be potentially recycled or reused, of which one third has high potential reusability depending on quality issues and necessary repairs. This is hardly the case in current practices as only 2% is reused (WRAP, 2009).

Whilst many bulky waste items are suitable for reuse, in practice this remains a possibility rather than a certainty (Shaw et al., 2010). The route for reuse is often difficult for a householder to identify. Furthermore, the existence of other reuse barriers including limited or lack of awareness on reuse options, including donation; a reluctance to use second hand goods; and the “rules” imposed by the recipient organisation regarding the condition of donated materials to ensure they are safe, fire retardant and in a good saleable condition often discourages donation (Williams et al, 2012).

This paper presents a case study that investigates the current management methods for household bulky waste in Charnwood Borough Council. The aim of paper is fourfold: outline current collection methods; quantify demand for bulky waste collections; explore opportunities to increase reuse and recycling from the bulky waste stream; and identify barriers to increasing reuse and recycling from the current collection system.

2. Current household waste management practices in Charnwood Borough Council

Charnwood Borough Council (CBC) is a Waste Collection Authority (WCA) in the East Midlands of England. Covering an area of 279 km², the Charnwood area is classified as an “Other Urban” area (Defra, 2005), with a population density of 5.5 persons/hectare (Census, 2001). CBC operates a comprehensive kerbside recycling collection to 67,000 households for

easily recycled household materials like glass, cans plastics paper and cardboard batteries on a fortnightly basis. There is also a fortnightly collection of organic garden waste and residual waste delivered under contract by an external service provider (Table 1).

Table 1: Refuse and recycling collections operated in Charnwood Borough (Jan 2013). (Charnwood Borough Council, 2013)

Service	Materials	Container	Frequency of collection
Recycling	Glass bottles and jars Steel and aluminium cans, plastic bottles, paper and cardboard	240 litre wheeled bin	Fortnightly
Organic waste	Garden waste only Charged for service	240 litre wheeled bin	Fortnightly
Residual waste	Non recyclable waste	240 litre wheeled bin	Fortnightly
Bulky household waste	Furniture, white goods etc (household items too large for containers supplied)	None supplied	On demand Up to 3 collections of 3 items per year

In 2011/12 CBC collected a total of 56,458 tonnes of household waste, of this 49% (27,293 tonnes) was recycled, reused or composted and 51% (29165 tonnes) sent for landfill disposal (WasteDataFlow, 2012).

In addition to the regular CBC household collections, there is an “on demand” special collection service for household bulky waste, provided free of charge up to three times per year for each household, with a maximum of three items per collection (maximum nine items per household per year) (Table 1). Current CBC collection and reuse practices for bulky waste are outlined below.

2.1 Current bulky waste collections

CBC offers a free of charge collection service for bulky waste. Of the 30 high performing recycling LAs in 2010, CBC was one of only three that offered a free of charge bulky waste collection (CBC, 2009). Householders book collections online or by telephone, which are entered on an internal database that records the date, number, and type of items for collection. CBC’s waste contractor makes around 12,000 individual bulky waste collections per annum in the Borough (approx 250 collections per week).

Items accepted for bulky waste collections are mostly discarded furniture and white goods. However, no previous study has taken place to investigate the number and types of items that are discarded through CBC special bulky waste collections. A very small number of items are recovered from bulky waste for reuse; the weight of items recovered between 2008 & 2012 is shown in Table 2.

Table 2: CBC reuse and recycling of household waste -tonnes per annum (WasteDataFlow, 2012)

Year	Total reuse (tonnes per annum)	Total household waste recycled (tonnes per annum)
2008-09	100.42	15817.29
2009-10	186.43	15868.64
2010-11	131.64	16202.27
2011-12	156.64	16795.51

Alternative disposal points are provided free of charge at three Household Waste Recycling Centres, these are sited at the three main urban centres within CBC's area.

2.2 Current bulky waste reuse opportunities: SOFA furniture reuse project

A collaboration between SOFA, a local third sector furniture reuse project and CBC has been operating for several years, but has very little impact on the amount of bulky waste diverted from landfill. A small number of items are diverted from the bulky waste collections by recommendation to the reuse project at the time of booking a collection. The total weight of furniture sold for reuse by SOFA annually are shown in Table 3, these items have been donated to SOFA for reuse from a variety of sources, some of these items may have been destined for landfill disposal via the bulky waste collection service.

Table 3: Furniture sold for reuse (by weight) by SOFA furniture reuse project, Loughborough, 2008-2012. (SOFA, 2013)

Year	Tonnes reused by SOFA
2008-09	76.9
2009-10	80.7
2010-11	76.2
2011-12	84.1

The SOFA reuse project offers social and environmental benefits to the area in which it operates, these include:

- Cheaper alternative for replacing furniture to needy homes;
- Training opportunities and a pathway into employment for volunteers; and
- Environmental benefits of reducing waste to landfill.

In addition to furniture reuse, some recycling of scrap metal from white goods also takes place via SOFA; this is a relatively small amount, with only 25 tonnes being recycled in 2011/12, from the 61 tonnes of electrical items collected.

3. Methods

The current destination of bulky waste was explored using archive analysis of WasteDataFlow records and CBC internal records.

Bulky waste collection records were used to quantify the amount of bulky waste collected from households in CBC during January to March 2012 and a compositional analysis of this bulky waste stream took place to show the type and number of items collected.

The resulting waste composition was then used together with the Average Weights for Furniture Guide (Furniture Reuse Network, 2012), to produce a table showing the total weights of each category of items over the period studied. The Average Weights for Furniture Guide sets generic weights for the different items which enter the bulky waste stream. LAs & reuse projects use these average weights, under guidance from Defra (Department for Environment, Food & Rural Affairs), a UK Government Department responsible for waste accounting, to calculate the volume of materials in the bulky waste stream without having to weigh individual items.

Using the quantity data of various bulky waste items, it has been possible to calculate an estimate total weight for each category and the subsequent impact on reuse and recycling improvements to make use of various available processes, technologies and outlets.

4. Data collection

4.1 WasteDataFlow

Monthly records kept by CBC and reported to Defra via WasteDataFlow, showing the amount of waste collected from household and the treatment and disposal routes for that waste. These records for CBC show household waste separated into three different categories: materials collected for reuse and recycling; organic waste (garden waste) collected for bio-treatment; and residual waste (all other waste) collected for landfill disposal

Data of interest to this study concerns the section within the reuse and recycling streams that accounts for items collected as bulky waste that is recycled or reused.

4.2 CBC internal records

Bulky waste collection data recorded by CBC at the time a householder requests a collection. These records show: collection address; type and number of items to be collected; and any special collection arrangements (e.g. collection time).

A sample of three months data for January, February and March 2012 was extracted from this database to quantify by item type and tonnage the amount of bulky waste collected. The items were then clustered into six bulky waste streams: soft furnishings, wooden furniture, mattresses, carpets & rugs, electrical items, and miscellaneous. Grouping was done in this way to estimate recycling and reuse potential.

A three month period was chosen to keep the data analysis manageable. These months were chosen because the records had been audited for the 2011/12 via WasteDataFlow reporting schedule and the national performance figures for 2011/12 were available from Defra.

5. Data analysis

The analysis was separated into two sections, one solely for general electrical items and one showing the other items commonly collected via this separate collection service. The records maintained by CBC, which enabled the collection of bulky waste to be carried out were a little limited for the purpose of the study. Indeed, several records contained poorly recorded data, with a lot of items described as “other”. This was further impeded by not finding out retrospectively what these items were, so although they are included in the overall weight of items collected it is not possible to include them in the waste composition analysis.

In addition to this, there was no record of the size of the items collected, for instance there was no indication of the size of mattresses, whether they were a single or double mattress, or the

size of the carpets collected. For these items an average weight has been used, so the total weights collected have to be treated as estimates.

6. Results

The amount of bulky waste sent to landfill is constant throughout the year, with over 22,000 bulky waste items collected from households in 2011/12.

Results reveal that once an item was booked as a bulky waste collection, there was very little opportunity for it being rescued for reuse. Some electrical items (mostly white goods i.e. fridges, washing machines and similar) are recovered for the scrap metal to be recycled via SOFA. In 2011/12 only 25 tonnes of scrap metal recovered from the bulky waste collections, Figure 1 shows the amount of scrap metal recycled each month. Some smaller household electrical items are sent for recycling via Leicestershire County Council, the regional LA responsible for disposal of household waste collected by CBC.

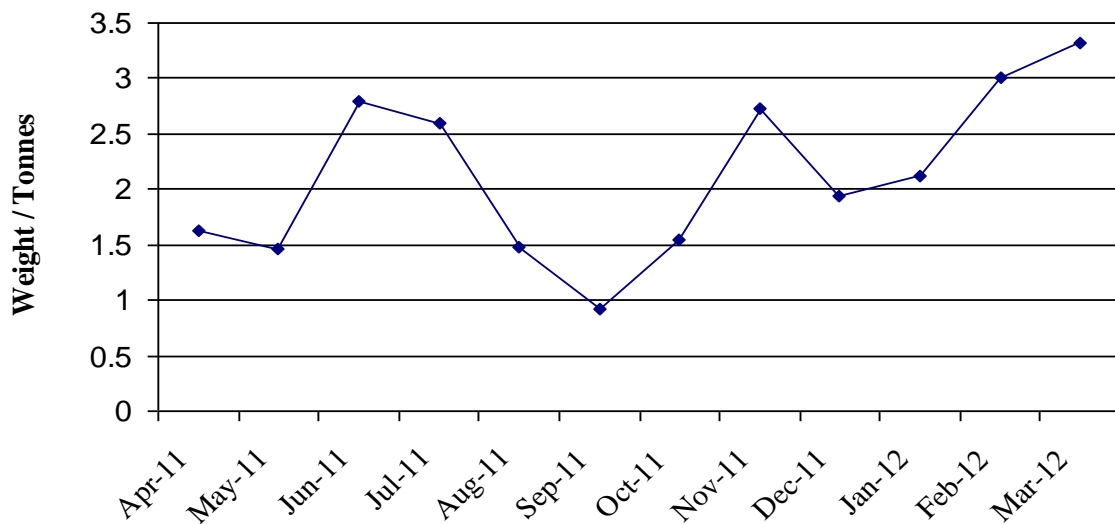


Figure 1: Scrap metal recycling in tonnes (CBC internal records, 2012)

6.1 Composition of bulky waste stream

During the three month monitoring period from January to March 2012, CBC collected 5524 items bulky waste items, this amounted to 50.37 tonnes. In order to analyse the bulky waste stream in detail these items were categorised by item. The 12 most commonly discarded items are shown in Table 4.

Table 4: Bulky waste items and electrical goods collected January 2012 to March 2012

Type of item	Number of units	Weight/unit (kg)	Total weight (kg)
Mattress	877	10	8,770
Sofa	654	20	13,080
Armchair	171	10	1,710
Sofa bed	14	60	840
Chair	204	3	612
Futon	4	35	140
Bed Base	340	10	3,400
Table	101	10	1,010
Bed	47	20	940
Cabinet	61	15	915
Chest of Drawers	60	10	600
Wardrobe - dismantled	28	20	560
White goods	525		8020
Household electrical items	449		5281

With a large variety of items included in the analysis, it was necessary to cluster bulky waste streams into groups of items (Table 5). The groups chosen were outlined in section 4.2.

Table 5: Weight of bulky waste items collected (January to March 2012)

Group of items	Weight collected Jan-Mar 2012 (kg)
Soft furnishings	16,382
Electrical items (including white goods)	13,301
Wooden furniture	9,650
Mattresses	8,770
Carpets, rugs etc	3,445
Miscellaneous	437

The most dominant group of items collected is furniture, with this group being made up of mostly sofas, and mattresses. Many items collected on the bulky waste collection service are not suitable for reuse since they are beyond their useful life, do not regularly pass safety and fire regulations for reuse, or are unattractive to the current market. However, there may be recycling opportunities to explore where items can be dismantled or deconstructed and the metal, wood or fabric contained within them can be recycled. Removing wood from the bulky waste stream in this way for recycling would also reduce the amount of organic waste sent for landfill disposal.

6.2 Estimating and identifying bulky waste potential reuse and recycling opportunities

WRAP's Waste Prevention Toolkit (WRAP, 2009) estimates the potential for reuse and recycling opportunities from the bulky waste stream as follows:-

- Furniture, reusable in current condition 20%
- Furniture, potentially repairable 25%
- White goods, potentially repairable 7.5%
- White goods & other metal, recyclable 20%

- Unrecoverable items not suitable for repair or reuse 27.5%

CBC collected 227 tonnes of bulky waste in 2011/12, if 72.5% of this was recovered (as outlined in the WRAP study), then there is the potential to increase CBC's annual recycling rate by 4%. This would require the segregation of reusable and potentially reusable items from the bulky waste stream.

During the three month study period, 18% of the total number of items (1013 items) collected could not be matched to the generic items due to incomplete data, or being classified as "other", because there was no information other than the number of items; and as such it is not possible to give an accurate estimate of the weight of these items. Over the course of a year this exceeds 4000 items, which could potentially add up to 40 tonnes of recoverable items and materials if each item weighed an average of 10kg. Improved data collection would be able to confirm this.

6.3 Alternative recycling and reuse options

There are recycling options available for some of the items not suitable for reuse; for instance, it is possible for the wood in wooden furniture e.g. bookcases and wardrobes to be recycled and there are specialist recycling treatment centres for carpets, which already process some carpets for LAs in the UK (Carpet Recycling UK, 2013) and mattresses (MRW, 2010). Mattresses and sofas appear in the bulky waste stream in sufficient quantities to make their segregation worthwhile. There are around three tonnes of each present in the waste stream each month. These items can be dismantled and different materials used in their manufacture, for example metals, wood and textiles can be recycled through existing recycling routes.

Alternative routes for reuse of bulky household waste exist; these include online sites such as eBay, freecycle, free local newspaper advertisements, second hand furniture shops, and car boot sales, and take back disposal schemes via retailers which operate for a limited number of items (e.g. mattresses WEEE).

These alternative recycling and reuse routes have different logistical challenges, but the promotion of these alternative routes for bulky waste could prevent it entering into CBC household waste stream.

6.4 Categorising items for reuse, repair or recycling

There is only a limited understanding of the type of items collected by the bulky waste service. Quantifying the bulky waste streams in terms of type of items and weight of individual categories highlights the areas to target for reuse and recycling opportunities in order to reduce the quantity sent for landfill disposal. In addition, it is unknown how many items are reusable in the condition they are discarded, or how many just require slight repair to become reusable. Currently no segregation takes place at either the collection point or prior to disposal. It would be useful to assess items at an early stage and categorise them as reusable; require minor repair; require major repair; not repairable but recyclable; and neither repairable nor recyclable.

Items suitable for reuse and/or recycling need to be separated early in the collection system; and identify items with reusability or recycling challenges related to fire safety, quality issues, repairs required, etc. The current collection arrangements provide no facility for separating reusable items. Reuse is labour intensive as it involves collection, sorting, testing, refurbishment and reselling. The current contract arrangements do not make specific requirements for maximising reuse and recycling opportunities from the bulky waste stream.

6.5 Drivers for improving reuse / recycling

The revised Waste Framework Directive has an increased focus on reuse as it seeks to move waste up the waste hierarchy towards the preferred options of waste reduction and reuse ahead of recycling.

CBC has been ambitious in its attempts to reduce the amount of household waste collected and sent for landfill disposal by operating a comprehensive kerbside collection of recyclable materials and garden waste. In order to meet the targets it has set itself in the 2012 Zero Waste Strategy, CBC will have to continue to strive to increase the proportion of waste collected for recycling and reuse.

6.6 Barriers for reuse and recycling

CBC has responsibility for the collection of household waste; the regional LA (Leicestershire County Council) is responsible for disposal of the waste. This sometimes prevents a holistic approach to waste management. However a good working partnership enables both parties to make appropriate decisions regarding the sustainable management of waste.

Other factors that make it difficult to improve the proportion of bulky waste that is reused and recycled include poor and incomplete data, limited capacity for handling furniture at the reuse projects and the current collection methods. Without segregation at the collection point, or at least prior to disposal there will be no improvement in the number of recovered items.

Amending the charging policy to introduce a fee for bulky waste collections may encourage residents to seek alternative routes for the disposal of this waste, with the possibility that more of it would be directed through reuse and recycling schemes, or any of the routes mentioned above.

7. Conclusion

Monitoring the bulky waste stream for a period of three months provided information on the type and number of items that have been collected from households through the special bulky waste collections. This waste stream is varied in composition; however, some data was missing. Providing more accurate data regarding the composition and quality of items collected would aid planning sustainable treatment and disposal routes for this waste stream.

Furniture was the most dominant type of bulky waste collected. There is potential for reuse of these items if they pass the quality standards required to make them acceptable for second hand use. An early assessment of the items regarding their potential for reuse, repair or recycling could lead to possible improvements in the CBC reuse and recycling rates.

The current CBC collection system for bulky waste is not operated in a way to encourage reuse or recycling of these items. It is set up to provide an efficient removal service for waste disposal at landfill sites. A range of changes would be needed to reverse this trend; these include:

- Operating a free of charge collection for residents may discourage them from trying to find alternative routes for their bulky waste item.
- Communication material that promote reuse and recycling.
- Publicity for local furniture reuse businesses such as SOFA project.
- Changing householders' behaviour studies.
- Maximising reuse and recycling opportunities in partnership with internal and external stakeholders.

- Improving coordination of services between waste contractor and LA regarding the potential for increasing reuse.
- Examining the cost and logistics of separating realistically reusable, repairable or recyclable items from genuine waste, identifying at referral and collection points.
- Storing items in a dry place before collection.
- Improving logistics, including handling and delivery and avoiding the use of a compaction vehicle for the collection round.

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