

## Case Study Report

# HIPPOBAG™ Case Study



Case study report assessing the use of HIPPOBAGS™ to improve the collection of non-inert waste materials at the Cardy Construction Ltd. site in Bexhill, East Sussex.

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**Written by:** WSP Environmental Ltd



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**Front cover photography:** HIPPOBAG™ being lifted using telehandler at Cardy Construction Ltd site in Bexhill, East Sussex.

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# List of Abbreviations

CDEW	Construction, Demolition and Excavation Wastes
FIBC	Flexible Intermediate Bulk Container
MRF	Materials Recovery Facility
SWMP	Site Waste Management Plan
WRAP	Waste & Resources Action Programme
WTN	Waste Transfer Note
WTS	Waste Transfer Station

# Contents

- 1.0 Introduction ..... 3**
- 2.0 About the HIPPOBAG™ ..... 4**
  - 2.1 What waste materials can be collected in a HIPPOBAG™? ..... 4
  - 2.2 How to position and use the HIPPOBAGS™ on site..... 5
  - 2.3 How are the HIPPOBAGS™ collected? ..... 5
  - 2.4 Operational Risks..... 6
  - 2.5 What is Waste Segregation and why is it important?..... 8
    - 2.5.1 Financial Benefits ..... 8
    - 2.5.2 Business Benefits ..... 8
    - 2.5.3 Environmental Benefits..... 8
  - 2.6 Using HIPPOBAGS™ to meet Legal Obligations ..... 9
  - 2.7 Preserving Material Quality for Recycling ..... 9
  - 2.8 Other Environmental Considerations ..... 9
- 3.0 Case Study Report ..... 11**
  - 3.1 Introduction ..... 11
  - 3.2 Review of HIPPOBAG™ use on site ..... 11
  - 3.3 Site Operative Training ..... 13
  - 3.4 Health and Safety ..... 13
  - 3.5 Financial Assessment ..... 13
  - 3.6 Case Study Summary ..... 15
- 4.0 Conclusions ..... 16**
- 5.0 Further Information ..... 17**
- 6.0 Acknowledgements ..... 18**

## 1.0 Introduction

The Materials Recycling Programme, initiated by WRAP (Waste & Resources Action Programme), aims to increase the quality of materials recovered from UK businesses for recycling. A key element of the programme is to focus on construction, demolition and excavation waste (CDEW) in order to support WRAP's wider construction sector work, which aims to help the industry as a whole to achieve the objectives set out by the government: The Construction Commitments: Halving Waste to Landfill.

WSP Environmental Ltd. was commissioned by WRAP to review current container options and techniques used for the collection and transport of Construction, Demolition and Excavation Wastes (CDEW) off site for further treatment and recycling. The research was to focus on the non-inert fraction of waste materials for which collections and recycling systems are currently under developed.

The materials to be considered during the research were the suite of typical non-inert waste materials generated on site, including packaging, wood pallets, timber, plastics, cardboard, tins, metals, plaster, plasterboard, insulation and ceramic materials.

Case study reports were produced, investigating innovative techniques for collecting waste materials on site, in order to understand the best and most practical methods available, keeping in perspective the need to collect high volumes of material for recycling whilst maintaining the best possible material quality for recycling.

The following report investigates the use of HIPPOBAGS™ as an alternative to standard skips for managing wastes on sites. The report considers a wide range of factors associated with the bag use, positioning and collection, as well as taking into account the relative benefits and drawbacks of the container choice. This report also considers the handling of the bags and sorting of waste materials for recycling at the HIPPOWASTE™ Waste Transfer Stations (WTSS) and Materials Recovery Facilities (MRFs).

This case study report is intended to help inform the industry of an alternative waste collection option currently available to the UK market; WRAP does not endorse any specific products discussed in this document.

## 2.0 About the HIPPOBAG™

HIPPOBAGs™ are a form of Flexible Intermediate Bulk Container (FIBC) manufactured from virgin, woven polypropylene and provided by the waste management company HIPPOWASTE™. The bags provide an alternative to traditional skips for collecting and segregating waste materials on site.

Figure 2.1 HIPPOBAGs™ being used to collect wastes on site.



Due to their small size, the bags are ideal for applications where a skip or larger container is not appropriate, such as when waste needs to be segregated at source or when working across several storeys or in awkward locations. The bags are also effective when used on sites with limited space, or sites that are producing smaller, irregular volumes of waste. The bags are available in three sizes, as detailed in Fig. 2.2.

Figure 2.2 The HIPPOBAG™ products and specifications.

Product Name	Volume (cu yd)	Dimensions (cm)	Capacity (tonnes)
Midibag	1	90 x 90 x 90	1
Megabag	1.5	180 x 90 x 70	1.5
Mightybag	4	250 x 140 x 100	1.5

### 2.1 What waste materials can be collected in a HIPPOBAG™?

HIPPOBAGs™ can be used to collect a wide range of inert and non-inert waste materials on site. However, the bags cannot be used to dispose of liquids, clinical wastes or animal or human by-products. Hazardous or specialist wastes may only be collected through prior arrangement with HIPPOWASTE™.

The two larger HIPPOBAGs™ were designed specifically for use by the construction industry. The Megabag was developed to accommodate an entire bathroom suite, and is also suitable for collecting other bulky wastes, including radiators, doors, kitchen units and other oversized items. The Mightybag was produced to meet customer demand for a skip sized bag suitable for collecting lighter, bulky wastes, such as carpets and light furniture units. The Mightybag is available on request for large scale waste disposal requirements and can only be used for the collection of lighter waste materials as the bag has a 1.5 tonne capacity limit.

The larger HIPPOBAGs™ have been used successfully to help deliver waste management support for refit projects associated with the government's Decent Homes<sup>1</sup> initiative. The initiative aims to improve the standard of all council and housing association homes, as well as aid vulnerable households in privately owned housing. The HIPPOBAGs™ were used to quickly collect wastes from the refits on a house by house basis.

## 2.2 How to position and use the HIPPOBAGs™ on site

HIPPOBAGs™ are delivered to site by courier or parcel delivery in flat packed batches ready for use (Fig. 2.3). The bags must be positioned correctly on site in order to ensure that they are used safely and efficiently, whilst enabling suitable access for collection. A brief training session or toolbox talk should be provided, advising site workers how to fill and position the bags in the most efficient way to help extract best value from them.

**Figure 2.3** Flat packed HIPPOBAGs™ delivered to site ready for use.



Empty bags can be placed manually close to the source of waste ready for use. HIPPOWASTE™ recommend folding down the sides of the bags ('cuffing') to improve rigidity and enable the bags to be filled from ground level upwards. HIPPOBAGs™ must be placed within 4 metres (13 feet) of a public highway and away from any walls, trees, parked cars, overhead wires or other obstructions. The highway must be at least 3.65 metres (12 feet) wide for the lorry to gain access. HIPPOBAGs™ should not be placed on public highways, pavements or verges without obtaining prior permission from the local authority.

If it is not practical to position the bags at the final waste collection point, empty bags can be placed on pallets prior to filling, enabling transport of the waste using a pallet truck once the bag is full. HIPPOBAGs™ also have fixed lifting loops, allowing the bags to be moved on site by crane. Once waste materials have been placed in the bags, they should not be moved manually.

## 2.3 How are the HIPPOBAGs™ collected?

HIPPOWASTE™ own a fleet of waste collection vehicles, with each vehicle able to collect approximately 18 cubic yards of waste, depending on the materials collected. Fewer bags may be collected if there are large quantities of heavy wastes, such as rubble and hardcore, to ensure that the vehicle stays within its safe working load. The HIPPOBAGs™ are loaded using the vehicle mounted crane, usually starting with the lighter waste types.

<sup>1</sup> COMMUNITIES AND LOCAL GOVERNMENT (2009) 'Decent homes and housing finance' [Online] Available from: <http://www.communities.gov.uk/housing/decenthomes/>

**Figure 2.4** Collection of a HIPPOBAG™ Megabag using the vehicle mounted crane.



On arrangement, the waste collection vehicles are able to remove bags from difficult locations. For example, restrictions placed on a site using HIPPOBAGs™ in Lowndes Square, London meant that waste materials could not be stored at ground level. HIPPOWASTE were able to safely collect the waste materials from a proof-loaded first floor gantry using the crane on the waste collection vehicle.

During the loading process, the HIPPOWASTE™ representative records the wastes that are being collected, creating a site specific assessment of waste. The representative is trained to identify suitable materials for collection and may refuse loads that have been contaminated with unsuitable waste types.

Transport and disposal costs are included in the collection fee, which varies depending on size of the bag, number of bags, site location and waste types. Dependent upon the project, the logistical costs associated with waste collection and disposal could be minimised by using HIPPOBAGs™, as several bags containing differing materials can be collected in one visit.

HIPPOWASTE™ have transport depots across the UK offering the flexibility to access to sites across the UK. In addition, there is some scope for depot relocation for larger projects to further reduce logistical costs.

## 2.4 Operational Risks

There are few additional risks associated with the use of HIPPOBAGs™ on site in comparison to standard techniques. The main risks to operatives are associated with the manual handling of waste materials to be placed in the bags. Risks can be minimised through appropriate training and monitoring of on site manual handling techniques. In addition, care should be taken to ensure that the bags are not manually handled once waste has been placed in the bags.

If the bags have been damaged on site, there may some risk that the bag will split when lifted or collected. Operatives must ensure that the bags are not mistreated on site and that the bag is inspected for punctures or other damage prior to lifting. In addition, bags must not be overfilled in order to reduce the risk of splitting and to prevent wastes from falling from the bag during transport. Toolbox talks can be an effective way of ensuring that the bag is positioned, filled and transported correctly on site to minimise risks.

On collection of the waste, appropriate precautions must be taken to minimise the risks associated with vehicle movements on site. HIPPOWASTE™ work to minimise human and mechanical risks associated with operation of the vehicle and crane through appropriate driver training and continuous development, as well as regular vehicle maintenance checks. In addition, the driver is trained to complete a visual assessment of each bag to ensure that there is no damage or over-filling prior to lifting.

## 2.5 HIPPOBAG™ handling at the Waste Transfer Station

Collected waste is transported to one of the HIPPOWASTE™ licensed Waste Transfer Stations (WTSs), Materials Recovery Facility (MRFs) or Recycling Centres. HIPPOWASTE™ have a network of approximately 60 - 70 third party tipping stations across the country which are used as appropriate, depending upon the construction site location and collected waste streams. These facilities are regularly audited by HIPPOWASTE™ to ensure that they meet both HIPPOWASTE™ standards and Environment Agency (EA) compliance criteria. Through these facilities, HIPPOWASTE™ have achieved recycling rates of approximately 80%. HIPPOWASTE™ are often involved in the early stages of a construction project to ensure that the predicted waste streams can be matched to a relevant, appropriately licensed local facility.

When the HIPPOWASTE™ collection vehicle arrives at the appropriate waste facility, the HIPPOBAGs™ bags are tipped from the back of purpose built lorries (Fig. 2.5). If the load contains HIPPOBAGs™ of fully segregated material that must be kept separate (such as plasterboard), the bags are craned off separately prior to tipping.

**Figure 2.5** Tipping of HIPPOBAGs™.



Handling of the HIPPOBAGs™ following tipping is dependent upon the facility type. In smaller WTSs, grab machines are often used to empty the contents of the bag (Fig. 2.6), which will then be manually sorted. Larger quantities of waste or bags full of specific materials may also undergo processing at the facility, for example, soil and hardcore processed through a trommel.

**Figure 2.6** Emptying of HIPPOBAG™ using grab and manual sorting of materials at a Waste Transfer Station.



In larger, fully mechanised facilities, the HIPPOBAGS™ may be tipped directly into the plant's feed hopper for further mechanical sorting. Any remaining material will often pass through a conveyor belt system where items are picked by hand (Fig. 2.6). The segregated waste streams will then be stored in designated bays at the facility, in accordance with their environmental permits (or exemptions).

The benefits of segregating materials using HIPPOBAGS™ on site are also passed to the MRF or WTS, as materials remain well segregated even after tipping. The bags also make it easier to identify any contamination that may not have been removed on site. Any contamination remains contained within the HIPPOBAG™, rather than potentially damaging a whole skip load. The HIPPOBAGS™ are also tagged on collection, meaning that loads can be traced back to the individual or company that filled them. This is of particular benefit if hazardous waste is found and the source needs to be identified. The system also enables HIPPOWASTE™ to liaise with the contractor and improve waste management on site.

The only potential problem with the use of HIPPOBAGS™ is a slightly reduced unloading efficiency at the MRF or WTS when individual bags must be removed by crane. Although this may take more time, the use of the bags helps to aid overall waste sorting efficiencies and limit material contamination, improving recycling rates.

## 2.6 What is Waste Segregation and why is it important?

Segregating wastes on site for recycling can introduce significant financial savings and enhance your business green credentials. An outline of the key benefits is summarised below:

### 2.6.1 Financial Benefits

- Waste diverted from landfill immediately reduces direct costs. Landfill tax increased in April 2010 to £48 per tonne, and is set to increase further.
- Well managed segregation maximises skip space and reduces collection costs.
- Waste materials that are properly segregated can have financial value; in certain circumstances where higher quality materials are generated in bulk it may be possible to sell the material to recyclers or reprocessors.

### 2.6.2 Business Benefits

- Taking an active approach to waste management through encouraging resource efficiency and recycling can be a differentiator for your business. Clients are becoming increasingly aware of the need to act sustainably, and those companies that can deliver improve their reputations, strengthen their bids for work and become more attractive to the best employers.
- The Government's National Procurement Strategy requires authorities to ensure sustainability considerations are built into their procurement contracts.
- Businesses can obtain guidance from WRAP who are helping the industry to achieve the objectives set out by government: The Construction Commitments: Halving Waste to Landfill<sup>2</sup>.

### 2.6.3 Environmental Benefits

- The energy used to manufacture new materials is partly saved through recycling wastes into new products.
- Some materials will degrade in landfill sites, releasing harmful greenhouse gases.

HIPPOWASTE™ have experienced problems on previous sites where the message of material segregation has not been fully taken on board by site operatives. For example, operatives have placed wood and plastics in the same container. Waste segregation involves separating each different waste stream into a different container. Segregating materials on site in this way helps companies to save money by identifying areas to improve resource efficiency and recycling rates, and aids compliance with legislation.

<sup>2</sup> WRAP (2009), 'The Construction Commitments: Halving Waste to Landfill' [Online] Available from: [http://www.wrap.org.uk/construction/halving\\_waste\\_to\\_landfill/index.html](http://www.wrap.org.uk/construction/halving_waste_to_landfill/index.html)

## 2.7 Using HIPPOBAGs™ to meet Legal Obligations

Segregating waste materials on site for recycling can help construction businesses to meet their legal obligations. The use of FIBCs, such as HIPPOBAGs™, encourages simple, source segregation of wastes on site, which will contribute to the requirements set out in the Duty of Care<sup>3</sup> and the Site Waste Management Plans Regulations<sup>4</sup>.

The Duty of Care places a number of responsibilities on those generating and transporting waste. Waste must be managed properly, recovered or disposed safely, must not cause harm to human health or pollution of the environment and must be transferred only to authorised businesses. An accurate record of all waste transported must also be kept through completing Waste Transfer Notes (WTNs).

In April 2008, the Site Waste Management Plans Regulations 2008 were introduced, requiring all construction projects in England over the value of £300,000 to have a Site Waste Management Plan (SWMP). The SWMP records information about the types and quantities of waste generated on site alongside details of how the materials will be reused, recycled or disposed of.

HIPPOWASTE™ are currently a licensed waste carrier able to sort wastes for recycling at their WTSs. When the HIPPOBAGs™ are collected, an accurate record of waste is made as the bags are loaded on to the vehicle, enabling the development of a comprehensive, site specific review of waste types and quantities. HIPPOWASTE™ currently use the BRE SMARTWaste Plan tool<sup>5</sup> to help to record and monitor wastes generated on site.

## 2.8 Preserving Material Quality for Recycling

The HIPPOBAGs™ are porous, allowing any water that may gather in the container to drain away. However, the bags would need to be sheltered in order to fully protect materials from inclement weather.

The smaller HIPPOBAG™ makes it easier to identify any contaminants in the load, meaning that objects placed through human error can be seen and can also be removed easily. Lidded HIPPOBAGs™ are available on request but are not supplied as standard.

Collection schedules can be tailored to remove full bags as quickly as possible, reducing the potential for incidents of contamination either by nature or by human influence, such as tampering or fly tipping.

## 2.9 Other Environmental Considerations

The HIPPOWASTE™ vehicles are purpose built to accommodate multiple container collections, thereby reducing vehicle movements on site and carbon emissions resulting from waste management on site.

The HIPPOBAGs™ are 'one cycle bags', meaning that after use, the bags are collected, baled and sent to a specialist plastics recycler. Although the bags are incredibly strong, they cannot be reused due to potential health and safety risks, as improper use or the bags may lead to weakening of the bags through puncturing or other damage. As the HIPPOBAGs™ are manufactured from virgin polypropylene, the bags have suitable value for recycling. Wherever feasible, the used HIPPOBAGs™ are baled with other bags of the same material (Fig. 2.7) and sent in bulk to a specialist plastics recycler.

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**Figure 2.7** Baled HIPPOBAGs™ ready for recycling.

<sup>3</sup> HMSO (1990), 'Duty of care etc., as respects to waste' [Online] Available from: [http://www.opsi.gov.uk/ACTS/acts1990/ukpga\\_19900043\\_en\\_5#pt2-pb3-11g34](http://www.opsi.gov.uk/ACTS/acts1990/ukpga_19900043_en_5#pt2-pb3-11g34)

<sup>4</sup> HMSO (2008) 'Site Waste Management Plans Regulations 2008' [Online] Available from: [http://www.opsi.gov.uk/si/si2008/uksi\\_20080314\\_en\\_1](http://www.opsi.gov.uk/si/si2008/uksi_20080314_en_1)

<sup>5</sup> BRE (2008), 'SMARTWaste' [Online] Available from: <http://www.smartwaste.co.uk/>



## 3.0 Case Study Report

### 3.1 Introduction

Cardy Construction Ltd. was the main contractor for a £10 million development at the Egerton Road site in Bexhill, East Sussex. The project involved demolition works and the construction of a block of 66 high specification, designer apartments. The building, comprises of seven floors, including two lower levels for car parking (Fig. 3.1).

**Figure 3.1** Cardy Construction Ltd. site for designer apartments in Bexhill, East Sussex.



HIPPOWASTE™ was the nominated waste contractor for the project and were closely involved in the monitoring of wastes from the site. They conducted a routine site visit every three to four weeks to assess waste management requirements, but were available for more frequent visits if the Site Manager deemed it necessary. The project was the fifth project that HIPPOWASTE had managed with Cardy Construction Ltd, and for this project HIPPOBAGS™ were being used throughout the duration to aid waste management on site.

### 3.2 Review of HIPPOBAG™ use on site

HIPPOBAGS™ were used on all floors of the development for collecting a variety of waste streams, with approximately 100 HIPPOBAGS™ kept in storage on site ready for use. When stocks were reduced to the last 20 bags, more were ordered to ensure a continuous supply, with no down time on site. Usage of the bags fluctuated depending on the stage of the project.

Waste materials segregated on the site included:

- timber wastes from shuttering used during reinforced concrete works;
- plastic wastes from plumbing and duct works;
- metal off cuts from dry lining works;
- rubble from demolition of existing chimney;
- insulation material;
- plasterboard and
- general waste

**Figure 3.2** HIPPOBAGs™ being used to segregate waste streams at source.



The bags were positioned on pallets near the source of waste, allowing the easy segregation of waste materials. When the bags were full, a pallet truck was used to move the bags to the hoist for transport to ground level. Full bags were stored in the designated waste area at the southern side of the site ready for collection (Fig. 3.3). In some circumstances, it was not practical to use several bags at source for segregating wastes due to the low volume of the waste streams generated and the time that would have been required to collect new bags from the ground level storage area. In these cases, wastes were collected in one mixed bag before being transported to ground level for sorting and removal of contamination. No waste was processed mechanically on site before being placed in the HIPPOBAG™.

**Figure 3.3** Location of waste storage area at southern side of site.



On average, approximately 20 HIPPOBAGs™ were picked up at each collection. This filled the waste collection vehicle which was scheduled to visit the site twice a week.

### 3.3 Site Operative Training

Approximately 35 - 45 workers were on site at any one time. Although no formal training is necessary to use the HIPPOBAGs™, the Site Manager requested that HIPPOWASTE provide a toolbox talk, educating site operatives in the correct positioning, use and transport of the bags on site. By receiving training from an external body, it was found that site operatives were more receptive to the new idea of using the bags on site. The toolbox talks were straightforward, lasting approximately 20 minutes. Three groups were taken for the toolbox talks, including representatives from all sub-contractors operating on site.

Initially there were some problems with site operatives overfilling bags. This was overcome by informing site operatives of the problem and monitoring waste management practices on site.

The successful segregation of materials on site provided some challenge. The Site Manager was considering options to improve waste segregation, possibly through colour coding the bags for different materials. The Site Manager also planned to introduce simple ply shutters to create divided bays which could be labelled for specific waste types. A HIPPOBAG™ could then be placed in each bay, which could be labelled to aid waste segregation.

### 3.4 Health and Safety

The Site Manager stated that the use of the HIPPOBAGs™ on site had not introduced any negative impact on the site Health and Safety plan. Use of the bags had actually improved health and safety on site, by improving housekeeping on site and ensuring that the floors were kept clear of debris. The tidiness of the site was commented upon by the client during a site visit. Use of the bags on site had also offered the opportunity to limit the number of vehicle movements required from waste collection, minimising associated health and safety risks on site.

Despite the exposed, coastal location of the site, which made the development vulnerable to high speed winds, no problems had been experienced with using the bags on site. New bags were kept in storage until they were needed, and when used on site, were placed in sheltered areas if necessary. As soon as wastes were placed in the bags, they were weighted and did not blow away.

**Figure 3.4** Transport of HIPPOBAG™ to waste storage area using telehandler.



### 3.5 Financial Assessment

In addition to the practical benefits of using HIPPOBAGs™ on site, significant financial savings can also be introduced. The financial benefits of using HIPPOBAGs™ on site are particularly notable for certain project types and at particular stages of the build process, for example, HIPPOWASTE™ recommend that for excavation and groundworks, traditional, larger containers are more appropriate for the collection of waste materials. The financial benefits and competitiveness of HIPPOBAGs™ are clear later in the construction process, when the building shell has been completed and fit out works can commence.

An example of the financial benefits gained from introducing HIPPOBAGS™ can be seen in Fig. 3.5. The contractor for the new build Medical Day Centre development altered existing waste management practices and introduced HIPPOBAGS to site with 39 weeks remaining on the project. This change reduced potential waste collection costs by more than 50%.

**Figure 3.5** Review of waste costs for a new build Medical Day Centre development with 39 weeks remaining.

Waste Collection Method	Item Cost	Cost (excl. VAT)
Original Method	Tipping Skips x 10 @ £40 = £400 per week	£15,600
	6 yard Skips x 3 @ £117 = £351 per week	£13,689
	Labourers x 2 @ £350 = £700 per week	£27,300
	<b>Total Cost (Original Method)</b>	<b>£56,589</b>
HIPPOBAG™ Method	Hippobags x 22 @ £32.50 = £715 per week	£27,885
	<b>Total Cost (HIPPOBAG™ Method)</b>	<b>£27,885</b>
<b>TOTAL SAVING (£56,589 - £27,885)</b>		<b>£28,704</b>

\* Costs exc. VAT. HIPPOBAG™ cost based on the use of 1 tonne Midibags, with full lorry loads collected. General waste streams only (i.e. specialist waste collections, such as WEEE, are priced separately).

In addition to the above financial savings, the contractor was able to save additional time as they had previously produced their own quarterly waste reports. HIPPOWASTE™ were able to provide these reports on a monthly basis as part of their service.

HIPPOWASTE™ aim to reward construction sites for high volume waste collections and a reduced carbon footprint through offering a lower price per bag. Bulk purchase may also affect prices, and site location may impact waste collection costs.

### 3.6 Case Study Summary

**Figure 3.6** Review of HIPPOBAG™ use on site for managing non-inert CDEW.

Case Study Observations	On site Implications
<ul style="list-style-type: none"> <li>HIPPOBAGs™ were delivered to site flat packed.</li> </ul>	<ul style="list-style-type: none"> <li>A space efficient solution as bags can be stored and are only on site when in use.</li> </ul>
<ul style="list-style-type: none"> <li>HIPPOWASTE provided training to site operatives in how to use the bags and segregate materials effectively.</li> </ul>	<ul style="list-style-type: none"> <li>Operatives can be more receptive to training from an external body, rather than in house.</li> <li>Appropriate training reduces health and safety risks on site.</li> <li>Appropriate training helps to ensure that materials are segregated correctly and contamination is avoided.</li> </ul>
<ul style="list-style-type: none"> <li>HIPPOBAGs™ have a small footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Practical alternative for sites with limited space, sites with several storeys or for collecting waste in awkward locations.</li> </ul>
<ul style="list-style-type: none"> <li>HIPPOBAGs™ enabled on site segregation of a large number of different waste streams at source.</li> </ul>	<ul style="list-style-type: none"> <li>Segregating waste at source improves housekeeping on site, minimising health and safety risks.</li> <li>Aids compliance with legal obligations, such as Site Waste Management Plans Regulations (2008).</li> <li>Offers the potential for contractors to improve recycling rates and reduce waste sent to landfill.</li> <li>Enables the segregation of lower volume waste streams that would otherwise be impractical to collect using traditional containers.</li> </ul>
<ul style="list-style-type: none"> <li>HIPPOBAGs™ could be transported on site using a forklift, telehandler or crane.</li> </ul>	<ul style="list-style-type: none"> <li>No special equipment is required to move bags on site. Bags can be attached to a telehandler or crane via the corner lifting loops, or can be placed on pallets to enable transport using a forklift as required</li> </ul>
<ul style="list-style-type: none"> <li>Where possible, HIPPOBAGs™ were not manually handled once waste materials were placed inside.</li> </ul>	<ul style="list-style-type: none"> <li>Manual handling of the bags once materials have been placed inside presents a health and safety risk which must be properly assessed.</li> </ul>
<ul style="list-style-type: none"> <li>Some difficulty was encountered with segregating wastes due to a lack of signage.</li> </ul>	<ul style="list-style-type: none"> <li>Waste signage is available to aid on site waste segregation.</li> <li>Appropriate training of site operatives and regular monitoring of wastes can help to avoid problems with waste segregation and contamination.</li> </ul>
<ul style="list-style-type: none"> <li>HIPPOWASTE generated comprehensive, site specific data regarding the waste types leaving the site.</li> </ul>	<ul style="list-style-type: none"> <li>Identifies areas to improve resource efficiency and save money.</li> <li>Aids compliance with legal obligations, such as Site Waste Management Plans Regulations (2008).</li> <li>Identifies opportunities for contractors to improve recycling rates and meet Halving Waste to Landfill targets.</li> <li>Aids waste management planning and waste forecasting for future projects.</li> <li>Appropriate waste management plans encouraging high recycling rates are attractive to key clients who are increasingly demanding sustainable development.</li> </ul>
<ul style="list-style-type: none"> <li>HIPPOWASTE were able to collect up to 20 HIPPOBAGs™ per collection (depending on weight).</li> </ul>	<ul style="list-style-type: none"> <li>Differing waste streams that have been source segregated can be taken at one collection, reducing the number of waste collections necessary and minimising vehicle movements on site.</li> <li>Reduced vehicle movements help to minimise health and safety risks on site and help to reduce carbon emissions from waste transport.</li> </ul>
<ul style="list-style-type: none"> <li>Financial benefits.</li> </ul>	<ul style="list-style-type: none"> <li>Significant financial benefits can be introduced through reduced waste collection costs and use of site specific HIPPOWASTE™ reporting.</li> </ul>

## 4.0 Conclusions

On the Cardy Construction Ltd. site, the HIPPOBAGs™ provided a practical solution to waste management on site, enabling the source segregation of wastes across the floors and easy transport of full bags to the waste storage area. The restricted space at the waste storage area would not have permitted the number of traditional skips that would have been necessary to segregate the wide range of materials for recycling. The use of the bags on site also helped to ensure that the site was kept tidy, which was a positive impact noticed by the client upon a site visit.

The primary benefits of using the HIPPOBAGs on site included:

- reduction in waste storage facilities required on the space restricted site;
- financial savings made due to the reduction in waste collections required;
- minimisation of vehicle movements on site;
- reduced health and safety risks due to reduced vehicle movements; and
- reduced CO2 emissions as a result of improved logistics management.

The initial problems encountered with the utilisation of the bags on site included overfilling of the bags. Waste segregation had also proved challenging at the ground floor designated waste storage area, as some difficulties were encountered separating waste streams correctly. Both of these issues can be overcome by educating and informing site operatives at tool box talks, as well as through regularly monitoring waste management practices on site. In addition, an industry led, generic colour coding scheme is used for waste type signage that can be used to aid on site waste segregation. Further information about waste signage can be obtained from Waste Aware Construction<sup>6</sup>.

Monitoring of wastes leaving the site helped to identify areas to improve resource efficiency and maximise recycling rates. The system also enabled compliance with legal obligations, such as the Duty of Care and Site Waste Management Plans Regulations (2008) and is important for measuring against Halving Waste to Landfill targets where applicable. Further information about The Construction Commitments: Halving Waste to Landfill can be found on the WRAP website at:

- [http://www.wrap.org.uk/construction/halving\\_waste\\_to\\_landfill/index.html](http://www.wrap.org.uk/construction/halving_waste_to_landfill/index.html)

Overall, the HIPPOBAGs™ provided a practical solution for managing wastes on a development with several storeys and restricted waste storage space, offering the potential to maximise recycling rates and reduce vehicle movements on site.

<sup>6</sup> WASTE AWARE CONSTRUCTION (2009) 'Waste Stream Colour Coding' [Online] Available from: <http://www.wasteawareconstruction.org.uk/colour.asp>

## 5.0 Further Information

### ■ WRAP

WRAP's vision is a world without waste, where resources are used sustainably.

WRAP works with businesses and individuals to help them reap the benefits of reducing waste, develop sustainable products and use resources in an efficient way.

Find out more at [www.wrap.org.uk](http://www.wrap.org.uk)

This case study applies to two key work areas covered by WRAP:

**Construction** - Helping the construction industry cut costs and increase efficiency through the better use of materials.

**Recycling Industry** - Providing practical help and support to enable a sustainable and profitable industry.

### ■ HIPPOBAG™ Supplier: HIPPOWASTE™

HIPPOWASTE™ is the trading name for Waste Management Systems Ltd, a national provider of innovative and integrated waste management solutions. The company delivers waste management solutions to householders, business and trade users, and local authorities nationwide.

Further information can be found on their website: <http://www.hippobag.co.uk/waste/>

### ■ Main Contractor: Cardy Construction Ltd.

Cardy Construction Ltd. are a construction company operating primarily in the south east of England. The company specialises in general building and construction works, but has also been involved in restoration projects, refurbishment and renovation works and high specification residential developments.

Further information can be found on their website: <http://www.cardyconstruction.co.uk/>

## 6.0 Acknowledgements

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**Waste & Resources  
Action Programme**

The Old Academy  
21 Horse Fair  
Banbury, Oxon  
OX16 0AH

Tel: 01295 819 900  
Fax: 01295 819 911  
E-mail: [info@wrap.org.uk](mailto:info@wrap.org.uk)

Helpline freephone  
0808 100 2040

[www.wrap.org.uk/constructionmrf](http://www.wrap.org.uk/constructionmrf)

