the Strategic Design Alliance

Leeds Non-PFI: Defining Municipal Waste Site Requirements.

Final Report

prepared for

Leeds City Council

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	Originator	Checked by	Reviewed by	Approved by
ORIGINAL	NAME **Sophie Elsworth**	NAME **Martin White**	NAME **Martin White**	NAME **Jane Bond**
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FINAL DOCUMENT	NAME	NAME	NAME **Martin White**	NAME
DATE **04 September 2009**	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
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1. Executive Summary

1.1 Introduction

This document aims to define the future municipal waste requirements which need to be delivered to achieve increases in recycling and composting as well as to meet the need for waste transfer activity. This document will inform the policy requirements of the Natural Resources and Waste Development Plan Document (NR&WDPD) and is part of the evidence base.

1.2 Scope of the Study Update

The purpose of the report is to clearly define in strategic terms the future requirements up to 2026 for the following municipal waste facilities:

- Food Waste Facilities/Green Waste Composting.
- Household Waste Sorting Sites.
- Materials Recovery Facility.
- Waste Transfer Stations.
- Residual Landfill requirements following these activities.

Although the Yorkshire and Humber Plan (RSS) only defines the future waste management requirements to 2021, the RSS housing growth requirements run until 2026. Therefore, this report has forecast the requirements to 2026 to reflect the potential household growth which will need to be planned for in the City. The aim of the report is to:

- Provide the future capacity required to be managed through different waste management processes in 2026.
- Review the existing capacity for each type of waste management process to identify the additional capacity required to meet requirements to 2026.
- Identify how many additional facilities are required to fulfil the additional capacity required.
- Provide an indicative building footprint and site area for each facility.
- Define the operational and location criteria for each facility.
- Identify any sites from the 2007 Site Selection Study and addendum to assess if they would be suitable for developing any of the facilities identified above.

The aims highlighted above are identified within sections 3-7 for each municipal waste facility. The overall need, the future capacity needed, the number of additional facilities required and a summary of the planning considerations are set out in section 8. The requirements for the Residual Waste Treatment Facility (RWTF) are dealt with in a separate Site Selection Report which is also part of the evidence base for the NR&WDPD.

1.3 Summary of Requirements

Overall the results of the needs assessment indicated that LCC would require additional capacity for Food Waste Facilities, Materials Recovery Facilities, Household Waste Sorting Sites, Green Waste Composting and Waste Transfer Stations.

Food/Organic Waste Facilities

New waste management facilities will be required to treat or compost organic waste arising from food and green wastes collected at the kerbside and Household Waste Sorting Sites (HWSS):

- Additional capacity required is 45,000 tonnes per annum to deal with the Municipal Waste Stream (the actual capacity of a facility may be greater if proposals also include Commercial and Industrial Waste).

- The capacity requirement increases to 92,000 tonnes per annum if green waste is incorporated into a single organic treatment facility which deals with food and green waste together in the same process. This may occur as a result of collecting food and green waste together at the kerbside.

- At least one new facility will be required but more may come forward dependent on how the future market develops as the price of landfill increases and the amount of void space decreases.

- If garden waste is not included within the food waste facility, separate facilities for food and green waste will be required.

- Major considerations are; impact on surrounding properties, working hours, strategic accessibility, impacts on future regeneration and areas of economic importance and impacts on the historic and natural environment. Ideally food waste facilities should be located within existing industrial areas away from residential properties or potentially sub-urban and rural locations to serve local markets. They should incorporate high quality design specifications and practices which minimise the potential for odour.

- There are two main types of technology for food waste facilities, In-Vessel Composting (IVC) and Anaerobic Digestion (AD). In terms of differences between them, site selection criteria and planning requirements are similar. Odour appears to be perceived as more of a potential issue in IVC than AD particularly if stages of the process are not enclosed. In terms of the aspirations for Leeds, AD may represent the most suitable in planning terms as it is most aligned with the objectives of the emerging Natural Resources and Waste Development Plan Document.

Green Waste Windrow Composting

- Separate facilities will be required to deal with green waste collected at HWSS even if waste collected at the kerbside is treated in a combined food waste facility.

- If green waste collected at the kerbside is also dealt with through windrow composting rather than through the food waste facility, the total capacity arising from the Municipal Waste Stream would be 64,000 tonnes. This could be dealt with by a network of smaller facilities with a typical capacity of 25,000 tonnes or a single larger facility. Developing more than one facility may reduce transport costs by reducing the total distance travelled from collection points but clearly this means finding a number of sites.

- Green waste compost can be used by farmers and in the restoration of landfill sites. This type of operation may need to be located within the Countryside and also potentially within the Green Belt. A specific policy which deals with this point will need to be included in the NR&WDPD.

Household Waste Sorting Sites (HWSS)

HWSS accept materials for recycling or disposal which are not suitable or are too large for kerbside collection for example; paint, electrical equipment and unwanted household items. They also provide bring recycling facilities for bottles, paper, plastics etc. There is currently a network of 11 HWSS across the City with a current throughput of approximately 75,000 tonnes of material.

- By 2026, the total capacity forecast to meet the increase in recycling is anticipated to be 90,000 tonnes per annum.

- Gamblethorpe HWSS is currently operating on a temporary planning permission and is due to close during 2010 (it currently accepts between 8000 and 10,000 tonnes of waste per annum). Taking into account its closure, approximately 25,000 tonnes of additional throughput will be required to meet the Councils recycling targets.

- Much of this additional capacity is likely to be met through seeking to increase capacity at existing sites (for example through extending opening hours during the summer into the early evening). Most sites already have a licensed capacity far greater than the current throughput which means that changes in how they operate should mean they can accept more waste. The main issue at HWSS is accepting waste during peak periods, such as weekends, during nice weather and bank holidays.

- The number of additional facilities required will depend on their size. The future requirements of HWSS are currently being looked at by LCC through a strategic review which should be completed by October 2009. However, at least one replacement site is likely to be required to meet geographical gaps in provision once Gamblethorpe is closed (rather than to increase overall capacity). The policies of the NR&WDPD will need to reflect that additional sites may be required.

- New HWSS facilities need to be located close enough to residential areas to enable people to access them easily and be designed to mitigate potential noise, dust and queuing impact. Some new facilities are now enclosed to minimise potential impacts.

- A site capable of achieving a throughput of 25,000 tonnes per annum would typically require a footprint of one hectare. However, facilities often occur on much smaller sites and can be designed to fit the site characteristics.

Materials Recovery Facility (MRF's)

MRFs accept dry recyclables which arise from Leeds City Councils kerbside collection scheme including paper, cans, cardboard and plastics. MRF's are required to sort and separate materials for re-processing into usable products. Therefore, it is an essential process in terms of facilitating and supporting the market for recycling.

- Based on further roll-out and increased frequency of the kerbside collection of co-mingled dry recyclables and enhanced public participation resulting from education, a capacity of 40,000 tonnes is required to meet this requirement at 2026.

- A typical MRF facility has an operating capacity of 25,000 tonnes per annum but facilities can be built with a much greater capacity. The number of facilities required may depend on whether more facilities are developed to reduce transportation. A MRF with a 25,000 tonne capacity would require a site footprint of approximately 1.5 hectares. However, facilities with a throughput of 80,000 tonnes can be built on sites of 2 hectares as much of the overall land take is for peripheral uses such as landscaping, car parking etc. Therefore, the size of the actual building does not need to increase significantly to provide a higher overall throughput.

- It may be feasible to convert existing industrial buildings into MRFs provided certain specifications can be met.

- Leeds currently sends recyclable waste to merchant capacity at HW Martin at Parkside Industrial Estate. This means LCC pay a gate fee to the operator rather than directly operate the facility themselves. The capacity of this facility is 60,000 tonnes, although this could be increased to 80,000 tonnes if the number of shifts was increased.

- Leeds may want to procure its own dedicated facility rather than rely on merchant capacity.

- Any future site needs to be well located strategically as material is collected from the kerbside and taken straight to the MRF.

- There is the potential for co-locating MRFs with other facilities particularly with transfer operations and HWSS.

- Previously Developed land or buildings within existing industrial estates are the most appropriate locations for such facilities.

Waste Transfer Stations (WTS)

Waste Transfer is an important aspect of sustainable waste management as it ensures waste is transported efficiently between the point of collection and its place of treatment or disposal. Operations normally take place in a building where waste is bulked up and then transferred from smaller refuse collection vehicles onto larger vehicles for onward transportation.

- The total waste transfer capacity for dealing with Municipal Waste generated in Leeds required at 2026 is 126,000 tonnes per annum.

- There is an existing WTS at Evanston Avenue off Kirkstall Road, Leeds. This is operating below capacity due to a fire damaging the building.

- The total number of facilities based on a typical size of existing facilities is one single facility as the capacity is within the range which can be achieved for Waste Transfer Stations. Depending on detailed planning considerations (e.g. vehicle movement restrictions) or site constraints, three smaller WTS could provide the capacity required if this was more appropriate.

- WTS are usually located on sites which are well located between where waste is collected and the point which it is recycled, treated or disposed of. Sites generally have direct access to the strategic road network.

- WTS need to be located in areas where any potential impacts can be mitigated. In particular, operations may sometimes take place at unsocial hours and measures should be put in place to minimise any potential for noise or odour impacts.

Landfill

In terms of additional landfill requirements once recycling and residual treatments are allowed for, the following annual capacity would be required at 2026.

- Non-Hazardous Landfill (Waste Direct to Landfill) - 37,000 tonnes.

- Non-Hazardous Landfill (Waste from Energy from Waste Facility) – The PFI Whole Life Cost Model has assumed that all this material will be reused or recycled rather than sent to landfill.

- Hazardous Landfill - 8,000 tonnes.

1.4 Assessment of the Potential for Co-Location

The different characteristics and requirements of recycling facilities mean that some waste management uses maybe more suitable for co-location than others:

- Waste Transfer Stations are most likely to be dictated by optimum travel distances between the point of collecting waste and where it is managed. By virtue of their function,

WTS are not generally located with other treatment and recycling facilities. The most likely combination is with a Household Waste Sorting Sites and/or a combined transfer and sorting MRF, as was the case prior to the fire at the Evanston Avenue transfer facility.

- A MRF is entirely enclosed in an industrial type building. For this reason, a MRF could be located on the same site as a waste treatment facility and/or a Household Waste Sorting Site.

- Household Waste Sorting Sites can probably be co-located with most other types of facility, provided that they serve local needs and would not give rise to local amenity impacts. Separate access arrangements are likely to be necessary to avoid vehicular conflict with the other facilities.

- Composting facilities maybe located in the Countryside. If this is the case, it is unlikely that it would be acceptable to deliver other facilities in combination with them. Organic treatment facilities, which may process food waste separately to green waste, should generally be located within an industrial estate away from residential properties. It could be located with HWSS and MRFs provided in similar locations.

1.5 Potential Sites

A site selection study to identify sites for a major waste facility was completed by Jacobs in September 2007. This has recently been updated through an Addendum. As the objective of the site selection study was to identify a potential site for residual waste treatment only, it is possible that other sites which were discounted under this process could be suitable for other types of waste management facilities, such as recycling, composting or other smaller scale treatment or community energy recovery schemes.

An initial review of these has identified that the following sites could potentially be investigated further for possible identification in the Natural Resources and Waste Development Plan Document for other waste management purposes:

- Britannia Quarries, Morley: This is an existing quarry but has an extant planning permission for a Waste Transfer Station.

- Howley Park Industrial Estate Morley: This is within an area adjacent to Brittania Quarry and the Howley Park Brickworks and Quarry is located opposite the site on the other side of the motorway.

- Tyresal Lane Employment Allocation. Although an existing employment allocation, it is quite isolated from residential properties.

- Sites within Stourton, dependent on the current development position and impact of the current economic circumstances on the prospect of their further development.

- Vacant sites in the Thorp Arch trading estate or the uses of existing buildings. There is already a Skip Waste Transfer Station and Household Waste Sorting Site at this location.

- Chapagne Whin. This has a history of waste uses and its isolation may make it suitable for some types of waste use.

2. Task Overview

2.1 Introduction

The purpose of this document is to define the future municipal waste requirements which the Council will need to deliver to meet recycling and composting targets as well as to provide new waste transfer facilities. This information will help inform the policy requirements of the Natural Resources and Waste Development Plan Document (NR&WDPD).

The report covers the following facilities:

- Food Waste facilities with green waste potential.
- Green Waste (Windrow) Composting (GWC) facilities
- Household Waste Sorting Sites (HWSS).
- Waste Transfer Station (WTS).
- Landfill capacity for the residual landfill that will still arise from municipal waste over this period.

The amount of capacity required for residual waste treatment is set out within the Site Selection Study 2007 and Addendum.

2.2 Brief

The brief for this report is:

- To provide the future capacity required to be managed through each type of facility at 2026 based on the most recent waste flow model produced in July 2009.
- To review existing capacity for each type of waste facility to identify the additional capacity required at 2026.
- To indicate how many additional facilities to fulfil the additional capacity are required based on the typical size of facilities which can normally be achieved. This includes setting out where this could be provided through either a greater number of smaller facilities or a smaller number of larger facilities and what the advantages and disadvantages of each approach might be.
- To provide an indicative building footprint for each facility. The building footprint is given separately so if joint facilities are proposed (for example waste transfer and sorting together under one building), it is possible to determine how big a building might need to be.

- An indicative total site area footprint for each type of facility is also provided to include wider development areas such as landscaping and car parking.

- To define operational and location criteria for each type of facility so they can inform future site requirements and planning criteria within the Natural Resources and Waste Development Plan Document (NR&WDPD.

- Comment on the potential for providing different facilities together within the same building or on the same site.

- To identify if any sites from the site selection study in 2007 could possibly be investigated further to see if they might be suitable for developing any of the facilities identified in this report.

2.3 Report Format

The report will be set out in the following order and provide the following information:

- Section 3.0: Food Waste Treatment and Green Waste Composting (GWC): This section sets out the food waste treatment requirements. This will be collected from households at the kerbside and can potentially be used to produce compost, fuel and/or power. This section sets out the capacity required, the technology choices in how this might be delivered and the planning requirements. It also sets out separately the requirements for GWC facilities should this source of waste not be processed together with food waste.

- Section 4.0: Household Waste Sorting Sites (HWSS). Leeds currently has a network of eleven sites across the City where people can bring waste for recycling and unwanted household items which are too big or not suitable for the normal refuse collection. This section sets out the total capacity which will need to be managed at these sites by 2026 to meet Council recycling targets. Jacobs has obtained figures from LCC relating to current throughputs being achieved at each site and the total throughputs allowed for by waste management licenses. However, there are some limitations to the recommendations of this section until further work on a strategic review of household waste site provision is completed by the City Council.

- Section 5.0: Materials Recycling Facilities (MRF).These facilities take either segregated at source or co-mingled waste and sort this into a useable recyclate. Current MRF capacity in Leeds is provided by merchant capacity which means the Council pays a gate fee to a commercial provider to sort the recyclate collected.

- Section 6.0: Waste Transfer Station (WTS). Waste transfer is required to reduce the impact of transport so waste collected at the kerbside is taken to its final destination as efficiently as possible.

- Section 7.0: Residual Landfill Requirements. Even with waste reduction, increased recycling and composting and residual treatment some remaining waste will still need to be sent to landfill. For example if waste is contaminated so it cannot be recycled, it is hazardous and needs special requirements or is a residual product from another product such as treatment.

- Section 8.0: Summary. This sets out the overall need and planning requirements for each facility.

- Appendix 1 sets out the detailed gap analysis which has informed the conclusions and finding in the main report.

3 Food Waste Facilities/Green Waste Composting

3.1 Introduction

The EU Landfill Directive is driving Local Authorities to reduce biodegradable waste sent to landfill in order to minimise methane emissions (a potent greenhouse gas). Furthermore, the EU and UK Governments have set stringent recycling targets for Municipal Waste whilst also implementing the Animal By-Products Regulation (ABPR) 2005 in order to minimise the likelihood of disease outbreaks such as Foot and Mouth. For these reasons composting is an important tool in the management of Biodegradable Municipal Waste.

The council is proposing to procure a food waste treatment contract. An In-Vessel Composting (IVC) facility and/or an Anaerobic Digestion (AD) facility could be delivered through this contract. The food waste facility will need the ability to deal with a capacity of the following throughputs:

- If the facility accepts food waste only, it would have a throughput of approximately 45,000 tonnes.

- If it accepts co-mingled food and garden waste collected together from the kerbside it would require an increased throughput of approximately 92, 000 tonnes.

Both of these types of waste will be collected at the kerbside.

This section will set out the operational processes and requirements of each option including providing an estimate of the site footprint required for an In-Vessel Composter and an Anaerobic Digestion facility, considering the operational criteria associated with each facility and, based on these, identifying the planning criteria.

IN VESSEL COMPOSTING (IVC)

3.2 The Process

The term 'In Vessel Composting' is used to cover a wide range of composting systems all of which feature the enclosed composting of waste. In-vessel systems can be broadly categorised into five types: containers, silos, agitated bays, tunnels and enclosed halls.

Composting is the process by which biodegradable waste is broken down by micro-organisms, in the presence of oxygen, to produce a stabilised residue known as compost. By utilising the natural composting process, the biodegradable waste can be reduced in weight by up to 60% and converted into a soil conditioner rich in nutrients and humus. In-Vessel Composting allows this to happen in a practical, sustainable and efficient manner.

IVC typically takes between 7 and 21 days, with a maturation time commonly between 4 and 10 weeks. Additionally it must comply with the Animal By-products Regulations to destroy pathogens which means waste must be either heated at above 70 degrees for one hour or alternatively at a lower temperature of 60 degrees for 2 days.

The volume of compost produced for distribution is usually around half of the original waste volume. The compost is far more stable and sanitary than the biodegradable municipal solid waste input, mainly due to the self heating biological oxidation and stabilisation that occurs during composting. The

composted products are used on-site or off-site, sold or distributed free of charge as, for example, soil conditioners, mulch, land restoration, material, or daily landfill covers.

3.3 Typical Physical and Operational Characteristics

As a starting point we have identified the typical characteristics of an In Vessel Composting (IVC) from previous OPDM research (table 3.3.1). It is updated to incorporate information from Jacobs experience of such facilities.

Table 3.3.1: In Vessel Compost – Characteristics

Characteristics	**25,000 tonnes per year plant composting waste containing kitchen/catering waste.**
Typical lifetime	10 – 25 yrs
Site area/ land take	1- 2 ha
Building footprint	Mobile in-vessel containers: 3000 – 4000m2
Maximum height	Mobile in-vessel containers: 3m
Hours of operation	8 hours, 5 – 6 days per week
Vehicle movements	20 – 40 refuse collection vehicles or equivalent per day dependent on the payload of the vehicle.
Air Emissions	Airborne microbes can be controlled through mitigation measures therefore no significant emissions should arise.
Odour	A creation of natural odours cannot be completely avoided at composting facilities. In enclosed composting systems the risk of odour is lowered by the physical containment and extraction/infiltration.
Dust	Dust should not be an issue at correctly run operations, where material moisture contents are maintained at levels above those at which dust is generated (less 30%)
Noise	Limited potential for significant noise impacts as operations are normally fully enclosed and designed to mitigate against this. .
Proximity to sensitive Receptors	Site specific risk assessment needs to be a condition if composting operations are to be located close to sensitive receptors such as schools, residential properties etc. In general, new facilities should be located away from such uses and preferable within existing industrial areas as is favoured by PPS 10 and the RSS.
Transport Infrastructure	Requires good access from primary road network and access roads which are free from HGV restrictions.
General Siting	Areas allocated for business use and traditional commercial/industrial urban areas or open areas within the Countryside.

ODPM, 2004 Planning for Waste Management Facilities: A Research Study and Jacobs experience of such facilities.

More refined work, based on the Whole Life Cost Model undertaken by Jacobs for this project, has identified that the following operational characteristics would be necessary for the Leeds facility under the following two scenarios:

Scenario 1 – Kitchen Waste Only

- The approximate annual tonnage throughputs per year are, input 45, 000 and output 20, 000. This is based on the estimated tonnage in year 2026 that will supply the Food Waste Contract.
- Waste is brought directly to the facility on a standard refuse collection vehicle with a payload of 10 tonnes.
- The compost/digestate is taken to market on a tractor head and semitrailer which has an average payload of 25 tonnes.
- The potential total vehicle movements per day based on these vehicle sizes (Mon – Fri) are:
    - - Input 35 vehicles
    - - Output 6 vehicles
- This gives 41 potential total vehicle movements per day (Mon – Fri). A vehicle movement is one trip in and out of the site.
- Operating hours during the day are generally normal working hours between 0800 and 1600 although some facilities may operate into the early evening.

Scenario 2 – Kitchen and Garden Waste if Treated in Combination

- The approximate annual tonnage throughputs per year are input 92, 000 and output 40,000. This is based on the estimated tonnage at year 2026 that will supply the food waste contract.
- The potential total vehicle movements per day (Mon – Fri) based on the same vehicles sizes of scenario 1 are:
    - - Input 71 vehicles
    - - Output 12 vehicles
- This gives a total of 83 potential total vehicle movements per day (Mon – Fri). A vehicle movement is one trip in and out of the site.
- A standard operational day is 0800-1600 hours although some facilities may operate into the early evening.

In order to identify the optimum location with regard to transport movements, further modelling work would be required.

3.4 Typical Site Footprint

Table 3.4.1 indicates the relationship between capacity and footprint to provide examples of the capacities and footprints of facilities. This can be used to inform a reasonable estimate of the footprint which may be required to deliver the throughput capacity for Leeds.

Table 3.4.1: In Vessel Composter – Comparison of Site Footprint

Source	Specific Site (if applicable)	Tonnage (tpa)	Processing Area (ha)
WRATE - This is an interrogative database which uses known examples of facilities.		14,300	0.6
Data Derived from internet mapping tools (google earth etc.)	Lynbottom, Isle of Wight	15,000	0.9
Data Derived from internet mapping tools (google earth etc.)	Christchurch, Dorset	20,000	0.7
Jacobs	High Heavens IVC nr Wycombe, Bucks	15,000	0.8
ODPM: Planning for Waste Management Facilities: A Research Study, 2004		25,000	1.0
Calderdale MBC Website	Todmorden	50,000	1.2

The processing area includes the facility and surrounding ancillary operations (i.e. reception area, weighbridge, landscaping, turning area etc). The correlation between capacity and footprint will not be linear as site specific and technological issues may influence footprint as well as factors specific to each planning application or the site characteristics. For example, the facility may be designed to fit on a particularly small site or certain technologies have focused on designing compact operating modules. Dependent on the final throughput, it is considered that a site of at least 1 hectare would be necessary to accommodate the facility. Additional space above this minimum threshold would provide more flexibility to a potential contractor dependent on their final requirements.

3.5 Key Planning Considerations and Mitigation

The following information has been taken from the ODPM Planning for Waste Management Facilities. In addition to this Jacobs has also reviewed the planning application for an extension to an existing In Vessel Composting Facility at Todmorden.

Traffic

Deliveries of waste are usually linked to waste collection rounds, as well as the collection of green waste from Household Waste Recycling Sites where this waste is processed in combination with food

waste. Vehicles should be routed away from inappropriate roads such as sensitive residential areas and schools.

Air Emissions

Recently developed operations are now generally fully enclosed meaning that this is not a significant issue. Areas of open storage should, however, be generally avoided.

Dust

Dust should not be an issue on correctly run sites where material moisture contents are maintained at levels above those at which dust is generated (less than 30%). In order to maintain these levels the levels should be monitored at all stages to prevent the waste from drying out.

Odour

In closed composting the risk of odour is lowered by their physical containment and the potential for pumping stale, exhaust-air into odour removal systems, such as bio filters, chemical scrubbers or burners. There is potential for some low level intermittent odour from queuing vehicles, however, the overall impact is still low. Odour may become an issue if open storage was used but operations are now normally fully enclosed and other measures such as rapid roller shutter doors are employed to minimise the potential for odour. Evidence on odour control and a programme of monitoring is likely to be required as part of the planning process.

Noise

Sites can be positioned a reasonable distance from sensitive receptors to achieve effective noise control. Other mitigation measures include fitting machinery with silencers and reducing the use of machinery during public holidays and weekends. Quick closing roller shutter doors also minimise the escape of odour and minimise noise.

Litter

In those cases where litter occurs, it can be alleviated by using net barriers and fences or natural vegetation barriers to contain the litter and provide wind breaks. This should not generally be a problem where vehicles are sheeted and planning conditions are likely to require litter picking and sweeping if necessary.

Visual Intrusion

Careful site selection and appropriate orientation of the building footprint together with appropriate screening can help to minimise any potential adverse impact. Buildings should also be designed so they are sensitive to their surroundings. For example, a recently facility at Driffield in East Yorkshire has been designed so it has a similar appearance to an agricultural building.

In Vessel Composting – Example of Todmorden Facility

In August 2006, TEG Environmental PLC was granted planning permission by Calderdale Metropolitan Borough Council (Ref 06/01313/FUL) for an In Vessel Composting facility located at Sharneyford Works, Bacup Road, Todmorden, West Yorkshire. The throughput of this plant is

currently limited to 35 thousand kilotonnes per annum (ktpa) because of the building size. The implementation of the PAS100QP standard since the original design of the Todmorden facility resulted in a requirement for longer product maturation meaning the original intended capacity of 50,000 tonnes per annum could not be achieved. TEG has very recently received planning permission (Ref 08/01746/WAS) to extend the building in order to allow an increase in capacity up to the 50ktpa without compromising the PAS100QP certification.

Specific site details including the building extension are:

- Total gross internal floorspace – 6764 m2.
- Site Area – 1.2 ha.
- Maximum annual operational throughput in tonnes – approximately 35,000ktpa prior to the building been extended and 50,000ktpa with the building extension.
- Design – Roofs – Steel Cladding Walls – Cladding and art stone. Fairly standard industrial building although it is designed to fit with the surroundings.
- Delivery Vehicles – Current input delivery is 10 – 14 vehicle movements per day and in terms of output delivery approximately 4 vehicles per day. However, the planning permission allows for up to 40 vehicle movements in any one day. It is not known what vehicles sizes these vehicle movements are based on.
- Approved working Hours are 07.00 – 19.00 Mon to Fri and 07.00 to 13.00 Saturdays.
- There are 10 full time employees.
- There is a condition imposed on the planning application which requires odour monitoring reports to be submitted to the satisfaction of the Local Planning Authority.

ANAEROBIC DIGESTION (AD)

3.6 Introduction

Anaerobic Digestion is the biological treatment of biodegradable organic waste in the absence of oxygen, utilising microbial activity to break down the waste in a controlled environment. Anaerobic digestion results in the generation of:

- Biogas, which is rich in methane and can be used to generate heat and/or electricity.
- Liquid effluent which can be broken down further into liquid effluent or a solid digestate.

3.7 The Process

The main process steps in the digestion of municipal solid wastes (MSW) are pre-treatment, anaerobic digestion and post-treatment. During the anaerobic digestion process between 30% and 60% of the feedstock is converted into biogas. This gas must be burned and can be used to generate

heat and power, whether via an engine or turbine, a gas burner or boiler, or a vehicle engine. When generating electricity, the use of a combined heat and power system enables heat to be removed in the first instance to maintain the temperature of the digester, then surplus energy can be used for other purposes or sold to the grid.

As more feedstock is introduced into the system, the digestate is pumped into a storage tank. Biogas continues to be produced in this tank and collection and combustion of this may be both an economic advantage and a safety requirement. This residual digestate can then be separated to produce a fibre and a liquor.

AD consists of a number of phases and depending on the bacteria, different heating and time requirements for this process will also be necessary to comply with the Animal By-products Regulations.

Typical Physical and Operational Characteristics

The typical characteristics of a small scale and centralised Anaerobic Digestion Plant have been identified from previous OPDM research at table 3.8.1. It is updated to incorporate information from Jacobs experience of such facilities.

Table 3.8.1: Anaerobic Digestion – Characteristics

Characteristic	**Small Scale Plant – throughput circa 5,000 tpa**	**Centralised Plant – throughput circa 40,000tpa**
Typical lifetime	25 yrs	25 yrs
Site area/ land take	0.15 ha	0.6 ha
Building footprint	30m x 15m, plus 4 circular tanks of 6 – 10m diameter.	40m x 25m, plus 2 circular tanks of 15m diameter
Maximum height	7m, maximum tanks height 6m	7m, tanks 6m
Hours of operation	24 hour process, wash deliveries, 20 days per month, typically 0700h – 1700h weekdays.	20 days per month, typically 0830h – 1730h weekdays and 0800h – 1300h on Saturdays although longer working hours for example to 1900 can be agreed with the Local Planning Authority. The reason there isn't 24 hour operation is that plants with larger throughputs are likely to have planning conditions imposed that prevent the site been operated 24 hours a day to reduce the impact on the surrounding area. Clearly the actual process with be continual.
Vehicle movements	Maximum of 4 waste collection vehicles or equivalent per day.	Approximately 20 waste collection vehicles or equivalent per day. One JCB used to move waste around on site.
Air Emissions	Low compared with those for other waste disposal options	
Odour	Fully enclosed operations, likely to be limited potential for significant odour impacts.	Operations are now generally fully enclosed and have modern processes and design features to reduce any potential problems.
Dust	Fully enclosed operations, likely to be limited potential for significant dust impacts.	
Noise	Fully enclosed operations, likely to be limited potential for significant noise impacts.	

Characteristic	Small Scale Plant – throughput circa 5,000 tpa	Centralised Plant – throughput circa 40,000tpa
Proximity to sensitive Receptors	Facilities should generally be sited away from sensitive land uses, such as schools, residential properties etc. Locations within existing industrial areas are favoured by PPS 10 and the RSS.	
Transport Infrastructure	Requires good access from primary road network and access roads which are free from the restriction from HGV's	
General Siting	Sub-urban and rural locations to serve local markets including agricultural users. However, planning considerations relating to the open countryside and the Green Belt would need to be taken into consideration and facilities may not necessarily be appropriate in such locations.	Areas allocated for business use and traditional commercial/industrial to serve a wider catchment area and because the operation is on a larger scale.

The data provided in this table is based on Jacobs' experience in the waste management sector and supplemented with information from ODPM, 2004 Planning for Waste Management Facilities: A Research Study.

Anaerobic Digestion Facilities have the capacity to produce Biofuel or Electricity. Essentially these processes are similar, with the main difference that they require different processing equipment at the rear of the site. Anaerobic Digestion facilities with the capacity to produce electricity require a gas engine to combust the gas, a turbine to generate electricity and a connection to the national grid. Anaerobic Digestion facilities with the capacity to produce Bio-fuel will require cleaning and compression equipment to prepare the gas as a methane fuel and a distribution point or a refuelling stop for vehicles. There are currently no existing Anaerobic Digestion facilities that produce Biofuel in the United Kingdom although permission for a new facility in Driffield, East Yorkshire, has just been granted planning permission.

More refined work by Jacobs based on the Whole Life Cost Model undertaken for this project has identified that the following operational characteristics would be necessary for a new facility in Leeds:

Scenario 1 – Kitchen Waste Only

- The approximate annual tonnage throughputs per year are, input 45,000 tonnes and output 38,000 tonnes based on year 2026.This assumes a wet AD process where a significant addition of process water occurs and this is assumed to require tankering off site. The number of output vehicle movements could be lower with a dry AD process.
- Waste is brought directly to the facility on a standard refuse collection vehicle with a payload of 10 tonnes.
- The compost/digestate is taken to market on a tractor head and semitrailer which has an average payload of 25 tonnes.
- The potential total vehicle movements per day (Mon – Fri) are:
    - - Input 34 vehicles
    - - Output 12 vehicles

- This gives 47 potential total vehicle movements per day (Mon – Fri). A vehicle movement is one trip in and out of the site.

- Operating hours during the day are generally normal working hours between 0800 and 1600 although some sites may operate into the early evening.

Scenario 2 – Kitchen and Garden Waste if Treated in Combination

- The approximate annual tonnage throughputs per year are input 92,000 and output 77,000 based on 2026. This assumes a wet AD process where a significant addition of process water occurs and this is assumed to require tankering off site. The number of output vehicle movements could be lower with a dry AD process.

- The potential total vehicle movements per day (Mon – Fri) are:

    - - Input 71 vehicles

    - - Output 24 vehicles

- This gives a total of 95 potential total vehicle movements per day (Mon – Fri). A vehicle movement is one trip in and out of the site.

- A standard operational day is generally normal working hours between 0800-1600 hours although some sites may operate into the early evening.

- In order to identify the optimum location with regard to transport, further modelling work would be required.

Typical Site Footprint

Table 3.9.1 provides an indication of the relationship between capacity and footprint which can be used to inform a reasonable estimate for the footprints that may be required at the capacities Leeds are considering.

Table 3.9.1: Anaerobic Digestion – Comparison of Site Footprint

Source	Specific Site (if applicable)	Tonnage (tpa)	Processing Area (ha)
ODPM: Planning for Waste Management Facilities: A Research Study, 2004		40,000	0.6
OWS Belgium	Hypothetical site based on modular DRANCO Process. Based on OWS Belgium site.	100,000	1.6
		200,000	3.1
		300,000	4.7

Source	Specific Site (if applicable)	Tonnage (tpa)	Processing Area (ha)
WRATE		38,000	1.0
Recent Planning Permission at Driffield, East Yorkshire.	Driffield, East Yorkshire	50,000	2.0 (but the planning application incorporated a bigger area than was required)

The processing area includes the facility and surrounding ancillary operations (i.e. reception area, weighbridge, landscaping, turning area etc). The correlation between capacity and footprint are not directly proportionate as site specific and technological issues may influence footprint. For example, the facility may be designed to fit on a particularly small site or certain technologies have focused on designing compact operating modules.

The table highlights that the tonnage throughput is not proportionate to the size of the site although it appears that Anaerobic Digestion may require a slightly smaller footprint than In Vessel Composting. However, it is still considered that a site of at least 1 hectare will be necessary to accommodate the larger throughput of 75,000 tonnes and a site greater than this threshold would provide more flexibility for a future contractor.

3.10 Key Planning Considerations and Mitigation

The following information has been taken from the ODPM Planning for Waste Management Facilities: A Research Study, 2004 and therefore the following points are an indication of the issues and mitigation measures associated with the facility. We have also incorporated findings from reviewing the planning application for the Driffield facility.

Traffic

The impact of waste deliveries to larger anaerobic digestion facilities may be minimised by routing delivery vehicles away from inappropriate roads and sensitive areas such as schools and seeking to schedule deliveries to avoid rush hour traffic flows.

Air Emissions

To avoid pathogen transfers, controls should be put in place such that a centralised anaerobic digestion plant could be isolated from other operations, that vehicle wheels can be washed, the wash water disposed of in a suitable way and that liquid and fibre leaving the site are carefully contained.

Dust and Odours

Appropriate siting of the facility along with effective site and plant management can minimise odour impacts. Operations should be fully enclosed with no outdoor storage and negative ventilation systems fitted with biofilters will control and contain odours within buildings. Quick shutting roller doors are also a further design feature which can be incorporated to minimise noise and odours. There is potential for some low level intermittent odour from queuing lorries, however, the overall impact is still low. Odour may become an issue if open storage was used but operations are normally

fully enclosed to avoid this. However, presenting evidence on odour prevention and a programme of monitoring are likely to be required as part of the planning process.

Vehicle wheel washing is likely to be necessary at centralised facilities, to minimise dust levels and reduce the potential for cross contamination.

Noise

Sensitive design of the main buildings and tanks, along with noise reduction in features on specific plant components, should enable noise levels to be kept to reasonable levels. Appropriate design of the site, including acoustic enclosures and physical barriers, as well as the location of operations that will give rise to noise as far as practically possible from sensitive receptors, is recommended.

Visual Intrusion

Visual intrusion can be minimised by:

- Co-locating the facility next to existing buildings of a similar scale.
- Landscaped bunds around the perimeter of the site, planting around the site.
- Partial burial of the digester, storage and reception tanks, dividing the plant up and laying electricity connections underground or careful route selection of overhead lines.
- Where possible, avoiding Countryside locations and sites within the Green Belt where this could cause impacts on the prevailing landscape or openness of land. The building in Driffield has been designed to give the appearance of an agricultural shed as it is located on an existing farm.

Anaerobic Digestion – Example of Existing Planning Permission

GWE Biogas is currently developing a 50,000 tonnes per annum AD facility at Driffield in East Yorkshire. Planning approval was granted in May 2009 with construction due to commence in June 2009 and commissioning in summer/autumn 2010. The site will generate between 1.5MW and 2MW of renewable electricity for export to the National Grid. The facility will also produce a liquid and solid bio fertiliser from the process which will be used as an organic bio-fertiliser by the applicant's associated farming businesses on about 1,400 hectares of land in the area. The development will represent a form of agricultural diversification and provide a source of local employment for up to 15 equivalent full time staff.

Specific Site Details:

- Built Site Area – approximately 2 ha.
- Overall Site Area – 13 ha.
- Throughput – 50,000 tonnes per annum.

- Design – The development will consist of a 2,811 square metre steel framed building clad in steel sheet having the appearance of an agricultural grain storage type building. The two other buildings on site will be used for employee facilities. These are low level prefabricated modular buildings structures having the appearance of many farm offices.

- Delivery Vehicles – Maximum of 78 delivery loads over a 6 day period (Monday – Saturday) equates to 13 loads per day (26 delivery vehicle trips in total – 13 arrivals and 13 departures). However, we have not established what size vehicles these are and much of the input into the site is likely to be from commercial markets and not just municipal waste streams which may be larger than refuse collection vehicles.

- Staff Vehicles – Maximum of approximately 30 staff vehicle trips (15 arrivals and 15 departures).

- Fertiliser Vehicle Trips – Maximum of approximately 500 fertiliser spreading trips made by tractor and trailer per year.

- The site is located within the open countryside and close to the motorway network.

- It will provide enough heat to supply a local business park and enough electricity to fully power 2000 homes or light 15,000 homes.

- It is part funded by the Anaerobic Digestion Demonstration Programme.

- Sources of waste are local authorities, food producers, manufacturers and supermarkets.

Overall Location Requirements of Food Waste Facilities (AD or IVC).

The main perception of food waste facilities is that this may lead to potential odours even though this can generally be mitigated through the operation and design of buildings. Buildings are designed so they appear similar to other industrial types of operations. As such, they are generally more suitable to urban rather than countryside locations, although there may be cases whereby they are proposed in the latter in conjunction with other agricultural operations and/or composting. Where they are proposed in the Countryside, conflict with policies relating to the Green Belt and the open countryside would be particularly contentious and in a mainly urban authority in Leeds there may be no justification for doing so where alternative previously developed sites may be available. As such, new facilities should ideally be confined to existing industrial estates which is the preferred approach in both the RSS and PPS 10.

3.11 Green Waste Composting (GWC)

Green Waste facilities will still be required even if waste collected at the kerbside is treated in combination with food waste because some will still be deposited at HWSS. If green waste is considered to include garden waste collected at the Kerbside, at HWSS and Trade Green waste the total tonnage requiring treatment is set out in Table 3.11.1 below. This is different to the amount of garden waste element included in the food waste facility because it includes other sources of green waste such as that collected at HWSS.

Table 3.11.1: GWC Assumptions

		Tonnes	Comments
Current Capacity		No current capacity	Provided by LCC.
Tonnage Processed in 2026		64,000	Sourced from latest PFI model.
Size of Typical GWC Facility	Small	25,000	Based on Jacobs' knowledge.
	Large	50,000	Based on Jacobs' knowledge.

Note: the numbers of facilities are based on typical facility sizes observed in the UK. Any deviation from this size, whether larger or smaller, will inevitably result in a different number of facilities required.

The future need was calculated by subtracting the existing GWC capacity from the throughput in 2026. Table 3.11.2 below identifies the capacity gap and the number of GWC facilities required to process this quantity of waste.

Table 3.11.2: Number of GWCs Required

GWC	Additional Required Capacity in 2026 (Tonnes)	Number of Facilities Required
Small	64,000	3
Large	64,000	2

Under the assumption that LCC will require capacity to treat an additional 64,000 tonnes of MSW in 2026, it is estimated that between 2 and 3 facilities will be required.

GWC operations are generally very basic in form consisting of concrete slabs, machinery for turning waste and access roads. Windrow composing takes place where the waste is stored in large deposits and periodically turned. This process often takes place at farms where the compost can be used in agricultural practices or on landfill sites where the composted material can be used as part of the restoration process. The existing saved policies of the UDP already acknowledge that Green Waste Composting operations may take place in the Countryside.

3.12 Key Planning Considerations

The information on each technology provided in the earlier sections of the report can be used to identify the key planning criteria that will impact on the choice of location for a new facility. The considerations are essentially the same regardless of technology choice but any differences are highlighted in the bullet points below.

- A site footprint to meet the higher anticipated throughput for both facilities should be at least 1 hectare. However, if site area above this threshold was available this would provide a future contractor with greater flexibility.

- A major consideration will be the impact on surrounding properties in terms of the potential for odour even where operations are fully enclosed. This will still represent one of the key planning considerations in terms of determining future applications even if it is considered that the potential for odour in modern buildings may be limited. As such, a future location for such uses should be within an existing highly industrialised location or alternatively an area that is reasonable remote from other land uses particularly residential properties. In terms of the latter, this may mean that a more open or countryside location or existing landfill sites although this would not be favoured where it could bring a proposal into conflict with policies on the Green Belt or Open Countryside.

- Facilities generally appear to operate during normal working hours Monday to Friday and Saturday morning, although the facility at Todmorden has permission to operate into the early evening to 1900 Monday to Friday.

- In addition to the criteria above, accessibility is also a key consideration. A site needs to be both strategically accessible to the whole City, but also locally accessible in terms of not having any significant highway constraints. As such, a location with direct access to the main trunk network would be most appropriate. More detailed transport modelling work on defining an optimal location in terms of access to the rest of the City would be required. A particular issue which could require further investigation is if waste transfer might be appropriate to reduce the number of vehicle movements and to improve sustainability. For example, if a potential site was outside the main urban area and involved travelling longer distances to reach it, this might make waste transfer more appropriate.

- If sites are located in the Countryside, there is the potential for development to conflict with policies which protect the openness and amenity of the countryside and the Green Belt. This is more likely to be a greater consideration in Leeds which is essentially urban in characteristic and therefore offers more potential to provide sites within existing built up locations and on previously developed land. In terms of current planning policy, a site allocated for existing industrial uses is more likely to be appropriate as essentially food waste composting represents a B2 Use Classes Order development (Industrial Development). Both the RSS and PPS 10 favour such locations.

- Impacts on future regeneration and areas of economic importance would also be important considerations. A proposed facility located in an area of significant regeneration may be subject to scrutiny and potential objection from developers. However, a balance must be struck as a facility may be compatible or compliment existing uses and the current character of the area. Although the most risk adverse approach may be to avoid areas of potential regeneration, where this is not possible it will be necessary to address these impacts as part of any future planning application. In terms of employment generating potential, a typical operation employs between 10-15 people.

- The impact on the historic and natural environment should be minimised and avoided by seeking to choose a site which avoids these issues.

- In terms of future existing planning policy, the Natural Resources and Waste Development Plan Document should either seek to identify appropriate sites and/or a policy which sets out the planning criteria which will be applied when planning applications for food waste composting are being considered. This will need to reflect the considerations set out in this report.

- In terms of differences between the two choices of technology, the site selection criteria and planning requirements are fairly similar although from our research odour appears to be perceived as more of a potential issue in IVC than AD. From a sustainability perspective, AD also appears to be emerging as the preferred technology, possibly because the end products allow a combination of heat, power and fertilizers suitable for agriculture or other uses. Therefore, in terms of the aspirations for Leeds, AD may represent the most suitable in planning terms as it is most aligned with the objectives of the emerging Natural Resources and Waste Development Plan Document.

- The nature of composting facilities and potential for medium level odours means that they may have very specific location requirements meaning co-location with other waste management facilities could be difficult to achieve.

Any site should also be deliverable in terms of potential for acquisition or by virtue that it is already within the ownership of the Council or a contractor.

4. Household Waste Sorting Sites

4.1 Overview

Household waste sorting and recycling sites (HWSS) are where householders can bring unwanted household items for free disposal. They are an important mechanism for achieving recycling targets, because they accept waste which is not accepted as part of the normal collection service.

4.2 The Process

Leeds City Council (LCC) currently operates eleven HWSS. In 2007/08 these facilities accepted 75,200 tonnes of recyclable and residual waste and 73,133 tonnes during 2008/2009. The majority of this tonnage is from households, however commercial waste can be taken to one of two transfer stations located in Leeds. One is at Kirkstall Road and another in East Leeds (East Leeds is currently closed to commercial waste pending completion of redevelopment work. A newly designed HWSS will re-open in Autumn 2010 which will accept both household and commercial waste). Both of these sites are operated by LCC.

Householders take their recyclables to a household waste sorting site. These sites may be split level for ease of access and usually incorporate skips, collection areas for waste refrigeration, metal appliances and recycling banks. A greater diversity of recycling banks are often found at these sites than at local bring sites, including containers for materials such as waste batteries, paint, oil and wood. A wide range of materials are collected at HWSSs. These include:

- Paper.
- Metal Cans.
- Cardboard Packaging.
- Plastics.
- Glass bottles and jars.
- Aerosol cans.
- Textiles and shoes.
- Foil.
- Batteries (car and household).
- Books.
- Ink cartridges.
- Spectacles.

- Stamps.
- Mobile Phones.
- WEEE (Electrical equipment including those which need special disposal such as fridges).
- Furniture.
- Oil.
- Paint.
- Timber.
- Green garden waste.
- Tyres.
- Inert Wastes.
- Scrap metal.
- Fluorescent lights.
- Chemicals.
- Re-usable furniture.

4.3 Typical Physical and Operational Characteristics

Table 4.3.1 below sets out the typical characteristics of a HWSS based on Jacobs experience from the waste management sector, the operational characteristics of existing sites in Leeds and also information from ODPM research.

Table 4.3.1: HWSS - Characteristics

Characteristic	Small HWSS – throughput circa 5,000tpa	Large HWSS – throughput circa 25,000tpa
Typical lifetime	Permanent	
Site area	Around 0.5 ha	Around 0.5-1 ha
	HWSSs are typically open air areas of hard standing with basic access arrangements. A mobile site office may be situated on site. However, more modern facilities may be enclosed within a building.	
Hours of operation	April to October – 9am to 5pm November – March 9am to 4pm	
Vehicle movements	Upto 1,000 cars per day on large sites on busy days. Vehicles removing waste streams for further treatment – average 2-3	

Characteristic	Small HWSS – throughput circa 5,000tpa	Large HWSS – throughput circa 25,000tpa
	vehicles per day but this may depend on the operational requirements of the site and how busy it is. Therefore, 6-10 movements may occur on some sites.	
Employment	3 workers per site in Leeds.	
Noise	In sensitive locations such as within residential areas careful design of internal arrangements is essential.	
Existing Landuse	Preference for sites allocated for industrial/business use adjacent to existing built up areas. Or areas of degraded, previously contaminated or derelict land rather than greenfield sites. Sites should be located away from sensitive properties and land uses. Although HWSS maybe located on former landfill sites they are not generally acceptable in the Green Belt.	
Proximity to sensitive Receptors	HWSSs need to be located close to residential areas so they can easily be accessed by householders. There is a trade off between convenience and the potential public concern if they are too close to properties or require access through residential streets.	
Transport Infrastructure	HWSSs have the ability to attract large numbers of people. These facilities need to be located near to centres of population or on the edge of urban areas, and served by suitable road infrastructure, usually good quality A/B class roads. Queuing may occur on occasion, and the impact of such queues on traffic flows should be considered when planning and designing the facility.	

The data provided in this table is based on Jacobs' experience in the waste management sector and supplemented with information from ODPM, 2004 Planning for Waste Management Facilities: A Research Study.

4.4 Future Need

A gap analysis has been undertaken and is provided as Appendix 1. The Gap Analysis indicated that Leeds will require approximately 90,000 tonnes of waste to be processed through Household Waste Sorting Sites at 2026. The current licensed capacities and current throughput of HWSS's in LCC are illustrated in table 4.4.1.

Table 4.4.1: Current HWSS Throughputs and Licensed Capacity in Leeds

HWSS	Licensed Capacity (Tonnes)	Current Throughput (Tonnes)	
		2007/8	2008/9
Calverley Bridge	7,499	1,775	1,489
East Leeds	10,000	4,682	6,974
Ellar Ghyll	24,999	5,083	4,776
Gamblethorpe	01	8,938	8,077
Grangefield Road	24,999	10,027	8,573
Holmewell Road	24,999	10,657	10,319
Kirkstall Road	7,499	1,851	2,668
Meanwood Road	15,000	10,529	9,612
Milner Road	24,999	8,321	7,486
Stanley Road	24,999	7,943	8,398
Thorp Arch	24,999	5,395	4,761
Total Capacity	189,992	75,200	73,133

[1] the actual licensed capacity is 7,499 tonnes, though, as this facility is going to be closed in 2010, no capacity has been assumed.

As table 4.4.1 shows, when the total current licensed capacities of HWSS's are compared against the predicted tonnage to be processed in 2026, there is a surplus of around 100,000 tonnes in licensed capacity. In reality, some of these facilities will be unable to process the amount of licensed waste capacity because they will reach optimum daily limits due to layout and operational limitations. These limits are most likely to be reached at the weekends and bank holidays when sites experience a significant peak. Based on current throughputs been achieved and taking into account the future closure of Gamblethorpe (which has accepted upto 10,000 tonnes per annum in the past), the capacity gap with future need at 2026 is approximately 25,000 tonnes.

The City Council is currently undertaking a strategic review of its HWSS provision and this is due for completion by the end of 2009. This review will identify where there is the potential to increase current throughputs at existing sites and if gaps in provision may exist, particularly with the planned closure of Gamblethorpe in 2010. The existing East Leeds site is already planned for redevelopment during 2010 and the potential for redeveloping the existing site at Evanston Avenue is also likely to be investigated. This means only Calverley Bridge remains to be modernised.

As such, it is highly likely that the capacity required at 2026 could be met through seeking to achieve higher throughputs at existing sites (for example by investigating if opening hours could be extended during the summer), seeking reciprocal arrangements with adjoining authorities so Leeds residents can use facilities in other authorities and through providing additional facilities. It is likely that at least one additional site is likely to be required in the east of the City to meet the gap in provision left by the closure of Gamblethorpe. The NR&WDPD should seek to allow for this.

At present due to the uncertainty of actual capacity at the HWSS it is difficult to predict the number of additional facilities required. This will be firmed up once the Council has completed its strategic review of household waste sites, which is due for completion in October 2009.

4.5 Typical Site Footprints

A single facility with a capacity to process 25,000 tonnes of waste per annum would require a total site area of approximately 1ha.

It should be noted that any facility constructed on a site of less than 1 ha may be difficult to develop due to a limited space during construction. Many smaller historic sites also experience operational problems once throughput increases. As such, it should be assumed that the minimum total site area required (processing and auxiliary areas) is 1 ha.

4.6 Key Planning Considerations and Mitigation

The following information has been taken from the ODPM Planning for Waste Management Facilities: A Research Study, 2004 and therefore the following points are an indication of the issues and mitigation measures associated with the facility. We have also incorporated findings from reviewing the planning application which Jacobs previously submitted on behalf of the City Council in August 2007 at Gamblethorpe.

Site

HWSSs need hard standing areas to site recycling bins, skips and possible compactors which can be fully/partially enclosed or open. Surfacing needs to be impermeable if the site is to cater for potentially polluting waste such as oil or car batteries and surface water drainage is routed via an interceptor. HWSSs are normally small scale and may be ancillary to an existing waste management operation, providing 'front end' recycling.

Facilities need to be located near to centres of population or on the edge of urban areas to maximise accessibility and ensure usage. These sites can attract large numbers of people and careful thought is required to maximise the space given to both the recycling areas and vehicle turning space.

Examples of new sites coming forward in other Local Authorities show that operations are now beginning to take place under cover to minimise noise and other potential amenity issues.

Traffic

Good access from the primary road network is required with access roads free from restrictions or HGVs. The facilities attract a significant level of traffic the majority of which will consist of private vehicles. In order to mitigate queuing, sites should incorporate as long a queuing lane and/or as many parking spaces as possible to reduce the likelihood of vehicles being held up on public roads. A clear road layout and one way flow traffic will help to reduce congestion on queuing. Clear signage will enable cars to access the part of the site they require. If possible the design of the site should maximise the space available to allow overtaking, enabling vehicles to access the containers they need without queuing.

The need to locate facilities within urban areas means it can be difficult to find locations which do not require access via residential roads. If possible this should be avoided particularly as sites operate 7 days a week. One way of achieving an increase in throughput at sites is to work into the early evening during the summer.

Noise

In sensitive locations such as sites within residential areas careful design of internal arrangements is essential.

The main noise issues that may arise include:

- General traffic noise such as running engines.
- Noise from waste collection vehicles manoeuvring.
- Waste being compacted or sorted.
- Noise from waste being deposited in skips.

Noise fencing and bunds may be used to mitigate noise levels although if properties are adjacent to the site this may be difficult to overcome. Some newer facilities are housed within steel framed buildings, which help to reduce noise impacts when waste is being deposited. On site vehicles may be fitted with reversing alarms which adjust themselves to track the surrounding ambient noise levels so they do not emit noise louder than they need to.

Litter

Windblown litter can give rise to nuisance issues off site if containers are not emptied often enough or materials are left lying around rather than been placed in bins. However, litter is not generally a problem unless the site is understaffed or poorly managed as this is a key aspect of managing a site.

Visual Intrusion

The visual impact of HWSSs can be mitigated by sensitive siting and the use of fencing and landscaping. Significant planning issues could arise where new sites are proposed in the Countryside or in the Green Belt. For example, to avoid amenity impacts or for historic reasons, sites are often located in former landfill sites or in the open countryside at the edge of settlements. This can create conflict between policies which seek to protect amenity and others which seek to protect the landscape or openness of the land.

There are emerging examples of HWSS facilities developed within buildings2. These modern developments can provide benefits in terms of visual appearance of the operation, although this is likely to be at the expense of a higher elevation building and a larger site footprint. Other advantages include better litter control, reduced contaminated surface water run off and reduced visual impact of queuing traffic.

In addition to HWSS, bring sites can be developed which provide recycling facilities normally for one or more commonly targeted recyclable material (for example glass bottles or ferrous and non ferrous cans). These sites can be developed and managed by a Council or a commercial operator (for example a supermarket retailer). Bring site facilities tend to be serviced or managed by Councils and the recyclable material collected is usually counted towards municipal waste. It is possible, however, for commercial operators to develop and manage 'bring' sites independently of a Council. The location of 'bring' sites needs to be carefully thought about when they are provided as part of new developments so noise does not disturb local residents.

Gamblethorpe Household Waste Site Sorting Site – Example of Existing Planning Permission

The site currently operates as a HWSS and has done since 1984. It is operating on a temporary permission which expires in 2010. The site forms part of the former Gamblethorpe Landfill site which is no longer in use as a landfill site and is ready for restoration. The planning application which was submitted in August 2007 to retain this temporary permission provides a useful indication of the level of activity which takes place at a typical site.

Specific Site Details:

- An average of 6 heavy goods vehicles enter Gamblethorpe HWSS per day to collect the waste material deposited. This equates to a total of 12 (6 in and 6 out) heavy goods vehicle movements per day.

[2] For example RE3 facilities at Smallmead Waste Management Park, Reading

- Gamblethorpe accepts on average 10,000 tonnes of waste per annum, which based on 363 day working year equates to an average of 27.5 tonnes per day. It is therefore estimated based on comparative sites that there is on average between 300 – 500 movements of private vehicles per day. Movements of up to 500 are experienced periodically on bank holiday weekend for example.

- The site is open 7 days a week, apart from Christmas Day and New Years Day. All year round as follows; 08.00 – 17.00 in summer, April to October, and 09.00 to 16.00 in winter, November to March.

- There are 3 full time members of staff who operate the site, one of whom is site supervisor.

4.7 Summary of Key Planning Considerations for HWSS

From this review, the key planning considerations when planning for either modernising or changing the operational requirements of existing sites or planning for new sites are:

- Finding a site close enough to residential areas to meet local need in order to reduce travel whilst also protecting amenity of local properties.

- Designing sites so that they mitigate as far as possible potential noise impacts and using equipment which minimises the potential impacts. In particular, there may be a need to use landscaping bunds and noise attenuation fences rather than standard palisade fencing. Recent examples of new facilities have been contained within buildings.

- Ideally a long queuing road or arrangements for vehicles queuing need to be built into the design of the site.

- Locating a site as close as possible to the primary road network avoiding as far as possible routes through residential areas.

- Determining which existing sites are capable of modernisation and increasing throughput without causing significant amenity impacts. Leeds City Council is considering this as part of their strategic review of HWSS provision.

- Reviewing the distribution of existing HWSS against future needs to determine which parts of the City are not well served by an existing facility. This could mean that whilst there may be the overall physical capacity at existing sites to deal with throughput, without additional sites this potential capacity might not be realised as their geographical distribution makes it too far for some people to travel. It may therefore be necessary to identify a new site to serve a particular part of the City or to seek arrangements with neighbouring authorities if there a possibility for sharing facilities. For example, planning permission at Gamblethorpe expires at the end of 2010 which means people using this site will need to make alternative arrangements. These issues are currently been looked at through the completion of a strategic review of HWSS provision.

- It would be possible to co-locate a HWSS with other waste facilities. For example, the HWSS at Kirkstall Road shares the same site as the Waste Transfer Station. There may be the potential to co-locate a HWSS on the same sites as a waste treatment facility although this would need to be designed to fit with any security and operational issues

particularly in terms of traffic conflict. As such, where a HWSS is co-located with another facility the HWSS would probably need separate access arrangements and also adequate security arrangements to reduce the risk of trespass.

5. Materials Recovery Facility (MRF)

5.1 Overview

LCC currently sends the majority of its recyclate to merchant capacity at the HW Martin facility at Parkside Industrial Estate, Leeds. LCC has also recently granted planning permission to Biffa for a MRF with a capacity of 200,000 tonnes per annum. The site is located within an existing industrial area at Gelderd Road. As the site is not yet constructed it is unknown what contracts might be in place for this facility to accept municipal waste. LCC needs to establish its future requirement to inform decisions about where recyclate collected at the kerbside should be processed in the future and whether it should continue with merchant capacity or develop a dedicated facility.

MRFs accept co-mingled dry recyclables which arise from Leeds City Councils kerbside collection scheme including:

- Paper.
- Metal Cans.
- Cardboard packaging.
- Plastics.

There has been a steady increase in the numbers of Materials Recovery (or Recycling) Facilities in the UK as more separate recyclate collections have been introduced and overall recycling tonnages have increased. It is now commonly accepted that using multiple bin systems and encouraging householders to undertake their own separation of recyclables is the best way of achieving high levels of recycling. There is a clear distinction between facilities designed to take mixed un-sorted household or commercial wastes and facilities designed to process dry, separated recyclables. The differences are:

- A ‘clean MRF’ accepts dry recyclable co-mingled materials that have already been separated at the source from municipal solid waste generated by either residential or commercial sources. It is generally accepted that this produces higher quality recyclate which is more attractive to the market.
- A ‘dirty MRF’ accepts a mixed solid waste stream and then proceeds to separate out designated recyclable materials through a combination of manual and mechanical sorting. The sorted recyclable materials may undergo further processing required to meet technical specifications established by end-markets while the balance of the mixed waste stream is sent to a disposal facility such as a landfill.

As part of the transition away from a landfill dominated industry there will be a need for more of both types of MRF and also hybrid facilities which combine mixed waste processing with the processing of recyclables. In planning terms the main reason for making the distinction relates to the nature of the wastes, the planning issues involved and also the type of process that can be used as mixed waste operations can involve biological as well as mechanical sorting processes. Due to the biodegradable nature of the waste stream, mixed waste operations have the potential for wider amenity impacts than may be the case for the processing of dry recyclables.

MRFs may be high and low technology facilities, depending on the sophistication of plant and equipment employed and the numbers of staff working in the operation of the process. This can range from manual sorting and picking to a highly mechanised process. Generally the greater the sophistication in the process the better quality the recyclate is making the end product more attractive to the market.

5.2 The Process

A Materials Recovery Facilities is a facility at which components of a mixed waste stream, in this case of co-mingled dry recyclables, are extracted and sorted by the use of mechanical separation techniques.

Mechanical processing typically starts with a bag splitter to remove the recyclables from the collection bags. Material can then be sorted by a combination of techniques which typically include:

- Hand picking.
- Mechanical sorting/screening/sieving.
- Magnetic separation.
- Light and density separators.
- Air separators for paper.

MRF's employ a system of conveyors which carry the recyclables over sorting screens or other sorting mechanisms (e.g. inclined tables, air classifiers) which divide the components of the dry recyclates and these pass over magnetic and eddy current separators and may incorporate advanced optical materials recognition equipment which can separate out different types of plastics from the recyclate.

There will typically be an element of hand-sorting of materials in addition to the automatic extraction of materials as part of the separation process. After the sorting of the materials there is a bulking and storage function whereby balers are used to compress some of the recyclables (cans and bottles) into dense bales for transport to the materials reprocesses. Other materials are bulked for transport.

There is no such thing as a standard recyclables processing facility. The nature of the processes and scale of operation will depend on various issues, including the nature of the waste strategy for the area, local contractual issues, the nature of the feedstock resulting from upstream management operations and market requirement, including quality specifications.

5.3 Typical Physical and Operational Characteristics

As a starting point we have identified the typical characteristics of a MRF` from previous OPDM research and incorporated Jacobs experience of such facilities into table 5.3.1 below.

5.3.1: Materials Recovery Facility - Characteristics

Characteristic	Small Materials Recovery Facility – Throughput circa 25,000tpa	Large Materials Recovery Facility – Throughput circa 80,000tpa

Characteristic	Small Materials Recovery Facility – Throughput circa 25,000tpa	Large Materials Recovery Facility – Throughput circa 80,000tpa
Typical lifetime	20 years (or linked to contract period)	
Site area	Approx 1.5 ha	Approx 2 ha
Hours of operation	10 hours a day, 6 days a week. Generally 07.30 – 17.30 weekdays and 07.30 – 13.00 Saturdays.	
Vehicle movements	10 - 15 waste collection vehicles or similar per day in. 5 - 10 bulk transport vehicles per day out.	30 - 45 waste collection vehicles or similar per day in. 15 - 30 bulk transport vehicles per day out.
Employment	If no hand picking less than 10 operatives; if hand picking potentially 50 or more operatives on shift rotation.	
Waste storage	Some storage of unsorted waste is likely in open bunkers or skips. Covered storage preferred, to limit generation of leachate. Open storage of sorted waste may be restricted due to product quality control concerns.	
Existing Land use	Preference should be given to industrial or degraded sites or sites on or close to existing waste management facilities. B1/B2 and B8 use class designations may potentially be acceptable as the use is essentially an industrial type process. PPS 10 and the RSS favour such locations.	
Proximity to sensitive Receptors	If amenity issues such a noise and litter can be minimised operations could be located within 100m of sensitive receptors. However, as stated above the preference is for sites to be located within existing industrial areas.	
Transport Infrastructure	Sites need to be suitable for use by large numbers of HGV's. Consideration should be given to the potential for co-location with rail or barge transfer operations. The optimum location of where waste is collected and transported to the MRF for sorting and baling. This is a critical issue to reduce transportation impacts.	

The data provided in this table is based on Jacobs' experience in the waste management sector and supplemented with information from ODPM, 2004 Planning for Waste Management Facilities: A Research Study.

5.4 Need

The detailed gap analysis provided at Appendix 1 has indicated that Leeds will require approximately 40,000 tonnes of recyclable material which will require treatment via a Materials Recovery Facilities. Table 5.4.1 illustrates how this need could be translated into numbers of facilities, based on assumptions regarding their size.

Table 5.4.1: Number of MRF's Required

MRF	Additional Required Capacity in 2026 (Tonnes)	Number of Facilities Required
Small (25,000 tonnes)	40,000	2
Large (80,000 tonnes)	40,000	1

Note: The typical facilities sizes are based on general sizes observed in the UK. This does not mean that facilities smaller or larger that these could be found these are simply averages used to calculate the potential number of facilities required. Any deviation from this size, whether larger or smaller, will inevitably result in a different number of facilities required.

MRF facilities can be developed at a range of sizes and are often economically feasible at relatively low capacities when compared to other waste management infrastructure. There a number of advantages and disadvantages to either a small or large MRF facility as illustrated in Table 5.4.2. A detailed assessment will be required to assess the most suitable scale for a facility to be developed

Table 5.4.2: Summary of advantages of small and large scale MRF facilities

Small Facilities	Large Facilities
Can be sites in close proximity to waste arisings.	One facility limits the number of planning and permitting applications required.
Can limit the visual and amenity impacts of facility.	Large facilities tend to benefit from economies of scale to construct.
Reduces local traffic impacts through fewer vehicle movements to and from a facility.	Design can be optimised so that site is used very efficiently.

Under the assumption that LCC will require capacity to treat an additional 40,000 tonnes of MSW in 2026, it is estimated that between one and three facilities will be required dependent on whether a network of smaller facilities or larger single facility was developed.

The Environment Agency typically estimates a reject rate of approximately 11% from MRFs3. Reject material is generally contaminated (for example paper which is wet). This material is assumed to be landfilled.

5.5 Typical Facility Building Footprint

Typically the footprint of a small (25,000 tonnes) MRF building would require approximately 0.3 hectares. The processing area of a large (80,000 tonne) MRF would cover a footprint of 0.8ha. Setting out the building footprint can be determine how much space would be required should the building be combined with another waste facility, such as a transfer station.

5.6 Typical Site Footprint

The building footprint excludes any auxiliary area which incorporates all non processing structures such as:

- Weighbridge(s).
- Weighbridge office.
- Road network.
- Car parking.
- Security block.
- Offices.
- Any landscaping that exists on site.

When these areas are included the smaller facility requires a site area of approximately 1.5 hectares and a larger facility approximately 2.0 hectares.

[3] http://www.wastedataflow.org/documents/LATS/LATS_MRF_Rejects.pdf

5.7 Key Planning Considerations and Mitigation

The following information has been taken from the ODPM Planning for Waste Management Facilities and information from Jacobs experience of waste management facilities.

Traffic

Like any waste facility, most recyclables processing operations will need to be served by a constant stream of HGV's potentially causing an impact on roads close by and the amenity of local residents. Co-location of this type of activity with other waste management practices is advantageous, particularly as not all material will be recycled and reject material will still need to be sent to treatment or landfill.

Mitigation measures may include routing of vehicles away from sensitive areas and limitation of operating hours.

Air Emissions

Atmospheric emissions in relation to mixed waste facilities are primarily associated with emissions from vehicles, and limited issues associated with dust and fugitive emissions. Due to the typical absence of bio-degradable wastes, air quality will not be a significant issue.

Limitation of journey distances and sensitive routing/siting may help reduce traffic related air quality effects.

Dust/Odour

Some odour may be generated as a result of small quantities of liquids retained in bottles and contamination of materials with residual biodegradable matter. De-odourisers and proprietary ventilation and air filtration systems should be sufficient to minimise odour to acceptable levels and some operations also use negative pressure within buildings. The handling of waste and the movement of vehicles may also give rise to dust.

Enclosure of operations within a building is the primary means of preventing odour and dust impacts.

Flies, Vermin and Birds

Recyclables processing operations will not normally experience problems associated with rodents or birds, given that operations tend to take place within a building and waste materials are only present for short periods. In hot summer weather, however, flies may become a problem, particularly if they are brought in by incoming waste.

Rodent and fly control may be assisted by rapid turnaround of waste materials and good housekeeping practice. Birds are discouraged by containing operations within a building.

Litter

The presence of separated household waste including paper and plastics may potentially result in the release of litter. Carrying out operations within a building should prevent any significant impacts. Any

external storage or sorting of materials, such as recycled paper products may exacerbate litter problems and should be adequately screened and appropriate fencing and daily litter picking arrangements put in place. Litter may also be spread from waste vehicles.

Enclosure of operations within buildings, regular road sweeping, litter picking and ensuring that all waste vehicles are adequately sheeted/contained helps prevent litter.

Noise

The main problems associated with noise at recyclables facilities have been attributed to the following activities:

- Vehicle manoeuvring.
- Traffic.
- Mechanical processes such as shredders, screens, conveyors, trommels, baling and crushing operations.
- Air extraction fans and ventilation systems.

Noise mitigation may include sensitive siting and regular maintenance of equipment. It is normal practice for waste management facilities to be insulated to mitigate against noise.

Visual Intrusion

The development of any new building could lead to impacts on landscape character and visual amenity if they were located in a non industrialised setting. If it is sited within an industrial setting impacts are likely to be minimal as MRFs have the same appearance as industrial type 'shed' buildings and the majority of operations are generally fully enclosed.

5.8 Could an Existing Building Be Converted to a MRF?

It could be feasible to construct a MRF facility within an existing building superstructure. An assessment would need to be undertaken to evaluate if the existing building would be fit for purpose. The assessment of a building should include but not necessarily be limited to the following:

- Structural survey.
- Building conditions survey.
- General situations survey.
- Identification of any restrictive covenance issues such as land ownership.
- Assessment of equipment sizing and outline design in relation to building superstructure.

- Planning and permitting assessment.
- Alteration and building maintenance.
- Handback arrangements.

5.9 Summary of Overall Planning Considerations for a MRF

In summary, important planning criteria for locating a MRF are:

- Needs to be well located strategically to serve the waste input i.e. the best location of where the recyclable material is collected from the kerbside for onward transfer to the MRF.
- It is difficult to know where markets for recyclate are and there is little information on this. However, as a proportion of the waste will still need to be treated or sent to landfill, there is a case for co-locating this with the treatment facility.
- Previously developed land or buildings within existing industrial buildings are the most appropriate locations. As a MRF is essentially an industrial activity, it is very similar to a B2/B8 planning activity and could be treated as such by the planning system. The RSS favours these facilities at such locations.
- The advantage of a smaller facility is that they require a smaller building footprint and traffic movements are also lower. Therefore, a smaller facility may offer more flexibility in terms of the choice of site or building. A network of smaller facilities may also be able to serve more local markets offering greater flexibility and they are often commercially viable at this scale.
- A single central facility would require a slightly larger footprint but as throughput is not directly proportionate to size this isn't that much bigger than required for the smaller facilities. There is an obvious advantage that it would only require a single site and it maybe preferable in planning terms to develop one larger facility rather than three facilities. Operators may also prefer to operate at as bigger scale as possible where this makes more commercial sense.

6. Waste Transfer Station

6.1 Overview

Waste transfer is the process by which waste is taken from waste producers, including industry, commerce and the general public, and taken for treatment, recycling and/or disposal. To minimise the cost of transport and to reduce environmental impacts, transfer stations are commonly used to transfer waste from smaller vehicles to larger vehicles or from road vehicles to trains or barges for onward transport. Typically waste from waste collection vehicles, usually with a capacity of around 10 - 12 tonnes, is bulked up or compacted and loaded onto larger vehicles with a capacity of up to 22 tonnes.

6.2 The Process

Municipal solid waste (MSW) transfer stations usually consist of a large building where vehicles deliver waste either onto the floor, into bays, or into compaction units. Inert wastes may be transferred in the open. Ideally waste should be stored on site for a limited amount of time as possible before being transferred, either directly or by front loading shovel, into larger vehicles for onward transport. Waste transfer stations are often located in association with other waste management activities such as Materials Recovery Facilities and Household Waste Sorting Sites.

6.3 Typical Physical and Operational Characteristics

As a starting point we have identified the typical characteristics of a WTS at two different sizes from previous OPDM research and added to this using Jacobs experience.

Table 6.3.1: Waste Transfer Station - Characteristics

Characteristic	Small Waste Transfer Station – Throughput circa 45,000tpa	Large Waste Transfer Station – Throughput circa 150,000tpa
Typical lifetime	20 years	
Site area	Approximately – 0.4-0.7 ha	Approximately – 0.7-1.1 ha
Hours of operation	WTS can be permitted for up to 24 hour operation. This allows access to the facility for example on a Saturday night or on special occasions when the streets in the City Centre require cleaning.	
Vehicle movements	Significant variation depending on the nature of work and mode of collection/transfer. For example, initial work undertaken by Jacobs looking at retaining the existing Waste Transfer Site in Leeds estimated that for a 50,000 tonnes facility would have 31 two way vehicles movements in and out per day and 62 for a 100,000 tonne facility.	
Employment	Site manager and foreman, plus two other workers.	
Waste storage	Unsorted waste may be sorted in open bunkers or skips, housed within a building.	
Existing Land use	Preference should be given to Industrial or degraded sites or sites on or close to existing waste management facilities.	
Proximity to sensitive Receptors	Sites closer than 250m from residential, commercial, or recreational areas should be avoided. Transfer routes away from residential areas are also preferable where this is possible.	
Transport Infrastructure	Good access to the primary road network is crucial. The optimum location between where the waste is collected and transferred to the treatment or landfill facility is critical to reducing transportation impacts.	

The data provided in this table is based on Jacobs' experience in the waste management sector and supplemented with information from ODPM, 2004 Planning for Waste Management Facilities: A Research Study.

6.4 Need

There are few technical limitations to restrict the capacity of a basic WTS operation. Assuming a basic WTS operation with limited or no processing equipment, a transfer station can be built at a range of sizes and capacities. The limitations on the upper capacity of WTS operations tend to be other issues such as site constraints or planning requirements.

Facilities with capacities greater than 100,000 tonnes per annum are already developed in the UK. The Gap Analysis indicated that Leeds will need to transfer approximately 126, 000 tonnes of MSW in 2026. The exact tonnage will depend upon the final location of treatment facilities.

Table 6.4.1: Number of WTS's Required

WTS Potential Throughput Range	Additional Required Capacity in 2026 (Tonnes)	Number of Facilities Required
45,000 – 150,000 tonnes	126,000	1-3

Note: The typical facilities sizes are based on general sizes observed in the UK. This does not mean that facilities smaller or larger than these could be found these are simply averages used to calculate the potential number of facilities required. Any deviation from this size, whether larger or smaller, will inevitably result in a different number of facilities required.

Based on the assumption that LCC will require capacity to treat an additional 126,000 tonnes of MSW in 2026, it is estimated that 1 to 3 facilities will be required dependent on whether it is more sustainable to focus on a single site or develop a network of smaller sites. It would be possible to achieve this capacity on a single site. .

The existing transfer station site at Evanston Avenue off Kirkstall Road previously accepted 252,000 tonnes of waste through the transfer station and a MRF before the site was damaged by a fire in 2001. This demonstrates the site previously had the capacity to accept the full throughput required for Leeds. If the sustainability of transporting waste to a single site is supported, then it is possible that the entire capacity could be met though redeveloping the existing Evanston Avenue Waste Transfer Station.

6.5 Typical Building Footprint

Typically the building footprint of a small (45,000 tonnes) WTS would occupy approximately 0.4 hectares and a large (150,000 tonnes) WTS a footprint of 0.9ha. This figure is based on measuring the site area of existing Waste Transfer Station developments.

6.6 Typical Site Footprint

The Building footprint excludes any auxiliary area which incorporates all non processing structures such as:

- Weighbridge(s).
- Weighbridge office.
- Road network.

- Car parking.
- Security block.
- Offices.
- Any landscaping that exists on site.

The existing site at Kirkstall Road occupies a total site area of 2.2 hectares, although this was a combined transfer and sorting facility prior to a fire destroying the sorting hall.

It should be noted that a site of less than 1 ha is not likely to be viable due to limited space during construction. It should be assumed that the minimum total site area required (processing and auxiliary areas) is at least 1 ha.

6.7 Key Planning Considerations and Mitigation

The following information has been taken from the ODPM Planning for Waste Management Facilities: A Research Study, 2004. Jacobs has already completed a detailed report (Feasibility Study for Enhancing the Existing Kirkstall Road Waste Transfer Station, Jacobs, 2008) investigating the potential for redeveloping the Kirkstall Road Waste Transfer Station Site and some information from this report is referred to below.

Traffic

Like any waste facility, Waste Transfer Stations will be served by significant numbers of HGVs potentially causing an impact on roads close by and the amenity of local residents. Transfer stations do, however, reduce the total number of HGVs on the roads and the total mileage of waste vehicle transportation. Issues such as traffic congestion, severance, safety and traffic related loss of amenity are material planning considerations and need to be assessed and mitigated for in planning applications. However, facilities need to be located where the overall transport impact of transfer is kept to a minimum amount of distance travelled and access to the primary road network is also critical.

Mitigation measures may include routing of vehicles away from sensitive areas and limiting operating hours. However, limitations on working hours may interfere with the operational requirements of the site.

Work previously undertaken by Jacob investigating the potential to retain the existing Evanston Avenue Transfer Site estimated that based on a 100,000 tonne facility, up to 62 two way vehicles movements would be required. This is based on the assumption that 46 Refuse Collection Vehicles which have collected waste from the kerbside, with a payload of 7.1 tonnes, enter the site each day. Once the waste has been transferred and bulked up, 16 HGV's with a payload of 20.7 tonnes would leave the site for onward transfer to the treatment facility. Based on an increase of 26% to a throughput of 126,000 tonnes this would increase the total vehicle movements to 78 per day.

Air Emissions

Atmospheric emissions in relation to waste transfer are primarily associated with emissions of combustion products from HGVs. These emissions may be important along the immediate route of

vehicles involved. However, on a regional basis, transfer stations reduce the total volume of pollutants produced by reducing the number and mileages of waste vehicles.

Limitation of journey distances and sensitive routing/siting may help reduce traffic related air quality effects.

Dust/Odour

The presence of putrescible/municipal wastes can lead to odours of fresh waste in close proximity to the transfer station, although the generally rapid turn around of waste onsite usually prevents any serious odour problems. New modern transfer stations also use negative pressure systems which mean odour problems are eliminated. The handling of waste and the movement of vehicles may also give rise to dust. However, transfer stations are not associated with dust nuisance.

Enclosure of operations within a building and design facilities such as roller shutter doors are the primary means of preventing odour and dust impacts.

The report at the Kirkstall Road site identified that some limited complaints with respect to odour had been received in the vicinity of the site. This is primarily a result of the facility been old and because the fire damage has limited the operation of the site.

Flies, Vermin and Birds

Transfer stations are not normally associated with rodents or birds given that operations tend to take place within a building and waste materials are only present for short periods. In hot summer weather, however, flies may become a problem, particularly if they are brought in with incoming waste.

Rodent and fly control may be assisted by rapid turnaround of waste materials and good housekeeping practice. Birds are discouraged by containing operations within a building.

Litter

The presence of MSW including paper and plastics may potentially result in the release of litter. Carrying out operations within a building however, tends to prevent any significant impacts. Litter from waste vehicles should be prevented by ensuring it is properly contained and that the vehicle is sheeted.

Enclosure of operations within buildings, regular road sweeping, litter picking and ensuring that all waste vehicles are adequately sheeted/contained helps prevent litter.

Noise

The main potential for noise disturbance is from operating a facility at night when ambient noise levels in the surrounding area are very low. People are more likely to be receptive to activities such as noise from traffic at night rather than during the day.

Noise mitigation may include sensitive siting and regular maintenance of equipment. On-site vehicles may be fitted with ‘smart’ reversing alarms which regulate their noise level to match the ambient noise level of the surrounding area.

Visual Intrusion

The development of any new building could lead to impacts on landscape character and visual amenity if they were located in a non industrialised setting. If sited within an industrial setting impacts are likely to be minimal as WTS have the same appearance as industrial type 'shed' buildings and the majority of operations are generally fully enclosed.

Environmental Advantages

The use of waste transfer stations reduces the amount of fuel and atmospheric emissions associated with the transport of waste by reducing the number of vehicle miles travelled for waste management purposes. They reduce the number of HGV's on the road that area associated with waste management, potentially reducing the effect on local traffic congestion. Finally, they allow disposal/management operations to occur at a distance from population centres by reducing transport costs.

6.8 Overall Planning Considerations

Important planning criteria for locating the Waste Transfer Station are:

- Whether in terms of optimum distribution, it is preferable to have a single transfer facility to serve the needs of the City or if more than one facility would best meet the transfer needs of the City.

- That it can be located where it meets the needs of the City whilst balancing the need to mitigate local amenity issues.

- That it has good access to the primary road network.

- Preferable that is located in an area characterised by industrial uses as it is essentially similar to a B2/B8 industrial operation.

- In terms of co-location, the waste transfer facility needs to be accessible to the main residential areas to ensure it is efficient in terms of transfer. Therefore, it would only be appropriate to locate it close to other facilities if these were located in the same optimum locations.

7. Residual Landfill

7.1 Need

It was agreed with Leeds City Council that there was no requirement to determine the number of landfills required to facilitate residual waste and most existing household waste is sent to Skelton Grange landfill which has permission to operate to 2022. However, it was requested that the throughput for 2026 be provided. Table 7.1 identifies the total tonnages requiring to be landfilled in 2026 according to the latest PFI model.

Table 7.1 Landfill Assumptions

		Tonnes
Tonnage Requiring to be Landfilled in 2026	Non-Hazardous sent to Landfill (Waste Direct to Landfill)	37,000
	Non-Hazardous sent to Landfill (Waste from Residual Waste Treatment Facility)*	0
	Hazardous Landfill	8,000

** The PFI Model assumes that this will all be recycled/re-used as opposed to been sent to landfill.*

8. Summary

8.1 Overall Need

Overall, the results of the needs assessment, as illustrated in table 8.1.1 below, indicated that LCC would require additional treatment capacity for the following quantities of waste. Using typical sizes of facilities based on Jacob's experience in this sector, it was possible to translate this tonnage into an estimated number of facilities based on whether that would be needed to process the additional waste.

Table 8.1.1: Summary of Additional Capacity Needed for Municipal Waste Facilities

Type of Facility	Additional Tonnage Requiring Treatment Capacity (thousand tonnes)	Number of facilities required Depending on Size
Food Waste Facility	45,000	1
Food Waste Facility with Garden Waste Collected at the Kerbside	92,000	1-2
Green Waste Composting (assuming kerbside garden waste is dealt with separately with food waste)	64,000	2-3
Household Waste Sorting Site	25,000*	To be confirmed in strategic review of HWSS
Materials Recovery Facility	40,000	1-2
Waste Transfer Station	126,000	1-3

**This is based on existing throughputs not the actual physical capacity of sites which is currently unknown.*

In terms of additional landfill requirements for waste which cannot be recycled, composted or treated the following annual capacity would be required at 2026.

Table 8.1.2: Landfill Assumptions

		Tonnes
Tonnage Requiring to be Landfilled in 2026	Non-Hazardous Landfill (Waste Direct to Landfill)	37,000
	Non-Hazardous Landfill (Waste from Energy from Waste Facility)	N/A
	Hazardous Landfill	8,000

8.2 Summary of Planning Considerations

The information provided in the earlier sections of the report can be used to identify what options should be investigated and the key planning criteria which will impact on the choice of location for a new facility.

Food Waste Facilities

- The food waste facility will be required to deal with waste from the kerbside and other Council operated facilities. The options for dealing with this are either through In Vessel Composting (IVC) or Anaerobic Digestion (AD). This would require a single facility of

92,000 tonnes if garden waste is included or 45,000 tonnes if this is removed and dealt with through separate Green Waste Composting (GWC) facilities.

- A site footprint to meet the higher anticipated throughput for both facilities should be at least 1 hectare. However, if site area above this threshold was available this would provide a future contractor with greater flexibility.

- A major consideration will be the impact on surrounding properties in terms of the potential for odour even where operations are fully enclosed. This will still represent one of the key planning considerations in terms of determining future applications even if it is considered that the potential for odour in modern buildings may be limited. As such, a future location for such uses should be within an existing highly industrialised location or alternatively an area that is reasonable remote from other land uses particularly residential properties. In terms of the latter, this may mean that a more open or countryside location or existing landfill sites although this would not be favoured where it could bring a proposal into conflict with policies on the Green Belt or Open Countryside.

- Facilities generally appear to operate during normal working hours Monday to Friday and Saturday morning, although the facility at Todmorden has permission to operate into the early evening to 1900 Monday to Friday.

- In addition to the criteria above, accessibility is also a key consideration. A site needs to be both strategically accessible to the whole City, but also locally accessible in terms of not having any significant highway constraints. As such, a location with direct access to the main trunk network would be most appropriate. More detailed transport modelling work on defining an optimal location in terms of access to the rest of the City would be required. A particular issue which could require further investigation is if waste transfer might be appropriate to reduce the number of vehicle movements and to improve sustainability. For example, if a potential site was outside the main urban area and involved travelling longer distances to reach it, this might make waste transfer more appropriate.

- If sites are located in the Countryside, there is the potential for development to conflict with policies which protect the openness and amenity of the countryside and the Green Belt. This is more likely to be a greater consideration in Leeds which is essentially urban in characteristic and therefore offers more potential to provide sites within existing built up locations and on previously developed land. In terms of current planning policy, a site allocated for existing industrial uses is more likely to be appropriate as essentially food waste composting represents a B2 Use Classes Order development (Industrial Development). Both the RSS and PPS 10 favour such locations.

- Impacts on future regeneration and areas of economic importance would also be important considerations. A proposed facility located in an area of significant regeneration may be subject to scrutiny and potential objection from developers. However, a balance must be struck as a facility may be compatible or compliment existing uses and the current character of the area. Although the most risk adverse approach may be to avoid areas of potential regeneration, where this is not possible it will be necessary to address these impacts as part of any future planning application. In terms of employment generating potential, a typical operation employs between 10-15 people.

- The impact on the historic and natural environment should be minimised and avoided by seeking to choose a site which avoids these issues.

- In terms of future existing planning policy, the Natural Resources and Waste Development Plan Document should either seek to identify appropriate sites and/or a policy which sets out the planning criteria which will be applied when planning applications for food waste composting are being considered. This will need to reflect the considerations set out in this report.

- In terms of differences between the two choices of technology, the site selection criteria and planning requirements are fairly similar although from our research odour appears to be perceived as more of a potential issue in IVC than AD. From a sustainability perspective, AD also appears to be emerging as the preferred technology, possibly because the end products allow a combination of heat, power and fertilizers suitable for agriculture or other uses. Therefore, in terms of the aspirations for Leeds, AD may represent the most suitable in planning terms as it is most aligned with the objectives of the emerging Natural Resources and Waste Development Plan Document.

- The nature of composting facilities and potential for medium level odours means that they may have very specific location requirements meaning co-location with other waste management facilities could be difficult to achieve.

Green Waste Composting

- If garden waste is not included within the food waste facility, separate facilities will be required if this waste is managed in Leeds rather than through continuing existing arrangements which export waste to facilities in adjoining authorities. The total capacity necessary to be met is 64,000 tonnes as this also includes garden waste collected from HWSS facilities. There is a choice of whether to develop up to 3 smaller facilities or a single larger facility. Developing more than one facility may reduce transport costs by reducing the total distance travelled from collection points but clearly this means finding a number of sites.

- Green waste compost can be used by farmers and in the restoration of landfill sites. This type of operation may need to be located within the Countryside and also potentially within the Green Belt. A specific policy which deals with this point will need to be included in the NR&WDPD.

Household Waste Sorting Sites

There is currently a network of 11 HWSS sites across the City which in 2008/2009 accepted a total throughput of 73,000 tonnes. By 2026, the total capacity forecast to meet the increase in recycling is anticipated to be 90,000 tonnes per annum. This means that the throughput at existing recycling centres could increase by 17,000 tonnes. However, as planning permission at the Gamblethorpe site expires in September 2010, this increases the requirement by a further 8,000 tonnes to 25,000 tonnes per annum.

The total licensed capacity of the 11 sites in Leeds is 197,000 tonnes although this will reduce to 190,000 tonnes once Gamblethorpe is closed. The gap between licensed capacity and actual throughput is therefore significant. Physical limitations on the operation of sites mean the actual licensed capacity is never likely to be reached.

The City Council is currently undertaking a strategic review of its HWSS provision and this is due for completion by the end of October 2009. This review will identify where there is the potential to increase current throughput at existing sites and where gaps in provision may exist, particularly with

the closure of Gamblethorpe in 2010. It will also investigate the potential for putting in place reciprocal arrangements with adjoining authorities. The existing East Leeds site is already planned for redevelopment during 2010 which should increase its capacity and the potential for redeveloping the existing site at Evanston Avenue is also likely to be investigated. Only the Calverley Bridge site would then require modernisation.

At least one additional HWSS site is likely to be required in the east of the City to meet the gap in provision left by the closure of Gamblethorpe. The NR&WDPD should seek to allow for this. Key planning considerations for changing the operation of existing sites to increase capacity (for example by extending opening hours) and identifying locations for new sites are:

- Finding a site close enough to residential areas to meet local need in order to reduce travel which does not have a negative impact on the amenity of local properties.

- Designing sites so that they mitigate as far as possible potential noise impacts and using equipment which minimises the potential impacts. In particular, there may be a need to use landscaping bunds and noise attenuation fences rather than standard palisade fencing. There are a number of examples of recently built facilities which are contained within a building.

- Ideally a long queuing road or and arrangements for vehicles queuing need to be built into the design of the site.

- Locating a site as close as possible to the primary road network avoiding as far as possible routes through residential areas.

- A site with a throughput of 25,000 tonnes per annum would typically require a footprint of one hectare.

Materials Recovery Facility (MRF)

Leeds currently sends recycling waste which needs to be sorted to HW Martin at Parkside Industrial Estate. The capacity of this facility is 60,000 tonnes, although it is understood this could increase to 80,000 tonnes if the number of shifts was increased. The facility was opened in July 2007 and uses very modern equipment to produce a high quality recyclate.

To meet the Councils recycling target, it is forecast that at 2026 the future requirements for the MRF will be 40,000 tonnes. The Council may continue its current arrangements with HW Martin but it may want to investigate procuring its own dedicated MRF.

In summary, important planning criteria for locating a MRF are:

- It needs to be well located strategically to serve the waste input i.e. the best location of where the recyclable material is collected from the kerbside for onward transfer to the MRF.

- It is difficult to know where markets for recyclate are and there is little information on this. However, as a proportion of the waste will still need to be treated or sent to landfill, there is a case for co-locating this with the treatment facility.

- Previously developed land or buildings within existing industrial buildings are the most appropriate locations. As a MRF is essentially an industrial activity, it is very similar to a B2/B8 planning activity and could be treated as such by the planning system.

- The advantage of a smaller facility is that they require a smaller building footprint and traffic movements are also lower. Therefore, a smaller facility may offer more flexibility in terms of the choice of site or building. A network of smaller facilities may also be able to serve more local markets offering greater flexibility and they are often commercially viable at this scale.

- A single central facility would require a slightly larger footprint but as throughput is not directly proportionate to size this isn't that much bigger than required for the smaller facilities. There is an obvious advantage that it would only require a single site and it maybe preferable in planning terms to develop one larger facility rather than three facilities. It is also likely that in practice operators are likely to want to operate at as bigger scale as possible as this makes more commercial sense.

Waste Transfer Stations

There is currently a WTS at Evanston Avenue off Kirkstall Road in Leeds. This has a limited existing capacity although before a fire in 2001 the facility had a capacity of 252,000 tonnes. The anticipated capacity requirement for a WTS in 2026 is 126,000 tonnes. Important planning criteria for locating the Waste Transfer Station are:

- Whether in terms of optimum distribution, it is preferable to have a single transfer facility to serve the needs of the City or if more than one facility would best meet the transfer needs of the City.

- That it can be located where it meets the needs of the City whilst balancing the need to ensure there are no local amenity issues.

- That it has good access to the primary road network.

- Preferable that is located in an area characterised by industrial uses as it is essentially similar to a B2/B8 industrial operation.

- In terms of co-location, the waste transfer facility needs to be accessible to the main residential areas to ensure it is efficient in terms of transfer. Therefore, it would only be appropriate to locate it close to other facilities if these were located in the same optimum locations.

8.3 Assessment of the Potential for Co-Location

The different characteristics and requirements of recycling facilities mean that some facilities maybe more suitable for co-location than others:

- Waste Transfer Stations are most likely to be dictated by optimum travel distances and by virtue of their function are generally located away from treatment and recycling facilities. The most likely combination is with a Household Waste Sorting Sites and also a combined transfer and sorting MRF, as was the case at Kirkstall Road prior to the fire.

- A MRF is entirely enclosed in industrial type building. For this reason, a MRF could be located on the same site as both a treatment facility and a Household Waste Sorting Site.

- Household Waste Sorting Sites can probably be co-located with most other types of facility, provided that they serve the local needs and would not give rise to local amenity impacts. Separate access arrangements are likely to be necessary to avoid vehicular conflict with the other facilities.

- Composting facilities give rise to more specific issues that need to be addressed and may need to be located in the countryside. If this is the case, it is unlikely that it would be acceptable to deliver other facilities in combination with them. If they are located within an industrial estate away from residential properties, then it would be possible to co-locate most other types of facilities with them.

- It is understood that some companies may favour sites capable of supporting both AD and IVC as they may develop such facilities in tandem. This then provides a choice in terms of which process they might use.

8.4 Potential Sites

A site selection study to identify sites for a major waste facility was completed by Jacobs in September 2007. This has recently been updated. As the objective of the site selection study was to identify a potential site for waste treatment only, it is possible that other sites which were discounted under this process could still be suitable for other types of waste management facilities, such as recovery, recycling or composting.

A brief review of these sites (as no formal assessment has been undertaken) has identified that the following sites could potentially be investigated further for the types of facilities set out in this document and subject to further investigation for possible identification in the Natural Resources and Waste Development Plan Document.

- Britannia Quarries, Morley: This is an existing quarry but has an extant planning permission for a Waste Transfer Station.

- Howley Park Industrial Estate Morley: This is within an area adjacent to Brittania Quarry and the Howley Park Brickworks and Quarry is located opposite the site on the other side of the motorway.

- Tyresal Lane Employment Allocation. Although an existing employment allocation, it is quite isolated from residential properties.

- Sites within Stourton, dependent on the current development position and impact of the current economic circumstances on the prospect of their further development.

- Vacant sites in the Thorp Arch trading estate or the uses of existing buildings. There is already a Skip Waste Transfer Station and Household Recycling Site at this location.

- Chapagne Whin. This has a history of waste uses and its isolation may make it suitable for certain types of waste use.

Appendix 1: Detailed Gap Analysis/ Need Assessment

Introduction

The purpose of Task 2 is to clearly define in strategic terms (as opposed to identifying specific sites or areas of potential search) the future requirements in 2026 for the following non PFI municipal solid waste (MSW) facilities:

- Materials recycling facility (MRF).
- Household waste sorting site (HWSS).
- Green waste composting (GWC).
- Waste transfer station (WTS).
- Residual waste landfill.

The following sections detail the method, assumptions and results of the analysis.

Method

Waste tonnage data from 2026 was extracted and manipulated from the latest PFI waste flow model, which was issued to Leeds City Council (LCC) in July 20094. This enabled the total future capacity requirement in 2026 to be identified.

Once the capacity requirement was identified, a gap analysis could be undertaken to calculate future need. The analysis utilised current capacity information from Leeds City Council to calculate the capacity requirement using 2026 throughputs. The number of facilties which would be required to accommodate the additional municipal waste was then estimated based on generic throughputs of the treatment facilities. These generic throughputs were derived from Jacobs' knowledge of the sector.

Material Recycling Facility

Table 1 below identifies the assumptions used to determine the future need for MRFs in Leeds to treat MSW in 2026.

[4] B05850NC_Leeds_Combined_Model_v13_approved strategy excluding kerbside glass_OUTPUT_Final, Issued 19 May 2009

Table 1: MRF Assumptions

		Tonnes	Comments
Current Capacity		No current capacity assumed	Despite the availability of a Merchant MRF (operated by HW Martin estimated capacity 80Kpa), it was agreed with LCC that once the tonnage of commercial and industrial waste processed is taken into account, it cannot be assumed that any capacity would remain available to treat LCC's MSW.
Tonnage Processed in 2026		40,000	Sourced from latest PFI model, based on all kerbside recyclables collected in Leeds being processed by a MRF
Size of Typical MRF Facility	Small	25,000	Based on Jacobs' knowledge.
	Large	80,000	Based on Jacobs' knowledge.

The typical facilities sizes are based on general sizes observed in the UK. This does not mean that facilities smaller or larger that these could be found these are simply averages used to calculate the potential number of facilities required.

The future need was calculated by subtracting the existing MRF capacity from the throughput in 2026. Table 2 identifies the capacity gap and the number of MRFs required to process this quantity of waste, based on typically sized facilities.

Table 2: Number of MRFs Required

MRF	Additional Required Capacity in 2026 (Tonnes)	Number of Facilities Required
Small	40,000	2
Large	40,000	1

Note: the numbers of facilities are based on typical facility sizes observed in the UK. Any deviation from this size, whether larger or smaller, will inevitably result in a different number of facilities required.

Under the assumption that LCC will require capacity to treat an additional 40,000 tonnes of MSW in 2026, it is estimated that between one and three facilities will be required.

Household Waste Sorting Site

Table 3 below identifies the assumptions used to determine the future need for the HWSS facilities in Leeds to treat MSW in 2026.

Table 3: HWSS Assumptions

		Tonnes	Comments
Current Capacity		See Table	Provided by LCC.
Tonnage Processed in 2026		90,000	Sourced from latest PFI model.
Size of Typical HWSS Facility	Small	5,000	Based on EA banding range.
	Large	25,000	Based on EA banding range.

The typical facilities sizes are based on general sizes observed in the UK. This does not mean that facilities smaller or larger that these could be found these are simply averages used to calculate the potential number of facilities required.

The current licensed capacities and current throughput of HWSS's in LCC are illustrated in Table 4.

Table 4: HWSS capacity

HWSS	Licensed Capacity (Tonnes)	Current Throughput (Tonnes)		Comments
		2007/8	2008/9	
Calverley Bridge	7,499	1,775	1,489	
East Leeds	10,000	4,682	6,974	
Ellar Ghyll	24,999	5,083	4,776	
Gamblethorpe	05	8,938	8,077	HWSS closes in 2010 therefore 0 capacity assumed.
Grangefield Road	24,999	10,027	8,573	
Holmewell Road	24,999	10,657	10,319	
Kirkstall Road	7,499	1,851	2,668	
Meanwood Road	15,000	10,529	9,612	
Milner Road	24,999	8,321	7,486	
Stanley Road	24,999	7,943	8,398	
Thorp Arch	24,999	5,395	4,761	
Total Capacity	189,992	75,200	73,133	

As table 4 shows, when the total current licensed capacities of HWSS's in LCC were compared against the predicted tonnage to be processed in 2026, it was determined that there is no requirement for additional HWSS capacity to deal with the 2026 waste tonnages. In reality some of these facilities are under current arrangement unable to process this amount of waste, though there maximum throughput is unknown. Based on current throughput and the closure of Gamblethorpe the capacity gap has been estimated at around 25,000 tonnes per annum.

At present due to the uncertainty of actual capacity at the HWSS it is difficult to predict the number of additional facilities required. The City Council is currently completing a strategic review of its Household Waste Sorting Sites.

Green Waste Composting (GWC)

Table 5 below identifies the assumptions used to determine the future need for the GWC facility in Leeds to treat MSW in 2026.

Table 5: GWC Assumptions

		Tonnes	Comments
Current Capacity		No current capacity	Provided by LCC.
Tonnage Processed in 2026		64,000	Sourced from latest PFI model.
Size of Typical GWC Facility	Small	25,000	Based on Jacobs' knowledge.
	Large	50,000	Based on Jacobs' knowledge.

[5] the actual licensed capacity is 7,499 tonnes though as this facility is going to be closed in 2010 no capacity has been assumed.

The typical facilities sizes are based on general sizes observed in the UK. This does not mean that facilities smaller or larger that these could be found these are simply averages used to calculate the potential number of facilities required.

The future need was calculated by subtracting the existing GWC capacity from the throughput in 2026. Table 6 below identifies the capacity gap and the number of GWC facilties required to process this quantity of waste

Table 6: Number of GWCs Required

GWC	Additional Required Capacity in 2026 (Tonnes)	Number of Facilities Required
Small	64,000	3
Large	64,000	2

Note: the numbers of facilities are based on typical facility sizes observed in the UK. Any deviation from this size, whether larger or smaller, will inevitably result in a different number of facilities required.

Under the assumption that LCC will require capacity to treat an additional 55,780 tonnes of MSW in 2026, it is estimated that between 2 and 3 facilities will be required.

It should be noted that green waste composting will only be required should green waste not be included within the food waste facility.

Waste Transfer Station

Table 7 below identifies the assumptions used to determine the future need for the WTS facilities in Leeds to treat MSW in 2026.

Table 7: WTS Assumptions

		Tonnes	Comments
Current Capacity		No current capacity	Provided by LCC.
Tonnage Processed in 2026		See **Error! Reference source not found.**	Agreed with LCC and sourced from latest PFI model.
Size of Typical WTS Facility	Small	45,000	Based on Jacobs' knowledge.
	Large	150,000	Based on Jacobs' knowledge.

The typical facilities sizes are based on general sizes observed in the UK. This does not mean that facilities smaller or larger that these could be found these are simply averages used to calculate the potential number of facilities required.

Table 8 illustrates the assumptions that were used to predict the quantities of various waste streams that will feed into LCC's WTS's in 2026. It is anticipated that LCC will require sufficient capacity to accept in the order of 126,000 tonnes of waste. Whilst the tonnages that were used to calculate the estimated capacity represent the range of materials that are likely to require a WTS in future, the exact tonnages of individual waste streams could vary due to changes in operational practices. These individual tonnages should not therefore be taken as exact forecasts of the materials that could pass through the WTS but moreover an estimate of the scale of capacity that is anticipated will be required. In view of future uncertainty over the exact nature of materials, a contingency of 10% has been factored into the overall estimation.

Table 8 WTS Estimate of Potential Input

Waste	2026 Tonnage	Percentage to Transfer Station	Estimate for WTS
Contract Waste	157,872	50%	77,769
Domestic Refuse Collection (energy recovery) - Clinical Waste	44	0%	-
Trade LCC Depts Landfilled - Asbestos Waste	1,669	14%	231
Trade LCC Depts Landfilled	1,669	69%	1,152
WMA Trade Collection/Brought-in (Landfilled) - Asbestos Waste / (Other Landfilled)	2,754	16%	430
HWSS GWC (Trade Green Composting)	1,409	100%	1,409
Domestic Sweepers & Gullies (composting and landfilled)	12,116	100%	12,116
HWSS Glass	2,155	83%	1,789
BB Glass	16,242	83%	13,481
Fridge/Freezers	1,376	0%	-
Fridge/Freezers Trade only	280	100%	280
Trade Refuse Collection (landfilled)	321	100%	321
Bulky Household (Landfilled)	324	100%	324
Kerbside Collected Green waste SATURDAY'S ONLY ESTIMATE	2,064	100%	2,064
Kirkstall HWSS Landfill waste	25,018	3.6%	901
Kirkstall HWSS Recycled Inerts	17,077	0.17%	28
Kirkstall HWSS Recycled green	15,306	0.15%	22
Kirkstall HWSS Recycled Recycling	31,043	8.23%	2,555
Kirkstall HWSS Re_use	31,043	0.10%	30
TOTAL CAPACITY			114,901
TOTAL CAPACITY WITH 10% Buffer			126,391

The future need was calculated by subtracting the existing WTS capacity from the throughput in 2026. Table 9 identifies the capacity gap and the number of WTS facilities required to process this quantity of waste. As there is no existing capacity in LCC, WTS capacity required would be for 126,000 tonnes.

Table 9: Number of WTSs Required

WTS	Additional Required Capacity in 2026 (Tonnes)	Number of Facilities Required
Small	126,000	3
Large	126,000	1

Note: as the numbers of facilities are based on typical facility sizes observed in the UK. Larger facilities exist, but for the purpose of this exercise, it is assumed that a large WTS facility can accept 150,000 tonnes of waste per annum.

Under the assumption that LCC will require capacity to treat an additional 126,000 tonnes of MSW in 2026, it is estimated that between 3 and 8 facilities will be required.

Residual Waste Landfill

It was agreed with Leeds City Council that there was no requirement to determine the number of landfills required to facilitate residual waste. However, it was requested that the throughput for 2026 be provided. Table 10 identifies the tonnages requiring to be landfilled in 2026 as taken from the latest PFI model.

Table 10: Landfill Assumptions

		Tonnes
Tonnage Requiring to be Landfilled in 2026	Non-Hazardous Landfill (Waste Direct to Landfill)	37,000
	Non-Hazardous Landfill (Waste from Energy from Waste Facility)	0
	Hazardous Landfill	8,000

Summary

Overall, the results of the needs assessment, as illustrated in **Error! Reference source not found.**, indicated that LCC would require additional treatment capacity for the following quantities of waste. Using typical sizes of facilities based on Jacob's experience in this sector, it was possible to translate this tonnage into an estimated number of facilities that would be needed to process the additional waste.

Table 11: Summary of Additional Capacity Needed in LCC

Type of Facility	Additional Tonnage Requiring Treatment Capacity (1000 tonnes)	Number of facilities required
Food and garden waste composing facility	92,000	1-2
MRF	40,000	1
HWSS	Unknown	Unknown
GWC	64,000	2-3
WTS	126,000	1-3

Jacobs U.K. Ltd
1 City Walk
Leeds LS11 9DX
224-226 Tower Bridge Road
London SE1 UP