



City of Bradford Metropolitan District Council

Waste Needs Assessment, Capacity Gap Analysis and Site/Facility Requirements Study



PART B

May 2014

Report by: 4Resources and Urban Vision

4Resources

 urbanvision

Bradford Waste Needs Assessment 2014 Errata Sheet

Table 4 as set out within the Waste Needs Assessment May 2014 has been revised and should be replaced with the table set out below. The alterations to the figures in Table 4 have arisen as a result of changes to the initial modelling prepared in February 2014, to remove waste arising from the Power and utilities sector from the model. This then lowered the waste arising figure and as a result a revised modelling exercise has been undertaken at that time. However table 4 was not updated with the changes in the model. This has now been rectified.

Growth	2013	2014	2015	2016	2017	2018	2019	2020	2021
C&I	513,830	518,627	523,475	528,372	533,321	538,326	543,384	548,495	553,660
CDE Waste	447,604	450,290	452,991	455,709	458,444	461,194	463,960	466,744	469,544
Agricultural Waste	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133
LACW	306,148	308,575	311,026	318,162	329,081	338,736	348,567	351,784	354,986
Hazardous	19,153	19,274	19,395	19,517	19,640	19,764	19,888	20,014	20,140
Total	1,569,868	1,579,899	1,590,020	1,604,893	1,623,619	1,641,153	1,658,932	1,670,170	1,681,463

Growth	2022	2023	2024	2025	2026	2027	2028	2029	2030
C&I	558,882	564,158	569,490	574,881	580,329	585,839	591,406	597,034	602,721
CDE Waste	472,360	475,194	478,046	480,914	483,800	486,703	489,623	492,561	495,515
Agricultural Waste	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133
LACW	358,179	361,022	363,851	366,856	369,852	372,837	375,751	378,653	381,188
Hazardous	20,267	20,394	20,523	20,652	20,782	20,913	21,045	21,178	21,311
Total	1,692,821	1,703,901	1,715,043	1,726,436	1,737,896	1,749,425	1,760,958	1,772,559	1,783,868

Minimised Growth	2013	2014	2015	2016	2017	2018	2019	2020	2021
C&I	506888	504713	502559	500427	498315	496225	494155	492106	490078
CDE Waste	444,934	444,934	444,934	444,934	444,934	444,934	444,934	444,934	444,934
Agricultural Waste	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133
LACW	306,148	308,575	311,026	318,162	329,081	338,736	348,567	351,784	354,986
Hazardous	19,153	18,961	18,772	18,584	18,398	18,214	18,032	17,852	17,673
Total	1,560,256	1,560,316	1,560,424	1,565,240	1,573,861	1,581,242	1,588,821	1,589,809	1,590,804

Minimised Growth	2022	2023	2024	2025	2026	2027	2028	2029	2030
C&I	488070	486083	484116	482166	480237	478328	476437	474564	472710
CDE Waste	444,934	444,934	444,934	444,934	444,934	444,934	444,934	444,934	444,934
Agricultural Waste	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133
LACW	358,179	361,022	363,851	366,856	369,852	372,837	375,751	378,653	381,188
Hazardous	17,497	17,322	17,148	16,977	16,807	16,639	16,473	16,308	16,145
Total	1,591,813	1,592,494	1,593,182	1,594,066	1,594,963	1,595,871	1,596,728	1,597,592	1,598,110

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APPENDIX 2 - CUMULATIVE CAPACITY REQUIREMENTS

APPENDIX 3 – EXISTING LICENCED CAPACITY IN BRADFORD

Due to their size the appendices are provided as separate documents

GLOSSARY OF TERMS

AD	Anaerobic Digestion
C&I Waste	Commercial and Industrial Waste
CDEW/CD&E	Construction Demolition and Excavation Waste
EA	Environment Agency
EfW	Energy from Waste
ELV	End of Life Vehicle
GVA	Gross Value Added
LACW	Local Authority Collected Waste
MBT	Mechanical Biological Treatment
ROCs	Renewable Obligations Certificates
RSS	Regional Spatial Strategy
WDA	Waste Disposal Authority
WEEE	Waste Electrical and Electronic Equipment
WDI	Waste Data Interrogator
WWTW	Waste Water Treatment Works

1. INTRODUCTION

This report presents a detailed assessment of need for future waste management facilities over the plan period up to 2030 for the City of Bradford Metropolitan District Council. The report addresses the following waste streams:

- Commercial and Industrial (C&I);
- Local Authority Collected Waste (LACW);
- Hazardous Waste;
- Construction, Demolition and Excavation Waste (CDEW);
- Agricultural;
- Low Level Non-Nuclear Radioactive Wastes (LLW); and
- Water Waste/Sewage Sludge.

As part of this study a detailed review of the robustness and limitations of currently available information on current and expected arisings of waste in Bradford was carried out for a range of waste streams, the detailed findings of which are presented in the Interim Report¹.

This final report presents the modelling options used to identify the potential future waste requirements for Bradford up to 2030. A number of scenarios have been modelled and the findings of each are summarised. Each scenario presents a different option for modelling waste based on a range of recycling and recovery targets and growth levels being achieved. The final result of this work is to identify the capacity gap for each waste stream.

This study has been undertaken by Urban Vision and 4Resources on behalf of the City of Bradford.

1.1 Future Waste Management Requirements

- 1.1.1 Waste is generated by a vast range of processes although people are most familiar with waste collected from their households, such as packaging and food. However, these wastes (officially named Local Authority Collected Waste or LACW) only account for part of the overall waste arisings. Much larger quantities of other waste from the construction industry, such as broken bricks and cables, and wastes from the commercial sector, such as food from restaurants, make up the total amount of waste produced within the City of Bradford. The majority of waste is produced as a result of producer demand for products and, an important aspect of reducing the overall production of waste is through behavioural changes in how individuals consume goods and services.

¹ Prepared by Urban Vision and 4Resources, December 2013

1.1.2 The need for waste management facilities to deal with the wastes in a more sustainable way will form an integral part of any Waste Management Development Plan Document. This section considers two key issues: How much waste will need to be managed over the Plan period (to 2030) and what facilities will be required to manage this waste?

1.2 Future Waste Capacity Requirements

1.2.1 To identify any requirements for new waste management facilities, it is important to gain as accurate a picture as possible of current waste arisings and the capacity of existing permitted waste management facilities. Economic and waste trends can then be used to forecast future waste growth and subsequently the need for new facilities can be projected based on the capacity gap identified.

1.2.2 Previously the level of waste capacity to be provided by a Waste Planning Authority would be set by the Regional Spatial Strategy (RSS). The Yorkshire and Humber RSS was revoked in February 2013 and in any case the data on which the RSS was based is now out of date.

1.2.3 To enable future planning for waste, the City of Bradford commissioned Urban Vision Partnership Ltd and 4Resources Ltd to produce a detailed projection of future waste capacity requirements. This Report is the final of a two stage reporting process to plan for future waste management requirements. The Interim Report² set out information relating to the arisings for the waste streams in the City of Bradford and this final report should be considered in conjunction with the interim report.

1.2.4 This Final Report provides information on waste arisings for the principal waste streams namely, C&I, CDEW, LACW, agricultural, waste water and sewage, and low level radioactive waste, and identifies where there may be a capacity gap up until 2030. This report provides a level of detail and consistency that has not previously been available. Not only does the projection of future waste capacity requirements look at waste arisings and their management but also the potential for recycling or energy recovery with the aim of managing waste more sustainably and moving it up the waste hierarchy.

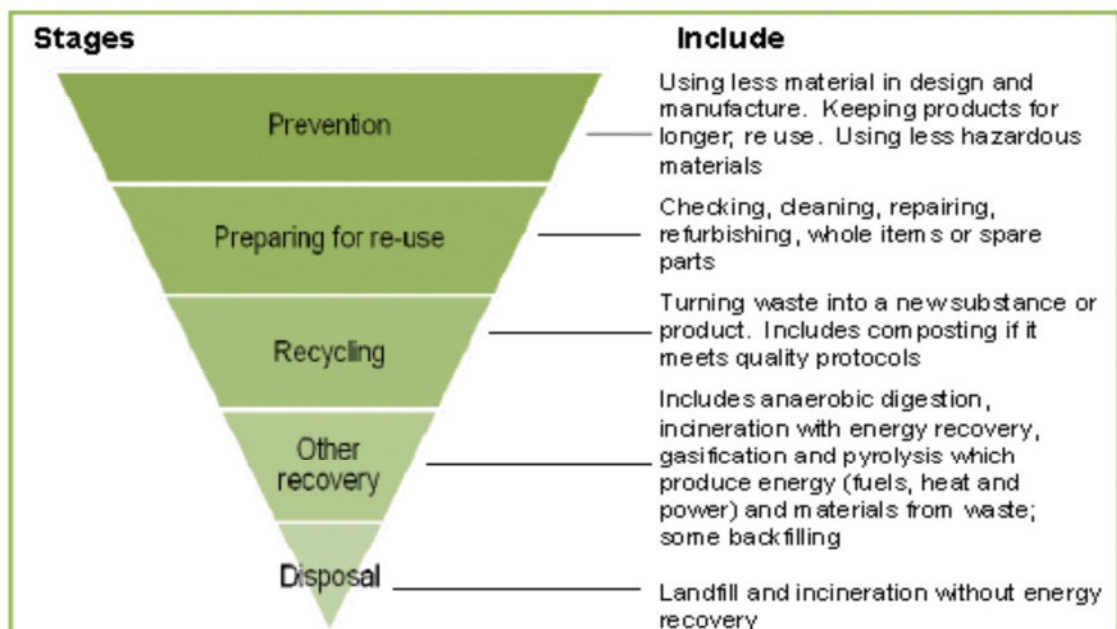
1.2.5 This approach is consistent with the Government's sustainable development agenda generally and their approach to sustainable waste management in particular. Planning Policy Statement 10: 'Planning for Sustainable Waste Management' refers to a key planning objective of *"helping to deliver*

² Prepared by Urban Vision and 4Resources, December 2013

sustainable development through driving waste management up the waste hierarchy, addressing waste as a resource and looking to disposal as the last option, but one that must be adequately catered for". The Waste Hierarchy has been transposed into UK law through the Waste (England and Wales) Regulations 2011. An updated version of *Planning for Sustainable Waste Management* was issued by Government for consultation in July 2013.

1.2.6 The need to decouple waste growth from economic growth has its roots in the need for sustainable development in the UK, particularly the idea of sustainable production and consumption of resources. By implementing the principles of the waste hierarchy, there will be a move towards reducing the amount of waste produced in the first place, thus helping to break the link.

Figure 1 The Waste Hierarchy

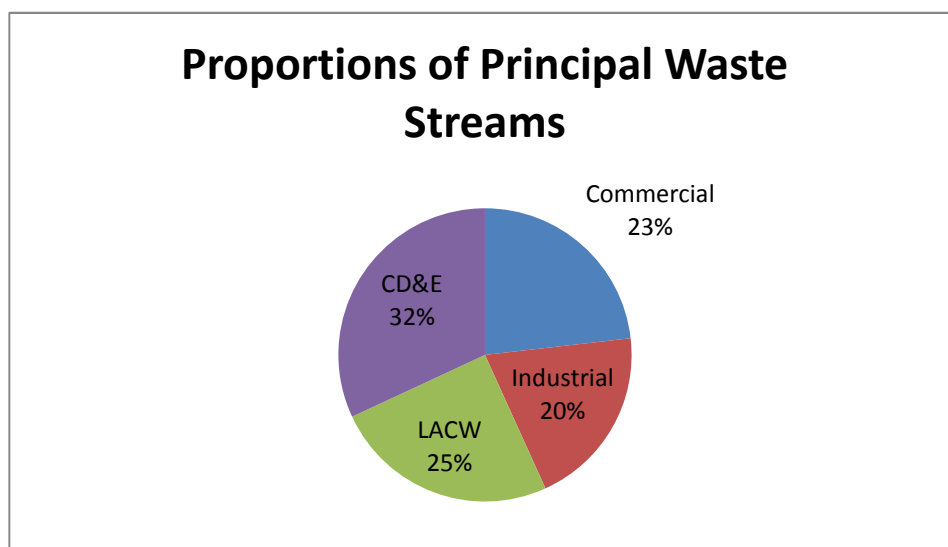


Source: www.Defra.gov.uk

1.3 Principal Waste Streams

1.3.1 Figure 2 and Table 1 below show the relative sizes of the principal waste streams arising in the City of Bradford (Data: 2012 Arisings from Interim Report 2013). They do not include agricultural, waste water and sewage and low level radioactive wastes, inclusion of which will distort the quantities for which capacity needs to be provided. Managing these streams requires specialist facilities which are detailed later in this report.

Figure 2 Proportion of principal waste streams in the City of Bradford



[Sources: Environment Agency Waste Data Interrogator 2012; C&I waste estimates extrapolated from Environment Agency survey of C&I Arisings in North West England, 2009]

Table 1 City of Bradford Waste Arisings (tonnes rounded)

Principal Waste Arisings Year 2012	Tonnes (rounded)
Commercial Waste	254,314
Industrial Waste	219,773
CD&E	350,000
Hazardous	19,153
LACW (including residual waste from Calderdale Borough Council).	272,668
Total arisings	1,115,908

[Sources: Environment Agency Waste Data and Hazardous Waste Data Interrogators 2012, and Defra WasteDataFlow]

Commercial & Industrial Waste

1.3.2 There are no data on C&I waste specific to the City of Bradford to use as a base, therefore extrapolation from other sources is necessary. There are two principal data sources which can be used to estimate commercial and industrial (C&I) waste arisings within the sub-region. The National DEFRA C&I survey (2009) only reports data at the level of the Yorkshire and Humberside region. Using the National Defra C&I survey (2009) (Yorkshire and Humberside region), a total for the City of Bradford of 404,324 tonnes of C&I waste arisings was identified in 2009. Using extrapolated figures from the

second source, the 2009 North West C&I Survey, a total of 474,087 tonnes was identified (not including arisings from the Power and Utilities sector).

- 1.3.3 However, the comparison of the two survey projections at a regional level with field data from the Environment Agency on landfill records suggests that for this category the NW survey is much closer to the observed quantities deposited at permitted sites. Whilst it is not possible to provide comparable data from the EA Interrogator other than for landfill, this suggests that the NW survey may provide a better projection for WPAs within the Yorkshire and Humberside region than the Defra National Survey. The extrapolated NW survey data is used as the main baseline data for C&I waste. Further information about the two data sources is included in the Interim report.

Local Authority Collected Waste

- 1.3.4 Figure 2 shows the proportion of principal waste streams in the city of Bradford in 2012. The LACW figure includes residual waste including an estimated 42,477 tonnes of residual waste from Calderdale Borough Council.
- 1.3.5 LACW collected in Bradford is currently managed in mechanical treatment facilities to produce a “secondary waste” commonly referred to as Refuse Derived Fuel (RDF), which is normally used as fuel for an Energy from Waste (EfW) facility. It is estimated that 20% of the material passing through the initial treatment process comprises recyclates (plastic, glass, etc.) that are removed with the remaining 80% being converted into the RDF. The forecasting model has been modified so that it evaluates the capacity needed to process waste into RDF and also the EfW capacity needed to use the secondary waste product. This approach does not result in waste being double-counted as the two processes involve different technologies and it ensures that all of the capacity needed to manage LACW can be provided in Bradford over the plan period. The outcome of this approach is that the model identifies that there is a need for EfW capacity in Bradford to take the RDF produced from LACW.
- 1.3.6 The amount of secondary products arising from the mechanical treatment is based on information provided by Bradford City Council. The PFI business case projects that in 2012 a facility managing RDF would handle 192,000 tonnes of LACW arising in Bradford and Calderdale, and a further 35,000 tonnes of commercial waste arising in Bradford only. Table 2 summarises the resulting quantities of RDF and recyclates that would be produced reflecting the proportions stated in the previous paragraph. Note that the business case anticipates 100% conversion of the residual waste into secondary products.

Table 2 Projected secondary products requiring treatment in Bradford, 2012 (tonnes (rounded))

Material	Tonnes
Refuse Derived Fuel	181,600
Recyclate	45,400
Total	227,000

[Source: Bradford City Council]

Construction, Demolition and Excavation Waste

1.3.7 An estimate of how much CD&E waste is produced in Bradford can be made with respect to CD&E managed through permitted sites. Data has been published by the Environment Agency for 2012 (EA Waste Data Interrogator database). This gives quantities of CD&E waste deposited at sites which are subject to Environment Agency permit. This data provides some information on origin and waste movements but is incomplete as some CD&E wastes are not fully recorded for all details.

1.3.8 Data on Construction, Demolition and Excavation deposits (CD&E) has been gathered from the EA Waste Data Interrogator (2012 deposit data) and an analysis of the waste categories has taken place to enable the separation of construction and demolition waste from excavation waste. Further information about this is included in the Interim report.

1.4 Predicting Future Requirements

1.4.1 As part of the forecast of future waste capacity requirements, a number of scenarios were considered that reflected a realistic range of possibilities that could be implemented. In developing the scenarios certain assumptions were made, in particular how, in general terms, the various categories of waste arisings would be managed in the future.

1.4.2 The initial modelling considered three waste management scenarios:

- Scenario 1 – baseline, which reflects the current status and forward planning position.
- Scenario 2 – maximised recycling and recovery of C&I and CD&E wastes.
- Scenario 3 – a median level of increased recycling and recovery.

1.4.3 In addition to the 3 scenarios, modifier factors have been selected as shown in Table 3 to reflect future uncertainties and their scale that could influence the future quantity of waste arisings and their subsequent management. These

factors seek to reflect future economic activity (using historic trends³ and projections on Gross Value Added (GVA) outcomes), fiscal/financial/legislative factors (landfill tax charges driving waste away from landfill and financial incentives such as ROCs (Renewable Obligations Certificates) increasing the competitiveness of energy recovery). The use of 33% estimated GVA growth projections, which is approximately 0.8% per annum, is based on an analysis of historic trends for growth in industrial, commercial waste and construction, demolition and excavation wastes.

Table 3 Modifier Factors

Growth Value	Modifier Value
NO GROWTH	All wastes no growth
GROWTH	Industrial wastes – growth @ 33% estimated GVA Commercial wastes (including LA collected commercial waste) – growth @ 33% estimated GVA CD&E wastes – growth @ 33% estimated GVA Agricultural wastes – no growth LA Collected Household Waste – growth projections as defined by the WDA
MINIMISED GROWTH	Industrial wastes – arisings declining at 1% per annum Commercial wastes – no growth CD&E wastes – no growth Agricultural wastes – no growth LA Collected Household Waste– growth at projections as defined by the WDA

1.4.4 Table 4 shows the forecast size of the principal streams under the Growth and Minimised Growth scenarios before assumptions about recycling, recovery and landfill performance are applied. The No Growth scenario is not shown as the streams will stay at the 2012 levels shown in Table 4.

³ Source: Environment Agency national surveys 1998 & 2003, NW survey 2006 & 2009 and Defra national Survey 2009

Table 4 Annual Arisings Forecasts Under the Growth and Minimised Growth Assumptions

GROWTH	2013	2014	2015	2016	2017	2018	2019	2020	2021
C&I	634,586	640,143	645,756	651,423	657,147	662,933	668,776	674,677	680,637
LACW - Bradford	224,507	226,287	228,084	233,317	241,324	248,405	255,614	257,973	260,321
LACW - Calderdale	81,641	82,288	82,942	84,845	87,757	90,331	92,953	93,811	94,665
Hazardous Waste	19,153	19,274	19,395	19,517	19,640	19,764	19,888	20,014	20,140
CD&E	447,604	450,290	452,991	455,709	458,444	461,194	463,960	466,744	469,544
Agricultural waste	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133
Total	1,690,624	1,701,415	1,712,301	1,727,944	1,747,445	1,765,760	1,784,325	1,796,351	1,808,440

GROWTH	2022	2023	2024	2025	2026	2027	2028	2029	2030
C&I	686,658	692,739	698,882	705,089	711,357	717,692	724,090	730,553	737,082
LACW - Bradford	262,663	264,748	266,822	269,026	271,223	273,412	275,549	277,677	279,536
LACW - Calderdale	95,516	96,274	97,029	97,830	98,629	99,425	100,202	100,976	101,652
Hazardous Waste	20,267	20,394	20,523	20,652	20,782	20,913	21,045	21,178	21,311
CD&E	472,360	475,194	478,046	480,914	483,800	486,703	489,623	492,561	495,515
Agricultural waste	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133
Total	1,820,597	1,832,483	1,844,434	1,856,644	1,868,924	1,881,279	1,893,642	1,906,078	1,918,229

MINIMISED GROWTH	2013	2014	2015	2016	2017	2018	2019	2020	2021
C&I	626,888	624,713	622,559	620,427	618,315	616,225	614,155	612,106	610,078
Hazardous Waste	19,153	18,961	18,772	18,584	18,398	18,214	18,032	17,852	17,673
CD&E	444,934	444,934	444,934	444,934	444,934	444,934	444,934	444,934	444,934
Agricultural waste	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133
LACW - Calderdale	224,507	226,287	228,084	233,317	241,324	248,405	255,614	257,973	260,321
LACW - Calderdale	81,641	82,288	82,942	84,845	87,757	90,331	92,953	93,811	94,665
Total	1,680,256	1,680,316	1,680,423	1,685,239	1,693,861	1,701,243	1,708,822	1,709,808	1,710,804

MINIMISED GROWTH	2022	2023	2024	2025	2026	2027	2028	2029	2030
C&I	608,070	606,083	604,116	602,166	600,237	598,328	596,437	594,564	592,710
Hazardous Waste	17,497	17,322	17,148	16,977	16,807	16,639	16,473	16,308	16,145
CD&E	444,934	444,934	444,934	444,934	444,934	444,934	444,934	444,934	444,934
Agricultural waste	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133	283,133
LACW - Calderdale	262,663	264,748	266,822	269,026	271,223	273,412	275,549	277,677	279,536
LACW - Calderdale	95,516	96,274	97,029	97,830	98,629	99,425	100,202	100,976	101,652
Total	1,711,813	1,712,494	1,713,182	1,714,066	1,714,963	1,715,872	1,716,727	1,717,592	1,718,110

[Source: Needs Assessment forecasting model]

1.4.5 Modelling the change of practice in the management of waste arisings must also consider the increasing recycling potential resulting from changes in practice of waste collection, processing and treatment, particularly for commercial and industrial waste. There are increasing opportunities for recycling or energy recovery from commercial and industrial mixed waste which is not currently source segregated. A series of three factors have therefore been chosen to reflect the potential changes in recycling and energy recovery as shown in Table 5. The 75% as a modifier factor has been chosen⁴ as this represents a high level of recycling but also reflects the practicality that not all mixed waste can be recycled, with 25% of mixed waste going to energy recovery⁵. The 50% as a modifier factor has been chosen to reflect a lower level of source segregation and recycling with 50% going to energy recovery. These modifiers are estimates and can be amended and re-modelled to meet any future changes in projections.

Table 5 Change in Practice Modifiers

Behaviour change	Modifier Value
BASELINE	All wastes no change, recycling and recovery as defined by the WDA for long term waste contract for LACW
MAXIMISED RECYCLING AND RECOVERY	75% Commercial waste recycling, 75% Industrial waste recycling, 75% CD&E recycling, 25% mixed ordinary Commercial waste and 25% Industrial waste to energy recovery, remaining CD&E to landfill. LACW as defined by the WDA for long term waste contract
MEDIAN RECYCLING AND RECOVERY	50% Commercial waste recycling, 50% Industrial waste recycling, 50% CD&E recycling, 50% mixed ordinary Commercial waste & Industrial waste energy recovery, LACW as defined by the WDA for long term waste contract

1.4.6 Scenarios have therefore been modelled using the 3 sets of modifier factors (no growth, growth and minimised growth) with the 3 changes in practice modifiers (Baseline, Maximised and Median recycling and recovery) to produce 9 outcomes with a range of different capacity requirements

⁴ Defra national Survey shows 48% recycling, Extrapolated NW Survey 2009 shows 64% recycling

⁵ Defra national Survey shows 1.5% energy recovery, Extrapolated NW Survey 2009 shows 2% energy recovery

depending on how waste is managed within the waste management hierarchy.

- 1.4.7 The capacity of all the available sites with planning permission for waste management are included in the model, together with information on annual capacity of the site and duration of activity according to the planning permissions. The existing sites were identified through a review of the list of sites identified from the EA Waste Data Interrogator, and the list of permitted waste sites as supplied by the EA. The final list for was sent to Bradford at this stage to provide any further information from the planning permission regarding the capacity and end date of each site.
- 1.4.8 For all sites included in the model, the capacity information was taken from the EA licence, Planning Permission information where available, and EA permits. However it is important to note that this information does not always correlate due to the way in which the EA issues its waste licences (the EA uses standard maximum capacity limits) and therefore a review of past annual throughputs was also undertaken to ascertain the most accurate information for the available capacity at each site. This figure, once agreed with Bradford is the figure used for available capacity at that site.
- 1.4.9 A comparison of the capacity gap at the end of the plan period across the scenarios is shown in Table 6-8. C&I waste arisings and management are extrapolated from the North West survey results as explained previously. Negative figures identify where there is no capacity gap.

Table 6 Comparison of the capacity gap at year 2030 across the 3 scenarios, assuming NO GROWTH for all wastes except Sewage and Low Level Radio Active wastes (tonnes)

Waste Management	Scenario 1 Baseline	Scenario 2 Maximised Recycling	Scenario 3 Median Recycling
Landfill (C+I & Municipal)	58,822	8,625	8,625
Landfill (Hazardous)	74	74	74
Landfill (C+D)	200,000	100,000	100,000
Energy from waste	201,457	214,006	226,555
Incineration (Specialist High Temp)	833	833	833
Recycling (C+I & Municipal)	399,927	437,575	425,025
Recycling (C+D)	112,301	212,301	212,301
Recycling (specialist material)	-1,060	-1,060	-1,060
Composting	34,024	34,024	34,024
Residual Mechanical Treatment	107,266	107,266	10,7266
Treatment plant	-52,515	-52,515	-52,515

Table 7 Comparison of the capacity gap at year 2030 across the 3 scenarios, assuming GROWTH for all wastes except Sewage and Low Level Radio Active wastes (tonnes)

Waste Management	Scenario 1 Baseline	Scenario 2 Maximised Recycling	Scenario 3 Median Recycling
Landfill (C+I &Municipal)	71,103	10,611	10,611
Landfill (Hazardous)	74	74	74
Landfill (C+D)	222,737	111,369	111,369
Energy from waste	248,293	263,416	278,539
Incineration (Specialist High Temp)	833	833	833
Recycling (C+I & Municipal)	481,420	526,789	511,666
Recycling (C+D)	125,068	236,436	236,436
Recycling (specialist material)	-1,042	-1,042	-1,042
Composting	42,742	42,742	42,742
Residual Mechanical Treatment	160,660	160,660	160,660
Treatment plant	-49,741	-49,741	-49,741

Table 8 Comparison of the capacity gap at year 2030 across the 3 scenarios, assuming LIMITED GROWTH for all wastes except Sewage and Low Level Radio Active wastes (tonnes)

Waste Management	Scenario 1 Baseline	Scenario 2 Maximised Recycling	Scenario 3 Median Recycling
Landfill (C+I &Municipal)	52,998	7,566	7,566
Landfill (Hazardous)	74	74	74
Landfill (C+D)	200,000	100,000	100,000
Energy from waste	238,850	250,208	261,566
Incineration (Specialist High Temp)	833	833	833
Recycling (C+I & Municipal)	398,939	433,013	421,655
Recycling (C+D)	112,301	212,301	212,301
Recycling (specialist material)	-1,060	-1,060	-1,060
Composting	40,561	40,561	40,561
Residual Mechanical Treatment	156,472	156,472	156,472
Treatment plant	-54,004	-54,004	-54,004

1.4.10 There are additional facilities for managing waste in Bradford which have recently been granted permission, however they have not as yet been implemented and therefore have not been included in the capacity available within the model for managing Bradford's waste. Should the facilities be implemented, there could be an additional 160,000 tonnes per annum of capacity for management through Energy from Waste and 300,000 tonnes per

annum for Residual Mechanical Treatment. This would provide a surplus of requirement under all scenarios for these management routes within Bradford.

1.4.11 The full projected capacity gaps across each of the scenarios for the period 2013-2030 are set out in Appendix 1; the tables identify the annual capacity requirements for each waste treatment type and can be used to identify pinch points when policies or allocations are likely to be required to prevent under-capacity issues. Appendix 2 sets out cumulative landfill capacity gaps under each scenario throughout the period 2013-2030 to assist the identification of the level of capacity required throughout the entire Plan period.

1.4.12 In order to ensure that sufficient opportunities are provided for new waste management facilities of the right type, in the right place and at the right time, it will be necessary for the Waste Management DPD to take a flexible approach to meeting future waste management requirements. Increasing energy costs and non fossil fuel incentives could well result in an increased demand for energy recovery including in the form of smaller scale embedded combined heat and power sources. In order to achieve this, it will be important to provide a flexible approach in meeting future waste management requirements and identifying suitable sites/areas.

1.4.13 Utilising the latest data (collected as at July 2013), existing capacity information was assembled and collated into a Waste Facility Capacity Database and used to inform the future waste capacity requirements. The capacity database represents the best available information as supplied by the City of Bradford. A summary of available capacity is set out in Table 9⁶. Capacity shown is assumed to be available for the duration of the plan unless information on end dates has been provided. There are sixty-one operational waste management facilities in Bradford and an additional two sites with planning permission but which have not yet been built and two facilities for the management of animal by-products.

⁶ Capacity is based on average annual capacity based on past years performance and NOT EA licenced capacity figures as this is not considered the most accurate figure for calculating actual available capacity due to the way in which the EA licence system works.

Table 9 Available Waste Capacity in Bradford (tonnes)

Waste Type	Facility Type	Annual Capacity
LACW only	Transfer stations (non-hazardous)	71,071
LACW only	Household Waste Recycling Site	68,492
LACW and CI	Treatment facility	57,729
LACW, CI and CDE	Residual Mechanical Treatment ⁷	120,047
CI only	Transfer stations (non-hazardous)	74,952
CI only	Transfer stations (hazardous)	561
CI only	Recycling (ELVs)	23
CI only	Treatment facility	7,271
CI only	WEEE	1,225
CI and CDE	Transfer stations (non-hazardous)	342,018
CI and CDE	Transfer stations (hazardous)	153,749
CI and CDE	Recycling (reprocessors)	3,579
CDE only	Transfer stations (non-hazardous)	25,570
Metallic wastes	Recycling (ELVs)	4,424
Metallic wastes	Recycling (Metals)	252,052
Metallic wastes	WEEE	12,545

[Sources: Environment Agency Waste Data Interrogators 2006-2012 supplemented by results of a survey undertaken for this assessment]

1.4.14 It is recommended that the City of Bradford consider the implications and requirements of each of the proposed scenarios and select one set for the purposes of planning for future waste facilities. In principle it is possible to utilise different scenarios for the individual waste streams, however significant modification will be required to the accompanying model supporting this report and justification would be required as to why alternative scenarios have been chosen from that agreed in preparation of this report.

1.4.15 The future management for residual LACW (for both Bradford and Calderdale) is currently under review. Modelling has taken into account both active existing sites and also sites with planning permission but not yet constructed or operational.

1.4.16 To cover a wider appraisal a review has taken place of sub-regional capacity for both LACW and C&I non-hazardous waste materials and highlighting any known restrictions. Any capacity identified however may not necessarily be available for the use of waste arisings from Bradford or Calderdale and would

⁷ See explanation in paragraph 1.3.6 of this report.

be subject to the Duty to Co-operate requirements. Findings are shown in Table 10.

Table 10 Sub-regional Waste Capacity

Site Name	Facility type	Status	Known Capacity/limitations
Cross Green Industrial Estate, Leeds EFW Veolia	EFW (CHP)	PP permitted – proposed start 2016	Leeds LACW only PFI 25 yr contract – 164,000 te
Skelton Grange Power Station, Leeds EFW Biffa	EFW	PP permitted Feb 2013	C&I waste – 300,000 te
South Kirkby, West Yorkshire, Wakefield Shanks Group	MBT/autoclave/AD	Contract signed January 2013 – 2015 proposed build completion	LACW only PFI – 25 yr contract – 230,000 te
Vine Street, Huddersfield, SITA	EFW	Operational since 2000	Processes 136,000 te LACW residual waste – contract with Kirklees Council
FerryBridge Biomass Power Station, West Yorkshire	EFW & Biomass Power Station	Govt approval Nov 2011 – expected operational early 2015	Will use biomass and waste, the latter including 200,000 te of waste wood + 300,000 te of C&I waste + 300,000 te of RDF processed from LACW
BDR residual Waste Treatment, Manvers, SSE Group	EFW	Expected operational 2015	Residual LACW from Barnsley, Doncaster & Rotherham – will produce 250,000 te of RDF feedstock for Ferrybridge –
Bradford Sites not yet operational			
Former gas works site Airedale Road, Marley, Keighley Halton Group	EFW and pyrolysis.	Planning submitted to Bradford Council November 2013 If approved provisional start date of 2016	Use only processed C&I as RDF feedstock. 130, 000 te (90,000 te RDF, 10,000 te tyre crumb, 30,000 te waste plastics)

Site Name	Facility type	Status	Known Capacity/limitations
Pennine Resource Recovery Bowling Back Lane, Bradford AECOM and FCC Environment (FCC).	EFW	Planning permission granted Nov 2012	Waste PFI 240,000 te LACW & C&I (193,000 te LACW from Bradford & Calderdale)
Waddington's Resource Recovery Facility (Autoclave)	Autoclave	Planning permission granted 2007	300,000 te possibly both LACW and C&I
Biogen/Energos) Ripley Road	Gasification	Planning permission granted 2010	160,000 te of C&I waste only

[Sources: Bradford City Council; desk research of industry news sites]

1.4.17 In addition to the above facilities, 17,877,000 cubic metres of landfill is available in West Yorkshire, with 11,954,000 cubic metres of this for non hazardous waste and 2,672,000 cubic metres for inert disposal (2012 data)⁸. As such West Yorkshire has sufficient landfill capacity to support the requirements of Bradford, and it is expected that the waste will continue to be exported to sites around the region. Bradford should enter into discussions with relevant authorities in order for the Waste Management DPD to identify continued export of waste requiring landfill.

1.4.18 It is recommended that the City of Bradford includes, within the Waste Management DPD, information on existing capacity and an indication of the number, scale and potential location for any facilities indicated as required to meet future capacity needs as informed by this Report.

2. FUTURE CAPACITY REQUIREMENTS

2.1 Introduction

2.1.1 This section of the report deals with each of the principal waste streams in turn, setting out:

- Current arisings and capacity of existing facilities;
- Future Arisings; and

⁸ Source Environment Agency Waste Data Tables 2012 Yorkshire and the Humber - <http://www.environment-agency.gov.uk/research/library/data/150326.aspx>

- Capacity of required facilities.

2.1.2 For each of the three scenarios explained in Paragraphs 1.42 a further set of growth modifiers were applied, these are explained in paragraphs 1.43-1.45 and Table 2. A summary of the findings of the modelling process are discussed below and presented in detail in Appendix 1.

2.2 LOCAL AUTHORITY COLLECTED WASTE (LACW)

Current Arisings and Capacity of Existing Facilities

2.2.1 A total of 224,507 tonnes of LACW was produced in 2012/13 in the City of Bradford (Waste Arisings and Capacity Requirements Interim Report 2013).

2.2.2 The City of Bradford currently relies on a local merchant facility which uses mechanical and hand sorting to extract recyclates. Resulting RDF is subsequently exported for energy recovery under interim arrangements. The interim waste treatment arrangements are currently in place up to 2015/16 until the Council adopts longer term arrangements.

2.2.3 Green waste composting takes place at Esholt WWTW within Bradford.. There is sufficient capacity at this site for LACW therefore no sites are envisaged being required to meet this need.

2.2.4 LACW materials sent for recycling are managed through a wide variety of outlets. Bradford has sufficient facilities for transfer of recyclable materials, however, there are few facilities available for recycling within Bradford for LACW. As a result, most of this waste is currently exported outside of the area for processing. There is a capacity gap identified for recycling throughout the plan period for this waste stream.

Future Arisings

2.2.5 The modelling reflects growth forecasts for LACW provided by the WDAs and includes residual LACW waste from Calderdale. Residual waste treatment capacity in the order of 190,000 tonnes per annum will be needed to provide for both Bradford and Calderdale residual waste as a replacement for the interim arrangements. Residual waste treatment and contract options are currently under consideration.

LACW Required Facilities: Recycling Facilities

- 2.2.6 There is a clear gap in recycling capacity within Bradford, and currently most waste is bulked up at transfer stations and managed elsewhere. Therefore there is a requirement of 50,000 tonnes per annum throughout the plan period

LACW Required Facilities: Treatment Facilities

- 2.2.7 Whilst there is an initial gap in required facilities for residual mechanical treatment as an option for the treatment of LACW waste, should sites with planning permission be built and become operational, Bradford may be in a position where there would be a surplus of capacity. However, it is important to note that although there are facilities with planning permission, there is no guarantee that these will be delivered. Therefore, Bradford will need to consider identifying additional capacity of at least 50,000 tonnes per annum to meet any shortfall in supply going forward. To ensure that an oversupply does not occur, Bradford should continue to liaise with the owners of sites with planning permission to assess the future potential contribution to capacity needs the facility could meet.

- 2.2.8 Green waste is taken to Esholt WWTW by the Council to be mixed with sewerage sludge for composting. A total of 17,130 tonnes of green waste were collected in 2011/12 from both kerbside collections and Household Waste Recycling Centres. Whilst a change in kerbside collection from sacks to wheelie bins in 2012 is likely to increase the quantity of green waste collected, the current arrangements retain adequate capacity to absorb any likely increase in arisings.

LACW Required Facilities: Landfill

- 2.2.9 There is an identified need for landfill throughout the plan period, however as discussed under 1.4.16, there is sufficient landfill capacity with West Yorkshire which could help meet this need. Bradford will need to continue to work closely with neighbouring WPAs to discuss future landfill requirements for Bradford.

LACW Required Facilities: Energy Recovery

- 2.2.10 As referred to in Section 1.3, LACW collected in Bradford undergoes mechanical treatment that produces a secondary product called RDF which remains a waste even though it has been processed. Table 2 summarises the quantity of RDF that was produced by this process in 2012. The forecasting model identifies that there is a need for EfW capacity in Bradford to use this

RDF as a fuel to ensure that it is managed locally rather than exported to other authorities or outside the UK, as happens currently.

2.2.11 The main input to the mechanical treatment processes will be LACW with an assumed level of 192,000 tonnes for management of waste arising in Bradford and Calderdale in 2012. Both the mechanical treatment and energy from waste management processes are able to co-treat C&I waste that is similar in composition to LACW. An allowance has therefore been made in line with the Bradford PFI business case for secondary products arising from the mechanical treatment of 35,000 tonnes per annum of C&I waste. This additional load has been included in the modelling to assess the total capacity needed to produce RDF, manage extracted recyclables and for energy recovery facilities.

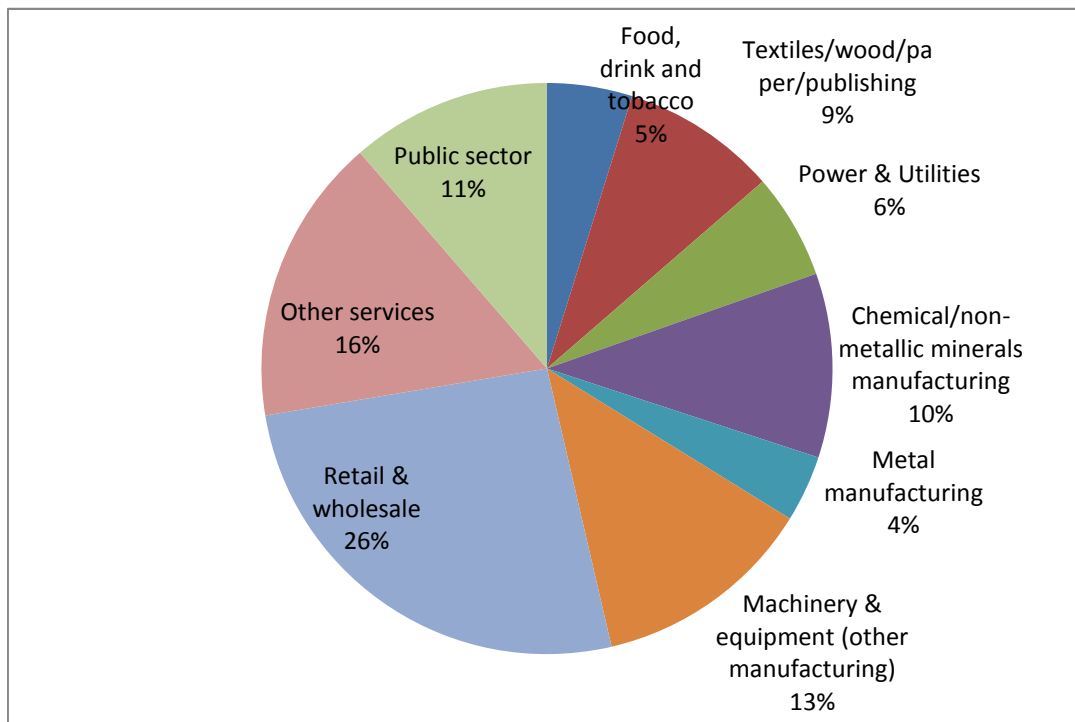
2.2.12 RDF produced from LACW in Bradford is currently exported to Holland or Denmark. It is proposed that this current interim contract and treatment arrangements for Bradford's residual LACW will only run until 2015. Bradford is currently in the process of securing long term arrangements for the management of LACW. There is one facility in planning and 3 sites with planning permission (see Table 8) which could help to meet the need for this element of LACW requirement. Should the remaining facility receive planning permission and all sites become operational, they will provide sufficient capacity to meet the identified need for this waste stream. Should these facilities not come forward, then Bradford will need to consider identifying sites to meet the identified gap throughout the plan period.

2.3 **COMMERCIAL AND INDUSTRIAL (C&I) WASTE**

Current Arisings and Existing Facilities

2.3.1 C&I data estimates have been based on 474,087 tonnes (2009, Extrapolated NW C&I survey).

Figure 3 C&I waste arisings by sector



[Source: extrapolated from Environment Agency survey of C&I Arisings in North West England, 2009]

- 2.3.2 The NW extrapolated survey gives a high level of commercial waste although this reflects a high level of commercial waste recycling in the NW extrapolated survey (62% of commercial waste estimated as recycled). However, the EA Interrogator database indicates that a significantly higher proportion of waste in the City of Bradford is managed through transfer facilities.
- 2.3.3 Waste transfer operations are increasingly undertaking waste segregation to increase recycling rates and avoid the increasing cost of landfill disposal. It is also the case that significant quantities of waste sent for recycling will be managed through sites that are exempt from the full permitting requirements and thus data is not captured by the EA Interrogator database. Many recycling locations will be outside of the Plan area and indeed the exportation of recyclate from the UK is a significant management route.
- 2.3.4 Recycling potential, particularly for commercial and industrial waste, is increasing, with the greatest opportunity for mixed waste which is not currently source segregated. Analysis of the 2009 extrapolated NW C&I survey indicated that 80% of the category of mixed waste could be capable of recycling or use for energy recovery.

Future Arisings Scenarios and Subsequent Capacity Gap

C&I Required Facilities: Transfer Stations

- 2.3.5 Waste transfer stations and bulking facilities provide a valuable component in the efficient management of waste materials. In particular they are useful when waste arisings are relatively small in quantity and widely distributed. For this reason transfer stations are seen to be a significant feature of waste management provision within the Plan area.
- 2.3.6 Under all growth projections and scenarios modelled there is no gap in transfer station facilities within the Plan period. Transfer capacity exceeds 570,000 tonnes throughout the Plan period even with applied growth and maximised recycling modifiers. In the model, capacity as waste arisings is allocated to recycling, treatment or disposal options. Transfer facilities are therefore shown as a surplus although they may play an important role in the chain of facilities used for any particular waste stream. It should however be noted that due to the important role of transfer station facilities in the Plan area, further capacity may be required to provide suitable geographical distribution.

C&I Required Facilities: Recycling Facilities

- 2.3.7 The Baseline Scenario indicates that currently (2013) there is a gap in available recycling capacity within the Plan area. The gap is significant for both LACW and C&I waste streams. The gap is indicated to be in the order of 400,000 tonnes under no growth (estimated gap in 2013) rising to the order of 527,000 tonnes by 2030 under the maximised recycling and growth scenario. Whilst a proportion of recyclate is currently managed through transfer and bulking facilities within the Plan area, final destination recycling and reprocessing facilities lie mainly outside of the Plan area and therefore current provision is met predominantly by export.
- 2.3.8 The National Waste Strategy is to increase recycling in accordance with the waste hierarchy (Waste Strategy 2007, The Government Review of Waste Policy in England 2011 and the Waste Management Plan for England 2013 Consultation). It is likely that increased national recycling provision for bulk recyclate materials such as paper, card, glass, plastics and metals will be met by increased capacity at regionally and nationally significant facilities, through economies of scale. It is therefore likely that provision for final management of increased levels of recyclate generated within the Plan area will be largely provided for by export to recycling and processing facilities outside the Plan area. As a consequence it is recommended that the City of Bradford make

contact, under the Duty to Cooperate, with neighbouring/other Waste Planning Authorities in order to establish whether they are aware of any foreseeable changes which may affect the position over the expected life of the Plan (see Interim Report for details pertaining to waste movements and Duty to Cooperate).

C&I Required Facilities: Composting

2.3.9 There are no permitted Aerobic Composting facilities within the Plan area. Modelling therefore shows a gap for the whole Plan period. Green Waste is taken to Esholt WWTW Biological Treatment Plant and managed through this route and this is expected to continue. In 2012, just over 54,000 tonnes of LACW and C&I green waste was treated at this facility.

C&I Required Facilities: Metal Recycling Sites (specialist recycling; End of Life Vehicles, Metals and Waste Electronic and Electrical Equipment [WEEE])

2.3.10 Modelling shows a surplus capacity under all growth projections and scenarios throughout the Plan period therefore no additional ELV, Metals and WEEE processing sites are likely to be required during the Plan period.

C&I Required Facilities: Treatment

2.3.11 Treatment includes a wide range of processes that may be required to deal with specialist materials prior to recycling, energy recovery or final disposal. C&I waste requiring treatment also includes hazardous waste and Environment Agency hazardous waste records for 2012 show that in the order of 18,000 tonnes of hazardous waste were exported (see table 12 of the interim report). Most of these arisings are treated or disposed of outside of Bradford. The only hazardous waste treatment capacity within Bradford is clinical waste treatment and records for 2012 show that approximately 1,660 tonnes of healthcare arisings were treated in Bradford.

2.3.12 A gap or surplus in treatment provision can therefore be strongly influenced by the local absence or provision of specialised treatment facilities which may only be viable at a regional or national level. Specialised biological treatment capacity provided by Esholt WWTW for green waste currently provides annual capacity of around 54,000 tonnes per annum, and this is assumed to only accept LACW although the licence does allow for C&I waste. Bradford currently takes around 17,000 tonnes of Green Waste to this facility and the remaining amount comes from WPAs within the Yorkshire and Humber region. Although the Capacity available at this site would indicate a surplus in

treatment capacity for LACW, this capacity may in practice be taken up by “imported” waste from neighbouring WPAs.

2.3.13 As detailed in paragraph 2.2.10, residual waste treatment processes are also able to deal with C&I wastes that are of similar composition to residual LACW. Table 8 summarises proposed treatment capacity which, could be supplemented by procurement of alternative facility to treat LACW waste that may offer capacity to manage C&I waste also.

C&I Required Facilities: Energy from Waste

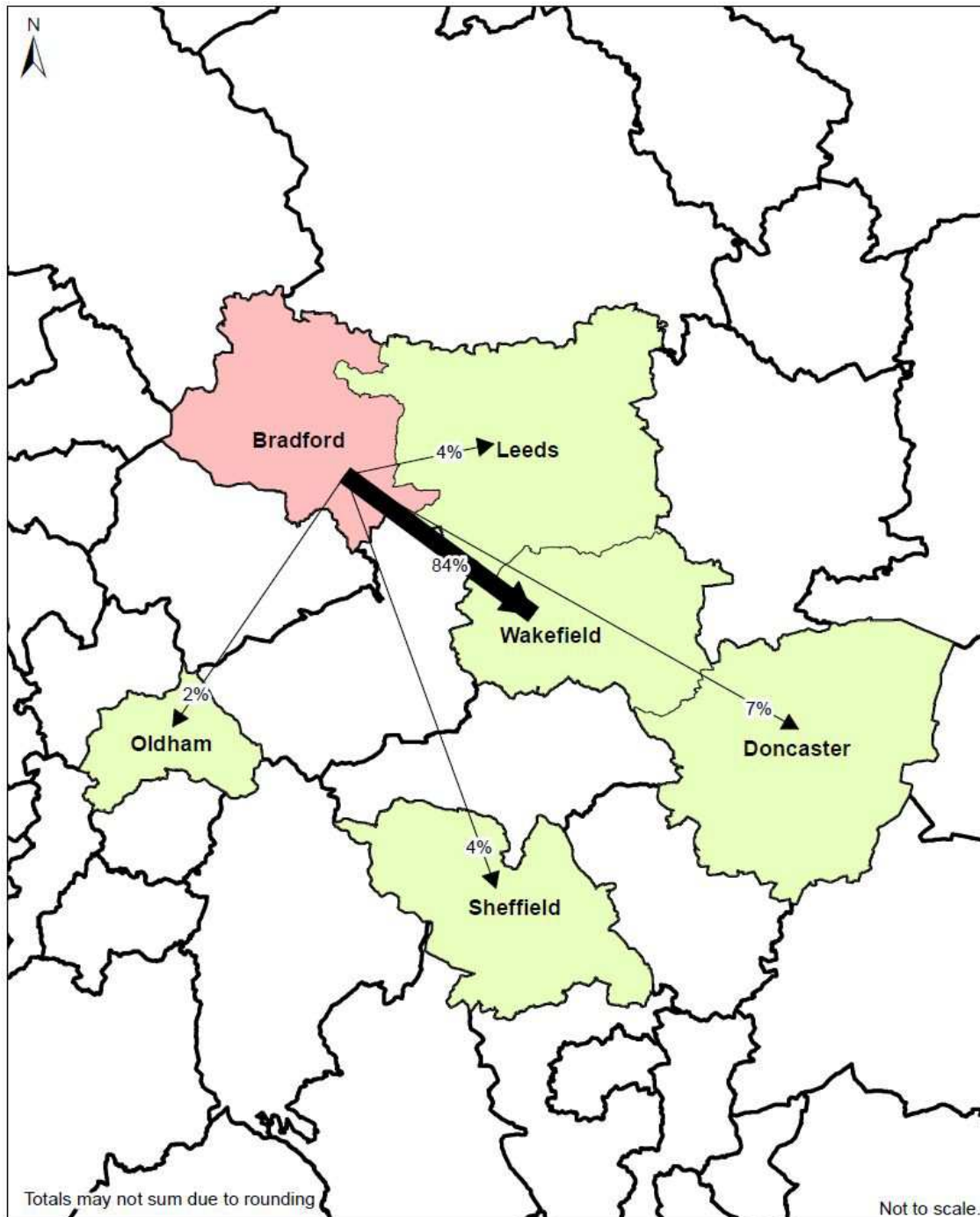
2.3.14 A requirement for energy recovery capacity is seen in all scenarios in the order of 200,000 to 278,000 tonnes per annum. The introduction of two energy recovery facilities with existing planning permission⁹ would substantially meet this need. Scenario 3 produces the greatest demand for energy recovery facilities. If these two energy recovery facilities are not commissioned the gap in energy recovery requirement would rise to the order of 278,000 tonnes per annum in 2030 under Scenario 3 (assuming growth).

C&I Required Facilities: Non-Hazardous Landfill

2.3.15 Landfill requirements range from 59,000 tonnes under Scenario 1 (Baseline recycling no growth) to 71,000 tonnes per annum in 2030 under Scenario 1 (baseline recycling and growth). Under Scenarios 2 maximised recycling and scenario 3, median recycling using minimised growth, (the lowest annual landfill requirement falls to 7,500 per annum tonnes by 2030. Currently, Bradford exports the majority of its landfill waste to sites within West Yorkshire, with over 80% going to Wakefield (EA WDI 2012), see Figure 3 below. Under the median and maximised scenarios there is a maximum requirement of 53,000 tonnes at the start of the plan period, dropping to about 10,500 by 2030, therefore there would be insufficient requirement to warrant the investment in a landfill site to manage Bradford’s waste. As discussed above in paragraph 1.4.16, there is significant void space available in West Yorkshire, and as such, assuming agreement can be reached under Duty to Co-operate, it is not expected that Bradford would seek to provide landfill capacity.

⁹ Biogen/Energos (gasification) Ripley Road plant and Waddington's Resource Recovery Facility (Autoclave)

Figure 3 Map showing movement of non-hazardous waste to landfill from Bradford



2.4 CONSTRUCTION, DEMOLITION AND EXCAVATION (CD&E) WASTE

2.4.1 Waste materials generated from Construction, Demolition and Excavation (CD&E) operations include a wide range of surplus waste construction materials as well as materials generated by the demolition and maintenance of buildings and soils and sub-soils from excavation. Most of these materials are inert with respect to their pollution potential. However, materials such as wood are biodegradable, plasterboard produces a polluting leachate and asbestos is classified as hazardous.

Current Arisings and Existing Facilities

2.4.2 Accurate data on the quantity of CD&E waste arisings has historically been poor. Between 1999 and 2005 the Department of Communities and Local Government conducted national surveys of arisings and use of alternatives to primary aggregates. The latest national survey in 2005¹⁰ suggested that the production of recycled aggregate in the region had increased slightly since the previous 2003 survey. However, due to the limited level of returns and at +/- 15% confidence level, the apparent changes in the 2003 and 2005 surveys are not statistically significant. The data at a regional level is even less robust.

2.4.3 The interim report is based on data from the EA WDI (Waste Data Interrogator, 2012) which showed a total of just over 155,468 tonnes of CD&E waste is deposited in Bradford, with over 114,123 tonnes of this being construction and demolition waste and just over 41,345 tonnes being excavation waste. The EA WDI also showed 65,716 tonnes of CD&E waste as originating in Bradford deposited in adjacent waste planning authority areas. These totals represent a minimum as more CD&E will be coded generally as Yorkshire and Humberside waste or managed through exempt facilities. In practice most CD&E waste is managed through transfer stations in Bradford or may be removed directly to sites outside the plan areas.

2.4.4 If it is assumed that CD&E waste arisings in the Yorkshire and Humberside region are essentially managed within the region, a proportion of this total can be estimated as arising in Bradford. Analysis of the EA Interrogator database for years 2011 and 2012 shows that when double counting of waste managed through transfer and treatment facilities and final disposals are taken into account a total in the order of 3.5 million tonnes was managed through permitted waste management facilities.

¹⁰ Survey of Arisings and Use of Alternatives to Primary Aggregates in England, 2005. *Construction, Demolition and Excavation Waste*, Communities and Local Government.

2.4.5 Based on population, the ONS gives a Yorkshire and Humberside total of 5.3 million tonnes and Bradford 513,000 tonnes per annum, therefore the proportion of waste arisings would be approximately 10%. Based on the most recent ONS data release GVA for the Yorkshire and Humberside region, the GVA in 2011 was £86.8 billion whereas Bradford's total GVA for 2011 was almost £8.3 billion giving again a proportion in the order of 10%. This would give C&D arisings for Bradford in the order of 150,000 tonnes and Excavation waste arisings of 200,000 tonnes.

2.4.6 There is no available data covering "Registered Exemptions" for CD&E which would include registered exempted composting sites, burning practices on land, spreading waste on land for reclamation/improvement and or sites used for the storage of CD&E materials and mobile recycling of C&D. It is likely that the level of arisings managed through exempt operations will continue into the future and thus these arisings will not require additional future planned capacity.

Future Arisings and Subsequent Capacity Gap

CD&E Required Facilities: Transfer Stations

2.4.7 Waste transfer stations and bulking facilities often provide a valuable component in the transfer and bulking of CD&E waste materials. Modelling under all scenarios and growth factors shows no gaps in provision over the whole Plan period.

CD&E Required Facilities: Recycling

2.4.8 There is a shortfall of capacity for recycling of CD&E materials (principally C&D waste) under Scenarios 2 and 3 over the plan period. Increasing recycling rates will widen the gap, as would growth in waste arisings.

2.4.9 CD&E is also currently recycled / treated on site through mobile machinery. These operations are permitted by local authorities and data on waste types and throughput are not recorded in the EA Interrogator database and thus no quantitative data is available. These operations are likely to remain an important methodology for C&D recycling.

2.4.10 There is an identified need for additional capacity to support higher levels of CD&E recycling early in the Plan period. Recycling of CD&E waste is economically more viable at more localised facilities due to the lower value and costs of transporting lower value higher density wastes and therefore the recycling facilities for this waste stream are more likely to be required within

the Plan Area. CD&E recycling can be achieved by mobile plant working at demolitions sites as well as at fixed facilities. Developments which produce a high level of CD&E are encouraged to recycle this material on site using mobile plant and it is expected that Bradford will continue to encourage the continuation of such practices to move the management of this waste up the hierarchy. The capacity gap for CD&E is identified from the start of the plan period, therefore facilities to process CD&E will be required from the outset. The gap ranges from 112,301 tonnes in 2013 (Baseline scenario and no growth) up to 236,436 tonnes per annum (scenario 2 maximised recycling and growth). The gap could be met from between 2-5 facilities depending on the size of facility developed.

CD&E Required Facilities: Landfill

2.4.11 Under the Baseline scenario with no growth the initial gap of 200,000 tonnes appears at 2017 and rises to 223,000 tonnes per annum at 2030 with growth. Under median and maximised recycling with no growth annual requirements will be limited to 100,000 tonnes per annum by 2030 and 111,000 tonnes per annum with waste growth. However, as there is in excess of 2,672,000 cubic metres of inert waste capacity available in West Yorkshire, it is assumed there is sufficient landfill to meet this need. In addition, infrastructure projects coming forward in Bradford and neighbouring areas may require such materials for engineering purposes and therefore Bradford are encouraged to look at the need for engineering material over the plan period.

CD&E Required Facilities: Hazardous Landfill

2.4.12 There are no provisions for landfill of hazardous CD&E waste, namely asbestos and asbestos contaminated waste, within the City of Bradford. Whilst asbestos contaminated waste CD&E waste amounted to 2,114 tonnes in 2011 and 4,850 tonnes in 2012 indicating significant year on year variance, there will be a gap in landfill provision for hazardous waste (from CD&E) under all growth factors. Bradford does not have a landfill site which can manage this waste, and there is insufficient need to warrant investment in landfill specifically to meet the small requirement of Bradford. However, within West Yorkshire, there are two sites licensed to take such waste, Skelton Grange in Leeds and Thornhill Quarry in Kirklees. Bradford should work with Kirklees and Bradford under the requirements of Duty to Co-operate to assess the potential for use of these sites throughout the plan period.

2.5 HAZARDOUS WASTE

- 2.5.1 The 2005 Hazardous Waste (England and Wales) Regulations and the List of Wastes (England and Wales) Regulations set out what is defined as hazardous waste. Waste is classified as “Hazardous Waste” if it has characteristics that make it harmful to human health, or to the environment, either immediately or over an extended period of time.
- 2.5.2 Hazardous waste is a sub category of Local Authority Collected Waste, Commercial and Industrial waste and CD&E classed materials. Estimated totals for LACW, C&I waste and CD&E waste are inclusive of waste in the sub-category of hazardous.

Current Arisings and Existing Facilities

A total of 19,152 tonnes of hazardous waste was recorded as arising in the City of Bradford in 2012. The City of Bradford is a net exporter of hazardous waste. In 2012 it imported 2,712 tonnes and exported 18,286 tonnes. A total of 3,578 tonnes were managed in Bradford of this 1,660 tonnes were recorded as healthcare treatment, 1,225 tonnes were managed through transfer stations with 693 tonnes managed by recovery operations.

- 2.5.3 The future capacity requirement for hazardous waste has already been taken into account under the main classes of waste materials for which hazardous waste is a sub-set. However, hazardous waste facilities for treatment, incineration and landfill are essentially located outside the Plan area and it is anticipated that provision will continue and remain available throughout the Plan period. It should be noted that hazardous waste facilities require economies of scale so that provision of facilities within the Plan area for the small quantities of arisings would be unlikely to be viable unless a new facility were to import significant quantities from outside the Plan area.

2.6 SEWAGE SLUDGE

- 2.6.1 There is one company who operate Waste Water Treatment Works (WWTW) within Bradford and that is Yorkshire Water.

Future Arisings and Subsequent Capacity Gap

- 2.6.2 Yorkshire Water was contacted in order to gain a broad overview of their future capacity requirements as far into the future as possible. The responses indicated that at this stage they cannot give any indication of what future requirements are likely to be with regard to waste water, especially not for the entire Plan period up to 2028. However, Yorkshire Water have been involved

in consultations on Local Plans in the area and will continue this role going forward, which would help inform any changes in growth requirements. Yorkshire Water did not anticipate building new WWTW in Bradford but would almost certainly be undertaking works at the existing WWTW over the plan period.

- 2.6.3 Waste water companies are only regulated on a 5 year cycle through Asset Management Plans (AMPs). The current AMP (AMP 5) will not finish until the end of March 2015. The programme for AMP6 will be driven by water quality requirements (yet to be finalised by the Environment Agency) for example compliance with the Water Framework Directive, and growth pressures.

*Required Facilities*¹¹

- 2.6.4 As a general principle, when greater capacity is required, WWTW operators would try and place new plant on existing treatment works, or failing that purchase land from an adjacent land owner. Therefore it is unlikely that new sites will be required within the Plan area to handle waste water/sewage sludge. However, in some circumstances it may be beneficial to do so, for example if there are site sensitive receptors near to an existing works making expansion unfeasible. The precise location would be dependent on engineering and environmental feasibility studies.
- 2.6.5 At present it is not envisaged that sites or capacity should be identified within the Waste Management DPD for future use as WWTW as there is no current requirement for additional facilities. Should any further land be required to support the operation of Yorkshire Water, there is capacity within the existing Esholt site which could meet that need. Yorkshire Water should be kept informed of the plans progress and invited to comment at consultation stages.

2.7 AGRICULTURAL WASTE

- 2.7.1 Agricultural Waste is waste produced at agricultural premises as a result of agricultural activity. Agricultural premises are defined in the Agriculture Act 1947 as land used for: horticulture, fruit growing, seed growing, dairy farming, livestock breeding and keeping, grazing land, meadow land, osier land (growing willow), market gardens and nursery grounds. It also includes woodlands where that use is ancillary to the use of land for other agricultural purposes. This definition includes all arable farming.

¹¹ The figures associated with waste water treatment capacity have not been included in Appendix 1 (but can be found within the Forecasting Model Access Database) as the future capacity requirements are dependent upon the issues outlined under paragraph 2.6.2 of this report.

2.7.2 This waste is made up of the following substances, many of which can also be defined as by-products and not necessarily wastes due to the fact they contain important nutrient resources and they are not defined as wastes when applied to the land as fertiliser for the benefit of agriculture:

- Compostable and digestible materials (farm yard manure, slurry, vegetable);
- Combustible materials (straw, silage wrap (plastic), bale twine and net (plastic), fertiliser and seed bags (plastic), animal feed bags (plastic), animal feed bags (paper & card), horticulture (plastic), tree guards (plastic), paper seed bags (paper & card), and oil);
- Hazardous and Difficult Waste¹²; chemical materials (silage effluent), agrochemical (plastic), agrochemical (paper & card), animal health (plastics), animal health (paper & card), animal health (glass), animal health (rubber/metal), pesticide washings, sheep dip (organic phosphates) and sheep dip (synthetic pyrethroids); and
- Other (milk).

Current Arisings and Existing Facilities

2.7.3 There are 417 holdings in Bradford (DEFRA Local Authority breakdown for key crop areas and livestock numbers on agricultural holdings 2010). Therefore, the figures used are based on the best estimates available. The City of Bradford generates around 280,000 tonnes of waste, the majority of which is managed within the generating farm holding (Table 21 Interim Report).

Future Arisings and Subsequent Capacity Gap

2.7.4 It will be necessary to provide for waste management leaving the farm holdings amounting to approximately just over 1,700 tonnes per annum (assuming no growth in the volume of agricultural waste arisings). It is likely that in the future more waste may be diverted from landfill for recycling, fulfilling the aspirations of waste management moving up the waste hierarchy.

2.7.5 It is likely that the majority of agricultural waste will still be managed within the farm holdings via land treatment/spreading and composting despite new agricultural exemptions currently being implemented (Interim Report). The quantities involved for management off-site from farm holdings are likely to be

¹² Difficult waste are those wastes which may be non hazardous but require special handling or treatment requirements

so small they will be of low significance in the overall waste arisings for the City of Bradford.

Required Facilities

- 2.7.6 The future arisings are very small (in the order of 1,700 tonnes per annum assuming no growth in agricultural activity or significant change in agricultural practice) and any required facilities to cover off farm holding recycling and hazardous landfill would, in practice, be likely to require additional waste materials to make any new facility viable. The capacity allowance should be noted for the specialised treatment requirements for certain types of agricultural waste such as animal by-products incineration and hazardous landfill. The figures reflect the optimum level of treatment according to the waste hierarchy and in reality some of the waste may not be able to be practically or cost effectively recycled and therefore require treatment by other methods such as landfill.
- 2.7.7 There is no immediate need to provide any new facilities solely to cover agricultural wastes, the small capacity requirements for agricultural wastes recycling are combined with C&I wastes and capacity gaps and new facility requirements are therefore included within the totals in the section of the report under C&I wastes. The “specialised” wastes generated that require specialist treatment are likely to continue to be treated at such existing specialised facilities over the plan period. It is noted that there are specialist storage plants, processing (rendering) plants, incineration, co-incineration plants and combustion plants all licensed and registered specifically for animal by-products treatment only located already in Bradford¹³ (such as the Incineration plants at Keighley and Bradford (operated by G and A Fort and Mitchell by-products Ltd), and rendering/processing plants operated by Omega Proteins Ltd and P Waddington and company).

2.8 LOW LEVEL RADIOACTIVE WASTE

- 2.8.1 Most (98%) of Low Level Waste (LLW) in the UK arises from operation of nuclear power stations, nuclear fuel reprocessing facilities and also from the decommissioning and clean-up of nuclear sites. The remaining 2% is produced by non-nuclear industry users of radioactivity. As no nuclear sites are located in the plan area, these non-nuclear industries are the sole producers of LLW that will need to be planned for. Therefore, when compared to the total LLW produced in the UK, the amount produced in Bradford is very small.

¹³ <http://www.defra.gov.uk/ahvla-en/disease-control/abp/premises/>

Current Arisings and Existing Facilities

- 2.8.2 The EA were contacted to provide a list of sites where LLW arises in Bradford. The results of this work identified two facilities: Bradford Royal Infirmary and Bradford University.
- 2.8.3 The information received indicates that levels of LLW produced in Bradford are minimal. This waste includes general items such as gloves, overshoes and tissues which are disposed of as general laboratory waste, as well as glassware and sharps which are contained in sharpsafes and assigned as radioactive and disposed of as radioactive.
- 2.8.4 Volumes of waste are not requested from producers of LLW, however an estimate has been made that the annual arising of LLW in the Sub-Region is likely not to exceed 100m³.

Future Arisings and Subsequent Capacity Gap

- 2.8.5 There is no likelihood of a nuclear facility being located in Bradford in the next 20 years, which means it is highly unlikely that LLW will increase significantly above current levels.
- 2.8.6 In March 2012 the UK Government produced 'A Strategy for the Management of Solid Low Level Radioactive Waste from the Non Nuclear Industry'. The Strategy aims to:
- Provide guidance and background information on this type of waste to enable planning authorities to make informed decisions on planning applications and to respond to concerns from their elected members and constituents.
 - Clarify the respective roles of waste producers, the environment agencies, planning authorities and the Nuclear Decommissioning Authority to enable decisions to be made that properly recognize the responsibilities of others.
 - Ensure that waste producers and regulators are fully aware of how the regulatory framework should be applied to LLW, particularly the need for waste management plans, waste minimisation at source and use of the waste hierarchy.
- 2.8.7 This Strategy has been produced in conjunction with the Nuclear Decommissioning Authority, under the auspices of the Government's Radioactive Waste Policy Group (RWPG) to ensure appropriate integration with the nuclear industry LLW strategy.

- 2.8.8 Research undertaken for the Strategy estimated that total UK arisings from the non-nuclear industry are very unlikely to exceed 100,000 m³ per year. In comparison, total waste arisings in England are around 272 million tonnes. Non-nuclear LLW arisings are therefore very unlikely to exceed 0.1% by volume of conventional waste arisings from the whole of the UK.
- 2.8.9 However, the document notes that participation in the LLW survey was less than anticipated and therefore the quantification of waste arisings from the non-nuclear industry across the whole of the UK remains very uncertain and is to be treated with caution.
- 2.8.10 The Strategy concludes that the disposal network available to the non-nuclear industry for radioactive waste is fragile and non-existent in some parts of the country. This means waste can travel some distance from source to disposal location.

Required Facilities

- 2.8.11 There are no landfill sites in Bradford permitted for controlled burial of LLW. The nearest landfill to Bradford able to accept LLW is Clifton Marsh in the county of Lancashire, which is permitted until 2015 with likely future capacity subject to permissions. The latest planning permission relating to Clifton Marsh (Refs: 05090376/ 06090395) restricts the amount of LLW originating from outside the North West Region and imported into the site to not more than 4,000 tonnes per annum.
- 2.8.12 It is not known where current arisings in Bradford are managed therefore it is recommended that contact is made with Lancashire and Cumbria County Councils under the Duty to Cooperate, in order to establish whether they are aware of any foreseeable changes which may affect the position for LLW over the expected life of the Plan.

3. SUMMARY OF FUTURE WASTE MANAGEMENT REQUIREMENTS

- 3.1 This section looks at the future waste management requirements for the City of Bradford in line with the waste hierarchy. According to the Needs Assessment, the indicative requirements for future waste management facilities in the City of Bradford can be summarised as follows:

Future Capacity Requirements for LACW

- Provision for composting remains as a gap throughout the plan period under all scenarios. This gap could be met through continued exports for treatment elsewhere or through the provision of 2-1 small to medium composting facilities with an annual throughput of 25,000 - 35,000 tonnes per annum¹⁴;
- It is proposed that residual waste treatment for LACW will include the residual element of LACW collected by Calderdale;
- Residual waste treatment capacity initially in the order of 192,000 tonnes per annum will be needed to provide for both Bradford and Calderdale residual waste as a replacement for the interim arrangements.
- Implementation of the proposed planning permissions for residual waste treatment and energy recovery would provide adequate provision for residual LACW and could potentially provide additional capacity for C&I waste. Should this facility not come forward then additional capacity will be required to manage this waste stream with capacity to manage around 240,000 tonnes per annum at its highest growth level in 2030 for Bradford (includes 35,000 tonnes of C&I residual waste).

Reviewing results by scenario the following can be deduced for residual mechanical treatment of LACW, on the basis of discontinuing use of the facility currently used for LACW treatment (which provides 120,000 tonnes per annum of treatment capacity);

- Scenario 1(baseline; no growth) gap of 192,313 tonnes for residual mechanical treatment throughout the plan period, under baseline growth the gap widens from 193,973 in 2013 to 241,519 by 2030 and under baseline with minimised growth, the gap is 193,973 in 2013 and by 2030 is 241,519 tonnes
- Scenario 2 (Maximised recycling and no growth) the gap of 192,313 tonnes remains the same over the whole plan period, under maximised recycling with growth the gap increases from 192,313 in 2013 to reach 241,519 tonnes by 2030 and under maximised recycling with minimised growth the capacity grows from 192,313 in 2013 to 241,519 by 2030.

¹⁴ Information on throughputs and average facility size in this section is taken from the ODPM document Planning for Waste Management Facilities, 2004.

- Scenario 3 (Median recycling and no growth) the gap of 192,313 remains the same over the whole plan period, with median recycling and growth the gap increases from 193,973 in 2013 to 241,519 by 2030 and with median recycling and minimised growth the gap reaches the lower figure of 241,519 tonnes by 2030.

Future Requirements for RDF and Recyclable Material for C&I and LACW

- There are a limited number of existing facilities for processing recyclable LACW and C&I materials within Bradford. Therefore, these materials are currently exported from the Plan area. There is an identified gap throughout the Plan period.
- RDF is currently produced at a site in Bradford and the resulting product is exported from the Plan area. However, it is proposed that treatment of LACW at this site will cease on termination of an interim contract.
- Provision of Residual Mechanical Treatment will result in secondary products from treating both LACW waste and C&I as RDF 80% of original input and recycle 20% of the original input.
- Total EfW requirements, including that for secondary RDF, are in the order of 200,000 tonnes per annum under the initial baseline to 278,000 tonnes per annum under median recycling and growth by 2030.
- There are number of EfWs within the sub-region that are built, being built or in the planning process, which specifically require RDF. The pre-treatment of waste to create a RDF for export is possible and there might be a requirement for facilities to utilise this energy source within Bradford. Should the plan provide for such facilities to manage both LACW and C&I, the plan would need to provide for 1 large facility with an annual throughput sufficient to manage up to 278,000 tonnes per annum, or up to 5 smaller facilities with an annual throughput of 50,000 tonnes per annum (under baseline levels of recycling).
- Recycling facilities (e.g. Materials Recycling Facilities (MRF's)) are required to manage both LACW and C&I. The plan would need to provide for either up to 5 large facilities with an annual throughput of 100,000 tonnes per annum, or up to 10 smaller facilities with an annual throughput of 50,000 tonnes per annum (under baseline levels of recycling). However, it should be noted that the outputs from recycling facilities can either be a product or a recycle. If a product is produced from the recycling facility then there is no further management of waste required as it ceases to be a waste. If recycle is produced, this material can still be considered a waste requiring further management. The management of the recycle is currently largely dependent on export from the Plan area and it is expected that this position will continue in the current markets. However, if the plan needs to provide

facilities for the treatment for recycle, then co-location on allocated recycling facility sites should be considered in the first instance, with sites of sufficient size to accommodate such co-location.

Future Waste Capacity Requirements for C&I Waste

- Waste requiring treatment consists largely of specialist hazardous wastes which are treated outside of the Plan area and, due to the specialist nature of the facilities that treat this waste, it is assumed that this practice will continue throughout the Plan period;
- There is no capacity gap for the recovery of energy from suitable C&I waste provided that the new energy from waste capacity with planning permission becomes operational and that the proposed LACW site is able to take merchant waste. Should the permissions not come forward then a single EfW with capacity of at least 100,000 tonnes per annum would be required to manage Bradford's C&I waste over the plan period;
- The requirement for non-hazardous landfill falls to a minimal amount (in the order of 11,000 tonnes per annum by the end of the plan period) if a maximised recycling scenario is realised. However, there are no existing landfill sites within Bradford, therefore it is assumed that there will be a continued reliance on export for waste managed this way throughout the plan period. The maximum requirement in 2013 is around 59,000 tonnes per annum under scenario 1 no growth.

Reviewing results by scenarios the following results can be seen for landfill (assuming LACW has gone for residual waste management treatment);

Scenario 1 (baseline, no growth) the landfill deficiency remains at 58,822 tonnes per annum for the whole plan period, under baseline with growth the deficiency rises from 2013 to reach 71,000 tonnes by 2030 and under baseline with minimised growth the deficiency is at 58,822 in 2013 to 53,000 by 2030.

Scenario 2 (maximised recycling, no growth) the deficiency reduces from the change in waste management from 52,547 in 2013 down to 8,625 by 2030 and with maximised recycling, minimised growth the fall in landfill requirement reduces down to 7,566 by 2030.

Scenario 3 (median recycling, no growth) landfill requirements fall to 8,625 by 2030 applying growth this rises to 10,611 tonnes by 2030 and by applying minimised growth the deficiency reduces to 7,566 by 2030.

Future Waste Capacity Requirements for CD&E Waste

- Additional recycling facilities are indicated as being required under all scenarios. If the maximum recycling option is to be achieved by 2030

facilities will be required to manage around 236,000 tonnes per annum. This requirement could continue to be met through export or through the provision of new facilities. Facilities for recycling C&D can range in size from small at around 25,000 tonnes per annum to larger facilities at around 80,000 tonnes per annum. Depending on what type of sites come forward to manage this resource, this could require the provision of 3 to a maximum of 10 facilities.

- Landfill capacity will be required principally for excavation waste for which no alternative option is available. As there are no landfill sites within Bradford it is expected that this waste will continue to be managed through exportation outside of Bradford. As discussed earlier in the report, there is potential capacity in West Yorkshire to manage this waste, and in addition Bradford will need to look at future infrastructure requirements to assess the use of such material for engineering works.
- Hazardous landfill; asbestos and asbestos contaminated waste from CD&E is currently exported for landfill which is the only management option for this waste, a gap in the order of 74 tonnes per annum appears throughout the Plan period. As with other landfill, it is expected that this waste will continue to be managed through exportation outside of Bradford. There are landfill site licenced to take such waste within West Yorkshire.
- Reviewing results by scenarios the following results can be seen for landfill and recycling;
Scenario 1 (baseline no growth) and minimised growth the landfill gap is at 200,000 tonnes and for recycling 112,301 tonnes both for the whole plan period, with growth this rises for landfill from 201,300 in 2013 to reach 222,737 tonnes by 2030 and for recycling 112,975 in 2013 rising to 125,068 by 2030.

Scenario 2 (maximised recycling, no growth/minimised growth) landfill deficit reduces from 187,500 tonnes in 2013 down to 100,000 tonnes by 2030, and obviously recycling capacity increases rising from 124,801 tonnes in 2013 up to 212,301 tonnes by 2030, applying growth increases landfill requirements slightly so that the reduction by 2030 is at 111,369 tonnes and for recycling increases the deficit to 236,436 tonnes by 2030.

Scenario 3 (median recycling, no growth/minimised growth) the landfill gap is at 187,500 in 2013 reducing down to 100,000 tonnes by 2013, with growth the deficit has increased slightly by 2030 to 111,369 tonnes and for recycling increased from 125,550 tonnes to 236,436 by 2030.

Future Waste Capacity Requirements for Agricultural Waste

- Off-farm disposal is included within C&I waste provision;
- There is no requirement for new facilities over the Plan period.

Future Waste Capacity Requirements for Sewage Sludge

- Anticipate adequate provision by the Water Companies with any additional requirement being met within existing operations.
- Asset management plans to continue throughout the Plan period.

Future Waste Capacity Requirements Low Level Radioactive Waste

- It is unknown where waste from Bradford is currently managed; therefore a review should be anticipated as there is uncertainty about the availability of landfill capacity locally outside the Plan area post-2015.

Duty to Co-operate

Under all scenarios where the continued export of waste is likely to be the management option going forward, it is recommended that Bradford engage in early discussion with those authorities to which it is known waste is currently exported to assess the continuation of the practice throughout the life of the waste Management DPD.

Summary Tables

Tables 11 to 13 show the capacity gaps across each scenario and growth modifier. The gap identified assumes that all the waste generated in Bradford be treated within the geographical boundary of Bradford and NOT exported to other MPA's. Representative annual capacities of standardised waste management facilities have been assumed as follows¹⁵:

- Materials reprocessing sites (LACW & C&I waste): 50,000 tonnes
- Materials reprocessing sites (C&D waste): 50,000 tonnes
- Non-hazardous non-inert landfill: 100,000 to 500,000 tonnes (or the equivalent void space)
- Non-hazardous inert landfill: 100,000 tonnes
- Hazardous landfill: 20,000 tonnes
- Composting: 25,000 to 35,000 tonnes.

¹⁵ Office of the Deputy Prime Minister, Planning for Waste Management Facilities, 2004.

Table 5 Comparison of the capacity gap at year across the 3 scenarios, assuming NO GROWTH (Negative figures indicates no gap), all wastes except Sewage and Low Level Radioactive waste (tonnes)

Waste Management	Year	Scenario 1 Baseline	Scenario 2 Max. Recycling	Scenario 3 Med. Recycling	Min no Facilities	Max No. Facilities
Landfill (non-hazardous)	2013	58,822	52,547	52,547	<1	<1
	2020	58,822	8,625	8,625	<1	<1
	2030	58,822	8,625	8,625	<1	<1
Landfill (hazardous)	2013	74	74	74	<1	<1
	2020	74	74	74	<1	<1
	2030	74	74	74	<1	<1
Landfill (CD&E)	2013	200,000	187,500	187,500	2	2
	2020	200,000	100,000	100,000	1	2
	2030	200,000	100,000	100,000	1	2
Energy recovery	2013	201,457	203,026	204,594	1	1
	2020	201,457	214,006	226,555	1	1
	2030	201,457	214,006	226,555	1	1
Incineration (Specialist High Temp)	2013	833	833	833	<1	<1
	2020	833	833	833	<1	<1
	2030	833	833	833	<1	<1
Recycling (C&I and LACW)	2013	396,348	401,054	399,485	8	9
	2020	399,927	437,575	435,025	8	9
	2030	399,927	437,575	425,025	8	9
Recycling (aggregates CD&E)	2013	112,301	124,801	124,801	3	3
	2020	112,301	212,301	212,301	3	5
	2030	112,301	212,301	212,301	3	5

Waste Management	Year	Scenario 1 Baseline	Scenario 2 Max. Recycling	Scenario 3 Med. Recycling	Min no Facilities	Max No. Facilities
Recycling (specialist materials– including metal recycling, End of Life Vehicles and WEEE)	2013	-1,060	-1,060	-1,060	Surplus	Surplus
	2020	-1,060	-1,060	-1,060	Surplus	Surplus
	2030	-1,060	-1,060	-1,060	Surplus	Surplus
Composting	2013	34,024	34,024	34,024	2	2
	2020	34,024	34,024	34,024	2	2
	2030	34,024	34,024	34,024	2	2
Residual Mechanical Treatment	2013	107,266	107,266	107,266	1	1
	2020	107,266	107,266	107,266	1	1
	2030	107,266	107,266	107,266	1	1
Treatment Plant (including Anaerobic Digestion, specialised treatment of biodegradable liquids and wastes, organic waste treatment by distillation)	2013	-52,515	-52,515	-52,515	Surplus	Surplus
	2020	-52,515	-52,515	-52,515	Surplus	Surplus
	2030	-52,515	-52,515	-52,515	Surplus	Surplus

Table 6 Comparison of the capacity gap at year across the 3 scenarios, assuming Minimised Growth (Negative figures indicates no gap), all wastes except Sewage and Low Level Radioactive waste (tonnes)

Waste Management	Year	Scenario 1 Baseline	Scenario 2 Max. Recycling	Scenario 3 Med. Recycling	Min no Facilities	Max No. Facilities
Landfill (non-hazardous)	2013	58,470	52,231	52,231	<1	<1
	2020	56,104	8,131	8,131	<1	<1
	2030	52,998	7,566	7,566	<1	<1
Landfill (hazardous)	2013	74	74	74	<1	<1
	2020	74	74	74	<1	<1
	2030	74	74	74	<1	<1
Landfill (CD&E)	2013	200,000	187,500	187,500	2	2
	2020	200,000	100,000	100,000	1	2
	2030	200,000	100,000	100,000	1	2
Energy recovery	2013	202,666	204,225	205,785	1	1
	2020	224,996	236,989	248,982	1	1
	2030	238,850	250,208	261,566	1	1
Incineration (Specialist High Temp)	2013	833	833	833	<1	<1
	2020	833	833	833	<1	<1
	2030	833	833	833	<1	<1
Recycling (C&I and LACW)	2013	395,676	400,356	398,795	8	8
	2020	403,009	438,989	426,475	8	9
	2030	398,939	433,013	421,655	8	9
Recycling (aggregates CD&E)	2013	112,301	124,801	124,801	2	2
	2020	112,301	212,301	212,301	2	3
	2030	112,301	212,301	212,301	2	3

Waste Management	Year	Scenario 1 Baseline	Scenario 2 Max. Recycling	Scenario 3 Med. Recycling	Min no Facilities	Max No. Facilities
Recycling (specialist materials– including metal recycling, End of Life Vehicles and WEEE)	2013	-1,060	-1,060	-1,060	Surplus	Surplus
	2020	-1,060	-1,060	-1,060	Surplus	Surplus
	2030	-1,060	-1,060	-1,060	Surplus	Surplus
Composting	2013	34,223	34,223	34,223	2	2
	2020	38,213	38,213	38,213	2	2
	2030	40,561	40,561	40,561	2	2
Residual Mechanical Treatment	2013	108,926	108,926	108,926	1	1
	2020	137,842	137,842	137,842	1	1
	2030	156,472	156,472	156,472	1	1
Treatment Plant (including Anaerobic Digestion, specialised treatment of biodegradable liquids and wastes, organic waste treatment by distillation)	2013	-52,605	-52,605	-52,605	Surplus	Surplus
	2020	-53,210	-53,210	-53,210	Surplus	Surplus
	2030	-54,004	-54,004	-54,004	Surplus	Surplus

Table 7 Comparison of the capacity gap at year across the 3 scenarios, assuming Growth (Negative figures indicates no gap), all wastes except Sewage and Low Level Radioactive waste (tonnes)

Waste Management	Year	Scenario 1 Baseline	Scenario 2 Max. Recycling	Scenario 3 Med. Recycling	Min no Facilities	Max No. Facilities
Landfill (non-hazardous)	2013	59,439	53,100	53,100	<1	<1
	2020	63,964	9,454	9,454	<1	1
	2030	71,103	10,611	10,611	<1	1
Landfill (hazardous)	2013	74	74	74	<1	<1
	2020	74	74	74	<1	<1
	2030	74	74	74	<1	<1
Landfill (CD&E)	2013	201,200	188,625	188,625	2	2
	2020	209,803	104,901	104,901	2	3
	2030	222,737	111,369	111,369	2	3
Energy recovery (LACW & C&I)	2013	203,169	204,754	206,338	1	1
	2020	229,084	242,711	256,338	1	1
	2030	248,293	263,416	278,539	1	1
Incineration (Specialist High Temp)	2013	833	833	833	<1	<1
	2020	833	833	833	<1	1
	2030	833	833	833	<1	1
Recycling (C&I and LACW)	2013	400,084	404,838	403,253	8	8
	2020	438,794	479,677	466,048	9	10
	2030	481,420	526,789	511,666	10	11
Recycling (aggregates CD&E)	2013	112,975	125,550	125,550	2	2
	2020	117,806	222,708	222,708	2	2
	2030	125,068	236,436	236,436	2	3

Recycling (specialist materials– including metal recycling, End of Life Vehicles and WEEE)	2013	-1,059	-1,059	-1,059		
	2020	-1,052	-1,052	-1,052		
	2030	-1,042	-1,042	-1,042		
Composting	2013	34,340	34,340	34,340	2	2
	2020	39,162	39,162	39,162	2	2
	2030	42,742	42,742	42,742	2	2
Residual Mechanical Treatment	2013	109,146	109,146	109,146	1	1
	2020	139,645	139,645	139,645	1	1
	2030	160,660	160,660	160,660	1	1
Treatment Plant (including Anaerobic Digestion, specialised treatment of biodegradable liquids and wastes, organic waste treatment by distillation)	2013	-52,376	-52,376	-52,376	Surplus	Surplus
	2020	-51,358	-51,358	-51,358	Surplus	Surplus
	2030	-49,741	-49,741	-49,741	Surplus	Surplus