

**WRG
EASTCROFT EXTENSION
LANDFILL DATA ANALYSIS
FINAL REPORT**

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1 INTRODUCTION

1.1 Background

Waste Recycling Group (WRG) have applied for planning permission to build an extension to their Eastcroft Energy-From-Waste plant in Nottingham. To support this application, WRG have asked Fichtner to analyse data on the waste which is being delivered to existing landfill sites around Nottingham, operated by WRG, in order to determine the potential tonnages of combustible waste that could be disposed of in the extended plant rather than being landfilled in WRG landfill sites around Nottingham.

WRG have provided detailed data for their landfill sites. The waste landfilled in these sites comes from a number of areas around Nottingham. WRG asked that just the waste received from around Nottinghamshire and Nottingham UA be considered when assessing the potential future tonnages.

2 CONCLUSIONS

A total of 1,349,900 tonnes of waste was disposed at the 5 WRG landfill sites around Nottingham in the two calendar years of 2006 and 2007. Of this 583,557 tonnes originated from Nottinghamshire (291,778 tonnes average per year) and 234,179 tonnes of waste originated from Nottingham UA (117,089 tonnes average per year).

The combustible fraction of this waste was assessed over the two year period, at 4 of the 5 sites, and total of 474,694 tonnes of waste was disposed by waste producers in Nottinghamshire (237,348 tonnes average per year), and 129,263 tonnes of the waste disposed of by waste producers in Nottingham UA (64,631 tonnes average per year) could be classed as combustible and so could potentially be used in Eastcroft EfW facility.

This gives a potential total of 301,979 tonnes of combustible waste that could be available annually for disposal in Eastcroft EfW facility. This is equivalent to 73.8% of all the waste that originated from waste producers in Nottingham UA and Nottinghamshire at the 4 WRG landfill sites.

It is important to note that this report centres on the analysis of site input data on just 4 landfill sites around Nottinghamshire, out of a total of 15 landfill sites within 35 miles of Nottingham City centre. The majority of the waste that is classified as combustible falls into the mixed municipal waste category, this includes household waste and similar commercial, industrial and institutional waste. It is not possible to split this fraction into the separate waste sources using site returns data, but from local knowledge, WRG has suggested that a substantial quantity would be C&I waste.

3 DISCUSSION

To assess the type and quantity of wastes currently being landfilled by Nottingham UA and Nottinghamshire, site input data for 5 of WRG's landfill sites around Nottingham has been used. The data was available for each quarter in the calendar years 2006-07 and 2007-08. For each delivery made in this period, the tonnage disposed of, the source county or borough and the European Waste Code (EWC) identifying the waste type was available.

The landfilled waste arriving at each landfill site was assessed to determine the originating borough/council of the waste and the total tonnages received over the two year periods, to firstly determine the source and tonnages that have been disposed from Nottingham UA and Nottinghamshire.

The data from 4 out of the 5 landfills was then analysed to determine the breakdown of the wastes that originated from Nottingham and Nottinghamshire and after this, assumptions were made regarding the combustible proportion of each of these waste fractions in order to determine the waste fractions that could be disposed of at the extended Eastcroft Energy from Waste plant.

3.1 Landfill Data Received

The data was firstly assessed to determine the originating county/borough. These were divided into five groups: Nottingham UA, Nottinghamshire (Nottinghamshire, Ashfield, Broxtowe, Gredling, Mansfield, Newark & Sherwood and Rushcliffe), Derbyshire (Derby UA, Erewash, Bolsover and Chesterfield), Lincolnshire and Leicestershire. The table below displays the total tonnages received at each landfill site over the two year period.

Table 1 – Breakdown of Waste Arriving at the 5 Landfill Sites

	Bilshorpe		Bradgate		Sutton		Staple Quarry		Dorket Head	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes	%
Derbyshire	23,052	16.9%	14,335	7.3%	156,082	38.5%	68,580	22.3%	60,327	9.5%
Lincolnshire	239	0.2%	149	0.1%	47	0.0%	15,184	4.9%	7	0.0%
Leicestershire	473	0.3%	120,942	61.8%	322	0.1%	98	0.0%	421	0.8%
Nottinghamshire	98,364	72.0%	433	0.2%	196,981	48.5%	119,698	38.8%	168,667	67.1%
Nottingham UA	11,764	8.6%	202	0.1%	50,288	12.4%	101,467	32.9%	70,751	21.3%
Total	136,693		195,726		405,812		308,106		302,975	

From the above table it can be seen that the majority of the waste arriving is from Nottingham UA and Nottinghamshire. It is notable that a very limited amount of waste received at Bradgate Landfill Site came from Nottingham or Nottinghamshire (635 tonnes in a 2 year period). Therefore, it was decided to omit the waste received at Bradgate Landfill site from further analysis of the landfill data.

The previous data can be summarised in the following table to show the total waste disposed of at each landfill site and the amount of the waste that originated from Nottingham or Nottinghamshire (excluding wastes received at Bradgate).

Landfill Site	Total waste to each of the landfill Sites		Fraction of waste received that originated from Nottinghamshire or Nottingham UA	
	Tonnes Received	% of total waste received	Tonnes Received	% of total waste received to the landfill site
Bilsthorpe	136,693	11.8%	110,129	80.6%
Sutton	405,812	35.2%	247,270	60.9%
Staple Quarry	308,106	26.7%	221,165	71.8%
Dorket Head	302,975	26.3%	239,418	88.3%
Total	1,153,586		817,982	70.9%

A total of 817,982 tonnes of waste that originated in Nottingham UA or Nottinghamshire was received at these 4 landfill sites in the 2 years

3.2 Breakdown of Waste from Nottingham UA and Nottinghamshire

The breakdown of the waste into European Waste Categories (EWC) for the waste received that originated from Nottinghamshire and Nottingham UA is assessed below. Firstly the tonnages that fall into each of the 20 main waste categories has been assessed.

The breakdown of wastes into the major waste categories is given in the following table for both Nottingham and Nottinghamshire.

European Waste Categories		Nottinghamshire (tonnes)	Nottingham UA (tonnes)
01	Wastes resulting from exploration, Mining, Quarrying, Physical and Chemical treatment of Minerals	0	0
02	Wastes from Agriculture, Horticulture, Aquaculture, Forestry, Hunting and Fishing, Food Preparation and Processing	190	910
03	Wastes from Wood Processing and the Production of Panels and Furniture, Pulp, Paper and Cardboard	213	690
04	Wastes from the Leather, Fur and Textile Industries	817	0
05	Wastes from the Petroleum Refining, Natural Gas Purification and Pyrolytic Treatment of Coal	0	0
06	Wastes from Inorganic Chemical Processes	0	0
07	Wastes from Organic Chemical Processes	0	136

Table 3 –Waste Category breakdown			
European Waste Categories		Nottinghamshire (tonnes)	Nottingham UA (tonnes)
08	Wastes from the MFSU of Coatings (Paints, Varnishes and Vitreous Enamels), Adhesives, Sealants and Printing Inks	1	179
09	Wastes from the Photographic Industry	0	0
10	Waste From Thermal Processes	1,022	911
11	Wastes from Chemical Surface Treatment and Coating of Metals and Other Materials, Non-Ferrous HydroMetallurgy	62	0
12	Wastes from Shaping and Physical and Mechanical Surface Treatment of Metals and Plastics	221	86
13	Oil Wastes and Wastes of Liquid Fuels	0	0
14	Waste Organic Solvents, Refrigerants and Propellants	0	0
15	Waste Packaging, Absorbents, Wiping Cloths, Filter Materials and Protective Clothing Not Otherwise Specified	36	77
16	Wastes Not Otherwise Specified in the List	991	64
17	Construction and Demolition Wastes (including Excavated Soil from Contaminated Sites)	91,776	39,805
18	Wastes From Human or Animal Health Care and/or Related Research (except kitchen wastes not arising from immediate health care)	0	7
19	Wastes from Waste Management Facilities, Off-Site Waste Water Treatment Plants and the Preparation of Water for Human Consumption and Water for Industrial Use	32,304	63,946
20	Municipal Wastes (Household Waste and Similar Commercial, Industrial and Institutional Wastes) Including Separately Collected Fractions	455,922	127,461
Total		583,555	234,272

From the breakdown above, it can be seen that the majority of the waste is classified as Municipal Wastes or Construction and Demolition Wastes.

3.3 Waste Combustible Fraction

To determine the tonnage of wastes that could potentially be disposed of via Eastcroft EfW facility, each of the waste fractions has been broken down further and an assumption made to the combustibility content of that waste. The assessment has been carried out for each EWC category in turn.

3.3.1 Wastes from Agriculture, Horticulture, Aquaculture, Forestry, Hunting and Fishing, Food Preparation and Processing

Table 4 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing	83	71	97%
Wastes from the preparation and processing of meat. Fish and other foods of animal origin	53	0	100%
Wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, teas and tobacco preparation and processing, conserve production, yeast and yeast extraction production	0	802	100%
Wastes from the baking and confectionery industry	4	37	100%
Wastes from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa)	51	0	50%
Total Combustible tonnes	162	908	

The value of 97% combustible of the wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing is obtained by assuming that agrochemical wastes are not combustible. An estimate of 50% has been used where the percentage of wastes that is combustible is unknown.

3.3.2 Wastes from Wood Processing and the Production of Panels and Furniture, Pulp, Paper and Cardboard

Table 5 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes from Wood Processing and the Production of Panels and Furniture, Pulp, Paper and Cardboard	213	690	100%
Total Combustible tonnes	213	690	

3.3.3 Wastes from the Leather, Fur and Textile Industries

Table 6 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes from the Leather, Fur and Textile Industries	817	0	50%
Total Combustible tonnes	408	0	

An assumption has been made regarding this fraction that only 50% of the material is combustible, this is because the breakdown of individual fractions that fall within this code is unknown and the relative difficulties in burning fur and leather.

3.3.4 Wastes from Organic Chemical Processes

Table 7 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes from Organic Chemical Processes	0	136	100%
Total Combustible tonnes	0	136	

3.3.5 Wastes from the MFSU of Coatings (Paints, Varnishes and Vitreous Enamels), Adhesives, Sealants and Printing Inks

Table 8 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes from the MFSU of Coatings (Paints, Varnishes and Vitreous Enamels), Adhesives, Sealants and Printing Inks	1	179	100%
Total Combustible tonnes	1	179	

3.3.6 Waste From Thermal Processes

Table 9 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes from power stations and other combustion plants (except 19)	2	212	0%
Wastes from casting of ferrous pieces	389	699	0%
Wastes from manufacture of ceramic goods, bricks, tiles and construction products	185	0	0%
Wastes from manufacture of cement, lime and plaster and articles and products made from them	446	0	0%
Total Combustible tonnes	0	0	

3.3.7 Wastes from Chemical Surface Treatment and Coating of Metals and Other Materials, Non-Ferrous HydroMetallurgy

Table 10 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes from Chemical Surface Treatment and Coating of Metals and Other Materials, Non-Ferrous HydroMetallurgy	62	0	0%
Total Combustible tonnes	0	0	

3.3.8 Wastes from Shaping and Physical and Mechanical Surface Treatment of Metals and Plastics

Table 11 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes from Shaping and Physical and Mechanical Surface Treatment of Metals and Plastics	221	86	0%
Total Combustible tonnes	0	0	

3.3.9 Waste Packaging, Absorbents, Wiping Cloths, Filter Materials and Protective Clothing Not Otherwise Specified

Table 12 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes from plastic packaging	3	2	100%
Wastes from metallic packaging	0	55	0%
Wastes from composite packaging	4	0	50%
Wastes from mixed packaging	30	20	50%
Total Combustible tonnes	20	12	

An estimate of 50% has been used where the percentage of wastes that is combustible is unknown.

3.3.10 Wastes Not Otherwise Specified in the List

Table 13 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes (end-of-life tyres)	733	0	100%
Wastes (Glass)	258	0	0%
Wastes (Inorganic wastes)	0	1	100%
Wastes (Organic wastes)	0	63	100%
Total Combustible tonnes	733	64	

It should be noted that end-of-life tyres may be difficult to process in the Eastcroft facility.

3.3.11 Construction and Demolition Wastes (including Excavated Soil from Contaminated Sites)

Table 14 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Concrete, bricks, tiles and ceramics	6,258	801	0%
Bituminous mixtures, coal tars and tarred products	2	19	50%

Table 14 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Soil (including excavated soil from contaminated sites), stones and dredging spoil	69,365	38,575	0%
Insulation materials and asbestos-containing construction materials	1	8	0%
Other construction and demolition wastes	16,151	402	25%
Total Combustible tonnes	4,039	110	

An estimate of 25% has been as this waste may contain waste wood from the demolition of buildings.

3.3.12 Wastes from Waste Management Facilities, Off-Site Waste Water Treatment Plants and the Preparation of Water for Human Consumption and Water for Industrial Use

Table 15 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Wastes from incineration or pyrolysis of waste	0	60,708	0%
Wastes from waste water treatment plants not otherwise specified	5,878	0	0%
Wastes from shredding of metal-containing wastes	0	2,605	0%
Plastic and rubber	1,429	5	100%
Textiles	198	0	100%
Other wastes (including mixtures of materials) from mechanical treatment of waste	24,799	628	100%
Total Combustible tonnes	26,426	633	

3.3.13 Municipal Wastes (Household Waste and Similar Commercial, Industrial and Institutional Wastes) Including Separately Collected Fractions

Table 16 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Paper and cardboard	222	12	100%
Clothes	5	52	100%

Table 16 –Combustibility Breakdown			
Waste Description	Nottinghamshire (tonnes)	Nottingham UA (tonnes)	Combustible fraction
Textiles wastes	0	1	100%
Discarded electrical and electronic equipment	0	10	0%
Plastics wastes	41	15	100%
Biodegradable garden and park wastes	489	0	100%
Soil and stones	601	0	0%
Mixed municipal waste	429,994	125,587	100%
Waste from markets	31	0	100%
Street-cleaning residues	22,715	1,728	50%
Septic tank sludge	0	34	0%
Bulky waste	1,272	21	0%
Municipal wastes not otherwise specified	552	0	100%
Total Combustible tonnes	442,693	126,531	

It is noted that mixed municipal waste is not 100% combustible since it has an appreciable ash content, but for the purposes of this report it has been assumed that it is 100% combustible as separation of the waste into combustible and non-combustible wastes would not take place.

3.3.14 Summary of Combustible Tonnages

Below is a summary of the tonnes delivered to WRG landfill sites in the area around Nottingham that can be categorised suitable for disposal in a thermal processing plant.

Table 17 –Waste Category breakdown			
European Waste Categories		Nottinghamshire (tonnes)	Nottingham UA (tonnes)
02	Wastes from Agriculture, Horticulture, Aquaculture, Forestry, Hunting and Fishing, Food Preparation and Processing	162	908
03	Wastes from Wood Processing and the Production of Panels and Furniture, Pulp, Paper and Cardboard	213	690
04	Wastes from the Leather, Fur and Textile Industries	408	0
07	Wastes from Organic Chemical Processes	0	136
08	Wastes from the MFSU of Coatings (Paints, Varnishes and Vitreous Enamels), Adhesives, Sealants and Printing Inks	1	179

Table 17 –Waste Category breakdown			
European Waste Categories		Nottinghamshire (tonnes)	Nottingham UA (tonnes)
10	Waste From Thermal Processes	0	0
11	Wastes from Chemical Surface Treatment and Coating of Metals and Other Materials, Non-Ferrous HydroMetallurgy	0	0
12	Wastes from Shaping and Physical and Mechanical Surface Treatment of Metals and Plastics	0	0
15	Waste Packaging, Absorbents, Wiping Cloths, Filter Materials and Protective Clothing Not Otherwise Specified	20	12
16	Wastes Not Otherwise Specified in the List	733	64
17	Construction and Demolition Wastes (including Excavated Soil from Contaminated Sites)	4,039	110
19	Wastes from Waste Management Facilities, Off-Site Waste Water Treatment Plants and the Preparation of Water for Human Consumption and Water for Industrial Use	14,027	319
20	Municipal Wastes (Household Waste and Similar Commercial, Industrial and Institutional Wastes) Including Separately Collected Fractions	442,693	126,531
Total Combustible Tonnes of Waste		474,694	129,263

Of the 583,555 tonnes of waste that was categorised as originating from Nottinghamshire, 474,694 tonnes (81.3%) can be categorised as combustible over the 2 year period. Of the 234,272 tonnes of waste that originated from Nottingham UA, 129,263 tonnes (55.2%) can be categorised as combustible over the 2 year period.

Therefore, there is a yearly average of 237,347 tonnes of combustible material from Nottinghamshire and 64,631 tonnes of combustible material from Nottingham UA that would potentially be available for used in the Eastcroft EfW facility. This is a combined total of 301,978 tonnes per year of combustible waste, equivalent to 74% of all the waste landfilled from Nottingham UA and Nottinghamshire.