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Humber Gate Waste Treatment Facility



Humber Resources Group Ltd

EP Application Supporting Information

Document approval

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Document revision record

Revision no	Date	Details of revisions	Prepared by	Checked by
00	19/12/2025	To Client	ACM	JRS
01	04/02/2026	To EA	ACM	JRS
02	21/04/2026	To Client	ACM	JRS
03	24/04/2026	To EA	ACM	JRS

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1 Introduction

Humber Resources Group Ltd (HRG) is applying to the Environment Agency (EA) under the Environmental Permitting Regulations (EPRs) for an Environmental Permit (EP) to operate a thermal waste treatment facility, to be known as the Humber Gate Waste Treatment Facility (the Facility). The Facility will have a throughput capacity of 29,500 tonnes per annum. The Facility will comprise of a waste reception area, feed system, tank farm, counter-current rotary kiln, vertical post-combustion chamber, wastewater treatment, multi-stage flue gas treatment, and drainage systems. The Facility will be located at Humber Gate, Grimsby, DN31 2TT.

This document and its appendices contain the supporting information for the application for an Environmental Permit (EP) for the Facility. They should be read in conjunction with the formal application forms. An overview of the activities to be undertaken at the Facility is provided in section 1.3. Further information and detail on each component at the Facility is provided in Section 2.

1.1 The Applicant

HRG is a subsidiary of GRG Waste UK, a group of waste management organisations that are a UK market leader in specialist waste. GRG Waste UK provide services in collection, treatment, recycling and disposal of both specialist and non-specialist waste. HRG has been set up as a special purpose vehicle (SPV) for the delivery and operation of the Facility.

HRG is registered in England (Company Number: 15746661) and has a registered address of Romsey, Hampshire, SO51 0PG.

1.2 The Site

The site address is Humber Gate, Energy Park Way, Grimsby, DN31 2TT. The grid reference for the centre of the Site is NZ 523644 412867. The Site will be located on approximately 24 acres of land, which is located within a wider industrial estate (the Estate). The site is approximately 350m southwest of the Humber Estuary and 4.5km to the northwest of the town of Grimsby. The nearest residential properties are located approximately 1.86km southwest of the Facility.

A site location plan and installation boundary drawing are presented in Appendix A.

1.3 The Activities

The Facility will consist of a combination of Schedule 1 installation activities (as defined in the Environmental Permitting Regulations) (EPR) and directly associated activities. The activities to be undertaken at the site include the following:

- thermal waste treatment plant, including the processing of specialist waste which is delivered to the Facility via road;
- treatment of flue gases generated from the combustion of the waste fuels;
- production of bottom ash material that will be transferred off-site to a licensed waste disposal/recovery facility;
- generation of an air pollution control residue (APCr) that will be transferred off-site to a licensed waste disposal/recovery facility;
- the repackaging of specialist wastes prior to incineration; and
- blending of wastes prior to incineration onsite.

The Schedule 1 activities (as defined in the Environmental Permitting Regulations), and the Directly Associated Activities (DAA's) which will be undertaken at the Facility are listed in Table 1.

Table 1: Scheduled and directly associated activities

Type of Activity	Schedule 1 Activity	Description of Activity
Energy from waste	Section 5.1A(1)(a) - incineration of hazardous wastes requiring high temperature incineration.	The incineration of hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 10 tonnes per day.
Directly Associated Activities		
Directly Associated Activities		The receipt, storage and handling of hazardous waste prior to incineration.
		Blending of hazardous waste for incineration.
		The handling, storage and transfer of raw materials and residues for transfer off-site.
		Energy recovery via a steam boiler, steam turbine and generator producing electricity.
		Cleaning of nominally empty containers including washing clinical bins
		Standby electrical generation to provide electrical power to the plant in the event of an interruption in the supply.

2 The Facility

The site is split into two plots of land, refer to the Installation Boundary drawing in Appendix A.

Plot I contains the main site offices and visitor centre, welfare facilities, weighbridge, staff parking and gatehouse.

Plot C contains the main activities associated with the Facility will be the thermal treatment of incoming waste. The waste thermal treatment process will be based around process areas comprising the following facilities among others: waste reception and waste storage area; various waste feeding systems; counter-current rotary kiln furnace; high temperature secondary combustion zone; a steam turbine; dry and wet flue gas treatment (FGT) systems with the treated flue gases being monitored prior to release to atmosphere via a dedicated 47m stack. In addition, the Facility will include a control room, and offices and welfare facilities.

Allowing for the maximum capacity of the Facility and an NCV of 18 MJ/kg, the boiler will have a thermal capacity of approximately 20MWth.

2.1 Raw materials

The Facility will utilise a number of different chemicals and raw materials. The chemicals and raw materials used at the site will include the following:

- sodium bicarbonate;
- urea solution (40%);
- powdered activated carbon (PAC);
- sodium hydroxide (32%);
- auxiliary fuel;
- sulphuric acid;
- TMT 15; and
- other boiler treatment chemicals.

The Facility will receive a small amount of the following consumables for water treatment:

- lime; and
- granulated activated carbon.

Small quantities of maintenance materials will be kept at the Facility (such as oils, greases, insulants, antifreezes, welding and firefighting gases etc) for the operation and maintenance of plant and equipment.

Raw materials (including maintenance materials) will be supplied to standard specifications offered by different suppliers. All chemicals will be handled in accordance with Control of Substances Hazardous to Health (COSHH) Regulations as part of the quality assurance procedures and full product data sheets will be available.

Periodic reviews of all materials used will be made in the light of new products and developments. Any significant change of material, where it may have an impact on the environment, will not be made without firstly assessing the impact and seeking approval from the EA.

HRG will maintain a detailed inventory of raw materials used and will have procedures for the regular review of developments in raw materials used.

2.2 Emissions

2.2.1 Emissions to air

Emissions from the Facility will be released from the stack. Detailed air dispersion modelling of emissions has been undertaken. The emission limits proposed within this application for the Facility are consistent with the upper range of the BAT-AEL's stated in the Waste Incineration BREF for a new plant.

2.2.2 Emissions to water and sewer

Overall, the Facility is designed to minimise the volumes of effluent requiring discharge off-site. Under normal operating conditions, wastewater will be generated from the following processes:

- reject water from the water treatment plant;
- process effluent (e.g. boiler blowdown);
- blowdown from the wet scrubber from acid gas cleaning;
- effluent generated through washing and maintenance procedures.

There are no point source emissions to sewer as there is no readily accessible public sewers within the vicinity of the site.

Overall, the Facility is designed to minimise the volumes of effluent requiring discharge off-site. Surface water run-off from building roofs and areas of hardstanding will be collected in the surface water drainage system. Surface water is to be kept separate from process effluents and clean roof water is to be kept separate from any potentially contaminated surface water:

- Clean roof water will be collected in local collection tanks prior to transfer to Area 2 of the onsite lagoon. Prior to wet scrubber use, the water will be treated in the waste water treatment (WWT) plant within Building 2. The treated water is held in a holding tanking for testing in the onsite laboratory. This will be used to generate wet scrubber make up water (within Building 12) if after testing it is determined the treated water is within specification.
 - In a flood event, the uncontaminated roof water from Area 2 of the lagoon may be also discharged to the Humber Estuary if required.
- Surface water from non-process areas will be captured in local interceptors and transferred to be collected in Area 1 of the lagoon. This water will also be treated and tested within Building 2 to allow for its reuse as wet scrubber make up water after testing in the onsite laboratory.
 - If after laboratory testing, the treated water is deemed as unsuitable for further reuse, further laboratory testing will be undertaken. This will determine if the effluent can be discharged to the Humber Estuary under consent via the fixed Estate pipeline, or if the effluent is to be transferred to a suitably licensed facility.
- Where practicable, reject water from the water treatment plant and process effluent will be re-used onsite. Excess process blowdown effluent or effluent that cannot be reused will be stored in a tank in Building 2. This will be treated and tested prior to discharge to the Humber Estuary or tankered offsite if falling outside of emissions limits.

Discharge to water will comply with the BAT-AELS for 'direct emissions to water' stated in the Waste Incineration BREF. Refer to Appendix I for the water quality modelling results, which demonstrate that the impact of emissions to water will generally achieve compliance within less than 5m of the outfall throughout the tidal cycle.

2.2.3 Noise

The impact of noise from the Installation is considered in the noise assessment contained in Appendix D of the Application Pack. The assessment indicates a negligible and therefore not significant impact according to BS 4142 for the residential and ecological receptors.

2.2.4 Odour

The storage and handling of incoming waste has a limited potential to give rise to odour. All wastes which are delivered to the Facility will be delivered in enclosed containers and stored within the containers prior to processing. The Facility will not be processing wastes which will inherently have a high putrescible content. Therefore, the risk of odours being generated by the wastes being processed at the Facility is considered to be low.

The facility will be designed in accordance with the requirements of Environment Agency Guidance Note H4: Odour, and hence will include controls to minimise odour during normal and abnormal operation. Waste will be managed in a manner to ensure that problems with odour, litter and pests do not occur.

Waste handling and storage will be undertaken in an enclosed building. Waste will be stored in secure, closed containers, prior to loading into the feed systems and being transferred to the furnace. The containers will only be opened when being directly fed into the waste feed or when being sampled at waste acceptance. This minimises the potential for any release of dusts, litter or odour. Primary air for the combustion process is taken from within the main building, creating negative pressure and minimising emissions of odour from the Facility.

When the Facility is not in operation, the incoming wastes will be stored in the enclosed containers to prevent the escape of potential odours. When it is practicable to do so, it will be transferred to a suitably licenced waste management facility.

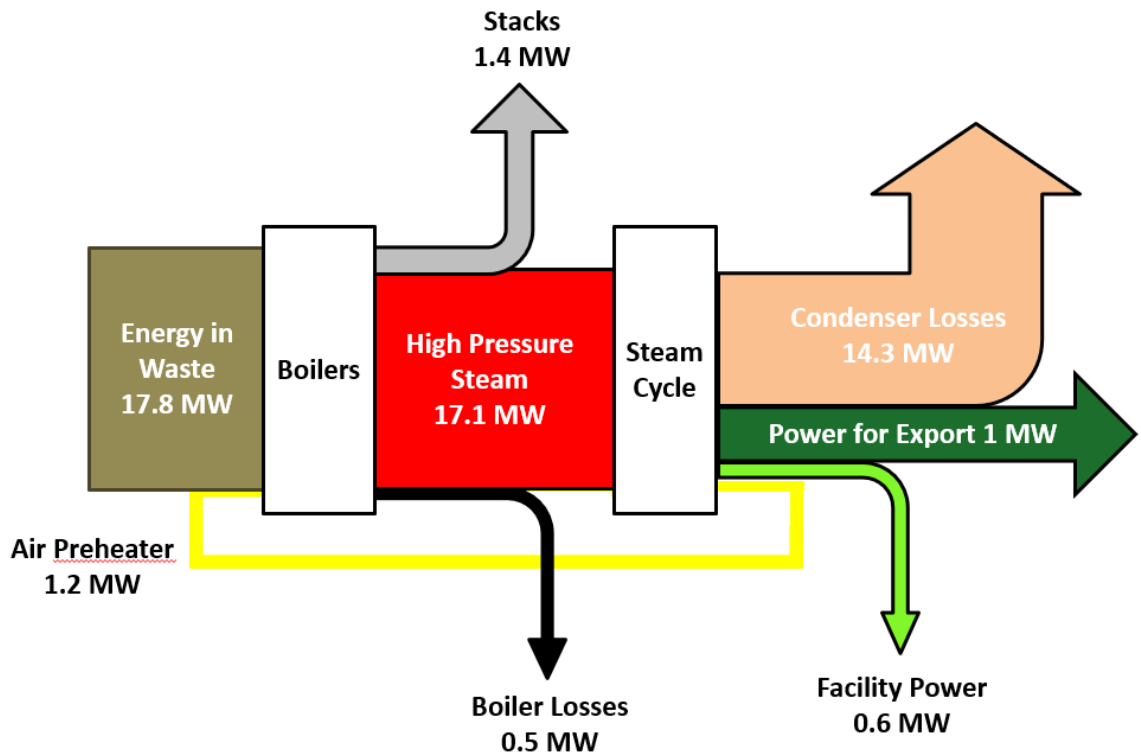
2.3 Monitoring

There will be continuous monitoring of emissions to air of the flue gases from the Facility. The monitoring system will include monitoring of oxygen, carbon monoxide, hydrogen chloride, sulphur dioxide, nitrogen oxides, ammonia, VOCs, mercury and particulates. Other pollutants will be monitored by spot measurements at regular intervals. All continuous emissions measurements will be recorded, and operators will be alerted if emissions to air approach the permitted limits. The results of emissions monitoring will be reported to the EA. The Facility will utilise modern control systems, which incorporate the latest advances in control and instrumentation technology. These systems will optimise the operation of the Facility. Process variables at the Facility will be monitored, including waste throughput, water use and electricity consumption. Regular sampling and analysis of Incinerator Bottom Ash (IBA) will be undertaken to confirm that the Total Organic Carbon (TOC) content is less than 3%, or LOI is less than 5%, and to confirm the complete combustion of the IBA. Ash produced will be assessed against WM3 technical guidance for its hazardous properties prior to onward disposal or recovery.

2.4 Technology selection (BAT)

The processes have been designed against the background of a detailed assessment of the prevailing environmental conditions at the site, in order that the objectives of the Industrial

Figure 1: Indicative Sankey Diagram - No heat export case



Based on the nominal design capacity of the CHP Plant - No Heat Export

With regards to new specialist waste thermal treatment facilities, the EA’s Implementation Plan for the Waste Incineration BREF states:

New plants will be expected to meet the relevant BAT-AEELs under BAT 20 in the WI BATCs for boiler efficiency and to maximise plant efficiency through electricity generation and/or heat supply as far as practicable.

In this regard, based on the design as presented in the Sankey Diagram, the boiler efficiency has been calculated as approximately 90%, which compares favourably with the boiler efficiency requirements of 60-80%. In addition, as shown in the Sankey Diagram, the Facility will generate 1.6MWe with 1MW being exported to the Grid. On this basis, the Facility is considered to represent BAT for energy efficiency.

2.4.1.1 Energy consumption and thermal efficiency

The most significant energy consumers are anticipated to be the following:

- primary and secondary combustion air fans;
- Induced Draft fans;
- boiler feed water pumps;
- ACC fans;
- air compressors;
- waste handling and loading systems and residue conveying systems; and
- offices and ancillary rooms.

The Facility has been designed with careful attention being paid to all normal energy efficiency design features, such as high efficiency motors, high efficiency variable speed drives, high standards of cladding and insulation etc.

The Facility will also be designed to achieve a high thermal efficiency. In particular:

- unnecessary releases of steam and hot water will be avoided, to avoid the loss of boiler water treatment chemicals and the heat contained within the steam and water;
- provision will be made for heat to be exported to adjacent facilities;
- steady operation will be maintained where necessary by using auxiliary fuel firing; and
- boiler heat exchange surfaces will be cleaned on a regular basis to ensure efficient heat recovery.

Due consideration will be given to the recommendations given in the relevant Sector Guidance Notes.

2.4.1.2 Operating and maintenance procedures

An O&M manual and procedures will be developed for the Facility. The O&M manual and procedures will include for the following aspects.

1. Good maintenance and housekeeping techniques and regimes across the whole plant.
2. Plant Condition Monitoring will be carried out on a regular basis. This will ensure, amongst other things, that motors are operating efficiently, insulation and cladding are not damaged and that there are no significant leaks.
3. Operators will be trained in energy awareness and will be encouraged to identify opportunities for energy efficiency improvements.

Due consideration would be given to the recommendations given in the Environment Agency sector guidance on waste incineration, titled '*Incineration of waste (EPR5.01)*' and waste treatment activities '*Recovery and disposal of hazardous and non-hazardous waste (S5.06)*'.

2.4.1.3 Energy efficiency measures

An energy efficiency plan will be built into the operation and maintenance procedures of the Facility ensuring maximum efficiency, practical, sustainable, safe and controllable processes. This plan will be reviewed regularly as part of the environmental management systems.

During normal operation, procedures will be reviewed and amended, where necessary, to include improvements in efficiency as and when proven new equipment and operating techniques become available. These are assessed on the implementation cost compared with the anticipated benefits.

2.4.2 Further energy efficiency requirements

In accordance with the requirements of the IED, heat must be recovered as far as practicable. In order to demonstrate this, the following points should be noted.

1. Economisers are installed to recover flue gas heat, compatibly with the temperature requirements of the flue gas treatment system.
2. The boiler will operate with saturated steam.

The Facility will not be subject to a Climate Change Levy agreement.

2.5 Residues

The main residue streams arising from the Facility are:

1. Incinerator bottom ash (IBA);
2. Air Pollution Control residues (APCr) - Dry; and
3. Wet scrubber residues.

The waste recovery and disposal techniques will be in accordance with the indicative BAT requirements.

Prior to the transfer of residues to any residues off-site, where appropriate, the residues will be tested in accordance with the requirements of Technical Guidance WM3: '*Waste classification technical guidance*'.

Any residues which are to be transferred to landfill from the Facility will be Waste Acceptance Criteria (WAC) tested – leachability tested – to ensure that they meet the WAC for the landfill that they are to be transferred to.

In accordance with the requirements of Article 4 (Waste Hierarchy) of the Waste Framework Directive, which sets out the priorities for the prevention and management of waste, HRG will review the options for the recovery and recycling of all residues generated by the Facility.

2.6 Management

GRG has existing management systems for their other Facilities which have been accredited to the ISO 14001 Environmental Management System Standard. The Facility will operate under a similar management system accredited to ISO 14001.

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