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ENVIRONMENTAL MANAGEMENT SYSTEM

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1. ENVIRONMENTAL POLICY

Graphite Resources (DEP) Limited are an established waste management facility that use mechanical heat treatment to sterilise and process hazardous, non-hazardous and clinical wastes. The techniques and technologies employed by the company provide a highly sustainable resource recovery process that minimises disposal to landfill and incineration.

The site is located in an environmental sensitive location with nearby sensitive receptors and ecological habitats. Due to the nature of the processes on site we have to carefully manage our noise and odour impacts to prevent off site nuisance.

The site is a Part A(1) Regulated Installation by the Environment Agency and operates under the conditions of Environmental Permit EPR/KB3939R.

The company recognises its obligation to comply with the Environmental Permit and all associated laws and to carry out its operations in an environmentally responsible, compliant and sustainable manner. Graphite Resources are committed to meeting all responsibilities to customers, shareholders, employees, neighbours and the natural environment.

This environmental policy forms part of suite of documents that define how the company will operate and manage its activities to ensure that the impact of our operations on the environment is reduced to as low a level as is practically and economically feasible.

The Management Team hold ultimate responsibility to ensure that management structure in place to ensure compliance in all aspects of their operations and to ensure that continuous improvement is achieved.

The company recognises its role in the helping the UK waste sector meet become more sustainable and move towards a circular economy. The company will review their environmental objectives and targets annually.

It is our policy to:

- Ensure compliance with our environmental permit and other relevant legal and regulatory obligations.
- Manage our processes, materials and workforce in order to achieve continual improvement in our environmental performance.
- Integrate environmental considerations into the selection of suppliers and sub-contractors,

manufacturing processes and materials.

- Take steps to prevent or minimise pollution arising as a result of our activities, including from potential accidental or emergency scenarios.
- Minimise our resource and energy consumption and re-use or recycle materials whenever possible.
- Set objectives and targets for environmental improvement and periodically review these.

This policy, which has the support of the Boards of Directors, will be communicated to all employees and on the relevant notice boards in the staff canteen, control room and the weighbridge, these will be made available to the public on request.

Signed

Director of Graphite Resources (DEP) Limited

Dated:

Review Date: 1st January 2021

2. INTRODUCTION

Graphite Resources (DEP) Ltd ('The Company' hereafter) operate a heat treatment plant located at Graphite Resources Facility, Derwenthaugh Ecoparc, Derwenthaugh Road, Blaydon, Gateshead, NE16 3BJ (National Grid Reference: 419933 563204).

The Facility comprises a mechanical heat treatment plant consisting of 2 rotating steam autoclaves, a drying plant, a metal separation unit, a pyrolysis plant and a number of gas engines. The facility treats clinical wastes which are pre-processed via twelve shredding systems. Additionally, the site accepts pre-sterilised RDF material from offsite autoclaving facilities. The output from the autoclaves is a sterilised material and recycles. This is further treated through the drier, metal separation unit and zig zag separator to remove moisture, metals and inerts prior to utilisation as a fuel for the pyrolysis plant. The pyrolysis plant processes the treated autoclaved waste in an oxygen free environment to produce a syngas which is then utilised within gas engines to produce electricity for use onsite and export to the grid. Excess heat from the process is utilised onsite to produce steam for the autoclave process or exported via the local District Heating Network to local business.

The site can accept and treat 100,000 tonnes of waste per annum, of which up to 50,000 tonnes is anticipated to comprise clinical wastes.

The site is permitted as an Installation as defined by:

- Section 1.2 'Gasification, Liquefaction and Refining Activities' Part A(1)(f)(iv) *Co-incineration using pyrolysis of pre-treated waste to produce and Article 42 compliant syngas*
- Section 5.3 'Disposal or recovery of hazardous waste' Part A(1)(a)(ii) *Disposal or recovery of hazardous waste with a capacity of exceeding 10 tonnes per day involving (ii) physico-chemical treatment; and*
- Section 5.6 'Temporary or underground storage of hazardous waste; Part A(1)(a) *Temporary storage of hazardous waste with a total capacity exceeding 50 tonnes pending any of the activities listed in Sections 5.1, 5.2, 5.3 and paragraph (b) of this section.*

The drying activity onsite utilises heat from the pyrolysis unit and gas engines and is therefore considered a Directly Associated Activity.

The sites two back up gas boilers which generate steam for the process and the gas engines are permitted as a Medium Combustion Plant in accordance with the Medium Combustion Plant Directive (Directive 2015/2193/EU) ('MCPD') as set out in Schedule 25A of The Environmental Permitting (England and Wales) Regulations 2018 (as amended).

This document forms part of the environmental management system and has been prepared in accordance with the following requirements:

- The Environmental Permitting Regulations 2018 (as amended); and
- Environmental Permit EPR/KB3939RR

This has been prepared to provide an account of the operational practices and environmental considerations for the reception and processing of clinical waste carried out by Graphite Resources.

A sign which provides the necessary site and operations information is positioned at the entrance to the site. The sign provides all the necessary site information, contact details as required by the sites Environmental Permit.

A copy of the Environmental Permit and the Management System will be kept in the site office at all times.

3. WASTE MANAGEMENT ACTIVITIES

The wastes accepted onto site for processing will consist of clinical and other non-hazardous waste.

Table 3.1: Specified Activities	
Site Address	Derwenthaugh Ecoparc, Derwenthaugh Road, Blaydon, Gateshead, NE16 3BJ
National Grid Reference	OS X (Eastings) 419933 OS Y (Northings) 563204
Operations Manager	Ian Haswell
Permit Reference	EPR/KB3939RR
Wastes accepted on site	Please see Appendix 1
Specified Waste Management Activities	R3: Recycling/reclamation of organic substances which are not used as solvents R4: Recycling/reclamation of metals and metal compounds R5: Recycling/reclamation of other inorganic compounds R12: Exchange of wastes for submission to any of the operations numbered R1 to R11 R13: Storage of wastes pending any of the operations numbered R1 to R12 D15: Storage pending any of the Operations D1 to D14 (Excluding temporary storage, pending collection, on the site where it is produced)
Throughput	The facility will accept up to 100,000 tpa wastes of which 50,000 tpa is anticipated to be clinical waste
Permitted operation hours for waste acceptance/despatch	Monday to Friday: 0600 – 0600 Saturday: 0600 – 1800 Sunday: Closed for maintenance In addition to operational personnel, the site is occupied by security staff 24/7
Planning Permission	N/A

Waste Management Operations are according to Table 3.2 below:

Table 3.2: Working Procedures		
Ref No:	Title	Purpose
GR-EMS	Environmental Management System and Policy	This EMS defines the management of the site and provides the management controls and policies for all aspects of the site.
Clinical Waste Procedures		
GR-C01	Clinical Waste Pre-Acceptance	This procedure defines the upstream screening, checking and pre-acceptance of all incoming clinical waste prior to its arrival on site.
GR-C02	Waste Acceptance	This procedure outlines the onsite controls and considerations that need to be applied when clinical waste arrives on site for processing.
GR-C03	Clinical Waste Rejection	This procedure outlines the clinical waste rejection process for all non-conforming waste that cannot be processed on site. Acceptance of non-conforming clinical wastes will be a direct breach of the permitted conditions of the sites Environmental Permit.
GR -C04	Off Site Waste Transfers	Refer to GR-E04
GR -C05	Clinical Waste Reception and Storage	This procedure outlines the clinical waste reception and storage processes for all incoming clinical waste.
Non-Hazardous Wastes		
GR-E01	Waste Pre-Acceptance	This procedure defines the upstream screening, checking and pre-acceptance of all incoming fuel feedstocks prior to its arrival on site.
GR-E02	Waste Acceptance	This procedure outlines the onsite controls and considerations that need to be applied when fuel feedstock materials arrive on site for processing.
GR -E03	Waste Rejection	This procedure outlines the waste rejection process for all non-conforming feedstocks that cannot be processed on site. Acceptance of non-conforming wastes will be a direct breach of the permitted conditions of the sites Environmental Permit.
GR -E04	Off Site Waste Transfers	This procedure provides the necessary information to enable the assessment and off site transfer of non-conforming or untreatable waste streams.
GR -E05	Waste Reception and Storage	This procedure outlines the waste reception and storage processes for all incoming non-hazardous waste.
General Procedures		
GR -E06	Environmental Records	This procedure defines the necessary Environmental Permit and Waste Records that are required to be managed by the site to ensure compliance.
GR -E07	Environmental Management and Monitoring Programme	This procedure provides an overview of all of the necessary environmental monitoring procedures and controls to ensure compliance with the Permit.
GR -E08	Infrastructure Management and Monitoring Programme	This procedure provides an outline of the inspection and cleaning requirements for the site.
GR -E09	Accident Management	This procedure refers to the site's emergency plans and response requirements.

	Plan	
GR -E10	Fire Prevention Plan	This procedure refers to the sites fire prevention measures.
GR -E11	Odour Management Plan	This procedure refers to the site's odour mitigation measures.
GR-E12	Roles & Responsibilities	This procedure outlines the management structure and key environmental responsibilities of personnel at the site.

4. PROCESS DESCRIPTION

The Derwenthaugh Ecoparc Facility includes the acceptance, storage, and treatment of wastes through mechanical heat treatment (autoclaving), drying and pyrolysis plant with associated gas engines to generate electricity.

The site is permitted to accept up to 100,000 tpa of mixed wastes of which up to 50,000 tpa are anticipated to be clinical wastes.

The mechanical heat treatment plant consists of a two-line rotating steam autoclave process, with the front end in line with clinical waste regulations to allow the processing and sterilisation of clinical waste. The sterilised waste will then be further processed through a drier and metal separation unit prior to use as a feedstock for the pyrolysis units.

The pyrolysis plant onsite utilises sterilised wastes from the autoclaves for the production of syngas. This is achieved by heating in an oxygen free environment followed by syngas clean-up prior to its utilisation within the onsite gas engines for the generation of electricity.

Excess heat from the pyrolysis process is utilised onsite to provide steam for the autoclaves and exported to local businesses via the local heat distribution network.

All wastes are accepted onto site in accordance with the sites stringent waste acceptance procedures. Clinical wastes are delivered to the Reception Hall within the main Building. Clinical wastes are delivered bagged in either bulk form or in bins. They are then either loaded directly onto the loading systems for processing or placed in temporary holding areas within bins for no longer than 7 days.

Wastes are shredded prior to autoclaving. This is an entirely enclosed system with shredded wastes transferred to an interim store for no longer than 2 hours prior to loading into the autoclave for immediate treatment. The temporary holding of shredded wastes within the interim store is to allow the accumulation of a full load for the autoclave prior to loading. The site will manage shredding operations so that no shredded waste will be stored over periods of shutdown. The entire process is enclosed.

Following waste conveyance into the autoclaves, they are pressurised with steam supplied from either a conventional gas boiler or the pyrolysis unit heat recovery boiler at 162°C and rotated along their axis for approximately 120 minutes. The resultant sterilised wastes are conveyed to the Metering Buffer Bins prior to controlled feeding into the drier. Following removal of moisture the waste is then directed through a metal separation unit for the removal of both ferrous and non-ferrous metals prior to removal of inerts via the zig zag separator and storage in the Fuel Bunkers. At this stage the material is referred to as Refuse Derived Fuel (RDF).

The RDF is then used as fuel for the pyrolysis process.

The schematic overleaf (Figure 4.1) provides a broad overview of the process flow through the plant for

waste streams onsite. Further detail of each stage is provided within each of the specific working procedures in use at the site and within the further sections of this environmental management system.

Environmental Management System

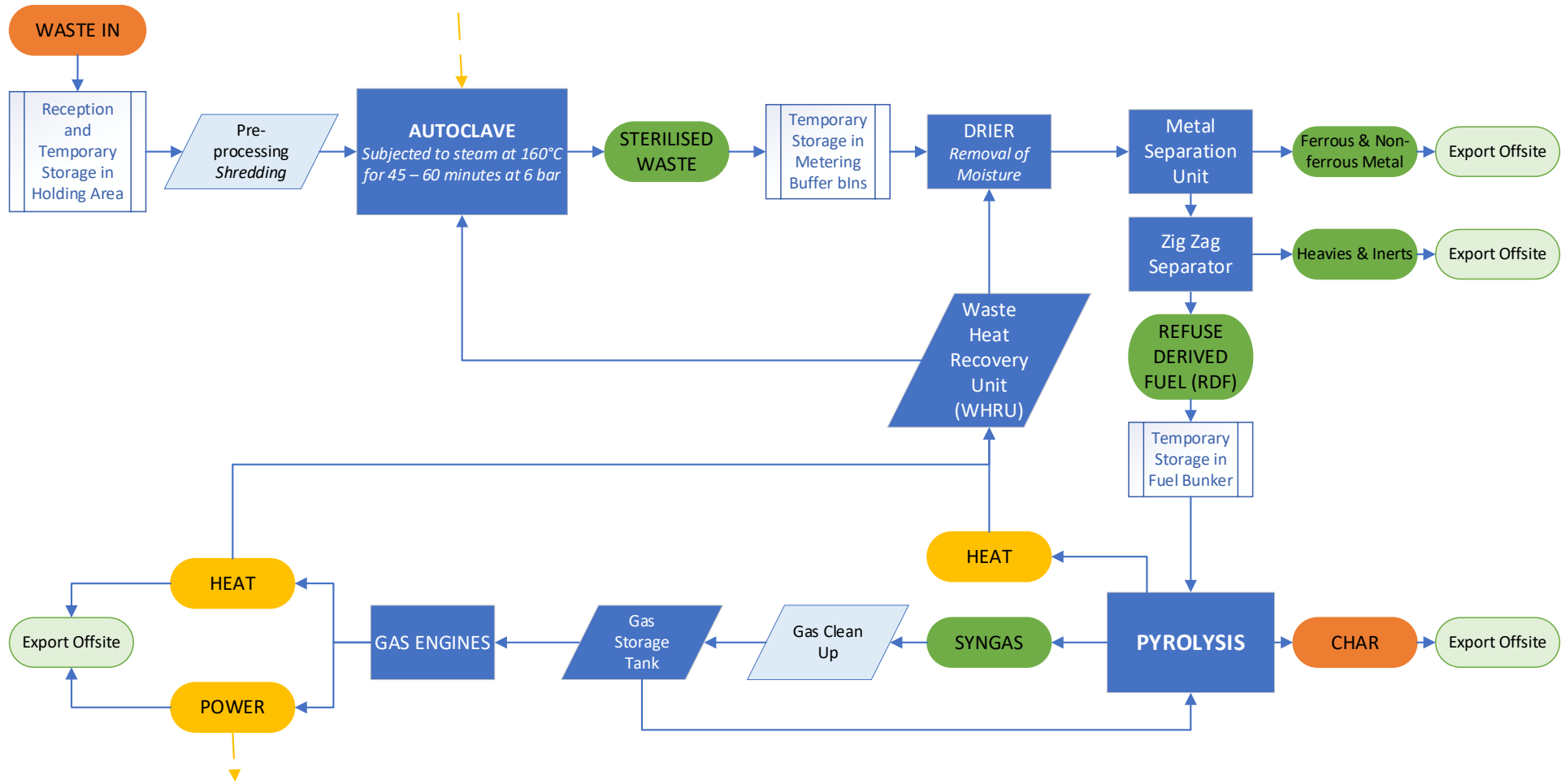


Figure 4.1 Site Process Flow

Environmental Management System

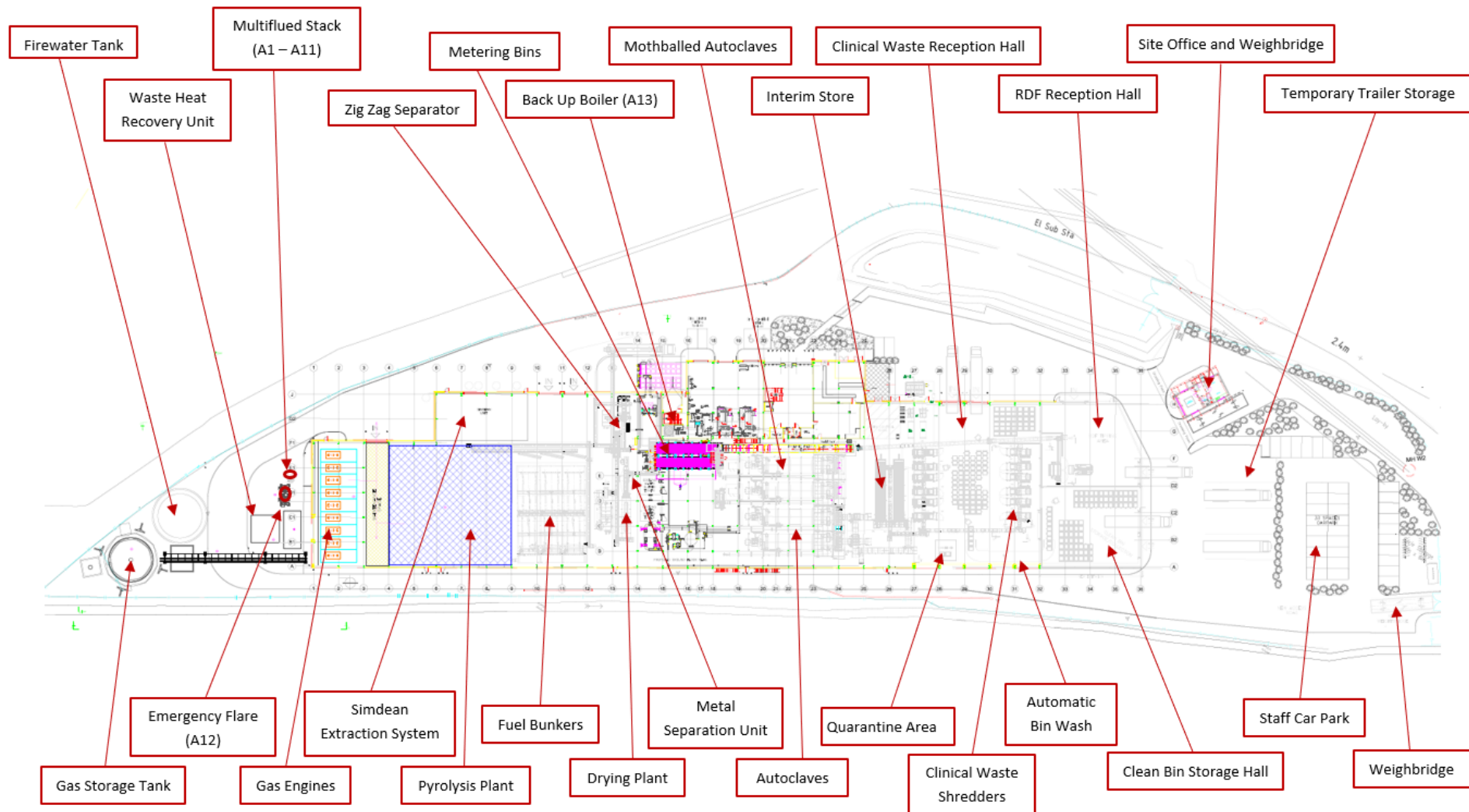


Figure 4.2: Site layout of the installation indicating the location of the key plant, equipment and process areas.

5. ENVIRONMENTAL SETTING

Geology and Hydrogeology

The site is underlain by superficial Alluvium Deposits overlying bedrock of the Pennine Lower Coal Measures Formation. The Pennine Lower Coal Measures Formation is comprised of mudstone, siltstone and sandstone.

The Environment Agency classified the superficial deposits at the site as a Secondary (undifferentiated) Aquifer and the bedrock geology as a Secondary 'A' Aquifer.

The site is not located within a Source Protection Zone (SPZ).

The groundwater vulnerability at the site is classified as Minor Aquifer High.

The site is not located within a Nitrate Vulnerable Zone (NVZ).

The site is considered to be situated in an area of moderate sensitivity with respect to groundwater resources, due to its setting upon two aquifers.

Surface Water Features

The River Tyne, classified by the Environment Agency as a main river, is located 200m to the north east of the site and the River Derwent is located 450 m to the south.

Shibdon Pond is located 300 m to the southwest, which is a designated SSSI and LNR.

The site is located within Environment Agency Flood Zone 2 – moderate risk in regards to fluvial flooding, with part of the eastern area of site designated Flood Zone 3 – high risk of flooding.

The site is considered to be situated in an area of high sensitivity in regard to surface water due to its proximity to both the River Tyne and River Derwent and Shibdon Pond.

Sensitive Environmental Receptors

Within 2 km of the site there are located a number of nationally and internationally designated sites of ecological importance.

There are no SPAs, SACs or Ramsar sites within 10 km of the site.

The habitat receptor designations and locations relevant to the assessment are shown in the table below.

Approximate Distance from Site	Receptor Name	Designation
215 m west	Shibdon Pond	LNR, SSI
1.3 km southeast	Cross Lane Meadows	LNR
1.6 km northeast	Benwell Nature Park	LNR
1.4 km north	Denton Dene	LNR
1.8 km south	Lower Derwent Meadows	SSSI
2 km north	Sugley Dene	LNR

The site is not considered likely to have any significant effects on these designated sites due to the limited nature of emissions from the site.

6. SITE INFRASTRUCTURE

Building Design and Layout

The Installation consists of the following:

- Incoming and outgoing weighbridges;
- Clinical Waste Reception Hall;
- Segregated Waste Reception Hall;
- Segregated clean bin Storage Hall;
- Temporary Trailer Storage Area;
- 12 x Bin lifter loading systems;
- 12 x Medical waste shredders with automated camera systems;
- Automated bin washing unit;
- Enclosed conveyors;
- 2 x interim buffer stores;
- 2 x 12 tonne autoclaves;
- 2 x Metering buffer bins;
- Drying plant;
- Metal separation unit;
- Zig Zag separator;
- 3 x Fuel bunkers;
- Fuel feed system;
- Pyrolysis plant;
- 9 x gas engine CHP generator sets;
- Waste heat recovery unit (WHRU);
- Replacement back – up steam boilers and associated stack (Emission point A13);
- Waste Water Treatment Plant (WWTP);
- Multiflued gas engine and pyrolysis units 35 m high stack (Emission Points A1 – A11);
- Enclosed flares (Emission Point A12);
- SynGas storage tank;
- SynGas compressors/blowers;
- Char discharge silo;
- 11 kV switchgear and sub-station;
- Fire water tank;
- Fire pumphouse;
- Segregated water drainage system; and
- Simdean Air Handling System (Emission Points A14 – A18).

Site Drainage System

All operational areas of the site are constructed on sealed concrete hardstanding with a sealed drainage system.

All surface water runoff from the site is collected within a sealed drainage system which is routed to a central catchment pit and pumped interceptor.

The surface water system is released via pumped discharge into an unnamed ditch which runs along the south eastern boundary of the site. The release point is identified as W1.

There are no other discharges from the site to controlled waters.

The Installation has an existing permitted integrated wastewater treatment plant (WWTP) that recycles and recovers a majority of the wastewater produced by the existing plant. All wastewater discharges are emitted directly to sewer from the site WWTP under the existing consent from Northumbrian Water.

The offices and site building sanitary discharges are all routed directly to sewer.

In the event of a fire, all potentially contaminated water will be contained on site. The surface water system will then be routed to the foul drainage system and the fire water pumped to sewer.

Effluent from the clinical waste area (e.g. bin wash and disinfectant residues) is directed to the existing WWTP for treatment prior to discharge to sewer.

Any spillage within the building will be contained and cleaned up using one of the spill kits located on site.

No external activities will take place that have the potential to impact the controlled waters.

All site infrastructure (roads, concrete pads, drainage systems and buildings) are inspected on a weekly basis by the competent person.

Any faults and repairs will be carried out as soon as practicable and a note made of them in the site diary.

Site Security

Site Security measures comprise;

- A perimeter fence which is inspected periodically to ensure that the site security has not been compromised.
- A weighbridge controlling the sole access point to the site.
- CCTV monitoring of the external and internal areas of the Installation.

- External on-line monitoring and administration of the combustion process from a remote location.

Infrastructure Monitoring

The infrastructure monitoring of the site will take place in accordance with procedure GR-E08 Infrastructure Management and Monitoring Programme.

7. TECHNICAL COMPETENCE & TRAINING

The Operations Manager will hold all necessary qualifications to be defined as ‘Technically Competent’ as defined by the Environment Agency Operator Competence Scheme and WAMITAB Certificate of Technical Competence Schemes.

All personnel on site have been trained in the site operation procedures and Working Plan according to Table 7.1 below.

The Operations Manager is responsible for ensuring that all operators and personnel receive training as required. The training matrix will be under continual review.

	Site Working Plan Manual GR-EMS	Waste Pre Acceptance GR-C01 and GR-E01	Waste Acceptance GR-C02 and GR-E02	Waste Rejection GR-C03 and GR-E03	Off site Waste Transfers GR-E04	Waste Reception and Storage GR-C05 and GR-E05	Environmental Records GR-E06	Environmental Monitoring GR-E07	Infrastructure Monitoring GR-E08	Accident Management Plan GR-E09	Fire Prevention Plan GR-E10	Odour Management Plan GR-E11
Operations Manager	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weighbridge Personnel	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
Administration Personnel	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes
Machine Operators	Yes	No	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes
Site Management	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Visitors	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes

Appendix 1

Permitted EWC Codes

Table 1.1 Permitted EWC Codes	
Waste Code	Description
18	HEALTHCARE WASTE
18 01	Natal care, diagnosis, treatment or prevention of disease in humans
18 01 01	sharps (except 18 01 03*)
18 01 02	body parts and organs including blood bags and blood preserves (except 18 01 03*)
18 01 03*	wastes whose collection and disposal is subject to special requirements in order to prevent infection
18 01 04	wastes whose collection and disposal is not subject to special requirements in order to prevent infection (for example dressings, plaster casts, linen, disposable clothing, diapers)
18 01 06*	chemicals consisting of or containing hazardous substances
18 01 07	chemicals other than those mentioned in 18 01 06*
18 01 08*	cytotoxic and cytostatic medicines
18 01 09	medicines other than those mentioned in 18 01 08*
18 01 10*	amalgam waste from dental care
18 02	wastes from research, diagnosis, treatment or prevention of disease involving animals
18 02 02*	wastes whose collection and disposal is subject to special requirements in order to prevent infection
18 02 03	wastes whose collection and disposal is not subject to special requirements in order to prevent infection
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 10	combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

Appendix 2

Operating Procedures